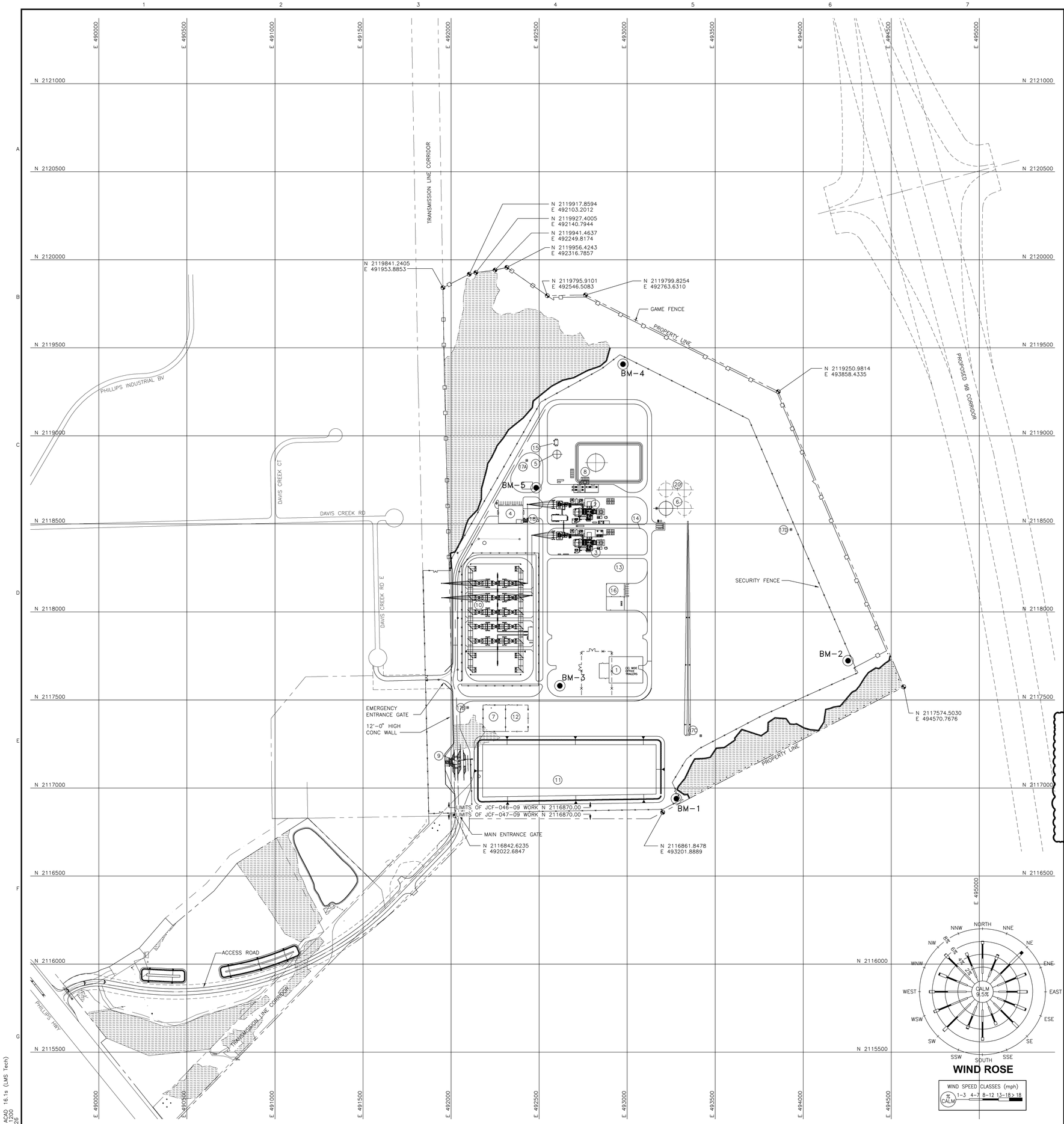


FACILITIES LEGEND

ITEM NO	DESCRIPTION	LOCATION COORDINATES NORTH	LOCATION COORDINATES EAST	REFERENCE LOCATION
1	(6) WIDE OFFICE TRAILER	.	.	.
2	COMBUSTION TURBINE NO 1	2118568	492852	CL STACK
3	COMBUSTION TURBINE NO 2	2118393	492852	CL STACK
4	WAREHOUSE (14,000 SF)			
5	FIRE WATER TANK			
6	DEMIN WATER TANK – OPTIONAL – 1.5 DAY STORAGE (800,000 GAL)			
7	GAS METERING STATION			
8	FUEL OIL TANK W/CONTAINMENT – OPTIONAL – 2.5 DAY STOR (1,875,000 GAL)			
9	GUARD SHACK			
10	230 KV SUBSTATION			
11	RETENTION POND			.
12	FUEL GAS HEATER	2117457	492310	CL STACK
13	DIESEL GENERATOR – OPTIONAL	2118287	492919	CL STACK
14	OIL WATER SEPARATOR			
15	FIRE PUMP BUILDING	2118962	492598	
16	FUTURE – ADMIN/CONTROL/MAINTENANCE BUILDING (26,250 SF)			
17A	ABOVE-GRADE MONITORING WELLS (SEE DWG 160167-DS-0055)	2118860	492430	
17B	ABOVE-GRADE MONITORING WELLS (SEE DWG 160167-DS-0055)	2117457	492094	
17C	ABOVE-GRADE MONITORING WELLS (SEE DWG 160167-DS-0055)	2117297	493418	
17D	ABOVE-GRADE MONITORING WELLS (SEE DWG 160167-DS-0055)	2118468	493930	
18	UTILITY TIE-INS			
19				
20	DEMIN WATER TANK (FUTURE) – 1.5 DAY STORAGE (800,000 GAL)			

GENERAL LEGEND

- FUTURE FACILITY
- 7' HIGH CHAIN LINK SECURITY FENCE
- 8' HIGH GAME FENCE
- PROPERTY LINE

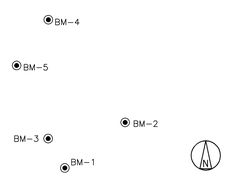
PROJECT SURVEY CONTROL

CONTROL MONUMENT LOCATIONS

MONUMENT NO.	PLANT COORDINATES NORTHING	PLANT COORDINATES EASTING	MONUMENT NO.	STATE PLANE COORDINATES NORTHING	STATE PLANE COORDINATES EASTING	ELEVATION (NGVD 29)	ELEVATION (NAVD 88)	
BM-1	–	–	BM-1	2,116,939.357	493,279.611	20.085	19.03	AS-BUILT
BM-2	–	–	BM-2	2,117,722.882	494,254.361	19.405	18.35	AS-BUILT
BM-3	–	–	BM-3	2,117,580.623	492617.765	29.212	28.15	AS-BUILT
BM-4	–	–	BM-4	2,119,406.707	492,976.529	28.715	27.66	AS-BUILT
BM-5	–	–	BM-5	2,118,704.960	492,483.113	29.035	27.98	AS-BUILT

NOTE: BENCHMARKS ARE 5' x 12"ø CONCRETE MONUMENTS WITH BRASS DISC IN THE TOP. HORIZONTAL CONTROL IS BASED ON THE FLORIDA STATE PLANE COORDINATE – EAST ZONE (1983/90 N.A.D.) SYSTEM. THE ELEVATIONS ARE BASED ON THE NGVD 29 DATUM.

NOTE: THE CONVERSION FROM NGVD 29 TO NAVD 88 CAN BE MADE BY SUBTRACTING 1.06 FT FROM THE GIVEN NGVD ELEVATION.



NOTES

APPROVED FOR CONSTRUCTION

THE DISTRIBUTION AND USE OF THE NATIVE FILE FORMAT OF THIS DRAWING OUTSIDE OF BLACK & VEATCH IS UNCONTROLLED AND SHALL BE USED FOR REFERENCE PURPOSES ONLY.

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
5	03/FEB/10	BENCHMARKS AS-BUILT	JCB	JCB	ALM	JCB	TPD
4	07/OCT/09	APPROVED FOR CONSTRUCTION	PJK	JCB	EEB	JCB	TPD
3	24/SEP/09	GENERAL REVISIONS	PJK	JCB		JCB	TPD
2	03/AUG/09	GENERAL REVISIONS	PJK	JCB		JCB	TPD
1	15/JUN/09	GENERAL REVISIONS	RRH	JCB		JCB	TPD
0	30/APR/09	ISSUED FOR BID	RRH	JCB		JCB	TPD

200' 100' 0 200' 400'
SCALE: 1"=200'

BLACK & VEATCH
12724 Gran Bay Parkway West
Jacksonville, Florida 32258
CERTIFICATE OF AUTHORIZATION NO. 8130

PROJECT	JEA GREENLAND ENERGY CENTER
DRAWING NUMBER	160167-CGAU-G1000
REV	5
ENGINEER	JCB
DRAWN	DAS
CHECKED	EEB
DATE	07/OCT/09
	PLOT PLAN – SIMPLE CYCLE UNITS 1 & 2
CODE	
AREA	1

ACAD 16.1s (LMS Tech)
A1V200
02/03/10 09:10:26
BA929945

KEY PLAN
SCALE: 1"=200'

GENERAL NOTES

1. SEE DWG S3100 FOR EROSION CONTROL PLAN.
2. SEE DWG S3200 FOR FENCING AND SURFACING PLAN.
3. SEE DWG S3900 FOR TYPICAL MANHOLE AND CATCH BASIN DETAILS AND LISTS.
4. SEE DWG S3901 FOR TYPICAL CULVERT AND RIPRAP DETAILS AND LISTS.
5. SEE DWG S3950 FOR SITE SPECIFIC GRADING AND DRAINAGE DETAILS.
6. SEE DWG S3920 FOR EROSION CONTROL DETAILS.
7. EXCESS EARTH MATERIAL FROM THE ENTRANCE ROAD AND THE PLANT SITE DEVELOPMENT WORK SHALL BE SPOILED IN THE AREA DESIGNATED IN PLAN. THE SPOIL MATERIAL SHALL BE UNIFORMLY GRADED TO DRAIN WITHOUT CAUSING ANY PONDING OF ADJACENT AREAS. TOP SOIL MATERIAL SHALL BE SEPARATED FROM MATERIAL SUITABLE FOR GENERAL FILL. THE AREA SHALL BE VEGETATED PER THE EROSION CONTROL SPECIFICATIONS. MATERIAL FROM CLEARING AND GRUBBING OPERATIONS SHALL BE DISPOSED OF PER THE CLEARING AND GRUBBING SPECIFICATIONS.
8. GRADE SHALL SLOPE UNFORMALLY BETWEEN FINISH SPOT ELEVATIONS AND COUNTOURS.
9. A SMOOTH VERTICAL TRANSITION SHALL BE PROVIDED AT ROAD INTERSECTIONS.
10. THE CONTRACTOR IS RESPONSIBLE FOR TYING FINISHED COUNTOURS INTO EXISTING GRADE IN AREAS WHERE THERE IS INSUFFICENT SURVEY DATA OF THE EXISTING GRADE.

LEGEND APPLICABLE TO ALL S3000 DRAWINGS

- PROPERTY LINE
- R/W — LIMIT OF RIGHT-OF-WAY
- NEW SECURITY FENCE
- SWITCHYARD FENCE
- PERIMETER FENCE
- 99 — NEW CONTOUR
- AREA INLET
- NEW STORM WATER SYSTEM
- NEW CULVERT
- DITCH/SWALE FLOW INDICATOR
- GRADE SURFACE FLOW INDICATOR
- 123.45 + — NEW SPOT ELEVATION
- SURVEY CONTROL MONUMENT
- EXISTING FENCE
- 99 — EXISTING CONTOUR
- ASPHALT SURFACING
- AGGREGATE SURFACING
- CONCRETE
- EARTH
- RIPRAP
- SAND/BEDDING MAT'L
- GRASS
- WETLANDS
- 1 / S3000 — SECTION OR DETAIL NUMBER / DRAWING DESIGNATION NUMBER

ABBREVIATIONS APPLICABLE TO ALL S3000 DRAWINGS

A	–	ARC LENGTH	LS	–	LIFT STATION
AGG	–	AGGREGATE	LTR	–	LATER
APPROX	–	APPROXIMATE	MATL	–	MATERIAL
ASPH	–	ASPHALT	MH	–	MANHOLE
AVG	–	AVERAGE	MSL	–	MEAN SEA LEVEL
BLDG	–	BUILDING	MW	–	MONITORING WELL
B/MH	–	BOTTOM OF MANHOLE ELEVATION	N	–	NORTH
BOD	–	BOTTOM OF ELECTRICAL DUCT BANK	NO.	–	NUMBER
BOP	–	BOTTOM OF PIPE	NTS	–	NOT TO SCALE
BU	–	BELL UP	OD	–	OUTSIDE DIAMETER
CHDPE	–	CORRUGATED HIGH DENSITY POLYETHYLENE PIPE	OWS	–	OIL/WATER SEPARATOR
CJ	–	CONTRACTION JOINT	PC	–	POINT OF CURVATURE
CL	–	CENTERLINE	PE	–	PLAIN END
CMP	–	CORRUGATED METAL PIPE	PI	–	POINT OF INTERSECTION
CO	–	CLEAN OUT	PL	–	PROPERTY LINE
D	–	DEGREE OF CURVE	PLCS	–	PLACES
Δ	–	DELTA ANGLE OF HORIZONTAL CURVE	PRC	–	POINT OF REVERSE CURVE
DI	–	DUCTILE IRON	PT	–	POINT OF TANGENT
DIA	–	DIAMETER	PVC	–	POINT OF VERTICAL CURVE
DIM	–	DIMENSION	PVI	–	POINT OF VERTICAL INTERSECTION
DWG	–	DRAWING	PVT	–	POINT OF VERTICAL TANGENT
E	–	EAST	R	–	RADIUS
EA	–	EACH	RCP	–	REINFORCED CONCRETE PIPE
EF	–	EACH FACE	RD	–	ROOF DRAIN
EGP	–	EDGE OF PAVEMENT	RED	–	REDUCER
EGS	–	EDGE OF SHOULDER	REQ'D	–	REQUIRED
EHH	–	ELECTRICAL HANDHOLE	REV	–	REVISION
EL	–	ELEVATION	R/W	–	RIGHT-OF-WAY
EJ	–	EXPANSION JOINT	S	–	SOUTH
EW	–	EACH WAY	SE	–	SUPERELEVATION
EXP	–	EXPANSION	SIM	–	SIMILAR
FD	–	FLOOR DRAIN	STA	–	STATION
FDN	–	FOUNDATION	T	–	TANGENT LENGTH
FF	–	FINISHED FLOOR	TMH	–	TOP OF MANHOLE
FG	–	FINISHED GRADE	TOC	–	TOP OF CONCRETE
FRP	–	FIBER REINFORCED PIPE	TOG	–	TOP OF GRATING
FT	–	FOOT	TOP	–	TOP OF PAVEMENT
HC	–	HANDICAPPED	TYP	–	TYPICAL
HDPE	–	HIGH DENSITY POLYETHYLENE	UNO	–	UNLESS NOTED OTHERWISE
HVCM	–	HORIZ & VERT CONTROL MONUMENT	V	–	DESIGN SPEED
HP	–	HIGH POINT	VERT	–	VERTICAL
ID	–	INSIDE DIAMETER	W	–	WEST
IN	–	INCH	W/	–	WITH
INV	–	INVERT	W/O	–	WITHOUT
L	–	LENGTH	WP	–	WORK POINT
LC	–	LENGTH OF VERTICAL CURVE			

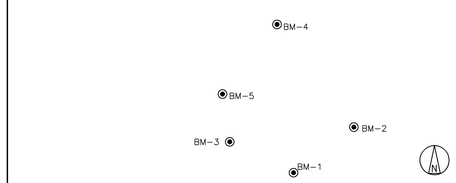
PROJECT SURVEY CONTROL

CONTROL MONUMENT LOCATIONS

MONUMENT NO.	PLANT COORDINATES		MONUMENT NO.	STATE PLANE COORDINATES		ELEVATION
	NORTHING	EASTING		NORTHING	EASTING	
BM-1	–	–	BM-1	2,116,939.36	493,279.61	20.09
BM-2	–	–	BM-2	2,117,722.88	494,254.36	19.41
BM-3	–	–	BM-3	2,117,436.00	492,143.00	24.23
BM-4	–	–	BM-4	2,119,406.71	492,976.53	28.72
BM-5	–	–	BM-5	2,118,252.88	492,019.51	24.09

NOTE: BENCHMARKS ARE 5' x 12"ø CONCRETE MONUMENTS WITH BRASS DISC IN THE TOP. HORIZONTAL CONTROL IS BASED ON THE FLORIDA STATE PLANE COORDINATE – EAST ZONE (1983/90 N.A.D.) SYSTEM. THE ELEVATIONS ARE BASED ON THE NGVD 29 DATUM.

NOTE: THE CONVERSION FROM NGVD 29 TO NAVD 88 CAN BE MADE BY SUBTRACTING 1.06 FT FROM THE GIVEN NGVD ELEVATION.



								8	08/SEP/11	CONFORMED TO CONSTRUCTION RECORD	SMB	JCB		JCB	TPD
								7	10/DEC/09	ECN N-S-0005	JRH	JCB	EEB	JCB	TPD
								6	07/OCT/09	GENERAL REVISIONS	PJK	JCB	EEB	JCB	TPD
								5	24/SEP/09	GENERAL REVISIONS	PJK	JCB	ALM	JCB	DRG
								4	07/SEP/09	APPROVED FOR CONSTRUCTION	PJK	JCB	ALM	JCB	DRG

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
3	24/AUG/09	CONFORMED TO CONTRACT (JCF-045-09)	RRH	JCB		JCB	TPD
2	15/JUN/09	GENERAL REVISIONS	RRH	JCB		JCB	TPD
1	30/APR/09	ISSUED FOR BID	RRH	JCB		JCB	TPD
0	25/SEP/08	ISSUED FOR OWNER REVIEW	MRR	MJT		TAP	

N

200' 100' 0 200' 400'
SCALE: 1"=200'

BLACK & VEATCH
12724 Gran Bay Parkway West
Suite 450
Jacksonville, Florida 32258
CERTIFICATE OF AUTHORIZATION NO. 8132

ENGINEER	MJT	DRAWN	MRR
CHECKED	ALM	DATE	07/SEP/09

JEA
GREENLAND ENERGY CENTER

GRADING AND DRAINAGE DRAWING
KEY PLAN LAYOUT

PROJECT	DRAWING NUMBER	REV
160167-CSTF-S3000		8

CODE
AREA

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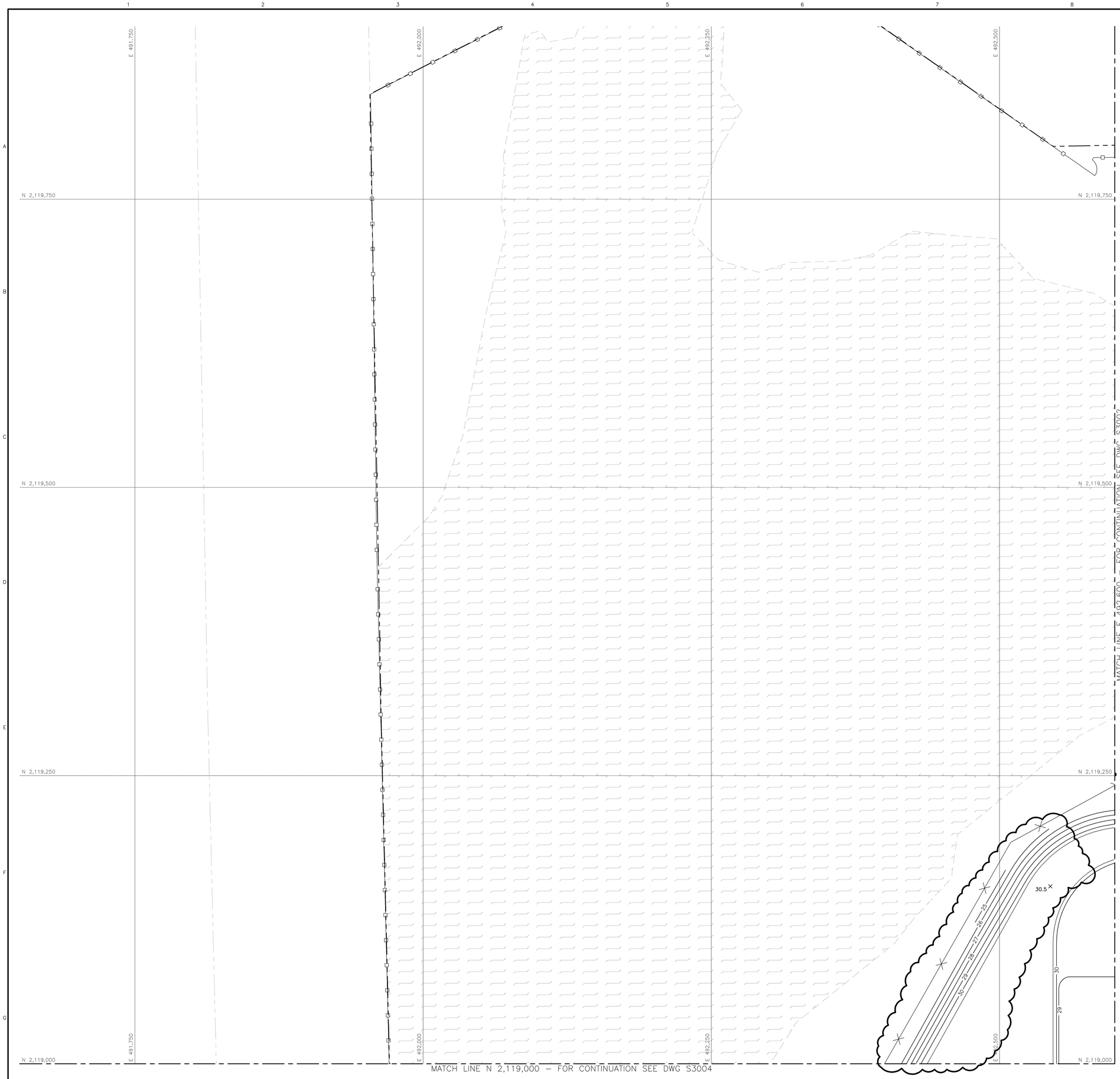
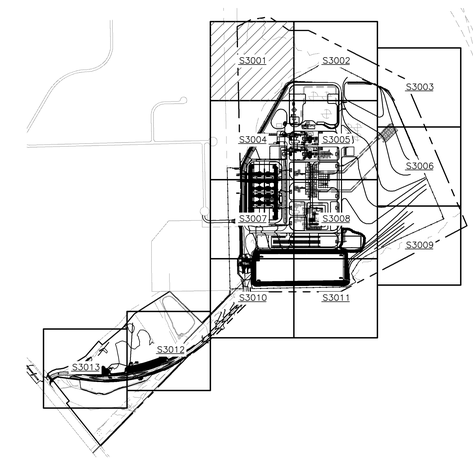
09/07/11



ALL CHANGES PER ECN N-S-0003

KEY PLAN



GENERAL NOTES

1. SEE DWG S3000 FOR LEGEND, GENERAL NOTES, KEY PLAN, AND ABBREVIATIONS.

APPROVED FOR CONSTRUCTION

THE DISTRIBUTION AND USE OF THE NATIVE FILE FORMAT OF THIS DRAWING OUTSIDE OF BLACK & VEATCH IS UNCONTROLLED AND SHALL BE USED FOR REFERENCE PURPOSES ONLY.

