

HARDIN HILL LANE EXT

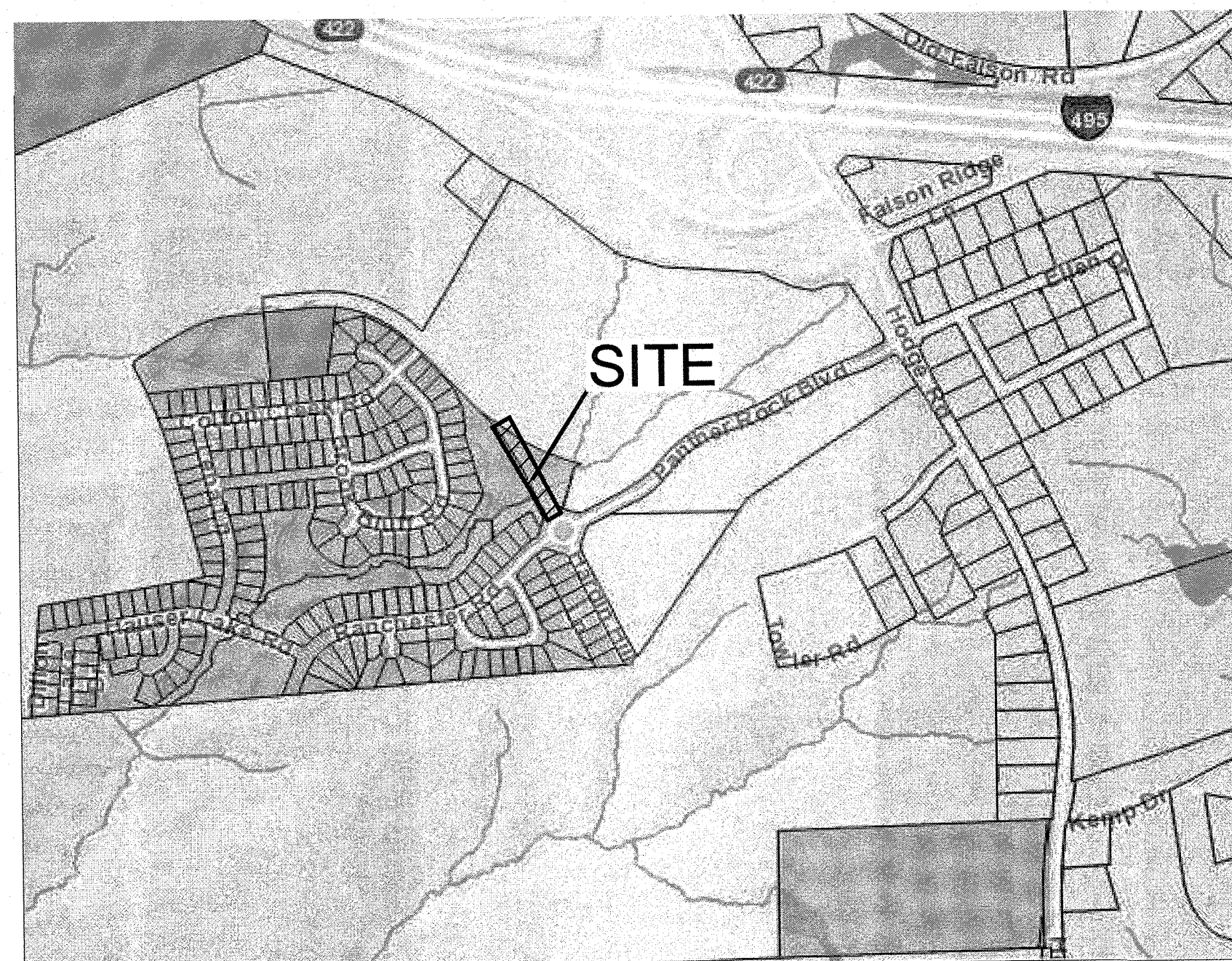
Sta: 46+50 - 52+00

St. Matthew's Township Knightdale, North Carolina

SITE DATA

PROJECT # S-6-16

ENGINEER:	JOEL D. SMITH, PE TIMMONS GROUP 5410 TRINITY ROAD, SUITE 102 RALEIGH, NC 27607 PHONE: 919-866-4953 FAX: 919-859-5663 EMAIL: JOEL.SMITH@TIMMONS.COM
PROPERTY LOCATION:	0 HARDIN HILL LANE INTERSECTION WITH PANTHER ROCK BLVD AND HARDIN HILL LANE
PIN:	WITHIN EXISTING R/W (NO PIN)
REFERENCES:	DEED BOOK 012664 PAGE 837
ZONING:	UR12
TOWNSHIP:	ST. MATTHEWS
LENGTH OF STREET:	456 LF
DISTURBED AREA:	1.30 Acres
LINEAR FOOTAGE OF PUBLIC STREET:	460 LF
LINEAR FOOTAGE OF CURB AND GUTTER:	920 LF
LINEAR FOOTAGE OF PUBLIC SIDEWALK:	920 LF
LINEAR FOOTAGE OF 12" PUBLIC WATER LINE:	460 LF
LINEAR FOOTAGE OF PUBLIC SEWER LINE:	0 LF
LINEAR FOOTAGE OF PUBLIC STORMWATER LINE:	1013 LF
TOTAL WASTEWATER FLOW GENERATED:	0



OVERALL VICINITY MAP
NOT TO SCALE

Sheet List Table

Sheet Number	Sheet Title
C0.0	COVER SHEET
C1.0	EXISTING CONDITIONS
C2.0	HARDIN HILL LANE PLAN & PROFILE
C3.0	EROSION CONTROL PLAN
C3.1	EROSION CONTROL DETAIL SHEET
C4.0	SIGNAGE & MARKING PLAN
C5.0	LANDSCAPE & LIGHTING PLAN
C6.0	SITE DETAIL SHEET
C6.1	SITE DETAIL SHEET

ATTENTION CONTRACTORS
The Construction Contractor responsible for the extension of water, sewer, and/or reuse, as approved in these plans, is responsible for contacting the Public Utilities Department at (919) 996-4540 at least twenty four hours prior to beginning any of their 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.

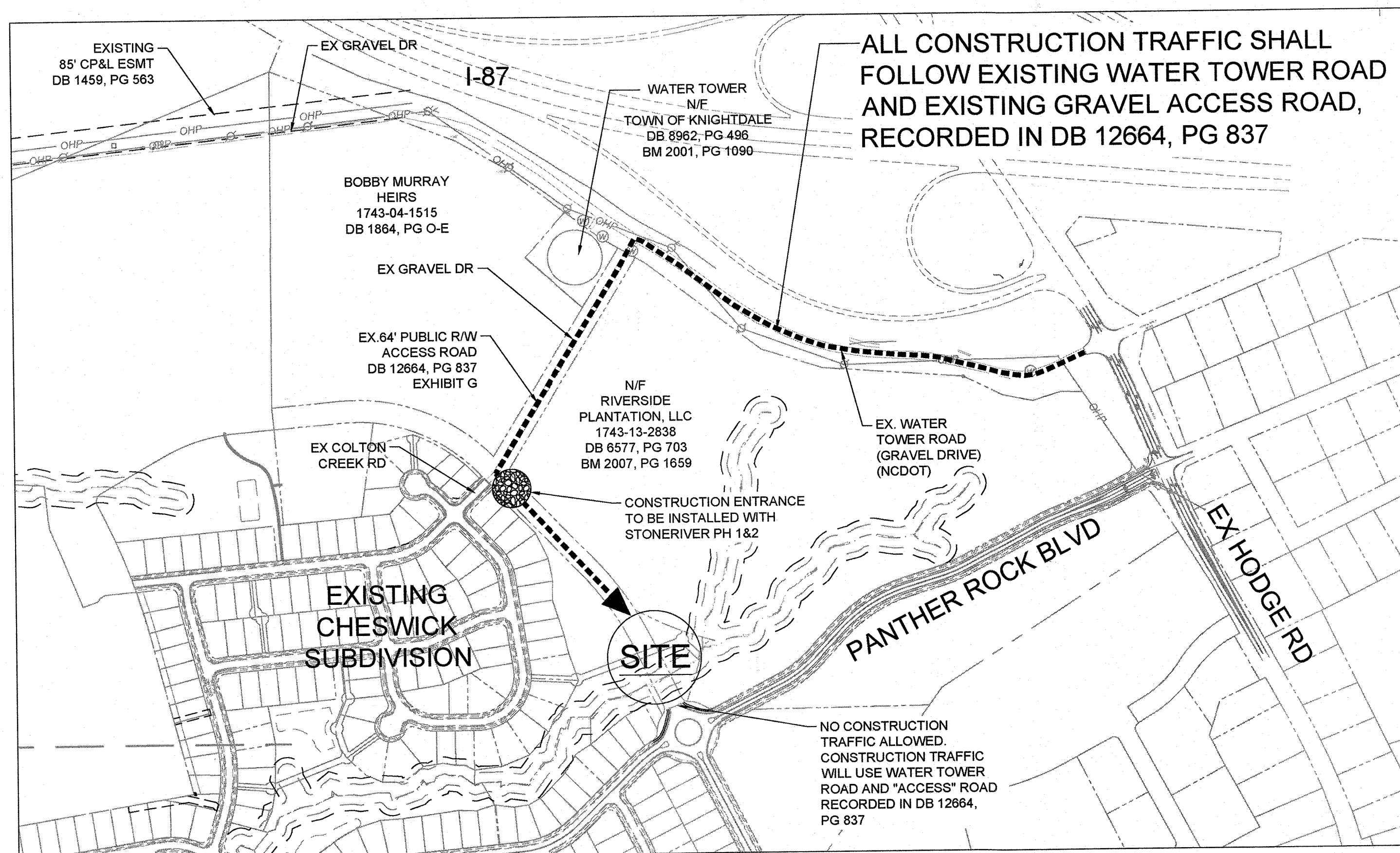
Failure to call for Inspection, Install a Downstream Plug, have Permitted Plans on the Jobsite, or any other Violation of City of Raleigh Standards will result in a Fine and Possible Exclusion from future work in the City of Raleigh.

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-3555
Authorization to Construct
Date 9/26/18

STORMWATER MANAGEMENT NOTES

- THIS PORTION OF THE PROJECT IS NOT LOCATED WITHIN FLOODPLAIN PER FEMA PANEL #1733J & #1743J EFFECTIVE DATE MAY 2, 2006.



SITE ACCESS EXHIBIT

SCALE 1"=300'
0 300' 600'

a. **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 plat(s), phasing schedule, Development Agreement, Utility Allocation Agreement, Annexation Agreement, the Town of Knightdale Standard Specification and Details Manual and applicable provisions of the North Carolina State Building Code.

b. **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, Joel D. Smith, PE, 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 C-1652 of these drawings.
Seal: [Signature] By: [Signature] PE, Date: 9/10/18

TOWN CERTIFICATION

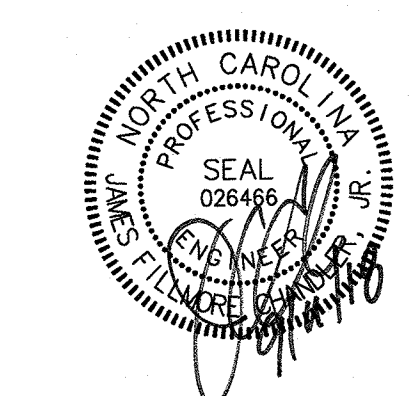
THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: [Signature] DATE: 10-26-2018
DEVELOPMENT SERVICES ENGINEER

THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PLANS FOR THIS PROJECT.
BY: [Signature] DATE: 10-26-18
ADMINISTRATOR

EROSION AND SEDIMENT CONTROL

APPROVED PLAN
DATE 11/02/2018
PERMIT NO. S- 6144
Wake County Environmental Services
Sedimentation & Erosion Control
919-856-7400



THIS DRAWING PREPARED AT THE
RALEIGH OFFICE
5410 Trinity Road, Suite 102 | Raleigh, NC 27607
TEL 919.866.4951 FAX 919.853.6124 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

DATE	REVISION DESCRIPTION
09/11/2018	

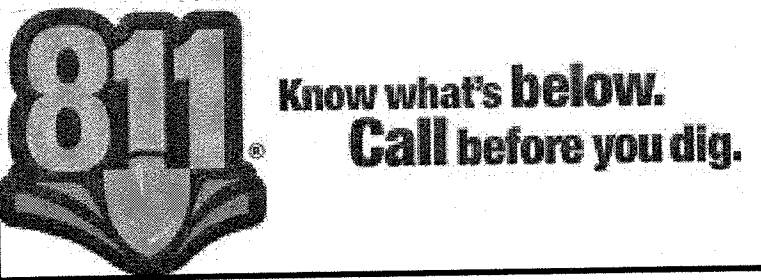
DRAWN BY: 331
DESIGNED BY: 331
CHECKED BY: JFC
SCALE: PER PLAN

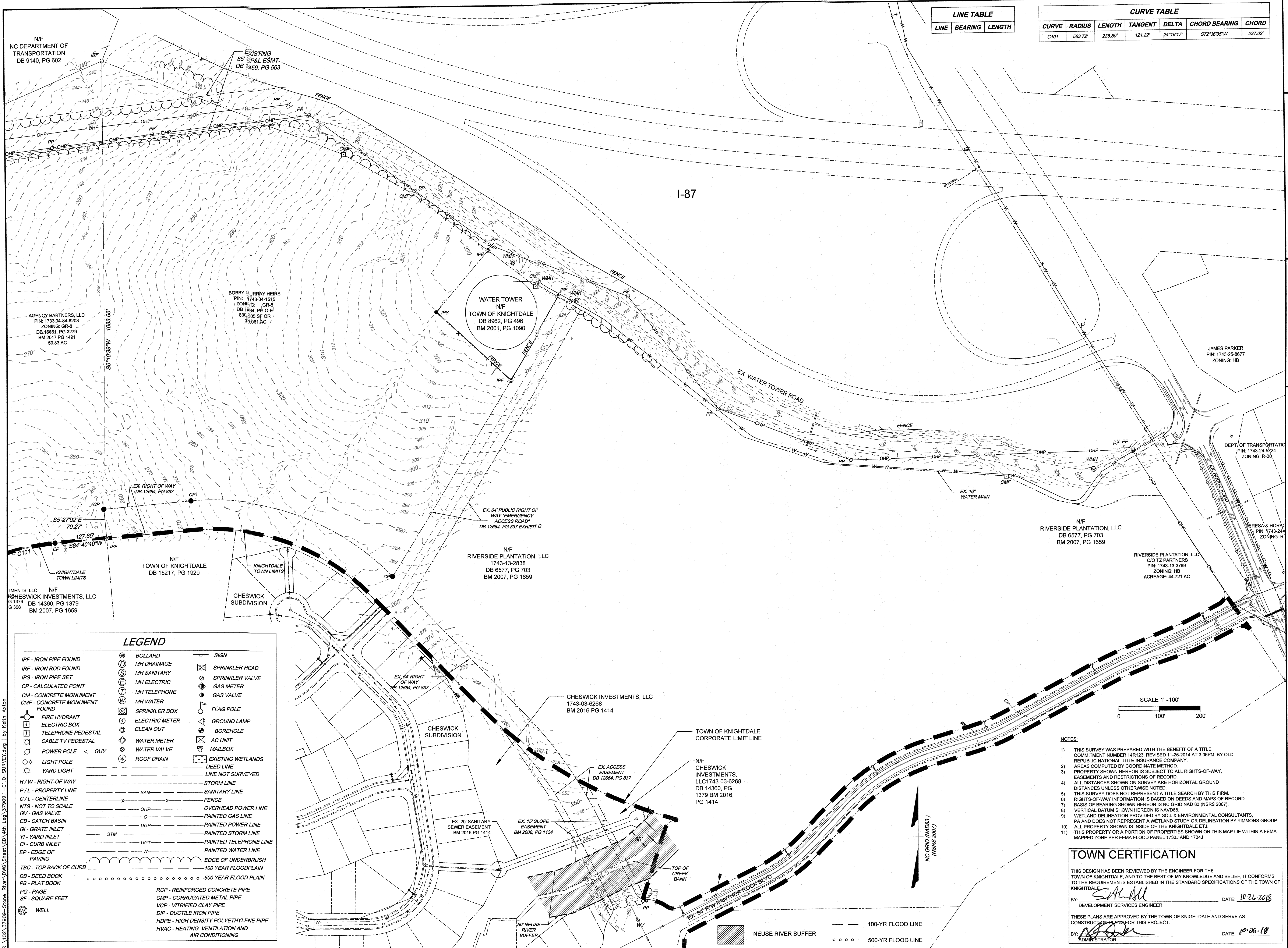
TIMMONS GROUP
NORTH CAROLINA LICENSE NO. C-1652
HARDIN HILL LANE EXT STA: 46+50 TO STA: 52+00
KNIGHTDALE - WAKE COUNTY - NORTH CAROLINA
COVER SHEET

JOB NO. 37909
SHEET NO. C0.0

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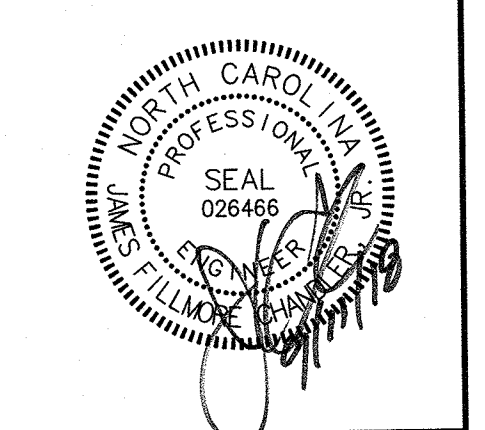
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LINE TABLE		
LINE	BEARING	LENGTH
C101	S5°27'02"E	70.27'
C101	S84°40'40"W	127.65'

CURVE TABLE						
CURVE	RADIUS	LENGTH	TANGENT	DELTA	CHORD BEARING	CHORD
C101	563.72'	238.89'	121.22'	24°16'17"	S72°36'35"W	237.02'



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DATE	REVISION DESCRIPTION
09/11/2018	

DRAWN BY	331
DESIGNED BY	331
CHECKED BY	JFC
SCALE	PER PLAN

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

HARDIN HILL LANE EXT STA: 46+50 TO STA: 52+00

KNIGHTDALE - WAKE COUNTY - NORTH CAROLINA

EXISTING CONDITIONS

JOB NO. 37909

SHEET NO. C1.0

LEGEND	
IPF - IRON PIPE FOUND	⊙ BOLLARD
IRF - IRON ROD FOUND	⊙ MH DRAINAGE
IPS - IRON PIPE SET	⊙ MH SANITARY
CP - CALCULATED POINT	⊙ MH ELECTRIC
CM - CONCRETE MONUMENT FOUND	⊙ MH TELEPHONE
CMF - CONCRETE MONUMENT FOUND	⊙ MH WATER
⊙ FIRE HYDRANT	⊙ SPRINKLER BOX
⊙ ELECTRIC BOX	⊙ ELECTRIC METER
⊙ TELEPHONE PEDESTAL	⊙ CLEAN OUT
⊙ CABLE TV PEDESTAL	⊙ WATER METER
⊙ POWER POLE < GUY	⊙ WATER VALVE
⊙ LIGHT POLE	⊙ ROOF DRAIN
⊙ YARD LIGHT	⊙ SIGN
R / W - RIGHT-OF-WAY	⊙ SPRINKLER HEAD
P / L - PROPERTY LINE	⊙ SPRINKLER VALVE
C / L - CENTERLINE	⊙ GAS METER
NTS - NOT TO SCALE	⊙ GAS VALVE
GV - GAS VALVE	⊙ FLAG POLE
CB - CATCH BASIN	⊙ GROUND LAMP
GI - GRATE INLET	⊙ BOREHOLE
YI - YARD INLET	⊙ AC UNIT
CI - CURB INLET	⊙ MAILBOX
EP - EDGE OF PAVING	⊙ EXISTING WETLANDS
TBC - TOP BACK OF CURB	⊙ DEED LINE
DB - DEED BOOK	⊙ LINE NOT SURVEYED
PB - PLAT BOOK	⊙ STORM LINE
PG - PAGE	⊙ SANITARY LINE
SF - SQUARE FEET	⊙ FENCE
⊙ WELL	⊙ OVERHEAD POWER LINE
	⊙ PAINTED GAS LINE
	⊙ PAINTED POWER LINE
	⊙ PAINTED STORM LINE
	⊙ PAINTED TELEPHONE LINE
	⊙ PAINTED WATER LINE
	⊙ EDGE OF UNDERBRUSH
	⊙ 100 YEAR FLOODPLAIN
	⊙ 500 YEAR FLOODPLAIN
	⊙ REINFORCED CONCRETE PIPE
	⊙ CORRUGATED METAL PIPE
	⊙ VITRIFIED CLAY PIPE
	⊙ DUCTILE IRON PIPE
	⊙ HIGH DENSITY POLYETHYLENE PIPE
	⊙ HEATING, VENTILATION AND AIR CONDITIONING

- NOTES:
- THIS SURVEY WAS PREPARED WITH THE BENEFIT OF A TITLE COMMITMENT NUMBER 14R123, REVISED 11-26-2014 AT 3:06PM, BY OLD REPUBLIC NATIONAL TITLE INSURANCE COMPANY.
 - AREAS COMPUTED BY COORDINATE METHOD.
 - PROPERTY SHOWN HEREON IS SUBJECT TO ALL RIGHTS-OF-WAY, EASEMENTS AND RESTRICTIONS OF RECORD.
 - ALL DISTANCES SHOWN ON SURVEY ARE HORIZONTAL GROUND DISTANCES UNLESS OTHERWISE NOTED.
 - THIS SURVEY DOES NOT REPRESENT A TITLE SEARCH BY THIS FIRM.
 - RIGHTS-OF-WAY INFORMATION IS BASED ON DEEDS AND MAPS OF RECORD.
 - BASIS OF BEARING SHOWN HEREON IS NC GRID NAD 83 (NSRS 2007).
 - VERTICAL DATUM SHOWN HEREON IS NAVD88.
 - WETLAND DELINEATION PROVIDED BY SOIL & ENVIRONMENTAL CONSULTANTS, PA AND DOES NOT REPRESENT A WETLAND STUDY OR DELINEATION BY TIMMONS GROUP.
 - ALL PROPERTY SHOWN IS INSIDE OF THE KNIGHTDALE ETJ.
 - THIS PROPERTY OR A PORTION OF PROPERTIES SHOWN ON THIS MAP LIE WITHIN A FEMA MAPPED ZONE PER FEMA FLOOD PANEL 1733J AND 1734J.

TOWN CERTIFICATION

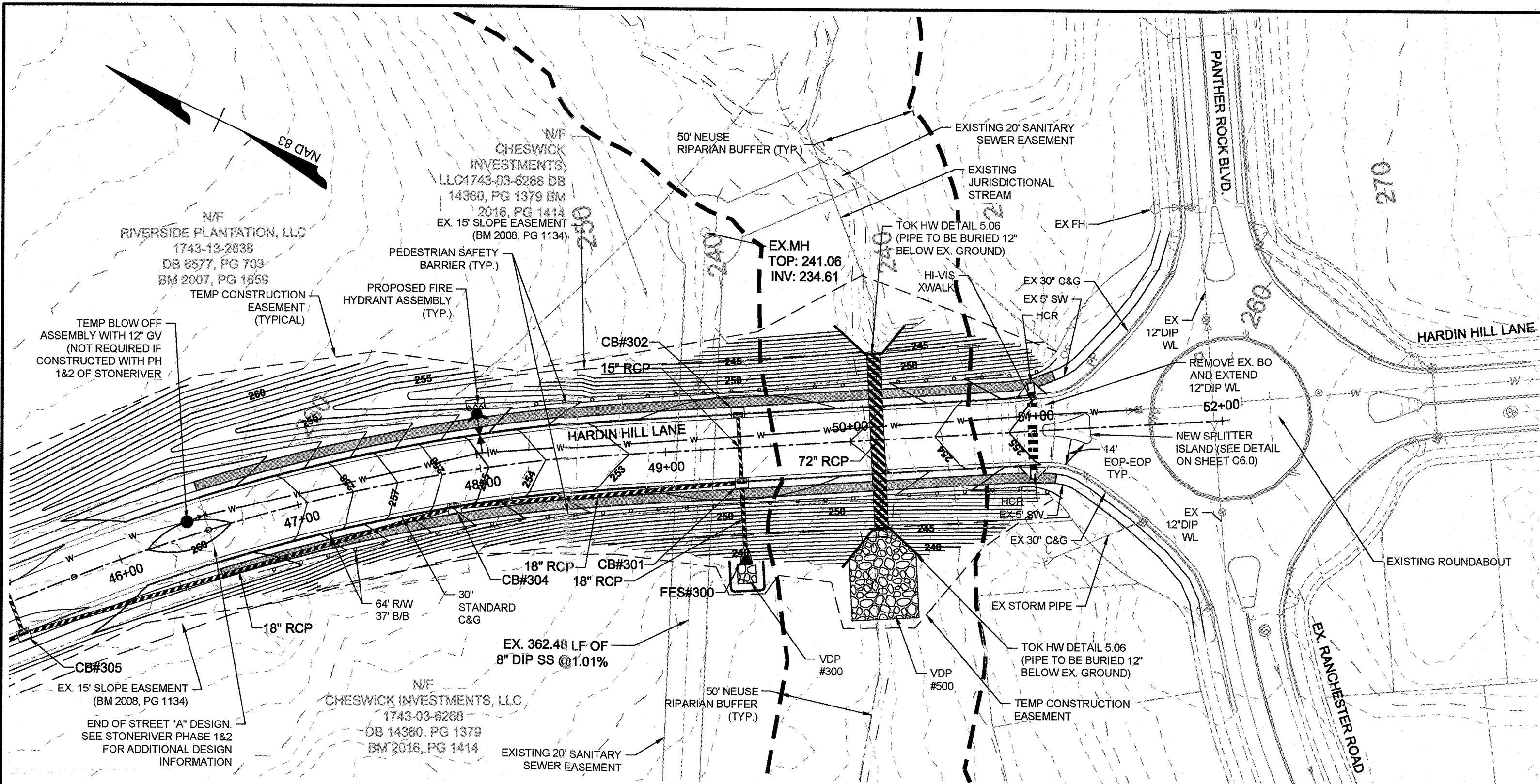
THIS DESIGN HAS BEEN REVIEWED BY THE ENGINEER FOR THE TOWN OF KNIGHTDALE, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, IT CONFORMS TO THE REQUIREMENTS ESTABLISHED IN THE STANDARD SPECIFICATIONS OF THE TOWN OF KNIGHTDALE.

BY: *[Signature]* DATE: 10-26-18
 DEVELOPMENT SERVICES ENGINEER

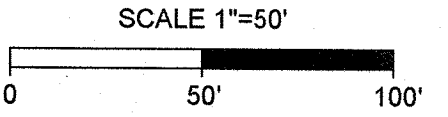
THESE PLANS ARE APPROVED BY THE TOWN OF KNIGHTDALE AND SERVE AS CONSTRUCTION PERMITS FOR THIS PROJECT.

BY: *[Signature]* DATE: 10-26-18
 ADMINISTRATOR

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HARDIN HILL LANE PLAN & PROFILE
STA 46+50 - STA 52+00
 HORZ. SCALE: 1" = 50' VERT. SCALE: 1" = 5'

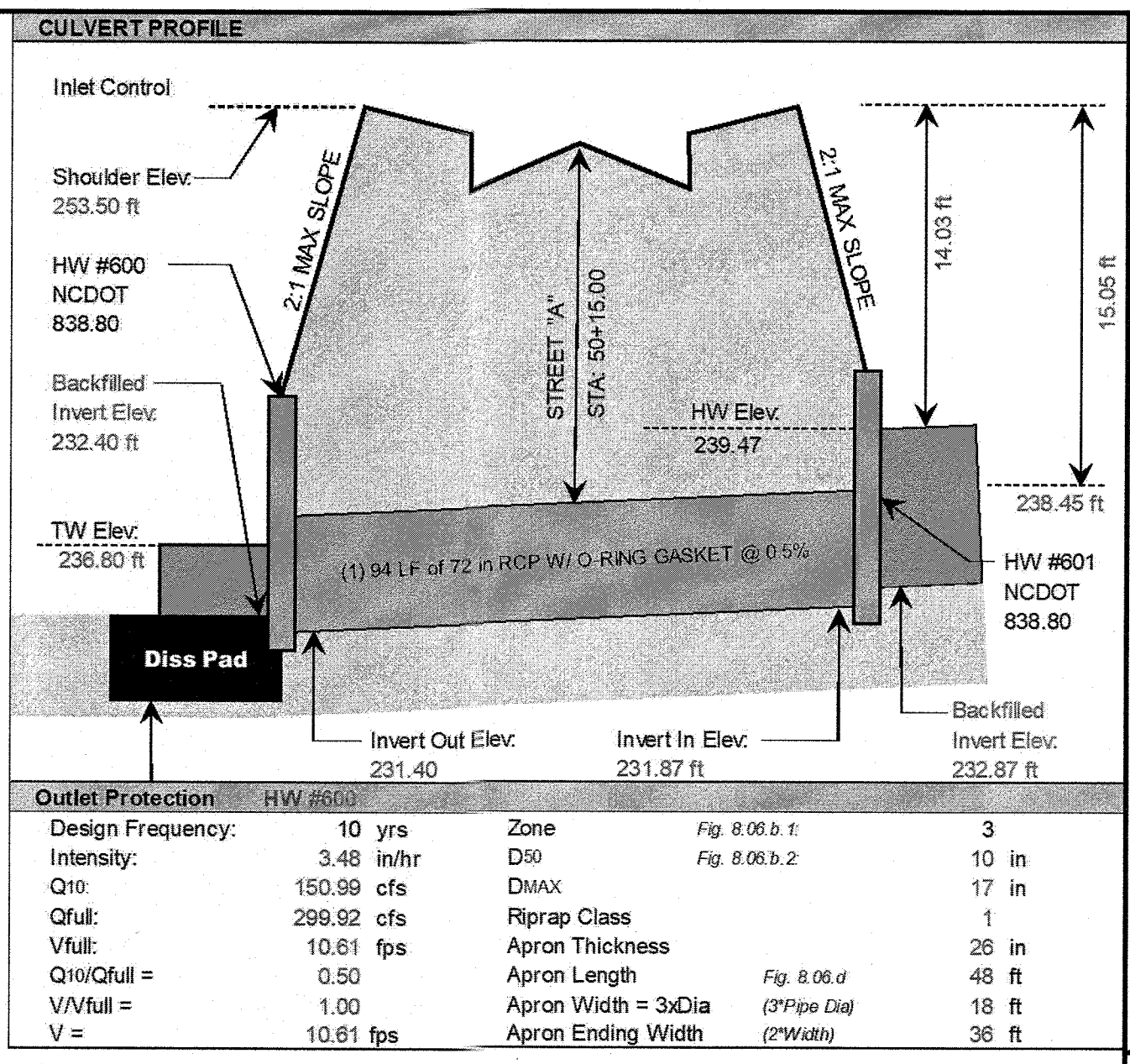


STORM DRAINAGE SCHEDULE (300)

UP STREAM STRUCTURE	INLET DEPTH	TOP	INV IN	INV OUT	OUTLET PIPE	DOWN STREAM STRUCTURE
PH1 310	4.25'	281.61		277.36' (15" RCP)	37.00' @ 1.00%	309
PH1 309	4.72'	281.61	276.99' (15" RCP) 310	276.89' (15" RCP)	123.38' @ 8.81%	307
PH1 308	4.50'	270.89		266.39' (15" RCP)	37.00' @ 1.00%	307
PH1 307	8.18'	270.89	266.02' (15" RCP) 309 266.02' (15" RCP) 308	262.71' (18" RCP)	294.76' @ 3.93%	305
PH1 306	4.25'	259.29		255.04' (15" RCP)	37.00' @ 1.00%	305
PH1 305	8.28'	259.29	251.12' (18" RCP) 307 254.67' (15" RCP) 306	251.02' (18" RCP)	241.52' @ 1.17%	304
304 HARDIN HILL EXT	7.85'	255.95	248.20' (18" RCP) 305	248.10' (18" RCP)	155.16' @ 1.00%	301
302 HARDIN HILL EXT	4.70'	252.63		247.93' (15" RCP)	37.00' @ 1.00%	301
301 HARDIN HILL EXT	13.73'	252.63	246.55' (18" RCP) 304 247.56' (15" RCP) 302	238.90' (18" RCP)	39.29' @ 4.84%	300
300 HARDIN HILL EXT	10.79'	247.79		237.00' (18" RCP) 301		

STORM DRAINAGE SCHEDULE (600)

UP STREAM STRUCTURE	INLET DEPTH	TOP	INV IN	INV OUT	OUTLET PIPE	DOWN STREAM STRUCTURE
601	13.96'	245.83		231.87' (72" RCP)	93.81' @ 0.50%	600
600	13.58'	244.98		231.40' (72" RCP) 601		



