

SITE DATA

PARCEL ID: R02800-004-104-000
PIN #: 325018.41.2644.000
ZONED: R-5 (MODERATE-HIGH RESIDENTIAL) (PERFORMANCE RESIDENTIAL)
PHASE 4-1 ACREAGE: 6.58 AC (287,047 SF)
FUTURE LAND USE PLACE TYPE: COMMUNITY MIXED USE
CAMA LAND USE CLASSIFICATION: WETLAND RESOURCE PROTECTION
DENSITY FACTOR: 8 UNITS/ACRE ALLOWED, 6.24 UNITS/ACRE PROPOSED
ACREAGE PH 4-1: 6.58 AC
UNITS ALLOWED: 53 UNITS
UNITS PROPOSED: 41 UNITS
BUILDING HEIGHT: 35' MAX.
BUILDING SETBACKS: 20' PERIMETER SETBACK
20' BUILDING SEPARATION
AREA DEDICATED AS PRIVATE ROAD ROW/ACCESS EASEMENT: 1.10± AC
BUILDING DATA: SEE TABLE
BUILDING LOT COVERAGE: 18.28%
OPEN SPACE REQUIRED: 0.03 AC PER UNIT SPLIT 50/50 ACTIVE/PASSIVE.
1.23 AC TOTAL (0.62 AC ACTIVE, 0.62 AC PASSIVE)
OPEN SPACE AVAILABLE: 2.28± AC AVAILABLE FOR DESIGNATION
OF ACTIVE/PASSIVE OPEN SPACE. (TO BE DETERMINED)
TRANSITIONAL BUFFER: 20' REQUIRED ADJOINING LOTS ON WEST SIDE.
PARKING REQUIREMENT: MULTIFAMILY
PARKING REQUIREMENT: 2.0 PER 2+BR UNIT REQUIRED
2.0 PER UNIT PROVIDED (1-PARK IN GARAGE & 1-PARK IN DRIVEWAY)
SITE DISTURBED AREA: 8.24 AC

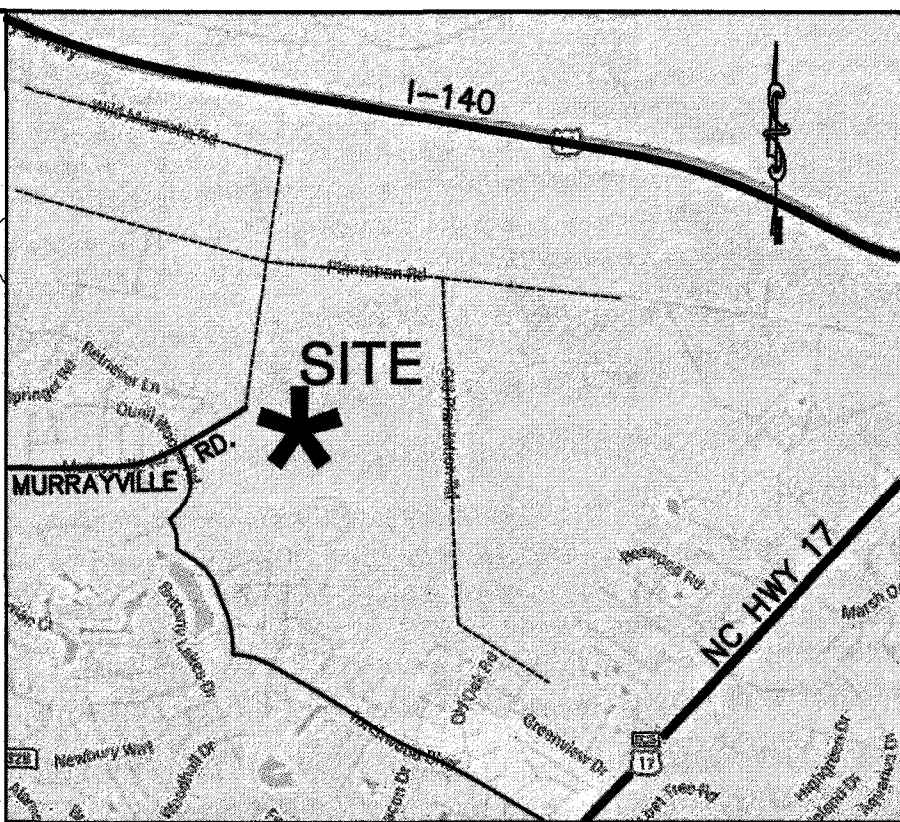
Site Data Table

Phase 4-1 On-Site			Phase 4-1 Within to be NCDOT Dedicated ROW			Off-Site Impervious to be NCDOT Dedicated ROW		
Impervious:			Impervious:			Impervious:		
Lots/Buildings	52,480 SF		Lots/Buildings	0 SF		Lots/Buildings	0 SF	
Asphalt	21,776 SF		Asphalt	7325 SF		Asphalt	24180 SF	
Sidewalk/Driveways/Conc	27,705 SF		Sidewalk/Driveways/Conc	0 SF		Sidewalk/Driveways/Conc	0 SF	
Patio	16,400 SF							
Total Impervious	118,361 SF		Total Impervious	7325 SF		Total Impervious	24180 SF	

Pond #5			Pond #4			Pond #6		
Total Drainage Area:	15.57 ac.		Total Drainage Area:	13.37 ac.		Total Drainage Area:	12.62 ac.	
Impervious:			Impervious:			Impervious:		
Lots/Buildings	114880 SF		Lots/Buildings	155000 SF		Lots/Buildings	94200 SF	
Asphalt	45007 SF		Asphalt	52950 SF		Asphalt	32320 SF	
Sidewalk/Driveways/Conc	31390 SF		Sidewalk/Driveways/Conc	10447 SF		Sidewalk/Driveways/Conc	4151 SF	
Patio	15600 SF		Patio	800 SF		Patio	0 SF	
Future	102399 SF		Future	19200 SF		Future	111062 SF	
Total Impervious	309276 SF		Total Impervious	238397 SF		Total Impervious	241733 SF	

Note: Pond #5 was expanded with the addition of Phase 4-1. The DA's to Ponds #4 and #6 were modified slightly due to the addition, however the specifications for each Pond remain unchanged.

BUILDING DATA PHASE I							
BUILDING	# OF BUILDINGS	FOOTPRINT (SF)	UNITS	BR/UNIT	STORIES	CONSTRUCTION TYPE	HEIGHT
(4) UNIT BUILDING	8	5,060/40,480	4/32	3	2	-	<35'
(3) UNIT BUILDING	3	4,000/12,000	3/9	3	2	-	<35'
TOTAL	11	52,480	41				



DISCLOSURE OF PLANNED THOROUGHFARE:
"THIS SUBDIVISION CROSSES A PROPOSED THOROUGHFARE RIGHT-OF-WAY. PRESENT STATUS SHOULD BE CONFIRMED WITH N.C. DEPARTMENT OF TRANSPORTATION."

LOCATION MAP

NTS

Certificate of Approval - New Hanover County Planning & Land Use

09/16/2020

Date

Administrator

OWNER/DEVELOPER
TDR-HL, LLC
JOHN A. ELMORE MEMBER-MANAGER
P.O. BOX 381
WRIGHTSVILLE BEACH, NC 28480

NORRIS & TUNSTALL
CONSULTING ENGINEERS P.C.
1900 EASTWOOD RD., SUITE 11
WILMINGTON, NC 28403
PHONE (910) 343-9653

Licence #C-3641

19094

DES. JST
CRD. JPN
DRWN. NKS

DATE 7/16/20



C0

DISCLOSURE OF PRIVATE ROADS:

I (WE) THE DEVELOPERS OF SUBDIVISION LOCATED IN THE UNINCORPORATED AREA OF NEW HANOVER COUNTY UNDERSTAND THAT THE ROADS IN SAID SUBDIVISION ARE DESIGNATED PRIVATE. I UNDERSTAND THAT OWNERSHIP AND MAINTENANCE OF THE ROADS WILL BE THE RESPONSIBILITY OF THE DEVELOPER UNTIL SUCH TIME THAT THE DEVELOPER DESIGNATES THE RESPONSIBILITY TO THE PROPERTY OWNERS' ASSOCIATION. RESPONSIBILITIES MUST BE ACCEPTED BY THE HOMEOWNERS ASSOCIATION AS SPECIFIED IN THE HOMEOWNER COVENANTS FOR SAID SUBDIVISION. THE PRIVATE ROADS IN SAID SUBDIVISION ARE TO BE CONSTRUCTED IN ACCORDANCE WITH SECTION 52-4 OF THE NEW HANOVER COUNTY SUBDIVISION ORDINANCE AND ALL APPLICABLE COUNTY CODES WHICH INCLUDES THE DESIGN, INSTALLATION, INSPECTION, AND APPROVAL BY A LICENSED PROFESSIONAL ENGINEER (PE) RECOGNIZED IN THE STATE OF NORTH CAROLINA PRIOR TO FINAL PLAT APPROVAL FOR ALL OR A PORTION OF THE SUBDIVISION. IF ALL OR A PORTION OF THE ROAD INFRASTRUCTURE SYSTEM WITHIN THE SUBDIVISION IS BONDED THROUGH A SURETY, PERFORMANCE BOND, OR CASH ESCROW, NO BOND SHALL BE RELEASED UNTIL ALL ROAD CONSTRUCTION IMPROVEMENTS ARE COMPLETE AND CERTIFIED BY THE PROFESSIONAL ENGINEER.

IT SHALL BE DISCLOSED TO THE PROSPECTIVE BUYER OF A LOT OR LOTS WITHIN THE SUBDIVISION THAT ROAD MAINTENANCE SHALL RUN THROUGH THE PROPERTY OWNERS' ASSOCIATION IN PERPETUITY AFTER ACCEPTANCE FROM THE DEVELOPER UNTIL SUCH TIME THAT THE ROADS ARE RE-PLATTED AS PUBLICALLY DESIGNATED ROADS AND TAKEN OVER FOR MAINTENANCE THROUGH THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) OR APPROPRIATE GOVERNING AUTHORITY.

DEVELOPER'S NAME

DATE

Designers Plan Certification:

"I hereby certify that this plan has been prepared in accordance with the latest New Hanover County Ordinances and Storm Water Design Manual."

Signature:

Printed Name and Title: T. Jason Clark, P.E.

Date:

Registration Number: 030869

Property Owner Certification:

"I (We) hereby certify that I (we) am (are) the current owner of the property and that upon receipt of "Authorization-To-Construct" any clearing, grading, construction or development, will be performed in accordance with this plan and that the applicable ordinances and rules of New Hanover County, the State of North Carolina and the Federal Government and its agencies which are hereby made part of this plan. As the owner, I (we) accept full responsibility for the construction and operation and maintenance of the proposed facilities. I (We) will not attempt to transfer this responsibility without the written authorization of New Hanover County."

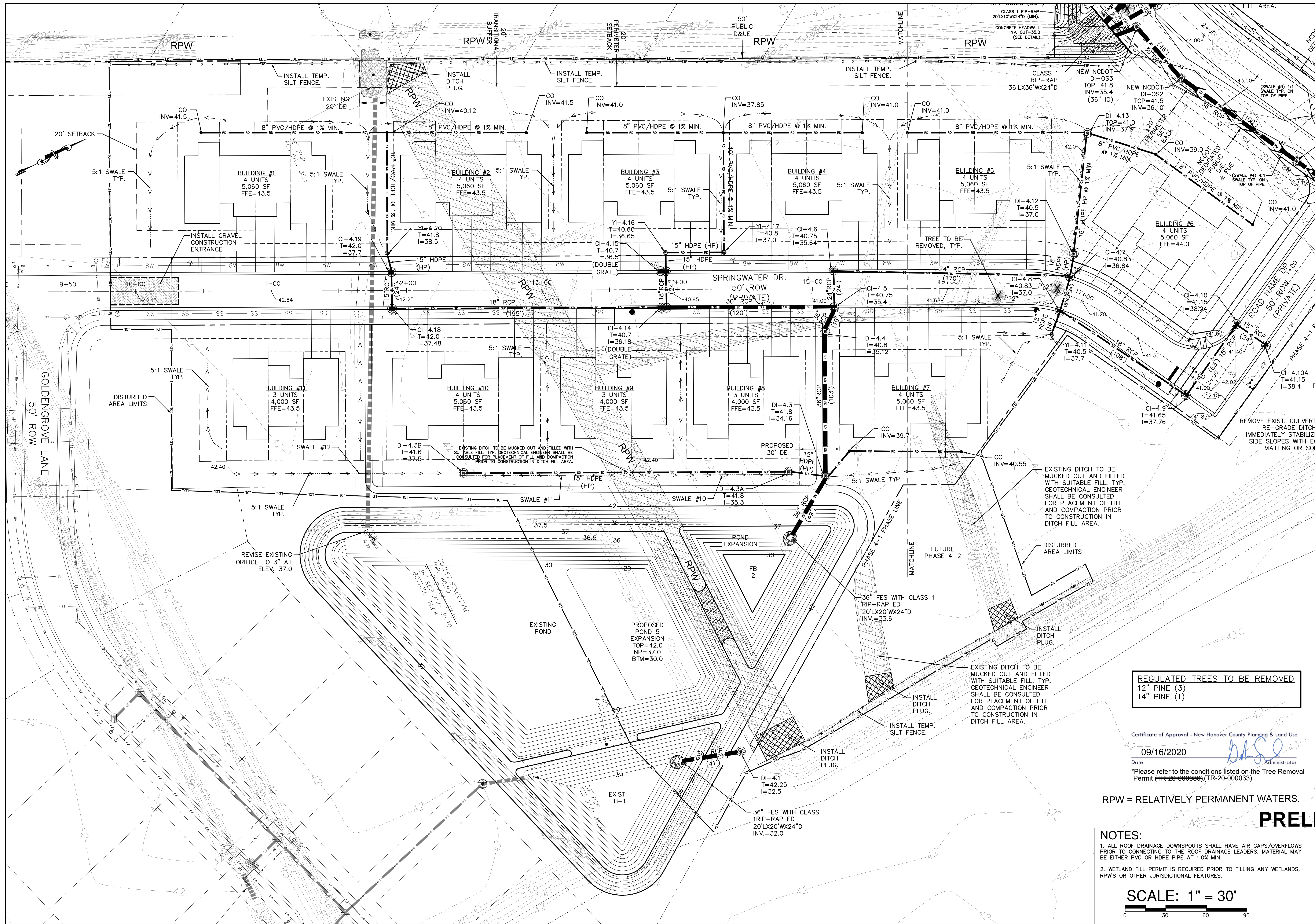
Signature:

Printed Name and Title: William Bland, President
Hanover Development Co., Inc.

Date:

NOTES:

- THIS MAP IS PRELIMINARY AND IS NOT FOR RECORDATION, SALES OR CONVEYANCE.
- TOPO SHOWN IS FROM MICHAEL UNDERWOOD AND ASSOCIATES.
- THIS PROPERTY IS NOT LOCATED WITHIN A SPECIAL 100 YR. FLOOD HAZARD AREA.
- ALL STREETS WITHIN HANOVER RESERVE PH 4-1 PROPERTY LIMITS ARE TO BE PRIVATE WITHIN A PRIVATE ROAD ROW AND UTILITY EASEMENT AND MAINTAINED BY HOA.
- MURRAYVILLE ROAD EXTENSION AND ROW WILL BE PUBLICLY DEDICATED.
- SANITARY SEWER TO BE CONNECTED TO CFWA SEWER SYSTEM.
- WATER TO BE CONNECTED TO CFWA WATER SYSTEM.
- ALL COMMON AREAS (OPEN SPACE; PASSIVE AND ACTIVE) IMPROVED RECREATIONAL AREAS AND STORM WATER FACILITIES TO BE MAINTAINED BY HOMEOWNERS ASSOCIATION.
- ALL COMMON AREAS (OPEN SPACE; ACTIVE AND PASSIVE) TO BE DEDICATED TO HOMEOWNERS ASSOCIATION.
- ALL STREETS ARE TO BE BUILT TO NCDOT STANDARDS AND ALSO MEET THE FIRE SERVICES ACCESS ROADS REQUIREMENTS.
- STREET LIGHTS WILL BE PLACED PER THE REQUIREMENTS OF THE UDO.
- SIDEWALKS WILL BE PROVIDED PER THE REQUIREMENTS OF THE UDO.
- A 10' NON-MUNICIPAL UTILITY EASEMENT IS RESERVED ALONG THE RIGHT OF WAY OF ALL ROADS.
- 404 WETLANDS EXIST WITHIN THE PHASE 4 BOUNDARY. A WETLANDS IMPACT PERMIT IS BEING APPLIED FOR.
- ALL DRAINAGE EASEMENTS, UTILITY EASEMENTS AND STORMWATER SWALES MUST REMAIN FREE AND CLEAR OF ALL OBSTRUCTIONS, INCLUDING FENCES.
- NO ON STREET PARKING WILL BE ALLOWED.
- NO SPEED CALMING DEVICES SHALL BE INSTALLED.
- ALL SIGNAGE MUST COMPLY WITH SECTION 5.6.2.1.1 OF NHC UDO.
- IF LANDSCAPING OR STREET TREES ARE TO BE INSTALLED ALONG SUBDIVISION STREETS, THEY MUST NOT INTERFERE WITH CLEAR VISUAL SIGHT DISTANCE FROM 30' TO 10' AT THE INTERSECTIONS.
- NO TRAFFIC CALMING DEVICES OR GATES WITHOUT TRC APPROVAL.
- ALL NEW CONSTRUCTION BUILDINGS MUST COMPLY WITH 2018 NC FIRE CODE CHAPTER 5, SECTION 510-EMERGENCY RESPONDER RADIO COVERAGE.
- BUILDING INFORMATION SIGNS MUST BE MET. (APPENDIX J OF THE 2018 NC FIRE CODE.
- ALL FIRE HYDRANTS INSTALLED ARE TO BE EQUIPPED WITH A 5 IN. STORZ CONNECTION ON THE 4.5 STEAMER.



GRADING, DRAINAGE AND EROSION CONTROL PLAN
HANOVER RESERVE - PHASE 4-1 (PERFORMANCE RESIDENTIAL)
1308 CROOKED PINE RD.
NEW HANOVER COUNTY
WILMINGTON, N.C.

OWNER/DEVELOPER
TDR-HL, LLC
JOHN A. ELMORE MEMBER-MANAGER
P.O. BOX 381
WRIGHTSVILLE BEACH, NC 28480

NORRIS & TUNSTALL
CONSULTING ENGINEERS P.C.
1900 EASTWOOD RD., SUITE 11
WILMINGTON, NC 28403
PHONE (910) 343-9653

Licence #C-3641
19094
DES. JST
CHK. JPN
DRWN. NKS
DATE 8/21/20

PRELIMINARY

C1

REGULATED TREES TO BE REMOVED
12" PINE (3)
14" PINE (1)

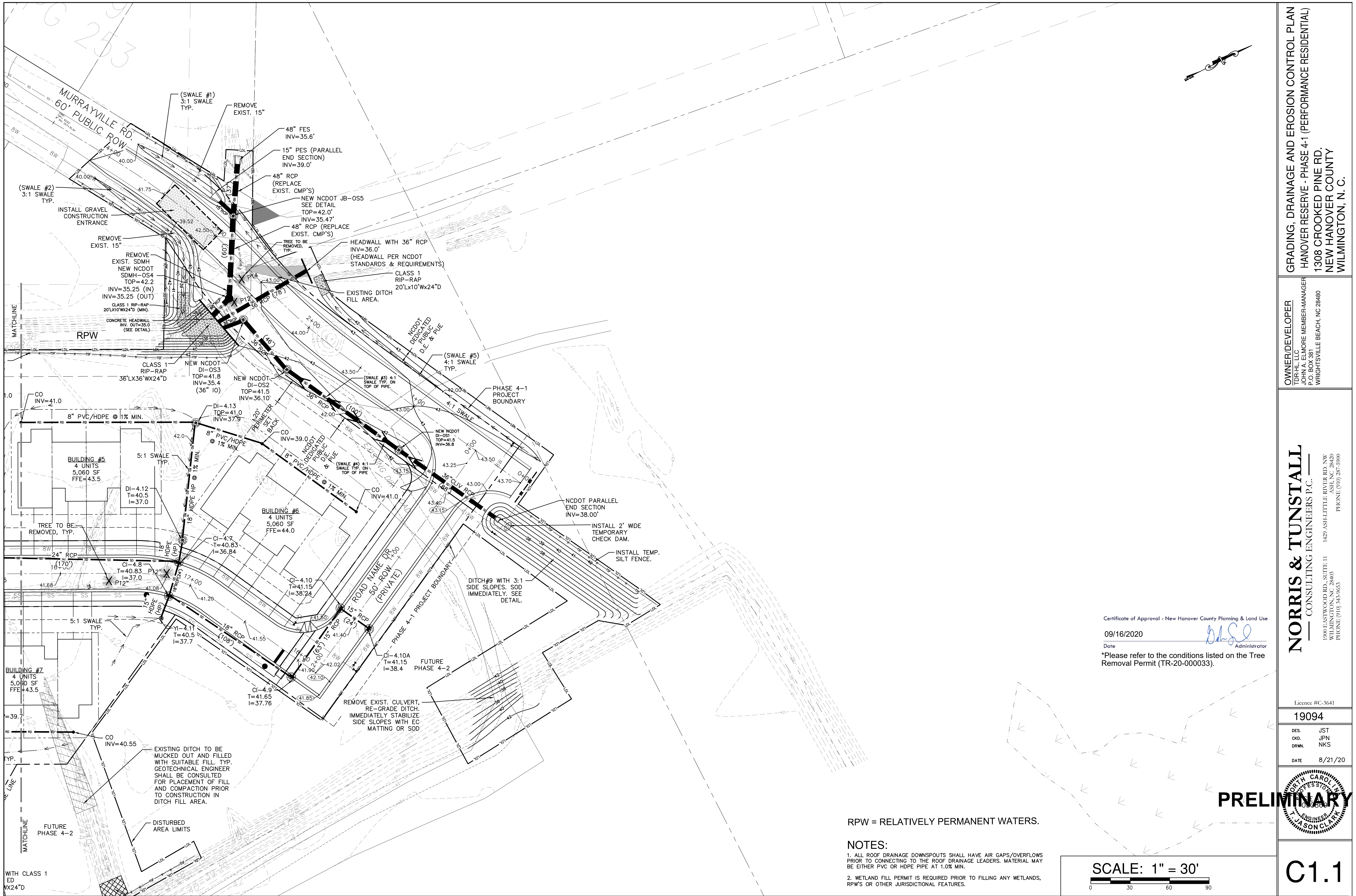
Certificate of Approval - New Hanover County Planning & Land Use
09/16/2020
Date
*Please refer to the conditions listed on the Tree Removal Permit (TR-20-000033).

RPW = RELATIVELY PERMANENT WATERS.

NOTES:
1. ALL ROOF DRAINAGE DOWNSPOUTS SHALL HAVE AIR GAPS/OVERFLOWS PRIOR TO CONNECTING TO THE ROOF DRAINAGE LEADERS. MATERIAL MAY BE EITHER PVC OR HDPE PIPE AT 1.0% MIN.
2. WETLAND FILL PERMIT IS REQUIRED PRIOR TO FILLING ANY WETLANDS, RPW'S OR OTHER JURISDICTIONAL FEATURES.

SCALE: 1" = 30'

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RPW = RELATIVELY PERMANENT WATERS.

NOTES:

1. ALL ROOF DRAINAGE DOWNSPOUTS SHALL HAVE AIR GAPS/OVERFLOWS PRIOR TO CONNECTING TO THE ROOF DRAINAGE LEADERS. MATERIAL MAY BE EITHER PVC OR HDPE PIPE AT 1.0% MIN.
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SCALE: 1" = 30'

0 30 60 90

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09/16/2020

Date

*Please refer to the conditions listed on the Tree Removal Permit (TR-20-000033).

GRADING, DRAINAGE AND EROSION CONTROL PLAN
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WILMINGTON, N.C.

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WRIGHTSVILLE BEACH, NC 28480

NORRIS & TUNSTALL
CONSULTING ENGINEERS P.C.
1900 EASTWOOD RD., SUITE 11
WILMINGTON, NC 28403
PHONE (910) 343-5953
1429 ASHLITTLE RIVER RD. NW
ASH, NC 28420
PHONE (910) 287-5000

Licence #C-3641

19094

DES. JST
CHK. JPN
DRWN. NKS


DATE 8/21/20



C1.1

C1.2

SCALE: 1" = 50'

A horizontal graphic scale bar with alternating black and white segments. It is marked with the numbers 0, 50, 100, and 150 at the bottom, representing feet.

QUAIL WOODS
SECTION 10
MB 34, PG 254

SYMBOL	DATE	DESCRIPTION	BY
REVISIONS			
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HANOVER RESERVE - PHASE 4-1 (PERFORMANCE RESIDENTIAL)
1308 CROOKED PINE RD.
NEW HANOVER COUNTY
WILMINGTON, N. C.

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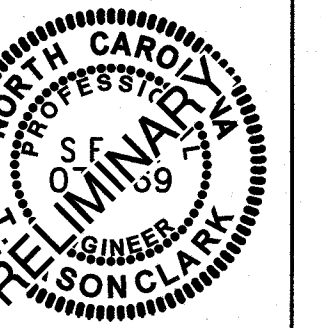
NORRIS & TUNSTALL
— CONSULTING ENGINEERS P.C. —
1900 EASTWOOD BL., SUITE 11
WILMINGTON, NC 28403
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1429 ASH-LITTLE RIVER RD. NW
ASH, NC 28420
PHONE (704) 287-5900

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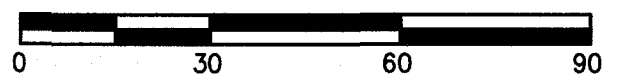
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C2

SCALE: 1" = 30'



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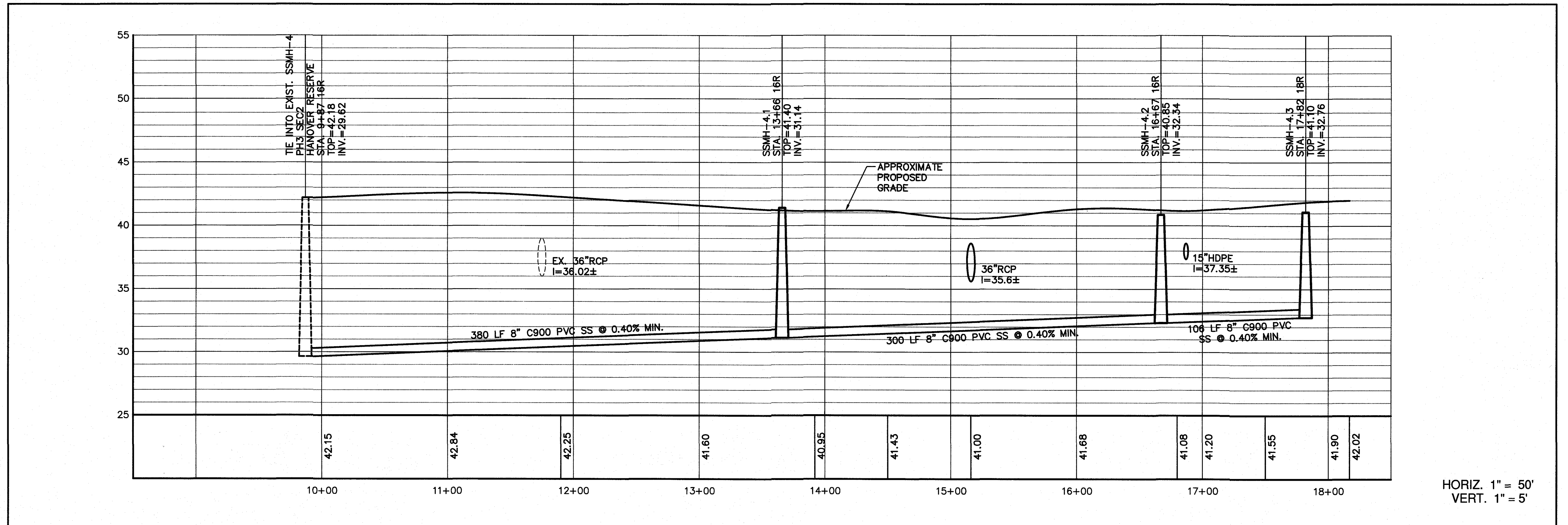
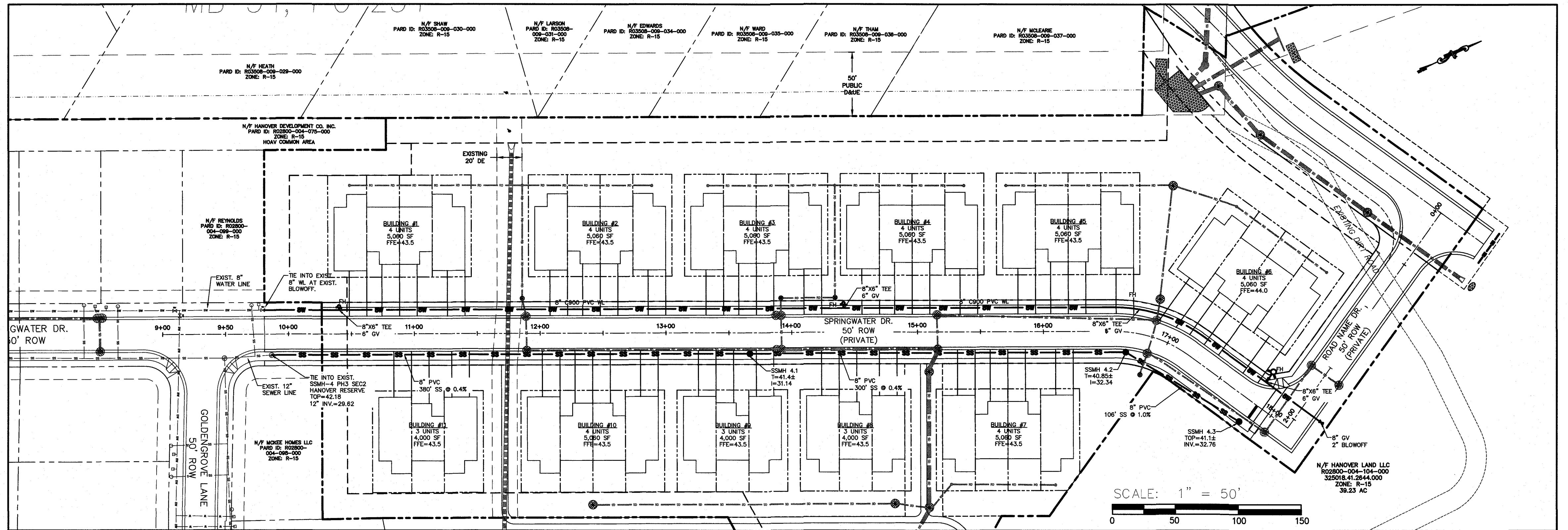
CAPE FEAR PUBLIC UTILITY AUTHORITY STANDARD NOTES:

- ALL PROPOSED ADDITIONS TO THE CAPE FEAR PUBLIC UTILITY AUTHORITY (CFPUA) WATER DISTRIBUTION AND SANITARY SEWER COLLECTION SYSTEMS, AS SHOWN AND SPECIFIED HEREIN, SHALL BE DESIGNED AND CONSTRUCTED TO CONFORM TO STATE RULES AND THE CFPUA'S MINIMUM TECHNICAL STANDARDS. THE CFPUA MINIMUM TECHNICAL STANDARDS ARE CONTAINED IN THE CURRENT DESIGN GUIDANCE MANUAL, MATERIAL SPECIFICATION MANUAL, TECHNICAL SPECIFICATIONS FOR CONSTRUCTION, AND STANDARD DRAWING DETAILS.
- SEWER GUARDS REQUIRED AT ALL MANHOLES. STAINLESS STEEL SEWER GUARDS REQUIRED AT MANHOLES LOCATED IN TRAFFIC AREAS.
- WATER AND SEWER SERVICES SHALL BE PERPENDICULAR TO MAIN AND TERMINATE 18" INSIDE RIGHT-OF-WAY LINE. SEWER SERVICES IN CUL-DE-SACS ARE REQUIRED TO BE PERPENDICULAR, OR MUST ORIGINATE IN END OF LINE MANHOLE AND TERMINATE 18" INSIDE RIGHT-OF-WAY LINE.
- ALL SEWER SERVICES CONNECTING INTO DUCTILE IRON MAINS SHALL ALSO BE CONSTRUCTED OF DIP.
- MINIMUM 10' UTILITIES EASEMENT PROVIDED ALONG THE FRONTAGE OF ALL LOTS AND AS SHOWN FOR NEW DEVELOPMENTS.
- NO FLEXIBLE COUPLINGS SHALL BE USED.
- ALL STAINLESS STEEL FASTENERS SHALL BE TYPE 316.
- CLEANOUTS SHALL BE LOCATED A MINIMUM OF 6 FEET FROM ALL PROPERTY CORNERS.
- WATER METER BOXES ARE TO BE A MINIMUM OF 5 FEET FROM THE PROPERTY CORNER.
- UNUSED SERVICES SHALL BE DISCONNECTED FROM MAIN.
- A MINIMUM OF 10' OF MAIN LINE, 5' UPSTREAM AND 5' DOWNSTREAM SHALL BE REPLACED FOR NEW SEWER SERVICE CONNECTIONS TO EXISTING CLAY GRAVITY SEWER MAINS.
- A MINIMUM OF 20' OF MAIN LINE, 10' UPSTREAM AND 10' DOWNSTREAM SHALL BE REPLACED FOR NEW CUT IN MANHOLES ON EXISTING CLAY GRAVITY SEWER MAINS.
- PROVIDE A MINIMUM DISTANCE OF SIX (6) INCHES BETWEEN EDGES OF CORE HOLES AND MANHOLE BARREL JOINTS. PROVIDE A MINIMUM DISTANCE OF SIX (6) INCHES BETWEEN EDGES OF CORE HOLES. CORING THE MANHOLE CONE IS NOT PERMITTED.
- WATER MAIN AND FORCE MAIN PIPE INSTALLED BY OPEN CUT SHALL BE BURIED AT A MINIMUM OF THREE (3) FEET AND A MAXIMUM OF FIVE (5) FEET BELOW FINISHED GRADE. DEPTHS GREATER THAN FIVE (5) FEET MUST BE APPROVED BY CFPUA.
- ALL MANHOLE MAIN LINE AND SERVICE PIPING TO BE INSTALLED AT A MINIMUM OF CROWN TO CROWN OF THE LARGEST DIAMETER PIPE.

