COMPUTATION FOR SEDIMENT TRAP #1

DRAINAGE AREA = 0.59 AC
DISTURBED AREA = 0.59 AC
REQUIRED BASIN VOLUME:
Vr= 134 CY/AC X DRAINAGE AREA = 79.06 CY = 2,135 CF
Vp= 7,699 CF (PROVIDED)
STORAGE VS. ELEVATION

ELEVATION	DEPTH	W.S. AREA	AVG W.S	INC. VOL	TOTAL VOL
136.00		1284			
	1.00	(SF)	1430	1430	1430
137.00		1576			
	1.00		1736	1736	3166
138.00		1896			
	1.00		2079	2079	5245
139.00		2262			
	1.00		2454	2454	7699
140.00		2646			

PROVIDED STORAGE ELEVATION = 136.00
DEWATERING VOLUME = 67 CY/AC X DRAINAGE AREA = 1,067 CF
DEWATERING ORIFICE ELEVATION = 136.99
CLEANOUT VOLUME = 34 CY/AC X DRAINAGE AREA = 542 CF
CLEANOUT ELEVATION = 137.17

COMPUTATION FOR SEDIMENT TRAP #2

DRAINAGE AREA = 2.70 AC
DISTURBED AREA = 2.70 AC
REQUIRED BASIN VOLUME:
Vr= 134 CY/AC X DRAINAGE AREA = 361.80 CY = 9,769 CF
Vp= 14060 CF (PROVIDED)
STORAGE VS. ELEVATION

ELEVATION	DEPTH	W.S. AREA	AVG W.S	INC. VOL	TOTAL VOL
159.00		1877			
	1.00	(SF)	2146	2146	2146
160.00		2415			
	1.00		2712	2712	4858
161.00		3009			
	1.00		3335	3335	8193
162.00		3660			
	1.00		4014	4014	12206
163.00		4367			

PROVIDED STORAGE ELEVATION = 159.74
DEWATERING VOLUME = 67 CY/AC X DRAINAGE AREA = 4,884 CF
DEWATERING ORIFICE ELEVATION = 161.01
CLEANOUT VOLUME = 34 CY/AC X DRAINAGE AREA = 2,479 CF
CLEANOUT ELEVATION = 160.51

COMPUTATION FOR SEDIMENT TRAP #3

DRAINAGE AREA = 1.80 AC
DISTURBED AREA = 1.80 AC
REQUIRED BASIN VOLUME:
Vr= 134 CY/AC X DRAINAGE AREA = 241.20 CY = 6,512
Vp= 6,715 CF (PROVIDED)
STORAGE VS. ELEVATION

ELEVATION	DEPTH	W.S. AREA	AVG W.S	INC. VOL	TOTAL VOL
159.00		834			
	1.00	(SF)	1040	1040	1040
160.00		1246			
	1.00		1499	1499	2539
161.00		1751			
	1.00		1806	1806	4345
162.00		1861			
	1.00		2371	2371	6715
163.00		2880			

PROVIDED STORAGE ELEVATION = 159.00
DEWATERING VOLUME = 67 CY/AC X DRAINAGE AREA = 3,256 CF
DEWATERING ORIFICE ELEVATION = 161.40
CLEANOUT VOLUME = 34 CY/AC X DRAINAGE AREA = 1,652 CF
CLEANOUT ELEVATION = 160.65

COMPUTATION FOR SEDIMENT TRAP #4

DRAINAGE AREA = 0.89 AC
DISTURBED AREA = 0.89 AC
REQUIRED BASIN VOLUME:
Vr= 134 CY/AC X DRAINAGE AREA = 119.26 CY = 3,220
Vp= 9,560 CF (PROVIDED)
STORAGE VS. ELEVATION

ELEVATION	DEPTH	W.S. AREA	AVG W.S	INC. VOL	TOTAL VOL
181.00		561			
	1.00	(SF)	840	840	840
182.00		1118			
	1.00		1346	1346	2186
183.00		1574			
	1.00		1827	1827	4013
184.00		2080			
			1040	0	4013

PROVIDED STORAGE ELEVATION = 186.25
DEWATERING VOLUME = 67 CY/AC X DRAINAGE AREA = 1,610 CF
DEWATERING ORIFICE ELEVATION = 182.69
CLEANOUT VOLUME = 34 CY/AC X DRAINAGE AREA = 817 CF
CLEANOUT ELEVATION = 182.37

COMPUTATION FOR SEDIMENT TRAP #5

DRAINAGE AREA = 0.99 AC
DISTURBED AREA = 0.99 AC
REQUIRED BASIN VOLUME:
Vr= 134 CY/AC X DRAINAGE AREA = 132.66 CY = 3,582 CF
Vp= 6,563 CF (PROVIDED)
STORAGE VS. ELEVATION

ELEVATION	DEPTH	W.S. AREA	AVG W.S	INC. VOL	TOTAL VOL
154.00		789			
	1.00	(SF)	1101	1101	1101
155.00		1413			
	1.00		1693	1693	2794
156.00		1973			
	1.00		2334	2334	5128
157.00		2694			
	0.50		2871	1436	6563
157.50		3048			

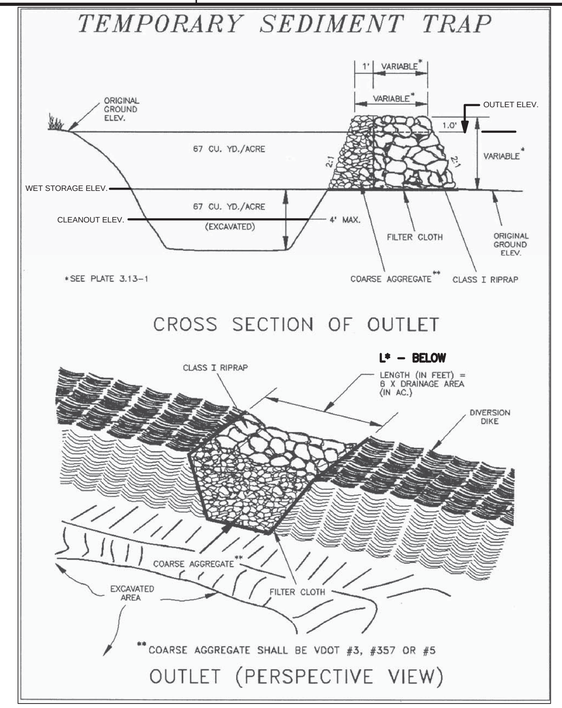
PROVIDED STORAGE ELEVATION = 154.00
DEWATERING VOLUME = 67 CY/AC X DRAINAGE AREA = 1,791 CF
DEWATERING ORIFICE ELEVATION = 155.57
CLEANOUT VOLUME = 34 CY/AC X DRAINAGE AREA = 909 CF
CLEANOUT ELEVATION = 155.33

COMPUTATION FOR SEDIMENT TRAP #6

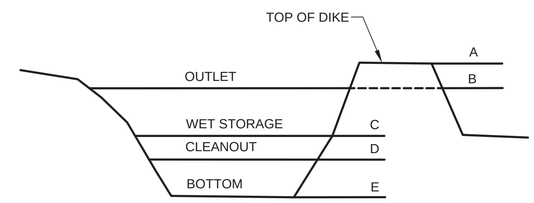
DRAINAGE AREA = 0.92 AC
DISTURBED AREA = 0.92 AC
REQUIRED BASIN VOLUME:
Vr= 134 CY/AC X DRAINAGE AREA = 123.28 CY = 3,329 CF
Vp= 3,446 CF (PROVIDED)
STORAGE VS. ELEVATION

ELEVATION	DEPTH	W.S. AREA	AVG W.S	INC. VOL	TOTAL VOL
187.00		204			
	1.00	(SF)	330	330	330
188.00		455			
	1.00		646	646	975
189.00		836			
	1.00		1035	1035	2010
190.00		1233			
	1.00		1436	1436	3446
191.00		1639			

PROVIDED STORAGE ELEVATION = 187.00
DEWATERING VOLUME = 67 CY/AC X DRAINAGE AREA = 1,664 CF
DEWATERING ORIFICE ELEVATION = 189.67
CLEANOUT VOLUME = 34 CY/AC X DRAINAGE AREA = 845 CF
CLEANOUT ELEVATION = 188.87



SEDIMENT TRAP
SOURCE: VESCS
CG505 C4



SEDIMENT TRAP ELEVATIONS

SEDIMENT TRAP DESIGN ELEVATIONS

TRAP #	A	B	C	D	E	TOP DAM WIDTH
1	140.5	139.5	136.99	137.17	136.0	4.5'
2	164.0	163.0	161.01	160.51	159.0	4.5'
3	150.0	149.0	161.40	160.65	159.0	4.5'
4	185.3	184.3	182.69	182.37	181.0	4.5'
5	158.5	157.5	155.57	155.33	154.0	4.5'
6	192.3	191.3	189.67	188.87	187.0	4.5'

SEDIMENT TRAP COMPUTATION SUMMARY

TRAP #	DA (ac) (DRAIN)	RISER PROVIDED	OUTLET PIPE (ø)	L*	WET STORAGE REQUIRED (yd.)^3	DRY STORAGE REQUIRED (yd.)^3	TOTAL STORAGE REQ'D. (yd.)^3	WET STORAGE PROVIDED (yd.)^3	DRY STORAGE PROVIDED (yd.)^3	TOTAL STORAGE PROV. (yd.)^3
1	0.59	NO	N/A	9	39.5	39.5	79	139.5	245	285.5
2	2.70	NO	N/A	23	181	181	362	181	271	452
3	1.80	NO	N/A	7	120	120	240	120	128	248
4	0.89	NO	N/A	11	59.5	59.5	119	59.5	89.5	149
5	0.99	NO	N/A	6	66.5	66.5	133	66.5	176	243
6	0.92	NO	N/A	6	61.5	61.5	123	61.5	66	127.5

SYM	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
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APPROVED
FOR COMMANDER NAVFAC 18 Sep 2015
ACTIVITY
SATISFACTORY TO DATE Signed by end 18 May 2015
DES HR DRW HR CHK RC
<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA
P-635 ASP EXPANSION
SEDIMENT TRAP DETAILS AND COMPUTATIONS

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
13072282
SHEET 66 OF 201
CG-505
DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\ghna\crowlerc\d0751223\NAVFAC_P635CG-505.dwg LAYOUT NAME: CG-505 PLOTTED: Wednesday, June 10, 2015 - 4:33pm USER: crowlerc

Temporary Sediment Basin Design Data Sheet

Project: P-635 Ammunition Supply Point
Basin No. 1

Drainage Area	4.10	acres
Total Storage required	549	cubic yards

Wet Storage

Minimum required volume	275	yd^3	67 cu. yds x DA (acres)
Wet Storage Provided	335	yd^3	
Elevation for Wet Storage	143.8		
Available volume before cleanout	135	yd^3	33 cu. yds x DA (acres)
Elevation of cleanout	142.8		
Distance from invert to cleanout	1.00	ft	Minimum 1 foot

Dry Storage

Minimum required volume	275	yd^3	67 cu. yds x DA (acres)
Dry Storage Provided	275	yd^3	
Elevation for Dry Storage (Top of Riser)	144.9		
Total Available basin volume at crest of riser	610	yd^3	Dry + Wet Storage
Diameter of dewatering orifice	4.00	in.	
Diameter of flexible tubing	6.00	in.	

STORAGE VS. ELEVATION

ELEVATION	AREA (SF)	AVG AREA	INC. VOL	TOTAL VOL (ft^3)	TOTAL VOL (yd^3)
142.00	4228				
		4672	4672	4672	173
143.00	5116				
		5596	5596	10268	380
144.00	6076				
		6593	6593	16861	624
145.00	7110				
		7357	7357	24218	897
146.00	7604				

Preliminary Design Elevations

Crest of Riser	144.9	ft
Top of Dam	148.0	ft
Design High Water	145.6	ft
Upstream Toe of Dam	142.0	ft

Basin Shape

L/We	2.64	Length of Flow / Effective Width
Baffles required?	NO	

Runoff

Q2	10.05	cfs
Q25	25.45	cfs

Principle Spillway Design

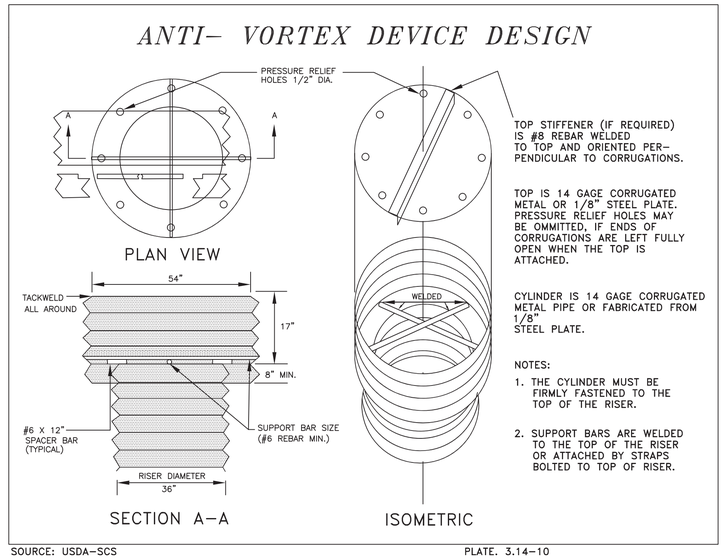
Emergency Spillway?	NO		
Qp	25.45	cfs	
Assumed available head (h)	0.7	ft	h = Design High Water Elevation - Crest of Riser
Riser Diameter (Dr)	30	in.	
Actual head (h)	1.2		From Plate 3.14-8 of the VDOT Drainage Manual
Barrel Length	55	ft	
Barrel Diameter	27	in.	From Plate 3.14-B of the VDOT Drainage Manual
Trash Rack Diameter	42	in.	From Table 3.14-D of the VDOT Drainage Manual
Trash Rack Height	15	in.	From Table 3.14-D of the VDOT Drainage Manual

Anti-Seep Collar Design

Depth of water at principal spillway crest (Y)	2.9	ft	
Slope of upstream face of embankment (Z)	3	:1	
Slope of principal spillway barral (Sb)	8.00	%	
Length of barrel in saturated zone (Ls)	25	ft	
Number of collars required	3		From Plate 3.14-12 of the VDOT Drainage Manual
Collar dimensions	5.9' x 5.9'		From Plate 3.14-12 of the VDOT Drainage Manual

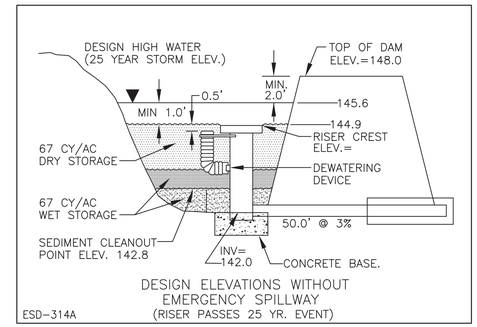
Final Design Elevations

Top of Dam	148.0	ft
Design High Water	145.6	ft
Principal Spillway Crest	144.9	ft
Dewatering Orifice Invert	143.8	ft
Cleanout Elevation	142.8	ft
Elevation of Upstream Toe of Dam	142.0	ft



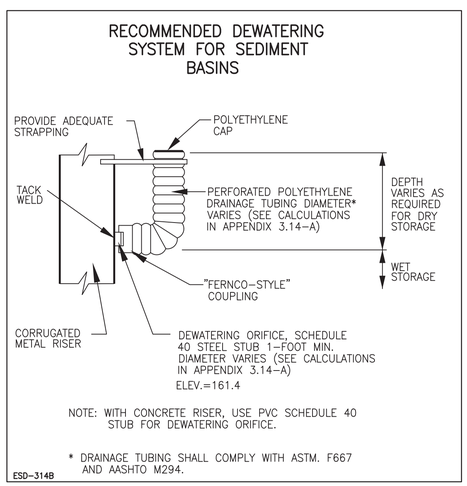
SOURCE: USDA–SCS PLATE. 3.14–10

ANTI VORTEX DEVICE
(NOT TO SCALE) C–508 C3

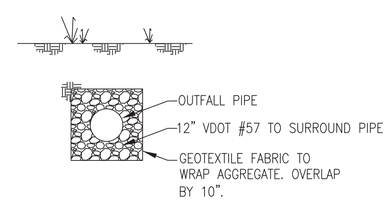


REFER TO DETAILS A3, A4 & C3 THIS SHEET.