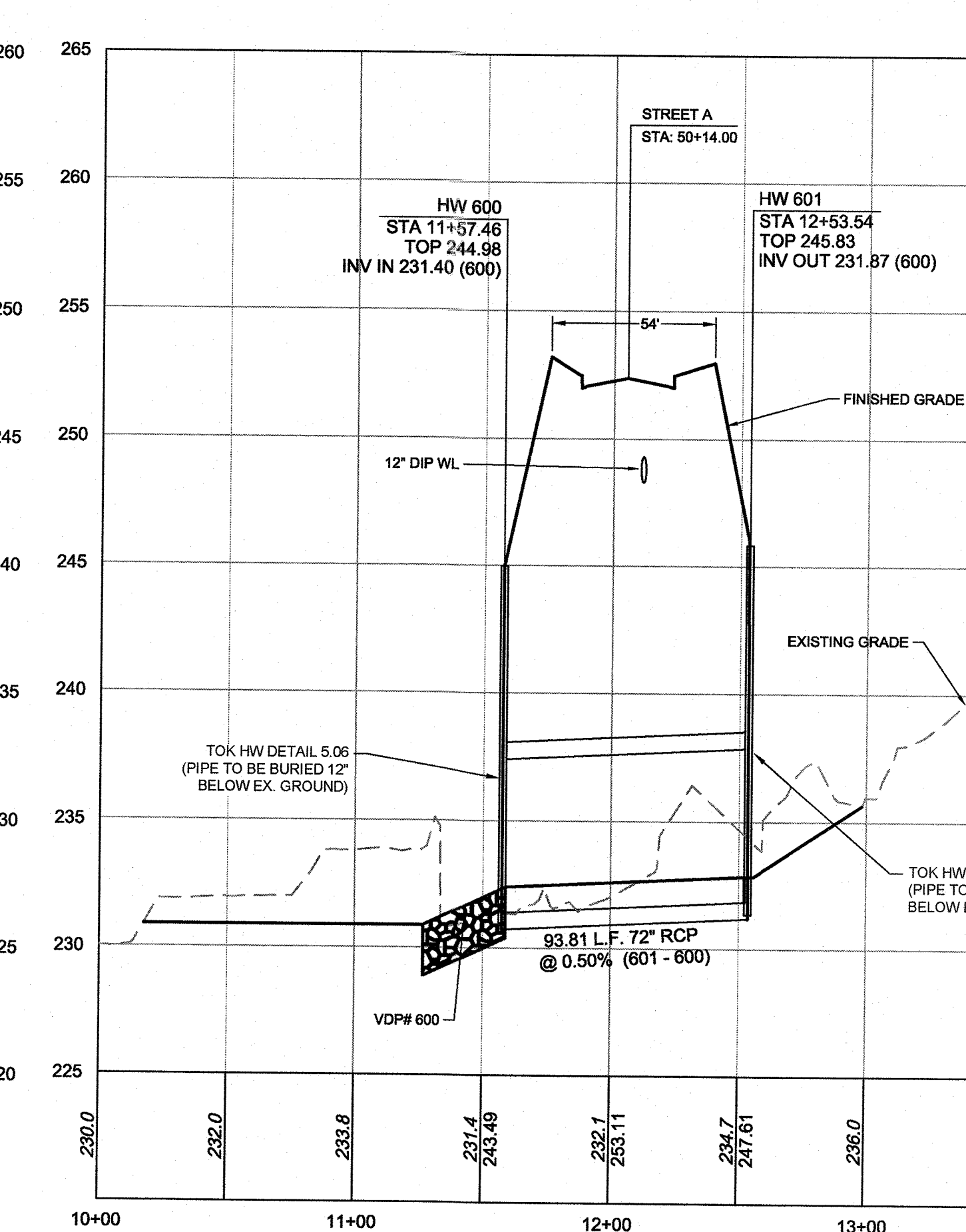
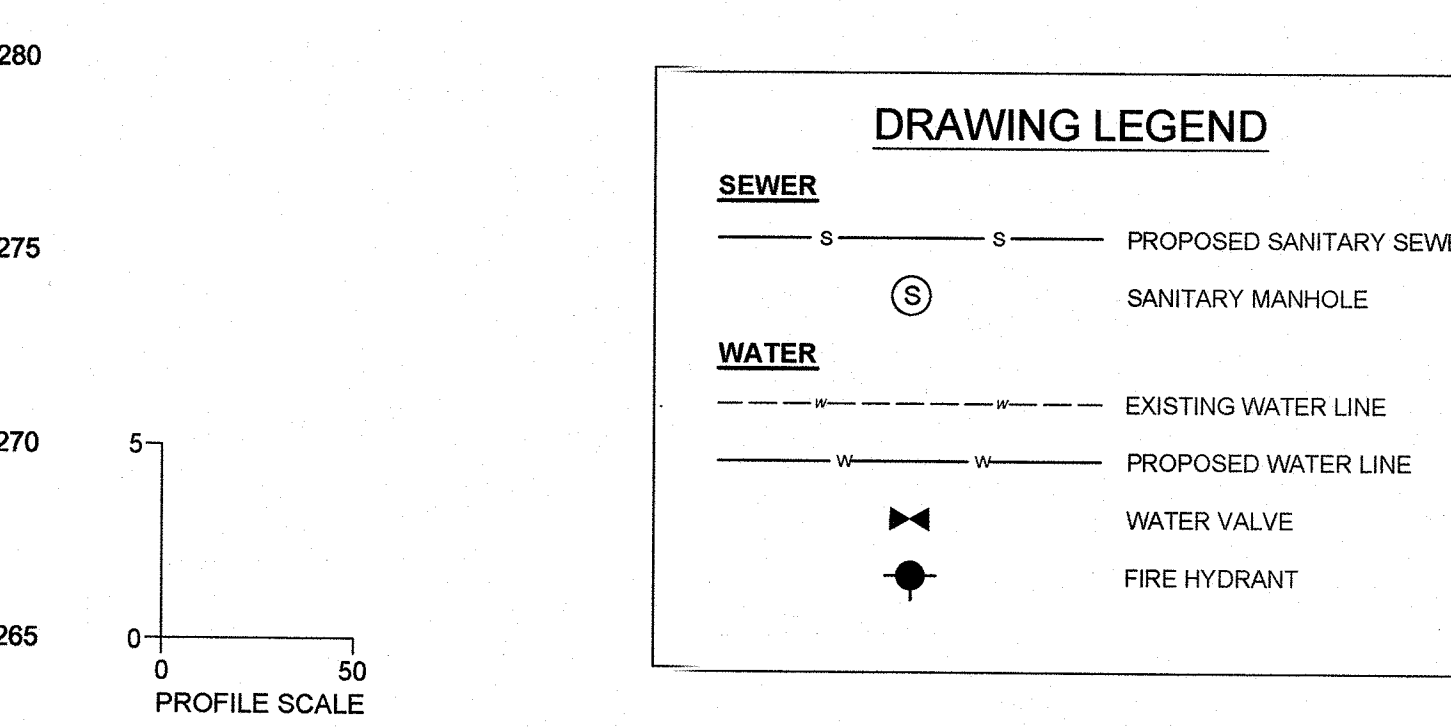
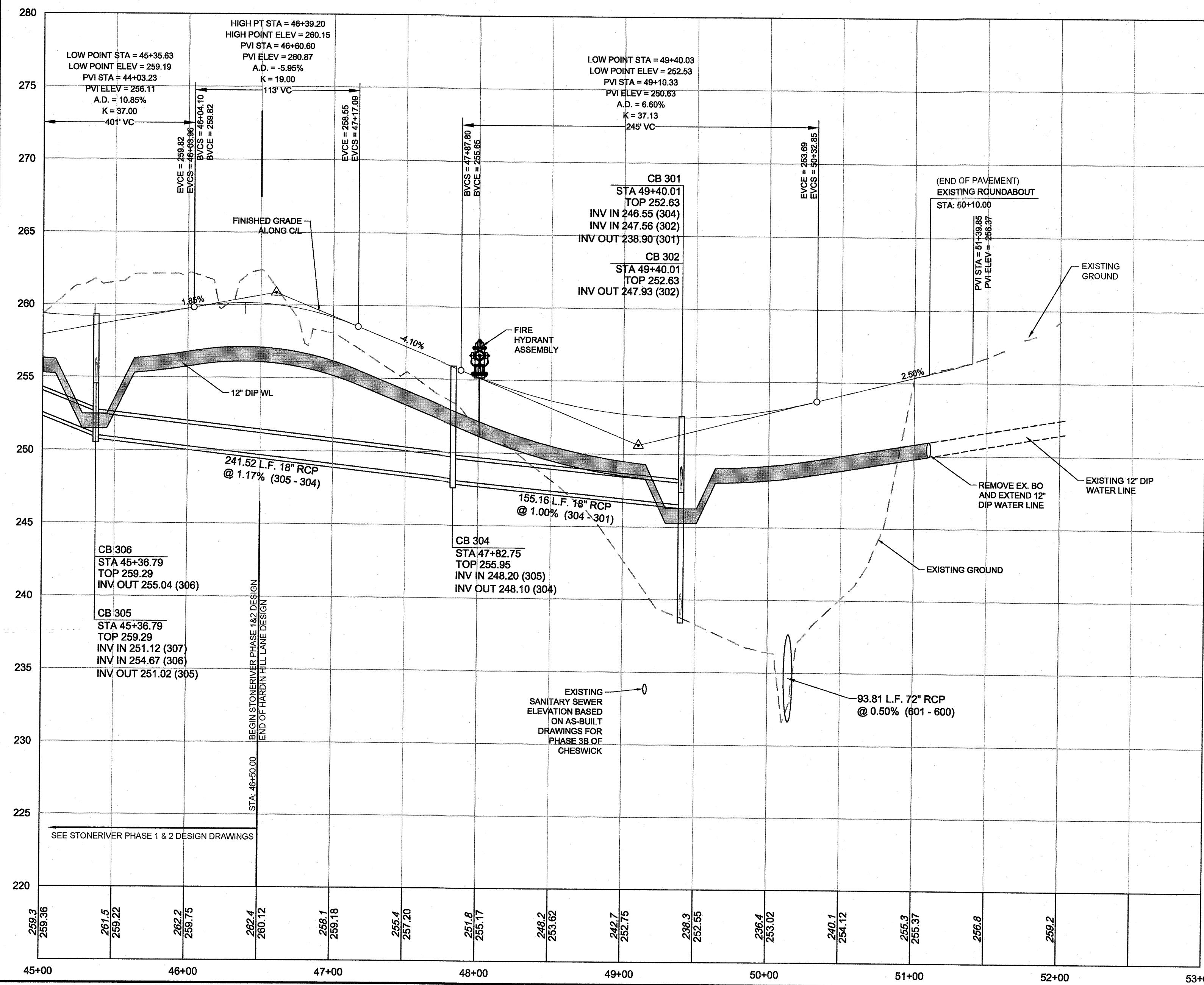
APRON DESIGN BASED ON GUIDELINES FROM NEW YORK DOT DISSIPATOR METHOD

VELOCITY DISSIPATOR PAD SCHEDULE - STREET A, STA: 46+50 - 52+00

STRUCTURE ID	PIPE SIZE (IN)	PIPE SLOPE	FLOW (Q10) (CFS)	OUTLET VELOCITY (V10) (FT/S)	OUTLET VELOCITY (VFull) (FT/S)	ZONE	RIPRAP CLASS	D50 (IN)	APRON DIMENSIONS			
									LENGTH (FT)	STARTING WIDTH (FT)	ENDING WIDTH (FT)	THICKNESS (")
FES 300	18	3.48%	14.50	11.07	12.07	3	1	10	12	4.5	9	18
HW 600	72	0.50%	150.99	10.58	10.58	3	1	10	48	18	36	26

TABLE: VDP-1

GEOTEXTILE FABRIC WILL BE REQUIRED UNDER ALL RIPRAP DISSIPATOR PADS



NOTE:

- MAINTAIN A MINIMUM OF 18" OF VERTICLE SEPARATION BETWEEN STORM PIPES AND WATER LINES.
- WATER MAIN TO BE EITHER 10' HORIZONTALLY FROM SEWER OR 18" ABOVE VERTICALLY. 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 6" MIN. CLEARANCE (PER CORPUD DETAILS W-41 & S-49).

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-3555
 Authorization to Construct: [Signature]
 Date: 9/26/18

ATTENTION CONTRACTORS

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BY: [Signature] DATE: 10-26-18
 TOWN ENGINEER

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

BY: [Signature] DATE: 10-26-18
 ADMINISTRATOR

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

HARDIN HILL LANE EXT STA: 46+50 TO STA: 52+00
 KNIGHTDALE - WAKE COUNTY - NORTH CAROLINA

HARDIN HILL LANE PLAN & PROFILE

YOUR VISION ACHIEVED THROUGH OURS.

THIS DRAWING PREPARED AT THE RALEIGH OFFICE
 5410 Trinity Lane, Raleigh, NC 27607
 TEL 919.866.6951 FAX 919.833.8181 www.timmons.com

DATE: 09/11/2018
 DRAWN BY: 331
 DESIGNED BY: 331
 CHECKED BY: JFC
 SCALE: PER PLAN

JOB NO. 37909
 SHEET NO. C2.0

GENERAL NOTES

THE GRADING CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL CODES IN OBSERVING EROSION CONTROL MEASURES BOTH ON AND OFF-SITE.

THE GRADING CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL DEVICES AFTER EACH RAINFALL EVENT OR AS DIRECTED BY LOCAL AUTHORITIES OR THE ENGINEER.

THE GRADING CONTRACTOR SHALL BE RESPONSIBLE FOR OFF-SITE DISPOSAL OF ALL CLEARING AND GRADING WASTE MATERIALS GENERATED DURING HIS PHASE OF WORK AND FOR OBTAINING ALL APPLICABLE PERMITS FOR OFF-SITE STOCKPILES AND/OR WASTE AREAS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANING ANY TRACKED SOIL FROM ALL ADJACENT ROADWAYS THAT ARE IMPACTED BY CONSTRUCTION TRAFFIC.

MAINTENANCE PLAN

- ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CHECKED FOR STABILITY AND OPERATION FOLLOWING EVERY RUNOFF-PRODUCING RAINFALL BUT IN NO CASE LESS THAN ONCE EVERY WEEK. ANY NEEDED REPAIRS SHALL BE MADE IMMEDIATELY TO MAINTAIN ALL MEASURES AS DESIGNED.
- REMOVE SEDIMENT FROM SEDIMENT SKIMMER BASINS WHEN STORAGE CAPACITY HAS BEEN APPROXIMATELY 50% FILLED. CLEAN OR REPLACE GRAVEL FILTER WHEN THE SEDIMENT POOL NO LONGER DRAINS PROPERLY.
- REMOVE SEDIMENT FROM BEHIND SILT FENCE WHEN DEPTH REACHES 6-INCHES AT THE FENCE. REPAIR SILT FENCE AS NECESSARY TO MAINTAIN A BARRIER.
- ALL SEEDED AREAS SHALL BE FERTILIZED, RE-SEEDING AS NECESSARY, AND MULCHED ACCORDING TO PROJECT SPECS TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE GROWTH.
- MAINTAIN SILT/TREE PROTECTION FENCING THROUGHOUT DURATION OF CONSTRUCTION.

STOCKPILE MAINTENANCE PLAN

- SEEDING OR COVERING STOCKPILES WITH TARPS OR MULCH IS REQUIRED AND REDUCES 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 THE 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).

STOCKPILE DESIGN CRITERIA

- A 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 NOTE SHALL BE PROVIDED ON THE APPROVED PLAN THAT STOCKPILE HEIGHT SHALL NOT EXCEED 35 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 UNAVAILABLE.
- 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 UDO 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-ENCROACHMENT AREAS ARE PROHIBITED EXCEPT AS OTHERWISE PROVIDED BY SUBSECTION 14-19-2 OF THE WAKE COUNTY UNIFIED DEVELOPMENT ORDINANCE (CERTIFICATIONS AND PERMITS REQUIRED).

BASIN REMOVAL SEQUENCE

- SCHEDULE A SITE MEETING WITH THE ENVIRONMENTAL 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 CONSULTANT FOR APPROVAL OF REMOVAL OF TEMPORARY EROSION CONTROL MEASURES AND ADVICE ON WHEN SITE CAN BE ISSUED A CERTIFICATE OF COMPLETION.

EROSION CONTROL CONSTRUCTION SEQUENCE

- SCHEDULE A PRE-CONSTRUCTION CONFERENCE WITH THE ENVIRONMENTAL CONSULTANT, KARYN PAGEAU AT 919-796-8769 TO OBTAIN A LAND DISTURBING PERMIT.
- INSTALL TEMPORARY GRAVEL CONSTRUCTION ENTRANCE. INSTALL TEMPORARY SILT/TREE PROTECTION FENCE & GRAVEL OUTLETS. CONSTRUCT TEMPORARY STREAM DIVERSION WITH IMPERMEABLE MEMBRANE AND OPTIONAL TEMP CMP STREAM CROSSING. CLEAR ONLY AS NEEDED TO CONSTRUCT THESE MEASURES.
- CALL KARYN PAGEAU AT 919-796-8769 FOR AN ONSITE INSPECTION BY THE ENVIRONMENTAL CONSULTANT TO OBTAIN A CERTIFICATE OF COMPLIANCE.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN ALL EROSION CONTROL MEASURES THROUGHOUT CONSTRUCTION. ALL EROSION CONTROL DEVICES SHOULD BE INSPECTED AFTER EACH RAINFALL EVENT, AND ON A WEEKLY BASIS, AND REBUILT IMMEDIATELY.
- CLEAR AND GRADE PER THIS PLAN SET. COMPLETE THE PERMANENT RCP CULVERT INSTALLATION, AND THEN REMOVE THE TEMPORARY STREAM CROSSING. REFER TO THE "CULVERT CONSTRUCTION SEQUENCE".
- INSTALL STORM DRAINAGE SYSTEM. INSTALL TEMPORARY INLET PROTECTION AT ALL DRAINAGE INLETS.
- STABILIZE THE SITE AS AREAS ARE BROUGHT UP TO FINISHED GRADE WITH VEGETATION, DITCH LINERS, ETC. SEED AND MULCH DENUDE AREAS WITHIN FIFTEEN (15) DAYS OF COMPLETION OF ANY PHASE OF CONSTRUCTION.
- WHEN CONSTRUCTION IS COMPLETE AND ALL AREAS ARE STABILIZED COMPLETELY, CALL KARYN PAGEAU AT 919-796-8769 FOR AN INSPECTION.
- REMOVE ALL TEMPORARY EROSION CONTROL DEVICES, INCLUDING TEMPORARY SILT FENCE. SEED AND STABILIZE ANY REMAINING DISTURBED AREAS. ALL REMAINING PERMANENT EROSION CONTROL DEVICES, SUCH AS RIPRAP DISSIPATORS OVER FILTER FABRIC SHOULD BE INSTALLED AT THIS TIME.
- WHEN VEGETATION HAS BECOME ESTABLISHED, CALL FOR A FINAL SITE INSPECTION BY THE ENVIRONMENTAL CONSULTANT, KARYN PAGEAU AT 919-796-8769 TO OBTAIN CERTIFICATE OF COMPLETION.

CULVERT CONSTRUCTION SEQUENCE

- GRADE TEMPORARY DIVERSION & EARTH BERM. INSTALL IMPERMEABLE MEMBRANE.
- (OPTIONAL): INSTALL TEMP CMP STORM PIPE IN DIVERSION CHANNEL, AND CONSTRUCT TEMP STREAM CROSSING. SEE DETAIL.
- INSTALL TEMPORARY SILT FENCE AT DIVERSION AS SHOWN.
- INSTALL EROSION CONTROL MEASURES ON NORTH SIDE OF STREAM PER EROSION CONTROL PLAN.
- DEWATER WORK AREA AS NEEDED TO ENSURE DRY WORK CONDITIONS SEE DETAIL 1630.06.
- INSTALL PERMANENT RCP CULVERT, HEADWALLS, & RIPRAP APRON OVER FILTER FABRIC PER ROAD PLAN & PROFILE.
- REMOVE TEMPORARY EARTH BERM. FINE GRADE CHANNEL TO DIRECT STREAM FLOW INTO PERMANENT RCP CULVERT.
- REMOVE TEMP CMP & IMPERMEABLE MEMBRANE.
- COMPLETE FILL/GRADING/COMPACTION OVER RCP CULVERT. IMMEDIATELY SEED ALL SLOPES.

SEEDBED PREPARATION

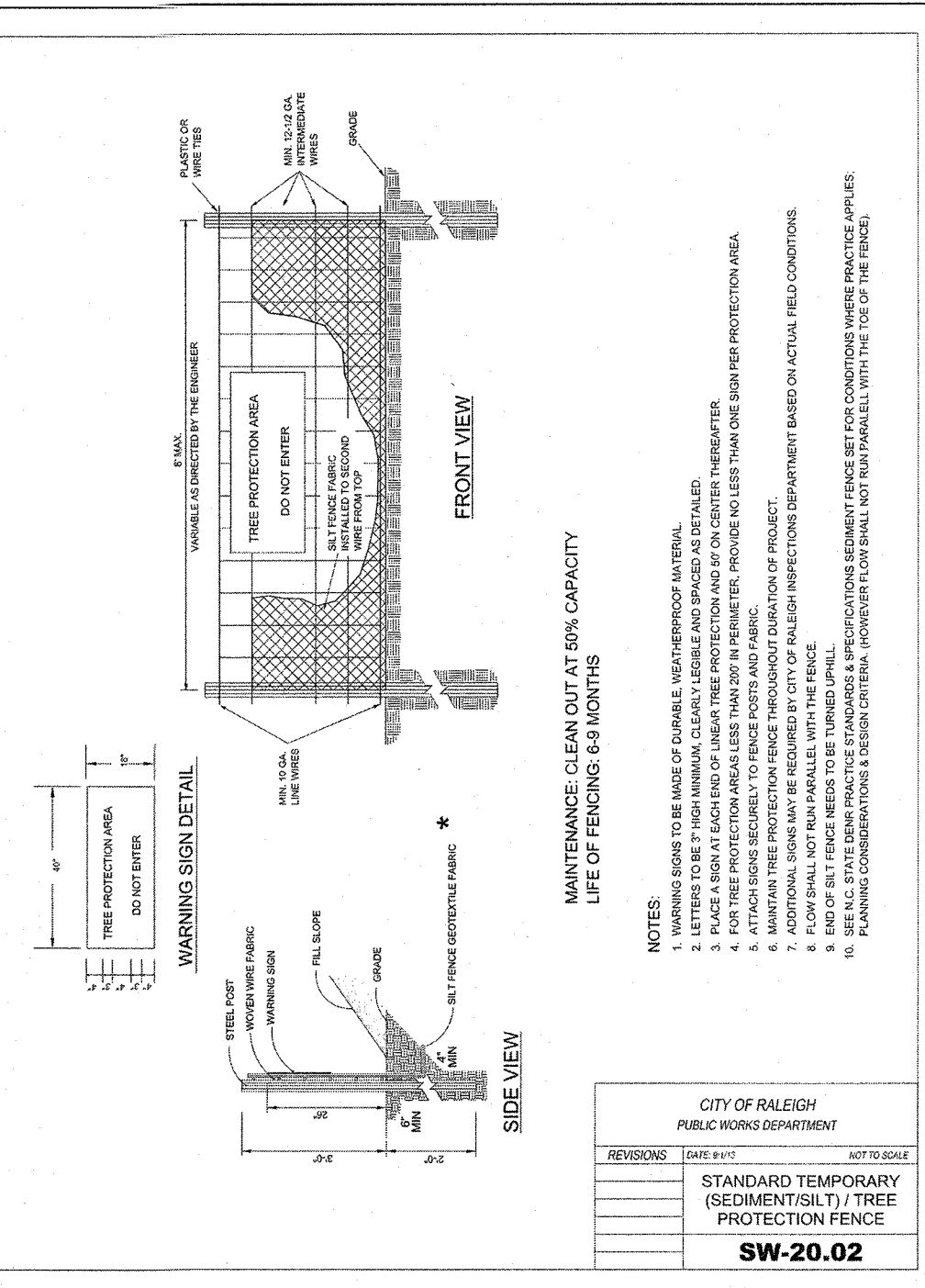
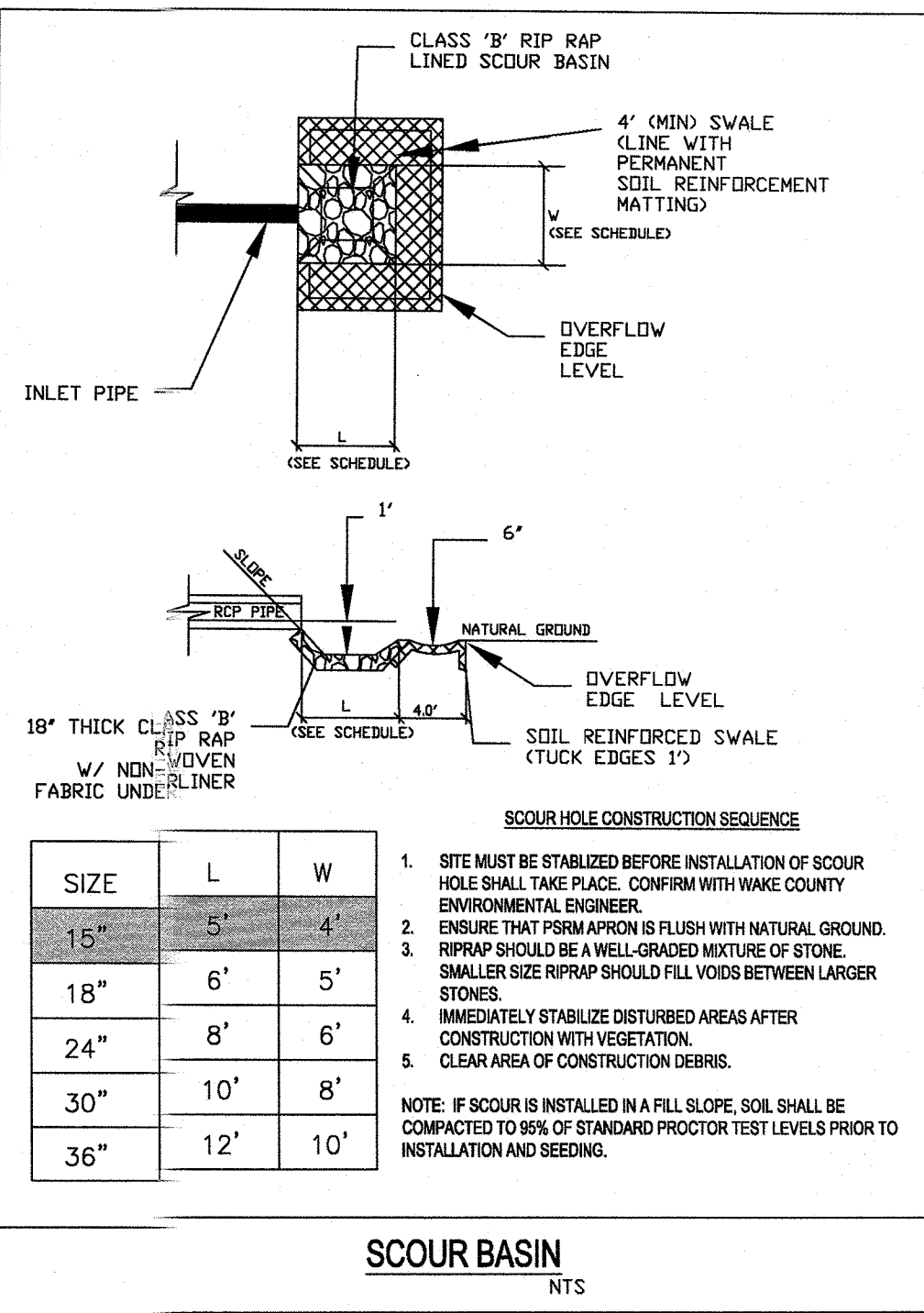
- CHISEL COMPACTED AREAS AND SPREAD TOPSOIL THREE INCHES DEEP OVER ADVERSE SOIL CONDITIONS, IF AVAILABLE.
- RIP THE ENTIRE AREA TO SIX INCHES DEEP.
- REMOVE ALL LOOSE ROCK, ROOTS AND OTHER OBSTRUCTIONS, LEAVING SURFACE REASONABLY SMOOTH AND UNIFORM.
- APPLY AGRICULTURAL LIME, FERTILIZER AND SUPERPHOSPHATE UNIFORMLY AND MIX WITH SOIL (SEE MIXTURE BELOW).
- CONTINUE TILLAGE UNTIL A WELL-PULVERIZED, FIRM, REASONABLY UNIFORM SEEDBED IS PREPARED FOUR TO SIX INCHES DEEP.
- SEED ON A FRESHLY PREPARED SEEDBED AND COVER SEED LIGHTLY WITH SEEDING EQUIPMENT OR CULTIPACK AFTER SEEDING.
- MULCH IMMEDIATELY AFTER SEEDING AND ANCHOR MULCH.
- INSPECT ALL SEEDED AREAS AND MAKE NECESSARY REPAIRS OR RESEEDINGS WITHIN THE PLANTING SEASON, IF POSSIBLE. IF STAND SHOULD BE MORE THAN 60% DAMAGED, RE-ESTABLISH FOLLOWING THE ORIGINAL LIME, FERTILIZER AND SEEDING RATES.
- CONSULT S&EC ENVIRONMENTAL ENGINEERS ON MAINTENANCE TREATMENT AND FERTILIZATION AFTER PERMANENT COVER IS ESTABLISHED.

MIXTURE

AGRICULTURAL LIMESTONE	2 TONS/ACRE - SMALL GRAIN STRAW
FERTILIZER	1,000 LBS/ACRE - 10-10-10
SUPERPHOSPHATE	500 LBS/ACRE - 20% ANALYSIS
MULCH	2 TONS/ACRE - SMALL GRAIN STRAW
ANCHOR	2 TONS/ACRE - SMALL GRAIN STRAW

GROUND STABILIZATION*		
SITE AREA DESCRIPTION	STABILIZATION TIME FRAME	STABILIZATION TIME FRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQM) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50 FEET IN LENGTH
ANY OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE (EXCEPT FOR PERIMETERS AND HQM ZONES)
SLOPES 2:1 OR STEEPER MUST BE LINED WITH EXCELSIOR NETTING OR SIMILAR AND SEED	IMMEDIATELY UPON COMPLETION OF SLOPE GRADING	NONE

*EXTENSIONS OF TIME MAY BE APPROVED BY THE PERMITTING AUTHORITY BASED ON WEATHER OR OTHER SITE-SPECIFIC CONDITIONS THAT MAKE COMPLIANCE IMPRACTICABLE. (SECTION II 92(B))



SEEDING SCHEDULE		
SEEDING PERIOD	SEEDING TYPE	APPLICATION RATE (LBS/ACRE)
AUGUST 15 - NOVEMBER 01	TALL FESCUE	300
AUGUST 15 - NOVEMBER 01	TALL FESCUE AND ABRUZZO RYE	300
NOVEMBER 01 - MARCH 01	ABRUZZO RYE	25
MARCH 01 - APRIL 15	TALL FESCUE	300
APRIL 15 - JUNE 30	HULLED COMMON BERMUDAGRASS	25
APRIL 15 - JUNE 30	TALL FESCUE AND *BROWN TOP MILLET OR *SORGHUM-SUDAN HYBRIDS	120
JULY 01 - AUGUST 15	*BROWN TOP MILLET OR *SORGHUM-SUDAN HYBRIDS	35
JULY 01 - AUGUST 15	*SORGHUM-SUDAN HYBRIDS	30
SLOPES 2:1 TO 3:1		
MARCH 01 - JUNE 01	SERICEA LESPEDEZA (SCARIFIED) AND TALL FESCUE OR WEeping LOVEGRASS OR HULLED COMMON BERMUDAGRASS	50
MARCH 01 - APRIL 15	TALL FESCUE OR	120
MARCH 01 - JUNE 30	*TALL FESCUE AND *BROWN TOP MILLET OR *SORGHUM-SUDAN HYBRIDS	120
JUNE 01 - SEPTEMBER 01	*BROWN TOP MILLET OR *SORGHUM-SUDAN HYBRIDS	35
JUNE 01 - SEPTEMBER 01	*SORGHUM-SUDAN HYBRIDS	30
SEPTEMBER 01 - MARCH 01	SERICEA LESPEDEZA (UNHULLED, UNSCARIFIED) AND TALL FESCUE OR ABRUZZO RYE	70
SEPTEMBER 01 - MARCH 01	TALL FESCUE OR	120
NOVEMBER 01 - MARCH 01	ABRUZZO RYE	25

TEMPORARY - RESEED ACCORDING TO OPTIMUM SEASON FOR DESIRED PERMANENT VEGETATION. DO NOT ALLOW TEMPORARY COVER TO GROW OVER 12" IN HEIGHT BEFORE MOWING. OTHERWISE FESCUE MAY BE SHAVED. CONSULT CONSERVATION ENGINEER OR SOIL CONSERVATION SERVICE FOR ADDITIONAL INFORMATION CONCERNING OTHER ALTERNATIVES FOR VEGETATION OF DENUDE AREAS. THE ABOVE VEGETATION RATES ARE THOSE WHICH DO WELL UNDER LOCAL CONDITIONS; OTHER SEEDING RATE COMBINATIONS ARE POSSIBLE.

GROUND COVER - WHEREVER LAND DISTURBING ACTIVITY IS UNDERTAKEN ON A TRACT COMPRISING MORE THAN ONE (1) ACRE, A GROUND COVER SUFFICIENT TO RESTRAIN EROSION MUST BE PLANTED OR PROVIDED WITHIN 15 WORKING DAYS OR 90 CALENDAR DAYS, OR COMPLETION OF ANY PHASE OF GRADING, WHICHEVER PERIOD IS SHORTER. SLOPES SHALL BE PLANTED OR OTHERWISE PROVIDED WITH GROUND COVER, DEVICES, OR STRUCTURES SUFFICIENT TO RESTRAIN EROSION.