DETAIL: STANDARD NOTES
(REQUIRED ON ALL PLAN AND PROFILE SHEETS)
SCALE: NOT TO SCALE
CFPUA DETAIL DATE: 01/10/20

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910) 392-6590
Ownership, Sustainability, Service.

DETAIL NO: WS-14
SHEET NO: 1



8" C-900 PVC WL = 846 LF
8" C-900 PVC SS = 786 LF

SPRINGWATER DRIVE

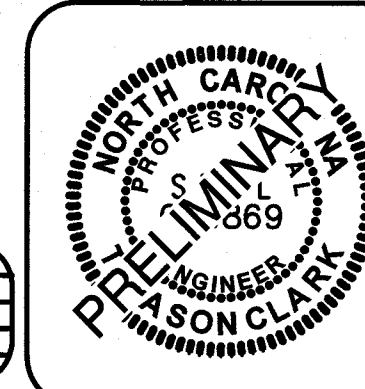
NORRIS & TUNSTALL
CONSULTING ENGINEERS P.C.
1900 EASTWOOD RD., SUITE 111 WILMINGTON, NC 28403
1429 ASH LITTLE RIVER RD., NW ARLING, NC 28403
PHONE: (910) 343-9653 PHONE: (910) 287-5900

HANOVER RESERVE
PHASE 4-1 (PERFORMANCE RESIDENTIAL)
WATERLINE LAYOUT AND SANITARY SEWER
PLAN & PROFILE

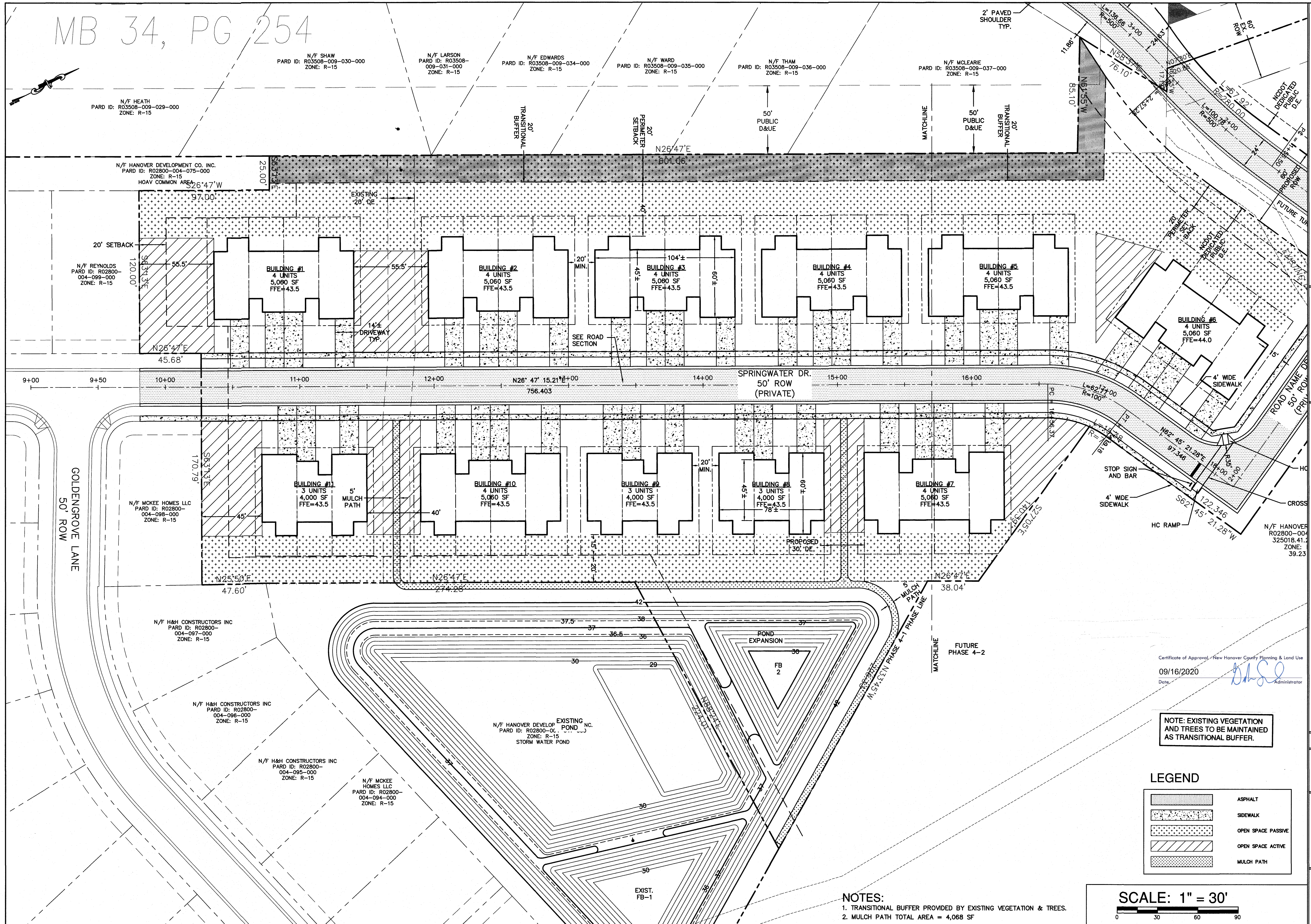
DATE: 7/16/20
SCALE: 1" = 50'
1" = 5'
DRAWN: NKS
CHECKED: JST
PROJECT NO: 06150

SHEET NO:
PR1

REV. NO.	DESCRIPTION	DATE



MB 34, PG 254



LAYOUT PLAN
HANOVER RESERVE - PHASE 4-1 (PERFORMANCE RESIDENTIAL)
1308 CROOKED PINE RD.
NEW HANOVER COUNTY
WILMINGTON, N. C.

OWNER/DEVELOPER
TDH-HL, LLC
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WILMINGTON, NC 28403
PHONE (910) 343-9653
1429 ASH-LITTLE RIVER RD. NW
ASH, NC 28420
PHONE (910) 287-5900

Licence #C-3641

19094

DES. JST
CHK. JPN
DRWN. NKS

DATE 7/16/20



C3

Certificate of Approval - New Hanover County Planning & Land Use
09/16/2020
Date: [Signature] Administrator

NOTE: EXISTING VEGETATION
AND TREES TO BE MAINTAINED
AS TRANSITIONAL BUFFER.

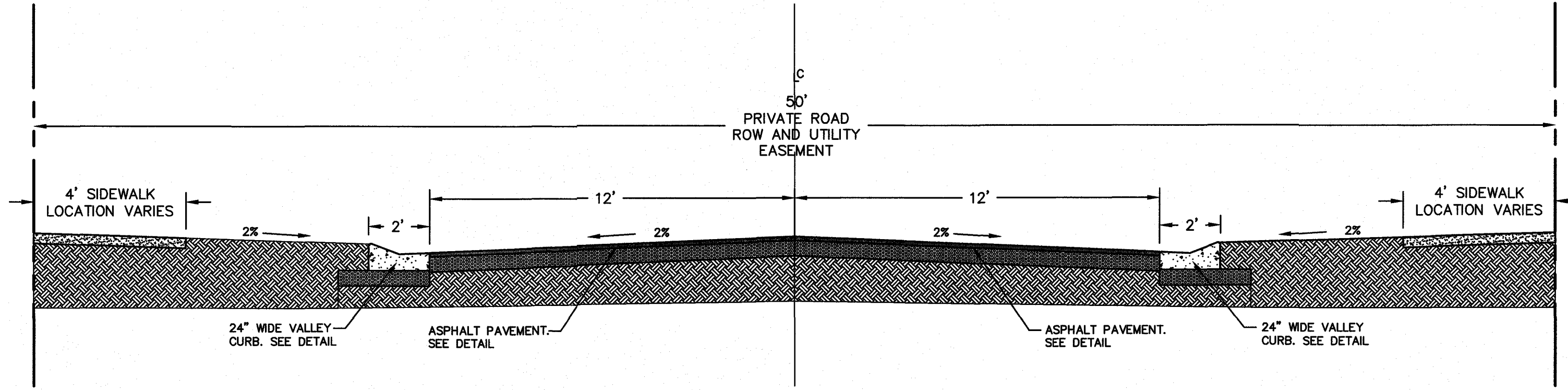
LEGEND

[Pattern]	ASPHALT
[Pattern]	SIDEWALK
[Pattern]	OPEN SPACE PASSIVE
[Pattern]	OPEN SPACE ACTIVE
[Pattern]	MULCH PATH

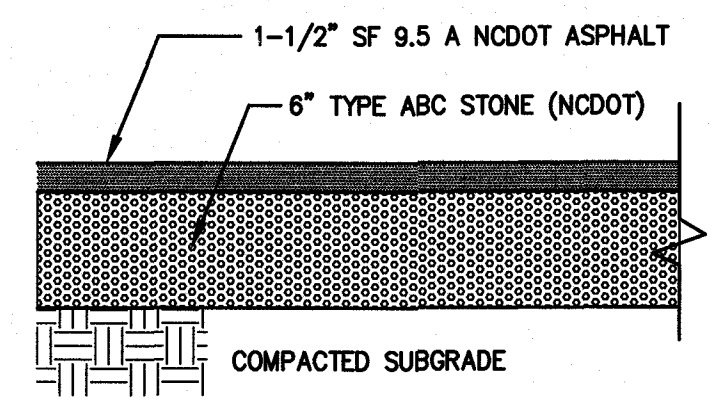
NOTES:
1. TRANSITIONAL BUFFER PROVIDED BY EXISTING VEGETATION & TREES.
2. MULCH PATH TOTAL AREA = 4,068 SF

SCALE: 1" = 30'
0 30 60 90

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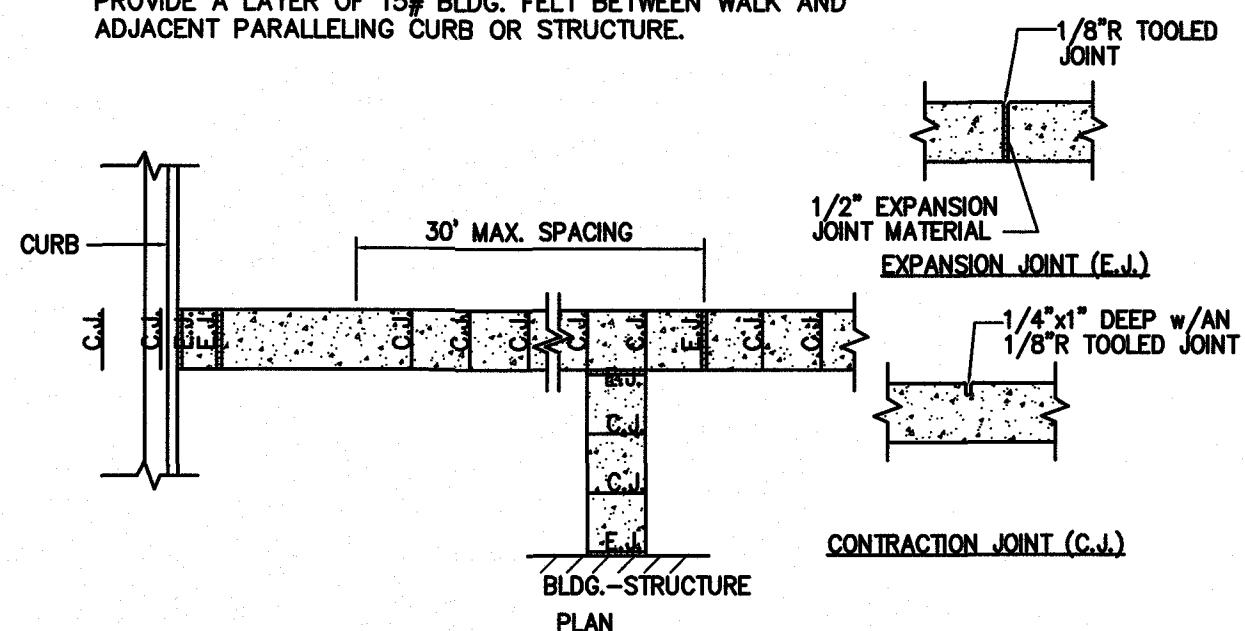
NOT TO SCALE



NOTES:
1. PAVEMENT SECTION MAY VARY DEPENDING UPON FIELD CONDITIONS. CONTRACTOR SHALL COORDINATE W/OWNER & GEOTECHNICAL ENGINEER TO DETERMINE ACTUAL PAVEMENT SECTION.
2. PAVEMENT SECTION AND MATERIALS SHALL MEET NCDOT MINIMUM STANDARDS FOR SUBDIVISION ROADS.

NOT TO SCALE

NOTES:
1. SIDEWALK THICKNESS SHALL BE 4" UNLESS NOTED OTHERWISE.
2. CONTRACTION JOINTS (C.J.) SPACE SAME AS SIDEWALK WIDTH.
3. THICKEN SIDEWALK TO 6" AT DRIVEWAYS.
4. THICKEN SIDEWALK TO 6" IN LAST 3' WHERE IT ABUTS PAVEMENT WITH NO CURB.
5. 1/2" EXPANSION JOINT (E.J.) AND SNAP CAP EXPANSION JOINT COVERS ARE REQUIRED AT 50' MAX. AT SIDEWALK JUNCTIONS, AT STRUCTURES, AND AS NOTED ON SITE PLAN. 6. PROVIDE A LAYER OF 15# BLDG. FELT BETWEEN WALK AND ADJACENT PARALLELING CURB OR STRUCTURE.

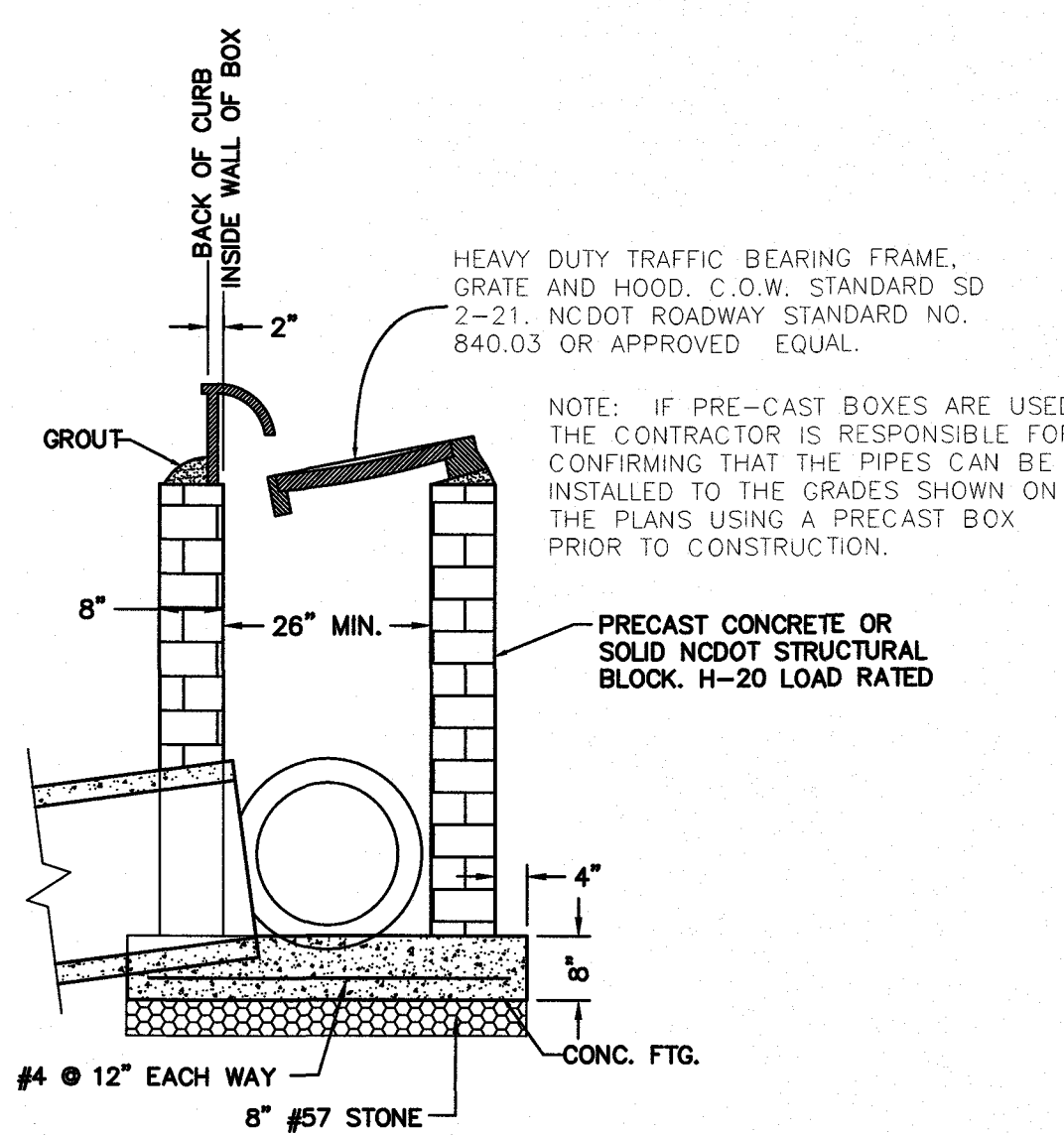


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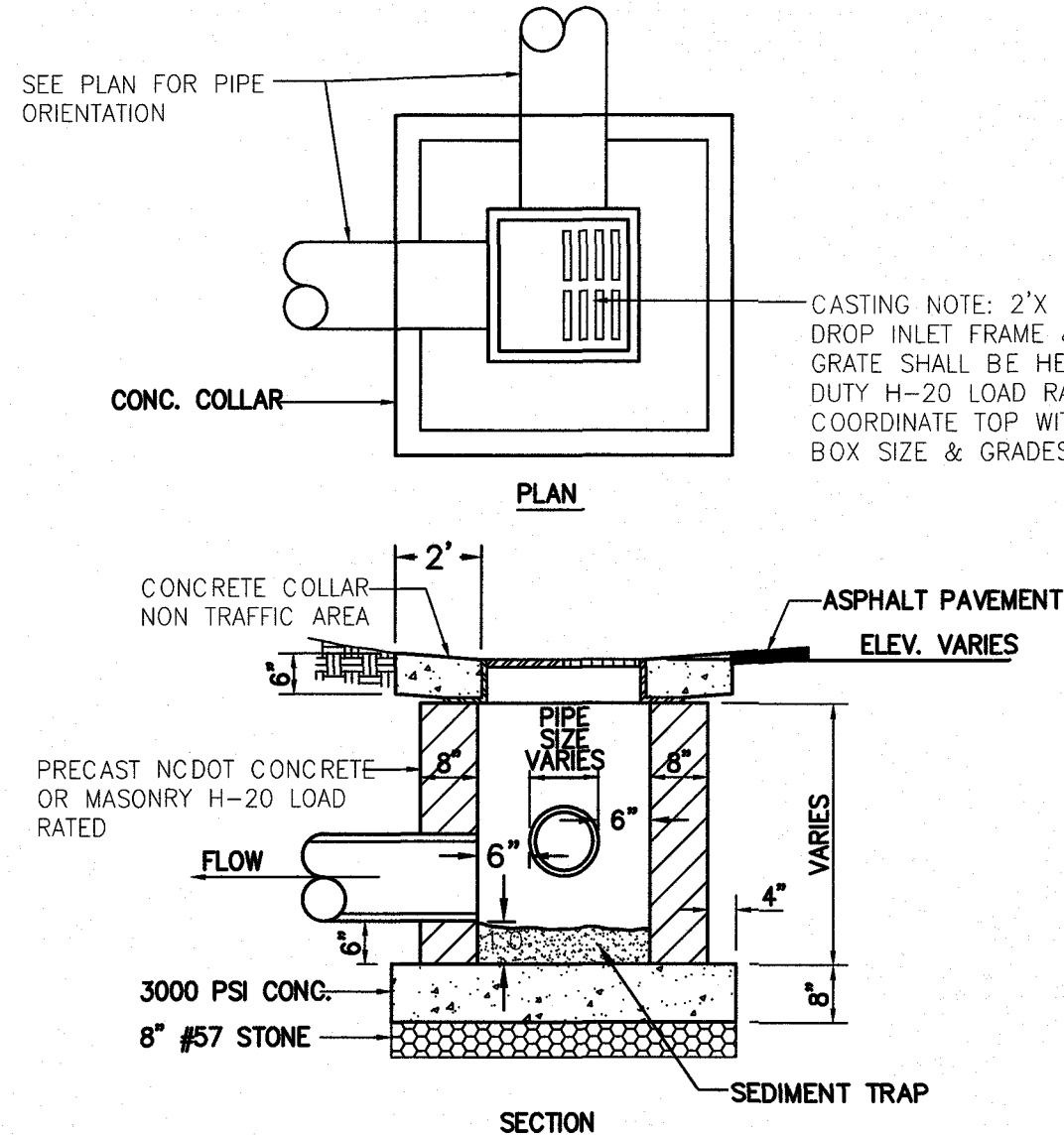
1 ROAD SECTION 50' ROW

2 ASPHALT PAVEMENT SECTION

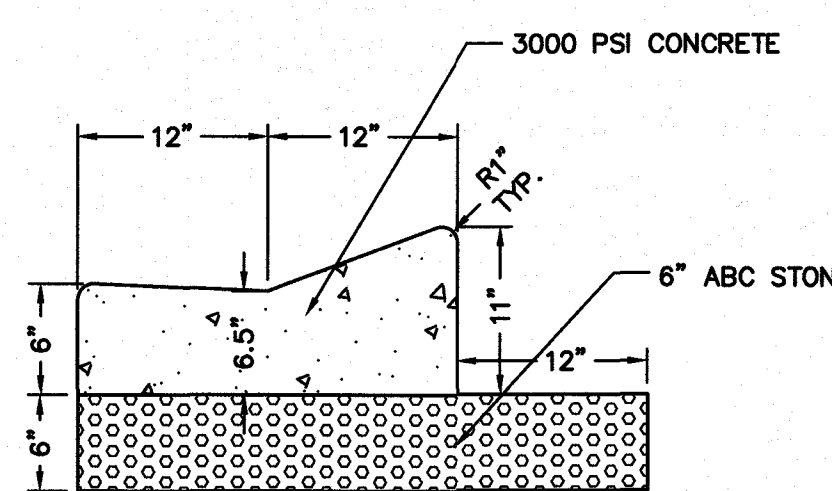
3 SIDEWALK JOINT DETAIL



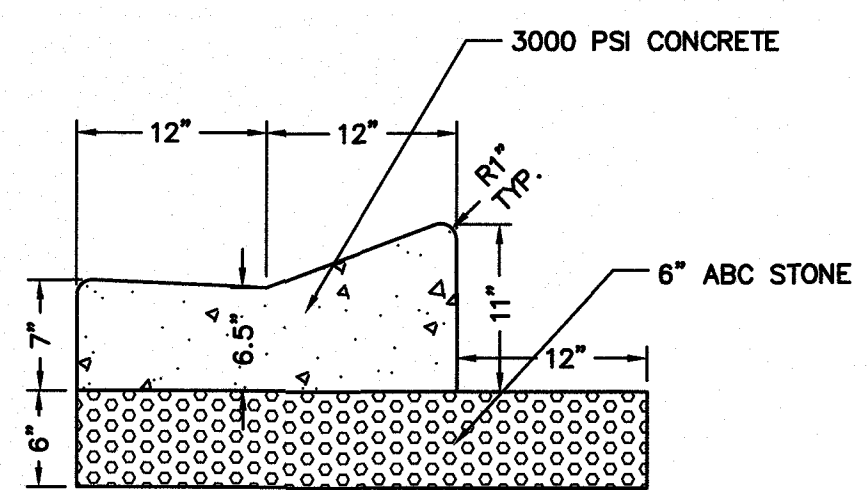
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NOT TO SCALE



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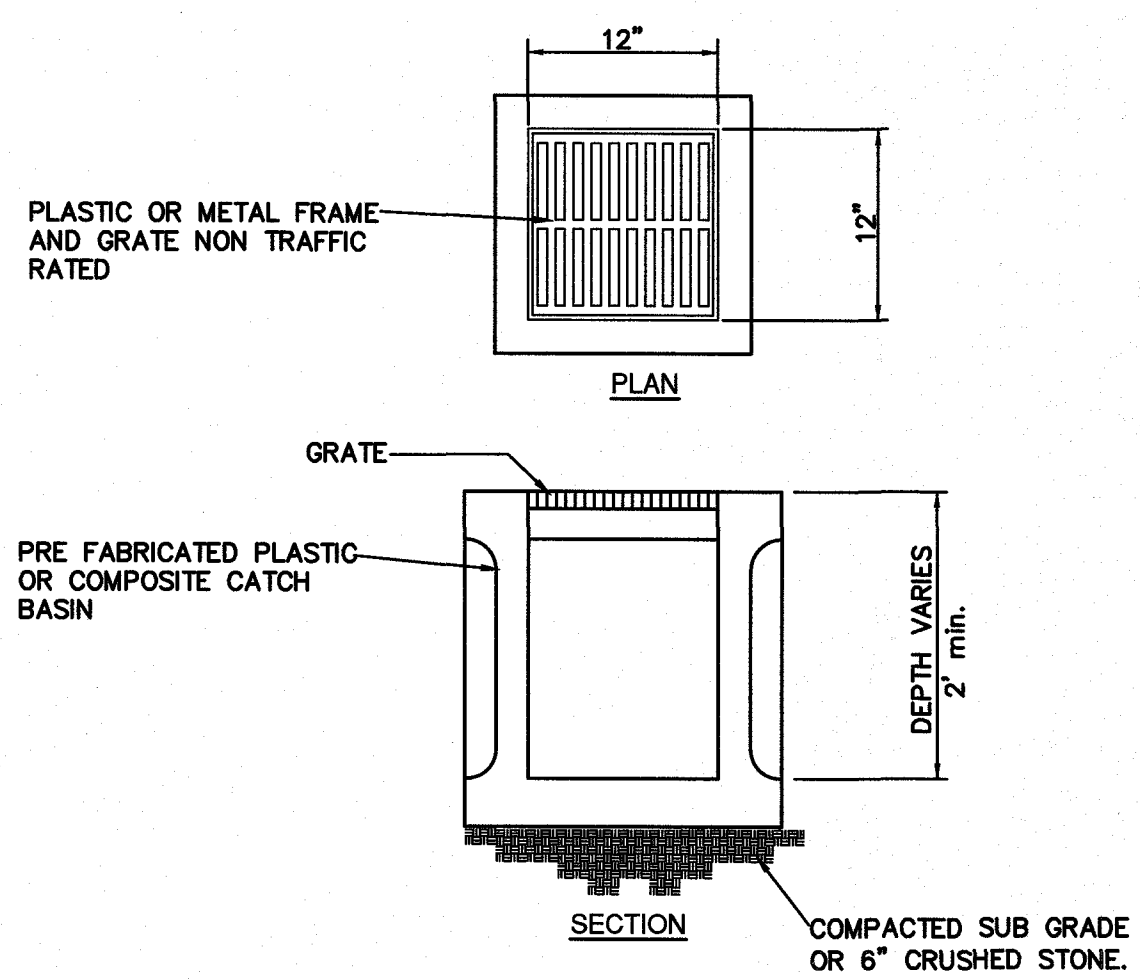
NOT TO SCALE

4 CATCH BASIN DETAIL

5 DROP INLET DETAIL

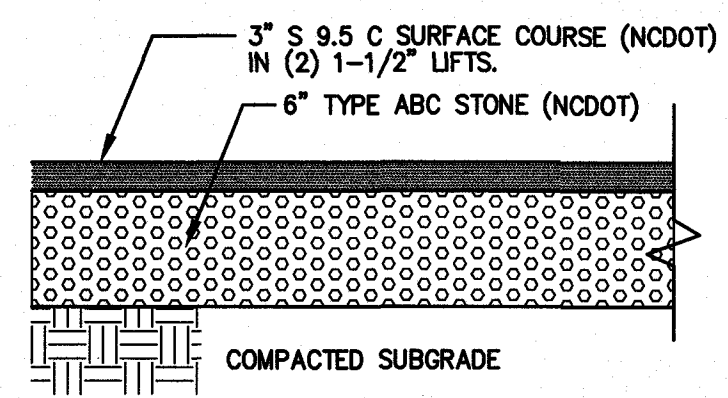
6 24" VALLEY CURB SECTION (SPILL-OFF)

7 24" VALLEY CURB SECTION



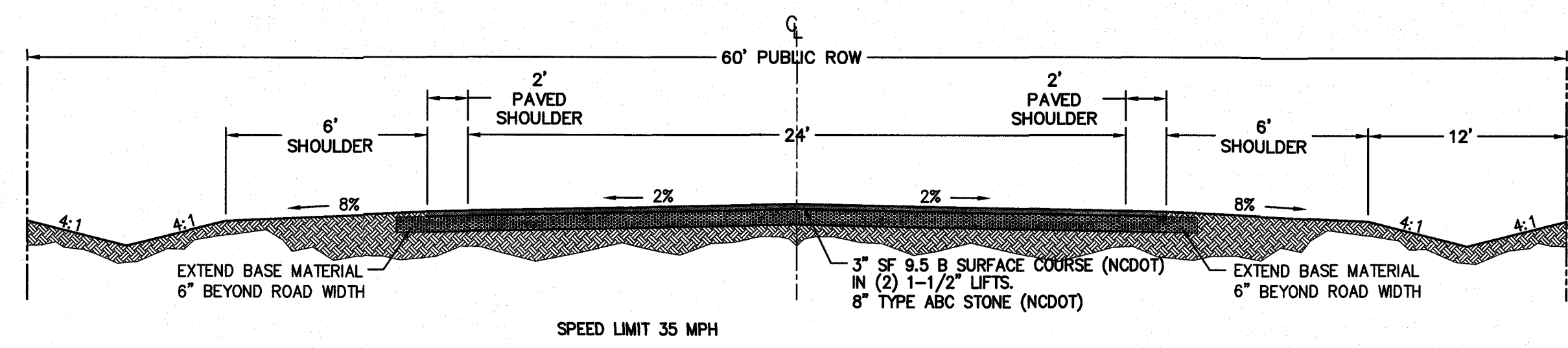
NOTES:
1. BASIN, FRAME AND GRATE MAY VARY IN NONESSENTIAL DIMENSIONS.
2. ALL INFILTRATION PIPES OUT OF YARD INLETS SHALL BE PROTECTED WITH 1/4" ALUMINUM SCREEN WITH FILTER FABRIC ATTACHED TO BOX AT PIPE OPENING.

NOT TO SCALE



NOTE: FINAL PAVEMENT DESIGN CROSS-SECTION TO BE DETERMINED BY GEOTECHNICAL ENGINEERS RECOMMENDATIONS.

