

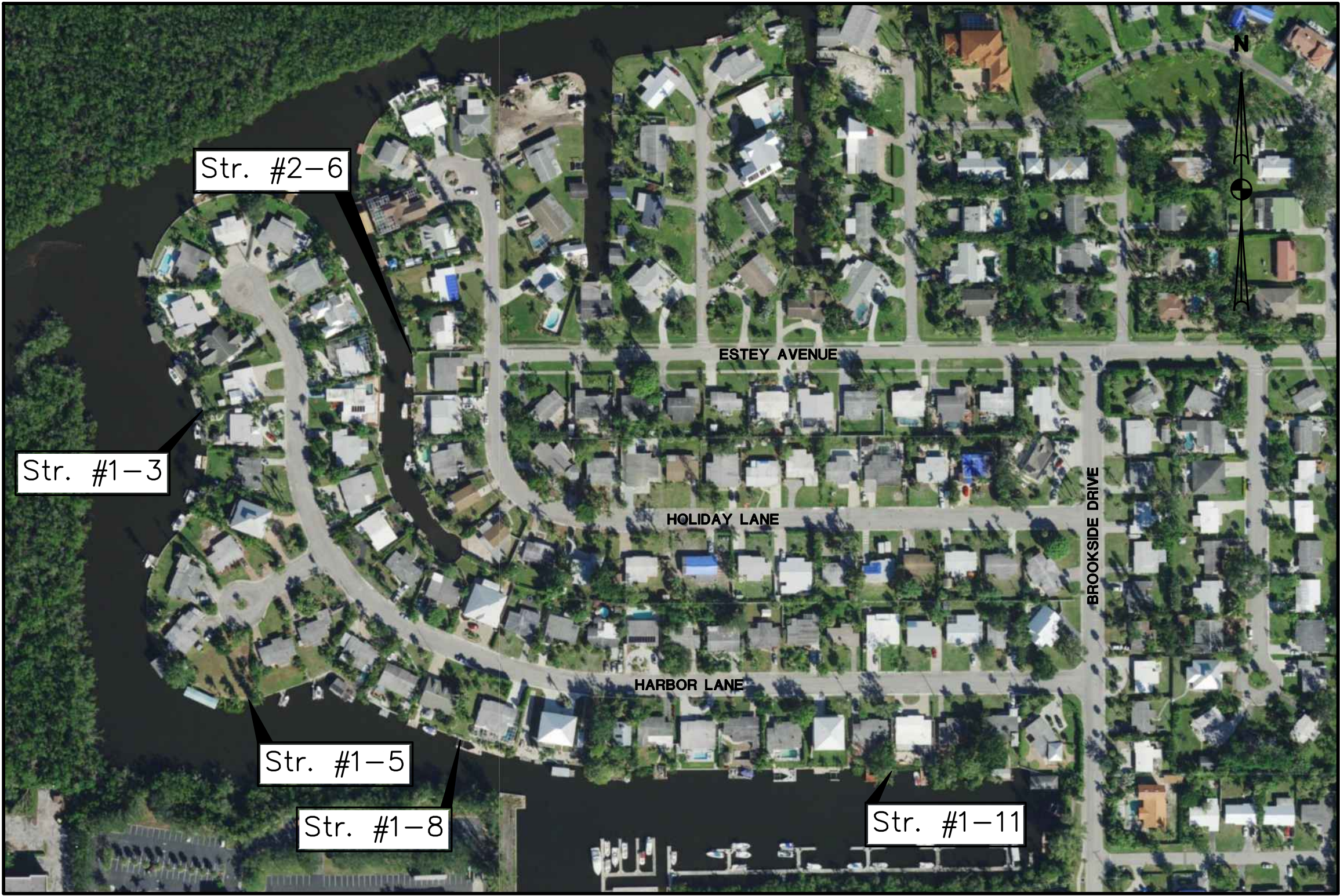
CONTRACT DOCUMENTS

For the construction of the

NEW STORMWATER OUTFALLS

SUPPLEMENT TO PLANS BY ROBAU & ASSOCIATES

Project # 020-00-017



SITE MAP

PROPERTY IDENTIFICATION:
BROOKSIDE SUBDIVISION, UNIT NO. 3,
PLAT NO. 2 (PB 3, PG 92) and part of
Rainbow Cove (PG 3, PG 92)

PRIMARY CONSULTANT:
ROBAU & ASSOCIATES
2770 HORSESHOE DRIVE SOUTH
SUITE 7
NAPLES, FLORIDA 34104

PROJECT INFORMATION:
CONTRACT NO. 18-7432-CE
COLLIER COUNTY PROFESSIONAL SERVICES
ARCHITECTURAL AND ENGINEERING STORMWATER
STUDY, PLANNING AND/OR DESIGN #103-172929

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OUTFALL PLAN AND SECTION	C-2
OUTFALL PLAN AND SECTION	C-3
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FOR THE
HARBOR AND HOLIDAY LANES
STORMWATER MANAGEMENT IMPROVEMENTS

Civil Drawings

AMERICAN ENGINEERING CONSULTANTS

OF MARCO ISLAND, INC.

AEC Project No. 10983-001-01

NOVEMBER 2021

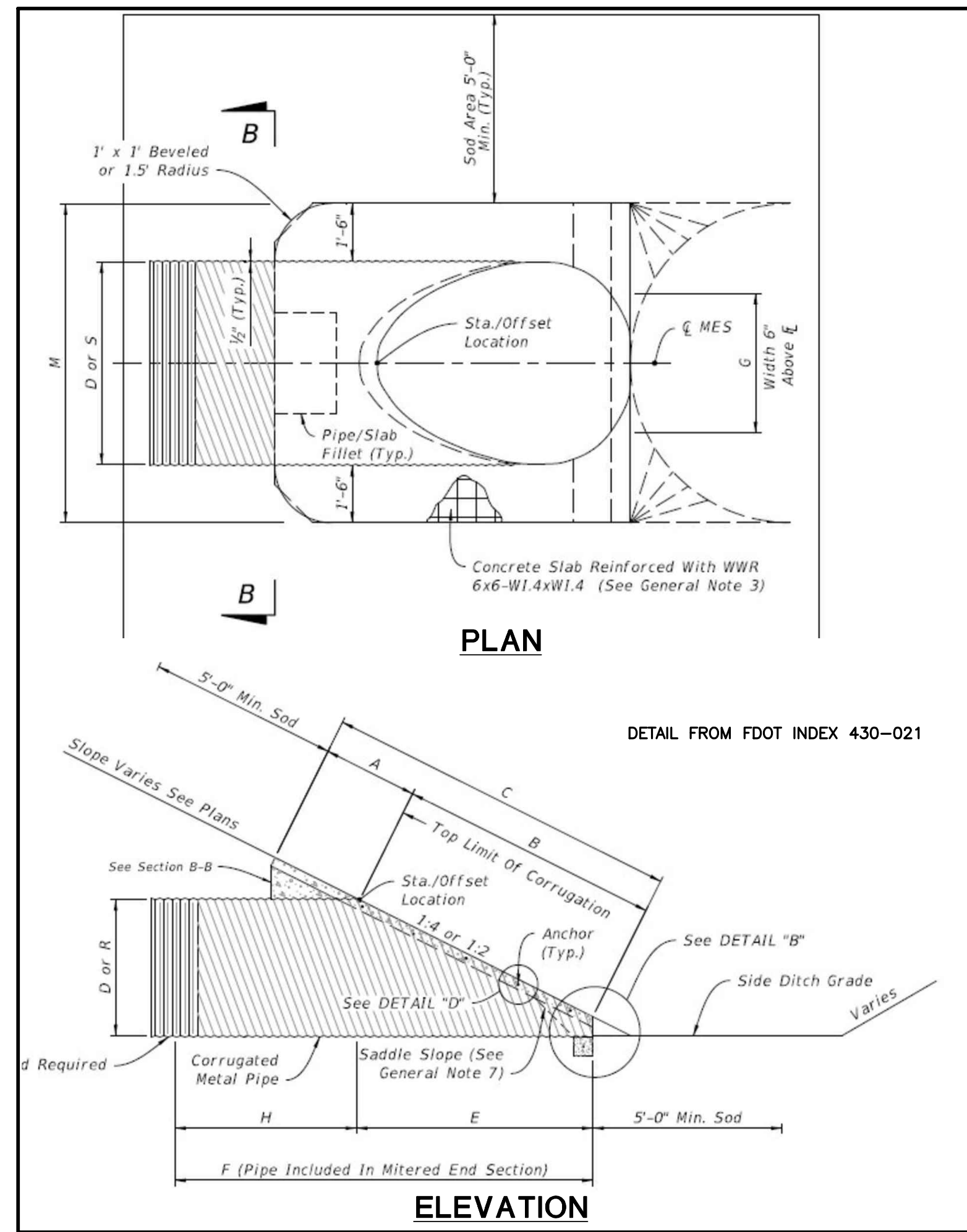
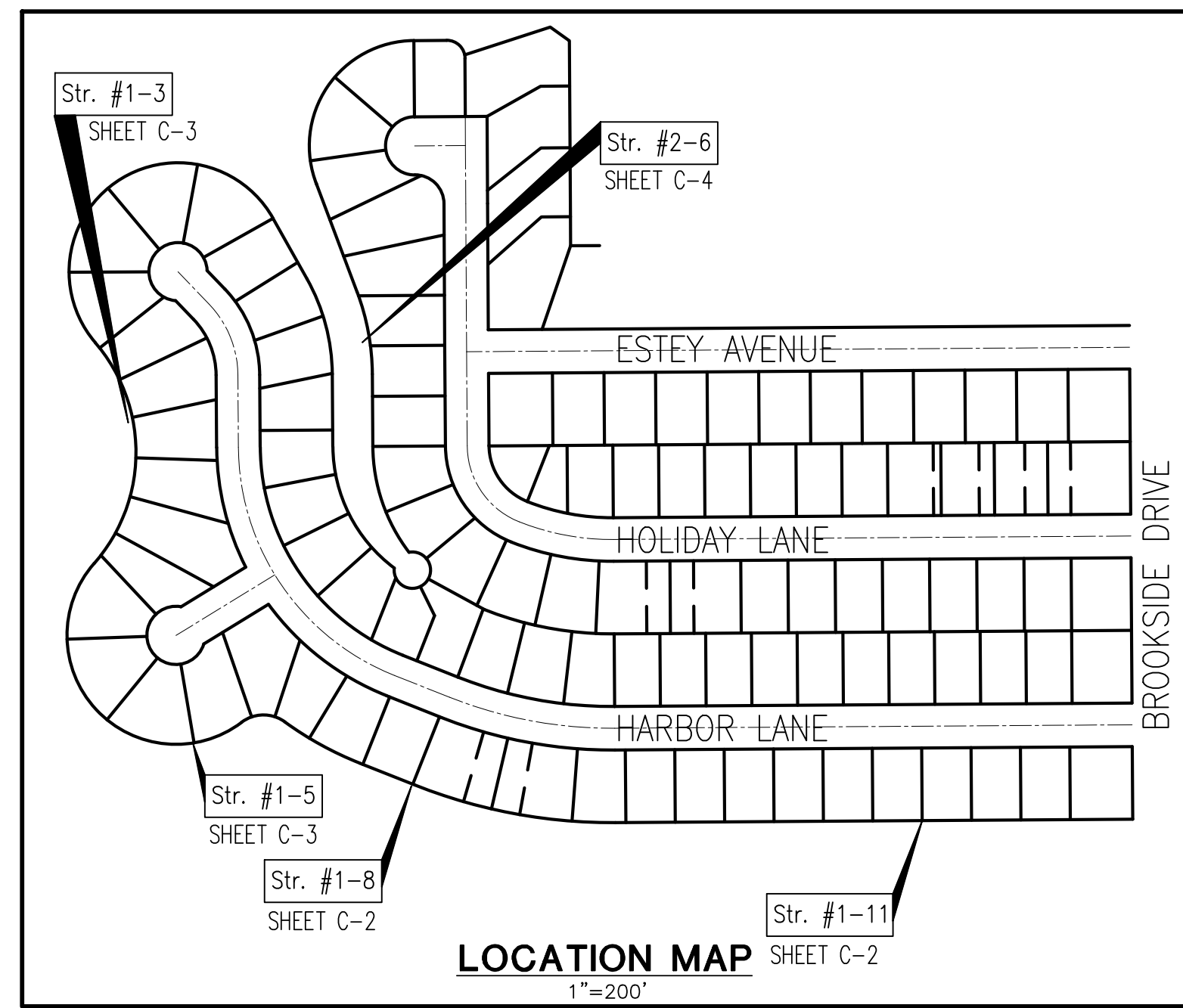