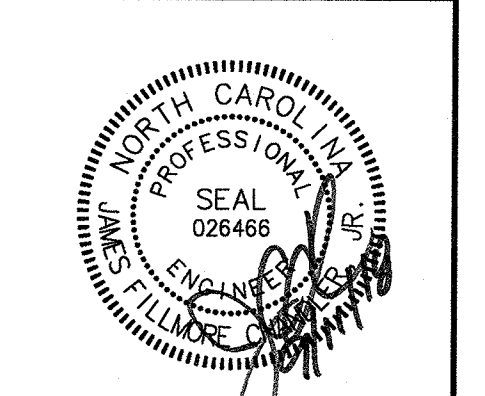
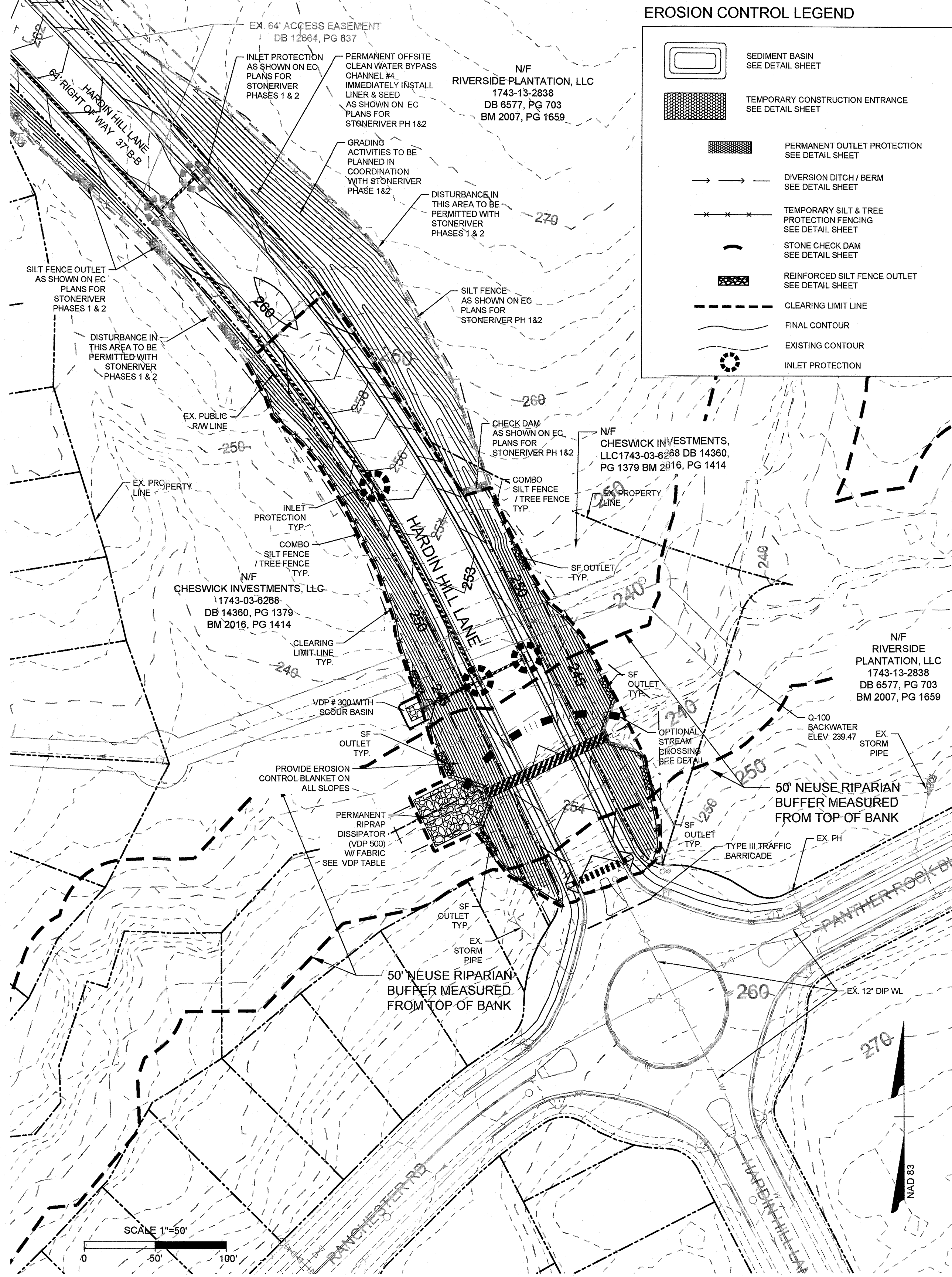
REVISIONS

DATE	DESCRIPTION

TOWN OF KNIGHTDALE STANDARD DETAILS

SEEDING SCHEDULE

STANDARD	NO.
2.01	



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DATE	09/11/2018
DRAWN BY	331
DESIGNED BY	331
CHECKED BY	JFC
SCALE	PER PLAN

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

KNIGHTDALE - WAKE COUNTY - NORTH CAROLINA

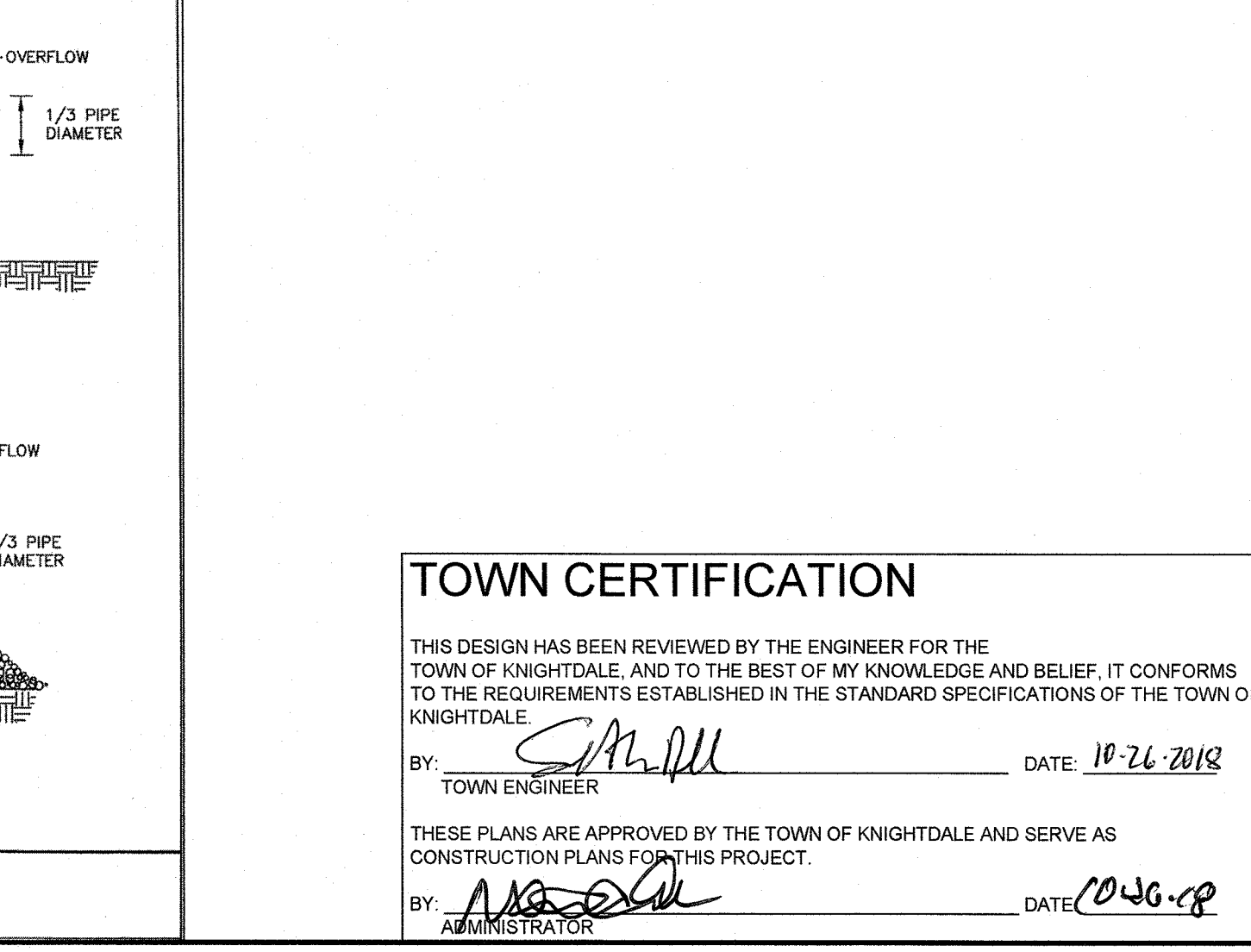
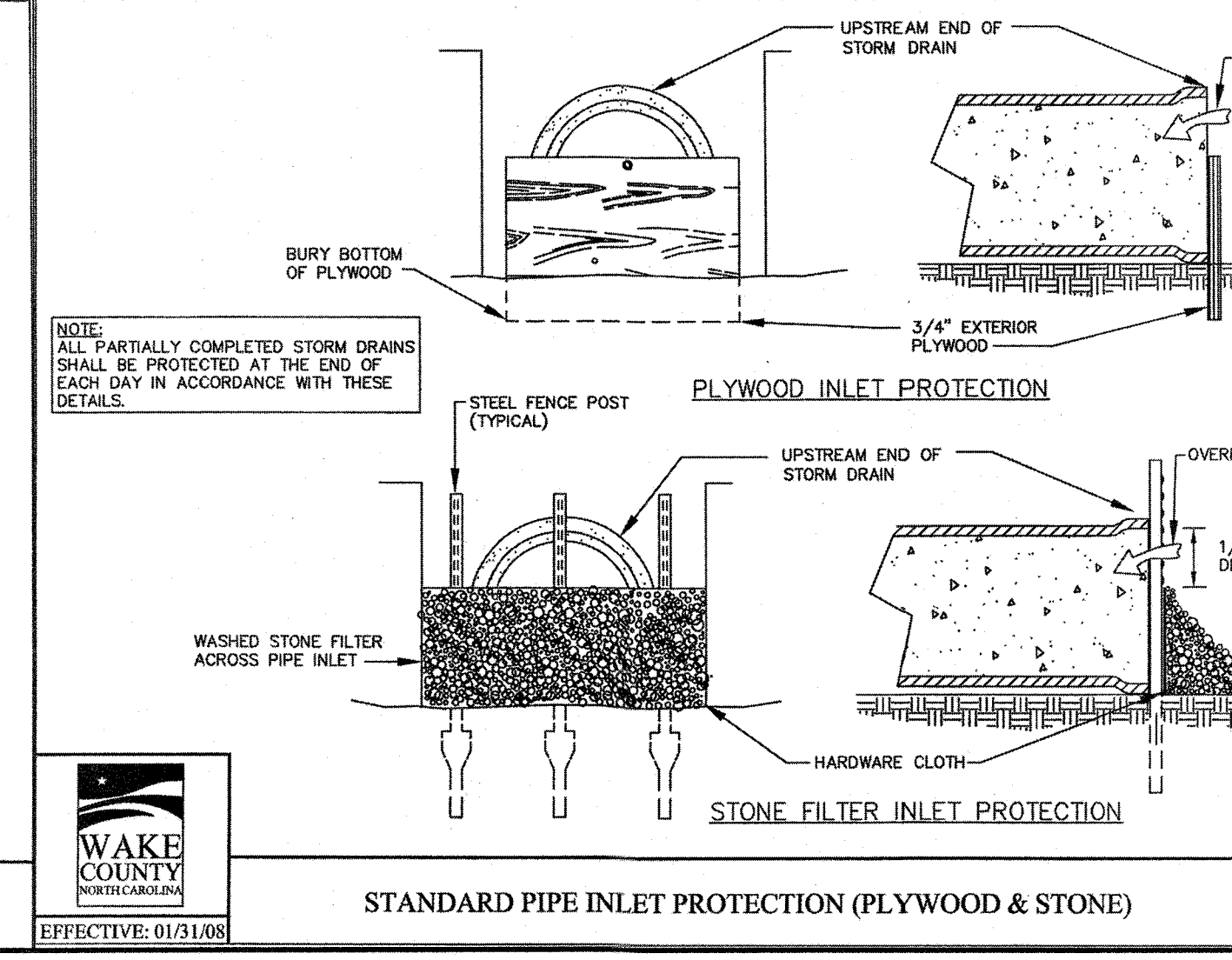
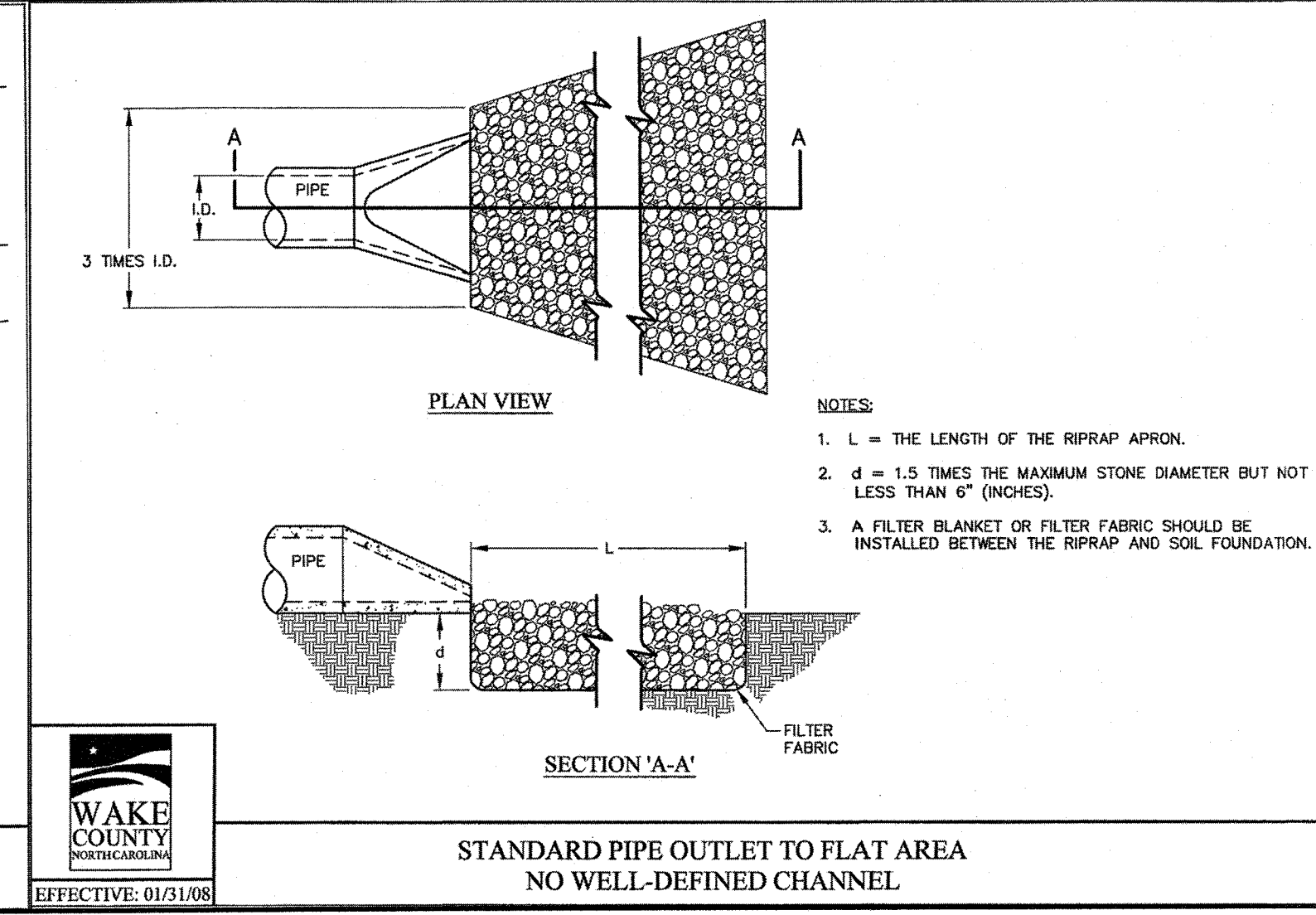
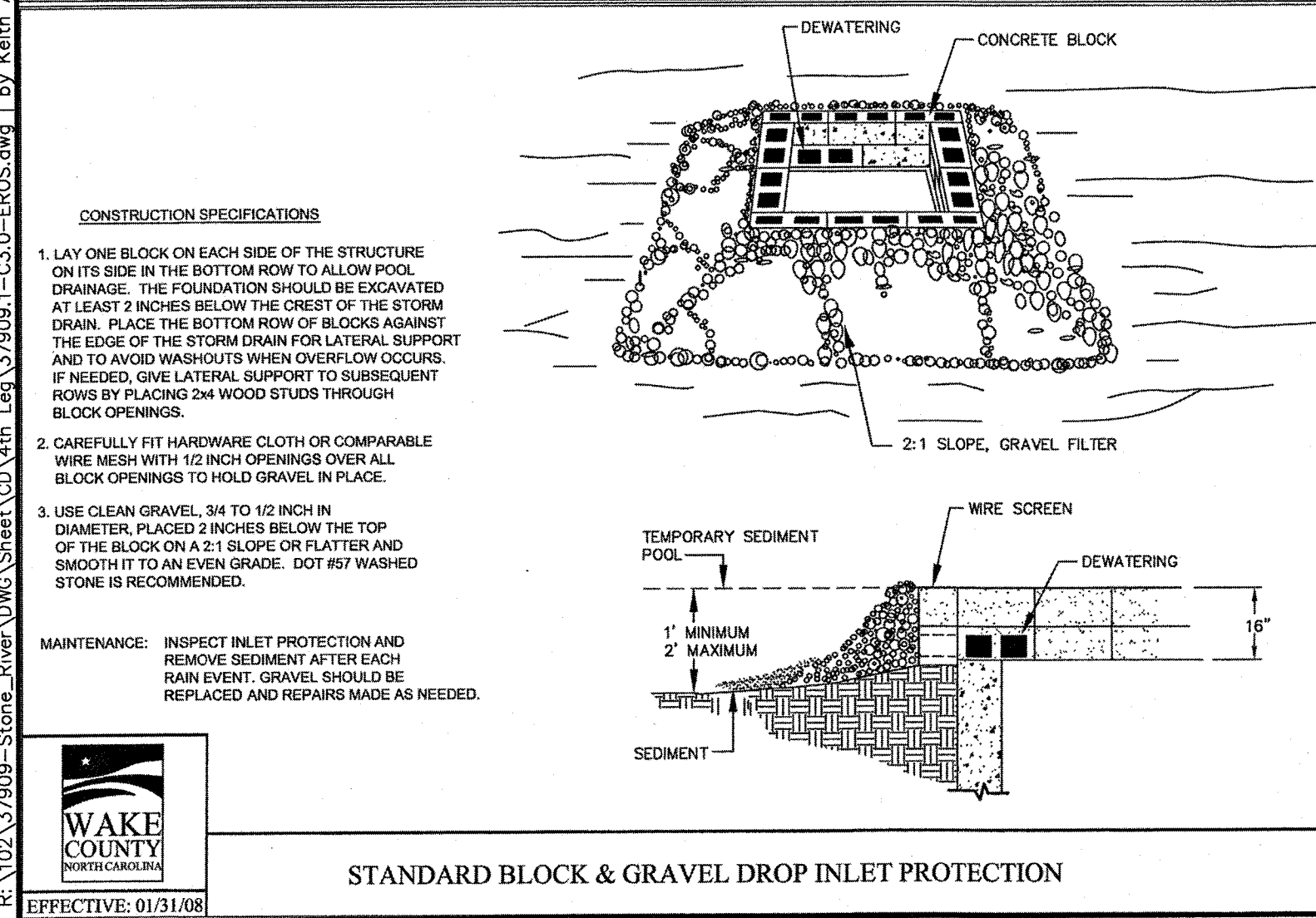
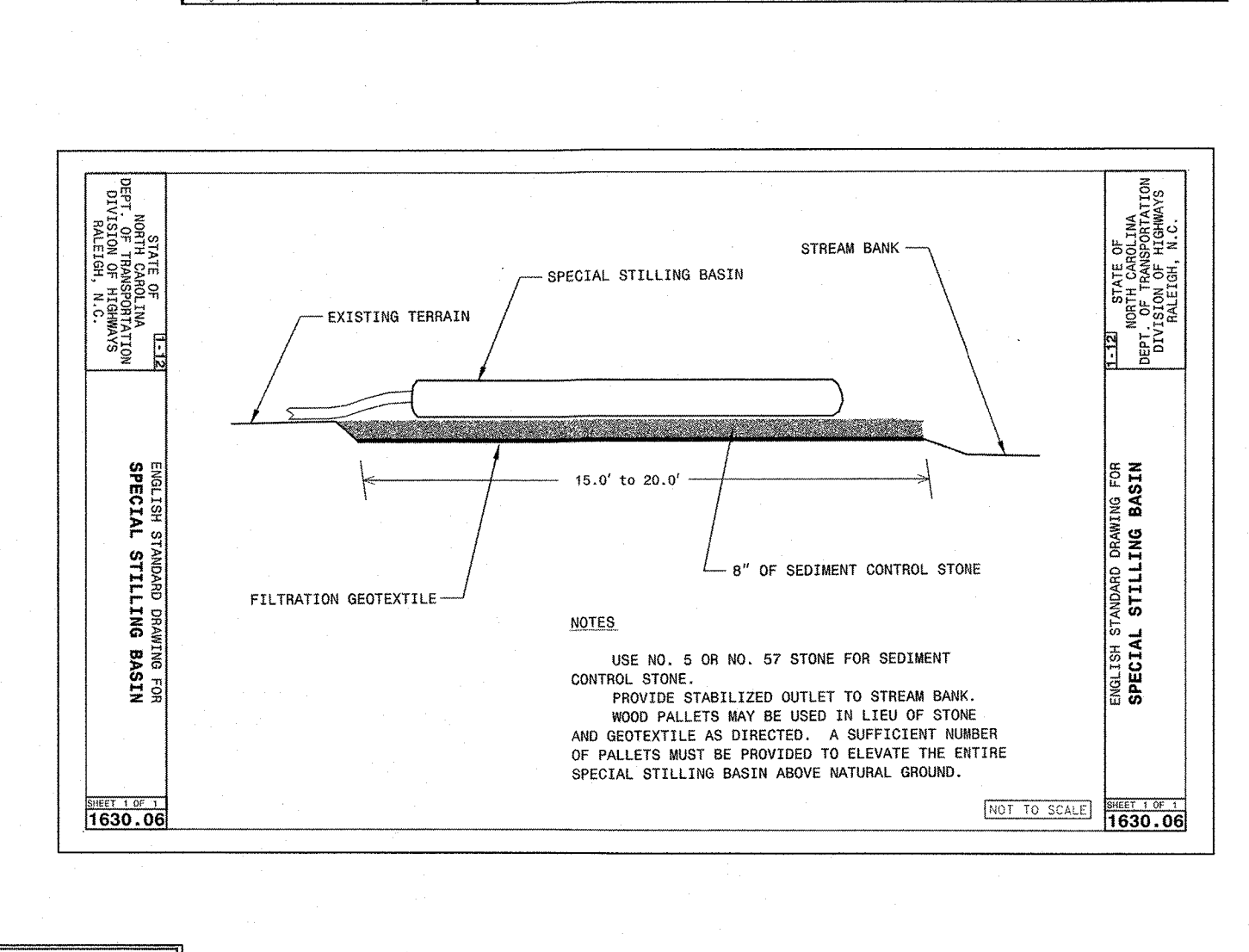
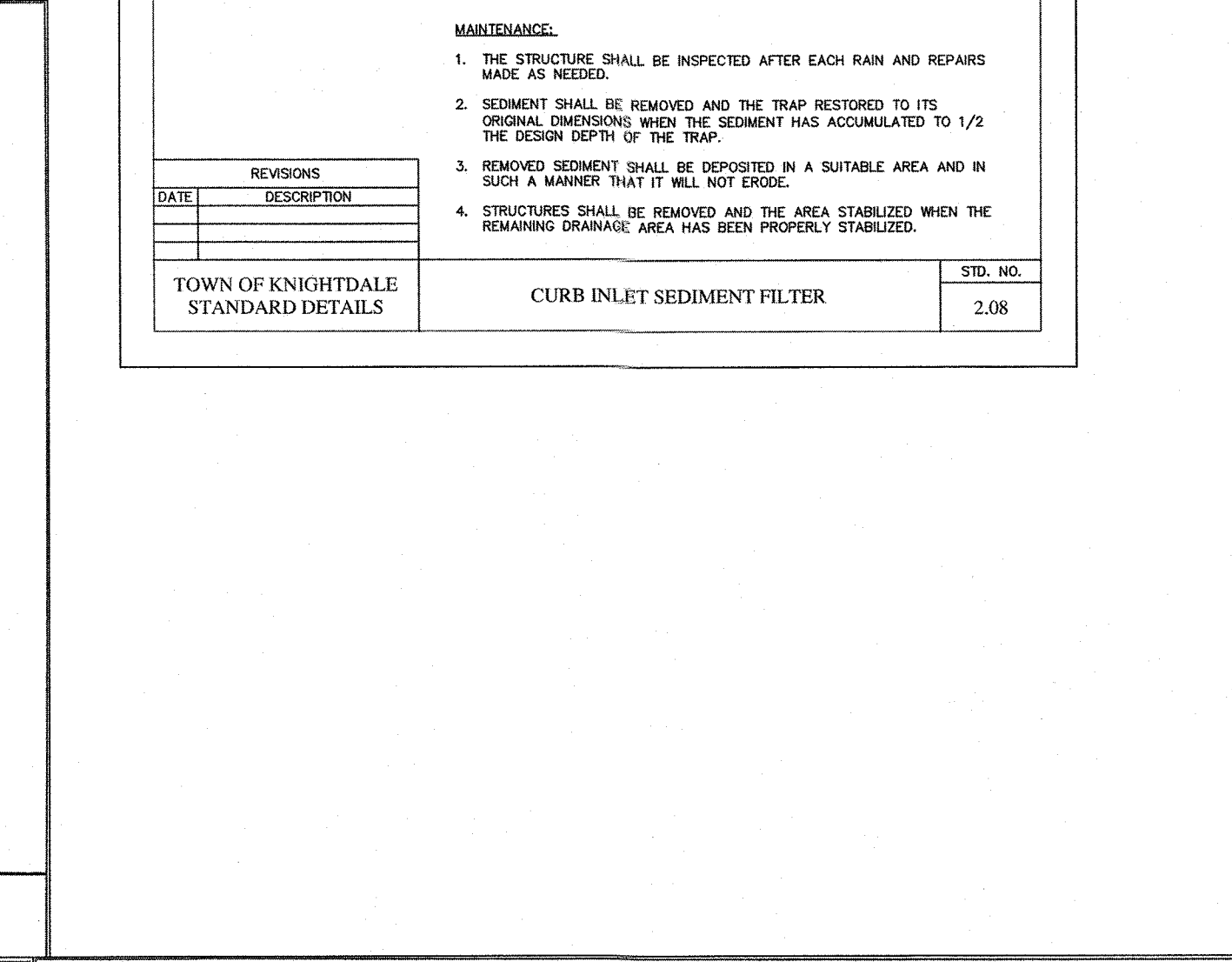
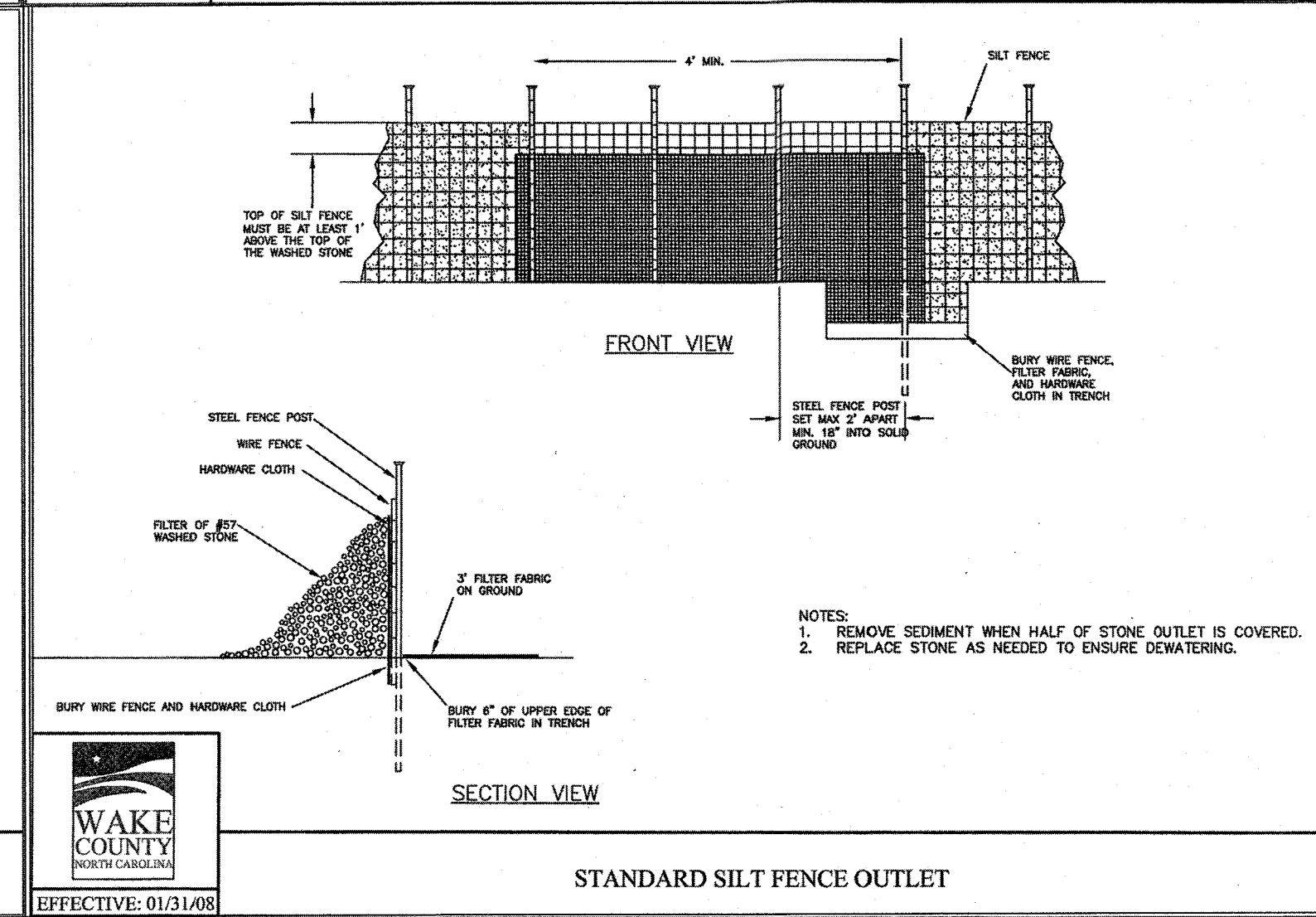
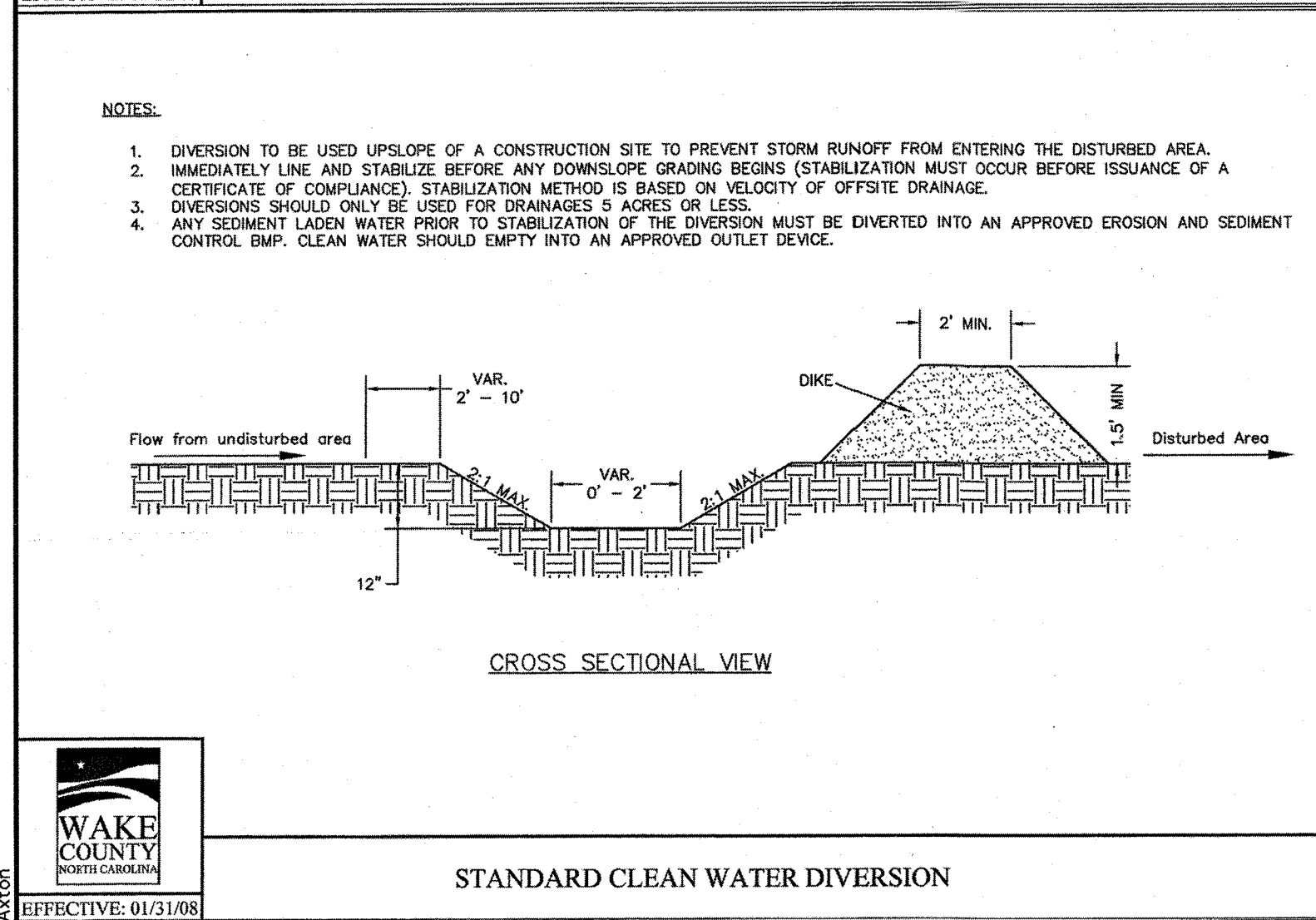
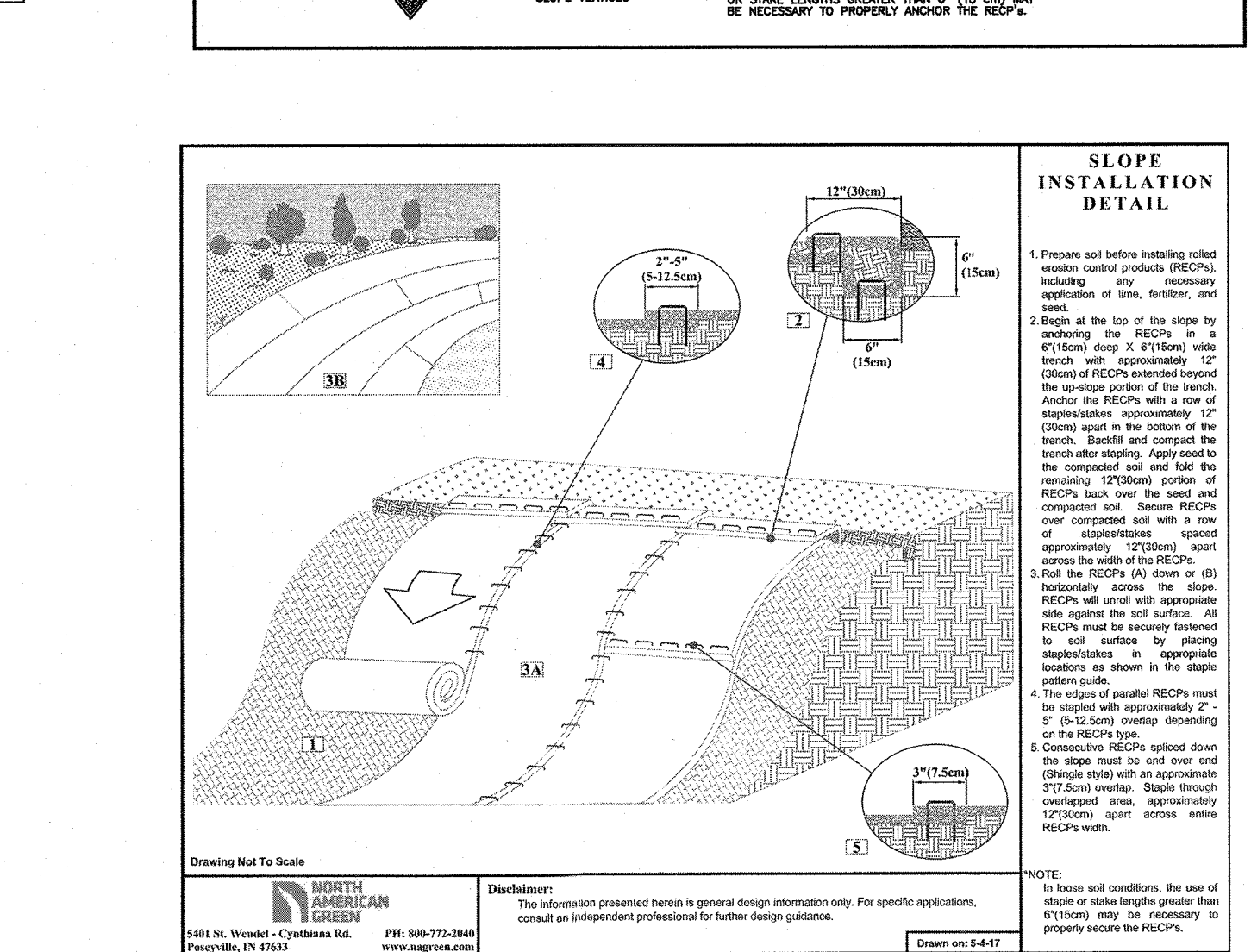
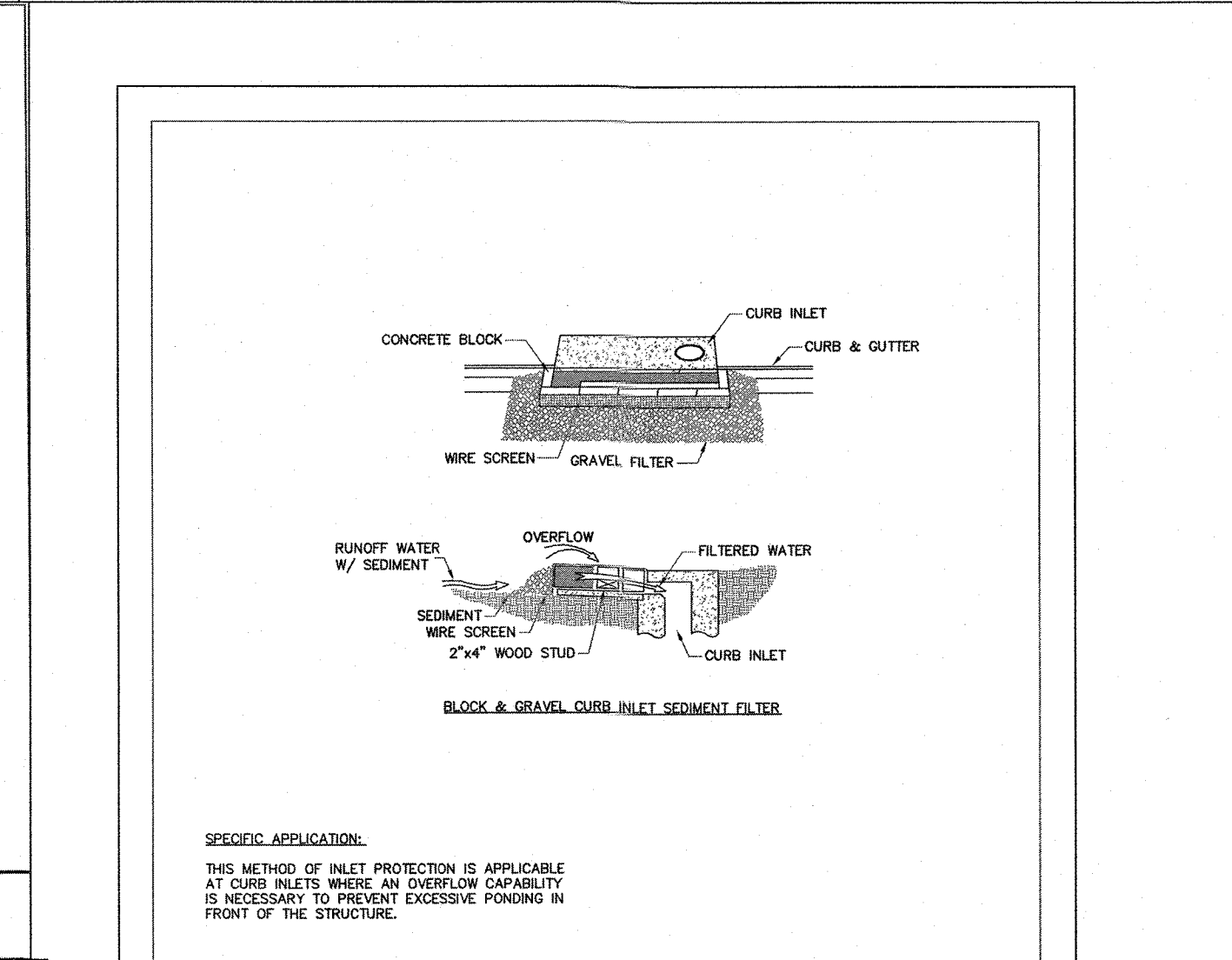
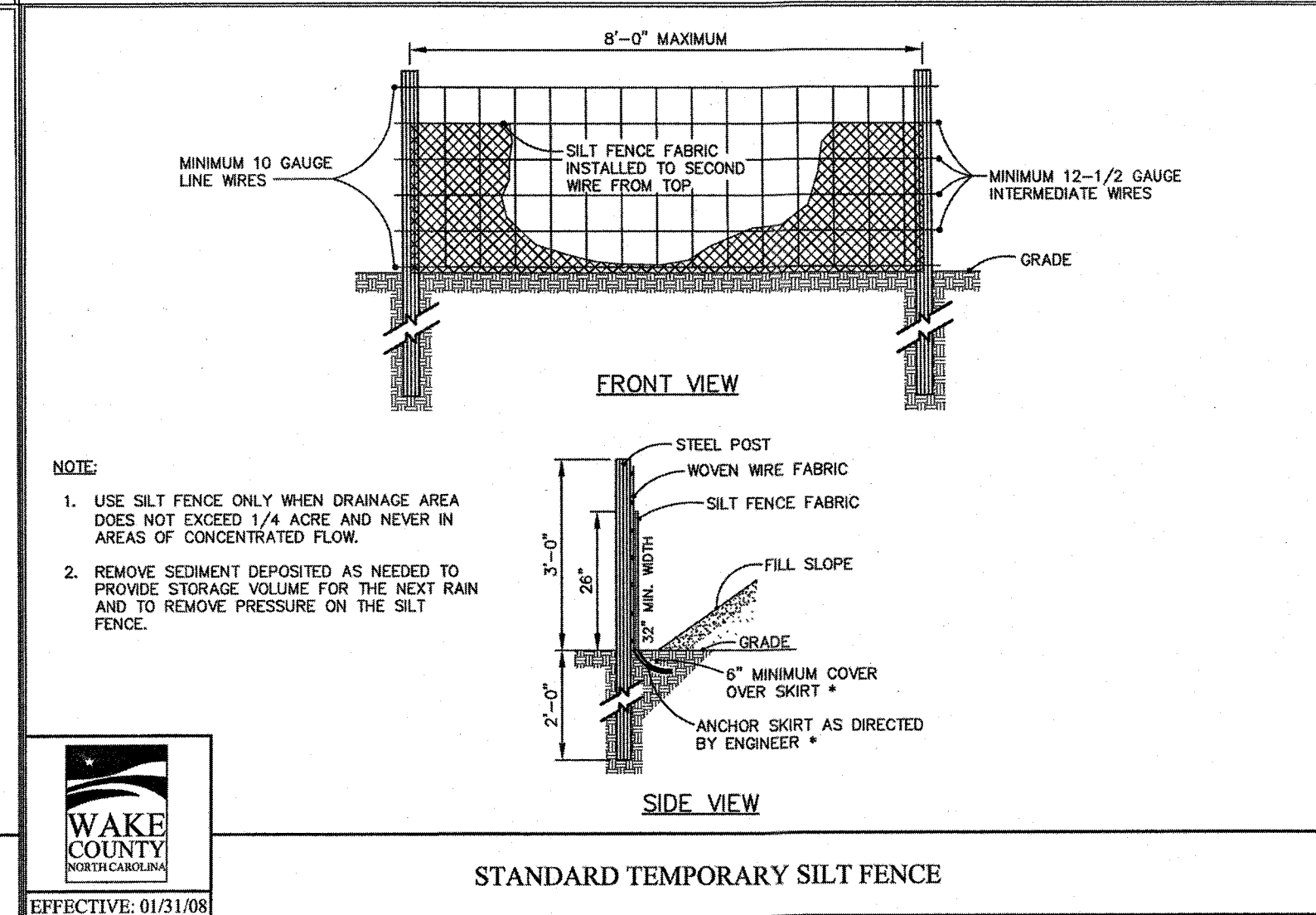
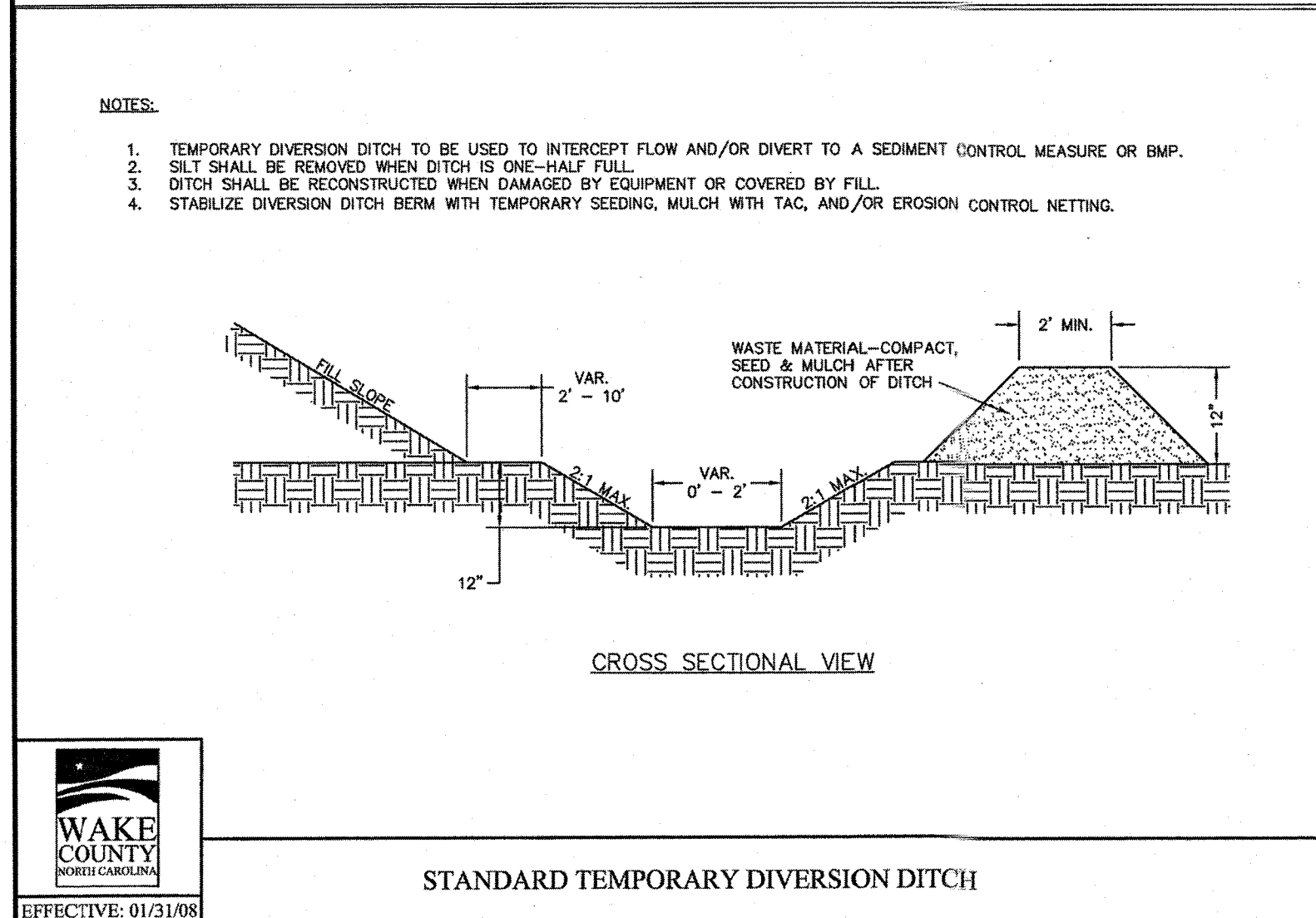
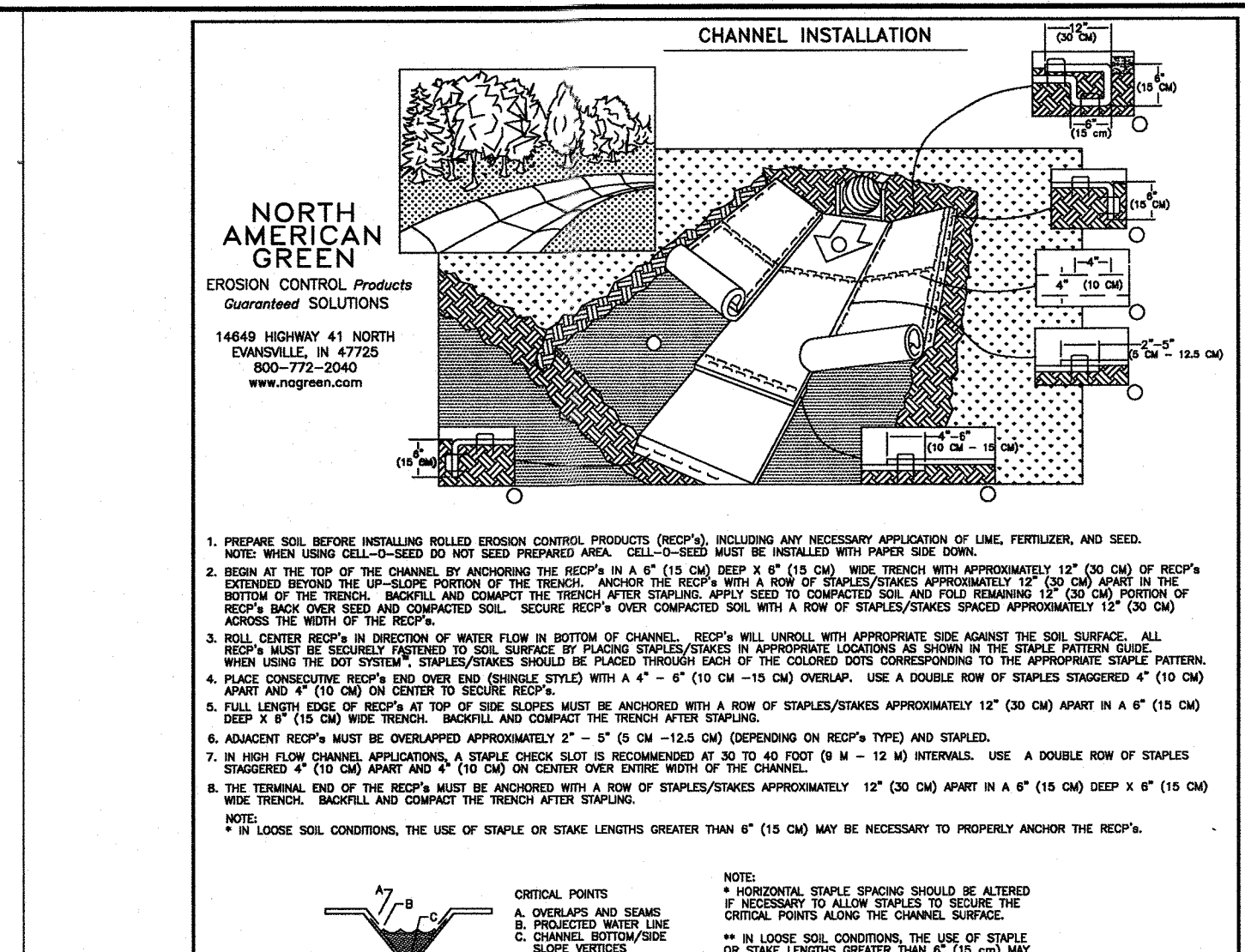
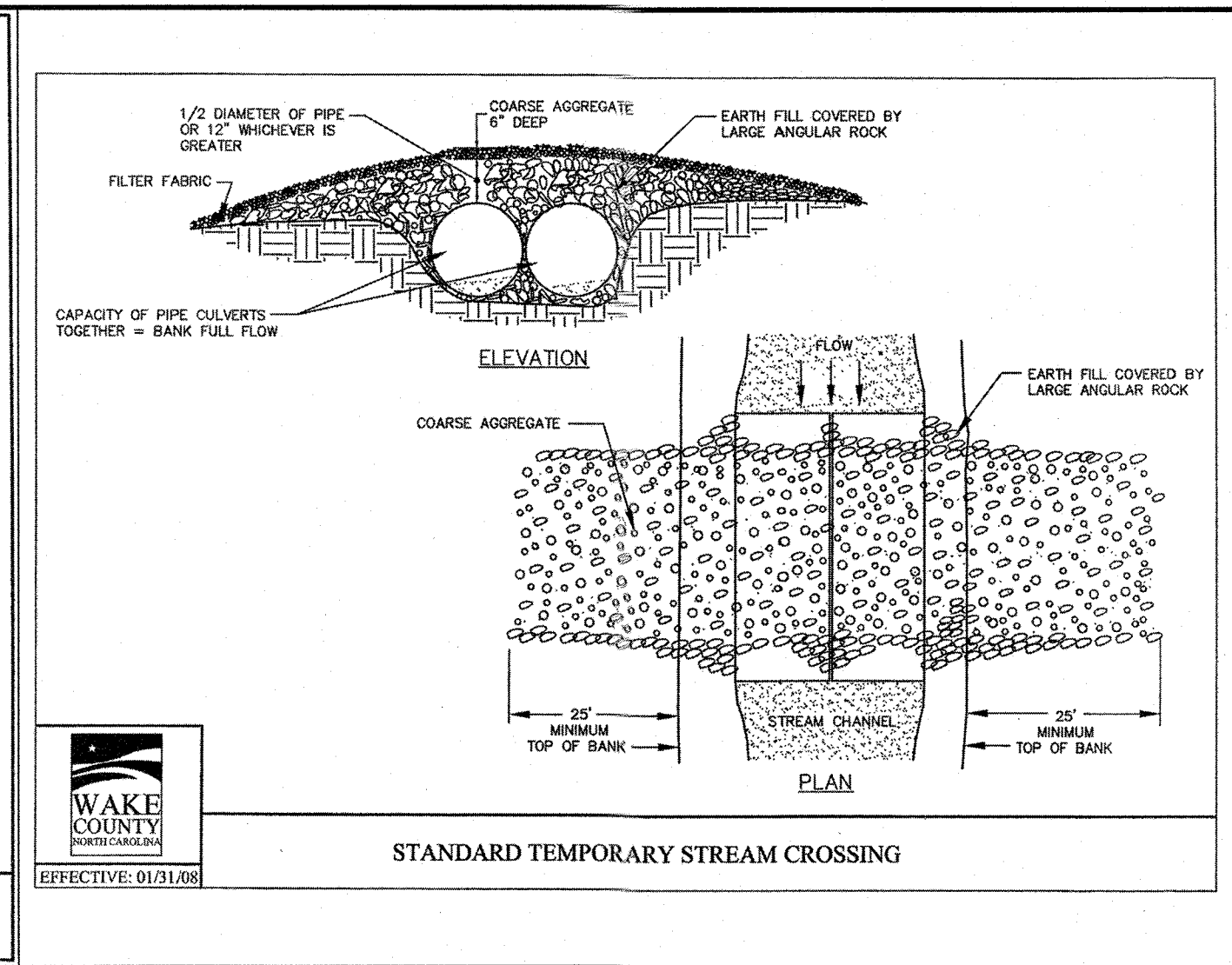
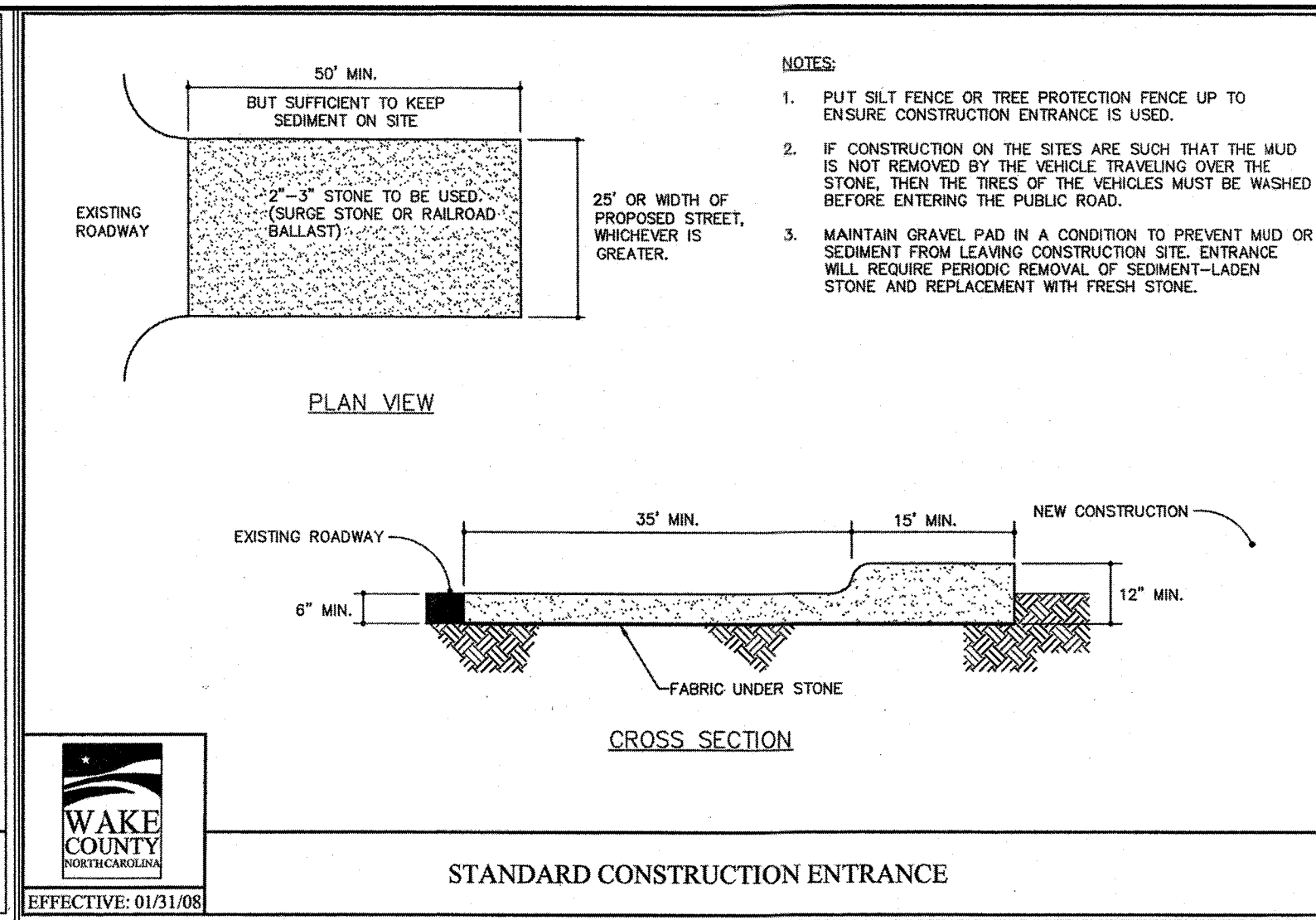
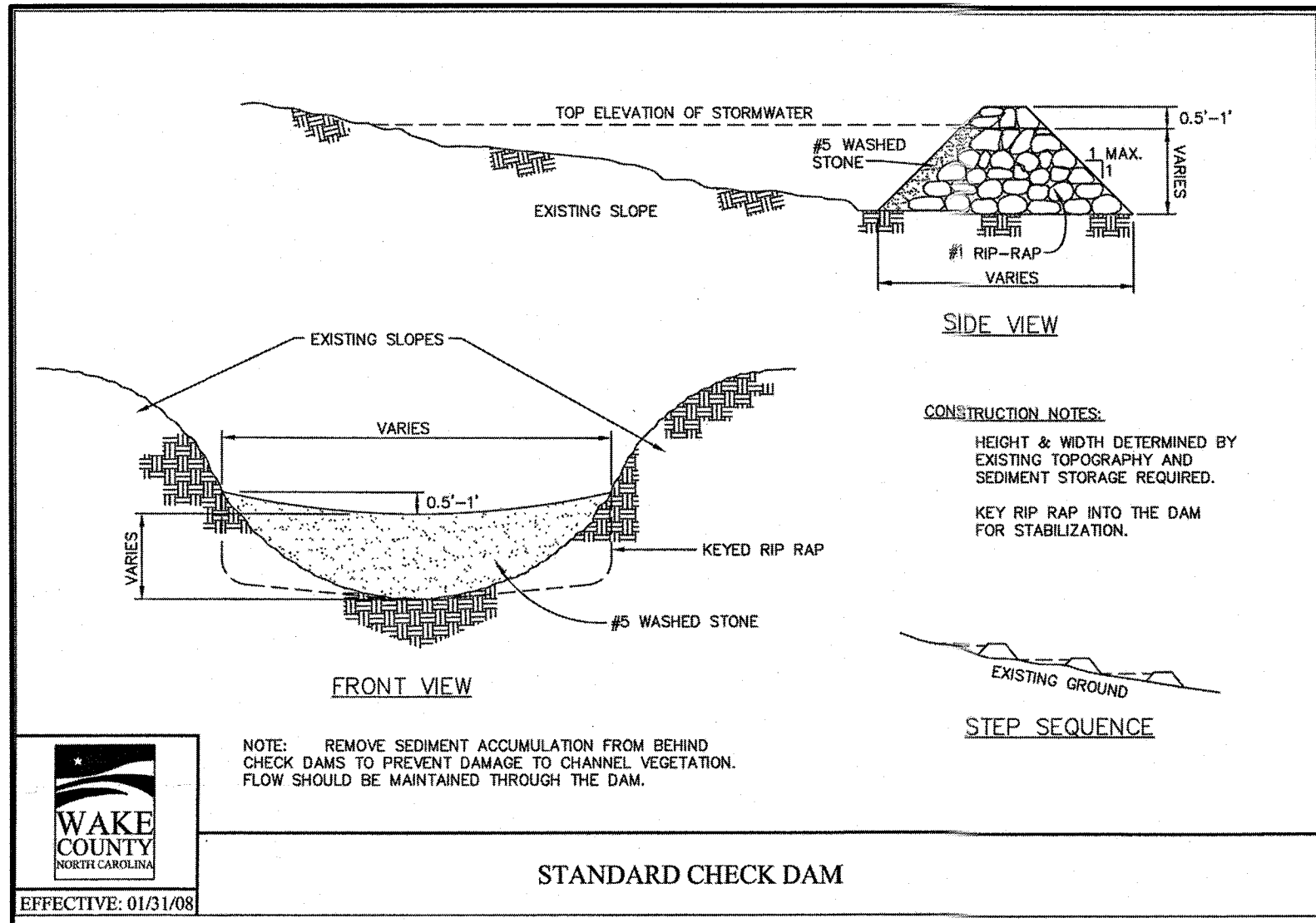
HARDIN HILL LANE EXT STA: 46+50 TO STA: 52+00