TEMPORARY SEDIMENT BASIN
(NOT TO SCALE) C–508 C4



DEWATERING DEVICE FOR TEMPORARY SEDIMENT BASIN
(NOT TO SCALE) C–508 A3



NOTE:
1. THE LAST ⅓ (13') OF THE OUTFALL PIPE LENGTH CLOSER TO ITS DISCHARGE SHALL BE ENCASED IN A 12–INCH THICK LAYER OF VDOT #57 STONE WRAPPED IN GEOTEXTILE FABRIC MEETING VDOT SPECIFICATION 245 (MIRAFI 140N). NO ANTI SEEP COLLARS ARE TO BE INSTALLED ON THE OUTFALL PIPES SERVICING THE SEDIMENT BASINS.

OUTFALL PIPE GRAVEL ENCASEMENT
(NOT TO SCALE) C–508 A4

SYM	DESCRIPTION	DATE	APPR

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COMMONWEALTH OF VIRGINIA 06/10/2015 BRADFORD D. WEINERT No. 022244 PROFESSIONAL ENGINEER

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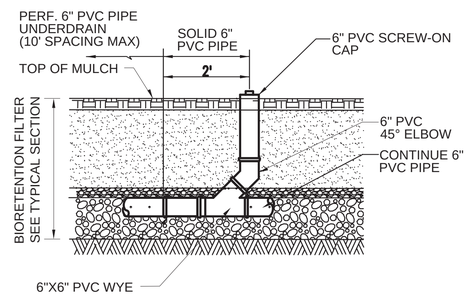
APPROVED
FOR COMMANDER NAVFAC 18 Sep 2015
ACTIVITY
SATISFACTORY TO DATE Signed by email 18 May 2015
DES HR DRW HR CHK RC
<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA
P-635 ASP EXPANSION
SEDIMENT BASIN DETAILS AND COMPUTATIONS

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072283
SHEET 67 OF 201
CG-506
DRAWFORM REVISION: 10 MARCH 2009

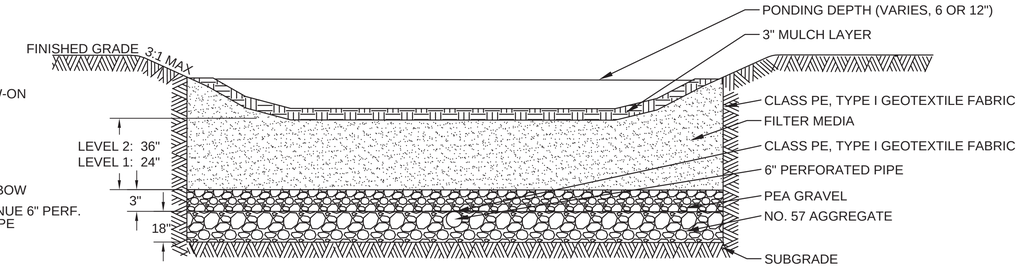
FILE NAME: C:\pwworking\ghoa\crowlero\d0751223\NAVFAC_P635CG-506.dwg LAYOUT NAME: CG-506 PLOTTED: Wednesday, June 10, 2015 - 4:34pm USER: crowlero



NOTE: CLEANOUTS SHALL USE BLACK PVC PIPE

PVC CLEAN OUT DETAIL

(NOT TO SCALE) CG-507 D3

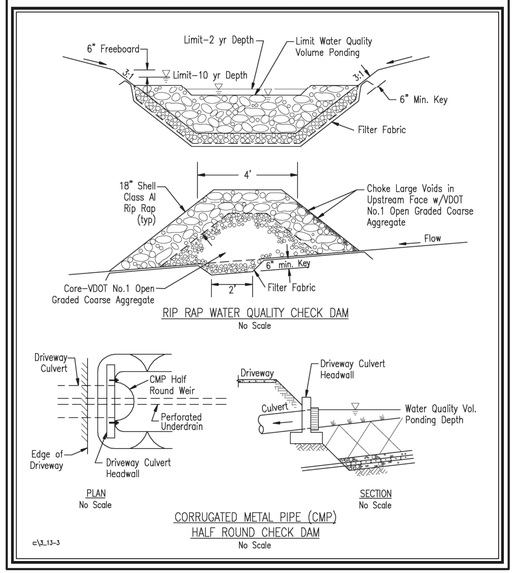


NOTE:
1. SEE SITE GRADING PLANS FOR LAYOUT OF STORMWATER MANAGEMENT SYSTEMS.
2. MAX. DRAINAGE AREA TO FACILITY = 5.0 AC.
3. SEE CG-508 FOR BIORETENTION FILTER PLANT LIST

BIORETENTION FILTER - TYPICAL SECTION

(NOT TO SCALE) CG-507 D4

FIGURE 3.13 - 3
Typical Check Dam Configurations



CHECK DAM MIN. STD. 3.13

(NOT TO SCALE) CG-507 B3

BIORETENTION SYSTEM DESIGN SCHEDULE

BIORETENTION FILTER	WATER QUALITY VOLUME (CF)	MIN. REQUIRED FILTER BED AREA (SF)	PROVIDED FILTER BED AREA (SF)	PONDING DEPTH (FT)	SURFACE ELEVATION
BF1 (LEVEL 2)	312	162	551	1	185
BF2 (LEVEL 2)	3721	2163	3805	1	179
BF3 (LEVEL 1)	2880	1516	4862	1	170
BF4 (LEVEL 1)	786	282	745	1	161
BF5 (LEVEL 2)	1256	952	4884	0.5	162
BF6 (LEVEL 2)	48	86	96	0.5	186.3
BF7 (LEVEL 2)	197	376	394	0.5	186
BF8 (LEVEL 2)	808	612	937	0.5	170
BF9 (LEVEL 2)	830	629	939	0.5	170
BF10 (LEVEL 2)	155	61	310	0.5	187.1
BF11 (LEVEL 2)	98	46	196	0.5	186.6
BF12 (LEVEL 2)	2185	1655	4195	0.5	142
BF13 (LEVEL 2)	1097	831	876	0.5	176
BF14 (LEVEL 2)	968	733	743	0.5	230

FILTER FABRIC TABLE	
GRAB TENSILE STRENGTH (ASTM D4632)	≥ 120 LBS
MULLEN BURST STRENGTH (ASTM D3786)	≥ 225 LBS/SQ. IN.
UV RESISTANCE (ASTM D4355)	70% STRENGTH AFTER 500 HOURS
FLOW RATE (ASTM D4491)	≥ 125 GAL/MIN/SQ FT
APPARENT OPENING SIZE (AOS) (ASTM D4751)	US #70 OR #80 SIEVE

MATERIAL SPECIFICATIONS FOR BIORETENTION SYSTEM

MATERIAL	SPECIFICATION	SIZE	NOTES
FILTER MEDIA	SAND 85 - 88% SOIL FINES 8 - 12% LEAF COMPOST 3 - 5%	N/A	THE VOLUME OF FILTER MEDIA IS BASED ON 110% OF THE PLAN VOLUME, TO ACCOUNT FOR SETTLING OR COMPACTION. THE BIORETENTION SOIL MIXTURE IS GENERALLY CLASSIFIED AS A LOAMY SAND ON THE USDA TEXTURE TRIANGLE. PLACE IN 12" LIFTS; LIGHTLY TAMP, DO NOT OVER COMPACT.
MULCH	SHREDDED HARDWOOD	N/A	AGED 6 MONTHS, MINIMUM; NO PINE OR WOOD CHIPS
GEOTEXTILE	SEE FILTER FABRIC TABLE	N/A	APPLY ONLY TO THE SIDES AND ABOVE THE UNDERDRAIN (IF APPLICABLE).
UNDERDRAIN GRAVEL	AASHTO M-43	NO. 57 AGGREGATE	
UNDERDRAIN PIPING	F 758, TYPE PS 28 OR AASHTO M-278	6" RIGID SCHEDULE 40 PVC OR SDR 35	3/8" PERF. @ 6" ON CENTER, 4 HOLES PER ROW,; MINIMUM OF 3" OF GRAVEL OVER PIPES. PIPE SHALL BE WRAPPED WITH 1/4 INCH GALVANIZED HARDWARE CLOTH
SAND	ASTM C-33	0.02" TO 0.04"	SAND SUBSTITUTIONS SUCH AS DIABASE AND GRAYSTONE (AASHTO) #10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATED OR DOLOMITIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND

SYM.	DESCRIPTION	DATE	APPR.

NAVFAC

COMMONWEALTH OF VIRGINIA 06/10/2015 BRADFORD D. WEINERT No. 022244 PROFESSIONAL ENGINEER

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APPROVED
FOR COMMANDER NAVFAC 15 May 2015

ACTIVITY
SATISFACTORY TO DATE 15 May 2015

DES XXX DRW XXX CHK XXX
<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
NAVAL FACILITIES ENGINEERING COMMAND
QUANTICO, VA

P-635 ASP EXPANSION

STORMWATER MANAGEMENT DETAILS

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072284
SHEET 68 OF 201

CG-507

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\ghnd\crowlerc\d0751223\NAVFAC_P635CG-507.dwg LAYOUT NAME: CG-507 PLOTTED: Wednesday, June 10, 2015 - 4:34pm USER: crowlerc

6.5. Compost Specifications

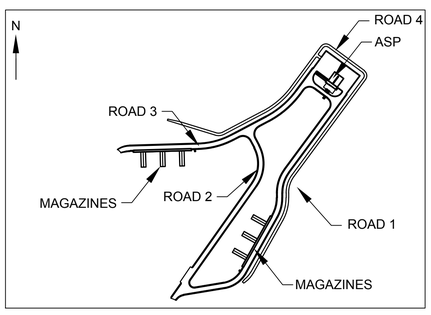
- Compost shall be derived from plant material and meet the general criteria set forth by the U.S. Composting Seal of Testing Assurance (STA) program. See www.compostingcouncil.org for a list of local providers.
- The compost shall be the result of the biological degradation and transformation of plant-derived materials under conditions that promote anaerobic decomposition. The material shall be well composted, free of viable weed seeds, and stable with regard to oxygen consumption and carbon dioxide generation. The compost shall have a moisture content that has no visible free water or dust produced when handling the material. It shall meet the following criteria, as reported by the U.S. Composting Council STA Compost Technical Data Sheet provided by the vendor:
  a. 100% of the material must pass through a half inch screen
  b. The pH of the material shall be between 5.5 and 8.5.
  c. Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0% by weight
  d. The organic matter content shall be >35%
  e. Soluble salt content shall be less than 6.0 mmhos/cm
  f. Must be mature and stable per the appropriate test(s) as specified by STA
  g. Carbon/nitrogen ratio shall be less than 25:1
  h. Must meet USEPA part 503 levels for heavy metals

The compost should have an optimum dry bulk density ranging from 40 to 50 lbs/ft^3. However, certain fully mature coarse textured composts may be lower

PLANT LIST - SEE CG-508 FOR BIORETENTION FILTER SYSTEM DETAILS AND SCHEDULE

SYMBOL	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	NOTES
TREES						
QP	7	Quercus phellos	Willow Oak	2.5" CAL., 8' HT.	AS SHOWN	B & B
BN	8	Betula nigra 'Heritage'	Heritage River Birch	MULTI-STEM, 8' HT.	AS SHOWN	B & B
TD	8	Taxodium distichum	Bald Cypress	2.5" CAL., 8' HT.	AS SHOWN	B & B
SHRUBS						
VD	71	Viburnum dentatum	Viburnum	30" HT.	5' O.C.	
CA	71	Clethra alnifolia	Summersweet	30" HT.	5' O.C.	
IW	69	Ilex verticillata 'Winter Red'	Winter Red Winterberry	30" HT.	4' O.C.	PROVIDE 1 MALE/GROUP MIN
IV	67	Itea virginica 'Henry's Garnet'	Virginia Sweetspire	24" HT.	3' O.C.	

BIORETENTION SEED MIX SHALL BE ERNST SEED COMPANY "ERNMX-180 RAIN GARDEN MIX" OR APPROVED EQUAL.
RATE: SEW @ ½ LB PER 1,000 SF
LOCATION: FROM BOTTOM OF FACILITY TO AN ELEVATION 18" ABOVE THE BOTTOM



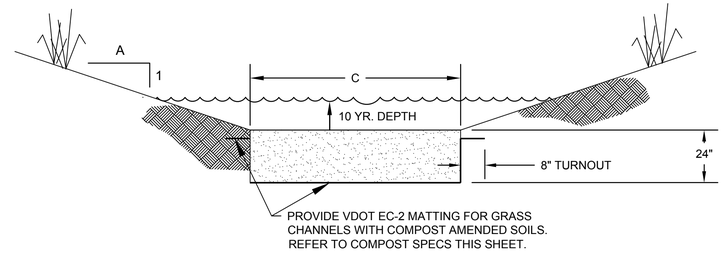
SITE PLAN
SCALE: 1" = 5000
CG-508 A2

Cover Type	Slope (%)	Erosion Resistant Soils (ft./sec.)	Easily Eroded Soils (ft./sec.)
Bermudagrass	0 – 5	6	4.5
Kentucky bluegrass Reed canarygrass Tall fescue	0 – 5	5	3.8
Bermudagrass	5 – 10	5	3.8
Kentucky bluegrass Reed canarygrass Tall fescue	5 – 10	4	3
Grass-legume mixture	0 – 5 5 - 10	4 3	3 2.3
Kentucky bluegrass Reed canarygrass Tall fescue	> 10	3	2.3
Red fescue	0 - 5	2.5	1.9