NOT TO SCALE



NOT TO SCALE

8 YARD INLET DETAIL

9 NCDOT PAVEMENT SECTION

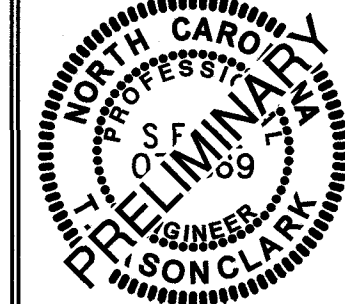
10 MURRAYVILLE ROAD ROW EXTENSION

NOTES AND DETAILS
HANOVER RESERVE - PHASE 4-1 (PERFORMANCE RESIDENTIAL)
1308 CROOKED PINE RD.
NEW HANOVER COUNTY
WILMINGTON, N. C.

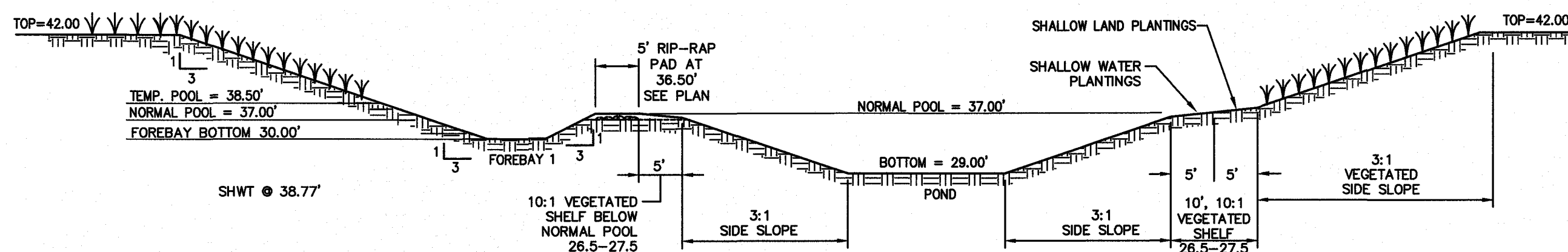
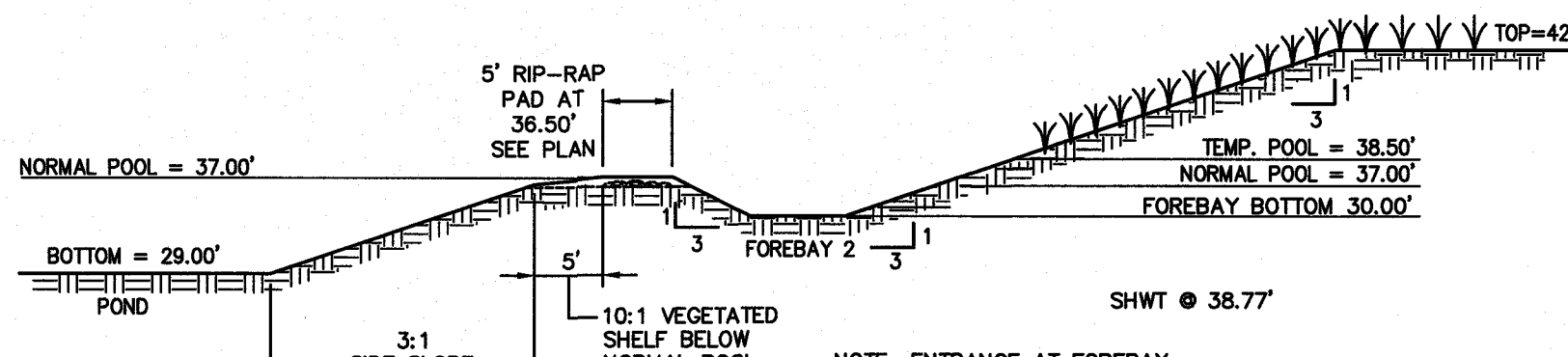
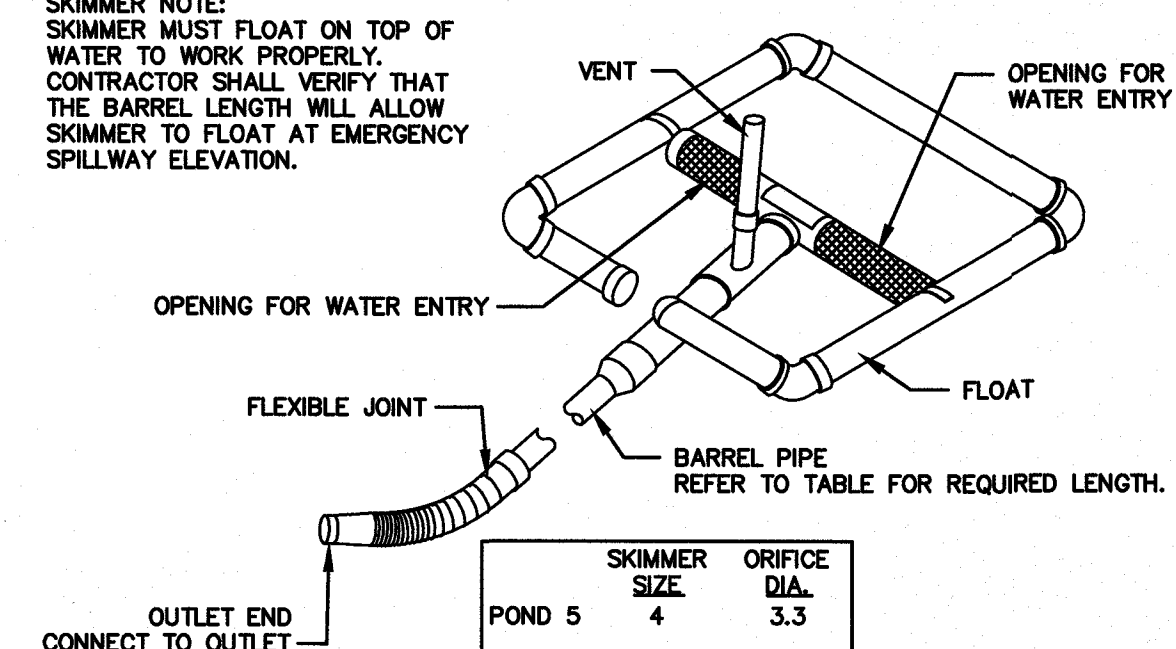
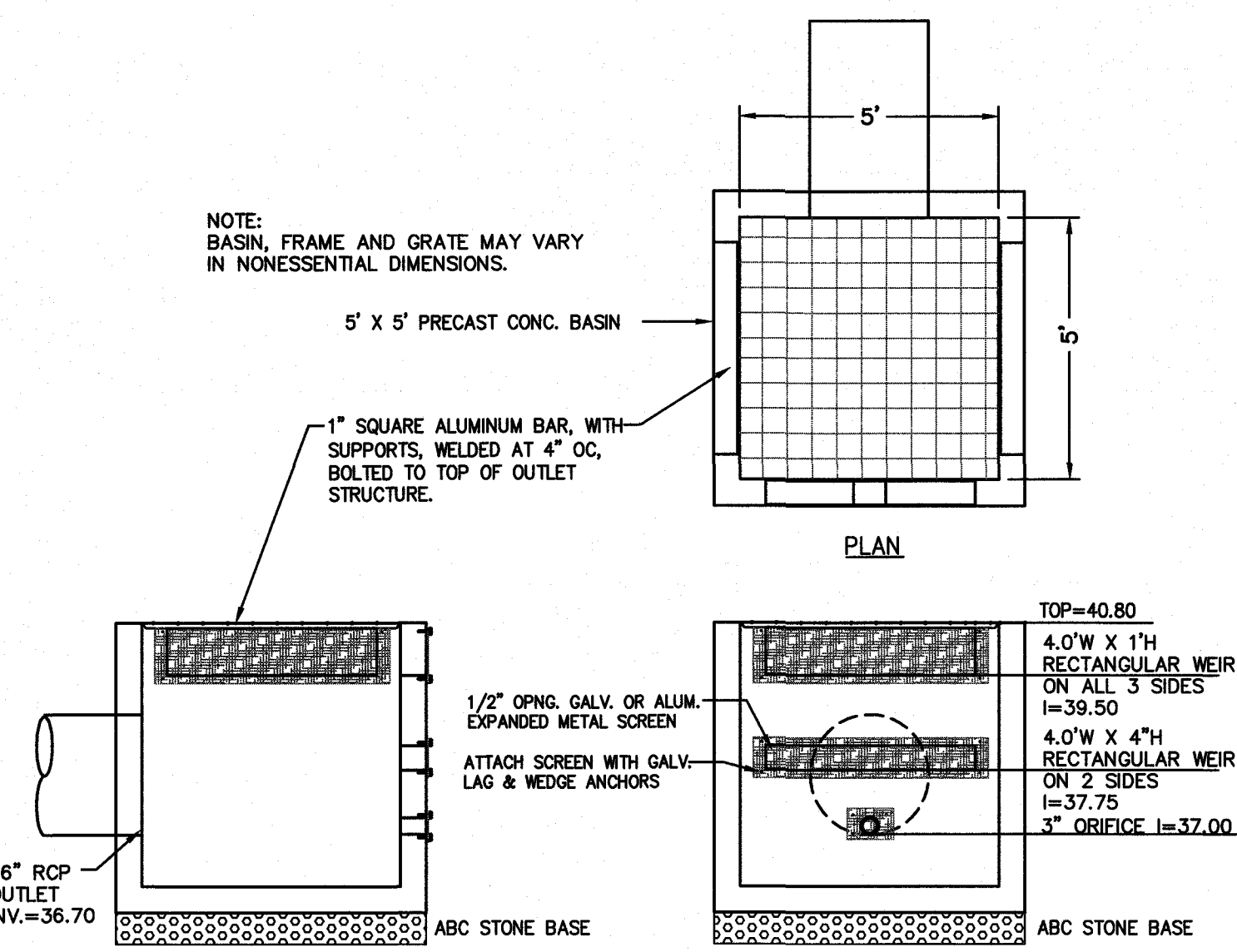
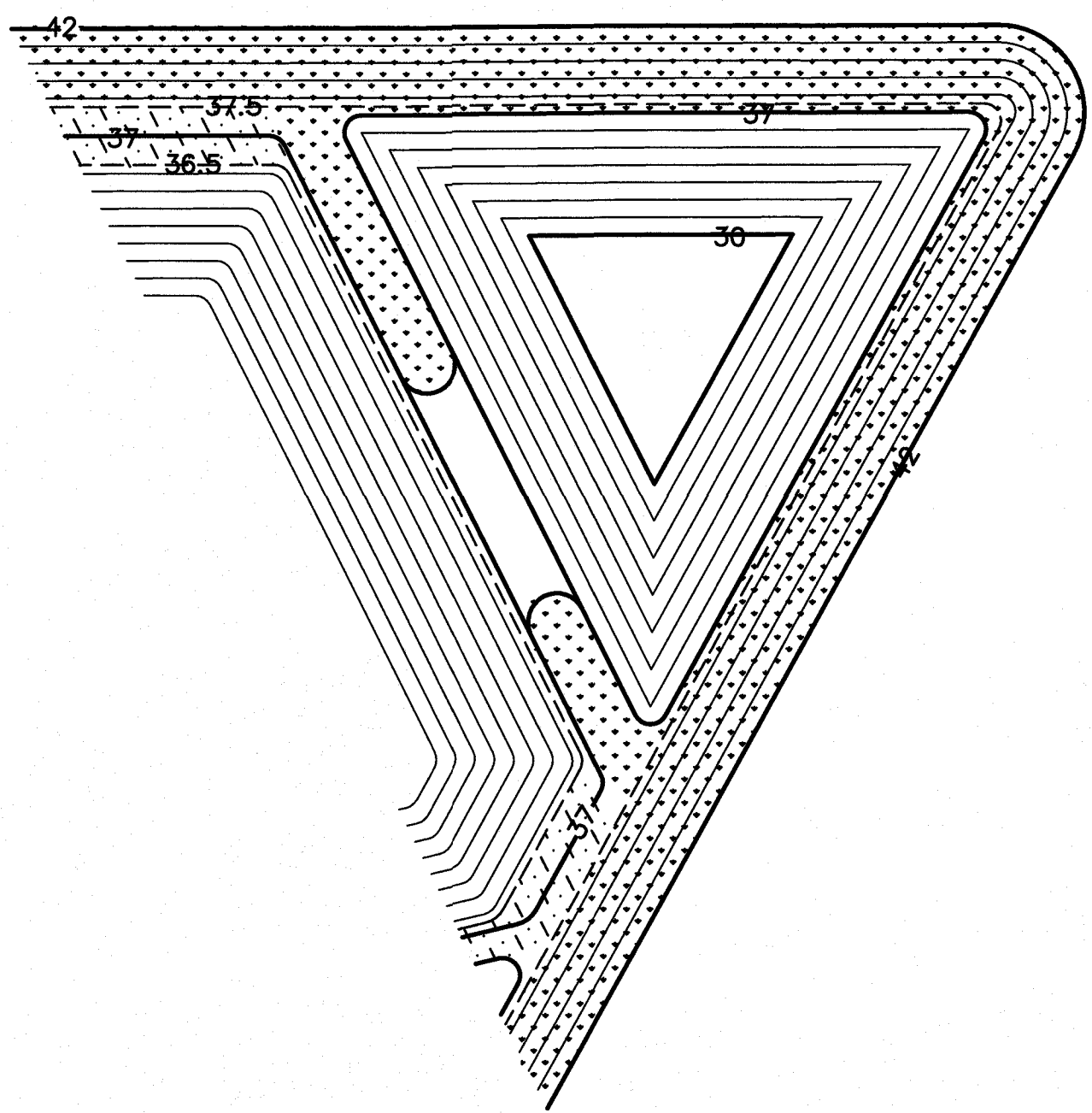

OWNER/DEVELOPER
TOR-HILL LLC
JOHN A. ELMORE MEMBER-MANAGER
P.O. BOX 381
WRIGHTSVILLE BEACH, NC 28480

NORRIS & TUNSTALL
CONSULTING ENGINEERS P.C.
1900 EASTWOOD RD., SUITE 111
WILMINGTON, NC 28403
PHONE (910) 343-9653
1429 ASH-LITTLE RIVER RD. NW
ASH, NC 28420
PHONE (910) 287-5900

Licence #C-3641
19094
RES. JST
CHK. JPN
DRWN. NKS
DATE 7/16/20



C4.2

<div>DETENTION POND NOTES:</div> <div>1. UPON STABILIZATION OF SITE, RESTORE POND TO DESIGN SIZE AND SHAPE.</div> <div></div> <div>NOT TO SCALE</div>		<div>POND 5 SURFACE AREAS</div> <div><table><tr><th colspan="5">SW Pond 5</th></tr><tr><th>Elevation</th><th>Total Forebay-1</th><th>Total Forebay-2</th><th>Main Pond</th><th>TOTAL</th></tr><tr><th></th><th>(SF)</th><th>(SF)</th><th>(SF)</th><th>(SF)</th></tr><tr><td>29</td><td>0</td><td>0</td><td>5411</td><td>5411</td></tr><tr><td>30</td><td>2000</td><td>986</td><td>19366</td><td>22352</td></tr><tr><td>31</td><td>2668</td><td>1463</td><td>21224</td><td>25355</td></tr><tr><td>32</td><td>3425</td><td>2034</td><td>23162</td><td>28621</td></tr><tr><td>33</td><td>4271</td><td>2698</td><td>25180</td><td>32149</td></tr><tr><td>34</td><td>5206</td><td>3457</td><td>27261</td><td>35924</td></tr><tr><td>35</td><td>6230</td><td>4309</td><td>29402</td><td>39941</td></tr><tr><td>36</td><td>7327</td><td>5255</td><td>31603</td><td>44185</td></tr><tr><td>36.5</td><td>7930</td><td>5763</td><td>32725</td><td>46418</td></tr><tr><td>37</td><td>8528</td><td>6276</td><td>36344</td><td>51148</td></tr><tr><td>37.5</td><td></td><td></td><td>55805</td><td>55805</td></tr><tr><td>38</td><td></td><td></td><td>57366</td><td>57366</td></tr><tr><td>39</td><td></td><td></td><td>60523</td><td>60523</td></tr><tr><td>40</td><td></td><td></td><td>63736</td><td>63736</td></tr><tr><td>41</td><td></td><td></td><td>67006</td><td>67006</td></tr><tr><td>42</td><td></td><td></td><td>70332</td><td>70332</td></tr></table></div> <div></div> <div>NOTE: ENTRANCE AT FOREBAY SHALL BE DEEPER THAN EXIT.</div>		SW Pond 5					Elevation	Total Forebay-1	Total Forebay-2	Main Pond	TOTAL		(SF)	(SF)	(SF)	(SF)	29	0	0	5411	5411	30	2000	986	19366	22352	31	2668	1463	21224	25355	32	3425	2034	23162	28621	33	4271	2698	25180	32149	34	5206	3457	27261	35924	35	6230	4309	29402	39941	36	7327	5255	31603	44185	36.5	7930	5763	32725	46418	37	8528	6276	36344	51148	37.5			55805	55805	38			57366	57366	39			60523	60523	40			63736	63736	41			67006	67006	42			70332	70332
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<div>SKIMMER MAINTENANCE NOTES:</div> <div>1. INSPECT SKIMMER SEDIMENT BASINS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (ON-HALF INCH OR GREATER) RAINFALL EVENT AND REPAIR IMMEDIATELY.</div> <div>2. IF THE SKIMMER IS CLOGGED WITH TRASH AND THERE IS WATER IN THE BASIN, USUALLY JERKING ON THE ROPE WILL MAKE THE SKIMMER BOB UP AND DOWN AND DISLODGE THE DEBRIS AND RESTORE FLOW. IF THIS DOES NOT WORK, PULL THE SKIMMER OVER TO THE SIDE OF THE BASIN AND REMOVE THE DEBRIS. ALSO CHECK THE ORIFICE INSIDE THE SKIMMER TO SEE IF IT IS CLOGGED; IF SO REMOVE THE DEBRIS.</div> <div>3. IF THE SKIMMER ARM OR BARREL PIPE IS CLOGGED, THE ORIFICE CAN BE REMOVED AND THE OBSTRUCTION CLEARED WITH A PLUMBER'S SNAKE OR BY FLUSHING WITH WATER. BE SURE AND REPLACE THE ORIFICE BEFORE REPOSITIONING THE SKIMMER.</div> <div>4. FREEZING WEATHER CAN RESULT IN ICE FORMING IN THE BASIN. SOME SPECIAL PRECAUTIONS SHOULD BE TAKEN IN THE WINTER TO PREVENT THE SKIMMER FROM PLUGGING WITH ICE.</div> <div>SKIMMER NOTE: SKIMMER MUST FLOAT ON TOP OF WATER TO WORK PROPERLY. CONTRACTOR SHALL VERIFY THAT THE BARREL LENGTH WILL ALLOW SKIMMER TO FLOAT AT EMERGENCY SPILLWAY ELEVATION.</div> <div></div> <div>NOT TO SCALE</div>		<div></div> <div>NOTE: BASIN, FRAME AND GRATE MAY VARY IN NONESSENTIAL DIMENSIONS.</div> <div>5' X 5' PRECAST CONC. BASIN</div> <div>1\" data-bbox="315 465 385 490"/></div> <div>1/2\" data-bbox="345 535 385 555"/></div> <div>ATTACH SCREEN WITH GALV. LAG & WEDGE ANCHORS</div> <div>36\" data-bbox="265 585 285 605"/></div> <div>INV.=36.70</div> <div>ABC STONE BASE</div> <div>PLAN</div> <div>TOP=40.80</div> <div>4.0'W X 17\" data-bbox="440 520 480 540"/></div> <div>ON ALL 3 SIDES</div> <div>L=39.50</div> <div>4.0'W X 4\" data-bbox="440 545 480 565"/></div> <div>ON 2 SIDES</div> <div>L=37.75</div> <div>3\" data-bbox="440 565 480 585"/></div> <div>L=37.00</div> <div>ABC STONE BASE</div>																																																																																																
3	FAIRCLOTH STANDARD SKIMMER DETAIL	4	POND #5 EXISTING CROSS SECTION																																																																																															
5	POND #5 EXPANSION PLANTINGS	<div></div> <div>POND PLANTING LEGEND:</div> <div></div> <div>THE VEGETATED SHELF (36.5-37.5) SHALL BE PLANTED WITH A MINIMUM OF THREE DIVERSE SPECIES OF HERBACEOUS, NATIVE VEGETATION AT A MINIMUM DENSITY OF 50 PLANTS PER 200 SF OF SHELF AREA. PLANTS MAY BE SWAMP MILKWEED, SCARLET ROSE MALLOW, AND LONGLEAF LOBELIA. FINAL PLANTINGS SHALL BE PER LANDSCAPE PROFESSIONAL.</div> <div>MAIN POND ABOVE ELEV. 37.5 AND FOREBAY ABOVE 37.0 ARE TO BE PLANTED WITH PERENNIAL TURF GRASS-HYBRID BERMUDA GRASS. POND SLOPE PLANTINGS SHALL BE EITHER SOD (BERMUDA GRASS) OR OR MATTED AND SEEDED WITH BERMUDA GRASS SEED.</div> <div>NOT TO SCALE</div>																																																																																																
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NOTES AND DETAILS

HANOVER RESERVE - PHASE 4-1 (PERFORMANCE RESIDENTIAL)

1308 CROOKED PINE RD.

NEW HANOVER COUNTY

WILMINGTON, N. C.

OWNER/DEVELOPER

TDR-HL, LLC

JOHN A. ELMORE MEMBER-MANAGER

P.O. BOX 381

WRIGHTSVILLE BEACH, NC 28480

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CONSULTING ENGINEERS P.C.

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WILMINGTON, NC 28403

PHONE (910) 343-9653

1429 ASH-LITTLE RIVER RD. NW

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DES. JST

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DRWN. NKS

DATE 7/16/20



C4.3

NOTES AND DETAILS
HANOVER RESERVE - PHASE 4-1 (PERFORMANCE RESIDENTIAL)
1308 CROOKED PINE RD.
NEW HANOVER COUNTY
WILMINGTON, N. C.

