



**AGENDA
TECHNICAL REVIEW COMMITTEE
REGULAR MEETING
SEPTEMBER 26, 2019
9:00 AM
CITY HALL COMMISSION CHAMBERS
204 ASH STREET
FERNANDINA BEACH, FL 32034**

- 1. CALL TO ORDER**
- 2. ROLL CALL**
- 3. APPROVAL OF MINUTES**
 - 3.1 September 12, 2019 TRC Minutes
- 4. DISCUSSION ITEMS**
 - 4.1 **Change of Use:** 832 S. 8th Street - Jeff Hall & Matthew Thomas, Owners of Island Glass and Mirror to discuss moving into the currently vacant building. MU-8 zoning.
 - 4.2 **Change of Use:** 850 Indigo Street - Lauren Templeton, director of Amelia Art Studio to discuss moving into currently occupied office space. MU-8 zoning.
- 5. DEVELOPMENT INQUIRIES FROM APPLICANTS NOT ON THE AGENDA - DISCUSSION ONLY, NO ACTION TO BE TAKEN.**
- 6. NEW BUSINESS**
 - 6.1 Distribute: SPR 2019-04 - Page Properties_224 N. 2nd Street
 - 6.2 Distribute: SPR 2019-05 - Lee Hangar_Jamestown Road
- 7. OLD BUSINESS**
 - 7.1 Distribute: Resubmit SPR 2018-09 WestRock Drop Yard
- 8. COMMITTEE BUSINESS**
- 9. ADJOURNMENT**

NEXT REGULAR TRC MEETING IS SCHEDULED FOR OCTOBER 10, 2019.

Persons with disabilities requiring accommodations in order to participate in this program or activity should contact 310-3115, TTY 711, or through the Florida Relay Services at 1-800-955-8771 (TTY number for all City offices) at least 24 hours in advance to request such accommodations.



**MINUTES
TECHNICAL REVIEW COMMITTEE
REGULAR MEETING
SEPTEMBER 12, 2019**

1. CALL TO ORDER – 9:01 AM

2. ROLL CALL

MEMBERS PRESENT:

Jacob Platt, Planning
John Mandrick, Utilities
Jason Higginbotham, Fire
Michelle Forstrom, Code

Rex Lester, Streets (arrived at 9:03am)
Don Kukla, Building
Andre Desilet, Stormwater

3. APPROVAL OF MINUTES

3.1 August 8, 2019 Regular Meeting

ACTION TAKEN: A motion was made by Member Forstrom, seconded by Member Desilet, to approve the minutes as presented.

Motion passed by unanimous voice vote.

4. DISCUSSION ITEMS

4.1 Change of Use Discussion: 508 Ash Street – Jose Miranda, Miranda Architects, Single family residential to bed and breakfast inn. C-3 zoning.

Jose Miranda provided information and details specific to the proposed project. Mr. Mandrick indicated the change of use would trip impact fee collection. The applicant was also advised to obtain a parking agreement and meeting with the Building Official to ensure building code compliance.

4.2 Change of Use Discussion: 1002 S. 8th Street – Willlys Assis, Owner of LaMancha Painting and Home Repair, automobile repair to office/showroom. MU-8.

The applicant was not present and the next agenda item was called.

4.3 Pre-Application Discussion: 2149 Sadler Road – John Cotner, Cotner & Associates, 4,200 square foot multi-tenant commercial building. This is the commercial out parcel associated with the Cape Sound PUD.

John Cotner provided information and details specific to the proposed request.

4.4 Pre-Application Discussion: Airport Road – Christopher Nardone AIA, Passero Associates, three bulk hanger on airport property. I-A zoning.

Applicants provided information and details specific to the request. Mr. Platt advised the applicants to

DRAFT

move forward with a formal application.

5. NEW BUSINESS

5.1 SPR 2019-03 – Simmons Road Park

Asa Gillette was present to discuss the proposed park.

6. OLD BUSINESS

6.1 SPR 2019-01 – RaynorStarr

7. DEVELOPMENT INQUIRIES FROM APPLICANTS NOT ON THE AGENDA- DISCUSSION ONLY, NO ACTION TO BE TAKEN.

7.1 Sean Watkins of Fernandina Dojo was present to discuss the relocation of the karate studio into what used to be Cato retail store in the Walmart plaza. This will be a change of use. Impact fee calculation and ADA compliance were discussed. Mr. Platt advised the applicant to move forward to permitting.

8. COMMITTEE BUSINESS

9. ADJOURNMENT – 10:27 AM

Jacob Platt

Engineering Plans

For

224 North 2nd Street

for

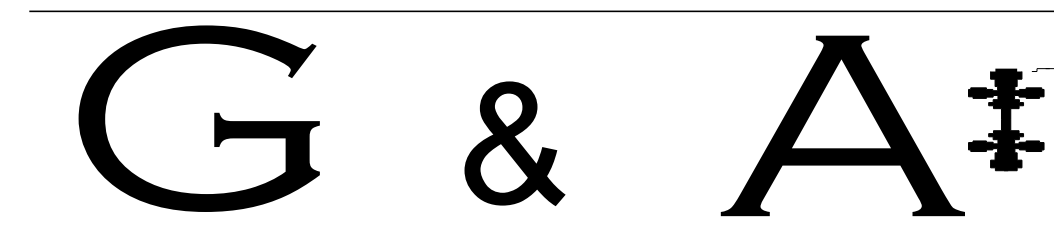
Page Properties

North 2nd Street
Fernandina Beach, Florida

Gillette & Associates, Inc.

Civil & Environmental Engineering
Mechanical & Structural Engineering
Permitting & Construction Management

20 South 4th Street Amelia Island, Florida 32034
Phone: (904) 261-8819



Issue Date:
September 11, 2019

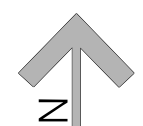
G&A Project
No.: 19-80.10

224 North 2nd Street

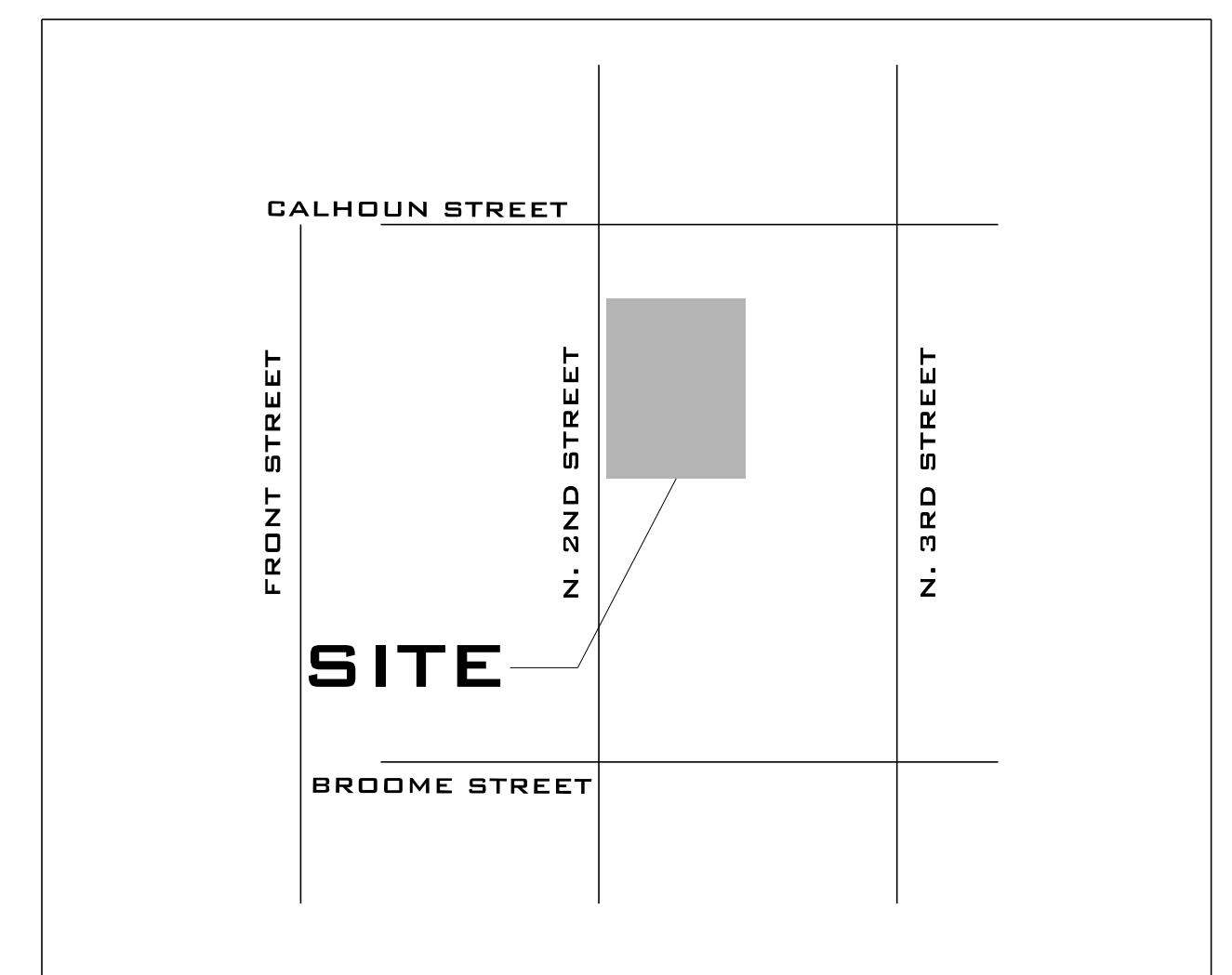
FOR

Page Properties

RELEASED FOR CONSTRUCTION BY _____



SITE LOCATION MAP



GENERAL NOTES

P.I.N.- 00-00-31-1800-0008-0102 & 00-00-31-1800-0008-0080

ZONING- C-3

FLUM- CENTRAL BUSINESS DISTRICT

PROPOSED USE- MIXED-USE (COMMERCIAL & RESIDENTIAL)

LOT SIZE- 15,625 SF = 0.36 ACRES

MAX BLDG. HEIGHT- 45'

MAX IMP. SURFACE RATIO- 0.75 (0.69 SHOWN)

MAX FLOOR AREA RATIO- 2.0 (0.80 SHOWN)

MAX DENSITY- 34 UNITS / ACRE (33 UNITS/ACRE SHOWN)

SETBACKS- NONE

LIGHTING TO BE BUILDING MOUNTED

TRASH TO BE COLLECTED VIA ROLL-OUT BINS

PERVIOUS PAVERS TO BE CLEANED OR VACCUMMED
AT MINIMUM EVERY 6 MONTHS, AND INSPECTED
ANNUALLY FOR INFILTRATION RATES

PARKING NOTES

BUSINESS/COMMERCIAL-1 SPACE / 300 SF GFA
 $975 \text{ SF} \times (1 \text{ SPACE} / 300 \text{ SF}) = 3 \text{ SPACES} / \text{UNIT}$
 $3 \text{ UNITS} \times (3 \text{ SPACES} / \text{UNIT}) = 9 \text{ SPACES}$

RESIDENTIAL-1.5 SPACES PER DWELLING UNIT IN CRA
 $9 \text{ DWELLING UNITS} \times 1.5 = 14 \text{ SPACES}$

SHARED PARKING APPLIES FOR RESIDENTIAL AND COMMERCIAL SPACES IN THE SAME AREAS,VACANT RESIDENTIAL SPACES DURING THE DAY.

TOTAL PARKING REQUIRED = 14 TOTAL SPACES

ON-STREET SPACES SHOWN - 4 SPACES
OFF-STREET SPACES SHOWN- 10 SPACES

ADA PARKING- 1 SPACE PER 25 SPACES = 1 SPACE
SPACES SHOWN: 1 ADA & 13 STANDARD SPACES

LEGEND

- *LANDSCAPED AREA*
- *BUILDING FOOTPRINT*
- *CONCRETE*
- *PERVIOUS PAVERS*
- *GRAVEL*

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A	LA	09/11/9	TAC Submittal
No.	Bv	Date	Revision

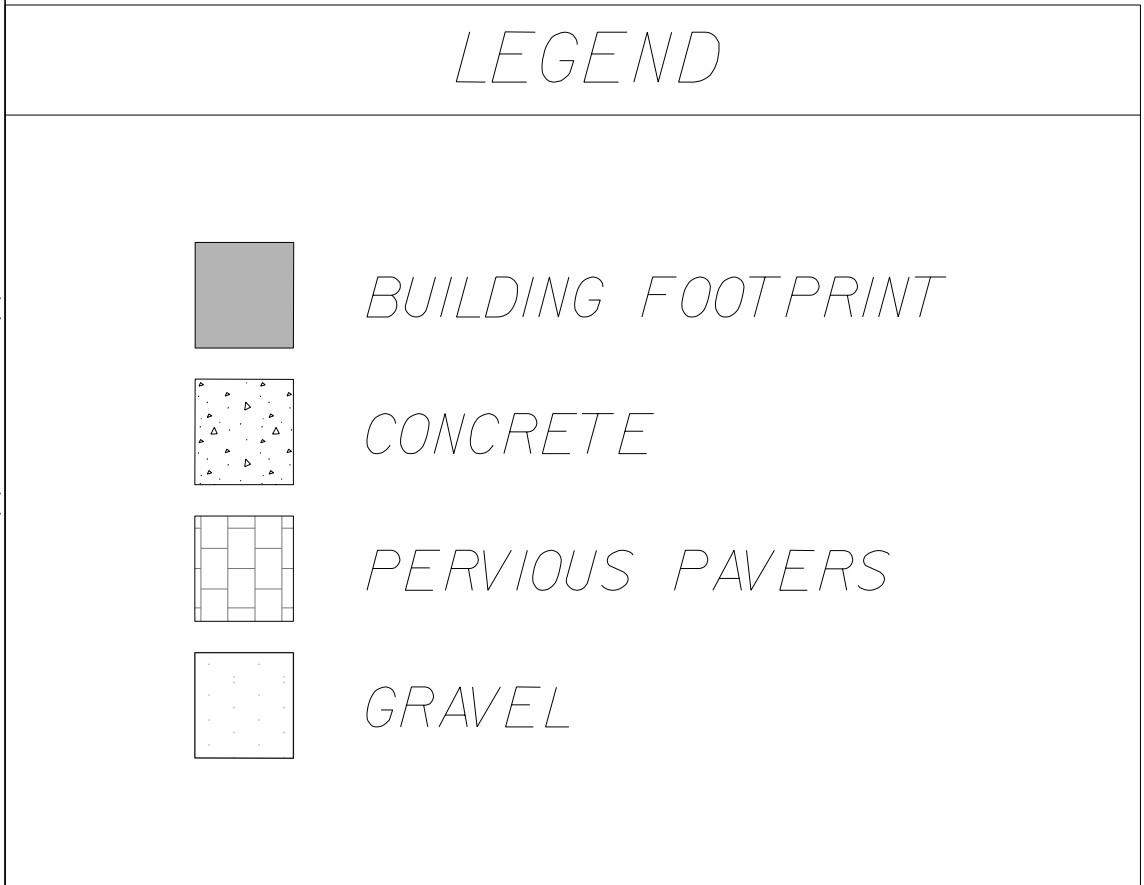
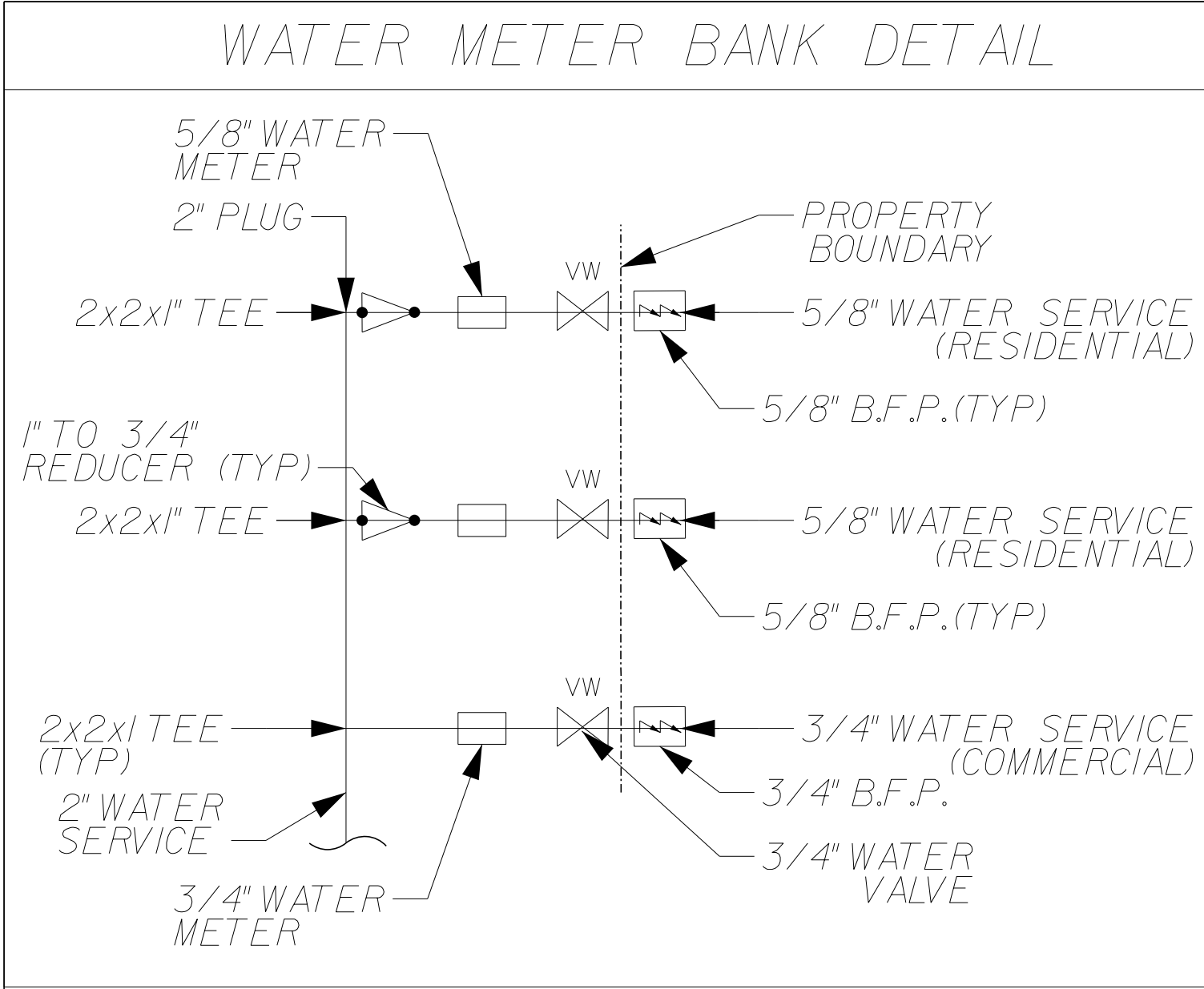
QA/QC: AG

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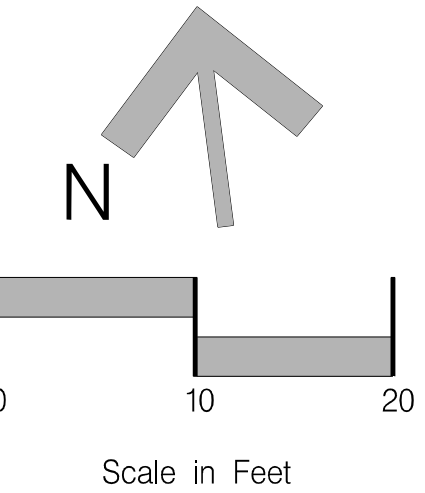
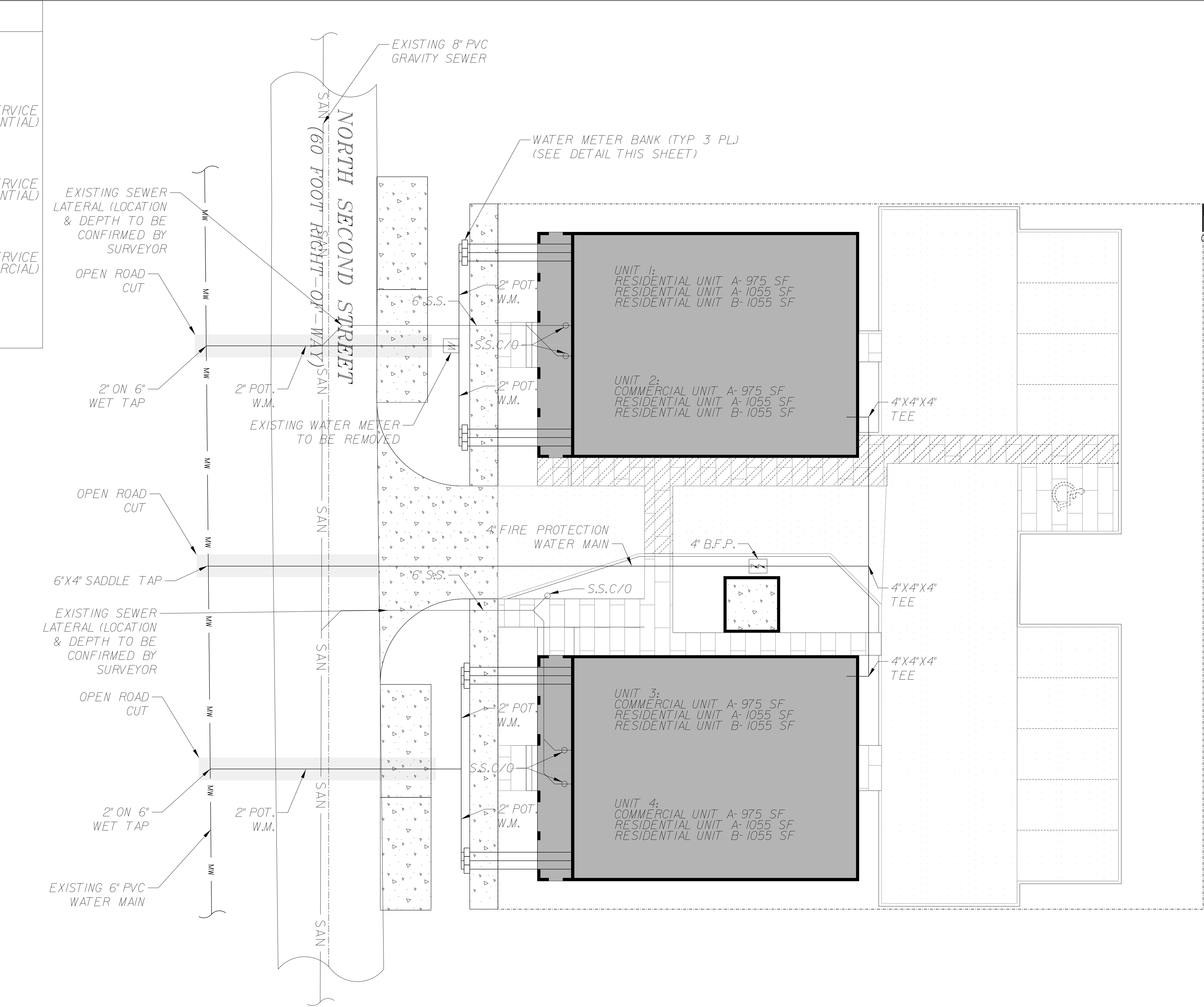
PHONE: (904) 261-8819

Registered Professional

Project No.
19-80-10



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No.	By	Date	Revision		

Scale: 1" = 20'	
Project Mgr: AG	
Designed by: AG	
Drawn by: LA	
QA/QC: AG	
Gillette & Associates, Inc. 20 South 4th Street Fernandina Beach, FL 32034	
Certificate of Authorization No.9332	
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GILLETTE & ASSOCIATES, INC.
20 SOUTH 4TH STREET
FERNANDINA BEACH, FL 32034
PHONE: (904) 261-8819

Page Properties

224 North 2nd. Street

UTILITY PLAN

Registered Professional

Sheet No.
UT-1
6 of 12
Issue Date
September 11, 2019
Project No.
19-80-10

TREE PROTECTION DETAIL

TREE MITIGATION LEGEND

TREE IN POOR HEALTH

TREE TO BE RETAINED

TREE TO BE REMOVED

CRITICAL ROOT ZONE

TREE PROTECTION BARRIER

NOTE TO CONTRACTOR :

REQUIRED TREE PROTECTION BARRICADES MUST BE INSPECTED BY THE CERTIFYING ARBORIST PRIOR TO ANY CONSTRUCTION ACTIVITIES, AND REMAIN INTACT THROUGHOUT CONSTRUCTION. ENCROACHMENT INTO OR FAILURE TO MAINTAIN TREE BARRICADES WILL RESULT IN ENFORCEMENT ACTION WHICH MAY INCLUDE CITATIONS AND/OR BUILDING/CLEARING PERMIT REVOCATION AS PROVIDED BY COUNTY ORDINANCE.

224 N. 2nd Street Count and Cumulative Dbh														
Tree ID	Species	DBH	Health (1-5)	DBH w Credits	Retained (Y or N)	DBH Retained with Credits	Comment							
1	SP	15	3	30	N		tree leans significantly,							
2	SP	10	5	15	N		Growth tip has been							
3	LAU	20	2	60	N		Tri-dominate leaders split							
4	LAU	31	4	93	N		Multiple co-dominate							
5	LAU	16	4	32	N		Co-dominate split in stem							
6	LAU	13	3	19.5	N		Overall healthy, some							
7	LAU	17	2	34	N		Overall healthy, Minor							
8	HB	12	2	18	N		Overall healthy, Minor							
9	LAU	17	3	34	N		Overall healthy and good							
10	LAU	14	2	28	Y	28	Overall healthy, Minor							
11	LAU	15	2	30	Y	30	Overall healthy, Minor							
12	PCN	12	3	18	Y	18	poor growth form and							
13	LAU	12	2	18	N		Overall appears healthy							
14	HB	13	3	19.5	N		good form and structure,							
15	HB	30	3	90	Y	90	good form and structure,							
16	CAM	36	5	108	N		FLEPLC Invasive Plant							
17	HB	17	3	34	Y	34	Tri-dominate leaders split							
		Pre	w Bonus		Post									
Total		300	681		200									
Health Status:			3=keep tree but has defects											
1=no apparent defect			4=poor health and suggest removal											
2=minor defects			5=severe defect and should be removed.											
* Preservation Credits			dbh removed for health reasons											
3X for dbh more than 19"														
2X for dbh more than 13" up to 18"														
1.5X for dbh more than 7" up to 12"														
		# Stems	Dbh (in)	Dbh w credits*										
Total on Site		17	300	681										
Required Replacement (25% DBH)				75										
Preserved		5		200										
Total on site				200										
Net				125					Preservation Credits (in)					

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Date

09/11/19

09/11/19

TRC Submittal

Revision

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Designed by: AG

Drawn by: LA

QA/QC: AG

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224 North 2nd.Street

TREE MITIGATION PLAN

Registered Professional

Sheet No.
TM-1

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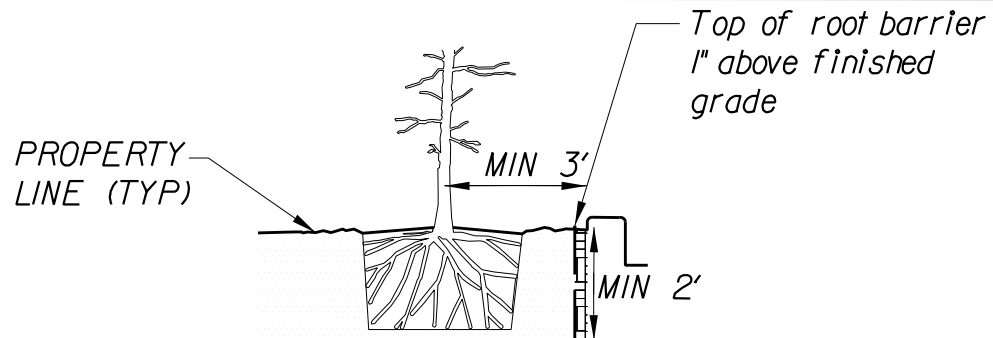
Issue Date
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Project No.
19-80-10

INTERNAL PLANTING PLANT/MATERIAL SCHEDULE				
	QUANTITY	KEY	SPECIES	SIZE/REMARKS
	405	PA	PENNISETUM ALOPECUROIDES FOUNTAIN GRASS	LP50 18"x18" SPACING
	75	VO	VIBURNUM OBOVATUM WALTER'S VIBURNUM 'MRS SCHILLERS'	MIN 18" HT.,15" WD. 3' SPACING
	45	SM	SABAL MINOR DWARF BLUESTEM PALMETTO	MIN 18" HT.,15" WD. 3' SPACING
	8	SP	SABAL PALMETTO CABBAGE PALM	10' MIN HT
	3	UP	ULMUS PARVIFOLIA 'ALLEE' CHINESE ELM 'ALLEE'	8' MIN HT,2.5' CAL.
	6	LxN	LAGERSTROEMIA x 'NATCHEZ' CRAPE MYRTLE 'NATCHEZ'	8' MIN HT. 6' COMBINED CAL.
	3	QV	QUERCUS VIRGINIANA LIVE OAK	8' MIN HT,2.5' CAL.
	840 SF	SOD	STENOTAPHRUM SECUNDATUM ST.AUGUSTINE SOD	LAYERED EVENLY WITHOUT GAPS
		MULCH	LONGLEAF PINESTRAW	3" DEEP

NOTE: ALL STREET TREES TO BE PLANTED WITH ROOT BARRIER

ROOT BARRIER DETAIL

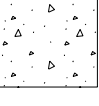


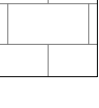
NOTES:
1.Root barriers shall be installed per manufacturer's specifications
2.Root barriers shall be installed when root ball is located within 8' of pavement, on all street trees, and all trees within 10' of underground utilities.

LEGEND

 GRAVEL

 BUILDING FOOTPRINT

 CONCRETE

 PERVIOUS PAVERS

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A	LA	09/11/19	TRC Submittal
No.	By	Date	Revision

Scale: 1" = 20'
Project Mgr: AG
Designed by: AG
Drawn by: LA
QA/QC: AG

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Fernandina Beach, FL 32034

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PIN: 00-00-31-1800-0008-0101
ZONING: I-1
USE: RESTAURANT

224 North 2nd. Street

LANDSCAPE PLAN

Sheet No.
LS-1

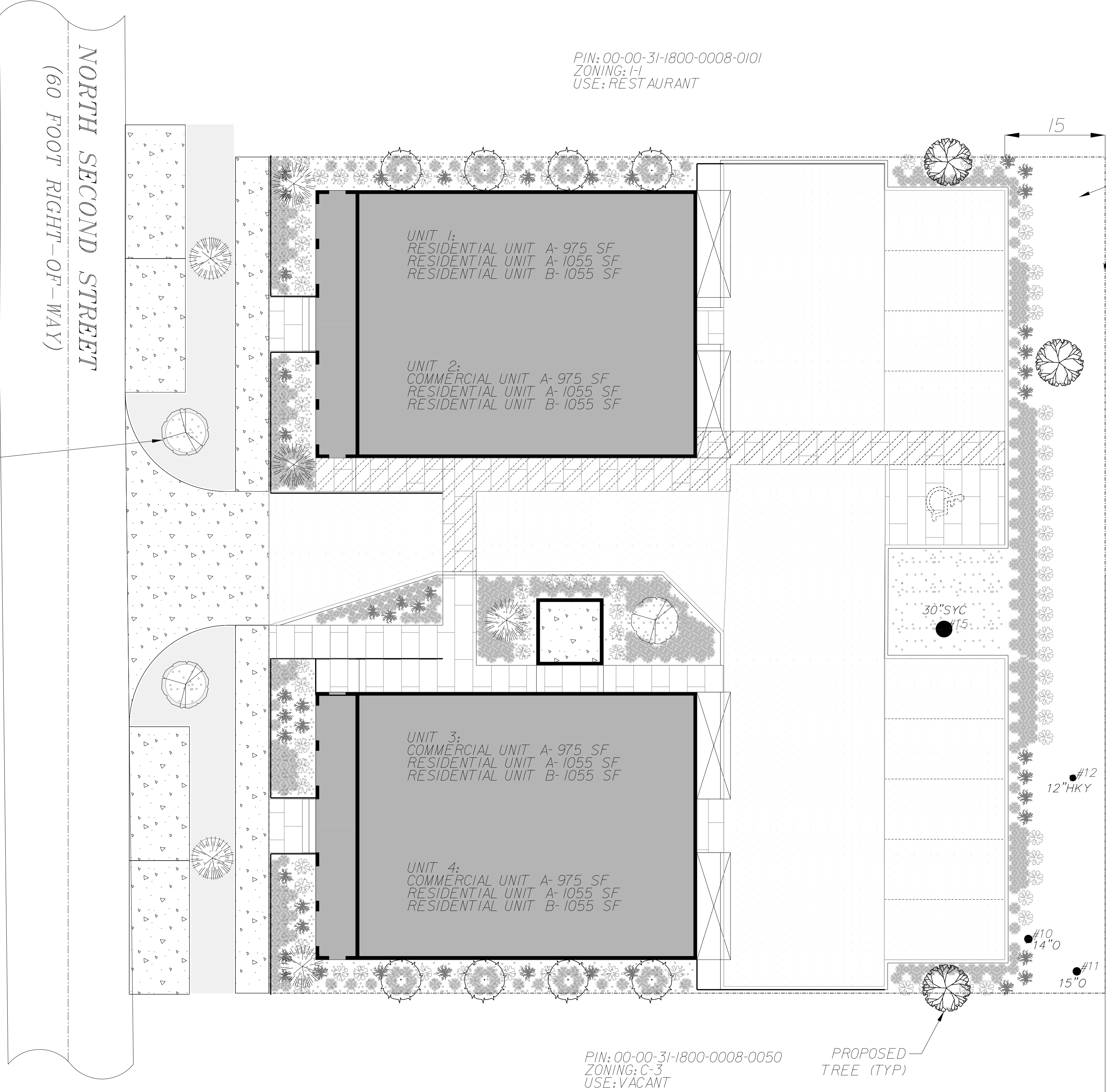
8 of 12

Issue Date
September 11, 2019

Project No.
19-80-10

Registered Professional

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\$\$\$\$\$ Name\$\$\$\$\$



LANDSCAPING NOTES

P.I.N: 00-00-31-1800-0008-0050 & 00-00-31-1800-0008-0080

ZONING- C-3

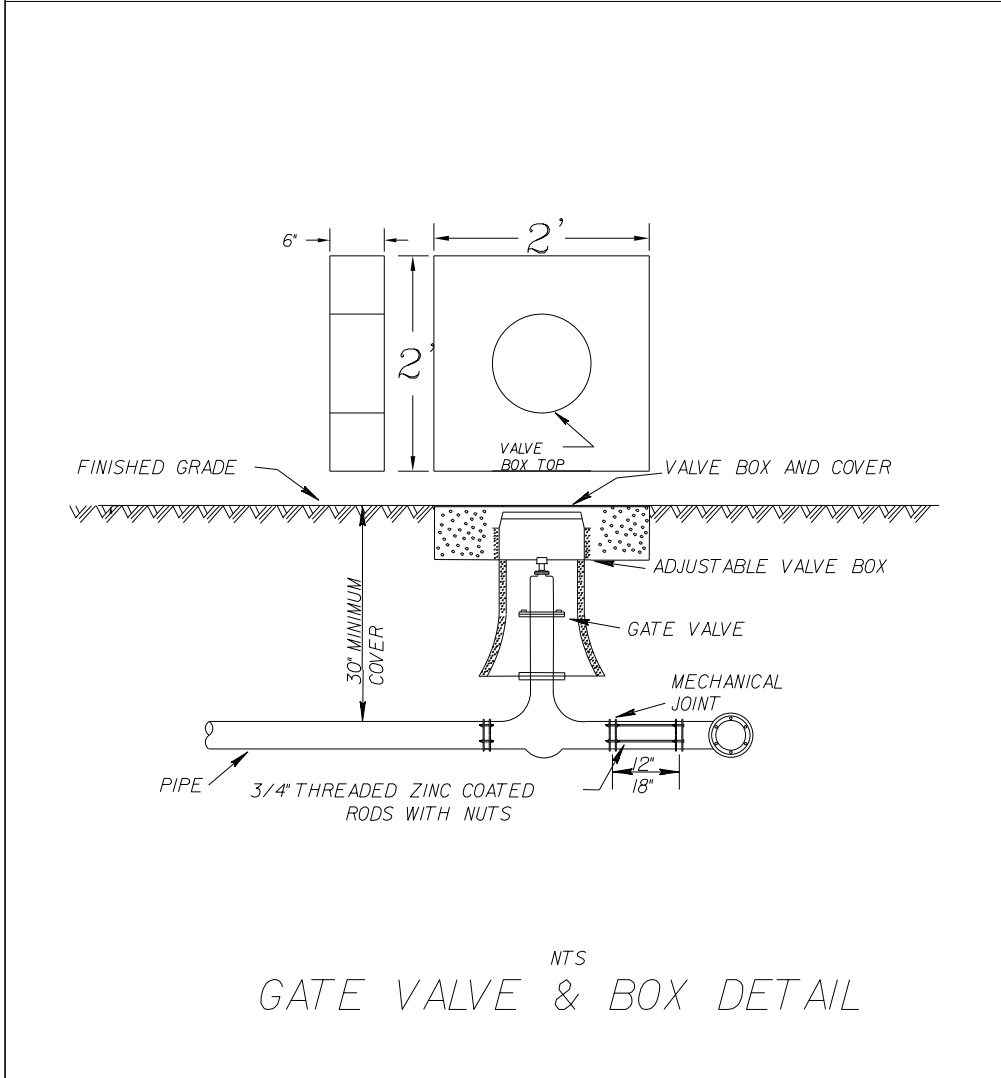
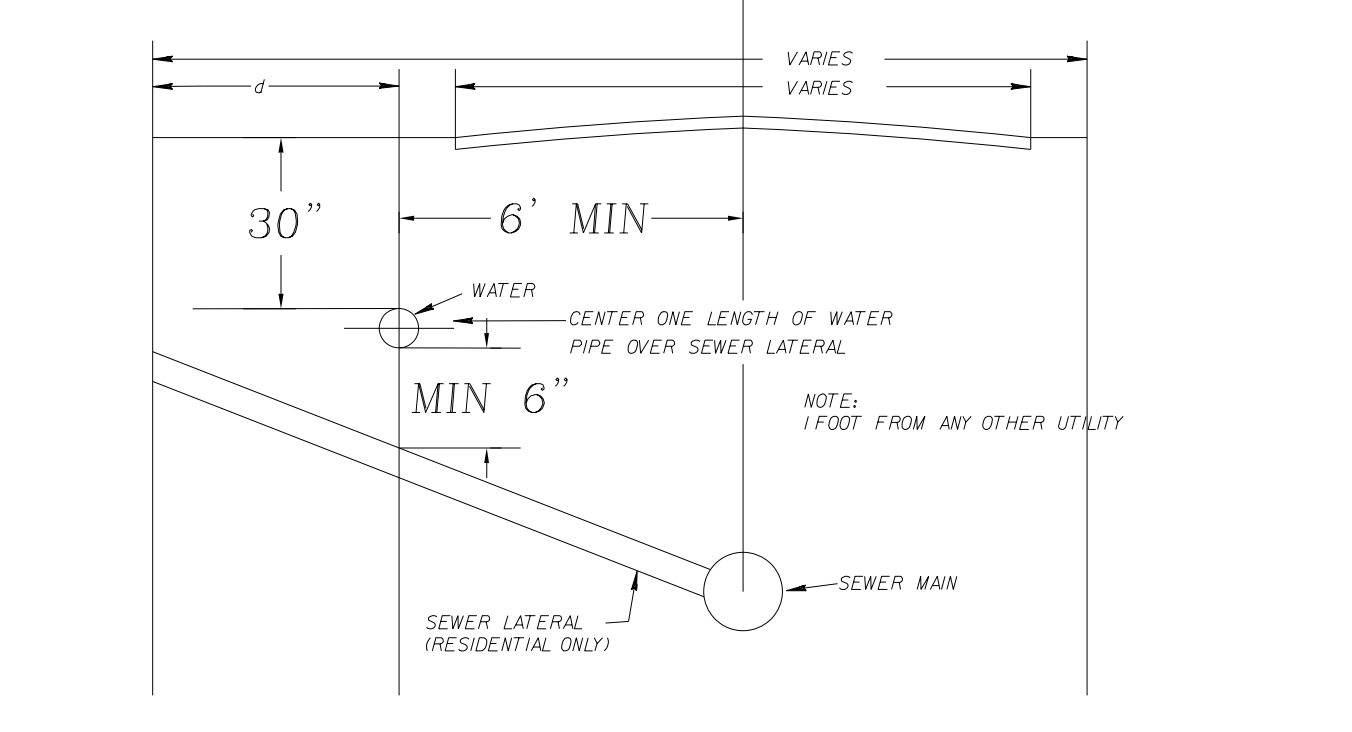
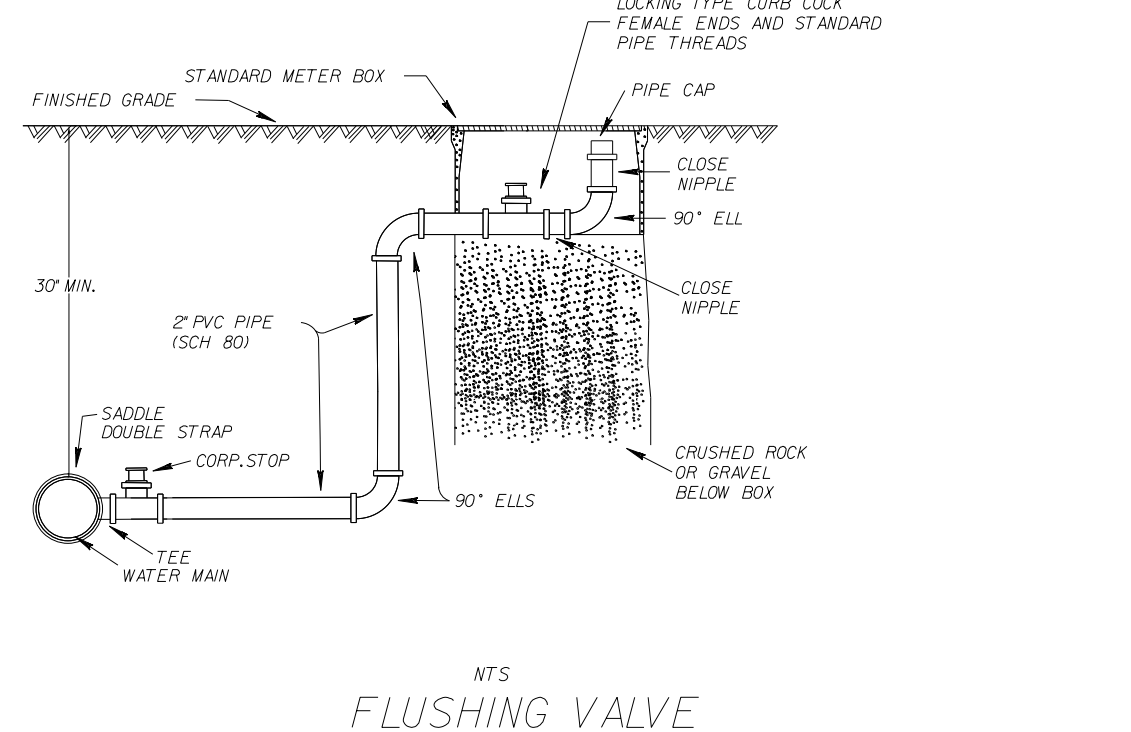
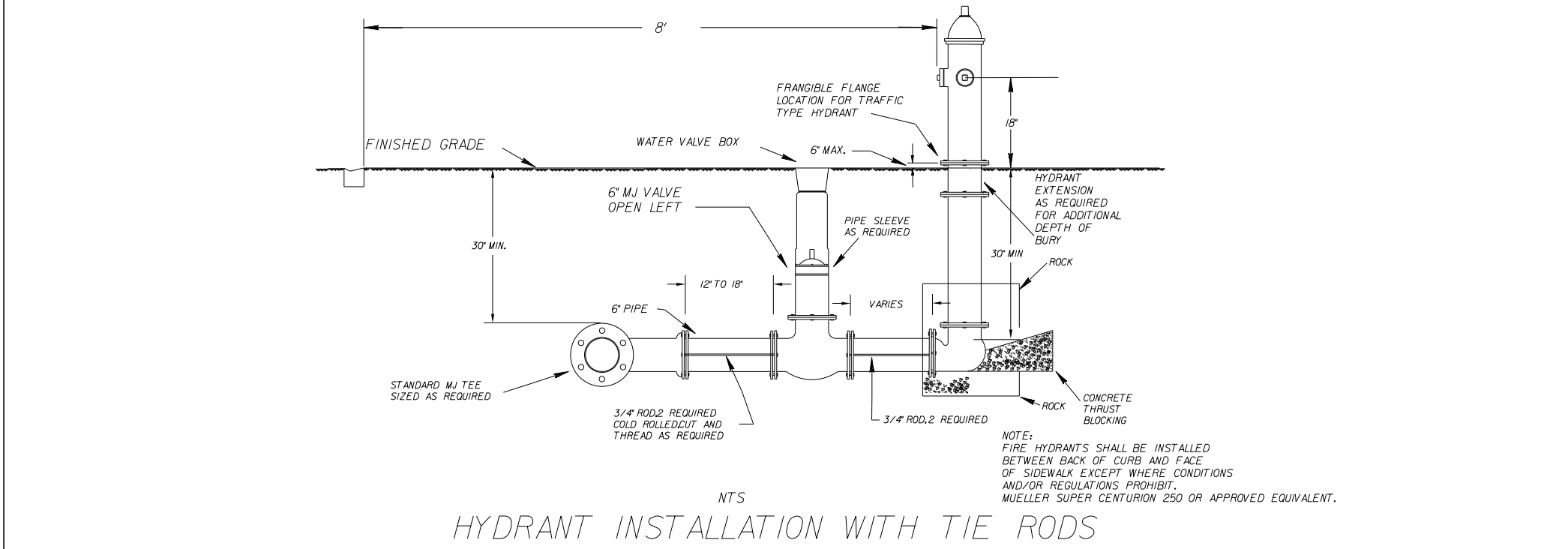
LOT SIZE- 15,625 SF