STORM SEWER PIPE DESIGN COMPUTATIONS AND SCHEDULE

FROM STR.	TO STR.	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)	AREA (SF)	AREA (AC)	C Value	10-yr Rainfall Intensity (in./hr)	Q INCR.	Q (CFS) ACCUM.	SLOPE (%)	PIPE SIZE (IN)	PIPE LENGTH (FT)	CAPACITY (CFS)	INVERT ELEV. INV. OUT UPSTREAM	INVERT ELEV. INV. IN DOWNSTREAM	RIM (FROM STR)	RIM (TO STR)	Q / CAPACITY (%)
							P-635											
DI 1	DI 1A	9379	21840	31219	0.717	0.53	6.41	2.44	2.44	1.00%	15	92	6.5	176.42	175.50	186.00	185.00	38%
DI 1A	ES 1	1618	23167	24785	0.569	0.39	6.41	1.42	3.86	1.00%	18	40	10.5	175.40	175.00	185.00	180.00	37%
DI 2	STMH 1	0	9636	9636	0.221	0.35	6.41	0.50	0.50	1.00%	15	14	6.5	182.35	182.21	191.00	186.75	8%
STMH 1	STMH 2	-	-	-	-	-	-	-	0.50	1.00%	15	107	6.5	182.11	181.04	186.75	186.25	8%
DI 3	STMH 2	0	8598	8598	0.197	0.35	6.41	0.44	0.44	1.00%	15	13	6.5	181.17	181.04	191.00	186.25	7%
STMH 2	STMH 3	-	-	-	-	-	-	-	0.94	7.00%	15	132	17.1	180.94	171.70	186.25	185.10	5%
HW 1	STMH 3A	18249	16825	35074	0.805	0.66	6.41	3.42	3.42	1.25%	15	8	7.2	180.90	180.80	180.90	184.10	47%
STMH 3A	ES 2 (DI 5)	-	-	-	-	-	-	-	3.42	1.25%	15	90	7.2	180.70	176.20	184.10	179.20	47%
DI 5	STMH 3	8581	68529	77110	1.770	0.42	6.41	4.73	8.15	1.00%	18	55	10.5	172.25	171.70	180.00	185.10	77%
STMH 3	ES 3	-	-	-	-	-	-	-	9.09	8.00%	18	170	29.8	171.60	158.00	185.10	158.00	30%
DI 6	DI 7	3230	43949	47179	1.083	0.39	6.41	2.72	2.72	1.00%	15	81	6.5	155.74	154.93	162.00	163.00	42%
DI 7	STMH 4	4280	34375	38655	0.887	0.42	6.41	2.37	5.08	1.00%	18	136	10.5	154.83	153.47	163.00	159.50	48%
STMH 4	ES 4	-	-	-	-	-	-	-	5.08	1.00%	18	37	10.5	153.37	153.00	159.50	153.00	48%
DI 8	DI 9	24532	39290	63822	1.465	0.58	6.41	5.45	5.45	0.50%	18	134	7.4	152.54	151.87	156.50	155.00	73%
DI 9	STMH 5	15728	3792	19520	0.448	0.83	6.41	2.39	7.85	0.50%	21	79	11.2	151.77	151.37	155.00	157.00	70%
DI 10	STMH 5	23566	56599	80165	1.840	0.53	6.41	6.21	6.21	0.35%	21	51	9.4	151.55	151.37	154.50	157.00	66%
STMH 5	ES 5 (DI 11)	-	-	-	-	-	-	-	14.06	0.40%	27	68	19.6	151.27	151.00	157.00	151.00	72%
DI 11	ES 6	0	15042	15042	0.345	0.35	6.41	0.77	14.83	8.00%	27	50	87.8	143.00	139.00	147.00	139.00	17%
DI 12	STMH 6	0	17874	17874	0.410	0.35	6.41	0.92	0.92	2.00%	15	22	9.2	179.39	178.95	193.00	185.80	10%
STMH 6	STMH 7	-	-	-	-	-	-	-	0.92	2.00%	15	108	9.2	178.85	176.69	185.80	185.10	10%
DI 13	STMH 7	0	27079	27079	0.622	0.35	6.41	1.39	1.39	2.00%	15	20	9.2	177.09	176.69	189.00	185.10	15%
STMH 7	DI 14	-	-	-	-	-	-	-	2.32	5.00%	15	195	14.5	176.59	166.84	185.10	177.00	16%
DI 14	STMH 8	24660	16478	41138	0.944	0.71	6.41	4.30	4.30	4.00%	15	131	13.0	166.74	161.50	177.00	171.80	33%
DI 15	DI 16	11800	204231	216031	4.959	0.38	6.41	12.17	12.17	1.50%	21	164	19.5	166.34	163.88	171.00	171.00	63%
DI 16	STMH 9	14730	33763	48493	1.113	0.53	6.41	3.80	15.97	1.50%	21	65	72.9	163.78	162.80	171.00	171.80	22%
DI 17	DI 18	1463	25464	26927	0.618	0.38	6.41	1.52	1.52	2.00%	15	78	9.2	165.26	163.70	171.00	168.00	17%
DI 18	STMH 9	10903	13624	24527	0.563	0.62	6.41	2.23	3.74	1.00%	15	80	6.5	163.60	162.80	168.00	171.80	58%
STMH 9	STMH 8	-	-	-	-	-	-	-	19.71	2.00%	24	60	32.1	162.70	161.50	171.80	165.50	61%
STMH 8	ES 7	-	-	-	-	-	-	-	24.00	2.00%	24	35	32.1	161.40	160.70	165.50	160.70	75%
DI 19	ES 8	0	16690	16690	0.383	0.35	6.41	0.86	0.86	1.00%	15	104	6.5	181.14	180.10	185.00	180.10	13%
DI 20	STMH 10	17471	19996	37467	0.860	0.63	6.41	3.47	3.47	0.50%	15	29	4.6	228.45	228.30	231.00	232.40	76%
CI 1	ES 9	24532	39290	63822	1.465	0.58	6.41	5.45	5.45	1.35%	15	26	7.5	160.91	160.56	163.00	163.00	72%
CI 2	ES 10	23566	56599	80165	1.840	0.53	6.41	6.21	6.21	1.04%	18	25	10.7	158.94	158.68	161.00	161.00	58%
CI 3	ES 11	23566	56599	80165	1.840	0.53	6.41	6.21	6.21	0.65%	18	35	8.5	154.93	154.70	157.80	157.80	73%
CI 4	ES 12	0	16690	16690	0.383	0.35	6.41	0.86	0.86	2.40%	15	39	10.0	164.86	163.92	167.00	167.00	9%

STORMATER SIZING CALCULATIONS
CG-508 D4



NOTE: COMPOST SHALL BE INCORPORATED USING SUBSOIL METHOD

GRASS CHANNEL - TYPICAL SECTION
(NOT TO SCALE)
CG-508 C4

Ditch	Sheet	Side	Point of Interest	Longitudinal slope (ft/ft)	"A" Side slopes (H:V)	"C" Bottom Width (ft)	Depth of channel (ft)	Length of Channel Side (ft)	Cross Sectional Area of Ditch (sq ft)	Hydraulic Radius, R	Maximum Permissible Velocity (ft/s)	V x R	DA (sq ft)	DA (acres)	Impervious Area (sq ft)	C-Value	2-year Roughness Coefficient	10-year Roughness Coefficient	2-year Q (cfs)	10-year Q (cfs)	2-year Velocity (ft/s)	10-year Velocity (ft/s)	2-year Normal Depth (ft)	10-year Normal Depth (ft)
Sta 101+00 - 103+00	CG-102	RT	Sta 103+00 RT	0.1000	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	24785	0.57	1618	0.91	0.185	0.181	2.52	3.32	3.630	3.698	0.09	0.11
	CG-102	LT	Sta 103+00 LT	0.1000	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	31219	0.72	9379	0.77	0.183	0.181	2.68	3.54	3.664	3.698	0.10	0.11
Sta 109+00 - 114+00	CG-101	RT	Sta 114+00 RT	0.0400	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	63822	0.72	24531	0.72	0.180	0.176	2.51	3.30	2.361	2.407	0.12	0.14
	CG-101	LT	Sta 114+00 LT	0.0400	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	38654	0.72	4279	0.88	0.178	0.173	3.08	4.06	2.384	2.454	0.13	0.16
Sta 303+00 - 301+00	CG-101	RT	Sta 301+00 RT	0.0544	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	47178	0.72	3230	0.91	0.180	0.175	3.17	4.18	2.754	2.834	0.12	0.15
	CG-101	LT	Sta 301+00 LT	0.0544	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	80164	0.72	23566	0.65	0.183	0.180	2.27	2.99	2.702	2.754	0.10	0.12
Sta 307+00 - 306+00	CG-103	RT	Sta 306+00 RT	0.0694	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	20492	0.72	5730	0.78	0.181	0.180	2.72	3.59	3.081	3.110	0.11	0.12
Sta 207+00 - 210+00	CG-102	LT	Sta 210+00 LT	0.0700	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	48492	0.72	8672	0.84	0.181	0.178	2.94	3.87	3.094	3.153	0.11	0.13
Sta 205+00 - 208+00	CG-102	RT	Sta 208+00 RT	0.0100	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	77110	0.72	8580	0.88	0.166	0.161	3.08	4.06	1.277	1.318	0.20	0.23
Milled Road Ditch	CG-104	LT	-	0.0800	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	16883	0.72	2346	0.87	0.181	0.178	3.02	3.98	3.308	3.371	0.11	0.13
Site Entrance Road	CG-106	LT	-	0.0350	3:1	4.0	3.0	9.0	39.0	1.70	4.0	6.8	37467	0.72	17471	0.67	0.180	0.176	2.33	3.08	2.209	2.251	0.12	0.14

GRASS CHANNEL - COMPUTATIONS
CG-508 A5

APPR | DATE | DESCRIPTION | SYM

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

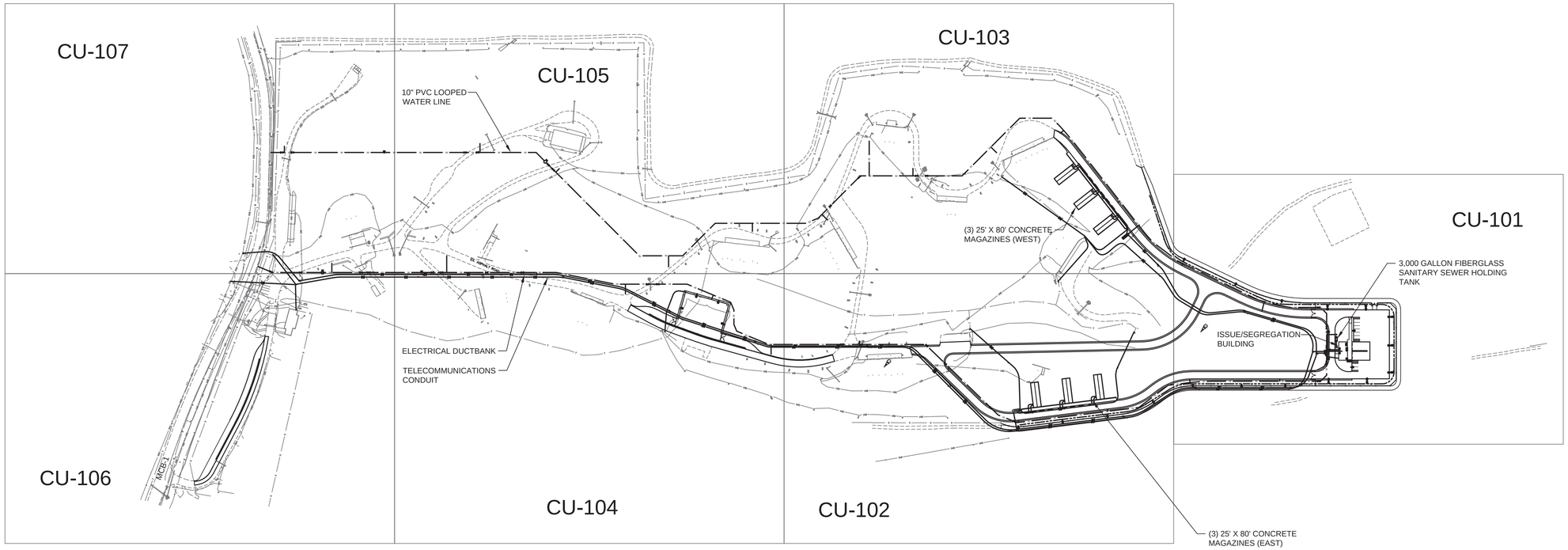
JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 18 June 2015
ACTIVITY
SATISFACTORY TO DATE Signed by email 18 May 2015
DES XXX DRW XXX CHK XXX
<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA
P-635 ASP EXPANSION
STORMWATER MANAGEMENT DETAILS

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072285
SHEET 69 OF 201
CG-508
DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\qbno\crowlerc\d0751223\NAVFAC_P635CG-508.dwg LAYOUT NAME: CG-508 PLOTTED: Wednesday, June 10, 2015 - 4:34pm USER: crowlerc



NOTES:

1. REFER TO SHEETS CU-101 THROUGH CU-107 FOR DETAILED LAYOUT OF SITE UTILITIES.
2. REFER TO SHEETS CU-201 THROUGH CU-209 FOR UTILITY PROFILES OF WATER MAIN, SANITARY SEWER FORCE MAIN, ELECTRICAL POWER AND COMMUNICATION.
3. REFER TO ELECTRICAL PLANS FOR INFORMATION ON DUCT BANKS, ELECTRICAL/TELECOM MANHOLES AND HANDHOLES, AND SITE LIGHTING.

0 100' 200' 400'