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
5	11/NOV/09	ECN N-S-0003	JCB	JCB	JCB	TPD	
4	24/SEP/09	GENERAL REVISIONS	PJK	MJT	TAP		
3	07/SEP/09	APPROVED FOR CONSTRUCTION	PJK	JCB	ALM	JCB	DRG
2	24/AUG/09	CONFORMED TO CONTRACT	RRH	JCB		JCB	TPD
1	30/APR/09	ISSUED FOR BID	RRH	JCB		JCB	TPD
0	25/SEP/08	ISSUED FOR OWNER REVIEW	MRR	MJT		TAP	

SCALE: 1"=30' (30' 20' 10' 0 30' 60')

BLACK & VEATCH CORPORATION

ENGINEER MJT | DRAWN MRR | CHECKED ALM | DATE 07/SEP/09

JEA
GREENLAND ENERGY CENTER

GRADING AND DRAINAGE DRAWING
PLAN – AREA 1

PROJECT / DRAWING NUMBER: 160167–CSTF–S3001 | REV: 5

CODE | AREA | CERTIFICATE OF AUTHORIZATION NO. 8132

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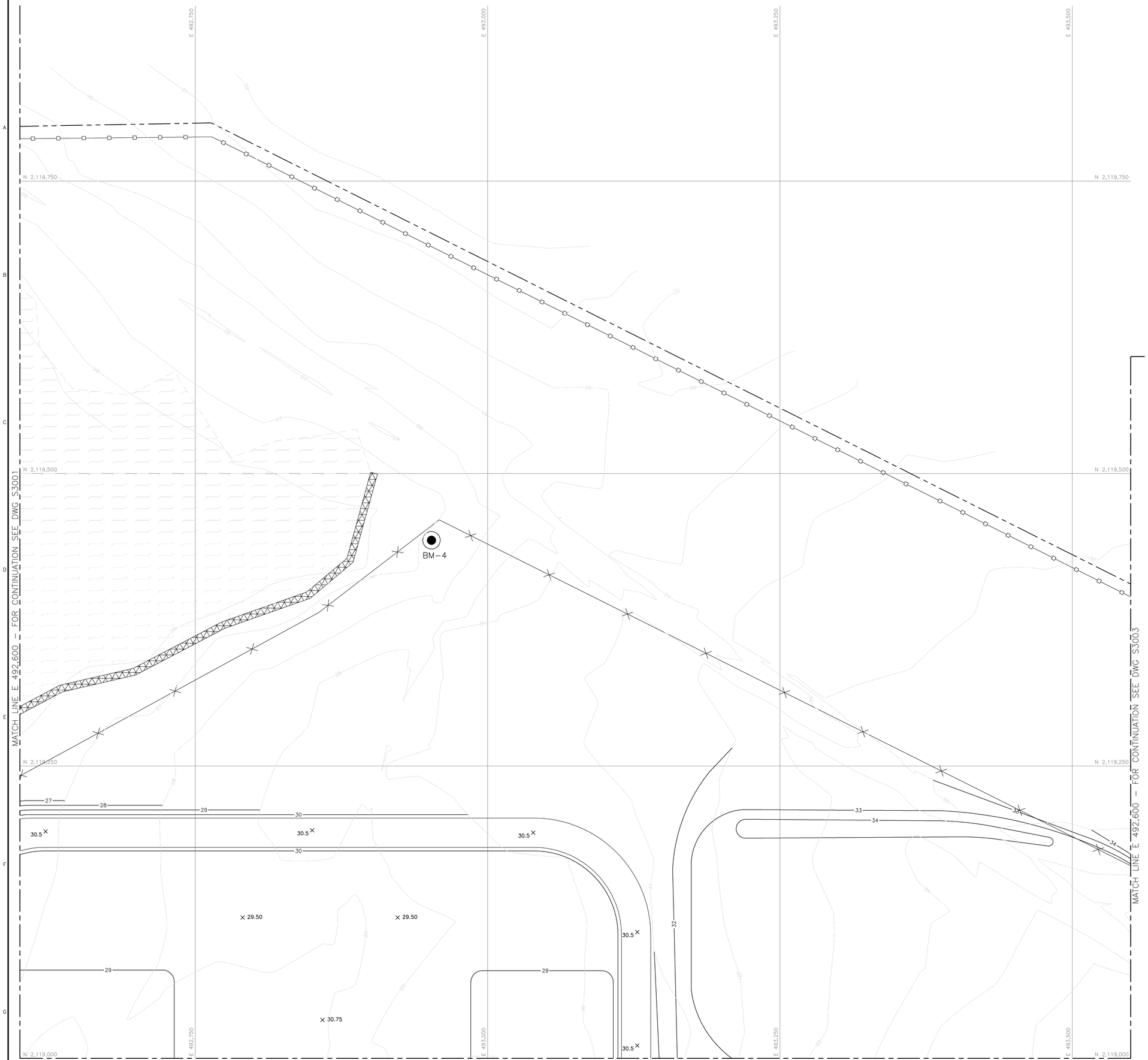
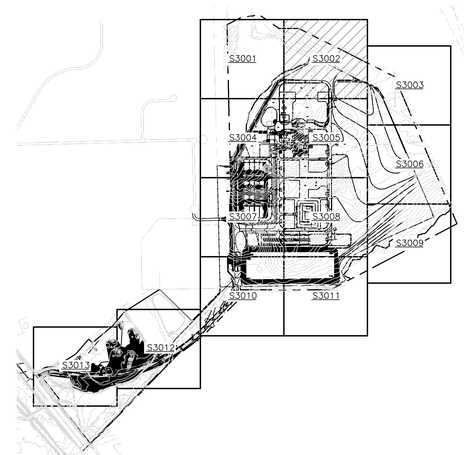


KEY PLAN



GENERAL NOTES

1. SEE DWG S3000 FOR LEGEND, GENERAL NOTES, KEY PLAN, AND ABBREVIATIONS.

APPROVED FOR CONSTRUCTION

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NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
3	07/SEP/09	APPROVED FOR CONSTRUCTION	PJK	JCB	ALM	JCB	DRG
2	24/AUG/09	CONFORMED TO CONTRACT	RRH	JCB		JCB	TPD
1	30/APR/09	ISSUED FOR BID	RRH	JCB		JCB	TPD
0	25/SEP/08	ISSUED FOR OWNER REVIEW	MRR	MJT		TAP	
4	24/SEP/09	GENERAL REVISIONS	PJK	MJT		TAP	

SCALE: 1" = 30'

BLACK & VEATCH
12724 Gran Bay Parkway West
Suite 400
Jacksonville, Florida 32258
CERTIFICATE OF AUTHORIZATION NO. 8132

MJT	DRAWN	MRR	
CHECKED	ALM	DATE	07/SEP/09

JEA
GREENLAND ENERGY CENTER

GRADING AND DRAINAGE DRAWING
PLAN – AREA 2

PROJECT / DRAWING NUMBER: 160167–CSTF–S3002

REV: 4

CODE:

AREA:

20

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J0H33930
41A007
11/19/09
E1
15.06.09
1=1

MATCH LINE N 2,119,000 – FOR CONTINUATION SEE DWG S3001

E 491,750 | E 492,000 | E 492,250 | E 492,500

N 2,118,750 | N 2,118,500 | N 2,118,250

CB-29 | CB-28 | CB-36 | CB-27 | CB-26 | CB-01 | CB-03 | CB-04 | CB-05

BM-5

BEGINNING OF DITCH
N 2118191.61

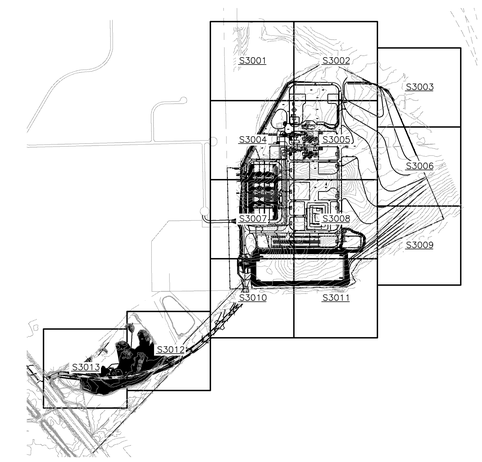
EOD OF DITCH
E 492049.49

HIGH POINT
E 492264.82

MATCH LINE E 492,600 – FOR CONTINUATION SEE DWG S3005

MATCH LINE N 2,118,100 – FOR CONTINUATION SEE DWG S3007

KEY PLAN



GENERAL NOTES

1. SEE DWG S3000 FOR LEGEND, GENERAL NOTES, KEY PLAN, AND ABBREVIATIONS.

ALL CHANGES PER ECN N-S-0003

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
3	24/AUG/09	CONFORMED TO CONTRACT	SAC	JCB		JCB	TPD
2	09/JUL/09	GENERAL REVISIONS	SAC	JCB		JCB	TPD
1	30/APR/09	ISSUED FOR BID	RRH	JCB		JCB	TPD
0	25/SEP/08	ISSUED FOR OWNER REVIEW	MRR	MJT		TAP	

NO	DATE	DESCRIPTION	DRN	DES	CHK	PDE	APP
7	11/NOV/09	ECN N-S-0003	JCB	JCB	MJT	JCB	DRG
6	22/OCT/09	ECN N-S-0002	DAS	JCB	JAC	JCB	DRG
5	24/SEP/09	GENERAL REVISIONS	PJK	JCB	ALM	JCB	DRG
4	07/SEP/09	APPROVED FOR CONSTRUCTION	PJK	JCB	ALM	JCB	DRG

SCALE: 1"=30'

BLACK & VEATCH CORPORATION

ENGINEER MJT | DRAWN MRR | CHECKED ALM | DATE 07/SEP/09

JEA
GREENLAND ENERGY CENTER

GRADING AND DRAINAGE DRAWING
PLAN – AREA 4

PROJECT / DRAWING NUMBER: P160167-CSTF-S3004 | REV 7

CODE | AREA

CERTIFICATE OF AUTHORIZATION NO. 8132

ACAD 16.1s (LMS Tech)
A1-1 E1
11/10/09 18:22:19
BA629948

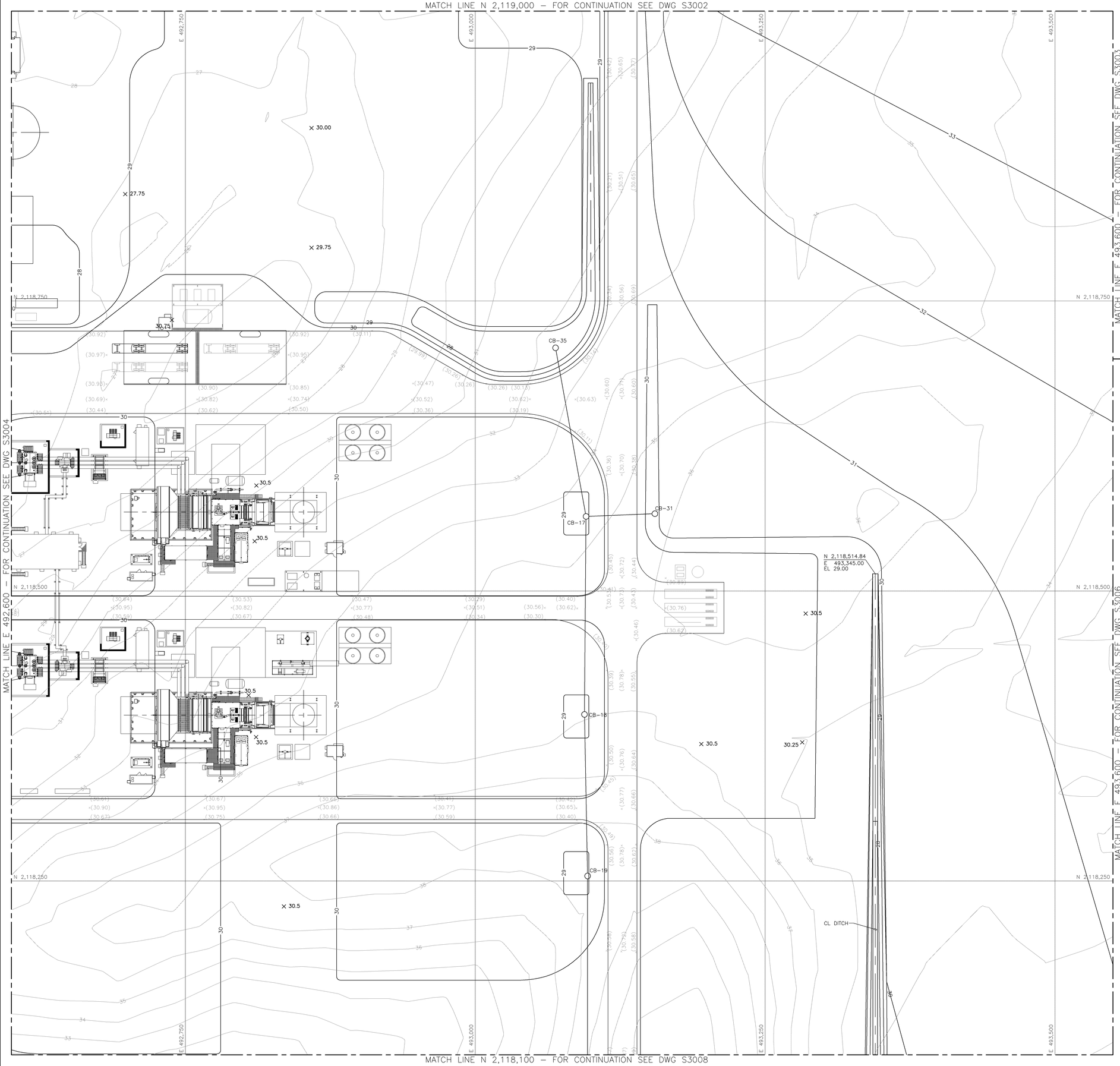
MATCH LINE N 2,119,000 – FOR CONTINUATION SEE DWG S3002

MATCH LINE E 492,600 – FOR CONTINUATION SEE DWG S3004

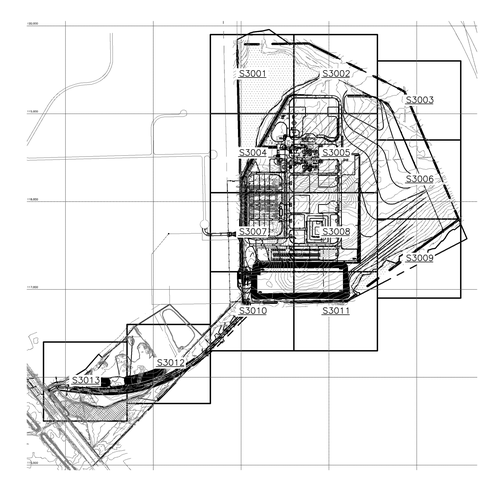
MATCH LINE E 493,600 – FOR CONTINUATION SEE DWG S3003

MATCH LINE E 493,600 – FOR CONTINUATION SEE DWG S3006

MATCH LINE N 2,118,100 – FOR CONTINUATION SEE DWG S3008



KEY PLAN



GENERAL NOTES

1. SEE DWG S3000 FOR LEGEND, GENERAL NOTES, KEY PLAN, AND ABBREVIATIONS.

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
3	07/SEP/09	APPROVED FOR CONSTRUCTION	PJK	JCB	ALM	JCB	DRB
2	24/AUG/09	CONFORMED TO CONTRACT	RRH	JCB		JCB	TPD
1	30/APR/09	ISSUED FOR BID	RRH	JCB		JCB	TPD
0	25/SEP/08	ISSUED FOR OWNER REVIEW	MRR	MJT		TAP	
4	24/SEP/09	ECN N-S-0001	DAS	JCB	ALM	JCB	TPD
5	18/DEC/09	ECN N-S-0006	SLJ	JCB	ALM	JCB	TPD
6	08/SEP/11	CONFORMED TO CONSTRUCTION RECORD	SMB	JCB		JCB	TPD

N

30' 20' 10' 0 30' 60'

SCALE: 1"=30'

BLACK & VEATCH
12724 Gran Bay Parkway West
Suite 300
Jacksonville, Florida 32258
CERTIFICATE OF AUTHORIZATION NO. 8132

ENGINEER	MJT	DRAWN	MRR
CHECKED	ALM	DATE	07/SEP/09

JEA
GREENLAND ENERGY CENTER

GRADING AND DRAINAGE DRAWING
PLAN – AREA 5

PROJECT / DRAWING NUMBER: 160167–CSTF–S3005

REV: 6

CODE

AREA

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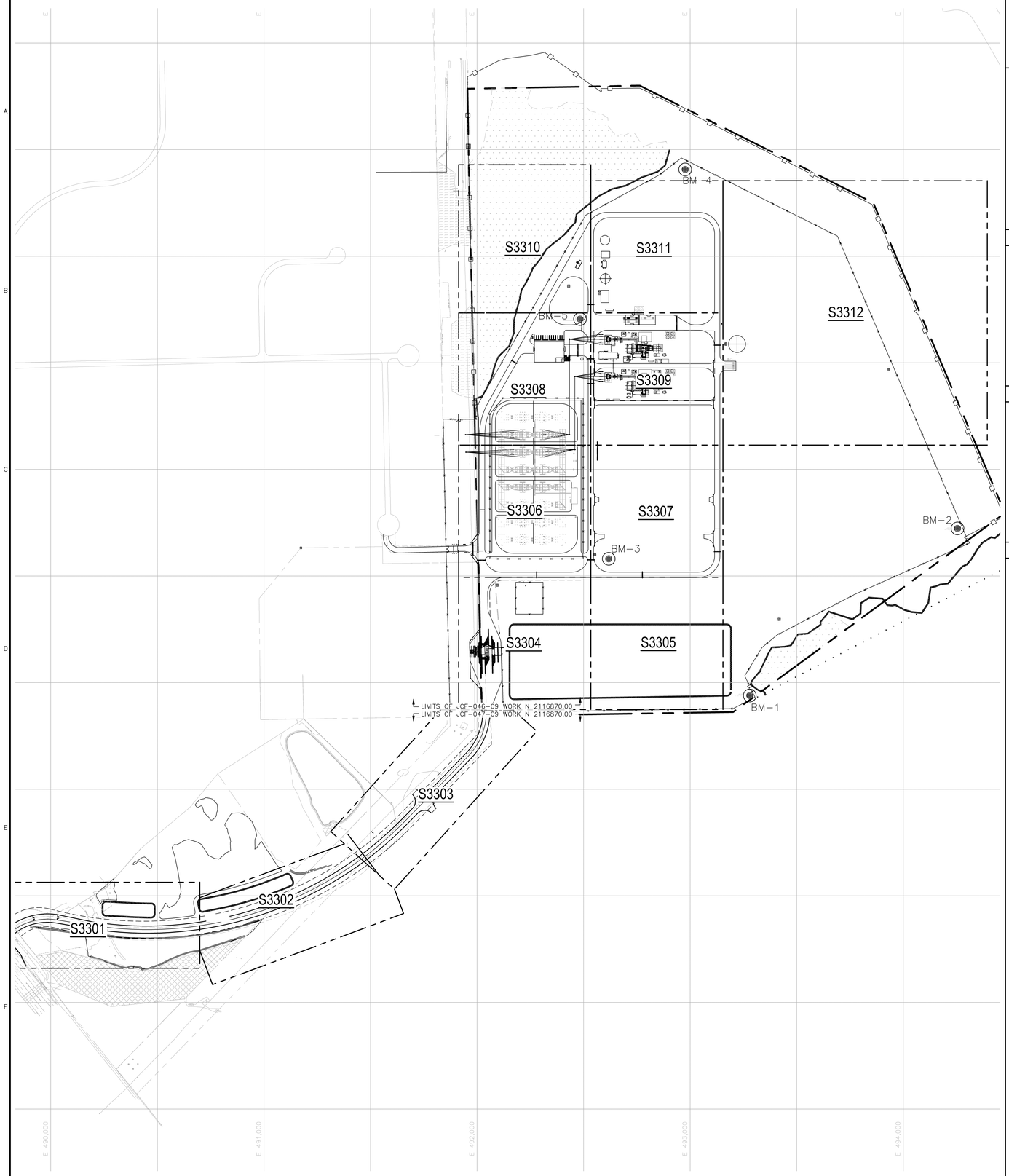
09/07/11



UNDERGROUND SYSTEM CODE LIST

SYSTEM CODE	SYSTEM DESCRIPTION
CFGC	NATURAL GAS SUPPLY
CSTG	SITE FIRE PROTECTION
CWSR	REUSE WATER SUPPLY
CWSE	POTABLE WATER/FIRE PROTECTION WATER SUPPLY
CWWB	SANITARY SEWER

PIPELINE SYSTEM DESIGNATION

UNIT DESIGNATOR
PIPE SYSTEM DESIGNATION
BOTTOM OF PIPE ELEVATION (UNLESS NOTED OTHERWISE)
CSTG EL 91.00
10 XXX E 9600.00
CENTERLINE COORDINATE
PIPE MATERIAL AND LINE CODE, SEE DWG M0100 FOR PIPELINE LIST
NOMINAL SIZE (INCHES)

ELECTRICAL SYSTEM DESIGNATION

10DB001 — INDICATES DUCT BANK DESIGNATION NUMBER
N 2000.00 — INDICATES CENTER LINE PLAN LOCATION
INDICATES ELECTRICAL DUCT BANK (CONCRETE ENCASED)
1EMH01 — INDICATES ELECTRICAL MANHOLE/ DESIGNATION NUMBER
BOD 91.00
INDICATES ELECTRICAL CONDUIT AND DUCT CALLOUT NUMBER
BOTTOM OF CONDUIT ELEVATION
1DB06A1 EL 100.00 — INDICATES ELECTRICAL CONDUIT AND DUCT CALLOUT NUMBER

LEGEND APPLICABLE TO ALL S3300 DRAWINGS

1 / S3300 — SECTION OR DETAIL NUMBER / DRAWING DESIGNATION NUMBER
PROPERTY LINE
UGL — UNDERGROUND CONDUIT (CONCRETE ENCASED)
UGL — UNDERGROUND LIGHTING CONDUIT
INDICATES PIPING
BV-01 — VALVE AND DESIGNATION NUMBER
POST INDICATOR VALVE
C-01 — INDICATES CULVERT
10 / A — CATHODIC PROTECTION FIELD TEST STATION; IDENTIFICATION TAG NUMBER AS INDICATED. "A" INDICATES ABOVEGROUND TYPE; "F" INDICATES FLUSH MOUNTED TYPE; "C" INDICATES THAT A PERMANENT REFERENCE ELECTRODE IS CONNECTED.
BLIND FLANGE
CAP
HYD-01 — FIRE HYDRANT AND DESIGNATION NUMBER
LP-01 — LIGHT POLE
AGGREGATE SURFACING
CONCRETE (REINFORCED)
ASPHALT SURFACING
GRASS
TEE AND 90° ELBOW
2-90° ELBOWS
1-90° ELBOW (NO ELEVATION CHANGE)
1-TEE (NO ELEVATION CHANGE)
ROLLED 90 W/45 (UNO) (FITTING TO FITTING)
ROLLED TEE W/45 (UNO)
2- 45° ELBOWS (FOR DRAIN SYSTEMS)
WYE AND 45° ELBOW (FOR DRAIN SYSTEMS)
45° ELBOW (UNO)
CLEAN-OUT (CO)
LINE SIZE CHANGE W/REDUCER
FLANGE W/ BLIND
VERTICAL TP, BU, OR FD
AV — AIR RELEASE VALVE AND PIT
FH — FLUSHING HYDRANT

GENERAL NOTES

1. GENERAL NOTES ARE APPLICABLE TO ALL S3300 SERIES DRAWINGS.
2. GRAVITY PIPE AND ELECTRICAL DUCT BANK SHALL HAVE A CONSTANT SLOPE BETWEEN ELEVATIONS INDICATED.
3. THE LOCATIONS OF THE EXISTING FACILITIES AND UNDERGROUND UTILITES SHOWN ON THIS SERIES OF DRAWINGS REPRESENT THE BEST KNOWLEDGE OF THE ENGINEER. BEFORE ANY WORK IS STARTED IN THE AREA OF EXISTING FACILITIES AND UNDERGROUND UTILITIES, THE CONTRACTOR SHALL CONFIRM THEIR LOCATIONS AND NOTIFY THE SITE MANAGER THAT WORK IS PLANNED IN THIS AREA.