TABLE 2
SINGLE AND MULTIPLE CORRUGATED METAL PIPE DIMENSIONS AND QUANTITIES

Dia. (D)	Rise (R)	Span (S)	X	3/8" CONC. SLAB (CY)										SOODING (CY)										
				A	B	C	E	F	G	H	I	J	N	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe							
18"	2"	25'	1.68	4.16	1.3	5.0	1.22	3.5	4.3	6.82	8.50	12.08	1.04	0.33	0.54	0.84	0.37	0.51	0.64	2.4	2.7	3.9		
18"	2"	25'	2.24	4.74	2.0	6.0	1.41	4.0	4.58	7.42	10.25	13.08	1.04	0.38	0.62	0.87	1.12	0.26	0.43	0.61	0.78	2.2	2.5	3.8
24"	2"	25'	3.25	5.85	3.0	7.0	1.73	4.0	5.08	8.50	11.50	15.33	1.04	0.47	0.75	1.05	1.34	0.32	0.52	0.72	0.91	2.3	2.7	3.1
24"	2"	25'	4.29	6.94	4.0	8.0	2.05	4.0	6.58	10.50	14.08	18.34	1.04	0.56	0.84	1.14	1.44	0.34	0.54	0.74	0.94	2.4	2.9	3.4
30"	2"	25'	5.29	8.09	5.0	9.0	2.38	4.0	6.98	11.17	15.25	21.33	1.04	0.67	1.01	1.31	1.72	0.34	0.54	0.74	1.14	2.4	2.9	3.4
36"	2"	25'	6.21	9.19	6.0	10.0	2.70	4.0	7.58	12.58	17.58	24.58	1.04	0.78	1.11	1.41	1.82	0.36	0.56	0.76	1.16	2.4	2.9	3.4
42"	2"	25'	7.13	10.33	7.0	11.0	3.02	4.0	8.18	13.83	19.58	27.58	1.04	0.89	1.21	1.51	1.92	0.38	0.58	0.78	1.18	2.4	2.9	3.4
48"	2"	25'	8.05	11.47	8.0	12.0	3.35	4.0	8.78	15.08	21.08	30.58	1.04	1.00	1.31	1.61	2.02	0.40	0.60	0.80	1.20	2.4	2.9	3.4
54"	2"	25'	8.97	12.61	9.0	13.0	3.68	4.0	9.38	16.33	22.33	33.58	1.04	1.11	1.41	1.71	2.12	0.42	0.62	0.82	1.22	2.4	2.9	3.4
60"	2"	25'	9.89	13.75	10.0	14.0	4.00	4.0	10.00	17.58	23.58	36.58	1.04	1.22	1.51	1.81	2.22	0.44	0.64	0.84	1.24	2.4	2.9	3.4
66"	2"	25'	10.81	14.89	11.0	15.0	4.33	4.0	10.60	18.83	24.83	39.58	1.04	1.33	1.61	1.91	2.32	0.46	0.66	0.86	1.26	2.4	2.9	3.4
72"	2"	25'	11.73	16.03	12.0	16.0	4.65	4.0	11.20	20.08	26.08	42.58	1.04	1.44	1.71	2.01	2.42	0.48	0.68	0.88	1.28	2.4	2.9	3.4
78"	2"	25'	12.65	17.17	13.0	17.0	4.98	4.0	11.80	21.33	27.33	45.58	1.04	1.55	1.81	2.11	2.52	0.50	0.70	0.90	1.30	2.4	2.9	3.4
84"	2"	25'	13.57	18.31	14.0	18.0	5.30	4.0	12.40	22.58	28.58	48.58	1.04	1.66	1.91	2.21	2.62	0.52	0.72	0.92	1.32	2.4	2.9	3.4
90"	2"	25'	14.49	19.45	15.0	19.0	5.63	4.0	13.00	23.83	29.83	51.58	1.04	1.77	2.01	2.31	2.72	0.54	0.74	0.94	1.34	2.4	2.9	3.4
96"	2"	25'	15.41	20.59	16.0	20.0	5.95	4.0	13.60	25.08	31.08	54.58	1.04	1.88	2.11	2.41	2.82	0.56	0.76	0.96	1.36	2.4	2.9	3.4
102"	2"	25'	16.33	21.73	17.0	21.0	6.28	4.0	14.20	26.33	32.33	57.58	1.04	1.99	2.21	2.51	2.92	0.58	0.78	0.98	1.38	2.4	2.9	3.4
108"	2"	25'	17.25	22.87	18.0	22.0	6.60	4.0	14.80	27.58	33.58	60.58	1.04	2.10	2.31	2.61	3.02	0.60	0.80	1.00	1.40	2.4	2.9	3.4
114"	2"	25'	18.17	24.01	19.0	23.0	6.93	4.0	15.40	28.83	34.83	63.58	1.04	2.21	2.41	2.71	3.12	0.62	0.82	1.02	1.42	2.4	2.9	3.4
120"	2"	25'	19.09	25.15	20.0	24.0	7.25	4.0	16.00	30.08	36.08	66.58	1.04	2.32	2.51	2.81	3.22	0.64	0.84	1.04	1.44	2.4	2.9	3.4
126"	2"	25'	19.99	26.29	21.0	25.0	7.58	4.0	16.60	31.33	37.33	69.58	1.04	2.43	2.61	2.91	3.32	0.66	0.86	1.06	1.46	2.4	2.9	3.4
132"	2"	25'	20.91	27.43	22.0	26.0	7.90	4.0	17.20	32.58	38.58	72.58	1.04	2.54	2.71	3.01	3.42	0.68	0.88	1.08	1.48	2.4	2.9	3.4
138"	2"	25'	21.83	28.57	23.0	27.0	8.23	4.0	17.80	33.83	39.83	75.58	1.04	2.65	2.81	3.11	3.52	0.70	0.90	1.10	1.50	2.4	2.9	3.4
144"	2"	25'	22.75	29.71	24.0	28.0	8.55	4.0	18.40	35.08	41.08	78.58	1.04	2.76	2.91	3.21	3.62	0.72	0.92	1.12	1.52	2.4	2.9	3.4
150"	2"	25'	23.67	30.85	25.0	29.0	8.88	4.0	19.00	36.33	42.33	81.58	1.04	2.87	3.01	3.31	3.72	0.74	0.94	1.14	1.54	2.4	2.9	3.4
156"	2"	25'	24.59	32.00	26.0	30.0	9.20	4.0	19.60	37.58	43.58	84.58	1.04	2.98	3.11	3.41	3.82	0.76	0.96	1.16	1.56	2.4	2.9	3.4
162"	2"	25'	25.51	33.14	27.0	31.0	9.53	4.0	20.20	38.83	44.83	87.58	1.04	3.09	3.21	3.51	3.92	0.78	0.98	1.18	1.58	2.4	2.9	3.4
168"	2"	25'	26.43	34.28	28.0	32.0	9.85	4.0	20.80	40.08	46.08	90.58	1.04	3.20	3.31	3.61	4.02	0.80	1.00	1.20	1.60	2.4	2.9	3.4
174"	2"	25'	27.35	35.42	29.0	33.0	10.18	4.0	21.40	41.33	47.33	93.58	1.04	3.31	3.41	3.71	4.12	0.82	1.02	1.22	1.62	2.4	2.9	3.4
180"	2"	25'	28.27	36.56	30.0	34.0	10.50	4.0	22.00	42.58	48.58	96.58	1.04	3.42	3.51	3.81	4.22	0.84	1.04	1.24	1.64	2.4	2.9	3.4
186"	2"	25'	29.19	37.70	31.0	35.0	10.83	4.0	22.60	43.83	49.83	99.58	1.04	3.53	3.61	3.91	4.32	0.86	1.06	1.26	1.66	2.4	2.9	3.4
192"	2"	25'	30.11	38.84	32.0	36.0	11.15	4.0	23.20	45.08	51.08	102.58	1.04	3.64	3.71	4.01	4.42	0.88	1.08	1.28	1.68	2.4	2.9	3.4
198"	2"	25'	31.03	40.00	33.0	37.0	11.48	4.0	23.80	46.33	52.33	105.58	1.04	3.75	3.81	4.11	4.52	0.90	1.10	1.30	1.70	2.4	2.9	3.4
204"	2"	25'	31.95	41.14	34.0	38.0	11.80	4.0	24.40	47.58	53.58	108.58	1.04	3.86	3.91	4.21	4.62	0.92	1.12	1.32	1.72	2.4	2.9	3.4
210"	2"	25'	32.87	42.28	35.0	39.0	12.13	4.0	25.00	48.83	54.83	111.58	1.04	3.97	4.01	4.31	4.72	0.94	1.14	1.34	1.74	2.4	2.9	3.4
216"	2"	25'	33.79	43.42	36.0	40.0	12.45	4.0	25.60	50.08	56.08	114.58	1.04	4.08	4.11	4.41	4.82	0.96	1.16	1.36	1.76	2.4	2.9	3.4
222"	2"	25'	34.71	44.56	37.0	41.0	12.78	4.0	26.20	51.33	57.33	117.58	1.04	4.19	4.21	4.51	4.92	0.98	1.18	1.38	1.78	2.4	2.9	3.4
228"	2"	25'	35.63	45.70	38.0	42.0	13.10	4.0	26.80	52.58	58.58	120.58	1.04	4.30	4.31	4.61	5.02	1.00	1.20	1.40	1.80	2.4	2.9	3.4
234"	2"	25'	36.55	46.84	39.0	43.0	13.43	4.0	27.40	53.83	59.83	123.58	1.04	4.41	4.41	4.71	5.12	1.02	1.22	1.42	1.82	2.4	2.9	3.4
240"	2"	25'	37.47	47.98	40.0	44.0	13.75	4.0	28.00	55.08	61.08	126.58	1.04	4.52	4.51	4.81	5.22	1.04	1.24	1.44	1.84	2.4	2.9	3.4
246"	2"	25'	38.39	49.12	41.0	45.0	14.08	4.0	28.60	56.33	62.33	129.58	1.04	4.63	4.61	4.91	5.32	1.06	1.26	1.46	1.86	2.4	2.9	3.4
252"	2"	25'	39.31	50.26	42.0	46.0	14.40	4.0	29.20	57.58	63.58	132.58	1.04	4.74	4.71	5.01	5.42	1.08	1.28	1.48	1.88	2.4	2.9	3.4
258"	2"	25'	40.23	51.40	43.0	47.0	14.73	4.0	29.80	58.83	64.83	135.58	1.04	4.85	4.81	5.11	5.52	1.10	1.30	1.50	1.90	2.4	2.9	3.4
264"	2"	25'	41.15	52.54	44.0	48.0	15.05	4.0	30.40	60.08	66.08	138.58	1.04	4.96	4.91	5.21	5.62	1.12	1.32	1.52	1.92	2.4	2.9	3.4
270"	2"	25'	42.07	53.68	45.0	49.0	15.38	4.0	31.00	61.33	67.33	141.58	1.04	5.07	5.01	5.31	5.72	1.14	1.34	1.54	1.94	2.4	2.9	3.4
276"	2"	25'	43.00	54.82	46.0	50.0	15.70	4.0	31.60	62.58	68.58	144.58	1.04	5.18	5.11	5.41	5.82	1.16	1.36	1.56	1.96	2.4	2.9	3.4
282"	2"	25'	43.92	55.96	47.0	51.0	16.03	4.0	32.20	63.83	69.83	147.58	1.04	5.29	5.21	5.51	5.92	1.18						

