TRACT AREA-- 8.55 AC
-- 372,438 SF
ADDRESS-- 294 MILITARY CUTOFF RD.
ZONING-- MF-M (CD)
PROPOSED UNITS-- 98
2 BEDROOM UNITS-- 90
1 BEDROOM UNITS-- 8
UNITS PER ACRE-- 11.46
TAX PIN-- R04300-005-001-000
DEED BOOK/PAGE-- 6029/2271
CAMA LUC-- WATERSHED RESOURCE PROTECTION
BUILDING SETBACKS
FRONT-- 35'
SIDE-- 20'
REAR-- 25'
MAX. BUILDING HEIGHT-- 35'
MAX.NUMBER OF STORIES-- 2
IBC CONSTRUCTION TYPE-- TYPE III
EXISTING IMPERVIOUS-- 86,369 SF
PROPOSED IMPERVIOUS-- 230,000 SF (5.28 AC)
% IMPERVIOUS-- 61.8%
BUILDING LOT COVERAGE-- 24.4%
AREA OF DISTURBANCE-- 8.6 AC.
35% REQ'D.OPEN SPACE-- 2.78 ACRE (PONDS EXCLUDED)
ACTIVE AREA PROVIDED-- 1.4 AC.
PASSIVE AREA PROVIDED-- 1.6 AC.
RECIEVING STREAM-- HOWE CREEK
CLASSIFICATION-- SA;ORW
MIN.REQUIRED PARKING-- 192 SPACES
MAX.REQUIRED PARKING-- 245 SPACES
PROP.PARKING SPACES-- 224 SPACES PROVIDED
-- 16 HANDICAP PROVIDED
BICYCLE PARKING SPACES-- 10 PROVIDED
EX.WATER DEMAND-- 13,200 GPD
PROP.WATER DEMAND-- 39,200 GPD
EX.SEWER DEMAND-- 11,880 GPD
PROP.SEWER DEMAND-- 35,280 GPD

SITE DATA

LEGEND

PROJECT BOUNDARY
WATER MAIN
GRAV.SEWER & MANHOLE
STORMDRAIN
WETLAND LINE
EX CONTOURS
PROP.HIGH POINT
PROP.DRAINAGE DIR.
DISTURBED AREA
GATE VALVE
HYDRANT ASSEMBLY
DENOTES EX. TREE
DENOTES 5 BIKE RACK

GENERAL NOTES:

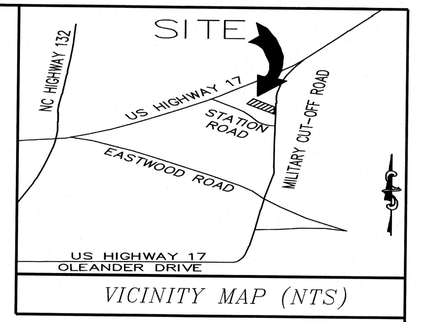
1. THIS PROPERTY IS NOT LOCATED IN THE 100 YEAR FLOOD ZONE.
2. THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION AND PROTECTION OF EXISTING UTILITIES DURING CONSTRUCTION FOR LOCATION OF UNDERGROUND UTILITIES CONTACT U::LOCO AT 1::800::632::4949.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE REPAIR AND REPLACEMENT OF ANY UTILITIES, CURB & GUTTER, PAVEMENT ETC. THAT MAY BE DAMAGED DURING CONSTRUCTION. ALL DAMAGED ITEMS SHALL BE REPAIRED TO AT LEAST THE QUALITY OF WORKMANSHIP FOUND IN THE ORIGINAL ITEM.
4. THERE ARE NO JURISDICTIONAL WETLANDS ON THIS SITE.
5. ALL ROOF DRAINS SHALL BE DIRECTED TO THE DETENTION POND COLLECTION SYSTEM AND SUBSEQUENTLY TREATED BY THE DETENTION POND.
6. NO CLEARING SHALL BE INITIATED UNTIL A TREE PRESERVATION PERMIT HAS BEEN ISSUED, THE REQUIRED TREE PROTECTION IS INSTALLED AND INSPECTED BY A NEW HANOVER COUNTY ZONING DEPT. REPRESENTATIVE.
7. WATER AND SEWER SERVICE TO BE PROVIDED BY THE CAPE FEAR PUBLIC UTILITY AUTHORITY.
8. FINAL STORMWATER MANAGEMENT, WATER AND SEWER CONSTRUCTION PLANS WILL BE SUBMITTED UPON APPROVAL.
9. REFERENCE DEED BOOK 5999, PAGE 216 NHCR FOR PROPERTY BOUNDARY.
10. NEW HANOVER COUNTY SOIL EROSION AND SEDIMENTATION CONTROL AS WELL AS STORM WATER DETENTION PERMIT IS REQUIRED.
11. CONTRACTOR SHALL MAINTAIN AN ALL::WEATHER ACCESS FOR EMERGENCY VEHICLES AT ALL TIMES DURING CONSTRUCTION.
12. NEW HYDRANTS MUST BE BROUGHT INTO SERVICE PRIOR TO COMBUSTIBLE MATERIALS DELIVERED TO THE JOB SITE.
13. LANDSCAPING OR PARKING CANNOT BLOCK OR IMPEDE FIRE HYDRANTS. A 3::FOOT CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF THE HYDRANT.
14. IN ADDITION TO THE STANDARD COMMENTS, ADDITIONAL FIRE PROTECTION AND ACCESSIBILITY REQUIREMENTS MAY BE REQUIRED DUE TO ANY SPECIAL CIRCUMSTANCES CONCERNING THE PROJECT.
15. CONTRACTOR SHALL SUBMIT A RADIO SIGNAL STRENGTH STUDY THAT DEMONSTRATES THAT EXISTING EMERGENCY RESPONDER RADIO SIGNAL LEVELS MEET THE REQUIREMENTS OF SECTION 510 OF THE 2018 NC FIRE CODE.
16. SITE LIGHTING WILL BE CONTAINED DOWNWARD AND INWARD TO SAFEGUARD ADJACENT PROPERTIES FROM BEING ADVERSELY AFFECTEDFROM SUCH LIGHTING.
17. ANY BROKEN OR MISSING SIDEWALK PANELS, DRIVEWAY PANELS AND CURBING WILL BE REPLACED.
18. A LANDSCAPING PLAN INDICATING THE LOCATION OF REQUIRED STREET TREES SHALL BE SUBMITTED TO THE CITY OF WILMINGTON TRAFFIC ENGINEERING DIVISION AND PARKS AND RECREATION DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO THE RECORDING OF THE FINAL PLAT. [SD 15-14 COFW TECH STDS]
19. A SIGN SHALL BE PLACED AT THE NORTHERN BOUNDARY OF THE PROPERTY INDICATING THAT A FUTURE CONNECTION WILL BE OPENED WHEN THE PROPERTY TO THE NORTH DEVELOPS.
20. CONTRACTOR SHALL RELOCATE EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED TRAIL OR NEGOTIATE SLIGHT DEVIATION TO ALIGNMENT WITH CITY INSPECTOR.
21. CONTRACTOR SHALL MAINTAIN AN ALL-WEATHER ACCESS FOR EMERGENCY VEHICLES AT ALL TIMES DURING CONSTRUCTION
22. NEW HYDRANTS MUST BE BROUGHT INTO SERVICE PRIOR TO COMBUSTIBLE MATERIALS DELIVERED TO THE JOB SITE LANDSCAPING OR PARKING CANNOT BLOCK OR IMPEDE FIRE HYDRANTS.
23. A 3-FOOT CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF THE HYDRANT. IN ADDITION TO THE STANDARD COMMENTS, ADDITIONAL FIRE PROTECTION AND ACCESSIBILITY REQUIREMENTS MAY BE REQUIRED DUE TO ANY SPECIAL CIRCUMSTANCES CONCERNING THE PROJECT.
24. CONTRACTOR SHALL SUBMIT A RADIO SIGNAL STRENGTH STUDY THAT DEMONSTRATES THAT EXISTING EMERGENCY RESPONDER RADIO SIGNAL LEVELS MEET THE REQUIREMENTS OF SECTION 510 OF THE 2018 NC FIRE CODE.

VILLAGE TOWNHOME IMPERVIOUS SUMMARY

Job # : PW1312
Engineer : JHF
REVISED 3/3/2019
REVISED 7/22/2019

BOUNDARY AREA =		**372,438**	**SF**	8.55 AC
TOWNHOME TYPE	NO. OF BLDGS			
9 UNIT BLDGS =	3	7987	SF	23,961 SF
8 UNIT BLDS =	2	7179	SF	14,358 SF
7 UNIT BLDG =	1	6369	SF	6,369 SF
3 UNIT BLDG =	1	2940	SF	2,940 SF
5A UNIT BLDGS =	2	4655	SF	9,310 SF
5B UNIT BLDGS =	1	4349	SF	4,349 SF
6A UNIT BLDGS =	2	5465	SF	10,930 SF
6B UNIT BLDGS =	3	5159	SF	15,477 SF
TOTAL TOWNHOME COVER	15			87,694 SF
CLUBHOUSE =				2644 SF
BUILDING COVER		TOTAL=		**90,338 SF**
	BUILDING COVER PERCENTAGE			24%
PARKING IMPERVIOUS				
MILITARY R/W DRIVEWAY		3,014	SF	Consider as future reserve
ONSITE PARKING AND DRIVE AISLES		105,135	SF	
	TOTAL=	105,135	SF	
SIDEWALK IMPERVIOUS				
MILITARY CUTOFF R/W		1,927	SF	Consider as future reserve
ONSITE SIDEWALKS		25,393	SF	
	TOTAL=	25,393	SF	
TOTAL ONSITE IMPERVIOUS		220,866	SF	
FUTURE RESERVE		9,134	SF	
TOTAL BNDY		372,438	SF	8.55 AC
TOTAL IMPERVIOUS		**230,000**	**SF**	5.28 AC
IMPERVIOUS PERCENTAGE		**61.8%**		

SHEET INDEX



VICINITY MAP (NTS)

FUTURE DEVELOPMENT

PID: R04400-006-003-00A
MAPID: 315806.48.1065.801
FRANCHISE REALTY INTERSTATE
Zoning: RB
Book & Page: BK1096 PG0024
EX. RETAIL CENTER USE

Lot 21 as shown on Map Book 4, Page 96

PID:R04300-005-008-000
MAPID: 315806.37.5974.000
TOWLES WILLIAM B
BRENDA H
Zoning: RB
Book & Page: BK2340 PG0605
EX. RESTAURANT

PID:R04300-005-007-000
MAPID: 315806.37.4862.000
3BS LLC
Zoning: RB
Book & Page: BK2751 PG0011
EX. RESTAURANT

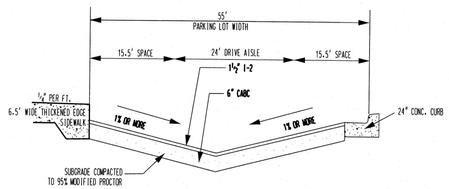
PID: R04320-005-006-000
MAPID: 315806.37.4648.000
MERRITT MICHAEL L RITA
Zoning: RB
Book & Page: BK1298 PG0267
Tract 1
Map Book 35, Page 124
EX. CAR & BOAT RETAIL

PID: R04417-011-001-000
MAPID: 315810.47.1109.000
CREB PROPERTIES LLC
Zoning: RB
Class: COM
Book & Page: BK5884 PG2008
Tract 2
Map Book 35, Page 124
MARINE SALVAGE

PID: R04417-011-002-000
MAPID: 315810.47.3006.000
MERRITT MICHAEL L RITA
Zoning: RB
Book & Page: BK1298 PG0267
Tract 3
Map Book 35, Page 124
EX. CHURCH

PID: R04400-006-001-000
MAPID: 315810.46.4712.000
PEACE BAPTIST CHURCH
Zoning: O&I 1
Book & Page: BK1100 PG0468
EX. CHURCH

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.



TYPICAL PARKING LOT SECTION

GRAPHIC SCALE: 1" = 40'

Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

CITY OF WILMINGTON
NORTH CAROLINA
Public Services ◦ Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:_____ Permit #_____
Signed: _____

NORTH CAROLINA PROFESSIONAL SEAL 20643 ENGINEER JAMES H. FENTRESS, JR.

JAMES H. FENTRESS, JR., P.E.
8-21-18
DATE

CITY OF WILMINGTON REZONING APPROVAL CONDITIONS

1. The use and development of the subject property shall comply with all regulations and requirements imposed by the Land Development Code, the City of Wilmington Technical Standards and Specifications Manual and any other applicable federal, state or local law, ordinance or regulation, as well as any condition stated below. In the event of a conflict, the more stringent requirement or higher standard shall apply.
2. Approval of this conditional district rezoning does not constitute technical approval of the site plan. Final approval by the Technical Review Committee and the issuance of all required permits must occur prior to release of the project for construction.
3. If, for any reason, any condition for approval is found to be illegal or invalid or if the applicant should fail to accept any condition following approval, the approval of the site plan for the district shall be null and void and of no effect and proceedings shall be instituted to rezone the property to its previous zoning classification.
4. The use and development of the subject property shall be in accordance with the plan and elevations dated March 16, 2018.
5. The proposed use shall be limited to a maximum of 98 townhomes, a 4,400 square foot clubhouse, and a swimming pool.
6. No building shall exceed two stories, 35 feet, in height.
7. All existing protected trees not located within the building foot print or impacted by essential site improvements shall be preserved or mitigated.
8. Exterior site lighting shall be installed so as not to shine directly onto adjacent residential parcels.
9. The use of pine straw as ground cover shall be prohibited within ten (10) feet of any combustible exterior construction.
10. A vehicular and pedestrian connection shall be provided to Ogden Plaza, east of the request.
11. Stub connections, as shown on the proposed site plan and approved by City Council, shall be provided to provide future vehicle access to the west and south.
12. Any freestanding sign(s) on the site shall be monument style with landscaping around the base of the sign; no pole signs shall be permitted.
13. The creative standard shall not be used to satisfy the streetyard landscaping requirements.
14. All city, state and federal regulations shall be followed.

PRELIMINARY PLAN

VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON — NEW HANOVER COUNTY — NORTH CAROLINA

OWNER: ARBORETUM VILLAGE, LLC
ADDRESS: 10 S. CARDINAL DRIVE
WILMINGTON, N.C. 28403
PHONE:

STROUD ENGINEERING, P.A. C-0647
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA 28403
(910) 815-0775 (910) 815-0593 FAX

DESIGNED:	JHF
DRAWN:	JHF
APPROVED:	JHF
DATE:	8/31/18
SCALE:	1" = 40'
SHEET	1 OF 21

PROJECT NO.: PW 1312

PROJECT NO.: PW 1312
DRAWING NO.: W:/MASTER/PW1312/dgn/ARBORETUM.DGN

VILLAGE TOWNHOMES TREE REMOVAL ASSESSMENT

Post Hurricane Florence accounting

Undamaged Regulated Trees proposed to be removed

NO.	TREE	DIA.	NO.	TREE	DIA.
1	Dogwood	8	42	Oak	8
2	Oak cluster	14	43	Oak	11
3	Pine	15	44	Oak	10
4	Oak	8	45	Oak	11
5	Pine	22	46	HW	12
6	Pine	14	47	Crape cluster	12
7	HW	9	48	Cypress	13
8	Dogwood	4	49	Oak	16
9	HW	8	50	Pine	16
10	HW	10	51	Oak	13
11	Pine	16	52	Pine	13
12	Oak	11	53	Pine	19
13	Oak	10	54	HW	8
14	Oak	8	55	Oak	13
15	Oak	18	56	Oak	9
16	Oak	20	57	Cypress	8
17	Oak	19	58	Pine	18
18	Oak	9	59	Pine	19
19	Boxelder Maple	10	60	Pine	18
20	HW	14	61	Oak	19
21	Oak	9	62	Pine	14
22	Oak twin	16	63	Pine	18
23	Oak	15	64	HW	9
24	Oak twin	11	65	Gum	18
25	Pine	19	66	Oak	11
26	Pine	19	67	Oak	15
27	Pine	16	68	Oak	12
28	Pine	16	69	Cypress	8
29	HW	9	70	Cypress	8
30	Oak	10	71	Orna	6
31	Oak	12	72	Cypress	10
32	Oak twin	15	73	Cypress	9
33	Dogwood	10	74	Cypress twin	8
34	Pine	14	75	Cypress	14
35	Pine	12	76	Cypress	10
36	Pine	12	77	Cypress	13
37	Oak	9	78	Cypress	14
38	Pine	12	79	Pine	14
39	Oak	8	80	Cypress	14
40	Oak	12	81	Cypress	10
41	HW twin	10	82	Oak twin	13
	Tree Dia. Sum	506		Tree Dia. Sum	514

506 + 514 = 1020 Dia. Inches of regulated trees to be Removed

521 + 578 = 1099 Dia. Inches of regulated trees to be Preserved

There are 12 Regulated and 1 Significant tree requiring mitigation

MITIGATION CALCULATIONS

48 REGULATED TREE CREDITS REQ'D.
7 SIGNIFICANT TREE CREDITS REQ'D.
55 TREE CREDITS REQUIRED

Regulated Trees to be preserved

NO.	TREE	DIA.	NO.	TREE	DIA.
1	Oak	17	39	Oak	18
2	Oak	11	40	Oak	24
3	Oak	8	41	Oak	22
4	Oak	12	42	Oak	22
5	Oak	10	43	Oak	20
6	Oak	16	44	Oak	12
7	Oak	9	45	Oak	11
8	Oak Twin	8	46	Gum	9
9	Oak	10	47	Pine	24
10	Pine	12	48	Gum	15
11	HW	14	49	Oak	8
12	Pine	12	50	Oak	10
13	Oak	15	51	Pine	16
14	Oak	9	52	Oak twin	15
15	Oak	10	53	HW	9
16	Oak	18	54	Oak	14
17	Oak	8	55	Pine	13
18	Oak	11	56	HW	8
19	Oak	12	57	Pine	14
20	Oak	32	58	HW	9
21	Oak	14	59	HW	10
22	Oak	28	60	Oak	11
23	Oak	19	61	Oak twin	11
24	Oak	10	62	Oak	12
25	Orna	6	63	Oak	16
26	Oak	23	64	Oak	23
27	Oak trip	9	65	HW	8
28	Oak	17	66	HW	8
29	Pine	22	67	HW	13
30	Crape cluster	10	68	Oak	30
31	Pine	24	69	Oak	18
32	Oak	19	70	Dogwood	6
33	Oak	18	71	Oak twin	8
34	Holly	14	72	Oak	31
35	Oak twin	24	73	HW	10
36	Dogwood twin	10	74	Oak	10
37	Oak	17	75	Oak	13
38	Oak	19	76	Oak	9
	Tree Dia. Sum	521		Tree Dia. Sum	578

1099 Dia. Inches to be preserved

Damaged Trees historically proposed to be removed

NO.	TREE	DIA.	NO.	TREE	DIA.
17	Pine	12	2	HW	13
13	Oak	15	14	Pine	16
18	Pine	18	11	HW	8
9	Oak	19	12	Oak	11
1	Cypress	8			
	Tree Dia. Sum	72		Tree Dia. Sum	48

72 + 48 = 120 Dia. Inches to be removed as hurricane damaged

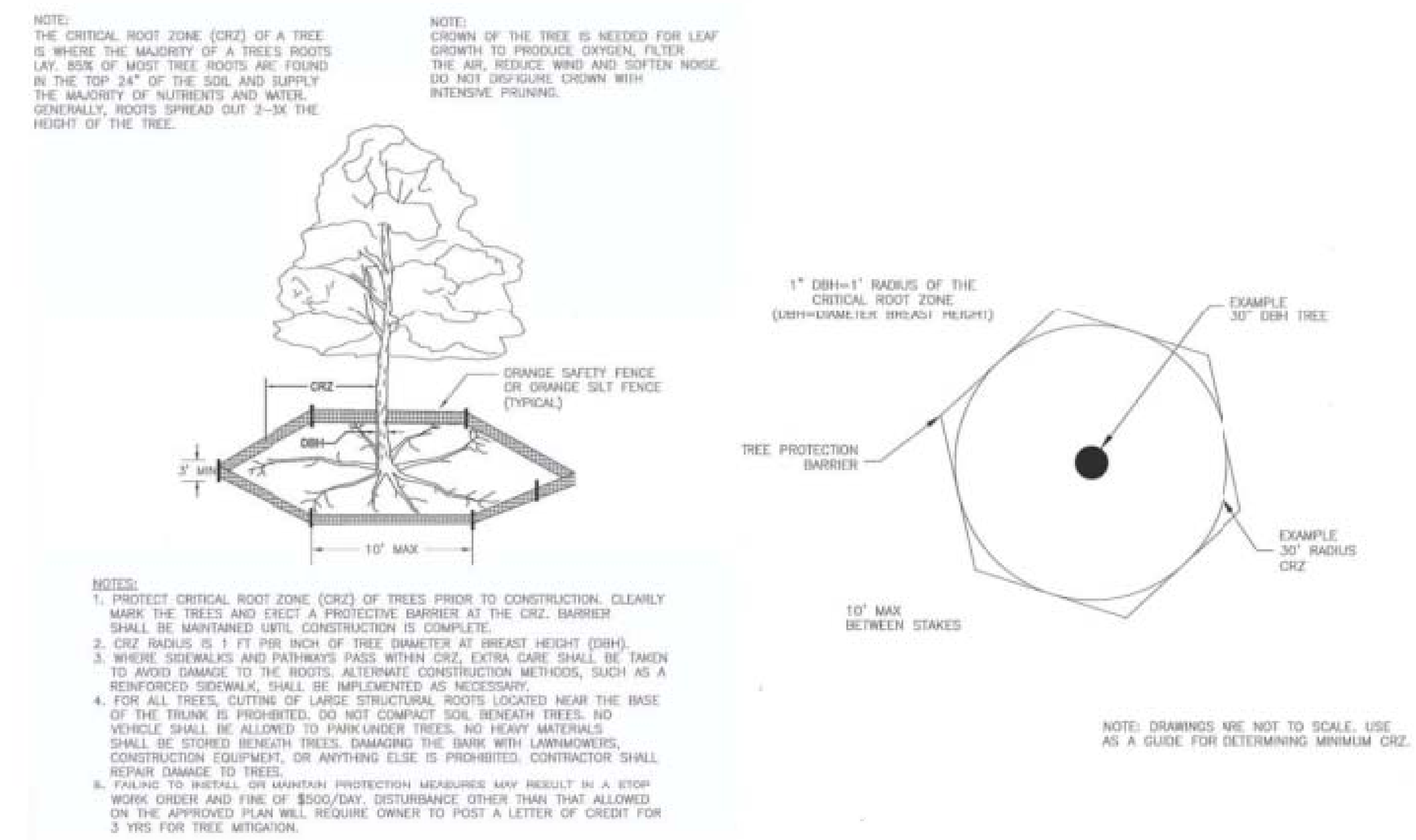
8.6 acres of disturbance requires 129 Trees Required
Sig. and Reg. Tree removal requires 55 Trees Required
therefore 184 Trees Required