   ALL TIE-IN POINTS OF EXISTING UNDERGROUND UTILITIES SHALL BE FIELD VERIFIED AND ADJUSTED AS NECESSARY. CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL NECESSARY TO MAKE TIE-IN. EXISTING PIPING SHALL BE REMOVED OR ABANDONED IN PLACE AS NOTED ON THE DRAWINGS. EXISTING UNDERGROUND PIPING AND FACILITIES NOT NOTED ON THE DRAWINGS TO BE REMOVED OR ABANDONED SHALL BE CONFIRMED WITH THE SITE MANAGER PRIOR TO BEING DISTURBED. MANHOLES ASSOCIATED WITH EXISTING PIPING TO BE REMOVED OR ABANDONED SHALL BE REMOVED UNLESS NEEDED FOR CONTINUED SERVICE OF OTHER ACTIVE PIPE. ALL WORK SHALL BE COORDINATED WITH THE CONSTRUCTION MANAGEMENT.
4. ALL UNDERGROUND UTILITIES SHALL HAVE A MINIMUM OF 2 FEET OF 95% COMPACTED EARTH COVER BEFORE BEING SUBJECTED TO ANY CONSTRUCTION TRAFFIC, UNLESS NOTED OTHERWISE. IF CONSTRUCTION TRAFFIC EXCEEDS 3360 PSF, ONCE THE COVER REQUIREMENT IS MET, THEN THE LOAD MUST BE SPREAD OUT TO 3360 PSF OR LESS USING MATS OR CRIBBING.
5. ALL WATER AND SEWER INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE LATEST JEA WATER & SEWER STANDARDS MANUAL, JEA DIS MANUAL, AND FLORIDA DEP REGULATIONS, FAC 62-555 AND 62-604.
6. CONTRACTOR TO PROVIDE HYDROSTATIC TESTING ON ALL NEW WATER MAINS IN ACCORDANCE WITH 62-444.330 FAC.
7. CONTRACTOR TO PROVIDE DISINFECTION AND BACTERIOLOGICAL TESTING FOR ALL NEW WATER MAINS IN ACCORDANCE WITH 62-555.340.
8. CONTRACTOR TO PROVIDE LOCATE WIRE ON WATER MAIN AND SANITARY SEWER FORCE MAIN PER JEA WATER & SEWER STANDARDS MANUAL - SECTION 350.
9. WATER MAIN PIPE AND FITTINGS SHALL BE IN ACCORDANCE WITH JEA WATER AND SEWER STANDARD SECTION 350.

WATER MAIN AND NON-WATER MAIN SEPARATION REQUIREMENTS

1. IT IS REQUIRED THAT "WATER MAINS" BE INSTALLED, CLEANED, DISINFECTED AND HAVE A SATISFACTORY BACTERIOLOGICAL SURVEY PERFORMED IN ACCORDANCE WITH THE LATEST APPLICABLE AWWA STANDARDS, CHAPTER 62-555, F.A.C. AND LATEST JEA WATER AND SEWER STANDARDS. FOR THE PURPOSE OF THIS SECTION, THE PHRASE "WATER MAINS" SHALL MEAN MAINS, INCLUDING TREATMENT PLANT PROCESS PIPING, CONVEYING EITHER RAW, PARTIALLY TREATED, OR FINISHED DRINKING WATER; FIRE HYDRANT LEADS; AND SERVICE LINES THAT HAVE AN INSIDE DIAMETER OF THREE (3) INCHES OR GREATER. IN ADDITION, THE PHRASE "RECLAIMED WATER" REFERS TO THE WATER REGULATED UNDER PART III OF CHAPTER 62-610, F.A.C.
2. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST THREE (3) FEET BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED STORM SEWER, STORMWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER.
3. NEW OR RELOCATED, UNDERGROUND WATER MAINS SHALL BE LAID TO PROVIDE A HORIZONTAL DISTANCE OF AT LEAST SIX (6) FEET, AND PREFERABLY TEN (10) FEET, BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF ANY EXISTING OR PROPOSED GRAVITY OR PRESSURE-TYPE SANITARY SEWER, WASTEWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER. THE MINIMUM HORIZONTAL SEPARATION DISTANCE BETWEEN WATER MAINS AND GRAVITY-TYPE SANITARY SEWERS MAY BE REDUCED TO THREE (3) FEET WHERE THE BOTTOM OF THE WATER MAIN IS LAID AT LEAST SIX (6) INCHES ABOVE THE TOP OF THE SEWER (SPECIAL CASE).
4. NEW OR RELOCATED, UNDERGROUND WATER MAINS CROSSING ANY EXISTING OR PROPOSED GRAVITY OR VACUUM-TYPE SANITARY SEWER OR STORM SEWER SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS AT LEAST SIX (6) INCHES, AND PREFERABLE TWELVE (12) INCHES, ABOVE OR AT LEAST TWELVE (12) INCHES BELOW THE OUTSIDE OF THE OTHER PIPELINE. HOWEVER, IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE OTHER PIPELINE.
5. NEW OR RELOCATED, UNDERGROUND WATER MAINS CROSSING ANY EXISTING OR PROPOSED PRESSURE-TYPE SANITARY SEWER, WASTEWATER OR STORMWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER SHALL BE LAID SO THE OUTSIDE OF THE WATER MAIN IS A LEAST TWELVE (12) INCHES ABOVE OR BELOW THE OUTSIDE OF THE OTHER PIPELINE. HOWEVER, IT IS PREFERABLE TO LAY THE WATER MAIN ABOVE THE OTHER PIPELINE.
6. AT THE UTILITY CROSSINGS DESCRIBED IN NOTES 4 AND 5 ABOVE, ONE FULL LENGTH OF WATER MAIN PIPE SHALL BE CENTERED ABOVE OR BELOW THE OTHER PIPELINE SO THE WATER MAIN JOINTS WILL BE AS FAR AS POSSIBLE FROM THE OTHER PIPELINE. ALTERNATIVELY, AT SUCH CROSSINGS, THE PIPES SHALL BE ARRANGED SO THAT ALL WATER MAIN JOINTS ARE AT LEAST THREE (3) FEET FROM ALL JOINTS IN VACUUM-TYPE SANITARY SEWERS, STORM SEWERS, STORMWATER FORCE MAINS, OR PIPELINES CONVEYING RECLAIMED WATER, AND AT LEAST SIX (6) FEET FROM ALL JOINTS IN GRAVITY OR PRESSURE-TYPE SANITARY SEWERS, WASTEWATER FORCE MAINS, OR PIPELINE CONVEYING RECLAIMED WATER.
7. NEW OR RELOCATED FIRE HYDRANTS SHALL BE LOCATED SO THAT THE HYDRANTS ARE AT LEAST THREE (3) FEET FROM ANY EXISTING OR PROPOSED STORM SEWER, STORMWATER FORCE MAIN, OR PIPELINE CONVEYING RECLAIMED WATER; AT LEAST THREE (3) FEET, AND PREFERABLY TEN (10) FEET, FROM ANY EXISTING OR PROPOSED VACUUM-TYPE SANITARY SEWER; AT LEAST SIX (6) FEET, AND PREFERABLY TEN (10) FEET, FROM ANY EXISTING OR PROPOSED GRAVITY OR PRESSURE-TYPE SANITARY SEWER OR WASTEWATER FORCE MAIN.
8. WHERE AN UNDERGROUND WATER MAIN IS BEING LAID LESS THAN THE REQUIRED MINIMUM HORIZONTAL DISTANCE FROM ANOTHER PIPELINE AND WHERE AN UNDERGROUND WATER MAIN IS CROSSING ANOTHER PIPELINE AND JOINTS IN THE WATER MAIN ARE BEING LOCATED LESS THAN THE REQUIRED MINIMUM DISTANCE FROM JOINTS IN THE OTHER PIPELINE, THE CONTRACTOR SHALL CONSULT THE DESIGN ENGINEER TO OBTAIN APPROVAL OF ANY ALTERNATIVE CONSTRUCTION METHODS, PRIOR TO CONSTRUCTION.

ABBREVIATIONS APPLICABLE TO ALL S3300 DRAWINGS

AV	– AIR RELEASE VALVE	JBX	– JUNCTION BOX
APPROX	– APPROXIMATE	LTR	– LATER
AVG	– AVERAGE	LUG	– UNDERGROUND LIGHTING CONDUIT
B/MH	– BOTTOM OF MANHOLE ELEVATION	MH	– MANHOLE
BOC	– BOTTOM OF CONDUIT ELEVATION	MJ	– MECHANICAL JOINT
BOD	– BOTTOM OF DUCTBANK ELEVATION	NO.	– NUMBER
BOP	– BOTTOM OF PIPE ELEVATION	NTS	– NOT TO SCALE
BU	– BELL-UP	OD	– OUTSIDE DIAMETER
CD	– CABLE DUCT	PE	– PLAIN END
CHDPE	– CORRUGATED HIGH DENSITY POLYETHYLENE PIPE	PI	– POINT OF INTERSECTION
CL	– CENTERLINE	PLCS	– PLACES
CLR	– CLEAR	PMH	– PLANT MANHOLE
CMH	– CHEMICAL MANHOLE	PT	– POINT OF TANGENT
CND	– CONDUIT	PVC	– POLYVINYL CHLORIDE PIPE
CO	– CLEAN OUT	R	– RADIUS
CS	– CARBON STEEL	RD	– ROOF DRAIN
CW	– CIRCULATING WATER	RED	– PIPE REDUCER
DB	– DUCTBANK	REV	– REVISION
DBC	– DIRECT BURIED CABLE	RGS	– RIGID GALVANIZE STEEL
DET	– DETAIL	RR	– RAILROAD
DIA	– DIAMETER	SIM	– SIMILAR
DIP	– DUCTILE IRON PIPE	SMH	– SANITARY MANHOLE
DWG	– DRAWING	STRL	– STRUCTURAL
DWP	– DOUBLE WALL PIPE	T/G	– TOP OF GRATE ELEVATION
EC	– ELECTRICAL CONDUIT	T/MH	– TOP OF MANHOLE ELEVATION
ECC	– ECCENTRIC	T/P	– TOP OF PAVEMENT ELEVATION
EF	– EACH FACE	THH	– TELEPHONE SERVICE HANDHOLE
EHH	– ELECTRICAL HANDHOLE	TOC	– TOP OF CONCRETE ELEVATION
EL	– ELEVATION	TP	– MECH PIPE TERMINATION POINT
ELL	– PIPE ELBOW	TYP	– TYPICAL
EMH	– ELECTRICAL MANHOLE	UNO	– UNLESS NOTED OTHERWISE
EW	– EACH WAY	VERT	– VERTICAL
FC	– FIELD CHECK	WTR	– WATER
FD	– FLOOR DRAIN	WP	– WORK POINT
FDN	– FOUNDATION	XFMR	– TRANSFORMER
FM	– FORCE MAIN		
FRP	– FIBERGLASS REINFORCED PIPE		
HDM	– HOT DRAIN MANHOLE		
HDPE	– HIGH DENSITY POLYETHYLENE PIPE		
HYD	– HYDRANT		
ID	– INSIDE DIAMETER		
INV	– INVERT ELEVATION		

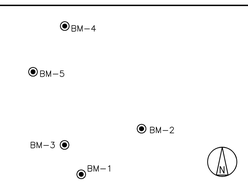
PROJECT SURVEY CONTROL

CONTROL MONUMENT LOCATIONS

MONUMENT NO.	PLANT COORDINATES		MONUMENT NO.	STATE PLANE COORDINATES		ELEVATION (NGVD 29)	ELEVATION (NAVD 88)	
	NORTHING	EASTING		NORTHING	EASTING			
BM-1	–	–	BM-1	2,116,939.357	493,279.611	20.085	19.03	AS-BUILT
BM-2	–	–	BM-2	2,117,722.882	494,254.361	19.405	18.35	AS-BUILT
BM-3	–	–	BM-3	2,117,580.623	492617.765	29.212	28.15	AS-BUILT
BM-4	–	–	BM-4	2,119,406.707	492,976.529	28.715	27.66	AS-BUILT
BM-5	–	–	BM-5	2,118,704.960	492,483.113	29.035	27.98	AS-BUILT

NOTE: BENCHMARKS ARE 5' x 12"ø CONCRETE MONUMENTS WITH BRASS DISC IN THE TOP. HORIZONTAL CONTROL IS BASED ON THE FLORIDA STATE PLANE COORDINATE - EAST ZONE (1983/90 N.A.D.) SYSTEM. THE ELEVATIONS ARE BASED ON THE NGVD 29 DATUM.

NOTE: THE CONVERSION FROM NGVD 29 TO NAVD 88 CAN BE MADE BY SUBTRACTING 1.06 FT FROM THE GIVEN NGVD ELEVATION.



APPROVED FOR CONSTRUCTION

THE DISTRIBUTION AND USE OF THE NATIVE FILE FORMAT OF THIS DRAWING OUTSIDE OF BLACK & VEATCH IS UNCONTROLLED AND SHALL BE USED FOR REFERENCE PURPOSES ONLY.

REV	DATE	DESCRIPTION	DRN	DES	CHK	PDE	APP
7	27/MAY/10	CONFORMED TO JCF-046-09	DAS	JCB	EEB	JCB	TPD
6	01/APR/10	GENERAL REVISIONS	DAS	JCB	EEB	JCB	TPD
5	19/NOV/09	REVISIONS PER ECN N-S-0004	DAS	JCB	EEB	JCB	TPD
4	07/OCT/09	APPROVED FOR CONSTRUCTION	PJK	JCB	EEB	JCB	TPD
3	03/AUG/09	GENERAL REVISIONS	SAJ	JCB		JCB	DRG
2	02/JUL/09	ISSUED FOR BID (JCF-046-09)	RRH	JCB		JCB	TPD
1	15/JUN/09	ISSUED FOR BID	RRH	JCB		JCB	TPD
0	22/MAY/09	ISSUED FOR REVIEW	RRH	JCB		JCB	TPD
NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP

200' 100' 0 200' 400'
1"=200'

BLACK & VEATCH — 12724 Gran Bay Parkway, Suite 450, Jacksonville, Florida 32258

JEA
GREENLAND ENERGY CENTER

UNDERGROUND UTILITIES - SITE
KEY PLAN, GENERAL NOTES AND LEGEND

ENGINEER	JCB	DRAWN	RRH
CHECKED	NWE	DATE	07/OCT/09

PROJECT / DRAWING NUMBER: 160167-CSTU-S3300 — REV 7
CODE
AREA

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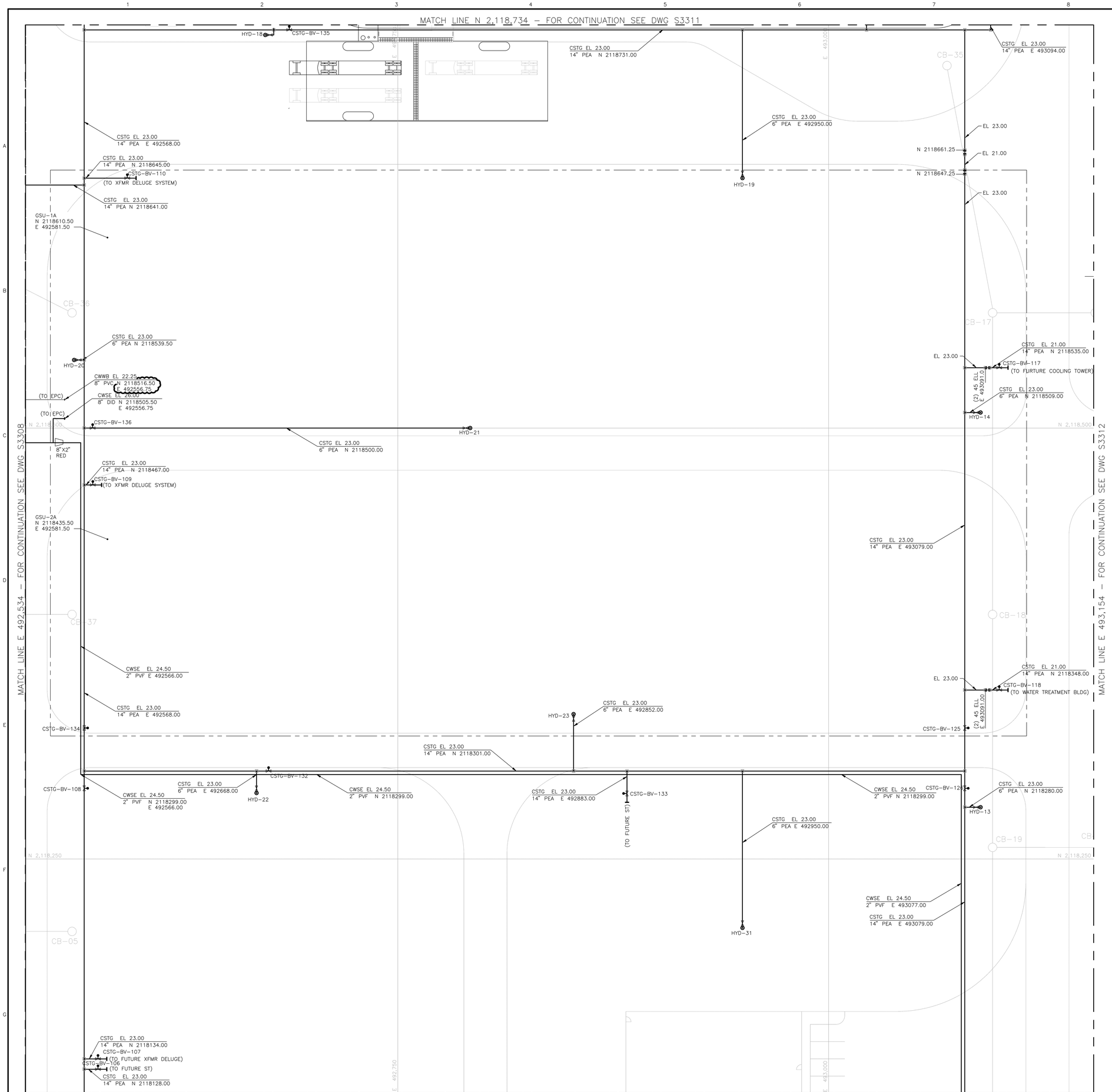
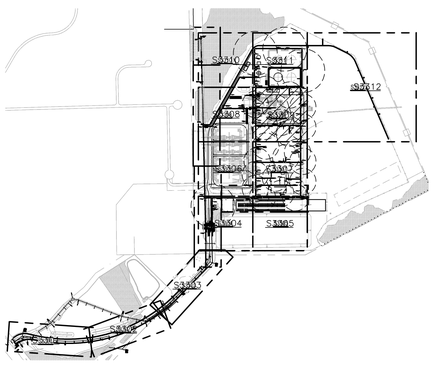


GENERAL NOTES

1. SEE DWG CSTU-S3300 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE DWG CSTU-S3350-S3352 FOR UNDERGROUND UTILITY SECTIONS AND DETAILS

KEY PLAN



APPROVED FOR CONSTRUCTION

THE DISTRIBUTION AND USE OF THE NATIVE FILE FORMAT OF THIS DRAWING OUTSIDE OF BLACK & VEATCH IS UNCONTROLLED AND SHALL BE USED FOR REFERENCE PURPOSES ONLY.