SCALE: 1" = 200'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER

SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 10 June 2015

ACTIVITY
SATISFACTORY TO DATE Signed by email 18 May 2015

DES	HR	DRW	HR	CHK	RC

<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA

P-635 ASP EXPANSION

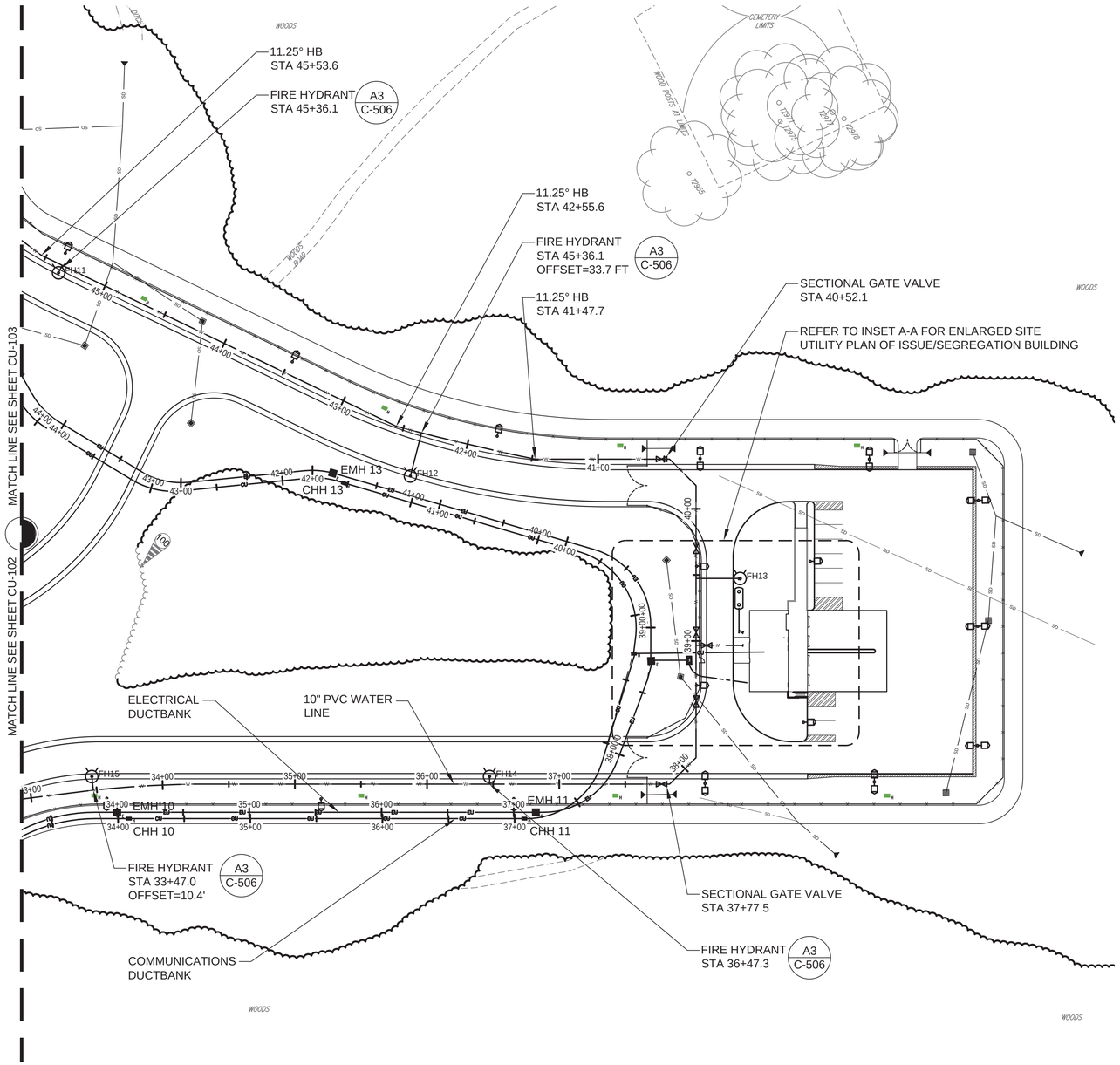
OVERALL SITE LAYOUT PLAN

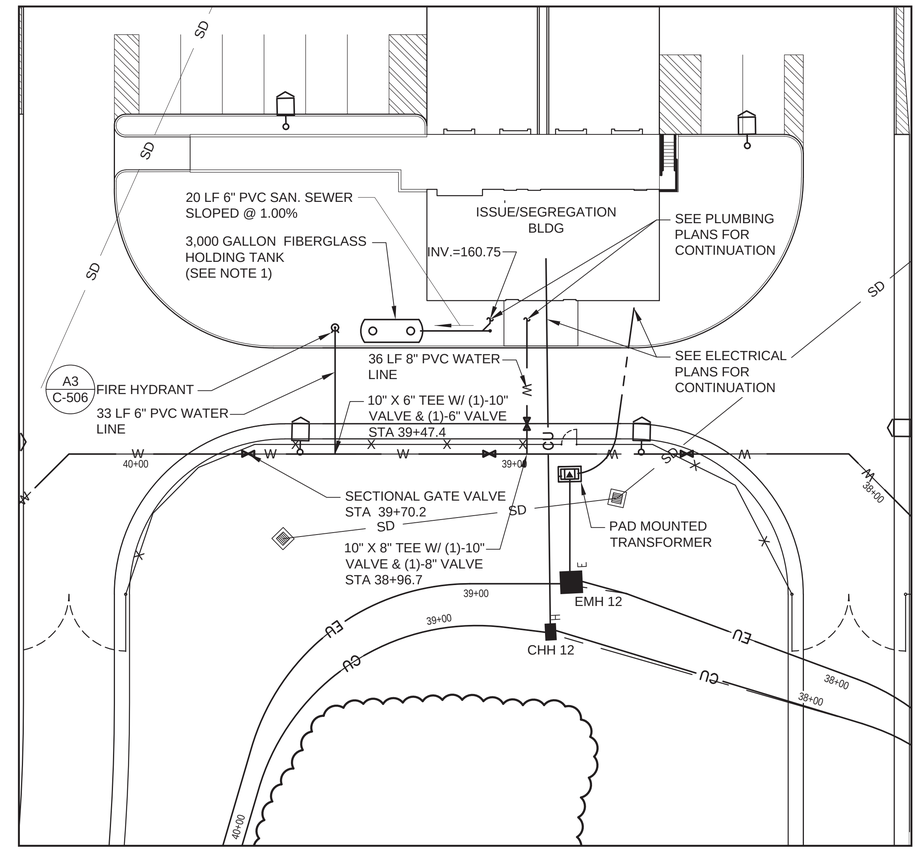
SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072286
SHEET 70 OF 201

CU-100

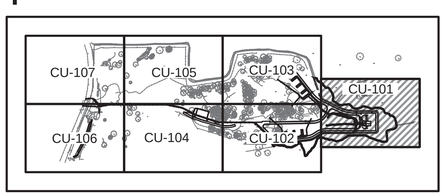
DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\gbna\crowlera\d0751223\NAVFAC_P635CU-100.dwg LAYOUT NAME: CU-100 PLOTTED: Wednesday, June 10, 2015 – 4:40pm USER: crowlera





INSET 'A-A'



KEY PLAN
SCALE: 1" = 1000'

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

0 50' 100'
SCALE: 1" = 50'

NOTES:

1. PROVIDE 3,000 GALLON, SINGLE-WALL FIBERGLASS REINFORCED PLASTIC (FRP) UNDERGROUND STORAGE TANK, CONFORMING TO THE REQUIREMENTS OF ANSI/AWWA D120 THERMSETTING FIBERGLASS REINFORCED PLASTIC TANKS. TANK SHALL MEET THE FOLLOWING REQUIREMENTS:
   - 1.1. TANK SHALL WITHSTAND H-20 SURFACE AXEL LOADS.
   - 1.2. TANK SHALL BE DESIGNED TO WITHSTAND A 5-PSIG AIR PRESSURE TEST WITH A 5:1 SAFETY FACTOR.
   - 1.3. TANK SHALL BE CAPABLE OF BEING BURIED IN GROUND WITH A 7 FT OVERBURDEN, THE HOLE FULLY FLOODED AND A SAFETY FACTOR OF 5:1 AGAINST BUCKLING.
   - 1.4. TANK SHALL BE CAPABLE OF STORING WASTEWATER PRODUCTS LIMITED TO THE COLLECTION AND STORAGE OF HUMAN SOLID OR LIQUID ORGANIC WASTE.
   - 1.5. TANK SHALL BE VENTED TO THE ATMOSPHERE. COORDINATE LOCATION OF VENT WITH COR PRIOR TO INSTALLATION.
   - 1.6. TANK SHALL BE MANUFACTURED WITH 100% RESIN AND GLASS-FIBER REINFORCEMENT.
   - 1.7. TANK SHALL BE EQUIPPED WITH ANCHOR STRAPS IN ACCORDANCE WITH TANK MANUFACTURER'S RECOMMENDATIONS.
   - 1.8. TANK SHALL BE WATERTIGHT, WITH ALL PIPING FACTORY SEALED.
   - 1.9. EQUIP TANK WITH TWO 24 INCH DIA. OPENINGS, MANUFACTURED OF FRP AND SIPHON NOZZEL.
2. ALL HORIZONTAL BENDS ARE AT 45°, UNLESS NOTED OTHERWISE.
3. ALL WATER LINE DEFLECTIONS SHALL BE IN ACCORDANCE WITH SECTION 2.1.14 OF THE STAFFORD COUNTY, DEPARTMENT OF UTILITIES, WATER AND SEWER DESIGN AND CONSTRUCTION STANDARDS.
4. REFER TO SHEETS CU-201 THROUGH CU-209 FOR UTILITY PROFILES OF WATER MAIN, SANITARY SEWER FORCE MAIN, ELECTRICAL POWER AND COMMUNICATION.
5. REFER TO ELECTRICAL PLANS FOR INFORMATION ON DUCT BANKS, ELECTRICAL/TELECOM MANHOLES AND HANDHOLES, AND SITE LIGHTING.
6. PROVIDE AN AUDIBLE AND VISUAL ALARM FOR THE HOLDING TANK, CONNECTED TO A PANEL LOCATED WITHIN THE MECHANICAL ROOM OF THE ISSUE/SEGREGATION BUILDING. THE ALARM SHALL BE CONNECTED TO A FLOAT SWITCH OR ELECTRICAL SENSOR LOCATED WITHIN THE TANK. THE MAXIMUM ALARM LEVEL SHALL BE SET TO 85 PERCENT OF THE TOTAL VOLUME OF THE VOLUME OF THE TANK.

SYM	DESCRIPTION	DATE	APPR.

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

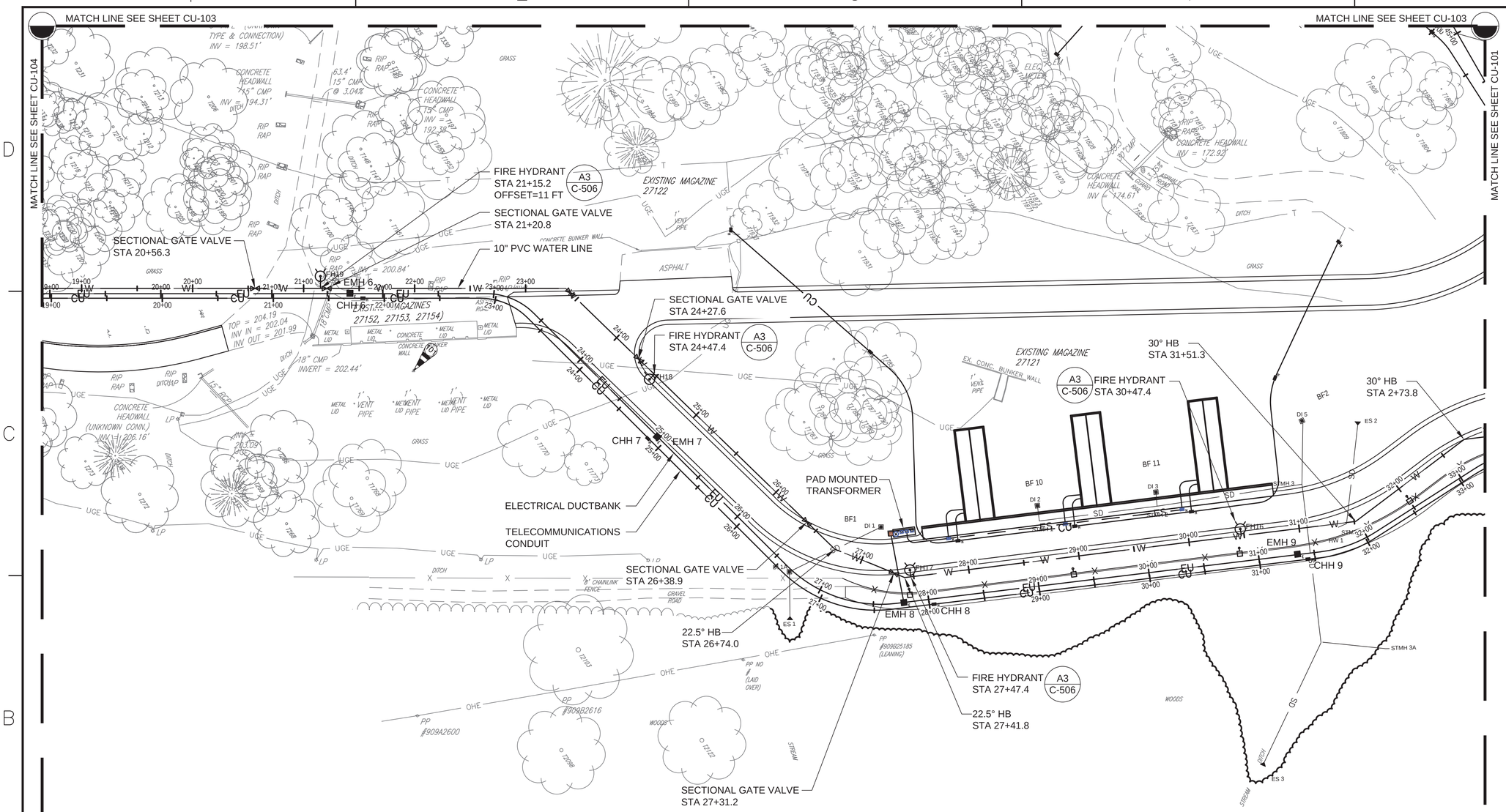
APPROVED
FOR COMMANDER NAVFAC
ACTIVITY
SATISFACTORY TO DATE 15 May 2015

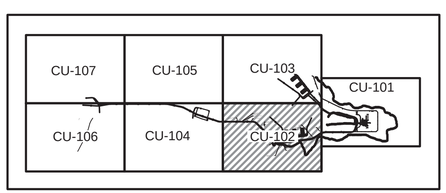
DES	HR	DRW	HR	CHK	RC
<<PM/DM>>					
BRANCH MANAGER					MS
CHIEF ENG/ARCH					THC
FIRE PROTECTION					KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA
P-635 ASP EXPANSION
SITE UTILITY PLAN

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
13072287
SHEET 71 OF 201
CU-101
DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\ghnc\\crowlerco\d0751223\NAVFAC_P635CU-101.dwg LAYOUT NAME: CU-101 PLOTTED: Wednesday, June 10, 2015 - 4:41pm USER: crowlerco





KEY PLAN
SCALE: 1" = 1000'

NOTES:

1. ALL HORIZONTAL BENDS ARE AT 45°, UNLESS NOTED OTHERWISE.
2. ALL WATER LINE DEFLECTIONS SHALL BE IN ACCORDANCE WITH SECTION 2.1.14 OF THE STAFFORD COUNTY, DEPARTMENT OF UTILITIES, WATER AND SEWER DESIGN AND CONSTRUCTION STANDARDS.
3. REFER TO SHEETS CU-201 THROUGH CU-209 FOR UTILITY PROFILES OF WATER MAIN, SANITARY SEWER FORCE MAIN, ELECTRICAL POWER AND COMMUNICATION.
4. REFER TO ELECTRICAL PLANS FOR INFORMATION ON DUCT BANKS, ELECTRICAL/TELECOM MANHOLES AND HANDHOLES, AND SITE LIGHTING.

0 50' 100'
SCALE: 1" = 50'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
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TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC
ACTIVITY
SATISFACTORY TO DATE 15 May 2015

DES	HR	DRW	HR	CHK	RC

<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
NAVAL FACILITIES ENGINEERING COMMAND
QUANTICO, VA

P-635 ASP EXPANSION

SITE UTILITY PLAN

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072288
SHEET 72 OF 201

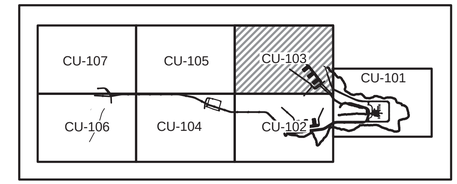
CU-102

DRAWFORM REVISION: 10 MARCH 2009

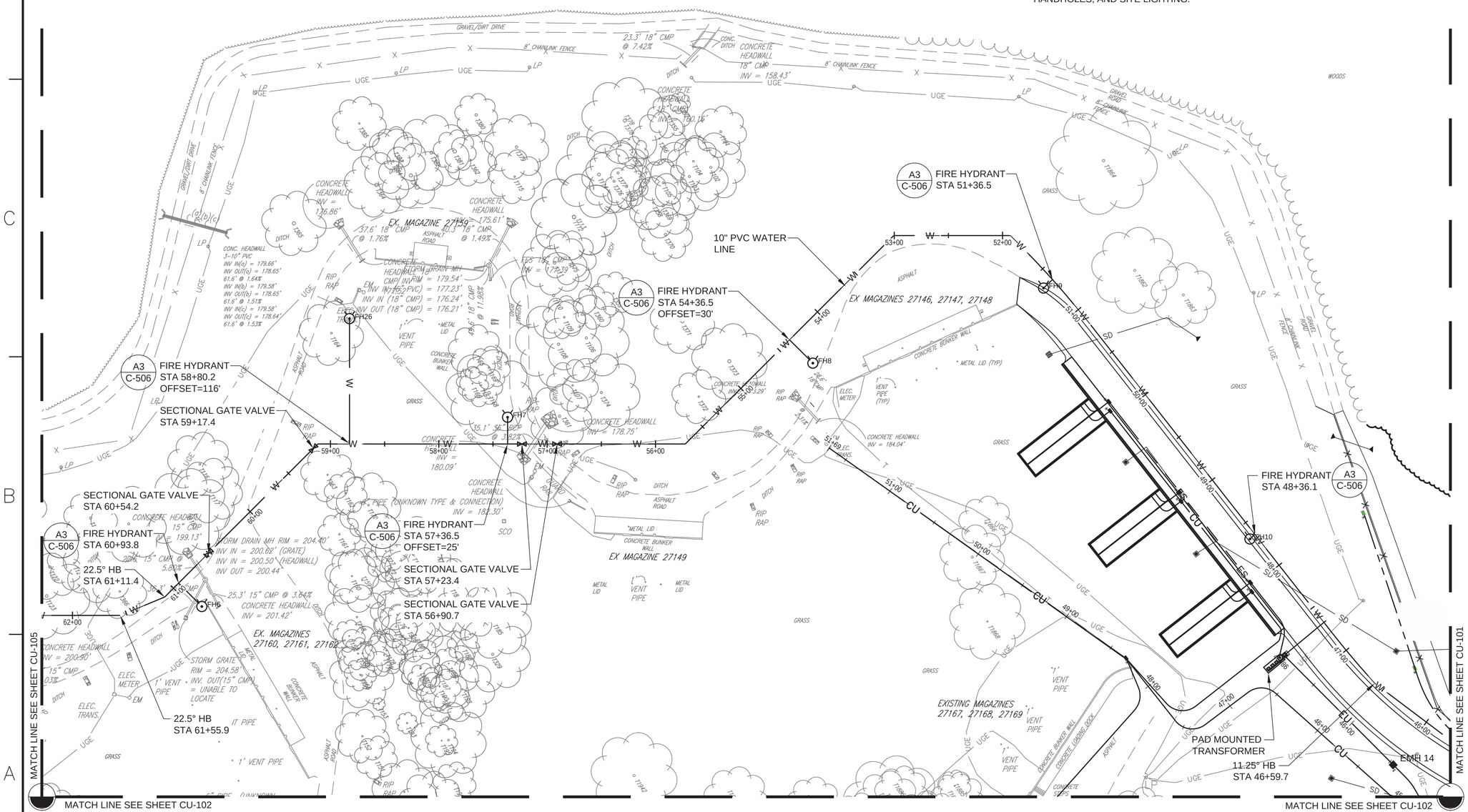
FILE NAME: C:\pwworking\gbno\crowlerv\d0751223\NAVFAC_P635CU-102.dwg LAYOUT NAME: CU-102 PLOTTED: Wednesday, June 10, 2015 - 4:42pm USER: crowlerv