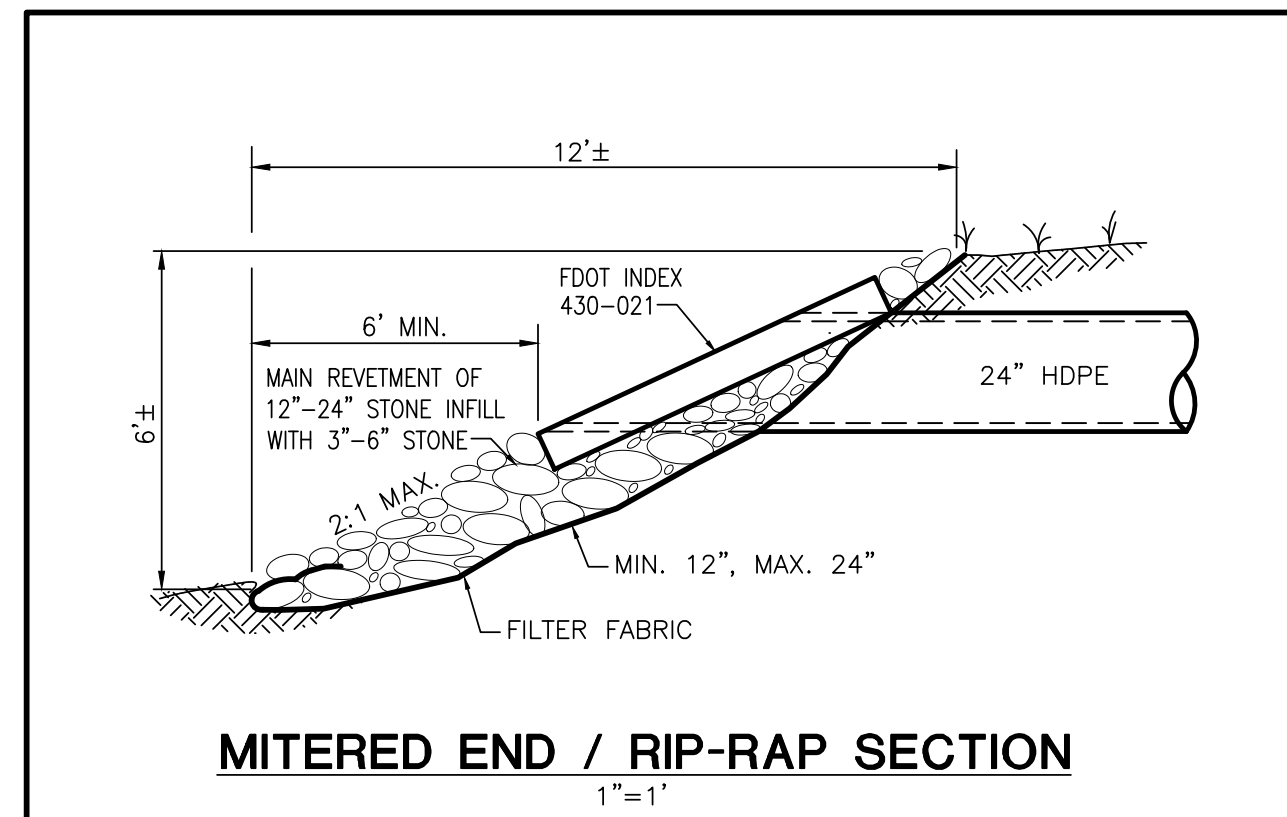
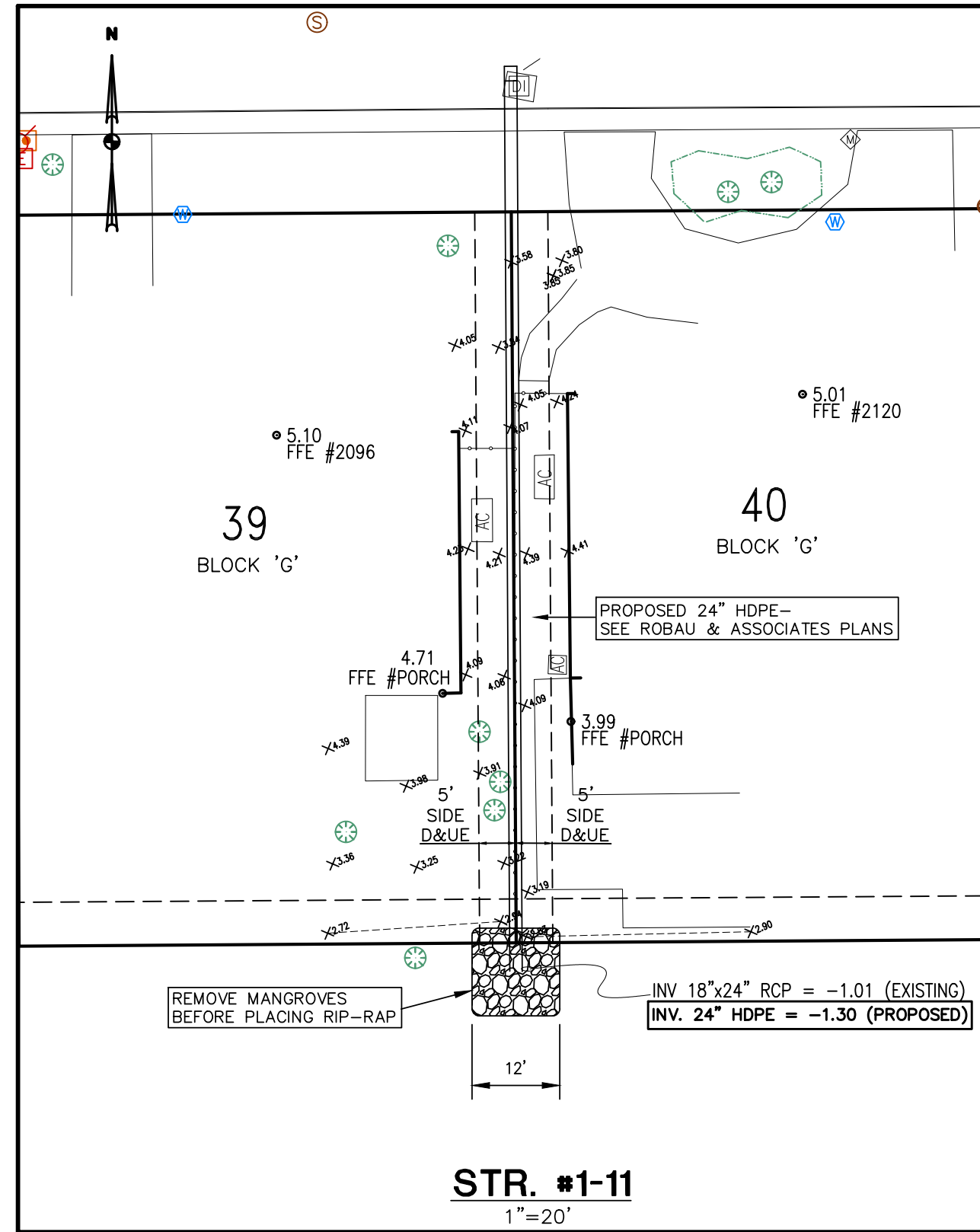