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
3	07/OCT/09	APPROVED FOR CONSTRUCTION	PJK	JCB	EEB	JCB	TPD
2	18/AUG/09	GENERAL REVISIONS	RRH	JCB		JCB	TPD
1	25/JUN/09	ISSUED FOR BID	RRH	JCB		JCB	TPD
0	01/JUN/09	ISSUED FOR REVIEW	RRH	JCB		JCB	
4	19/NOV/09	REVISIONS PER ECN N-S-0004	DAS	JCB	EEB	JCB	TPD

20' 10' 0 20' 40'
1"=20'

BLACK & VEATCH 12724 Gran Bay Parkway, Suite 450 Jacksonville, Florida 32258

ENGINEER	JCB	DRAWN	RRH
CHECKED	EEB	DATE	07/OCT/09

JEA
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UNDERGROUND UTILITIES-SITE PLAN – AREA 9

PROJECT / DRAWING NUMBER: 160167-CSTU-S3309
REV: 4
CODE
AREA

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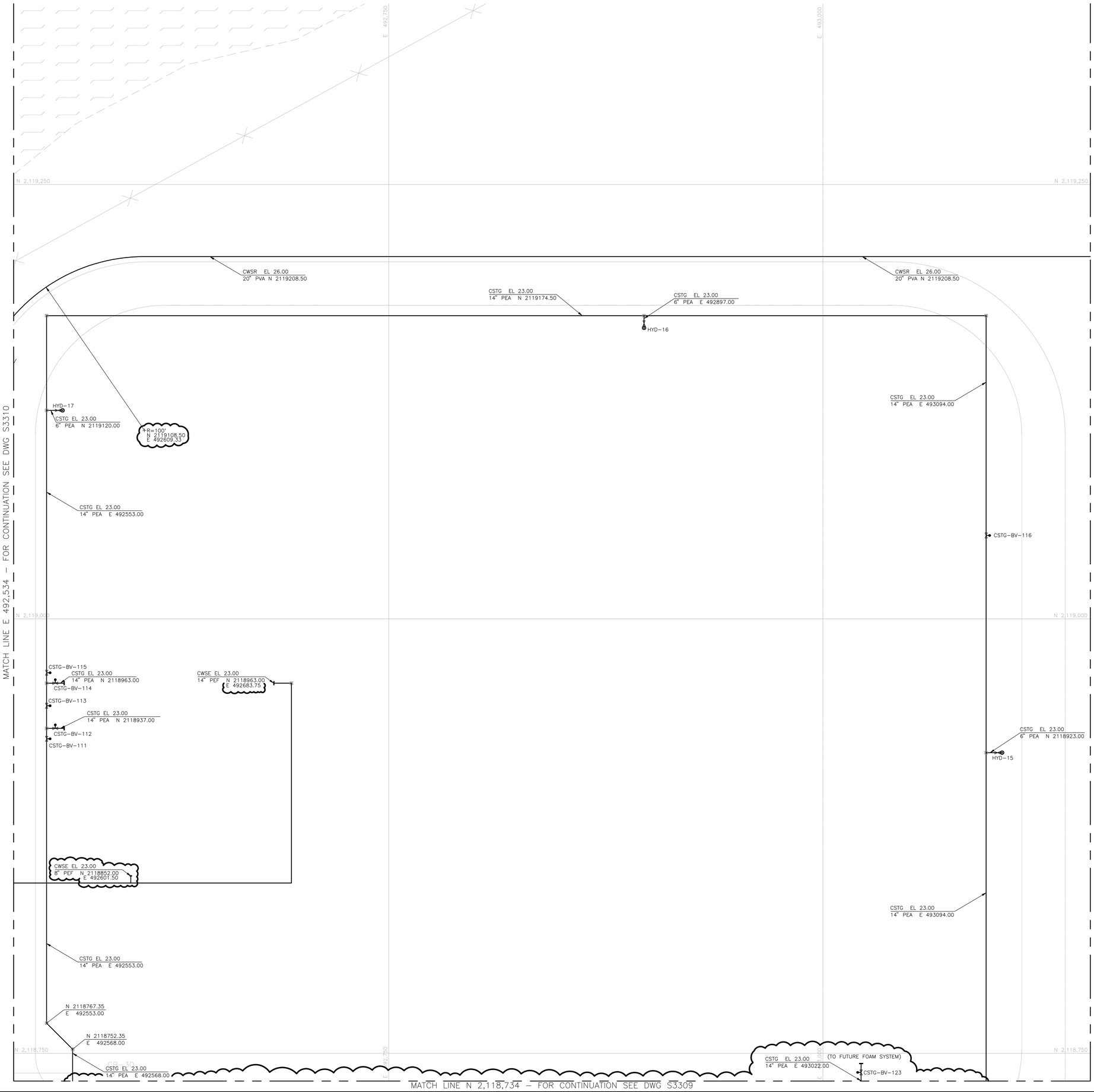
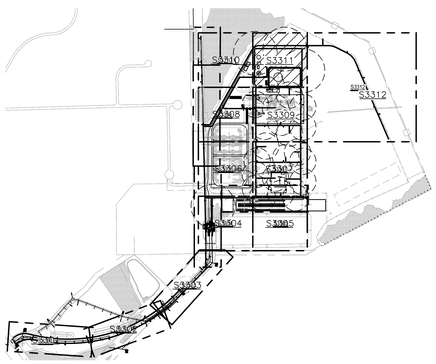
11/18/09



GENERAL NOTES

1. SEE DWG CSTU-S3300 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. SEE DWG CSTU-S3350-S3352 FOR UNDERGROUND UTILITY SECTIONS AND DETAILS

KEY PLAN



APPROVED FOR CONSTRUCTION

THE DISTRIBUTION AND USE OF THE NATIVE FILE FORMAT OF THIS DRAWING OUTSIDE OF BLACK & VEATCH IS UNCONTROLLED AND SHALL BE USED FOR REFERENCE PURPOSES ONLY.

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
4	19/NOV/09	REVISIONS PER ECN N-S-0004	DAS	JCB	EEB	JCB	TPD
3	07/OCT/09	APPROVED FOR CONSTRUCTION	PJK	JCB	EEB	JCB	TPD
2	18/AUG/09	GENERAL REVISIONS	RRH	JCB		JCB	TPD
1	02/JUL/09	ISSUED FOR BID	RRH	JCB		JCB	TPD
0	01/JUN/09	ISSUED FOR REVIEW	RRH	JCB		JCB	

N

20' 10' 0 20' 40'
1"=20'

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ENGINEER	JCB	DRAWN	RRH
CHECKED	EEB	DATE	07/OCT/09

JEA
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UNDERGROUND UTILITIES-SITE
PLAN - AREA 11

PROJECT	DRAWING NUMBER	REV
	160167-CSTU-S3311	4

CODE
AREA

ACAD 16.1s (LMS Tech)
A-1 E1
07-48-49
SYM52704
11/19/09

600 VOLT	600V, 3 CONDUCTOR (WITH GROUND), FR-EPR OR FR-XLPE INSULATION, PVC JACKET (FLAME RETARDANT POWER CABLE) (UL TYPE TC-ER)	TYPE C3 SPEC 70.0100 PROJECT 196116

SPECIFICATIONS

REFERENCE:	LATEST EDITIONS OF: ICEA S-95-658 (NEMA WC 70), UL 44, UL 854, UL 1277, UL 2556, IEEE 1202.
CONDUCTOR:	CONCENTRIC-LAY, COATED OR UNCOATED COPPER, CLASS B, COMPRESSED, OR COMPACT PER ASTM B8 OR ASTM B496; NORMAL MAXIMUM OPERATING TEMPERATURE 90 C
INSULATION:	FLAME-RETARDANT ETHYLENE-PROPYLENE RUBBER, ICEA S-95-658 (TYPE E-1 OR E-2); OR FLAME-RETARDANT CROSS-LINKED POLYETHYLENE, ICEA S-95-658 (TYPE X-1 OR X-2). INSULATION THICKNESS SHALL BE IN ACCORDANCE WITH ICEA S-95-658.
CABLE ASSEMBLY:	INSULATED CONDUCTORS CABLED WITH AN UNINSULATED BARE COPPER GROUND CONDUCTOR (SIZED PER ICEA S-95-658), FILLERS AND BINDER AS NECESSARY.
JACKET:	LEAD FREE, BLACK, FLAME RETARDANT, POLYVINYL CHLORIDE (PVC), ICEA S-95-658. MINIMUM JACKET THICKNESS SHALL BE IN ACCORDANCE WITH ICEA S-95-658.
PRINT LEGEND:	A DURABLE MARKING SHALL BE PROVIDED ON THE SURFACE OF THE CABLE AT INTERVALS NOT EXCEEDING 24 INCHES. MARKING SHALL INCLUDE: MANUFACTURER'S NAME, PLANT OF MFG, VOLTAGE CLASS, UL LISTING (XHHW-2, VW-1, TC-ER), INSULATING MATERIAL, JACKET MATERIAL, CONDUCTOR SIZE, GROUNDING CONDUCTOR SIZE, FLAME RETARDANCE RATING, DAY/MONTH/YEAR OF MFG, AND SEQUENTIAL FOOTAGE MARKINGS
CONDUCTOR IDENTIFICATION:	SINGLE COLOR COMPOUND WITH SURFACE PRINTING OF NUMBERS PER ICEA S-58-679, METHOD 4.
TESTS:	IN ADDITION TO THE REQUIREMENTS OF ICEA S-95-658 AND UL 1277 TYPE TC-ER, EACH CONDUCTOR SHALL PASS THE VW-1 FLAME TEST PER UL 2556. THE FINISHED CABLES SHALL ALSO MEET THE FLAME TEST REQUIREMENTS PER IEEE 1202.

CABLE DETAILS

PHASE CONDUCTOR SIZE (AWG OR KCMIL)	GROUND CONDUCTOR SIZE (AWG)	NOMINAL INSULATION THICKNESS (INCHES)	AVERAGE ASSEMBLY JACKET THICKNESS (INCHES)	O.D. MAX (INCHES)
14	14	0.030	0.045	0.41
12	12	0.030	0.045	0.46
10	10	0.030	0.060	0.51
8	10	0.045	0.060	0.69
6	8	0.045	0.060	0.77
4	8	0.045	0.080	0.88
3	6	0.045	0.080	0.95
2	6	0.045	0.080	1.02
1	6	0.055	0.080	1.13
1/0	6	0.055	0.080	1.23
2/0	6	0.055	0.080	1.31
3/0	4	0.055	0.080	1.43
4/0	4	0.055	0.080	1.55
250	4	0.065	0.110	1.77
300	3	0.065	0.110	1.88
350	3	0.065	0,110	1.97
400	3	0.065	0.110	2.07
500	2	0.065	0.110	2.25
600	2	0.080	0.110	2.49
700	1	0.080	0.110	2.65
750	1	0.080	0.140	2.82
800	1	0.080	0.140	2.88
900	1	0.080	0.140	3.02
1000	1/0	0.080	0.140	3.15

CABLE SHALL BE UL LISTED TYPE XHHW-2, VW-1, AND TYPE TC-ER

BLACK & VEATCH Building a world of difference.	JEA GEC Fuel Oil/Demin Water Storage Tank Addition	600-3-EPR/XLPE-PVC SHEET 1 OF 1
AC06ZV3A	CABLE SPECIFICATION	Dec 2013

600 VOLT	600V, MULTI-CONDUCTOR, FR-XLPE OR FR EPR INSULATION, PVC JACKET (E-2 COLOR CODE) (FLAME RETARDANT CONTROL CABLE) (UL LISTED TYPE TC, TC-ER ON APPLICABLE SIZES)	TYPE D1 SPEC 70.0100 PROJECT 196116

SPECIFICATIONS

REFERENCE: LATEST EDITIONS OF ICEA S-73-532 (NEMA WC 57), UL-44, UL-1277, IEEE 1202.

CONDUCTOR: 16 AWG, BUNCH STRANDED (CLASS K) PER ASTM B-174; 14 AWG, 12 AWG, OR 10 AWG – CLASS B OR C STRANDED PER ASTM B8, CONCENTRIC-LAY, UNCOATED COPPER; NORMAL MAXIMUM OPERATING TEMPERATURE 90C WET OR DRY (ICEA S-73-532).

INSULATION: 16 AWG,14 AWG, 12 AWG AND 10 AWG - TYPE II XLPE OR EP RUBBER (ICEA S-73-532); NOT LESS THAN 30 MILS AVERAGE INSULATION THICKNESS (27 MILS MINIMUM THICKNESS).

SHIELD: NONE.

JACKET: CABLE ASSEMBLY: BLACK, SUNLIGHT-RESISTANT, FLAME RETARDANT POLYVINYL CHLORIDE (PVC), (ICEA S-73-532). ASSEMBLY JACKET APPLIED OVER TAPE WRAPPED CABLE CORE. THE MINIMUM THICKNESS SHALL BE NOT LESS THAN 80 PERCENT OF THE VALUES INDICATED BELOW.

CONDUCTOR IDENTIFICATION: ICEA S-73-532, APPENDIX E, METHOD 1, COLORED COMPOUNDS WITH TRACERS, TABLE E-2.
WHITE OR GREEN CONDUCTORS SHALL NOT BE PROVIDED.
TRACERS SHALL BE CONTINUOUS THROUGHOUT THE LENGTH OF CONDUCTOR. COLOR BANDS OR MARKINGS APPLIED AT DISCRETE INTERVALS ARE NOT ALLOWED.

ASSEMBLY: TWO CONDUCTOR CABLE SHALL BE FLAT. FOR THREE CONDUCTORS OR MORE, THE CONDUCTORS SHALL BE CABLED TOGETHER WITH FLAME-RETARDANT POLYPROPYLENE FILLERS, AS NECESSARY, TO MAKE THE FINISHED CABLE ROUND.

PRINT LEGEND: A DURABLE MARKING SHALL BE PROVIDED ON THE SURFACE OF THE CABLE AT INTERVALS NOT EXCEEDING 24 INCHES. MARKING SHALL INCLUDE: MANUFACTURER'S NAME, PLANT OF MFG, VOLTAGE RATING, CONDUCTOR SIZE AND NUMBER OF CONDUCTORS, INSULATION AND JACKET MATERIAL, SUNLIGHT-RESISTANCE, UL LISTING (TYPE TC) (TYPE TC-ER ON 14 AWG AND LARGER), FLAME-RETARDANCE RATING, DAY/MONTH/YEAR OF MFG, AND SEQUENTIAL FOOTAGE MARKINGS.

TESTS: CABLES SHALL MEET THE REQUIREMENTS OF ICEA S-73-532. FINISHED CABLES SHALL MEET THE FLAME TEST REQUIREMENTS PER IEEE 1202.

CABLE DETAILS

NUMBER OF CONDUCTORS	AVERAGE ASSEMBLY JACKET THICKNESS (INCHES)				O.D. MAXIMUM (INCHES)				COLOR CODE ICEA S-73-532 TABLE E-2					
	16 AWG	14 AWG	12 AWG	10 AWG	16 AWG	14 AWG	12 AWG	10 AWG	COND NO	BASE	TRACER	COND NO	BASE	TRACER
2	0.045	0.045	0.045	0.045	0.35	0.38	0.43	0.48	1	BK	-	11	BN	BK
3	0.045	0.045	0.045	0.045	0.37	0.40	0.46	0.52	2	R	-	12	BK	R
4	0.045	0.045	0.045	0.045	0.40	0.43	0.50	0.59	3	BL	-	13	BL	R
5	0.045	0.045	0.045	0.045	0.44	0.48	0.54	0.64	4	O	-	14	O	R
7	0.045	0.045	0.060	0.060	0.48	0.55	0.62	0.70	5	Y	-	15	Y	R
9	0.060	0.060	0.060	0.060	0.58	065	0.72	0.80	6	BN	-	16	BN	R
10	0.060	0.060	0.060	0.060	0.60	0.67	0.75	0.87	7	R	BK	17	BK	BL
12	0.060	0.060	0.060	0.080	0.62	0.73	0.81	0.93	8	BL	BK	18	R	BL
15	0.060	0.060	0.060	0.080	0.71	0.78	0.89	1.10	9	O	BK	19	O	BL
19	0.060	0.060	0.080	0.080	0.76	0.85	0.98	1.28	10	Y	BK			
25	0.060	0.080	0.080		0.89	0.99	1..15							
30	0.060	0.080	0.080		0.93	1.07	1.21							
37	0.080	0.080	0.080		1.05	1.16	1.32							

CABLE SHALL BE UL LISTED TYPE TC.

BLACK & VEATCH Building a world of difference.	JEA GEC Fuel Oil/Demin Water Storage Tank Addition	600-MULTI- FRXLPE OR FREPR-PVC SHEET 1 OF 1
AD06ZVMA	CABLE SPECIFICATION	Dec 2013

300 VOLT	300V, #16 AWG SINGLE PAIR, #18 OR #20 AWG MULTIPLE PAIR, SHIELDED PVC INSULATION, PVC JACKET (INDIVIDUAL PAIR AND OVERALL SHIELDED) (FLAME RETARDANT INSTRUMENT CABLE) (UL LISTED TYPE PLTC/ITC)	TYPE EP2 SPEC 70.0100 PROJECT 196116

SPECIFICATIONS

REFERENCE: LATEST EDITIONS OF ICEA S-73-532 (NEMA WC 57), UL-13, UL 1581, UL 2250, IEEE 1202.

CONDUCTOR: 7 STRAND, CONCENTRIC-LAY, UNCOATED COPPER (ICEA S-73-532); NORMAL MAXIMUM OPERATING TEMPERATURE 105 C.

INSULATION: POLYVINYL CHLORIDE(PVC) (UL 13); NOT LESS THAN 15 MILS AVERAGE THICKNESS (#16 AND #18 AWG) OR 12 MILS (#20 AWG), 105 C TEMPERATURE RATING.

LAY: TWISTED PAIRS WITH 2-INCH NOMINAL LAY.

SHIELD: SINGLE PAIR – CABLE ASSEMBLY ONLY; MULTIPLE PAIR – EACH PAIR AND CABLE ASSEMBLY: COMBINATION ALUMINUM-POLYESTER TAPE AND 7-STRAND, 22 AWG MINIMUM SIZE, TINNED COPPER DRAIN WIRE; SHIELD APPLIED TO ACHIEVE 100 PERCENT COVER OVER INSULATED CONDUCTORS. SHIELD TAPE ON PAIR ASSEMBLY SHALL BE APPLIED IN SUCH A WAY AS TO GIVE A TOTAL SHIELD ISOLATION FROM ALL OTHER PAIR S.

JACKET: CABLE ASSEMBLY: BLACK, SUNLIGHT-RESISTANT, FLAME RETARDANT POLYVINYL CHLORIDE (PVC), (ICEA S-73-532). ASSEMBLY JACKET APPLIED OVER TAPE WRAPPED CABLE CORE. THE MINIMUM THICKNESS SHALL BE NOT LESS THAN THE VALUES INDICATED BELOW.

CONDUCTOR IDENTIFICATION: ICEA S-73-532, APPENDIX E, METHOD 9A, COLORED (PIGMENTED) INSULATION – ONE CONDUCTOR BLACK AND ONE CONDUCTOR WHITE (EACH PAIR). IN ADDITION, EACH PAIR OF MULTIPLE- PAIR CABLES SHALL BE NUMBERED WITH PRINTED NUMBERS ON THE PAIR COVERING, BEGINNING WITH THE NUMBER "1".
.

ASSEMBLY: THE PAIRS SHALL BE CABLED TOGETHER WITH FLAME-RETARDANT POLYPROPYLENE FILLERS, AS NECESSARY, TO MAKE THE FINISHED CABLE ROUND.

PRINT LEGEND: A DURABLE MARKING SHALL BE PROVIDED ON THE SURFACE OF THE CABLE AT INTERVALS NOT EXCEEDING 24 INCHES. MARKING SHALL INCLUDE: MANUFACTURER'S NAME, PLANT OF MFG, VOLTAGE RATING, CONDUCTOR SIZE AND NUMBER OF PAIR S, INSULATION AND JACKET MATERIAL, SUNLIGHT-RESISTANCE, UL LISTING (TYPE PLTC/ITC), FLAME-RETARDANCE RATING, DAY/MONTH/YEAR OF MFG, AND SEQUENTIAL FOOTAGE MARKINGS.

TESTS: INSULATED CONDUCTORS AND ASSEMBLY JACKET SHALL MEET THE REQUIREMENTS OF ICEA S-73-532 AND UL 13, AND SHALL MEET THE VERTICAL TRAY FLAME TEST REQUIREMENTS PER IEEE 1202.

CABLE DETAILS

NUMBER OF PAIRS	MINIMUM ACCEPTABLE AVERAGE ASSEMBLY JACKET THICKNESS (INCHES)				O.D. MAXIMUM (INCHES)									
	16 AWG	18 AWG	20 AWG		16 AWG	18 AWG	20 AWG							
1	0.035				0.30									
2	-	0.040	0.040		-	0.40	0.34							
4	-	0.050	0.040		-	0.43	0.35							
8	-	0.050	0.050		-	0.50	0.45							
12	-	0.060	0.060		-	0.79	0.66							
16	-	0.060	0.060		-	0.87	0.73							
20	-	0.070	0.060		-	0.98	0.81							
24	-	0.070	0.060		-	1.06	0.87							
36	-	0.070	0.070		-	1.25	1.04							
50	-	0.080	0.070		-	1.49	1.22							

CABLE SHALL BE UL LISTED TYPE PLTC/ITC.

BLACK & VEATCH Building a world of difference.	JEA GEC Fuel Oil/Demin Water Storage Tank Addition	300-16-SINGLE, 18 OR 20-MULTI-SH-PAIRS-INSTR PVC - PVC SHEET 1 OF 1
AE03VVMC	CABLE SPECIFICATION	Dec 2013

600 VOLT	600V, 1 CONDUCTOR, BARE COPPER (UN-INSULATED GROUND CABLE)	TYPE GU SPEC 70.0100 PROJECT 196116

SPECIFICATIONS

REFERENCE:	**ASTM B-8.**
CONDUCTOR:	CONCENTRIC-LAY, CLASS B STRANDED, SOFT-DRAWN BARE ANNEALED COPPER.
INSULATION:	NONE.
SHIELD:	NONE.
JACKET:	NONE.
FACTORY TESTS:	CABLE SHALL BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM B-8.