188 Tree Credits provided through preservation

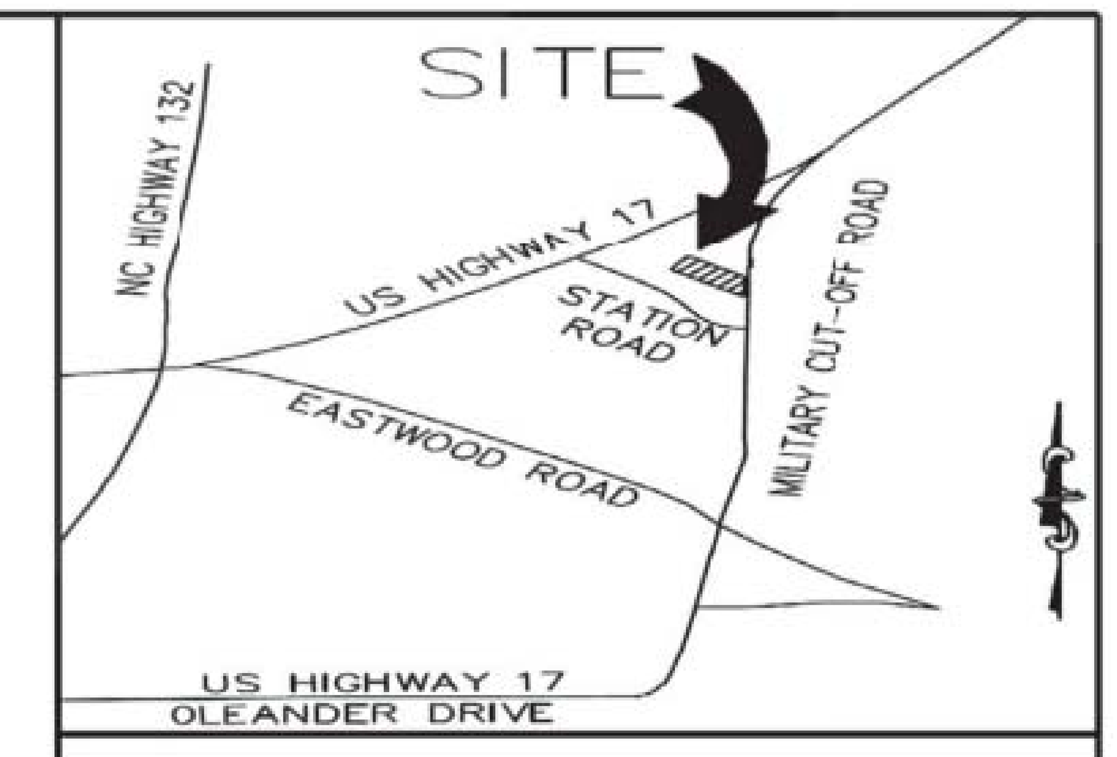
Damaged Trees originally proposed to be saved

NO.	TREE	DIA.	NO.	TREE	DIA.
16	Cypress	9	31	Oak DEAD	13
4	Gum	9	30	Oak	13
3	Pine	22	19	Oak	19
1	Oak	19	7	Oak	21
20	Pine	20	8	Oak	14
5	Oak	10			
	Tree Dia. Sum	89		Tree Dia. Sum	80

89 + 80 = 169 Dia. Inches to be removed as hurricane damaged



TREE PROTECTION DETAILS



VICINITY MAP (NTS)

Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

CITY OF WILMINGTON NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date: ____________ Permit #____________
Signed: ____________

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

76 TREES TO REMAIN
82 TREES TO BE REMOVED INCLUDES TREES REQUIRING MITIGATION
20 HURRICANE DAMAGED TREES TO BE REMOVED PROPOSED PRIOR OR NOT
13 TREES REQUIRE MITIGATION AS A FUNCTION OF CRITICAL SITE IMPROVEMENTS OR NOT

LEGEND

PROJECT BOUNDARY
WATER MAIN
GRAV. SEWER & MANHOLE
STORMDRAIN
WETLAND LINE
EX CONTOURS
PROP. HIGH POINT
PROP. DRAINAGE DIR.
DISTURBED AREA
GATE VALVE
HYDRANT ASSEMBLY
TREE TO BE REMOVED FOR ESSNTL. SITE IMPRVMNTS.
TREE TO BE REMOVED FOR BUILDING CONSTRUCTION

TREES DAMAGED BY HURRICAN FLORENCE TO BE REMOVED

PROJECT NO.: PW 1312

DRAWING NO.: W://MASTER/PW1312/dgn/EXISTING CONDITIONS & TREE PRESERVATION

PROJECT NO.: PW 1312

40 20 0 40 80
GRAPHIC SCALE: 1" = 40'

SURVEY REFERENCE :
TREE SURVEY PROVIDED BY BATEMAN CIVIL SURVEY CO.
REVISED MAY 17, 2019 TO REPORT NOTED OMMISSIONS
AND POST HURRICANE FLORENCE TREE DAMAGE

NORTH CAROLINA PROFESSIONAL SEAL 20643 ENGINEER JAMES H. FENTRESS, JR.

[illegible]
JAMES H. FENTRESS, JR., P.E
6/26/2019
DATE

EXISTING CONDITIONS & TREE PRESERVATION PLAN

VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER:	WHEEL ESTATES I, LLC	DESIGNED: JHF
ADDRESS:	101 N. THIRD STREET WILMINGTON, N.C. 28401	DRAWN: kbn
PHONE:		APPROVED: JHF

STROUD ENGINEERING, P.A. C-0647
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA 28403
(910) 815-0775 (910) 815-0593 FAX

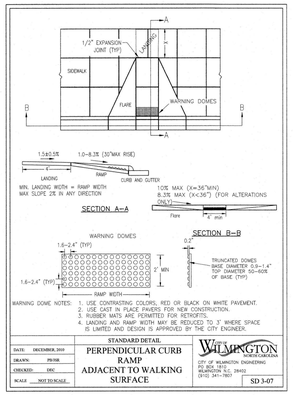
DATE: 3/6/18
SCALE: 1" = 40'
SHEET 2 OF 19

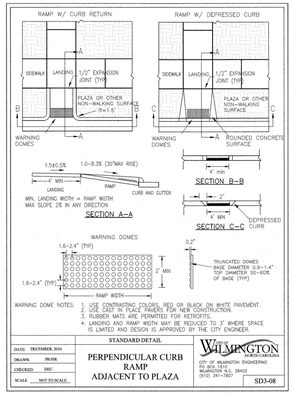
ATRIUM COURT CENTERLINE DESCRIPTION

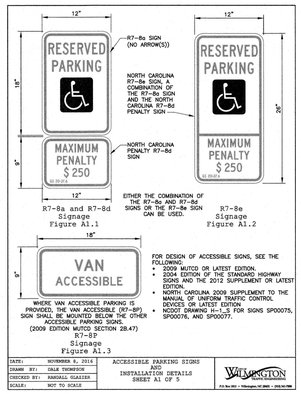
Point Type	Station	Radius	Length	Tangent
Aligment Name:				
Description:				
POB	0+00.00			
PC	0+34.56		34.56	
PC	0+34.56			
PI	0+43.11	11.24	14.61	8.54
PRC	0+49.17			
PRC	0+49.17			
PI	1+07.01	70.83	97.00	57.84
PRC	1+46.18			
PRC	1+46.18			
PI	1+62.74	70.00	32.52	16.56
PRC	1+78.69			
PRC	1+78.69			
PI	2+24.65	62.00	79.09	45.95
PT	2+57.79			
PT	2+57.79			
PC	3+26.51		68.72	
PC	3+26.51			
PI	3+73.51	47.00	73.83	47.00
PT	4+00.34			
PT	4+00.34			
PC	5+17.85		117.51	
PC	5+17.85			
PI	5+47.41	110.00	57.75	29.56
PRC	5+75.60			
PRC	5+75.60			
PI	6+04.37	72.50	54.77	28.77
PT	6+30.37			
PT	6+30.37			
PC	6+47.63		17.26	
PC	6+47.63			
PI	6+56.95	86.50	18.58	9.33
PT	6+66.21			
PT	6+66.21			
PC	7+75.57		109.36	
PC	7+75.57			
PI	7+87.58	107.00	23.91	12.01
PT	7+99.49			

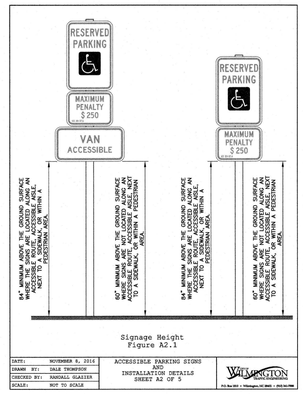
ATRIUM COURT CENTERLINE DESCRIPTION (CONT'D)

Point Type	Station	Radius	Length	Tangent
Aligment Name:				
Description:				
PT	7+99.49			
PC	8+10.12		10.63	
PC	8+10.12			
PI	8+20.56	93.00	20.79	10.44
PT	8+30.91			
PT	8+30.91			
PC	10+39.63		208.72	
PC	10+39.63			
PI	10+79.01	40.00	62.21	39.38
PT	11+01.84			
PT	11+01.84			
PC	12+51.04		149.20	
PC	12+51.04			
PI	12+83.08	32.00	50.31	32.04
PT	13+01.34			
PT	13+01.34			
PC	16+36.76		335.42	
PC	16+36.76			
PI	16+78.76	42.00	65.97	42.00
PT	17+02.74			
PT	17+02.74			
PC	17+29.24		26.50	
PC	17+29.24			
PI	17+57.74	28.50	44.77	28.50
PT	17+74.00			
PT	17+74.00			
PC	20+20.94		246.94	
PC	20+20.94			
PI	20+55.89	35.00	54.93	34.95
PT	20+75.87			
PT	20+75.87			
PC	21+45.07		69.20	
PC	21+45.07			
PI	21+59.00	35.00	26.52	13.93
PT	21+71.59			
PT	21+71.59			
POE	21+85.86		14.27	









VILLAGE TOWNHOMES LANDSCAPE CALCULATIONS

The interior area of a parking facility shall be shaded by canopy trees either planted or retained to provide twenty (20) percent or greater canopy coverage at maturity. For purposes of this section, a parking facility shall include any areas of a development devoted to pedestrian or vehicular use, including, but not limited to, parking areas, loading spaces, automobile sales lots, driveways and internal drive aisles. The following standards shall apply to interior parking area landscaping:

PARKING IMPERVIOUS

ONSITE PARKING AND DRIVE AISLES 105,135 SF

20% CANOPY COVERAGE = 21027 SF

For purposes of determining if the landscape plan meets the shading requirements of this section, each canopy tree of the type described in this section shall be presumed to shade a circular area of seven hundred and seven (707) square feet (based on having a canopy radius of fifteen (15) feet with the trunk of the tree as the center). When smaller shade trees are planted, each tree shall be presumed to shade a circular area of three hundred and fourteen (314) square feet (based on having a canopy radius of ten (10) feet).

21027 Divided by 707 SF per Canopy Tree per island

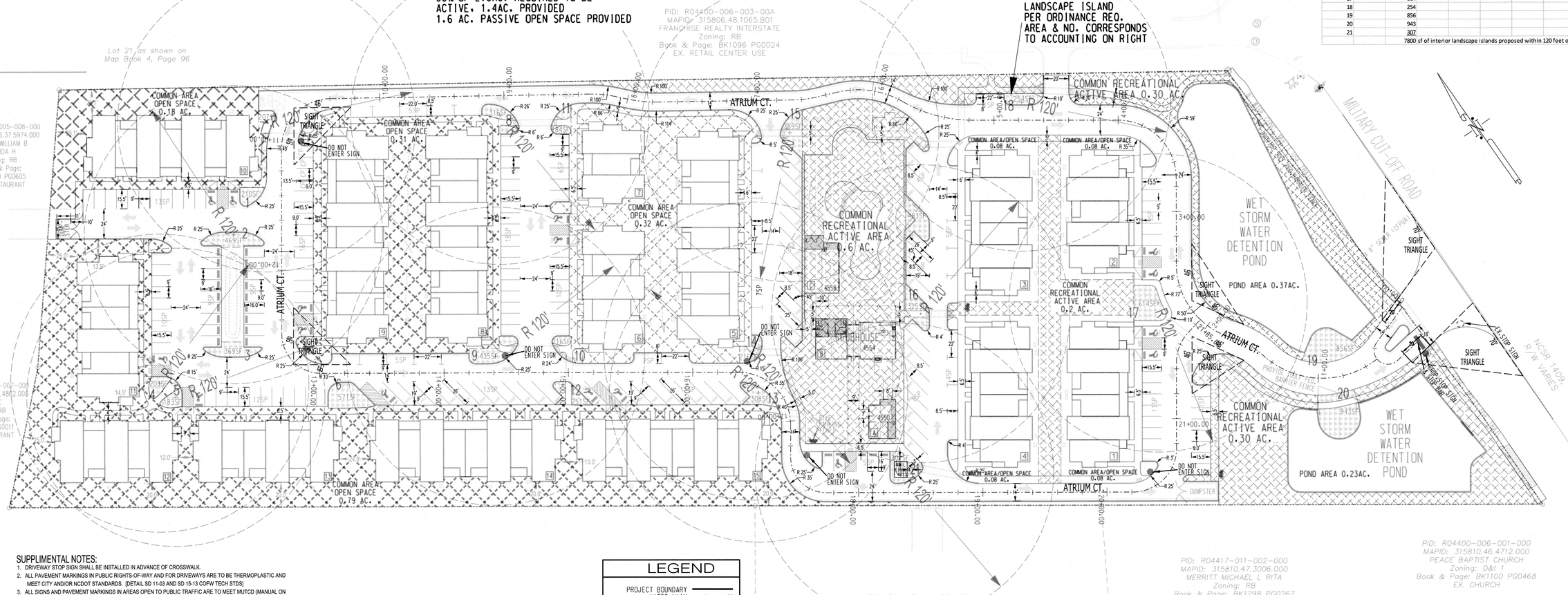
Need 30 Landscape islands @ 216 sf each 6424 sf of island area

LANDSCAPE ISLAND	AREA
1	210
2	469
3	369
4	204
5	189
6	571
7	207
8	316
9	435
10	216
11	184
12	251
13	308
14	216
15	356
16	325
17	614
18	254
19	856
20	943
21	307

7800 sf of interior landscape islands proposed within 120 feet of all parking

35% OF SITE AREA EXCLUDING PONDS
REQUIRED TO BE OPEN SPACE
0.35 X 7.95AC.= 2.8AC.
50% OF 2.8AC. REQUIRED TO BE ACTIVE. 1.4AC. PROVIDED
1.6 AC. PASSIVE OPEN SPACE PROVIDED

LANDSCAPE ISLAND PER ORDINANCE REQ. AREA & NO. CORRESPONDS TO ACCOUNTING ON RIGHT



SUPPLIMENTAL NOTES:

1. DRIVEWAY STOP SIGN SHALL BE INSTALLED IN ADVANCE OF CROSSWALK.
2. ALL PAVEMENT MARKINGS IN PUBLIC RIGHTS-OF-WAY AND FOR DRIVEWAYS ARE TO BE THERMOPLASTIC AND MEET CITY AND/OR NCDOT STANDARDS. [DETAIL SD 11-03 AND SD 15-13 COFW TECH STDS]
3. ALL SIGNS AND PAVEMENT MARKINGS IN AREAS OPEN TO PUBLIC TRAFFIC ARE TO MEET MUTCD (MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES) STANDARDS. [DETAIL SD 15-13 COFW TECH STDS]
4. ALL TRAFFIC CONTROL SIGNS AND MARKINGS OFF THE RIGHT-OF-WAY ARE TO BE MAINTAINED BY THE PROPERTY OWNER IN ACCORDANCE WITH MUTCD STANDARDS.

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

LEGEND

PROJECT BOUNDARY
WATER MAIN
GRAV.SEWER & MANHOLE
STORMDRAIN
WETLAND LINE
EX CONTOURS
PROP.HIGH POINT
PROP.DRAINAGE DIR.
DISTURBED AREA
GATE VALVE
HYDRANT ASSEMBLY
DENOTES EX. TREE
DENOTES 5 BIKE RACK

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

CITY OF WILMINGTON NORTH CAROLINA
Public Services ◦ Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:_____ Permit #_____
Signed: _____

NORTH CAROLINA PROFESSIONAL SEAL 20643 ENGINEER JAMES H. FENTRESS, JR.

JAMES H. FENTRESS, JR., P.E. DATE 4-17-19

SITE GEOMETRY PLAN

VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: ARBORETUM VILLAGE, LLC
ADDRESS: 10 S. CARDINAL DRIVE WILMINGTON, N.C. 28403
PHONE:

STROUD ENGINEERING, P.A. C-0647
102-D CINEMA DRIVE WILMINGTON, NORTH CAROLINA 28403
(910) 815-0775 (910) 815-0593 FAX

DESIGNED:	JHF
DRAWN:	JHF
APPROVED:	JHF
DATE:	5/09/19
SCALE:	1" = 40'
SHEET	2A OF 21

PROJECT NO.: PW 1312

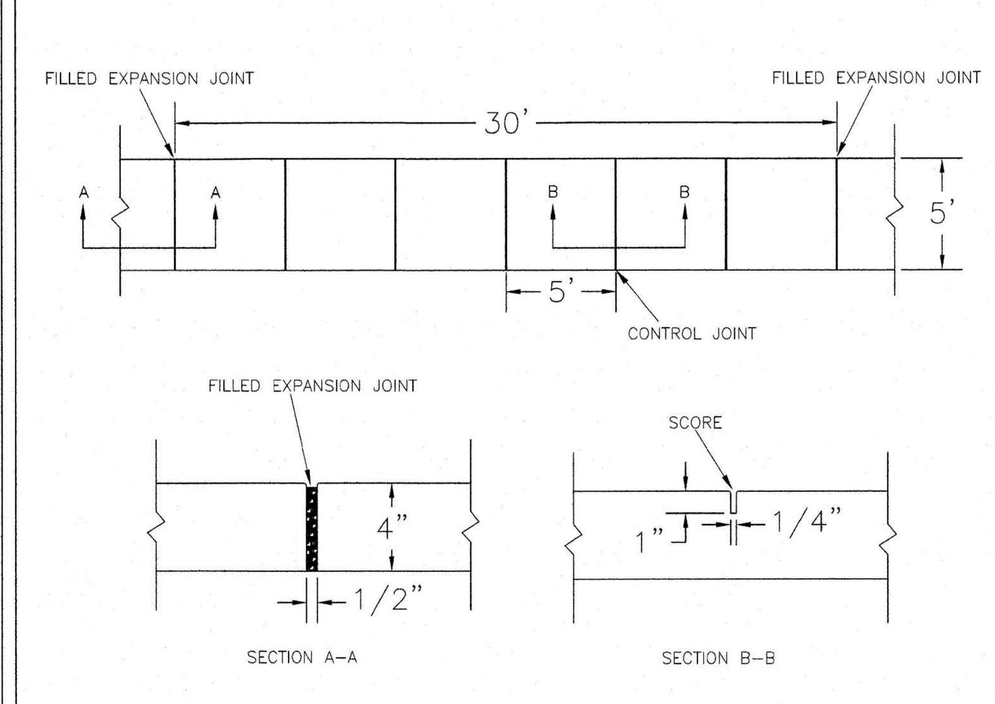
PROJECT NO.: PW 1312
DRAWING NO.: W:/MASTER/PW1312/dgn/ARBORETUM.DGN

STORM DRAIN SCHEDULE

REVISED 7/22/2019

Village Townhomes

STRUCTURE	HOOD	INVERT	DEPTH	PIPE DIA.	HEADWATER
DI 2	42.00	39.60	2.40	12	40.60
DI 4	43.50	39.95	3.55	12	40.95
DI 3	44.00	39.79	4.21	12	40.79
CB 1	43.50	39.03	4.47	18	40.53
DI 6	41.50	39.02	2.48	12	40.02
CB 5	42.50	38.47	4.03	18	39.97
DI 8	40.80	38.38	2.43	12	39.38
DI 9	41.50	38.35	3.15	12	39.35
JB 1	41.50	37.07	4.43	24	39.07
DI 11	41.00	37.82	3.18	12	38.82
DI 12	40.50	36.75	3.75	24	38.75
DI 13	40.50	36.28	4.22	24	38.28
CB 7	41.00	35.76	5.24	24	37.76
DI 15	40.00	36.28	3.72	15	37.53
CB 8	41.20	34.62	6.58	30	37.12
DI 18	39.50	35.85	3.65	12	36.85
CB 10	40.30	34.28	6.02	30	36.78
JB 2	38.70	33.88	4.82	30	36.38
CB 11	38.50	33.79	4.71	30	36.29
DI 20	38.00	33.56	4.44	30	36.06
DI 19	38.00	33.40	4.60	30	35.90
CB 14	38.50	33.05	5.45	30	35.55
DI 1	42.30	37.69	4.61	15	38.94
CB 13	44.00	37.20	6.80	18	38.70
CB 2	43.50	36.97	6.53	18	38.47
DI 5	42.50	37.34	5.16	12	38.34
CB 3	43.20	36.72	6.48	18	38.22
DI 7	40.50	36.92	3.58	12	37.92
JB 3	41.60	35.72	5.88	24	37.72
DI 10	41.00	36.50	4.50	12	37.50
CB 4	41.20	35.42	5.78	24	37.42
CB 6	41.20	35.15	6.05	24	37.15
DI 14	40.00	34.98	5.02	24	36.98
DI 16	39.50	34.49	5.01	24	36.49
CB 9	40.00	34.26	5.74	24	36.26
DI 17	39.50	34.80	4.70	12	35.80
CB 12	40.00	33.74	6.26	24	35.74
DI 21	39.00	32.05	6.95	36	35.05
DI 22	35.50	31.00	4.50	36	35.80
DI 23	35.50	31.00	4.50	36	35.80
OS	35.50	30.08	5.42	30	30.08



NOTES:
1. JOINT MATERIAL TO COMPLY WITH CURRENT NCDOT STANDARDS.
2. SANITARY SEWER CLEAN–OUTS, WATER METERS, MANHOLES, AND VALVE LIDS TO BE LOCATED OUTSIDE SIDEWALK WHERE FEASIBLE.
3. MINIMUM SIDEWALK WIDTH TO BE 6' MINIMUM IF PLACED AT BACK OF CURB.
4. CONCRETE FOR ALL SIDEWALKS (EXCEPT ANY PORTION CONTAIN WITHIN A DRIVEWAY APRON) SHALL BE CLASS "A" – 3,000 PSI.
5. MINIMUM REPLACEMENT FOR REPAIRS IS A 5' X 5' PANEL
6. 4" STONE BASE MAY BE REQUIRED FOR POOR SOIL CONDITIONS
7. MINIMUM DEPTH FOR TUNNELING BELOW SIDEWALK IS 12"
8. MAX ADJACENT GROUND SLOPE WITHOUT RAILING IS 2:1
9. MIN GRADE FOR PROPER DRAINAGE IS 1% IN AT LEAST 1 DIRECTION. MAX CROSS SLOPE IS 2%. MAX LONGITUDINAL SLOPE IS 8.3%, 10% IF LIMITED BY EXISTING CONDITIONS, OR NO GREATER THAN THE SLOPE OF THE EXISTING ADJACENT ROAD.