EROSION CONTROL PLAN

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JOB NO.	37909
SHEET NO.	C3.0

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TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

HARDIN HILL LANE EXT STA: 46+50 TO STA: 52+00

KNIGHTDALE - WAKE COUNTY - NORTH CAROLINA

EROSION CONTROL DETAIL SHEET

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REVISION DESCRIPTION	DATE
	09/11/2018

DATE: 09/11/2018

DRAWN BY: 331

DESIGNED BY: 331

CHECKED BY: JFC

SCALE: PER PLAN

JOB NO: 37909

SHEET NO: C3.1

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PAVEMENT MARKING NOTES

- ALL REGULATORY PAVEMENT MARKING SHALL BE HIGH VISIBILITY THERMO PLASTIC.
- PARKING SPACE STRIPING MAY BE HIGH VISIBILITY THERMO PLASTIC OR WHITE PAINT.

THIS SECTION OF ROADWAY TO BE REVIEWED AND APPROVED STONERIVER PH 1&2

EXISTING 64' RIGHT OF WAY "EMERGENCY ACCESS ROAD" DB. 12664 PG. 837 EXHIBIT G

EXISTING GRAVEL DRIVE TO REMAIN OPEN THROUGHOUT CONSTRUCTION OF PHASE 1 & 2

EXISTING 70' RIGHT-OF-WAY PROPOSED 64' RIGHT-OF-WAY 3' ON BOTH SIDES OF EXISTING RIGHT-OF-WAY TO BE ABANDONED

30" CURB & GUTTER (TYP.)