CABLE DETAILS

CONDUCTOR SIZE (AWG OR KCMIL)	NO. OF STRANDS	NOMINAL O.D. (INCHES)
8	7	0.164
6	7	0.184
4	7	0.232
2	7	0.292
1/0	19	0.373
2/0	19	0.419
4/0	19	0.528
250	37	0.575
350	37	0.681
500	37	0.813

BLACK & VEATCH Building a world of difference.	**JEA** **GEC Fuel Oil/demin Water Storage Tank Addition**	**600-1-BARE COPPER GROUND CABLE** **SHEET 1 OF 1**
AG06XX1B	**CABLE SPECIFICATION**	**Dec 2013**

600 V	600V, 1CONDUCTOR, XLPE INSULATION, NO JACKET (LIGHTING CABLE) (XHHW-2)	TYPE L1 SPEC 70.0100 PROJECT 196116

SPECIFICATIONS

REFERENCE:	UL 44, UL 1581.
CONDUCTOR:	CONCENTRIC-LAY UNCOATED COPPER, MAXIMUM OPERATING TEMPERATURE 90 C WET OR DRY.
INSULATION:	CROSS-LINKED POLYETHYLENE (XLPE), UL 1581.
JACKET:	NONE.
FACTORY TESTS:	CABLE SHALL MEET THE REQUIREMENTS OF UL 44 FOR XHHW-2.

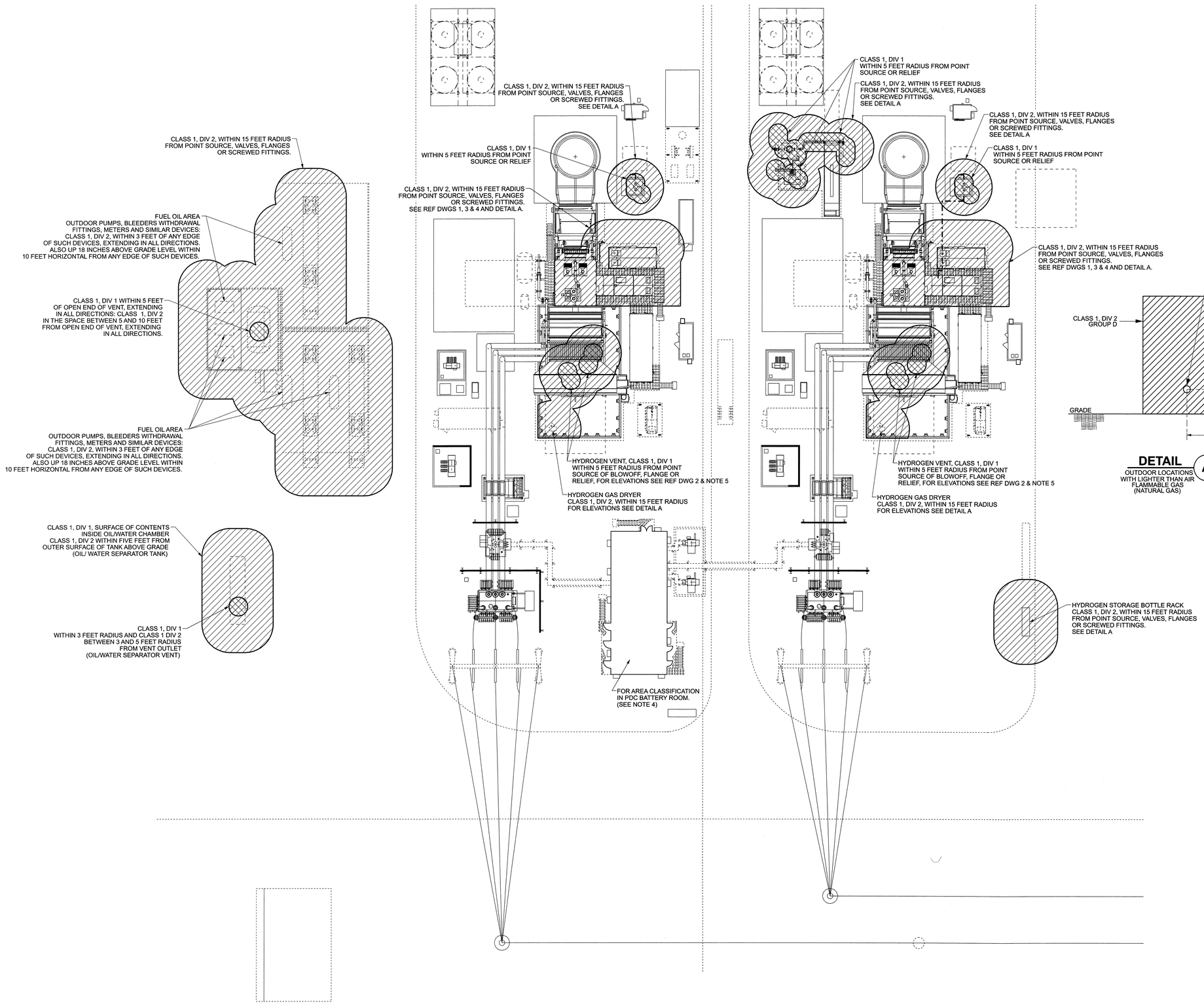
CABLE DETAILS

CONDUCTOR SIZE (AWG OR KCMIL)	NUMBER OF STRANDS	AVERAGE INSULATION THICKNESS (INCHES)	O.D. MAX (INCHES)
14	7	0.030	0.15
12	7	0.030	0.19
10	7	0.030	0.21
8	7	0.045	0.28
6	7	0.045	0.31
4	7	0.045	0.37
2	7	0.045	0.43
1	19	0.055	0.49
1/0	19	0.055	0.53
2/0	19	0.055	0.58
4/0	19	0.055	0.69
250	37	0.065	0.76
350	37	0.065	0.85
500	37	0.065	0.98
750	61	0.080	1.20
1000	61	0.080	1.36

A DURABLE MARKING SHALL BE PROVIDED ON THE SURFACE OF THE CABLE AT INTERVALS NOT EXCEEDING 24 INCHES. MARKING SHALL INCLUDE MANUFACTURER'S NAME, XHHW-2, CONDUCTOR SIZE, AND 600 V.

INSULATION COLOR CODING SHALL BE AS INDICATED ON THE DRAWINGS.

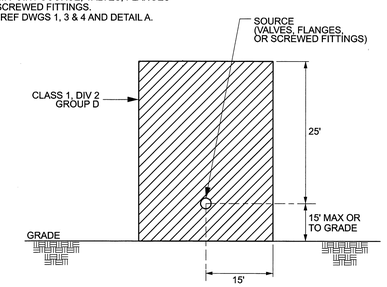
BLACK & VEATCH Building a world of difference.	JEA GEC Fuel Oil/Demin Water Storage Tank Addition	600-1-XLPE-NONE XHHW-2 SHEET 1 OF 1
AL06XX1A	CABLE SPECIFICATION	Dec 2013



LEGEND

INDICATES CLASS 1, DIVISION 2 AREA

INDICATES CLASS, 1 DIVISION 1 AREA



DETAIL A

OUTDOOR LOCATIONS WITH LIGHTER THAN AIR FLAMMABLE GAS (NATURAL GAS)

GENERAL NOTES

1. THE AREA CLASSIFICATION SHOWN ON THIS DRAWING WERE DETERMINED FROM THE FOLLOWING SAFETY CODES.

   A. NESC SECTION 12, 127

   B. NFPA 497

   C. NEC ARTICLE 500

2. FOR NATURAL GAS SYSTEM: ANY BELOW GRADE TRENCHES, VAULTS, ETC. WITHIN A CLASS 1, DIVISION 1 OR 2 LOCATION ARE CLASSIFIED CLASS 1, DIVISION 1.
3. CLOUDED AREAS DO NOT INDICATE CLASSIFICATIONS AT FINISHED GRADE, BUT IS A PLAN VIEW OF SPHERICAL RADII FROM ELEVATIONS OF FLANGES OR VENT CONNECTIONS.
4. BATTERY ROOM IS NOT CLASSIFIED PER IEEE STD 484-2002-5.4.
5. THE HYDROGEN VENT PIPES SHALL BE ROUTED ALONG SIDE THE GENERATOR TURBINE INLET DUCT TO A POINT ABOVE THE INLET DUCT. THE VENT PIPES SHALL NOT BE THE HIGHEST OBJECTS ABOVE THE SURROUNDINGS.

REFERENCE DRAWINGS

1. GE POWER GENERATION O/L HAZARDOUS AREA MAP M013784-311A002 SH01
2. GE POWER GENERATION HAZARDOUS AREA MAP M013784-311A011 SH01 & SH02
3. GE POWER GENERATION HAZARDOUS AREA CLASSIFICATION 7FA ACCESSORY MODULE M013784-311A031 SH01
4. GE POWER GENERATION HAZARDOUS AREA CLASSIFICATION 9FA LF/AA MODULE, OUTDOOR M013784-311A001

NO	REVISIONS	DATE	DRWN	CHKD	DSND	APPD
0	ISSUED FOR CONSTRUCTION					

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JEA

ZACHRY

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FLORIDA CERTIFICATE OF AUTHORIZATION #26739
AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

DEC 09 2009
ZERE H. WELDEMICAEL
LICENSE No. 69563
STATE OF FLORIDA
PROFESSIONAL ENGINEER

NAME ZERE H. WELDEMICAEL
LICENSE NO. 69563

GREENLAND ENERGY CENTER

SITE RELATED WORK AREA CLASSIFICATION PLAN

DRAWN	DESIGNED	CHECKED	CHECKED
12-08-09	12-8-09	12-08-09	
D.VIA	H.AHMAD	T.DEVENNEY	J.H. SMITH

APPROVED 12/11/09 S. Davis

DRAWING NUMBER D013784-100E00001 SHEET 01 REV 0

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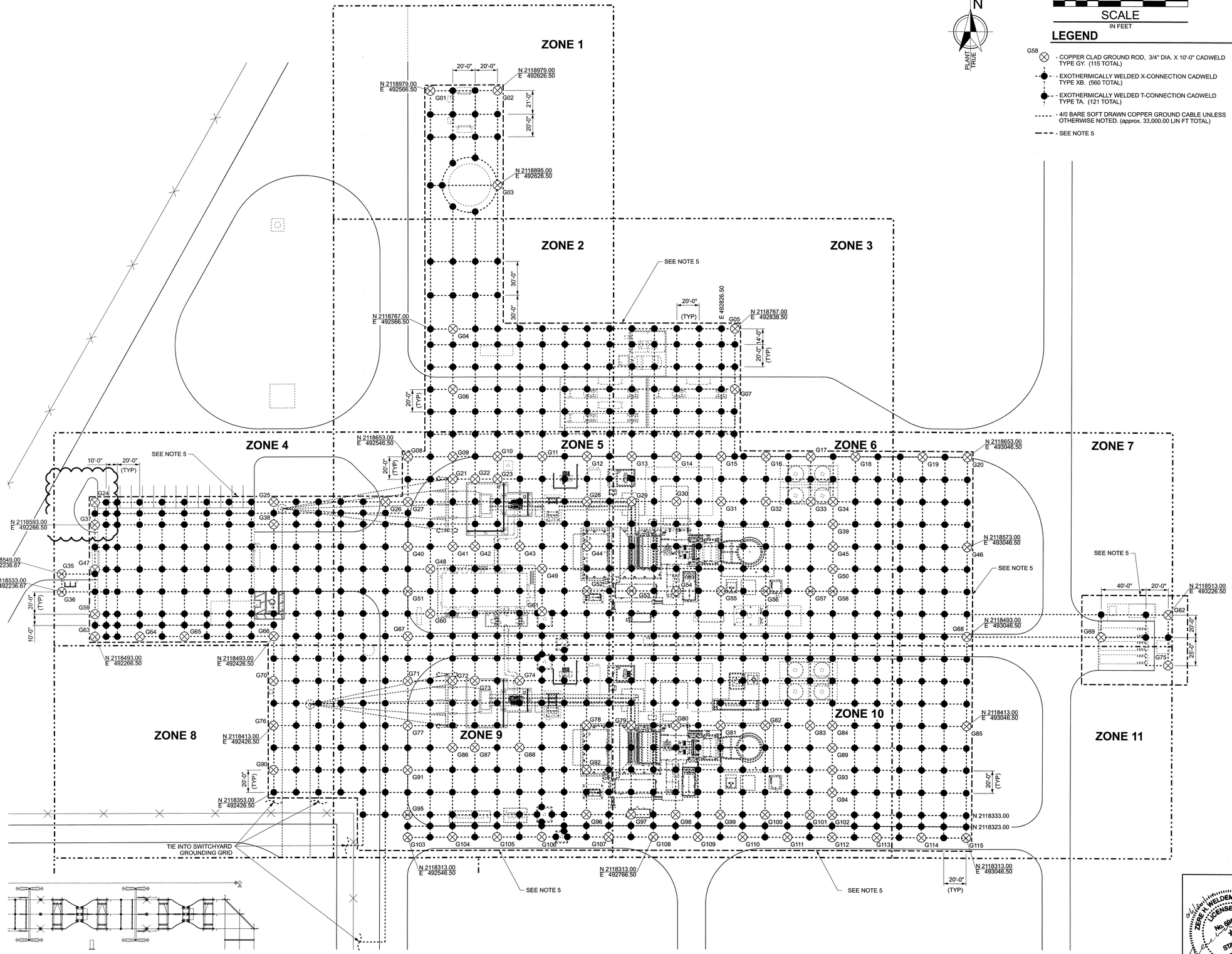

SCALE
IN FEET
40 0 20 40 60 80

LEGEND

- G58 ⊗ - COPPER CLAD GROUND ROD, 3/4" DIA. X 10'-0" CADWELD TYPE GY. (115 TOTAL)
- ● - EXOTHERMICALLY WELDED X-CONNECTION CADWELD TYPE XB. (560 TOTAL)
- ● - EXOTHERMICALLY WELDED T-CONNECTION CADWELD TYPE TA. (121 TOTAL)
- ------ - 4/0 BARE SOFT DRAWN COPPER GROUND CABLE UNLESS OTHERWISE NOTED. (approx. 33,000.00 LIN FT TOTAL)
- — — — - SEE NOTE 5

GENERAL NOTES

1. REFER TO REFERENCE DRAWING 1 FOR GROUNDING GENERAL NOTES AND DETAILS.
2. SEE GROUNDING SPECIFICATION 260526 FOR ADDITIONAL GROUNDING REQUIREMENTS.
3. QUANTITIES GIVEN APPLY TO MAIN GRID ONLY AND DO NOT INCLUDE STINGERS & STINGER CONNECTIONS.
4. CATHODIC PROTECTION LINES SHALL BE ELECTRONICALLY ISOLATED FROM THE PLANT GROUNDING GRID SYSTEM. TANKS SHALL BE CONNECTED TO PLANT GROUNDING GRID THROUGH A SOLID STATE DIRECT CURRENT (DC) ISOLATING/ALTERNATING CURRENT (AC) COUPLING DEVICE.
5. OWNER'S FINAL GRADING CONTRACTOR TO PROVIDE AND INSTALL 3 INCH DEEP SURFACE LAYER WITH 3000 OHM-M WET RESISTIVITY. SURFACE SHALL EXTEND 3 FEET BEYOND ANY STRUCTURES AND EQUIPMENT OUTLINE AND SHALL BE INSTALLED FOR THE FOLLOWING AREAS:

   POWER BLOCK AREA

   WAREHOUSE BLDG AREA

   OIL/ WATER SEPARATOR AREA

   FIRE PUMP BLDG AND FIREWATER TANK AREAS

   FUEL UNLOADING AND FUEL TANK AREAS

   AREA BETWEEN CONTROL ROOM AND POWER BLOCK

   DEMIN WATER PUMP AND DEMIN WATER TANK AREAS

   FUEL GAS YARD AREA AND 3 FEET OUTSIDE THE FENCE.

   ROADWAY LIGHTING POLES

   HIGH VOLTAGE TOWER POLES

REFERENCE DRAWINGS

1. GROUNDING TYPICAL DETAILS AND GENERAL NOTES D013784-684E00001 SH01
2. GROUNDING ZONE 1 LAYOUT D013784-684E00003 SH01
3. GROUNDING ZONE 2 LAYOUT D013784-684E00004 SH01
4. GROUNDING ZONE 3 LAYOUT D013784-684E00005 SH01
5. GROUNDING ZONE 4 LAYOUT D013784-684E00006 SH01
6. GROUNDING ZONE 5 LAYOUT D013784-684E00007 SH01
7. GROUNDING ZONE 6 LAYOUT D013784-684E00008 SH01
8. GROUNDING ZONE 7 LAYOUT D013784-684E00009 SH01
9. GROUNDING ZONE 8 LAYOUT D013784-684E00010 SH01
10. GROUNDING ZONE 9 LAYOUT D013784-684E00011 SH01
11. GROUNDING ZONE 10 LAYOUT D013784-684E00012 SH01
12. GROUNDING ZONE 11 LAYOUT D013784-684E00013 SH01
13. GROUNDING FUEL GAS YARD AREA LAYOUT D013784-684E00014 SH01

NO	REVISIONS	DATE	DRWN	CHKD	DSND	APPD
3	REVISED GROUNDING GRID AND NOTES.	6-29-10	JJM	RB	JHS	SWD
2	REVISED LEGEND AND ADDED NOTE 5	5/25/10	BJM	RB	JHS	SWD
1	REVISED GROUNDING ROD COORDINATE	1/14/10	JP	RB	HA	SWD
0	ISSUED FOR CONSTRUCTION.					

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JEA

ZACHRY

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AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

GREENLAND ENERGY CENTER

GROUNDING PLANT AREA GROUNDING PLAN VIEW

DRAWN	DESIGNED	CHECKED	CHECKED
1-08-10 PINA	1-08-10 H. AHMAD	0-08-10 BARNETT	1-08-10 ZERE
APPROVED 1-08-10 S. DAVIS	DRAWING NUMBER D013784-684E00002	SHEET 01	REV 3

NAME ZERE H. WELDEMICAEL
LICENSE NO. 69563

ZERE H. WELDEMICAEL LICENSE No. 69563 STATE OF FLORIDA PROFESSIONAL ENGINEER

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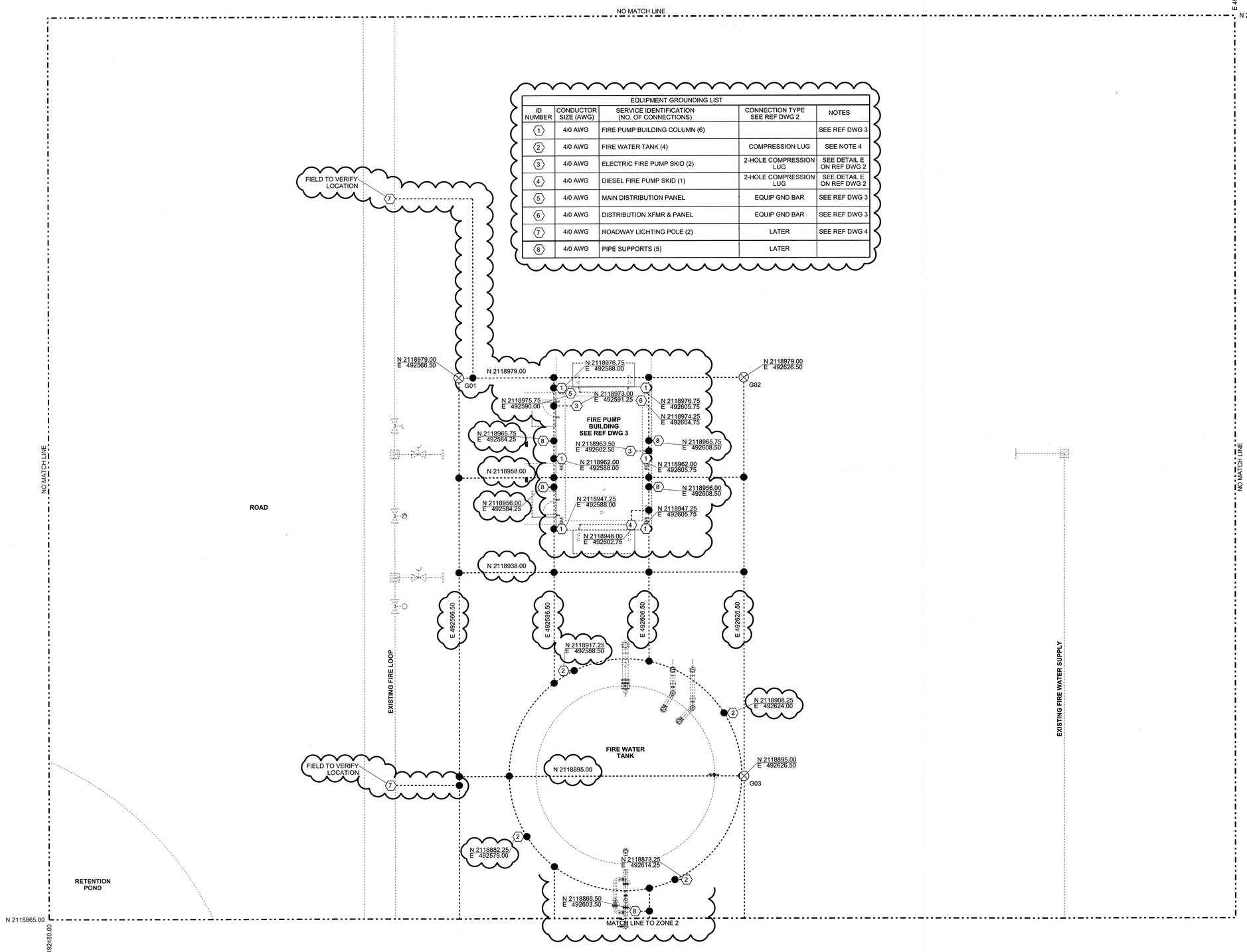
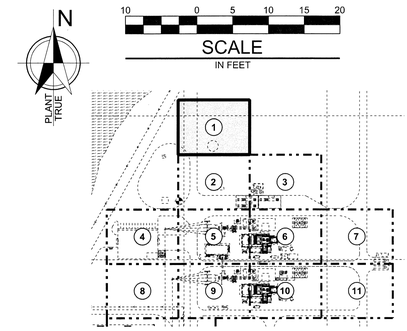
EQUIPMENT GROUNDING LIST				
ID NUMBER	CONDUCTOR SIZE (AWG)	SERVICE IDENTIFICATION (NO. OF CONNECTIONS)	CONNECTION TYPE SEE REF DWG 2	NOTES
1	4/0 AWG	FIRE PUMP BUILDING COLUMN (6)		SEE REF DWG 3
2	4/0 AWG	FIRE WATER TANK (4)	COMPRESSION LUG	SEE NOTE 4
3	4/0 AWG	ELECTRIC FIRE PUMP SKID (2)	2-HOLE COMPRESSION LUG	SEE DETAIL E ON REF DWG 2
4	4/0 AWG	DIESEL FIRE PUMP SKID (1)	2-HOLE COMPRESSION LUG	SEE DETAIL E ON REF DWG 2
5	4/0 AWG	MAIN DISTRIBUTION PANEL	EQUIP GND BAR	SEE REF DWG 3
6	4/0 AWG	DISTRIBUTION XFMR & PANEL	EQUIP GND BAR	SEE REF DWG 3
7	4/0 AWG	ROADWAY LIGHTING POLE (2)	LATER	SEE REF DWG 4
8	4/0 AWG	PIPE SUPPORTS (5)	LATER	





KEY PLAN

LEGEND

- COPPER CLAD GROUND ROD, ¾" DIA. X 10'-0" CADWELD TYPE GY. G58
- EXOTHERMICALLY WELDED X-CONNECTION CADWELD TYPE XB.
- EXOTHERMICALLY WELDED T-CONNECTION CADWELD TYPE TA.
- 4/0 BARE SOFT DRAWN COPPER GROUND CABLE UNLESS OTHERWISE NOTED.