DATE: OCTOBER, 2010
DRAWN: PB/JSR
CHECKED: DEC
SCALE NOT TO SCALE

STANDARD DETAIL

SIDEWALK

CITY OF WILMINGTON NORTH CAROLINA
CITY OF WILMINGTON ENGINEERING
PO BOX 1810
WILMINGTON N.C. 28402
(910) 341–7807

SD 3-10

PIPE DESIGN CALCULATIONS

PROJECT: Village Townhomes
ENGINEER: JHF
DATE: REVISED 05/27/19

STORM: 10 YEAR, 5 MINUTE T_C
SOURCE: COW SW DESIGN MANUAL   RCP n: 0.013

LOCATION: FROM	TO	AREA (ACRES) SUBTOTAL	TOTAL	RUNOFF CHAR. Ic (IN/HR) INTENSITY	C RUNOFF COEFF.	Q=CIA (CFS) BASIN SUBTOTAL	BASIN TOTAL	PIPE DATA HEADWATER ELEV.	TAILWATER ELEV.	PIPE LENGTH	HYDRAULIC GRADE %	DIAMETER THEO(IN)	SIZE (IN)	V FULL (FPS)
DI 2	CB 1	0.33	0.33	7.23	0.65	1.58	1.58	40.6	40.5	14	0.50	10.06	12	3.21
DI 4	DI 3	0.25	0.25	7.23	0.65	1.18	1.18	40.9	40.8	54	0.30	9.94	12	2.48
DI 3	CB 1	0.09	0.34	7.23	0.65	0.41	1.59	40.8	40.5	63	0.40	10.52	12	2.87
CB 1	CB 5	0.23	0.90	7.23	0.65	1.10	4.27	40.5	40.0	141	0.40	15.23	18	3.76
DI 6	CB 5	0.16	0.16	7.23	0.65	0.76	0.76	40.0	40.0	18	0.30	8.42	12	2.48
CB 5	JB	0.27	1.33	7.23	0.65	1.25	6.28	40.0	39.1	128	0.70	15.85	18	4.97
DI 8	JB	0.45	0.45	7.23	0.65	2.13	2.13	39.4	39.1	43	0.70	10.57	12	3.79
DI 9	JB	0.11	0.11	7.23	0.65	0.53	0.53	39.4	39.1	92	0.30	7.33	12	2.48
JB	DI 12	1.89	1.89	7.23	0.65	8.93	8.93	39.1	38.8	81	0.40	20.09	24	4.55
DI 11	DI 12	0.17	0.17	7.23	0.65	0.79	0.79	38.8	38.8	22	0.30	8.55	12	2.48
DI 12	DI 13	0.28	2.34	7.23	0.65	1.32	11.04	38.8	38.3	94	0.50	20.86	24	5.09
DI 13	CB 7	0.31	2.65	7.23	0.65	1.46	12.50	38.3	37.8	87	0.60	21.12	24	5.58
CB 7	CB 8	0.11	2.76	7.23	0.65	0.50	13.00	37.8	37.1	91	0.70	20.82	24	6.02
DI 15	CB 8	0.41	0.41	7.23	0.65	1.93	1.93	37.5	37.1	136	0.30	11.93	15	2.88
CB 8	CB 10	0.17	3.34	7.23	0.65	0.81	15.73	37.1	36.8	114	0.30	26.22	30	4.58
DI 18	CB 10	0.23	0.23	7.23	0.65	1.11	1.11	36.8	36.8	23	0.30	9.69	12	2.48
CB 10	JB	0.04	3.61	7.23	0.65	0.17	17.01	36.8	36.4	100	0.40	25.58	30	5.28
JB	CB 11	3.61	3.61	7.23	0.65	17.01	17.01	36.4	36.3	22	0.40	25.58	30	5.28
CB 11	DI 19	0.16	3.76	7.23	0.65	0.73	17.74	36.3	35.9	97	0.40	25.99	30	5.28
DI 20	DI 19	0.06	3.82	7.23	0.65	0.28	18.03	36.1	35.9	40	0.40	26.15	30	5.28
DI 19	CB 14	0.18	4.00	7.23	0.65	0.83	18.85	35.9	35.5	71	0.50	25.50	30	5.91
CB 14	DI 21	0.25	4.25	7.23	0.65	1.19	20.05	35.5	35.0	100	0.50	26.09	30	5.91
DI 1	CB 13	0.61	0.61	7.23	0.65	2.89	2.89	38.9	38.7	61	0.40	13.17	15	3.33
CB 13	CB 2	0.22	0.83	7.23	0.65	1.04	3.93	38.7	38.5	77	0.30	15.59	18	3.25
CB 2	CB 3	0.04	0.87	7.23	0.65	0.19	4.12	38.5	38.2	82	0.30	15.87	18	3.25
DI 5	CB 3	0.20	0.20	7.23	0.65	0.95	0.95	38.3	38.2	39	0.30	9.17	12	2.48
CB 3	JB	0.05	1.13	7.23	0.65	0.23	5.31	38.2	37.7	101	0.50	15.86	18	4.20
DI 7	JB	0.26	0.26	7.23	0.65	1.22	1.22	37.9	37.7	68	0.30	10.06	12	2.48
JB	CB 4	0.26	1.38	7.23	0.65	1.22	6.53	37.7	37.4	99	0.30	18.86	24	3.94
DI 10	CB 4	0.20	0.20	7.23	0.65	0.94	0.94	37.5	37.4	27	0.30	9.10	12	2.48
CB 4	CB 6	0.19	1.77	7.23	0.65	0.90	8.36	37.4	37.1	91	0.30	20.69	24	3.94
CB 6	DI 14	0.11	1.88	7.23	0.65	0.51	8.88	37.1	37.0	56	0.30	21.16	24	3.94
DI 14	DI 16	0.28	2.16	7.23	0.65	1.32	10.19	37.0	36.5	122	0.40	21.12	24	4.55
DI 16	CB 9	0.21	2.37	7.23	0.65	0.99	11.18	36.5	36.3	47	0.50	20.97	24	5.09
CB 9	CB 12	0.13	2.50	7.23	0.65	0.62	11.80	36.3	35.7	86	0.60	20.67	24	5.58
DI 17	CB 12	0.26	0.26	7.23	0.65	1.21	1.21	35.8	35.7	19	0.30	10.04	12	2.48
CB 12	DI 21	0.08	2.84	7.23	0.65	0.40	13.41	35.7	35.0	99	0.70	21.07	24	6.02
DI 21	FOREBAY	0.11	7.21	7.23	0.65	0.54	34.00	35.0	35.0	8	0.60	30.74	36	7.31
OS	LVL SPRDR						29.75	30.1	30.0	12	0.65	28.81	30	6.74

Sodded waterways—Sod provides a resilient channel lining, providing immediate protection from concentrated runoff and eliminating the need for installing mats or mulch. The following points apply to the use of sod in waterways:

1. Prepare the soil as described in Practice 6.30, *Grass-lined Channels*. The sod type must be able to withstand the velocity of flow specified in the channel design (*Appendix 8.05*).

2. Lay sod strips perpendicular to the direction of flow, with the lateral joints staggered in a brick-like pattern. Edges should butt tightly together (Figure 6.12b).

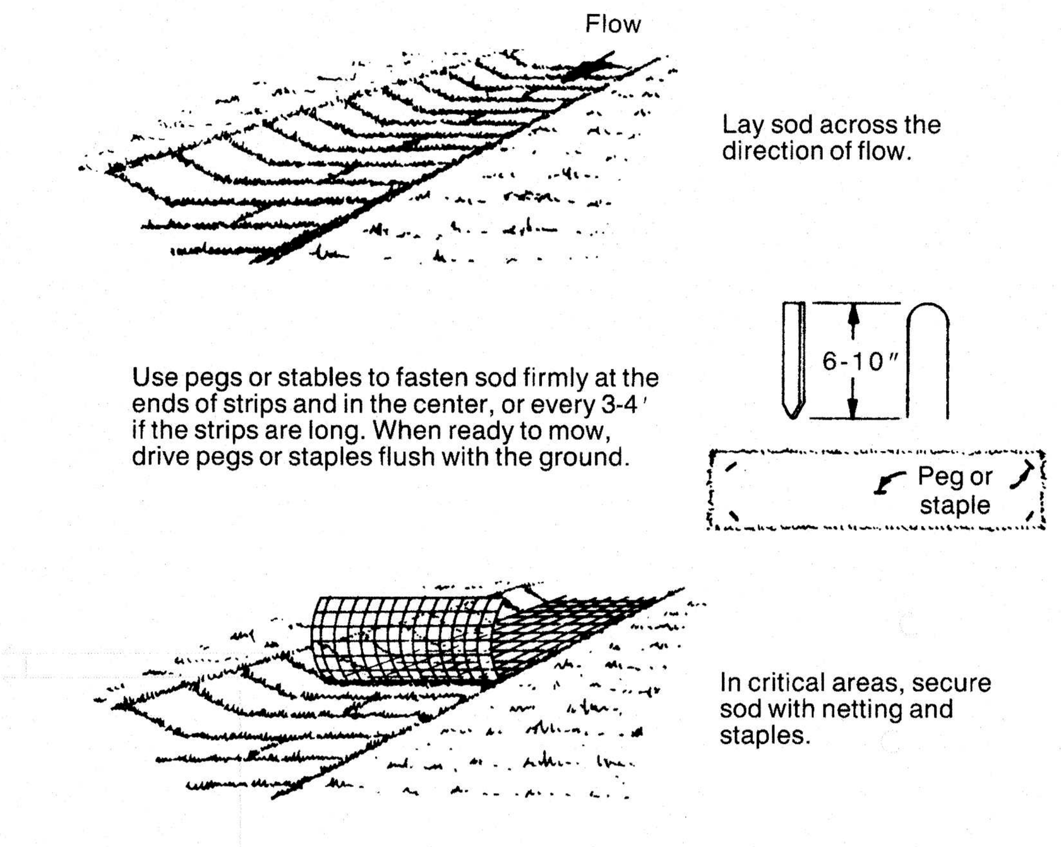


Figure 6.12b Installation of sod in waterways (modified from Va SWCC).

SODDING CHANNELS

EXCELSIOR LOG

Maintenance: The Contractor shall inspect all rolled excelsior logs immediately after each rainfall and at least daily during prolonged rainfall. The Contractor shall immediately correct any deficiencies.

The Contractor shall also make a daily review of the location of rolled excelsior logs in areas where construction activities have altered the natural contour and drainage runoff to ensure that the rolled excelsior logs are properly located for effectiveness. Where deficiencies exist as determined by the Engineer, additional rolled excelsior logs shall be installed as directed by the Engineer.

Damaged or otherwise ineffective rolled excelsior logs shall be repaired or replaced promptly.

Sediment deposits shall either be removed when the deposit reaches half the height of the rolled excelsior log or a second rolled excelsior log shall be installed as directed by the Engineer.

The rolled excelsior log shall remain in place until the Engineer directs it to be removed. After the rolled excelsior log removal, the Contractor shall remove and dispose of any excess sediment accumulations, dress the area to give it a pleasing appearance, and cover with vegetation all bare areas according to the contract requirements.

The removed rolled excelsior logs may be used at other locations provided the netting and other material requirements continue to be met to the satisfaction of the Engineer.

During the construction operation when any loose material is deposited in the flow line of ditches, gutters or drainage structures so the natural flow of water is obstructed, the material shall be removed at the close of each working day.

At the conclusion of the construction operations all drainage structures shall be free from all dirt and debris. This work will not be paid for separately but shall be considered included in the unit cost of PERIMETER EROSION BARRIER, ROLLED EXCELSIOR.

LEGEND

- PROJECT BOUNDARY
- WATER MAIN
- GRAV. SEWER & MANHOLE
- STORMDRAIN
- WETLAND LINE
- EX CONTOURS
- PROP. HIGH POINT X
- PROP. DRAINAGE DIR.
- DISTURBED AREA
- GATE VALVE
- HYDRANT ASSEMBLY
- DENOTES EX. TREE

PROVIDE SILT FENCE WHERE GRADING OPERATIONS ABUTT PROPERTY LINE (TYP)

SEDIMENT BASIN/POND B W/ SKIMMER

PROVIDE SAND FILITER LEVEL SPREADER & VEGETATIVE FILTER @ POND OUTLET CLEARING PHASE

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan	Name	Date
Planning		
Traffic		
Fire		

40 20 0 40 80
GRAPHIC SCALE: 1" = 40'

CITY OF WILMINGTON NORTH CAROLINA
Public Services ◦ Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date: ____________ Permit #____________
Signed: ____________

NORTH CAROLINA PROFESSIONAL SEAL 20643 ENGINEER JAMES H. FENTRESS, JR.
JAMES H. FENTRESS, JR., P.E.
8/27/19
DATE

SOIL EROSION, SEDIMENTATION CONTROL AND STORMWATER PLAN

VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON   NEW HANOVER COUNTY   NORTH CAROLINA

OWNER: ARBORETUM VILLAGE, LLC
ADDRESS: 10 S. CARDINAL DRIVE WILMINGTON, N.C. 28403
PHONE:

STROUD ENGINEERING, P.A. C-0647
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA 28403
(910) 815-0775 (910) 815-0593 FAX

DESIGNED: JHF
DRAWN: JHF
APPROVED: JHF
DATE: 8/31/18
SCALE: 1" = 40'
SHEET 3 OF 21

PROJECT NO.: PW 1312
DRAWING NO.: W:/MASTER/PW1312/dgn/ARBORETUM.DGN

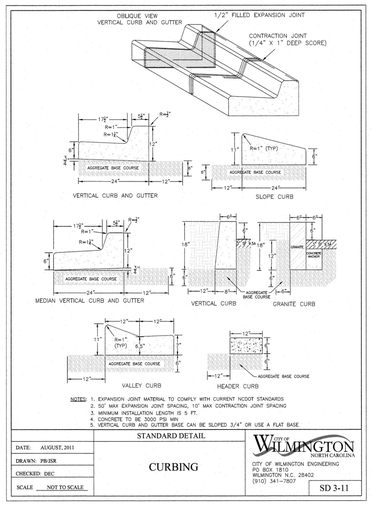
PROJECT NO.: PW 1312

STORM DRAIN SCHEDULE

REVISED 7/22/2019

Village Townhomes

STRUCTURE	HOOD	INVERT	DEPTH	PIPE DIA.	HEADWATER
DI2	42.00	39.60	2.40	12	40.60
DI4	43.50	39.95	3.55	12	40.95
DI3	44.00	39.79	4.21	12	40.79
CB 1	43.50	39.03	4.47	18	40.53
DI6	41.50	39.02	2.48	12	40.02
CB 5	42.50	38.47	4.03	18	39.97
DI8	40.80	38.38	2.43	12	39.38
DI9	41.50	38.35	3.15	12	39.35
JB 1	41.50	37.07	4.43	24	39.07
DI 11	41.00	37.82	3.18	12	38.82
DI 12	40.50	36.75	3.75	24	38.75
DI 13	40.50	36.28	4.22	24	38.28
CB 7	41.00	35.76	5.24	24	37.76
DI 15	40.00	36.28	3.72	15	37.53
CB 8	41.20	34.62	6.58	30	37.12
DI 18	39.50	35.85	3.65	12	36.85
CB 10	40.30	34.28	6.02	30	36.78
JB 2	38.70	33.88	4.82	30	36.38
CB 11	38.50	33.79	4.71	30	36.29
DI 20	38.00	33.56	4.44	30	36.06
DI 19	38.00	33.40	4.60	30	35.90
CB 14	38.50	33.05	5.45	30	35.55
DI 1	42.30	37.69	4.61	15	38.94
CB 13	44.00	37.20	6.80	18	38.70
CB 2	43.50	36.97	6.53	18	38.47
DI 5	42.50	37.34	5.16	12	38.34
CB 3	43.20	36.72	6.48	18	38.22
DI7	40.50	36.92	3.58	12	37.92
JB 3	41.60	35.72	5.88	24	37.72
DI 10	41.00	36.50	4.50	12	37.50
CB 4	41.20	35.42	5.78	24	37.42
CB 6	41.20	35.15	6.05	24	37.15
DI 14	40.00	34.98	5.02	24	36.98
DI 16	39.50	34.49	5.01	24	36.49
CB 9	40.00	34.26	5.74	24	36.26
DI 17	39.50	34.80	4.70	12	35.80
CB 12	40.00	33.74	6.26	24	35.74
DI 21	39.00	32.05	6.95	36	35.05
DI 22	35.50	31.00	4.50	36	35.80
DI 23	35.50	31.00	4.50	36	35.80
OS	35.50	30.08	5.42	30	35.08