Pavement Marking Symbols - English				Pavement Marking Symbols - English					
Symbol	Description	Material	Transport Pay Item No.	Linear Length Adjustment	Symbol	Description	Material	Transport Pay Item No.	Linear Length Adjustment
T1	WHITE LINE, RR X (1/2", 120 MIL)	Thermo	470500000-E	1	TV	YELLOW DIAGONAL (12", 90 MIL)	Thermo	470000000-E	1
T2	WHITE STOPBAR (24", 120 MIL)	Thermo	471000000-E	1	UA	LEFT TURN ARROW (90 MIL)	Thermo	472500000-E	1
T3	WHITE CROSSWALK LINE (24", 120 MIL)	Thermo	471000000-E	1	UB	RIGHT TURN ARROW (90 MIL)	Thermo	472500000-E	1
T4	WHITE RUMBLE STRIP (4", 240 MIL)	Thermo	468700000-E	1	UC	STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
T5	YELLOW RUMBLE STRIP (4", 240 MIL)	Thermo	468700000-E	1	UD	COMBO. LEFT/STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
T6	WHITE EDGELINE (6", 90 MIL)	Thermo	468800000-E	1	UE	COMBO. RIGHT/STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
T7	YELLOW EDGELINE (6", 90 MIL)	Thermo	468800000-E	1	UF	COMBO. LEFT/RIGHT ARROW (90 MIL)	Thermo	472500000-E	1
T8	2 FT. - 6 FT./SP WHITE MINISKIP (4", 120 MIL)	Thermo	468800000-E	1	UG	COMBO. LEFT/RIGHT/STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
T9	2 FT. - 3 FT./SP YELLOW MINISKIP (4", 120 MIL)	Thermo	468800000-E	1	UH	HANDICAP PARKING (90 MIL)	Thermo	472500000-E	1
T10	3 FT. - 3 FT./SP WHITE MINISKIP (12", 120 MIL) (Roundabouts only)	Thermo	470200000-E	1	UI	ALPHANUMERIC CHAR. (120 MIL)	Thermo	472500000-E	1
T11	2 FT. - 6 FT./SP WHITE MINISKIP (6", 120 MIL)	Thermo	469000000-E	1	UJ	BICYCLE SYMBOL, HEATED-IN-PLACE (90 MIL)	Thermo	472500000-E	1
T12	2 FT. - 6 FT./SP YELLOW MINISKIP (6", 120 MIL)	Thermo	469000000-E	1	UK	BICYCLE STRAIGHT ARROW, HEATED-IN-PLACE (90 MIL)	Thermo	472500000-E	1
T13	3 FT. - 9 FT./SP WHITE MINISKIP (8", 120 MIL)	Thermo	469700000-E	1	UL	BICYCLE CHAR., HEATED-IN-PLACE (120 MIL)	Thermo	472500000-E	1
T14	3 FT. - 9 FT./SP WHITE MINISKIP (12", 120 MIL)	Thermo	470200000-E	1	UM	12" YIELD LINE TRIANGLE (90 MIL)	Thermo	472500000-E	1
T15	YELLOW SINGLE CENTER (8", 120 MIL)	Thermo	469000000-E	1	UN	24" YIELD LINE TRIANGLE (90 MIL)	Thermo	472500000-E	1
T16	YELLOW DOUBLE CENTER (8", 120 MIL)	Thermo	469000000-E	1	UO	BICYCLE LEFT ARROW, HEATED-IN-PLACE (90 MIL)	Thermo	472500000-E	1
T17	3 FT. - 3 FT./SP WHITE MINISKIP (8", 120 MIL) (Roundabouts only)	Thermo	469700000-E	1	UP	MERGE ARROW (90 MIL)	Thermo	472500000-E	1
TA	WHITE EDGELINE (4", 90 MIL)	Thermo	468500000-E	1	UQ	RAMP ARROW SYMBOL (90 MIL)	Thermo	472500000-E	1
TB	YELLOW EDGELINE (4", 90 MIL)	Thermo	468500000-E	1	UR	SHARROW, HEATED-IN-PLACE (90 MIL)	Thermo	472500000-E	1
TC	10 FT. WHITE SKIP (4", 120 MIL)	Thermo	468600000-E	1	US	BICYCLE LOOP DETECTOR, HEATED-IN-PLACE (90 MIL)	Thermo	472500000-E	1
TD	3 FT. - 9 FT./SP WHITE MINISKIP (4", 120 MIL)	Thermo	468600000-E	1	UT	U-TURN ARROW (90 MIL)	Thermo	472500000-E	1
TE	WHITE SOLID LANE LINE (4", 120 MIL)	Thermo	468600000-E	1	UU	FISH-HOOK STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
TF	10 FT. YELLOW SKIP (4", 120 MIL)	Thermo	468600000-E	1	UV	FISH-HOOK LEFT/STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
TH	YELLOW SINGLE CENTER (4", 120 MIL)	Thermo	468600000-E	1	UW	FISH-HOOK RIGHT/STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
TI	YELLOW DOUBLE CENTER (4", 120 MIL)	Thermo	468600000-E	1	UX	FISH-HOOK LEFT/STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
TJ	10 FT. WHITE SKIP (6", 120 MIL)	Thermo	468600000-E	1	UY	FISH-HOOK LEFT/RIGHT/STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
TK	3 FT. - 9 FT./SP WHITE MINISKIP (6", 120 MIL)	Thermo	469000000-E	1	UZ	FISH-HOOK W/CIRCLE STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
TL	WHITE SOLID LANE LINE (6", 120 MIL)	Thermo	469000000-E	1	WA	FISH-HOOK W/CIRCLE LEFT ARROW (90 MIL)	Thermo	472500000-E	1
TM	10 FT. YELLOW SKIP (6", 120 MIL)	Thermo	469000000-E	1	WB	FISH-HOOK W/CIRCLE LEFT/STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
TN	WHITE GORELINE (8", 90 MIL)	Thermo	469500000-E	1	WC	FISH-HOOK W/CIRCLE LEFT/RIGHT/STRAIGHT ARROW (90 MIL)	Thermo	472500000-E	1
TO	WHITE DIAGONAL (8", 90 MIL)	Thermo	469500000-E	1					
TP	YELLOW DIAGONAL (8", 90 MIL)	Thermo	469500000-E	1					
TQ	WHITE CROSSWALK LINE (8", 120 MIL)	Thermo	468700000-E	1					
TR	WHITE SOLID LANE LINE (8", 120 MIL)	Thermo	468700000-E	1					
TS	WHITE GORELINE (12", 90 MIL)	Thermo	470000000-E	1					
TT	WHITE SOLID LANE LINE (12", 120 MIL)	Thermo	470000000-E	1					
TU	WHITE DIAGONAL (12", 90 MIL)	Thermo	470000000-E	1					

SIGN LEGEND

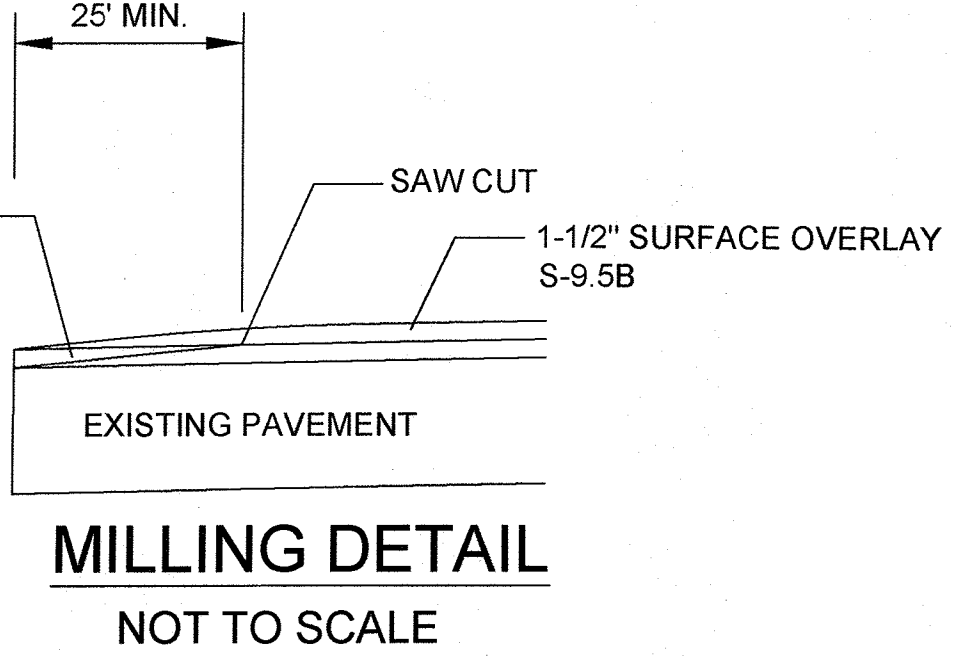
- ALL SITE SIGNAGE SHALL BE IN ACCORDANCE WITH THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND NCDOT STANDARDS.

SIZE	MUTCD STD.
YIELD	R1-2
YIELD AHEAD	W3-2
STOP	R1-1
PEDESTRIAN CROSSING	S1-1
CROSSING ARROW	W16-7P
ROUNDABOUT WARNING	W2-6
ROUNDABOUT CHEVRONS	R6-4A
25 MPH NEIGHBORHOOD ROAD CLOSED STREET SIGN	R2-1
	R2-5bP
	R11-2
	D3-1
- ALL SIGNS SHALL BE MOUNTED WITH 7" MIN. VERTICAL CLEARANCE TO THE BOTTOM OF THE SIGN ON 3-LB. GALV. STEEL U-CHEANNEL POST SET IN 3-FT DEEP x 12-IN DIA. CONCRETE FOOTING.
- ALL SIGNAGE SHALL BE FIELD STAKED AND THE LOCATIONS APPROVED BY THE TOWN OF KNIGHTDALE AND/OR NCDOT PRIOR TO SIGN INSTALLATION.
- CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL AS REQUIRED BY THE TOWN OF KNIGHTDALE, THE CURRENT MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND ALL NCDOT STANDARDS AND SPECIFICATIONS.
- THE TOWN OF KNIGHTDALE REQUIRES ALL REGULATORY PAVEMENT MARKINGS TO BE HI-VIS THERMOPLASTIC, EXCEPT FOR PARKING SPACE STRIPING WHICH MAY BE WHITE PAINT.

LEGEND

EXISTING WETLANDS	[Symbol]
STORMWATER EASEMENT	[Symbol]
PROPOSED SIDEWALK	[Symbol]
100-YR FLOODPLAIN	[Symbol]
EXISTING WETLAND BUFFER	[Symbol]
50' NEUSE RIPARIAN BUFFER	[Symbol]
PROPERTY LINE	[Symbol]
PHASE LINE	[Symbol]
EXISTING SS EASEMENT	[Symbol]
PROPOSED SS EASEMENT	[Symbol]
PROPOSED DRAINAGE EASEMENT	[Symbol]

- FOR PAVEMENT JOINT AT END OF EXISTING PAVEMENT, USE THE FOLLOWING STEPS:
- SAWCUT EXISTING PAVEMENT TO CREATE STRAIGHT, NEAT JOINT LINE.
 - MILL EXISTING PAVEMENT 1" DEPTH AND 2" FROM SAWCUT LINE.
 - TACK JOINT PRIOR TO INSTALLING NEW PAVEMENT.
 - INSTALL NEW PAVEMENT SO SURFACE COURSE FORMS SMOOTH TRANSITION.



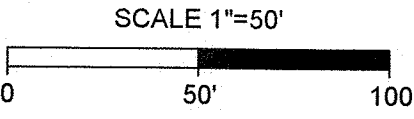
TOWN CERTIFICATION

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.

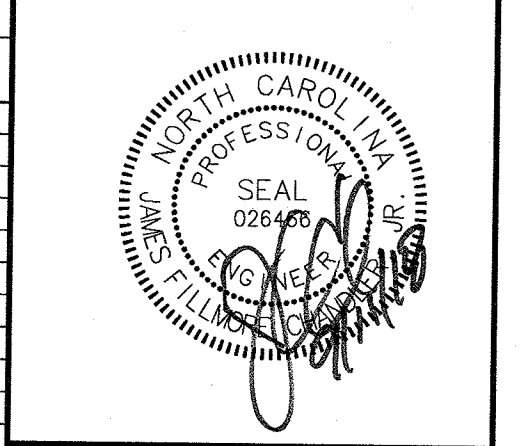
BY: *[Signature]* DATE: 10-26-2018
DEVELOPMENT SERVICES ENGINEER

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

BY: *[Signature]* DATE: 10-26-18
ADMINISTRATOR



SEE MILLING DETAIL (THIS PAGE) FOR ADDITIONAL INFORMATION ON PAVEMENT CONNECTION AND REPAIR



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SCALE	PER PLAN

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NORTH CAROLINA LICENSE NO. C-1652

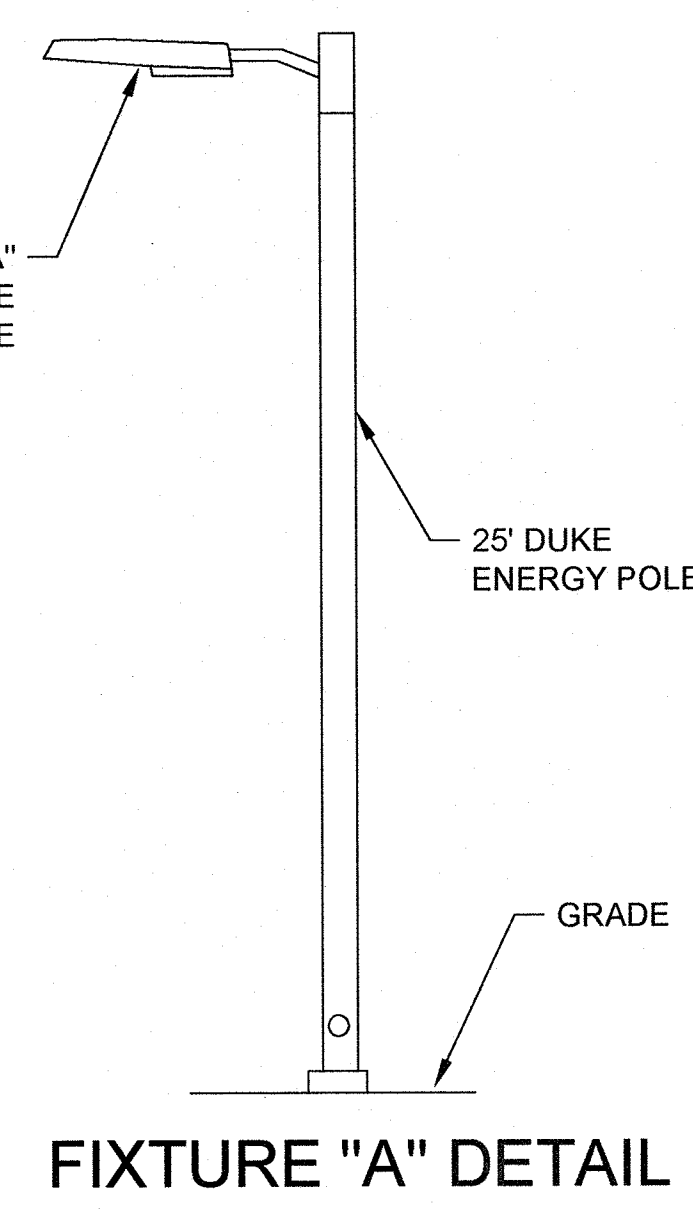
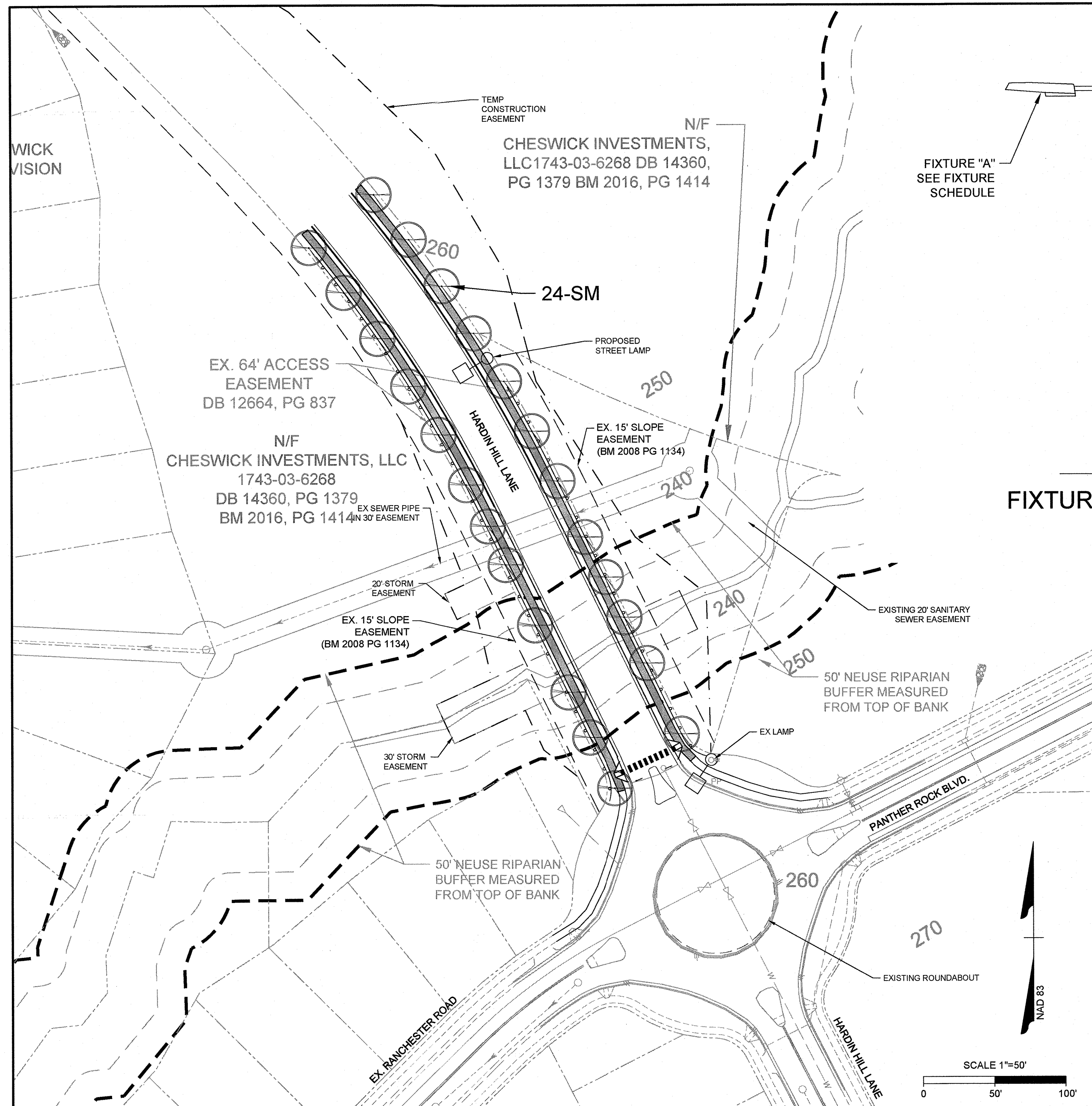
HARDIN HILL LANE EXT STA: 46+50 TO STA: 52+00

KNIGHTDALE - WAKE COUNTY - NORTH CAROLINA

SIGNAGE & MARKING PLAN

JOB NO. 37909
SHEET NO. C4.0

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Outdoor Lighting
Roadway LED

The Roadway LED is a green solution and great fit for streets, roads, long, narrow areas and parking lots. This energy-efficient luminaire delivers the light where it is needed while increasing visibility and reducing spill light to adjoining properties. Choose low to medium light output on wood or fiberglass poles (or mount on an existing pole). Available with one to four fixtures per pole, depending on the fixture/pole combination selected.

For additional information, visit duke-energy.com/OutdoorLighting or call us toll free: 800.244.6900 (OH and KY) 800.521.2232 (IN)

LED (Light Emitting Diode) 50 | 70 | 110 | 150 | 220 | 280 watts

Mounting heights 15', 20', 25', 30', 35'

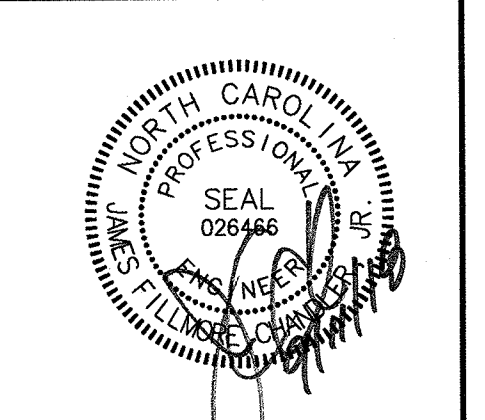
Colors Bronze, Black, Gray, Green

Poles Style A, C, Wood

Light source: LED (white)
Voltage: 50 | 70 | 110 | 150 | 220 | 280
Light pattern: ICESNA Type III (low)
ICESNA cutoff classification: Full cutoff
Color temperature: 4,000K
Warm-up and restrike time: Instant on (no warm-up or restrike time)

Poles available:		
Name	Mounting height	Color
Aluminum	15', 20', 25', 30', 35'	Bronze, Black, Gray, Green
Wood	25', 30', 35'	Standard

Features	Benefits
No installation cost	Frees up capital for other projects
Design services by lighting professionals included	Meets industry standards and lighting ordinances
Maintenance included	Eliminates high and unexpected repair bills
Electricity included	Less expensive than metered service
Warranty included	Worry-free
One low monthly cost on your electric bill	Convenience and savings for you
Turnkey operation	Provides hassle-free installation and service
Backed by over 40 years of experience	A name you can trust today ... and tomorrow



THIS DRAWING PREPARED AT THE
RALEIGH OFFICE
5410 Trinity Road, Suite 102 | Raleigh, NC 27607
TEL 919.866.4951 FAX 919.833.8124 www.timmons.com

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DATE	REVISION DESCRIPTION
09/11/2018	

LEGEND

- LED STREET LIGHTS (9,500 LUMENS LED 75 ROADWAY LIGHT) ALUMINUM POLE - HEIGHT 30'
- STREET / SHADE TREE

HARDIN HILL LANE EXT. - LUMINAIRE SCHEDULE

TYP	SYMBOL	DESCRIPTION	LAMP	LUMENS	MOUNTING /BALLAST	LLF
A		LED ROADWAY TYPE II LED LIGHT FIXTURE, MOUNT ON 25' POLE	(1) 50W LED 4000 K	4476	25' DUKE ENERGY POLE	0.64

PLANT LIST - Street Trees							
KEY	BOTANICAL NAME	COMMON NAME	QTY.	SIZE	HEIGHT	ROOT	COMMENTS
SM	Acer saccharum	Sugar Maple	24	2" Cal.	8' Min.	B&B	

SCOPE OF WORK:
FURNISH ALL LABOR, MATERIALS, AND EQUIPMENT REQUIRED OR INDICATED BY THE DRAWINGS AND SPECIFICATIONS TO COMPLETE THE WORK INCLUDING INSTALLATION OF ALL TREES, SHRUBS, GROUNDCOVER, ANNUALS, SEED, SOD AND MULCH.

MATERIALS AND WORK:
THE SELECTION OF ALL MATERIALS AND THE EXECUTION OF ALL WORK REQUIRED UNDER THE CONTRACT SHALL BE SUBJECT TO APPROVAL BY THE OWNER. THE OWNER SHALL HAVE THE RIGHT TO REJECT AND ALL MATERIALS AND ANY AND ALL WORK, WHICH IN HIS OPINION, DOES NOT MEET THE REQUIREMENTS OF THE CONTRACT.

PLANT MATERIALS:
ALL PLANT MATERIALS SHALL BE NURSERY GROWN, FRESHLY DUG IN THE FIELD, NATURALLY SHAPED, WELL BRANCHED, FULLY FOLIATED WHEN IN LEAF WITH FULLY DEVELOPED ROOT SYSTEMS. TREES MUST BE SELF SUPPORTING, WITH STRAIGHT TRUNKS AND LEADERS IN TACT. ALL PLANTS MUST BE FREE OF DISEASE, INSECT INFESTATION OR THEIR EGGS AND SHALL HAVE BEEN GROWN IN CLIMATIC CONDITIONS SIMILAR TO THOSE OF THE PROJECT SITE

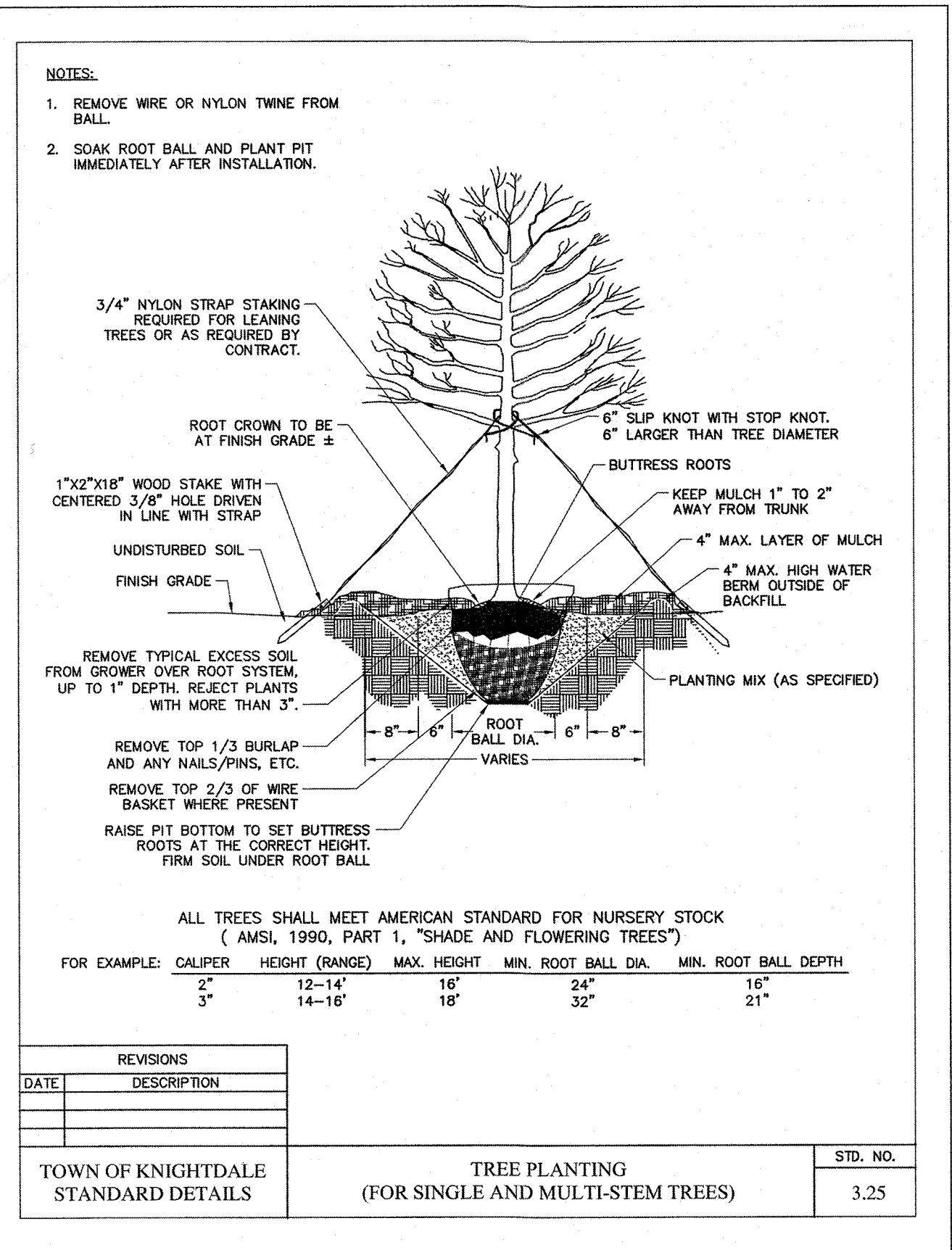
PLANT SIZE:
SPECIFIED SIZES INDICATES THE MINIMUM ALLOWABLE SIZE AT PLANTING. WHERE CONTAINER AND HEIGHT SPREADS ARE INDICATED FOR A SINGLE SPECIES, BOTH SIZE REQUIREMENTS SHALL BE MET WHEN ONLY PLANT HEIGHT OR SPREAD ARE INDICATED. CONTAINER SIZE SHALL BE BASED ON ANSI STANDARDS.

ORGANIC MATTER:
AGED MANURE, COMPOST OR PINE BARK FINES, AT THE OPTION OF THE CONTRACTOR, MATERIAL SHALL BE AIR DRIED, FINELY SHREDDED AND SUITABLE FOR HORTICULTURAL PURPOSES AND SHALL CONTAIN NO MORE THAN 35 MOISTURE CONTENT BY WEIGHT.

PINE BARK MULCH:
ALL PINE BARK MULCH SHALL BE CLEAN, DOUBLE GROUND, FINE TEXTURED NUGGET MULCH WITH MINIMAL AMOUNTS OF SAPWOOD CONTENT.

TURF AREAS:
PRIOR TO ANY SEEDING OR SOD APPLICATION, VERIFY THAT ALL TRENCHING AND LAND DISTURBING ACTIVITIES HAVE BEEN COMPLETED. ENSURE ALL AREAS ARE FREE OF STONES, LARGE SOIL CLODS AND ANY OTHER CONSTRUCTION DEBRIS.

- NOTES:**
- CONTRACTOR SHALL CONTACT UTILITY LOCATOR SERVICE TO VERIFY ALL SUBSURFACE UTILITIES PRIOR TO AND DIGGING OR CONSTRUCTION ON THE SITE. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE RESULTING FROM HIS ACTIVITIES.
 - PLANT MATERIAL ON THIS SITE MUST BE INSTALLED IN CONFORMANCE WITH THE GENERAL PLANTING NOTES AND DETAILS ON THIS PLAN.
 - ALL SOD TO BE REBEL FESCUE IV, TURF GEM, LESCO OR EQUAL. ALL SEED TO BE REBEL FESCUE IV, TURF GEM, LESCO OR EQUAL @ 6 LBS. PER 1000 S.F.
 - ALL MULCH SHALL BE DOUBLE GROUND PINE BARK MULCH TO A DEPTH OF 4".
 - ALL ABOVE GROUND ELECTRICAL TRANSFORMERS, DUMPSTERS, AND BACKFLOW PREVENTION VALVE HOT BOXES SHALL BE SCREENED FROM VIEW WHILE MAINTAINING REQUIRED ACCESS TO LOCAL CODE STANDARDS AND REQUIREMENTS.
 - DO NOT ALTER PLANTS WITHOUT PERMISSION FROM THE TOWN OF KNIGHTDALE AND THE DESIGN FIRM OR OWNER. NOTIFY THE DESIGN FIRM OF ANY DISCREPANCIES ON THE PLAN.
 - LANDSCAPE CONTRACTOR SHALL PROVIDE DESIGN BUILD IRRIGATION PROPOSAL TO THE OWNER FOR PROJECT AREAS TO BE SPECIFIED BY THE OWNER.
 - CONTRACTOR SHALL PROVIDE 6" PVC SLEEVES UNDER STREETS AND DRIVE AISLES FOR IRRIGATION LINES.
 - STREET TREES SHALL BE LOCATED BEHIND THE SIDEWALK.



- 11.5 Additional Outdoor Lighting Standards for Specific Lighting Types**
In addition to meeting the general lighting standards in Section 11.4, the following types of lighting shall also meet the additional specific standards listed below.
- A. Street Lighting**
Street lighting shall be placed on all streets by the developer to allow for the safe use of streets by cars, cyclists and pedestrians. Developer placed lighting shall also include all improved frontages on local and NCDOT streets. Developers requesting upgrades from the Town's minimum street light specification of a fiberglass pole with a fully-shielded, arm-mounted LED fixture shall pay the Town up front the difference in the costs of maintenance for the desired LED fixture and pole covering a period of 10 years. Developers interested in pursuing this option should consult with the Administrator concerning the Town's "Premium Lighting Policy". All street lighting shall conform to the specific standards for LED lighting in subsection 'B' as well as the following design standards:
- Average Spacing Maximums:** The following maximum average spacing requirements between street lights shall apply to all local, collector and arterial street classifications according to the use context of the adjacent land as listed below, except alleys (Section 17.3A1) which are exempt from said requirements.
 - Local & Collector Streets:**
 - Residential at less than three (<3) unit per acre - 500 feet
 - Residential from three (3.0) to eight (8.0) units per acre - 250 feet
 - Residential over eight (>8.0) units per acre - 150 feet
 - All other uses - 300 feet
 - Arterial Streets:** All uses - 150 feet
 - Minimum Initial Delivered Lumen Levels:**
 - Local Streets - 4,800 lumens
 - Collector Streets in Residential Areas - 12,500 lumens
 - Collector Streets in Other Areas - 12,500 lumens
 - Arterial Streets - 18,500 lumens
 - BUG Rating:** All street lights shall be fully-shielded (no light at or above horizontal) and shall not exceed the following BUG ratings established for each type of street:
 - Local Streets - B1, U1, G1
 - Collector Streets in Residential Areas - B2, U2, G2
 - Collector Streets in Other Areas - B3, U3, G3
 - Arterial Streets - B3, U3, G3
 - Placement:**
 - Although the primary purpose of street lighting is to provide adequate lighting for the roadway, street lighting should also promote pedestrian. Therefore, lighting should be placed in a manner to minimize the casting of shadows on sidewalks.
 - Lighting shall be placed as far from street trees as the landscaping plan will allow.
 - Lights on newly constructed streets shall be alternately staggered on each side of the street wherever possible.
 - Lighting shall be placed at all street intersections, in street curves and at the end of any street or cul-de-sac.
- (Note: For additional information on the connectivity and circulation of streets, please refer to Chp. 9)