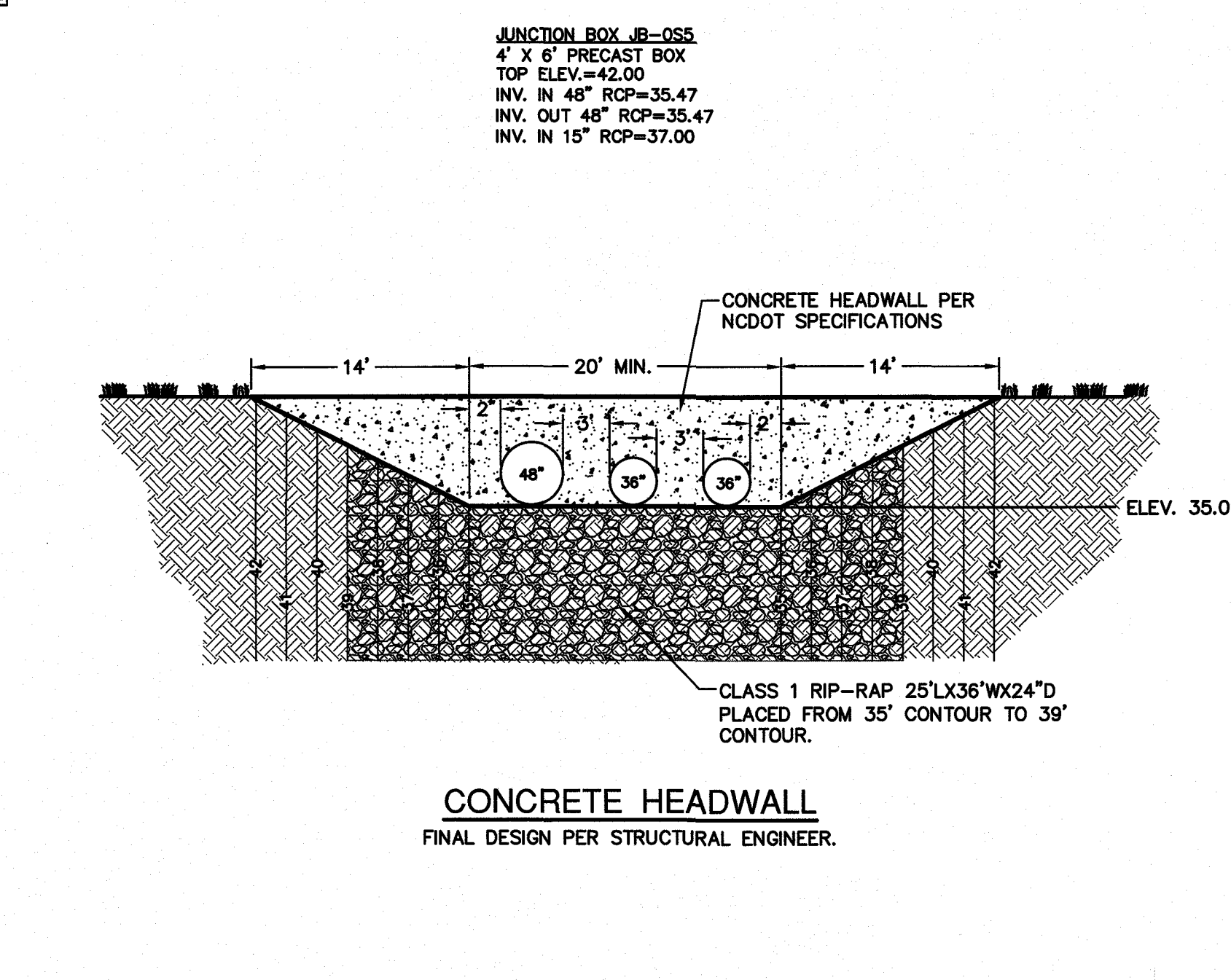
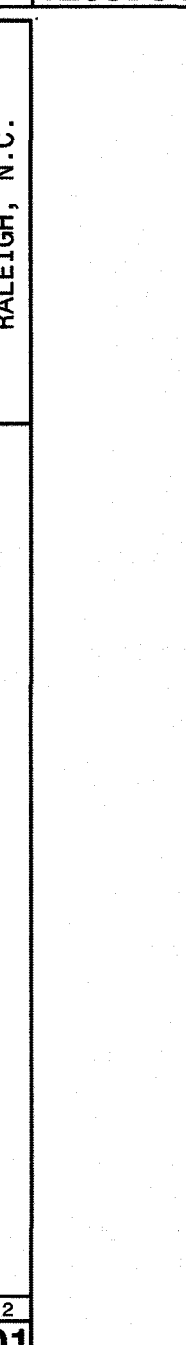
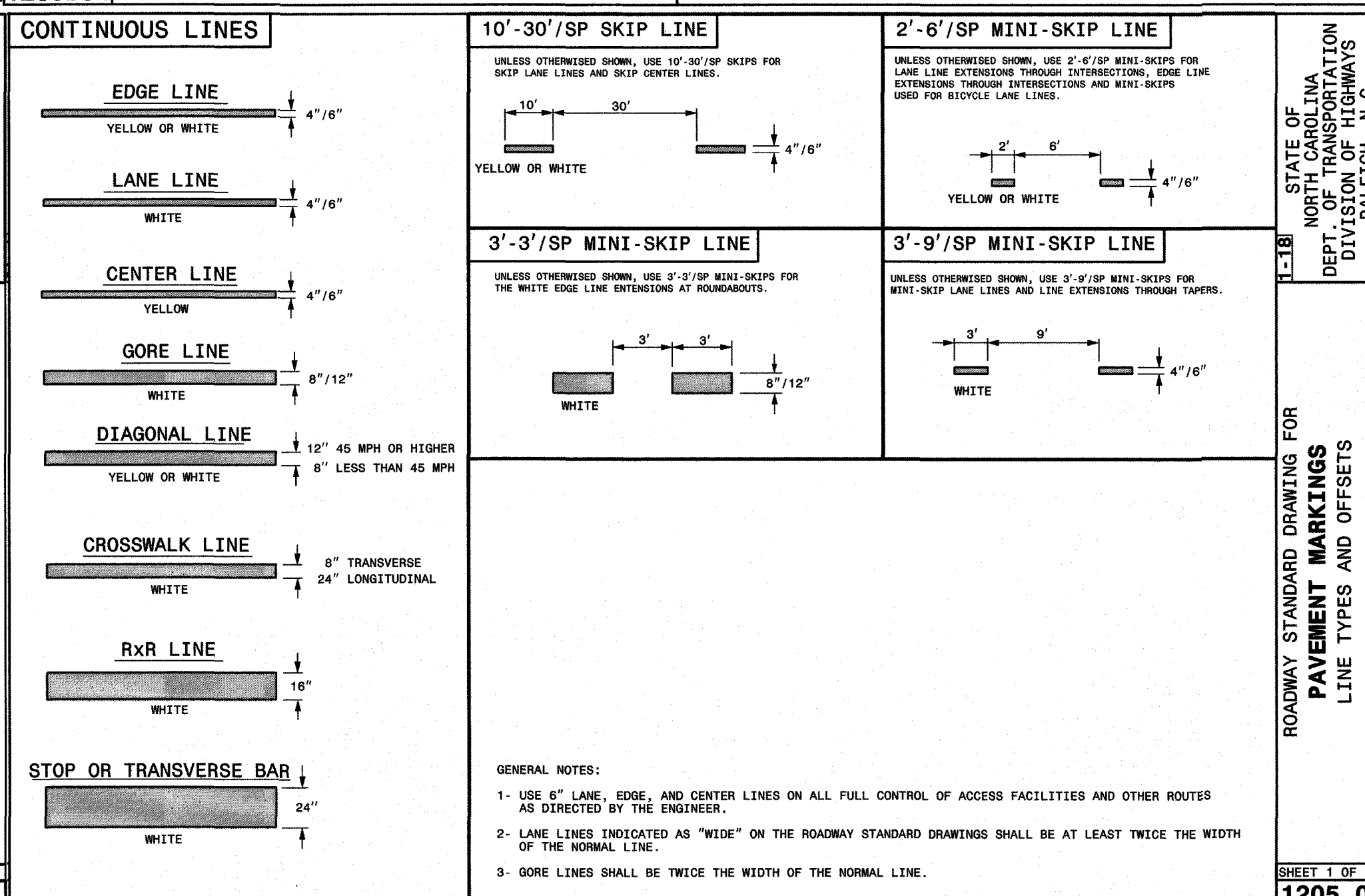
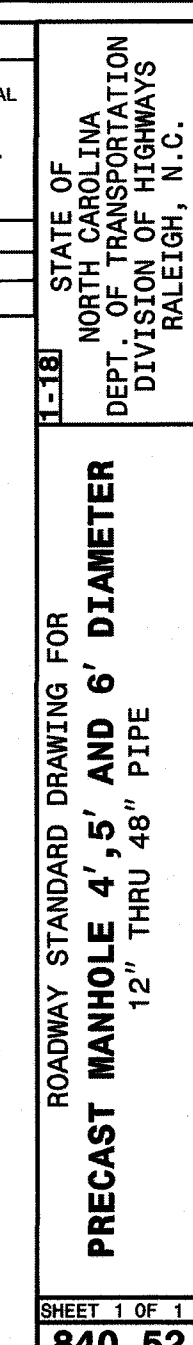
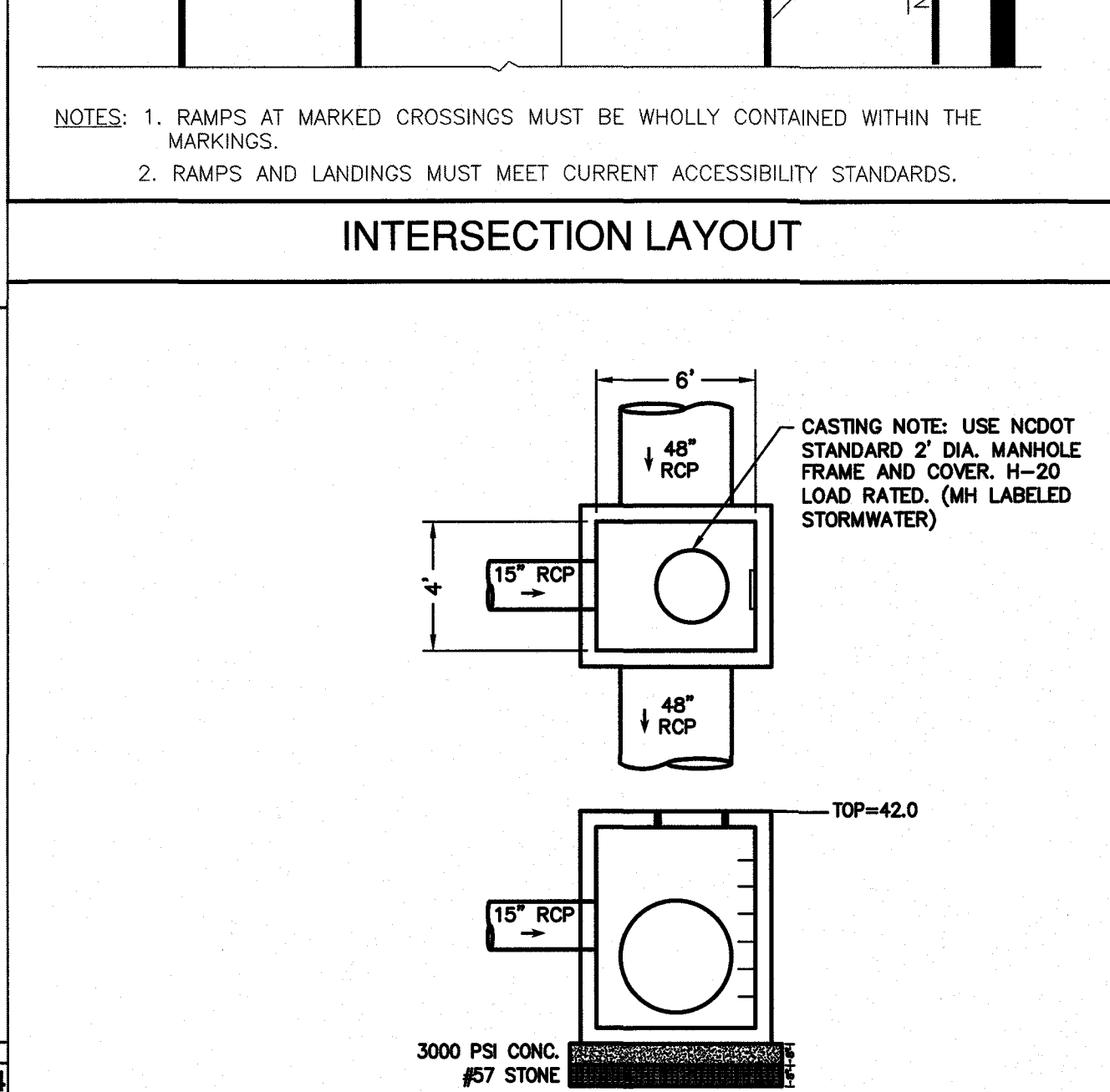
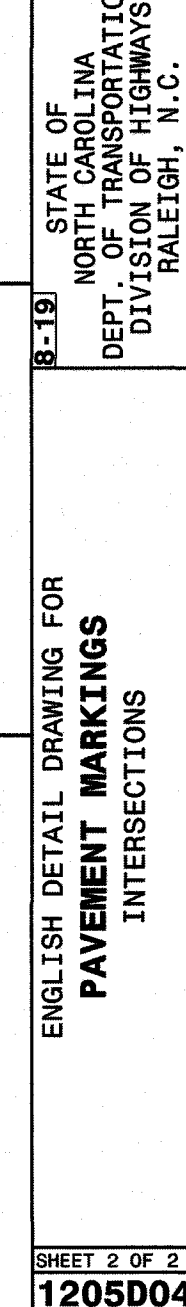
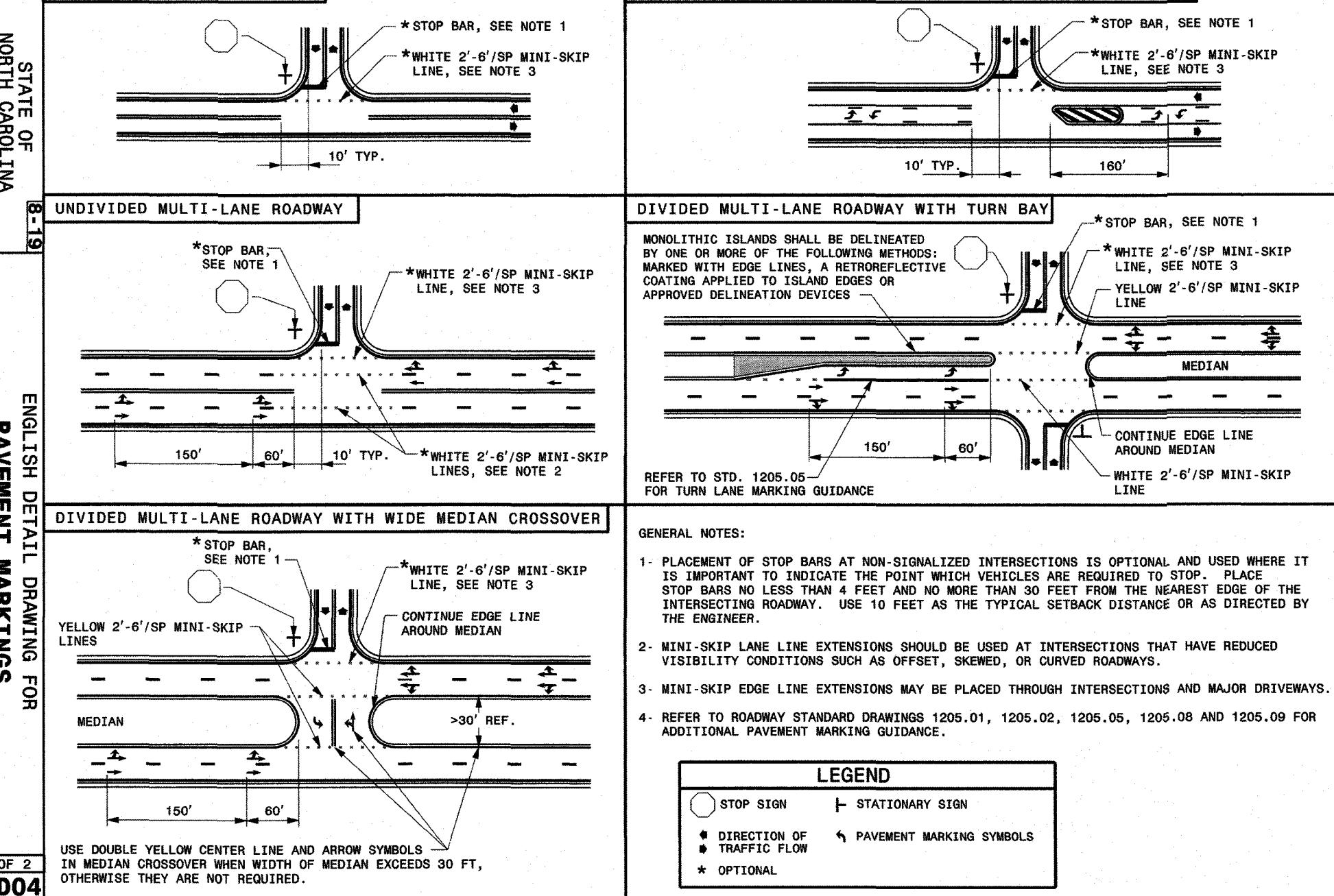
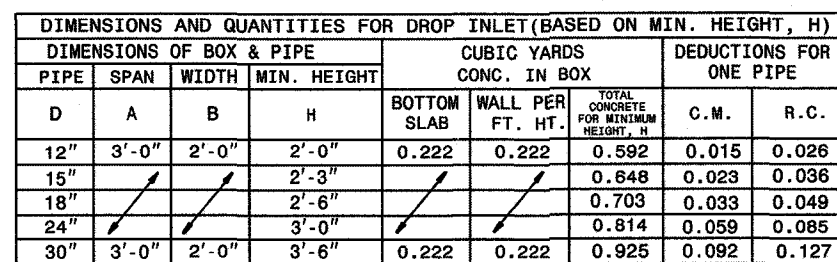
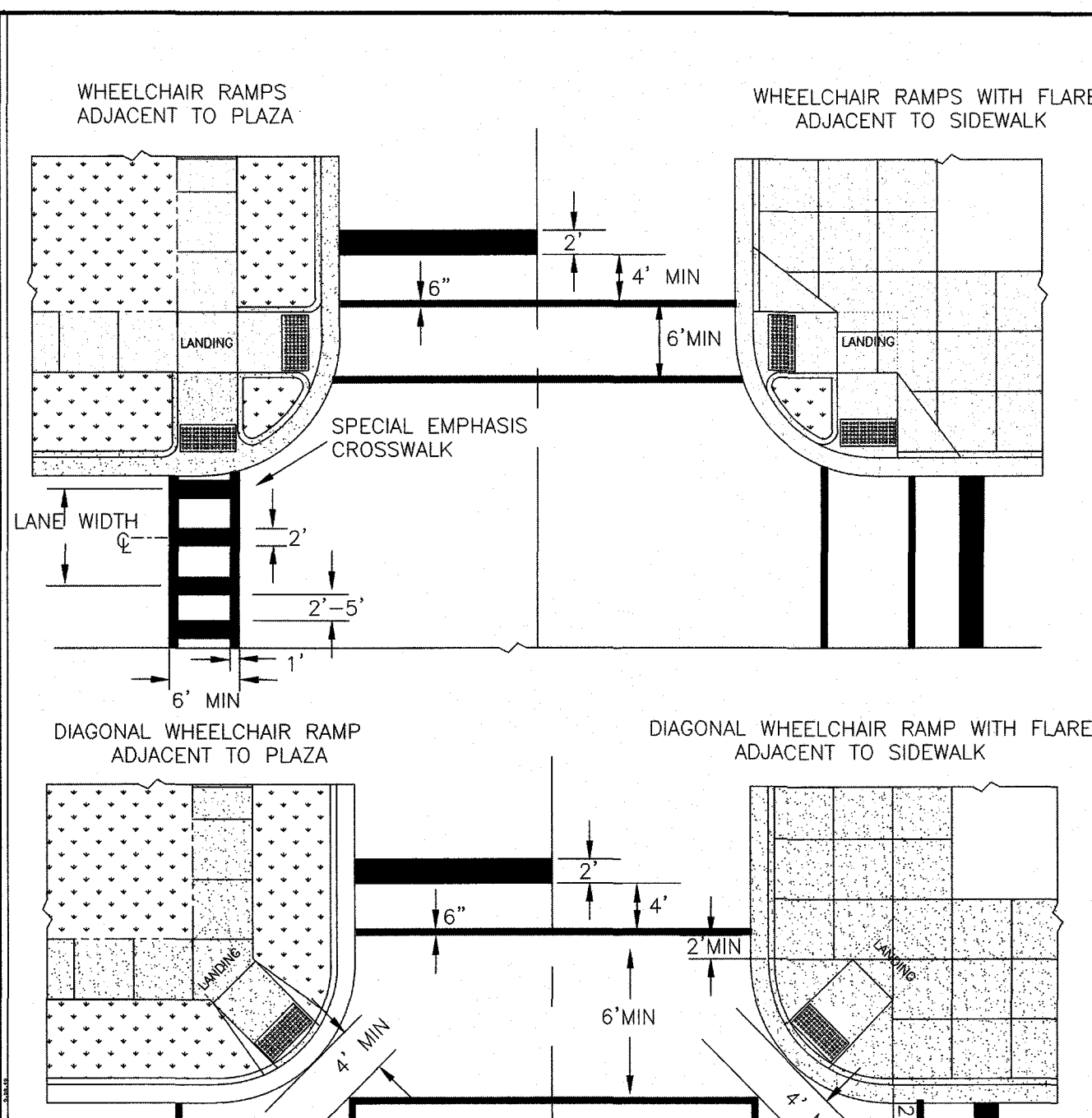
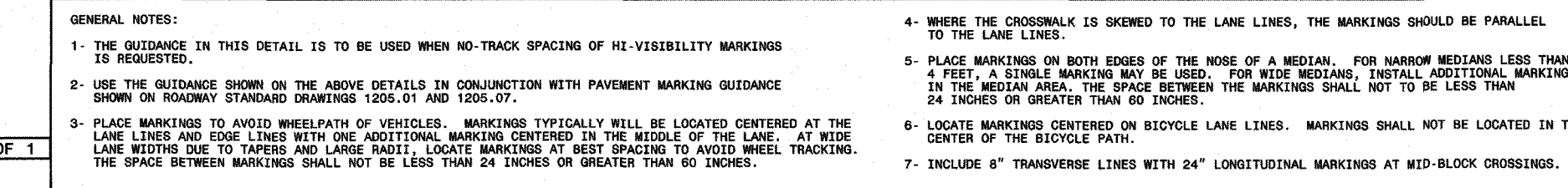
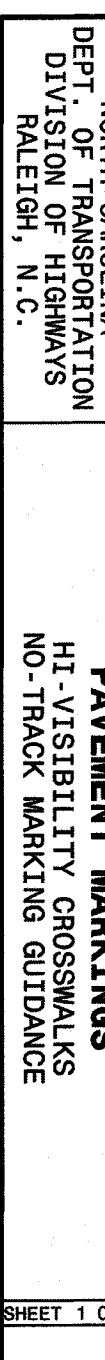
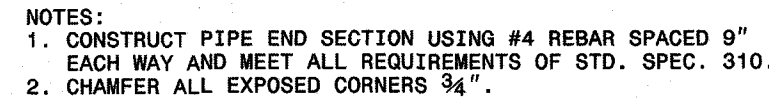
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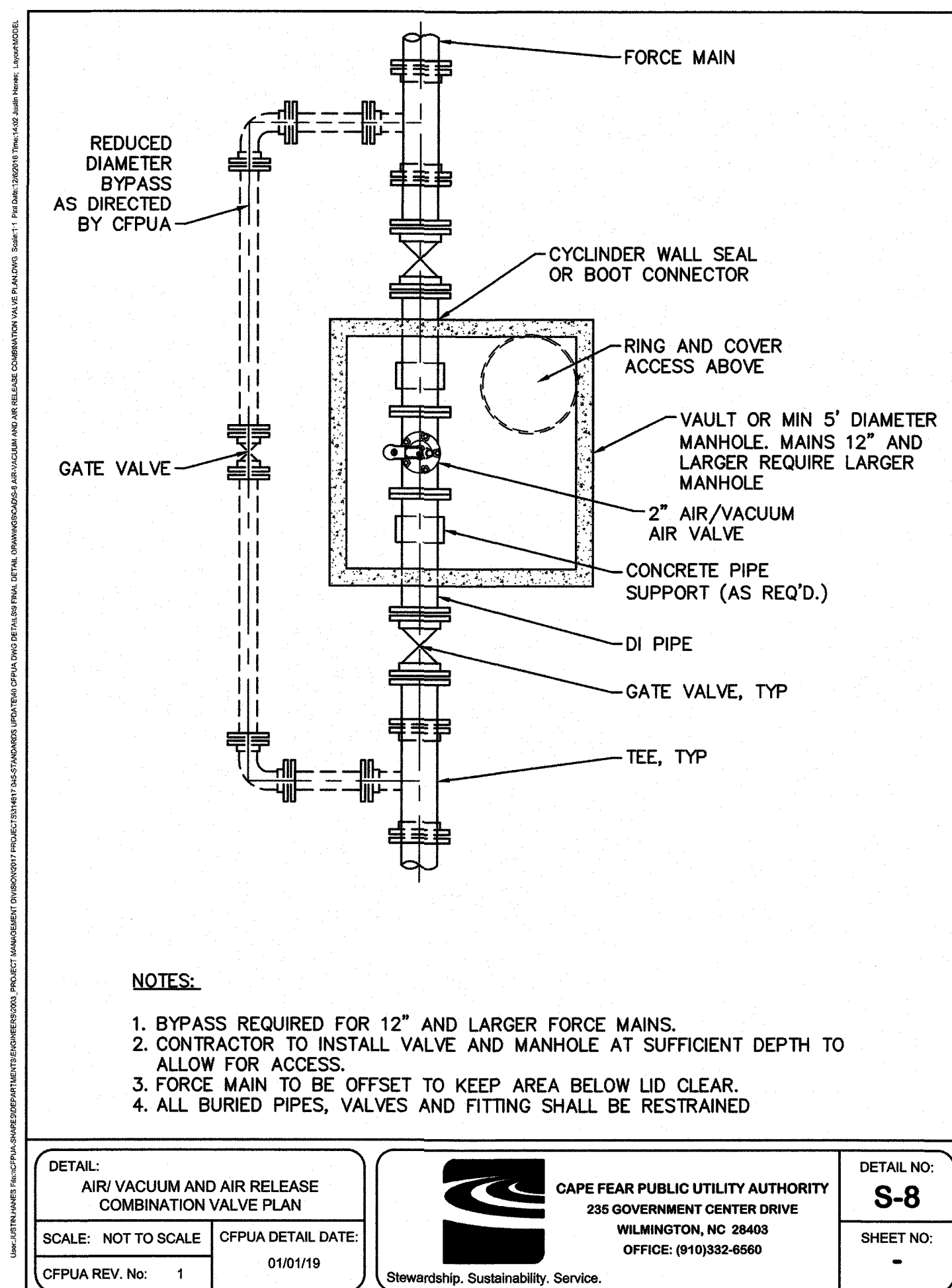
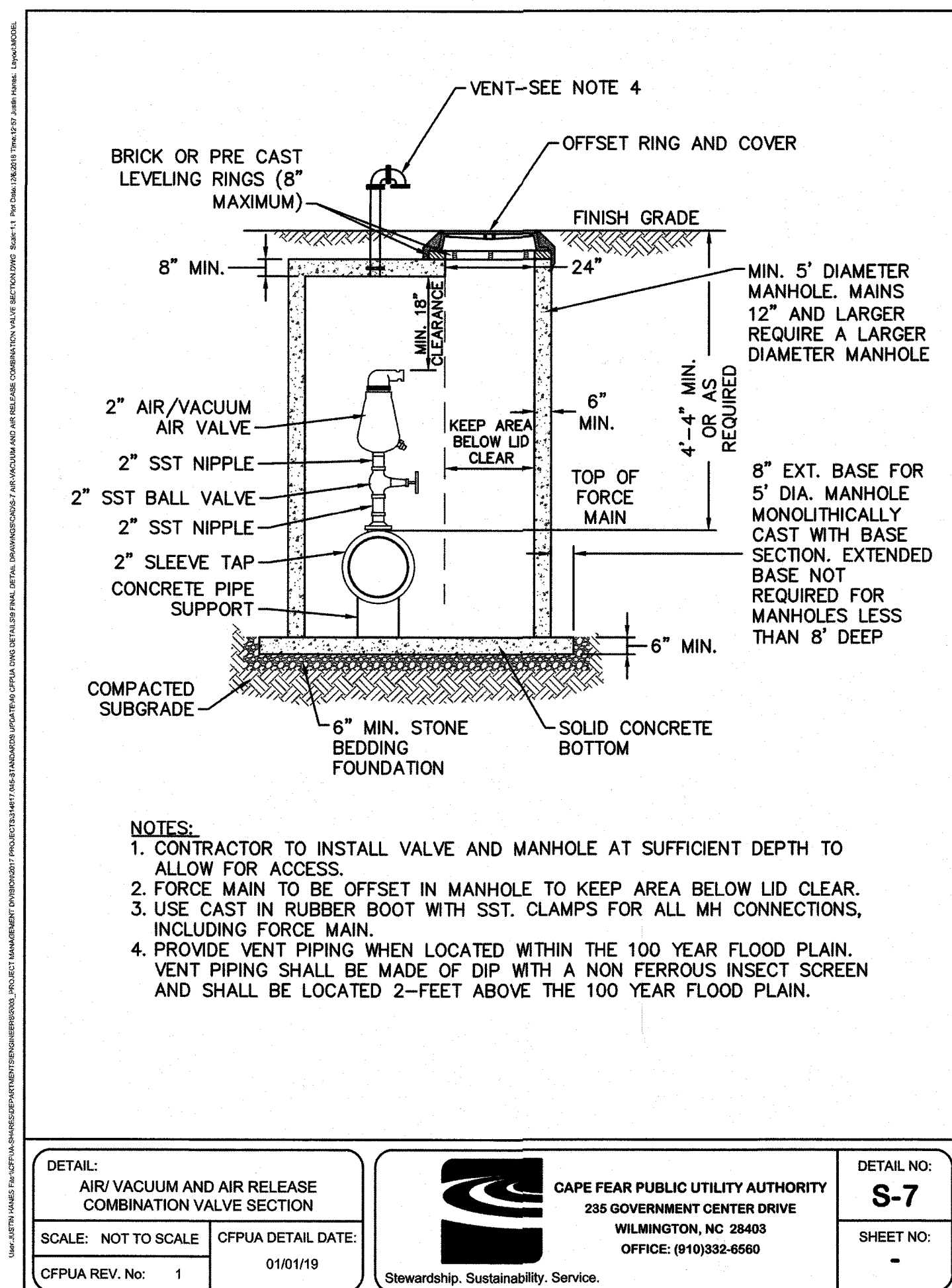
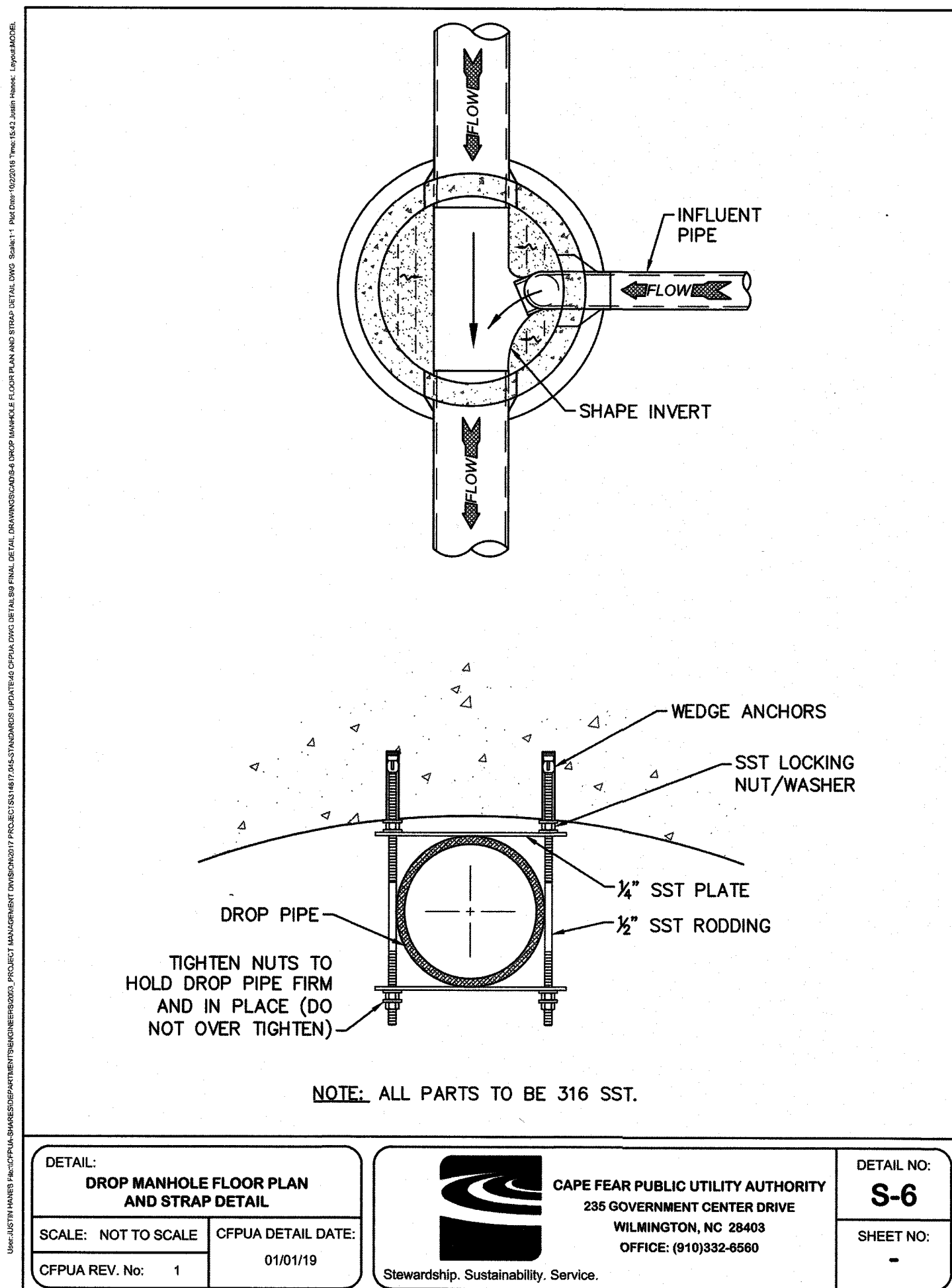
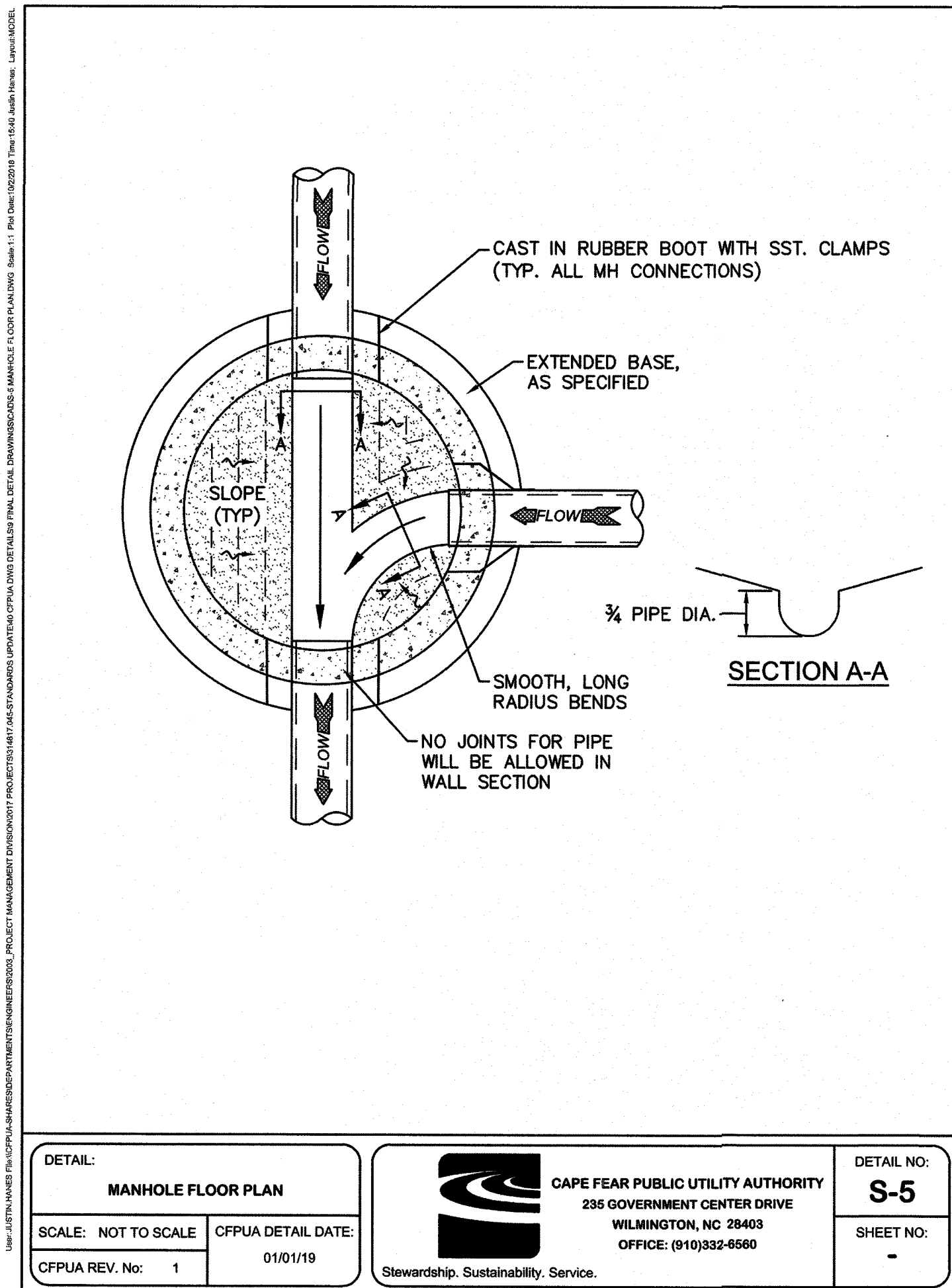
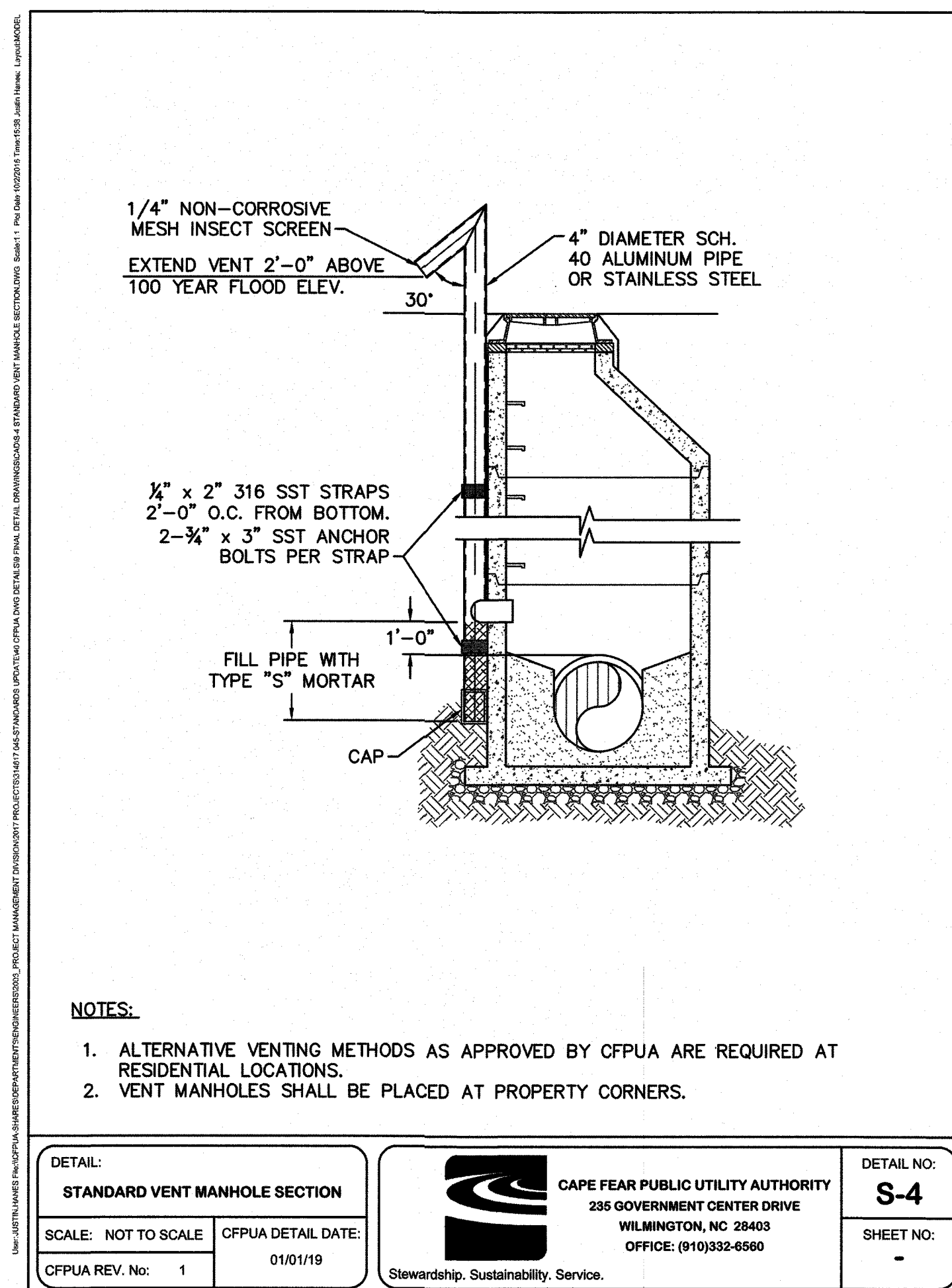
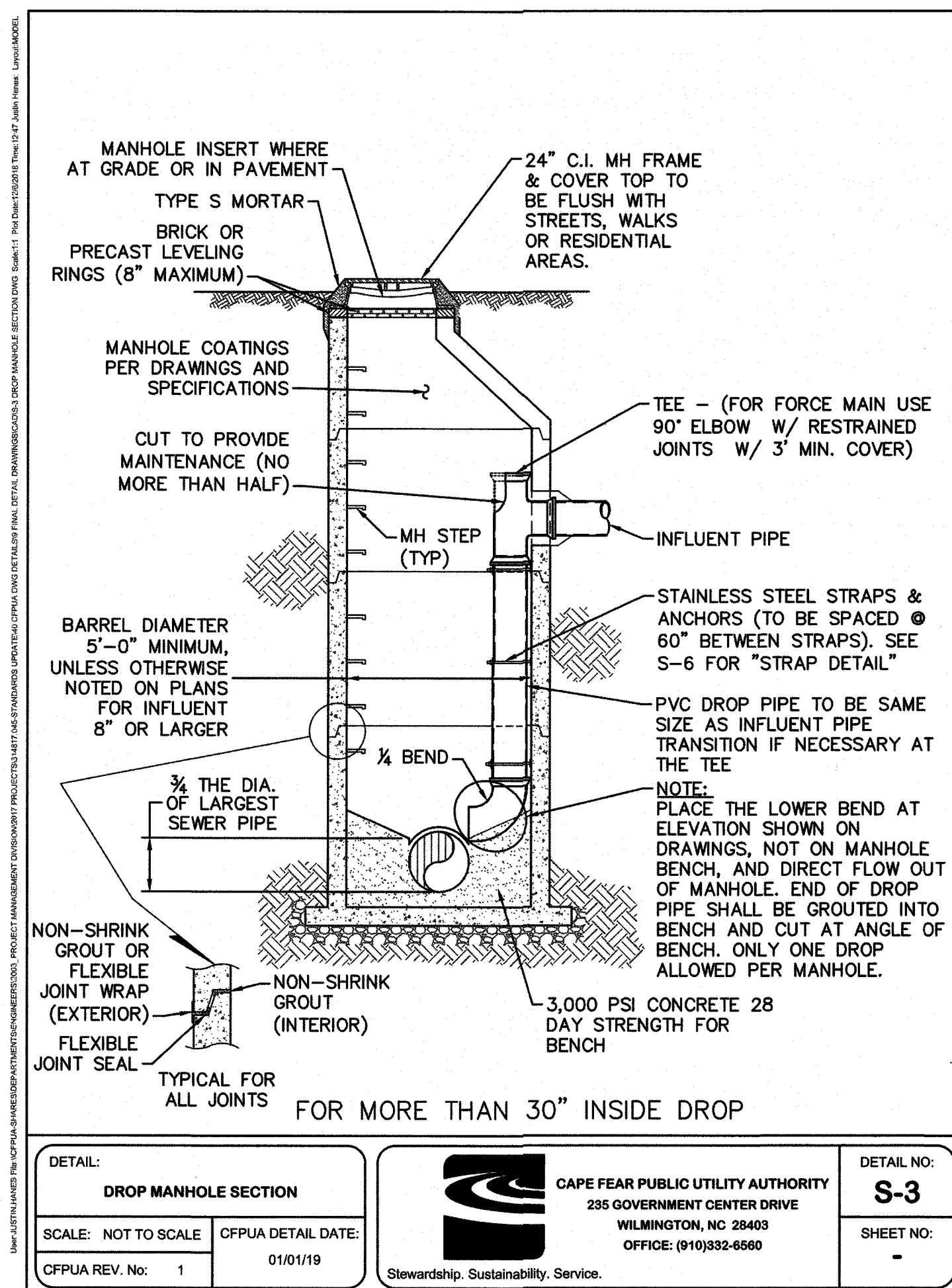
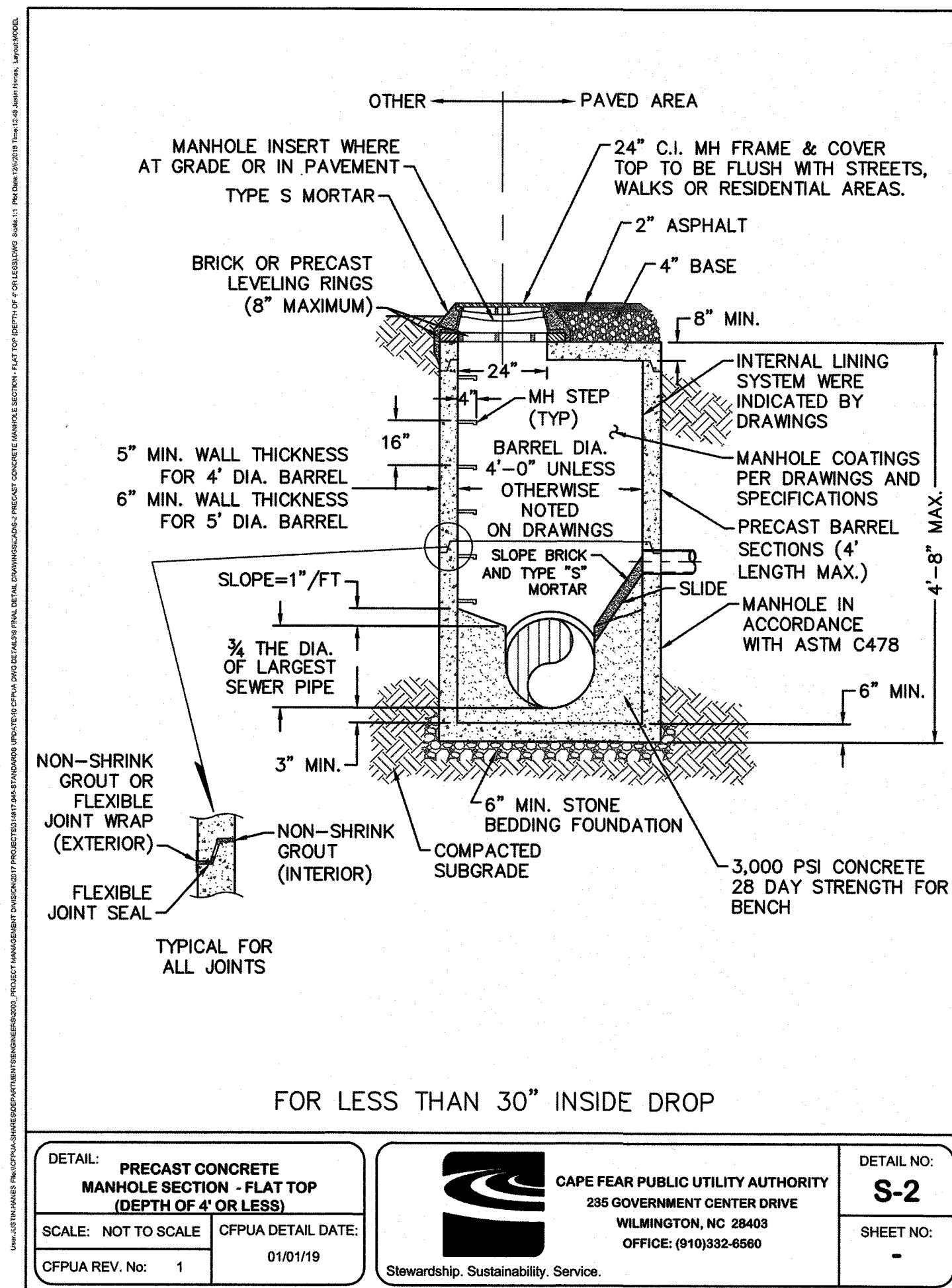
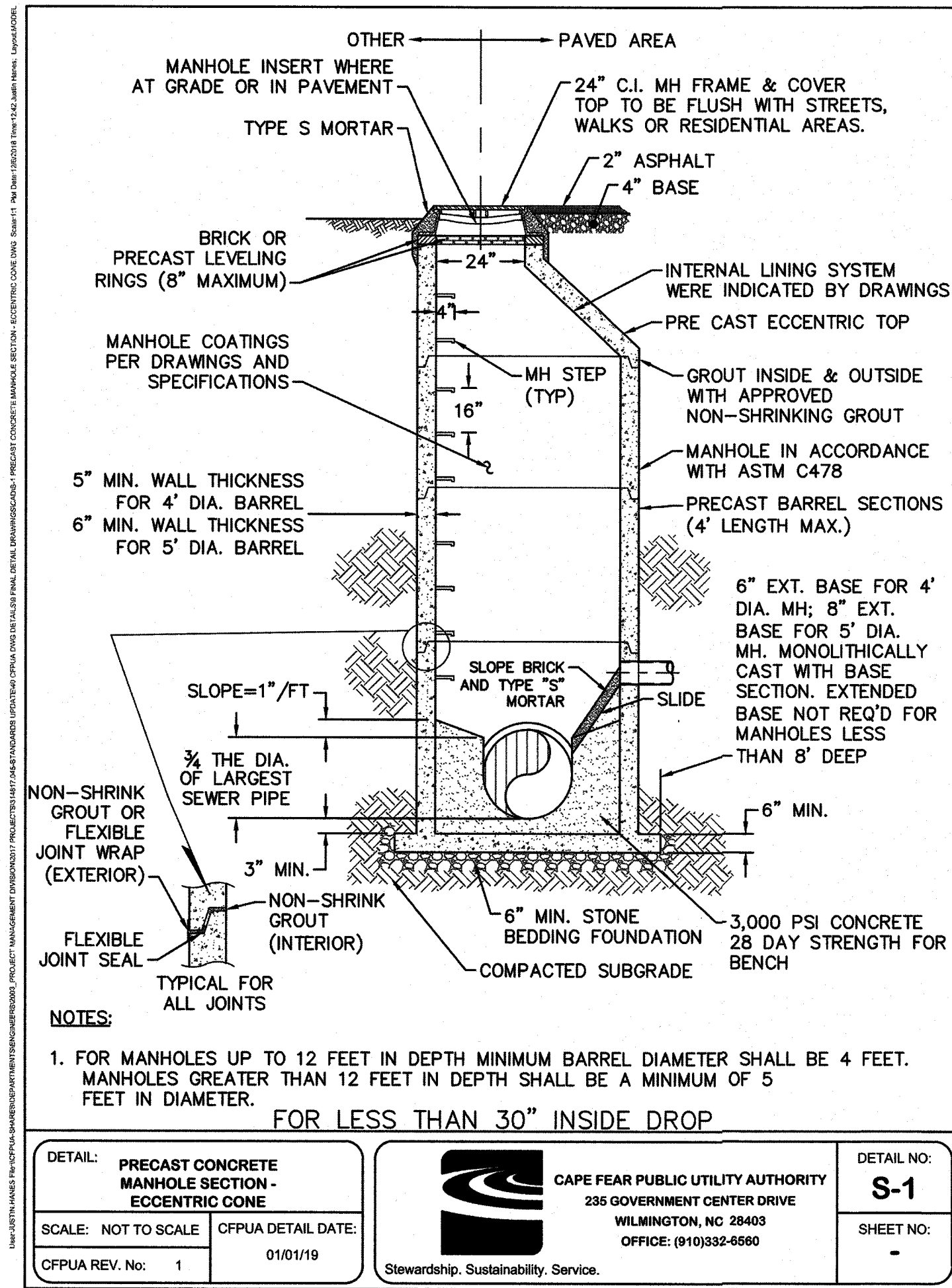
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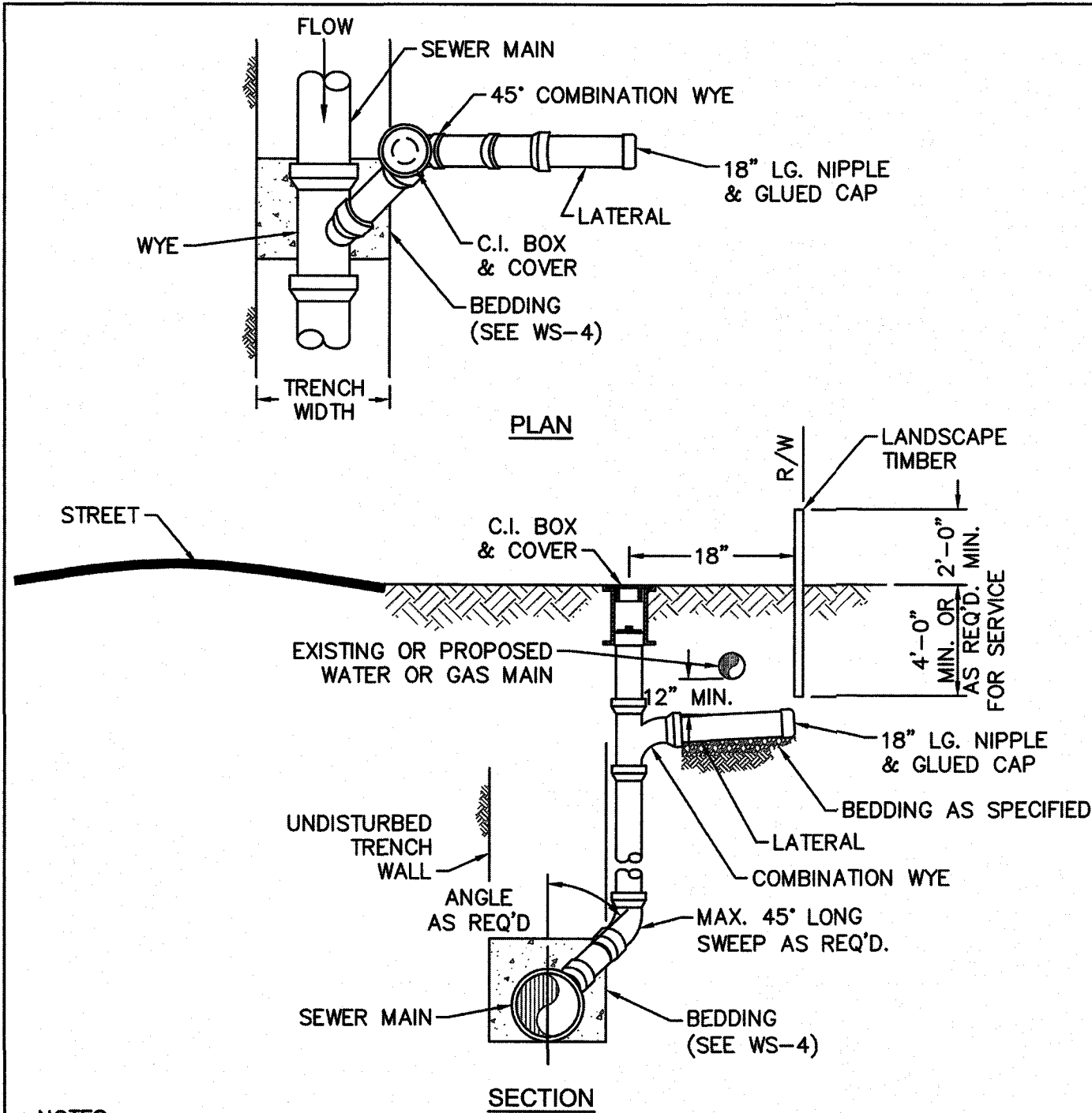
NORTH CAROLINA
REGISTERED PROFESSIONAL ENGINEER
PRELIMINARY
19094