NOTES:

1. ALL HORIZONTAL BENDS ARE AT 45°, UNLESS NOTED OTHERWISE.
2. ALL WATER LINE DEFLECTIONS SHALL BE IN ACCORDANCE WITH SECTION 2.1.14 OF THE STAFFORD COUNTY, DEPARTMENT OF UTILITIES, WATER AND SEWER DESIGN AND CONSTRUCTION STANDARDS.
3. REFER TO SHEETS CU-201 THROUGH CU-209 FOR UTILITY PROFILES OF WATER MAIN, SANITARY SEWER FORCE MAIN, ELECTRICAL POWER AND COMMUNICATION.
4. REFER TO ELECTRICAL PLANS FOR INFORMATION ON DUCT BANKS, ELECTRICAL/TELECOM MANHOLES AND HANDHOLES, AND SITE LIGHTING.



KEY PLAN
SCALE: 1" = 1000'



0 50' 100'
SCALE: 1" = 50'

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 10 June 2015
ACTIVITY
SATISFACTORY TO DATE 18 May 2015
DES HR DRW HR CHK RC
<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA

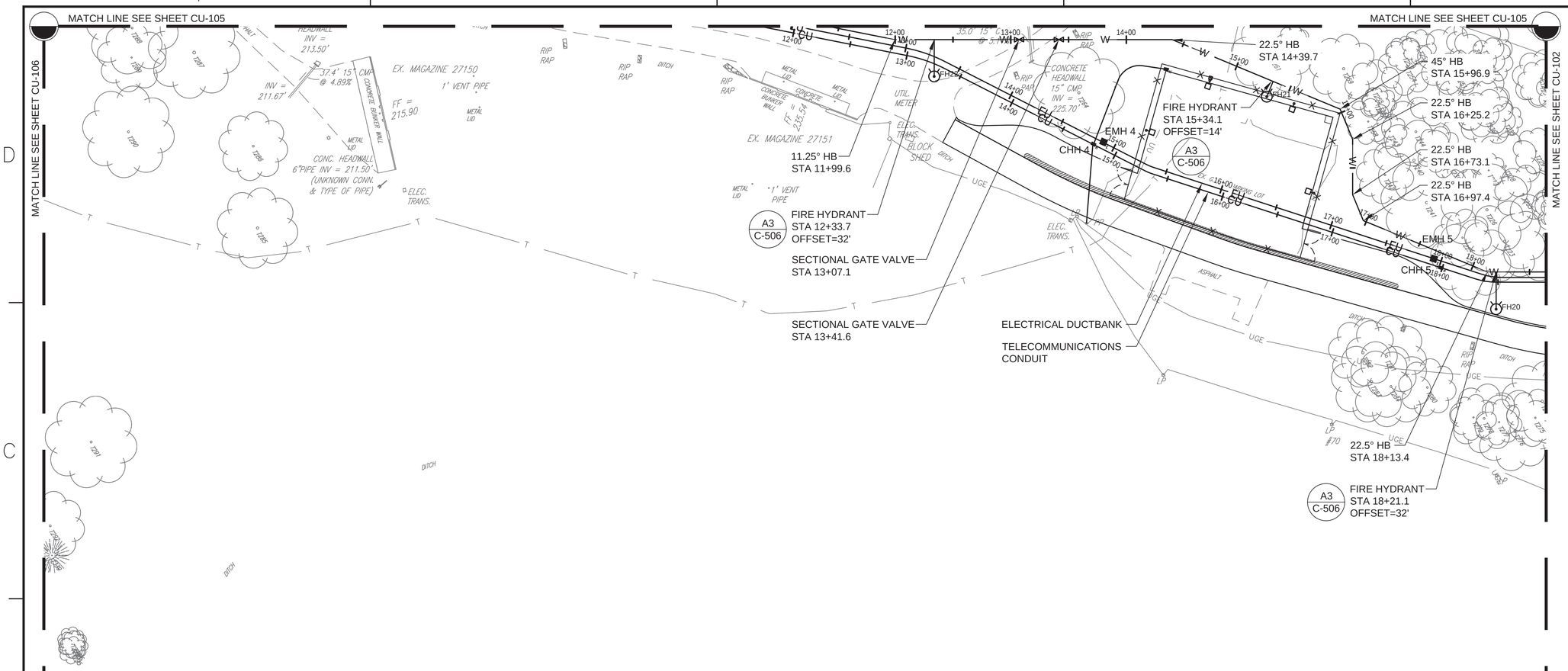
P-635 ASP EXPANSION

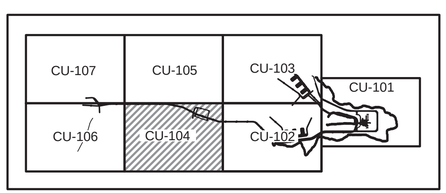
SITE UTILITY PLAN

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072289
SHEET 73 OF 201
CU-103

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\gbna\crowlera\d0751223\NAVFAC_P635CU-103.dwg LAYOUT NAME: CU-103 PLOTTED: Wednesday, June 10, 2015 - 4:42pm USER: crowlera





KEY PLAN
SCALE: 1" = 1000'

NOTES:

1. ALL HORIZONTAL BENDS ARE AT 45°, UNLESS NOTED OTHERWISE.
2. ALL WATER LINE DEFLECTIONS SHALL BE IN ACCORDANCE WITH SECTION 2.1.14 OF THE STAFFORD COUNTY, DEPARTMENT OF UTILITIES, WATER AND SEWER DESIGN AND CONSTRUCTION STANDARDS.
3. REFER TO SHEETS CU-201 THROUGH CU-209 FOR UTILITY PROFILES OF WATER MAIN, SANITARY SEWER FORCE MAIN, ELECTRICAL POWER AND COMMUNICATION.
4. REFER TO ELECTRICAL PLANS FOR INFORMATION ON DUCT BANKS, ELECTRICAL/TELECOM MANHOLES AND HANDHOLES, AND SITE LIGHTING.

0 50' 100'
SCALE: 1" = 50'

SYM	DESCRIPTION	DATE	APPR.

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 18 May 2015

ACTIVITY
SATISFACTORY TO DATE Signed by email 18 May 2015

DES	DRW	CHK
HR	HR	RC

<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA
P-635 ASP EXPANSION
SITE UTILITY PLAN

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072290
SHEET 74 OF 201
CU-104

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\gbno\crowlerx\d0751223\NAVFAC_P635CU-104.dwg LAYOUT NAME: CU-104 PLOTTED: Wednesday, June 10, 2015 – 4:43pm USER: crowlerx

NOTES:

1. ALL HORIZONTAL BENDS ARE AT 45°, UNLESS NOTED OTHERWISE.
2. ALL WATER LINE DEFLECTIONS SHALL BE IN ACCORDANCE WITH SECTION 2.1.14 OF THE STAFFORD COUNTY, DEPARTMENT OF UTILITIES, WATER AND SEWER DESIGN AND CONSTRUCTION STANDARDS.
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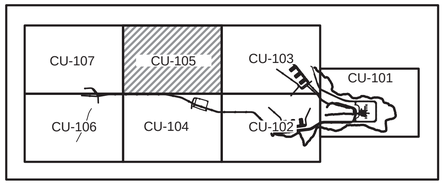
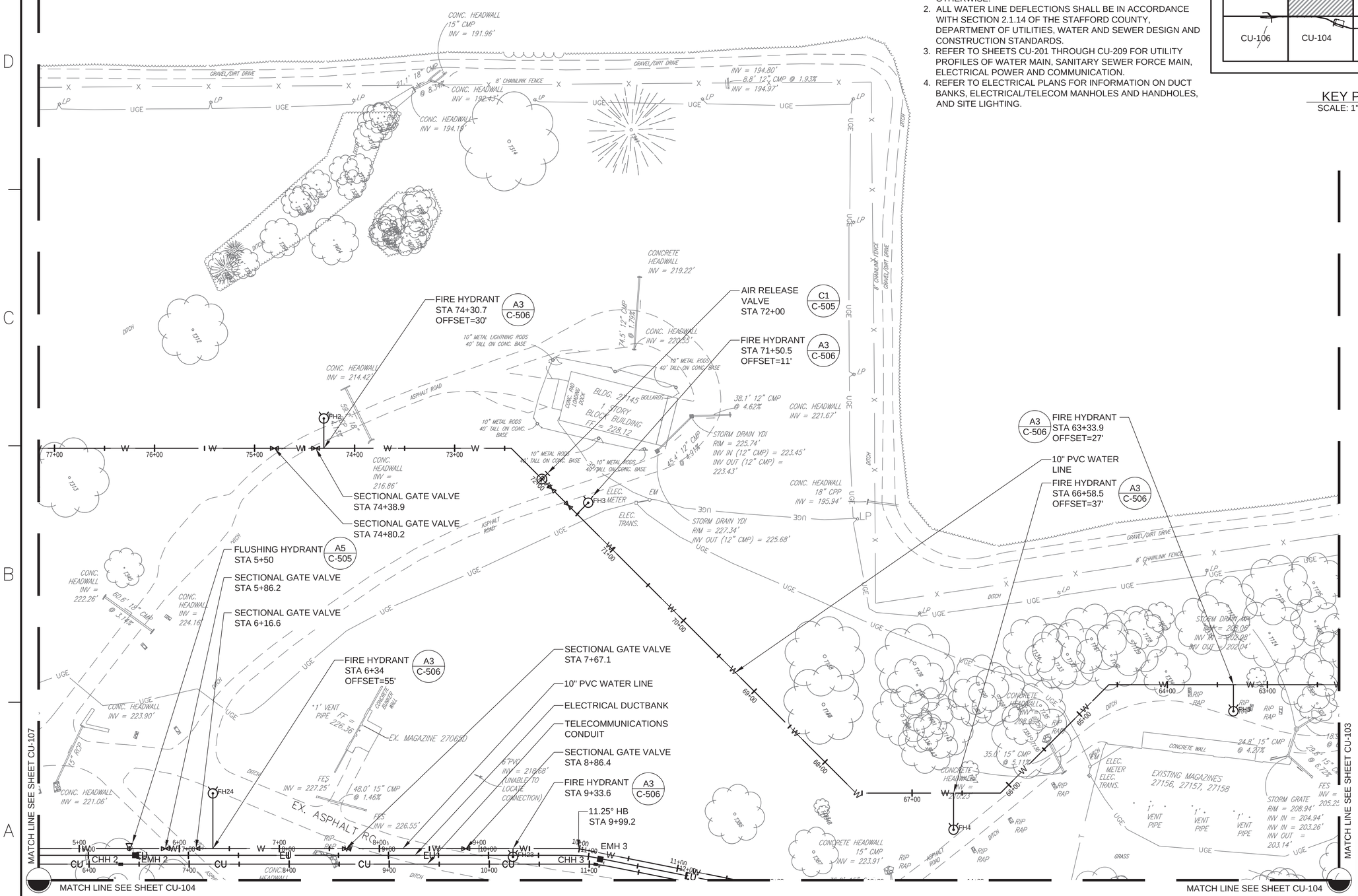
4. REFER TO ELECTRICAL PLANS FOR INFORMATION ON DUCT BANKS, ELECTRICAL/TELECOM MANHOLES AND HANDHOLES, AND SITE LIGHTING.