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: 10-26-2018
TOWN ENGINEER

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

BY: DATE: 10-26-18
ADMINISTRATOR

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

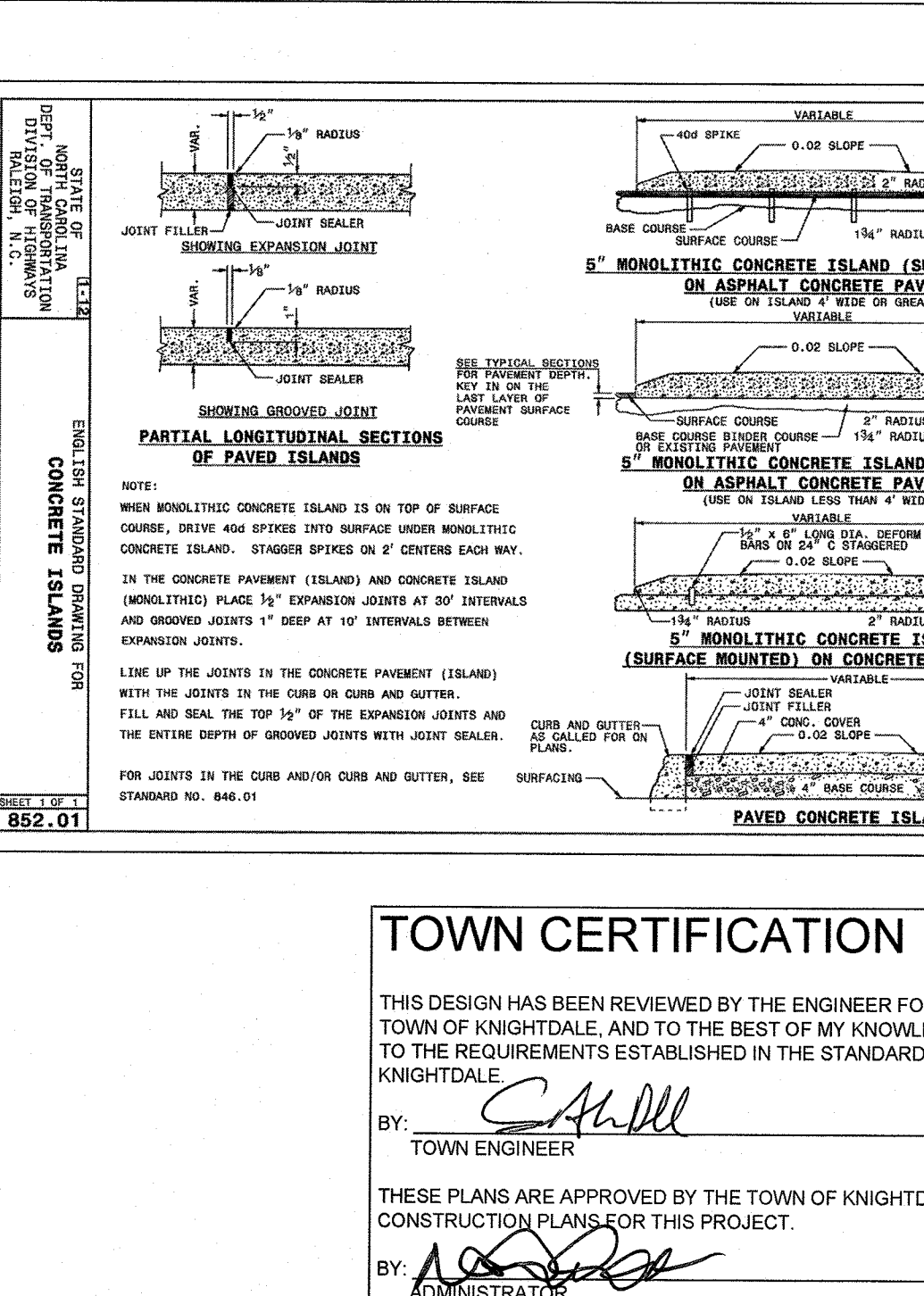
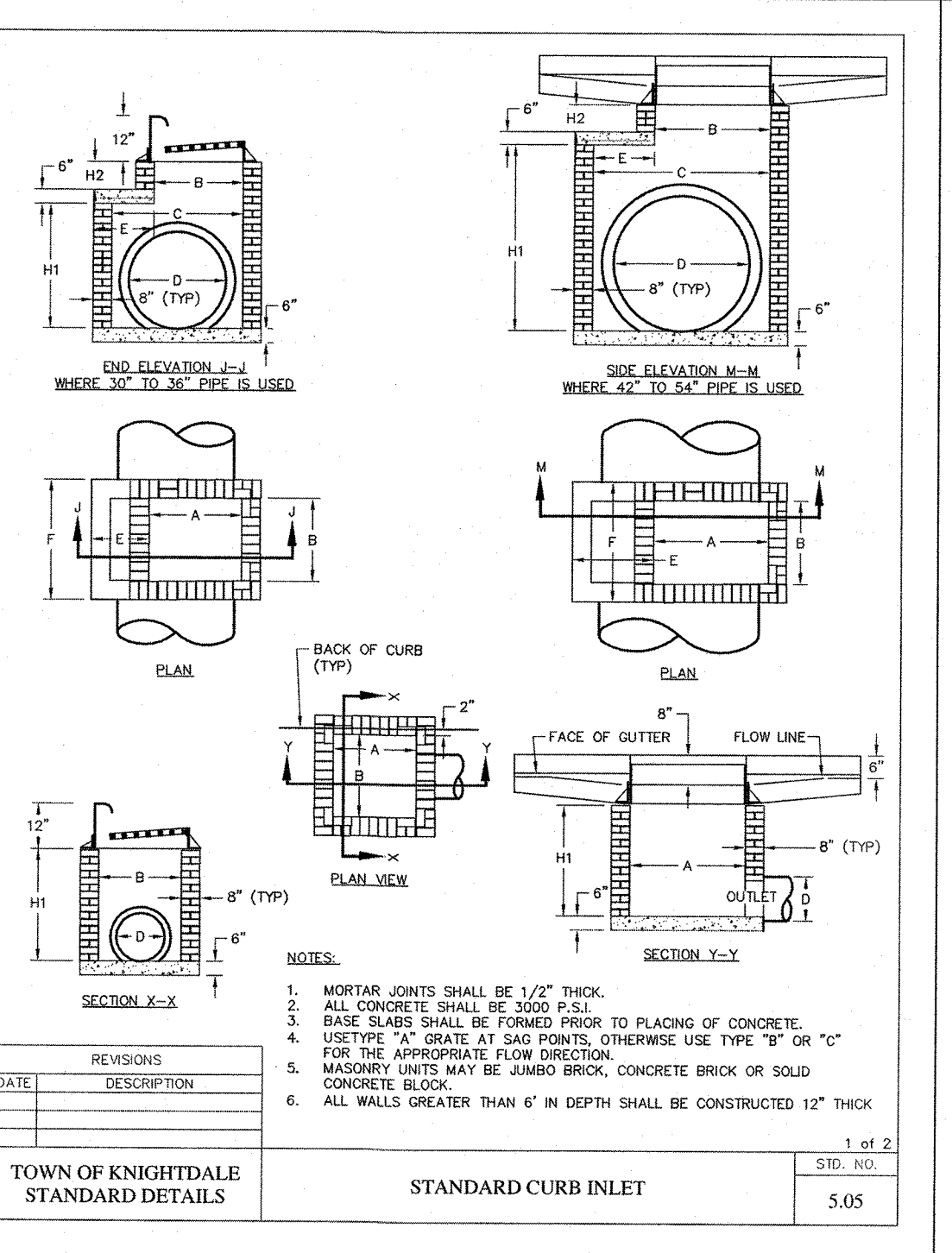
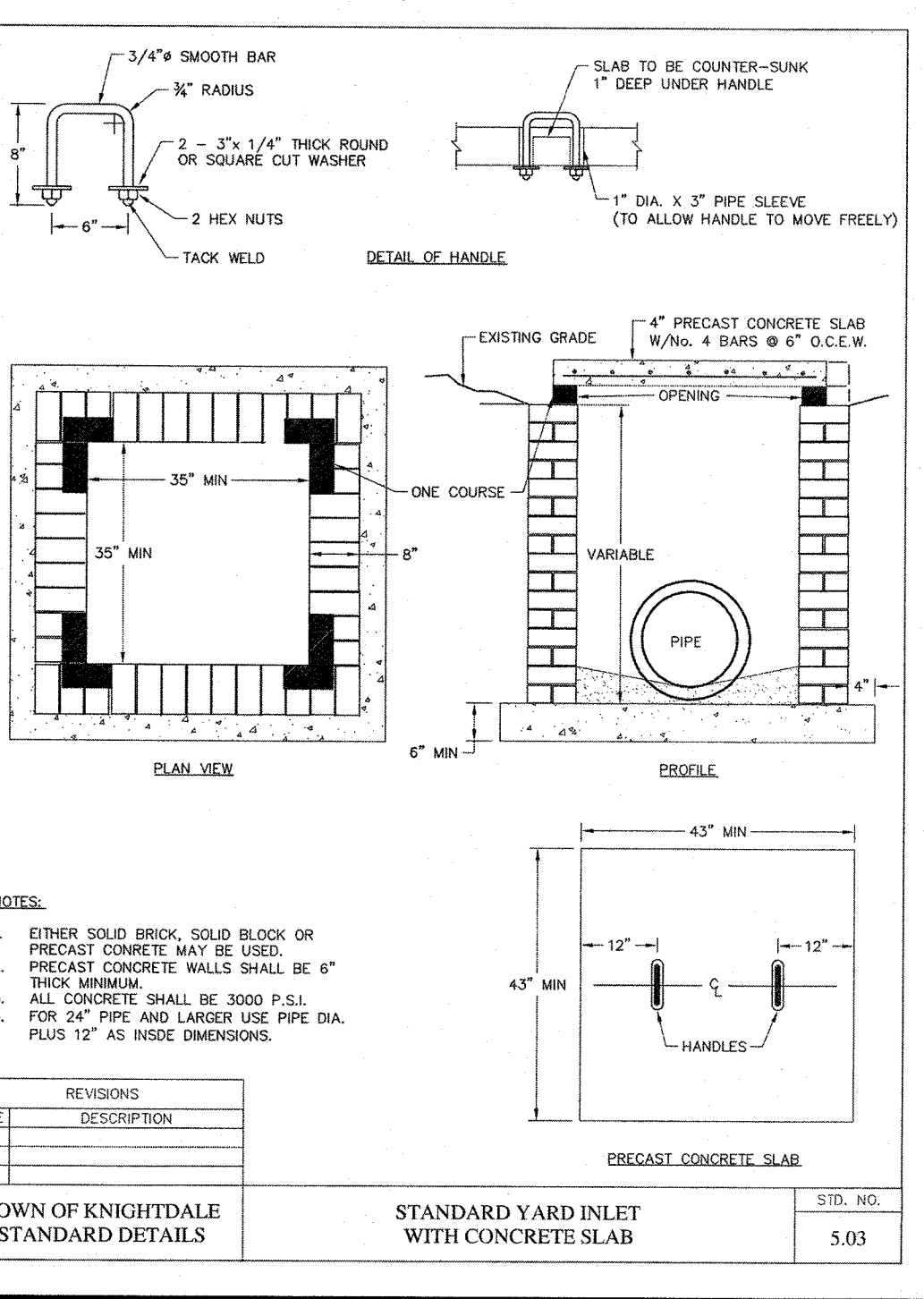
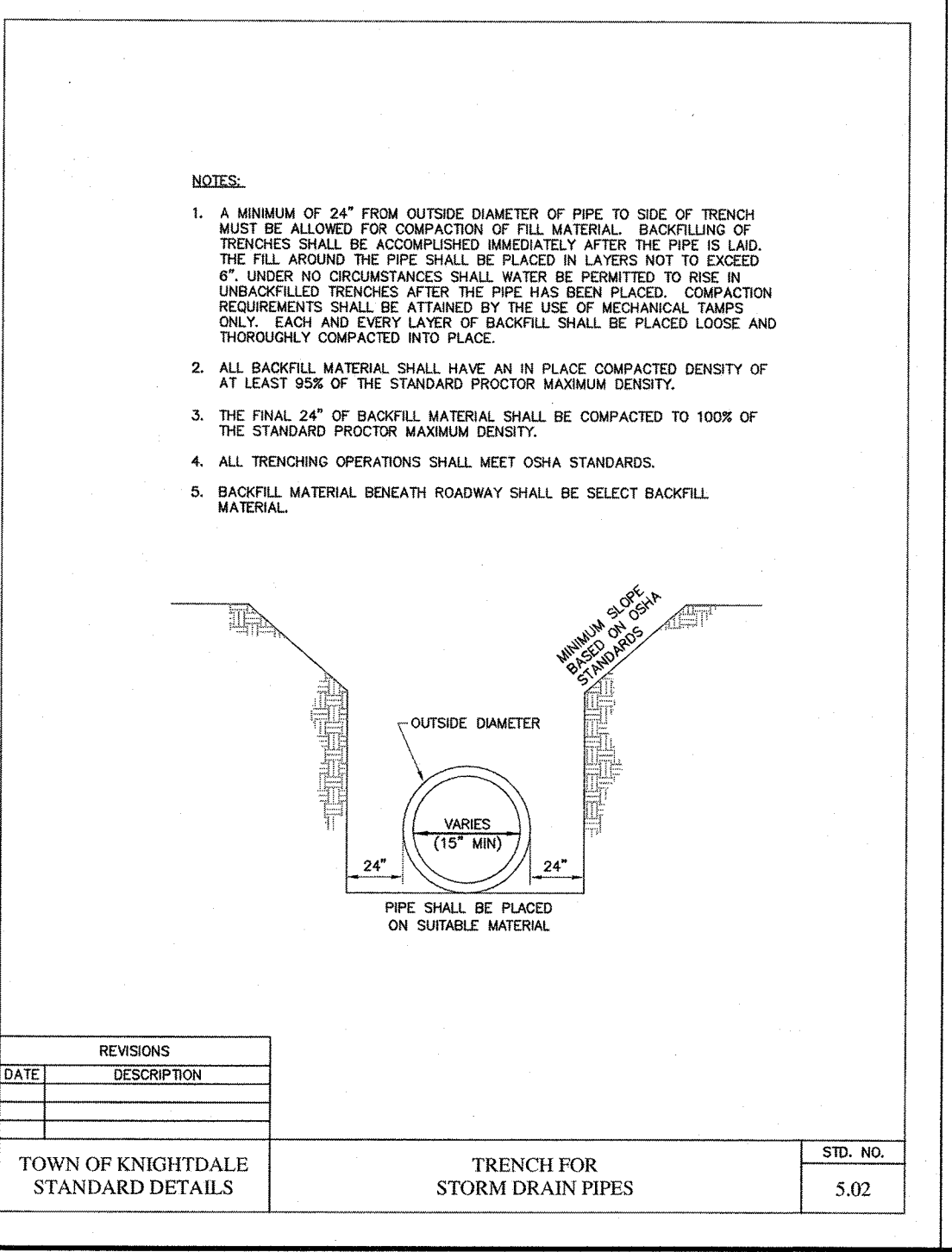
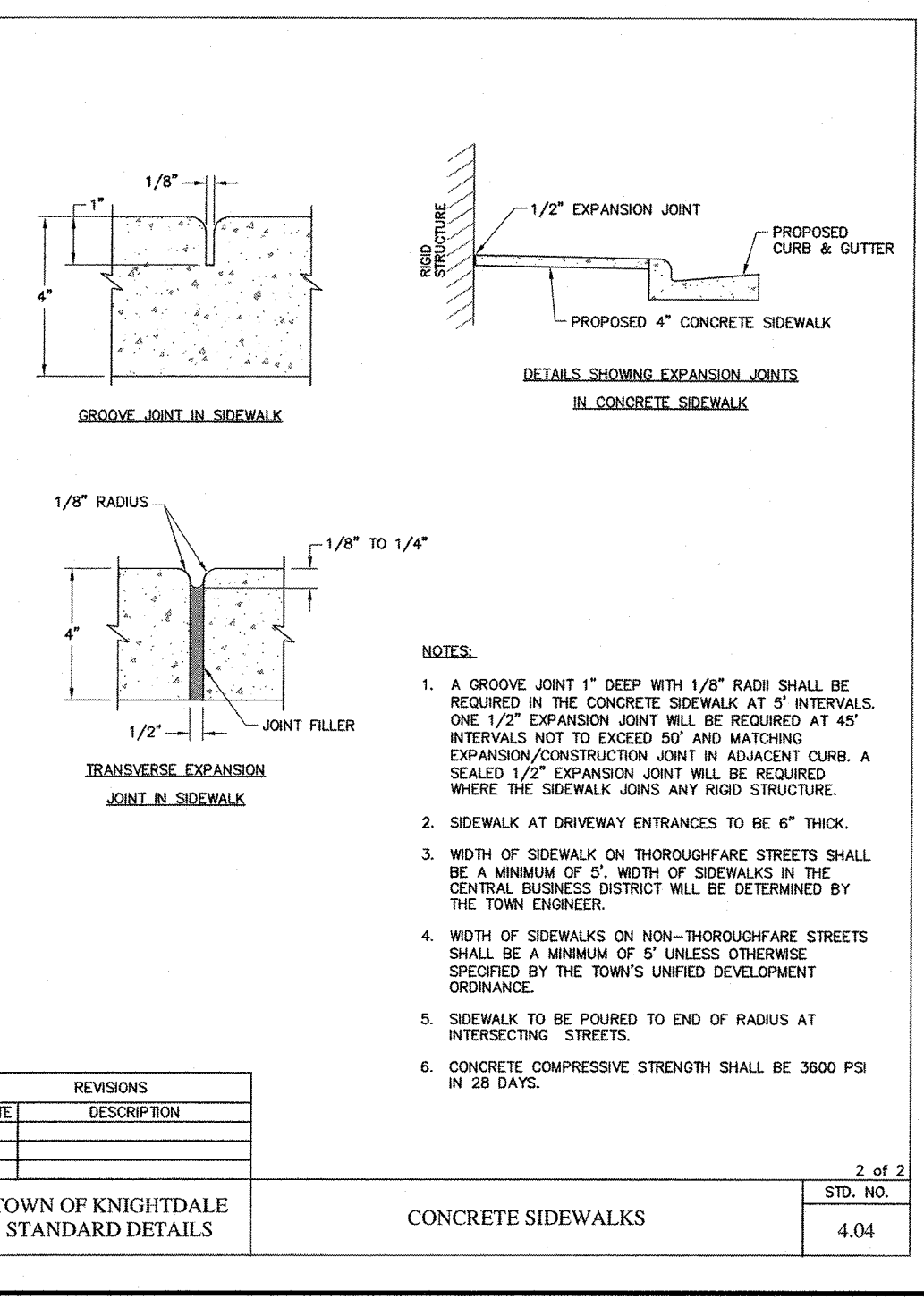
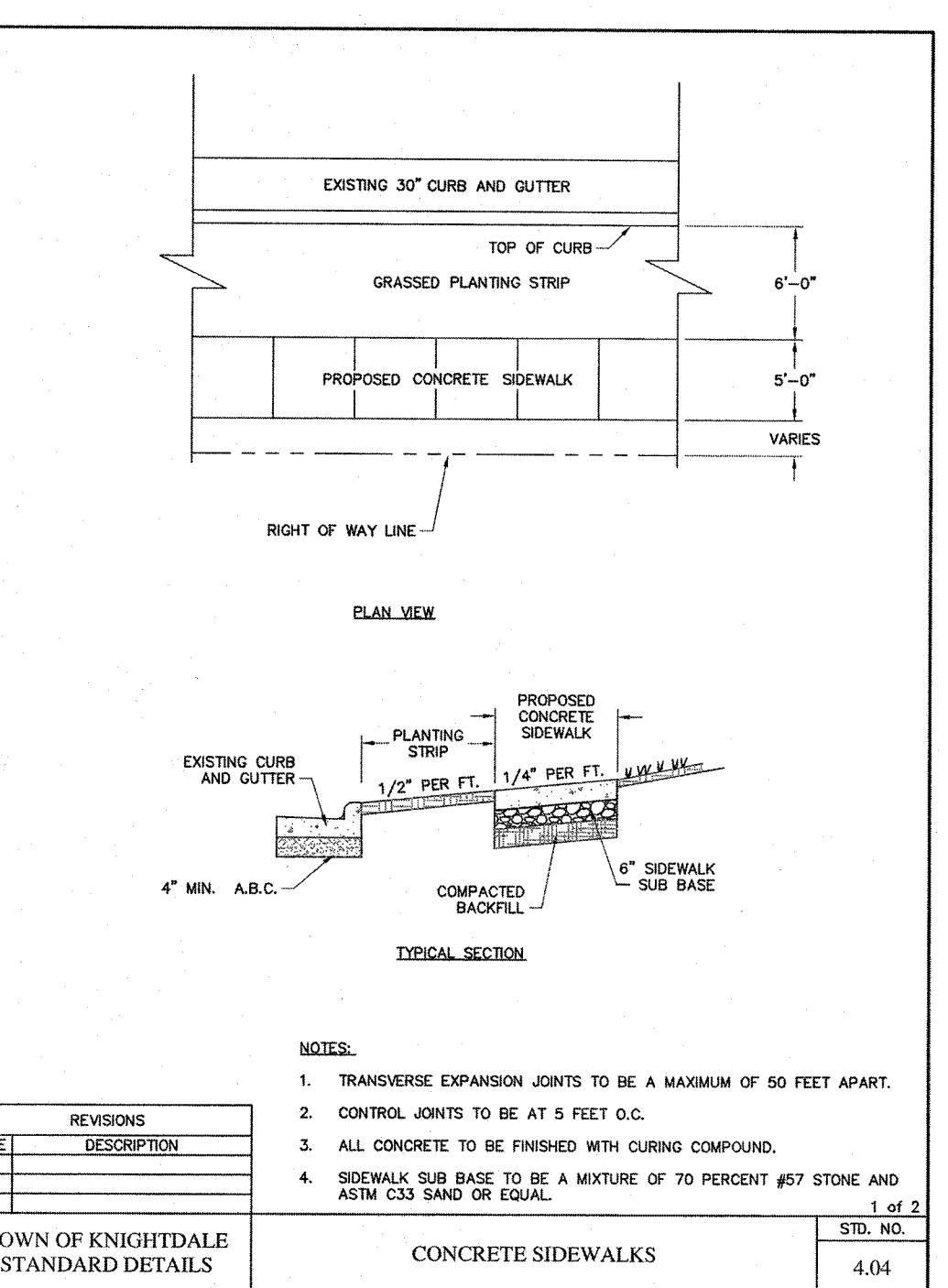
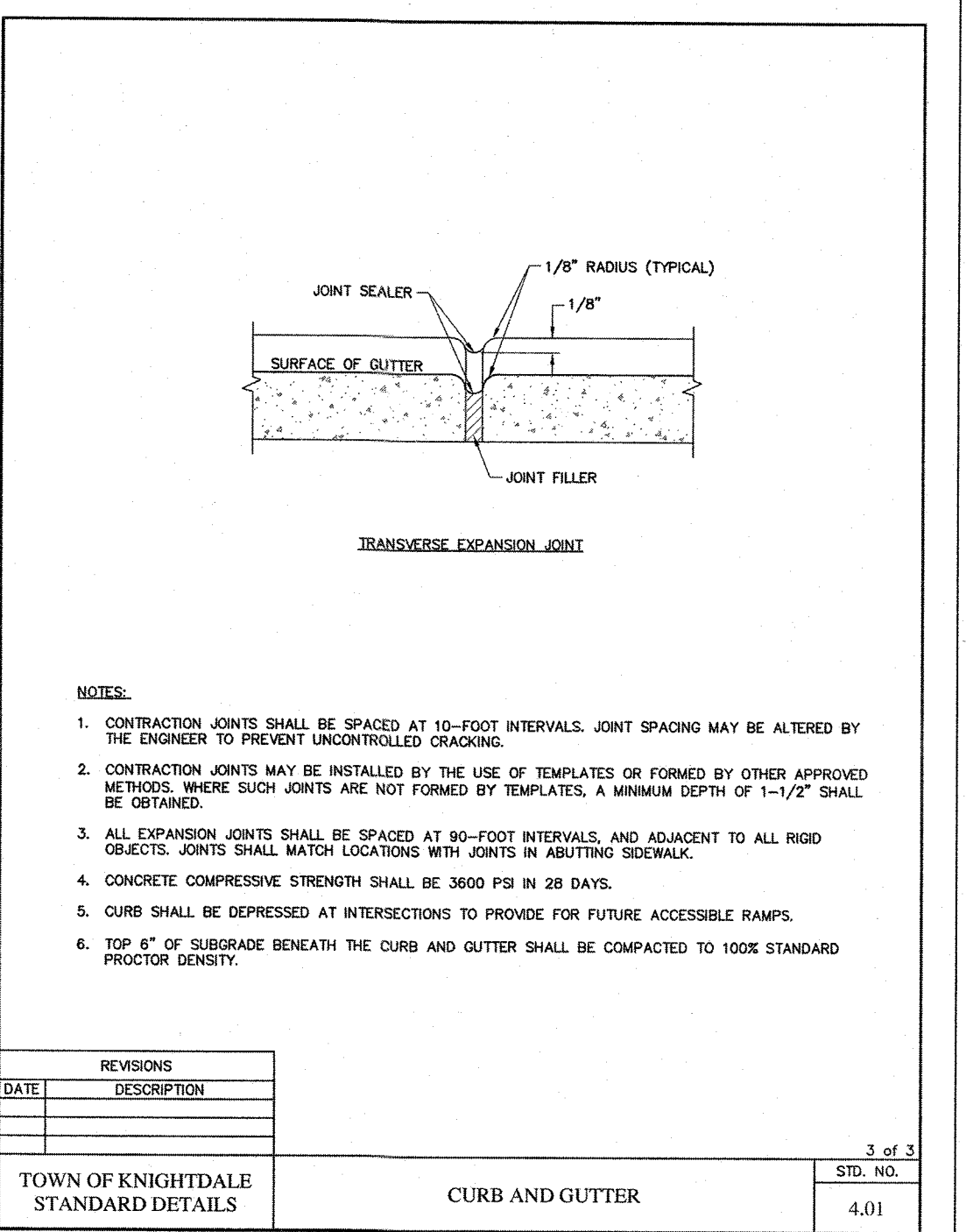
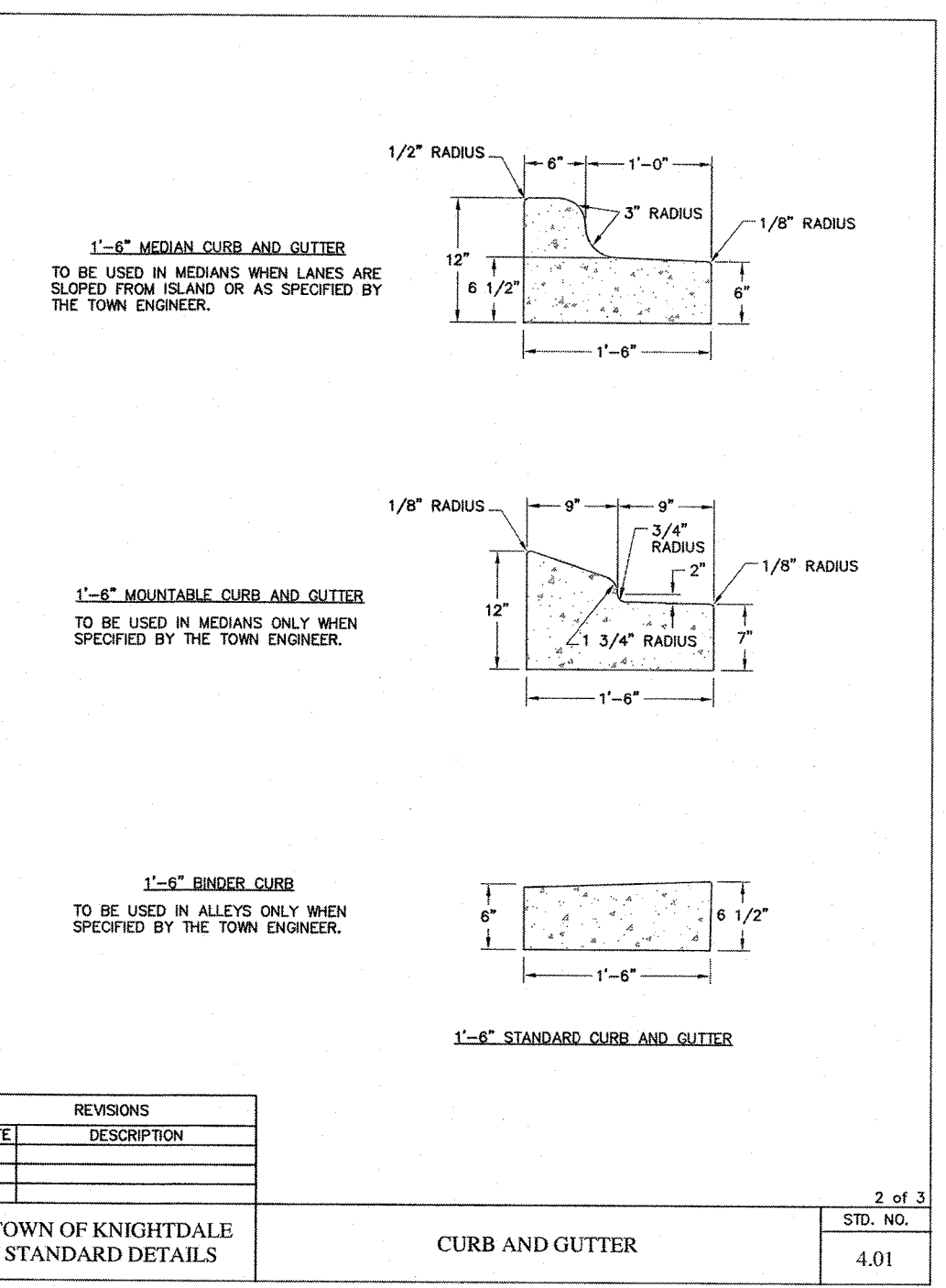
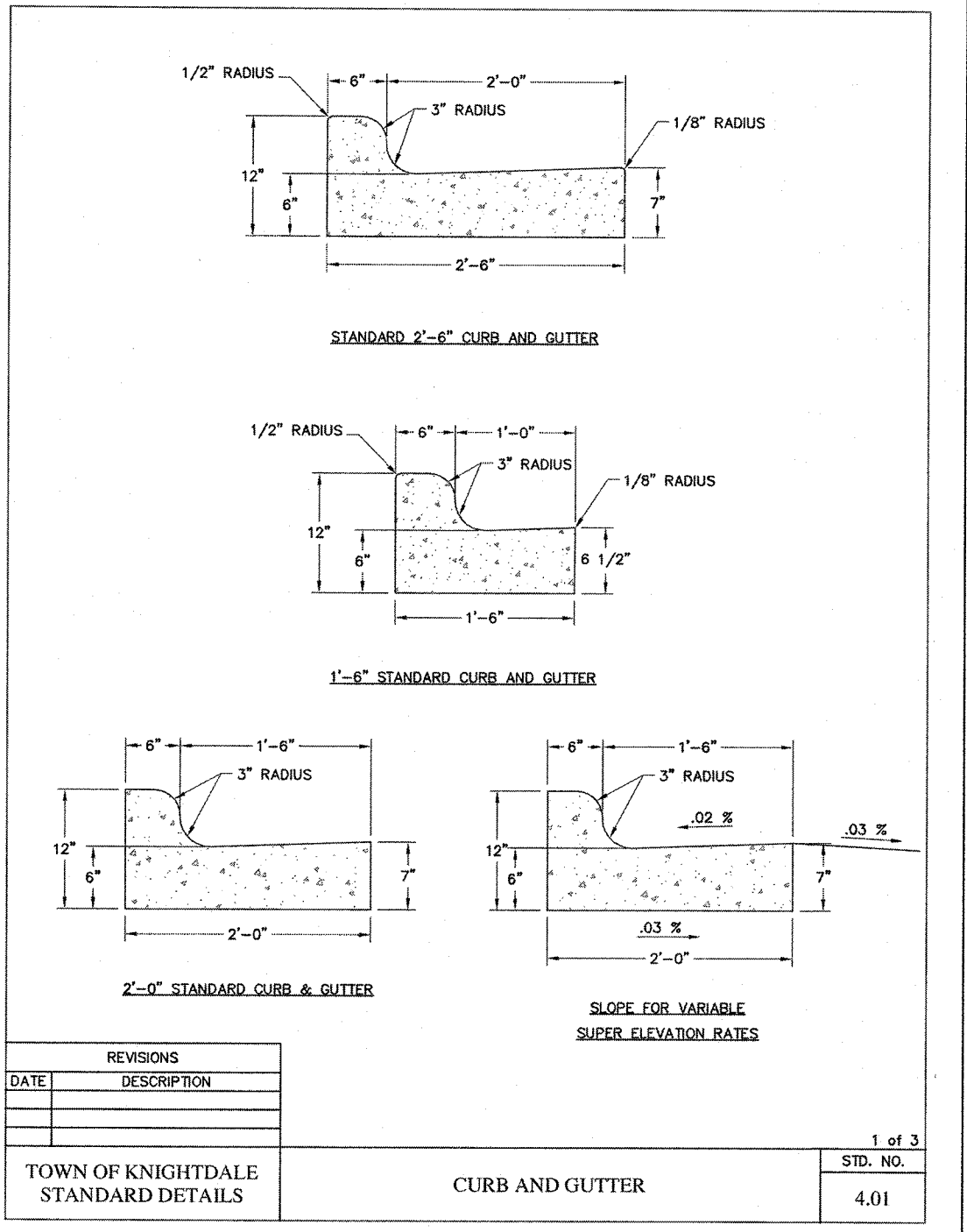
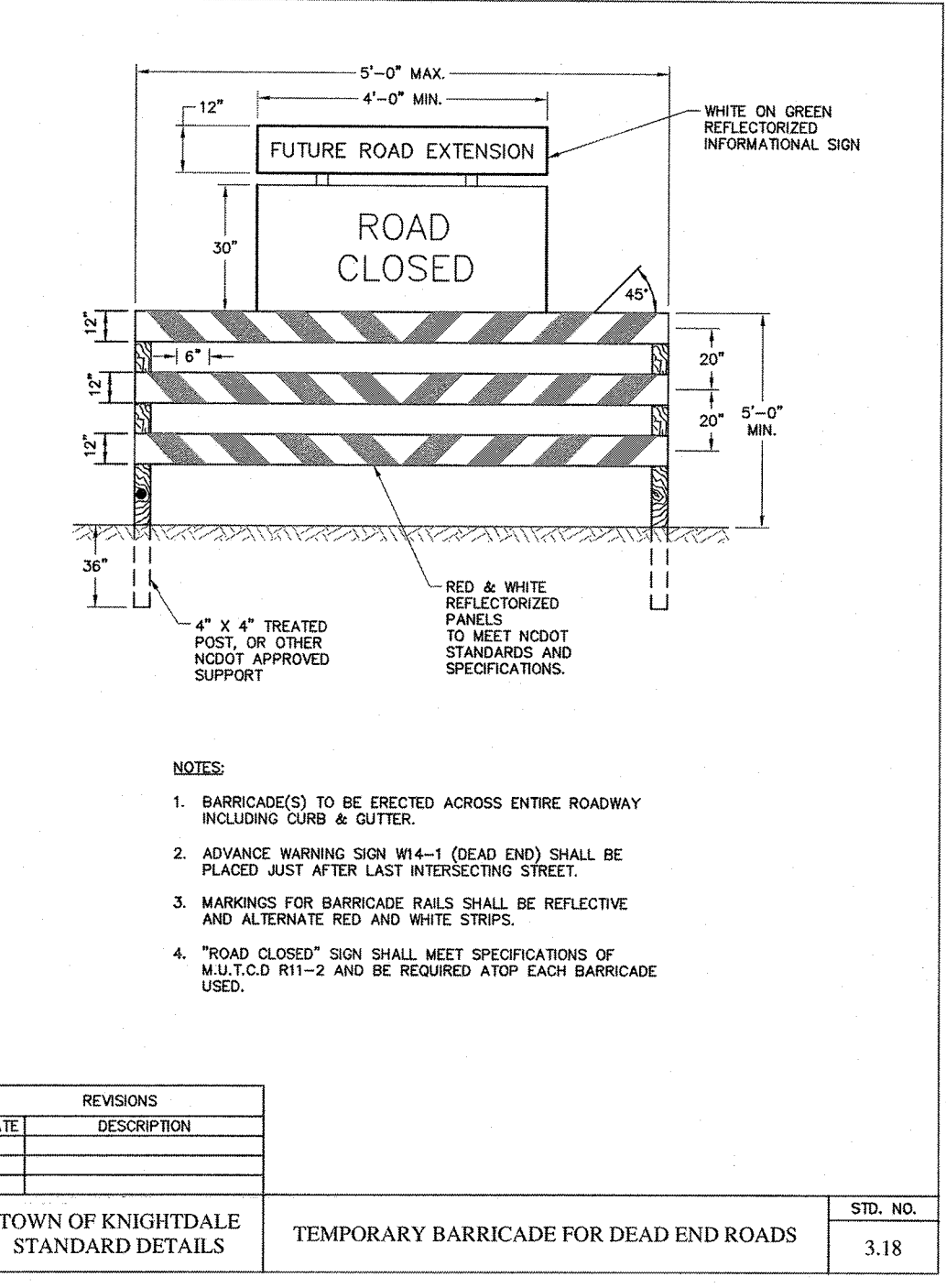
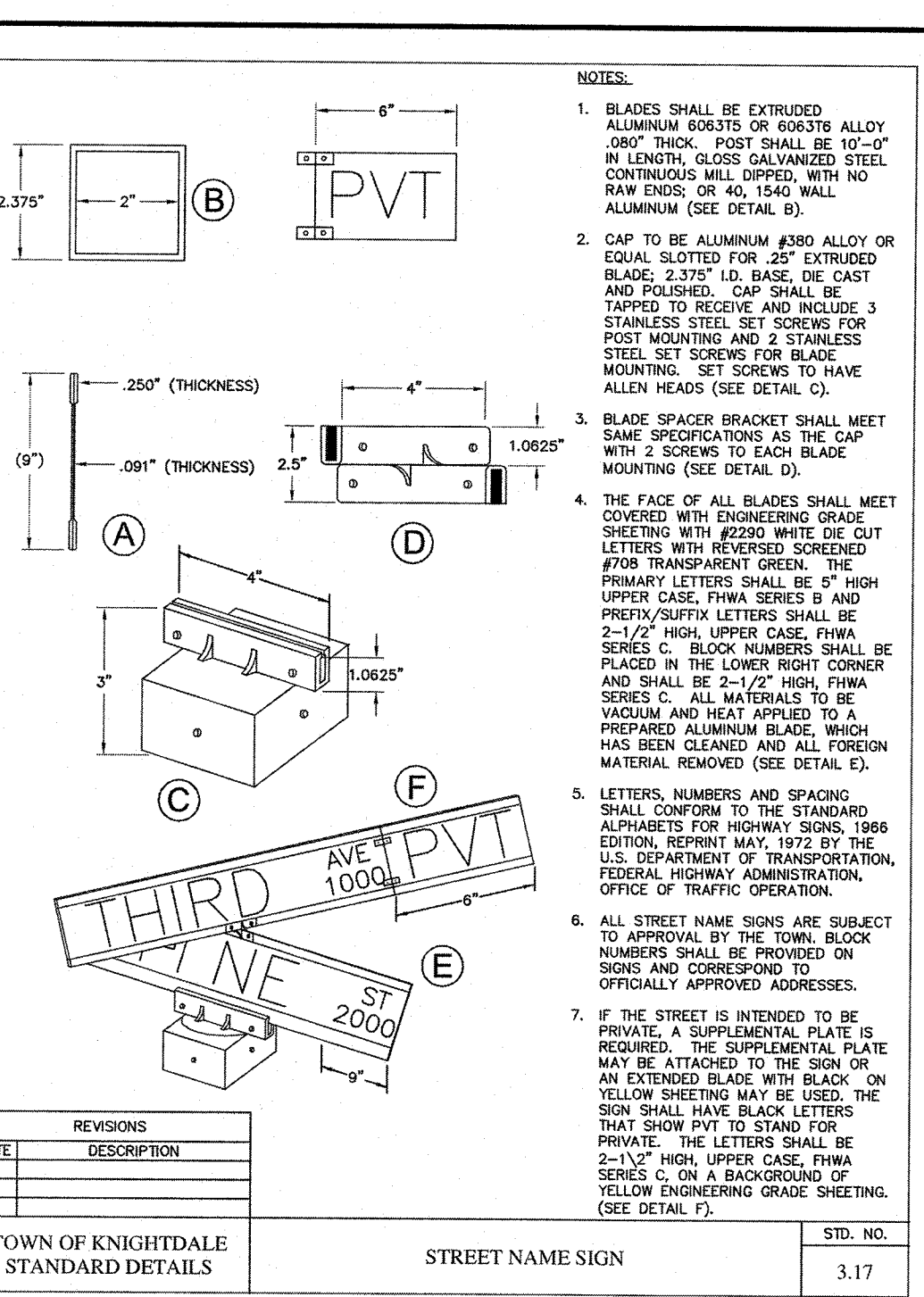
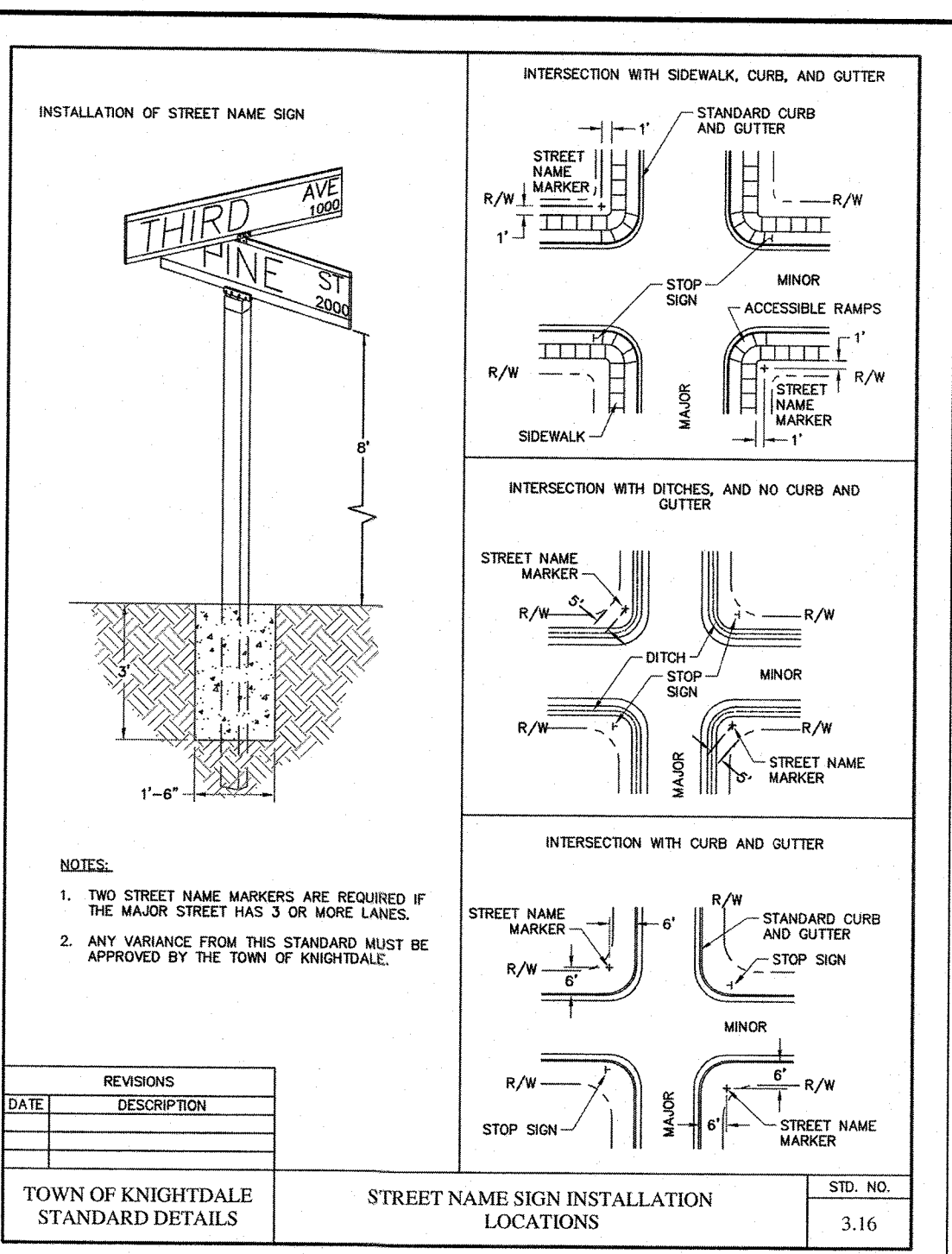
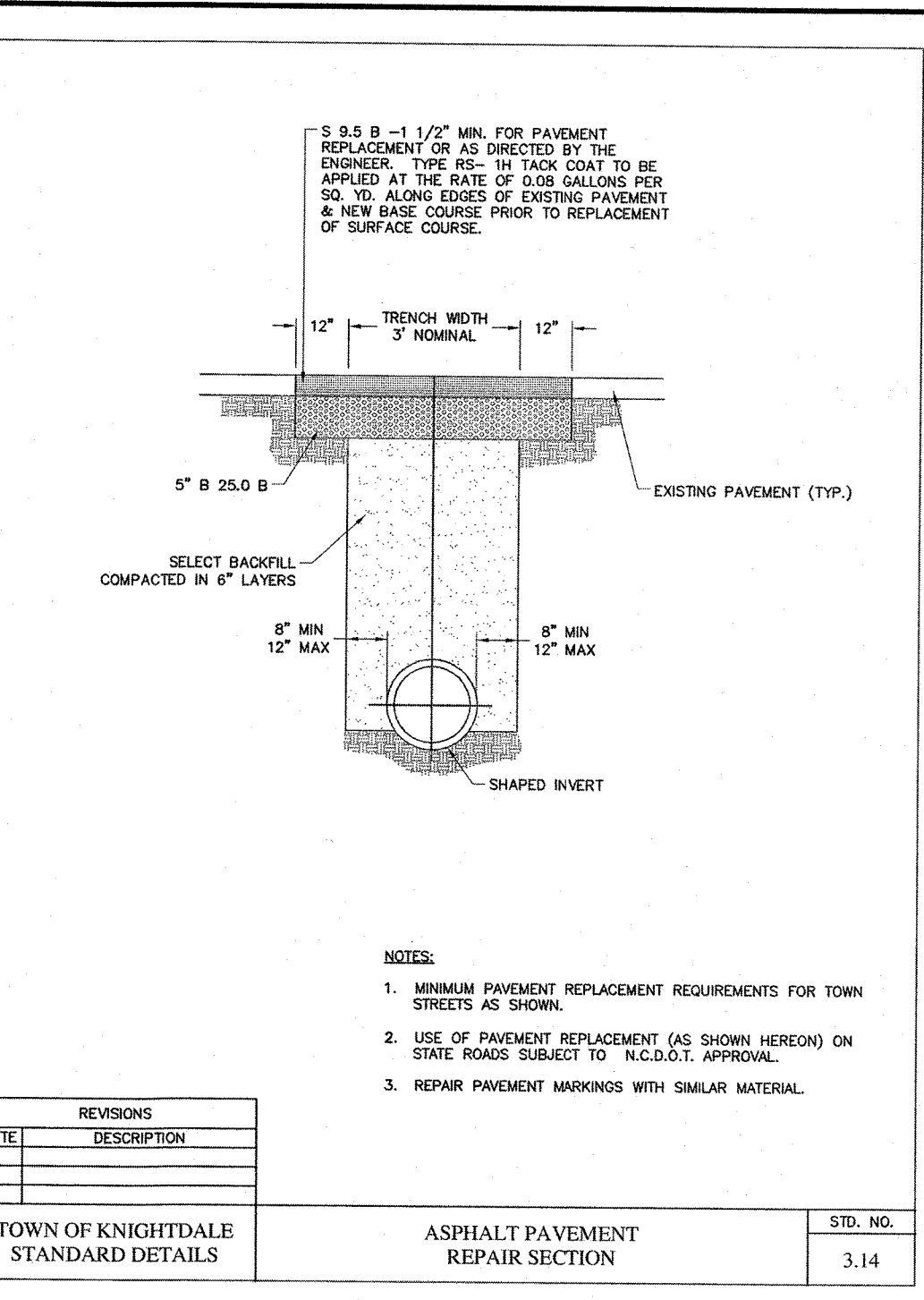
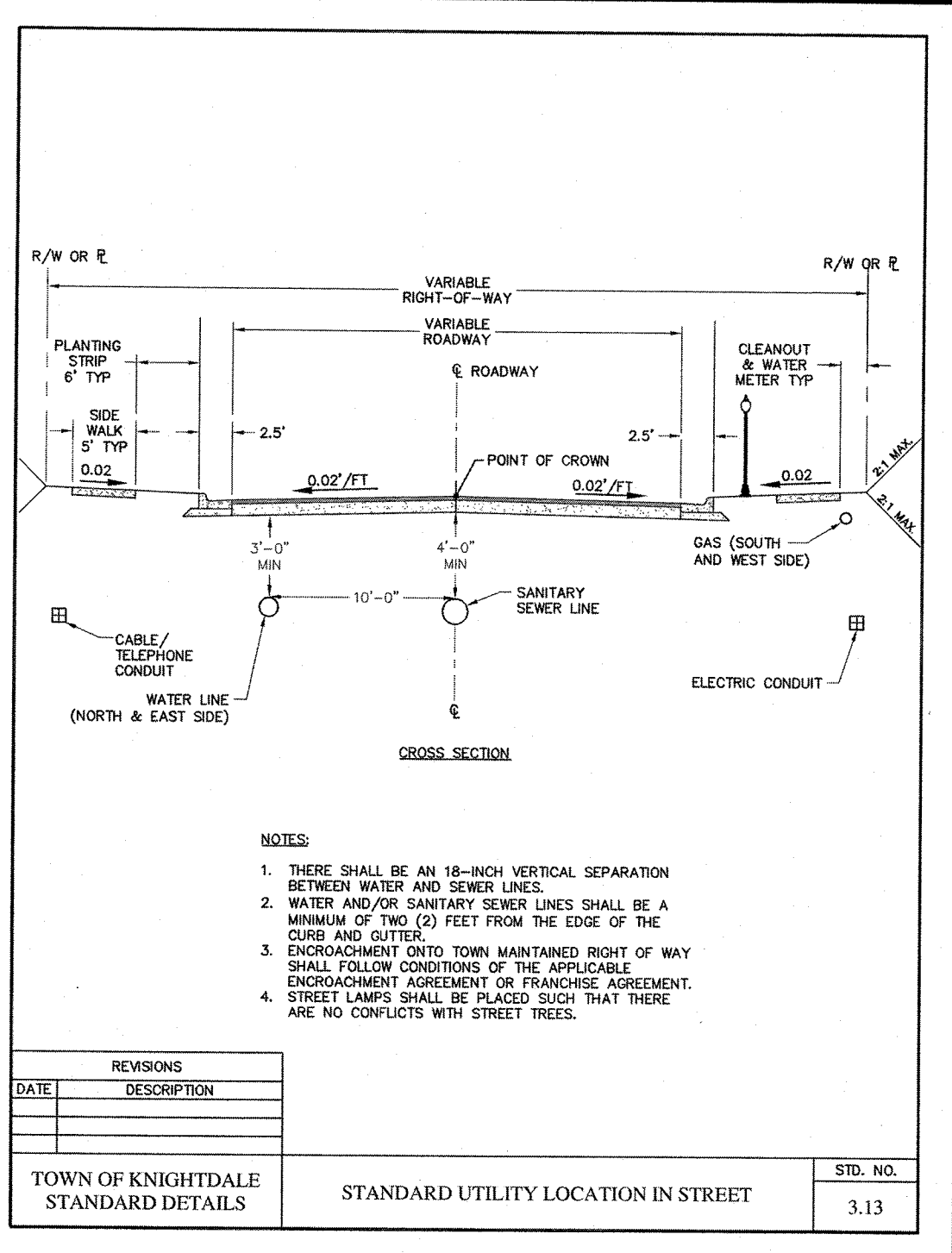
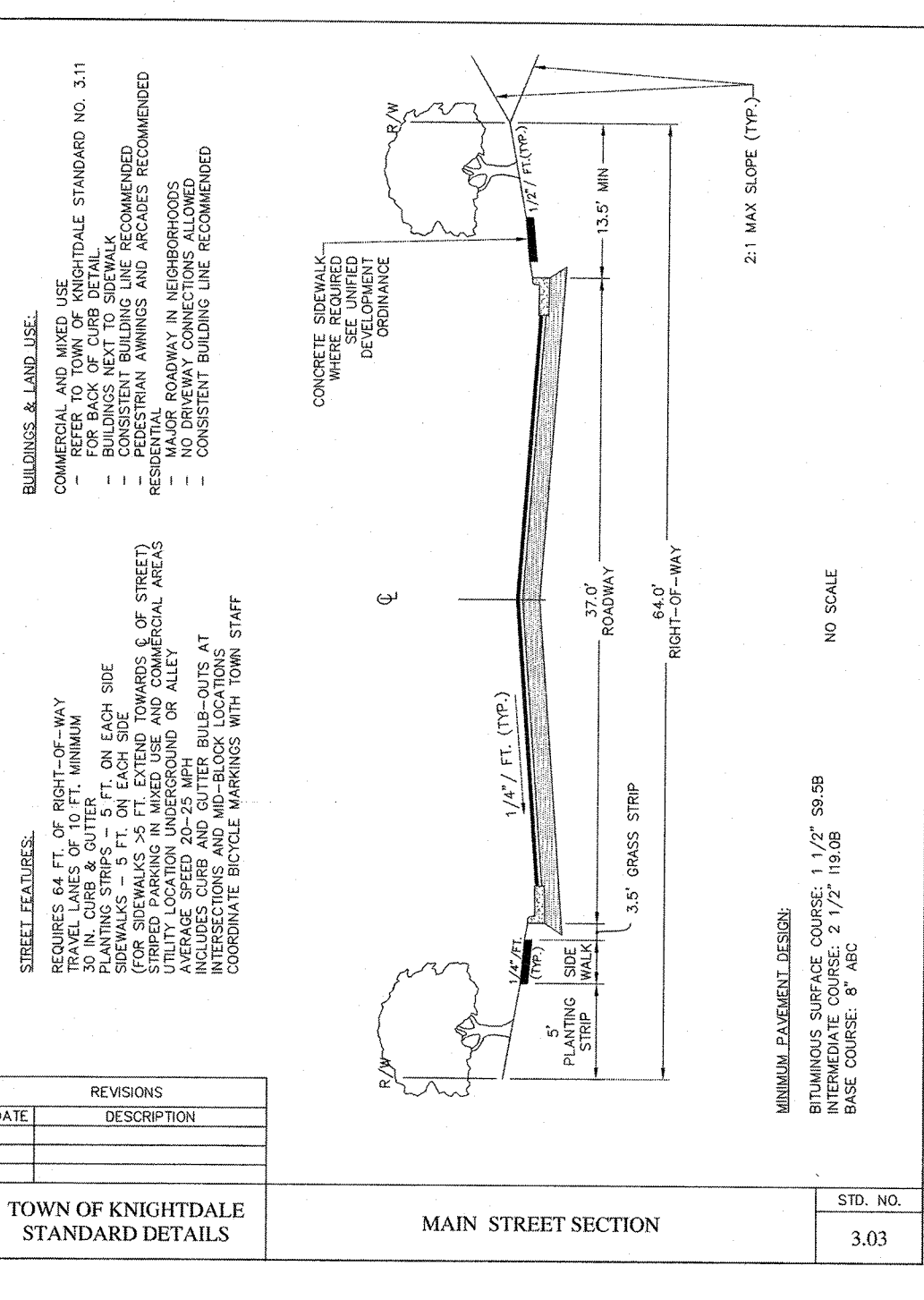
HARDIN HILL LANE EXT STA: 46+50 TO STA: 52+00