GENERAL NOTES

1. SEE REFERENCE DRAWINGS 1 AND 2 FOR GROUNDING NOTES AND DETAILS.
2. SEE GROUNDING SPECIFICATION 260526 FOR ADDITIONAL GROUNDING REQUIREMENTS.
3. STINGER COORDINATES ARE GENERAL LOCATIONS ONLY, FIELD MUST VERIFY PRIOR TO INSTALLATION.
4. TANK SHALL BE GROUNDED TO THE GROUND GRID THROUGH A SOLID STATE DECOUPLER (SSD) FURNISHED BY THE CATHODIC PROTECTION CONTRACTOR. SOLID STATE DECOUPLER SHALL BE DAIRYLAND INDUSTRIES MODEL SSD OR APPROVED EQUAL.

REFERENCE DRAWINGS

1. GROUNDING
   PLANT AREA GROUNDING
   PLAN VIEW
   D013784-684E00002 SH01
2. GROUNDING
   TYPICAL DETAILS & GENERAL NOTES
   D013784-684E00001 SH01
3. FIRE PUMP BUILDING
   GROUNDING & POWER PLAN
   D013784-572E00001 SH01
4. LIGHTNING & COMMUNICATIONS PLAN
   B & V DWG NO 160167-CSTH-E2608
   M013784-100E012

NO	REVISIONS	DATE	DRWN	CHKD	DSND	APPD
1	REVISED GROUNDING LIST, ADDED STINGER AND GROUNDING CONDUCTOR COORDINATES, FIRE PUMP BLDG STINGERS, NOTE 3 & REF DWG3 3 & 4.	05/28/10	EG	TM	RB	JHS
0	ISSUED FOR CONSTRUCTION.					

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JEA

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05/28/10
ZERE H. WELDEMICAEL
LICENSE
NO. 69583
STATE OF FLORIDA
PROFESSIONAL ENGINEER
ZERE H. WELDEMICAEL
NAME 69583
LICENSE NO.

GREENLAND ENERGY CENTER
GROUNDING
ZONE 1
LAYOUT

DRAWN	DESIGNED	CHECKED	CHECKED
011810	011810	011810	012110
PINA	H. AHMAD	BARNETT	ZERE WELDIMICAEL

APPROVED	DRAWING NUMBER	SHEET	REV
012110 S. DAVIS	D013784-684E00003	01	1

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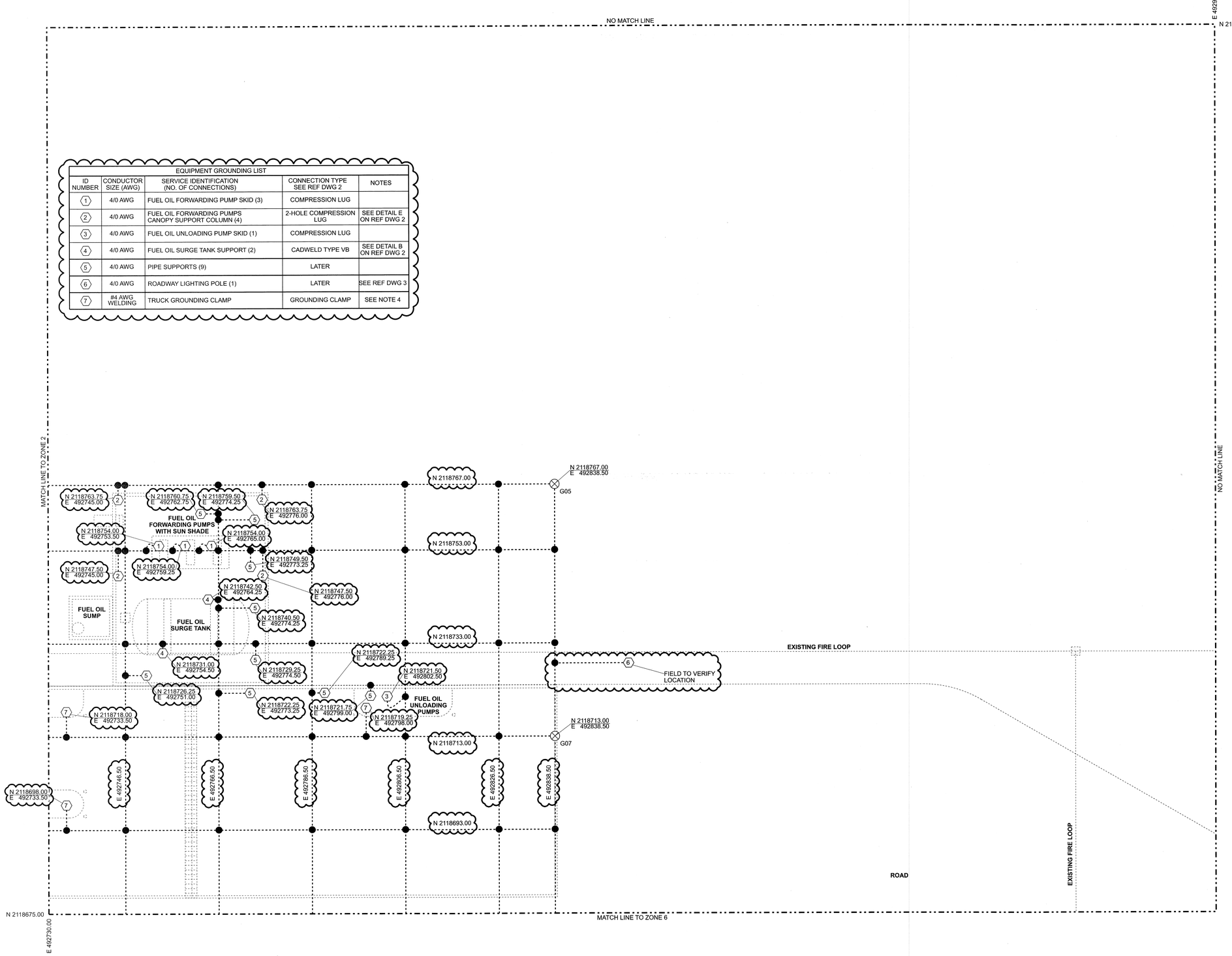
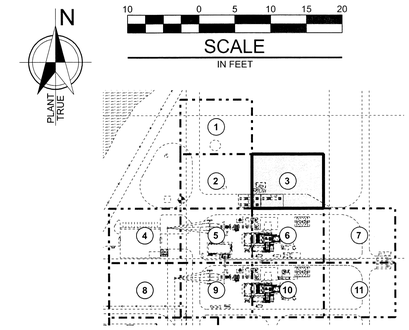
EQUIPMENT GROUNDING LIST				
ID NUMBER	CONDUCTOR SIZE (AWG)	SERVICE IDENTIFICATION (NO. OF CONNECTIONS)	CONNECTION TYPE SEE REF DWG 2	NOTES
1	4/0 AWG	FUEL OIL FORWARDING PUMP SKID (3)	COMPRESSION LUG	
2	4/0 AWG	FUEL OIL FORWARDING PUMPS CANOPY SUPPORT COLUMN (4)	2-HOLE COMPRESSION LUG	SEE DETAIL E ON REF DWG 2
3	4/0 AWG	FUEL OIL UNLOADING PUMP SKID (1)	COMPRESSION LUG	
4	4/0 AWG	FUEL OIL SURGE TANK SUPPORT (2)	CADWELD TYPE VB	SEE DETAIL B ON REF DWG 2
5	4/0 AWG	PIPE SUPPORTS (9)	LATER	
6	4/0 AWG	ROADWAY LIGHTING POLE (1)	LATER	SEE REF DWG 3
7	#4 AWG WELDING	TRUCK GROUNDING CLAMP	GROUNDING CLAMP	SEE NOTE 4





KEY PLAN

LEGEND

- COPPER CLAD GROUND ROD, ¾" DIA. X 10'-0" CADWELD TYPE GY. G58
- EXOTHERMICALLY WELDED X-CONNECTION CADWELD TYPE XB.
- EXOTHERMICALLY WELDED T-CONNECTION CADWELD TYPE TA.
- 4/0 BARE SOFT DRAWN COPPER GROUND CABLE UNLESS OTHERWISE NOTED.

GENERAL NOTES

1. SEE REFERENCE DRAWINGS 1 & 2 FOR GROUNDING NOTES AND DETAILS.
2. SEE GROUNDING SPECIFICATION 260526 FOR ADDITIONAL GROUNDING REQUIREMENTS.
3. STINGER COORDINATES ARE GENERAL LOCATIONS ONLY. FIELD MUST VERIFY PRIOR TO INSTALLATION.
4. PROVIDE 10 FEET OF #4 AWG WELDING CABLE WITH BURNDY GROUNDING CLAMP CAT. NO: GIE4CG4; FOR STATIC GROUNDING OF FUEL OIL TRUCK. BOND TO PIPING.

REFERENCE DRAWINGS

1. GROUNDING
   PLANT AREA GROUNDING
   PLAN VIEW
   D013784-684E00002 SH01
2. GROUNDING
   TYPICAL DETAILS & GENERAL NOTES
   D013784-684E00001 SH01
3. LIGHTING & COMMUNICATIONS PLAN
   B & V DWG NO. 160167-CSTH-E2608
   M013784-100E012

NO	REVISIONS	DATE	DRWN	CHKD	DSND	APPD
1	REVISED GROUNDING LIST, ADDED STINGER AND GROUNDING CONDUCTOR COORDINATES. NOTE 3 & 4. REF DWG 3. GROUNDING CATEGORY 7	6/28/10	RB	RB	JHS	SWD
0	ISSUED FOR CONSTRUCTION.					

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JEA

ZACHRY

ZACHRY ENGINEERING CORPORATION - 1015 ARAPAHOE STREET, TOWER 1, SUITE 900, DENVER, CO 80202-4256
FLORIDA CERTIFICATE OF AUTHORIZATION #26739
AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

ZERE H. WELDEMICAEL
LICENSE
No. 69563
STATE OF FLORIDA
PROFESSIONAL ENGINEER
05/18/10

NAME ZERE H. WELDEMICAEL
LICENSE NO. 69563

GREENLAND ENERGY CENTER
GROUNDING
ZONE 3
LAYOUT

DRAWN	DESIGNED	CHECKED	CHECKED
PINA	H. AHMAD	BARNETT	ZERE WELDIMICAEL
011810	011910	011810	012110

APPROVED	DRAWING NUMBER	SHEET	REV
S. DAVIS	D013784-684E00005	01	1

APPROVED

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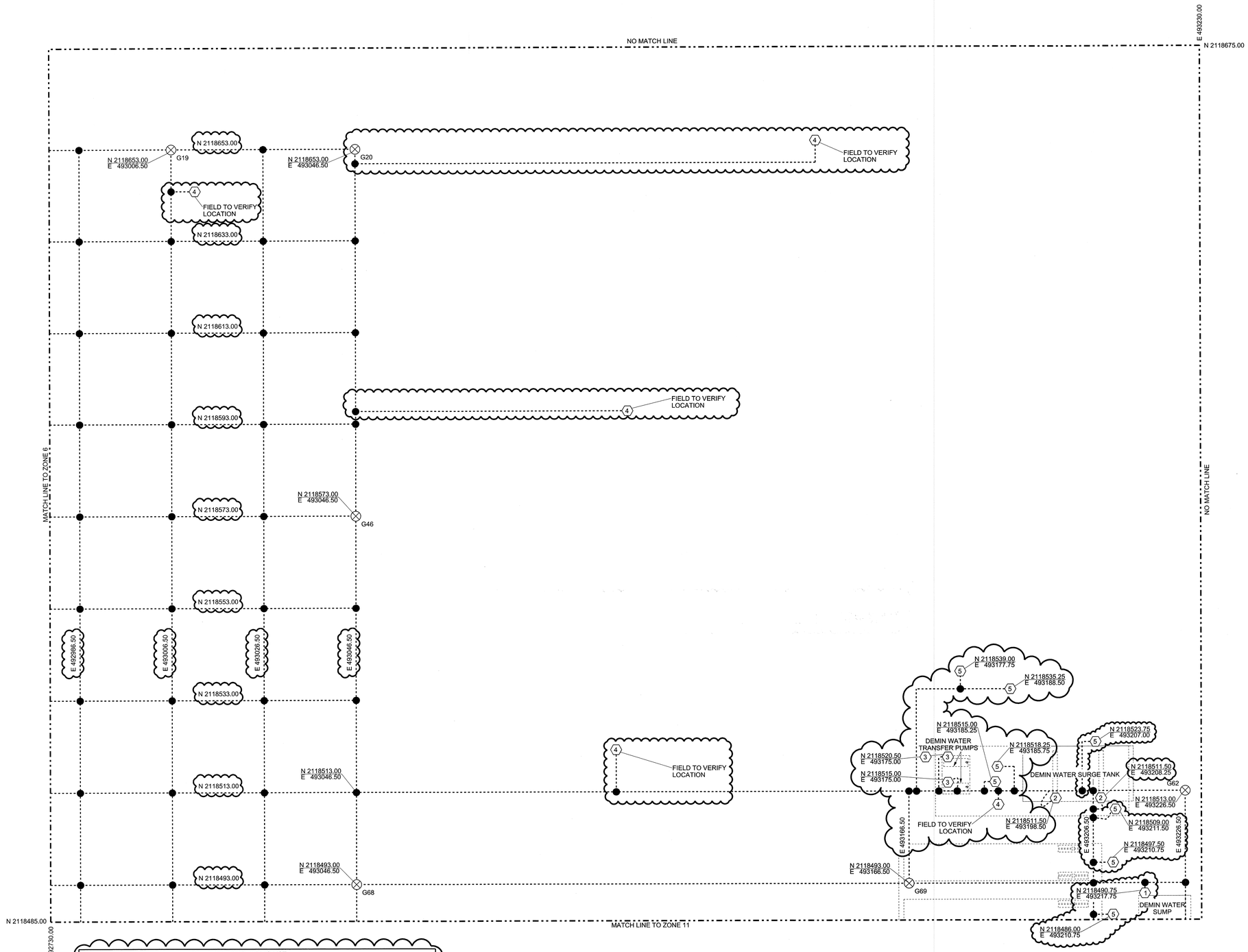
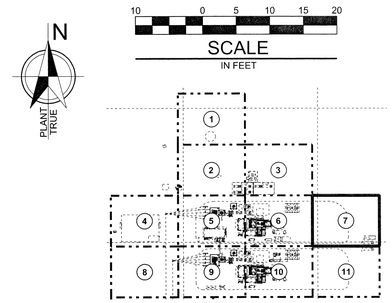


EQUIPMENT GROUNDING LIST				
ID NUMBER	CONDUCTOR SIZE (AWG)	SERVICE IDENTIFICATION (NO. OF CONNECTIONS)	CONNECTION TYPE SEE REF DWG 2	NOTES
1	4/0 AWG	DEMIN WATER SUMP PUMP CONTROL PANEL (1)	COMPRESSION LUG	
2	4/0 AWG	DEMIN WATER SURGE TANK SUPPORT (2)	CADWELD TYPE VB	SEE DETAIL B ON REF DWG 2
3	4/0 AWG	DEMIN WATER TRANSFER PUMP SKID (2)	COMPRESSION LUG	
4	4/0 AWG	ROADWAY LIGHTING POLE (5)	LATER	SEE REF DWG 3
5	4/0 AWG	PIPE SUPPORTS (8)	LATER	



KEY PLAN

LEGEND

G58 - COPPER CLAD GROUND ROD, ¾" DIA. X 10'-0" CADWELD TYPE GY.

- EXOTHERMICALLY WELDED X-CONNECTION CADWELD TYPE XB.

- EXOTHERMICALLY WELDED T-CONNECTION CADWELD TYPE TA.

- 4/0 BARE SOFT DRAWN COPPER GROUND CABLE UNLESS OTHERWISE NOTED.

GENERAL NOTES

1. SEE REFERENCE DRAWINGS 1 & 2 FOR GROUNDING NOTES AND DETAILS.
2. SEE GROUNDING SPECIFICATION 260526 FOR ADDITIONAL GROUNDING REQUIREMENTS.
3. STINGER COORDINATES ARE GENERAL LOCATIONS ONLY. FIELD MUST VERIFY PRIOR TO INSTALLATION.

REFERENCE DRAWINGS

1. GROUNDING
   PLANT AREA GROUNDING
   PLAN VIEW
   D013784-684E00002 SH01
2. GROUNDING
   TYPICAL DETAILS AND GENERAL NOTES
   D013784-684E00001 SH01
3. LIGHTING & COMMUNICATIONS PLAN
   B & V DWG NO. 160167-CSTH-E2608
   M013784-100E012

NO	REVISIONS	DATE	DRWN	CHKD	DSND	APPD
1	REVISED GROUNDING LIST, ADDED GROUNDING CONDUCTOR & STINGER COORDINATES, NOTE 3 AND REF DWG 3.	5/21/10	BJM	KTS	JHS	SWD
0	ISSUED FOR CONSTRUCTION.					

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JEA

ZACHRY

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FLORIDA CERTIFICATE OF AUTHORIZATION #28739
AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

GREENLAND ENERGY CENTER
GROUNDING
ZONE 7
LAYOUT

DRAWN	DESIGNED	CHECKED	CHECKED
PINA	H. AHMAD	BARNETT	ZERE WELDIMICAEL
APPROVED	DRAWING NUMBER	SHEET	REV
S. DAVIS	D013784-684E00009	01	1

05/18/10
ZERE H. WELDEMICAEL
LICENSE
No. 69563
STATE OF FLORIDA
PROFESSIONAL ENGINEER
NAME ZERE H. WELDEMICAEL
LICENSE NO. 69563

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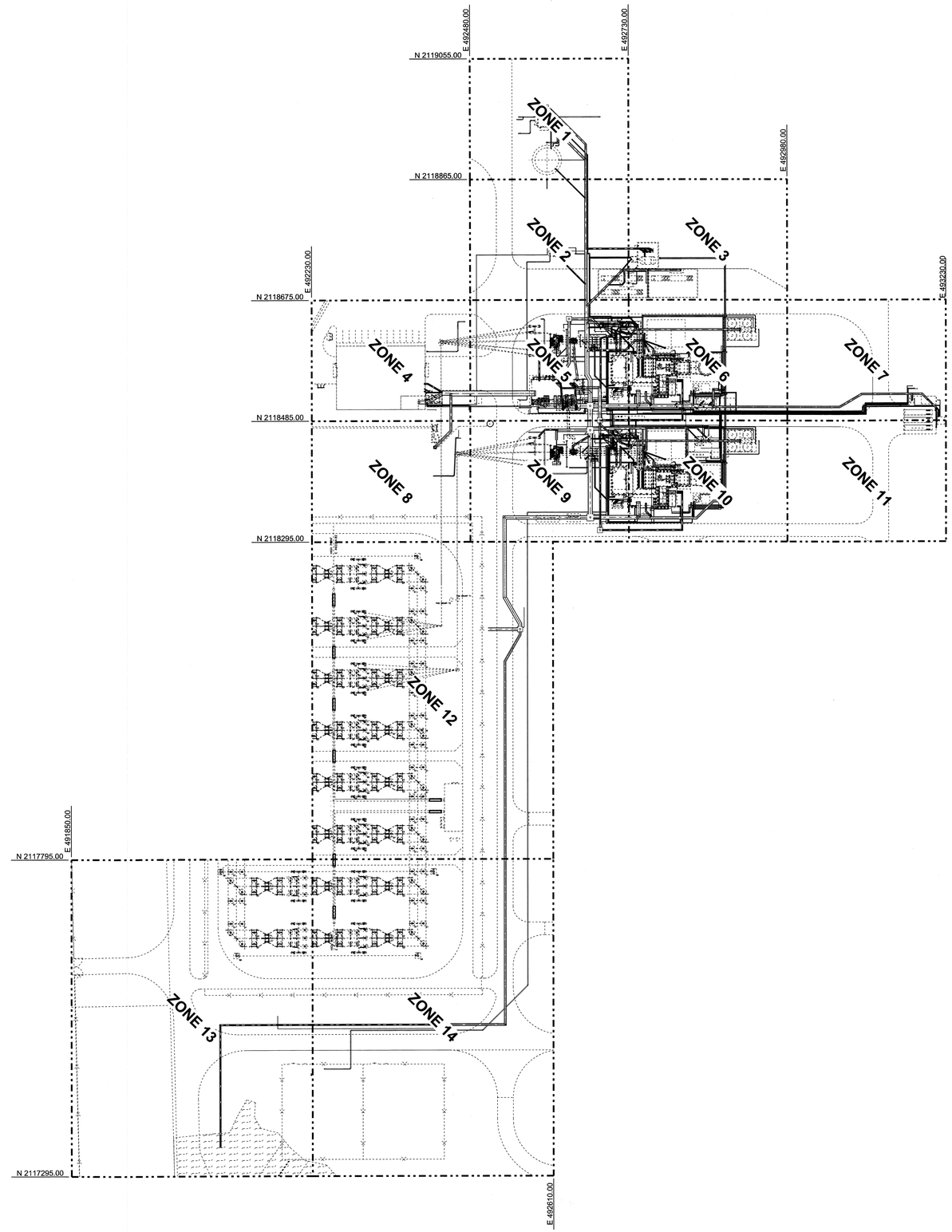

N

PLANT TRUE

90 0 45 90 135 180

SCALE

IN FEET

LEGEND

○ OR ⊢⊣	INDICATES FLANGED CONNECTION
○ BU	INDICATES BELL UP
○ FD	INDICATES FLOOR DRAIN
▷	INDICATES LINE SIZE CHANGE
BOP	INDICATES BOTTOM OF PIPE
FOF	INDICATES FACE OF FLANGE

GENERAL NOTES

1. ALL DRAIN PIPING SHALL SLOPE CONTINUOUSLY A MINIMUM OF 1/8" PER FOOT, UNLESS OTHERWISE NOTED.
2. AT ALL HDPE ELEVATION CHANGE, CONTRACTOR TO DETERMINE IF FITTINGS ARE REQUIRED OR IF PIPING CAN SLOPE TO ACCOMMODATE ELEVATION CHANGE.
3. CONTRACTOR SHALL VERIFY ALL FOUNDATIONS, EQUIPMENT PADS AND FOOTINGS AGAINST PIPING AND STUB- UPS PRIOR TO INSTALLATION.
4. ALL UNDERGROUND STEEL PIPING SHALL BE COATED AND WRAPPED PER TAPECOAT 6025 WITH APPROPRIATE PRIMER (BELOW 180 DEG F USE TC OMNIPRIME; OR GREATER THAN 180 DEG F USE TC 7000) OR FUSION BONDED EPOXY COATINGS; FOR SHOP COAT USE 3M SKOTCHKOTE FBE 6233 WITH TOP 3M SKOTCHKOTE FBE 6352 DUAL COATING COAT (IF REQUIRED FOR ABRASION); AND IF FIELD APPLIED USE 3M SCOTCHKOTE 323 LIQUID EPOXY COATING.
5. ALL BELL-UPS SHALL BE 0'-6" ABOVE FINISH GRADE OR FINISH SLAB, ALL BELL-UPS SHALL BE IDENTIFIED ON DRAWINGS BY "BU", "FD" DENOTES FLOOR DRAIN. ALL BELL-UPS WILL TERMINATE WITH A REDUCER TO INCREASE ONE PIPE SIZE, BUT NOT LESS THAN 4"Ø.
6. BELOW GRADE STEEL PIPING SHALL BE ELECTRONICALLY ISOLATED FROM ABOVE GRADE STEEL PIPING AT FIRST ABOVE GRADE SET OF FLANGES USING A FLANGE ISOLATION KIT, EXCEPT FUEL OIL UNLOADING PIPE.
7. ALL CARBON STEEL OR STAINLESS STEEL FLANGES SHALL BE 150#, RAISED FACE, UNLESS OTHERWISE NOTED.
8. ALL REDUCERS SHALL BE ECCENTRIC FLAT ON BOTTOM, UNLESS OTHERWISE NOTED.