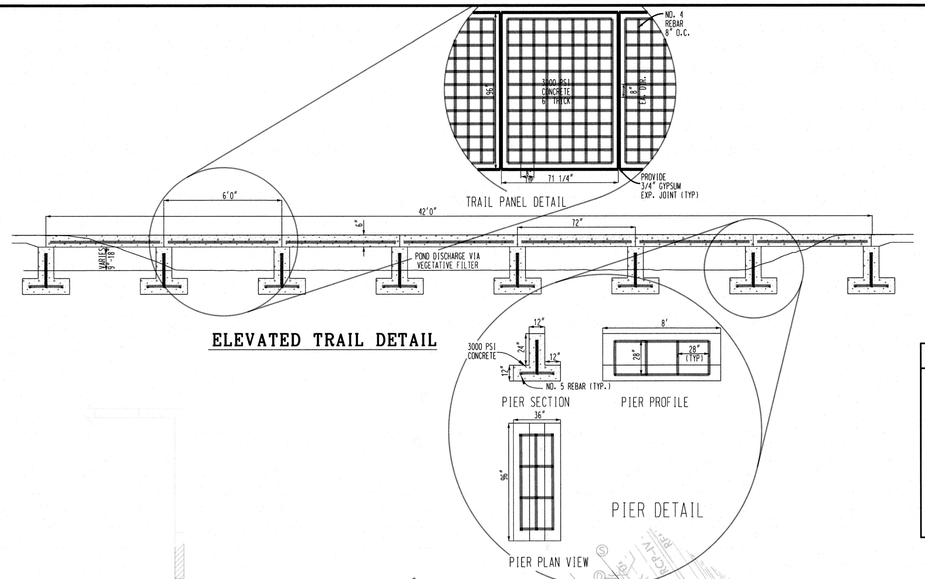


PIPE DESIGN CALCULATIONS

PROJECT: Village Townhomes
ENGINEER: JHF
DATE: REVISED 05/27/19

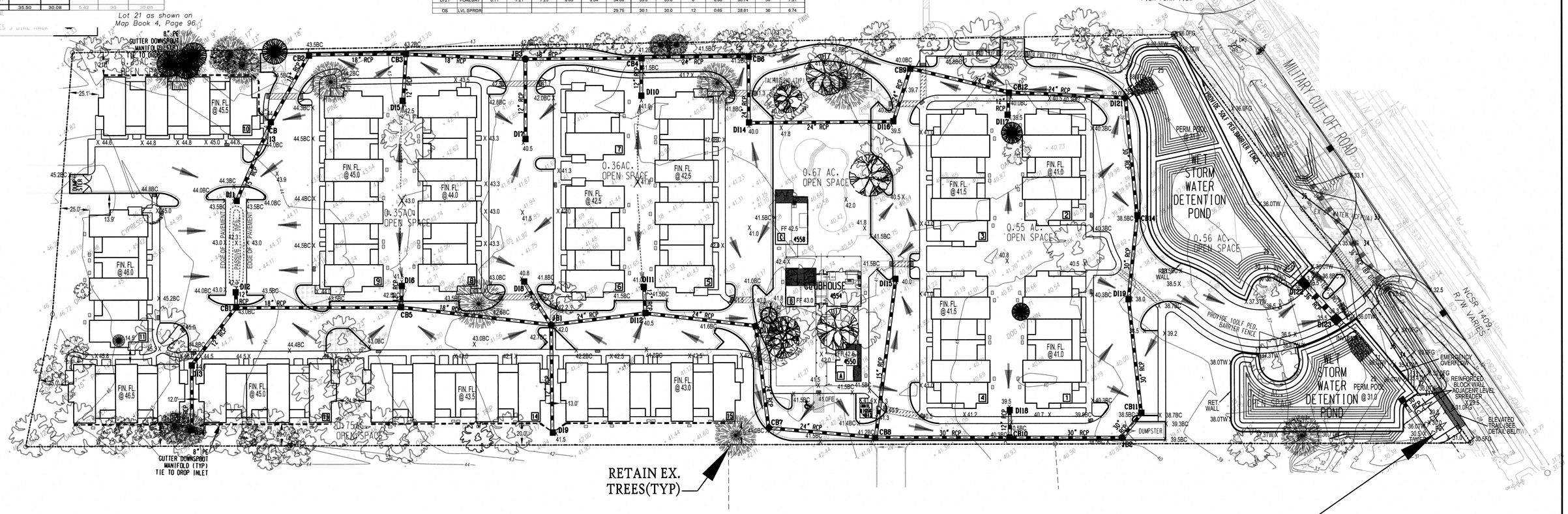
STORM: 10 YEAR, 5 MINUTE T_C
SOURCE: COW SW DESIGN MANUAL RCP n: 0.013

LOCATION:		AREA (ACRES)		RUNOFF CHAR.		Q=CIA (CFS)		PIPE DATA						
FROM	TO	SUBTOTAL	TOTAL	I (IN/HR) INTENSITY	C RUNOFF COEFF.	BASIN SUBTOTAL	BASIN TOTAL	HEADWATER ELEV.	TAILWATER ELEV.	PIPE LENGTH	HYDRAULIC GRADE %	DIAMETER THEO(IN)	SIZE (IN)	V FULL (FPS)
DI2	CB 1	0.33	0.33	7.23	0.65	1.58	1.58	40.6	40.5	14	0.50	10.06	12	3.21
DI4	DI3	0.25	0.25	7.23	0.65	1.18	1.18	40.9	40.8	54	0.30	9.94	12	2.48
DI3	CB 1	0.09	0.34	7.23	0.65	0.41	1.59	40.8	40.5	63	0.40	10.52	12	2.87
CB 1	CB 5	0.23	0.90	7.23	0.65	1.10	4.27	40.5	40.0	141	0.40	15.23	18	3.76
DI6	CB 5	0.16	0.16	7.23	0.65	0.76	0.76	40.0	40.0	18	0.30	8.42	12	2.48
CB 5	JB	0.27	1.33	7.23	0.65	1.25	6.28	40.0	39.1	128	0.70	15.85	18	4.97
DI8	JB	0.45	0.45	7.23	0.65	2.13	2.13	39.4	39.1	43	0.70	10.57	12	3.79
DI9	JB	0.11	0.11	7.23	0.65	0.53	0.53	39.4	39.1	92	0.30	7.33	12	2.48
JB	DI12	1.89	1.89	7.23	0.65	8.93	8.93	39.1	38.8	81	0.40	20.09	24	4.55
DI11	DI12	0.17	0.17	7.23	0.65	0.79	0.79	38.8	38.8	22	0.30	8.55	12	2.48
DI12	DI13	0.28	2.34	7.23	0.65	1.32	11.04	38.8	38.3	94	0.50	20.86	24	5.09
DI13	CB 7	0.31	2.65	7.23	0.65	1.46	12.50	38.3	37.8	87	0.60	21.12	24	5.58
CB 7	CB 8	0.11	2.76	7.23	0.65	0.50	13.00	37.8	37.1	91	0.70	20.62	24	6.02
DI15	CB 8	0.41	0.41	7.23	0.65	1.93	1.93	37.5	37.1	136	0.30	11.93	15	2.88
CB 8	CB 10	0.17	3.34	7.23	0.65	0.81	15.73	37.1	36.8	114	0.30	26.22	30	4.58
DI18	CB 10	0.23	0.23	7.23	0.65	1.11	1.11	36.8	36.8	23	0.30	9.69	12	2.48
CB 10	JB	0.04	3.61	7.23	0.65	0.17	17.01	36.8	36.4	100	0.40	25.58	30	5.28
JB	CB 11	3.61	3.61	7.23	0.65	17.01	17.01	36.4	36.3	22	0.40	25.58	30	5.28
CB 11	DI19	0.16	3.76	7.23	0.65	0.73	17.74	36.3	35.9	97	0.40	25.99	30	5.28
DI20	DI19	0.06	3.82	7.23	0.65	0.28	18.03	36.1	35.9	40	0.40	26.15	30	5.28
DI19	CB 14	0.18	4.00	7.23	0.65	0.83	18.85	35.9	35.5	71	0.50	25.50	30	5.91
CB 14	DI21	0.25	4.25	7.23	0.65	1.19	20.05	35.5	35.0	100	0.50	26.09	30	5.91
DI1	CB 13	0.61	0.61	7.23	0.65	2.89	2.89	38.9	38.7	61	0.40	13.17	15	3.33
CB 13	CB 2	0.22	0.83	7.23	0.65	1.04	3.93	38.7	38.5	77	0.30	15.59	18	3.25
CB 2	CB 3	0.04	0.87	7.23	0.65	0.19	4.12	38.5	38.2	82	0.30	15.87	18	3.25
DI5	CB 3	0.20	0.20	7.23	0.65	0.95	0.95	38.3	38.2	39	0.30	9.17	12	2.48
CB 3	JB	0.05	1.13	7.23	0.65	0.23	5.31	38.2	37.7	101	0.50	15.86	18	4.20
DI7	JB	0.26	0.26	7.23	0.65	1.22	1.22	37.9	37.7	68	0.30	10.06	12	2.48
JB	CB 4	0.26	1.38	7.23	0.65	1.22	6.53	37.7	37.4	99	0.30	18.86	24	3.94
DI10	CB 4	0.20	0.20	7.23	0.65	0.94	0.94	37.5	37.4	27	0.30	9.10	12	2.48
CB 4	CB 6	0.19	1.77	7.23	0.65	0.90	8.36	37.4	37.1	91	0.30	20.69	24	3.94
CB 6	DI14	0.11	1.88	7.23	0.65	0.51	8.88	37.1	37.0	56	0.30	21.16	24	3.94
DI14	DI16	0.28	2.16	7.23	0.65	1.32	10.19	37.0	36.5	122	0.40	21.12	24	4.55
DI16	CB 9	0.21	2.37	7.23	0.65	0.99	11.18	36.5	36.3	47	0.50	20.97	24	5.09
CB 9	CB 12	0.13	2.50	7.23	0.65	0.62	11.80	36.3	35.7	86	0.60	20.67	24	5.58
DI17	CB 12	0.26	0.26	7.23	0.65	1.21	1.21	35.8	35.7	19	0.30	10.04	12	2.48
CB 12	DI21	0.08	2.84	7.23	0.65	0.40	13.41	35.7	35.0	99	0.70	21.07	24	6.02
DI21	FOREBAY	0.11	7.21	7.23	0.65	0.54	34.00	35.0	35.0	8	0.60	30.74	36	7.31
OS	LVL SPRDR						29.75	30.1	30.0	12	0.65	28.81	30	6.74



LEGEND

- PROJECT BOUNDARY
- WATER MAIN
- GRAV.SEWER & MANHOLE
- STORMDRAIN
- WETLAND LINE
- EX CONTOURS
- PROP.HIGH POINT
- PROP.DRAINAGE DIR.
- DISTURBED AREA
- GATE VALVE
- HYDRANT ASSEMBLY
- DENOTES EX. TREE



For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

GRAPHIC SCALE: 1" = 40'

CITY OF WILMINGTON NORTH CAROLINA
Public Services ◦ Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:_____ Permit #_____
Signed: _____

NORTH CAROLINA PROFESSIONAL SEAL 20643 ENGINEER JAMES H. FENTRESS

JAMES H. FENTRESS, JR., P.E.
DATE 8/27/19

DRAINAGE/GRADING PLAN

VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: ARBORETUM VILLAGE, LLC
ADDRESS: 10 S. CARDINAL DRIVE WILMINGTON, N.C. 28403
PHONE:

STROUD ENGINEERING, P.A. C-0647
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA 28403
(910) 815-0775 (910) 815-0593 FAX

DESIGNED:	JHF
DRAWN:	JHF
APPROVED:	JHF
DATE:	8/31/18
SCALE:	1" = 40'
SHEET	3A OF 21

PROJECT NO.: PW 1312

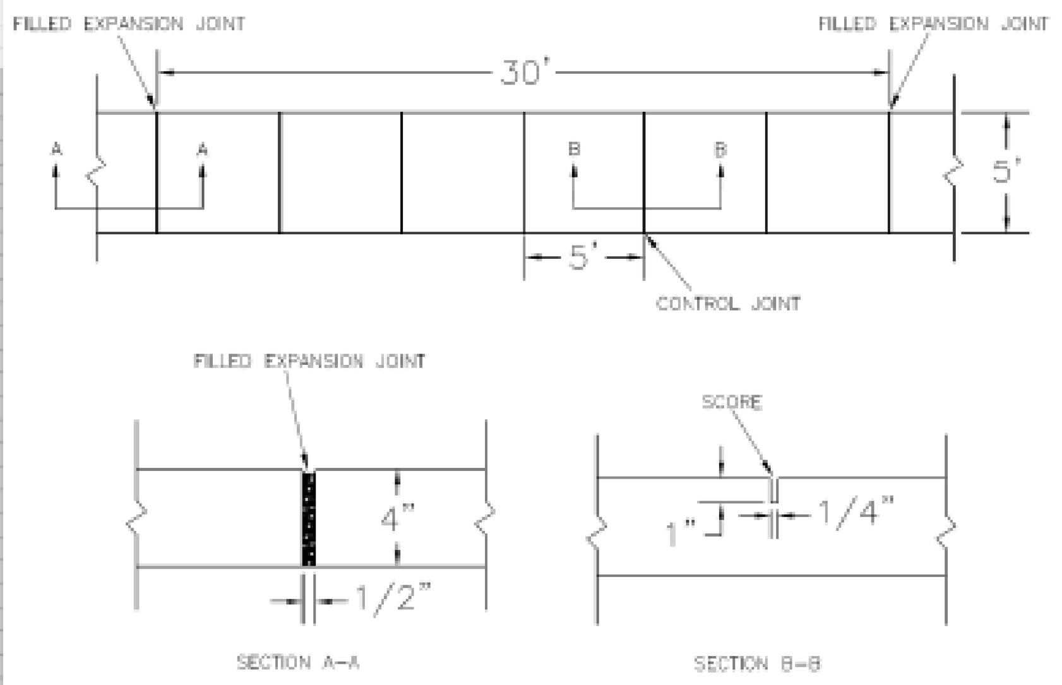
PROJECT NO.: PW 1312
DRAWING NO.: W:/MASTER/PW1312/dgn/ARBORETUM.DGN

STORM DRAIN SCHEDULE

REVISED 7/22/2019

Village Townhomes

STRUCTURE	HOOD	INVERT	DEPTH	PIPE DIA.	HEADWATER
DI 2	42.00	39.60	2.40	12	40.60
DI 4	43.50	39.95	3.55	12	40.95
DI 3	44.00	39.79	4.21	12	40.79
CB 1	43.50	39.03	4.47	18	40.53
DI 6	41.50	39.02	2.48	12	40.02
CB 5	42.50	38.47	4.03	18	39.97
DI 8	40.80	38.38	2.43	12	39.38
DI 9	41.50	38.35	3.15	12	39.35
JB 1	41.50	37.07	4.43	24	39.07
DI 11	41.00	37.82	3.18	12	38.82
DI 12	40.50	36.75	3.75	24	38.75
DI 13	40.50	36.28	4.22	24	38.28
CB 7	41.00	35.76	5.24	24	37.76
DI 15	40.00	36.28	3.72	15	37.53
CB 8	41.20	34.62	6.58	30	37.12
DI 18	39.50	35.85	3.65	12	36.85
CB 10	40.30	34.28	6.02	30	36.78
JB 2	38.70	33.88	4.82	30	36.38
CB 11	38.50	33.79	4.71	30	36.29
DI 20	38.00	33.56	4.44	30	36.06
DI 19	38.00	33.40	4.60	30	35.90
CB 14	38.50	33.05	5.45	30	35.55
DI 1	42.30	37.69	4.61	15	38.94
CB 13	44.00	37.20	6.80	18	38.70
CB 2	43.50	36.97	6.53	18	38.47
DI 5	42.50	37.34	5.16	12	38.34
CB 3	43.20	36.72	6.48	18	38.22
DI 7	40.50	36.92	3.58	12	37.92
JB 3	41.60	35.72	5.88	24	37.72
DI 10	41.00	36.50	4.50	12	37.50
CB 4	41.20	35.42	5.78	24	37.42
CB 6	41.20	35.15	6.05	24	37.15
DI 14	40.00	34.98	5.02	24	36.98
DI 16	39.50	34.49	5.01	24	36.49
CB 9	40.00	34.26	5.74	24	36.26
DI 17	39.50	34.80	4.70	12	35.80
CB 12	40.00	33.74	6.26	24	35.74
DI 21	39.00	32.05	6.95	36	35.05
DI 22	35.50	31.00	4.50	36	35.80
DI 23	35.50	31.00	4.50	36	35.80
OS	35.50	30.08	5.42	30	30.08



NOTES:

1. JOINT MATERIAL TO COMPLY WITH CURRENT NCDOT STANDARDS.
2. SANITARY SEWER CLEAN-OUTS, WATER METERS, MANHOLES, AND VALVE LIDS TO BE LOCATED OUTSIDE SIDEWALK WHERE FEASIBLE.
3. MINIMUM SIDEWALK WIDTH TO BE 6' MINIMUM IF PLACED AT BACK OF CURB.
4. CONCRETE FOR ALL SIDEWALKS (EXCEPT ANY PORTION CONTAIN WITHIN A DRIVEWAY APRON) SHALL BE CLASS "A" – 3,000 PSI.
5. MINIMUM REPLACEMENT FOR REPAIRS IS A 5' X 5' PANEL
6. 4" STONE BASE MAY BE REQUIRED FOR POOR SOIL CONDITIONS
7. MINIMUM DEPTH FOR TUNNELING BELOW SIDEWALK IS 12"
8. MAX ADJACENT GROUND SLOPE WITHOUT RAILING IS 2:1
9. MIN GRADE FOR PROPER DRAINAGE IS 1% IN AT LEAST 1 DIRECTION. MAX CROSS SLOPE IS 2%. MAX LONGITUDINAL SLOPE IS 8.3%, 10% IF LIMITED BY EXISTING CONDITIONS, OR NO GREATER THAN THE SLOPE OF THE EXISTING ADJACENT ROAD.

SIDEWALK DETAIL

PIPE DESIGN CALCULATIONS

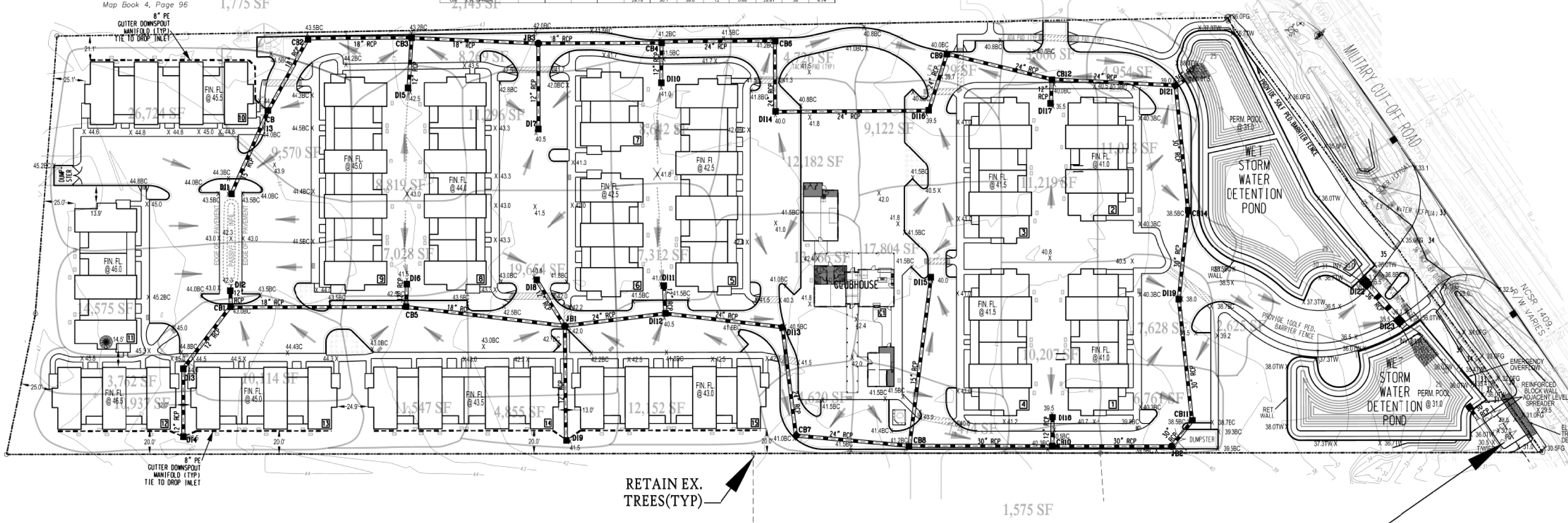
PROJECT: Village Townhomes
ENGINEER: JHF
DATE: REVISED 05/27/19

STORM: 10 YEAR, 5 MINUTE T_C
SOURCE: COW SW DESIGN MANUAL RCP n 0.013

LOCATION:		AREA (ACRES)		RUNOFF CHAR.		Q=CIA (CFS)		PIPE DATA						
FROM	TO	SUBTOTAL	TOTAL	I (IN/HR) INTENSITY	C RUNOFF COEFF.	BASIN SUBTOTAL	BASIN TOTAL	HEADWATER ELEV.	TAILWATER ELEV.	PIPE LENGTH	HYDRAULIC GRADE %	DIAMETER THEO(IN)	SIZE (IN)	V FULL (FPS)
DI 2	CB 1	0.33	0.33	7.23	0.65	1.58	1.58	40.6	40.5	14	0.50	10.06	12	3.21
DI 4	DI 3	0.25	0.25	7.23	0.65	1.18	1.18	40.9	40.8	54	0.30	9.94	12	2.48
DI 3	CB 1	0.09	0.34	7.23	0.65	0.41	1.59	40.8	40.5	63	0.40	10.52	12	2.87
CB 1	CB 5	0.23	0.90	7.23	0.65	1.10	4.27	40.5	40.0	141	0.40	15.23	18	3.76
DI 6	CB 5	0.16	0.16	7.23	0.65	0.76	0.76	40.0	40.0	18	0.30	8.42	12	2.48
CB 5	JB	0.27	1.33	7.23	0.65	1.25	6.28	40.0	39.1	128	0.70	15.85	18	4.97
DI 8	JB	0.45	0.45	7.23	0.65	2.13	2.13	39.4	39.1	43	0.70	10.57	12	3.79
DI 9	JB	0.11	0.11	7.23	0.65	0.53	0.53	39.4	39.1	92	0.30	7.33	12	2.48
JB	DI 12	1.89	1.89	7.23	0.65	8.93	8.93	39.1	38.8	81	0.40	20.09	24	4.55
DI 11	DI 12	0.17	0.17	7.23	0.65	0.79	0.79	38.8	38.8	22	0.30	8.55	12	2.48
DI 12	DI 13	0.28	2.34	7.23	0.65	1.32	11.04	38.8	38.3	94	0.50	20.86	24	5.09
DI 13	CB 7	0.31	2.65	7.23	0.65	1.46	12.50	38.3	37.8	87	0.60	21.12	24	5.58
CB 7	CB 8	0.11	2.76	7.23	0.65	0.50	13.00	37.8	37.1	91	0.70	20.82	24	6.02
DI 15	CB 8	0.41	0.41	7.23	0.65	1.93	1.93	37.5	37.1	136	0.30	11.93	15	2.88
CB 8	CB 10	0.17	3.34	7.23	0.65	0.81	15.73	37.1	36.8	114	0.30	26.22	30	4.58
DI 18	CB 10	0.23	0.23	7.23	0.65	1.11	1.11	36.8	36.8	23	0.30	9.69	12	2.48
CB 10	JB	0.04	3.61	7.23	0.65	0.17	17.01	36.8	36.4	100	0.40	25.58	30	5.28
JB	CB 11	3.61	3.61	7.23	0.65	17.01	17.01	36.4	36.3	22	0.40	25.58	30	5.28
CB 11	DI 19	0.16	3.76	7.23	0.65	0.73	17.74	36.3	35.9	97	0.40	25.99	30	5.28
DI 20	DI 19	0.06	3.82	7.23	0.65	0.28	18.03	36.1	35.9	40	0.40	26.15	30	5.28
DI 19	CB 14	0.18	4.00	7.23	0.65	0.83	18.85	35.9	35.5	71	0.50	25.50	30	5.91
CB 14	DI 21	0.25	4.25	7.23	0.65	1.19	20.05	35.5	35.0	100	0.50	26.09	30	5.91
DI 1	CB 13	0.61	0.61	7.23	0.65	2.89	2.89	38.9	38.7	61	0.40	13.17	15	3.33
CB 13	CB 2	0.22	0.83	7.23	0.65	1.04	3.93	38.7	38.5	77	0.30	15.59	18	3.25
CB 2	CB 3	0.04	0.87	7.23	0.65	0.19	4.12	38.5	38.2	82	0.30	15.87	18	3.25
DI 5	CB 3	0.20	0.20	7.23	0.65	0.95	0.95	38.3	38.2	39	0.30	9.17	12	2.48
CB 3	JB	0.05	1.13	7.23	0.65	0.23	5.31	38.2	37.7	101	0.50	15.86	18	4.20
DI 7	JB	0.26	0.26	7.23	0.65	1.22	1.22	37.9	37.7	68	0.30	10.06	12	2.48
JB	CB 4	0.26	1.38	7.23	0.65	1.22	6.53	37.7	37.4	99	0.30	18.86	24	3.94
DI 10	CB 4	0.20	0.20	7.23	0.65	0.94	0.94	37.5	37.4	27	0.30	9.10	12	2.48
CB 4	CB 6	0.19	1.77	7.23	0.65	0.90	8.36	37.4	37.1	91	0.30	20.69	24	3.94
CB 6	DI 14	0.11	1.88	7.23	0.65	0.51	8.88	37.1	37.0	56	0.30	21.16	24	3.94
DI 14	DI 16	0.28	2.16	7.23	0.65	1.32	10.19	37.0	36.5	122	0.40	21.12	24	4.55
DI 16	CB 9	0.21	2.37	7.23	0.65	0.99	11.18	36.5	36.3	47	0.50	20.97	24	5.09
CB 9	CB 12	0.13	2.50	7.23	0.65	0.62	11.80	36.3	35.7	86	0.60	20.67	24	5.58
DI 17	CB 12	0.26	0.26	7.23	0.65	1.21	1.21	35.8	35.7	19	0.30	10.04	12	2.48
CB 12	DI 21	0.08	2.84	7.23	0.65	0.40	13.41	35.7	35.0	99	0.70	21.07	24	6.02
DI 21	FOREBAY	0.11	7.21	7.23	0.65	0.54	34.00	35.0	35.0	8	0.60	30.74	36	7.31
OS	LVL SPRDR						29.75	30.1	30.0	12	0.65	28.81	30	6.74