KNIGHTDALE - WAKE COUNTY - NORTH CAROLINA

LANDSCAPE & LIGHTING PLAN

JOB NO.	37909
SHEET NO.	C5.0

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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]* TOWN ENGINEER DATE: 10-26-2018

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

BY: *[Signature]* ADMINISTRATOR DATE: 10-26-18

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

HARDIN HILL LANE EXT STA: 46+50 TO STA: 52+00

KNIGHTDALE - WAKE COUNTY - NORTH CAROLINA

SITE DETAIL SHEET

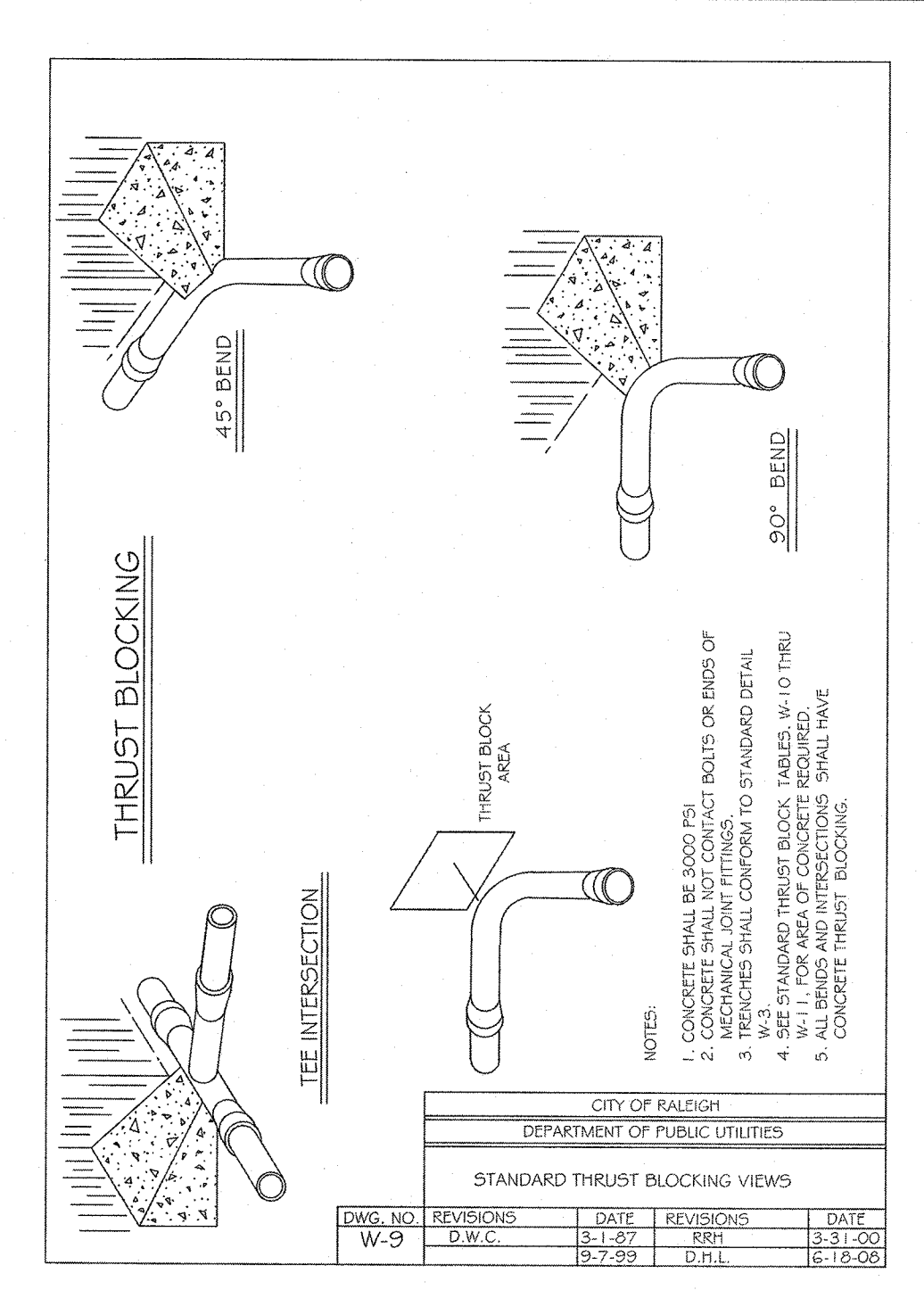
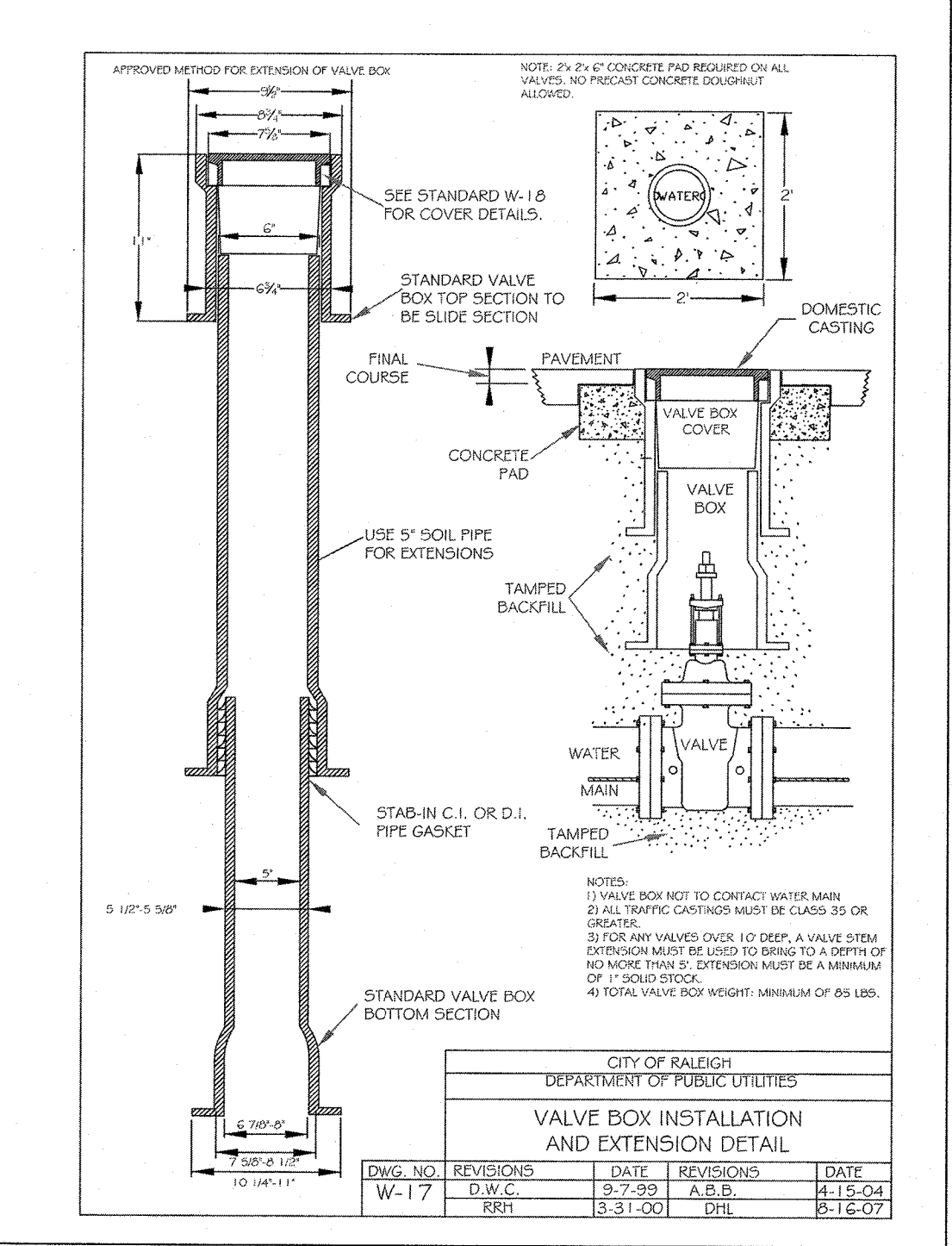
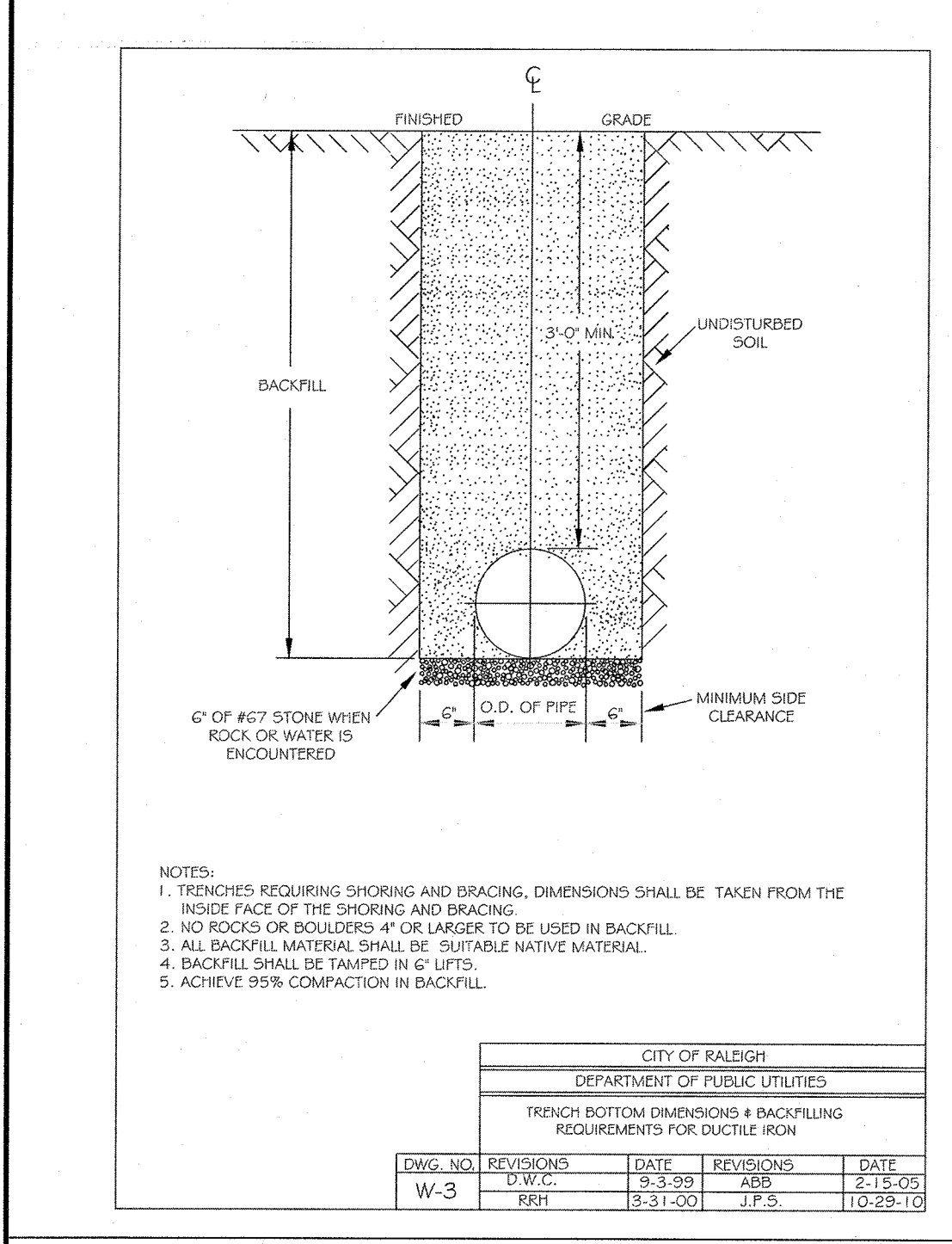
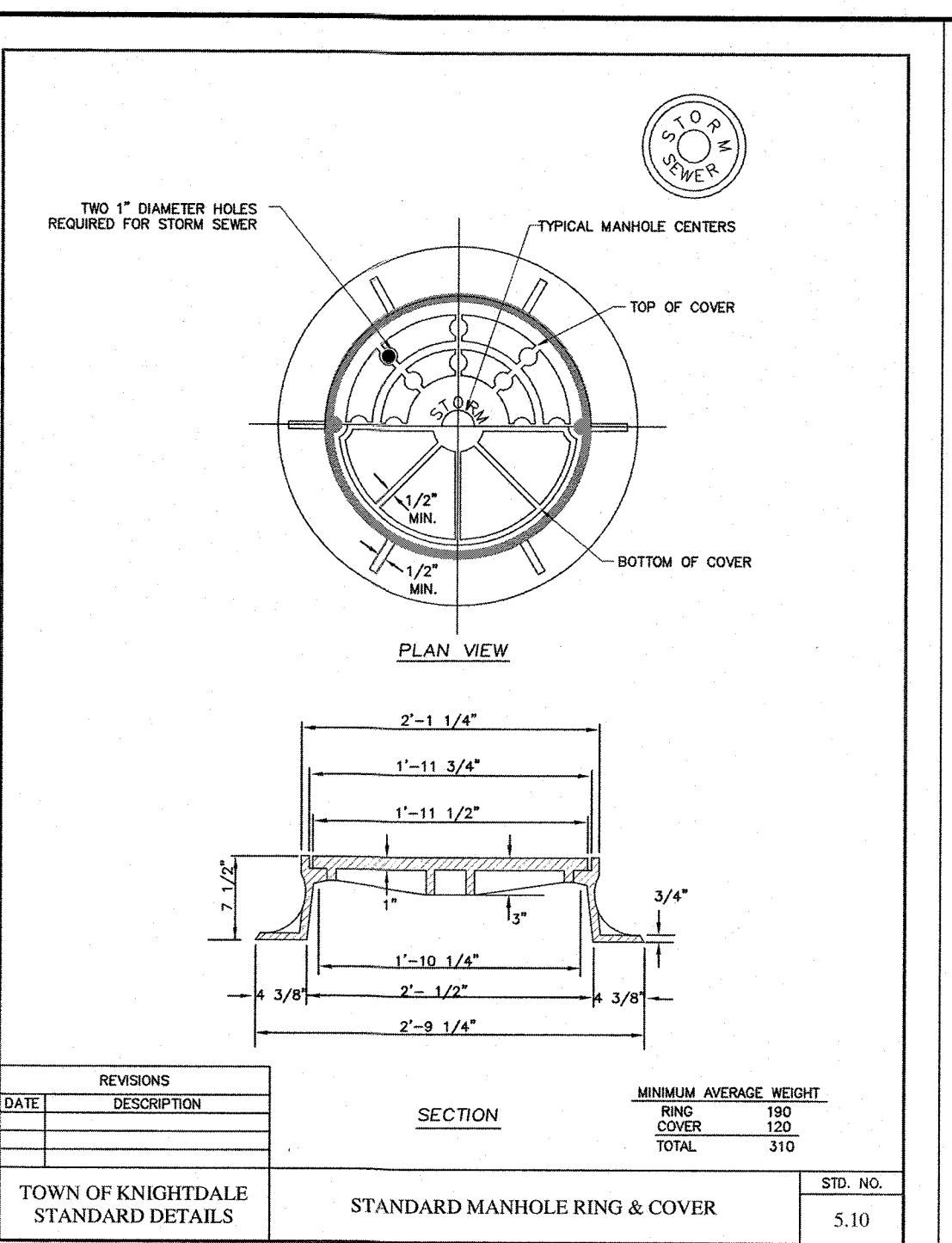
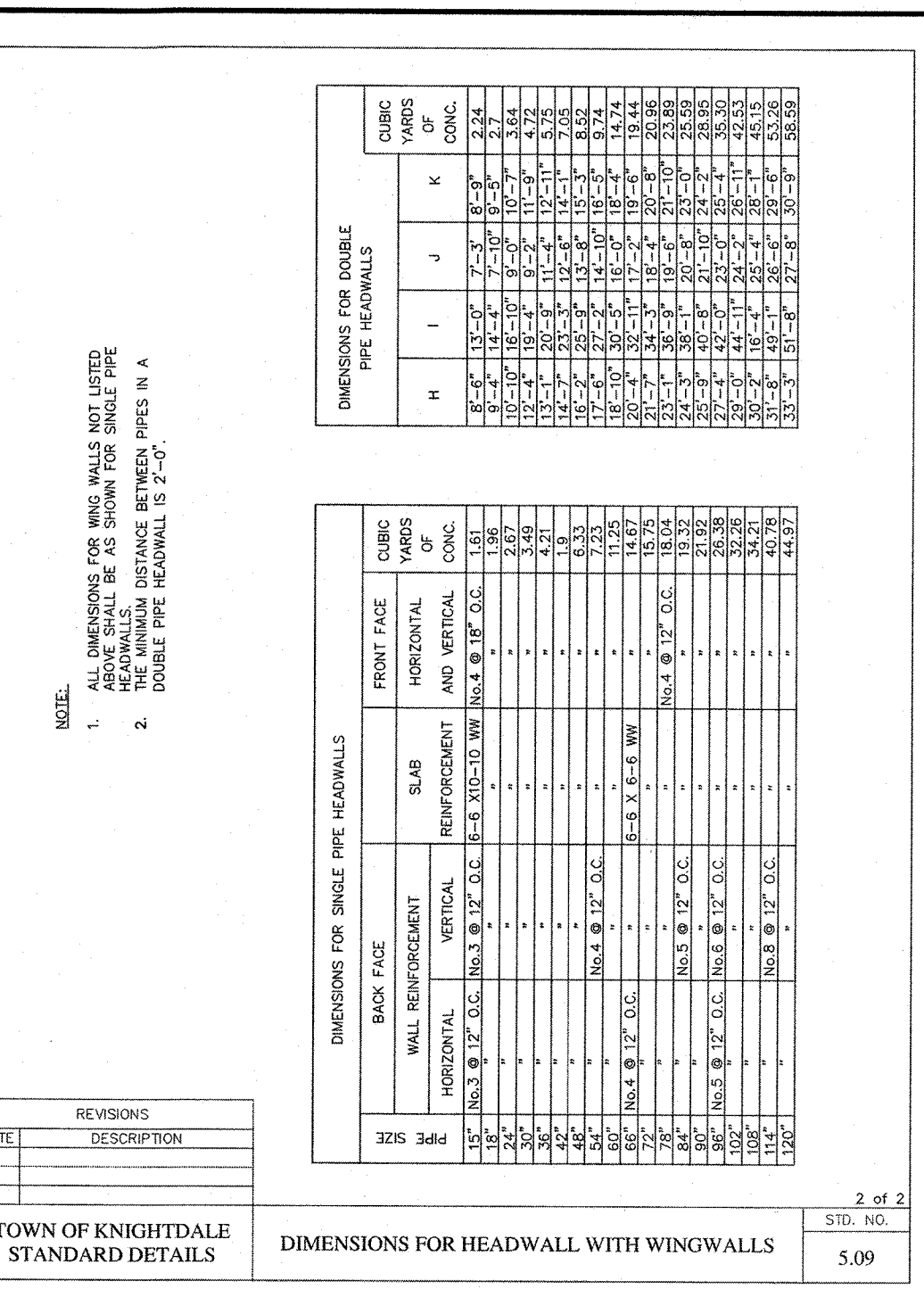
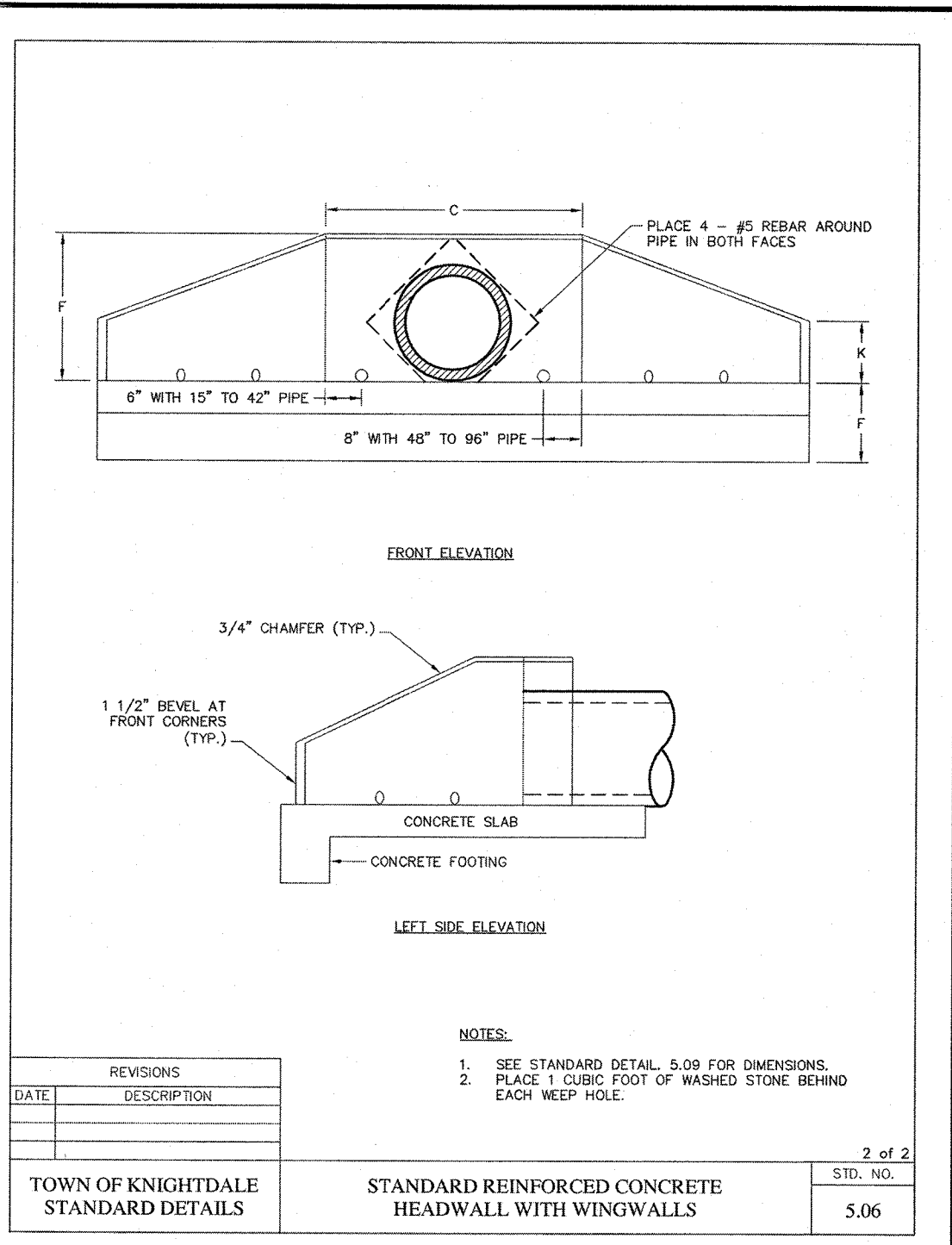
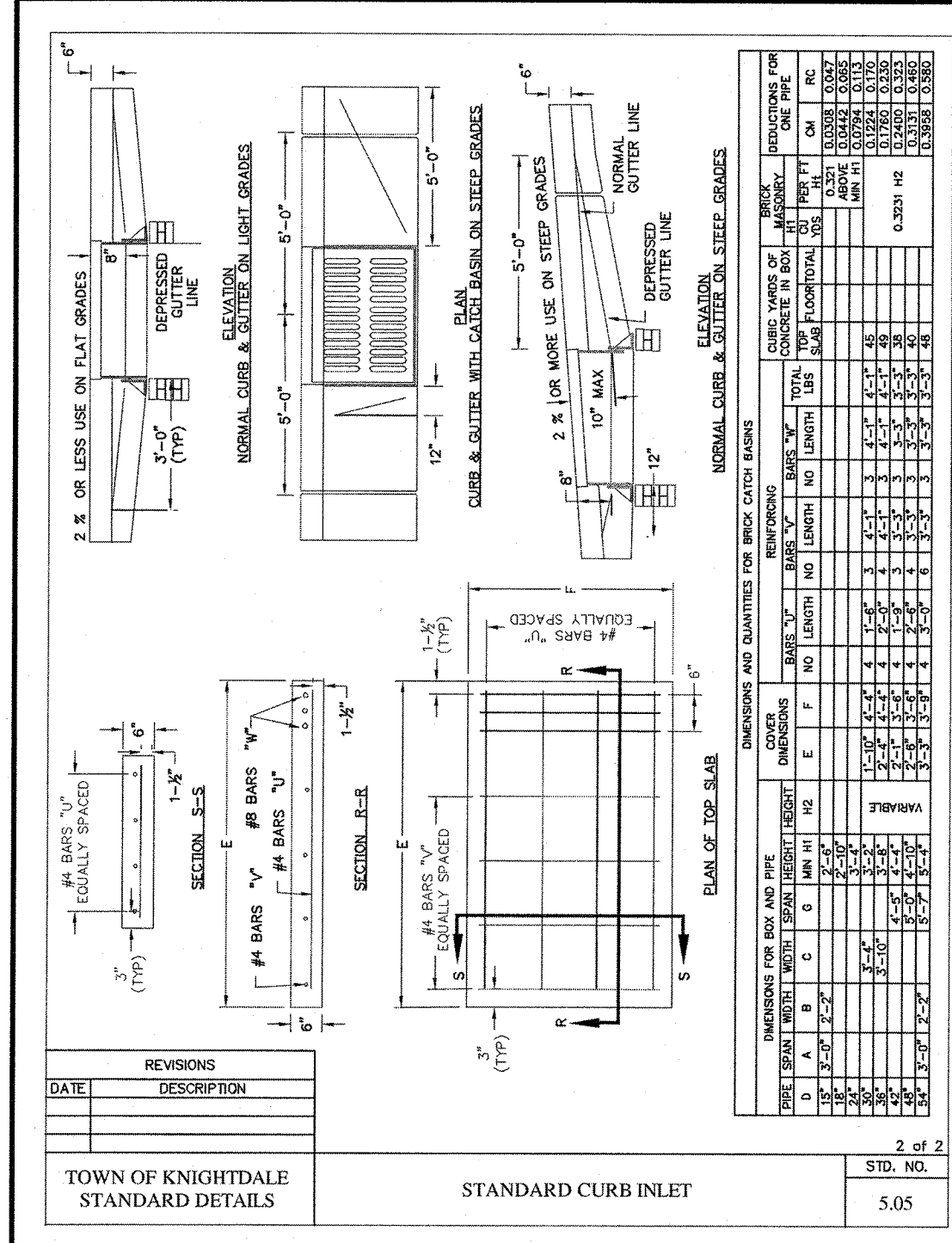
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 TEL 919.966.4951 FAX 919.833.8124 www.timmons.com