MIN. LANDSCAPED AREA (10% LOT) AREA:
15,625 SF X 0.10 = 1,568 SF
(1,608 SF PROPOSED)

MINIMUM SHADE TREE (ST) REQUIREMENTS:
1 ST / 1,500 SF LOT SIZE 15,625 SF X 1/1,500 (ST/SF) = 10 ST
5 SHADE TREES RETAINED ON SITE
7 SHADE TREES PROPOSED

PARKING LOT LANDSCAPING:
10% GROSS AREA FOR VEHICULAR USE
5,908 SF X 0.10 = 591 SF REQUIRED,
2,262 SF PROPOSED

LANDSCAPE BUFFERS:
EAST- TYPE C
2 ST / 100' X 125' = 2 ST
4 UST / 100' X 125' = 4 UST
SHOWN: 5 PRESERVED, 3 PROPOSED

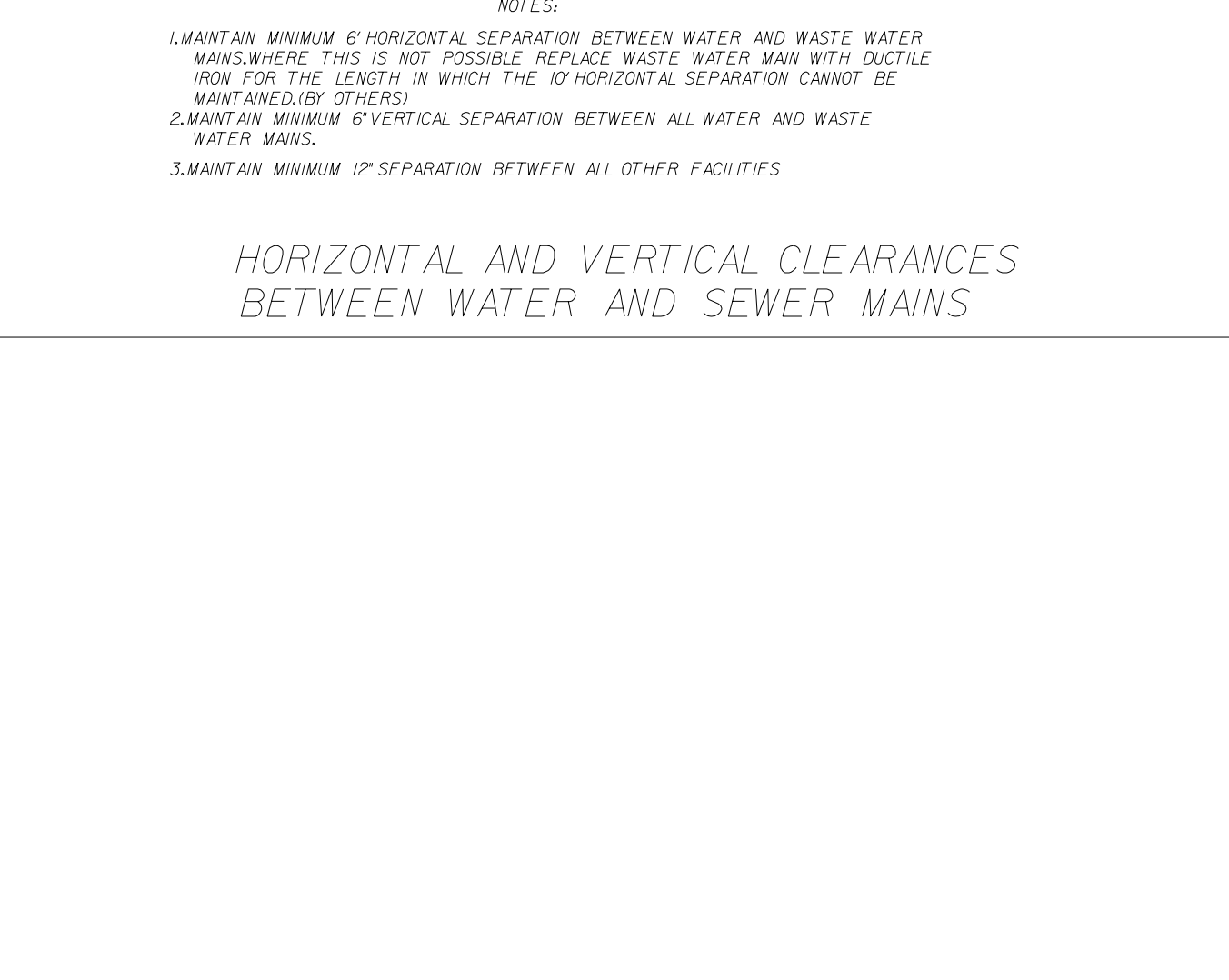


NT.S.

THRUST BLOCKS FOR BENDS & TEE'S

1/4" BENDS				1/8" BENDS				1/16" BENDS				TEE			
SIZE	A	B	CONC.	SIZE	A	B	CONC.	SIZE	A	B	CONC.	SIZE	A	B	CONC.
8"	10"	10"	3/2"	8"	10"	10"	3/2"	8"	10"	10"	3/2"	8"	10"	10"	3/2"
10"	12"	12"	1/2"	10"	12"	12"	1/2"	10"	12"	12"	1/2"	10"	12"	12"	1/2"
12"	14"	14"	1/2"	12"	14"	14"	1/2"	12"	14"	14"	1/2"	12"	14"	14"	1/2"
14"	16"	16"	1/2"	14"	16"	16"	1/2"	14"	16"	16"	1/2"	14"	16"	16"	1/2"
16"	18"	18"	1/2"	16"	18"	18"	1/2"	16"	18"	18"	1/2"	16"	18"	18"	1/2"
18"	20"	20"	1/2"	18"	20"	20"	1/2"	18"	20"	20"	1/2"	18"	20"	20"	1/2"
20"	22"	22"	1/2"	20"	22"	22"	1/2"	20"	22"	22"	1/2"	20"	22"	22"	1/2"

NOTE:
1. ALL BEARING SURFACES TO BE CARRIED TO UNDISTURBED SOIL.
2. THESE TABLES SHOW MINIMUM SIZE THRUST BLOCKS FOR GOOD SOIL (A-1 THROUGH A-3, CLEAN SAND AND GRAVELS).
3. POOR SOIL (A-4 THROUGH A-8, SILTY SOILS, CLAYS, MUCK AND PEAT) WILL REQUIRE LARGER THRUST BLOCKS.



TIE RODS

TWO RODS ON ALL SIX INCH (6") PIPE
THREE RODS ON ALL EIGHT INCH (8") PIPE
FOUR RODS ON ALL TEN AND TWELVE INCH (10" & 12") PIPE

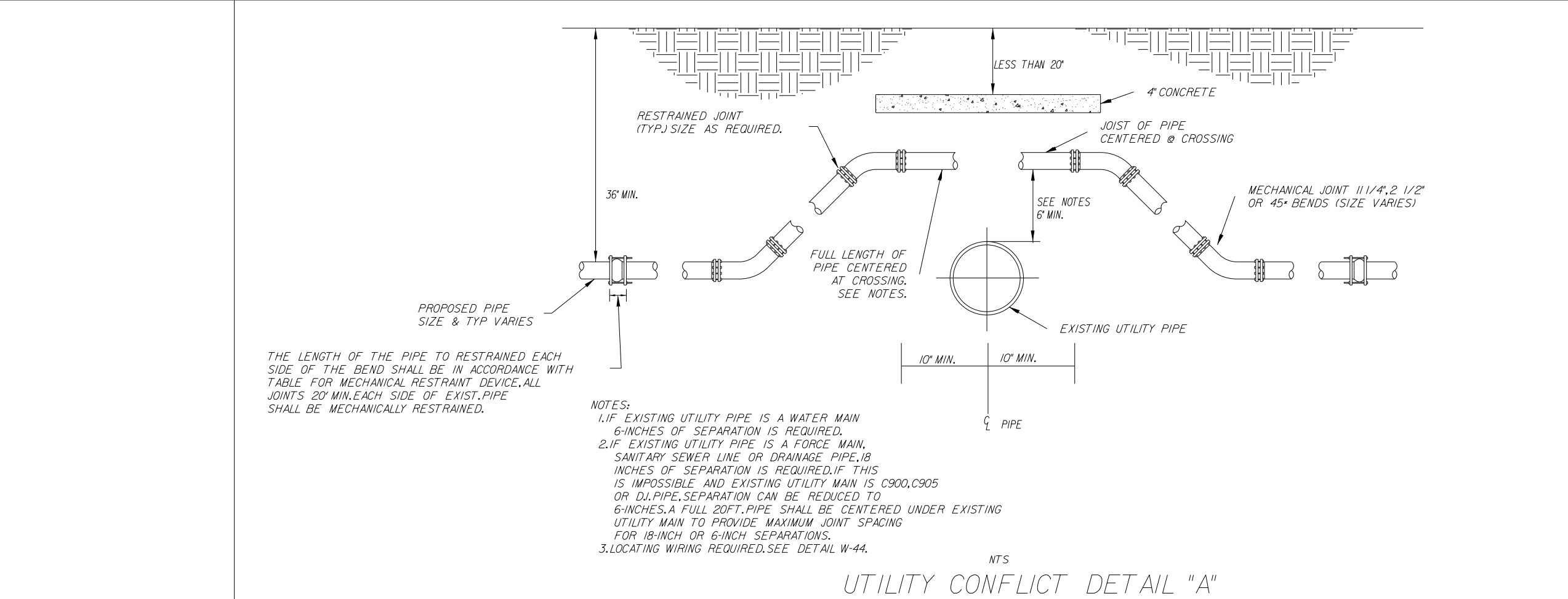
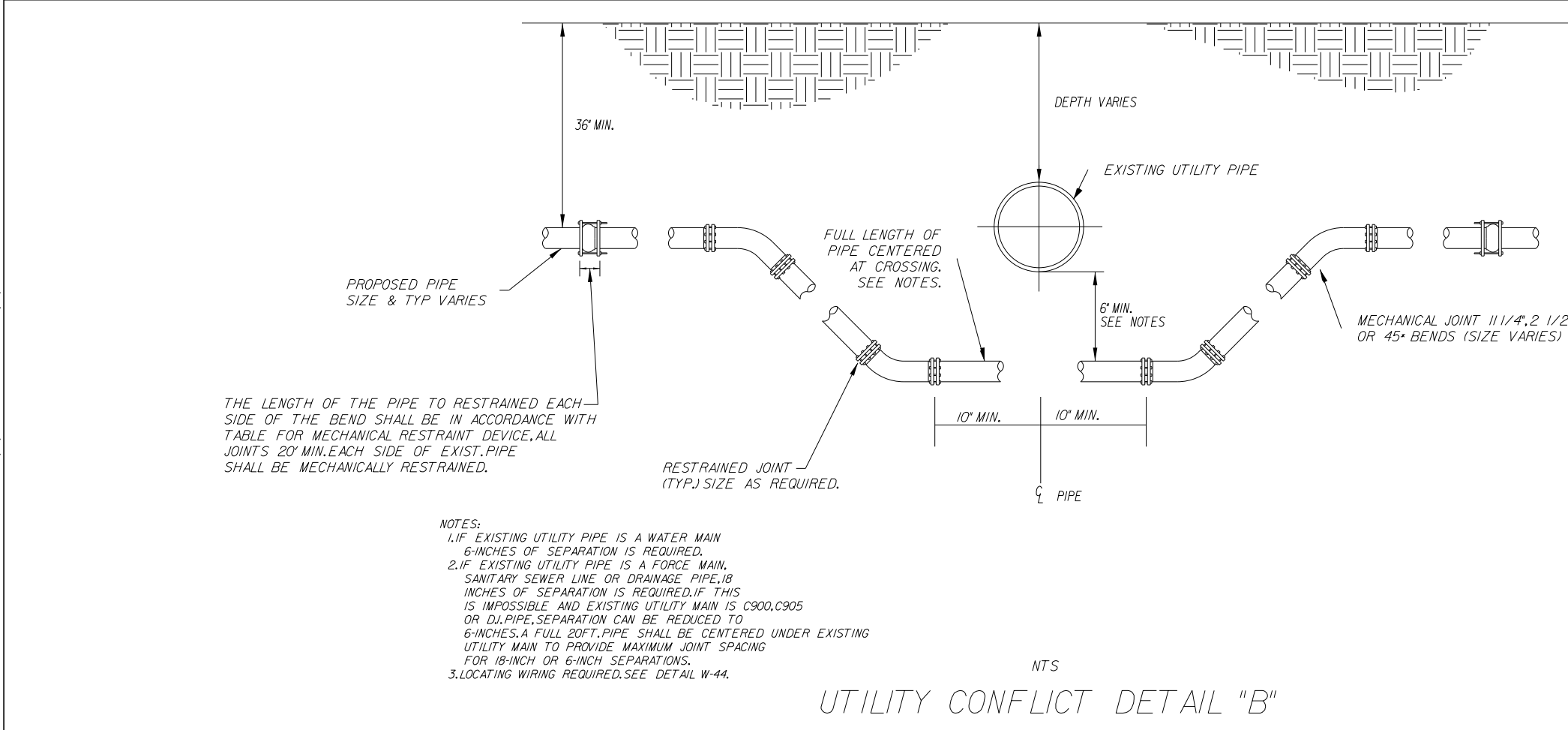
MINIMUM LENGTH TO BE RESTRAINED ON EACH SIDE OF FITTING (FEET)										
PIPE SIZE	11	1/4	22	1/2	45	90	TEE	VALVE	CAP	REDUCER
4	2	4	7	18	20	39	39	N/A		
6	2	5	10	25	20	55	55	28		
8	3	6	13	32	20	72	72	30		
10	4	8	16	38	20	86	86	29		
12	4	9	19	45	20	102	102	50		
16	6	11	23	57	20	131	131	30		

BELL RESTRAINT REQUIREMENTS

MATERIALS		
ITEM	QUANT.	DESCRIPTION
1	1	2.5"-10" VALVE, DOUBLE CHECK OR REDUCED PRESSURE
2	4	2.5"-10" BEND - 90° F-F
3	2	2.5"-10" D.I.P. (48" LONG) F-PE
3A	1	2.5"-10" D.I.P. (24" LONG) F-PE (OPT.X)
4	3	2.5"-10" FLANGE, D.I.P.
5	2	2.5"-10" VALVE, GATE, D.I., F-F, OS+Y (RESILIENT SEAT)
6	1	2" IRON PIPE/CONCRETE FOUNDATION
7	2	THRUST BLOCK
8	2	SUPPORT BLOCKING UNDER VALVES (6" AND LARGER SIZES)

LARGE WATER SERVICE
DOUBLE CHECK AND REDUCED PRESSURE
BACKFLOW PREVENTION
SINGLE SERVICE: 2 1/2" - 10"

BACKFLOW PREVENTER



CONTRACTORS ARE REQUIRED TO PAINT NEW HYDRANTS SAFETY YELLOW AND MARK HYDRANTS. THE TOPS AND NOZZLE CAPS SHALL BE PAINTED WITH THE FOLLOWING CAPACITY INDICATOR COLOR SCHEME:

BLUE (SW4079) 1500GPM AND HIGHER
GREEN (SW4085) 1000-1499 GPM
ORANGE (SW4083) 500-999 GPM
RED (SW4081) LESS THAN 500 GPM

IT IS REQUIRED THAT ALL NEW AND RELOCATED WATER MAINS BE PRESSURE TESTED AND LEAKAGE TESTED IN ACCORDANCE WITH AWWA STANDARD C600.

IT IS REQUIRED THAT ALL NEW AND RELOCATED WATER MAINS BE DISINFECTED IN ACCORDANCE WITH AWWA STANDARD C651 AND RULE 62-555.345, F.A.C.

ALL WATER MAINS WILL BE CONSTRUCTED WITH BLUE C900-DR25 PIPE
ALL WATER SERVICES WILL CONSTRUCTED WITH WHITE PVC SCHEDULE 80 PIPE. BLUE SPRAY PAINT WILL BE APPLIED TO THE TOP SURFACE.
JOINT RESTRAINTERS MAY BE USED IN PLACE OF THRUST BLOCKS ON C900, DR25 PIPE, WITH APPROVAL OF THE CITY UTILITIES DEPARTMENT.

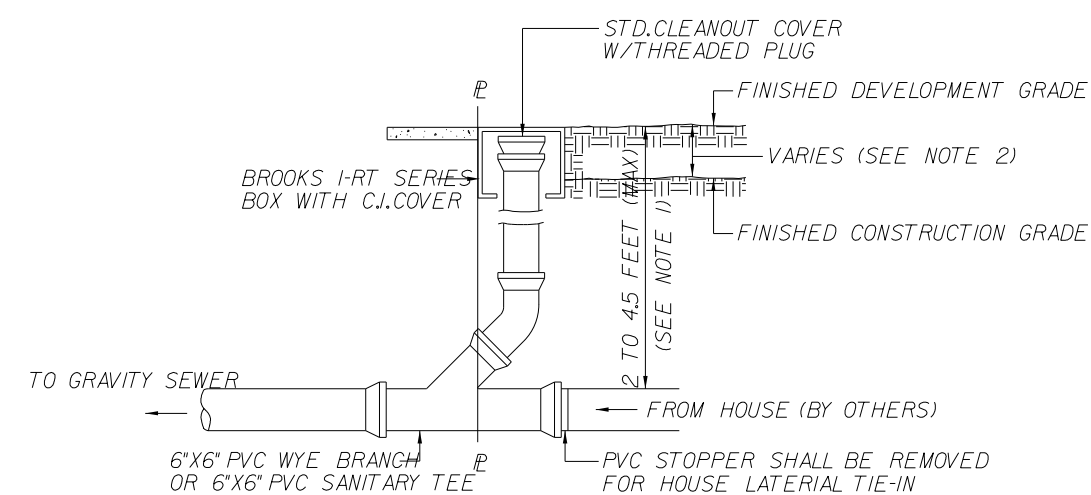
CITY OF FERNANDINA BEACH FLORIDA		WATER SPECIFICATIONS	
SCALE: N.T.S.		CITY OF FERNANDINA BEACH	
DATE: 2/5/98		FERNANDINA BEACH, FLORIDA 32034	
DRAWN BY: VLT			
REVISED BY: JMM			
DATE: 6/20/06			

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A	09/11/19	TRC Submittal			
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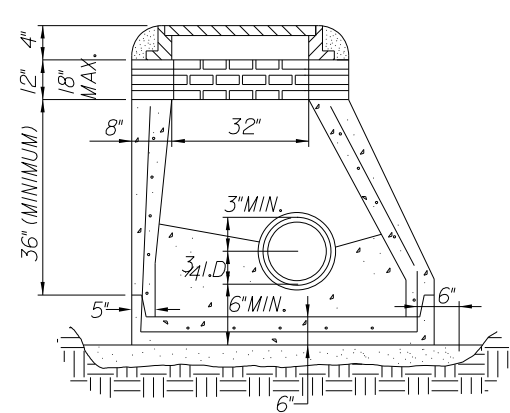
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FERNANDINA BEACH, FL 32034
PHONE: (904) 261-8819

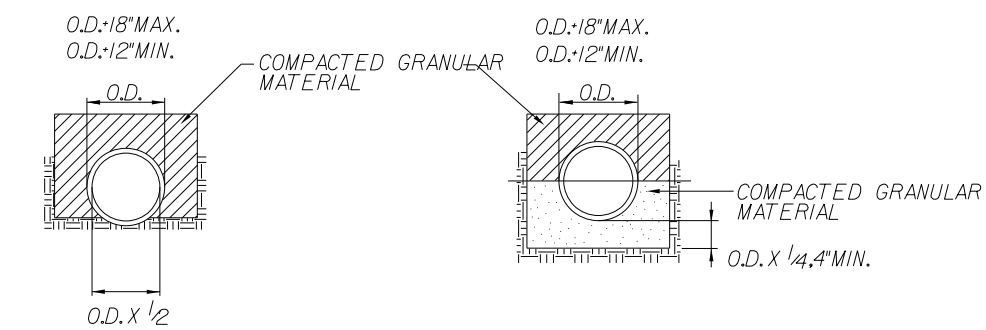
Page Properties	224 North 2nd. Street	WATER DETAILS	Sheet No. DT-2 10 of 12 Issue Date September 11, 2019 Project No. 19-80-10
		Registered Professional	



- NOTE:
1. DEPTH OF CLEANOUT SHALL BE SET BY DISTANCE TO HOUSE CONNECTION @ 1/4" PER FOOT, PLUS ONE FOOT.
 2. CONTRACTOR TO COORDINATE DEPTH WITH DEVELOPER.



SHALLOW MANHOLE

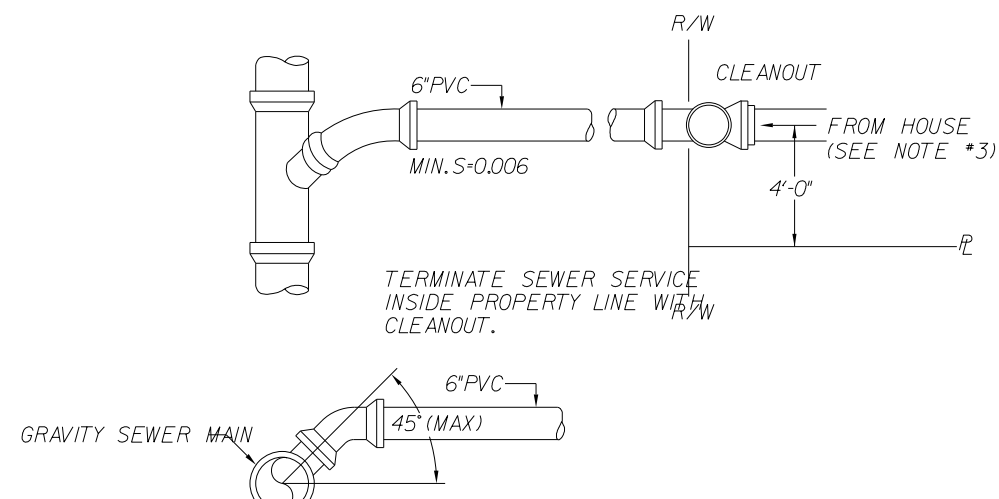


<u>TYPE I</u>	<u>TYPE II</u>
SHAPED BOTTOM W/TAMPED	COMPACTED GRANULAR BEDDING

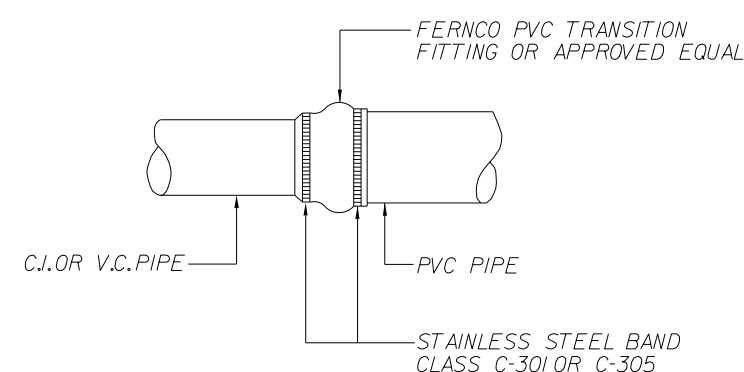
CLASS "B"

- ALL MANHOLES SHALL BE PRECAST CONCRETE AND CONFORM TO ASTM C-478 STANDARDS. MANHOLE CONES AND RISERS SHALL BE CONSTRUCTED OF 400 PSI TYPE II CEMENT WITH RIVER ROCK OR GRANITE AGGREGATE.
2. ALL PIPES SHALL BE CONNECTED TO THE MANHOLE USING A LOCK JOINT FLEXIBLE MANHOLE SLEEVE (ASTM C-923) OR APPROVED EQUAL.
3. THE EXTERIOR AND INTERIOR OF THE MANHOLE SHALL BE COATED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS WITH FABRITITE AS MANUFACTURED BY BRIGGS BITUMINOUS COMPOSITION COMPANY.
4. AIN INSIDE P.V.C DROP MANHOLE (TYPE "B") SHALL BE REQUIRED FOR MANHOLES WHICH ARE DEEPER THAN 18 INCHES. A 18 INCH DIA. SLOPE INVERT PIPE INVERT AND EFFLUENT PIPE INVERT. ALL OTHER DROPS SHALL HAVE A SLIDE CONSTRUCTED TO DIRECT THE FLOW INTO THE INVERT CHANNEL.
5. SEWER SERVICES SHALL BE CAST IRON IF 2 1/2 FEET OF GROUND COVER CAN NOT BE MAINTAINED OVER THE SERVICE LINE.
6. ALL DUCTILE IRON SEWER PIPE, WHERE SPECIFIED, SHALL BE CLASS 51 AND COMPLY WITH ANSI/AWWA C500/A2150 AND ANSI/AWWA C151/A201. DUCTILE IRON PIPE SHALL BE LINED WITH A FACTORY APPLIED INTERIOR POLYETHYLENE LINING IN ACCORDANCE WITH ANSI/A201 D1248.
7. THE MAXIMUM NUMBER OF DIPS IS ONE. 1 INCH DIP PER 135 LF OF PIPE, NO MORE THAN ONE DIP PER 135 LF OF PIPE. A DIP IS DEFINED AS A CHANGE IN ELEVATION OF 0.5 OR GREATER.

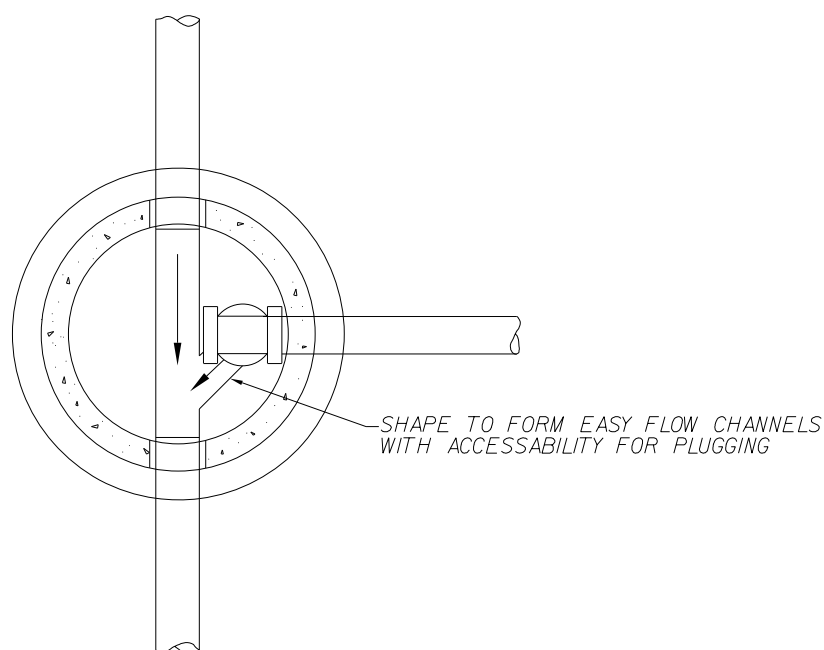
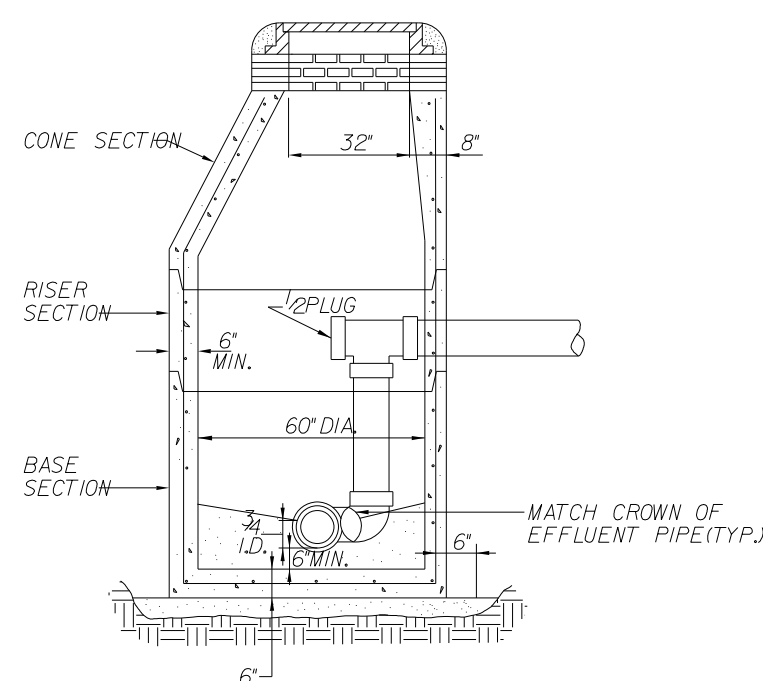
CLEANOUT



- NOTE:
1. SEWER SERVICE SHALL BE INSTALLED 4'-0" INSIDE PROPERTY LINES.
 2. TEMPORARY 4'x4'x8' POST, PAINTED RED AT TOP, TO BE INSTALLED FOR AIDING IN THE PROTECTION OF SEWER CLEAN OUTS. THE POST SHALL EXTEND 4' ABOVE GRADE.
 3. CONNECTION FROM HOUSE TO UNF SYSTEMS SHALL BE A HARD CONNECTION. FLEXIBLE CONNECTIONS SHALL NOT BE USED.

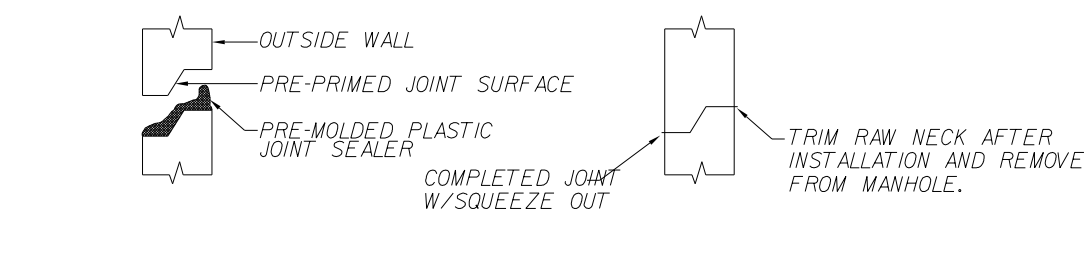


C.I.T.O PVC COUPLING ADAPTER

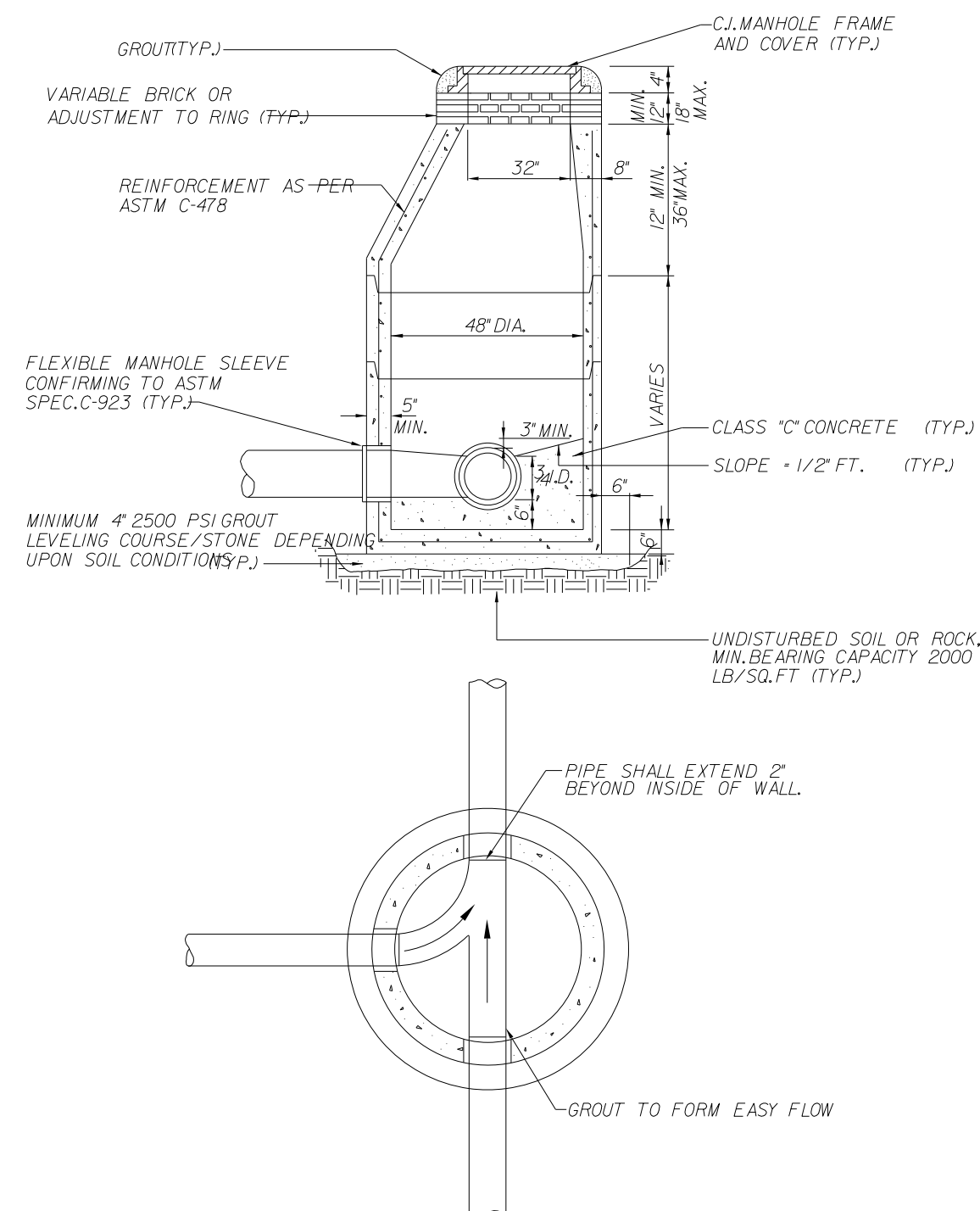


INSIDE PVC DROP CONNECTION TO MANHOLE

TYPE "B" MANHOLE



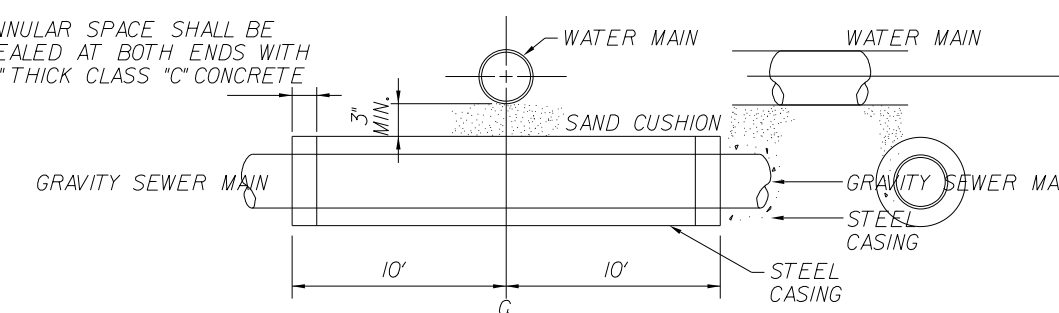
MANHOLE JOINT



STANDARD PRECAST SANITARY MANHOLE

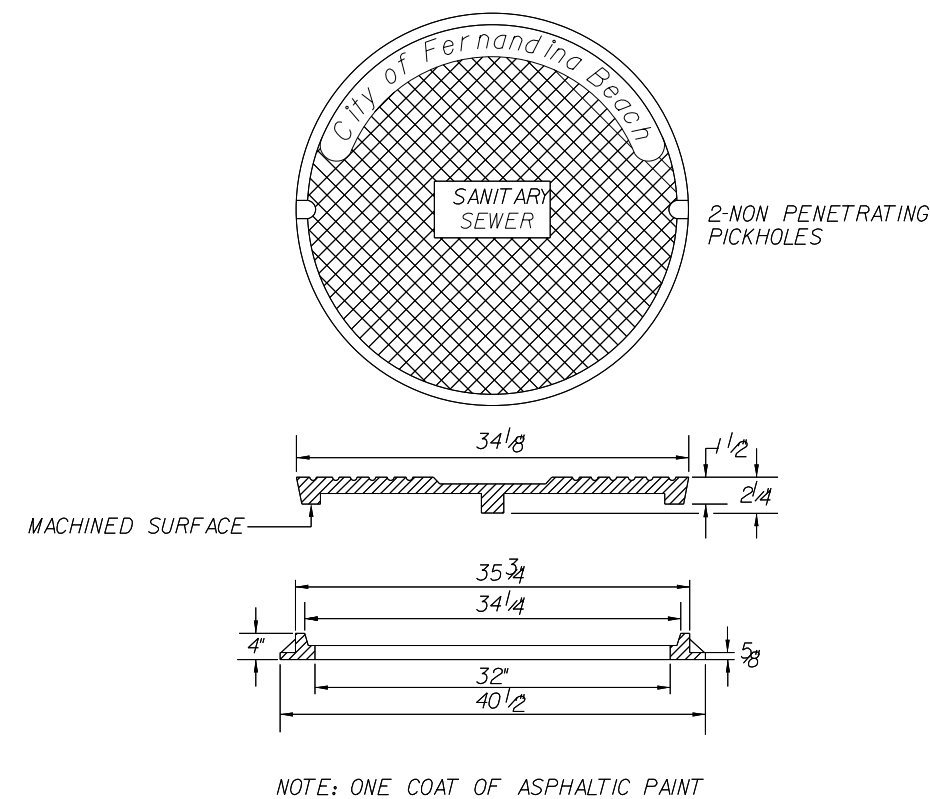
TYPE "A" MANHOLE

GRAVITY SEWER STANDARD SPECIFICATIONS



- NOTE:
1. SEWER MAIN SHALL BE ENCASED AS SHOWN ON THE ABOVE DETAIL WHERE LESS THAN 18 INCHES OF VERTICAL CLEARANCE IS MAINTAINED BETWEEN WATER MAIN AND SEWER MAIN.
 2. CLASS 51 STEEL CASING SHALL BE SIZED FOR 2 INCHES PLUS THE OUTSIDE DIAMETER OF THE CARRIER PIPE JOINT.
 3. THE ABOVE DETAIL APPLIES TO WATER MAIN ≥ 1 INCH DIAMETER AND LARGER

ENCASEMENT AT WATER LINE



NOTE: ONE COAT OF ASPHALTIC PAINT

MANHOLE COVER

\$\$\$code\$\$\$ \$\$\$\$time\$\$\$ \$\$\$FileName\$\$\$

K					Scale: 1" = 20'	
J						
I					Project Mgr: AG	Gillette & Associates, Inc.
H						20 South 4th Street
G					Designed by: AG	Fernandina Beach, FL 32034
F						
E					Drawn by: LA	Certificate of Authorization No.9332
D						
C					QAQC: AG	
B						
A	LA	09/11/19	A	TRC Submittal		DO NOT SCALE THIS DRAWING - DIMENSIONS AND NOTES TAKE
No.	By	Date	Rev	Revision		PREFERENCE. DRAWING IS REDUCED IF LESS THAN 22" x 34"

G & A⁺
GILLETTE & ASSOCIATES, INC.
20 SOUTH 4TH STREET
FERNANDINA BEACH, FL 32034
PHONE: (904) 261-8819

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224 North 2nd Street

SEWER DETAILS

Registered Professional

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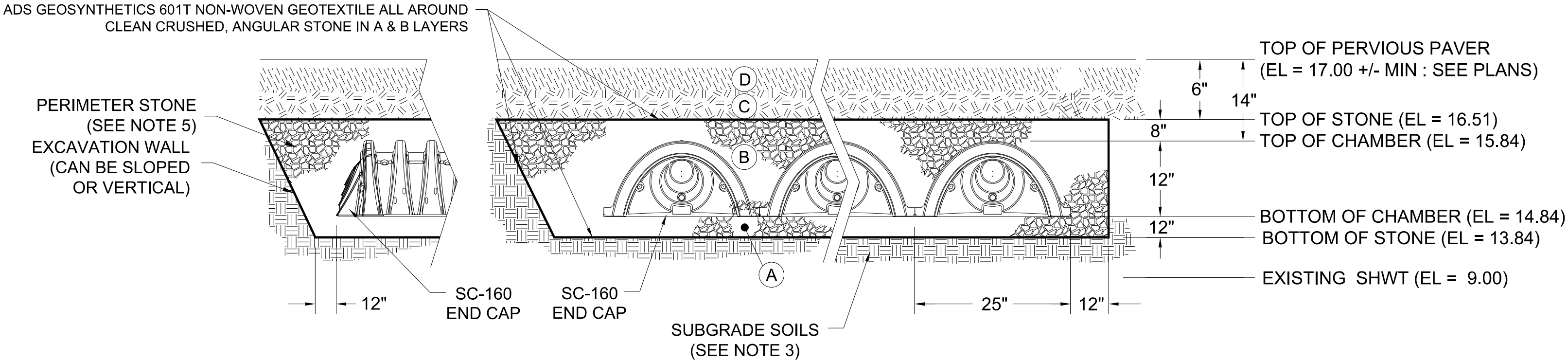
Issue Date
September 11, 2019

Project No.
19-80-10

ACCEPTABLE FILL MATERIALS: STORMTECH SC-160LP CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M145 ¹ A-1, A-2.4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



INFILTRATION GALLERY CROSS SECTION

NOTES:

1.SC-160LP CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS", OR ASTM F2922 "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".