KEY PLAN
SCALE: 1" = 1000'



0 50' 100'
SCALE: 1" = 50'

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 10 June 2015
ACTIVITY
SATISFACTORY TO DATE 18 May 2015
DES HR DRW HR CHK RC
<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA

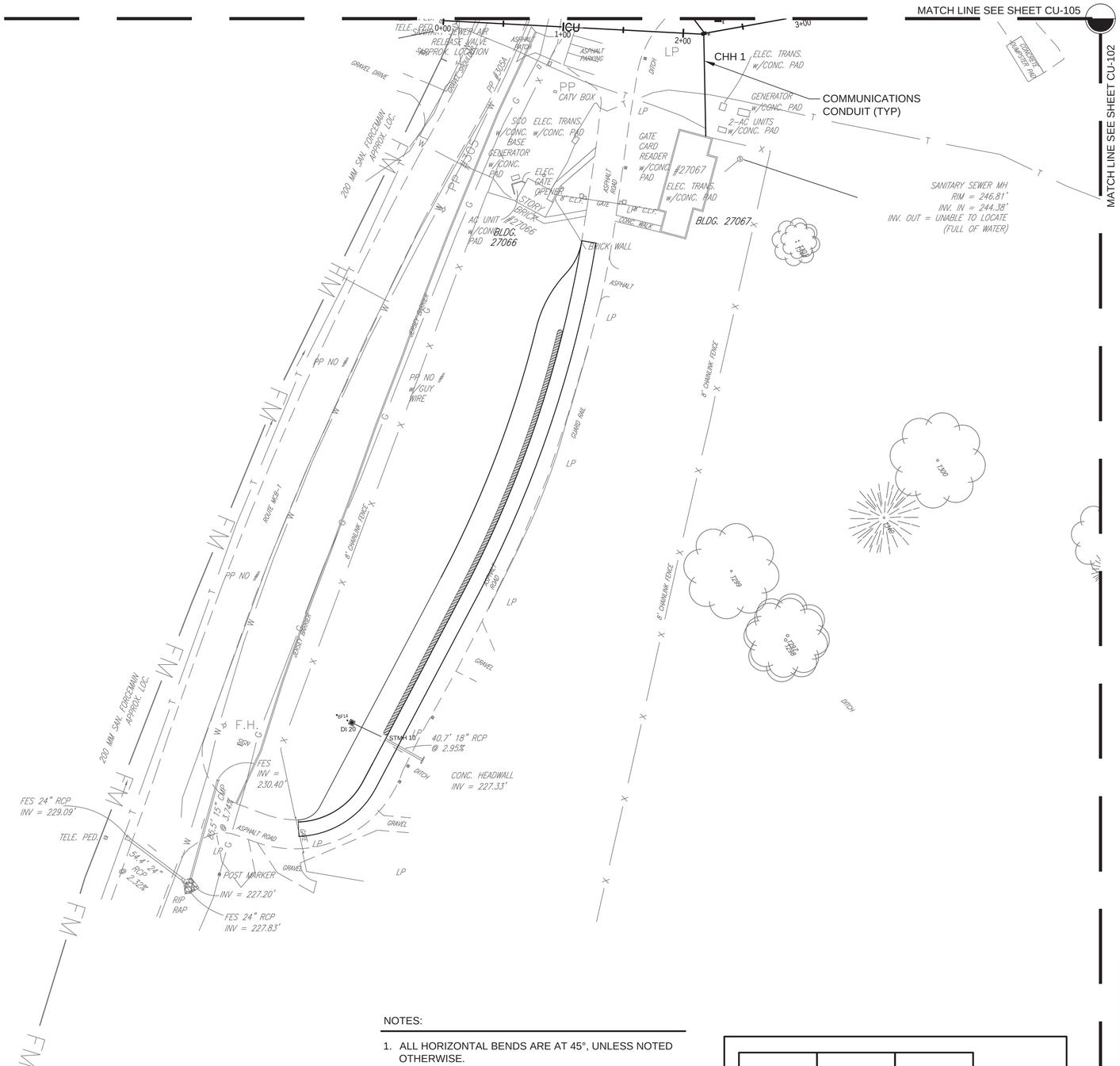
P-635 ASP EXPANSION

SITE UTILITY PLAN

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072291
SHEET 75 OF 201
CU-105

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\gbna\crowlera\d0751223\NAVFAC_P635CU-105.dwg LAYOUT NAME: CU-105 PLOTTED: Wednesday, June 10, 2015 – 4:43pm USER: crowlera



NOTES:

1. ALL HORIZONTAL BENDS ARE AT 45°, UNLESS NOTED OTHERWISE.
2. ALL WATER LINE DEFLECTIONS SHALL BE IN ACCORDANCE WITH SECTION 2.1.14 OF THE STAFFORD COUNTY, DEPARTMENT OF UTILITIES, WATER AND SEWER DESIGN AND CONSTRUCTION STANDARDS.
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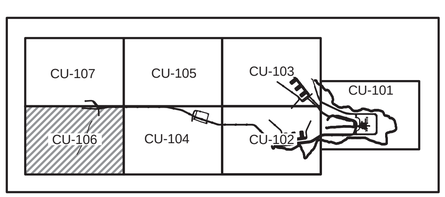


KEY PLAN
SCALE: 1" = 1000'

0 50' 100'
SCALE: 1" = 50'

SYM	DESCRIPTION	DATE	APPR.

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC
ACTIVITY
SATISFACTORY TO DATE 15 May 2015

DES	HR	DRW	HR	CHK	RC
<CPM/DM>					
BRANCH MANAGER				MS	
CHIEF ENG/ARCH				THC	
FIRE PROTECTION				KTD	

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA

P-635 ASP EXPANSION

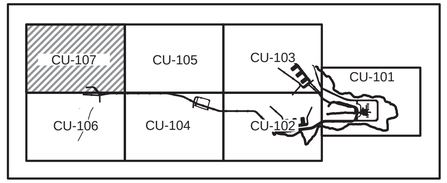
SITE UTILITY PLAN

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072292
SHEET 76 OF 201

CU-106

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\ghon\crowlerc\d0751223\NAVFAC_P635CU-106.dwg LAYOUT NAME: CU-106 PLOTTED: Wednesday, June 10, 2015 - 4:44pm USER: crowlerc



KEY PLAN

SCALE: 1" = 1000'

NOTES:

1. ALL HORIZONTAL BENDS ARE AT 45°, UNLESS NOTED OTHERWISE.
2. ALL WATER LINE DEFLECTIONS SHALL BE IN ACCORDANCE WITH SECTION 2.1.14 OF THE STAFFORD COUNTY, DEPARTMENT OF UTILITIES, WATER AND SEWER DESIGN AND CONSTRUCTION STANDARDS.
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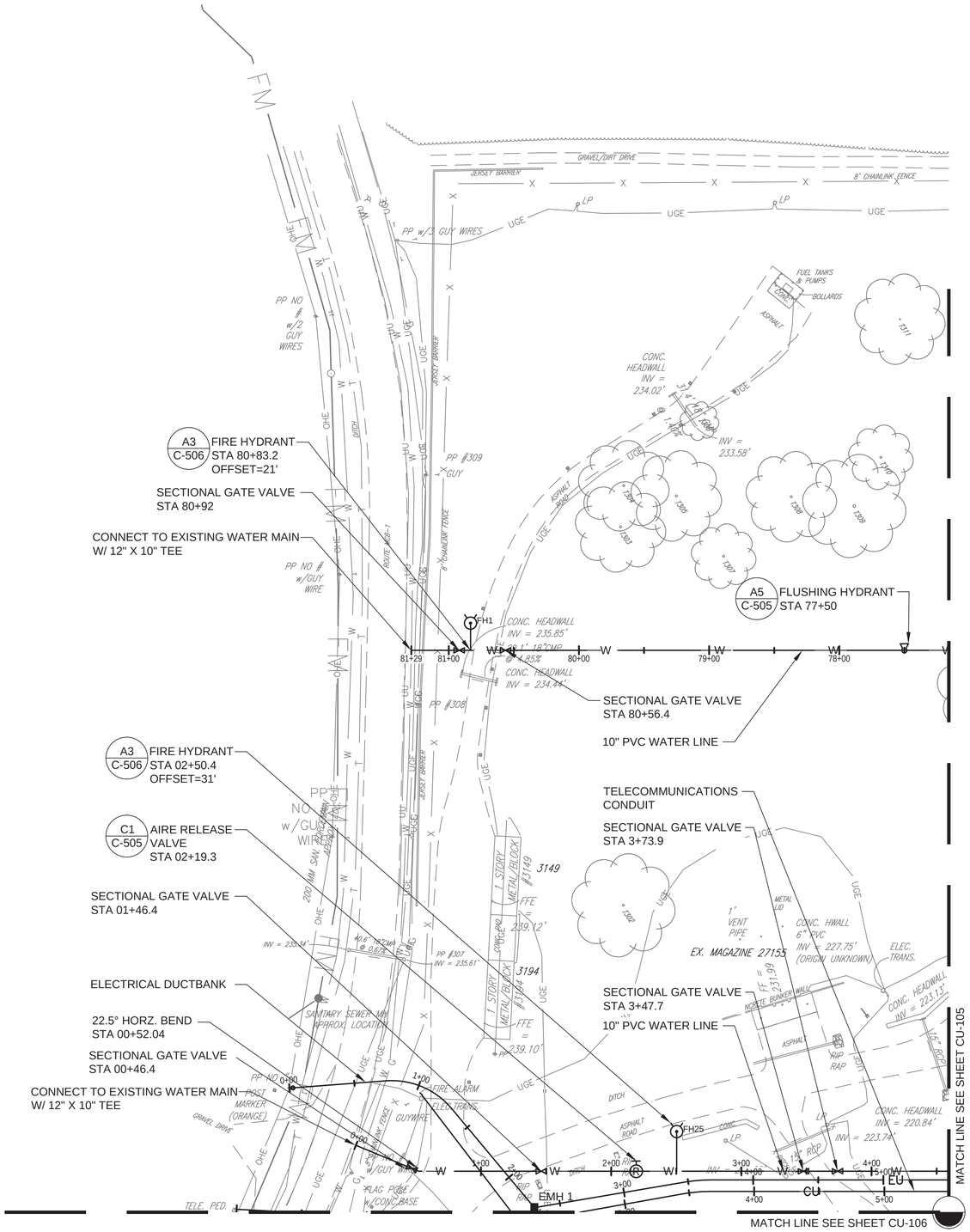


0 50' 100'

SCALE: 1" = 50'

SYM	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC
ACTIVITY
SATISFACTORY TO DATE 15 May 2015

DES	HR	DRW	HR	CHK	RC

<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
NAVAL FACILITIES ENGINEERING COMMAND
QUANTICO, VA

P-635 ASP EXPANSION

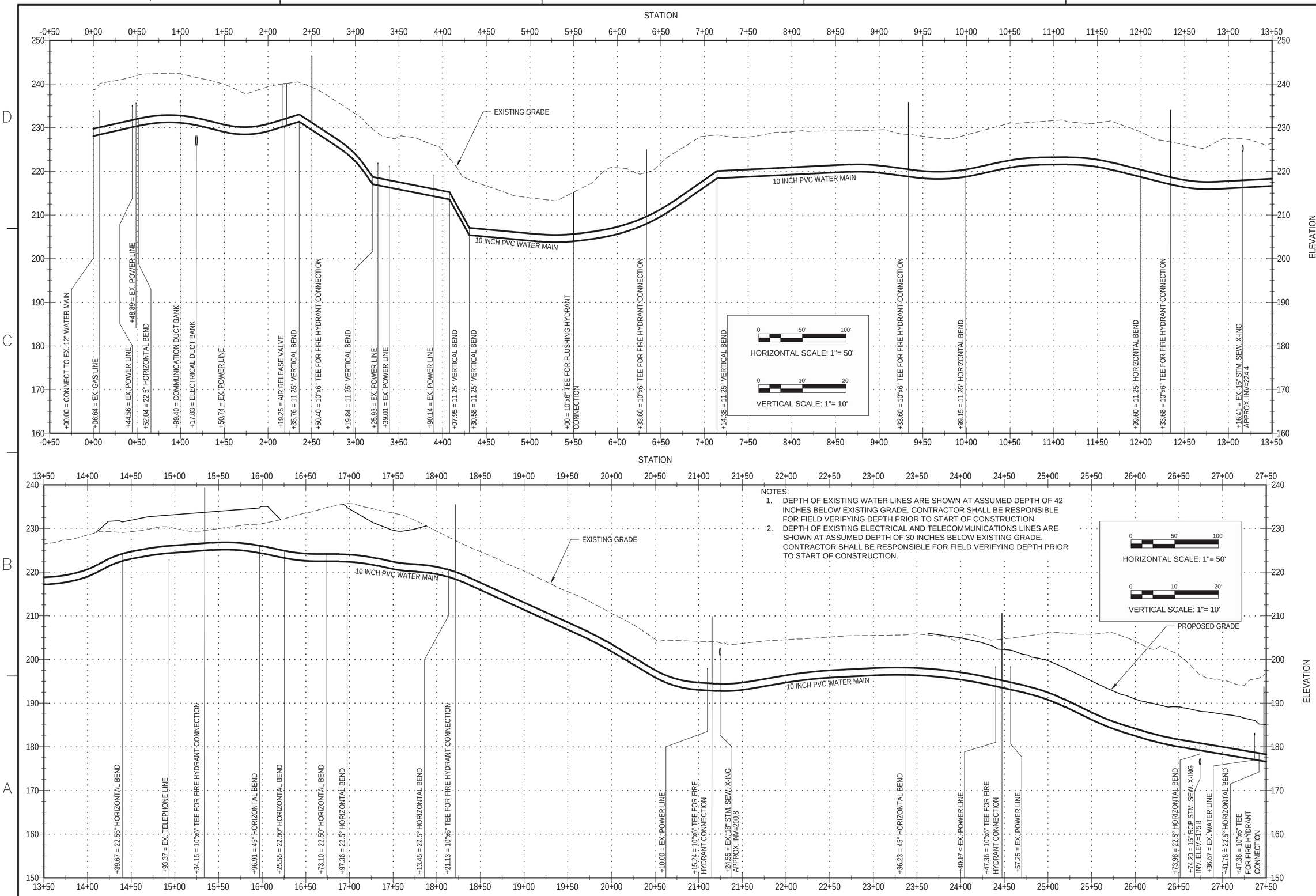
SITE UTILITY PLAN

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072293
SHEET 77 OF 201

CU-107

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\gbno\crowlerx\d0751223\NAVFAC_P635CU-107.dwg LAYOUT NAME: CU-107 PLOTTED: Wednesday, June 10, 2015 - 4:45pm USER: crowlerx



NOTES:

1. DEPTH OF EXISTING WATER LINES ARE SHOWN AT ASSUMED DEPTH OF 42 INCHES BELOW EXISTING GRADE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING DEPTH PRIOR TO START OF CONSTRUCTION.
2. DEPTH OF EXISTING ELECTRICAL AND TELECOMMUNICATIONS LINES ARE SHOWN AT ASSUMED DEPTH OF 30 INCHES BELOW EXISTING GRADE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING DEPTH PRIOR TO START OF CONSTRUCTION.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER

SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 10 June 2015

ACTIVITY
SATISFACTORY TO DATE Signed by email 18 May 2015

DES	HR	DRW	HR	CHK	RC
<<PM/DM>>					
BRANCH MANAGER	MS				
CHIEF ENG/ARCH	THC				
FIRE PROTECTION	KTD				

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA

P-635 ASP EXPANSION

SITE UTILITY PROFILES

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072294
SHEET 78 OF 201

CU-201

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\gbna\crowlera\d0751223\NAVFAC_P635CU-201.dwg LAYOUT NAME: CU-201 PLOTTED: Wednesday, June 10, 2015 – 4:45pm USER: crowlera

NOTES:

1. DEPTH OF EXISTING WATER LINES ARE SHOWN AT ASSUMED DEPTH OF 42 INCHES BELOW EXISTING GRADE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING DEPTH PRIOR TO START OF CONSTRUCTION.
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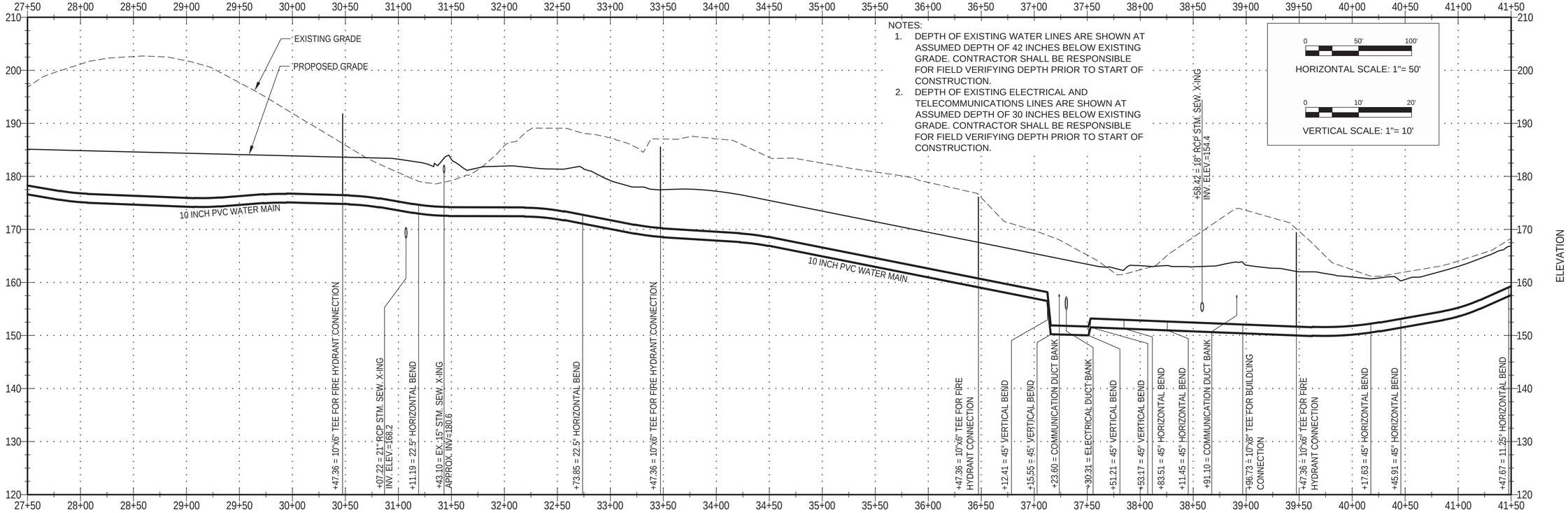
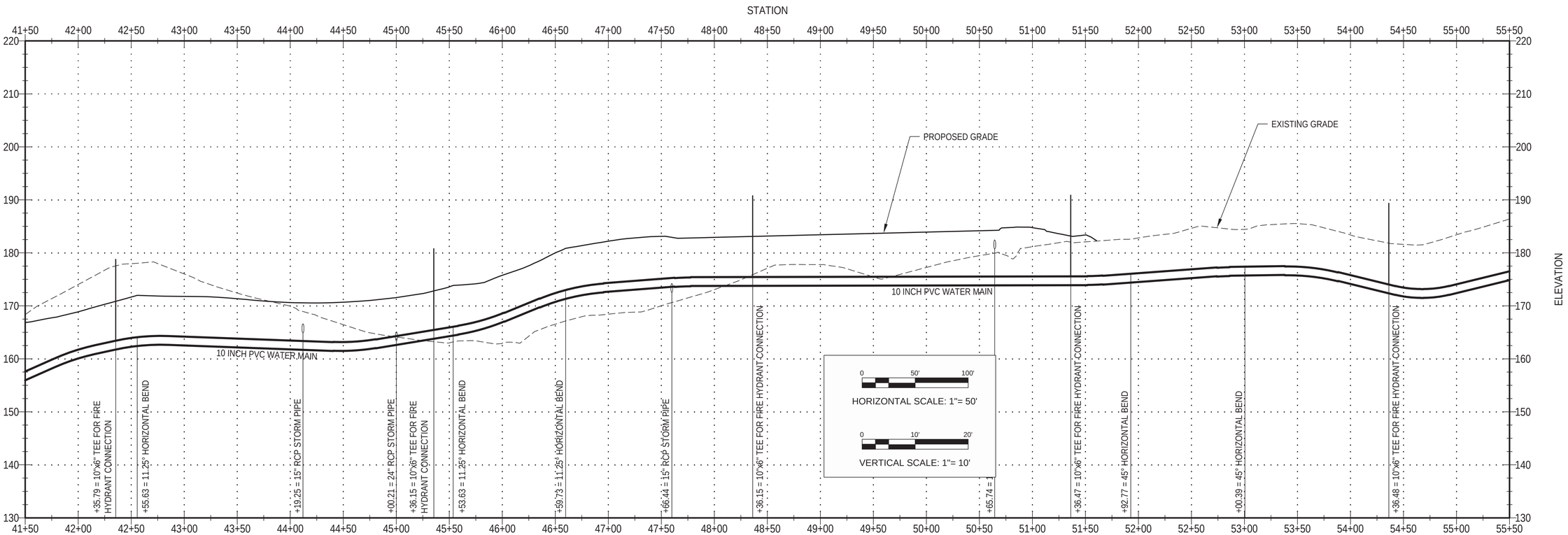




SYM	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 18 June 2015
ACTIVITY
SATISFACTORY TO DATE Signed by end 18 May 2015

DES	HR	DRW	HR	CHK	RC
<<PM/DM>>					
BRANCH MANAGER					MS
CHIEF ENG/ARCH					THC
FIRE PROTECTION					KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA

P-635 ASP EXPANSION

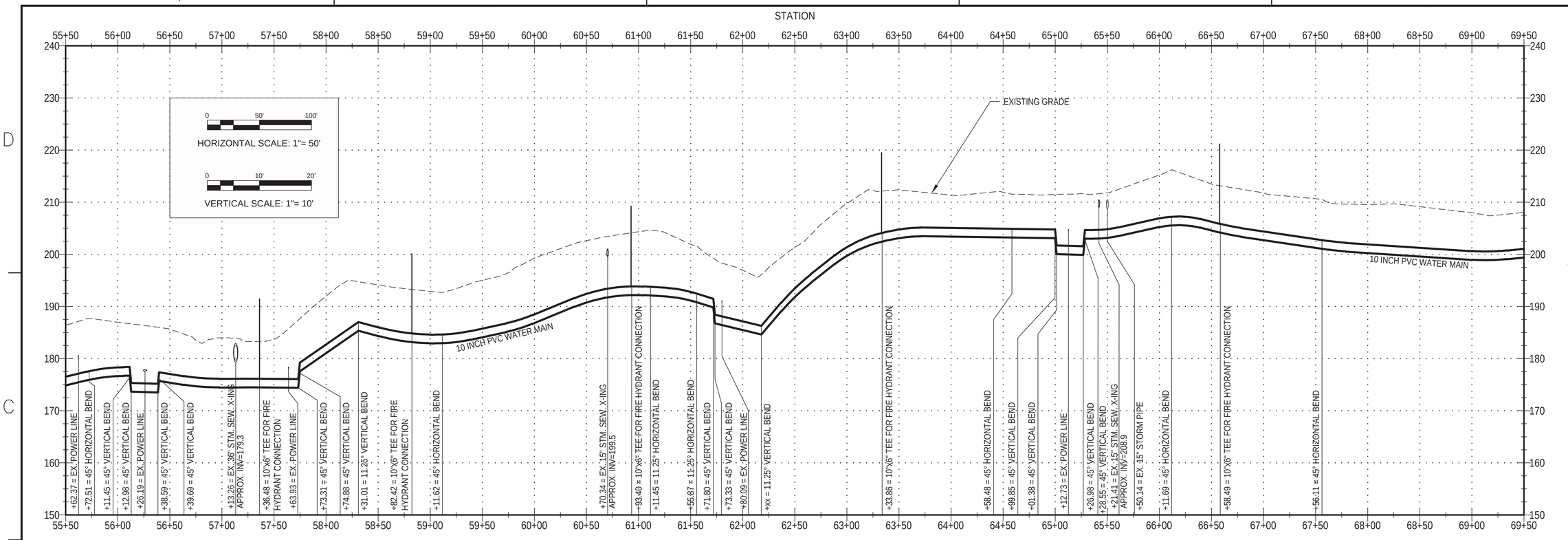
SITE UTILITY PROFILES

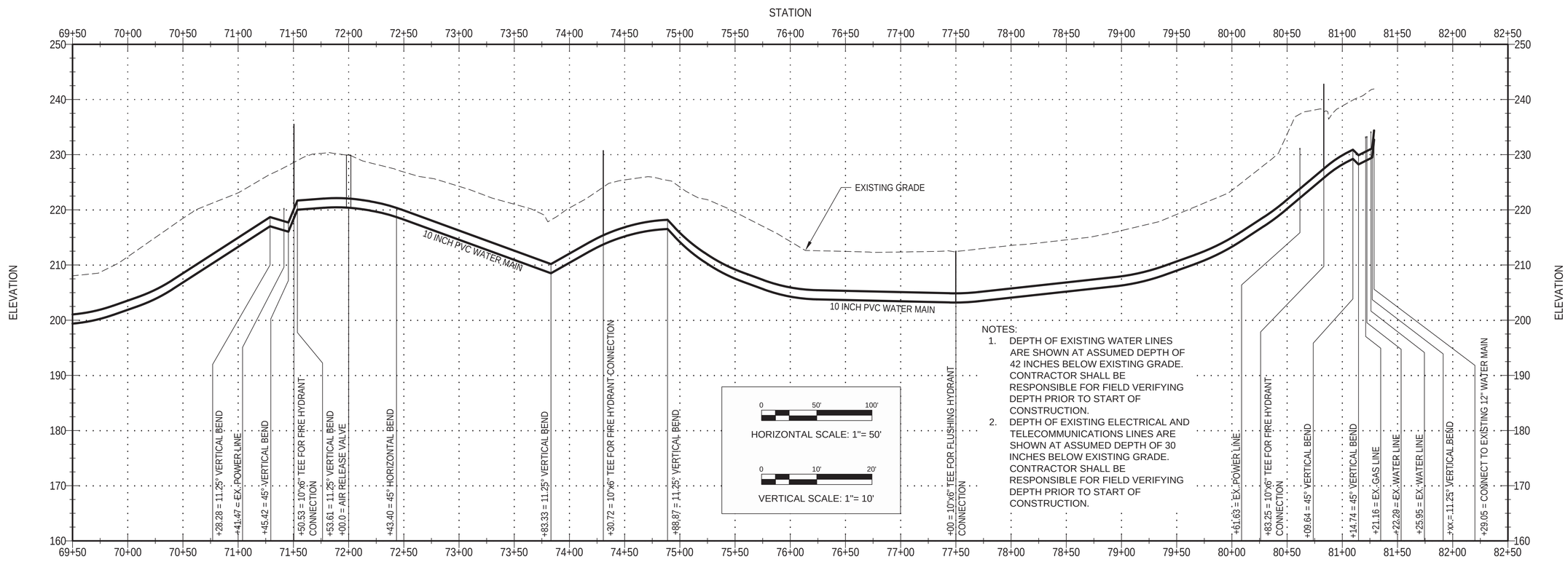
SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072295
SHEET 79 OF 201

CU-202

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\gbna\crowlerc\d0751223\NAVFAC_P635CU-202.dwg LAYOUT NAME: CU-202 PLOTTED: Wednesday, June 10, 2015 - 4:46pm USER: crowlerc





NOTES:

1. DEPTH OF EXISTING WATER LINES ARE SHOWN AT ASSUMED DEPTH OF 42 INCHES BELOW EXISTING GRADE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING DEPTH PRIOR TO START OF CONSTRUCTION.
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STM	WLS	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 18 June 2015

ACTIVITY
SATISFACTORY TO DATE Signed by end 18 May 2015

DES	HR	DRW	HR	CHK	RC
<<PM/DM>>					
BRANCH MANAGER					MS
CHIEF ENG/ARCH					THC
FIRE PROTECTION					KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA

P-635 ASP EXPANSION

SITE UTILITY PROFILES

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072296
SHEET 80 OF 201

CU-203

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\ghro\crowlerc\d0751223\NAVFAC_P635CU-203.dwg LAYOUT NAME: CU-203 PLOTTED: Wednesday, June 10, 2015 - 4:46pm USER: crowlerc

NOTES:
1. DEPTH OF EXISTING WATER LINES ARE SHOWN AT ASSUMED DEPTH OF 42 INCHES BELOW EXISTING GRADE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING DEPTH PRIOR TO START OF CONSTRUCTION.
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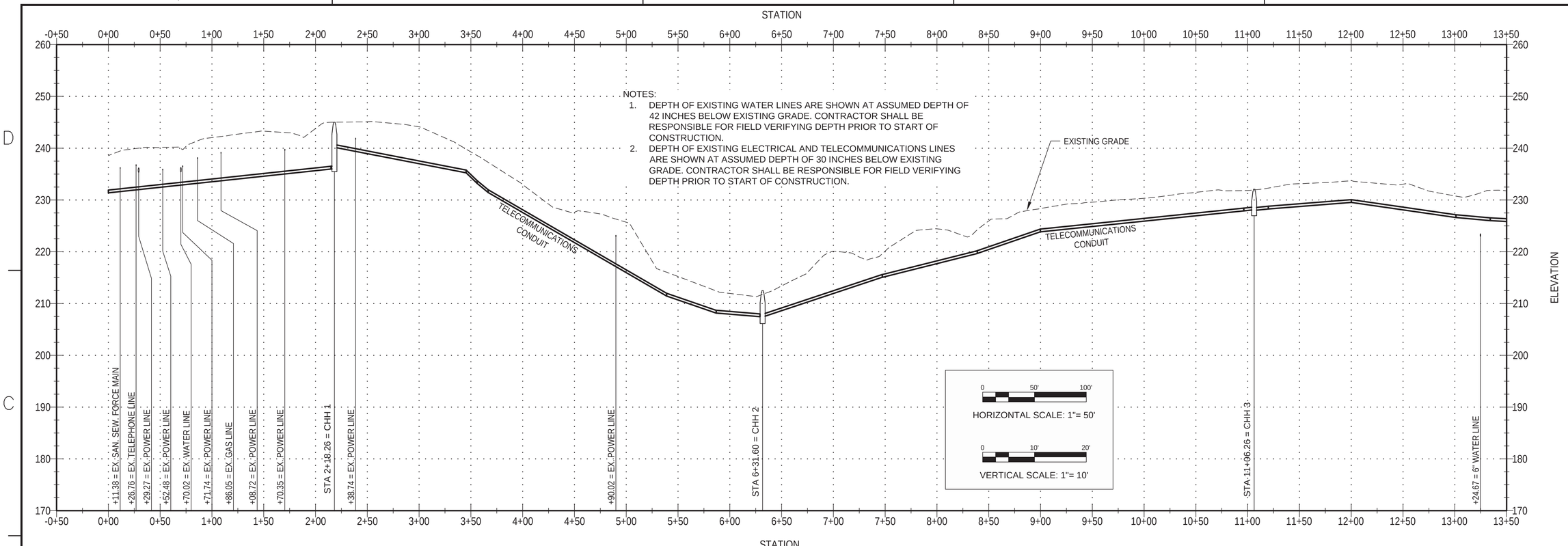
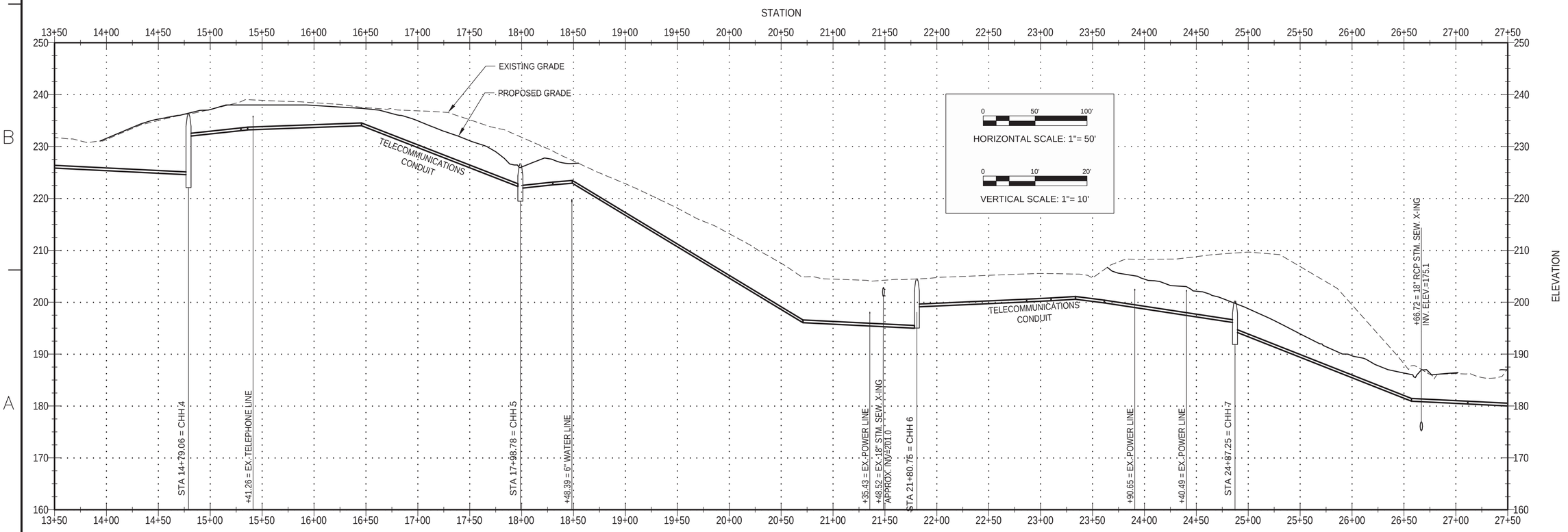