REFERENCE DRAWINGS

1. SITE UNDERGROUND UTILITIES
   ZONES 1 THRU 14
   PLAN VIEW
   D013784-591L10101 SH01 THRU 591L10114 SH01

NO	REVISIONS	DATE	DRWN	CHKD	DSND	APPD
1	REVISED GENERAL NOTE 5.	4-20-10	AG	LW	AJE	HB
0	ISSUED FOR CONSTRUCTION.					

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JEA

ZACHRY

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FLORIDA CERTIFICATE OF AUTHORIZATION #26739
AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

HEIDI BLASINGAME LICENSE No. 70073 STATE OF FLORIDA PROFESSIONAL ENGINEER

NAME HEIDI BLASINGAME
LICENSE NO. 70073

GREENLAND ENERGY CENTER

SITE UNDERGROUND UTILITIES
OVERALL ZONE LAYOUT
PLAN VIEW

DRAWN	DESIGNED	CHECKED	CHECKED
A. GAMEZ	M. ELLIS	M. SELLMYER	H. AHMAD

APPROVED	DRAWING NUMBER	SHEET	REV
H. BLASINGAME	D013784-591L10100	01	1

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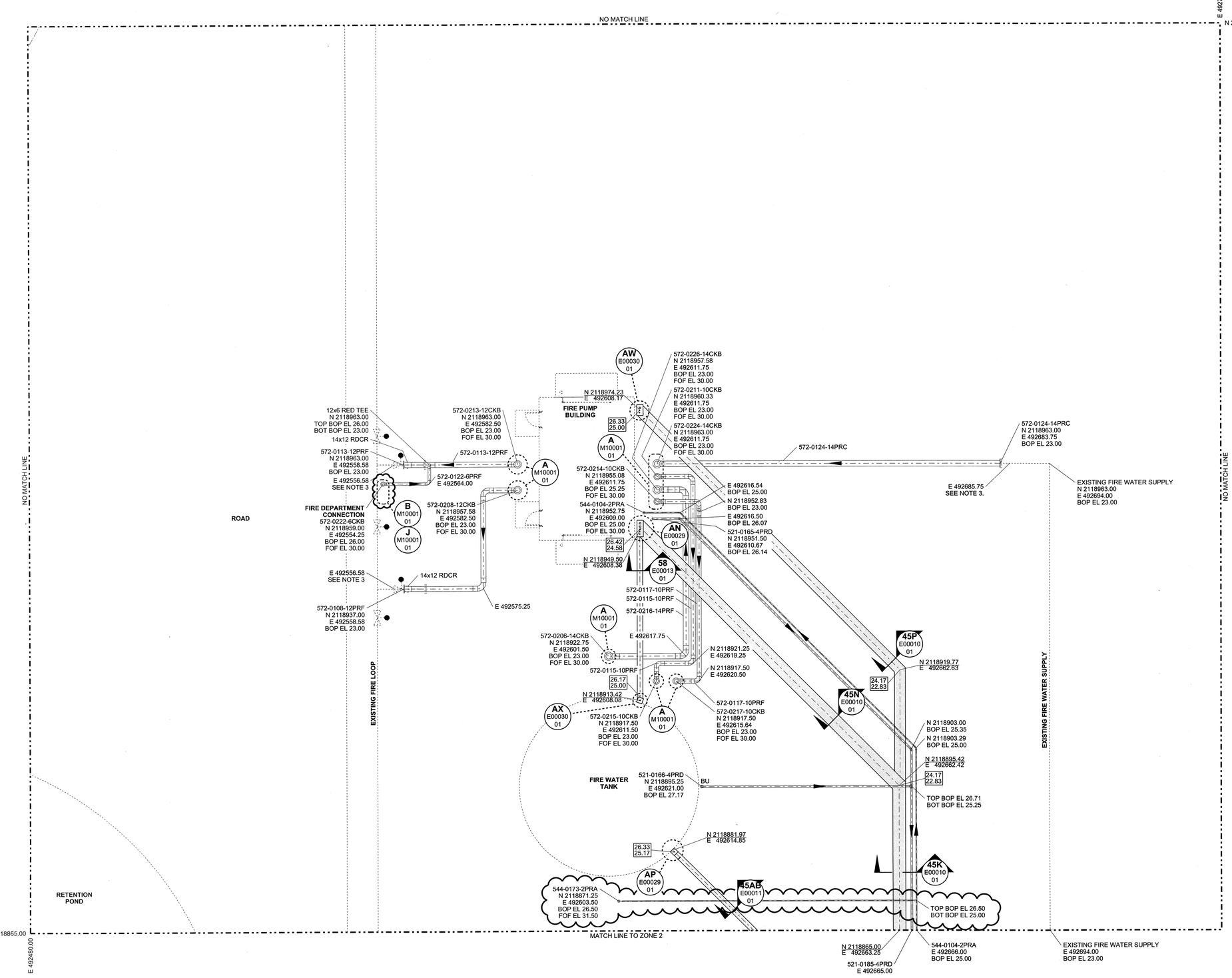

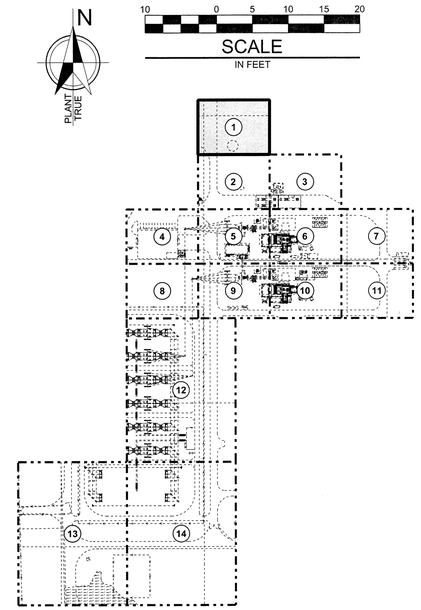

KEY PLAN

GENERAL NOTES

1. FOR ALL UNDERGROUND PIPING NOTES, SEE REF DWG 1.
2. FOR DUCT BANK INSTALLATION DETAILS, SEE REF DWG 2.
3. TRIM TO FUSION WELD TO EXISTING TIE-IN CONNECTION.

REFERENCE DRAWINGS

1. UNDERGROUND UTILITIES
   OVERALL ZONE LAYOUT
   PLAN VIEW
   D013784-591L10100 SH01
2. UNDERGROUND UTILITIES
   DUCT BANK INSTALLATION
   DETAILS AND NOTES
   D013784-591E00001 SH01
3. UNDERGROUND UTILITIES
   BURIED PIPING
   DETAILS
   D013784-591M10001 SH01

NO	REVISIONS	DATE	DRWN	CHKD	DSND	APPD
4	"FOR RECORD PURPOSES" PER FIELD MEMO #078-ADDED LINE 544-0173-2PRA.	4-26-11	AG	LW	MTE	HB
3	REVISED COORDINATES ON LINES 572-0117-10PRF, 572-0115-10PRF, 572-0217-10CKB.	031510	AG	LW	MTE	HB
2	REVISED LINES 572-0213-12CKB, 572-0113-12PRF, 572-0222-8CKB, 572-0122-6PRF, 572-0208-12CKB, 572-0226-14CKB, 572-0211-10CKB, 572-0224-14CKB, 572-0214-10CKB, 572-0124-14PRC, 572-0117-10PRF, 572-0115-10PRF, 572-0216-14PRF, 572-0206-14CKB, 572-0215-10CKB, 572-0217-10CKB, 544-0104-2PRA; ADDED DETAILS AW, AX, DUCT BANK 58 AND DUCT BANK 45N & 45P; REVISED DUCT BANK 45; ADDED NOTE 3.	021610	AG	LW	MTE	HB
1	ADDED COORDINATES TO EXISTING UTILITIES CROSSINGS; ADDED LINES 572-0211-10CKB, 572-0214-10CKB, 572-0226-14CKB, 572-0224-14CKB, 572-0213-12CKB, 572-0208-12CKB, 572-0222-8CKB, 572-0206-14CKB, 572-0216-14PRF, 572-0215-10CKB, 572-0217-10CKB; ADDED DETAILS A & B; REVISED LINES 544-0104-2PRA, 572-0108-12PRF & 572-0113-12PRF; REVISED DUCT BANK 45 & DETAIL AP; REMOVED HOLDS.	011410	JM	MHS	MTE	HB
0	ISSUED FOR CONSTRUCTION WITH HOLDS.					

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JEA

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FLORIDA CERTIFICATE OF AUTHORIZATION #26739
AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

GREENLAND ENERGY CENTER
SITE UNDERGROUND UTILITIES
ZONE 1
PLAN VIEW

HEIDI BLASINGAME LICENSE 70873 STATE OF FLORIDA PROFESSIONAL ENGINEER
4/26/11

NAME HEIDI BLASINGAME
LICENSE NO. 70873

DRAWN	DESIGNED	CHECKED	CHECKED
A. GAMEZ	M. ELLIS	11/20/09 M. SELLMYER	H. AHMAD
APPROVED	DRAWING NUMBER	SHEET	REV
H. BLASINGAME	D013784-591L10101	01	4
APPROVED			

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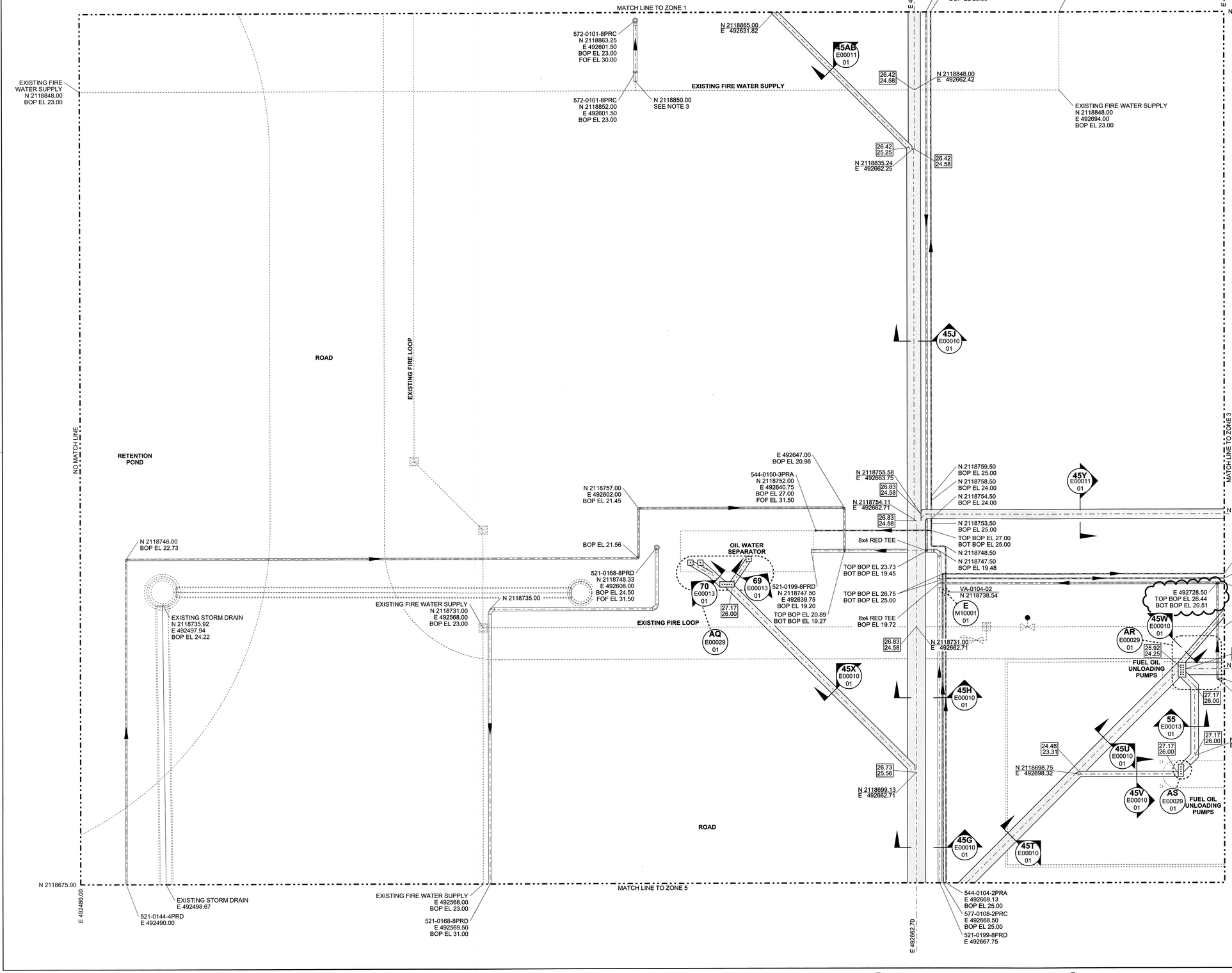

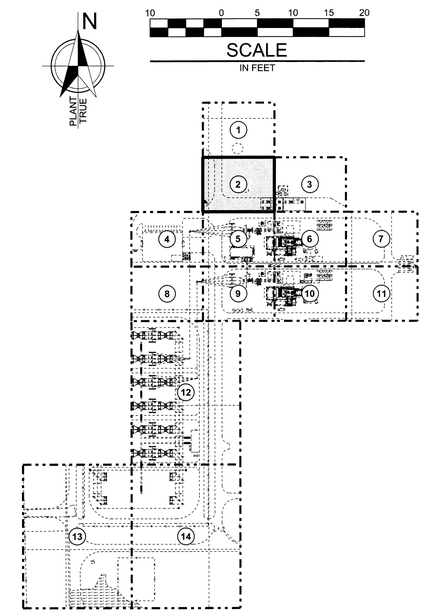

KEY PLAN

GENERAL NOTES

1. FOR ALL UNDERGROUND PIPING NOTES, SEE REF DWG 1.
2. FOR DUCT BANK INSTALLATION DETAILS, SEE REF DWG 2.
3. TRIM TO FUSION WELD TO EXISTING TIE-IN CONNECTIONS.

REFERENCE DRAWINGS

1. UNDERGROUND UTILITIES
   OVERALL ZONE LAYOUT
   PLAN VIEW
   D013784-591L10100 SH01
2. UNDERGROUND UTILITIES
   DUCT BANK INSTALLATION
   DETAILS AND NOTES
   D013784-591E00001 SH01
3. UNDERGROUND UTILITIES
   BURIED PIPING
   DETAILS
   D013784-591M10001 SH01

NO	REVISIONS	DATE	DRWN	CHKD	DSND	APPD
3	REVISED ELEVATION ON LINE 521-0184-4PRD.	3/5/10	AG	LW	MTE	HB
2	REMOVED DETAIL A; ADDED NOTE 3 & LINE 521-0144-4PRD; ADDED COORDINATES TO THE EXISTING FIRE WATER SUPPLY & EXISTING STORM DRAIN; REVISED LINE 572-0101-8PRC;REVISED DUCT BANK 45.	021610	AG	LW	MTE	HB
1	ADDED COORDINATES TO EXISTING FIRE WATER SUPPLY; ADDED DETAILS A & E; REMOVED VA-0184-01; ADDED LINE 521-0191-4PRD; REVISED LINES 521-0184-4PRD, 544-0148-2PRA, 577-0108-2PRC, 544-0104-2PRA, 577-0108-2PRD & 544-0148-2PRA; REVISED VA-0104-02; 577-0108-2PRD; ADDED 45 & 55 AND DETAILS AQ, AR & AS; REMOVED HOLDS.	011910	JM	MHS	MTE	HB
0	ISSUED FOR CONSTRUCTION WITH HOLDS.					

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JEA

ZACHRY

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FLORIDA CERTIFICATE OF AUTHORIZATION #26739
AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

3-1-10
HEIDI BLASINGAME
LICENSE
No. 70079
STATE OF FLORIDA
PROFESSIONAL ENGINEER
NAME HEIDI BLASINGAME
LICENSE NO. 70079

GREENLAND ENERGY CENTER
SITE UNDERGROUND UTILITIES
ZONE 2
PLAN VIEW

DRAWN	DESIGNED	CHECKED	CHECKED
A. GAMEZ	M. ELLIS	M. SELLMYER	H. AHMAD
APPROVED	DRAWING NUMBER		SHEET / REV
H. BLASINGAME	D013784-591L10102		01 / 3

APPROVED

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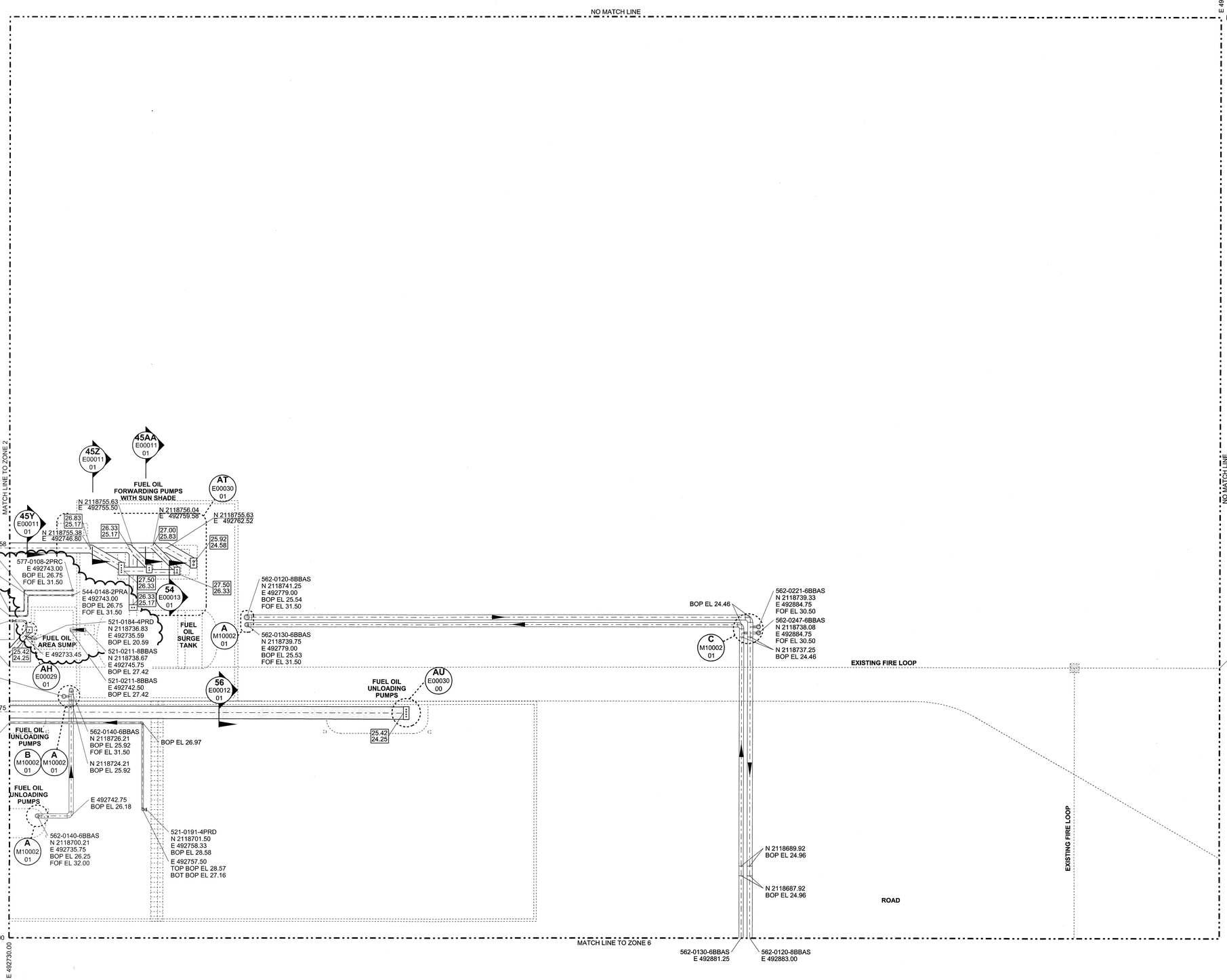

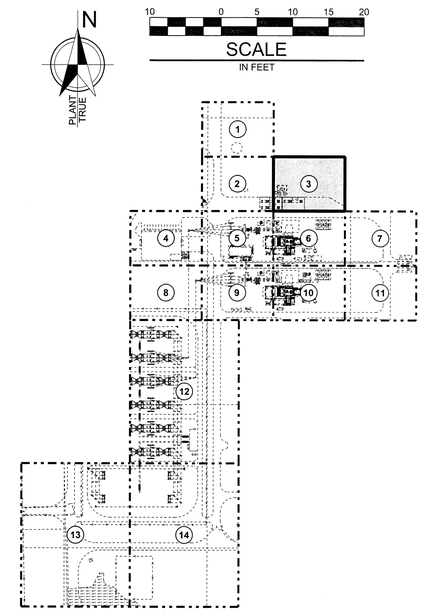

KEY PLAN

GENERAL NOTES

1. FOR ALL UNDERGROUND PIPING NOTES, SEE REF DWG 1.
2. FOR DUCT BANK INSTALLATION DETAILS, SEE REF DWG 2.

REFERENCE DRAWINGS

1. UNDERGROUND UTILITIES
   OVERALL ZONE LAYOUT
   PLAN VIEW
   D013784-591L10100 SH01
2. UNDERGROUND UTILITIES
   DUCT BANK INSTALLATION
   DETAILS AND NOTES
   D013784-591E00001 SH01
3. UNDERGROUND UTILITIES
   BURIED PIPING
   DETAILS
   D013784-591M10001 SH01
4. SITE UNDERGROUND UTILITIES
   FUEL OIL PIPING
   SECTIONS AND DETAILS
   D013784-591M1002 SH01

NO	REVISIONS	DATE	DRWN	CHKD	DSND	APPD
3	"FOR RECORD PURPOSES" PER FIELD MEMO #022-REVISED LINE 521-0184-4PRD AND COORDS. PER FIELD MEMO #087-REVISED 544-0148-2PRA & 577-0108-2PRC.	Y-EE-11	AG	LWS	MTE	HB
2	REVISED LINES 521-0191-4PRD, 562-0251-6BBAS & 562-0140-6BBAS; ADDED COORDINATES; ADDED LINES 521-0211-8BBAS.	021610	AG	LW	MTE	HB
1	REMOVED HOLDS; ADDED LINES 521-0184-4PRD, 521-0191-4PRD, 544-0148-3PRA, 577-0108-3PRC, 562-0140-6BBAS, 562-0251-6BBAS, 562-0221-6BBAS, 562-0247-6BBAS; REVISED LINES 544-0148-2PRA & 577-0108-2PRC; ADDED COORDINATES TO EXISTING FIRE LOOP; ADDED REFERENCE DRAWING 4; ADDED DETAILS A, B, C, D; ADDED DUCT BANKS 45, 54, 56; DETAIL AT & AU & ADDED DETAIL AH.	011910	JM	MHS	MTE	HB
0	ISSUED FOR CONSTRUCTION WITH HOLDS.					