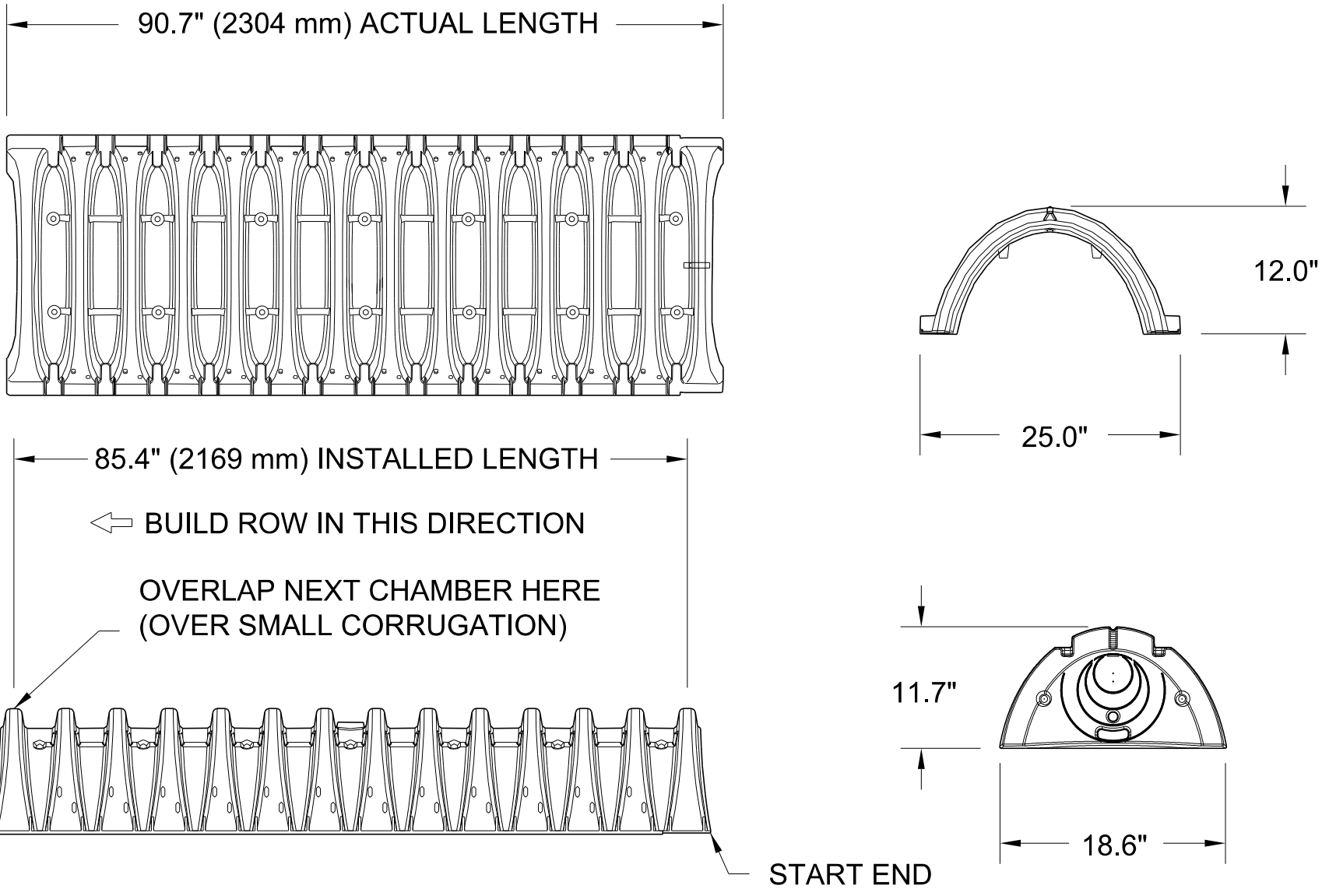
2.SC-160LP CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".

3."ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.

4.THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.

5.PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.

6.ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W x H x INSTALLED LENGTH) : 25.0" x 12.0" x 85.4"
CHAMBER STORAGE: 6.85 CUBIC FEET
MINIMUM INSTALLED STORAGE: 16.0 CUBIC FEET
WEIGHT: 24.0 LBS.

PART #	STUB	A
SC160IEPP08	8"	0.96"

ALL STUBS ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

NOTE: ALL DIMENSIONS ARE NOMINAL

STORMTECH SC-160LP CHAMBER

INFILTRATION GALLERY CONNECTION DETAILS

K

J

I

H

G

F

E

D

C

B

A

LA

09/11/19

TRC Submittal

No.

By

Date

Scale: NONE

Project Mgr: AG

Designed by: AG

Drawn by: LA

QA/QC: AG

Gillette & Associates, Inc.
20 South 4th Street
Fernandina Beach, FL 32034

Certificate of Authorization No.9332

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G & A

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20 SOUTH 4TH STREET
FERNANDINA BEACH, FL 32034

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Page Properties

224 North 2nd. Street

DRAINAGE GALLERY SHEET

Registered Professional

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Issue Date
September 11, 2019

Project No.
19-80-10



Civil & Environmental Engineering • Mechanical & Structural Engineering • Construction Management

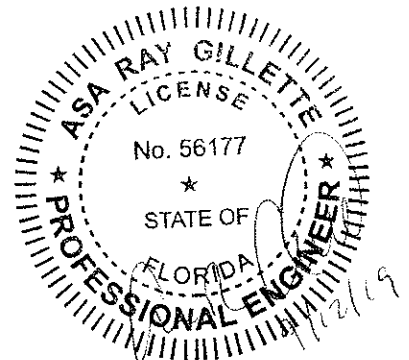
Page Properties

**224 North 2nd Street
FERNANDINA BEACH, FLORIDA**

BY

**Gillette & Associates, Inc.
20 South 4th Street
Fernandina Beach, FL**

Issue Date: September 11, 2019



PROJECT DESCRIPTION

The proposed project consists of two mixed use buildings, being constructed on a 15,625 ft² lot, on North 2nd Street, in the City of Fernandina Beach. The site will be served by an underground stormwater reservoir and vault system, designed to provide storm water treatment and meet pre vs. post discharge requirements of the City of Fernandina Beach for a 10-year rain event.

EXISTING CONDITIONS

The project site is currently vacant with no impervious areas, and no visible surface water. In its pre-developed state, the site has a single drainage basin, DA-1, which ranges in elevation from approximately 18.0' to 12.0'. Storm water is currently not contained on the site and flows from East to West and drains into North 2nd Street. This basin, which is the area of study for this report, encompasses the entire 15,625 ft² lot. There are no wetlands on site.

DRAINAGE ANALYSIS

The analysis was conducted over the drainage basin, DA-1, which encompasses the 15,625 ft² lot and all of the improved/developed area. The 15,625 ft² lot contains of 4,808 ft² total of impervious and semi-impervious area. A composite curve number of 78.6 was used in the simulation based on the ratio of impervious area to remaining pervious area. The underground vault system is two StormTech SC-160LP chambered vault systems. The vault systems have 12" and 8" deep of stone aggregate reservoirs (40% voids) below and above the StormTech vaults, respectively. Treatment and recovery for the StormTech vault and reservoir system was modeled using MODRET. NRCS Soil Survey data was used to estimate vertical and horizontal hydraulic conductivity values used in the MODRET simulations. The Seasonal High Groundwater Level and Aquifer Base were estimated from the NRCS Soil Survey data and MHWL of the Amelia River.

<u>Summary of Design:</u>	<u>Pre-Development</u>	<u>Post-Development</u>
Total Drainage Area	15,625 ft ²	15,625 ft ²
Total Impervious Area	N/A	4,808 ft ²
Top of Bank Elevation	N/A	16.51'
Bottom Elevation	N/A	13.84'
Treatment Required	N/A	1,302 ft ³
Treatment Provided	N/A	1,449 ft ³
10-Year Event Discharge	5,928 ft ³	2,740 ft ³

DRY POND CALCULATIONS

PAGE N. 2nd STREET Post Developed - Total Area

Basin Calculations

Basin 1

Composite Cn

Total Drainage Area = 15628 ft²
 Impervious Area = 4808 ft²
 Pond Area = 0 ft²

Impervious Cn = 98.0
 Pond Cn = 0.0
 Pervious Cn = 70.0

Composite Cn = 78.6

Time of Concentration, Tc

Minimum Time of Concentration = 10 min.
 Length of Overland Flow @ 1ft/sec. = 40 ft.
 Length of Pipe Flow @ 2.5 ft/sec. = 0 ft.

Tc = 11 min.

Pond Information (U/G Reservoir/Chambers)

El. (ft.)		Area ft ²	Volume ft ³
16.51	TOB/weir	1150	1449
15.84		1150	1142
15.51		1150	959
14.84		1150	460
13.84	Bottom	1150	0

Treatment Volume Required, TVR

(on-line retention)

TVR = 1" * (1'/12")*Total Drainage Area = 1302 ft³
 or

TVR = 1.25" * (1'/12")*Total Impervious Drainage Area + 0.5" * (1'/12")*Total Drainage Area = 1152 ft³

TVR = 1302 ft³

Treatment Volume Provided, TVP

TVP = Vol @ Weir = 1449 ft³ OK

Project: _____



Chamber Model -
Units -

SC-160
Imperial [Click Here for Metric](#)
100

Number of chambers -

54

Voids in the stone (porosity) -

40 %

Base of STONE Elevation -

13.84 ft

Amount of Stone Above Chambers -

8 in

Amount of Stone Below Chambers -

12 in

Area of system -

1150 sf Min. Area - 801 sf min. area

☒ Include Perimeter Stone in Calculations

Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Total Chamber (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch & St (cubic feet)	Cumulative Chamber (cubic feet)	Elevation (feet)
32	0.00	0.00	38.33	38.33	1448.72	16.51
31	0.00	0.00	38.33	38.33	1410.39	16.42
30	0.00	0.00	38.33	38.33	1372.06	16.34
29	0.00	0.00	38.33	38.33	1333.72	16.26
28	0.00	0.00	38.33	38.33	1295.39	16.17
27	0.00	0.00	38.33	38.33	1257.06	16.09
26	0.00	0.00	38.33	38.33	1218.72	16.01
25	0.00	0.00	38.33	38.33	1180.39	15.92
24	0.05	2.77	37.23	39.99	1142.06	15.84
23	0.13	7.26	35.43	42.69	1102.06	15.76
22	0.29	15.69	32.06	47.75	1059.37	15.67
21	0.44	23.86	28.79	52.65	1011.63	15.59
20	0.54	29.11	26.69	55.80	958.97	15.51
19	0.62	33.28	25.02	58.30	903.17	15.42
18	0.68	36.76	23.63	60.39	844.87	15.34
17	0.74	39.74	22.44	62.18	784.48	15.26
16	0.78	42.30	21.41	63.72	722.30	15.17
15	0.82	44.55	20.52	65.06	658.59	15.09
14	0.86	46.46	19.75	66.21	593.53	15.01
13	0.89	48.31	19.01	67.32	527.32	14.92
12	0.00	0.00	38.33	38.33	460.00	14.84
11	0.00	0.00	38.33	38.33	421.67	14.76
10	0.00	0.00	38.33	38.33	383.33	14.67
9	0.00	0.00	38.33	38.33	345.00	14.59
8	0.00	0.00	38.33	38.33	306.67	14.51
7	0.00	0.00	38.33	38.33	268.33	14.42
6	0.00	0.00	38.33	38.33	230.00	14.34
5	0.00	0.00	38.33	38.33	191.67	14.26
4	0.00	0.00	38.33	38.33	153.33	14.17
3	0.00	0.00	38.33	38.33	115.00	14.09
2	0.00	0.00	38.33	38.33	76.67	14.01
1	0.00	0.00	38.33	38.33	38.33	13.92

MODRET ANALYSIS

10-Year Storm Event

MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : Page 10 yr pre
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area

0.36 ac.

SCS Curve Number

73.70

Time of Concentration

11.00 min.

Rainfall Depth

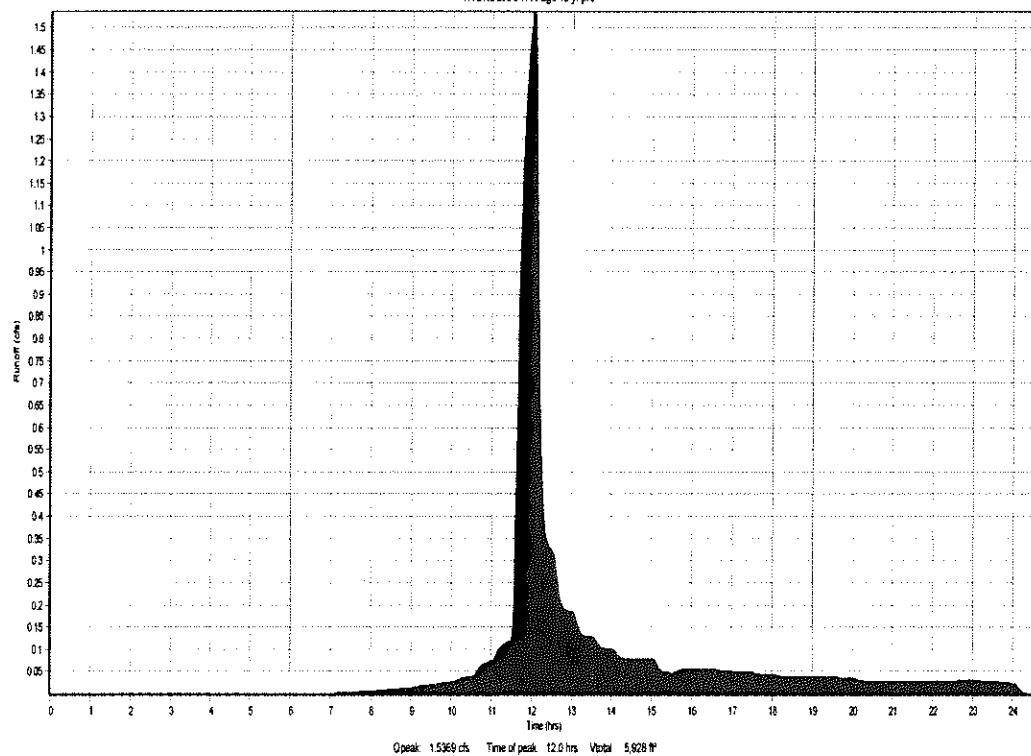
7.60 in.

Shape Factor

484

Percent DCIA

0.00 %



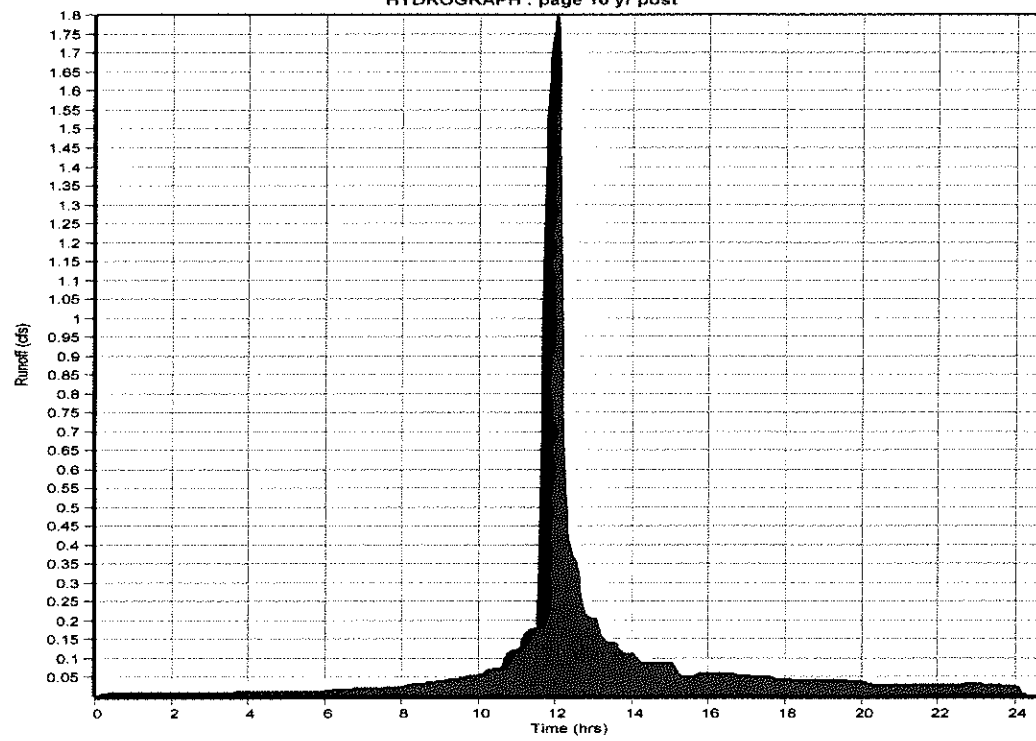
MODRET

HYDROGRAPH DATA INPUT - SCS UNIT METHOD

Project Name : page 10 yr post
Rainfall Distribution : SCS Type II (24 hrs)

Contributing Basin Area	0.36 ac.
SCS Curve Number	78.60
Time of Concentration	11.00 min.
Rainfall Depth	7.60 in.
Shape Factor	484
Percent DCIA	28.80 %

HYDROGRAPH : page 10 yr post



Qpeak: 1.8012 cfs Time of peak: 12.0 hrs Vtotal: 7,597 ft³

MODRET

SUMMARY OF UNSATURATED & SATURATED INPUT PARAMETERS

PROJECT NAME : page infil 10 psot
HYDROGRAPH RUNOFF DATA USED
UNSATURATED ANALYSIS INCLUDED

Pond Bottom Area	1,265.00 ft ²
Pond Volume between Bottom & DHWL	1,553.00 ft ³
Pond Length to Width Ratio (L/W)	1.50
Elevation of Effective Aquifer Base	4.00 ft
Elevation of Seasonal High Groundwater Table	9.00 ft
Elevation of Starting Water Level	13.84 ft
Elevation of Pond Bottom	13.84 ft
Is there overflow ?	Y
Avg. Effective Storage Coefficient of Soil for Unsaturated Analysis	0.27
Unsaturated Vertical Hydraulic Conductivity	40.00 ft/d
Factor of Safety	2.00
Saturated Horizontal Hydraulic Conductivity	5.00 ft/d
Avg. Effective Storage Coefficient of Soil for Saturated Analysis	0.30
Avg. Effective Storage Coefficient of Pond/Exfiltration Trench	1.00
Time Increment During Storm Event	2.00 hrs
Time Increment After Storm Event	12.00 hrs
Total Number of Increments After Storm Event	6.00

Runoff Hydrograph File Name: SCS2.SCS

Time of Peak Runoff: 12.03 hrs

Rate of Peak Runoff: 1.80 cfs

Hydraulic Control Features:

Groundwater Control Features - Y/N

Distance to Edge of Pond
Elevation of Water Level

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00

Impervious Barrier - Y/N

Elevation of Barrier Bottom

Top	Bottom	Left	Right
N	N	N	N
0.00	0.00	0.00	0.00

MODRET

ELEVATION VS OVERFLOW RELATIONSHIP

PROJECT NAME : page infil 10 psot
Structure Type: V_NOTCH

Crest Elevation	16.00 ft
Vertex Angle of "V"	90.00
Coefficient of Discharge	3.31
Weir Flow Exponent	2.50
Number of Contractions	0.00
Design High Water Level Elevation	16.34 ft

MODRET

SUMMARY OF RESULTS

PROJECT NAME : page infil 10 psot

CUMULATIVE TIME (hrs)	WATER ELEVATION (feet)	INSTANTANEOUS INFILTRATION RATE (cfs)	AVERAGE INFILTRATION RATE (cfs)	CUMULATIVE OVERFLOW (ft³)
00.00 - 0.03	9.000	0.000 *		
			0.00000	
0.03	9.000	0.03573		
			0.04188	
13.71	16.381	0.04804		2,142.30
			0.04894	
15.72	16.188	0.04539		2,510.40
			0.04184	
17.73	16.128	0.03967		2,652.70
			0.03750	
19.74	16.090	0.03517		2,710.30
			0.03284	
21.75	16.055	0.03165		2,728.70
			0.03045	
23.76	16.045	0.02847		2,739.60
			0.01666	
35.76	14.887	0.01384		2,739.60
			0.01101	
47.76	14.121	0.00952		2,739.60
			0.00803	
53.79	13.840	0.00713		2,739.60
			0.00622	
71.76	13.130	0.00562		2,739.60
			0.00501	
83.76	12.781	0.00459		2,739.60
			0.00418	
95.76	12.491			2,739.60

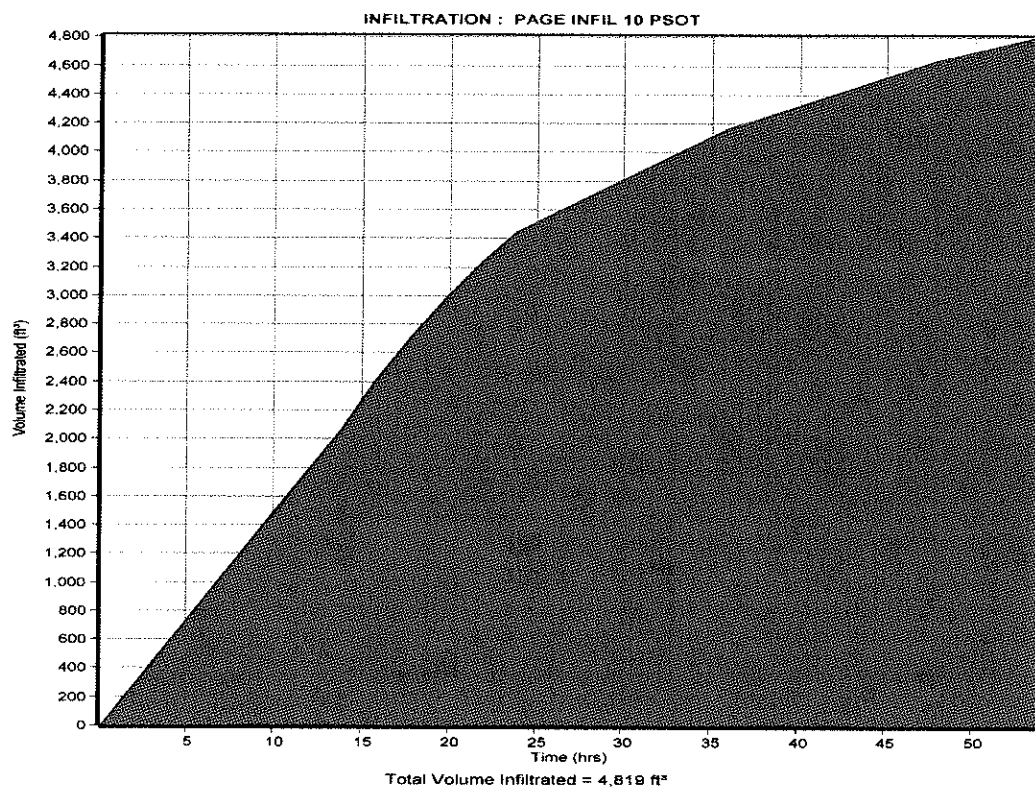
Maximum Water Elevation: 16.381 feet @ 13.71 hours

Recovery @ 53.793 hours

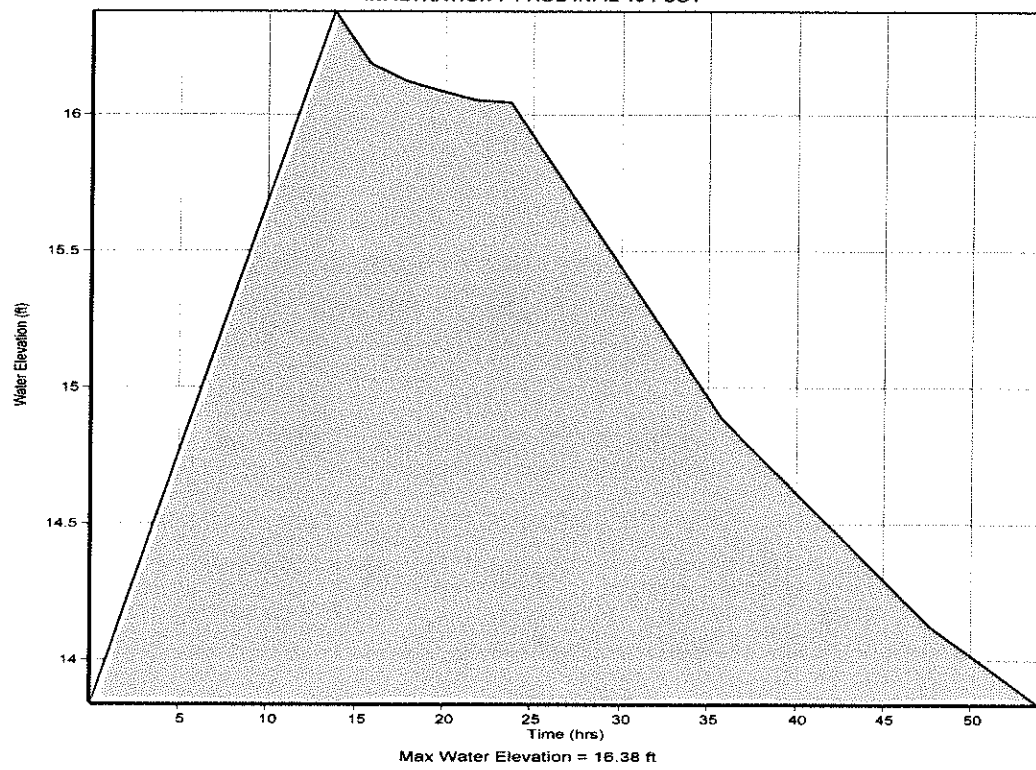
* Time increment when there is no runoff

Maximum Infiltration Rate: 6.807 ft/day

Analysis Date: 8/14/2019



INFILTRATION : PAGE INFIL 10 PSOT



NRCS Soil Survey Data



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **Nassau County, Florida**



September 11, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:904 if printed on A portrait (8.5" x 11") sheet.

0 10 20 40 60 Meters

0 40 80 160 240 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 17N WGS84

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MAP LEGEND

Area of Interest (AOI)				Spoil Area
	Area of Interest (AOI)			Stony Spot
Soils				Very Stony Spot
	Soil Map Unit Polygons			Wet Spot
	Soil Map Unit Lines			Other
	Soil Map Unit Points			Special Line Features
Special Point Features		Water Features		
	Blowout			Streams and Canals
	Borrow Pit	Transportation		
	Clay Spot			Rails
	Closed Depression			Interstate Highways
	Gravel Pit			US Routes
	Gravelly Spot			Major Roads
	Landfill			Local Roads
	Lava Flow	Background		
	Marsh or swamp			Aerial Photography
	Mine or Quarry			
	Miscellaneous Water			
	Perennial Water			
	Rock Outcrop			
	Saline Spot			
	Sandy Spot			
	Severely Eroded Spot			
	Sinkhole			
	Slide or Slip			
	Sodic Spot			

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Nassau County, Florida
Survey Area Data: Version 18, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 13, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
20	Ortega fine sand, 0 to 5 percent slopes	3.0	92.5%
31	Kershaw fine sand, 2 to 8 percent slopes	0.2	7.5%
Totals for Area of Interest		3.2	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

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onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Nassau County, Florida

20—Ortega fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 4g9b
Elevation: 20 to 500 feet
Mean annual precipitation: 47 to 55 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 305 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Ortega and similar soils: 93 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ortega

Setting

Landform: Ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Eolian or sandy marine deposits

Typical profile

A - 0 to 6 inches: fine sand
C - 6 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G153AA121FL)
Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R153AY002FL)
Hydric soil rating: No

Minor Components

Hurricane

Percent of map unit: 2 percent

Landform: Rises on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Kershaw

Percent of map unit: 2 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Albany

Percent of map unit: 2 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve, talus

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Ridgewood

Percent of map unit: 1 percent

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

31—Kershaw fine sand, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 4g9q

Elevation: 40 to 500 feet

Mean annual precipitation: 47 to 55 inches

Mean annual air temperature: 64 to 72 degrees F

Frost-free period: 305 to 335 days

Farmland classification: Not prime farmland

Map Unit Composition

Kershaw and similar soils: 98 percent

Minor components: 2 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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Description of Kershaw

Setting

Landform: Ridges on marine terraces, knolls on marine terraces

Landform position (three-dimensional): Interfluvial, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy marine deposits

Typical profile

A - 0 to 7 inches: fine sand

C - 7 to 80 inches: fine sand

Properties and qualities

Slope: 2 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 4.0

Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A

Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G153AA111FL)

Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R153AY002FL)

Hydric soil rating: No

Minor Components

Ortega

Percent of map unit: 2 percent

Landform: Ridges on marine terraces

Landform position (three-dimensional): Interfluvial

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

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PRIVATE COMMERCIAL HANGAR

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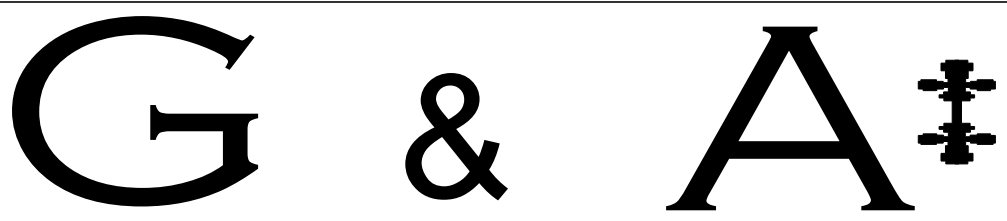
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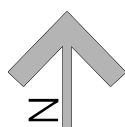
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UTILITY PROVIDERS

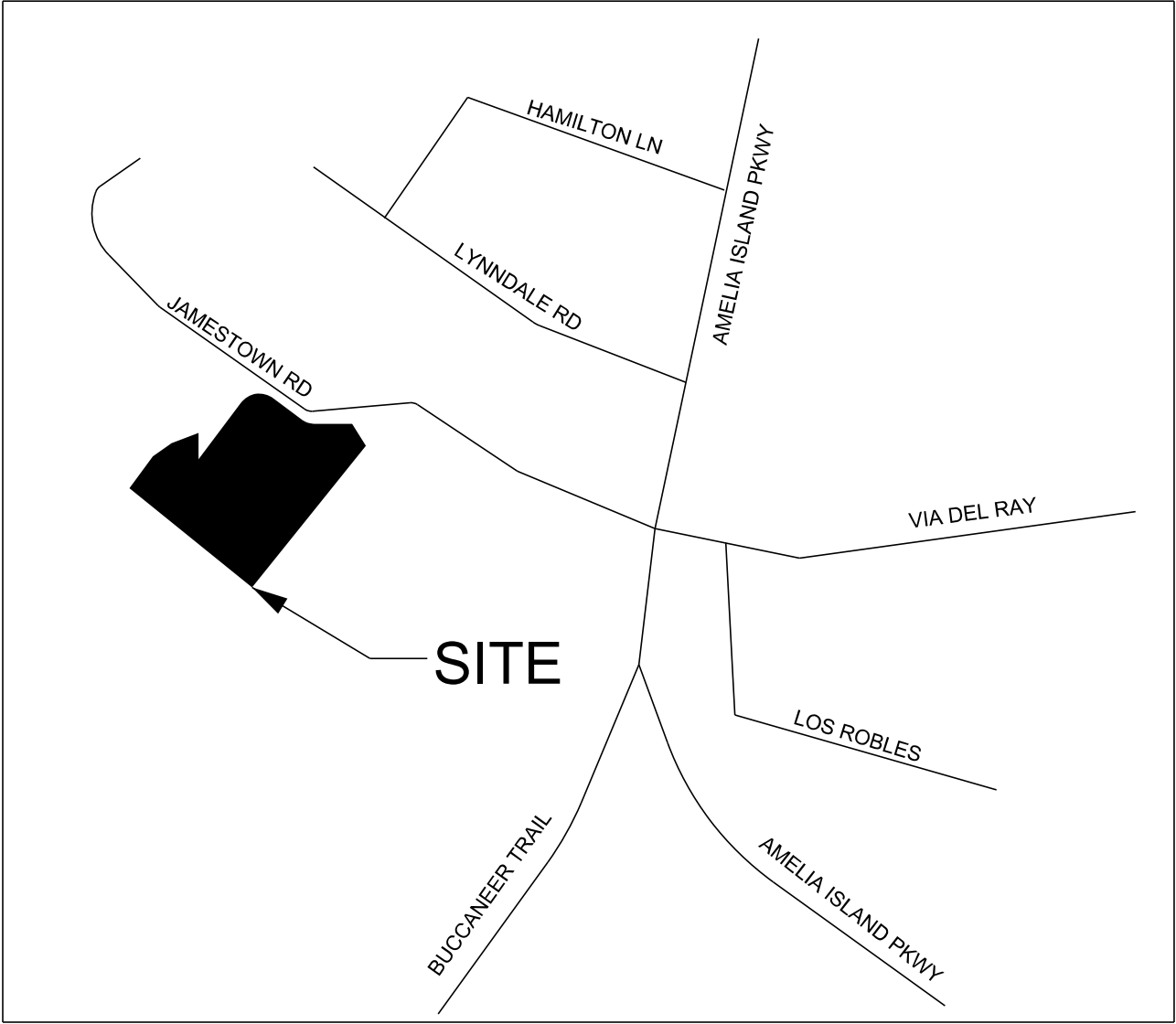
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CABLE: COMCAST
TELEPHONE: AT&T



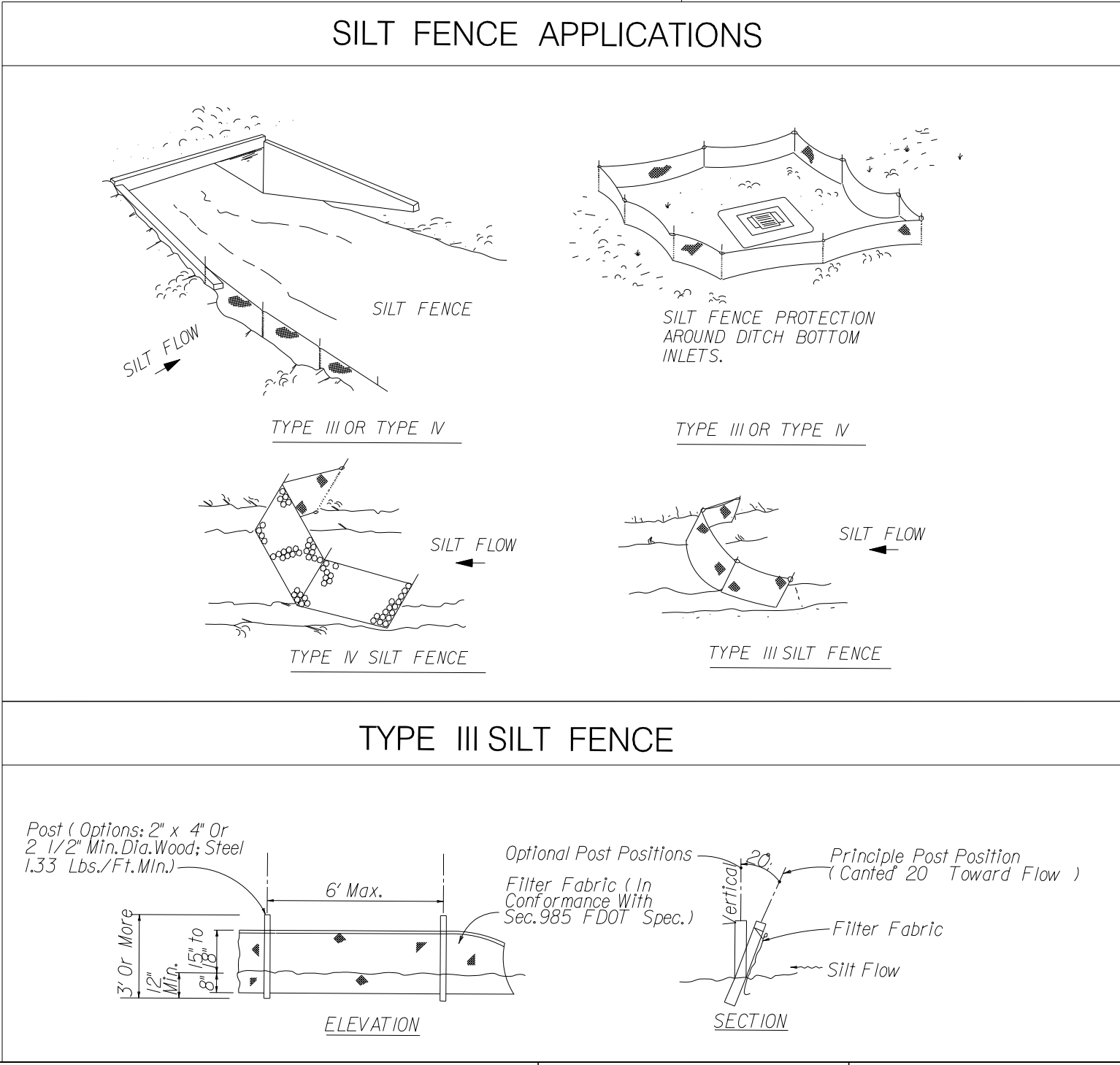
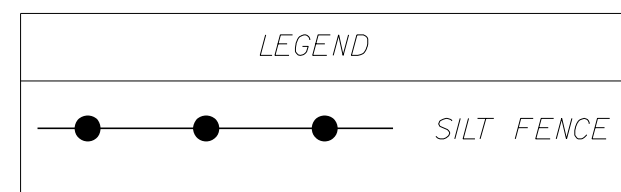
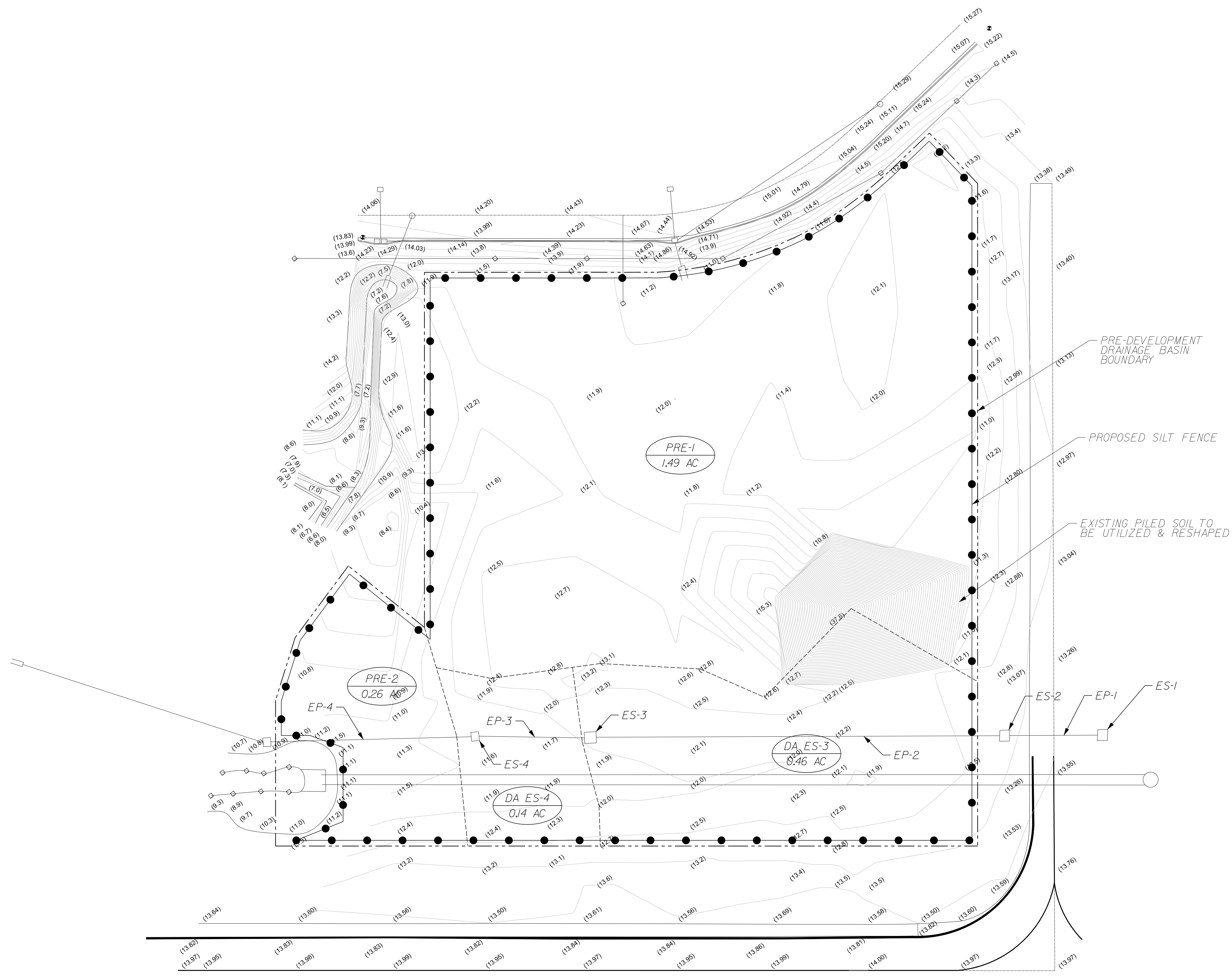
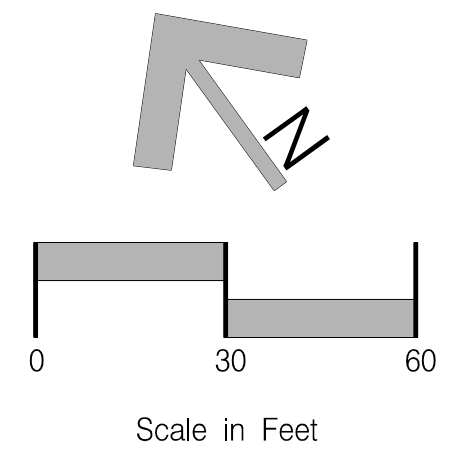
ISSUE DATE: September 12, 2019