LEGEND

PROJECT BOUNDARY
WATER MAIN
GRAV. SEWER & MANHOLE
STORMDRAIN
WETLAND LINE
EX CONTOURS
PROP. HIGH POINT X
PROP. DRAINAGE DIR.
DISTURBED AREA
GATE VALVE
HYDRANT ASSEMBLY
DENOTES EX. TREE



PROVIDE
SAND FILITER
LEVEL SPREADER
& VEGETATIVE
FILTER @ POND OUTLET

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan	Name	Date
Planning		
Traffic		
Fire		

40 20 0 40 80

GRAPHIC SCALE: 1" = 40'

CITY OF WILMINGTON
NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:__________ Permit #__________
Signed: __________

NORTH CAROLINA PROFESSIONAL SEAL 20643 ENGINEER JAMES H. FENTRESS, JR.

JAMES H. FENTRESS, JR., P.E.
7/22/2019
DATE

DRAINAGE AREAS MAP

VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

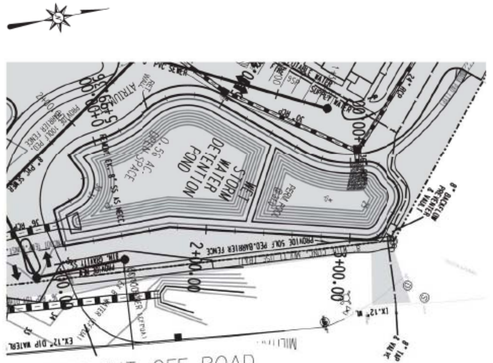
OWNER: ARBORETUM VILLAGE, LLC
ADDRESS: 10 S. CARDINAL DRIVE WILMINGTON, N.C. 28403
PHONE:

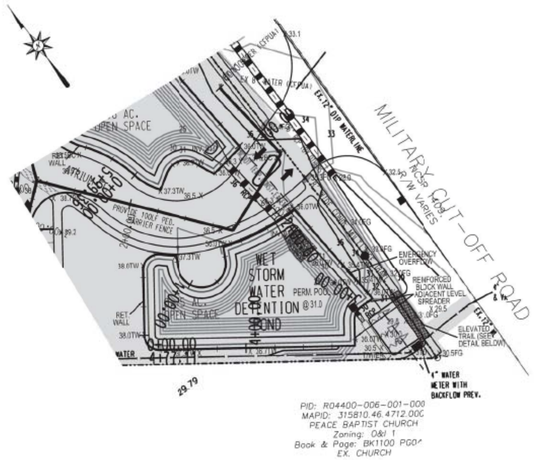
STROUD ENGINEERING, P.A. C-0647
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA 28403
(910) 815-0775 (910) 815-0593 FAX

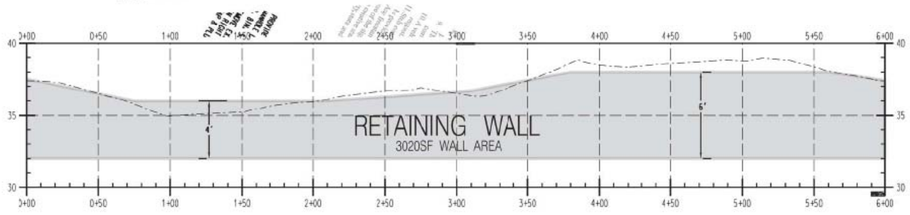
DESIGNED: JHF
DRAWN: JHF
APPROVED: JHF
DATE: 8/31/18
SCALE: 1" = 40'
SHEET 3B OF 21

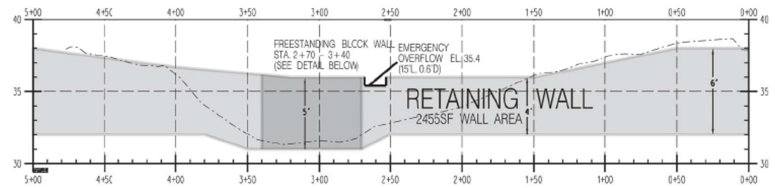
PROJECT NO.: PW 1312
DRAWING NO.: W:/MASTER/PW1312/dgn/ARBORETUM.DGN

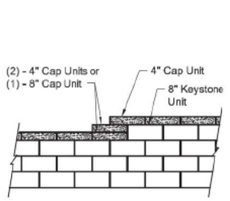
PROJECT NO.: PW 1312





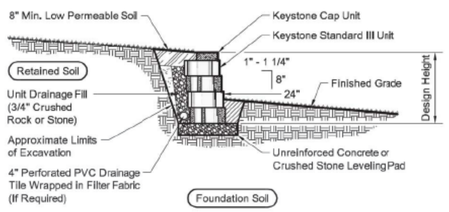




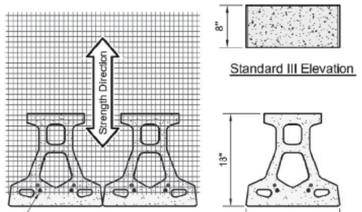


Note:
1. Secure all cap units with Keystone Kapseal or equal.

Top of Wall Steps

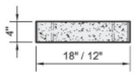


Typical Gravity Wall Section
Standard III Unit - 1" Setback

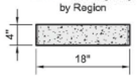


Grid & Pin Connection

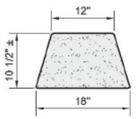
Standard III Unit
* Dimensions May Vary by Region



Cap Unit Elevation

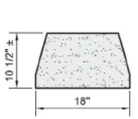


Cap Unit Elevation



Cap Unit Plan

Universal Cap Unit Option
* Dimensions & Availability Will Vary by Region



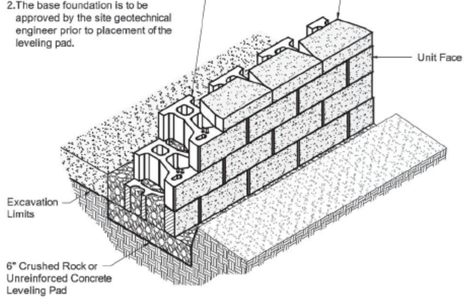
Cap Unit Plan

Straight Split Cap Unit Option
* Dimensions & Availability Will Vary by Region

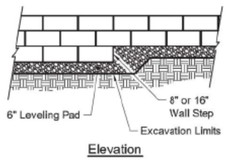
Base Leveling Pad Notes:
1. The leveling pad is to be constructed of crushed stone or 2,000 psi± unreinforced concrete
2. The base foundation is to be approved by the site gectechnical engineer prior to placement of the leveling pad.

Standard III Unit	
Width:	18"
*Depth:	18"
Height:	8"
*Weight:	89 lbs

Cap Unit	
Width:	18"
*Depth:	10 1/2"
Height:	4"
*Weight:	50 lbs

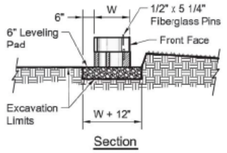


Standard III Unit/Base Pad Isometric Section View
* Dimensions & Weight May Vary by Region



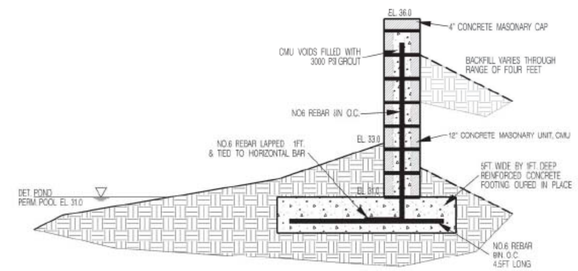
Elevation

Note:
1. The leveling pad is to be constructed of crushed stone or 2000 psi ± unreinforced concrete.

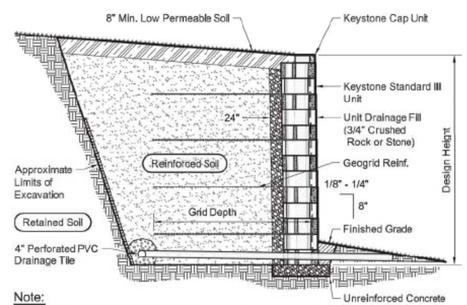


Section

Leveling Pad Detail



FREESTANDING WALL SECTION



Note:
When site conditions require, wrap drainage tile in 3/4" aggregate and filter fabric with drainage composite or aggregate back drain system, as directed by geotechnical engineer.

Typical Reinforced Wall Section
Standard III Unit - Near Vertical Setback

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

CITY OF WILMINGTON NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date: _____ Permit # _____
Signed: _____

NORTH CAROLINA PROFESSIONAL SEAL 26843 ENGINEER JAMES H. FENTRESS, JR.

JAMES H. FENTRESS, JR. P.E.
DATE 5/29/2019

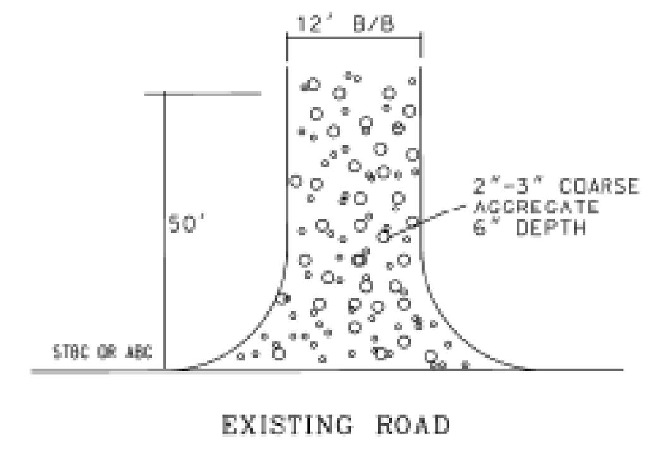
RETAINING WALL PLAN AND PROFILE
VILLAGE TOWNHOMES
(FORMERLY ARBORETUM VILLAGE)
CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: ARBORETUM VILLAGE, LLC
ADDRESS: 10 S. CARDINAL DRIVE
PHONE: WILMINGTON, N.C. 28403

STROUD ENGINEERING, P.A. C-0647
102 D CINEMA DRIVE WILMINGTON, NC 28403 (910) 815-0775
JAMES H. FENTRESS, JR. P.E.

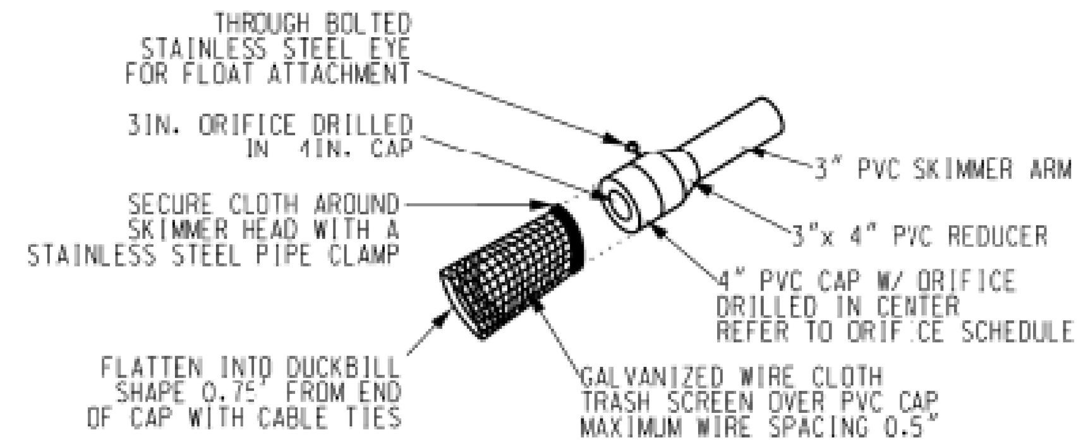
DESIGNED:	JHF
DRAWN:	JHF
APPROVED:	JHF
DATE:	10/10/18
SCALE:	HOR: 1" = 50' VER: 1" = 5'
SHEET	4 OF 21

W:\Master\PW-1312\DGN\borders.dgn



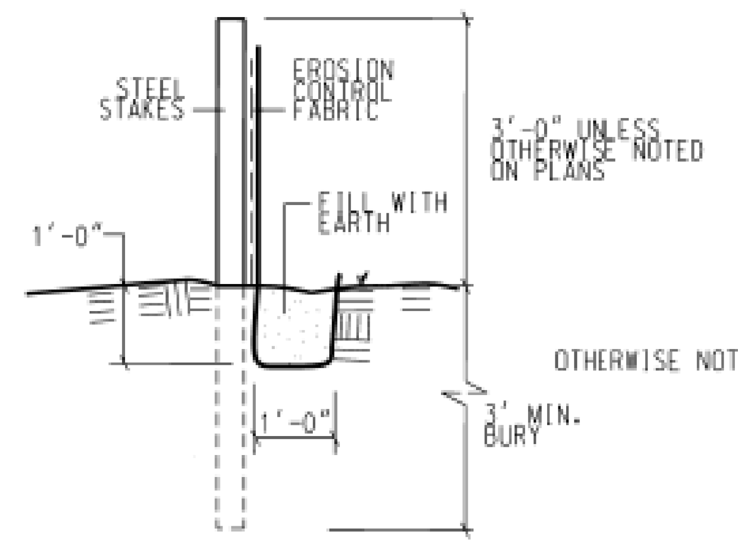
TEMPORARY CONSTRUCTION ENTRANCE DETAIL

NTS



SKIMMER HEAD DETAIL

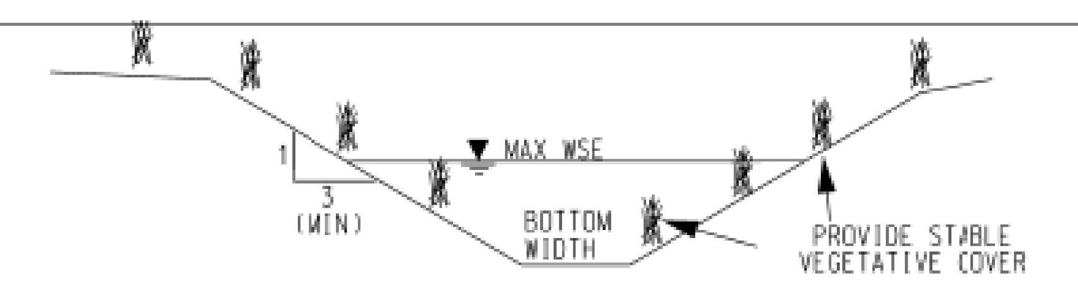
NTS



TYPICAL SILT FENCE

NTS

NOTES:
POSTS TO BE SPACED 6 FT O.C.
UTILIZE COIR MESH W/ 10 GAUGE 6 X 6 WIRE MESH REINFORCEMENT FOR BATTENS



SWALE DETAIL

NTS

SWALE NOTES:

THE REQUIRED DEPTH INCLUDES THE FLOW DEPTH OF THE 10 YEAR STORM PLUS 0.5' OF FREEBOARD.

THE MAXIMUM FLOW 10 YEAR STORM FLOW VELOCITY IS 2.0 FPS IN OUTLET SWALES.

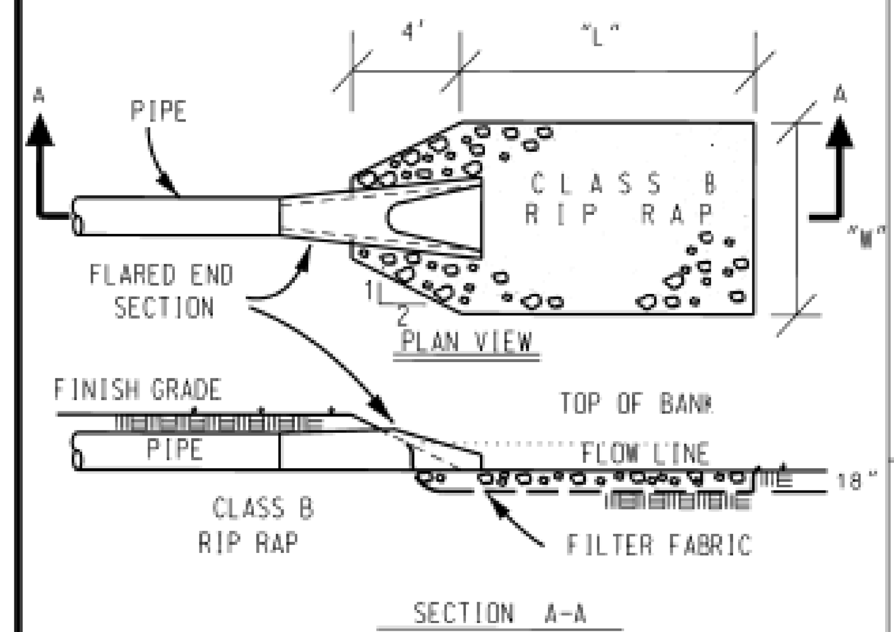
MAXIMUM SIDE SLOPES OF SWALES SHALL BE 3:1.

IMPROVEMENTS, INCLUDING RETAINING WALLS, DRIVES ROADWAYS, ETC. SHALL BE PERMITTED ABOVE THE REQUIRED SWALE DEPTH.

SWALES AND OTHER AREAS SUBJECT TO EROSIVE FLOWS SHALL BE PERMANENTLY SEEDED OR SODDED WITH BERMUDAGRASS OR APPROVED EQUAL IN ACCORDANCE WITH STABILIZATION SCHEDULE.

EITHER SOD OR TEMPORARY SEEDING SHALL BE PROVIDED FOR STABILIZATION OUTSIDE OF THE RECOMMENDED PERMANENT SEEDING DATES.