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JEA

ZACHRY

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FLORIDA CERTIFICATE OF AUTHORIZATION #26739
AMARILLO, TX CHARLOTTE, NC HOUSTON, TX MINNEAPOLIS, MN OMAHA, NE SAN ANTONIO, TX

HEIDI BLASINGAME LICENSE STATE OF FLORIDA PROFESSIONAL ENGINEER 70073

NAME: HEIDI BLASINGAME
LICENSE NO.: 70073

GREENLAND ENERGY CENTER
SITE UNDERGROUND UTILITIES
ZONE 3
PLAN VIEW

DRAWN	DESIGNED	CHECKED	111708 CHECKED
A. GAMEZ	M. ELLIS	M. SELLMYER	H. AHMAD
APPROVED	DRAWING NUMBER	SHEET	REV
H. BLASINGAME	D013784-591L10103	01	3

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Project	Coating System and Blast Media Selection Procedure
Description	Organic zinc with high-build polyurethane finish
Surfaces	Carbon steel

Regulatory Compliance	Volatile organic compound (VOC) content of all materials must comply with applicable regulations for the point of application and, as required, the site location.

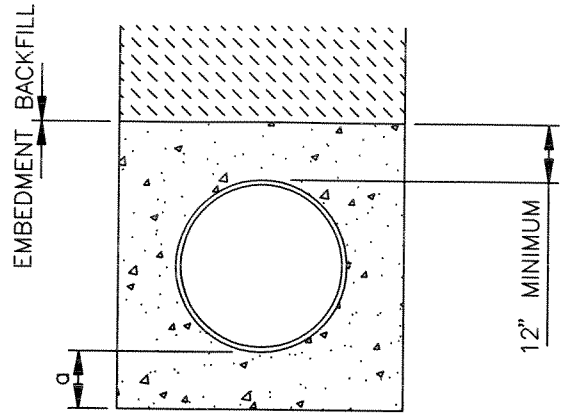
Approved Products — Coating manufacturers and products other than those listed herein are subject to Engineer's review/approval.

Manufacturer	First Coat	Touchup	Second Coat
Carboline	Carbozinc 859	Carbozinc 859	Carbothane 133 LH
Hempel	Zinc Rich Epoxy 178US	Zinc Rich Epoxy 178US	Hempathane HS 55610
International	Interzinc 315	Interzinc 315	Interthane 870UHS
PPG	Amercoat 68 HS	Amercoat 68 HS	Amershield
Sherwin-Williams	Zinc Clad III HS	Zinc Clad III HS	Acrolon 218 HS

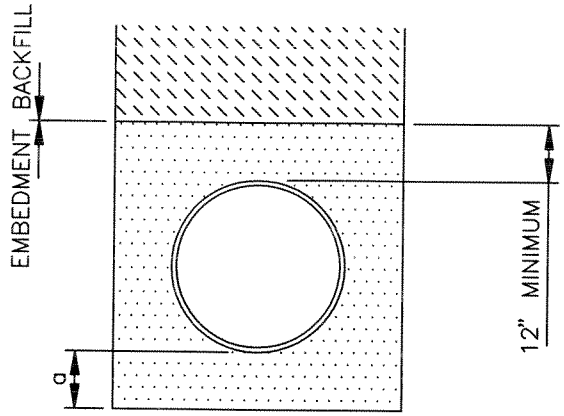
Surface Preparation	SSPC-SP 6/NACE No. 3 Commercial Blast Cleaning Profile depth 1 to 3 mils (25 µm to 75 µm)
Remarks	Profile to be verified by Contractor using ASTM D4417 Method C. Welds to be prepared in accordance with NACE SP0178, Appendix C, Designation "E."

Dry Film Thickness (DFT)

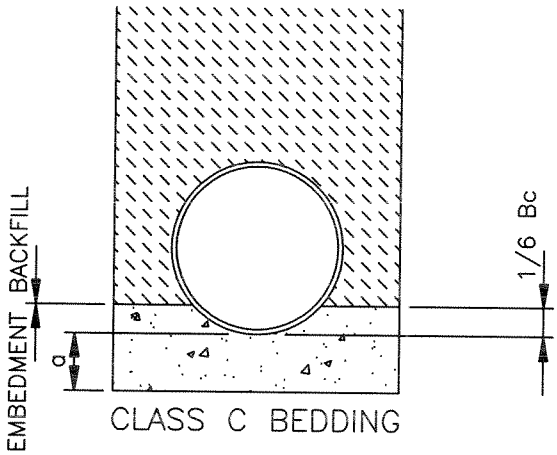
	Generic Coating Type	Minimum DFT	Maximum DFT	Shop (S) or Field (F) Applied	Remarks
First Coat	EPZ	3 mils (75 µm)	4 mils (100 µm)	S, F	0.50 minimum slip factor for faying surfaces.
Touchup	EPZ	3 mils (75 µm)	4 mils (100 µm)	S, F	SSPC-SP 3 Power Tool Cleaning (Non-Rusted Areas Only). SSPC-SP 15 Commercial Grade Power Tool Cleaning (Bare Metal or Rusted Areas).
Second Coat	URA	3 mils (75 µm)	5 mils (125 µm)	S, F	Do not apply to faying surfaces.
Completed System		6 mils (150 µm)	9 mils (225 µm)		Dry film thickness to be verified in accordance with SSPC-PA 2.



CLASS A BEDDING



CLASS B BEDDING



CLASS C BEDDING

LEGEND

D	NOMINAL PIPE SIZE
Bc	OUTSIDE DIAMETER OF PIPE
H	COVER ABOVE TOP OF PIPE
a	FOUNDATION DEPTH BELOW PIPE SEE TABLE
	CRUSHED ROCK OR CRUSHED GRAVEL EMBEDMENT
	COMPACTED BACKFILL
	SAND EMBEDMENT

NOTES

FOR FIRST CLASS BEDDING BENEATH RAILROADS, ROADS, AND PARKING AREAS, EXTEND CRUSHED ROCK EMBEDMENT TO TOP OF SUBGRADE OR 5 FEET ABOVE TOP OF PIPE.

SEE SPECIFIED REQUIREMENTS FOR MATERIALS, COMPACTION, AND TRENCH WIDTHS.

PIPE FOUNDATION DEPTH

D	a MIN. SOIL	a MIN. ROCK
60" & SMALLER	4"	9"
66" TO 90"	6"	12"
96" & LARGER	12"	12"

BLACK & VEATCH CORPORATION

ENGINEER	DRAWN
VHS	AGG
CHECKED	DATE
DRN	10/06/82

NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP
3	07/02/03	GENERAL REVISIONS	MDW	MJS	KWB		BES
2	06/30/89	GENERAL REVISIONS	JC	DRN			VHS
1	10/01/87	PROJECT NUMBER CHANGE	JC	DRN			VHS
0	10/06/82	INITIAL ISSUE	JC	DRN			VHS

PROJECT DRAWING NUMBER: 81112-DS-0053

REV: 3

PIPE EMBEDMENT

CODE

AREA

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BUI06695 ACAD 18.2s (LMS Tech)
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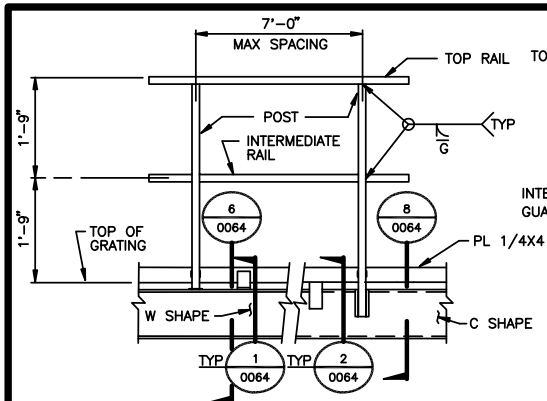
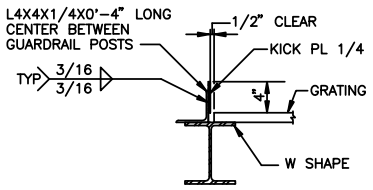
09/08/14 11:47:38

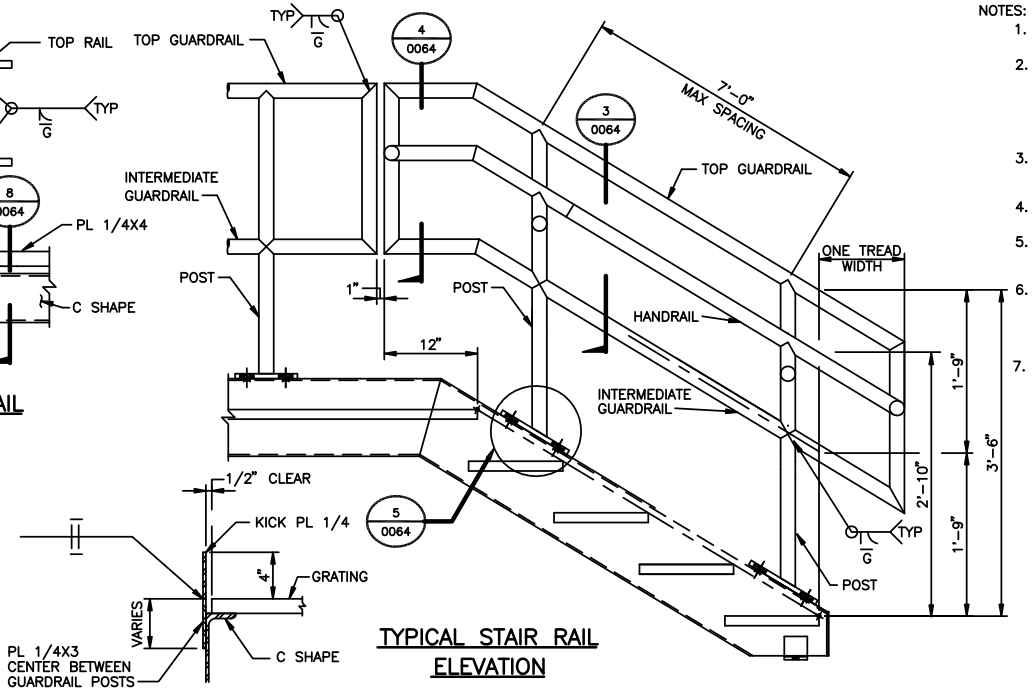


TYPICAL GUARDRAIL ELEVATION



NOTE:
ATTACHMENT OF ANGLE TO W SHAPE SHALL BE SAME AS GUARDRAIL POST TO W SHAPE

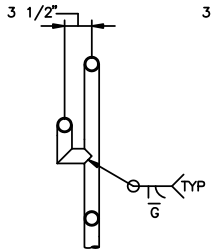
SECTION 1



TYPICAL STAIR RAIL ELEVATION

NOTES:

1. POSTS SHALL BE SPACED UNIFORM BETWEEN CORNER POSTS WITH MAXIMUM POST SPACING OF 7'-0".
2. SHOP & FIELD WELD CONNECTIONS SHOWN ARE TO BE CONSIDERED TYPICAL DETAILS. CONNECTIONS REQUIRED BUT NOT DETAILED ARE TO BE CONSIDERED IN LIGHT OF TYPICAL DETAILS. ALL CONNECTIONS SUBJECT TO ENGINEERS ACCEPTANCE PRIOR TO FABRICATION.
3. CHECK APPROPRIATE CODE FOR HANDRAIL AND GUARDRAIL CONCENTRATED AND OR UNIFORM LOAD REQUIREMENTS.
4. SAFETY GATES SHALL BE PROVIDED IN THE RAIL AT THE TOP OF ALL LADDERS.
5. STAIR RAILS AND HANDRAILS SHALL BE EXTENDED AS SHOWN UNLESS CONTINUOUS AROUND NEWEL POSTS BETWEEN STAIR FLIGHTS.
6. RAILING DIMENSIONS CONFORM TO BUILDINGS AND STRUCTURES CLASSIFIED AS FACTORY, INDUSTRIAL, AND STORAGE OCCUPANCIES, FOR AREAS NOT ACCESSIBLE TO THE GENERAL PUBLIC, AND HAVE AN OCCUPANT LOAD NO GREATER THAN 50.
7. CHECK APPLICABLE NATIONAL, STATE, AND LOCAL CODES FOR DEVIATIONS FROM DETAILS SHOWN.



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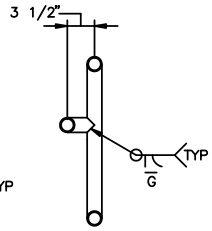

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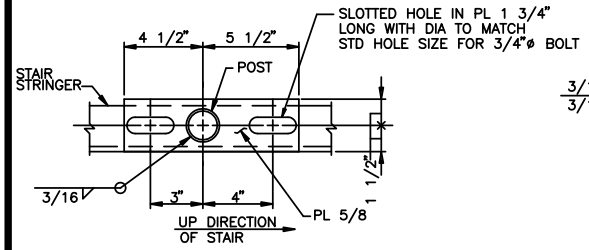

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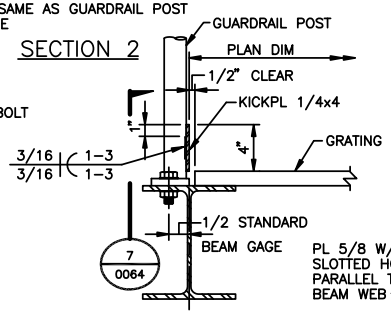
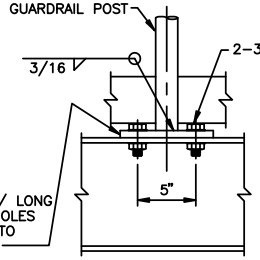


SECTION 2

SECTION 6



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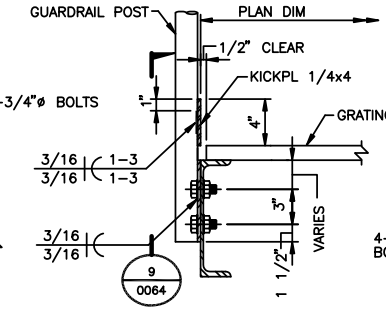

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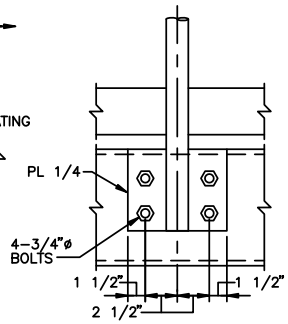

SECTION 9

8	04/30/10	GENERAL REVISIONS	SJB	BES	KWB		BES	9	10/21/10	REVISED DRAWING TITLE	KWB	BES	KWB		BES
10	09/08/14	REVISED DRAWING TITLE	KWB	BAG	KWB		BAG	NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP

BLACK & VEATCH CORPORATION

PROJECT DRAWING NUMBER: 81112-DS-0064

REV: 10

ENGINEER | DRAWN | CHECKED | DATE

TYPICAL GUARDRAIL AND STAIR RAIL
CONFORMING TO IBC 2003, 2006, 2009 & 2012
FOR AREAS NOT ACCESSIBLE TO THE PUBLIC

CODE | AREA

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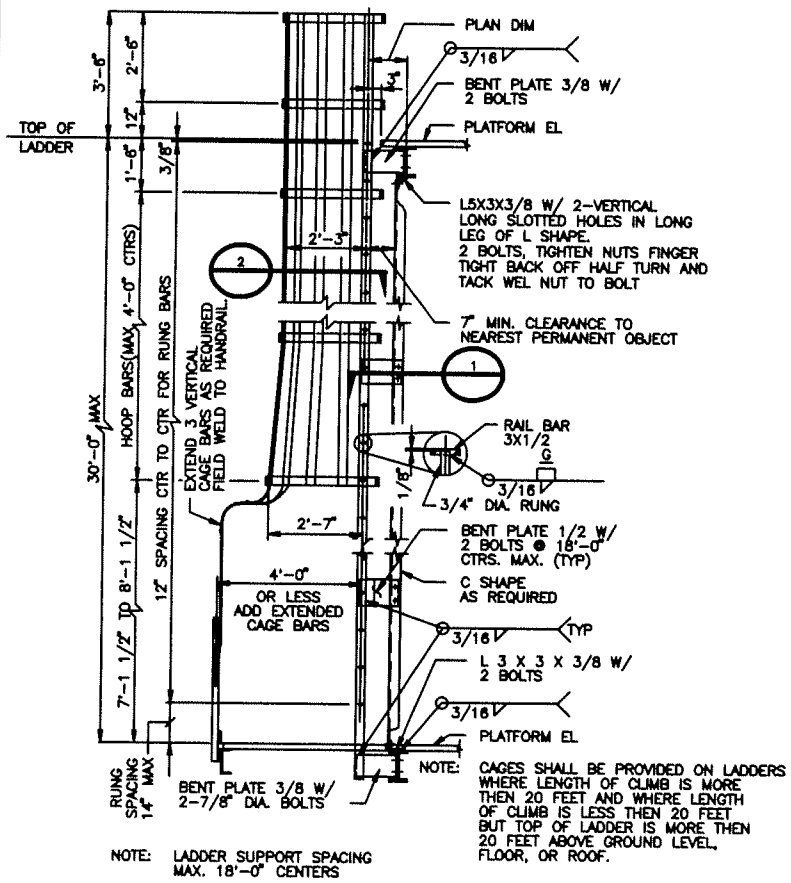
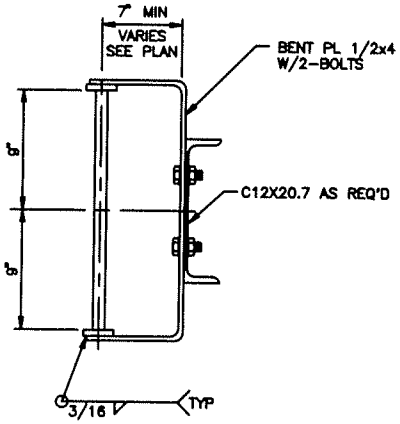
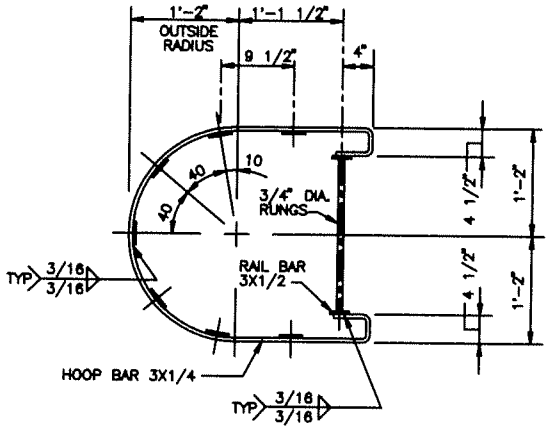


TYPICAL LADDER & CAGE



SECTION 1



SECTION 2

8	07/25/2008	GENERAL REVISIONS	REZ	REZ	KWB		BES	6	12/10/2004	GENERAL REVISIONS	REZ	AB	KWB		BES
7	02/22/2007	GENERAL REVISIONS	KWB	BES	KWB		BES	NO	DATE	REVISIONS AND RECORD OF ISSUE	DRN	DES	CHK	PDE	APP

BLACK & VEATCH CORPORATION

ENGINEER VHS	DRAWN AGG	TYPICAL LADDER DETAILS	PROJECT DRAWING NUMBER 81112-DS-0071 REV 8
CHECKED DRN	DATE 08/09/85		CODE / AREA