SITE LOCATION MAP



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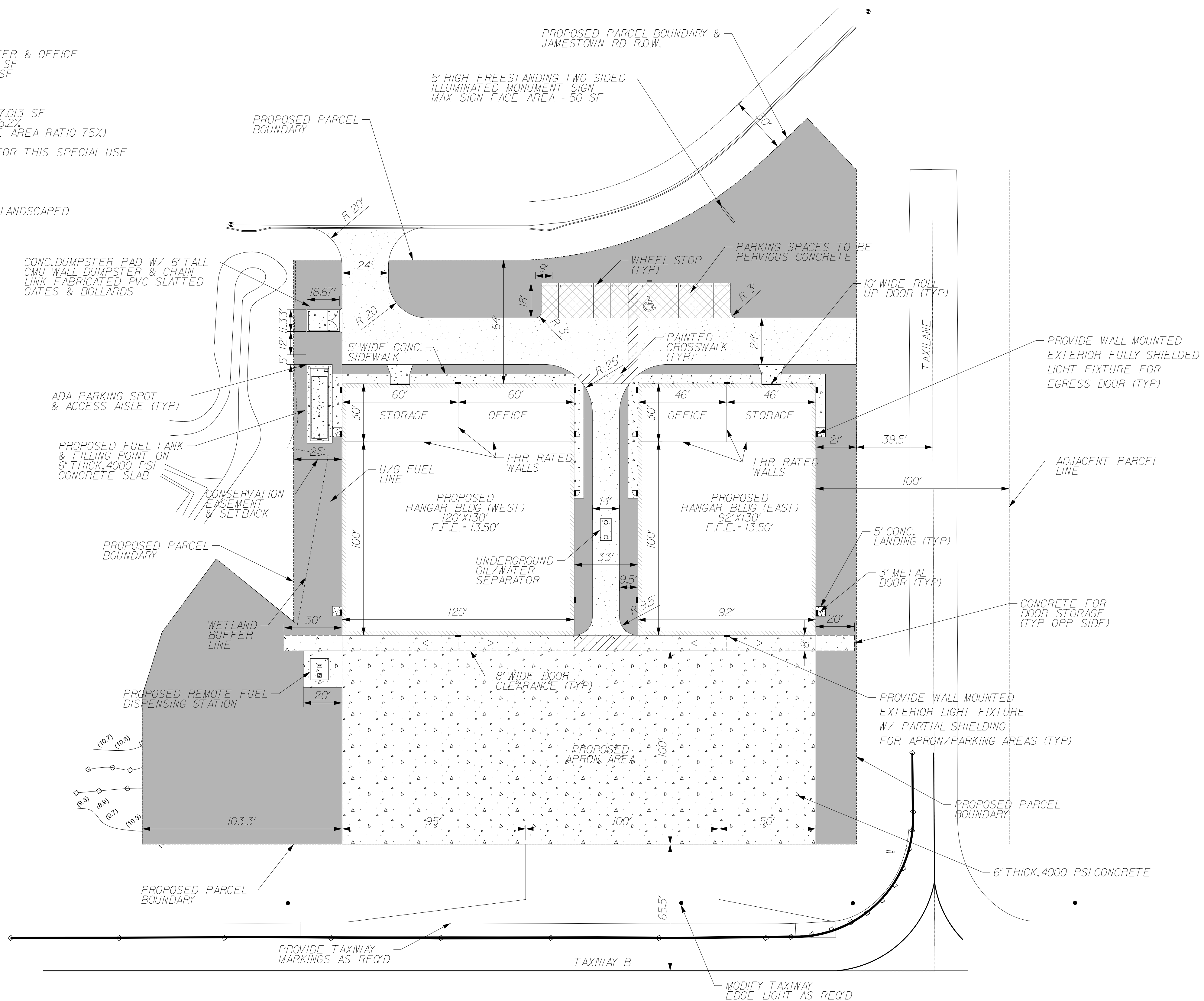
				Scale: 1" = 30'		Gillette & Associates, Inc. 20 South 4th Street Fernandina Beach, FL 32034	G & A [®] GILLETTE & ASSOCIATES, INC. 20 SOUTH 4TH STREET FERNANDINA BEACH, FL 32034 PHONE: (904) 261-8819 FAX: (904) 261-9905	PRIVATE COMMERCIAL HANGAR	CLAY LEE	PREDEVELOPMENT DRAINAGE PLAN	SHEET NO. PRE-1 3 of 9 Issue Date September 12, 2019 Project No. 19-10.31				
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No. By Date Revision															

CONCRETE

PERVIOUS CONCRETE

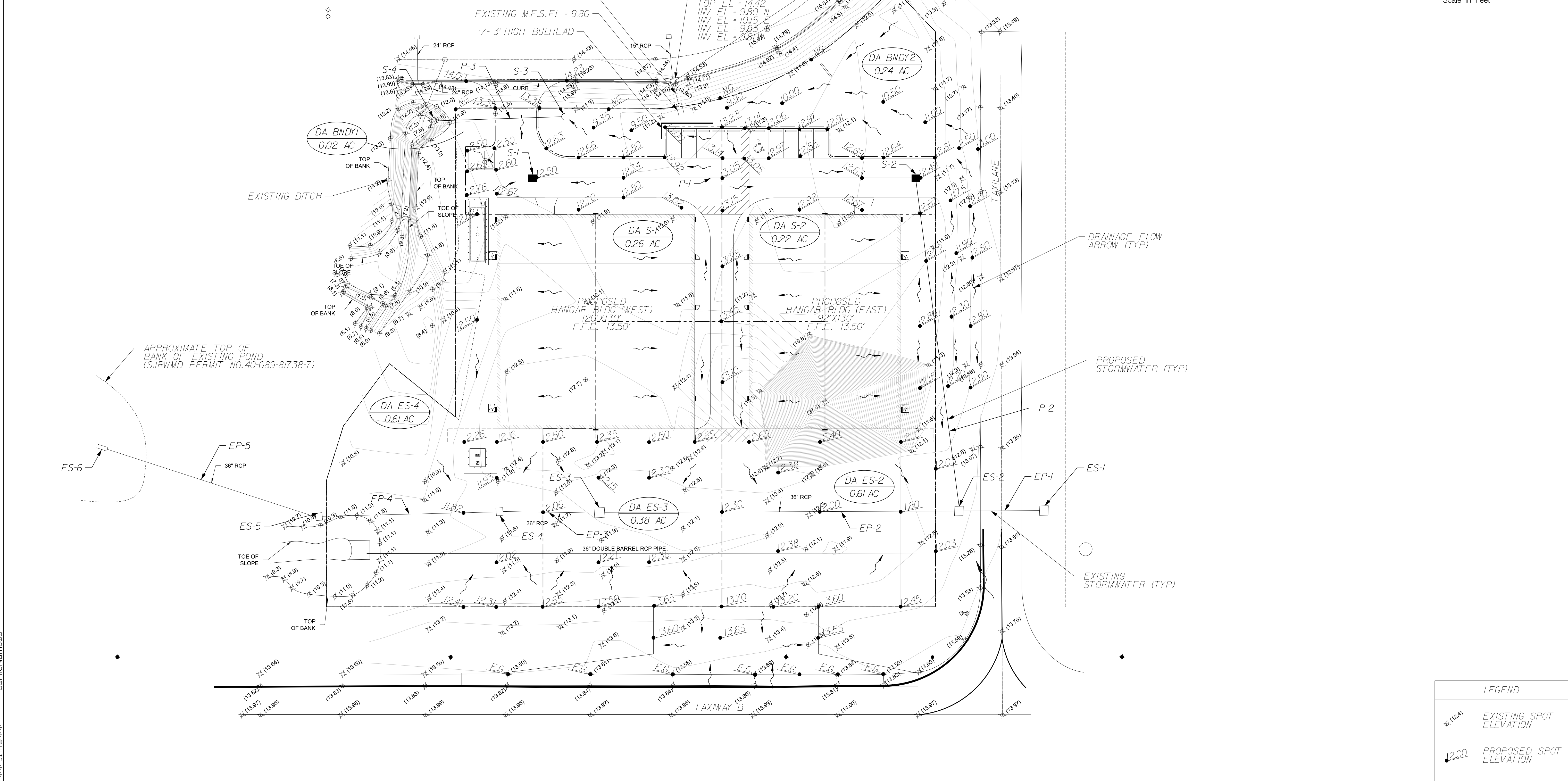
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LANDSCAPE



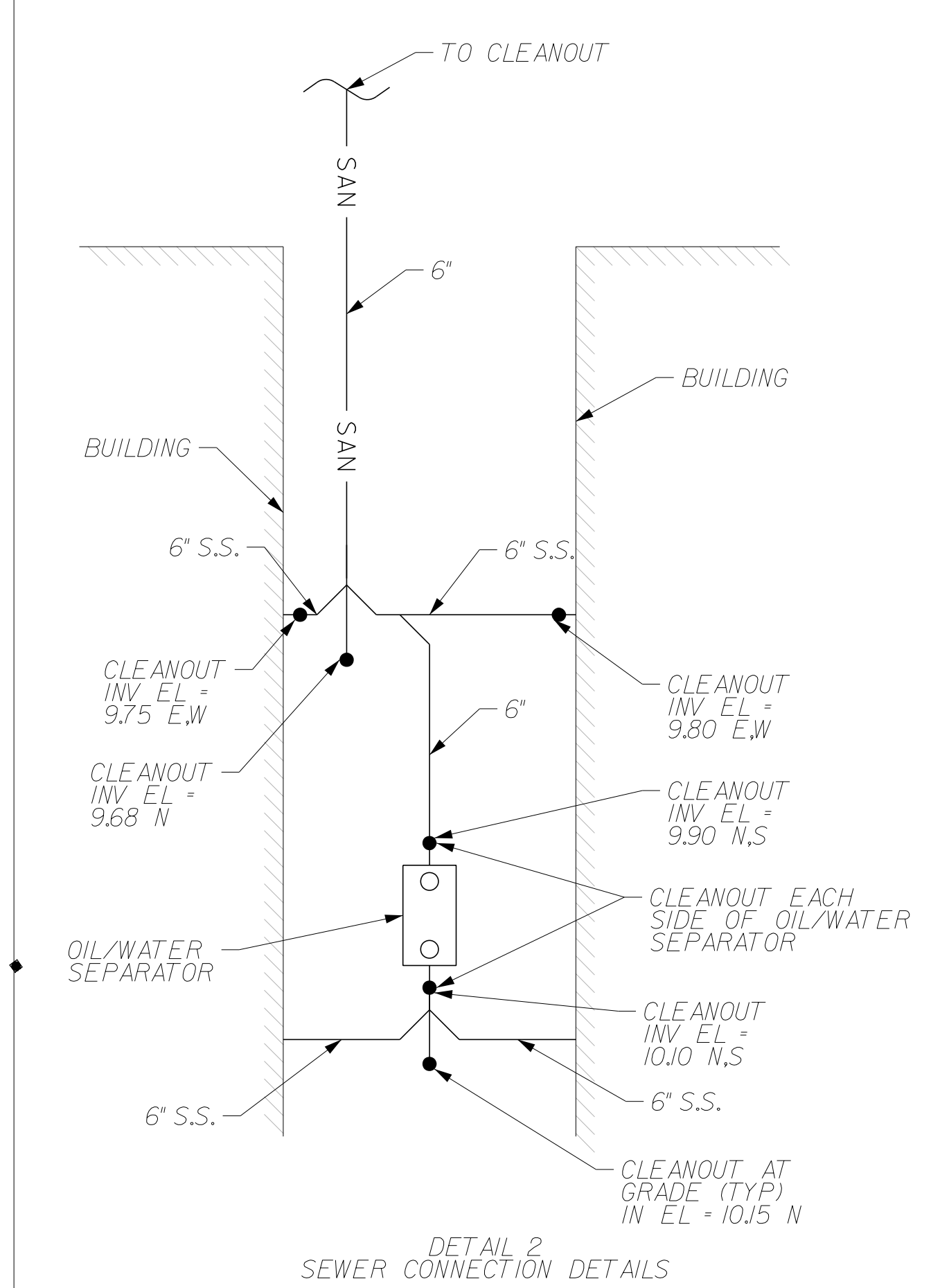
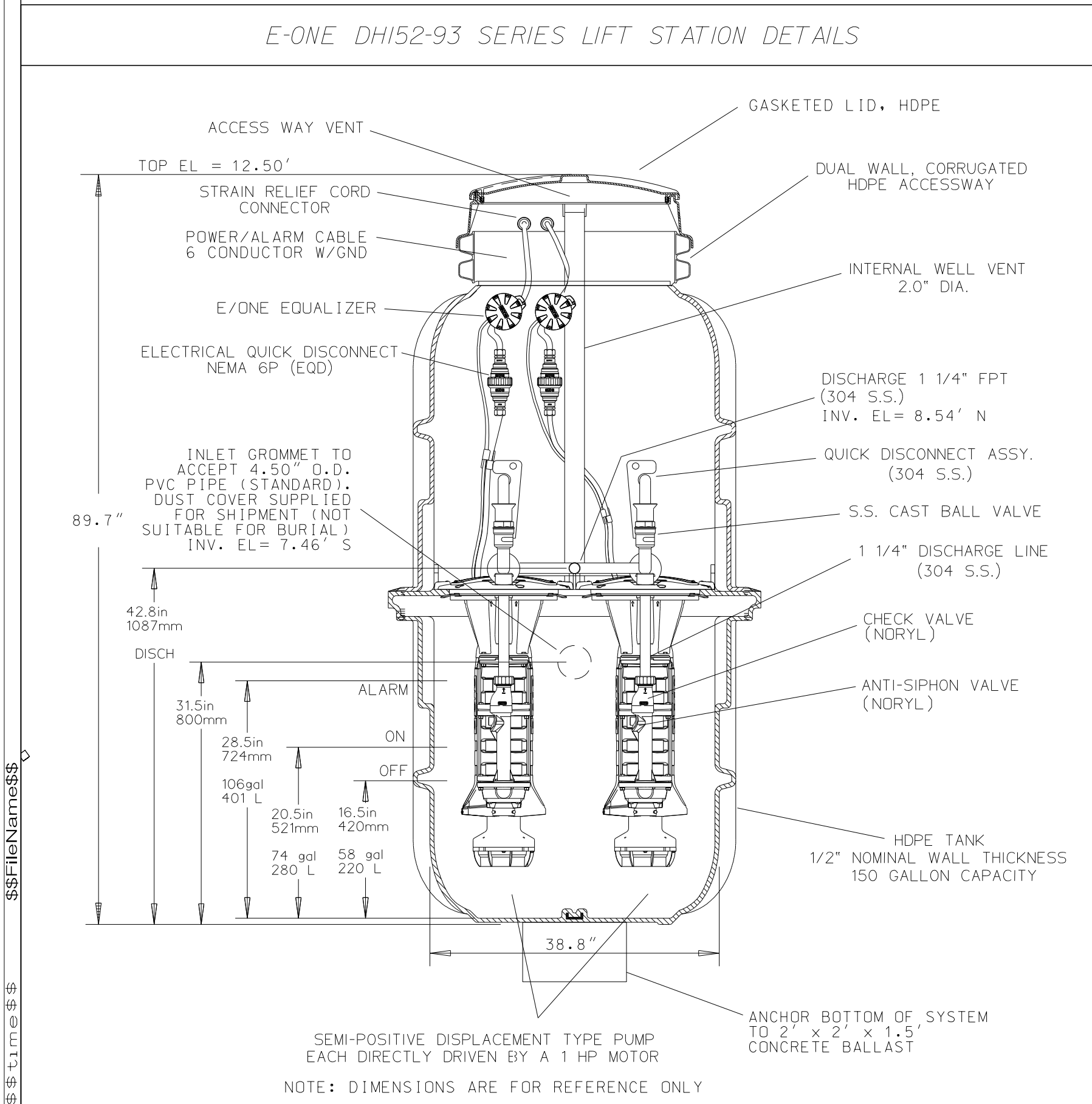
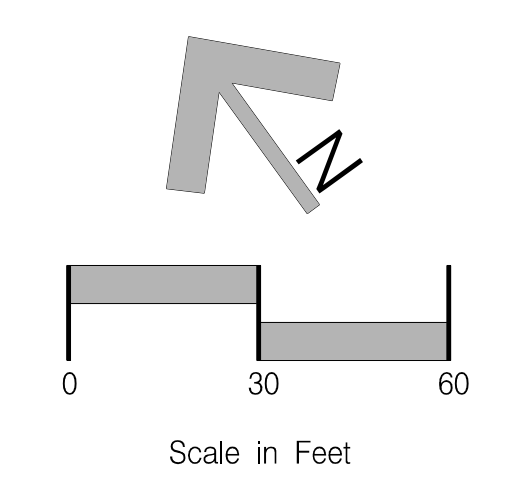
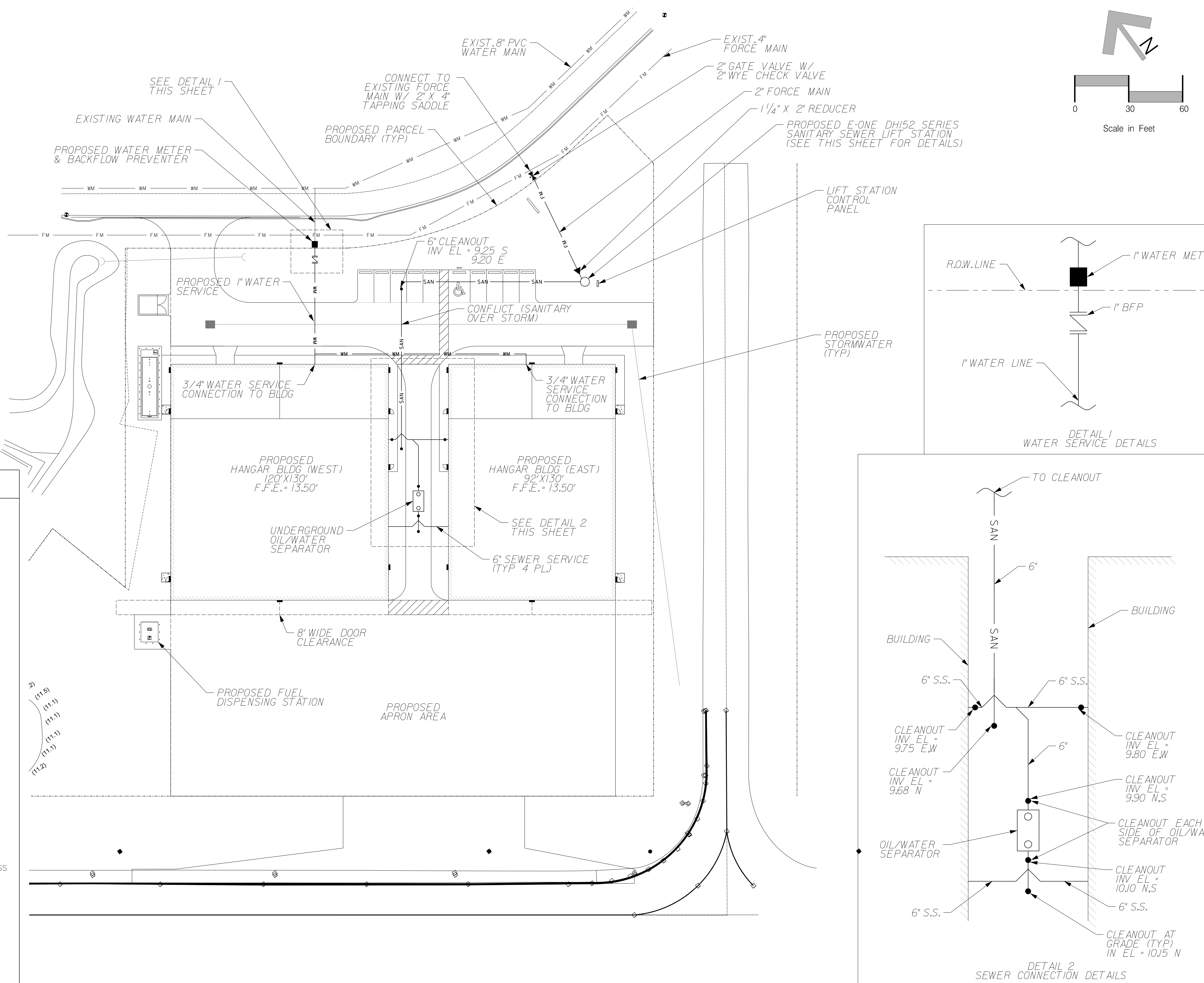
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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STRUCTURE TABLE							PIPE TABLE					
NAME	TYPE	TOP/ INLET ELEV.	INVERT ELEVATION				NAME	FROM	TO	SIZE	LENGTH	MATERIAL
ES-1	"C" INLET	11.65	-	-	-	4.45	EP-1	ES-1	ES-2	36"	46'	RCP
ES-2	"C" INLET	11.77	3.50	-	4.26	4.25	EP-2	ES-2	ES-3	36"	212'	RCP
ES-3	"C" INLET	11.91	-	-	3.62	3.54	EP-3	ES-3	ES-4	36"	55'	RCP
ES-4	"C" INLET	11.72	-	-	3.59	3.50	EP-4	ES-4	ES-5	36"	105'	RCP
ES-5	"C" INLET	11.61	-	-	3.35	3.29	EP-5	ES-5	ES-6	36"	133'	RCP
ES-6	MES	-	-	-	1.62	-	P-1	S-1	S-2	36"	227'	RCP
S-1	"C" INLET	12.50	-	-	4.87	-	P-2	S-2	ES-2	36"	199'	RCP
S-2	"C" INLET	12.49	-	3.62	-	3.90	P-3	S-3	S-4	18"	55'	CLASS V RCP
S-3	MES	-	-	-	9.20	-						
S-4	MES	-	-	-	-	9.00						

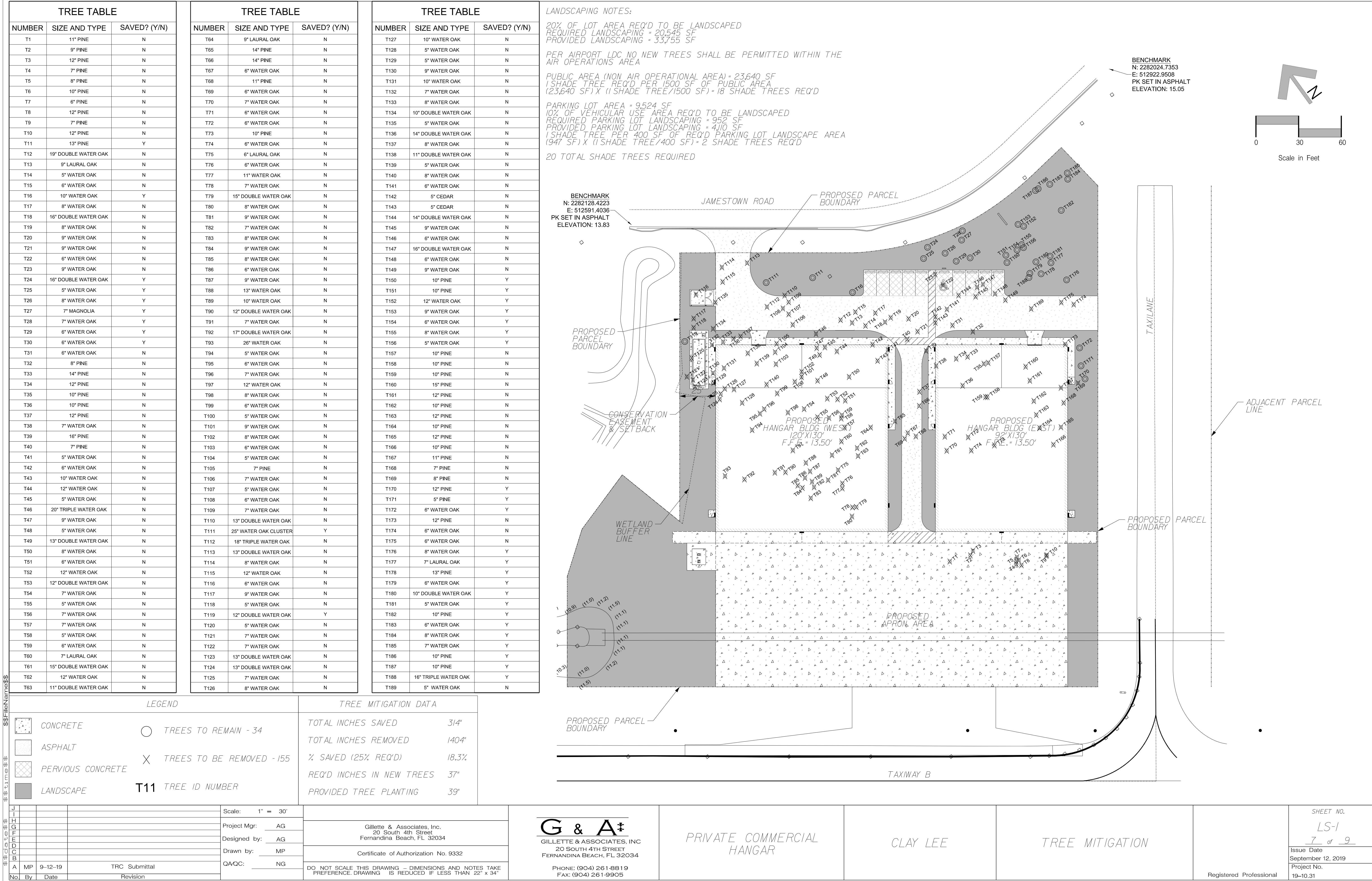


LEGEND	
	EXISTING SPOT ELEVATION
	PROPOSED SPOT ELEVATION

Scale: 1" = 30' Project Mgr: AG Designed by: AG Drawn by: MP QA/QC: NG	Gillette & Associates, Inc. 20 South 4th Street Fernandina Beach, FL 32034 Certificate of Authorization No. 9332 DO NOT SCALE THIS DRAWING - DIMENSIONS AND NOTES TAKE PREFERENCE. DRAWING IS REDUCED IF LESS THAN 22" x 34"	G & A GILLETTE & ASSOCIATES, INC. 20 SOUTH 4TH STREET FERNANDINA BEACH, FL 32034 PHONE: (904) 261-8819 FAX: (904) 261-9905	PRIVATE COMMERCIAL HANGAR	CLAY LEE	POST-DEVELOPMENT DRAINAGE PLAN	SHEET NO. DR-1 5 of 9 Issue Date: September 12, 2019 Project No. 19-10.31 Registered Professional
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J I H G F E D C B A MP 9-12-19 TRC Submittal	Scale: 1" = 30'		Project Mgr: AG 20 South 4th Street Fernandina Beach, FL 32034 Designed by: AG 20 SOUTH 4TH STREET FERNANDINA BEACH, FL 32034 Drawn by: MP Certificate of Authorization No. 9332 QA/QC: NG	G & A [±] GILLETTE & ASSOCIATES, INC. 20 SOUTH 4TH STREET FERNANDINA BEACH, FL 32034 PHONE: (904) 261-8819 FAX: (904) 261-9905	PRIVATE COMMERCIAL HANGAR	CLAY LEE	UTILITY PLAN	Registered Professional	SHEET NO. UT-1 6 of 9
	DO NOT SCALE THIS DRAWING - DIMENSIONS AND NOTES TAKE PREFERENCE. DRAWING IS REDUCED IF LESS THAN 22" x 34"								Issue Date September 12, 2019
									Project No. 19-10-31
No.	By	Date	Revision						



1. ALL SIGNS SHOWN SHALL CONFORM TO FEDERAL ACCESSIBILITY SPECIFICATIONS.
2. ALL SIGNS SHOWN SHALL BE REFLECTORIZED TO SHOW THE SAME COLOR BY NIGHT AS BY DAY.
3. ALL SIGNS SHALL BE SECURELY MOUNTED ON GALVANIZED STEEL CHANNEL POSTS.
4. INSTALL QUANTITY AND AT LOCATIONS REQUIRED BY CODE AND/OR AS INDICATED ON DRAWINGS.CONFIRM ALL HANDICAPPED SIGNAGE CODES.

HC PARKING SIGN

4" STRIPES - PAINT
BLUE (15 MIL)
MINIMUM THICKNESS

12" WHITE

18'

12'

5'

16"

Stall dimension measured from
inside to inside striping

Handicap Space and Access aisle
to be concrete pads

4" STRIPES - PAINT
YELLOW (15 MIL)
MINIMUM THICKNESS

18'

9'

Stall dimension measured from inside to inside striping

Diagram illustrating a sidewalk cross-section with a 5-foot utility strip. The diagram shows a concrete curb on the left, followed by a grass area, a concrete landing (flat) with a thermoplastic truncated dome, and a concrete landing. The utility strip is shown on the right, with a buffer zone. Key dimensions and labels include:

- 6" H. or 6 1/2" O" Sidewalk Curb
- Grass
- Landing (Flat)
- Thermoplastic Truncated Dome
- Transition Slope
- Curb Transition
- Landing
- Utility Strip (Util.)
- Buffer
- Dimensions: 1:12, 0:02, 9 1/2", < 5'-11" Util.

Diagram of a Dummy Joint. The joint has a height of 4". The fillet radius is $\frac{1}{8}" R$ (TYP). The fillet transitions from a $\frac{1}{4}"$ thick section to a 1" thick section.

Dummy Joint

The diagram shows a cross-section of a concrete slab with a height of $4''$. A central vertical section is filled with a cross-hatched pattern, representing the preformed expansion joint material. Above this section, a dimension line indicates a width of $\frac{3}{8}''$. A leader line points from the text "Preformed Expansion Joint Material" to the hatched area. Below the diagram, the text "Expansion Joint" is written.

Technical drawing showing two parts, A and B, with dimensions and fillet specifications.

Part A:

- Top width: 6"
- Bottom width: 7"
- Left height: 18"
- Right height: 12"
- Fillet at top right corner: $1\frac{1}{2}^\circ R$

Part B:

- Top width: 7"
- Bottom width: 7"
- Right height: $13\frac{7}{8}$ "
- Fillet at top left corner: $1\frac{1}{2}^\circ R$

1 1/2" Asphaltic Concrete Type SP-12.5

6" Compacted Limerock Base
Min. LBR 100

12" Constructed Sub-Base
Min. LBR 40 & 98% compaction

Soil analysis may indicate the need for a

Note: Soil analysis may indicate the need for a thicker base course than those shown herein. The pavement thickness shown herein are not intended to be absolute, but are preliminary criteria & may be modified to accommodate the bearing capacities of various subgrades.

6" Thick, 4000 psi Concrete Slab w/ 6x6 6/6 WWM

12" Constructed Sub-Base
Min. LBR 40 & 98% compaction

Note: Soil analysis may indicate the need for a thicker base course than those shown herein. The pavement thickness shown herein are not intended to be absolute, but are preliminary criteria & may be modified to accommodate the bearing capacities of various subgrades.

STRENGTH 4,000 P.S.I.

8'

4'-5"

8'

3'-1"

2"x2"x 1/4"

PLAN

NOTE: CONC. DESIGN

2"x2"x1/4" ANGLE IRON SEAL

ALL EXPOSED CORNERS AND EDGES TO BE CHAMFERED 3/4"

PIPES MUST NOT BE IN CONSTRUCTION JOINTS

VARIES

#4 @ 6" O.C. B.W.

3' 4"

2'

2' 1/4"

GRATE

2" CL.

EYE BOLTS

5 3/4"

#4 @ 12" O.C. B.W.

ROUTED OR "RAM-NEK" JOINTS WHEN REQUIRED

8"

#4 BARS @ 12" O.C. B.W.

8"

MIN. BEARING CAPACITY 2000 PSF

PIPES SHALL BE FLUSH WITH INSIDE WALL

SECTION

J				
I				
H				
G				
F				
E				
D				
C				
B				
A	MP	9-12-19	TRC Submittal	
No.	By	Date	Revision	

Scale:	NONE
Project Mgr:	_____
Designed by:	_____
Drawn by:	_____
QA/QC:	_____

Gillette & Associates, Inc.
20 South 4th Street
Fernandina Beach, FL 32034

Certificate of Authorization No. 9332

DO NOT SCALE THIS DRAWING - DIMENSIONS AND NOTES TAKE PREFERENCE. DRAWING IS REDUCED IF LESS THAN 22" x 34"

G & A
GILLETTE & ASSOCIATES, INC.
20 SOUTH 4TH STREET
FERNANDINA BEACH, FL 32034

PHONE: (904) 261-8819
FAX: (904) 261-9905

PRIVATE COMMERCIAL
HANGAR

CLAY LEE

MISCELLANEOUS DETAILS

Registered Professional

SHEET NO.

DT-1

9 of 9

Issue Date
September 12, 2019

Project No.
19-10.31

SHEET NO.:		COVER SHEET		MATTHEWS DESIGN GROUP, INC. P.O. BOX 3126, 7 WALDO STREET ST. AUGUSTINE, FLORIDA 32084 PHONE: 904.826.1334 FAX: 904.826.4547 INFO@MATTHEWSDESIGN.NET		ORDER BY: MS & KIM DWG BY: SAK CHK BY: SAK DATE: 8/7/2019 JOB NO.: 18037		REVISIONS NO. DATE DESCRIPTION 1 8/29/2019 UPDATES PER COFB TRC COMMENTS	
WESTROCK DROP YARD FERNANDINA BEACH PREPARED FOR WESTROCK FERNANDINA MILL									

1. ALL WORK AND MATERIALS SHALL BE IN COMPLETE ACCORDANCE WITH ALL RELATIVE SECTIONS OF FERNANDINA BEACH LAND DEVELOPMENT CODE, (LATEST REVISION) AND ALL FERNANDINA BEACH STANDARD DETAILS.
2. ALL WORK SHALL BE PERFORMED IN A SAFE MANNER. ALL SAFETY RULES AND GUIDELINES OF OSHA SHALL BE FOLLOWED. THE CONTRACTOR SHALL BE WHOLLY RESPONSIBLE FOR ANY INJURIES OF THEIR EMPLOYEES, AND FOR ANY DAMAGE TO PROPERTY OR PERSONS DURING THE COURSE OF THIS PROJECT. ALL COSTS ASSOCIATED WITH COMPLYING WITH OSHA REGULATIONS AND THE FLORIDA TRENCH SAFETY ACT MUST BE INCLUDED IN THE CONTRACTOR'S BID.
3. PRIOR TO CONSTRUCTION, THE SITE CONTRACTOR SHALL VERIFY ALL SURVEY CONTROL POINTS AS PROVIDED IN THE BOUNDARY SURVEY. THE CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER OF ANY DISCREPANCIES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE JOB SITE PRIOR TO PREPARING THE BID FOR THE PURPOSE OF FAMILIARIZING THEMSELVES WITH THE NATURE AND THE EXTENT OF THE WORK AND LOCAL CONDITIONS, EITHER SURFACE OR SUB-SURFACE, WHICH MAY AFFECT THE WORK TO BE PERFORMED, AND THE EQUIPMENT, LABOR AND MATERIALS REQUIRED. FAILURE TO DO SO WILL NOT RELIEVE THE CONTRACTOR OF THE OBLIGATION TO ESTIMATE THE AMOUNT OF OFF SITE BORROW THAT WILL BE REQUIRED. FAILURE OF THE CONTRACTOR TO IDENTIFY/QUANTIFY THE AMOUNT OF UNSUITABLE MATERIAL TO BE REMOVED AND REPLACED DURING THE BID PROCESS WILL NOT RELIEVE THE CONTRACTOR OF COMPLETE PERFORMANCE UNDER THE CONSTRUCTION CONTRACT.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO EITHER CONDUCT ANY FIELD EXPLORATION OR ACQUIRE ANY GEOTECHNICAL ASSISTANCE REQUIRED TO ESTIMATE THE AMOUNT OF UNSUITABLE MATERIAL THAT WILL REQUIRE REMOVAL AND REPLACEMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY FIELD EXPLORATION TO IDENTIFY/QUANTIFY THE AMOUNT OF UNSUITABLE MATERIAL TO BE REMOVED AND REPLACED DURING THE BID PROCESS WILL NOT RELIEVE THE CONTRACTOR OF COMPLETE PERFORMANCE UNDER THE CONSTRUCTION CONTRACT.
6. ALL IMPROVEMENTS SHOWN ARE TO BE WARRANTED BY THE CONTRACTOR TO THE DEVELOPER AND FERNANDINA BEACH FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE BY THE OWNER AND FERNANDINA BEACH.
7. FOR BOUNDARY, ROADWAY, AND BUILDING GEOMETRY INFORMATION SEE ENGINEERING SITE PLAN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT THE BUILDING DIMENSIONS SHOWN ON THE ENGINEERING PLAN CORRELATE WITH THE DIMENSIONS SHOWN ON THE ARCHITECTURAL PLAN. IF ANY DIMENSIONS DO NOT AGREE, THE ARCHITECT, ENGINEER, AND OWNER SHALL BE NOTIFIED AND THE DIMENSIONS ADJUSTED PRIOR TO COMMENCING WITH CONSTRUCTION.
8. UNLESS DIRECTED OTHERWISE BY THE OWNER OR THE ENGINEER, THE CONTRACTOR WILL CONTRACT WITH AN INDEPENDENT TESTING LABORATORY TO PERFORM MATERIAL TESTING AND SOIL TESTING IN ACCORDANCE WITH FERNANDINA BEACH REQUIREMENTS. THIS SHALL INCLUDE DENSITY TESTS IN ALL PAVEMENT AREAS AND IN ALL UTILITY TRENCHES SHOWN ON THE ARCHITECTURAL PLAN. IF ANY DIMENSIONS DO NOT AGREE, THE CONTRACTOR, PRIOR TO LIMEROCK PLACEMENT, THE PROJECT GEOTECHNICAL ENGINEER SHALL MAKE RECOMMENDATION FOR UNDERDRAIN PLACEMENT.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND INSURANCE REQUIRED FOR THE PROJECT INCLUDING FERNANDINA BEACH RIGHT-OF-WAY PERMITS FOR WORK IN THE FERNANDINA BEACH RIGHT-OF-WAY OR EASEMENT.
10. THE CONTRACTOR SHALL COORDINATE THEIR CONSTRUCTION WITH ALL OTHER CONTRACTORS. IN THE EVENT OF ANY CONFLICT WHATSOEVER, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND OWNER PRIOR TO PROCEEDING WITH CONSTRUCTION.
11. THE LOCATION OF ALL EXISTING UTILITIES, STRUCTURES AND IMPROVEMENTS SHOWN ON THE DRAWINGS IS BASED ON LIMITED INFORMATION AND MAY NOT HAVE BEEN FIELD VERIFIED. THE LOCATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL NOTIFY RESPECTIVE UTILITY OWNERS AND FIELD VERIFY LOCATIONS OF EXISTING UTILITIES AND OTHER IMPROVEMENTS PRIOR TO COMMENCING ANY CONSTRUCTION. IF THE LOCATIONS SHOWN ARE CONTRARY TO THE ACTUAL LOCATIONS, THE CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER OF THE DISCREPANCY. THIS DISCREPANCY SHOULD BE RESOLVED PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN WORKING IN AREAS NEAR EXISTING UTILITIES AND IMPROVEMENTS AND SHALL BE RESPONSIBLE FOR AND SHALL REPAIR OR PAY FOR ALL DAMAGE MADE TO EXISTING UTILITIES OR OTHER IMPROVEMENTS. PRIOR TO COMMENCING ANY CONSTRUCTION, THE CONTRACTOR SHALL VERIFY ALL GRADES, INVERTS AND TYPE OF MATERIAL OF EXISTING UTILITIES TO WHICH THEY SHALL CONNECT, AND NOTIFY THE OWNER AND ENGINEER OF ANY DISCREPANCIES.
12. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE CIVIL ENGINEER TO DETERMINE IF THIS PROJECT IS WITHIN THE FERNANDINA BEACH'S JURISDICTION FOR INSPECTION. IF SO, THEN IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE FERNANDINA BEACH FOR A PRE-CON MEETING FOR INSPECTIONS.
13. DUE TO THE PROXIMITY TO EXISTING RESIDENTIAL HOMES THE APPLICANT SHOULD LIMIT HOURS OF OPERATION TO DAYTIME HOURS AND PROVIDE MITIGATION TO NOISE FROM PUMPS IF 24 HOUR DEWATERING ACTIVITIES ARE REQUIRED.
14. THE BUILDING FOOTPRINTS SHOWN HEREON ARE APPROXIMATE. SEE ARCHITECTURAL PLANS FOR EXACT BUILDING DIMENSIONS.
15. THE MAXIMUM BUILDING HEIGHT SHALL NOT EXCEED 35'.
16. ALL STOP SIGNS SHALL BE FINISHED WITH DIAMOND GRADE HIGH REFLECTIVITY SURFACE.
17. ALL STOP BARS SHALL BE THERMO-PLASTIC MATERIAL.
18. MECHANICAL EQUIPMENT LOCATED ON THE GROUND AND/OR THE ROOFTOP SHALL BE SCREENED IN COMPLIANCE WITH LDC SECTION 6.06.04 (9).
19. SOLID WASTE STORAGE DUMPSTER SCREENING AND LOCATION SHALL BE IN COMPLIANCE WITH LDC SECTION 6.06.04 (8).