~~SEEDED (TEMPORARY OR PERMANENT) SWALE "B" SHALL BE LINED WITH EXCELSIOR MAT.~~



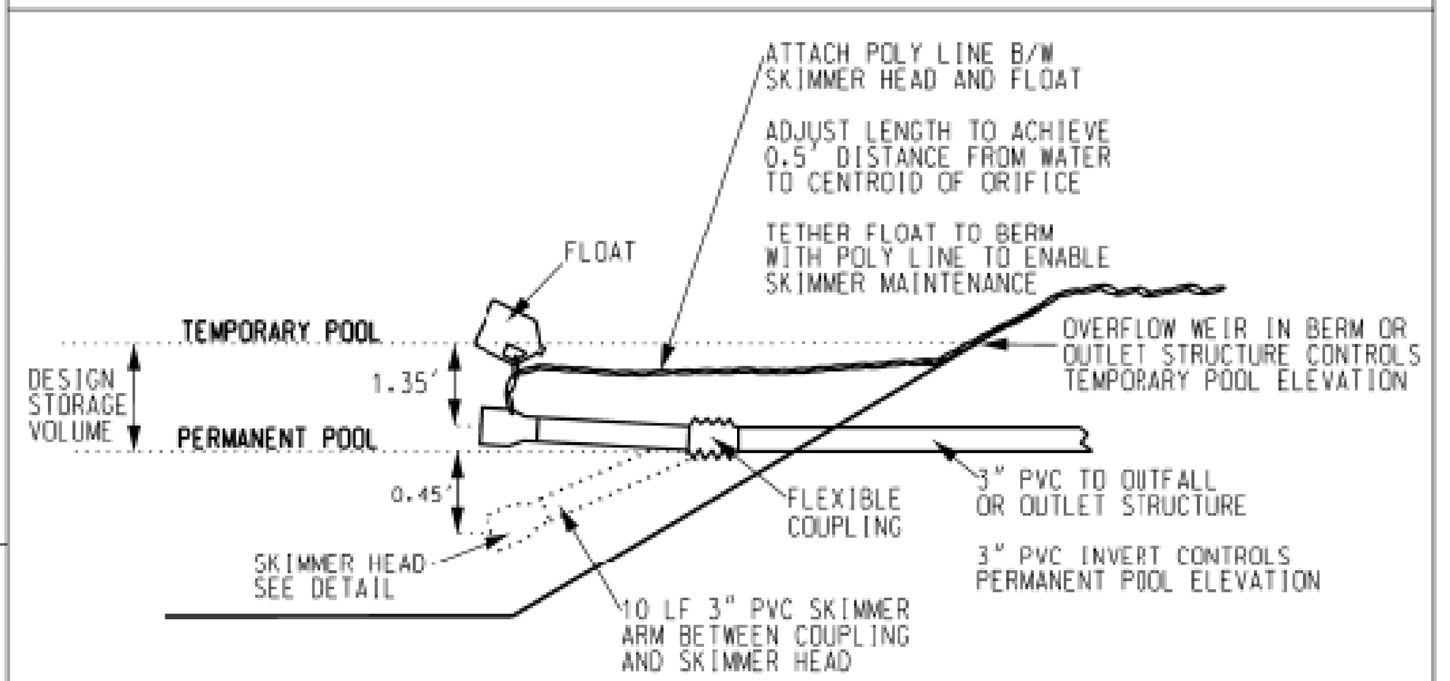
RIP RAP APRON DETAIL

NTS

RIP RAP APRON SCHEDULE		
PIPE	LENGTH	WIDTH
36"	18.0'	9.0'

FILTER FABRIC TO BE TREVIRA SPUNBOUND TYPE 11/120

RIP RAP APRONS SHALL BE PROVIDED ON DOWNSTREAM ENDS OF CULVERT FLARED END SECTIONS



SKIMMER ASSEMBLY DETAIL

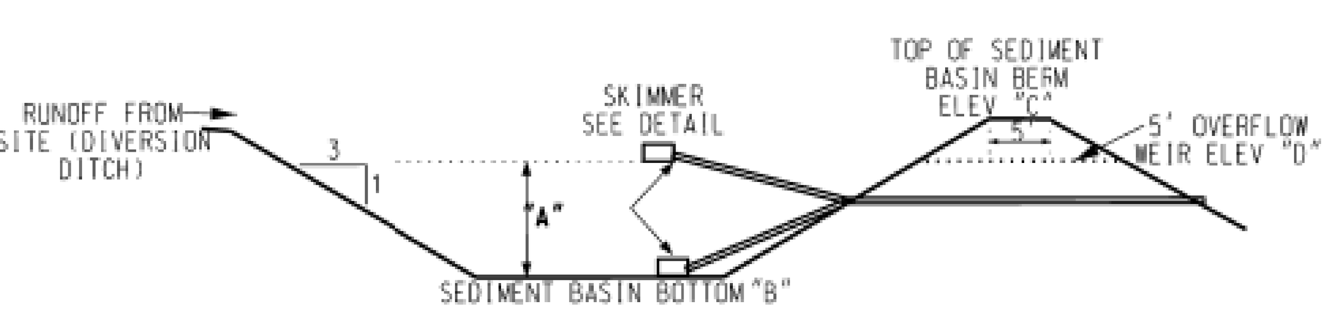
NTS

COASTAL PLAIN SITE STABILIZATION SCHEDULE

1. Fertilize and lime per recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fer-ilizer.
2. Incorporate lime/fertilizer 4-6 inches.
3. Roughen steep slopes by tracked machinary.
4. Select species based on season. Refer -o tables.
5. Broadcast seeds evenly and cover by raking or dragging a chain. Firm soil by rol ing.
6. Apply straw mulch at a rate 1-2 tons per acre. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.
7. Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other daMGe.

SOD INSTALLATION

1. Fertilize and lime per recommendations of soil tests or apply 100 lb/1,000 sf ground agricultural limestone and 25 lb/1,000 sf fertilizer. In the fall, use 10-10-10. In the spring, use 5-10-10.
2. Incorporate lime/fertilizer 4-6 inches.
3. Rake or harrow to achieve a smooth final grade.
4. Roll to achieve a smooth, firm surface on which to lay the sod.
5. Lightly rake and irrigate top layer of soil just prior to installation.
6. Lay sod in a staggered, brick-like pattern with the longest dimension perpendicular to the slope. Avoid gaps. Use a knife to fit irregular shapes.
7. Roll sod lightly after installation to ensure good sod to soil contact.
8. Irrigate initially to wet soil to a depth of 4'. Keep soil moist for 2-3 weeks thereafter or until sod has taken root.

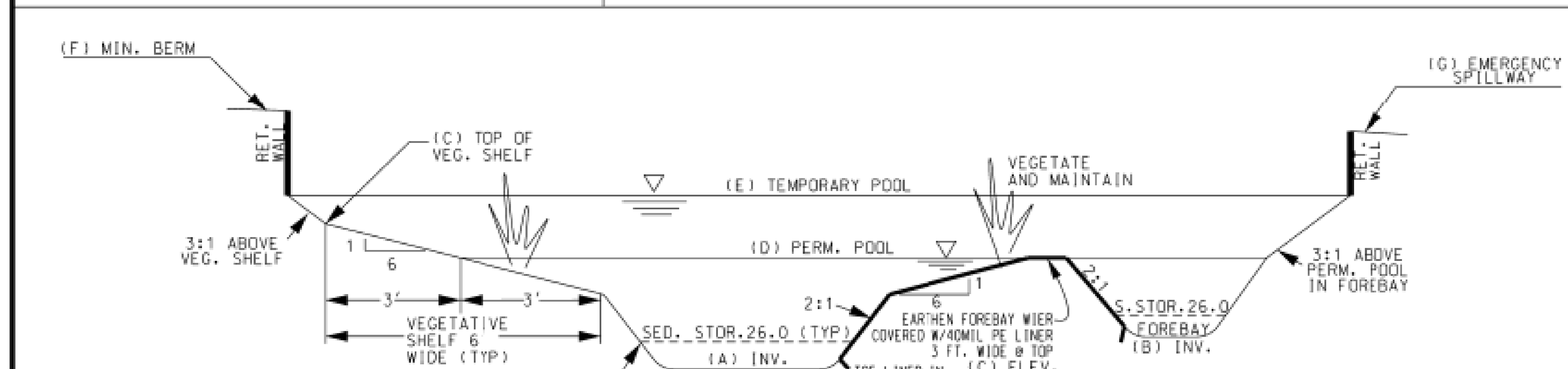


SEDIMENT BASIN DETAIL

NTS

NOTE:
DEWATER, DE-MUCK AND FILL POND ONCE SITE IS STABILIZED.

SEDIMENT BASIN SCHEDULE									
SEDIMENT BASIN	LENGTH (FT) TOP	LENGTH (FT) BOTTOM	WIDTH (FT) TOP	WIDTH (FT) BOTTOM	BATTEN SPACING (FT)	"A" (FT)	"B" (ELEV)	"C" (ELEV)	"D" (ELEV)
A	200	182	45	27	50/50/50	2.0	31.0	34.0	33.0
B	125	107	50	32	30/30/30	2.0	31.0	34.0	33.0



POND ELEVATIONS							
POND	A	B	C	D	E	F	G
POND A	24.0	25.0	31.5	31.0	32.8	36.0	N/A
POND B	24.0	N/A	31.5	31.0	32.8	36.0	35.4

DETENTION POND AND FOREBAY SECTION

PERMANENT SEEDING TABLE 1

Seeding Dates	Recommended Planting	
Feb. 15 - Apr. 1 Sep. 1 - Nov. 1	Tall Fescue Mixture	Rate (lb/ac)
Apr. 1 - Aug. 1	Hybrid Bermudagrass	see table 2
Apr. 1 - Jul. 15	Common Bermudagrass	see table 2
Mar. 1 - Jul. 1	Centipedegrass	see table 2
		see table 2

PERMANENT SEEDING TABLE 2a-LOW MAINTENANCE MIXTURES

Site Description	Recommended Planting	
Well to poorly drained soils	Tall Fescue Mixture Pensacola Bahiagrass Kobe Lespedeza	Rate (lb/ac) 80 50
Dry to well drained soils	Pensacola Bahiagrass Common Bermudagrass Kobe Lespedeza German Millet	40 50 30 10
Swales	Common Bermudagrass	10
		40-80

PERMANENT SEEDING TABLE 2b-HIGH MAINTENANCE MIXTURES

Site Description	Recommended Planting	
Well to poorly drained soils	Tall Fescue Mixture Rye Grain	Rate (lb/ac) 200
Dry to well drained soils	Hybrid Bermudagrass	25
Well drained sandy loam to sand, lawns.	Centipedegrass	50 10-20

TEMPORARY SEEDING TABLE

Seeding Dates	Recommended Planting	
Dec. 1 - Apr. 15	Kobe Lespedeza with Rye Grain	Rate (lb/ac) 50
Apr. 15 - Aug. 15	German Millet	120
Aug. 15 - Dec. 1	Rye Grain	40
		120

Notes:
For seeding outside of recommended dates and/or for temporary stabilization, refer to temporary seeding table.

For highly erosive areas or as directed by an engineer, sod shall be provided.

CONSTRUCTION SEQUENCE

1. INSTALL STONE CONSTRUCTION ENTRANCE AT MILITARY CUTOFF ROAD.
2. INSTALL SILT FENCE AND TREE PROTECTION.
3. CLEAR & GRADE FOR SEDIMENT BASIN-PONDS A & B AND CONNECTING PIPE.
4. INSTALL STORMWATER SEDIMENT BASIN-PONDS A & B. AND PROMOTE DRAINAGE TO BOTH.
5. CLEAR & GRADE SITE.
6. INSTALL UNDERGROUND UTILITIES.
7. PROVIDE VEGETATIVE COVER IN ACCORDANCE TO NPDES SPECIFICATIONS.
8. INSTALL CURB, GUTTER, AND PAVEMENT.
9. PROVIDE 100% VEGETATIVE COVER OF ALL DISTURBED SOILS.

NPDES NOTES

SITE AREA DESCRIPTION	STABILIZATION TIMEFRAME	STABILIZATION TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, AND DITCHES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND FLATTER THAN 2:1 THEN 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE (EXCEPT FOR PERIMETERS AND HQW ZONES)

BUILDING WASTES HANDLING
1. NO PAINT OR LIQUID WASTES IN STREAMS OR STORM DRAINS.
2. DEDICATED AREAS FOR DEMOLITION, CONSTRUCTION, AND OTHER WASTES MUST BE LOCATED 50' FROM STORM DRAINS AND STREAMS UNLESS NO REASONABLE ALTERNATIVES AVAILABLE.
3. EARTHEN-MATERIALS STOCKPILES MUST BE LOCATED 50' FROM STORM DRAINS AND STREAMS UNLESS NO REASONABLE ALTERNATIVES AVAILABLE.
4. CONCRETE MATERIALS MUST BE CONTROLLED TO AVOID CONTACT WITH SURFACE WATERS, WETLANDS, OR BUFFERS.

INSPECTIONS
1. SAME WEEKLY INSPECTION REQUIREMENTS
2. SAME RAIN GAUGE AND INSPECTIONS AFTER 0.5" RAINFALL EVENT.
3. INSPECTIONS ARE ONLY REQUIRED DURING "NORMAL" BUSINESS HOURS.
4. INSPECTION REPORTS MUST BE AVAILABLE ONSITE DURING BUSINESS HOURS UNLESS A SITE SPECIFIC EXEMPTION IS APPROVED.
5. RECORDS MUST BE KEPT FOR 3 YEARS AND AVAILABLE UPON REQUEST.
6. ELECTRONICALLY AVAILABLE RECORDS MAY BE SUBSTITUTED UNDER CERTAIN CONDITIONS.

SEDIMENT BASINS
1. OUTLET STRUCTURES MUST WITHDRAW FOR BASIN SURFACE UNLESS DRAINAGE AREA IS LESS THAN 1 ACRE.
2. USE ONLY DWQ APPROVED FLOCCULENTS.

NPDES SPECIFIC PLAN SHEETS NOTES
1. THIS PAGE IS SUBMITTED TO COMPLY WITH NPDES GENERAL STORMWATER PERMIT NCG010000.
2. THIS PAGE CAN BE APPROVED BY THE COUNTY PURUANT TO NPDES GENERAL STORMWATER PERMIT NCG010000 ONLY.
3. THIS PAGE OF THE APPROVED PLANS IS ENFORCEABLE EXCLUSIVELY PURUANT TO NPDES GENERAL STORMWATER PERMIT NCG010000.
4. THE COUNTY IS NOT AUTHORIZED TO ENFORCE THE PAGE OF THE PLANS AND IT IS NOT A PART OF THE APPROVED PLANS FOR THE PURPOSES OF ENFORCEMENT ACTION UNDER THE COUNTY CODE.

802.2 Silt Fence
The work under this section shall consist of furnishing, installing, maintaining, and removing and disposing of silt fence as designated on the plans or in the Contract Documents, or as required by the Engineer. Material for silt fence shall meet the following minimum requirements as set for in the Wisconsin Construction Site Best Management Practice Handbook.

a. Grab Strength: 100 lb. Minimum in any principal direction (ASTM D-1682)

b. Mullen Burst: Minimum 200 psi (ASTM D-3786)

c. Equivalent Opening Size: Between 50 and 140 for soils with more than 15% byweight passing a No. 200 sieve. Between 20 and 50 for soils with less than 15% by weight passing a No. 200 sieve.

d. Water flow rate of 10 gal/min/ft37#64 at 50 mm constant head as determined by multiplying permitting in Sec 1 (as determined by ASTM D-4491) by a conversion factor of 74.

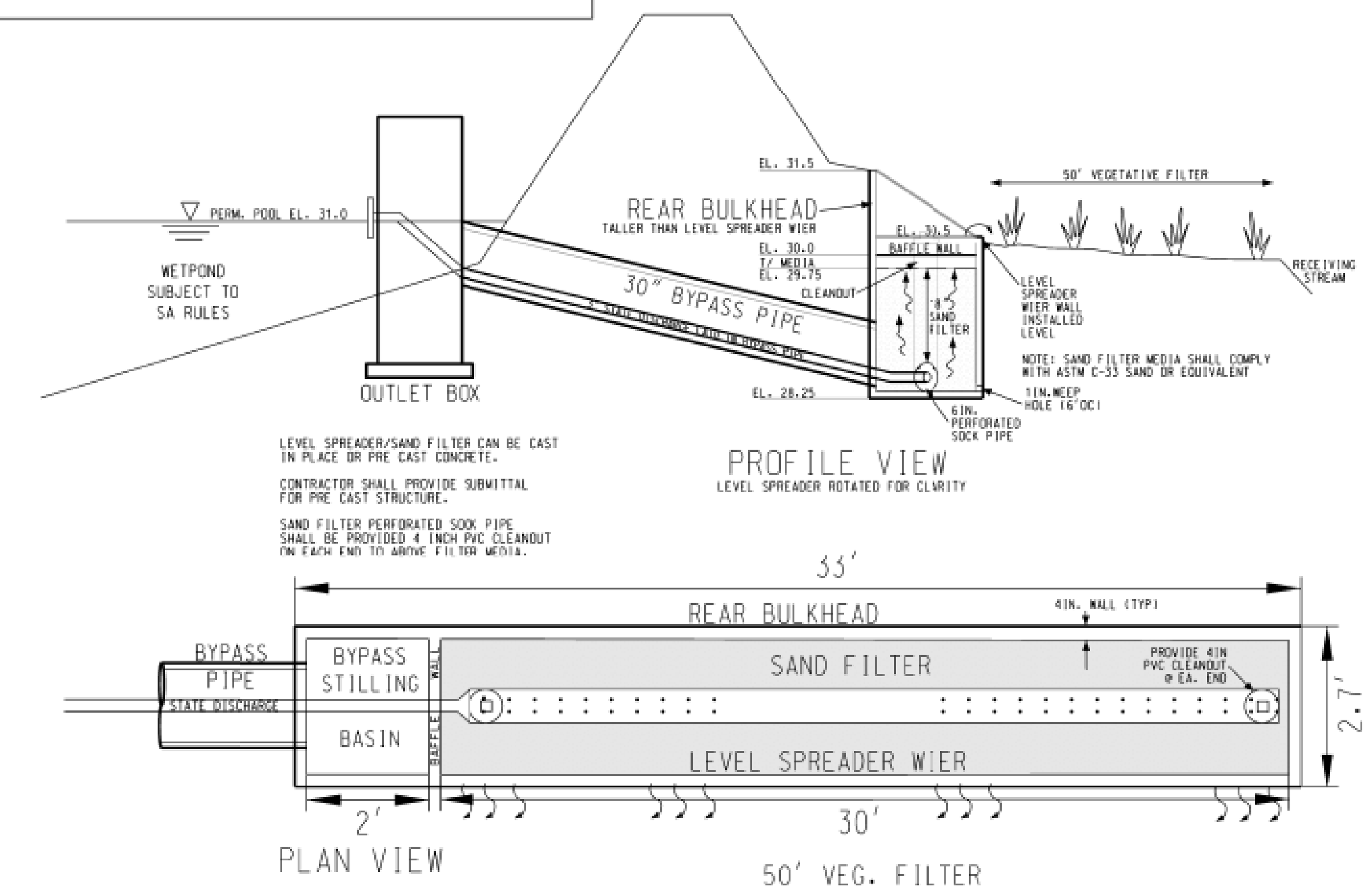
e. Ultraviolet radiation stability of 90%.

f. Fabric with support netting shall be reinforced with an industrial polypropylene netting with a 61/64 inch spacing or equivalent. A heavy duty nylon top support cord or equivalent is required. Silt fences shall be inspected immediately after each rainfall and at least daily during prolonged rainfall periods. Any required repairs or sediment removal shall be done immediately.

SILT FENCE SPECIFICATIONS

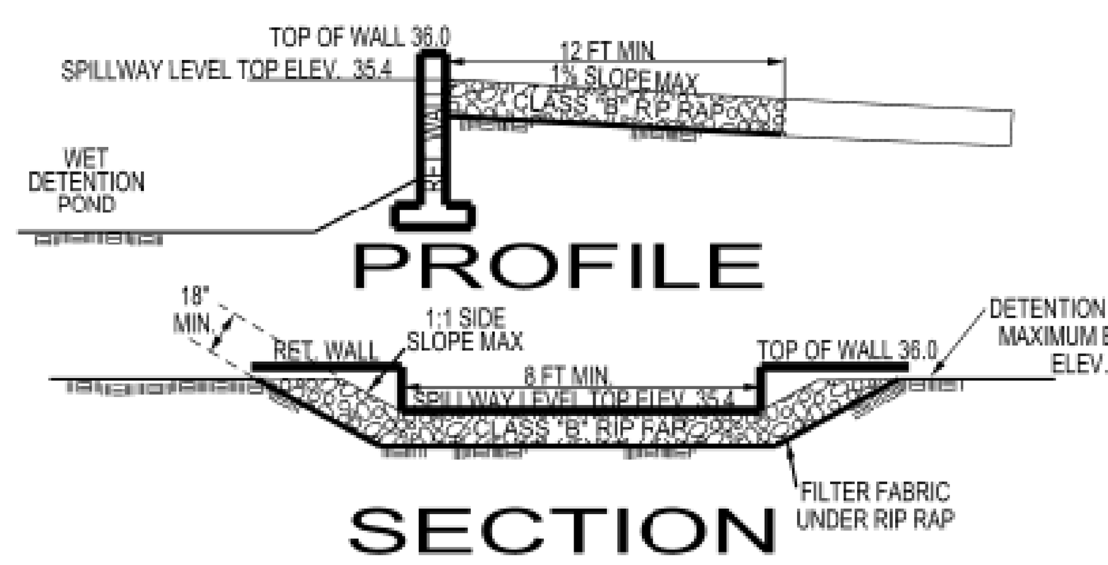
NOTE:
ALL SCM'S IMPACTED BY EROSION DURING THE CONSTRUCTION PHASE SHALL BE CLEANED OUT AND CONVERTED TO ITS APPROVED DESIGN STATE ONCE CONSTRUCTION IS COMPLETE.

NOTE:
IN THE INSTANCE THAT A COMPLETE DRAWDOWN IS NEEDED FOR MAINTENANCE OR INSPECTION, A SUMP PUMP WILL NEED TO BE PROVIDED.