C4.3



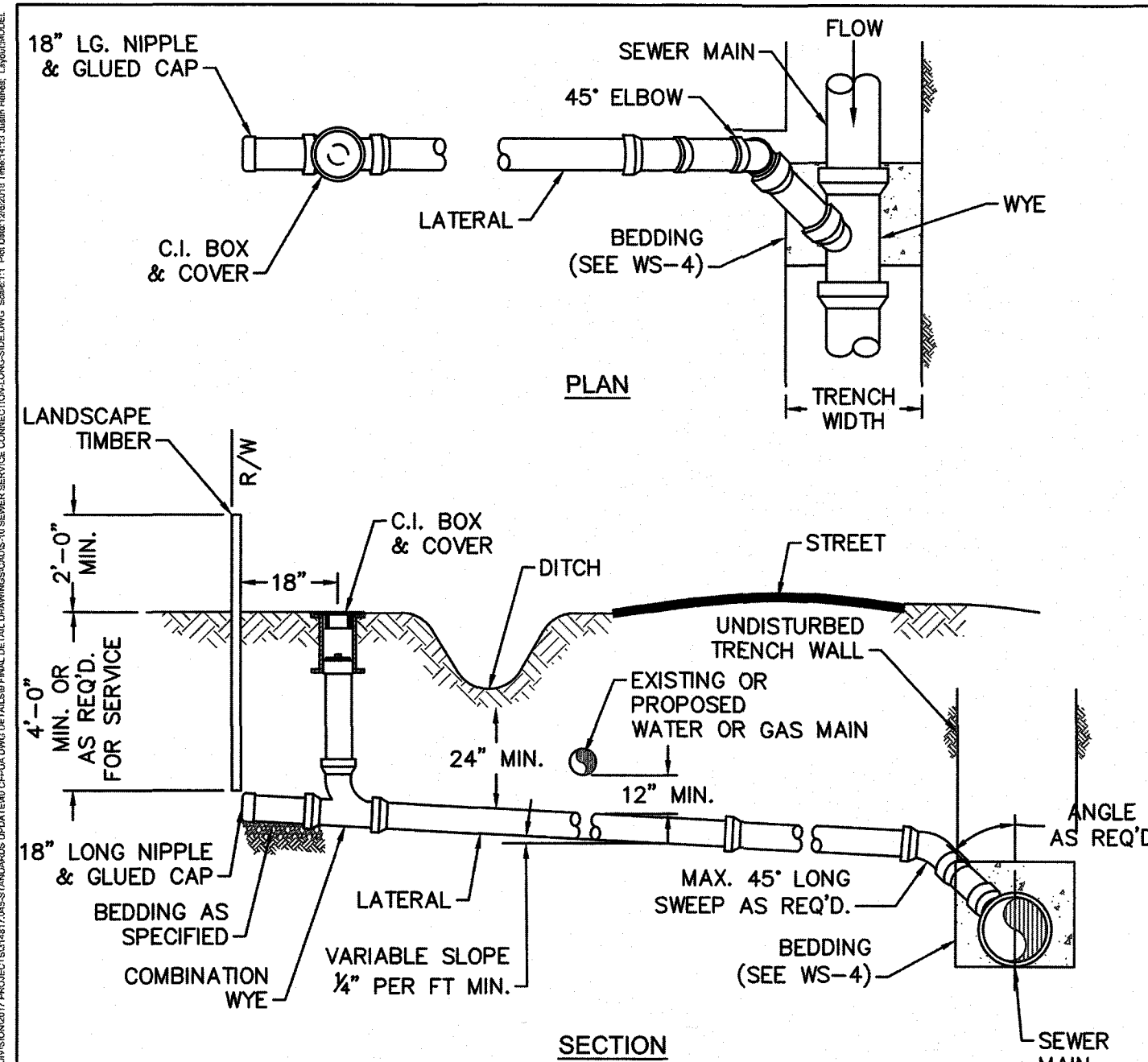
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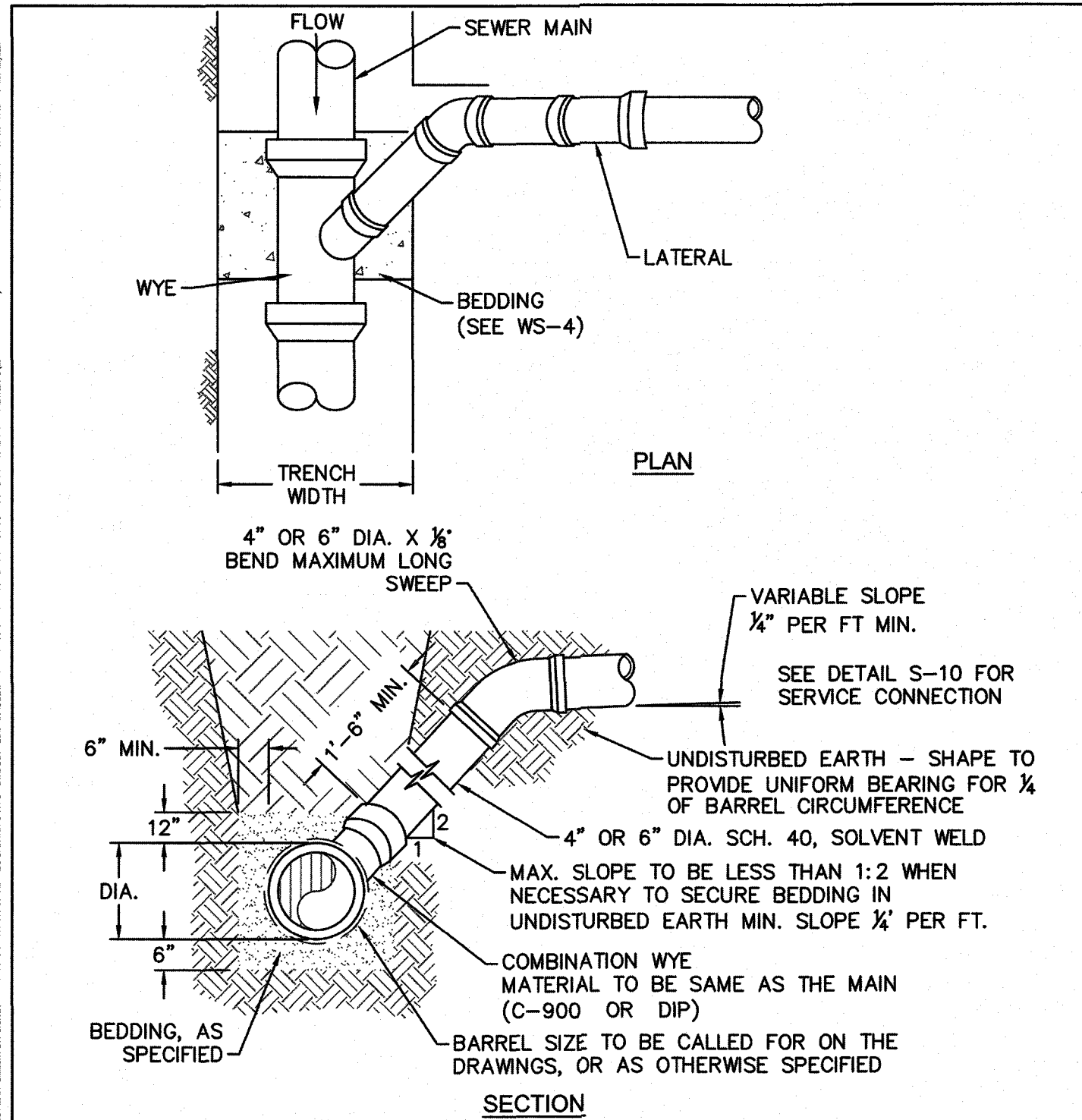
- NOTES:**
- SEWER SERVICES SHALL BE PERPENDICULAR TO MAIN. SEWER SERVICES IN CUL-DE-SACS ARE REQUIRED TO BE PERPENDICULAR, OR MUST ORIGINATE IN END OF LINE MANHOLE AND TERMINATE AT RIGHT-OF-WAY LINE.
 - ALL SERVICES CONNECTING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF DIP, WITH PROTECTIVE LINING.
 - CLEANOUTS SHALL BE LOCATED A MINIMUM OF 12 FEET FROM ALL PROPERTY CORNERS.
 - FOR PRIVATE 8" SERVICES, MANHOLES ARE REQUIRED FOR CONNECTION TO MAIN.

DETAIL: SEWER SERVICE CONNECTION - SHORT-SIDE	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: S-9
SCALE: NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No: 1		



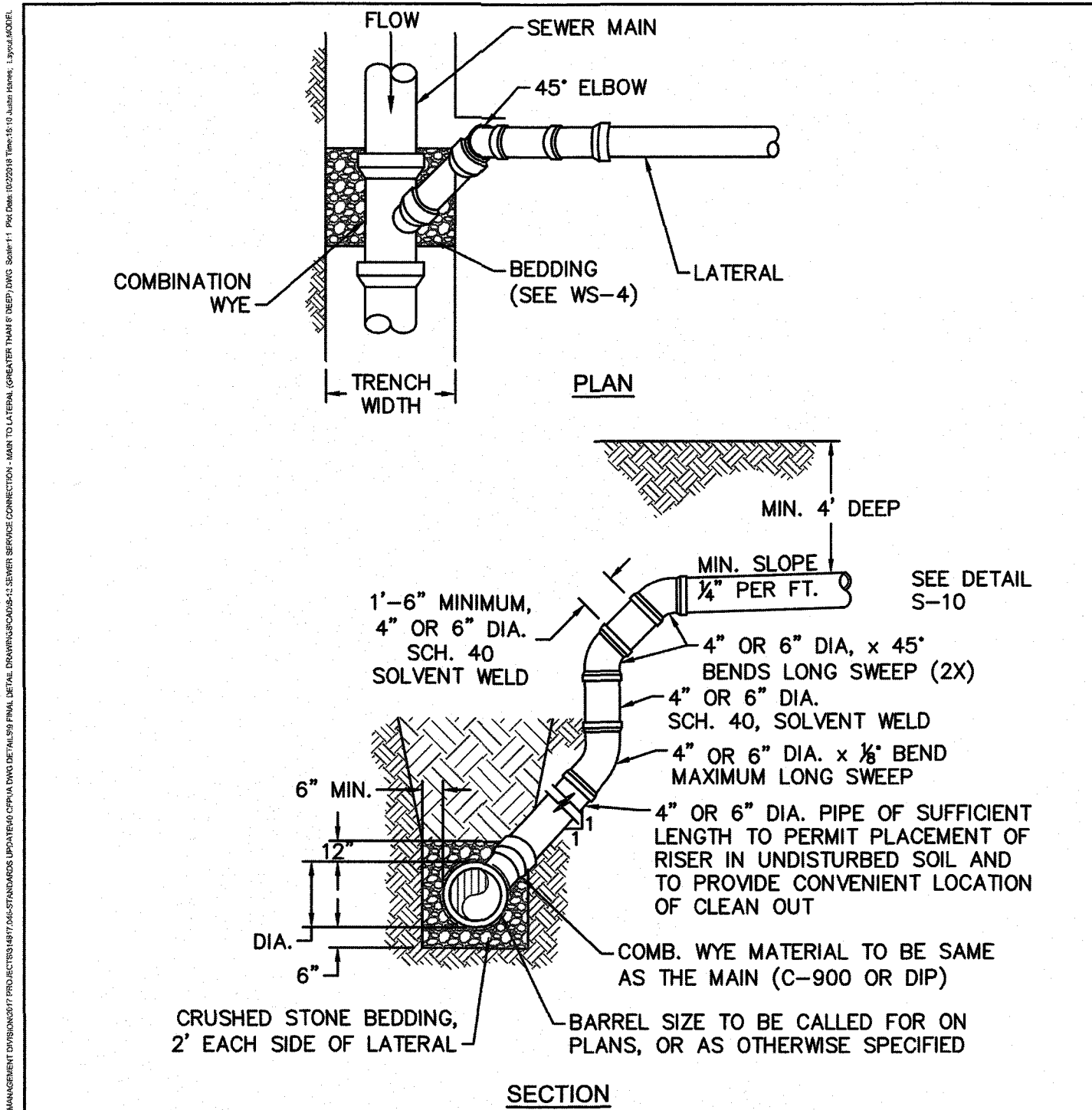
- NOTES:**
- SEWER SERVICES SHALL BE PERPENDICULAR TO MAIN. SEWER SERVICES IN CUL-DE-SACS ARE REQUIRED TO BE PERPENDICULAR, OR MUST ORIGINATE IN END OF LINE MANHOLE AND TERMINATE AT RIGHT-OF-WAY LINE.
 - ALL SERVICES CONNECTING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF DIP, WITH PROTECTIVE LINING.
 - CLEANOUTS SHALL BE LOCATED A MINIMUM OF 12 FEET FROM ALL PROPERTY CORNERS.
 - MINIMUM 1'-6" NIPPLE SPACING BETWEEN FITTINGS.
 - FOR PRIVATE 8" SERVICES, MANHOLES ARE REQUIRED FOR CONNECTION TO MAIN.

DETAIL: SEWER SERVICE CONNECTION - LONG-SIDE	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: S-10
SCALE: NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No: 1		



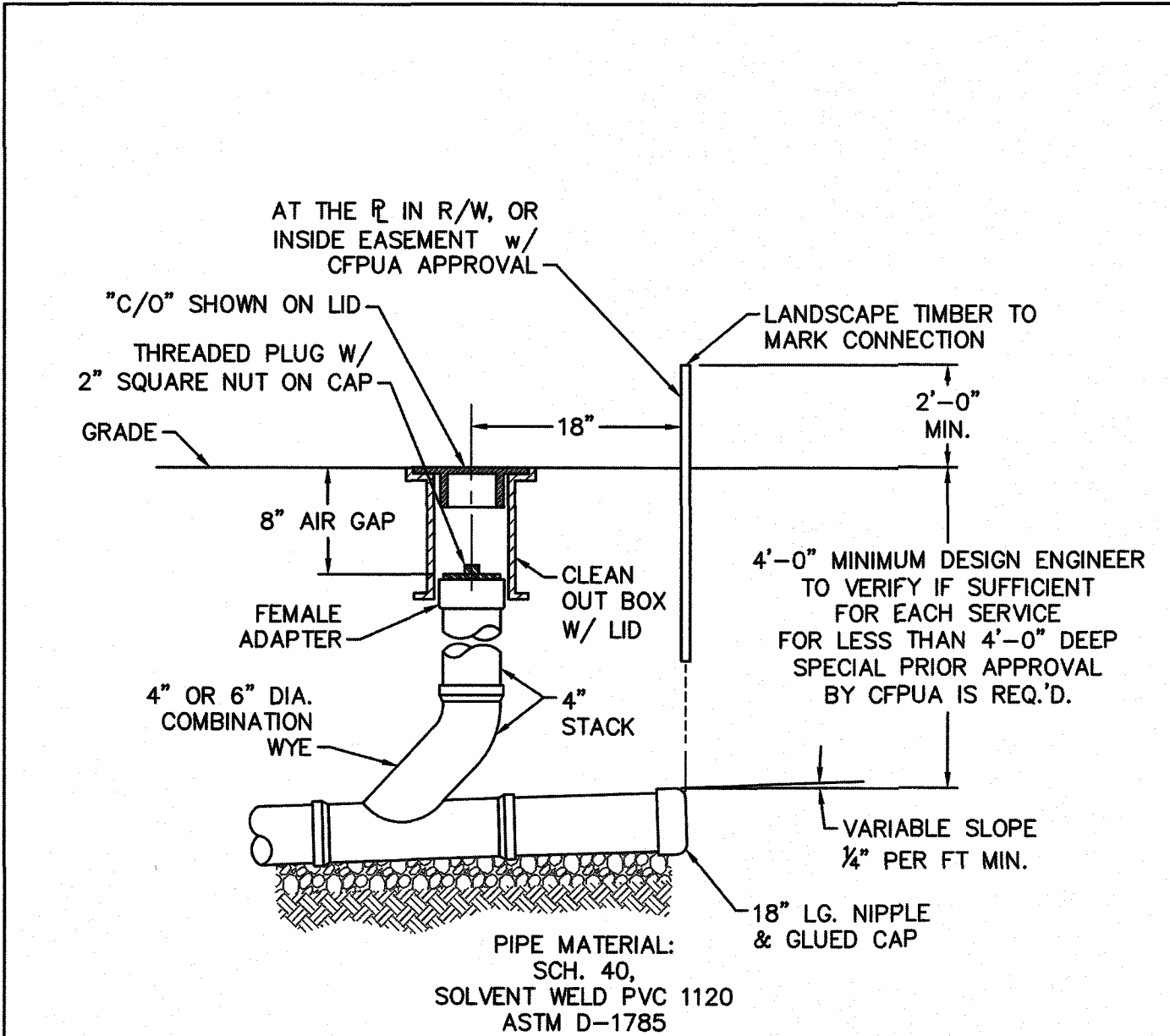
- NOTES:**
- FOR PRIVATE 8" SERVICES, MANHOLES ARE REQUIRED FOR CONNECTION TO SYSTEM AND AT THE PROPERTY LINE, WITH REQUIRED EASEMENT.
 - ALL SERVICES CONNECTING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF DIP, WITH PROTECTIVE LINING.