PAVING & DRAINAGE NOTES:

1. "AS-BUILT" DRAWINGS - DRAINAGE AS-BUILTS PROVIDED TO FERNANDINA BEACH AND THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT ARE REQUIRED TO BE SIGNED AND SEALED BY A FLORIDA REGISTERED LAND SURVEYOR. THEREFORE, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONTACT WITH A LAND SURVEYOR IN ACCORDANCE WITH STATE 62-62.01 300(2), F.A.C. IF THE TEST RESULTS ON THE EFFLUENT ARE BELOW THE SCREENING VALUES OF RULE 62-62.01 300(2), F.A.C., THE CONTRACTOR SHALL SUBMIT A SUMMARY OF THE PROPOSED CONSTRUCTION ACTIVITY AND THE TEST RESULTS TO THE DEPARTMENT OF ENVIRONMENTAL PROTECTION DISTRICT OFFICE, WITHIN ONE (1) WEEK AFTER DISCHARGE BEGINS. THE CONTRACTOR SHALL CONTINUE TO SAMPLE THE EFFLUENT AS REQUIRED THROUGHOUT THE PROJECT AND COMPLY WITH ALL CONDITIONS OF RULE 62-62.01 300(2), F.A.C. IF THE GROUND WATER EXCEEDS THE SCREENING VALUES OF RULE 62-62.01 300(2), F.A.C., THE CONTRACTOR SHALL COMPLY WITH OTHER APPLICABLE RULES AND REGULATIONS PRIOR TO DISCHARGE OF THE EFFLUENT (GROUND WATER) TO SURFACE WATERS OF THE STATE.
2. ALL AREAS SHOWN TO BE FILLED SHALL BE CLEARED AND GRUBBED IN ACCORDANCE WITH FERNANDINA BEACH STANDARDS AND SHALL BE FILLED WITH CLEAN STRUCTURAL FILL COMPACTED AND TESTED IN ACCORDANCE WITH THE GEOTECHNICAL INVESTIGATION REPORT.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF ALL SURVEY AND PROPERTY MONUMENTS. IF A MONUMENT IS DISTURBED, THE CONTRACTOR SHALL CONTRACT WITH THE SURVEYOR OF RECORD FOR REINSTALLATION OF THE MONUMENT.
4. ALL DEBRIS RESULTING FROM ALL ACTIVITIES SHALL BE DISPOSED OF OFF-SITE BY CONTRACTOR.
5. ALL EXCESS SUITABLE AND UNSUITABLE MATERIAL SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AT HIS EXPENSE UNLESS DIRECTED OTHERWISE BY ENGINEER OR OWNER.
6. ALL EXISTING TREES TO REMAIN SHALL BE PRESERVED AND PROTECTED.
7. BURNING OF TREES, BRUSH, AND OTHER MATERIAL SHALL BE APPROVED, PERMITTED, AND COORDINATED WITH FERNANDINA BEACH FIRE MARSHAL.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING A PERMANENT STAND OF SOD AND/OR GRASS PER FERNANDINA BEACH STANDARDS AND MEETING THE NPDES FINAL STABILIZATION REQUIREMENTS.
9. UNSUITABLE MATERIALS UNDER WATER PIPE, SEWER PIPE, STORM PIPE, OR STRUCTURES SHALL BE REMOVED AND REPLACED WITH SELECTED BACKFILL, PROPERLY COMPACTED AT CONTRACTOR'S EXPENSE.
10. THE CONTRACTOR SHALL COORDINATE THE WORK WITHIN FERNANDINA BEACH OR STATE RIGHT-OF-WAY WITH THE PROPER AGENCIES FOR MAINTENANCE OF TRAFFIC AND METHOD OF CONSTRUCTION AND REPAIR.
11. ALL CLEARING AND GRUBBING REQUIRED FOR ALL ROADWAY, UTILITIES, DITCHES, BERMS, AND BUILDINGS INCLUDED IN THIS PROJECT AND THE CLEARING AND GRUBBING OF ALL RIGHT-OF-WAY OR EASEMENTS SHALL BE CONSIDERED AS PART OF THIS PROJECT.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A DEWATERING PERMIT FROM THE SJRWMD.
13. PRIOR TO ANY DISCHARGE OF GROUND WATER (DEWATERING FROM CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS PROJECT TO WATERS OF THE STATE (INCLUDING, BUT NOT LIMITED TO, WETLANDS, CREEKS, SWALES AND MUNICIPAL, STORM SEWERS), THE CONTRACTOR SHALL TEST THE EFFLUENT (WATER TO BE DISCHARGED) IN ACCORDANCE WITH STATE 62-62.01 300(2), F.A.C. IF THE TEST RESULTS ON THE EFFLUENT ARE BELOW THE SCREENING VALUES OF RULE 62-62.01 300(2), F.A.C., THE CONTRACTOR SHALL SUBMIT A SUMMARY OF THE PROPOSED CONSTRUCTION ACTIVITY AND THE TEST RESULTS TO THE DEPARTMENT OF ENVIRONMENTAL PROTECTION DISTRICT OFFICE, WITHIN ONE (1) WEEK AFTER DISCHARGE BEGINS. THE CONTRACTOR SHALL CONTINUE TO SAMPLE THE EFFLUENT AS REQUIRED THROUGHOUT THE PROJECT AND COMPLY WITH ALL CONDITIONS OF RULE 62-62.01 300(2), F.A.C. IF THE GROUND WATER EXCEEDS THE SCREENING VALUES OF RULE 62-62.01 300(2), F.A.C., THE CONTRACTOR SHALL COMPLY WITH OTHER APPLICABLE RULES AND REGULATIONS PRIOR TO DISCHARGE OF THE EFFLUENT (GROUND WATER) TO SURFACE WATERS OF THE STATE.
14. FOR ALL STANDARD DETAILS SEE THE FERNANDINA BEACH STANDARD SPECIFICATIONS AND DETAILS, LATEST REVISION.
15. ALL PIPE LENGTHS ARE SCALED DIMENSIONS, MEASURED FROM CENTER OF STRUCTURE TO END OF MITERED END CONNECTION.

- SECTIONS. STRUCTURES WITHIN FOOT RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH FOOT STANDARDS. ALL DRAINAGE STRUCTURES SHALL BE CONSTRUCTED TO CONFORM WITH FERNANDINA BEACH REQUIREMENTS AND SHALL BE CONSTRUCTED TO CONFORM WITH CURBING, PROPERTY LINES, AND LOW POINTS AS SHOWN ON THE PLANS.
16. CONTRACTOR SHALL INSURE THAT ALL DRAINAGE STRUCTURES, PIPES, ETC. ARE CLEAN AND FUNCTIONING PROPERLY AT TIME OF ACCEPTANCE.
17. ALL DRAINAGE STRUCTURES SHALL HAVE TRAFFIC BEARING GRATES.
18. ALL DRAINAGE PIPE JOINTS ARE TO BE FILTER-WRAPPED.
19. ALL INVERTS IN DRAINAGE STRUCTURES TO BE PRECAST OR BRICK WITH LAYER OF MORTAR BETWEEN EACH LAYER OF BRICK, OR REDDI-MIX CONCRETE WITH #5 STONE.
20. THE CONTRACTOR SHALL PROVIDE HANDICAP RAMPS AT ALL SIDEWALK AND CURB CONNECTIONS. HANDICAP RAMPS SHALL MEET ALL APPLICABLE ADA REQUIREMENTS.
21. ALL UNDERGROUND UTILITIES MUST BE INSTALLED PRIOR TO PREPARATION OF SUBGRADE FOR PAVEMENT.
22. IF DEWATERING CAPACITY REQUIRES A CONSUMPTIVE USE PERMIT (C.U.P.), IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE PERMIT THROUGH THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT.
23. ALL DIMENSIONS TO EDGE OF PAVEMENT UNLESS OTHERWISE SHOWN. ALL EDGE OF PAVEMENT RADII ARE TO BE 5' UNLESS OTHERWISE NOTED.
24. ALL DRAINAGE PIPES INSTALLED WITHIN ROADWAY RIGHT-OF-WAY/EASEMENTS (PUBLIC OR PRIVATE) SHALL BE TELEVIEWED BY A COMPANY OR INDIVIDUAL CERTIFIED TO PERFORM SUCH WORK PER LDC 6.04.07 L.S.G. THIS REQUIREMENT MAY ONLY BE WAIVED ON COMMERCIAL SITES IF THE ENGINEER OF RECORD CERTIFIES BY LETTER THAT THE SITE DOES NOT REQUIRE "SAFETY YELLOW." ARE TO BE SET INTO THE CONCRETE AND ARE TO BE FLUSH WITH CONNECTION OR RELATIONSHIP BETWEEN THE PROJECT SITE AND A FERNANDINA BEACH OWNED OR MAINTAINED DITCH, POND, OR STRUCTURE. IT SHALL BE REQUIRED "THIS TELEVIEWING OF THE DRAINAGE LINE SHALL BE DONE IN CONJUNCTION WITH AND SHALL BE IDENTIFIED AS VISUAL IDENTIFICATION OF THE PROPER CONSTRUCTION OF ALL JOINTS AND PIPE ALIGNMENT. A VIDEO TAPE SHALL BE PROVIDED TO THE FERNANDINA BEACH UPON COMPLETION. THE TELEVIEWING OF THE DRAINAGE LINES SHALL BE PERFORMED AFTER THE PLACEMENT OF THE BASE MATERIAL AND PRIOR TO THE FINAL WEAVING SURFACE OF THE ROADWAY. THE APPROVAL, BY THE FERNANDINA BEACH, OF THE TELEVIEWING SHALL BE REQUIRED PRIOR TO THE PLACEMENT OF THE FINAL WEAVING SURFACE OF THE ROADWAY. TELEVIEWING RECORD SHALL BE REVIEWED AND CERTIFIED BY THE ENGINEER OF RECORD (EOR).
25. PLEASE BE AWARE THAT ALL DETECTABLE WARNING SURFACES FOR SIDEWALK AT CURB CUT HANDICAP RAMPS UNDER THE JURISDICTION OF FERNANDINA BEACH SHALL BE A FERNANDINA BEACH APPROVED YELLOW COLORED COMPOSITE MATERIAL, ANCHORED IN THE CONCRETE SIDEWALK RAMP. ANCHORED COMPOSITE WARNING AREA MATERIALS ARE TO BE DETECTABLE "SAFETY YELLOW." ARE TO BE SET INTO THE CONCRETE AND ARE TO BE FLUSH WITH CONCRETE SURFACE ALONG ALL FOUR SIDES. DESIGN DIMENSIONS OF DETECTABLE WARNING AREA SHALL CONFORM TO FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) STANDARD INDEX 304, SHEETS 1 THROUGH 6, AND 28 CODES OF FEDERAL REGULATIONS (CFR) PART 36, APPENDIX A LATEST REVISION, AS WELL AS APPLICABLE FERNANDINA BEACH REQUIREMENTS.
26. ALL SIDEWALKS AND CURB CUT RAMPS UNDER THE JURISDICTION OF FERNANDINA BEACH SHALL BE DESIGNED AND CONSTRUCTED TO CONFORM TO FDOT STANDARD INDEX 304 AND 310; AND TITLE 28, PART 36, APPENDIX A CODE OF FEDERAL REGULATIONS (CFR) LATEST REVISION, AS WELL AS MEETING ALL ADA REQUIREMENTS.
27. PRIOR TO INSTALLATION OF STORM OR SANITARY SEWER, THE CONTRACTOR SHALL EXCAVATE, VERIFY AND CALCULATE ALL CROSSINGS AND INFORM THE ENGINEER OF ANY CONFLICTS PRIOR TO CONSTRUCTION. THE ENGINEER WILL BE HELD HARMLESS IN THE EVENT THE HESHE IS NOT NOTIFIED OF DESIGN CONFLICTS.
28. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND MEASUREMENTS TAKEN IN THE FIELD WHEN POSSIBLE. THE INFORMATION SHOWN HOWEVER, IS NOT BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE UTILITY LOCATION AT LEAST 48 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES.
29. UNLESS OTHERWISE INDICATED ALL STORM SEWER SHALL BE BEDDED IN ACCORDANCE WITH DETAIL G015 TYPE "B," AS SHOWN ON SHEET 13 - CONSTRUCTION DETAILS. UNLESS CONDITIONS IN THE FIELD DICTATE THE USE OF TYPE "A" BEDDING, AS SHOWN ON SHEET 13 - CONSTRUCTION DETAILS.
30. POND SLOPES AS SHOWN ARE THE MAXIMUM ALLOWABLE SLOPE. IF SITE CONDITIONS OR OTHER ISSUES, SUCH AS GROUNDWATER SEEPAGE CAUSE SLOPE FAILURE, IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO CORRECT THE SLOPES TO MEET THE INTENT OF THE DESIGN. CONTRACTOR IS TO NOTIFY ENGINEER IMMEDIATELY OF THESE ISSUES SO THAT ENGINEER MAY ASSIST WITH THE CORRECTIVE ACTION.
31. ALL STORM PIPE ON THIS PLAN SET, MUST MEET THE FOLLOWING STANDARDS: PP PIPE (12 INCHES TO 80 INCHES) FOR DEBRIS, STORM DRAIN, AND OTHER SPECIFIED APPLICATIONS SHALL MEET THE REQUIREMENTS OF ASHSTO M21-11.

1. ALL STRIPING SHALL CONFORM TO FERNANDINA BEACH AND/OR FDOT SPECIFICATIONS.
2. MATCH EXISTING PAVEMENT MARKINGS AT THE BEGINNING AND END OF PROJECT AREA.
3. SIGNS SHALL BE PLACED IN ACCORDANCE WITH INDEX NO. 11860, 17302, AND 17346.
4. SIGN ASSEMBLY LOCATIONS SHOWN ON PLANS WHICH ARE IN CONFLICT WITH LIGHTING CURB CUTS, ETC. SHALL BE ADJUSTED AS DIRECTED BY ENGINEER.
5. EXISTING SIGNS TO BE REMOVED SHALL BE DELIVERED AND STOCKPILED ON SITE IN THE AREA AND RETURNED TO THE OWNER.
6. COST FOR SIGNING AND MARKING, IF ANY, SHALL BE INCLUDED IN THE COSTS FOR PAVEMENT.

1. ALL UTILITIES SHALL REMAIN IN PLACE AND UNHARMED UNLESS SPECIFICALLY INDICATED OTHERWISE BY THE DEMOLITION PLANS (SHEETS 8 AND 7).
2. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY ABANDONING WELLS OR SEPTIC SYSTEMS FOUND DURING CONSTRUCTION. ABANDONMENT SHALL BE IN ACCORDANCE WITH ALL FERNANDINA BEACH, STATE REGULATIONS, PER THE REQUIREMENTS SET FORTH IN THE F.A.C.

1. NO CONSTRUCTION ACTIVITY INVOLVING EXCAVATION, DENUDING OR DEMOLITION OF ANY SITE SURFACE OR STOCKPILING OF ANY EARTHEN OR AUDIBLE MATERIALS SHALL BEGIN WITHOUT AN APPROVED PLAN AND/OR WRITTEN CONSENT BY THE FERNANDINA BEACH PUBLIC WORKS.
2. THE CONTRACTOR SHALL ESTABLISH ALL EROSION CONTROL MEASURES PRIOR TO EXCAVATION, DENUDING OR DEMOLITION OF ANY SITE SURFACE OR STOCKPILING OF ANY EARTHEN OR ERODIBLE MATERIALS.
3. THE CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL MEASURES THROUGHOUT THE DEVELOPMENT OF THE PROJECT AND SHALL NOT REMOVE ANY EROSION CONTROL MEASURE UNTIL ALL CONTRIBUTING SITE SURFACES AND VEGETATION HAVE BEEN ESTABLISHED AND STABILIZED.
4. THE CONTRACTOR SHALL PERFORM DAILY CLEAN UP OF ALL SEDIMENT AND DEBRIS WHICH LEAVES THE PROJECT SITE(S).
5. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL FERNANDINA BEACH STORM DRAIN SYSTEMS WHICH RECEIVE SEDIMENT OR DEBRIS AS A RESULT OF CONSTRUCTION, STOCKPILING OR DISPOSAL ACTIVITIES. CLEANING OF THE STORM DRAIN WILL OCCUR FROM THE POINT OF INTERCEPT TO THE OUTFALL OF THE SYSTEM OR TO A POINT WITHIN THE SYSTEM WHERE SEDIMENT OR DEBRIS IS NO LONGER PRESENT.
6. RAIN DAYS CLAIMED BY THE CONTRACTOR, DO NOT EXCUSE THE CONTRACTOR OF DAILY INSPECTION AND MAINTENANCE OF ALL SITE EROSION CONTROL MEASURES AND CLEANUP.
7. ALL SEDIMENT COLLECTION SYSTEMS MUST BE MUCKED OUT WHEN 1/3 FULL, MUCKED SEDIMENT MUST BE PROPERLY CONTAINED AND DISPOSED.

1. LOCATE ALL UTILITIES AND SITE LIGHTING CONDUITS BEFORE LANDSCAPE CONSTRUCTION BEGINS.
2. NOTIFY LANDSCAPE ARCHITECT OR DESIGNATED REPRESENTATIVE OF ANY LAYOUT DISCREPANCIES PRIOR TO ANY PLANTING.
3. FERTILIZE ALL PLANTS AT THE TIME OF PLANTING WITH TIME RELEASE FERTILIZER.
4. PLANT MATERIAL SHALL CONFORM TO THE STANDARDS FOR GRADE #1 OR BETTER AS GIVEN IN THE LATEST "GRADES AND STANDARDS FOR NURSERY PLANTS, PARTS I AND II," FLORIDA DEPARTMENT OF AGRICULTURE, LAND AND WATER SERVICES OR TO THE STANDARDS AS GIVEN IN THE LATEST "AMERICAN STANDARD FOR NURSERY STOCK," AMERICAN NATIONAL STANDARDS INSTITUTE.
5. REMOVE ALL DEAD WOOD AND PRUNE TREES ACCORDING TO THE PRUNING GUIDELINES BY THE INTERNATIONAL SOCIETY OF ARBORICULTURE. IF AN ARBORIST BELIEVES A LIMB SHOULD NOT BE REMOVED THE ARBORIST SHALL CONTACT THE LANDSCAPE DESIGNER. REMOVE ALL DEBRIS FROM THE SITE TO AN APPROVED OFF SITE LOCATION. FOLLOW THE "AMERICAN NATIONAL STANDARDS FOR TREE CARE OPERATIONS" AND ANSI Z13.1 GUIDELINES.
6. TREES SHALL HAVE A MINIMUM HEIGHTS OF (8) EIGHT TO (10) TEN FEET AND (2) TWO INCHES OF CALIPER.
7. ALL DISTURBED AREAS MUST BE STABILIZED BY MEANS OF MULCH, SEEDING, OR SOD AS CALLED OUT ON THIS PLAN. IF DISTURBED AREA IS OUTSIDE OF THE LIMITS OF THIS PLAN, AREAS MUST BE STABILIZED WITH EXISTING MATERIAL OR BETTER, I.E. SEEDING OR SODDING.

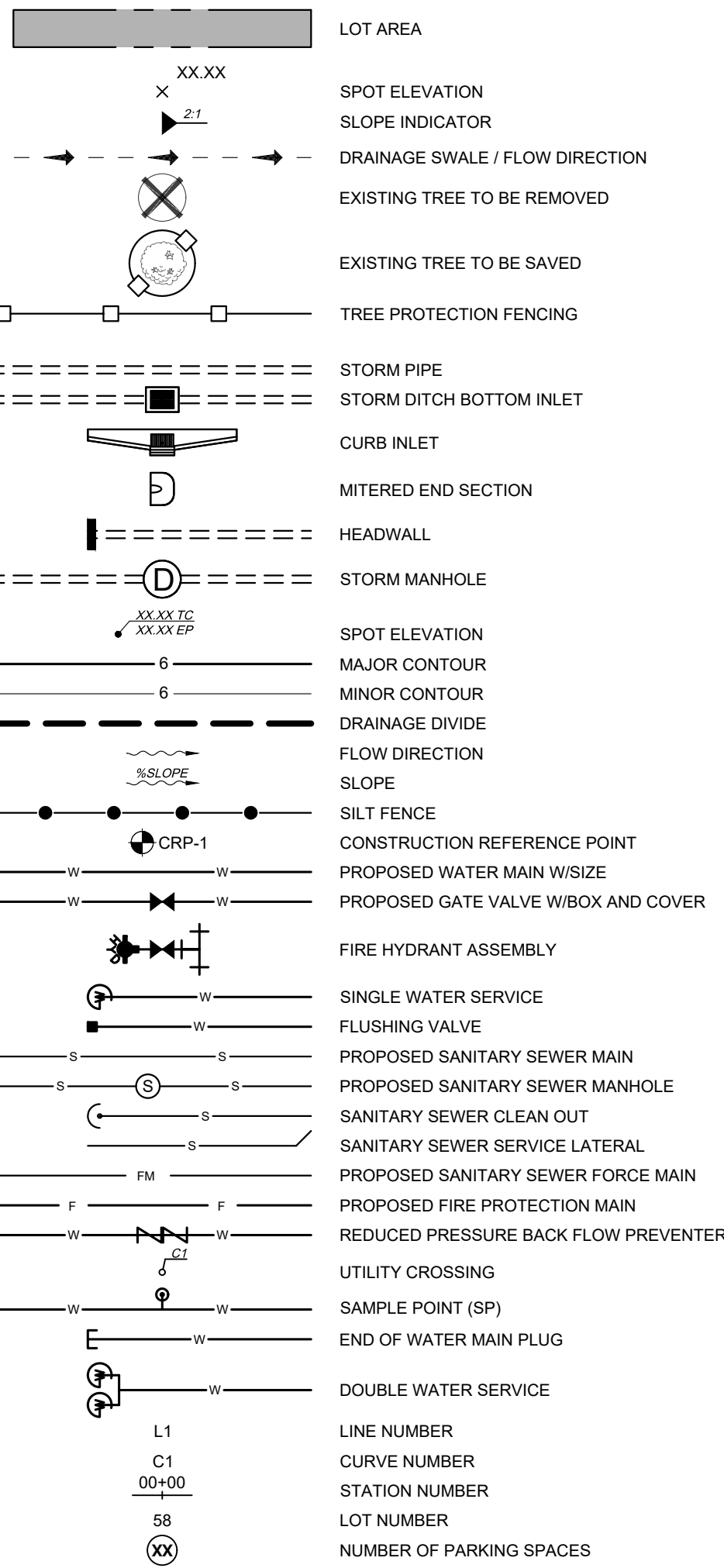
- ROW IMPROVEMENT NOTES:**
1. ALL EXISTING UTILITIES ARE TO BE ADJUSTED TO FINAL GRADE.
 2. CONTRACTOR SHALL REMOVE ANY CONFLICTING STRIPING.

1. FIRE PROTECTION FOR THE PURPOSE OF THESE PLANS IS ANY UNDERGROUND WATER LINE NOT OWNED AND MAINTAINED BY A PUBLIC UTILITY AS WELL AS ANY PRIVATE FIRE SERVICE MAIN AND PIPE AND ITS APPURTENANCES OR PRIVATE PROPORTION OF SUCH MAIN AND PIPE. (1) BETWEEN A SOURCE OF WATER AND THE BASE OF THE SYSTEM RISER FOR WATER-BASED FIRE PROTECTION SYSTEMS, (2) BETWEEN A SOURCE OF WATER AND INLETS TO FOAM-MAKING SYSTEMS, (3) BETWEEN A SOURCE OF WATER AND THE BASE ELBOW OF PRIVATE HYDRANTS OR MONITOR NOZZLES AND (4) USED AS FIRE PUMP SUCTION AND DISCHARGE PIPING, (5) BEGINNING AT THE INLET SIDE OF THE CHECK VALVE ON A GRAVITY OR PRESSURE TANK.
2. THIS SHALL ALSO APPLY TO COMBINED SERVICE MAINS USED TO CARRY WATER FOR FIRE SERVICE AND OTHER USES, I.E. DOMESTIC.
3. STANDARDS TO BE REFERENCED ARE TO BE THE MOST CURRENT AS ADOPTED BY THE FLORIDA FIRE PREVENTION CODE:
 - NFPA 24, INSTALLATION OF PRIVATE FIRE SERVICE MAINS & THEIR APPURTENANCES
 - NFPA 20, STANDARD FOR INSTALLATION OF STATIONARY PUMPS FOR FIRE PROTECTION
 - NFPA 22, STANDARD FOR WATER TANKS FOR PRIVATE FIRE PROTECTION
 - NFPA 16, STANDARD ON DELUGE FOAM-WATER SPRINKLER & FOAM-WATER SPRAY SYSTEMS
 - NFPA 1963 STANDARD FOR FIRE HOSE CONNECTIONS
4. ITEMS ON THE CONSTRUCTION PLANS SHALL INCLUDE BUT NOT LIMITED TO SCALE DRAWINGS AND DETAILS AND TO INCLUDE THE FOLLOWING ITEMS WHEN THEY ARE APPLICABLE TO THE SYSTEM BEING INSTALLED:

- A. NAME OF OWNER AND OCCUPANT.
 - B. LOCATION, INCLUDING STREET ADDRESS.
 - C. POINT OF COMPASS.
 - D. A GRAPHIC REPRESENTATION OF THE SCALE USED ON ALL PLANS.
 - E. NAME AND ADDRESS OF CONTRACTOR.
 - F. SIZE AND LOCATION OF ALL WATER SUPPLIES.
 - G. SIZE AND LOCATION OF ALL PIPING, INDICATING, WHERE POSSIBLE, THE CLASS AND TYPE AND DEPTH OF EXISTING PIPE, THE CLASS AND TYPE OF NEW PIPE TO BE INSTALLED, AND THE DEPTH TO WHICH IT IS TO BE BURIED.
 - H. SIZE, TYPE, AND LOCATION OF VALVES. INDICATE IF LOCATED IN PIT OR IF OPERATION IS BY POST INDICATOR OR KEY WRENCH THROUGH A CURB BOX.
 - I. LOCATION OF FIRE DEPARTMENT CONNECTIONS, IF PART OF PRIVATE FIRE SERVICE MAIN SYSTEM, INCLUDING DETAIL OF CONNECTIONS.
 - J. SPRINKLER AND STANDPIPE RISERS AND MONITOR NOZZLES TO BE SUPPLIED BY THE SYSTEM.
 - K. LOCATION OF FIRE DEPARTMENT CONNECTIONS, IF PART OF PRIVATE FIRE SERVICE MAIN SYSTEM, INCLUDING DETAIL OF CONNECTIONS.
 - L. ALL COMPONENTS MUST HAVE LISTING WITH FIRE PROTECTION NFPA 24.
 - M. ALL FIRE HYDRANTS INSTALLED IN ST. JOHNS COUNTY MUST HAVE A SINGLE 4.5 INCH HOUSE OUTLET, AND TWO (2) 2.5 INCH HOUSE OUTLETS, ALL WITH MALE NH STANDARD THREADS, IN ACCORDANCE WITH NFPA 1963.
5. A COPY THESE APPROVED ENGINEERED PLANS SHALL ACOMPLY A REQUIRED FIRE MARSHAL UNDERGROUND PERMIT SUBMITTED BY A CERTIFIED CONTRACTOR, THIS UNDERGROUND PERMIT WILL REQUIRE ADDITIONAL DETAILS AND SPECS AT THE TIME OF SUBMITTAL TO THE FIRE MARSHAL'S OFFICE.
6. CONTRACTORS INSTALLING THE UNDERGROUND PIPING IN ACCORDANCE WITH THE ABOVE REFERENCE STANDARDS FOR A FIRE PROTECTION SYSTEM USING WAR GAS AS THE EXTINGUISHING AGENT BEGINNING AT THE POINT AT WHICH THE PIPING IS USED EXCLUSIVELY FOR FIRE PROTECTION AND ENDING NO MORE THAN 1 FOOT ABOVE THE FLOOR SHALL BE REQUIRED TO HAVE A CLASS I, II, OR V FIRE PROTECTION CONTRACTORS LICENSE PURSUANT TO CHAPTER 633, FLORIDA STATUTES. GENERAL CONTRACTORS ARE REMINDED THAT THEY ARE RESPONSIBLE FOR OBTAINING THE NECESSARY CONTRACTORS HOLD THE REQUIRED LICENSES. CONTRACTORS WHO ARE VIOLATING THIS REQUIREMENT MAY BE REPORTED TO THE DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION AND/OR THE STATE FIRE MARSHAL'S REGULATORY LICENSING SECTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A PERMIT FROM THE FIRE MARSHAL'S OFFICE PRIOR TO THE START OF SITE CONSTRUCTION IN ACCORDANCE WITH THE ABOVE REFERENCED STANDARDS.
8. NOTE: MINIMUM WORKING PRESSURE OF THE UNDERGROUND PIPING SHALL BE 150 PSI. NFPA 24 REQUIRES SPECIFIC PVC PIPING TO MEET TABLE C-900 WITH MANUFACTURING LISTING FOR FIRE PROTECTION.
9. ALL FIRE LINES MUST BE INSPECTED BY THE FIRE MARSHAL'S OFFICE PRIOR TO BACKFILL. THE CODE REQUIRES ALL JOINTS EXPLORED FOR INSPECTION WITH FILL IN-BETWEEN JOINTS. ALL PIPING AND ATTACHED APPURTENANCES SUBJECTED TO SYSTEM WORKING PRESSURE SHALL BE HYDROSTATICALLY TESTED AT 200 PSI OR 50 PSI IN EXCESS OF THE SYSTEM WORKING PRESSURE, WHICHEVER IS GREATER, AND SHALL MAINTAIN THAT PRESSURE WITHOUT LOSS FOR 2 HOURS.

PROPERTY / RIGHT OF WAY LINE
WETLAND LINE
ROADWAY CENTERLINE
CURB & GUTTER
WETLANDS
SPOT ELEVATION
GRAVITY SEWER
FORCE MAIN SEWER
WATER MAIN
MAJOR CONTOUR
MINOR CONTOUR

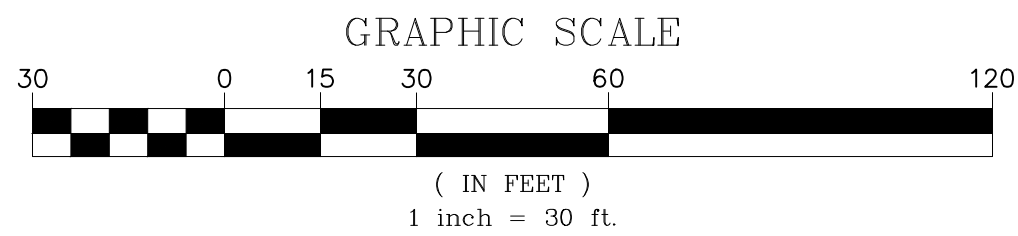
	PROPERTY / RIGHT OF WAY LINE
	DRAINAGE EASEMENT LINE
	UTILITY EASEMENT LINE
	ROADWAY CENTERLINE
	BUILDING SETBACK LINE
	CURB & GUTTER
	UPLAND BUFFER HATCH



ABBREVIATIONS	
ABBREVIATION	DESCRIPTION
A	ARC
AC	ACRE
BC	BACK OF CURB
BFC	BACK FLOW PREVENTER
BLDG	BUILDING
BM	BENCHMARK
BOTT	BOTTOM
CI	CURB INLET
CO	CLEANOUT
CB	CHORD BEARING
CH	CHORD
CWC	CORRUGATED METAL PIPE
CMC	CONCRETE
CONSTR	CONSTRUCT
CONT	CONTINUATION
COORD	COORDINATE
DBL CI	DOUBLE CURB INLET
DE	DRAINAGE EASEMENT
DH	DESIGN HIGH WATER
DIP	DUCTILE IRON PIPE
Δ	DELTA
E	EAST
EOP	EDGE OF PAVEMENT
EL	ELEVATION
ERCP	ELLIPTICAL REINFORCED CONCRETE PIPE
ESMT	EASEMENT
EXIST	EXISTING
FF	FINISH FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
FM	FORCE MAIN
FP	FIRE PROTECTION MAIN
FV	FLUSHING VALVE
GV	GATE VALVE
HDPE	HIGH DENSITY POLYETHYLENE
HDWL	HEADWALL
HWL	HIGH WATER LEVEL
INV	INVERT
L	LENGTH
L	LINEAR FEET
MES	MITERED END SECTION
MAX	MAXIMUM
H	MANHOLE
M	MINIMUM
N	NORTH
NIC	NOT IN CONTRACT
NG	NATURAL GRADE
NTS	NOT TO SCALE
NWL	NORMAL WATER LEVEL
PC	POINT OF CURVATURE
PCB	POINT OF COMPOUND CURVE
PI	POINT OF INTERSECTION
PBB	POINT OF BEGINNING
PRC	POINT OF REVERSE CURVE
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INFLECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PVC	POLYVINYL CHLORIDE PIPE
R	RADIUS
RP	RADIUS POINT
RW	RIGHT OF WAY
RCP	REINFORCED CONCRETE PIPE
REDUCER	REDUCER
RPZBFP	REDUCED PRESSURE BACKFLOW PREVENTER
S	SOUTH
SAN	SANITARY
SEP	SEPARATION
SLP	SLOPE
SP	SAMPLE POINT
SHT	SHEET
STA	STATION
SWMF	STORM WATER MANAGEMENT FACILITY
TOT	TOP OF BANK
SWR	SEWER
TOT	TOP OF CURB
TRI CI	TRIPLE CURB INLET
TYP	TYPICAL
UDAE	UNOBSTRUCTED DRAINAGE & ACCESS EASEMENT
UDE	UNOBSTRUCTED DRAINAGE EASEMENT
UE	UTILITY EASEMENT
VC	VERTICAL CURVE
W	WEST
WM	WATER MAIN

SHEET No. 2		OF 17	
GENERAL NOTES SHEET WESTROCK DROP YARD FERNANDINA BEACH PREPARED FOR WESTROCK FERNANDINA MILL			
MATTHEWS DESIGN GROUP, INC. P.O. BOX 3126, 7 WALDO STREET ST. AUGUSTINE, FLORIDA 32084 PHONE: 904.826.1334 FAX: 904.826.4547 INFO@MATTHEWSDSIGN.NET			
			
DESIGN BY: SAK DWG BY: MS & KJM		NO. 1 DATE 8/29/2019	
REVISIONS		DESCRIPTION	
UPDATES PER COFB TRC COMMENTS			

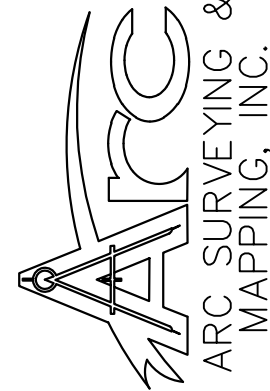
MAP SHOWING TOPOGRAPHIC SURVEY OF



TOPOGRAPHIC LEGEND
x 20.00 = TOPOGRAPHIC HARD SPOT SHOT
x 20.0 = TOPOGRAPHIC SOFT SPOT SHOT
---(5)--- = MAJOR CONTOUR 5.0' INTERVAL
---(1)--- = MINOR CONTOUR 1.0' INTERVAL
(NAVD_88) = NORTH AMERICAN VERTICAL DATUM OF 1988
(NGVD_29) = NATIONAL GEODETIC VERTICAL DATUM OF 1929

GENERAL NOTES

1. BEARINGS AND DISTANCES ESTABLISHED FROM XXXXXXXXXX
2. DIMENSIONS SHOWN THUS 25.0' AND DENOTE BUILDING, CONCRETE AND FENCE TIES.
3. ALL DIMENSIONS SHOWN HEREON ARE IN FEET AND IN TENTHS AND ARE BASED ON THE U.S. SURVEY FOOT.
4. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF TITLE COMMITMENT.
5. NOTICE: THERE MAY BE ADDITIONAL RESTRICTIONS THAT ARE NOT SHOWN ON THIS SURVEY THAT MAY BE FOUND IN THE PUBLIC RECORDS OF THIS COUNTY.
6. THE LANDS SHOWN HEREON LIE WITHIN FEMA FLOOD INSURANCE ZONE "X" ACCORDING TO FLOOD INSURANCE RATE MAP XXXXXXXXX, DATED XX/XX/XXXX FOR DUVAL COUNTY, FLORIDA.



5202 San Juan Ave.
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www.arc-surveyors.com
Licensed Business # 6467

NASSAU COUNTY, FLORIDA

FERNANDINA

File name:

Reference files:

Party Chief:

C.V.

N/A

Dwn by:

JDY

Clk by:

BLP

Drawing Date

09/26/17

Survey Date:

09/25/17

Certified To:

WESTROCK

Description

No Approved

Date

THIS IS TO CERTIFY THAT THE ABOVE LANDS WERE SURVEYED UNDER MY RESPONSIBLE SUPERVISION AND I CERTIFY THAT THERE ARE NO UNRECORDED EASEMENTS, ENCUMBRANCES, OR OTHER INTERESTS AFFECTING THE SURVEYED LANDS. I AM A LICENSED PROFESSIONAL SURVEYOR IN THE STATE OF FLORIDA, LICENSE NO. 4827, AND I AM NOT PROVIDING THIS CERTIFICATE OF SURVEY FOR ANY OTHER PURPOSE.

BOB L. PITTMAN, P.E., F.S.M.
FLORIDA REGISTERED PROFESSIONAL SURVEYOR NO. 4827
SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

PROJECT NO.

17-03-18

FILE NO.

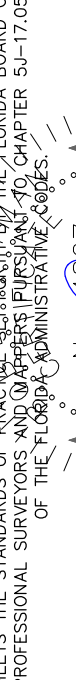
17-03-18

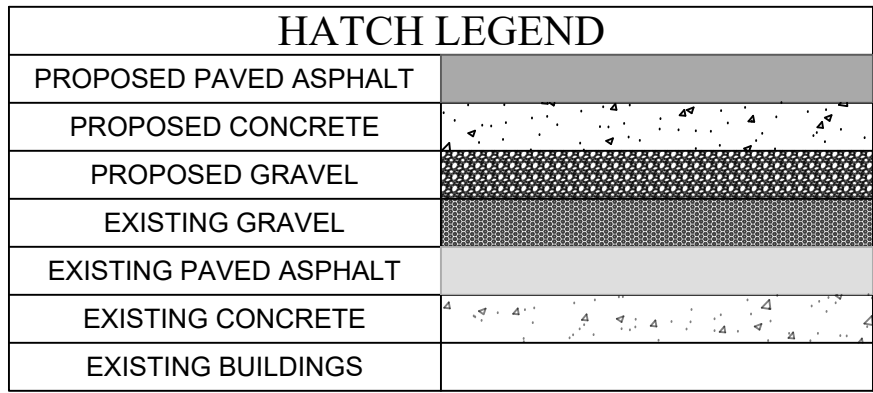
SHEET X OF X

LOCATION OF TREES NORTHWEST OF THE INTERSECTION OF EIGHTH STREET AND ESCAMBIA STREET, LYING IN THE CITY OF FERNANDINA BEACH, NASSAU COUNTY, FLORIDA.



1. THIS IS NOT A BOUNDARY SURVEY, NOR DOES IT PURPORT TO BE SUCH.
2. THE SPECIFIC PURPOSE OF THIS SURVEY IS TO SHOW THE LOCATION OF TREES NORTHWEST OF THE INTERSECTION OF EIGHTH STREET AND ESCAMBIA STREET, AS REQUESTED BY THE CLIENT.
3. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF TITLE COMMITMENT.
4. NOTICE: THERE MAY BE ADDITIONAL RESTRICTIONS THAT ARE NOT SHOWN ON THIS SURVEY THAT MAY BE FOUND IN THE PUBLIC RECORDS OF THIS COUNTY.