PHOTO OF EXISTING CONDITIONS
N.T.S.

Symbol	Description	Symbol	Description
AC	AIR CONDITIONER	WOOD POLE	
◆	MAILBOX	PULL-BOX	
→	SINGLE POST SIGN	FIRE HYDRANT	
↔	SPEED LIMIT SIGN	IRRIGATION CONTROL	
▲	FOUND NAIL & DISC	SANITARY CLEANOUT	
□	FOUND CONCRETE MONUMENT	SANITARY MANHOLE COVER	
⊙	FOUND DRILL HOLE	SANITARY MARKER/FLAGGING	
○	FOUND IRON PIN	WATERLINE MARKER/FLAGGING	
⊠	CABLE SERVICE	WATER METER	
⊞	DRAINAGE INLET	WATER VALVE	
⊞	INACCESSIBLE DRAINAGE INLET	TREE	
⊞	DRAINAGE MANHOLE COVER	X.XX	ELEVATION
—	GUY ANCHOR	INV	INVERT
D&UE	DRAINAGE UTILITY EASEMENT	A1	HORIZONTAL & VERTICAL CONTROL POINT
FFE #	FINISHED FLOOR ELEV & HOUSE #	3.22	

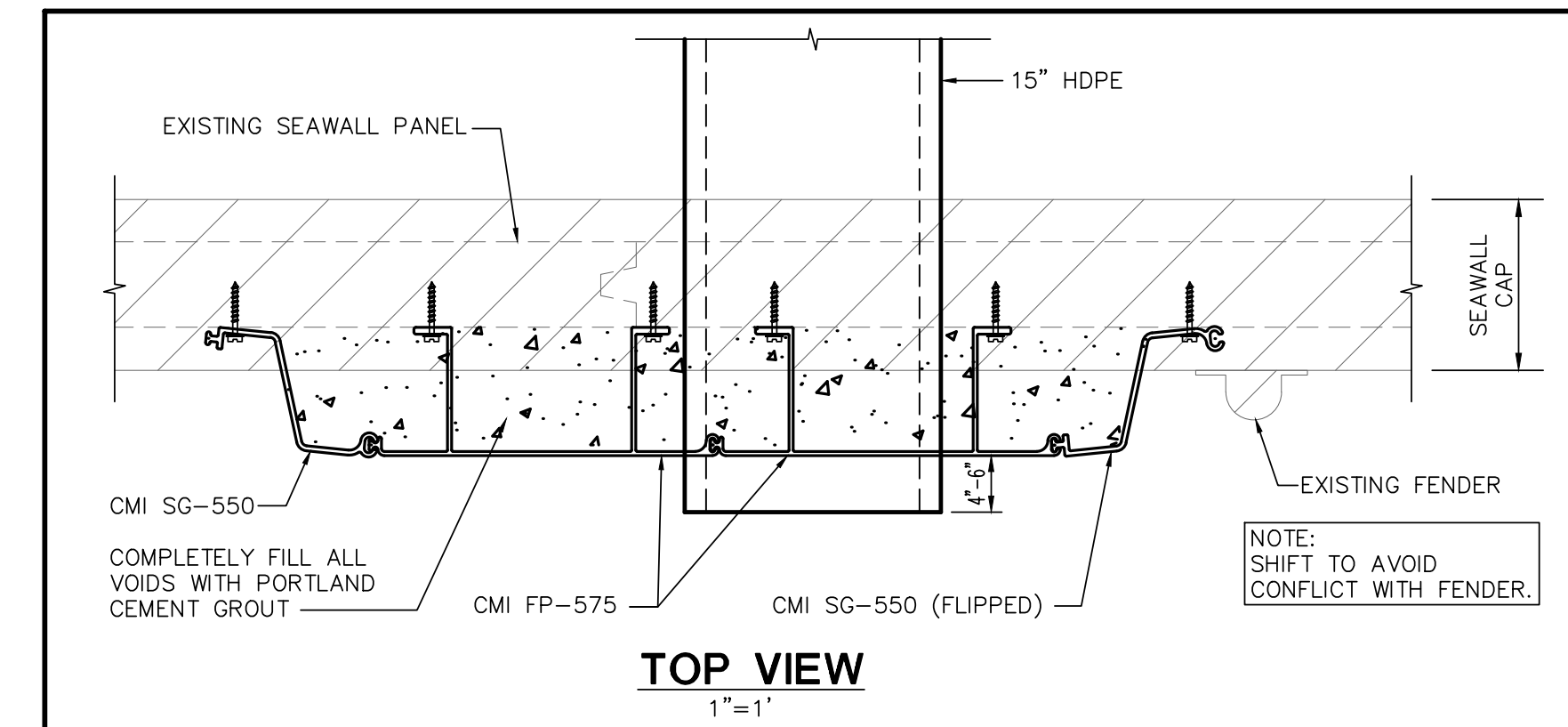
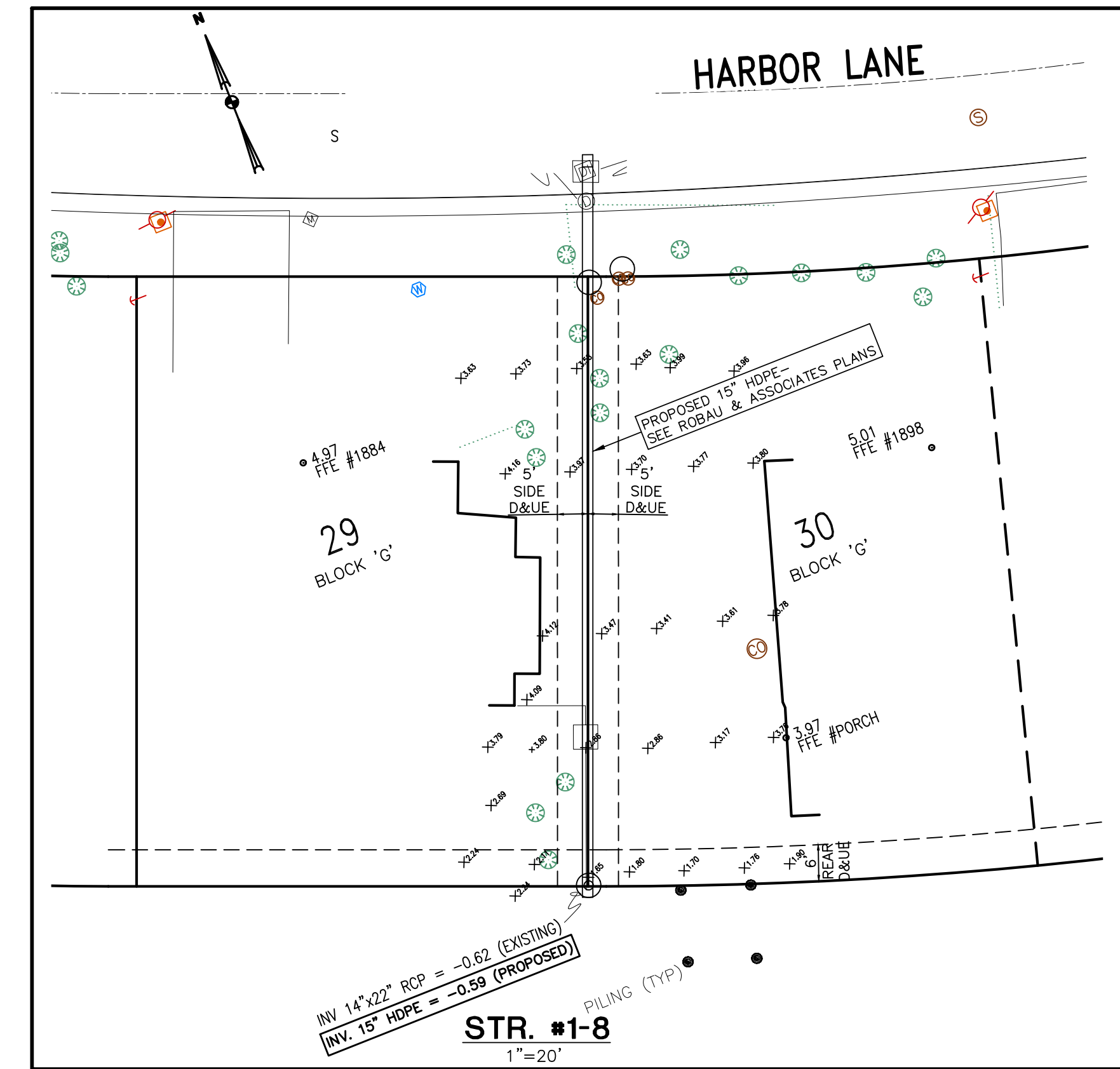
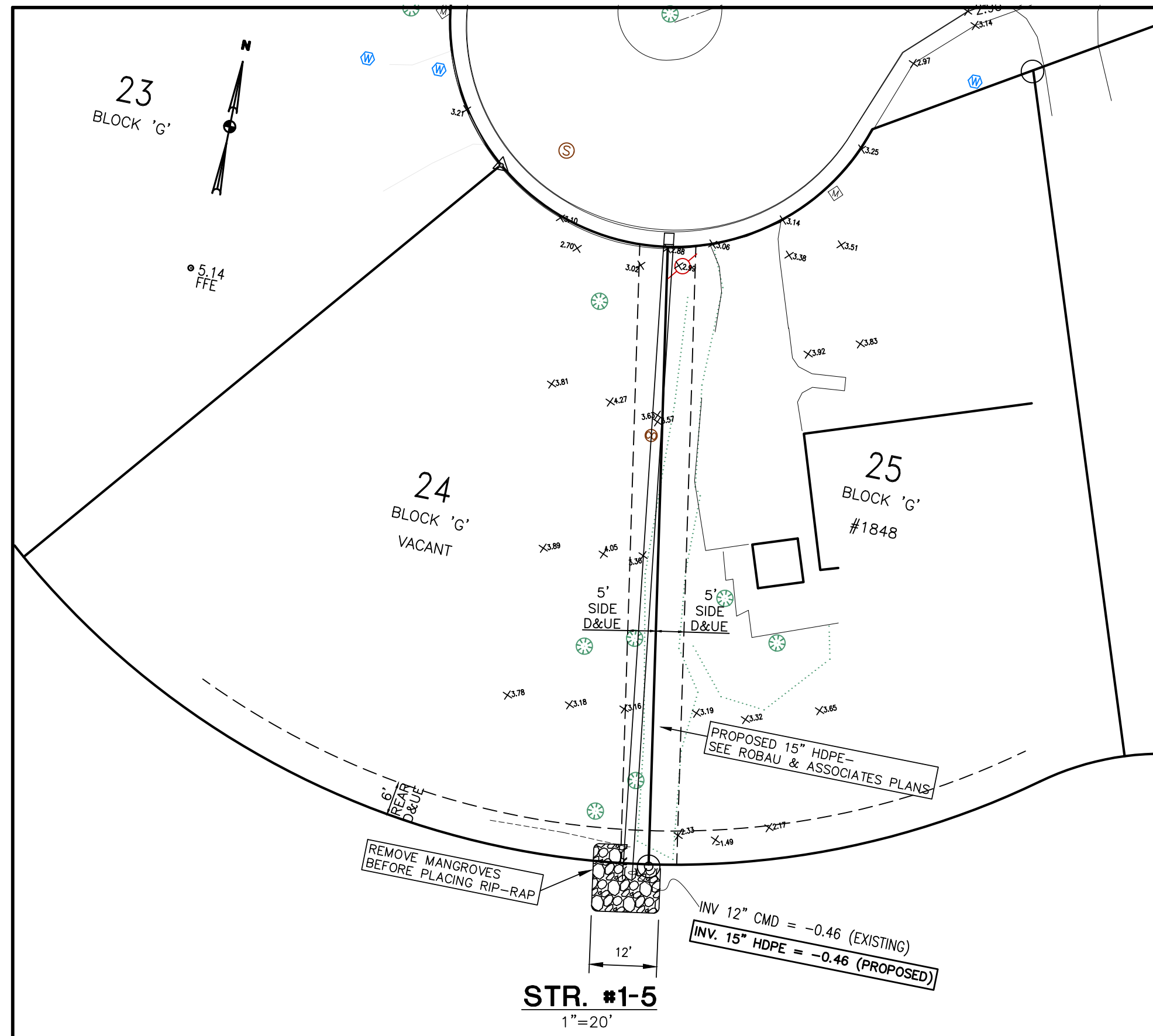