LEVEL SPREADER/SAND/VEGETATIVE FILTER DETAIL

NTS

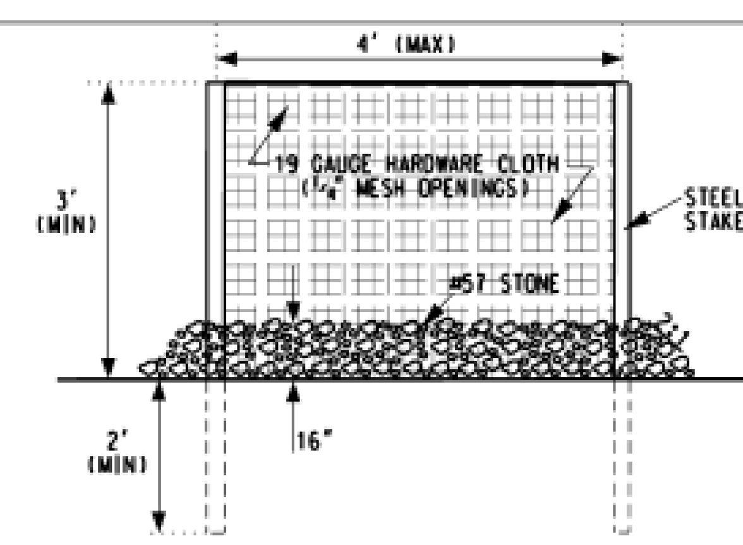


EMERGENCY SPILLWAY DETAIL

EROSION & SEDIMENT CONTROL MAINTENANCE PLAN

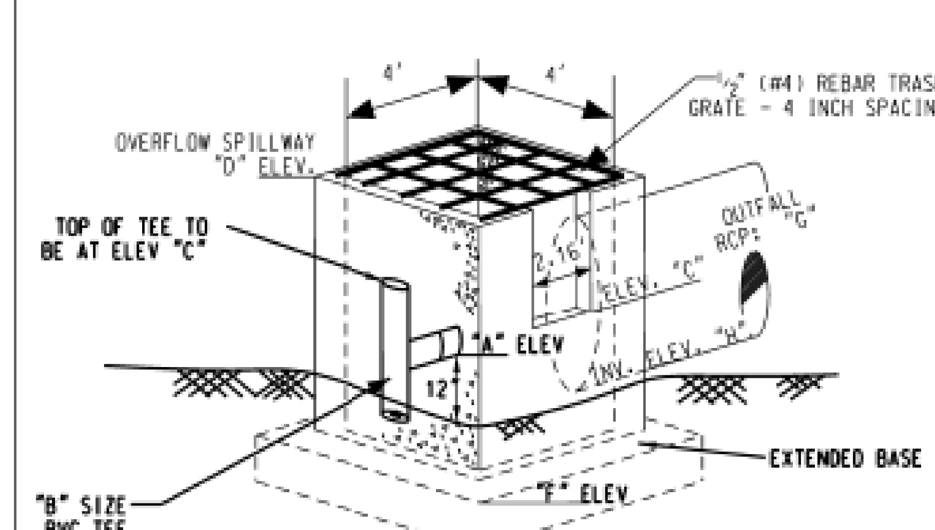
1. ALL EROSION AND SEDIMENTATION CONTROL MEASURES WILL BE CHECKED FOR STABILITY AND OPERATION FOLLOWING EVERY RUNOFF-PRODUCING RAINFALL BUT IN NO CASE LESS THAN ONCE EVERY WEEK AND WITHIN 24 HOURS OF EVERY HALF INCH RAINFALL.
2. ALL POINTS OF EGRESS WILL HAVE CONSTRUCTIONS ENTRANCES THAT WILL BE PERIODICALLY TOP-DRESSED WITH AN ADDITIONAL 2" OF #4 STONE TO MAINTAIN PROPER DEPTH. THEY WILL BE MAINTAINED IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE SITE. IMMEDIATELY REMOVE OBJECTIONABLE MATERIAL SPILLED, WASHED, OR TRACKED ONTO THE CONSTRUCTION ENTRANCE OR ROADWAYS.
3. SEDIMENT WILL BE REMOVED FROM HARDWARE CLOTH AND GRAVEL INLET PROTECTION, BLOCK AND GRAVEL INLET PROTECTION, ROCK DOUGHNUT INLET PROTECTION, ROCK PIPE INLET PROTECTION, AND GUTTERBUDDY INLET PROTECTDIN WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS AS DESIGNED. DEBRIS WILL BE REMOVED FROM THE ROCK AND HARWARE CLOTH TO ALLOW PROPER DRAINAGE. SILT SACKS WILL BE EMPTIED ONCE A WEEK AND AFTER EVERY RAIN EVENT. SEDIMENT WILL BE REMOVED FROM AROUND BEAVER DAMS, DANDY SACKS/SOCKS, AND GUTTERBUDDIES ONCE A WEEK AND AFTER EVERY RAIN EVENT. NOTE THAT THE GUTTERBUDDY IS REUSABLE SHOULD BE STORED OUT OF DIRECT SUNLIGHT BETWEEN JOBS.
4. DIVERSION DITCHES WILL BE CLEANED OUT IMMEDIATLEY TO REMOVE SEDIMENT OR OBSTRUCTIONS FROM THE FLOW AREA. THE DIVERSION RIDGES WILL ALSO BE REPAIRED. SWALES MUST BE RESTABLIZED WITHIN 21 CALENDAR DAYS OF CEASE OF ANY PHASE OF PHASE OF ACTIVITY ASSOCIATED WITH A SWALE.
5. SEDIMENT WILL BE REMOVED FROM BEHIND THE SEDIMENT FENCE WHEN IT BECOMES HALF FILLED. THE SEDIMENT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN A BARRIER. STAKES MUST BE STEEL. STAKE SPACING WILL BE 6 FEET (MAX) WITH THE USE OF EXTRA STRENGHT FABRIC WITHOUT WIRE BACKING. sTAKE SPACING WILL BE 8 FEET (MAX) WHEN STANDARD STRENGTH FABRIC AND WIRE BACKING ARE USED. IF ROCK FILTERS ARE USED AT LOW POINTS IN THE SEDIMENT FENCE, THE ROCK WILL BE REPAIRED OR REPLACED IF IT BECOMES HALF FULL OF SEDIMENT, NO LONGER DRAINS AS DESIGNED, OR IS DAMGED.
6. SEDIMENT WILL BE REMOVED FROM THE SEDIMENT TRAPS AND BASINS WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS OR WHEN THE ROCK IS DISLODGED. BAFFLES WILL BE REPAIRED OR REPLACED IF THEY COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE. THEY WILL BE REPLACED PROMPTLY. SEDIMENT WILL BE REMOVED WHEN DEPOSITS REACH HALF THE HEIGHT OF THE FIRST BAFFLE. IN SKIMMER BASINS, FLOATING SKIMMERS WILL BE INSPECTED WEEKLY AND WILL BE KEPT CLEAN.
7. ALL SEEDED AREAS WILL BE FERTILIZED, RESEEDED AS NECESSARY, AND MULCHED ACCORDING TO SPECIFICATIONS IN THE VEGETATIVE PLAN TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER. ALL SLOPES WILL BE SLABILIZED WITHIN 21 CALENDAR DAYS. ALL OTHER AREAS WILL BE STABILIZED WITHIN 15 WORKING DAYS.
8. FLOCCULANTS WILL BE USED TO ADDRESS TURBIDITY ISSUES. THE PUMPS, TANKS, HOSES AND INJECTION SYSTEMS WILL BE CHECKED FOR PROBLEMS OR TURBID DISCHARGES DAILY.

NPDES STABILIZATION TIMEFRAMES		
SITE AREA DESCRIPTION	STABILIZATION	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, AND DITCHES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND FLATTER THAN 2:1 THEN 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE



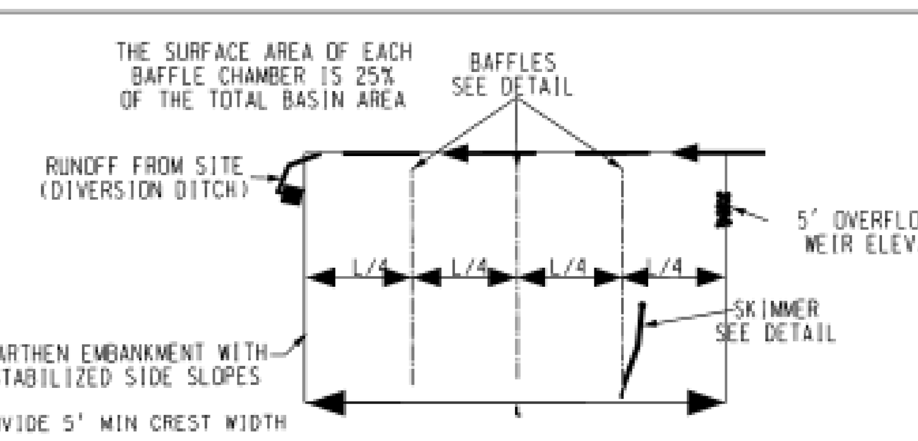
TYPICAL INLET PROTECTION

NTS



POND OUTLET STRUCTURE

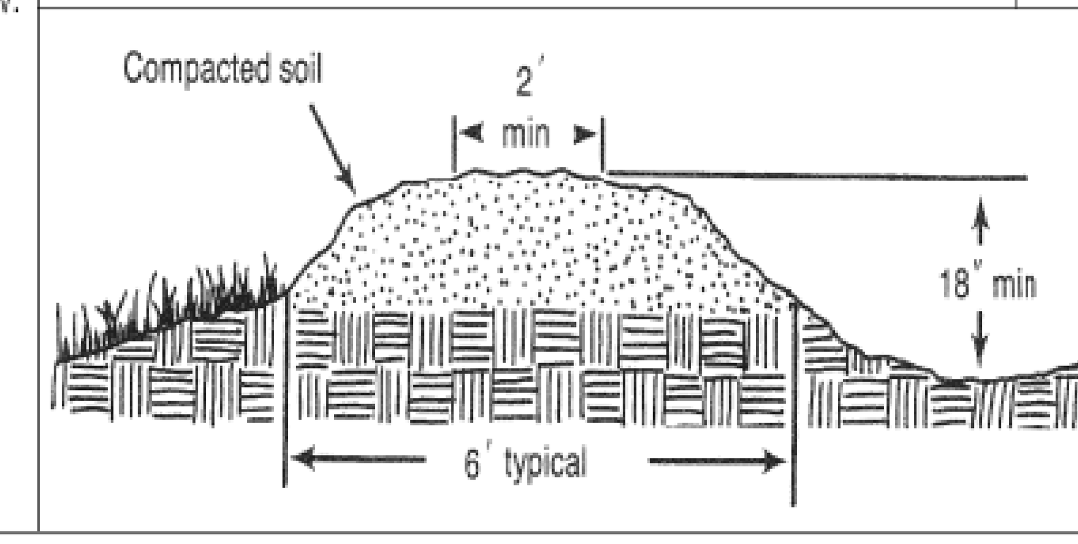
OUTLET STRUCTURE SCHEDULE							
	A	B	C	D	F	G	H
OS 1	31.0	3"	32.84	35.0	24.0	30"	25.5



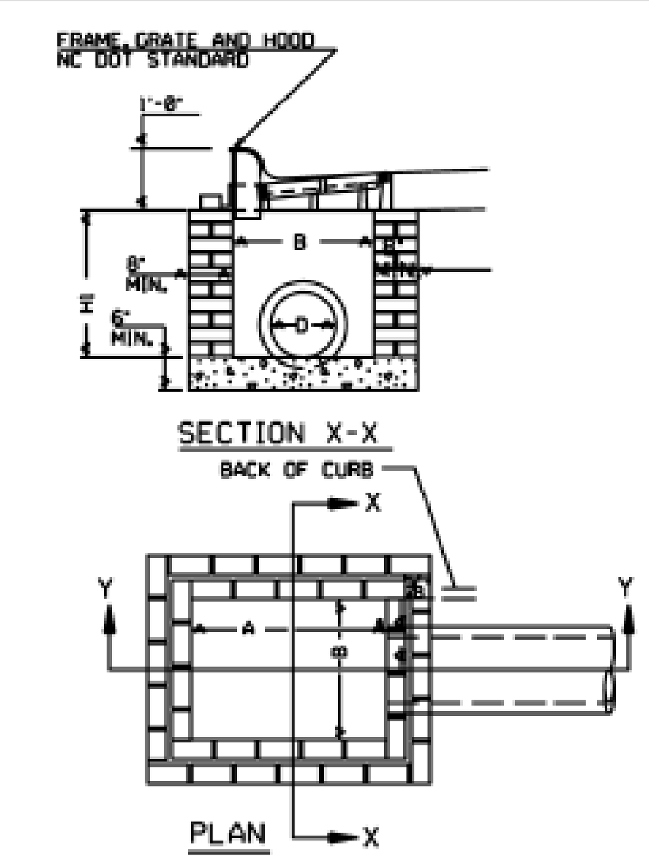
BAFFLE DETAIL

NTS

COIR BAFFLE MATERIAL PROPERTY REQUIREMENTS	
THICKNESS	0.30 IN (MIN)
TENSILE STRENGTH (WET)	900 x 680 LB/FT (MIN)
ELONGATION (WET)	69% x 34% (MAX)
FLOW VELOCITY	10-12 FT/SEC
WEIGHT	20 OZ/SY (MIN)
MINIMUM WIDTH	6.5 FT
OPEN AREA	50% (MAX)



DIVERSION BERM



GENERAL NOTES:
MORTAR JOINTS 1/2" TO 1/8" THICK.
CLASS "B" CONCRETE TO BE USED THROUGHOUT.
THE POURING OF FLOOR SLAB TO BE ACCOMPLISHED BY FORMING.
DEDUCT FOR PIPE(S) FROM TOTAL CU. YDS. OF BRICK MASONRY.
ALL CATCH BASINS OVER 3'-6" IN DEPTH TO BE PROVIDED WITH STEPS 1'-2" ON CENTER. STEPS SHALL BE IN ACCORDANCE WITH STD. NO. 840.66.
USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.
JUMBO BRICK WILL BE PERMITTED. CONCRETE BRICK OR 4" SOLID CONCRETE BLOCKS MAY BE USED IN LIEU OF CLAY BRICK.
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STD. NO. 840.00.
FOR 8'-0" IN HEIGHT OR LESS, USE 8" WALL. OVER 8'-0" IN HEIGHT, USE 12" WALL TO 6'-0" FROM TOP OF WALL AND 8" WALL FOR THE REMAINING 6'-0". QUANTITES TO BE ADJUSTED ACCORDINGLY.

STANDARD BRICK CATCH BASIN DETAIL

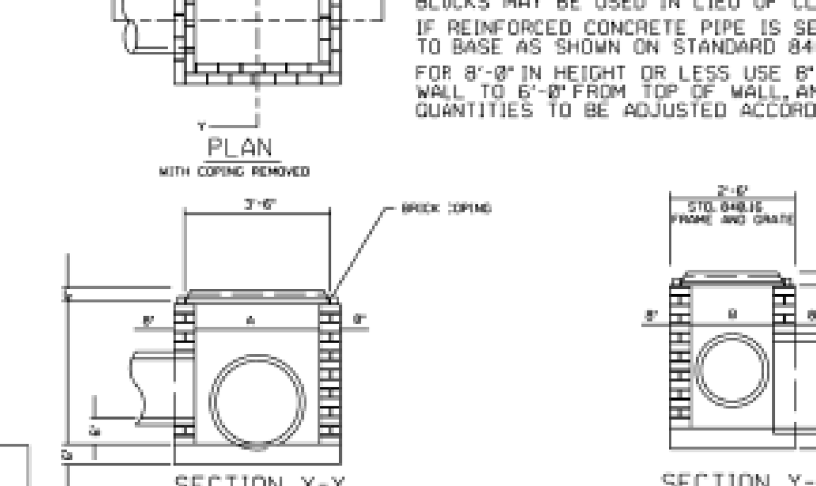
NTS

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

GENERAL NOTES:
ALL DROP INLETS OVER 3'-6" IN DEPTH TO BE PROVIDED WITH STEPS 1'-2" ON CENTERS. STEPS SHALL BE IN ACCORDANCE WITH STD. 840.66.
CLASS "B" CONCRETE TO BE USED.
ALL MORTAR JOINTS ARE 1/2" • 1/8".
FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
BRICK MASONRY DROP INLET NOT TO BE USED IN LOCATIONS SUBJECT TO TRAFFIC.
JUMBO BRICK WILL BE PERMITTED. CONCRETE BRICK OR 4" SOLID CONCRETE BLOCKS MAY BE USED IN LIEU OF CLAY BRICK.
IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD 840.00.
FOR 8'-0" IN HEIGHT OR LESS USE 8" WALL. OVER 8'-0" IN HEIGHT USE 12" WALL TO 6'-0" FROM TOP OF WALL, AND 8" WALL FOR THE REMAINING 6'-0". QUANTITIES TO BE ADJUSTED ACCORDINGLY.



DIMENSIONS AND QUANTITIES										
PIPE D	SPAN A	WIDTH B	HEIGHT H	CONC. IN BASE CU. YDS.	PER FT. HEIGHT	BRICK COPING	MIN. H	C.S.	R.C.
12"	3'-0"	2'-0"	2'-8"	0.267	0.313	0.037	0.871	0.020	0.032
15"			3'-0"	0.267	0.313	0.037	0.978	0.031	0.047
18"			3'-5"	0.267	0.313	0.037	1.106	0.044	0.065
24"			4'-0"	0.267	0.313	0.037	1.289	0.078	0.113
30"	3'-0"	2'-0"	4'-3"	0.267	0.313	0.037	1.367	0.122	0.178

STANDARD DROP INLET

NTS

CITY OF WILMINGTON NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:____________ Permit #________________
Signed: ______________________________

NORTH CAROLINA PROFESSIONAL SEAL 20643 ENGINEER JAMES H. FENTRESS, JR.

JAMES H. FENTRESS, JR., P.E
7/22/2019
DATE

SOIL EROSION, SEDIMENTATION CONTROL AND STORMWATER DETAILS

VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: ARBORETUM VILLAGE, LLC
ADDRESS: 10 S. CARDINAL DRIVE WILMINGTON, N.C. 28403
PHONE:

STROUD ENGINEERING, P.A. C-0647
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA 28403
(910) 815-0775 (910) 815-0593 FAX

DESIGNED: JHF
DRAWN: JHF
APPROVED: JHF
DATE: 7/16/18
SCALE: AS NOTED
SHEET 5 OF 21

PROJECT NO.:
DRAWING NO.:

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

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

Temporary and Permanent Groundcover*

STABILIZATION TIMEFRAMES
(Effective Aug. 3, 2011)

SITE AREA DESCRIPTION	STABILIZATION	TIMEFRAME EXCEPTIONS
Perimeter dikes, swales, ditches, slopes	7 days	None
High Quality Water (HQW) 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 are allowed.
Slopes 3:1 or flatter	14 days	7 days for slopes greater than 50' in length.
All other areas with slopes flatter than 4:1	14 days	None, except for perimeters and HQW Zones.

*-For Falls Lake watershed, in disturbed areas where grading activities are incomplete, provide temporary groundcover no later than seven (7) days for slopes steeper than 3:1; ten (10) days for slopes equal to or flatter than 3:1; fourteen (14) days for areas with no slope.

GROUND STABILIZATION SPECIFICATION

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

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers • Hydroseeding • Rolled erosion control products with or without temporary grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt or retaining walls

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

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

NORTH CAROLINA *Environmental Quality*

EQUIPMENT AND VEHICLE MAINTENANCE

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

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number of waste containers on site to manage the quantity of waste produced.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow.
8. Dispose waste off-site at an approved disposal facility.

PAINT AND OTHER LIQUID WASTE

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

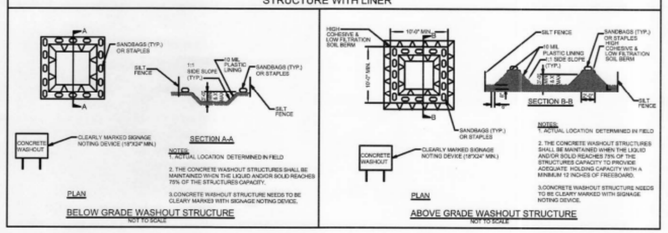
PORTABLE TOILETS

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

EARTHEN STOCKPILE MANAGEMENT

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

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



CONCRETE WASHOUTS

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

HERBICIDES, PESTICIDES AND RODENTICIDES

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

HAZARDOUS AND TOXIC WASTE

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

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 03/01/19

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

CITY OF WILMINGTON NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:_____ Permit #_____
Signed: _____

NORTH CAROLINA PROFESSIONAL SEAL 20043 ENGINEER JAMES H. FENTRESS, JR.
JAMES H. FENTRESS, JR., P.E.
DATE 9/5/2019

SOIL EROSION, SEDIMENTATION CONTROL AND STORMWATER DETAILS

VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: ARBORETUM VILLAGE, LLC
ADDRESS: 10 S. CARDINAL DRIVE WILMINGTON, N.C. 28403
PHONE:

STROUD ENGINEERING, P.A. C-0647
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA 28403
(910) 815-0775 (910) 815-0593 FAX

DESIGNED: JHF	
DRAWN: JHF	
APPROVED: JHF	
DATE: 7/16/18	
SCALE: AS NOTED	
SHEET 6 OF 21	

PROJECT NO.:
DRAWING NO.:

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

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

Inspect	**Frequency (during normal business hours)**	**Inspection records must include** [40 CFR 122.41]**:**
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those un-attended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event > 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Corrective actions taken, and 7. Date of actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event > 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Actions taken to correct/prevent sedimentation, and 7. Date of actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event > 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Date of actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event > 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Evidence and actions taken to reduce sediment contributions, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit of this permit.

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

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

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

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

2. Additional Documentation

In addition to the E&SC Plan documents above, the following items shall be kept on the site and available for agency inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

(a) This general permit as well as the certificate of coverage, after it is received.

(b) Records of inspections made during the previous 30 days. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

(c) All data used to complete the Notice of Intent and older inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that must be reported

Permittees shall report the following occurrences:

(a) Visible sediment deposition in a stream or wetland.

(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(a) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

(b) Anticipated bypasses and unanticipated bypasses.

(c) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Division's Emergency Response personnel at (800) 662-7956, (800) 858-0368 or (919) 733-3300.