 ARC SURVEYING & MAPPING, INC. 5202 San Juan Ave. Jacksonville, Florida 32210 Tel. (904)384-4374 Fax (904)384-4388 Licensed Business # 6487	NASSAU COUNTY, FLORIDA FERNANDINA BEACH	File name: Reference files:	Party Chief: CV	Dwn by:	Drawing Date 06-14-2019						THIS IS TO CERTIFY THAT THE ABOVE LINES WERE SURVEYED UNDER MY PERSONAL SUPERVISION AND IN ACCORDANCE WITH THE FLORIDA SURVEYING ENFORCEMENTS EXCEPT AS SHOWN AND THAT THE SURVEY SHOWN HEREON MEETS ALL STANDARDS OF ACCURACY SET FORTH BY THE CHARTERED BOARD OF PROFESSIONAL SURVEYORS AND MAPPERS OF THE FLORIDA ADMINISTRATIVE CODE, CHAPTER 12C, PART 1, F.A.C.	PROJECT NO. 170318
			Field Bk/Pg N/A	Ckd by: BLP	Survey Date: 03-20-2018							
			Certified To: WESTROCK								 Bob L. Pittman No. 4827 BOB L. PITTMAN, P.S.M. of 06-14-2019 FLORIDA REGISTERED CERTIFICATE NO. 4827 NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.	SHEET 1 OF 1



SITE DATA TABLE			
TOTAL SITE	213 AC		9,278,280 SF
EXISTING IMPERVIOUS AREA			355,790 SF
EXISTING BUILDING			919,109 SF
PROPOSED BUILDING			0 SF
PROPOSED IMPERVIOUS AREA			304,390 SF
TOTAL IMPERVIOUS			1,579,298 SF
TOTAL Pervious			7,698,982 SF
TOTAL IMPERVIOUS %			17%
TOTAL Pervious %			83%
PARCEL NUMBER(S)		00-00-31-1860-0000-0000	
911 ADDRESS		600 N 87th St	
FEMA PANEL NUMBER		12089C0237G	
FLOOD ZONE			AE, X

DESIGN BY:		SAK		REVISIONS	
DWG BY:	MS & KJM	NO.	DATE	DESCRIPTION	
CHE BY:	SAK	1	8/29/2019	UPDATES PER COFB TRC COMMENTS	
DATE:	8/7/2019	APPROVED:	SIGNED:	DATE:	
JOB NO.:	18037	APPROVED:	SIGNED:	DATE:	

DESIGN GROUP, INC.
P.O. BOX 3126, 7 WALDO STREET
ST. AUGUSTINE, FLORIDA 32084
PHONE: 904.826.1334
FAX: 904.826.4547
INFO@MATTHEWSDSIGN.NET



OVERALL SITE PLAN

WESTROCK DROP YARD

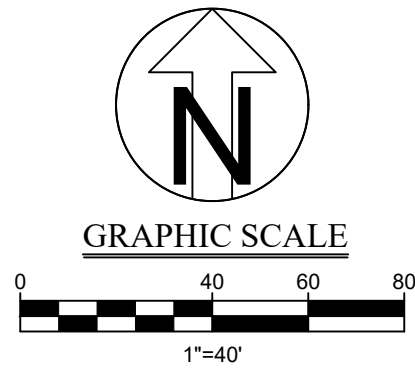
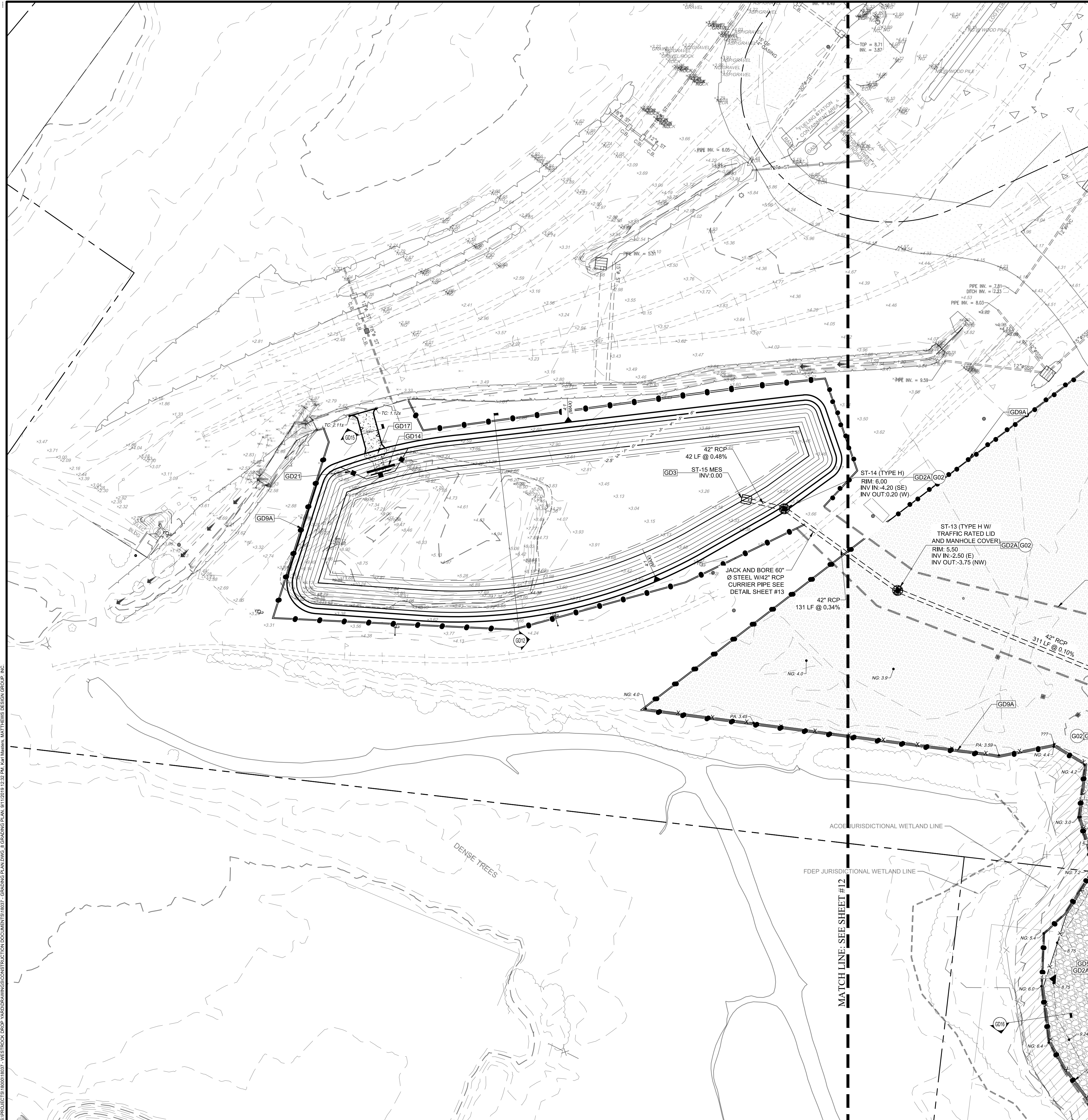
FERNANDINA BEACH

PREPARED FOR

WESTROCK FERNANDINA MILL

SHEET No.:
6
OF 17

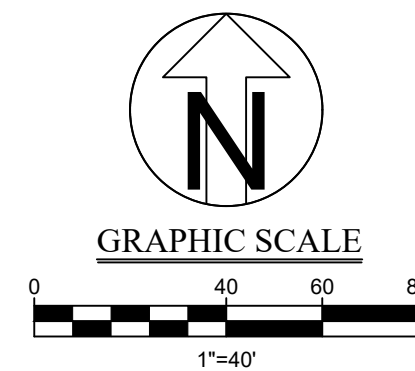




- GRADING DETAILS**
- GD2A HAYBALE INLET PROTECTION
 - GD3 MITERED END SECTION
 - GD4 TYPE C INLET
 - GD8D MANHOLE FRAME AND COVER
 - GD9A DOUBLE TYPE III SILT FENCE
 - GD12 POND CROSS SECTION
 - GD14 SKIMMER DETAIL
 - GD15 SWALE CROSS SECTION
 - GD16 GRAVEL PARKING CROSS SECTION
 - GD17 CONCRETE WEIR
 - GD18 TYPE D INLET
 - GD21 TURBIDITY BARRIERS
- GRADING NOTES**
- G01 MATCH EXISTING GRADE
 - G02 FDOT STD. TYPE H INLET PER FDOT STD. PLAN, INDEX 425-010
- LEGEND**
- CL CENTER LINE
 - EP EDGE OF PAVEMENT
 - NG NATURAL GRADE
 - PA TOP OF PAVEMENT

REVISIONS NO. DATE DESCRIPTION 1 8/29/2019 UPDATES PER COFB TRC COMMENTS		SAK MS & KJM		MATTHEWS DESIGN GROUP, INC. P.O. BOX 3126, 7 WALDO STREET ST. AUGUSTINE, FLORIDA 32084 PHONE: 904.826.1334 FAX: 904.826.4547 INFO@MATTHEWSDESIGN.NET
		SAK 8/7/2019 18037		
GRADING PLAN WESTROCK DROP YARD FERNANDINA BEACH PREPARED FOR WESTROCK FERNANDINA MILL				SHEET No. 11 OF 17

REVISION #1 11-28-2018
(PENDING FDEP APPROVAL)



- | | GRADING DETAILS |
|------|----------------------------|
| GD2A | HAYBALE INLET PROTECTION |
| GD3 | MITERED END SECTION |
| GD4 | TYPE C INLET |
| GD8D | MANHOLE FRAME AND COVER |
| GD9A | DOUBLE TYPE III SILT FENCE |
| GD12 | POND CROSS SECTION |
| GD14 | SKIMMER DETAIL |
| GD17 | CONCRETE WEIR |
| GD18 | TYPE D INLET |
| GD21 | TURBIDITY BARRIERS |

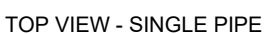
- | GRADING NOTES | |
|---------------|--|
| G01 | MATCH EXISTING GRADE |
| G02 | FDOT STD. TYPE H INLET PER FDOT STD. PLAN, INDEX 425-010 |

- | LEGEND | |
|--------|------------------|
| CL | CENTER LINE |
| EP | EDGE OF PAVEMENT |
| NG | NATURAL GRADE |
| PA | TOP OF PAVEMENT |

SHEET NO.	GRADING PLAN WESTROCK DROP YARD FERNANDINA BEACH PREPARED FOR WESTROCK FERNANDINA MILL	 MATTHEWS DESIGN GROUP, INC. P.O. BOX 3126, 7 WALDO STREET ST. AUGUSTINE, FLORIDA 32084 PHONE: 904.826.1334 FAX: 904.826.4547 INFO@MATTHEWSDESIGN.NET	ISSUED BY:	SAK	NO.	DATE	DESCRIPTION	REVISIONS
			DWG BY:	MS & KJM				
			CHE BY:	SAK				
			DATE:	8/7/2019				
			JOB No.:	18037				



SHEET No.:
13
OF 17



OWNER'S REQUIREMENTS

SITE DESCRIPTION

PROJECT NAME: WESTROCK DROP YARD

LOCATION: NASSAU COUNTY - FERNANDINA BEACH

LATITUDE: 30° 40' 53"

LONGITUDE: 81° 27' 28"

OWNER NAME AND ADDRESS: ROCKTENN CP LLC (MATT SCOLFORO, P.E.)
PO BOX 4098 NORCROSS, GA 30091

DESCRIPTION: EXPANSION OF WESTROCKS TRAILER DROP YARD
INCLUDING PAVEMENT IMPROVEMENTS AND STORM
SYSTEM / TREATMENT POND CONSTRUCTION.

SOIL DISTURBING ACTIVITIES WILL INCLUDE:
PAVING, DRAINAGE, AND EARTHWORK ACTIVITIES

RUNOFF CURVE NUMBERS:
1. PRE-CONSTRUCTION = 74
2. DURING CONSTRUCTION = 86
3. POST-CONSTRUCTION = 98

EXISTING SOILS TYPE: ARENTS, TISONIA, KERSHAW
ESTIMATED SHVLS: 4.0

SITE MAPS:
1. SEE ATTACHED GRADING PLAN FOR PRE & POST DEVELOPMENT GRADES.
AREAS OF SOILS, DISTURBANCE, LOCATION OF SURFACE WATERS, WETLANDS,
PROTECTED AREAS, MAJOR STRUCTURAL AND NONSTRUCTURAL CONTROLS
AND STORM WATER DISCHARGE POINTS.
2. SEE ATTACHED EROSION & TURBIDITY CONTROL PLAN FOR LOCATION OF
TEMPORARY STABILIZATION PRACTICES, AND TURBIDITY BARRIERS
3. SEE GENERAL NOTES FOR REQUIREMENTS FOR TEMPORARY AND
PERMANENT STABILIZATION.

SITE AREA:
1. TOTAL AREA OF SITE = 213 ACRES
2. TOTAL AREA TO BE DISTURBED = 213.8 ACRES
NAME OF RECEIVING WATERS: ST. MARYS RIVER BASIN

OUTFALL 1:
DRAINAGE AREA: BASIN 1
LATITUDE: 30° 40' 46" N
LONGITUDE: 81° 27' 40" W
OUTFALL 2:
DRAINAGE AREA: _____
LATITUDE: _____
LONGITUDE: _____

CONTROLS

THIS PLAN UTILIZES BEST MANAGEMENT PRACTICES TO CONTROL
EROSION AND TURBIDITY CAUSED BY STORM WATER RUN OFF. AN EROSION AND
TURBIDITY PLAN HAS BEEN PREPARED TO INSTRUCT THE CONTRACTOR ON
PLACEMENT OF THESE CONTROLS. IT IS THE CONTRACTORS RESPONSIBILITY
TO INSTALL AND MAINTAIN THE CONTROLS PER PLAN AS WELL AS ENSURING
THE PLAN IS PROVIDING THE PROPER PROTECTION AS REQUIRED BY FEDERAL,
STATE AND LOCAL LAWS. REFER TO "CONTRACTORS RESPONSIBILITY" FOR A
DESCRIPTION OF THE CONTROLS THAT MAY BE IMPLEMENTED.

STORM WATER MANAGEMENT
STORM WATER DRAINAGE WILL BE PROVIDED BY (DESCRIPTION) _____
STANDARD CONSTRUCTION PRACTICES AND PROPOSED POND
AREAS WHICH ARE NOT TO BE CONSTRUCTED ON, BUT
WILL BE REGRADED SHALL BE STABILIZED IMMEDIATELY AFTER GRADING IS
COMPLETE. WHEN CONSTRUCTION IS COMPLETE, A TOTAL OF 12.8 ACRES WILL
HAVE BEEN REGRADED AND 200 ACRES LEFT UNDISTURBED. THE SITE DISCHARGES
TO A WET DETENTION SYSTEM. WHERE PRACTICAL, TEMPORARY SEDIMENT
BASINS WILL BE USED TO INTERCEPT SEDIMENT BEFORE ENTERING THE PERMANENT
DETENTION BASIN. THIS IS IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH BY
THE WATER MANAGEMENT DISTRICT FOR THIS TYPE OF DEVELOPMENT AT THE TIME
OF PERMITTING

BMPS TO BE IMPLEMENTED
BMF: SILT FENCE
LOCATION AND DESCRIPTION: CONSTRUCTION LIMITS BOUNDARY
BMF: CONSTRUCTION ENTRANCE
LOCATION AND DESCRIPTION: SOUTHWEST AREA OF SITE
BMF: FLOATING TURBIDITY BARRIER / INLET PROTECTION
LOCATION AND DESCRIPTION: POND INES OUTFALL / ALL APPLICABLE INLETS

CERTIFICATION OF COMPLIANCE WITH
FEDERAL, STATE AND LOCAL REGULATIONS

IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL LAWS RELATED TO STORM
WATER MANAGEMENT AND EROSION AND TURBIDITY CONTROLS, THE FOLLOWING
PERMITS HAVE BEEN OBTAINED.

C.O.E. DREDGE/FILL PERMIT # N/A
US ARMY CORPS OF ENGINEERS PERMIT # SAJ-2017-01699

POLLUTION PREVENTION PLAN CERTIFICATION

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL
ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN
ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED
PERSONNEL PROPERLY GATHERED AND EVALUATED THE INFORMATION
SUBMITTED, BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO
MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR
GATHERING THE INFORMATION. THE INFORMATION SUBMITTED IS, TO THE
BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I
AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE
INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR
KNOWING VIOLATIONS.

SIGNED: _____

DATED: _____

GENERAL

THE CONTRACTOR SHALL AT A MINIMUM IMPLEMENT THE CONTRACTOR'S
REQUIREMENTS OUTLINED BELOW AND THOSE MEASURES SHOWN ON THE EROSION
AND TURBIDITY CONTROL PLAN. IN ADDITION THE CONTRACTOR SHALL UNDERTAKE
ADDITIONAL MEASURES REQUIRED TO BE IN COMPLIANCE WITH APPLICABLE PERMIT
CONDITIONS AND STATE WATER QUALITY STANDARDS. DEPENDING ON THE NATURE
OF MATERIALS AND METHODS OF CONSTRUCTION THE CONTRACTOR MAY BE
REQUIRED TO ADD FLOCCULANTS TO THE RETENTION SYSTEM PRIOR TO PLACING
THE SYSTEM INTO OPERATION.

SEQUENCE OF MAJOR ACTIVITIES:

THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS:

1. INSTALL STABILIZED
CONSTRUCTION ENTRANCE
2. INSTALL SILT FENCES AND SYNTHETIC
BALES AS REQUIRED
3. CLEAR AND GRUB FOR DIVERSION
SWALES/DIKES AND SEDIMENT
BASIN
4. CONSTRUCT SEDIMENTATION
BASIN
5. CONTINUE CLEARING AND
GRUBBING
6. STOCK PILE TOP SOIL IF REQUIRED
7. PERFORM PRELIMINARY GRADING
ON SITE AS REQUIRED
8. STABILIZE IDLE/UNUSED AREAS AND
STOCKPILES AS SOON AS
PRACTICABLE

9. INSTALL STORM SEWER
AND IRRIGATION
10. COMPLETE GRADING AND
INSTALL PERMANENT
SEEDINGS/SOIL AND PLANTING
11. REMOVE ACCUMULATED
SEDIMENT FROM BASINS
12. WHEN ALL CONSTRUCTION
ACTIVITY IS COMPLETE AND THE
SITE IS STABILIZED, REMOVE ANY
TEMPORARY DIVERSION
SWALES/DIKES AND RESEED/SOIL
AS REQUIRED

TIMING OF CONTROL/MEASURES

AS INDICATED IN THE SEQUENCE OF MAJOR ACTIVITIES, THE SILT FENCES
AND HAY BALES, STABILIZED CONSTRUCTION ENTRANCE AND SEDIMENT
BASIN WILL BE CONSTRUCTED PRIOR TO CLEARING OR GRADING OF ANY
OTHER PORTIONS OF THE SITE. STABILIZATION OF THE HAY BALES WILL
BE INITIATED AS SOON AS PRACTICAL. IN PORTIONS OF THE SITE WHERE
CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY
CEASED, ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN
AREA, THAT AREA WILL BE STABILIZED PERMANENTLY IN ACCORDANCE
WITH THE PLAN. AFTER THE ENTIRE SITE IS STABILIZED, THE
ACCUMULATED SEDIMENT WILL BE REMOVED FROM THE SEDIMENT TRAPS
AND THE EARTH DIKES/SWALES WILL BE REGRADED/REMOVED AND STABILIZED
IN ACCORDANCE WITH THE EROSION & TURBIDITY CONTROL PLAN.

CONTROLS

IT IS THE CONTRACTORS RESPONSIBILITY TO IMPLEMENT THE EROSION AND
TURBIDITY CONTROLS AS SHOWN ON THE EROSION AND TURBIDITY CONTROL
PLAN. IT IS ALSO THE CONTRACTORS RESPONSIBILITY TO ENSURE THESE
CONTROLS ARE PROPERLY INSTALLED, MAINTAINED AND FUNCTIONING PROPERLY
TO PREVENT TURBID OR POLLUTED WATER FROM LEAVING THE PROJECT SITE.
THE CONTRACTOR WILL ADJUST THE EROSION AND TURBIDITY CONTROLS SHOWN
ON THE EROSION AND TURBIDITY CONTROL PLAN AND ADD ADDITIONAL CONTROL
MEASURES, AS REQUIRED, TO ENSURE THE SITE MEETS ALL FEDERAL, STATE AND
LOCAL EROSION AND TURBIDITY CONTROL REQUIREMENTS. THE FOLLOWING BEST
MANAGEMENT PRACTICES WILL BE IMPLEMENTED BY THE CONTRACTOR AS
REQUIRED BY THE EROSION AND TURBIDITY CONTROL PLAN AND AS REQUIRED
TO MEET THE EROSION AND TURBIDITY REQUIREMENTS IMPOSED ON THE PROJECT
SITE BY THE REGULATORY AGENCIES.

EROSION AND SEDIMENT CONTROLS
STABILIZATION PRACTICES

1. SYNTHETIC BALE BARRIER: SYNTHETIC BALE BARRIERS CAN BE USED BELOW
DISTURBED AREAS SUBJECT TO SHEET AND RILL EROSION WITH THE
FOLLOWING LIMITATIONS:
A. WHERE THE MAXIMUM SLOPE BEHIND THE BARRIER IS 33 PERCENT.
B. IN MINOR SWALES OR DITCH LINES WHERE THE MAXIMUM
CONTRIBUTING DRAINAGE AREA IS NO GREATER THAN 2 ACRES.
C. WHERE EFFECTIVENESS IS REQUIRED FOR LESS THAN 3 MONTHS.
D. EVERY EFFORT SHOULD BE MADE TO LIMIT THE USE OF SYNTHETIC BALE
BARRIERS CONSTRUCTED IN LIVE STREAMS OR IN SWALES WHERE
THERE IS THE POSSIBILITY OF A WASHOUT. IF NECESSARY, MEASURES
SHALL BE TAKEN TO PROPERLY ANCHOR BALES TO INSURE
AGAINST WASHOUT.
REFER TO THE DETAILS FOR CONSTRUCTING THE HAY BALE BARRIER,
ALSO REFER TO THE DETAILS FOR PROPER LOCATION, MATERIAL
AND USAGE.
2. FILTER FABRIC BARRIER: FILTER FABRIC BARRIERS CAN BE USED BELOW
DISTURBED AREAS SUBJECT TO SHEET AND RILL EROSION WITH THE
FOLLOWING LIMITATIONS:
A. WHERE THE MAXIMUM SLOPE BEHIND THE BARRIER IS 33 PERCENT.
B. IN MINOR SWALES OR DITCH LINES WHERE THE MAXIMUM
CONTRIBUTING DRAINAGE AREA IS NO GREATER THAN 2 ACRES.
REFER TO THE DETAIL SHEET FOR PROPER CONSTRUCTION
OF THE FILTER FABRIC BARRIER.
3. BRUSH BARRIER WITH FILTER FABRIC: BRUSH BARRIER MAY BE USED
BELOW DISTURBED AREAS SUBJECT TO SHEET AND RILL EROSION WHERE
ENOUGH RESIDUE MATERIAL IS AVAILABLE ON SITE.
4. LEVEL SPREADER: A LEVEL SPREADER MAY BE USED WHERE SEDIMENT-
FREE STORM RUNOFF IS INTERCEPTED AND DIVERTED AWAY FROM THE
GRADED AREAS ONTO UNDISTURBED STABILIZED AREAS. THIS PRACTICE
APPLIES ONLY IN THOSE SITUATIONS WHERE THE SPREADER CAN BE

CONTRACTOR'S REQUIREMENTS

THE 3,600 CUBIC FEET OF STORAGE AREA PER ACRE DRAINED DOES NOT
APPLY TO FLOWS FROM OFFSITE AREAS AND FLOWS FROM ONSITE AREAS
THAT ARE EITHER UNDISTURBED OR HAVE UNDERGONE FINAL
STABILIZATION WHERE SUCH FLOWS ARE DIVERTED AROUND BOTH THE
DISTURBED AREA AND THE SEDIMENT BASIN. ANY TEMPORARY SEDIMENT
BASINS CONSTRUCTED MUST BE BACKFILLED AND COMPACTED IN
ACCORDANCE WITH THE SPECIFICATIONS FOR STRUCTURAL FILL. ALL
SEDIMENT COLLECTED IN PERMANENT OR TEMPORARY SEDIMENT TRAPS
MUST BE REMOVED UPON FINAL STABILIZATION.

OTHER CONTROLS

WASTE DISPOSAL

WASTE MATERIALS

ALL WASTE MATERIALS EXCEPT LAND CLEARING DEBRIS SHALL BE
COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER. THE
DUMPSTER WILL MEET ALL LOCAL AND STATE SOLID WASTE MANAGEMENT
REGULATIONS. THE DUMPSTER WILL BE EMPTIED AS NEEDED AND THE
TRASH WILL BE HAULED TO A STATE APPROVED LANDFILL. ALL
PERSONNEL WILL BE INSTRUCTED REGARDING THE CORRECT
PROCEDURE FOR WASTE DISPOSAL. NOTICES STATING THESE
PRACTICES WILL BE POSTED AT THE CONSTRUCTION SITE BY THE
CONSTRUCTION SUPERINTENDENT. THE INDIVIDUAL WHO MANAGES
THE DAY-TO-DAY SITE OPERATIONS WILL BE RESPONSIBLE FOR
SEEING THAT THESE PROCEDURES ARE FOLLOWED.

HAZARDOUS WASTE

ALL HAZARDOUS WASTE MATERIALS WILL BE DISPOSED OF IN THE
MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE
MANUFACTURER. SITE PERSONNEL WILL BE INSTRUCTED IN THESE
PRACTICES AND THE SITE SUPERINTENDENT. THE INDIVIDUAL WHO
MANAGES DAY-TO-DAY SITE OPERATIONS WILL BE RESPONSIBLE FOR
SEEING THAT THESE PRACTICES ARE FOLLOWED.

SANITARY WASTE

ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS AS
NEEDED TO PREVENT POSSIBLE SPILLAGE. THE WASTE WILL BE COLLECTED
AND DEPOSED OF IN ACCORDANCE WITH STATE AND LOCAL WASTE DISPOSAL
REGULATIONS FOR SANITARY SEWER OR SEPTIC SYSTEMS.

OFFSITE VEHICLE TRACKING

A STABILIZED CONSTRUCTION ENTRANCE WILL BE PROVIDED TO HELP
REDUCE VEHICLE TRACKING OF SEDIMENTS. THE PAVED STREET ADJACENT
TO THE SITE ENTRANCE WILL BE SWEEP DAILY TO REMOVE ANY EXCESS
MUD, DIRT OR ROCK TRACKED FROM THE SITE. DUMP TRUCKS HAULING
MATERIAL FROM THE CONSTRUCTION SITE WILL BE COVERED WITH A
TARPAULIN.

INVENTORY FOR POLLUTION PREVENTION PLAN

THE MATERIALS OR SUBSTANCES LISTED BELOW ARE EXPECTED TO BE
PRESENT DURING CONSTRUCTION:

☐ Concrete ☐ Fertilizers ☐ Wood
☐ Asphalt ☐ Petroleum Based Products ☐ Masonry Blocks
☐ Tar ☐ Cleaning Solvents ☐ Roofing Materials
☐ Detergents ☐ Paints ☐ Metal Studs
☐ _____

STRUCTURAL PRACTICES

1. TEMPORARY DIVERSION DIKE: TEMPORARY DIVERSION DIKES MAY BE
USED TO DIVERT RUNOFF THROUGH A SEDIMENT-TRAPPING FACILITY,
AND IT SHALL BE CONSTRUCTED IN ACCORDANCE TO WITH THE DETAILS.
2. TEMPORARY SEDIMENT TRAP: A SEDIMENT TRAP SHALL BE INSTALLED IN
AN DRAINAGE WAY AT A STORM DRAIN INLET OR AT OTHER POINTS OF
DISCHARGE FROM A DISTURBED AREA.
THE FOLLOWING SEDIMENT TRAPS MAY BE CONSTRUCTED EITHER
INDEPENDENTLY OR IN CONJUNCTION WITH A TEMPORARY DIVERSION
DIKE.
A. BLOCK & GRAVEL SEDIMENT FILTER - THIS PROTECTION IS
APPLICABLE WHERE HEAVY FLOWS AND/OR WHERE AN OVERFLOW
CAPACITY IS NECESSARY TO PREVENT EXCESSIVE PONDING AROUND
THE STRUCTURE. REFER TO THE DETAIL SHEET FOR CONSTRUCTION OF A
CURB INLET SEDIMENT FILTER, AND FOR CONSTRUCTION OF A
DROPP INLET SEDIMENT FILTER.
AREAS, REFER TO THE DETAILS FOR CONSTRUCTION OF CURB INLET & DROP
B. GRAVEL SEDIMENT TRAP - THIS PROTECTION IS APPLICABLE WHERE
HEAVY CONCENTRATED FLOWS ARE EXPECTED, BUT NOT WHERE
PONDING AROUND THE STRUCTURE MIGHT CAUSE EXCESSIVE
INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES & UNPROTECTED
SEDIMENT TRAP.
C. DROP INLET SEDIMENT TRAP - THIS PROTECTION IS APPLICABLE WHERE
THE INLET DRAINS A RELATIVELY FLAT AREA IS < 5% AND WHERE
SHEET OR OVERLAND FLOWS (Q < 0.5 CFS) ARE TYPICAL. THIS METHOD
SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS SUCH
AS IN STREET OR HIGHWAY MEDIANS. REFER TO THE DETAILS FOR
CONSTRUCTION OF HAY BALE & FABRIC SEDIMENT FILTER.
3. OUTLET PROTECTION: APPLICABLE TO THE OUTLETS OF ALL PIPES AND
PAVED CHANNEL SECTIONS WHERE THE FLOW COULD CAUSE EROSION
& SEDIMENT PROBLEM TO THE RECEIVING WATER BODY. SILT FENCES &
HAY BALES ARE TO BE INSTALLED IMMEDIATELY DOWNSTREAM OF THE
DISCHARGING STRUCTURE AS SHOWN ON THE OUTLET PROTECTION DETAIL.
4. SEDIMENT BASIN: WILL BE CONSTRUCTED AT THE COMMON DRAINAGE
LOCATIONS THAT SERVE AN AREA WITH 10 OR MORE DISTURBED ACRES
AT ONE TIME. THE PROPOSED STORM WATER PONDS (OR TEMPORARY
PONDS) WILL BE CONSTRUCTED FOR USE AS SEDIMENT BASINS. THESE
SEDIMENT BASINS MUST PROVIDE A MINIMUM OF 3,600 CUBIC FEET OF
STORAGE PER ACRE DRAINED UNTIL FINAL STABILIZATION OF THE SITE.

HAZARDOUS PRODUCTS

THESE PRACTICES ARE USED TO REDUCE THE RISKS ASSOCIATED WITH
HAZARDOUS MATERIALS.

* PRODUCTS WILL BE KEPT IN ORIGINAL CONTAINERS UNLESS THEY ARE NOT
REPLACEABLE.

* ORIGINAL LABELS AND MATERIAL SAFETY DATA WILL BE RETAINED. THEY
CONTAIN IMPORTANT PRODUCT INFORMATION.

* IF SURPLUS PRODUCT MUST BE DISPOSED OF, MANUFACTURER'S OR LOCAL
AND STATE RECOMMENDED METHODS FOR PROPER DISPOSAL WILL BE
FOLLOWED.

PRODUCT SPECIFIC PRACTICES

THE FOLLOWING PRODUCT SPECIFIC PRACTICES WILL BE FOLLOWED ONSITE:

PETROLEUM PRODUCTS

ALL ONSITE VEHICLES WILL BE MONITORED FOR LEAKS AND RECEIVE
REGULAR PREVENTIVE MAINTENANCE TO REDUCE THE CHANCE OF
LEAKAGE. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED
CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT SUBSTANCES
USED ONSITE WILL BE APPLIED ACCORDING TO THE MANUFACTURER'S
RECOMMENDATIONS.

FERTILIZERS

FERTILIZERS USED WILL BE APPLIED ONLY IN THE MINIMUM AMOUNTS
RECOMMENDED BY THE MANUFACTURER. ONCE APPLIED, FERTILIZER WILL
BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORM WATER.
STORAGE WILL BE IN A COVERED AREA. THE CONTENTS OF ANY
PARTIALLY USED BAGS OF FERTILIZER WILL BE TRANSFERRED TO A
SEALABLE PLASTIC BIN TO AVOID SPILLS.

PAINTS

ALL CONTAINERS WILL BE TIGHTLY SEALED AND STORED WHEN NOT
REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE
STORM SEWER SYSTEM BUT WILL BE PROPERLY DISPOSED OF ACCORDING
TO MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.

CONCRETE TRUCKS

CONCRETE TRUCKS SHALL BE ALLOWED TO WASH OUT OR DISCHARGE
SURPLUS CONCRETE OR DRUM WASH WATER ONLY AT DISCHARGE POINT
PROVIDED, NO OFFSITE DISCHARGE WILL BE PERMITTED.

SPILL CONTROL PRACTICES

IN ADDITION TO THE GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT
PRACTICES DISCUSSED IN THE PREVIOUS SECTIONS OF THIS PLAN, THE
FOLLOWING PRACTICES WILL BE FOLLOWED FOR SPILL PREVENTION AND
CLEANUP:

MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE
CLEARLY POSTED ON SITE AND SITE PERSONNEL WILL BE MADE AWARE OF THE
PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP
SUPPLIES.

MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP WILL BE KEPT
IN THE MATERIAL STORAGE AREA ONSITE. EQUIPMENT AND MATERIALS WILL
INCLUDE BUT NOT BE LIMITED TO BROOMS, DUST PANS, MOPS, RAGS,
GLOVES, GOGGLES, LIQUID ABSORBENT (i.e. KITTY LITTER OR EQUAL),
SAND, SAWDUST, AND PLASTIC AND METAL TRASH CONTAINERS SPECIFICALLY
FOR THIS PURPOSE.

ALL SPILLS WILL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY.

THE SPILL AREA WILL BE KEPT WELL VENTILATED AND PERSONNEL WILL
WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM
CONTACT WITH A HAZARDOUS SUBSTANCE.

SPILL OF TOXIC OR HAZARDOUS MATERIAL WILL BE REPORTED TO THE
APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY, REGARDLESS OF THE
SIZE OF THE SPILL.

THE SPILL PREVENTION PLAN WILL BE ADJUSTED TO INCLUDE MEASURES TO
PREVENT THIS TYPE OF SPILL FROM REOCCURRING AND HOW TO CLEAN UP
THE SPILL IF THERE IS ANOTHER ONE. A DESCRIPTION OF THE SPILL, WHAT
CAUSED IT, AND THE CLEANUP MEASURES WILL ALSO BE INCLUDED.

THE SITE SUPERINTENDENT RESPONSIBLE FOR THE DAY-TO-DAY SITE
OPERATIONS, WILL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.
HE/SHE WILL DESIGNATE AT LEAST ONE OTHER SITE PERSONNEL WHO
WILL RECEIVE SPILL PREVENTION AND CLEANUP TRAINING. THESE
INDIVIDUALS WILL EACH BECOME RESPONSIBLE FOR A PARTICULAR PHASE
OF PREVENTION AND CLEANUP. THE NAMES OF RESPONSIBLE SPILL
PERSONNEL WILL BE POSTED IN THE MATERIAL STORAGE AREA AND IF
APPLICABLE, IN THE OFFICE TRAILER ONSITE.

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THE SPILL IF THERE IS ANOTHER ONE. A DESCRIPTION OF THE SPILL, WHAT
CAUSED IT, AND THE CLEANUP MEASURES WILL ALSO BE INCLUDED.

THE SITE SUPERINTENDENT RESPONSIBLE FOR THE DAY-TO-DAY SITE
OPERATIONS, WILL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.
HE/SHE WILL DESIGNATE AT LEAST ONE OTHER SITE PERSONNEL WHO
WILL RECEIVE SPILL PREVENTION AND CLEANUP TRAINING. THESE
INDIVIDUALS WILL EACH BECOME RESPONSIBLE FOR A PARTICULAR PHASE
OF PREVENTION AND CLEANUP. THE NAMES OF RESPONSIBLE SPILL
PERSONNEL WILL BE POSTED IN THE MATERIAL STORAGE AREA AND IF
APPLICABLE, IN THE OFFICE TRAILER ONSITE.

MAINTENANCE/INSPECTION PROCEDURES

EROSION AND SEDIMENT CONTROL INSPECTION AND MAINTENANCE PRACTICES

THE FOLLOWING ARE INSPECTION AND MAINTENANCE PRACTICES THAT WILL BE
USED TO MAINTAIN EROSION AND SEDIMENT CONTROLS.

* NO MORE THAN 10 ACRES OF THE SITE WILL BE DENVED AT ONE TIME
WITHOUT WRITTEN PERMISSION FROM THE ENGINEER.

* ALL CONTROL MEASURES WILL BE INSPECTED BY THE SUPERINTENDENT,
THE PERSON RESPONSIBLE FOR THE DAY TO DAY SITE OPERATION OR
SOMEONE APPOINTED BY THE SUPERINTENDENT, AT LEAST ONCE A WEEK AND
FOLLOWING ANY STORM EVENT OF 0.50 INCHES OR GREATER.

* ALL TURBIDITY CONTROL MEASURES WILL BE MAINTAINED IN GOOD WORKING
ORDER. IF A REPAIR IS NECESSARY, IT WILL BE INITIATED WITHIN 24 HOURS OF
REPORT.

* BUILT UP SEDIMENT WILL BE REMOVED FROM SILT FENCE WHEN IT HAS
REACHED ONE-THIRD THE HEIGHT OF THE FENCE.

REVISIONS

NO.	DATE	DESCRIPTION

SAK MS & KJM
DATE 8/7/2019
JOB NO. 18037

CONTRACTOR'S CERTIFICATION

I CERTIFY UNDER PENALTY OF LAW THAT I UNDERSTAND THE TERMS AND
CONDITIONS OF THE GENERIC STORMWATER PERMIT ISSUED PURSUANT TO
SECTION 403.0885, F.S., THAT AUTHORIZES THE STORM WATER DISCHARGES
ASSOCIATED WITH INDUSTRIAL ACTIVITY FROM THE CONSTRUCTION SITE
IDENTIFIED AS PART OF THIS CERTIFICATION.

RESponsible FOR/ITIES
GENERAL CONTRACTOR
SUB-CONTRACTOR
SUB-CONTRACTOR
SUB-CONTRACTOR
SUB-CONTRACTOR

BUSINESS NAME AND ADDRESS
OF CONTRACTOR AND ALL ISSUES

SIGNATURE / DATE

SWPPP
WESTROCK DROP YARD
FERNANDINA BEACH
PREPARED FOR
WESTROCK FERNANDINA MILL

16
OF 17

STORM WATER POLLUTION PREVENTION PLAN
INSPECTION AND MAINTENANCE REPORT FORM

TO BE COMPLETED EVERY 7 DAYS AND WITHIN 24 HOURS OF
A RAINFALL EVENT OF 0.50 INCHES OR MORE

INSPECTOR:	DATE:
INSPECTOR'S QUALIFICATIONS: 	
DAYS SINCE LAST RAINFALL:	AMOUNT OF LAST RAINFALL INCHES

STABILIZATION MEASURES

INSPECTION AREA (DESCRIPTION OF LOCATION)	DATE SINCE LAST DISTURBED	DATE OF NEXT DISBURSANCE	STABILIZED ? (YES/NO)	STABILIZED WITH	CONDITION

STABILIZATION REQUIRED:

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

PAGE 1 OF 4

STORM WATER POLLUTION PREVENTION PLAN
INSPECTION AND MAINTENANCE REPORT FORM

SEDIMENT BASIN

DEPTH OF SEDIMENT IN BASIN	DEPTH OF SEDIMENT SIDE BASIN	ANY EVIDENCE OF OVERTOPPING OF THE EMBANKMENT ?	CONDITION OF OUTFALL FROM SEDIMENT BASIN

MAINTENANCE REQUIRED FOR SEDIMENT BASIN:

.....

TO BE PERFORMED BY:..... ON OR BEFORE.....

.....

OTHER CONTROLS

STABILIZED CONSTRUCTION ENTRANCE

DONES MUCH SEDIMENT GET TRACKED ON TO ROAD ?	IS THE GRAVEL CLEAN OR IS IT FILLED WITH SEDIMENT?	DOES ALL TRAFFIC USE THE STABILIZED ENTRANCE TO LEAVE THE SITE ?	IS THE CULVERT BENEATH THE ENTRANCE WORKING? (IF APPLICABLE)

MAINTENANCE REQUIRED FOR STABILIZED CONSTRUCTION ENTRANCE:

.....

TO BE PERFORMED BY:..... ON OR BEFORE.....

PAGE 3 OF 4

STORM WATER POLLUTION PREVENTION PLAN
INSPECTION AND MAINTENANCE REPORT FORM

STRUCTURAL CONTROLS

DATE: _____

EARTH DIKES/SWALES

DIKE OR SWALE	FROM	TO	IS DIKE/SWALE STABILIZED ?	IS THERE EVIDENCE OF WASHOUT OR OVERTOPPING

MAINTENANCE REQUIRED FOR EARTH DIKE/SWALE: _____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

CATCH BASIN/CURB INLET/OUTFALL TURBIDITY CONTROLS

STRUCTURE/ OUTFALL	ARE TURBIDITY CONTROLS IN PLACE	ANY EVIDENCE OF CLOGGING/WASHOUT OR BYPASSING ?	ARE TURBIDITY CONTROLS IN NEED OF REPLACING	DOES SILT NEED TO BE REMOVED FROM AROUND CONTROL

MAINTENANCE REQUIRED FOR CATCH BASIN/CURB INLETS/OUTFALLS TURBIDITY CONTROLS: _____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

[illegible]

THIS IS THE CONTRACTORS CERTIFICATION REQUIRED BY THE EPA'S NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES), STORM WATER POLLUTION PREVENTION PLAN FOR CONSTRUCTION SITES OVER 5 ACRES. THIS CERTIFICATION MUST BE COMPLETED WEEKLY AND AFTER EVERY RAINFALL EVENT OVER 0.50 INCHES. IT IS SUGGESTED THAT THIS SHEET BE REMOVED FROM THE PLAN SET AND DUPLICATED AS NEEDED BY THE CONTRACTOR

SHEET No. 17	SWPPP CERTIFICATION WESTROCK DROP YARD FERNANDINA BEACH PREPARED FOR WESTROCK FERNANDINA MILL
OF 17	



MATTHEW'S DESIGN GROUP, INC.

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INFO@MATTHEWSDESIGN.NET

DESIGNED BY:	SAK
DRAWN BY:	MS & KJM
CHECK BY:	SAK
DATE:	8/7/2019
DWG. NO.	18037

REVISIONS		NO.	DATE	DESCRIPTION
		1	8/29/2019	UPDATES PER COFB TRC COMMENTS
		REVISION	DATE	DESCRIPTION
		REVISION	DATE	DESCRIPTION
		REVISION	DATE	DESCRIPTION
		REVISION	DATE	DESCRIPTION
		REVISION	DATE	DESCRIPTION



MATTHEWS DESIGN GROUP

I N C O R P O R A T E D

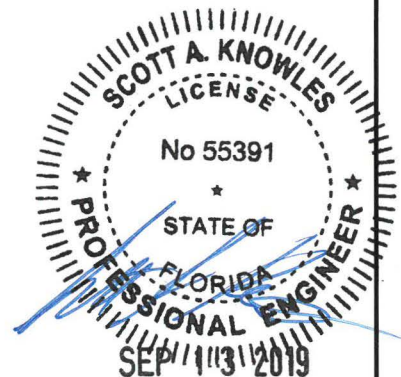
STORMWATER CALCULATIONS

WESTROCK DROP YARD ADDITION

MODIFICATION TO EXISTING FDEP ERP PERMIT NO. 45-0367519-001-EI

MDG #18037

March 11, 2019



PO Box 3126 • 7 Waldo Street • St. Augustine • Florida • 32084
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www.mdginc.com

Scott A. Knowles, P.E.
#55391
CA #26535

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MDG #18037 – Westrock Drop Yard

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SECTION 1
EXECUTIVE SUMMARY

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Section 1 - Executive Summary

A. Project Summary

The purpose of this report is to modify the existing FDEP ERP permit no. 45-0367519-001-EI. At the time of the original permit, there was not enough information regarding an existing untreated stormwater outfall that made it impracticable to treat through the proposed water management system. For this reason, the outfall was left unimproved. However, since the approval of the permit, the client (Westrock) has put in further resources to better identify the currently freely discharging waters origins. The FDEP has also worked with the client and MDG design team to coordinate a design that meets all requirements and allows for an overall improvement in discharge water quality.

The existing permit consisted of expansion of an overflow parking area and its associated infrastructure. In this report a separate, existing untreated outfall will be re-routed into the stormwater pond associated with the above-mentioned permit. The existing outfall control structure (Overland Weir and Orifice) will be modified to provide proper treatment and attenuation of the additional water volume. The existing detention pond will be used to treatment of an additional 4.48 acres. The 4.48-acre area is completely impervious and is comprised of an existing faculty parking lot and a roof drain leader system that services half of an existing buildings roof area. This area currently outfalls without any treatment directly into a wetland system that outfalls into the Amelia River. See the attached Site Development Map for an overview of drainage characteristics and outfalls.

This drainage analysis has been prepared in accordance with current requirements of the Florida Department of Environmental Protection, St. Johns River Water Management District and Fernandina Beach LDC.

Wet Detention Area Calculation Summary:

Pond ID	Bottom Elevation	TOB	Drawdown Control Elevation	Normal Water Level	Weir Elevation	Required Treatment Volume	Provided Treatment Volume	Required Permanent Pool Volume	Provided Permanent Pool Volume
-	(ft)	(ft)	(ft)	(ft)	(ft)	(cf)	(cf)	(cf)	(cf)
1	-2.5	6.0	2.50	2.50	4.25	107,236	125,630	207,332	214,781

The pond stage and peak flow results from the computer model analysis are as follows:

Pre-developed Analysis	SJRWMD Storm Event	Peak Pre-Developed (Pre-Basin 1)
		(cfs)
	Mean Annual	33.4
	10yr-24hr	56.8
	25yr-24hr	68.3
	100yr-24hr*	87.2

	SJRWMD Storm Event	Peak Post-Developed flow Basin A with Detention	Pond Stage
Basin A Analysis Results		(cfs)	(ft)
	Mean Annual	10.8	4.7
	10yr-24hr	43.1	5.4
	25yr-24hr	59.1	5.7
	100yr-24hr*	83.1	6.0

*100yr-24hr storm event analyzed for pond capacity only

	SJRWMD Storm Event	Pre-Developed	Post-Developed	Pre-Developed	Post-Developed
Site Total Discharge Summary		(cfs)	(cfs)	(ac-ft)	(ac-ft)
	Mean Annual	33.4	10.8	66.2	21.4
	10yr-24hr	56.8	43.1	112	85.4
	25yr-24hr	68.3	59.1	135	117
	100yr-24hr*	87.2	83.1	172	165

SECTION 2
INTRODUCTION

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Section 2 – Introduction

A. General Project Information:

This analysis is for the modification of an existing FDEP ERP permit (45-0367519-001-EI) to allow for an additional volume of water to be routed through and treated in the pond associated with the existing permit. The existing outfall structure has been modified to allow for the treatment of the additional flow. Attenuation is not a concern due to the similar outfall locations of the freely discharging stormwater with the existing ponds outfall.