DETAIL: SEWER SERVICE CONNECTION - MAIN TO LATERAL (LESS THAN 8' DEEP)	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: S-11
SCALE: NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No: 1		



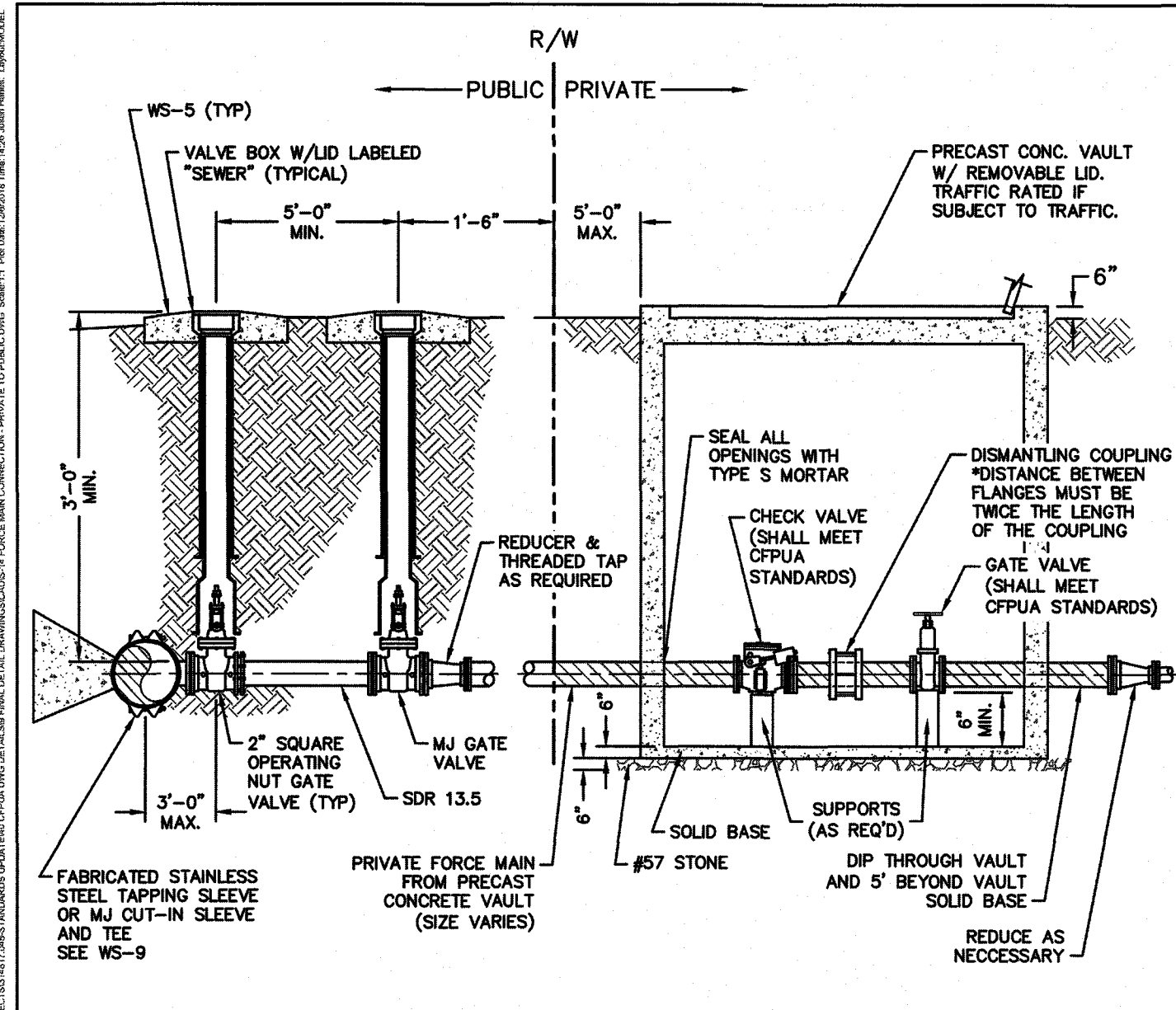
- NOTES:**
- SPECIAL CARE SHALL BE TAKEN DURING BACKFILL OPERATIONS. THE RISER SHALL BE PLUMB AND TRUE AT ALL TIMES, AND REST ON FIRM, STABLE FOUNDATION.
 - FOR PRIVATE 8" SERVICES, MANHOLES ARE REQUIRED FOR CONNECTION TO SYSTEM AND AT THE PROPERTY LINE, WITH REQUIRED EASEMENT.
 - ALL SERVICES CONNECTING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF DIP, WITH PROTECTIVE LINING.
 - 1'-6" MINIMUM NIPPLE SPACING BETWEEN FITTINGS.

DETAIL: SEWER SERVICE CONNECTION - MAIN TO LATERAL (GREATER THAN 8' DEEP)	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: S-12
SCALE: NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No: 1		



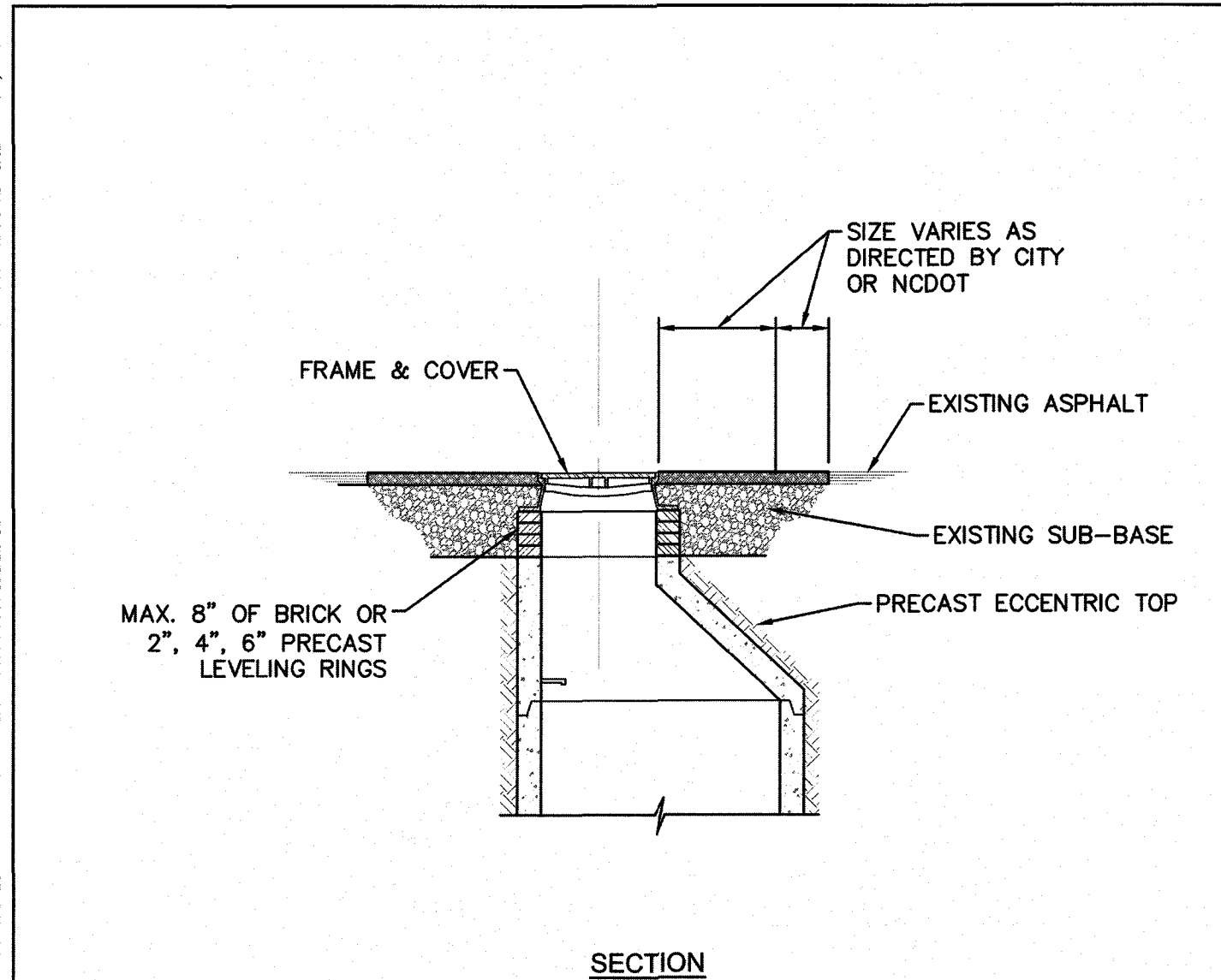
- NOTES:**
- FOR PRIVATE 8" SERVICES, MANHOLES ARE REQUIRED FOR CONNECTION TO SYSTEM AND AT THE PROPERTY LINE, WITH REQUIRED EASEMENT.
 - CLEANOUTS SHALL BE LOCATED A MINIMUM OF 12 FEET FROM ALL PROPERTY CORNERS.

DETAIL: SEWER SERVICE CONNECTION - TYPICAL CLEAN-OUT	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: S-13
SCALE: NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No: 1		



- NOTES:**
- FOR 2-INCH FORCE MAINS, CFPUA ACCEPTS SDR 13.5 OR SDR-21 PVC INSTALLED BY OPEN TRENCH OR SDR-9 HDPE BY HORIZONTAL DIRECTIONAL DRILLING.
 - A GATE VALVE IS REQUIRED AT THE CFPUA FORCE MAIN TAP LOCATION.
 - WHEN PRIVATE MAIN IS FROM OPPOSITE SIDE OF NC-DOT ROAD OR CITY STREET, A SECOND VALVE IS REQUIRED 18" INSIDE PUBLIC R/W.
 - IF TAPPING VALVE IS LESS THAN 5'-FEET FROM R/W (OR EASEMENT) THEN SECOND VALVE AT R/W (OR EASEMENT) IS NOT REQUIRED.

DETAIL: FORCE MAIN CONNECTION - PRIVATE TO PUBLIC	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: S-14
SCALE: NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No: 1		



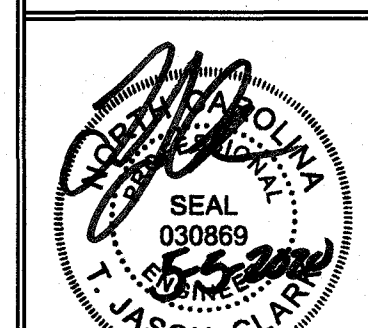
DETAIL: MANHOLE RIM ADJUSTMENTS	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: S-15
SCALE: NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No: 1		

UTILITY DETAILS - SEWER
CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403

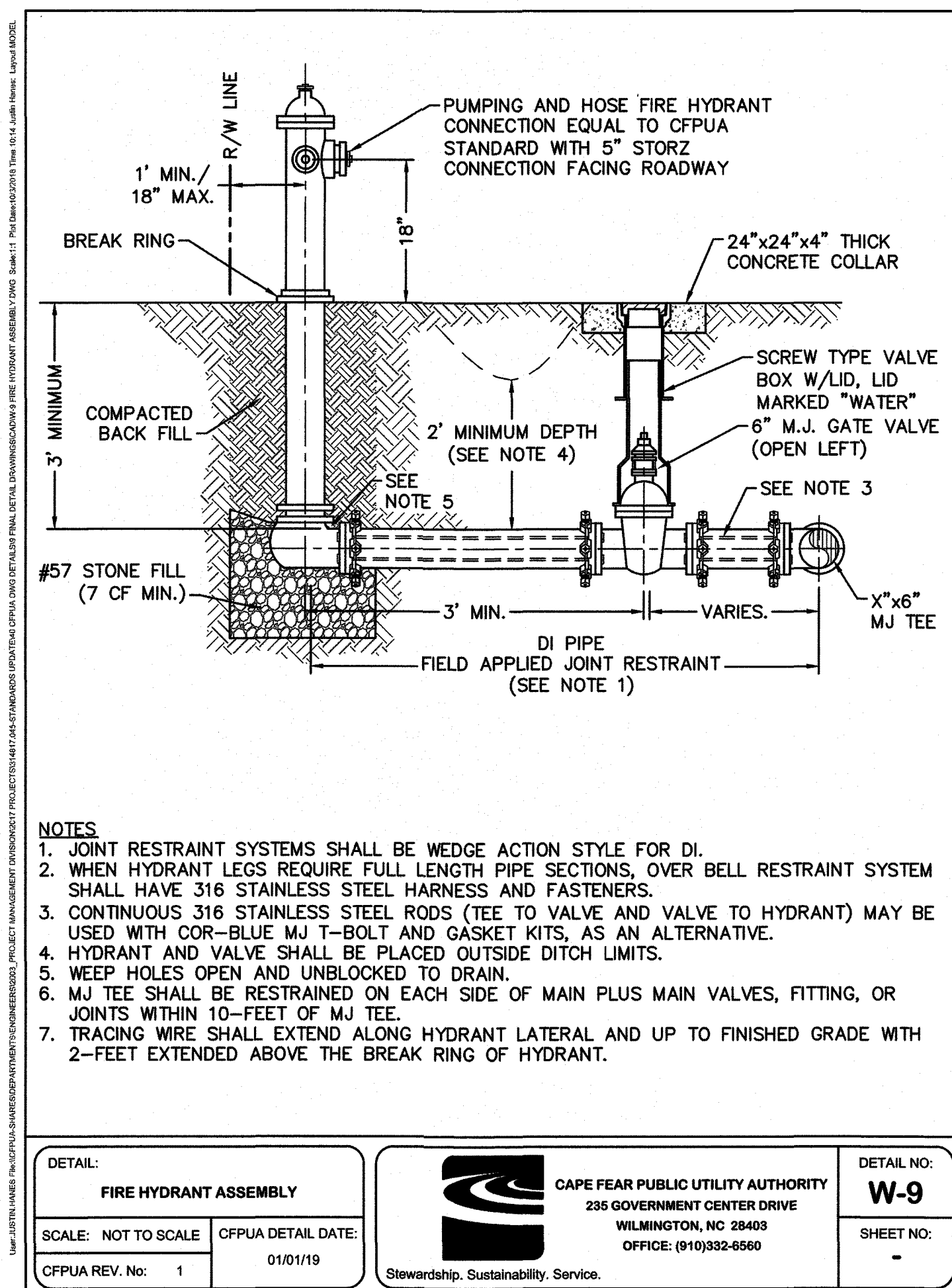
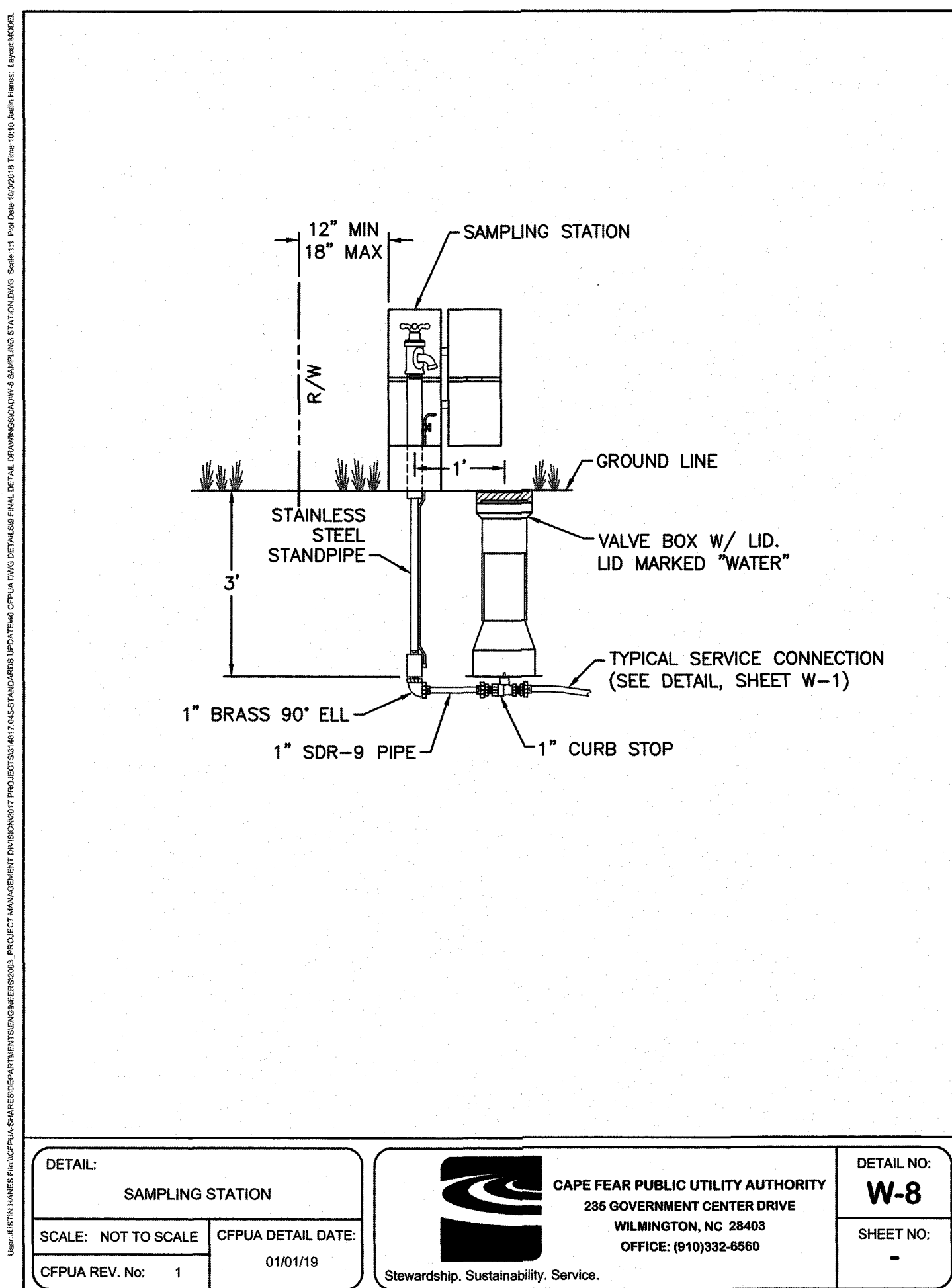
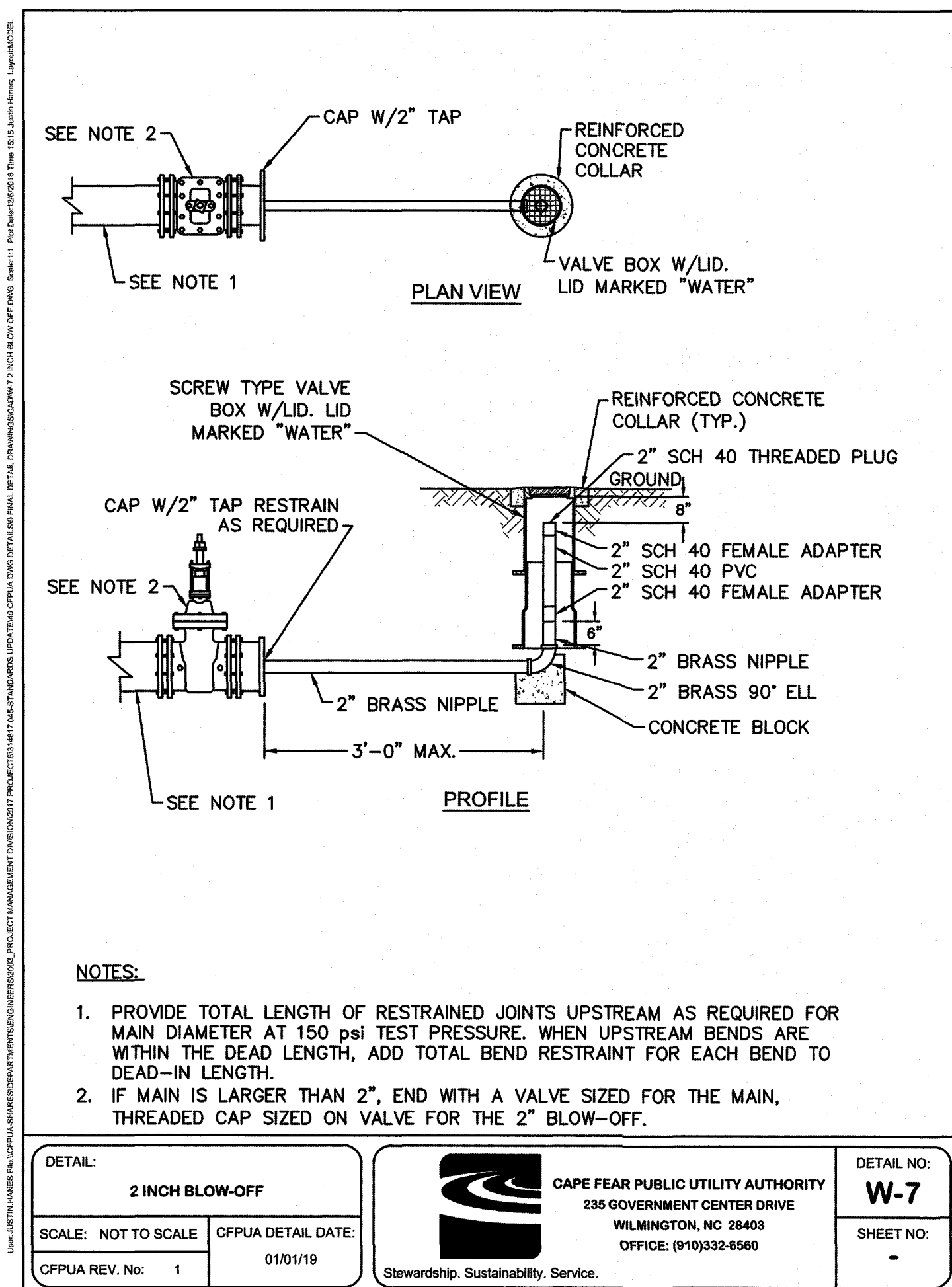
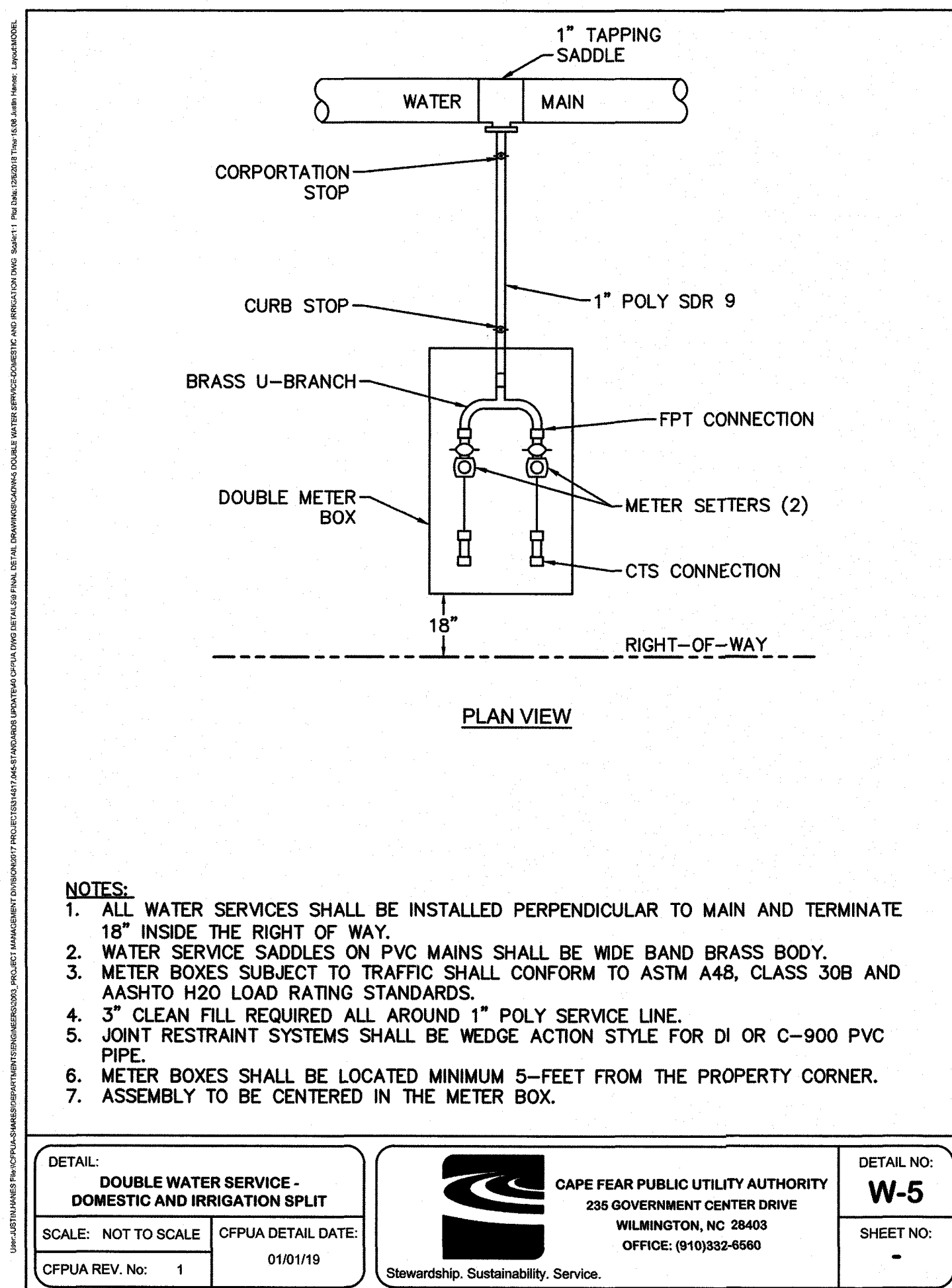
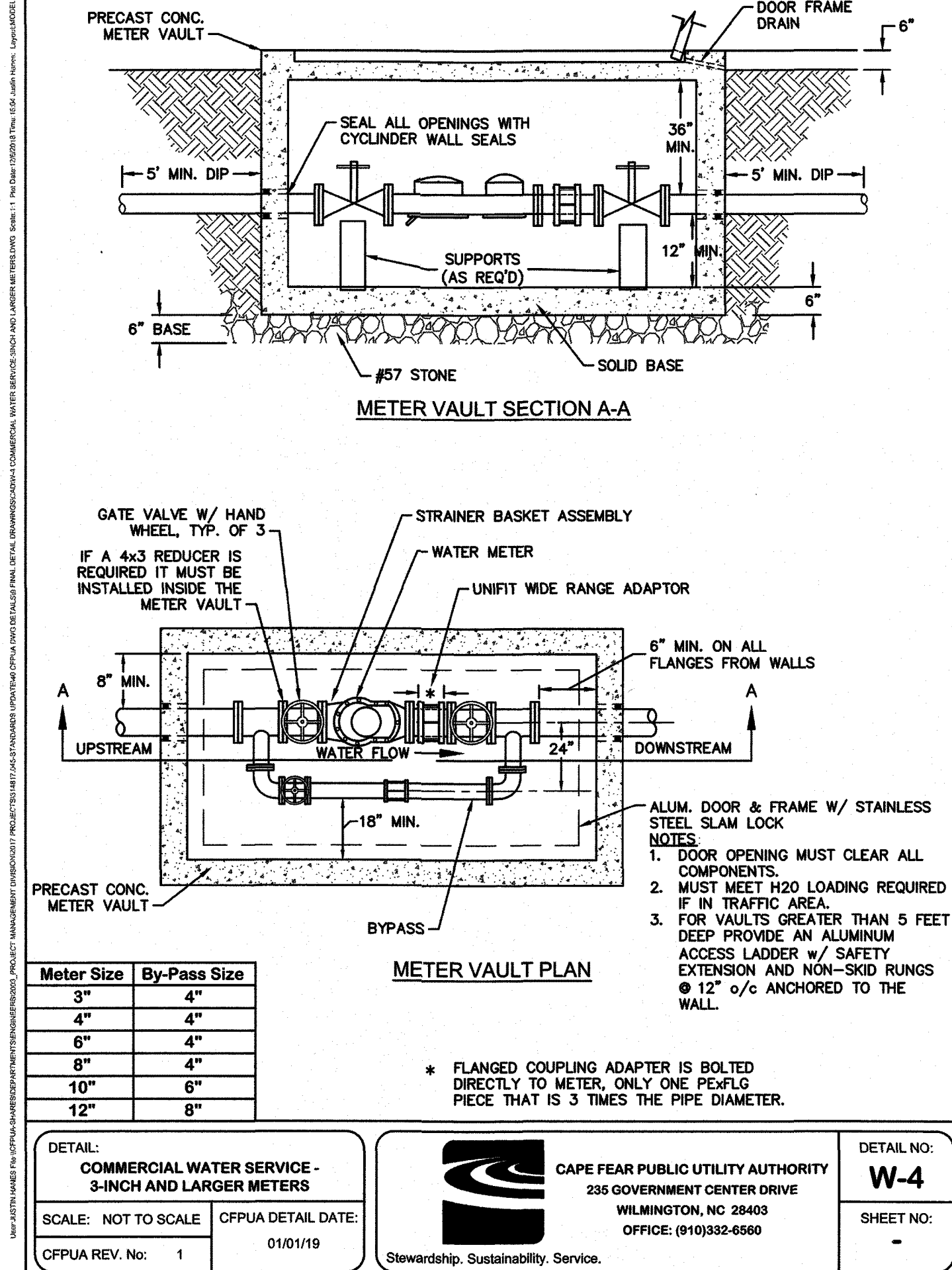
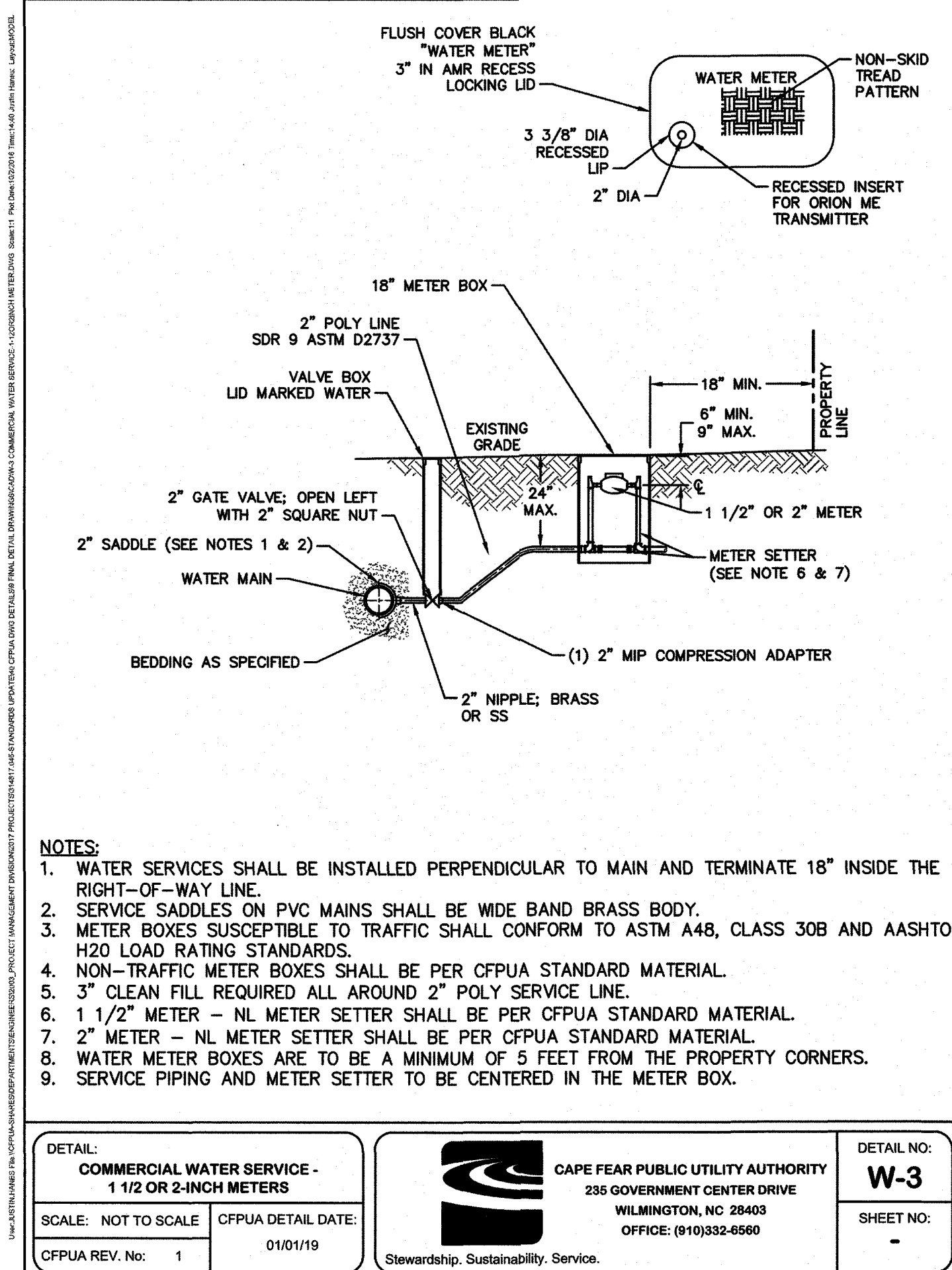
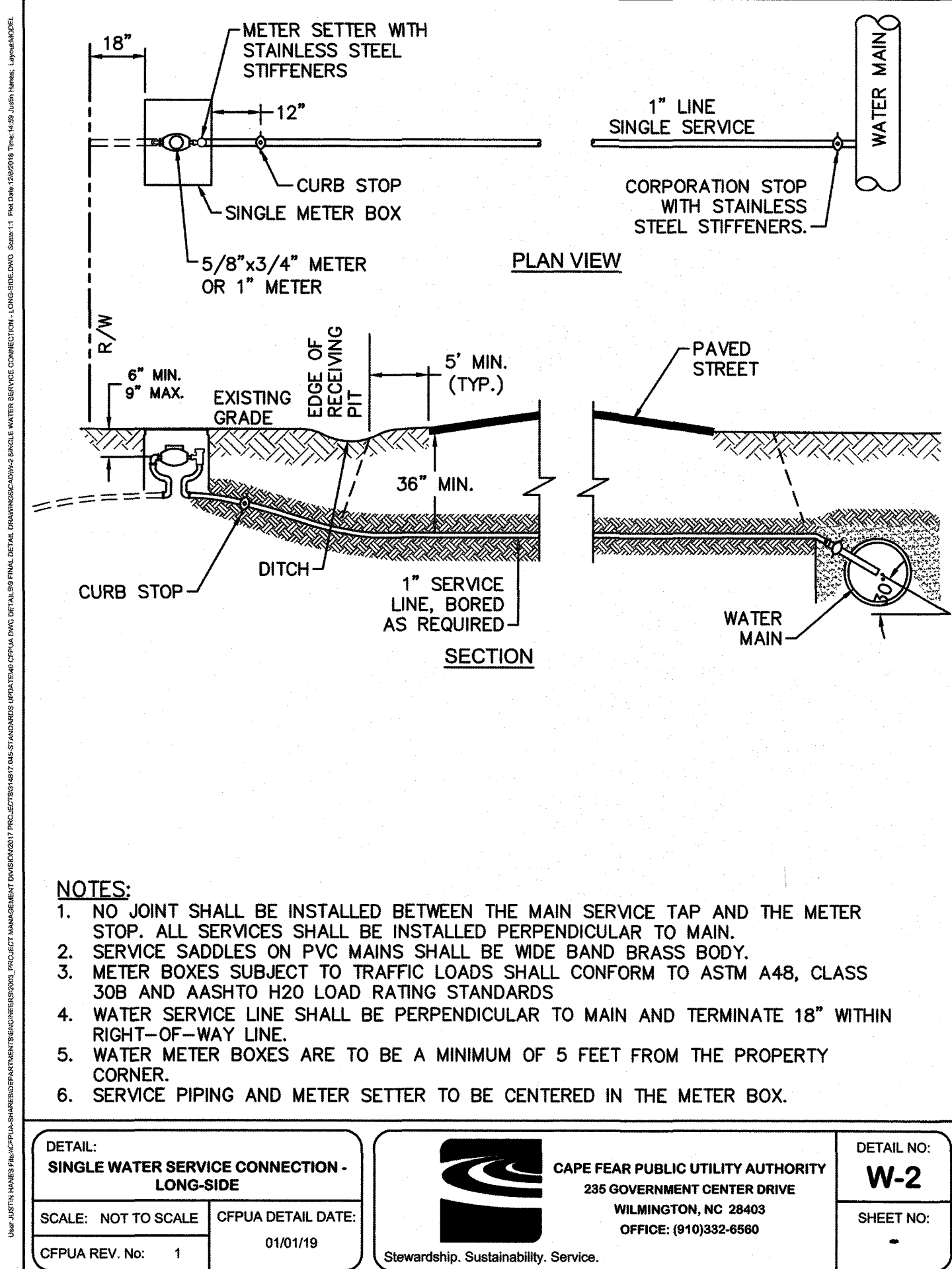
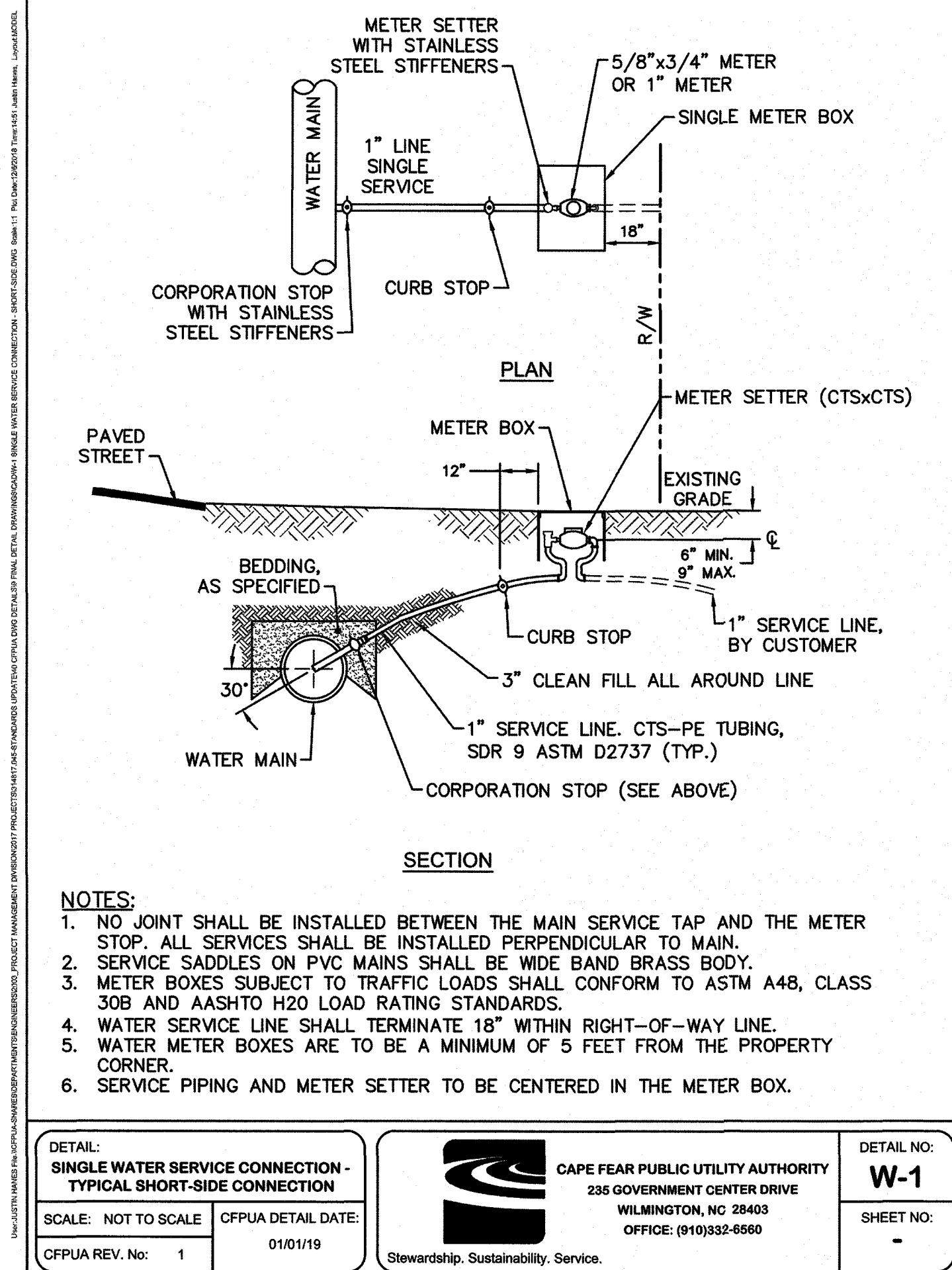
DISCLAIMER:
THESE DETAILS ARE A WORK OF
ENGINEERING AND DESIGN
AND HAVE BEEN REVIEWED AND
APPROVED FOR CONTENT AND
GENERAL CONFORMANCE WITH
THE SEWER DESIGN FOR THIS
PROJECT.