SYM	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 18 June 2015

ACTIVITY
SATISFACTORY TO DATE Signed by Email 18 May 2015

DES	DRW	CHK
HR	HR	RC

<<PM/DM>>	
BRANCH MANAGER	MS
CHIEF ENG/ARCH	THC
FIRE PROTECTION	KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA

P-635 ASP EXPANSION

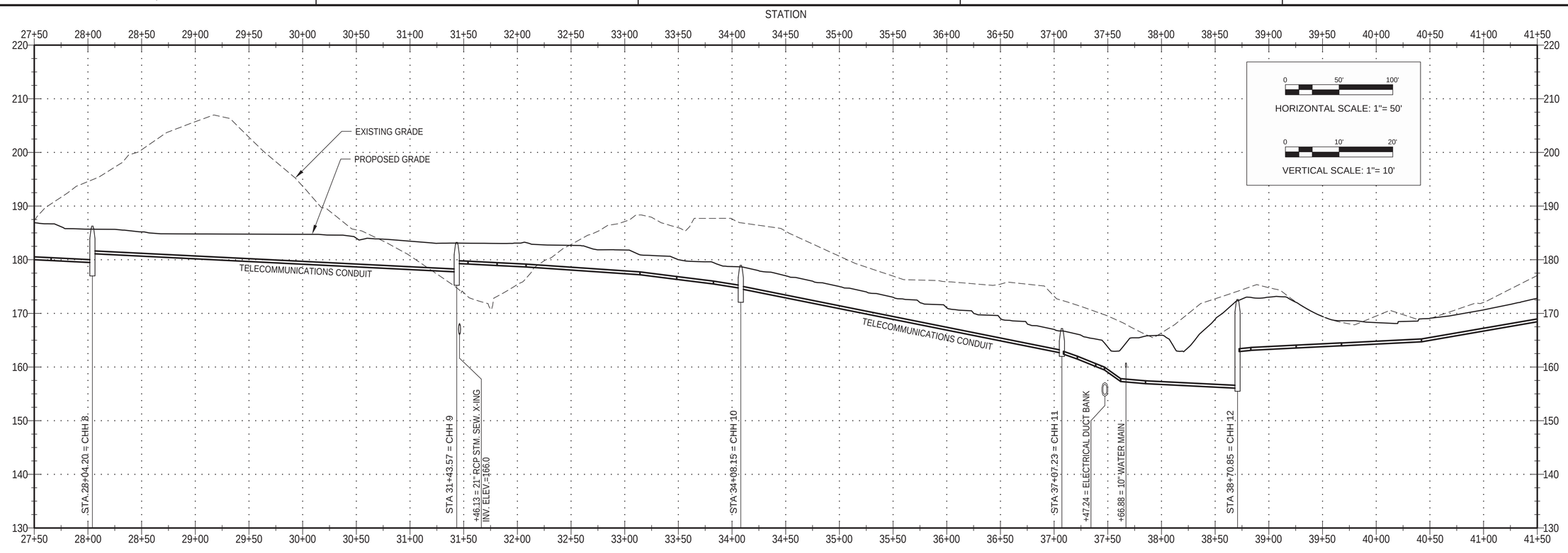
SITE UTILITY PROFILES

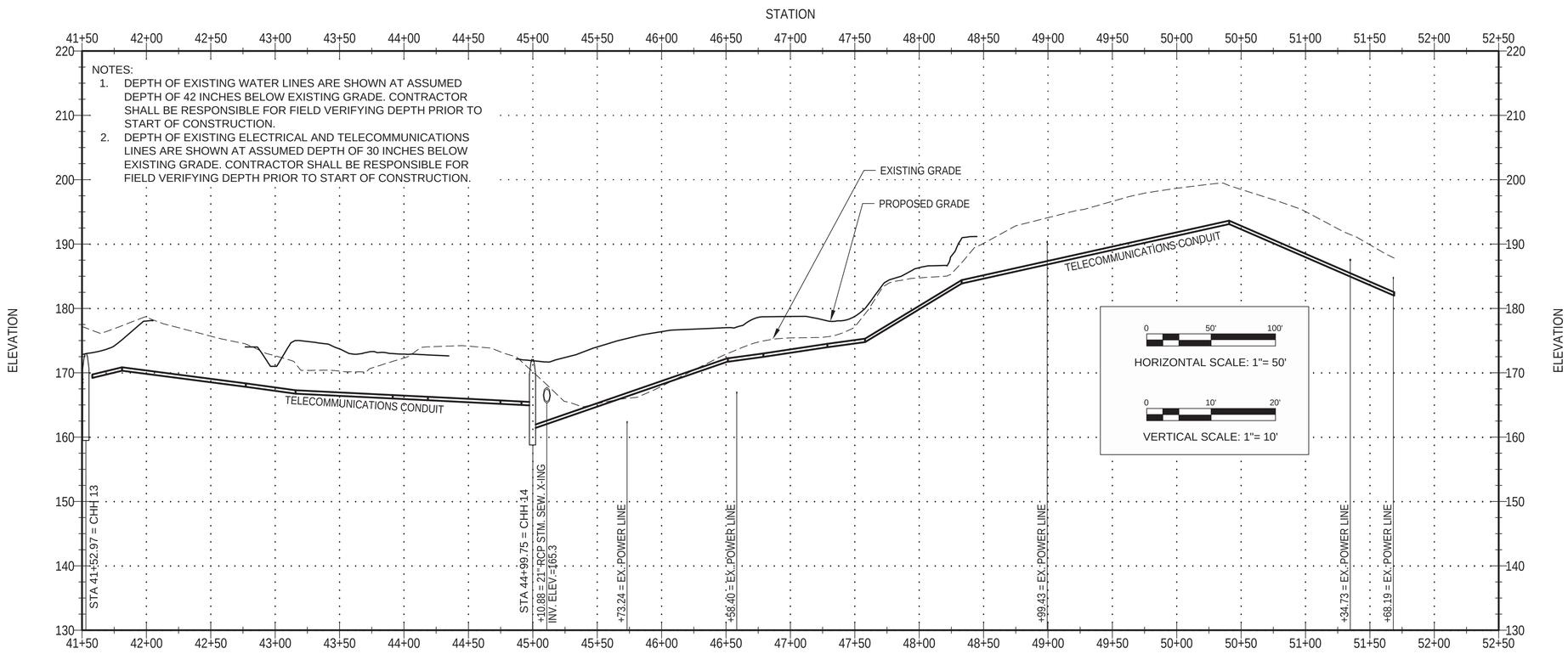
SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072297
SHEET 81 OF 201

CU-204

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\ghna\crowlerc\d0751223\NAVFAC_P635CU-204.dwg LAYOUT NAME: CU-204 PLOTTED: Wednesday, June 10, 2015 - 4:47pm USER: crowlerc





SYM	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER
SEAL

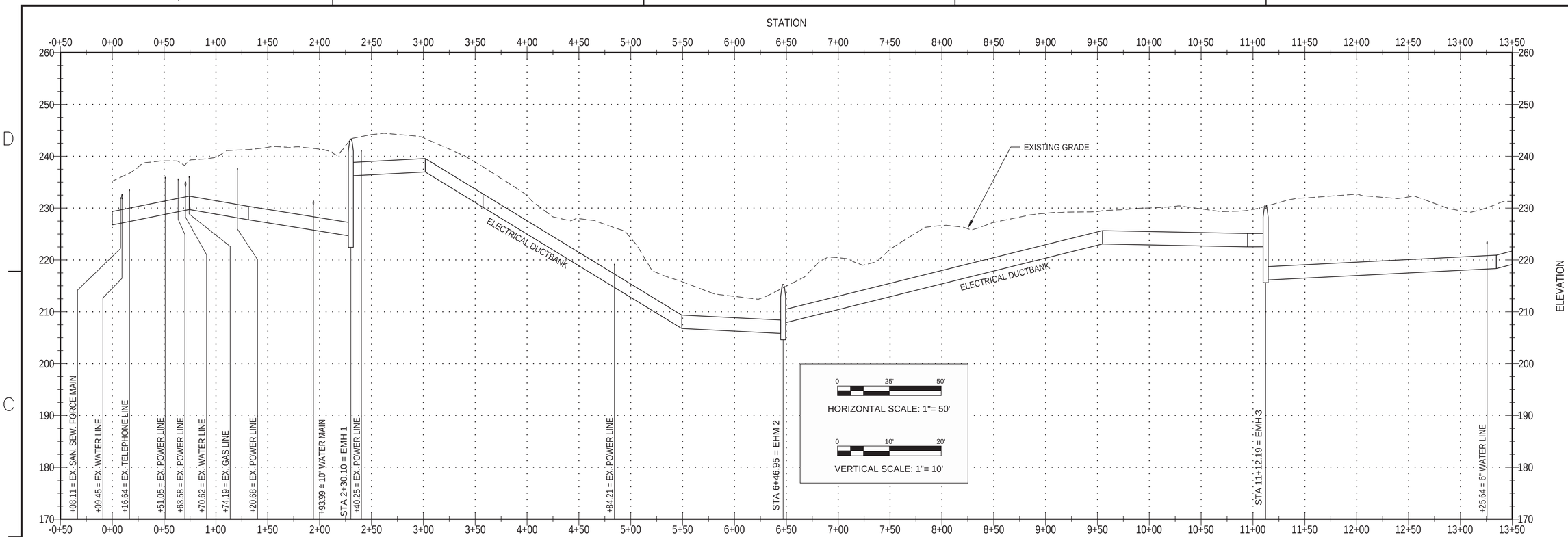
JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

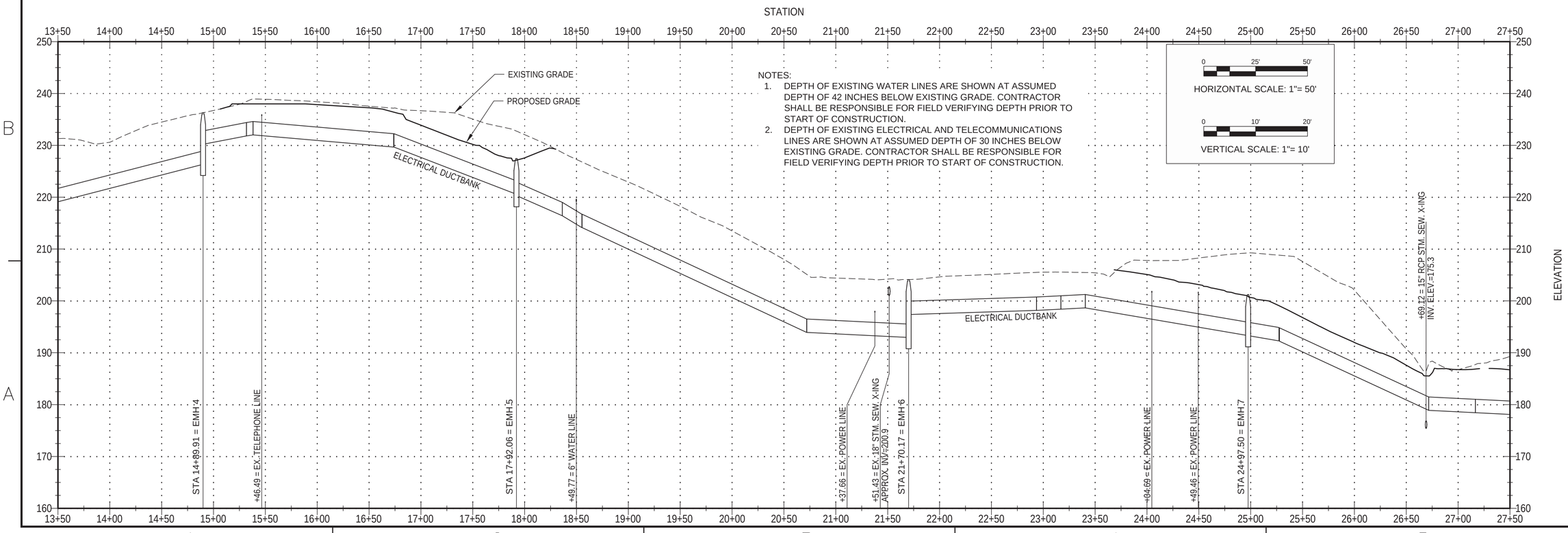
APPROVED
FOR COMMANDER NAVFAC 18 June 2015
ACTIVITY
SATISFACTORY TO DATE Signed by email 18 May 2015
DES HR DRW HR CHK RC
<<PM/DM>>
BRANCH MANAGER MS
CHIEF ENG/ARCH THC
FIRE PROTECTION KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA
P-635 ASP EXPANSION
SITE UTILITY PROFILES

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072298
SHEET 82 OF 201
CU-205
DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\ghm\crowlerc\d0751223\NAVFAC_P635CU-205.dwg LAYOUT NAME: CU-205 PLOTTED: Wednesday, June 10, 2015 - 4:48pm USER: crowlerc





NOTES:

1. DEPTH OF EXISTING WATER LINES ARE SHOWN AT ASSUMED DEPTH OF 42 INCHES BELOW EXISTING GRADE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING DEPTH PRIOR TO START OF CONSTRUCTION.
2. DEPTH OF EXISTING ELECTRICAL AND TELECOMMUNICATIONS LINES ARE SHOWN AT ASSUMED DEPTH OF 30 INCHES BELOW EXISTING GRADE. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING DEPTH PRIOR TO START OF CONSTRUCTION.

SYM	DESCRIPTION	DATE	APPR

NAVFAC

COMMONWEALTH OF VIRGINIA
06/10/2015
BRADFORD D. WEINERT
No. 022244
PROFESSIONAL ENGINEER

SEAL

JACOBS
1100 NORTH GLEBE ROAD SUITE 500
ARLINGTON, VIRGINIA 22201
TEL (571) 218-1000 FAX (571) 218-1600
A/E INFO

APPROVED
FOR COMMANDER NAVFAC 18 June 2015

ACTIVITY
SATISFACTORY TO DATE Signed by end 18 May 2015

DES HR	DRW HR	CHK	RC
<<PM/DM>>			
BRANCH MANAGER			MS
CHIEF ENG/ARCH			THC
FIRE PROTECTION			KTD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL FACILITIES ENGINEERING COMMAND
MARINE CORPS BASE – QUANTICO
QUANTICO, VA

P-635 ASP EXPANSION

SITE UTILITY PROFILES

SCALE: AS NOTED
EPROJECT NO.: 1312142
CONSTR. CONTR. NO.
NAVFAC DRAWING NO. 13072299
SHEET 83 OF 201

CU-206

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: C:\pwworking\qbno\crowlerc\d0751223\NAVFAC_P635CU-206.dwg LAYOUT NAME: CU-206 PLOTTED: Wednesday, June 10, 2015 - 4:48pm USER: crowlerc