Occurrence	**Reporting Timeframes (After Discovery) and Other Requirements**
(a) Visible sediment deposition in a stream or wetland	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	• ***Within 24 hours***, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	• ***A report at least ten days before the date of the bypass, if possible***. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment[40 CFR 122.41(l)(7)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by-case basis.

NORTH CAROLINA *Environmental Quality*

NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING

EFFECTIVE: 03/01/19

PROJECT NO.:

DRAWING NO.:

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

CITY OF WILMINGTON NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:_____ Permit #_____
Signed: _____

NORTH CAROLINA PROFESSIONAL SEAL 20043 ENGINEER JAMES H. FENTRESS, JR.
JAMES H. FENTRESS, JR., P.E.
DATE 4/5/2019

SOIL EROSION, SEDIMENTATION CONTROL AND STORMWATER DETAILS

VILLAGE TOWNHOMES
(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: ARBORETUM VILLAGE, LLC
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DESIGNED:	JHF
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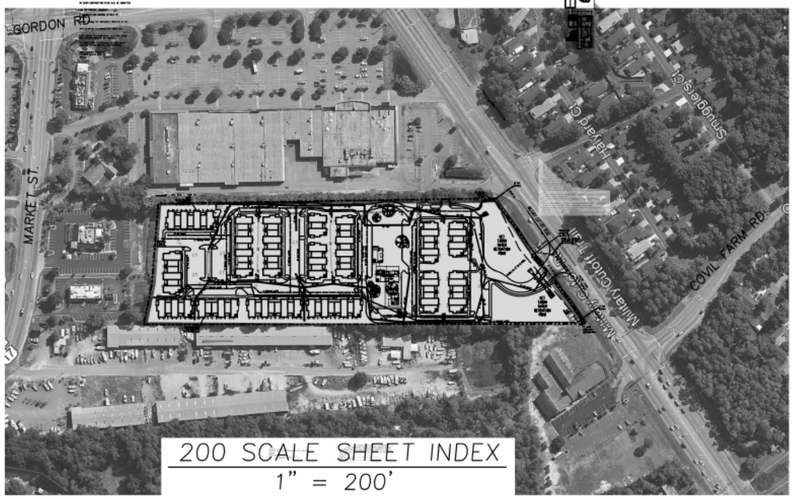
APPROVED:	JHF
DATE:	7/16/18
SCALE:	AS NOTED
SHEET	7 OF 21



200 SCALE SHEET INDEX
1" = 200'

UTILITY PLANSET INDEX

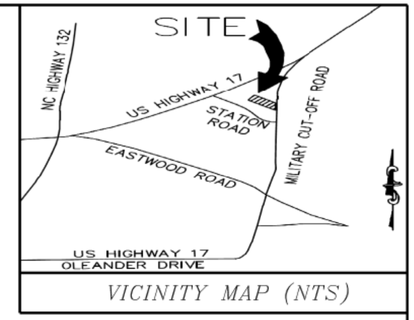
For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

CITY OF WILMINGTON NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:_____ Permit #_____
Signed: _____

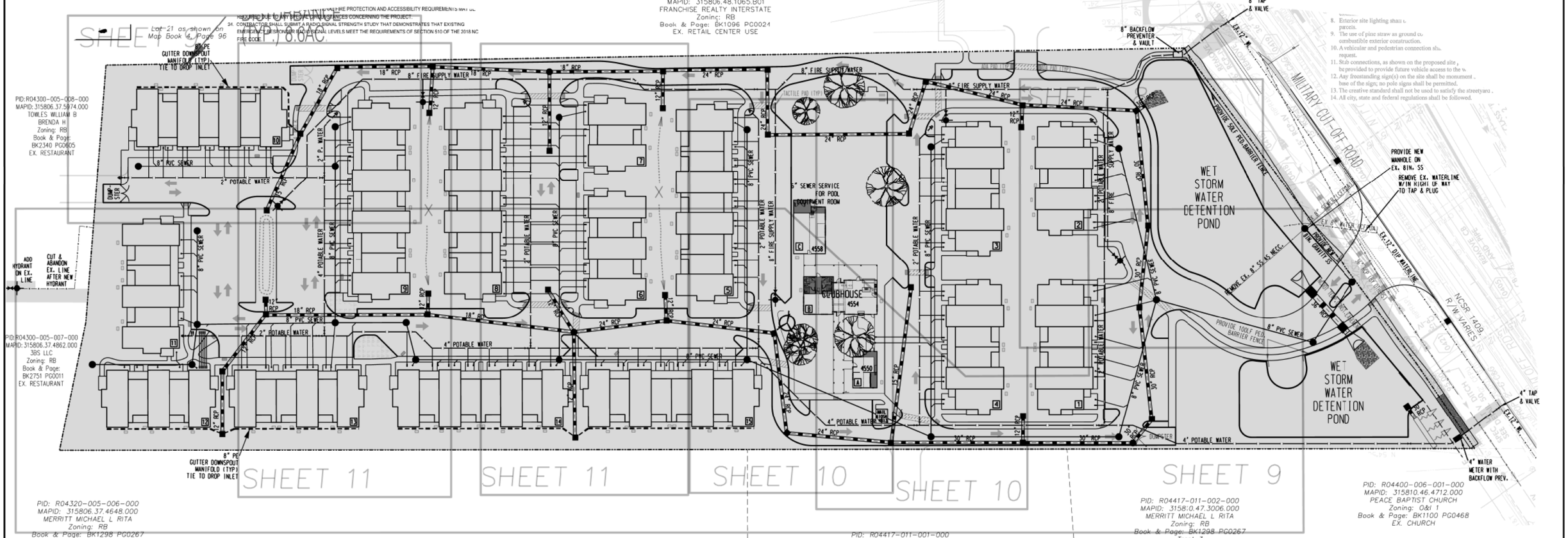
Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

LEGEND
PROJECT BOUNDARY
WATER MAIN
GRAV.SEWER & MANHOLE
STORMDRAIN
PROP.HIGH POINT
PROP.DRAINAGE DIR.
GATE VALVE
HYDRANT ASSEMBLY



VICINITY MAP (NTS)



CAPE FEAR PUBLIC UTILITY AUTHORITY STANDARD NOTES:
1. SEWER GUARDS REQUIRED AT ALL MANHOLES LOCATED IN TRAFFIC AREAS.
2. WATER & SEWER SERVICES SHALL BE PERPENDICULAR TO MAIN AND TERMINATE AT RIGHT-OF-WAY LINE. SEWER SERVICES IN CUL-DE-SACS ARE REQUIRED TO BE PERPENDICULAR, OR MUST ORIGINALTE IN END OF LINE MANHOLE & TERMINATE AT RIGHT-OF-WAY LINE.
3. ALL SERVICES TYING INTO DUCTILE IRON MAINS SHALL BE CONSTRUCTED OF CLASS 50, DIP, WITH PROTECTO 401 CERAMIC EPOXY LINING.
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 FASTNERS SHALL BE 316.
7. CLEANOUTS SHALL BE LOCATED A MINIMUM OF 12 FEET FROM ALL PROPERTY CORNERS. WATER METER BOXES ARE TO BE A MINIMUM OF 5 FEET FROM THE PROPERTY CORNER.

8. Exterior site lighting shall c… parcels.
9. The use of pine straw as ground co… combustible exterior construction.
10. A vehicular and pedestrian connection sha… request.
11. Stub connections, as shown on the proposed site … be provided to provide future vehicle access to the w…
12. Any freestanding sign(s) on the site shall be monument … base of the sign; no pole signs shall be permitted.
13. The creative standard shall not be used to satisfy the streetyard …
14. All city, state and federal regulations shall be followed.

JAMES H. FENTRESS, JR., P.E.
8/19/19
DATE

UTILITY SITE PLAN
VILLAGE TOWNHOMES
(FORMERLY ARBORETUM VILLAGE)
CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

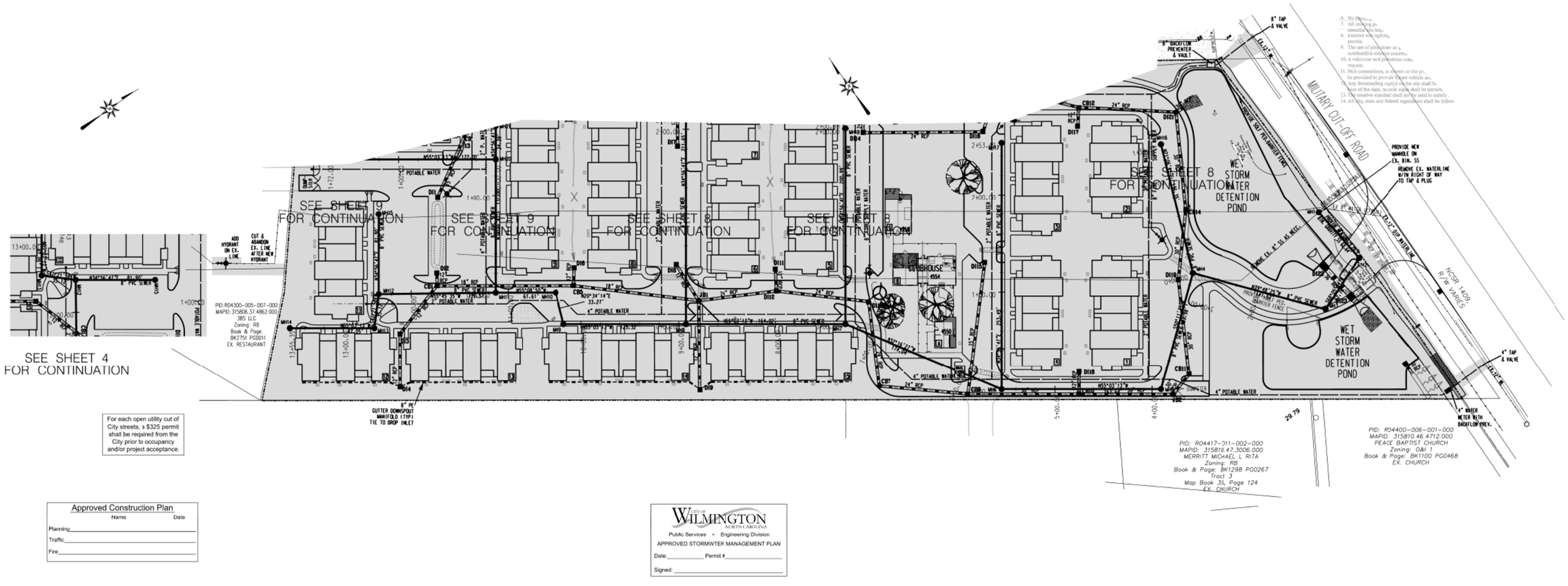
OWNER: ARBORETUM VILLAGE, LLC
ADDRESS: 10 S. CARDINAL DRIVE WILMINGTON, N.C. 28403
PHONE:

STROUD ENGINEERING, P.A. C-0647
102-D CINEMA DRIVE
WILMINGTON, NORTH CAROLINA 28403
(910) 815-0775 (910) 815-0593 Fax

DESIGNED: JHF
DRAWN: JHF
APPROVED: JHF
DATE: 6-29-2018
SCALE: 1" = 40'
SHEET 8 OF 21

PROJECT NO.: PW 1312
DRAWING NO.: W:/MASTER/PW1312/dgn/ARBORETUM.DGN

PROJECT NO.: PW 1312



For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

Approved Construction Plan

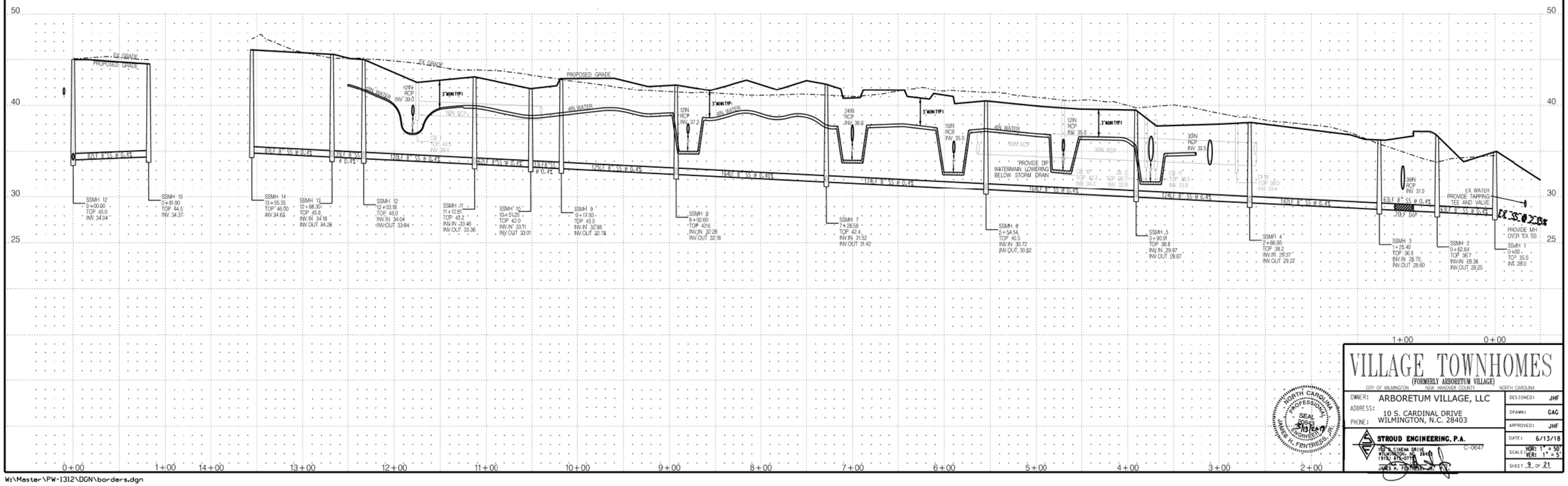
Name Date

Planning_____

Traffic_____

Fire_____

CITY OF WILMINGTON
NORTH CAROLINA
Public Services - Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:_____ Permit #_____
Signed: _____



VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER: ARBORETUM VILLAGE, LLC

ADDRESS: 10 S. CARDINAL DRIVE

PHONE: WILMINGTON, N.C. 28403

STROUD ENGINEERING, P.A.

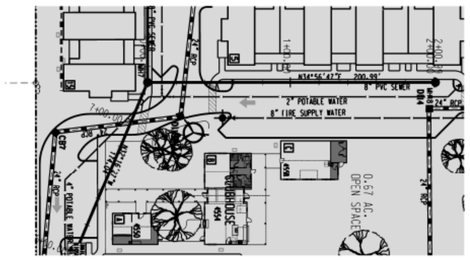
C-0647

100 S. CINEMA DRIVE
WILMINGTON, NC 28403
(910) 470-0705

JAMES H. FENTRESS, JR., P.E.

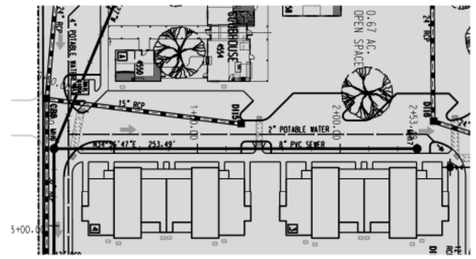
DESIGNED:	JHF
DRAWN:	GAG
APPROVED:	JHF
DATE:	6/13/18
SCALE:	HOR: 1" = 50' VER: 1" = 5'
SHEET	9 OF 21

W:\Master\PW-1312\DGN\borders.dgn

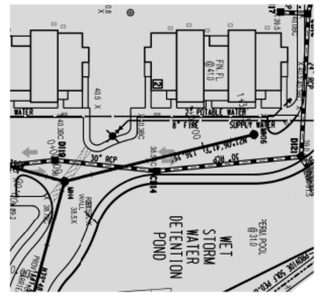


SEE SHEET 7
FOR CONTINUATION

For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.



SEE SHEET 7
FOR CONTINUATION

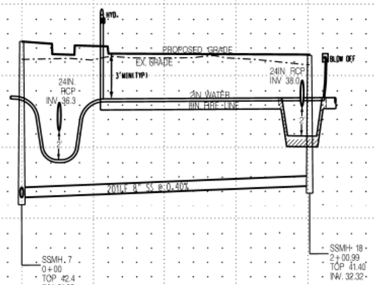


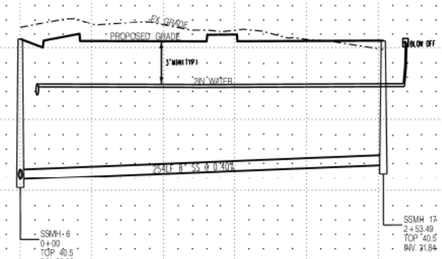
SEE SHEET 7
FOR CONTINUATION

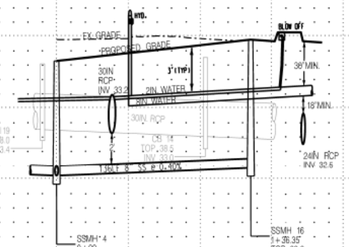
Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

CITY OF WILMINGTON
NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:_____ Permit #_____
Signed: _____







VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER:	ARBORETUM VILLAGE, LLC
ADDRESS:	10 S. CARDINAL DRIVE
PHONE:	WILMINGTON, N.C. 28403

STROUD ENGINEERING, P.A.
C-0647
102 S. CINEMA DRIVE
WILMINGTON, NC 28403
(910) 815-0778
JAMES H. FENNESS, JR., P.E.

NORTH CAROLINA PROFESSIONAL SEAL 29649 ENGINEER JAMES H. FENNESS, JR.

DESIGNED:	JHF
DRAWN:	GAG
APPROVED:	JHF
DATE:	6/13/18
SCALE:	HOR: 1" = 50' VER: 1" = 5'
SHEET	10 OF 21

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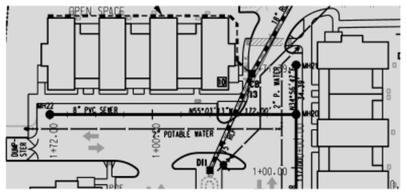
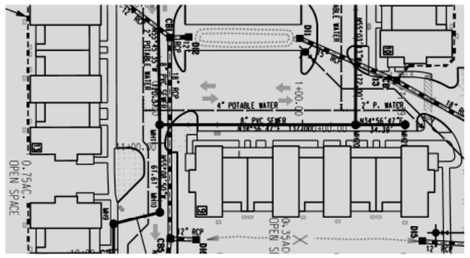
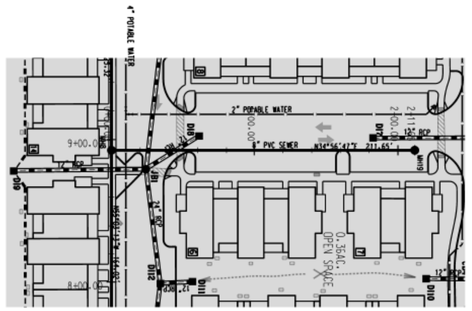


SEE NEXT
FOR CONTINUATION



SEE SHEET 7
FOR CONTINUATION



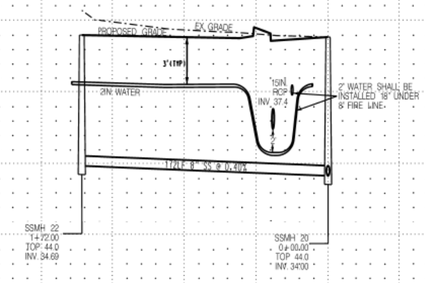
SEE SHEET 7
FOR CONTINUATION

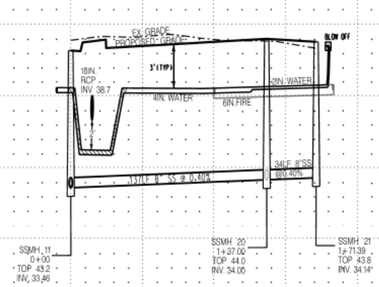
For each open utility cut of City streets, a $325 permit shall be required from the City prior to occupancy and/or project acceptance.

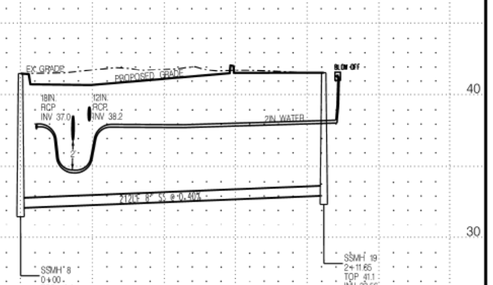
Approved Construction Plan

	Name	Date
Planning		
Traffic		
Fire		

CITY OF WILMINGTON
NORTH CAROLINA
Public Services • Engineering Division
APPROVED STORMWTER MANAGEMENT PLAN
Date:_____ Permit #_____
Signed: _____







50
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2+00
3+00
0+00

VILLAGE TOWNHOMES

(FORMERLY ARBORETUM VILLAGE)

CITY OF WILMINGTON NEW HANOVER COUNTY NORTH CAROLINA

OWNER:	ARBORETUM VILLAGE, LLC
ADDRESS:	10 S. CARDINAL DRIVE WILMINGTON, N.C. 28403
PHONE:	

STROUD ENGINEERING, P.A. C-0647
102 S. CINEMA DRIVE
WILMINGTON, NC 28403
(910) 874-0732

JAMES H. FENTRESS, JR. P.E.

NORTH CAROLINA PROFESSIONAL SEAL 20643 ENGINEER JAMES H. FENTRESS, JR.
3/13/2018

DESIGNED:	JHF
DRAWN:	CAG
APPROVED:	JHF
DATE:	6/13/18
SCALE:	HOR: 1" = 50' VER: 1" = 5'
SHEET	11 OF 21

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