PHOTO OF EXISTING CONDITIONS
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OUTFALL PLAN AND SECTIONS		AMERICAN ENGINEERING CONSULTANTS MARCO ISLAND, INC. CERTIFICATE OF AUTHORIZATION NUMBER: 26446 WWW.AEC-MI.COM 573 BALD EAGLE DR. MARCO ISLAND, FL. (339) 394-1697		DESIGNED BY: M. PINCKNEY DRAWN BY: K. SCHMADTKE SCALE: AS NOTED		APPROVED BY: MARTIN D. PINCKNEY LICENSE NO.: 10983-001-01 DATE: NOVEMBER 2021 REF.: SEAWALL		REV. PER LATEST COUNTY COMMENTS: 03/10/22 KAS REVISIONS: DATE INIT
HARBOR AND HOLIDAY LANES STORMWATER MANAGEMENT IMPROVEMENTS		ROBAU AND ASSOCIATES LLC		SHEET C-1-2 OF 4				



Symbol	Description	Symbol	Description
AC	AIR CONDITIONER	WOOD POLE	
MAILBOX		PULL-BOX	
SINGLE POST SIGN		FIRE HYDRANT	
SPEED LIMIT SIGN		IRRIGATION CONTROL	
FOUND NAIL & DISC		SANITARY CLEANOUT	
FOUND CONCRETE MONUMENT		SANITARY MANHOLE COVER	
FOUND DRILL HOLE		SANITARY MARKER/FLAGGING	
FOUND IRON PIN		WATERLINE MARKER/FLAGGING	
CABLE SERVICE		WATER METER	
DRAINAGE INLET		WATER VALVE	
INACCESSIBLE DRAINAGE INLET		TREE	
DRAINAGE MANHOLE COVER		ELEVATION	X.XX
GUY ANCHOR		INVERT	INV
D&UE	DRAINAGE UTILITY EASEMENT	A1	HORIZONTAL & VERTICAL CONTROL POINT
FFE #	FINISHED FLOOR ELEV & HOUSE #	3.22	