DATE	REVISION DESCRIPTION
09/11/2018 <td></td>	

DRAWN BY	331
DESIGNED BY	331
CHECKED BY	JFC
SCALE	PER PLAN

JOB NO.	37909
SHEET NO.	C6.0



REACTION BEARING AREAS FOR HORIZONTAL WATER PIPE BENDS

BASED ON TEST PRESSURE OF 300 P.S.I.

SIZE AND DEGREE OF BEND	START THRU IN	END THRU IN	START THRU IN	END THRU IN	START THRU IN	END THRU IN	START THRU IN	END THRU IN
6"								
11 1/4"	1,108	1	1	1	1	1	2	1
22 1/2"	2,207	1	2	2	1	1	1	3
45"	4,428	2	3	3	1	1	2	5
90"	7,996	2	4	5	1	1	2	6
PLUG	5,655	2	3	4	1	1	2	6
8"								
11 1/4"	1,370	1	1	2	1	1	1	2
22 1/2"	3,292	1	2	2	1	1	1	4
45"	7,694	2	4	5	1	1	2	6
90"	14,219	4	8	9	2	2	4	15
PLUG	10,053	3	5	6	2	2	3	10
12"								
11 1/4"	4,433	2	3	3	1	1	2	5
22 1/2"	8,826	3	5	6	2	2	3	9
45"	17,312	5	9	11	3	3	5	18
90"	31,993	8	16	19	4	4	8	32
PLUG	22,619	6	12	14	3	3	6	23
16"								
11 1/4"	7,861	2	4	5	1	1	2	6
22 1/2"	15,691	4	8	10	2	2	4	16
45"	30,779	8	16	19	4	4	8	31
90"	56,261	15	29	35	8	8	15	57
PLUG	40,213	10	21	25	5	5	10	41

REACTION BEARING AREAS ARE IN SQUARE FEET MEASURED IN A VERTICAL PLANE IN THE TRENCH SIDE AT AN ANGLE OF 90° TO THE THRUST VECTOR.

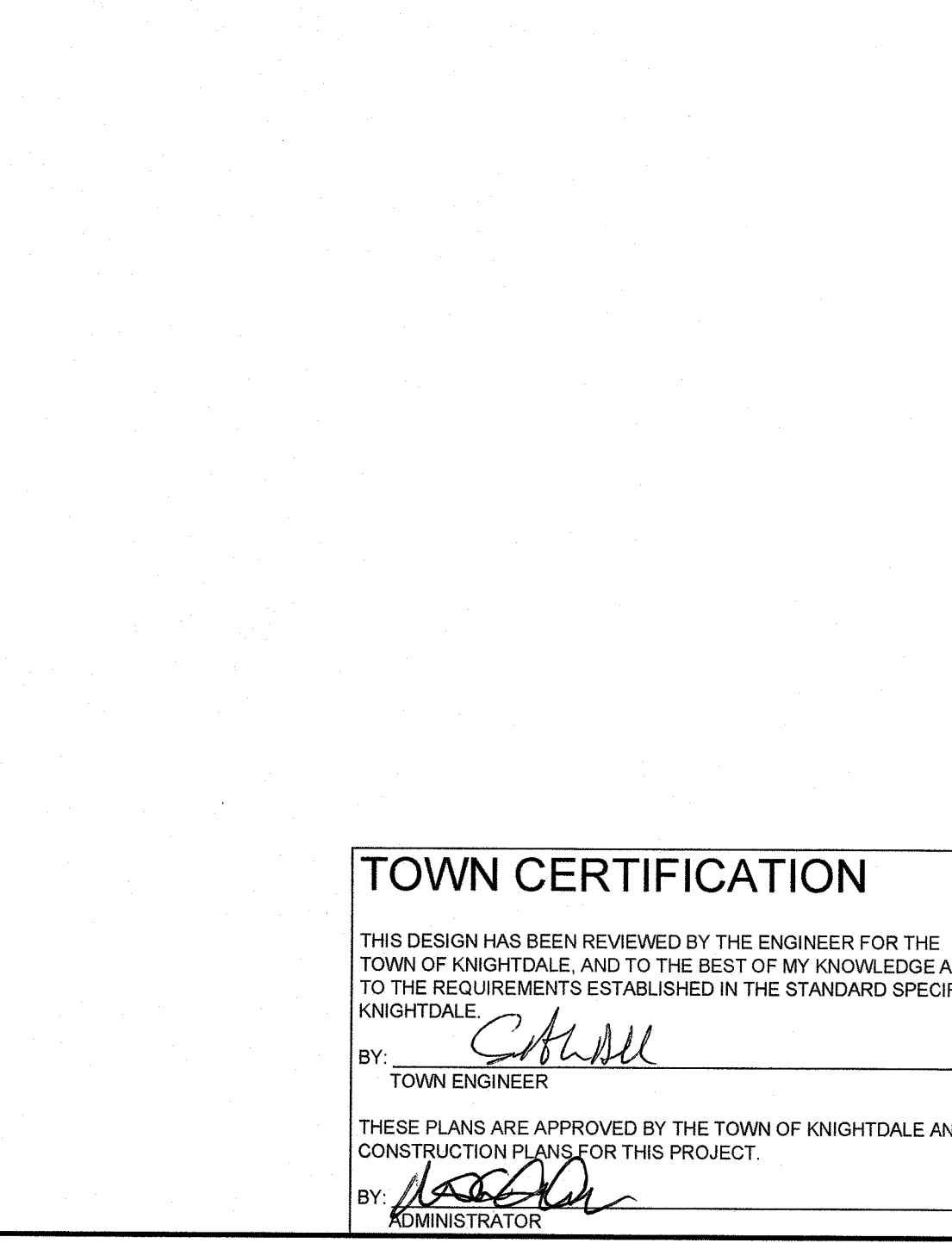
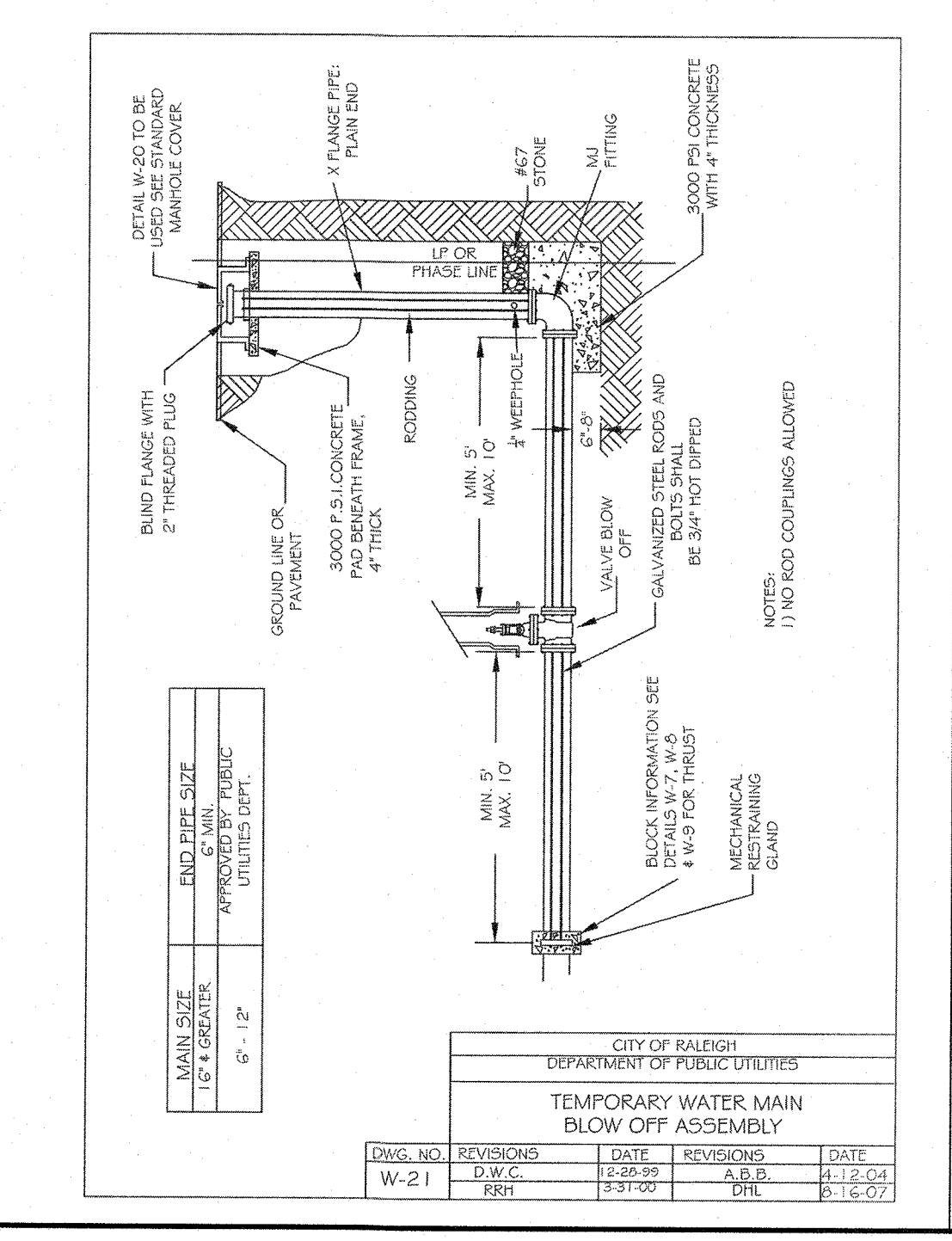
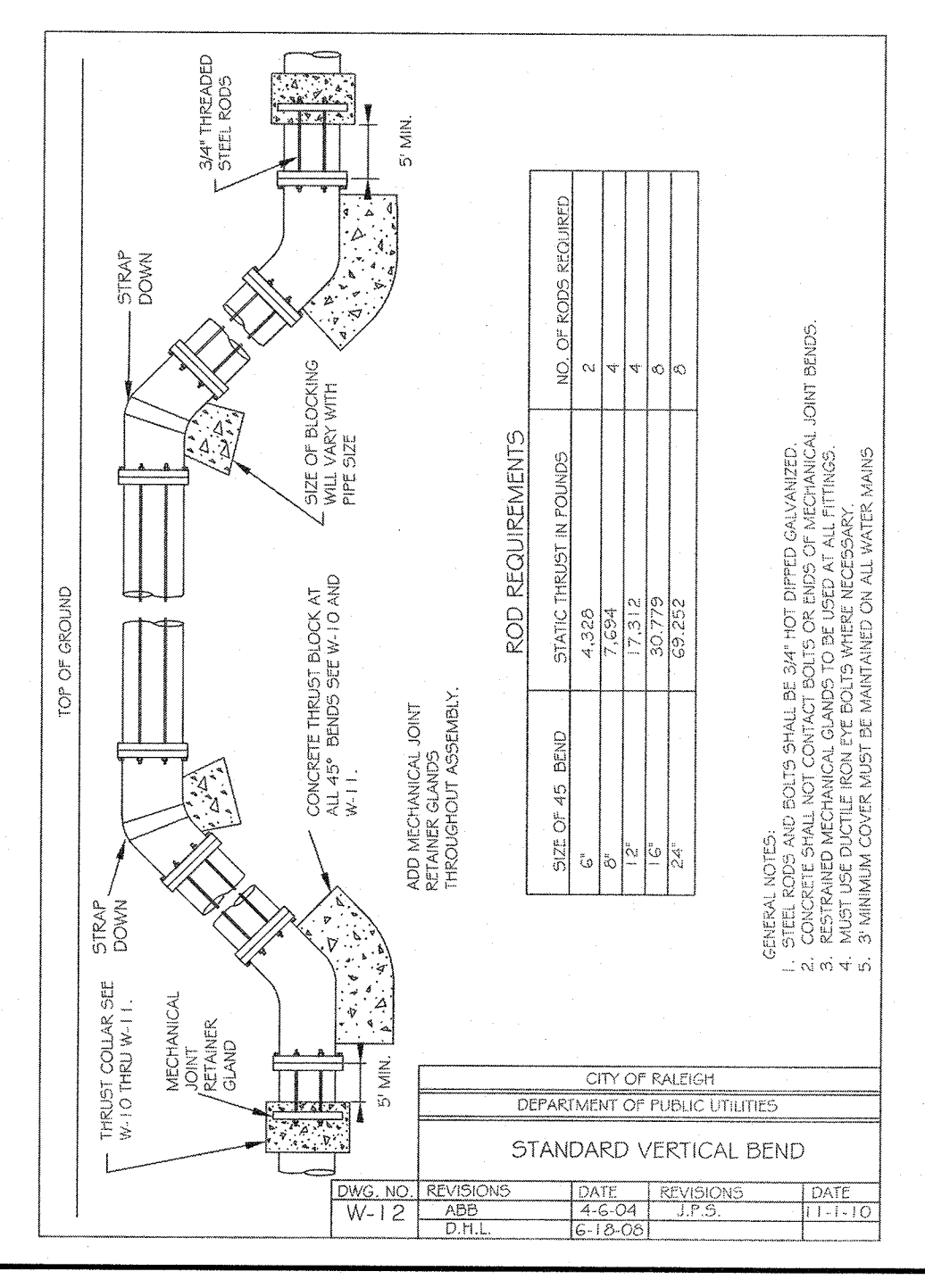
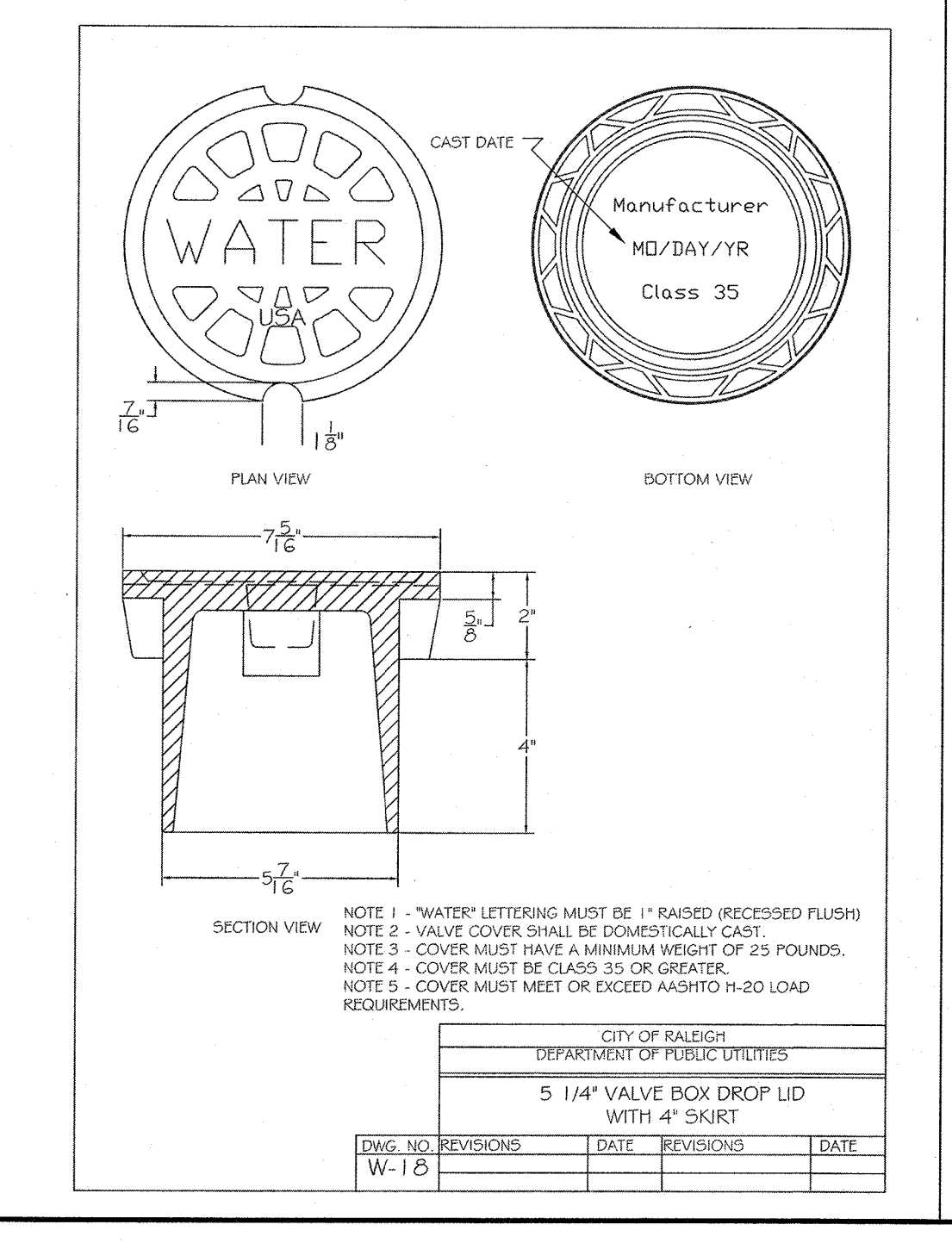
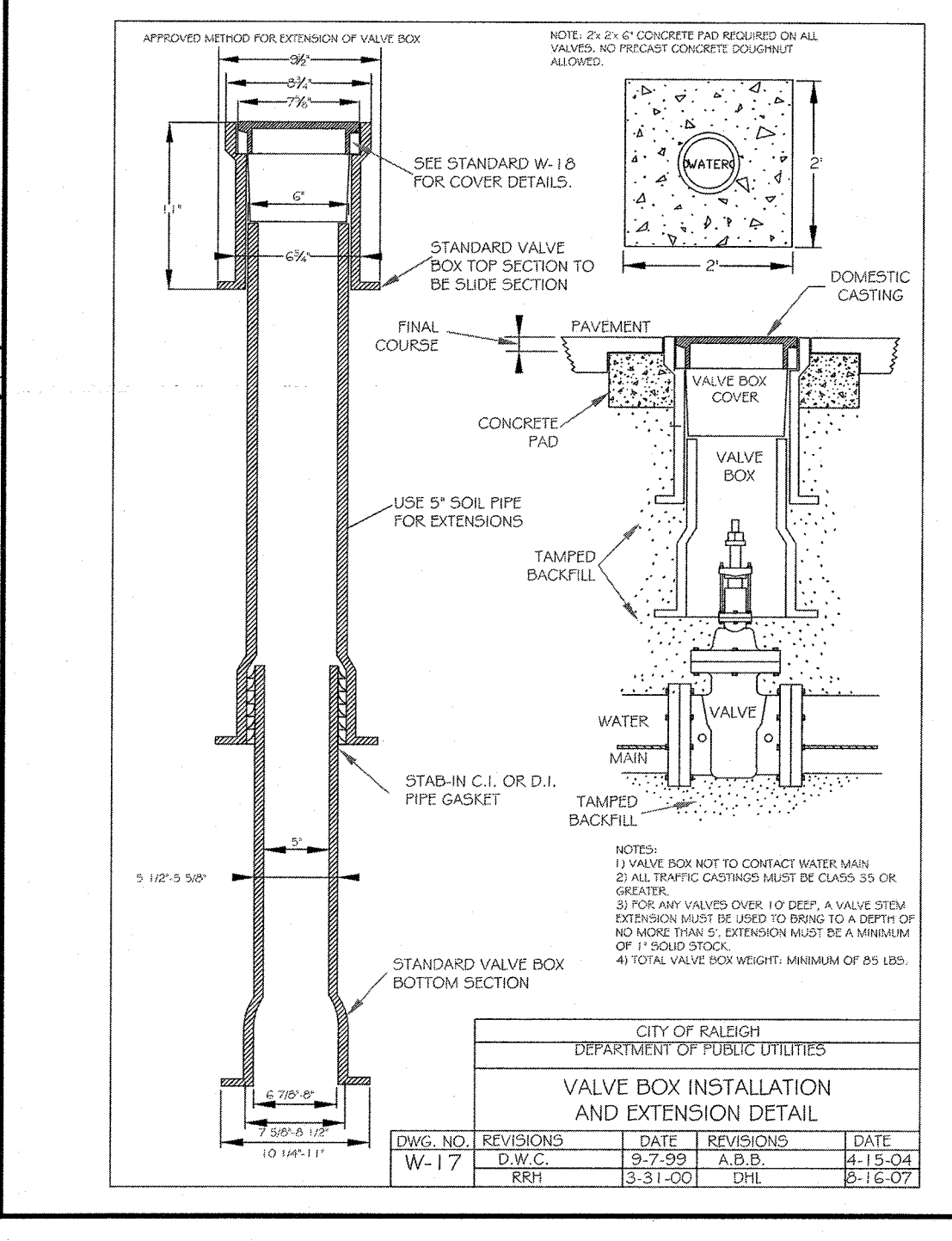
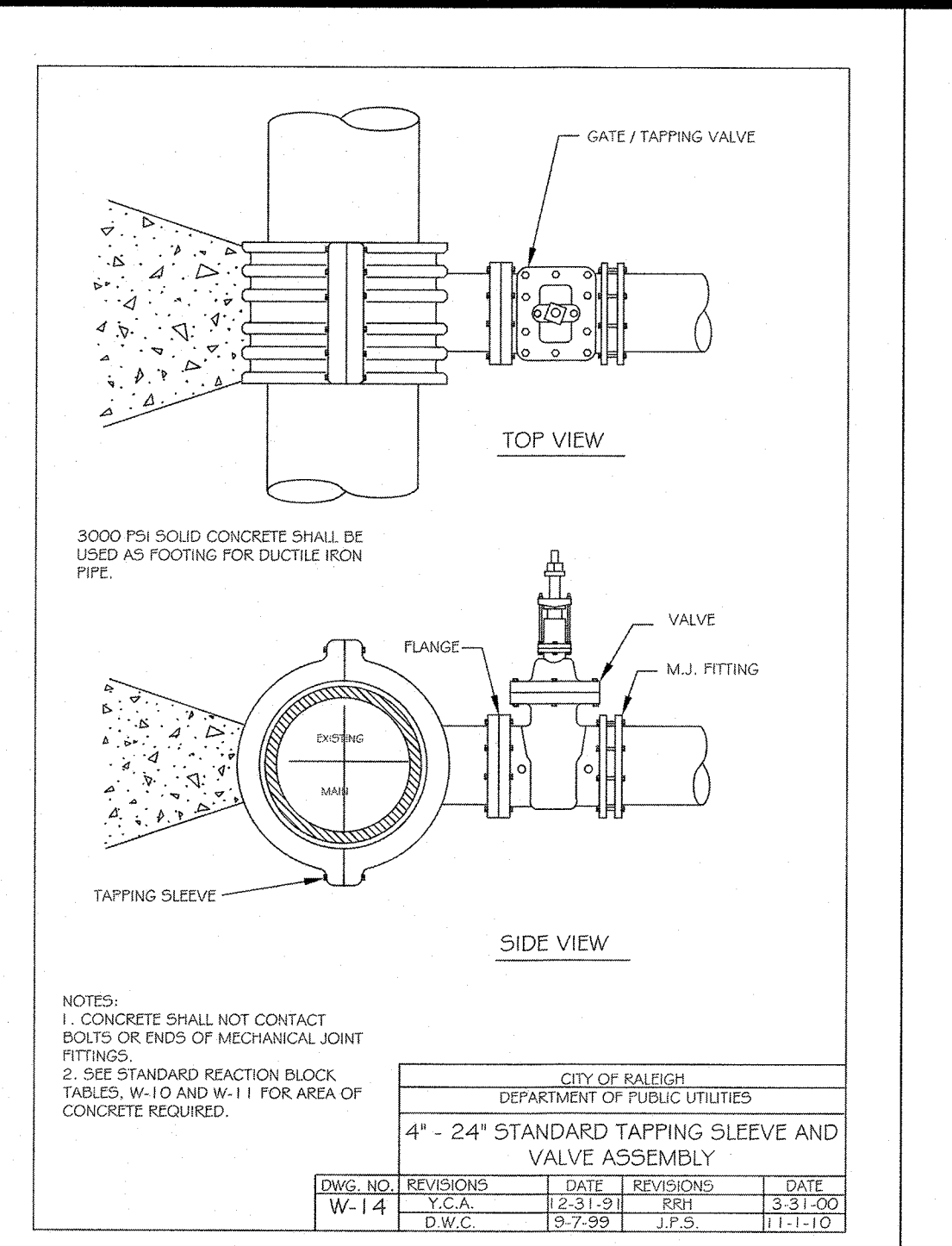
USE 6" x 90 BEND VALVE FOR HYDRANTS FOR ADDITIONAL SAFETY FACTOR.

REVISIONS:

DATE	DESCRIPTION

TOWN OF KNIGHTDALE STANDARD DETAILS

STD. NO. 5.10



TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652

HARDIN HILL LANE EXT STA: 46+50 TO STA: 52+00

KNIGHTDALE - WAKE COUNTY - NORTH CAROLINA

SITE DETAIL SHEET

C6.1

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REVISION DESCRIPTION

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DRAWN BY 331

DESIGNED BY 331

CHECKED BY JFC

SCALE PER PLAN