NORRIS & TUNSTALL
CONSULTING ENGINEERS P.C.
1900 EASTWOOD RD., SUITE #11
WILMINGTON, NC 28403
PHONE (910) 343-9653

Licence #C-3641
19094
DES. JST
CHK. JPN
DRWN. NKS
DATE 5.5.20



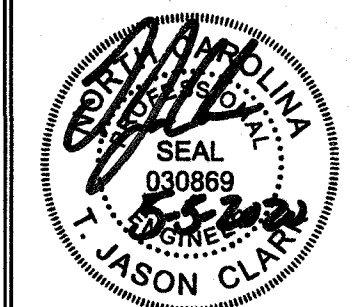
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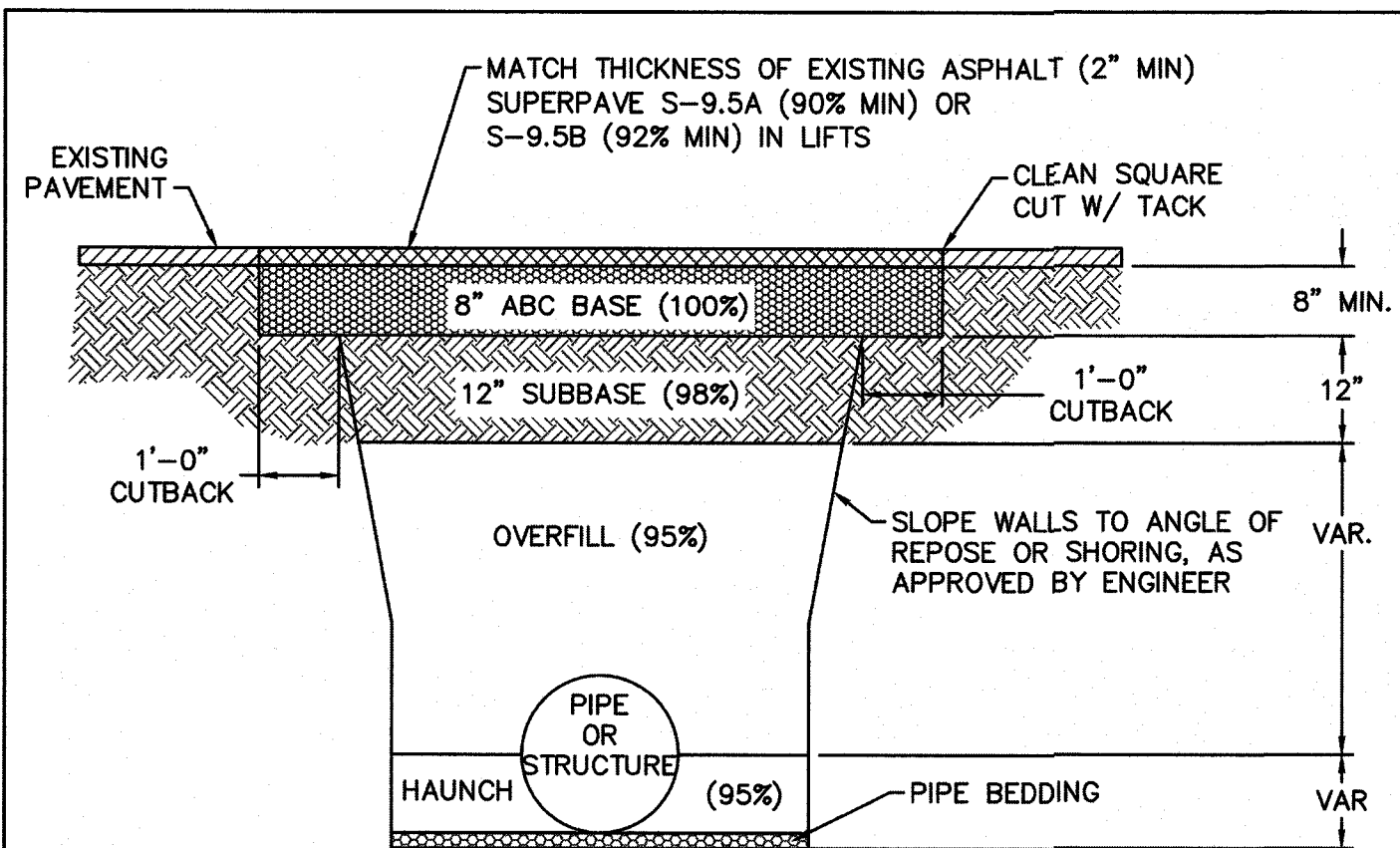
NORRIS & TUNSTALL
CONSULTING ENGINEERS P.C.
1900 EASTWOOD RD., SUITE #11
WILMINGTON, NC 28403
PHONE (910) 343-9653
1429 ASH-LITTLE RIVER RD. NW
ASH, NC 28420
PHONE (910) 287-5900

Licence #C-3641
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DRWN. NKS
DATE 5.5.20



W1

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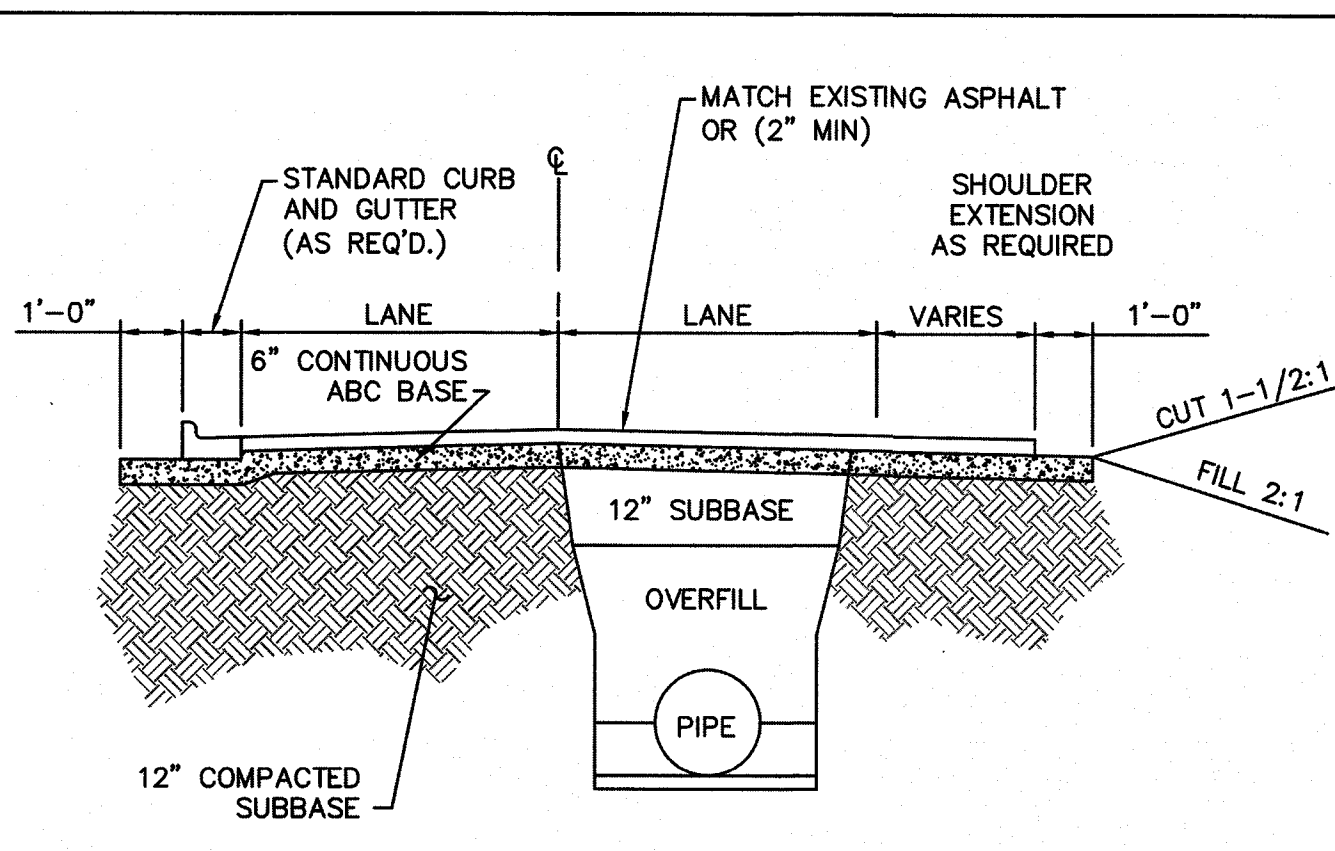


NOTES:

1. CONTRACTOR SHALL ENSURE BOTTOM OF TRENCH IS SUITABLE FOR INSTALLATION AND DOES NOT REQUIRE FOUNDATION CONDITIONING STONE.
2. FILL SHALL BE SUITABLE MATERIAL THAT IS FREE FROM HEAVY CLAY, GUMBO, DEBRIS, ORGANICS AND LITTLE TO NO EXCESSIVE MOISTURE.
3. SELECT BACKFILL MAY BE SUBSTITUTED OR REQUIRED BY CITY TO ACHIEVE COMPACTION, (I.E. #57 STONE, ABC, CRUSHED LIMESTONE, CLEAN SAND, FLOWABLE FILL, ETC).
4. SOIL SHALL BE INSTALLED IN 6"-8" LIFTS AND COMPACTION BY A MECHANIZED TAMPER (I.E. JUMPING JACK). HOWEVER, VIBRATORY ROLLERS > 18" WIDTH MAY BE USED FOR LARGER EXCAVATIONS. THE PLATE TAMP METHOD SHALL NOT BE USED.
5. ALL APPROVED CASTINGS SHALL BE SET FLUSH TO GRADE AND SUPPORTED IF APPLICABLE.
6. COMPACTION MATERIALS TO MINIMUM % DENSITY SHOWN IN DIAGRAM AS DETERMINED BY THE STANDARD PROCTOR METHOD ASTM D-698-A FOR SOILS, AND ASTM D-698-C FOR ABC STONE, AND BY NUCLEAR GAGE OR CORE SAMPLE FOR ASPHALT.
7. CUTBACKS OF ASPHALT SHALL BE PREPARED ON EDGE OF EXCAVATION OVER TOP OF UNDISTURBED SOIL.

(FOR PRIVATE ROADS AND PAVED AREAS; CONTRACTOR TO MEET MINIMUM REQUIREMENTS AS DEFINED BY RIGHT-OF-WAY OWNER FOR PUBLIC ROAD REPAIRS)

DETAIL:	CITY OF WILMINGTON PAVEMENT REPAIRS-UTILITY CUTS	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: WS-1
SCALE:	NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No:	1		

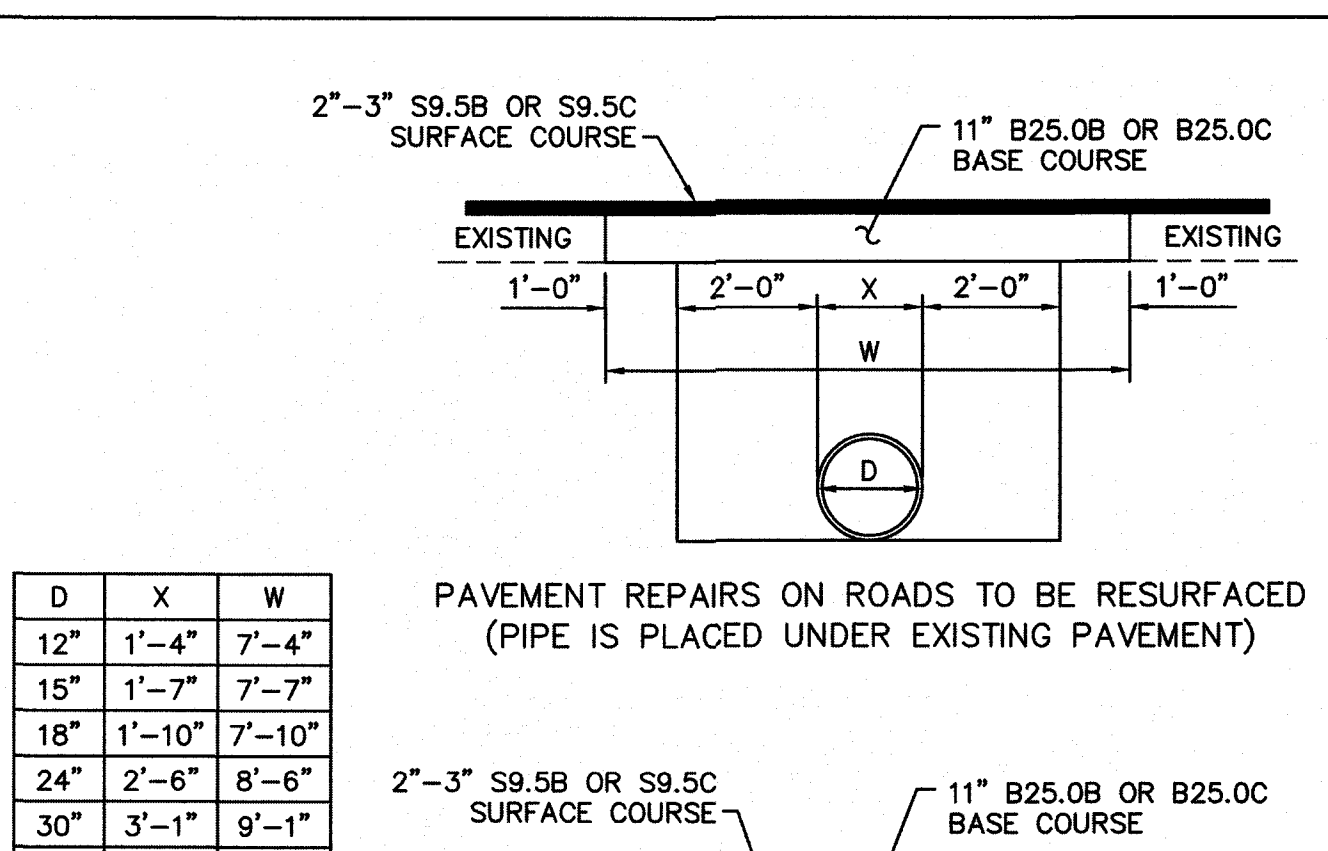


NOTES:

1. PAVEMENT RESTORATION DESIGN IS DEPENDENT ON CITY OF WILMINGTON STREET CUT POLICY AND PERMITTED CONDITIONS.
2. PIPE TRENCH AND COMPACTION REQUIREMENTS PER SPECIFICATIONS. SEE WS-1.

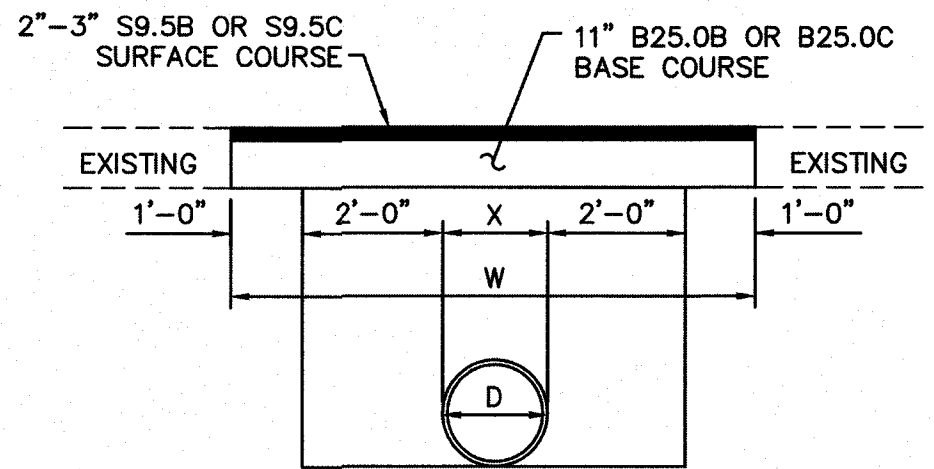
(FOR PRIVATE ROADS AND PAVED AREAS; CONTRACTOR TO MEET MINIMUM REQUIREMENTS AS DEFINED BY RIGHT-OF-WAY OWNER FOR PUBLIC ROAD REPAIRS)

DETAIL:	CITY OF WILMINGTON TYPICAL ROAD REBUILD	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: WS-2
SCALE:	NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No:	1		



PAVEMENT REPAIRS ON ROADS TO BE RESURFACED
(PIPE IS PLACED UNDER EXISTING PAVEMENT)

D	X	W
12"	1'-4"	7'-4"
15"	1'-7"	7'-7"
18"	1'-10"	7'-10"
24"	2'-6"	8'-6"
30"	3'-1"	9'-1"
36"	3'-8"	9'-8"
42"	4'-5"	10'-5"
48"	5'-0"	11'-0"

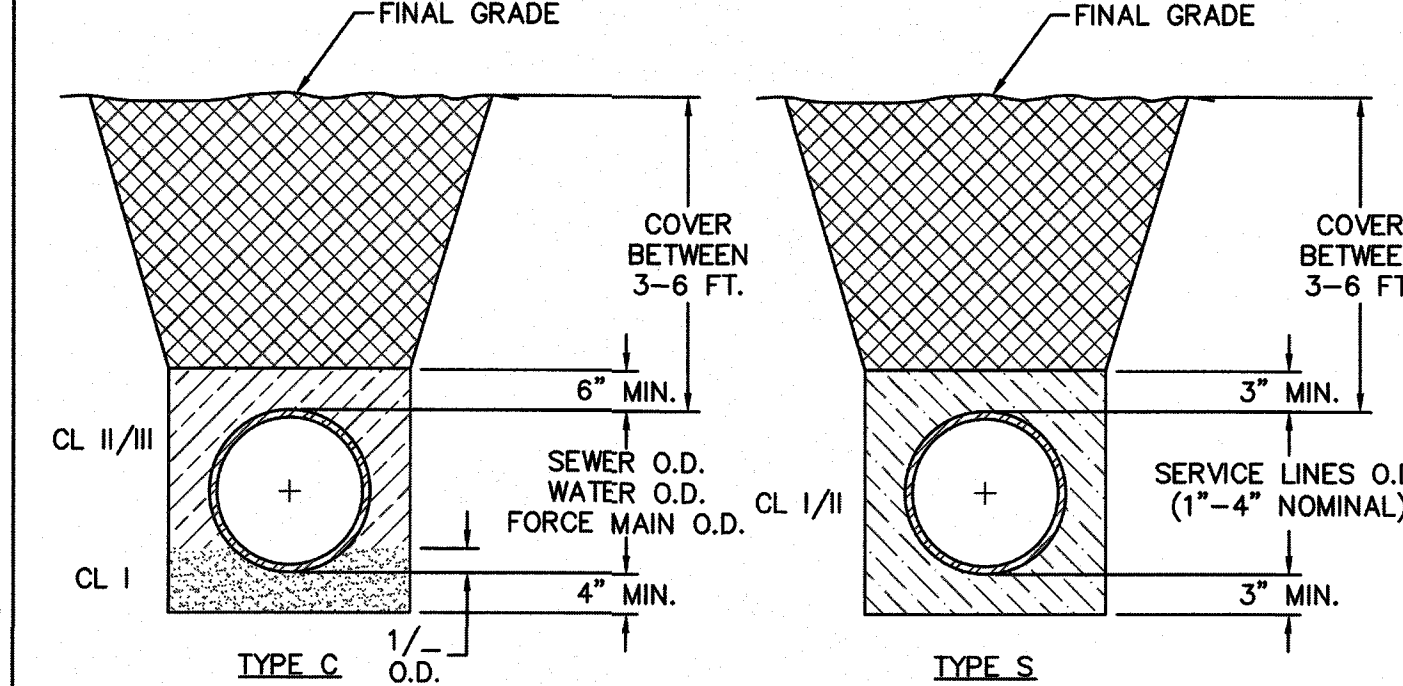
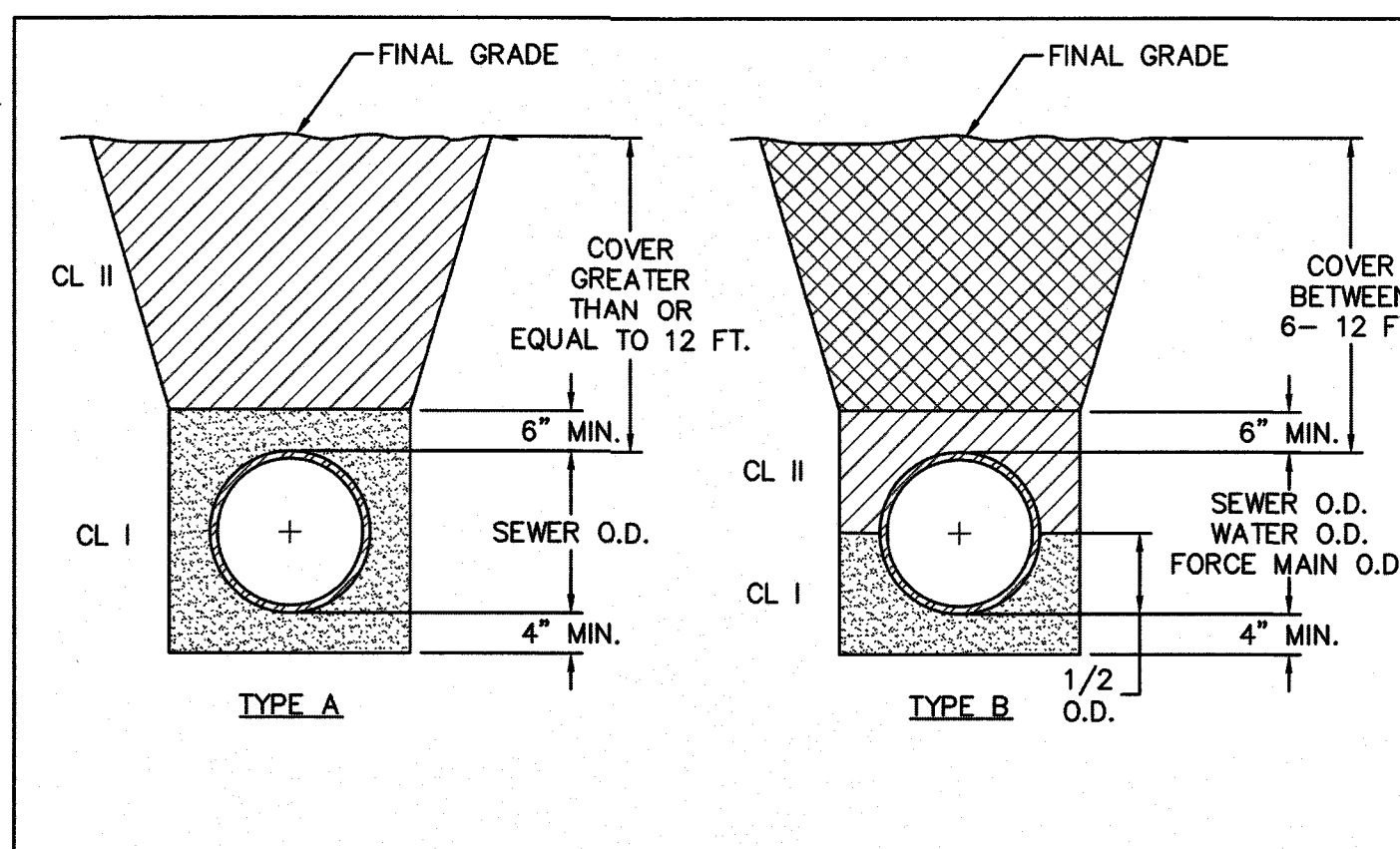


PAVEMENT REPAIRS ON ROADS NOT TO BE RESURFACED
(PIPE IS PLACED UNDER EXISTING PAVEMENT)

NOTE:

1. FOR REFERENCE, SEE NCDOT STANDARD 654.01

DETAIL:	NCDOT-PAVEMENT REPAIRS	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: WS-3
SCALE:	NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No:	1		

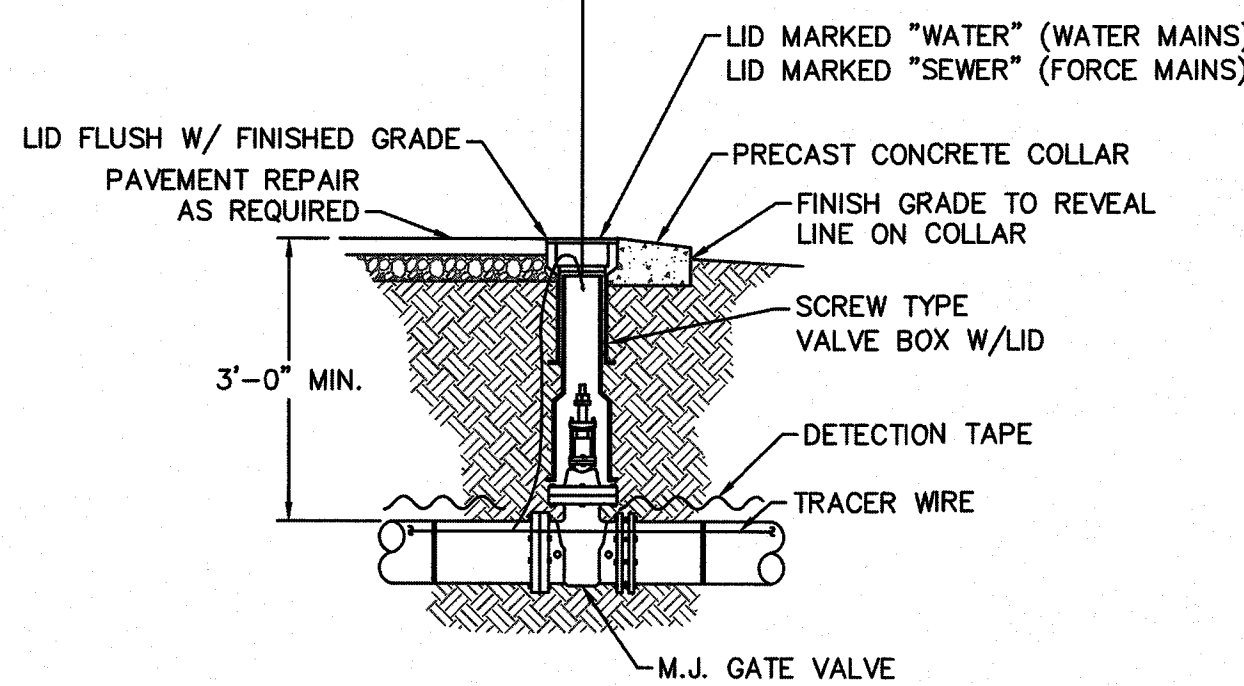


COMPACTION NOTES:

1. ALL ZONES: 95% STD EFFORT PER ASTM D698, EXCEPT AS STATED IN COMPACTION NOTE 2.
2. 12" SUBGRADE UNDER PAVEMENT: 98% STD EFFORT PER ASTM D698.