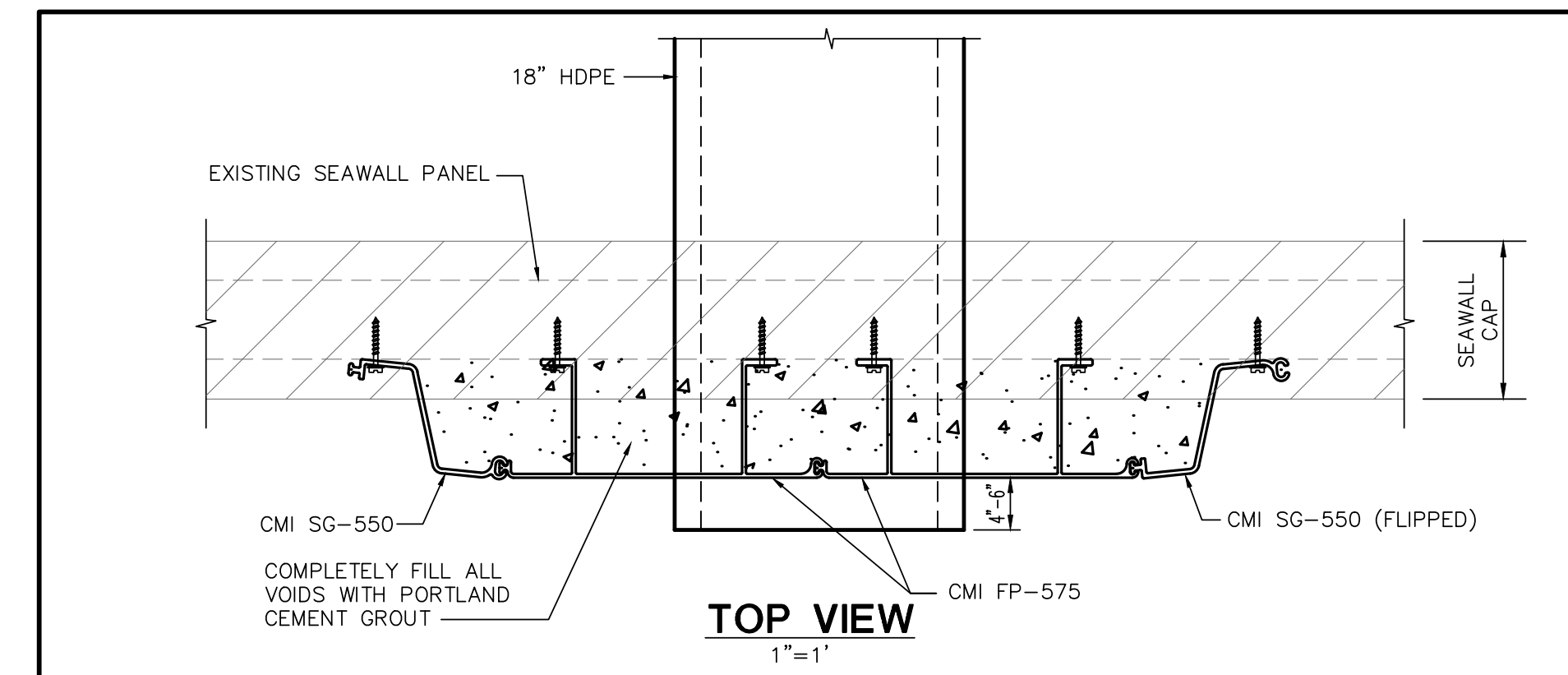
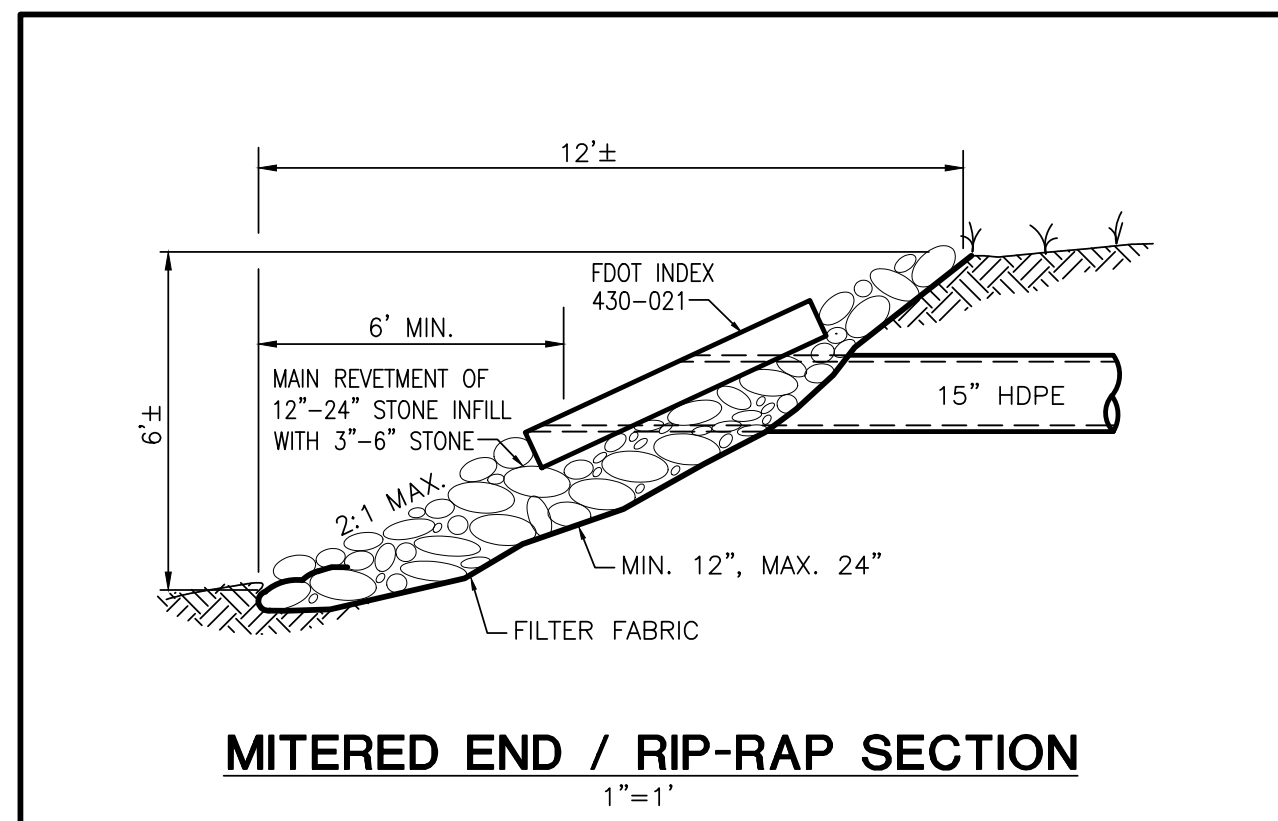
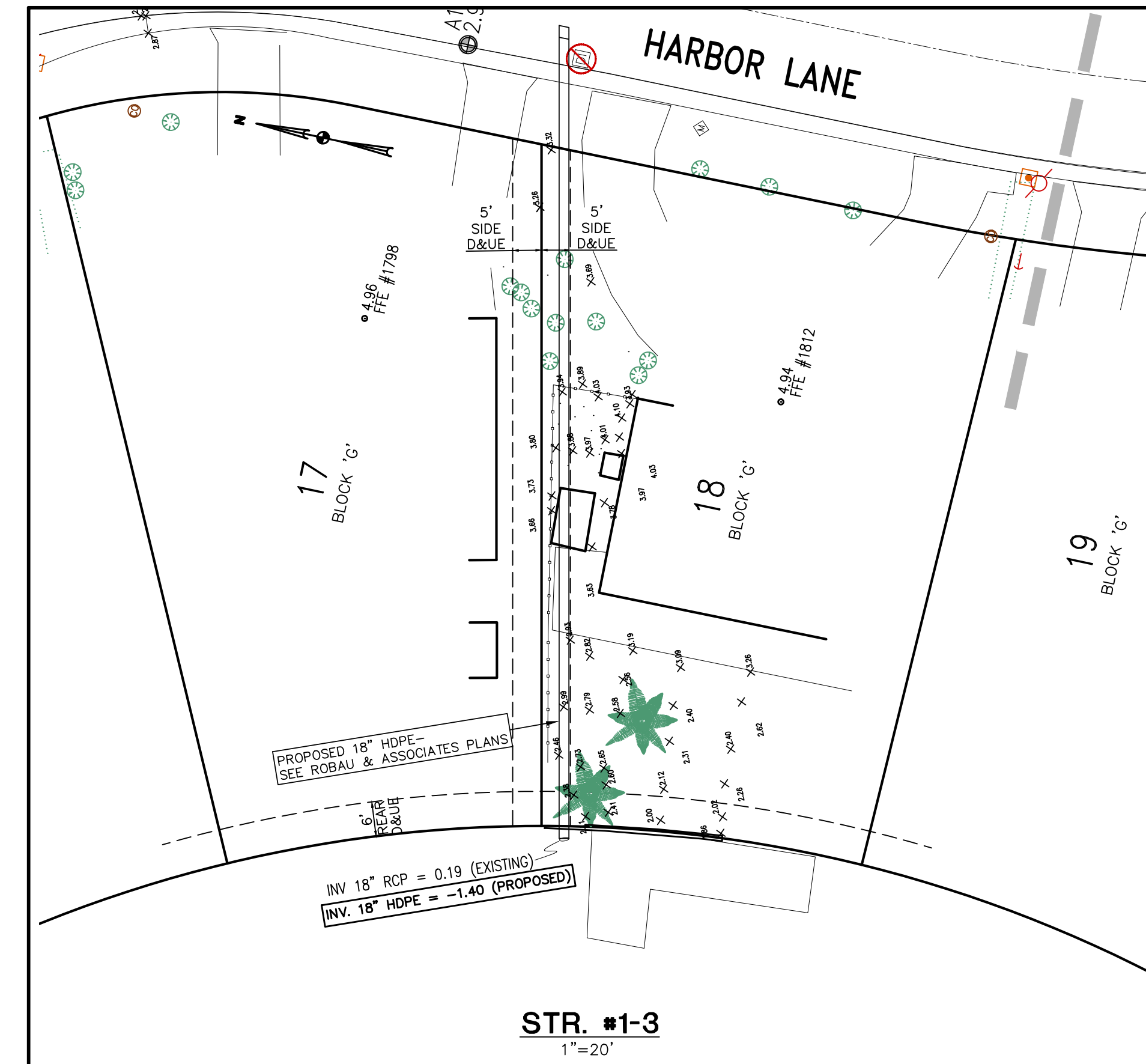


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N.T.S.

OUTFALL PLAN AND SECTION

AMERICAN ENGINEERING CONSULTANTS
OF MARCO ISLAND, INC.