Currently, stormwater collected from an existing onsite building and employee parking area freely discharges into the wetland to the south. Westrock would like to reroute this water through the existing pond and provide treatment to improve discharge water quality. The existing pond was originally designed to account for the development of a gravel overflow parking area. This ponds outfall structure and orifice have been redesigned to allow for proper treatment of the new inflow of stormwater.

B. Site Location:

The project site is located on a 213-acre parcel, located in Fernandina Beach, Florida (see Location Map, Attachment A). More particularly, the property address is 600 North 8th Street, Fernandina Beach, FL 32034. The site currently contains the Rocktenn CP LLC paper plant. The site will be expanded to the south into a currently mildly developed area.

As required by the Florida Department of Environmental Protection, Fernandina Beach, and St. Johns River Water Management District the following items are also included as reference material: Aerial Map (Attachment B), USGS Quad Map (Attachment C), and Flood Insurance Rate Map (Attachment D).

C. General Geotechnical Information:

Based on the NRCS Soil Survey of the Westrock drop yard, the soils present throughout the entire project site are: #2, Arenas; #9, Leon fine sand; #17, Urban Land; #28, Tisonia Mucky peat; #29, Resota fine sand; and #31, Kershaw fine sand. The NRCS Soil Survey has been attached with this submittal.

D. Methodology:

This drainage report has been prepared in accordance with current requirements of the Florida Department of Environmental Protection, St Johns River Water Management District and St. Johns County. In addition, storm events (frequencies), run off calculations, discharge criteria, pipe hydraulics, and evaluation methods (including computer software applications), etc., have been based on the guidelines/requirements of these permitting entities.

Stormwater design for this site will incorporate on-line wet detention systems. ICPR was used to route the various storms through the ponds and into the receiving waters. The SCS Unit Hydrograph Method was used to create the pre

and post-development run-off hydrographs. Peak flow and maximum stage considerations were given to the mean annual, 10yr-24hr and 25yr-24hr storms. The 100yr-24hour storm was also modeled to verify pond capacity only.

Manning "n" Values, SCS Runoff Coefficients (C), and Curve Numbers (CN) are based on recommended practices as published by the USDA in Technical Release 55 (TR-55) titled "Urban Hydrology for Small Watersheds." These guidelines are repeated in the FDOT Hydrology Drainage Handbook, which is also used as reference throughout this report.

SECTION 3
PRE-DEVELOPED (EXISTING) EVALUATION

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Section 3 – Pre-Developed (Existing) Evaluation

A. Project Area Information:

The site is designed to discharge into a single wet detention pond located on the southwestern side of the property. The proposed stormwater pond will be designed for treatment and attenuation of the stormwater runoff associated with the construction of new asphalt and concrete paving, as well as gravel container parking. In addition, existing stormwater currently directly discharging into the Amelia River Basin will be routed into this proposed pond for treatment. A sediment basin and littoral shelf are included in the proposed stormwater treatment facility design to provide further treatment.

The post developed condition is modeled as two drainage basins (Pre-Basin 1 And Pre-Basin 2) covering approximately 14.9 acres of which 7.63 acres are impervious and 5.23 acres are gravel. The basins both currently outfall to the same wetlands (Pre-Out Node). The wetlands discharges to the Amelia River.

B. Soils Data:

Based on the NRCS Soil Survey of the Westrock drop yard, the soils present throughout the entire project site are: #2, Arents (Hydrologic Group – A); Urban Land; #28, Tisonia Mucky peat (Hydrologic Group – A/D); #29, Resota fine sand; and #31, Kershaw fine sand (Hydrologic Group – A). The NRCS Soil Survey has been attached with this submittal.

C. Run-off Coefficient Calculations:

The site was modeled as 2 separate pre-basins. Pre-Basin 1 is shown as the “permitted site area” on the Site Development Map (Attachment G). This is the area where construction activities will take place. Pre-Basin 2 is shown as the “existing impervious area” on the Site Development Map (Attachment G). This area is an existing impervious surface (Asphalt/metal roof) that currently freely discharges to the wetland area. This basin will be routed though our proposed pond for treatment. The existing site hydrologic conditions and corresponding CN values used for the pre-developed runoff analysis are listed in the table below:

Runoff Curve Number Summary

Pre-Basin 1	Description	Area	CN	C
	Pervious “D” Soil (Poor Condition)	8.01	89	.20
	Impervious	2.44	95	.95
	Sum	10.4		
	Composite CN & C		90	.38
Pre-Basin 2	Description	Area	CN	C
	Impervious	4.48	95	.95
	Sum	4.48		
	Composite CN & C		95	.95

D. Time of Concentration:

The predeveloped time of concentration for the current Westrock site, Pre-Basin 1, was calculated as 25 minutes. For time of concentration worksheets, please see Attachment I.

Due to the high imperviousness of the Pre-Basin 2, the time of concentration (Tc) for the pre-developed basins is estimated to be:

- Pre-Basin 2 Tc = 10 minutes

E. Seasonal High Ground Water Level:

The normal water elevation for the pond was established to be an elevation of 2.75' based on the geotechnical report provided by Universal Engineering. Boring B-1 is in close proximity to the proposed pond and is expected to provide the best representation of that characteristics of the pond area outline by Universals Investigation (See Geotechnical Investigation). Boring B-1 (Approx. elevation of 4.0') shows a water table location 3.0' below existing ground. Further, Universal Engineering estimated SHGW will occur 0.0' to 0.5' above the encounter water levels, the NWL was conservatively established as 2.75'.

Ground Elevation – WT + SHGW = Estimated Pond Water Level;

$4.5' - 3' + .5' = 2.0' \Rightarrow 2.50'$ Conservative estimate

In addition, the outfall from the pond was provided a headwater equal to the Mean High-Water elevation as established by the Florida Sea Grant and NOAA. This MHW was established to be 2.39 feet per NOAA website (Fernandina Beach, FL – Station ID: 8720030).

F. Peak Rate Factor:

The pre-development site condition was modeled as grassed with moderate slopes to the west throughout the site.

Using the SJRWMD memorandum for a "Procedure for Selection of SCS Peak Rate Factors for Use in MSSE Permit Applications" dated April 25, 1990 as reference, this particular site most closely resembles the description given for watersheds with a SCS Peak Rate (K) Factor ranging between 256-484. For modeling purposes, a K factor of 323 was used for Pre-Basin 1 and 484 was used for Pre-Basin 2.

SECTION 4
POST-DEVELOPED (PROPOSED) EVALUATION

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Section 4 – Post-Developed Evaluation

A. Introduction

This analysis is for the modification of an existing FDEP ERP permit (45-0367519-001-EI) to allow for an additional volume of water to be routed through and treated in the pond associated with the existing permit. The existing outfall structure has been modified to allow for the treatment of the additional flow. Attenuation is not a concern due to the similar outfall locations of the freely discharging stormwater with the existing ponds outfall. This ponds outfall structure and orifice have been redesigned to allow for proper treatment of the new inflow of stormwater.

The post developed condition is modeled as one drainage basin (Post Basin A) covering approximately 14.9 acres of which 7.63 acres is to be impervious and 5.23 acres to be gravel. The wet detention stormwater pond will discharge over a concrete overflow weir control structure and outfall into an existing ditch along the south western side of the site. This ditch discharges to localized wetland that directly feeds into the Amelia River.

In addition to the required stormwater faciality treatment, storm structures will utilize a minimum 1' sump (As indicated in the construction details associated with the construction plans) to provide additional treatment and sediment removal before the stormwater enters the pond. These structures will be added to the existing operation and maintenance schedule of the stormwater structures that already exist on site.

B. Runoff Coefficient Calculations:

The drainage basin's curve numbers are calculated as the composite of the impervious areas, pond and pervious areas. The following is a breakdown of the site surface coverage and runoff coefficient and curve number calculations:

Basin A	Description	Area	CN	C
	Pervious "A" Soil	.45	39	.20
	Impervious	7.63	95	.95
	Gravel	5.36	88	.95
	Pond	1.6	100	1.00
	Sum	14.9		
	Composite CN & C		91	.93

C. Time of Concentration:

Time of concentration as calculated in Attachment I, Post Basin 1 Tc Worksheet, and shown on Attachment H, Pre-Development Map. The time of concentration began at the furthest point hydrologically from the water management facility in the north east corner of our basin boundary. From this point, the water sheet flows over asphalt to the nearest inlet. After the proposed pipe system carries the water to the pond. Using TR 55 Tc guidelines, the Tc was estimated to be approximately 17 minutes.

- Post-Basin A Tc = 17 minutes

D. Peak Rate Factor:

The Standard Peak Rate (K) Factor of 484, which is typical for watersheds with significant drainage works, was used for the post development drainage basins.

E. SJRWMD Requirements:

The following tables are a summary of the stage – volume relationship for the pond.

Stage vs. Volume (Pond 1):

Stage	Area	Area	Incremental Volume	Incremental Volume	Volume Sum	Treatment Volume Sum
(ft)	(sf)	(ac)	(ft ³)	(ac-ft)	(ft ³)	(cf)
-2.5	32,764	0.752	-	-	-	-
-2	34,706	0.797	16,868	0.387	16,868	0
-1	38,678	0.888	36,692	0.842	53,560	0
0	42,773	0.982	40,726	0.935	94,285	0
1	46,982	1.079	44,878	1.030	139,163	0
2	51,300	1.178	49,141	1.128	188,304	0
2.5 (NWL)	54,608	1.254	26,477	0.608	214,781	0
3	55,724	1.279	27,583	0.633	242,364	27,583
4	60,248	1.383	57,986	1.331	300,350	85,569
5	64,873	1.489	62,561	1.436	362,910	148,130
6	69,599	1.598	67,236	1.544	367,586	215,366

1. Treatment Volume Calculations (Basin A)

Following FDEP direction the gravel area is established to shed 80% of the stormwater that lands on this medium due to void ratio in the aggregate. Calculation of SJRWMD Required Treatment Volume has been adjusted to treat the gravel at 80% impervious and the calculations for a wet detention system (WDA) is as follows:

1. 1-inch of rainfall over the improved drainage area (Basin B):

$$V_r = PA = (1\text{ inch} \times 655,282 \text{ sf}) / 12 \text{ in/ft} = 54,606\text{cf} = 1.24\text{ac-ft}$$

2. 2.5-inches of rainfall over the impervious area:

$$V_t = PA_{\text{imp}} = (2.5\text{ inch} / (332,394\text{sf} + .8 \times 233,515\text{sf}) / 12 \text{ in/ft} = 107,236 \text{ cf} = 2.46 \text{ ac-ft}$$

The required treatment volume is the greater of the two; therefore, the required treatment volume for the SJRWMD is 107,236 cubic feet or 2.46 ac-ft.

Setting the overflow weir elevation: The pond is designed to retain the required permanent pool volume and slowly release the treatment volume using the existing stormwater pump station. An overflow weir will be employed to discharge runoff volumes in excess of the treatment volume.

The minimum weir elevation is to be 4.25 ft using the pond stage volume table for the required treatment volume calculated previously.

Summary Table:

Required TV =	107,236 cf	2.46 ac-ft	At weir= 4.24
Provided TV=	107,683 cf	2.47 ac-ft	At weir= 4.25

It is worth noting that in the event of the 100-yr storm water will temporarily pool around inlet ST-11 to a depth of no more than 3" (100 yr storm elevation (6.0') – structure w/rim below 6' (5.75') = .25' = 3"). All other storms will be retained below proposed elevations.

2. Permanent Pool Volume Calculations (Basin A)

The permanent pool is calculated to provide a residence time of 21 days during the wet season (June-October) in the pond. The permanent pool is that portion of the pond which is designed to hold water at all times. This provides the wet detention pond the additional capacity to remove pollutants through uptake of nutrients by algae, absorption of nutrients and heavy metals onto the bottom, biological oxidation of organic materials and sedimentation.

The permanent pool volume (PPV) is calculated using equation 29-4 of the SJRWMD handbook which is:

$$PPV = \frac{(DA \times C \times R \times RT)}{(WS \times CF)} \times LZF$$

Where:

DA = Drainage area to pond

C = the runoff coefficient

R = wet seasonal rainfall depth = 30 inches

RT = minimum residence time = 21 days

WS = the length of the wet season = 153 days

CF = Conversion Factor = 12

LZF = Littoral Zone Factor = 1.0

$$PPV = \frac{(14.9 \text{ ac})(.93)(30 \text{ in})(21 \text{ days})}{(153 \text{ days}) 12 \text{ in/ft}} \times 1.0 = 4.76 \text{ ac} - \text{ft}$$

The pond volume below elevation 2.5' is 4.93 ac-ft (214,781 ft³), therefore adequate storage is provided to satisfy the permanent pool criteria.

3. Mean Depth Calculations (Pond 1)

The mean depth of a wet detention pond is required to be between 2-ft and 8-ft in accordance with the SJRWMD rules. The mean depth equation is the permanent pool volume divided by the pond surface area at the normal water level (NWL). The mean depth is checked as follows:

$$MD = \frac{PPV}{A} = \frac{214,781 \text{ ft}^3}{54,608 \text{ ft}^2} = 3.93 \text{ ft}$$

The design permanent pool mean depth of 3.93 ft complies with the requirement.

4. Orifice Bleed-down Calculations

Requirements state that the wet detention facility must recover $\frac{1}{2}$ of the treatment volume between 24 and 30 hrs and complete recovery from the treatment volume in under 60 hours. The recovery time has been checked and the calculations demonstrated in the following tables:

50% TV recovery in 24 – 30 hours

RECOVERY CHECK:			
H1 (Weir – NWL)	1.75	ft	
1/2 TV Req	53,618	cf	1.23 ac-ft
1/2 TV Stage	3.37	ft	
H2	0.87	ft	
H average	1.31	ft	
C (orifice coefficient)	0.60		
D (Orif Diam. Using)	4.25	in	
A (Area of orif. Using)	0.10	sf	
Q	0.54	cfs	
T (Recovery Time)	27.4	hr	

100% TV recovery in less than 60 hours

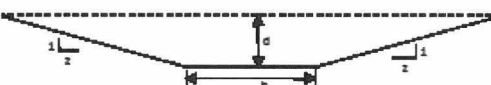
RECOVERY CHECK:			
H1 (Weir – NWL)	1.75	ft	
Full TV Req	107,236	cf	2.46 ac-ft
Full TV Stage	4.24	ft	
H2	1.74	ft	
H average	1.75	ft	
C (orifice coefficient)	0.60		
D (Orif Diam. Using)	4.25	in	
A (Area of orif. Using)	0.10	sf	
Q	0.63	cfs	
T (Recovery Time)	47.54	hr	

5. Outfall Swale Capacity Calculations

The pond's proposed outfall ditch was checked to ensure its ability to handle the increased flow capacity. The outfall ditch's worst-case scenario (100-yr outfall flow) was selected as the basis for calculations. See below for calculations;

Swale Capacity

100-Year Flow = Q = 81.4'
 100-Year Max Stage = 6.00'

Swale Capacity Calculations						
Project Name: Westrock Drop Yard Project Number: 18037 Designer: KJM Date: 1/25/2019 Location: Swale - Road A		MATTHEWS DESIGN GROUP INCORPORATED				
Manning's Equation for Open Channel Flow						
				Parameters		Units
				z (sideslope) =		4 -
				z (sideslope) =		4 -
				b (btm width) =		3.5 ft
				d (depth) =		1.5 ft
Manning's Formula		Volume Equation		S (slope) =		0.129 ft/ft
$Q = (1.486/n) * A * R^{2/3} * S^{1/2}$ $R = A/P$ A = Cross Sectional Area P = Wetted Perimeter S = Slope of Channel n = Manning's Roughness Coefficient		$V = (1.49/n) * R^{2/3} * S^{1/2}$ $Q = V * A$ V = Velocity		n (low) =		0.011 -
Design Swale Capacity						
				n		
Depth (ft)	Area (sf)	Wetted Perimeter (ft)	Hydraulic Radius (ft)	Velocity (fps)	Flow (cfs)	
1.5	14.25	15.87	0.90	45.28	645.27	
Required Swale Capacity						
Q taken from ICPR Modeling				Q =		81.40 cfs
Design Check						
Design Capacity =				645.27 cfs		
Required Capacity =				81.40 cfs		
YES		If "YES" the Swale design is adequate				
		If "NO" the Swale design is not adequate				

SECTION 5
Pre/Post ICPR Analysis

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Pre/Post ICPR Analysis

A. Node Diagram

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18073 - WESTROCK DROP YARD
NODE DIAGRAM

Nodes

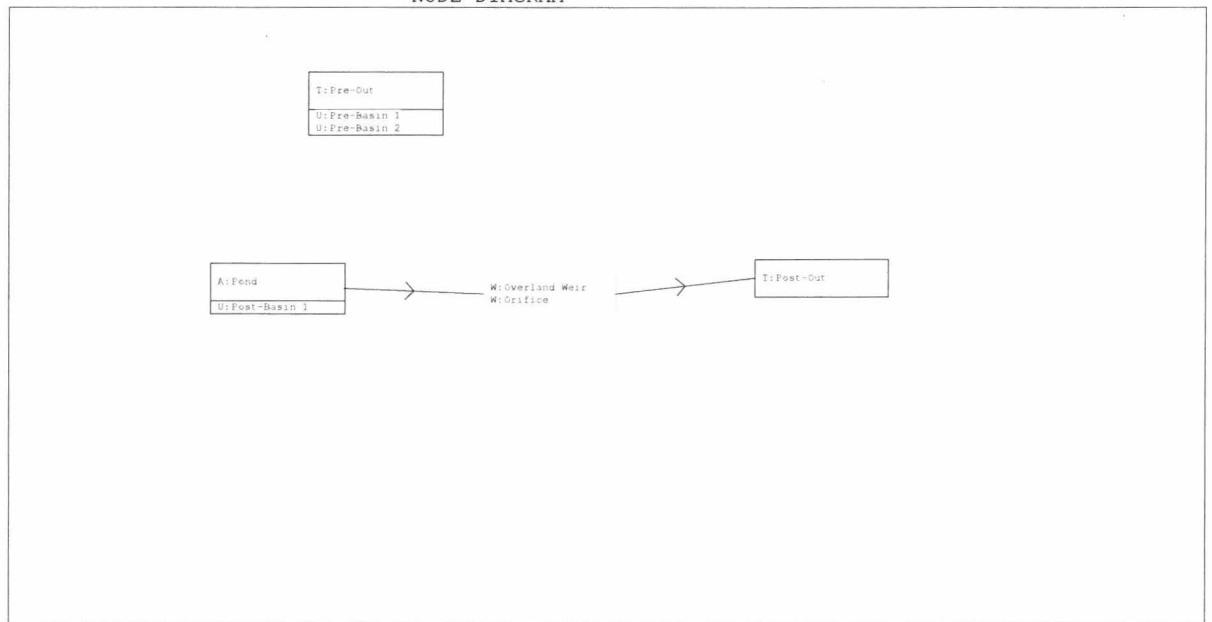
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins

O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links

P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench



Pre/Post ICPR Analysis

B. Input Report

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18073 - WESTROCK DROP YARD
Input Report

==== Basins =====

Name: Post-Basin 1 Node: Pond Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 17.00
Area(ac): 14.900 Time Shift(hrs): 0.00
Curve Number: 91.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 30.00

Name: Pre-Basin 1 Node: Pre-Out Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh323 Peaking Factor: 323.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 25.00
Area(ac): 10.400 Time Shift(hrs): 0.00
Curve Number: 90.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: Pre-Basin 2 Node: Pre-Out Status: Onsite
Group: BASE Type: SCS Unit Hydrograph CN

Unit Hydrograph: UH484 Peaking Factor: 484.0
Rainfall File: Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 10.00
Area(ac): 4.480 Time Shift(hrs): 0.00
Curve Number: 95.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==== Nodes =====

Name: Pond Base Flow(cfs): 0.000 Init Stage(ft): 2.500
Group: BASE Warn Stage(ft): 6.000
Type: Stage/Area

Stage(ft)	Area(ac)
2.500	1.2500
3.000	1.2800
4.000	1.3800
5.000	1.4900
6.000	1.6000

Name: Post-Out Base Flow(cfs): 0.000 Init Stage(ft): 2.390
Group: BASE Warn Stage(ft): 6.000
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	2.390
30.00	2.390

Name: Pre-Out Base Flow(cfs): 0.000 Init Stage(ft): 2.740
Group: BASE Warn Stage(ft): 6.000

18073 - WESTROCK DROP YARD
Input Report

Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	2.740
30.00	2.740

===== Weirs =====

Name: Orifice From Node: Pond
Group: BASE To Node: Post-Out
Flow: Both Count: 1
Type: Horizontal Geometry: Circular

Span(in): 4.25
Rise(in): 4.25
Invert(ft): 2.000
Control Elevation(ft): 2.500

TABLE

Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Discharge Coef: 3.200
Orifice Discharge Coef: 0.600

Name: Overland Weir From Node: Pond
Group: BASE To Node: Post-Out
Flow: Both Count: 1
Type: Vertical: Mavis Geometry: Trapezoidal

Bottom Width(ft): 9.50
Left Side Slope(h/v): 1.00
Right Side Slope(h/v): 1.00
Invert(ft): 4.250
Control Elevation(ft): 4.250
Struct Opening Dim(ft): 9999.00

TABLE

Bottom Clip(ft): 0.000
Top Clip(ft): 0.000
Weir Discharge Coef: 3.200
Orifice Discharge Coef: 0.600

===== Hydrology Simulations =====

Name: 100yr-24hr
Filename: S:\Projects\15000\15073 - Hospice Thrift Store\ENG\Storm Calcs\ICPR\100yr-24hr.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Flmod
Rainfall Amount(in): 12.00

Time(hrs)	Print Inc(min)
30.000	5.00

Name: 10yr-24hr
Filename: S:\Projects\15000\15073 - Hospice Thrift Store\ENG\Storm Calcs\ICPR\10yr-1hr.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Flmod
Rainfall Amount(in): 8.00

Time(hrs)	Print Inc(min)
-----------	----------------

18073 - WESTROCK DROP YARD
Input Report

30.000 5.00

Name: 25Yr-24hr
Filename: S:\Projects\15000\15073 - Hospice Thrift Store\ENG\Storm Calcs\ICPR\25Yr-24hr.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Flmod
Rainfall Amount(in): 9.50

Time(hrs) Print Inc(min)

30.000 5.00

Name: MA-24
Filename: S:\Projects\15000\15073 - Hospice Thrift Store\ENG\Storm Calcs\ICPR\MA-24.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Flmod
Rainfall Amount(in): 4.95

Time(hrs) Print Inc(min)

30.000 5.00

=====
=== Routing Simulations ===
=====

Name: 100yr-24hr Hydrology Sim: 100yr-24hr
Filename: S:\Projects\15000\15073 - Hospice Thrift Store\ENG\Storm Calcs\ICPR\100yr-24hr.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 30.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs) Print Inc(min)

30.000 5.000

Group Run

BASE Yes

Name: 10yr-24hr Hydrology Sim: 10yr-24hr
Filename: S:\Projects\15000\15073 - Hospice Thrift Store\ENG\Storm Calcs\ICPR\10yr-24hr.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 30.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs) Print Inc(min)

30.000 5.000

Group Run

18073 - WESTROCK DROP YARD
Input Report

BASE Yes

Name: 25yr-24hr Hydrology Sim: 25Yr-24hr
Filename: S:\Projects\15000\15073 - Hospice Thrift Store\ENG\Storm Calcs\ICPR\25yr-24hr.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 30.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs) Print Inc(min)

30.000 5.000

Group Run

BASE Yes

Name: MA-24 Hydrology Sim: MA-24
Filename: S:\Projects\15000\15073 - Hospice Thrift Store\ENG\Storm Calcs\ICPR\MA-24.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 30.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs) Print Inc(min)

30.000 5.000

Group Run

BASE Yes

Pre/Post ICPR Analysis
C. Basin Summary Report

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18073 - WESTROCK DROP YARD
Basin Report

Basin Name: Post-Basin 1
Group Name: BASE
Simulation: 100yr-24hr
Node Name: Pond
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 2.27
Comp Time Inc (min): 2.27
Rainfall File: Flmod
Rainfall Amount (in): 12.000
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 17.00
Time Shift (hrs): 0.00
Area (ac): 14.900
Vol of Unit Hyd (in): 1.001
Curve Number: 91.000
DCIA (%): 30.000

Time Max (hrs): 12.05
Flow Max (cfs): 117.67
Runoff Volume (in): 11.176
Runoff Volume (ft3): 604503

Basin Name: Pre-Basin 1
Group Name: BASE
Simulation: 100yr-24hr
Node Name: Pre-Out
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh323
Peaking Fator: 323.0
Spec Time Inc (min): 3.33
Comp Time Inc (min): 3.33
Rainfall File: Flmod
Rainfall Amount (in): 12.000
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 25.00
Time Shift (hrs): 0.00
Area (ac): 10.400
Vol of Unit Hyd (in): 1.001
Curve Number: 90.000
DCIA (%): 0.000

Time Max (hrs): 12.17
Flow Max (cfs): 56.47
Runoff Volume (in): 10.767
Runoff Volume (ft3): 406477

Basin Name: Post-Basin 1
Group Name: BASE
Simulation: 10yr-24hr
Node Name: Pond
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 2.27
Comp Time Inc (min): 2.27
Rainfall File: Flmod
Rainfall Amount (in): 8.000
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 17.00
Time Shift (hrs): 0.00
Area (ac): 14.900
Vol of Unit Hyd (in): 1.001

18073 - WESTROCK DROP YARD
Basin Report

Curve Number: 91.000
DCIA (%): 30.000

Time Max (hrs): 12.05
Flow Max (cfs): 77.19
Runoff Volume (in): 7.207
Runoff Volume (ft3): 389783

Basin Name: Pre-Basin 1
Group Name: BASE
Simulation: 10yr-24hr
Node Name: Pre-Out
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh323
Peaking Fator: 323.0
Spec Time Inc (min): 3.33
Comp Time Inc (min): 3.33
Rainfall File: Flmod
Rainfall Amount (in): 8.000
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 25.00
Time Shift (hrs): 0.00
Area (ac): 10.400
Vol of Unit Hyd (in): 1.001
Curve Number: 90.000
DCIA (%): 0.000

Time Max (hrs): 12.17
Flow Max (cfs): 36.50
Runoff Volume (in): 6.808
Runoff Volume (ft3): 257033

Basin Name: Post-Basin 1
Group Name: BASE
Simulation: 25Yr-24hr
Node Name: Pond
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 2.27
Comp Time Inc (min): 2.27
Rainfall File: Flmod
Rainfall Amount (in): 9.500
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 17.00
Time Shift (hrs): 0.00
Area (ac): 14.900
Vol of Unit Hyd (in): 1.001
Curve Number: 91.000
DCIA (%): 30.000

Time Max (hrs): 12.05
Flow Max (cfs): 92.41
Runoff Volume (in): 8.693
Runoff Volume (ft3): 470183

Basin Name: Pre-Basin 1
Group Name: BASE
Simulation: 25Yr-24hr
Node Name: Pre-Out
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh323

18073 - WESTROCK DROP YARD
Basin Report

Peaking Fator: 323.0
Spec Time Inc (min): 3.33
Comp Time Inc (min): 3.33
Rainfall File: Flmod
Rainfall Amount (in): 9.500
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 25.00
Time Shift (hrs): 0.00
Area (ac): 10.400
Vol of Unit Hyd (in): 1.001
Curve Number: 90.000
DCIA (%): 0.000

Time Max (hrs): 12.17
Flow Max (cfs): 44.02
Runoff Volume (in): 8.289
Runoff Volume (ft3): 312927

Basin Name: Post-Basin 1
Group Name: BASE
Simulation: MA-24
Node Name: Pond
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh484
Peaking Fator: 484.0
Spec Time Inc (min): 2.27
Comp Time Inc (min): 2.27
Rainfall File: Flmod
Rainfall Amount (in): 4.950
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 17.00
Time Shift (hrs): 0.00
Area (ac): 14.900
Vol of Unit Hyd (in): 1.001
Curve Number: 91.000
DCIA (%): 30.000

Time Max (hrs): 12.05
Flow Max (cfs): 46.00
Runoff Volume (in): 4.202
Runoff Volume (ft3): 227292

Basin Name: Pre-Basin 1
Group Name: BASE
Simulation: MA-24
Node Name: Pre-Out
Basin Type: SCS Unit Hydrograph

Unit Hydrograph: Uh323
Peaking Fator: 323.0
Spec Time Inc (min): 3.33
Comp Time Inc (min): 3.33
Rainfall File: Flmod
Rainfall Amount (in): 4.950
Storm Duration (hrs): 24.00
Status: Onsite
Time of Conc (min): 25.00
Time Shift (hrs): 0.00
Area (ac): 10.400
Vol of Unit Hyd (in): 1.001
Curve Number: 90.000
DCIA (%): 0.000

Time Max (hrs): 12.17
Flow Max (cfs): 21.05
Runoff Volume (in): 3.830
Runoff Volume (ft3): 144580

Pre/Post ICPR Analysis

D. Node Min/Max Report



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18073 - WESTROCK DROP YARD
Node Report

Name	Group	Simulation	Max Time Stage hrs	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
Pond	BASE	100yr-24hr	12.24	6.02	6.00	0.0050	69792	12.08	116.45	12.24	83.05
Pond	BASE	10yr-24hr	12.32	5.42	6.00	0.0050	66926	12.08	76.47	12.32	43.14
Pond	BASE	25yr-24hr	12.27	5.68	6.00	0.0050	68169	12.08	91.49	12.27	59.13
Pond	BASE	MA-24	12.63	4.72	6.00	0.0050	63547	12.08	45.63	12.63	10.78
Post-Out	BASE	100yr-24hr	0.00	2.39	6.00	0.0000	0	12.24	83.05	0.00	0.00
Post-Out	BASE	10yr-24hr	0.00	2.39	6.00	0.0000	0	12.32	43.14	0.00	0.00
Post-Out	BASE	25yr-24hr	0.00	2.39	6.00	0.0000	0	12.27	59.13	0.00	0.00
Post-Out	BASE	MA-24	0.00	2.39	6.00	0.0000	0	12.63	10.78	0.00	0.00
Pre-Out	BASE	100yr-24hr	0.00	2.74	6.00	0.0000	0	12.08	87.21	0.00	0.00
Pre-Out	BASE	10yr-24hr	0.00	2.74	6.00	0.0000	0	12.08	56.82	0.00	0.00
Pre-Out	BASE	25yr-24hr	0.00	2.74	6.00	0.0000	0	12.08	68.25	0.00	0.00
Pre-Out	BASE	MA-24	0.00	2.74	6.00	0.0000	0	12.08	33.35	0.00	0.00

Pre/Post ICPR Analysis

E. Link Min/Max Report

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18073 - WESTROCK DROP YARD
Link Report

Name	Group	Simulation	Max Time Flow hrs	Max Flow cfs	Max Delta Q cfs	Max Time US Stage hrs	Max US Stage ft	Max Time DS Stage hrs	Max DS Stage ft
Overland Weir	BASE	100yr-24hr	12.24	82.16	-0.361	12.24	6.02	0.00	2.39
Overland Weir	BASE	10yr-24hr	12.32	42.33	-0.272	12.32	5.42	0.00	2.39
Overland Weir	BASE	25yr-24hr	12.27	58.28	-0.312	12.27	5.68	0.00	2.39
Overland Weir	BASE	MA-24	12.63	10.07	-0.084	12.63	4.72	0.00	2.39

SECTION 6
ATTACHMENTS

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ATTACHMENT A
LOCATION MAP

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LOCATION MAP



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LOCATION MAP
WESTROCK DROP YARD
600 N 8TH ST, FERNANDINA BEACH, FL 32034

MDG# 18037
ST. AUGUSTINE, FLORIDA

ATTACHMENT B
AERIAL MAP

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AERIAL MAP



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AERIAL MAP
WESTROCK DROP YARD
MDG# 18037

ST. AUGUSTINE, FLORIDA

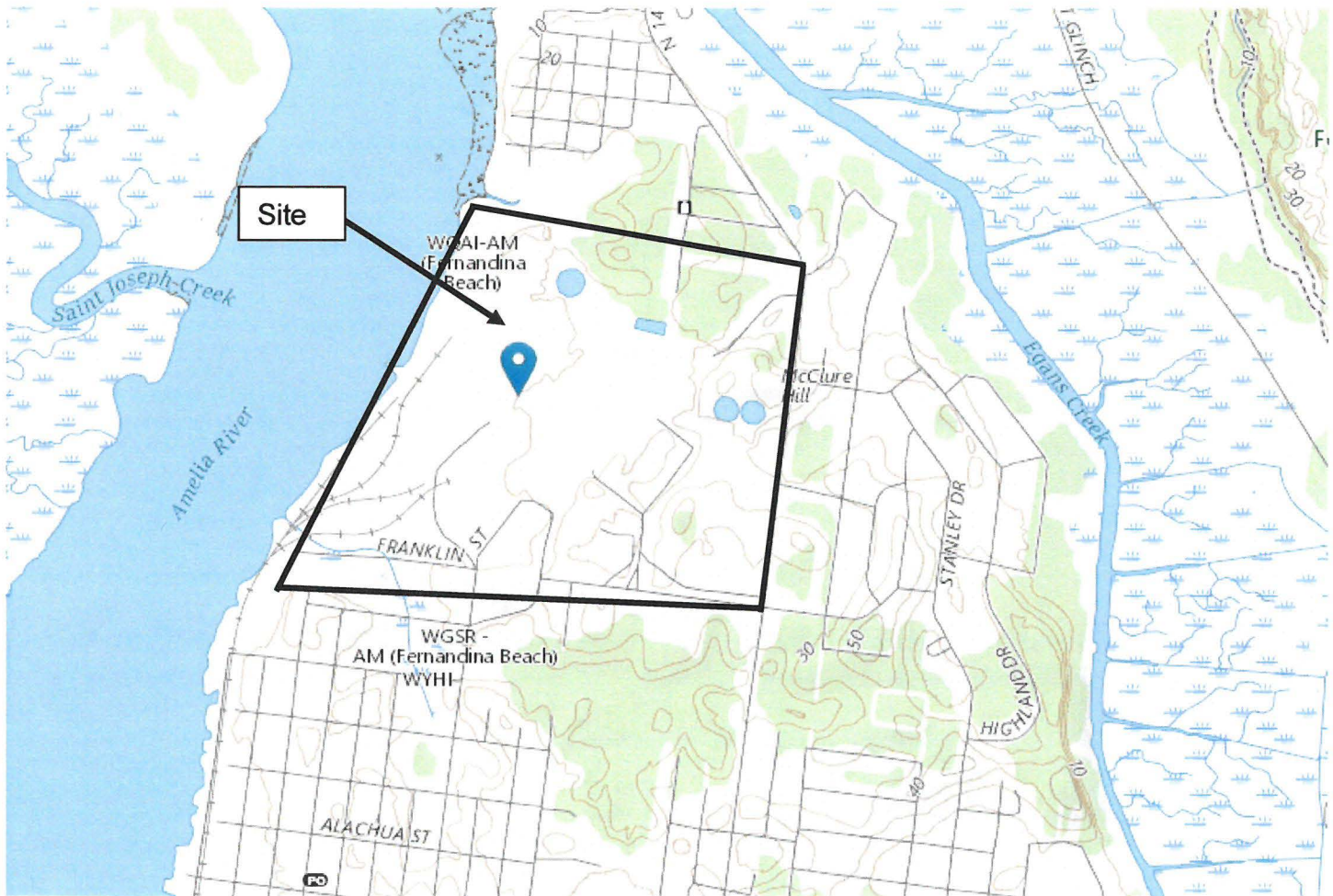
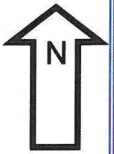
ATTACHMENT C

USGS MAP

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USGS QUAD MAP



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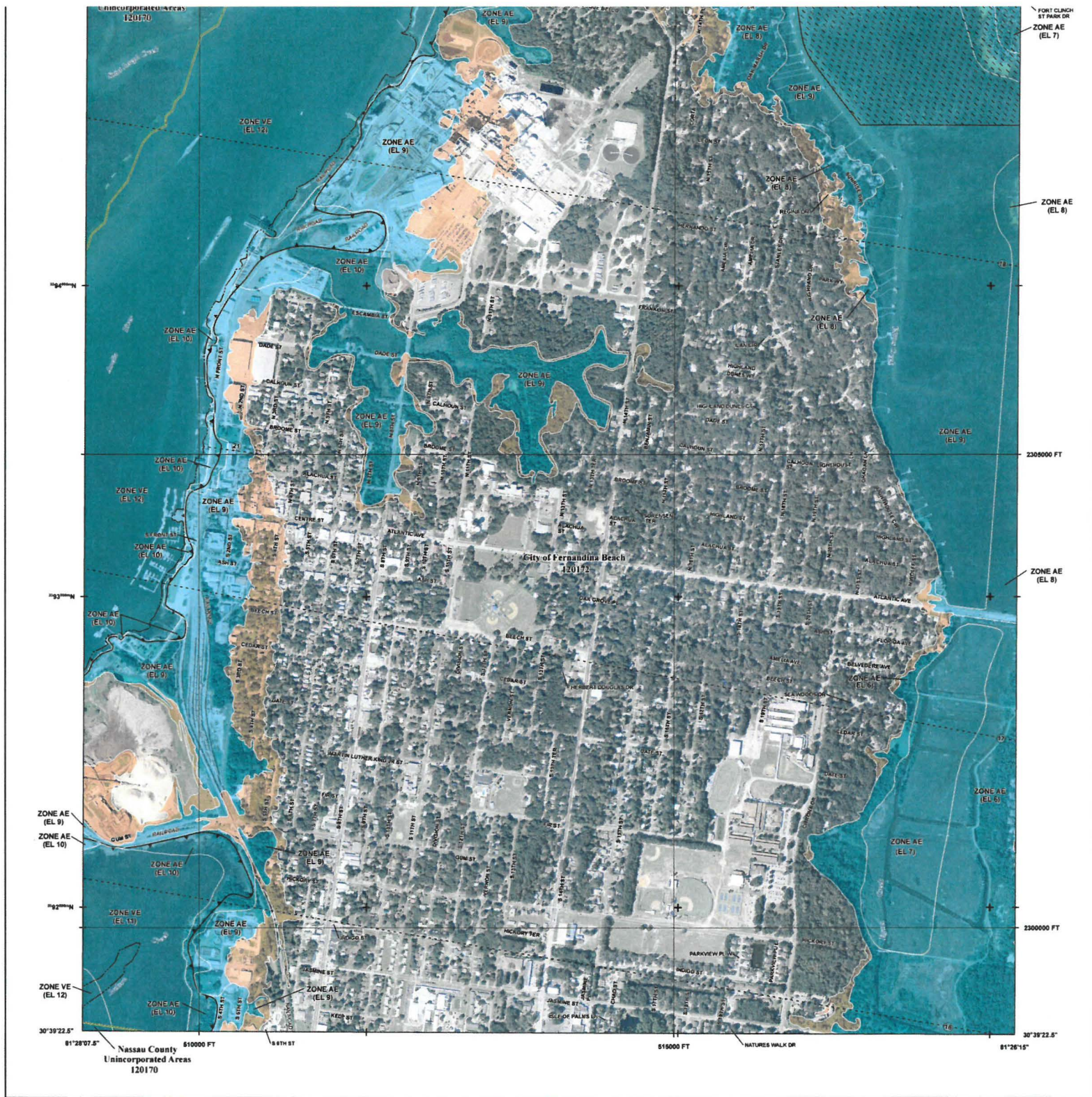
QUAD MAP
WESTROCK DROP YARD
MDG# 18037

FERNANDINA BEACH, FLORIDA

ATTACHMENT D
FLOOD INSURANCE RATE MAP (FIRM)

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FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING
DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) Zone A.V. A99
	With BFE or Depth Zone AE, AO, AH, VE, AR
OTHER AREAS OF FLOOD HAZARD	Regulatory Floodway
	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
	Future Conditions 1% Annual Chance Flood Hazard Zone X
	Area with Reduced Flood Risk due to Levee Zone X
OTHER AREAS	NO SCREEN
	Area of Minimal Flood Hazard Zone X
GENERAL STRUCTURES	Area of Undetermined Flood Hazard Zone D
	Channel, Culvert, or Storm Sewer Levee, Dike, or Floodwall

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map data for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information Call Center at 1-877-FEMA-MAP (1-877-366-2627) or visit the FEMA Flood Map Service Center website at <http://www.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities planning land use or adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map data refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-438-6620.

Base map information shown on this FIRM was derived from digital orthorectified imagery collected by the U.S. Department of Agriculture Farm Service Agency. This imagery was flown in 2013 and was produced with a 1-meter ground sample distance.

LIMIT OF MODERATE WAVE ACTION: Zone AE has been divided by a Limit of Moderate Wave Action (LMWA). The LMWA represents the approximate landward limit of the 1-foot breaking wave. The effects of wave hazards between Zone VE and the LMWA (or between the shoreline and the LMWA for areas where Zone VE is not identified) will be similar to, but less severe than, those in Zone VE.

For community and countywide map data refer to the Flood Insurance Study report for this jurisdiction.

Base map information shown on this FIRM was derived from digital orthorectified imagery collected by the U.S. Department of Agriculture Farm Service Agency. This imagery was flown in 2013 and was produced with a 1-meter ground sample distance.

LIMIT OF MODERATE WAVE ACTION: Zone AE has been divided by a Limit of Moderate Wave Action (LMWA). The LMWA represents the approximate landward limit of the 1-foot breaking wave. The effects of wave hazards between Zone VE and the LMWA (or between the shoreline and the LMWA for areas where Zone VE is not identified) will be similar to, but less severe than, those in Zone VE.

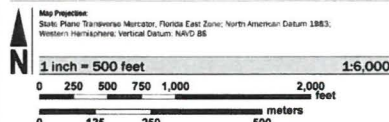
COASTAL BARRIER RESOURCES (CBRS)

This map includes approximate boundaries of the CBRS for informational purposes only. Flood insurance is not available within CBRS areas for structures that are newly built or substantially improved on or after the date(s) indicated on the map. For more information see <http://www.fema.gov/cbcrs>, the FIS Report, or call the U.S. Fish and Wildlife Service Customer Service Center at 1-800-344-6850.

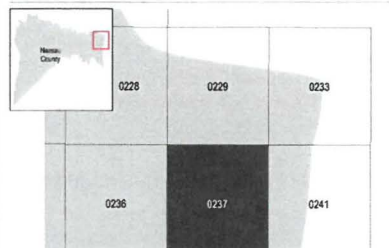
CBRS Area

Otherwise Protected Area

SCALE



PANEL LOCATOR



FEMA
National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
NASSAU COUNTY, FLORIDA
and Incorporated Areas
PANEL 237 of 510

Panel Contains:
COMMUNITY
FERNANDINA BEACH, CITY OF
NASSAU COUNTY

NUMBER PANEL SUFFIX
120172 0237 6

ATTACHMENT E
SOILS MAP AND DESCRIPTION

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United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Nassau County, Florida

WestRock Drop Yard



March 27, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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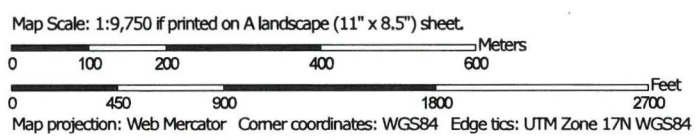
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Soil Map may not be valid at this scale.



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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Nassau County, Florida

Survey Area Data: Version 17, Oct 27, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Apr 5, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2	Arents, nearly level	29.9	13.8%
9	Leon fine sand, 0 to 2 percent slopes	0.8	0.3%
17	Urban land	99.8	46.0%
28	Tisonia mucky peat, tidal	19.7	9.1%
29	Resota fine sand, 0 to 5 percent slopes	0.2	0.1%
31	Kershaw fine sand, 2 to 8 percent slopes	59.9	27.6%
99	Water	6.8	3.1%
Totals for Area of Interest		217.1	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

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was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Nassau County, Florida

2—Arents, nearly level

Map Unit Setting

National map unit symbol: 4g99
Mean annual precipitation: 47 to 55 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 305 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Arents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents

Setting

Landform: Rises on marine terraces
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Altered marine deposits

Typical profile

AC - 0 to 80 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 to 50.02 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.4 inches)

9—Leon fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2sxqv
Elevation: 0 to 250 feet
Mean annual precipitation: 47 to 61 inches
Mean annual air temperature: 55 to 81 degrees F
Frost-free period: 267 to 347 days
Farmland classification: Not prime farmland

Map Unit Composition

Leon, non-hydric, and similar soils: 89 percent

Minor components: 11 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Leon, Non-hydric

Setting

Landform: Flatwoods

Landform position (three-dimensional): Talf

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy marine deposits

Typical profile

A - 0 to 8 inches: fine sand

E - 8 to 18 inches: fine sand

Bh - 18 to 37 inches: fine sand

E' - 37 to 45 inches: fine sand

B'h - 45 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high
(0.06 to 2.00 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0
mmhos/cm)

Sodium adsorption ratio, maximum in profile: 4.0

Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: A/D

Forage suitability group: Sandy soils on flats of mesic or hydric lowlands
(G153AA141FL)

Hydric soil rating: No

Minor Components

Leon, hydric

Percent of map unit: 5 percent

Landform: Flatwoods

Landform position (three-dimensional): Talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: Yes

Mandarin

Percent of map unit: 3 percent

Landform: Rises

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Landform position (three-dimensional): Talf, rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Mascotte

Percent of map unit: 3 percent
Landform: Flatwoods
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

17—Urban land

Map Unit Composition

Urban land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Marine terraces
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: No parent material

28—Tisonia mucky peat, tidal

Map Unit Setting

National map unit symbol: 4g9l
Elevation: 10 to 150 feet
Mean annual precipitation: 47 to 55 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 305 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Tisonia, tidal, and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tisonia, Tidal

Setting

Landform: Tidal marshes on marine terraces
Landform position (three-dimensional): Talf

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Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Organic material over clayey alluvium

Typical profile

Oe - 0 to 40 inches: mucky peat
C - 40 to 65 inches: clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Salinity, maximum in profile: Strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 35.0
Available water storage in profile: Very high (about 15.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: A/D
Forage suitability group: Forage suitability group not assigned (G153AA999FL)
Other vegetative classification: Salt Marsh (R153AY009FL)
Hydric soil rating: Yes

Minor Components

Kingsland

Percent of map unit: 1 percent
Landform: Flood plains on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Maurepas

Percent of map unit: 1 percent
Landform: Flood plains on marine terraces
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

29—Resota fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 4g9m
Mean annual precipitation: 47 to 55 inches
Mean annual air temperature: 64 to 72 degrees F
Frost-free period: 305 to 335 days
Farmland classification: Not prime farmland

Map Unit Composition

Resota and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Resota

Setting

Landform: Knolls on marine terraces, ridges on marine terraces
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Sandy marine deposits

Typical profile

A - 0 to 4 inches: fine sand
E - 4 to 27 inches: fine sand
Bw - 27 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Forage suitability group: Sandy soils on rises, knolls, and ridges of mesic uplands (G153AA121FL)
Other vegetative classification: Sand Pine Scrub (R153AY001FL)
Hydric soil rating: No

Minor Components

Kureb

Percent of map unit: 3 percent

Landform: Dunes on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Other vegetative classification: Sand Pine Scrub (R153AY001FL)

Hydric soil rating: No

Ridgewood

Percent of map unit: 2 percent

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

31—Kershaw fine sand, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 4g9q

Elevation: 40 to 500 feet

Mean annual precipitation: 47 to 55 inches

Mean annual air temperature: 64 to 72 degrees F

Frost-free period: 305 to 335 days

Farmland classification: Not prime farmland

Map Unit Composition

Kershaw and similar soils: 98 percent

Minor components: 2 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kershaw

Setting

Landform: Knolls on marine terraces, ridges on marine terraces

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Sandy marine deposits

Typical profile

A - 0 to 7 inches: fine sand

C - 7 to 80 inches: fine sand

Properties and qualities

Slope: 2 to 8 percent

Depth to restrictive feature: More than 80 inches

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Natural drainage class: Excessively drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Very high (19.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 4.0

Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: A

Forage suitability group: Sandy soils on ridges and dunes of xeric uplands (G153AA111FL)

Other vegetative classification: Longleaf Pine-Turkey Oak Hills (R153AY002FL)

Hydric soil rating: No

Minor Components

Ortega

Percent of map unit: 2 percent

Landform: Ridges on marine terraces

Landform position (three-dimensional): Interfluve

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

99—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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ATTACHMENT F
GEOTECHNICAL REPORT

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REPORT OF A GEOTECHNICAL EXPLORATION

**West Rock Stormwater Improvements
Fernandina Beach, Florida**

August 2, 2018

**PROJECT NO. 0930.1800172.0000
REPORT NO. 1587754**

Prepared For:

WestRock
600 North 8th Street
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• Tampa, FL
• West Palm Beach, FL

August 2, 2018

WestRock
600 North 8th Street
Fernandina Beach, Florida 32034

Attention: Mr. Manoharan Thamodharan

Reference: **REPORT OF A GEOTECHNICAL EXPLORATION**
West Rock Stormwater Improvements
Fernandina Beach, Florida
UES Project No. 0930.1800172.0000 and Report No. 1587754

Dear Mr. Thamodharan:

As requested, Universal Engineering Sciences, Inc. has completed a geotechnical exploration for the subject project. This report briefly presents our understanding of the proposed construction, describes the field exploration performed, presents the data obtained, and provides our geotechnical engineering evaluation of the subsurface conditions at the subject utility crossing with respect to the proposed construction.

PROJECT INFORMATION

Project information was provided to us in a recent correspondence with you. We were provided with a copy of a Grading Plan for the project prepared by Matthews Design Group dated 05/10/2018. This plan shows an aerial view of the site and surrounding areas and the requested boring locations.

It is understood that the proposed construction will consist of stormwater improvements at the existing West Rock facility in Fernandina Beach, Florida. The improvements will consist of installation of stormwater piping in some areas of the facility. It is desired to determine the suitability of the soils that will be excavated for use as backfill above the pipe.

This report presents the soil conditions encountered on the basis of traditional geotechnical procedures for site characterization. The recovered samples were not examined, either visually or analytically, for chemical composition or environmental hazards. Universal Engineering Sciences would be pleased to perform these services if you desire.

Our work did not address the potential for surface expression of deep geological conditions. This evaluation requires a more extensive range of field services than performed in this study. We will be pleased to conduct an investigation to evaluate the probable effect of the regional geology upon the proposed construction if you desire.

FIELD EXPLORATION

A field exploration was performed on July 12, 2018. The approximate boring locations are shown on the attached Boring Location Plan in Appendix A. The approximate boring locations were determined in the field by our personnel using taped measurements from existing features at the site, and should be considered accurate only to the degree implied by the method of measurement used. Samples of the soils encountered will be held in our laboratory for your inspection for 60 days unless we are notified otherwise.

To explore the subsurface conditions within the area of the proposed improvements, we located and drilled four (4) Standard Penetration Test (SPT) borings to depths ranging from 10.5 to 30 feet below the existing ground surface in general accordance with the methodology outlined in ASTM D 1586. A summary of this field procedure is included in Appendix A. Split-spoon soil samples recovered during performance of the boring were visually classified in the field and representative portions of the samples were transported to our laboratory for further evaluation.

LABORATORY EXPLORATION

Representative soil samples obtained during our field exploration were returned to our office and classified by a geotechnical engineer. The samples were visually classified in general accordance with ASTM D 2488 (Unified Soil Classification System).

Four (4) fines content tests, four (4) moisture content tests, and one (1) Atterberg limits test were conducted in the laboratory on representative soil samples obtained from the borings. These tests were performed to aid in classifying the soils and to help quantify and correlate engineering properties. The results of these tests are presented on the Boring Logs in Appendix A. A brief description of the laboratory procedures used is also provided in Appendix A.

FINDINGS

Surface Conditions

The proposed project is located at the south end of the existing WestRock facility in Fernandina Beach, FL directly east of the St. Mary's River Inter-Coastal Waterway. The north portion of the site is a rail yard with tracks and storage area and the south end is an unpaved parking lot. The site has a slightly rolling topography.

General Soil Profile

The boring locations and detailed subsurface conditions are included in the Attachments on the Boring Location Plan and Boring Logs. The classifications and descriptions shown on the logs are generally based upon visual characterizations and laboratory results of the recovered soil samples. When reviewing these records, it should be understood that the soil conditions will vary across the site. The following table summarizes the soil conditions encountered.

TABLE 1A (Borings B-1) General Soil Profile		
Typical depth (ft)		Soil Descriptions
From	To	
0	4.8	Loose to medium dense slightly silty fine sand with limerock, wood, mulch, and debris (PT)
4.8	15	Very soft clay (CH)
* Termination Depth of Deepest Boring () Indicates Unified Soil Classification		

TABLE 1B (Borings B-2) General Soil Profile		
Typical depth (ft)		Soil Descriptions
From	To	
0	1.5	Very loose clayey fine sand (SC)
1.5	6.5	Very loose to medium dense slightly silty to silty fine sand (SP-SM/SM)
6.5	30	Very soft clay (CH)
* Termination Depth of Deepest Boring () Indicates Unified Soil Classification		

TABLE 1C (Borings B-3) General Soil Profile		
Typical depth (ft)		Soil Descriptions
From	To	
0	6.5	Very loose to loose fine sand (SP)
6.5	11.3	Very loose clayey fine sand (SC) and very soft clay (CH)
11.3	15	Medium dense fine sand (SP)
* Termination Depth of Deepest Boring () Indicates Unified Soil Classification		

TABLE 1D (Borings B-4) General Soil Profile		
Typical depth (ft)		Soil Descriptions
From	To	
0	1.5	Very loose fine sand (SP)
1.5	15	Medium dense fine sand (SP)
* Termination Depth of Deepest Boring () Indicates Unified Soil Classification		

The groundwater levels were encountered at the boring locations and recorded at the time of drilling at depths of 0.5 to 3.0 feet below the existing ground surface. The groundwater should be anticipated to fluctuate due to seasonal climatic variations, surface water runoff patterns, construction operations and other interrelated factors. We estimate the seasonal high water levels will occur approximately 0 to 0.5 feet above the level we encountered at the time of our exploration. These estimates are based upon our review of U.S.G.S. data, Nassau County Soils Survey, and regional hydrogeology.

GEOTECHNICAL ENGINEERING EVALUATION AND RECOMMENDATIONS

Directional Drilling and Jack and Bore Construction Recommendations

Geotechnical information to aid in planning the directional drilling procedure that may occur in the vicinity of the railroad track for the specific boring locations is shown in Tables 2A to 2D below:

TABLE 2A DESIGN PARAMETERS (B-1)							
Typical Depth ¹⁾ (ft)		Total Unit Weight (pcf)	Friction Angle ²⁾ (degrees)	Cohesion (psf)	Ko	Ka	Kp
From	To						
0	4.8	65	-	-	-	-	-
4.8	15	100	-	250	1.0	1.0	1.0

1) Depth below existing ground surface.

2) The indicated values are ultimate values. Appropriate factors of safety should be applied to these values for design purposes.

**TABLE 2B
DESIGN PARAMETERS (B-2)**

Typical Depth ¹⁾ (ft)		Total Unit Weight (pcf)	Friction Angle ²⁾ (degrees)	Cohesion (psf)	Ko	Ka	Kp
From	To						
0	1.5	105	26	-	0.56	0.39	2.56
1.5	3	110	28	-	0.53	0.36	2.77
3	6.5	105	26	-	0.56	0.39	2.56
6.5	30	100	-	250	1.0	1.0	1.0

1) Depth below existing ground surface.

2) The indicated values are ultimate values. Appropriate factors of safety should be applied to these values for design purposes.

**TABLE 2C
DESIGN PARAMETERS (B-3)**

Typical Depth ¹⁾ (ft)		Total Unit Weight (pcf)	Friction Angle ²⁾ (degrees)	Cohesion (psf)	Ko	Ka	Kp
From	To						
0	3	105	27	-	0.55	0.38	2.66
3	6.5	110	28	-	0.53	0.36	2.77
6.5	11	105	26	-	0.56	0.39	2.56
11	15	100	-	250	1.0	1.0	1.0

1) Depth below existing ground surface.

2) The indicated values are ultimate values. Appropriate factors of safety should be applied to these values for design purposes.

**TABLE 2D
DESIGN PARAMETERS (B-4)**

Typical Depth ¹⁾ (ft)		Total Unit Weight (pcf)	Friction Angle ²⁾ (degrees)	Cohesion (psf)	Ko	Ka	Kp
From	To						
0	1.5	105	27	-	0.55	0.38	2.66
1.5	15	110	31	-	0.48	0.32	3.12

1) Depth below existing ground surface.

2) The indicated values are ultimate values. Appropriate factors of safety should be applied to these values for design purposes.

The above parameters are based on the field data and limited laboratory testing data obtained from the site. It should be anticipated that soil strength parameters will vary between boring locations and may transition gradually between adjacent soil layers.

Seams and layers of denser/harder or looser/softer soils may be encountered within the soil layers shown above.

Launching and Receiving Pit Preparation

Based on our evaluation of the soil conditions encountered in this area, we offer the following recommendations for the proposed construction.

1. The proposed construction area should be dewatered as necessary and excavated to the required pit depths. Excavation work will be required to meet OSHA Excavation Standard Subpart P regulations, Type C Soils. Either a braced sheet pile structure or an excavation with temporary side slopes cut back at 1.5 horizontal to 1.0 vertical can be implemented, depending on the specific project requirements. The side slope of 1.5 horizontal to 1.0 vertical is contingent upon the dewatering system adequately controlling slope seepage. Sheet piling should be designed according to OSHA sheeting and bracing requirements. We recommend a Florida registered Professional Engineer design the sheeting/bracing system.
2. A dewatering system will likely be required for the project. The water table should be maintained at least two feet below the proposed bottom of the required excavation. The dewatering system should not be decommissioned until the excavation is backfilled two feet above the groundwater level at the time of construction.
3. The natural soil and backfill in the excavation bottom should be densified using hand-operated compaction equipment once the drilling procedures are completed. Based on the boring data, the soils classified as sand (SP) and slightly silty fine sand (SP-SM) that may be excavated from the pits areas, can be used as structural backfill. The soils classified as clayey sand (SC), silty sand (SM), and sandy clay (CH) should not be used as structural backfill due to the high fines and moisture content. Compaction should continue until a minimum density of 95 percent of the soils Modified Proctor maximum dry density (ASTM D 1557) has been achieved to a depth of one foot and in each lift of backfill.
4. All backfill should be placed in level lifts not exceeding six inches loose thickness. The fine sands and fine sands with silt excavated from the pits may be used as backfill. Any large roots should be removed prior to placing backfill.

Dewatering

The groundwater levels were encountered at a depth range of 2.1 to 6.8 feet below the ground surface. Based on the water conditions encountered, the need for dewatering operations may be necessary. The actual method(s) of dewatering should be

determined by the contractor. Regardless of the method(s) used, we suggest drawing down the water level at least two feet below the bottom of the excavations to preclude “pumping” and /or compaction related problems with the subgrade soils.

Dewatering should be accomplished with the knowledge that the permeability of the soils decreases with increasing silt and clay content. The sand (SP) type soils can usually be dewatered by well pointing. Permeability values for these type soils generally range from low 10^{-5} cm/sec to high 10^{-2} cm/sec.

Open Cut Site Preparation Procedures

We recommend the following site preparation procedures for open cut construction:

1. Implement temporary groundwater control measures. It is recommended the groundwater be maintained at least 18 inches below compacted surfaces, and also 18 inches below the depths of excavation required. Temporary groundwater control measures should be the responsibility of the contractor.
2. Excavate to the proposed bearing level. Maintain a minimum separation of at least one foot between the utility bearing depths and the top of the clayey fine sand (SC) or silty fine sand (SM). Clayey fine sand present within the recommended separation zone should be over-excavated and replaced with compacted structural backfill. Compact the exposed surface of sandy soils within the excavations with lightweight, hand equipment until a density of at least 95 percent of the Modified Proctor maximum dry density (ASTM D-1557) is achieved within the upper one foot. We recommend the compacted soils have a moisture content within 2 percent of the optimum value as determined by the Modified Proctor maximum dry density (ASTM-D1557). Please note that clayey fine sand (SC) could be difficult to work with during wet conditions due to its inherent natural moisture. The project budget should account for these possible difficult construction operations.

Should the soils experience pumping and soil strength loss during the compaction operations, compaction work should be immediately terminated and (1) the disturbed soils removed and backfilled with dry structural fill soils which are then compacted, or (2) the excess moisture content within the disturbed soils allowed to dissipate before recompacting.

FDOT No. 57 stone placed below the pipeline bearing depths in a thickness of one foot can be used in lieu of compacted structural backfill. It is recommended the stone be fully wrapped with a geotextile filter fabric such as Mirafi 140N, or equivalent. The excavations should be performed in accordance with OSHA specifications.

3. Test the compacted surface within the upper one foot for density at a frequency of not less than one test per 300 linear feet of pipeline.
4. Place fill material, as required. The fill should consist of "clean," fine sand with less than 5 percent soil fines. You may use fill materials with soil fines between 5 percent and 10 percent, but strict moisture control may be required. Place fill in uniform 10 to 12-inch loose lifts and compact each lift to a minimum density of 95 percent of the Modified Proctor maximum dry density. We recommend the compacted soils have a moisture content within 2 percent of the optimum value as determined by the Modified Proctor maximum dry density (ASTM-D1557).
5. Perform compliance tests within each lift of fill at a frequency of not less than one test per 300 linear feet of pipeline.

Borrow Suitability

The borings were planned, in part, to provide an indication of the suitability of excavated soils from the proposed construction for use as structural fill. Based on the boring results and classification of the soil samples, the soil described as sand (SP) and slightly silty fine sand (SP-SM) are considered suitable for use as structural fill depending on the moisture content of the soils at the time of placement and compaction. It should be understood that all soils excavated from below the water table may be excessively wet and may require stockpiling or spreading to dry prior to placement and compaction. Soils described as slightly silty fine sand (SP-SM) may take longer to dry than the soils described as fine sand (SP). The soils classified as clayey fine sand (SC), silty fine sand (SM), clay (CH), and slightly silty fine sand with limerock, wood, mulch, and debris (PT) are not considered suitable for structural fill material due to their plasticity characteristics and/or inherent moisture-related instability. Although not suitable for structural fill, due to excessive organic content, the organic materials may be used in landscape areas as long as positive drainage is maintained. Table 3 shows the depths of suitable fill for each boring performed.

TABLE 3 Depths of Suitable Fill	
Boring	Depth Ranges of Suitable Fill (Feet)
B-1	None encountered
B-2	1.8-3, 4.8-6.3
B-3	0-6.3, 11-15
B-4	0-10.5

LIMITATIONS

During the early stages of most construction projects, geotechnical issues not addressed in this report may arise. Because of the natural limitations inherent in working with the subsurface, it is not possible for a geotechnical engineer to predict and address all possible problems. An Geotechnical Business Council (GBC) publication, "Important Information About Your Geotechnical Engineering Report" appears in Appendix B, and will help explain the nature of geotechnical issues.

We trust this report meets your needs and addresses the geotechnical issues associated with the proposed construction. We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully submitted,

UNIVERSAL ENGINEERING SCIENCES

Certificate of Authorization No. 549



Stephen R. Weaver, P.E.
Geotechnical Services Manager
FL P.E. Number 37389 ★

Date: 8/12/18

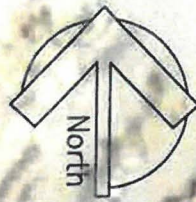
SRW/sw



Jacob Fuller
Staff Geotechnical Engineer

APPENDIX A

**BORING LOCATION PLAN
BORING LOGS
KEY TO BORING LOGS
FIELD EXPLORATION PROCEDURES
LABORATORY TESTING PROCEDURES**



 SPT BORING LOCATIONS

GEOTECHNICAL EXPLORATION WESTROCK STORMWATER IMPROVEMENTS FERNANDINA BEACH, FLORIDA BORING LOCATION PLAN	CLIENT: WESTROCK	
	DRAWN BY: TW	DATE: 7/24/18
	CHECKED BY: JF	DATE: 7/24/18
	SCALE: 1"= 100'	
	PROJECT NO: 0930.1800172.0000 REPORT NO:	


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PAGE NO:
FIGURE 1

BORING_LOG 0930 1800172 0000-WESTROCK STORMWATER IMPROVEMENTS.GPJ UNIENGSC.GDT 7/24/18



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0930.1800172.0000

REPORT NO.:

PAGE: A-1

PROJECT: GEOTECHNICAL EXPLORATION
WESTROCK STORMWATER IMPROVEMENTS
FERNANDINA BEACH, FLORIDA

BORING DESIGNATION: **B-2**
SECTION: TOWNSHIP:

SHEET: **1 of 1**
RANGE:

CLIENT: WESTROCK
LOCATION: SEE BORING LOCATION PLAN
REMARKS:

G.S. ELEVATION (ft): DATE STARTED: 7/12/18
WATER TABLE (ft): .5 DATE FINISHED: 7/12/18
DATE OF READING: 7/12/18 DRILLED BY: DB/DH
EST. W.S.W.T. (ft): TYPE OF SAMPLING: ASTM D 21586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT./ DAY)	ORG. CONT. (%)
									LL	PI		
0						Very loose dark greenish-gray Clayey fine SAND with Limerock (SC)						
		WOH-2	2									
		4-8-3	11			Medium dense dark grayish-brown slightly Silty fine SAND with Brick fragments (SP-SM)						
		3-2-1	3			Very loose dark grayish-brown Silty fine SAND with trace red Brick Debris (SM)						
5		1-1-2	3			Very loose dark brown slightly Silty fine SAND with mixed Debris (SP-SM)						
		1-1-1	2			Very soft gray Silty CLAY with mixed Debris (CH)						
		WOH	WOH			Very soft dark greenish-gray Silty CLAY (CH)						
10		WOH	WOH				97.4	140.2				
15		WOH	WOH			Very soft dark greenish-gray Silty CLAY with some decaying Roots (CH)						
20		WOH	WOH									
25		WOH	WOH									
30		WOH	WOH									

BORING LOG 0930.1800172.0000-WESTROCK STORMWATER IMPROVEMENTS GPJ UNIENGSC.GDT 7/26/18



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0930.1800172.0000

REPORT NO.:

PAGE: A-2

PROJECT: GEOTECHNICAL EXPLORATION
WESTROCK STORMWATER IMPROVEMENTS
FERNANDINA BEACH, FLORIDA

BORING DESIGNATION: **B-3**
SECTION: TOWNSHIP:

SHEET: **1 of 1**
RANGE:

CLIENT: WESTROCK

G.S. ELEVATION (ft):

DATE STARTED: 7/12/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 1.7

DATE FINISHED: 7/12/18

REMARKS:

DATE OF READING: 7/12/18

DRILLED BY: DB/DH

EST. W.S.W.T. (ft):

TYPE OF SAMPLING: ASTM D 21586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT./ DAY)	ORG. CONT. (%)
									LL	PI		
0						Very loose brown to light brown fine SAND (SP)						
		WOH-1-1	2									
		1-2-1	3			Very loose dark brown fine SAND with some Wood chips (SP)						
		2-3-4	7			Loose brown to dark grayish-brown fine SAND (SP)						
5		2-3-4	7				4.5	34.5				
		2-2-1	3			Very loose brown to dark brown Clayey fine SAND (SC)						
		WOH	WOH			Very soft greenish-gray CLAY (CH)						
10		WOH	WOH			Very loose greenish-gray Clayey fine SAND (SC)						
						Medium dense light greenish-gray fine SAND (SP)						
15		5-7-7	14									



UNIVERSAL ENGINEERING SCIENCES BORING LOG

PROJECT NO.: 0930.1800172.0000

REPORT NO.:

PAGE: A-4

PROJECT: GEOTECHNICAL EXPLORATION
WESTROCK STORMWATER IMPROVEMENTS
FERNANDINA BEACH, FLORIDA

BORING DESIGNATION: **B-4**
SECTION: TOWNSHIP:

SHEET: **1 of 1**
RANGE:

CLIENT: WESTROCK

G.S. ELEVATION (ft):

DATE STARTED: 7/12/18

LOCATION: SEE BORING LOCATION PLAN

WATER TABLE (ft): 3.0

DATE FINISHED: 7/12/18

REMARKS:

DATE OF READING: 7/12/18

DRILLED BY: DB/DH

EST. W.S.W.T. (ft):

TYPE OF SAMPLING: ASTM D 21586

DEPTH (FT.)	S A M P L E	BLOWS PER 6" INCREMENT	N (BLOWS/ FT.)	W.T.	S Y M B O L	DESCRIPTION	-200 (%)	MC (%)	ATTERBERG LIMITS		K (FT./ DAY)	ORG. CONT. (%)
									LL	PI		
0						Very loose to medium dense light brown to light gray fine SAND with reddish-brown seams (SP)						
		1-1-2	3				1.9	10.1				
		4-5-7	12									
		5-6-8	14									
5												
		8-8-8	16									
		8-8-8	16									
		4-6-8	14									
10												
		5-6-6	12									



SYMBOLS

SYMBOL DESCRIPTION

N	No. of blows of a 140-lb weight falling 30 inches required to drive standard spoon 1 foot.
WOR	Weight of Drill Rods
WOH	Weight of Drill Rods and Hammer
% REC	Percent Core Recovery from Rock Core Drilling
RQD	Rock Quality Designation
EOB	End Of Boring
BT	Boring Terminated
-200	Fines Content or % Passing No. 200 Sieve
MC	Moisture Content
LL	Liquid Limit
PI	Plasticity Index
K	Coefficient of Permeability
O.C.	Organic Content
▽	Estimated seasonal high groundwater level
▼	Measured groundwater level at time of drilling

RELATIVE DENSITY (sand-silt)

Very Loose - Less Than 4 Blows/Ft.
Loose - 4 to 10 Blows/Ft.
Medium - 11 to 30 Blows/Ft.
Dense - 31 to 50 Blows/Ft.
Very Dense - More Than 50 Blows/Ft.

CONSISTENCY (clay)

Very Soft - Less than 2 Blows/Ft.
Soft - 2 to 4 Blows/Ft.
Medium - 5 to 8 Blows/Ft.
Stiff - 9 to 15 Blows/Ft.
Very Stiff - 16 to 30 Blows/Ft.
Hard - More Than 30 Blows/Ft.

RELATIVE HARDNESS (Limestone)

Soft - 100 Blows for more than 2"
Hard - 100 Blows for less than 2"

UNIFIED CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Well-graded gravels and gravel-sand mixtures, little or no fines
		GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS	SW**	Well-graded sands and gravelly sands, little or no fines
			SP**	Well-graded sands and gravelly sands, little or no fines
FINE-GRAINED SOILS 50% or more passes No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less		SM**	Silty sands, sand-silt mixtures
			SC**	Clayey sands, sand-clay mixtures
	SILTS AND CLAYS Liquid limit greater than 50%		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
			MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Organic clays or high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
			PT	Peat, muck and other highly organic soils

* Based on the material passing the 3-in. (75 mm) sieve.

** Use dual symbol (such as, SP-SM and SP-SC) for soil with more than 5% but less than 12% passing through No. 200 sieve.

MODIFIERS

These modifiers provide our estimate of the amount of minor constituents (SILT or CLAY sized particles) in the soil sample.

Trace - 5% or less
With SILT or with CLAY - 6% to 11%
SILTY or CLAYEY - 12% to 30%
Very SILTY or Very CLAYEY - 31% to 50%

These modifiers provide our estimate of the amount of organic components in the soil sample.

Trace - 1% to 2%
Few - 3% to 4%
Some - 5% to 8%
Many - Greater than 8%

These modifiers provide our estimate of the amount of other components (Shell, Gravel, Etc.) in the soil sample

Trace - 5% or less
Few - 6% to 12%
Some - 13% to 30%
Many - 31% to 50%

FIELD EXPLORATION PROCEDURES

Standard Penetration Test Borings

The penetration borings were made in general accordance with the latest revision of ASTM D 1586, "Penetration Test and Split-Barrel Sampling of Soils". The borings were advanced by rotary drilling techniques using a circulating bentonite fluid for borehole flushing and stability. At 2 ½ to 5 foot intervals, the drilling tools were removed from the borehole and a split-barrel sampler inserted to the borehole bottom and driven 18 inches into the soil using a 140 pound hammer falling on the average 30 inches per hammer blow. The number of blows for the final 12 inches of penetration is termed the "penetration resistance, blow count, or N-value". This value is an index to several in-place geotechnical properties of the material tested, such as relative density and Young's Modulus.

LABORATORY TESTING PROCEDURES

Natural Moisture Content

The water content of the sample tested was determined in general accordance with the latest revision of ASTM D 2216. The water content is defined as the ratio of “pore” or “free” water in a given mass of material to the mass of solid material particles.

Percent Fines Content

The percent fines or material passing the No. 200 mesh sieve of the sample tested was determined in general accordance with the latest revision of ASTM D 1140. The percent fines are the soil particles in the silt and clay size range.

Organic Loss on Ignition (Percent Organics)

The organic loss on ignition or percent organic material in the sample tested was determined in general accordance with ASTM D 2974. The percent organics is the material, expressed as a percentage, which is burned off in a muffle furnace at 550° Celsius.

Atterberg Limits

The Atterberg Limits consist of the Liquid Limit (LL) and the Plastic Limit (PL). The LL and PL were determined in general accordance with the latest revision of ASTM D 4318. The LL is the water content of the material denoting the boundary between the liquid and plastic states. The PL is the water content denoting the boundary between the plastic and semi-solid states. The Plasticity Index (PI) is the range of water content over which a soil behaves plastically and is denoted numerically by as the difference between the LL and the PL. The water content of the sample tested was determined in general accordance with the latest revision of ASTM D 2216. The water content is defined as the ratio of “pore” or “free” water in a given mass of material to the mass of solid material particles.

APPENDIX B

**IMPORTANT INFORMATION ABOUT YOUR
GEOTECHNICAL ENGINEERING REPORT**

CONSTRAINTS AND RESTRICTIONS

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time to perform additional study.* Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.



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CONSTRAINTS AND RESTRICTIONS

WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of investigation. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.

LIST OF APPENDICES

APPENDIX A

BORING LOCATION PLAN
BORING LOGS
KEY TO BORING LOGS
FIELD EXPLORATION PROCEDURES
LABORATORY TEST PROCEDURES

APPENDIX B

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT
CONSTRAINTS AND RESTRICTIONS

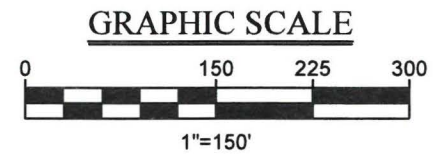
ATTACHMENT G
SITE DEVELOPMENT MAP

MATTHEWS
DESIGN GROUP
INCORPORATED

PO Box 3126 • 7 Waldo Street • St. Augustine • Florida • 32084
www.matthewsdesign.net

EXISTING IMPERVIOUS AREA
NOT INCLUDED IN
CALCULATIONS
OUTFALL WILL REMAIN AS IS

PROJECT AREA
LIMITS 15.0 AC



PERMITTED POND AREA
89,384 SF
(69,600 @ NWL)

EXISTING OUTFALL
CONVEYANCE

EXISTING IMPERVIOUS AREA TO
BE INCLUDED IN CALCULATIONS
AND ROUTED THROUGH POND
195,001 SF

EXISTING/PROPOSED
OUTFALL
LOCATION 2

PERMITTED SITE AREA
AREA = 365,309 SF
(227,926 SF GRAVEL AND 137,383 SF ASPHALT)

EXISTING
OUTFALL
LOCATION 1
TO BE
REMOVED

SITE TABLE		
TOTAL SITE	14.9 AC	649,704 SF
DETENTION POND (NWL)	69,600 SF	
GRAVEL PARKING	233,515 SF	
ASPHALT	131,794 SF	
ADDITIONAL IMPERVIOUS (ROOF/ASPHALT)	195,011 SF	
PERVIOUS (GRASS)	19,783 SF	

REVISIONS

NO.	DATE	DESCRIPTION

DESIGNED BY

SAK

MS & KIM

CHECKED BY

SAK

DATE

05-10-2018

JOB NO.

18037

MATTHEWS DESIGN GROUP, INC.

P.O. BOX 3126, 7 WALDO STREET
ST. AUGUSTINE, FLORIDA 32084

PHONE: 904.826.1334
FAX: 904.826.4547
INFO@MATTHEWSDESIGN.NET

SITE DEVELOPMENT MAP

WESTROCK DROP YARD

FERNANDINA BEACH

PREPARED FOR

TECHNICAL ASSOCIATES

SHEET NO.

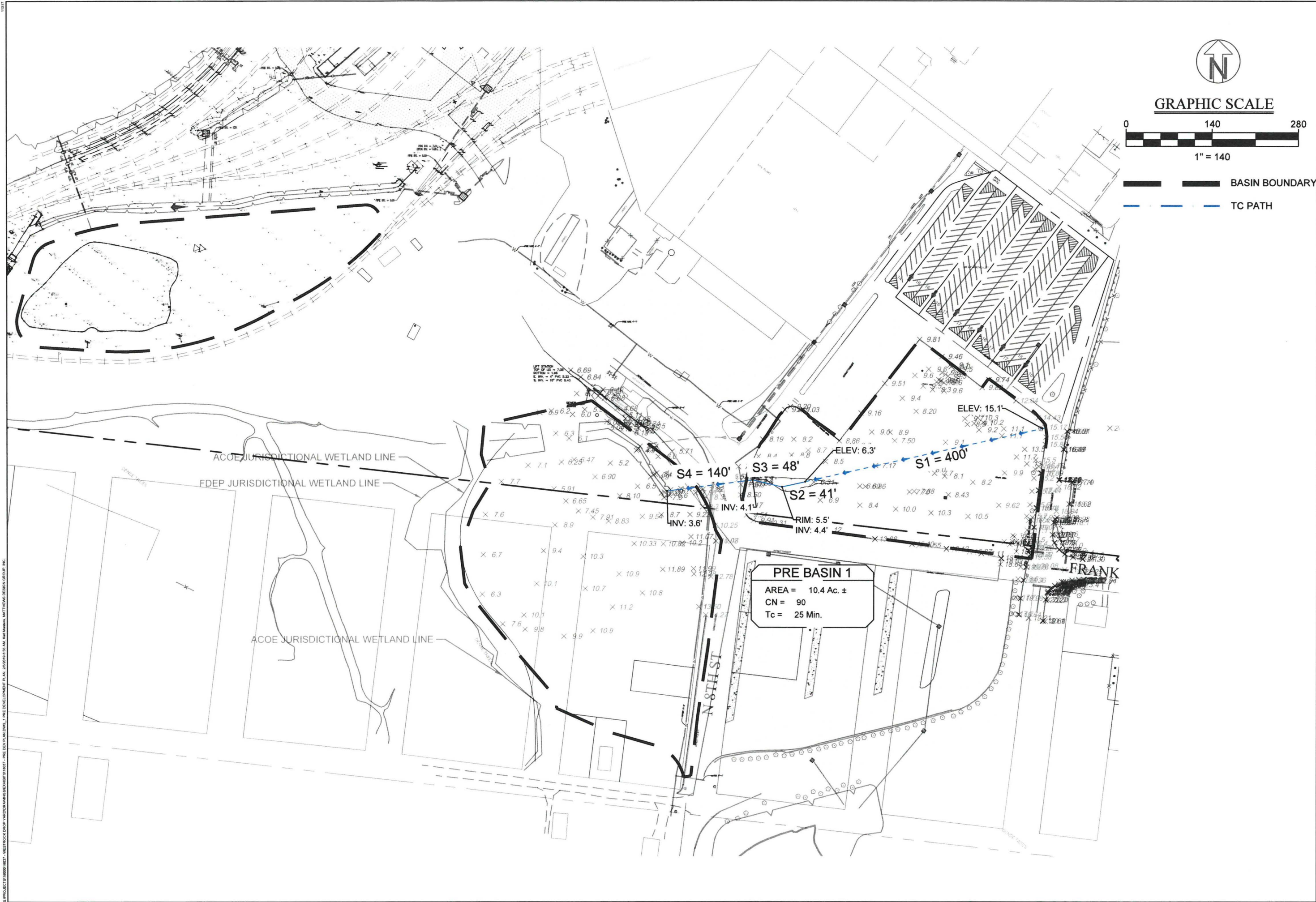
H

OF H

ATTACHMENT H
PRE AND POST DEVELOPMENT MAP

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INCORPORATED

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www.matthewsdesign.net



REVISIONS		NO.		DATE		DESCRIPTION	

DESIGN BY	SAK	MS & KJM	DATE	JOB No.

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PRE DEVELOPMENT PLAN
WESTROCK DROP YARD
FERNANDINA BEACH
PREPARED FOR
TECHNICAL ASSOCIATES

1
OF 1



POST BASIN 1
AREA = 14.9 AC. ±
CN = 87
Tc = 17 Min.

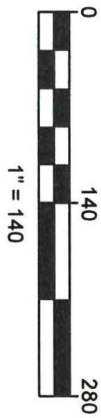
S2 = 1,450'

S1 = 206'

RIM: 9.0'
INV: 7.5'

ELEV: 9.5'

NOTE:
SEE CONSTRUCTION
GRADING PLAN FOR
MORE DETAILED
STORMWATER PIPE
AND STRUCTURE
INFORMATION



POST DEVELOPMENT PLAN
WESTROCK DROP YARD
FERNANDINA BEACH
PREPARED FOR
TECHNICAL ASSOCIATES

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DSGN BY: SAK
DWG BY: MS & KJM
CHK BY: SAK
DATE: 05-10-2018
JOB No.: 18037

REVISIONS	
NO.	DESCRIPTION

REGISTERED ENGINEER
SCOTT A. KNOWLES, P.E.
CA#26535 FL#55391

ATTACHMENT I
PRE AND POST TC WORKSHEETS

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MATTHEWS DESIGN GROUP INCORPORATED

Project Name: Westrock
Project No: 18037

Designer: KJM
Date: 1/20/2019

TIME OF CONCENTRATION CALCULATIONS

Stormwater Basin: Pre Basin 1

Time of concentration for sheet flow from Manning-Kinematic wave equation (1976)

$$T_C = 0.007 * (n * L)^{0.8} / (P_2^{0.5} * S^{0.4})$$

Length:	400 ft	n:	0.15		
High Pt:	15.0 ft	Slope:	0.022 ft/ft		
Low Pt:	6.3 ft	P ₂ :	5.04 in/hr	2yr/24hr	
Surface:	Short grass prairie			T ₁ :	22.89 min

Time of concentration for shallow concentrated flow from SCS TR-55 velocity method.

Length:	41 ft	Slope:	0.021 ft/ft		
High Pt:	4.1 ft	Velocity:	2.323 ft/sec		
Low Pt:	3.3 ft				
Surface:	Unpaved			T ₂ :	0.29 min

Time of concentration for Rect./Vee/Trap.channel from Manning's Equation.

Length:	0 ft	Depth:	0.0 ft		
High Pt:	0.0 ft	Bottom:	0.0 ft		
Low Pt:	0.0 ft	Side Slope:	0 ft/ft		
Slope:	0.000 ft/ft	Type:	Rectangular		
Surface:	Clean	R _H :	0.00 ft		
n:	0	Velocity:	0.000 ft/sec		
				T ₃ :	0.00 min

Time of concentration for Storm Sewer flow assuming 2 fps velocity.

Length:	188 ft				
Velocity:	2.00 ft/sec				
				T ₄ :	1.57 min

T_C: 24.75 min

USE T_C: 25 min

MATTHEWS DESIGN GROUP INCORPORATED

Project Name: Westrock
Project No: 18037

Designer: KJM
Date: 1/20/2019

TIME OF CONCENTRATION CALCULATIONS

Stormwater Basin: Post Basin 1

Time of concentration for sheet flow from Manning-Kinematic wave equation (1976)

$$T_C = 0.007 * (n*L)^{0.8} / (P_2^{0.5} * S^{0.4})$$

Length:	206 ft	n:	0.012		
High Pt:	9.5 ft	Slope:	0.002 ft/ft		
Low Pt:	9.0 ft	P ₂ :	5.04 in/hr	2yr/24hr	
Surface:	Asphalt			T ₁ :	4.29 min

Time of concentration for shallow concentrated flow from SCS TR-55 velocity method.

Length:	0 ft	Slope:	0.000 ft/ft		
High Pt:	0.0 ft	Velocity:	0.000 ft/sec		
Low Pt:	0.0 ft				
Surface:	Unpaved			T ₂ :	0.00 min

Time of concentration for Rect./Vee/Trap.channel from Manning's Equation.

Length:	0 ft	Depth:	0.0 ft		
High Pt:	0.0 ft	Bottom:	0.0 ft		
Low Pt:	0.0 ft	Side Slope:	0 ft/ft		
Slope:	0.000 ft/ft	Type:	Vee		
Surface:	Weedy	R _H :	0.00 ft		
n:	0.03	Velocity:	0.000 ft/sec		
				T ₃ :	0.00 min

Time of concentration for Storm Sewer flow assuming 2 fps velocity.

Length:	1,473 ft				
Velocity:	2.00 ft/sec				
				T ₄ :	12.28 min

T_C: 16.56 min

USE T_C: 17 min