DETAIL:	PIPE EMBEDMENT TYPES	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: WS-4
SCALE:	NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No:	1		

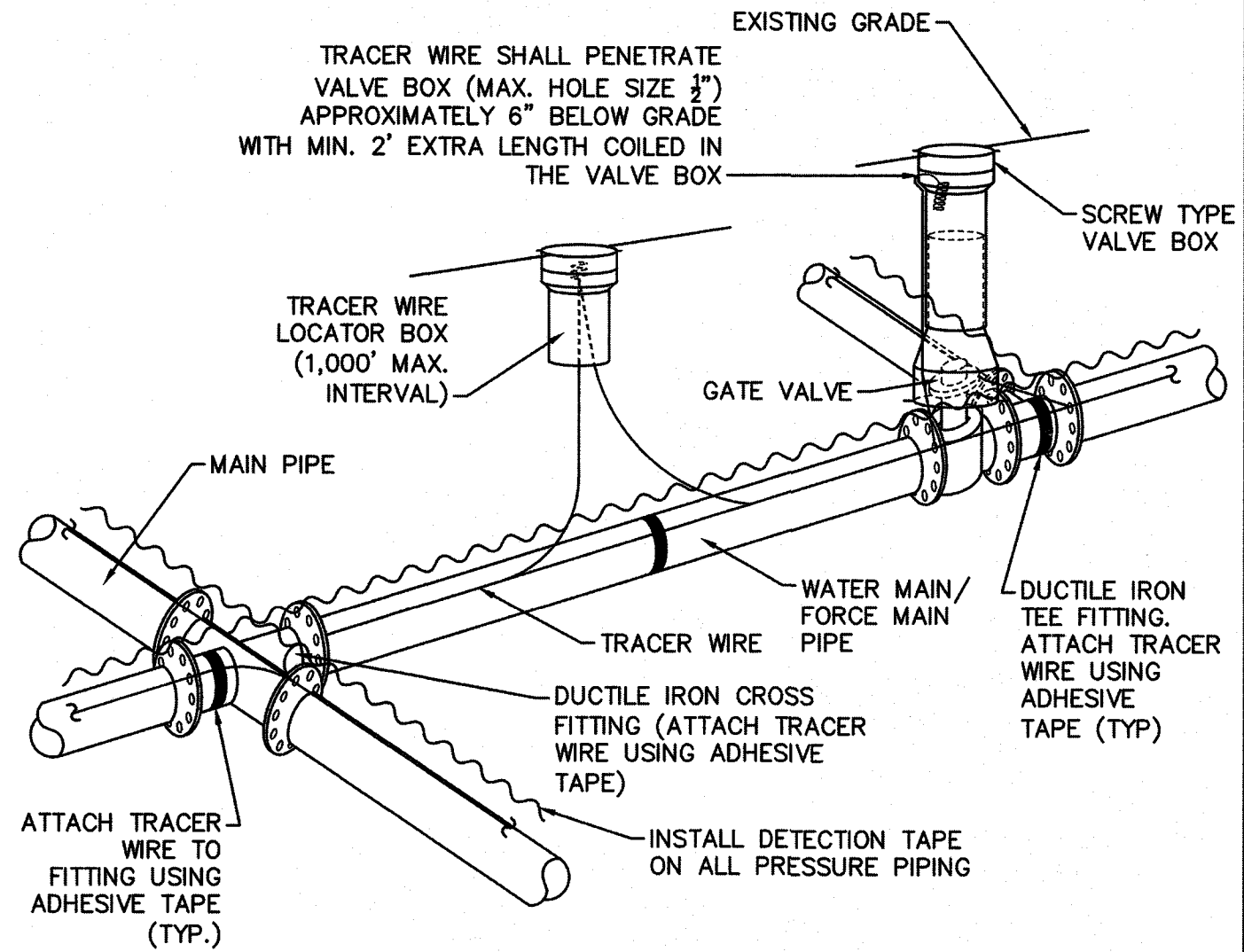
PAVED AREA UNPAVED AREA



NOTES:

1. TRACER WIRE SHALL PENETRATE VALVE BOX THROUGH DRILLED HOLE APPROX. 6" BELOW GRADE WITH MINIMUM 2-FEET EXTRA LENGTH COILED IN THE VALVE BOX. SEE WS-6.

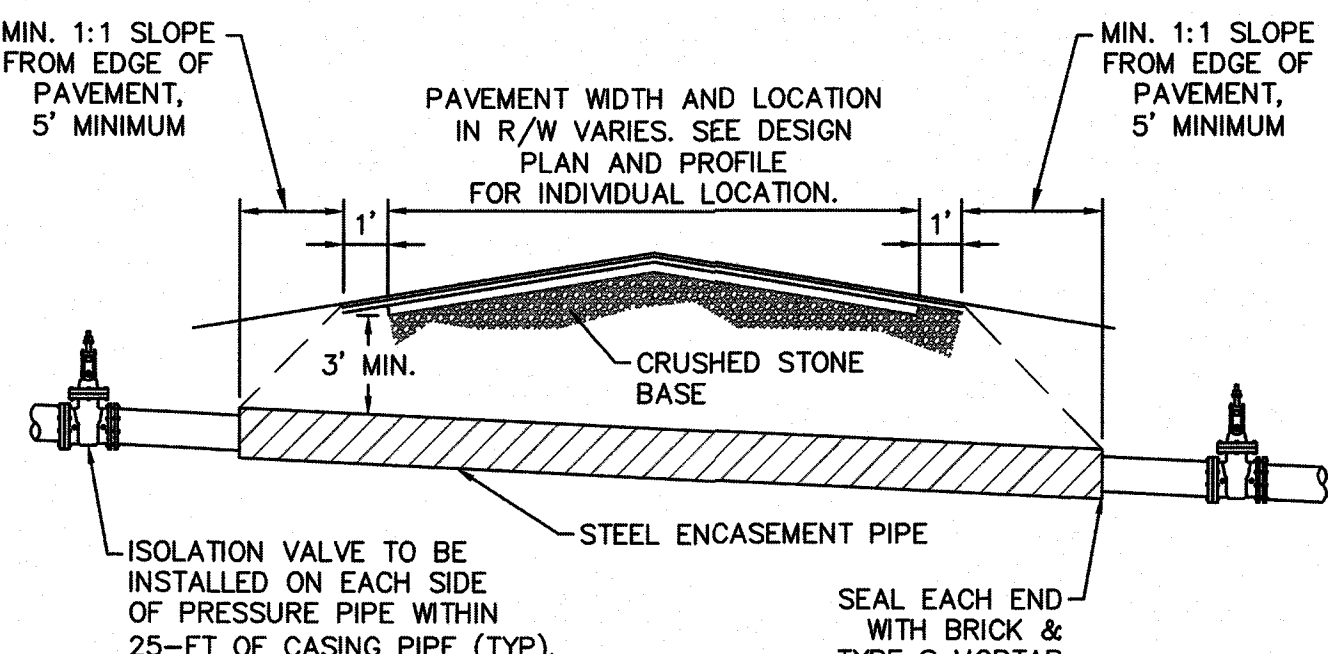
DETAIL:	VALVE DETAIL	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: WS-5
SCALE:	NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No:	1		



NOTES:

1. TRACER WIRE SHALL BE #10 COPPER SOLID CORE COPPER WIRE WITH GAS AND OIL RESISTANT INSULATION AND DIRECT BURY RATING.
2. WIRE SHALL BE STRAPPED TO ALL PVC PIPING WITH ADHESIVE TAPE AT 12 FOOT INTERVALS.
3. SECURE WIRE TO ALL TEE AND CROSS FITTINGS WITH ADHESIVE TAPE.
4. ALL SPLICES IN THE WIRE SHALL BE MADE WITH 3M DBR DIRECT BURY SPLICE KITS.

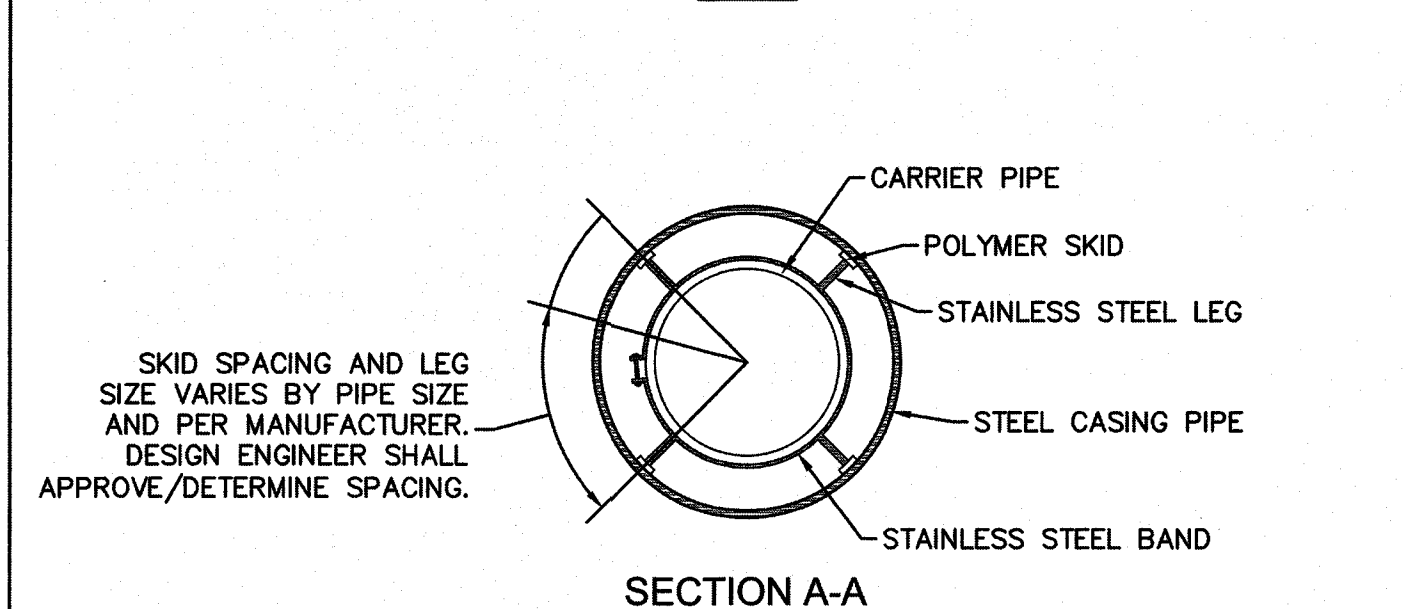
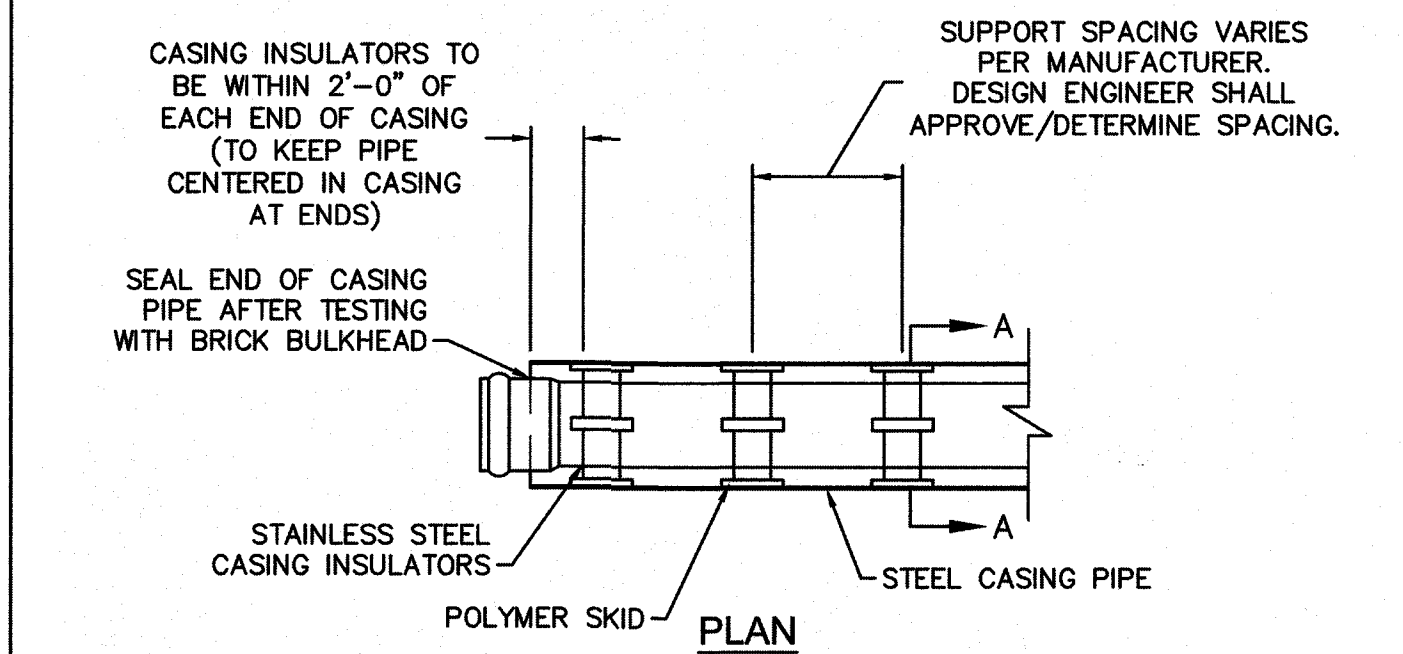
DETAIL:	TRACER WIRE DETAIL	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: WS-6
SCALE:	NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No:	1		



NOTES:

1. CASING WILL BE INSTALLED AT LINE AND GRADE SHOWN ON INDIVIDUAL PROFILE FOR EACH CROSSING. BORING/JACKING TO LINE AND GRADE IS REQUIRED.
2. TRACER WIRE SHALL BE TAPED AT 12' INTERVALS THROUGHOUT THE CASING.
3. PIPING THROUGH CASING SHALL BE RESTRAINED JOINT.
4. SEE DETAIL WS-8 FOR PIPE CASING SUPPORT DETAILS.

DETAIL:	TYPICAL BORING & JACKING DETAIL	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: WS-7
SCALE:	NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No:	1		



NOTES:

1. PIPE SUPPORTS TO BE PLACED TO PROVIDE PROPER SPACING, ALIGNMENT, AND GRADE AS SPECIFIED. OIL, GREASE, OR PETROLEUM PRODUCT MAY NOT BE USED AS LUBRICANT.

DETAIL:	PIPE CASING SUPPORT DETAIL	CAPE FEAR PUBLIC UTILITY AUTHORITY 235 GOVERNMENT CENTER DRIVE WILMINGTON, NC 28403 OFFICE: (910)332-6560	DETAIL NO: WS-8
SCALE:	NOT TO SCALE	CFPUA DETAIL DATE: 01/01/19	SHEET NO: -
CFPUA REV. No:	1		

UTILITY DETAILS
TYPICAL WATER AND SEWER
CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403

DISCLAIMER:
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NORRIS & TUNSTALL
CONSULTING ENGINEERS P.C.
1900 EASTWOOD RD., SUITE #11
WILMINGTON, NC 28403
PHONE (910) 343-9653
PHONE (910) 257-5900

Licence #C-3641

19094

DES. JST
CKD. JPN
DRWN. NKS

DATE 5.5.20



WS1

UTILITY DETAILS
TAPPING SLEEVE AND VALVE ASSEMBLY (4"-24")

DETAIL NO: WS-9
SHEET NO: -

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560

Stewardship. Sustainability. Service.

DETAIL: TAPPING SLEEVE AND VALVE ASSEMBLY (4"-24")
SCALE: NOT TO SCALE
CFPUA DETAIL DATE: 01/01/19
CFPUA REV. No: 1

TEST PORT
GATE/TAPPING VALVE
CONCRETE THRUST AREA AS REQUIRED FOR 150 PSI
TOP VIEW
FLANGE
VALVE
MJ FITTING
TAPPING SLEEVE
SIDE VIEW

NOTES:
1. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
2. TEST PRESSURE SHALL NOT BE APPLIED FOR A MINIMUM OF 7 DAYS AFTER THRUST BLOCK PLACEMENT.
3. BRANCH SHALL NOT EQUAL RUN DIAMETER UNLESS APPROVED BY CFPUA ENGINEERING.
4. TAPPING SLEEVE & VALVE TO BE HYDROSTATICALLY TESTED AT 150 PSI FOR 15 MINUTES WITH ZERO PRESSURE LOSS.

UTILITY DETAILS
PRESSURE MAIN DITCH AND STORM DRAIN CROSSING-DIP

DETAIL NO: WS-10
SHEET NO: -

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560

Stewardship. Sustainability. Service.

DETAIL: PRESSURE MAIN DITCH AND STORM DRAIN CROSSING-DIP
SCALE: NOT TO SCALE
CFPUA DETAIL DATE: 01/01/19
CFPUA REV. No: 1

GATE VALVES REQUIRED ON EACH SIDE OF THE CROSSING. NO SERVICES ARE PERMITTED BETWEEN THE VALVES.
D.I.P.
STORM DRAIN
45° BEND (D.I.P.) (TYPICAL)
10' MIN.
10' MIN.
3' MIN.-5' MAX COVER
RESTRAINED JOINT AS REQUIRED BY CONFIGURATION, SOILS TYPE, PIPE DIAMETER, AND TEST PRESSURE (SEE SCALED PLAN).

NOTES:
1. USE PRESSURE CLASS 350 DIP, UNLESS SPECIFIED OTHERWISE.
2. ALL BURIED PIPES, VALVES AND FITTINGS SHALL BE RESTRAINED.
3. MINIMUM DEPTH REQUIRED, UNLESS SPECIFIED OTHERWISE BY CFPUA:
a. IN DOT R/W, 36" MIN. TYPICAL, OR 24" MIN. WHEN CROSSING A DITCH LINE.
b. ALL OTHER LOCATIONS, 30" MIN.
c. WHEN STORM DRAIN INVERT IS BURIED AT OR BELOW ABOVE DEPTHS, WATER MAIN AND STORM DRAIN SHALL BE CONSTRUCTED OF FERROUS MATERIALS WITH JOINTS EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF 10-Feet EACH SIDE OF THE POINT OF CROSSING.

UTILITY DETAILS
PRESSURE MAIN AND STORM DRAIN CROSSING-HDPE

DETAIL NO: WS-11
SHEET NO: -

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560

Stewardship. Sustainability. Service.

DETAIL: PRESSURE MAIN AND STORM DRAIN CROSSING-HDPE
SCALE: NOT TO SCALE
CFPUA DETAIL DATE: 01/01/19
CFPUA REV. No: 1

12" OR SMALLER PVC OR DIP WATER OR FORCE MAIN
15' MAX.
15' MAX.
STORM DRAIN
3' MIN.-5' MAX COVER
FUSED HDPE 45° VERTICAL BENDS (TYP.)
CONTINUOUS FUSED HDPE
HEAVY LOAD METAL LOAD PLATE
PRIMARY GASKET
DIP OR C-900 PIPE
METAL STIFFENER
GASKET RETAINER
STANDARD 316SS T-BOLT
HDPE PIPE
BUTT FUSION END OF MJ ADAPTER
FUSED MJ ADAPTER KIT DRISCOPEX OR EQUAL WHERE CONNECTING TO DIP OR PVC C-900 (TYPICAL EACH END) (SEE ADAPTER COUPLING INSET)
HEAVY DUTY RETAINER GLAND RING
HDPE ADAPTER COUPLING INSET

NOTES:
1. MAY BE USED AS AN ALTERNATIVE TO CFPUA STANDARD DETAIL WS-10 (STORM CROSSING) WITH APPROVAL BY CFPUA. SHALL NOT BE USED FOR DITCH CROSSINGS.
2. NO SERVICE CONNECTIONS, VALVES, TEES, ADDITIONAL FITTINGS OR APPURTENANCES SHALL BE INSTALLED ON HDPE.
3. 45° VERTICAL BENDS MAY BE ELIMINATED IF OFFSET CAN BE ACHIEVED BY DEFLECTING PIPE WITHIN MANUFACTURER'S MAXIMUM BENDING RADIUS.
4. HDPE SHALL BE A MINIMUM OF DR-11 (200 PSI), DIPS, PE 4710, BLUE POTABLE WATER MAINS AND GREEN SEWER FORCE MAINS. INSTALLATIONS IN PUBLIC RIGHT-OF-WAY ARE SUBJECT TO NC DOT REQUIREMENTS, WHICH MAY INCLUDE USE OF DR-9 HDPE.
5. 45° VERTICAL BENDS MAY BE FUSED BY SUPPLIER PRIOR TO DELIVERY TO SITE. IF THE ASSEMBLY IS FUSED ONSITE, IT MUST BE PRESSURE TESTED.

UTILITY DETAILS
STRUCTURAL BRIDGING OVER WATER & SEWER PIPELINES

DETAIL NO: WS-12
SHEET NO: -

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560

Stewardship. Sustainability. Service.

DETAIL: STRUCTURAL BRIDGING OVER WATER & SEWER PIPELINES
SCALE: NOT TO SCALE
CFPUA DETAIL DATE: 01/01/19
CFPUA REV. No: 1

STORM DRAIN
INSET NOT TO SCALE
FORM CRADLE, FILL VOID WITH 3000 PSI (MIN) CONCRETE
FINISHED GRADE
FILL
STORM DRAIN
12" MIN.
12" MIN.
8" MIN.
12" MIN. FROM EDGE OF PIPE
CONCRETE FOOTING/PIER (OR CONC. BLOCK FILLED WITH CONC.)
#57 STONE BEDDING AS NEEDED TO STABILIZE FOUNDATION
DIA. OF STORM DRAIN PIPE
SEE INSET
STORM DRAIN
SANITARY SEWER, FORCE, OR WATER MAIN

NOTES:
1. PIPELINE BRIDGING REQUIRED FOR VERTICAL SEPARATION 6"-24".
2. VERTICAL SEPARATION LESS THAN 6" IS NOT PERMITTED.
3. NO PIPE JOINTS ON STORM DRAINS BETWEEN PIERS.
4. WHEN SANITARY SEWER CROSSES OVER A WATER MAIN, BOTH PIPELINES SHALL BE PRESSURE RATED DUCTILE IRON PIPE AND JOINTS FOR 10' (MINIMUM) ON EACH SIDE OF THE POINT OF CROSSING.

UTILITY DETAILS
THRUST BLOCK

DETAIL NO: WS-13
SHEET NO: -

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560

Stewardship. Sustainability. Service.

DETAIL: THRUST BLOCK
SCALE: NOT TO SCALE
CFPUA DETAIL DATE: 01/01/19
CFPUA REV. No: 1

ANCHOR STRAPS
EXISTING GROUND
45° VERTICAL BENDS
PLAN BENDS
PLAN TEES
SECTION X-X
BENDS & TEES
18" MIN.
10" & SMALLER PIPE
16" MIN.
PLAN & ELEVATION PLUGS

NOTES:
1. THRUST BLOCKING IS NOT PERMITTED EXCEPT IN SPECIAL INSTALLATIONS WHERE DESIGNED BY ENGINEER AND APPROVED BY CFPUA.
2. ALLOW 7-DAY MINIMUM CONCRETE CURE TIME BEFORE PLACING LOAD ON THRUST BLOCK
3. BASED ON 160 PSI TEST PRESSURE AND 2,000 PSF SOIL BEARING CAPACITY.
4. ALL BEARING SURFACES TO BE CARRIED TO UNDISTURBED GROUND.
5. PIPE & FITTINGS TO BE WRAPPED IN 10 MIL PLASTIC PRIOR TO THRUST BLOCK BEING POURED.

SIZE	90° BENDS		45° BENDS		22-1/2° BENDS		TEES/PLUGS		45° VERT. BENDS
	A	B	A	B	A	B	A	B	
3"	8"	6"	5"	6"	3"	7"	6"	8"	27"
4"	8"	9"	5"	8"	3"	11"	6"	9"	28"
6"	14"	11"	9"	9"	8"	8"	12"	9"	36"
8"	16"	16"	12"	12"	10"	13"	14"	13"	42"
10"	18"	22"	15"	14"	14"	16"	18"	15"	50"
12"	20"	28"	18"	17"	16"	16"	22"	18"	62"
14"	26"	29"	21"	19"	18"	18"	26"	20"	72"
16"	33"	29"	25"	21"	20"	21"	32"	21"	83"
18"	40"	30"	28"	24"	22"	23"	36"	24"	88"

UTILITY DETAILS
STANDARD NOTES

DETAIL NO: WS-14
SHEET NO: -

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560

Stewardship. Sustainability. Service.

DETAIL: STANDARD NOTES (REQUIRED ON ALL PLAN AND PROFILE SHEETS)
SCALE: NOT TO SCALE
CFPUA DETAIL DATE: 01/01/19
CFPUA REV. No: 1

CAPE FEAR PUBLIC UTILITY AUTHORITY STANDARD NOTES:
1. SEWER GUARDS REQUIRED AT ALL MANHOLES. STAINLESS STEEL SEWER GUARDS REQUIRED AT MANHOLES LOCATED IN TRAFFIC AREAS.
2. WATER AND SEWER SERVICES SHALL BE PERPENDICULAR TO MAIN AND TERMINATE 18" INSIDE RIGHT-OF-WAY LINE. SEWER SERVICES IN CUL-DE-SACS ARE REQUIRED TO BE PERPENDICULAR, OR MUST ORIGINATE IN END OF LINE MANHOLE AND TERMINATE 18" INSIDE RIGHT-OF-WAY LINE.
3. ALL SEWER SERVICES CONNECTING INTO DUCTILE IRON MAINS SHALL ALSO BE CONSTRUCTED OF DIP.
4. MINIMUM 10' UTILITIES EASEMENT PROVIDED ALONG THE FRONTAGE OF ALL LOTS AND AS SHOWN FOR NEW DEVELOPMENTS.
5. NO FLEXIBLE COUPLINGS SHALL BE USED.
6. ALL STAINLESS STEEL FASTENERS SHALL BE TYPE 316.
7. CLEANOUTS SHALL BE LOCATED A MINIMUM OF 12 FEET FROM ALL PROPERTY CORNERS.
8. WATER METER BOXES ARE TO BE A MINIMUM OF 5 FEET FROM THE PROPERTY CORNER.
9. UNUSED SERVICES SHALL BE ABANDONED. ABANDONED WATER SERVICES SHALL BE DISCONNECTED FROM MAIN.
10. A MINIMUM OF 10' OF MAIN LINE SHALL BE REPLACED FOR NEW CONNECTIONS TO EXISTING CLAY GRAVITY SEWER MAINS.

UTILITY DETAILS
PRESSURE MAIN AND STORM DRAIN CROSSING-HDPE

DETAIL NO: WS-11
SHEET NO: -

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560

Stewardship. Sustainability. Service.

DETAIL: PRESSURE MAIN AND STORM DRAIN CROSSING-HDPE
SCALE: NOT TO SCALE
CFPUA DETAIL DATE: 01/01/19
CFPUA REV. No: 1

12" OR SMALLER PVC OR DIP WATER OR FORCE MAIN
15' MAX.
15' MAX.
STORM DRAIN
3' MIN.-5' MAX COVER
FUSED HDPE 45° VERTICAL BENDS (TYP.)
CONTINUOUS FUSED HDPE
HEAVY LOAD METAL LOAD PLATE
PRIMARY GASKET
DIP OR C-900 PIPE
METAL STIFFENER
GASKET RETAINER
STANDARD 316SS T-BOLT
HDPE PIPE
BUTT FUSION END OF MJ ADAPTER
FUSED MJ ADAPTER KIT DRISCOPEX OR EQUAL WHERE CONNECTING TO DIP OR PVC C-900 (TYPICAL EACH END) (SEE ADAPTER COUPLING INSET)
HEAVY DUTY RETAINER GLAND RING
HDPE ADAPTER COUPLING INSET

NOTES:
1. MAY BE USED AS AN ALTERNATIVE TO CFPUA STANDARD DETAIL WS-10 (STORM CROSSING) WITH APPROVAL BY CFPUA. SHALL NOT BE USED FOR DITCH CROSSINGS.
2. NO SERVICE CONNECTIONS, VALVES, TEES, ADDITIONAL FITTINGS OR APPURTENANCES SHALL BE INSTALLED ON HDPE.
3. 45° VERTICAL BENDS MAY BE ELIMINATED IF OFFSET CAN BE ACHIEVED BY DEFLECTING PIPE WITHIN MANUFACTURER'S MAXIMUM BENDING RADIUS.
4. HDPE SHALL BE A MINIMUM OF DR-11 (200 PSI), DIPS, PE 4710, BLUE POTABLE WATER MAINS AND GREEN SEWER FORCE MAINS. INSTALLATIONS IN PUBLIC RIGHT-OF-WAY ARE SUBJECT TO NC DOT REQUIREMENTS, WHICH MAY INCLUDE USE OF DR-9 HDPE.
5. 45° VERTICAL BENDS MAY BE FUSED BY SUPPLIER PRIOR TO DELIVERY TO SITE. IF THE ASSEMBLY IS FUSED ONSITE, IT MUST BE PRESSURE TESTED.

UTILITY DETAILS
STRUCTURAL BRIDGING OVER WATER & SEWER PIPELINES

DETAIL NO: WS-12
SHEET NO: -

CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403
OFFICE: (910)332-6560

Stewardship. Sustainability. Service.

DETAIL: STRUCTURAL BRIDGING OVER WATER & SEWER PIPELINES
SCALE: NOT TO SCALE
CFPUA DETAIL DATE: 01/01/19
CFPUA REV. No: 1

STORM DRAIN
INSET NOT TO SCALE
FORM CRADLE, FILL VOID WITH 3000 PSI (MIN) CONCRETE
FINISHED GRADE
FILL
STORM DRAIN
12" MIN.
12" MIN.
8" MIN.
12" MIN. FROM EDGE OF PIPE
CONCRETE FOOTING/PIER (OR CONC. BLOCK FILLED WITH CONC.)
#57 STONE BEDDING AS NEEDED TO STABILIZE FOUNDATION
DIA. OF STORM DRAIN PIPE
SEE INSET
STORM DRAIN
SANITARY SEWER, FORCE, OR WATER MAIN

NOTES:
1. PIPELINE BRIDGING REQUIRED FOR VERTICAL SEPARATION 6"-24".
2. VERTICAL SEPARATION LESS THAN 6" IS NOT PERMITTED.
3. NO PIPE JOINTS ON STORM DRAINS BETWEEN PIERS.
4. WHEN SANITARY SEWER CROSSES OVER A WATER MAIN, BOTH PIPELINES SHALL BE PRESSURE RATED DUCTILE IRON PIPE AND JOINTS FOR 10' (MINIMUM) ON EACH SIDE OF THE POINT OF CROSSING.

UTILITY DETAILS
TYPICAL WATER AND SEWER
CAPE FEAR PUBLIC UTILITY AUTHORITY
235 GOVERNMENT CENTER DRIVE
WILMINGTON, NC 28403

DISCLAIMER:
THESE DETAILS ARE A WORK OF DESIGN FOR UTILITIES SYSTEMS AND HAVE BEEN REVIEWED AND APPROVED FOR CONTENT AND GENERAL CONFORMANCE WITH THE SEWER DESIGN FOR THIS PROJECT.

NORRIS & TUNSTALL
CONSULTING ENGINEERS P.C.
1900 EASTWOOD RD., SUITE #11
WILMINGTON, NC 28403
PHONE (910) 343-9663
1429 ASH-LITTLE RIVER RD. NW
ASH, NC 28420
PHONE (910) 287-5900

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