CERTIFICATE OF AUTHORIZATION NUMBER: 26446
www.AEC-MI.com

573 BALD EAGLE DR. MARCO ISLAND, FL. (339) 394-1897

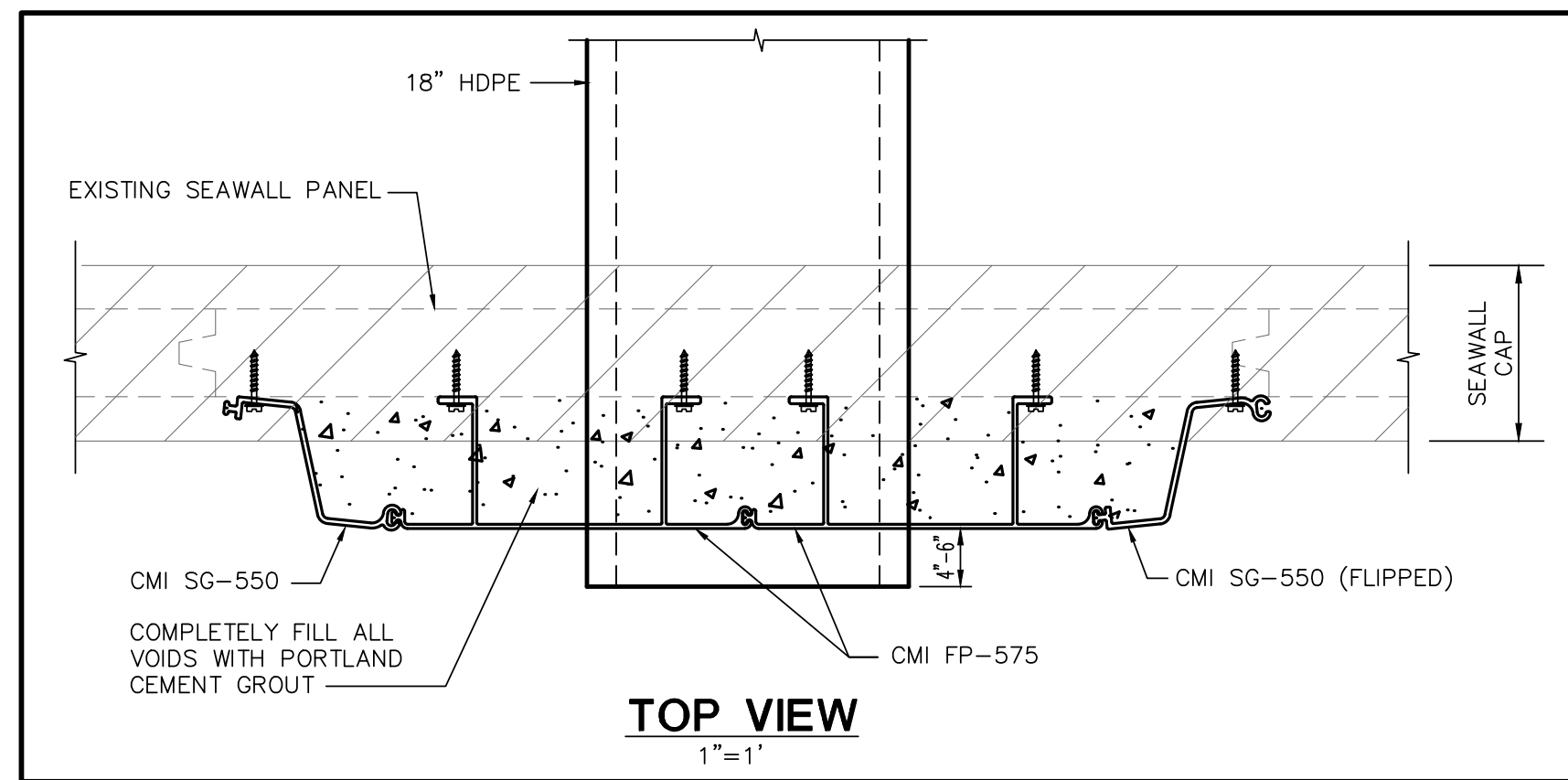
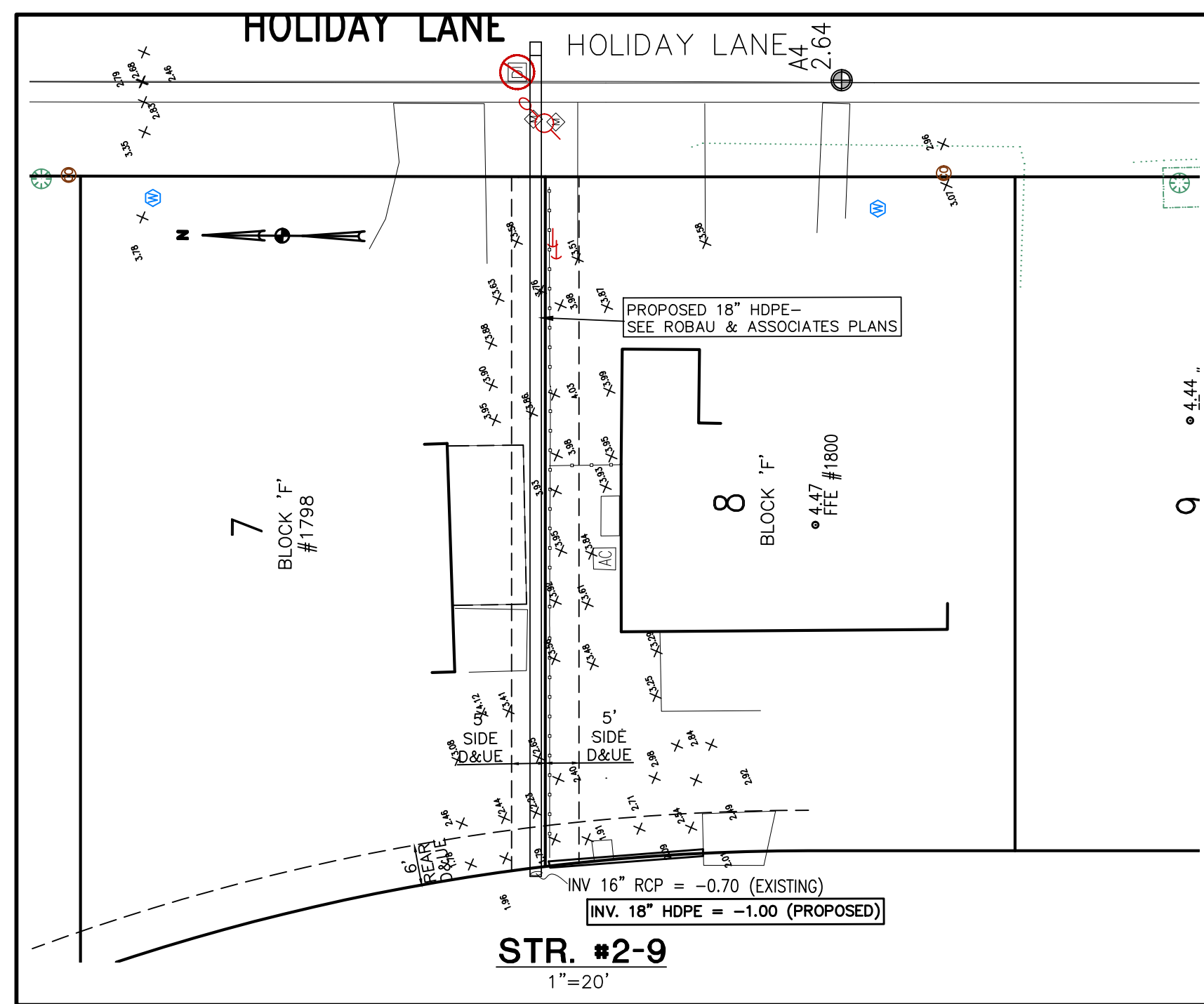
DRAWN BY: K. SCHMADTKE

DESIGNED BY: M. PINCKNEY

APPROVED BY: MARTIN D. PINCKNEY

HARBOR AND HOLIDAY LANES STORMWATER
MANAGEMENT IMPROVEMENTS

ROBAU AND ASSOCIATES LLC



FILTER FABRIC SPECIFICATIONS

Property	Test Method	English	Metric
Grab Tensile Strength	ASTM D-4632	370 x 250 lbs	1,647 x 1,113 N
Elongation @ Break	ASTM D-4632	15 %	15 %
Wide Width Tensile Strength	ASTM D-4595	2,700 x 2,300 lbs/ft	39.4 x 33.56 kN/m
CBR Puncture	ASTM D-6241	950 lbs	4,228 N
Trapezoidal Tear	ASTM D-4533	100 x 60 lbs	445 x 267 N
Apparent Opening Size	ASTM D-4751	70 US Sieve	0.21 mm
Permittivity	ASTM D-4491	0.28 Sec ⁻¹	0.28 Sec ⁻¹
Permeability	ASTM D-4491	0.01 cm/sec	0.01 cm/sec
Water Flow Rate	ASTM D-4491	18 g/min/ft ²	733.4 L/min/m ²
Percent Open Area	CW-02215	4 %	4 %
UV Resistance @ 500 Hours	ASTM D-4355	90 %	90 %

SPECIFICATIONS

PART 1 - GENERAL

1. REFERENCES

ASTM D4226, ASTM D4216, ASTM D638, ASTM D790 Vinyl building products.
 ASTM C476 for concrete grout.
 FDOT Section 145 and 985 for filter fabric.
 FDOT Section 530 for rip-rap revetment.

2. SUBMITTALS

- A. Shop drawings for sheet piling.
- B. Concrete grout for filling seawall voids.
- C. Concrete screws for attaching vinyl seawall sheet piles to concrete.
- D. Filter fabric for rip-rap.
- E. Stone for rip-rap.

PART 2 - PRODUCTS

2.1 DELIVERY, STORAGE, AND HANDLING

- A. The contractor shall store vinyl sheeting in an area designated by the Owner or the Engineer. In the absence of a specific location, material shall be stored in an area that will not impair the uses of the facility or harm the material. The contractor shall store the vinyl sheet piles to protect them from puncture, buildup of dirt on the surface, grease, mechanical abrasions, excessive heat or other damage. The contractor shall not drag the vinyl sheet piling on the ground.
- B. Materials delivered to the site shall be new and undamaged. Provide the manufacturer's label with the logo and product work order number or other identifying mark on each sheet pile bundle. Store and handle sheet piling in the manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks; as a minimum, support on level blocks or racks spaced not more than 6 feet apart and not more than 2 feet from the ends. Store materials in the original packaging with dunnage between bundles and on level ground until the product is to be used. Do not stack bundles more than 3 high at the job site. Storage of sheet piling should also facilitate required inspection activities and prevent damage to the product. Handle sheet piling using a minimum of two pickup points. Center the lifting equipment in the middle of bundles when unloading. Contact the manufacturer for specific handling instructions when the product exceeds 30 ft. in length.
- C. The Contractor will deliver materials to the jobsite only after the Engineer accepts the required submittals in writing.
- D. The Contractor shall supply a suitable number of vinyl sheet piles of the required lengths to the project site such that if a sheet is damaged or otherwise rejected, a backup sheet will be available. Damaged material shall be repaired or rejected at the discretion of the Engineer.

2.2 MATERIALS

- A. All sheet piling shall be manufactured from a rigid, high impact, UV inhibited, and weather resistant durable vinyl compound. Sheet piling shall be full-length sections of the dimensions shown. Provide fabricated sections conforming to the requirement and the piling manufacturer's recommendations for fabricated sections. At a minimum the following sheet piling properties shall be met.

Sheet Pile Profile	Allowable Moment (ft-lbs/ft.)	Section Modulus (in ³ /ft.)	Moment of Inertia (in ⁴ /ft.)	Thickness (in.)	Depth (in.)	Coverage (in.)
SG-550	4,933	18.5	74	0.35	8	12
FP-575	8,320	31.2	91	0.29/0.475	9	24

Color of sheet pile shall be grey or clay. Final color selection will be by the engineer based on color samples submitted.

- B. The interlocks of sheet piling shall be free-sliding, provide a swing angle suitable for the intended installation but not less than 5 degrees when interlocked, and maintain continuous interlocking when installed.
- C. All exposed surfaces of the sheet piling shall be UV resistant and comprised of virgin material.
- D. RIPRAP: The CONTRACTOR shall furnish stone for riprap that is sound, durable and angular in shape. No more than 10% of the stone for any gradation shall have an elongation (ratio of greatest dimension to least dimension) greater than 3:1, and no stone shall have an elongation greater than 4:1. The riprap material shall be provided by a Florida Department of Transportation (FDOT) certified pit. Stone for riprap shall have the following properties: 1. Bulk specific gravity (saturated surface-dry basis) not less than 2.38 when tested by ASTM C127 for gradations A, B, and C, and D. 2. The minimum apparent specific gravity of the stones shall be 2.5 as determined by AASHTO T 85. Stone size: 12"-24" with 3"-6" infill.

PART 3 - EXECUTION

3.1 DRIVING EQUIPMENT

- A. Submit complete descriptions of sheet piling driving equipment including hammers, protection caps and other installation appurtenances, prior to commencement of work. Provide pile driving equipment conforming to the following requirements.
- B. Driving Hammer: Hammers shall be single-acting; gravity drop or vibratory type. The weight of the hammers shall be determined jointly by the manufacturer and the contractor for the piling products and subsurface materials to be encountered.
- C. Jetting Equipment: Jetting may be used if necessary. See 3.2 F below.
- D. Hammer Cushions and Driving Caps: Between hammer and top of pile, provide hammer cushion and steel driving cap as recommended by hammer manufacturer and as required to drive pile without damage.

3.2 PLACING AND DRIVING PILES

- A. Piling properly placed and driven shall be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall.
- B. Pilings shall be carefully located as shown or directed. Pilings shall be placed plumb with out-of-plumbness not exceeding 1/8-inch per 4-feet of length and true to line. Place the pile so the back will be in contact with the existing sheet piles after driving. Top of pile at elevation of cut-off shall be within 1/2-inch horizontally and 2-inches vertically of the location indicated. Manipulation of piles to force them into position will not be permitted.
- C. Drive pilings with the proper size hammer and by approved methods so as not to subject the pilings to damage and to ensure proper interlocking throughout their lengths

- D. Maintain driving hammers in proper alignment during driving operations by use of leads or guides attached to the hammer. Caution shall be taken in the sustained use of vibratory hammers when a hard driving condition is encountered to avoid interlock-melt or damages. Discontinue the use of vibratory hammers and impact hammers employed when the penetration rate due to vibratory loading is 6" or less per minute.
- E. Employ a protecting cap in driving when using impact hammers to prevent damage to the tops of pilings. Remove and replace pilings damaged during driving or driven out of interlock at the Contractor's expense.
- F. To protect the berm, drive pilings without the aid of a water jet unless absolutely necessary. Perform authorized jetting sparingly.
- G. Take adequate precautions to ensure that pilings are driven plumb. Where possible, drive piling with the male lock leading. If an open socket is leading, a bolt or similar object placed in the bottom of the interlock will minimize packing material into it and ease driving for the next sheet.
- H. Pilings in each run or continuous length of piling wall shall generally be driven to their final depth before continuing. If the piling next to the one being driven tends to follow below final elevation, it may be pinned to the next adjacent piling.
- I. If obstructions restrict driving a piling to the specified penetration, the obstructions shall be removed or penetrated. If the Contractor demonstrates that removal or penetration is impractical, make changes in the design alignment of the piling structure as directed to ensure the adequacy and stability of the structure. Pilings shall be driven to depths shown and shall extend up to the elevation indicated for the top of pilings.

3.3 CUTTING-OFF

- A. Pilings driven to refusal or to the point where additional penetration cannot be attained and are extending above the required top elevation in excess of the specified tolerance shall be cut off to the required elevation. Pilings should not be driven below the required top elevation.
- B. Cut hole in pilings for bolts, rods, drains or utilities in a neat and workmanlike manner, as shown or as directed. Bolt holes in vinyl piling shall be drilled by approved methods which will not damage the pile. Holes other than bolt holes shall be reasonably smooth and the proper size for rods and other items to be inserted.

3.4 INSPECTION OF DRIVEN PILING

Perform continuous inspection during pile driving. Inspect all piles for compliance with tolerance requirements. Bring any unusual problems which may occur to the attention of the Engineer. Inspect the interlocked joints of driven pilings extending above ground. Pilings found to be out of interlock shall be removed and replaced at the Contractor's expense.

3.5 PULLING AND RE-DRIVING

In general, pulling of vinyl sheet piles is discouraged. Submit the proposed method of pulling sheet piling, prior to pulling any piling. Pull, as directed, selected pilings after driving to determine the condition of the underground portions of pilings. Any piling so pulled and found to be damaged, to the extent that its usefulness in the structure is impaired, shall be removed and replaced at the Contractor's expense. Pilings pulled and found to be in satisfactory condition shall be re-driven when directed.

3.6 PILE DRIVING RECORDS

Maintain accurate driving records for each pile, compiled and attested to by a qualified professional engineer. Include the following data:

- a. Project name, number and date of driving.
- b. Name of Contractor
- c. Pile type.
- d. Pile lengths.
- e. Final tip and cutoff elevations of piles
- f. Records of re-driving
- g. Type, make, model, and rated energy of hammer.
- h. Weight and stroke of hammer
- i. Type of pile-driving cap used
- j. Cushion material and thickness
- k. Actual stroke and blow rate of hammer
- l. Pile deviations from location and plumb.
- m. Jetting or special procedures used.
- n. Unusual occurrences during pile driving.

3.7 FIELD QUALITY CONTROL

- A. Special Inspections: Contractor will provide completed pile driving logs to Engineer and Owner. Pile logs shall be prepared by the contractor's designated Quality Control personnel.

3.8 DISPOSAL

- A. Remove withdrawn and damaged piles and cutoff sections of piles from site and legally dispose of them off Owner's property.

3.9 FILTER FABRIC:

- A. Filter fabric shall be woven type meeting FILTER FABRIC SPECIFICATIONS chart.
- B. Overlap adjacent strips of fabric a minimum of twelve (12) inches, and anchor them with securing pins inserted through both strips of fabric along a line through the midpoint of overlap and to the extent necessary to prevent displacement of the fabric. Securing pins shall be as per the MANUFACTURER's recommendations. The CONTRACTOR may opt for a six (6) inch stitched overlap.
- C. Place the fabric so that the upstream strip of fabric overlaps the downstream strip.
- D. The fabric shall be placed on the entire slope, continuous from top to bottom, without any joints or splices.
- E. Do not drop bedding stone or riprap from heights greater than three (3) feet onto the fabric.

- 3.10 RIPRAP: The CONTRACTOR shall proceed placing the riprap upon completion of filter fabric and bedding material (where required). The CONTRACTOR shall place riprap in accordance with the following:

- A. Stone shall be placed in such a manner as to produce a reasonably well-graded mass with the minimum practicable percentage of voids.
 - 1. Place to full course thickness in one operation in a manner to avoid displacing or puncturing filter fabric.
 - 2. Stone shall not be dropped from a height greater than three (3) feet above the fabric.
- a. Finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones. Hand place or adjust if necessary to secure the desired results

OUTFALL PLAN AND SPECIFICATIONS

AMERICAN ENGINEERING CONSULTANTS OF MARCO ISLAND, INC.
 CERTIFICATE OF AUTHORIZATION NUMBER: 26446
 MARCO ISLAND, FL. (239) 384-1697
 www.AEC-MI.com

DRAWN BY: K. SCHMADTKE
 DESIGNED BY: M. PINCKNEY
 APPROVED BY: MARTIN D. PINCKNEY
 SCALE: AS NOTED
 DATE: NOVEMBER 2021
 JOB NO.: 10983-001-01
 REF.: SEAWALL

HARBOR AND HOLIDAY LANES STORMWATER MANAGEMENT IMPROVEMENTS
 ROBBAU AND ASSOCIATES LLC

SHEET C-4 OF 4

REV. PER LATEST COUNTY COMMENTS: 03/10/22 K.A.S.
 REVISIONS: DATE: INIT: