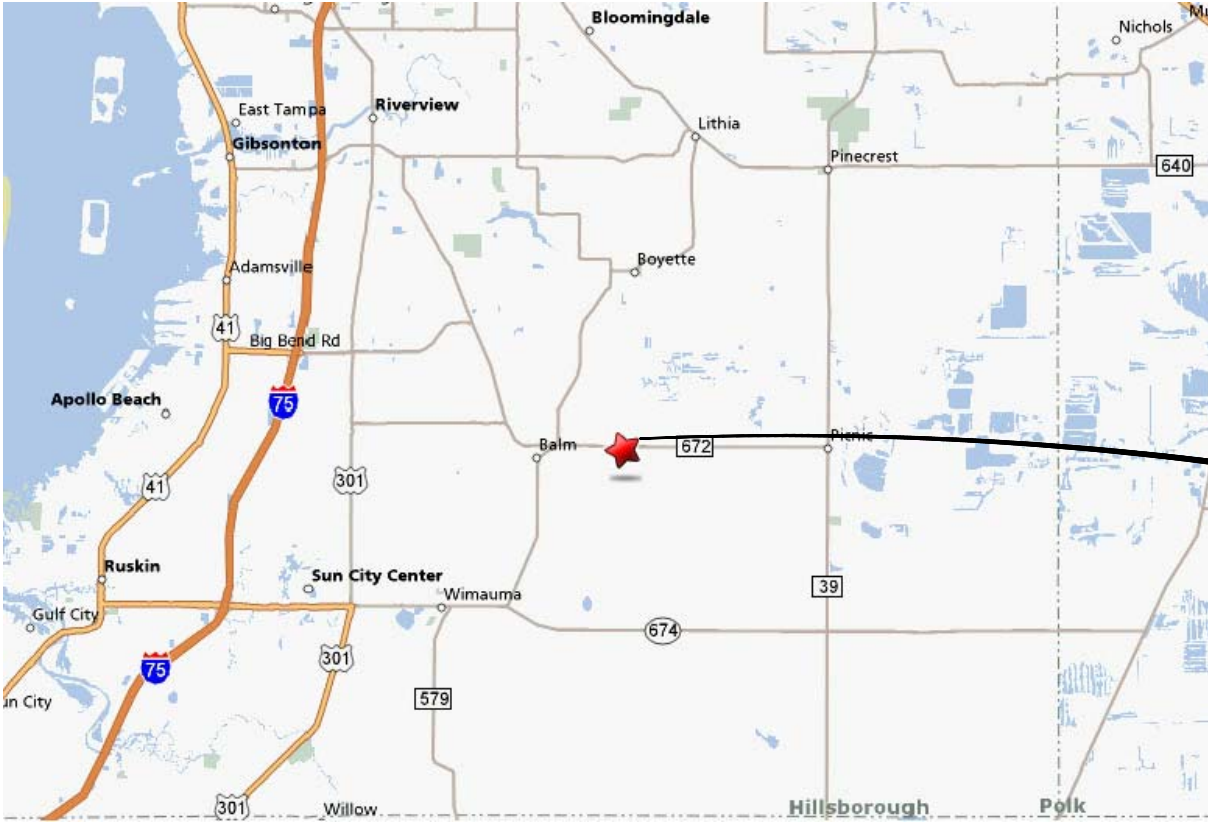


# FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY PNRS II AS-BUILT DOCUMENTS

## LIST OF DRAWINGS

SHEET COUNT	SHEET NUMBER	SHEET TITLE
GENERAL		
1	G-1	COVER SHEET AND INDEX OF DRAWINGS
2	G-2	LEGENDS AND NOTES
CIVIL		
3	C-1	EXISTING ONSITE WASTEWATER TREATMENT SYSTEM
4	C-2	OVERALL PROPOSED SITE PLAN
5	C-3	PROCESS FLOW DIAGRAM
6	C-4	HYDRAULIC PROFILE PNRS II
7	C-5	PNRS II DETAILS
8	C-6	PNRS II DETAILS
9	C-7	TASK C NITROGEN FATE & TRANSPORT STUDY AND PNRS II IN-SITU SYSTEMS
10	C-8	WASTEWATER SOURCE COMPONENTS DETAILS
11	C-9	MONITORING PLAN
STRUCTURAL		
12	S-1	PNRS II STRUCTURAL SITE PLAN
13	S-2	PNRS II STRUCTURAL SITE PLAN AND DETAILS
14	S-3	PNRS II STRUCTURAL SITE PLAN AND DETAILS
MECHANICAL		
15	M-1	YARD PIPING PLAN
ELECTRICAL		
16	E-1	ELECTRICAL SITE PLAN
17	E-2	ELECTRICAL SITE PLAN AND DETAILS
INSTRUMENTATION		
18	I-1	PANEL POWER
19	I-2	DI MODULE 1
20	I-3	DI MODULE 2
21	I-4	DI MODULE 3
22	I-5	DO MODULE 1
23	I-6	DO MODULE 2
24	I-7	PANEL ELEVATIONS
25	I-8	BILL OF MATERIALS
26	I-9	FUNCTIONAL CONTROL DESCRIPTIONS
27	I-10	FUNCTIONAL CONTROL DESCRIPTIONS

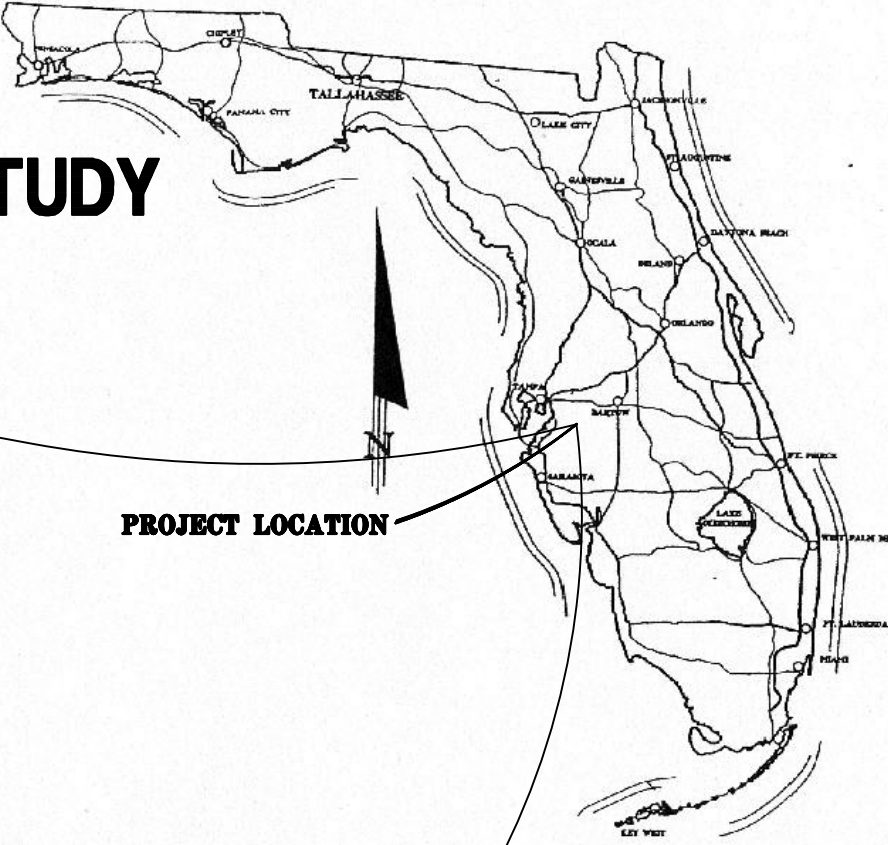


LOCATION MAP

N.T.S.

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

10002 Princess Palm Ave., Suite 200  
Tampa, Florida 33619  
Certificate of Authorization Number: 2771



PROJECT LOCATION

**PROJECT LOCATION**  
**UNIVERSITY OF FLORIDA**  
**GULF COAST RESEARCH AND**  
**EDUCATION CENTER**  
**WIMAUMA, FL.**



**FLORIDA DEPARTMENT OF HEALTH**  
4052 BALD CYPRESS WAY, BIN A08  
TALLAHASSEE, FLORIDA 32399-1713  
(850)-245-4070

SITE GENERAL NOTES

1. THE TOPOGRAPHIC INFORMATION SHOWN HEREON IS BASED ON A SURVEY AS PREPARED BY PHOTOGRAMMETRIC TECHNOLOGIES, INC. DATED FEBRUARY 2, 2003. THE BOUNDARY SURVEY IS AS PROVIDED BY U.F. I.F.A.S.
2. CONTRACTOR TO REVIEW GEOTECHNICAL REPORT AND BORINGS PRIOR TO BIDDING THE PROJECT AND FOLLOW OUTLINED CONSTRUCTION TECHNIQUES.
3. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING APPLICABLE TESTING WITH THE SERVICES OF AN APPROVED TESTING LABORATORY AND SOILS ENGINEER, AS REQUIRED BY APPLICABLE REGULATORY AGENCIES AND AS MAY BE FOUND IN THE ENGINEERING CONSTRUCTION DRAWINGS. CONTRACTOR TO VERIFY ALL TESTING WITH THE OWNER PRIOR TO COMMENCING CONSTRUCTION. UPON COMPLETION OF THE WORK, THE SOILS ENGINEER MUST SUBMIT TO THE OWNER'S ENGINEER CERTIFICATIONS STATING THAT ALL REQUIREMENTS HAVE BEEN MET.
4. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING FACILITIES, ABOVE OR BELOW GROUND THAT MAY OCCUR AS A RESULT OF THE WORK PERFORMED BY THE CONTRACTOR.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO BECOME FAMILIAR WITH THE PERMIT AND INSPECTION REQUIREMENTS OF THE VARIOUS GOVERNMENTAL AGENCIES. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO CONSTRUCTION, AND SCHEDULE INSPECTIONS ACCORDING TO AGENCY INSTRUCTIONS.
6. ALL WORK PERFORMED SHALL COMPLY WITH THE REGULATIONS AND ORDINANCES OF THE VARIOUS GOVERNMENTAL AGENCIES HAVING JURISDICTION OVER THE WORK INCLUDING LANDSCAPING.
7. REPAIR AND REPLACEMENT OF ALL PRIVATE AND PUBLIC PROPERTY AFFECTED BY THIS WORK SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THEN EXISTING CONDITIONS BEFORE COMMENCING CONSTRUCTION WORK UNLESS SPECIFICALLY EXEMPTED BY THE PLANS. ADDITIONAL COSTS ARE INCIDENTAL TO OTHER CONSTRUCTION AND NO EXTRA COMPENSATION WILL BE ALLOWED.
8. RECORD DRAWINGS:  
THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING INFORMATION ON A SET OF THE APPROVED PLANS CONCURRENTLY WITH CONSTRUCTION PROGRESS. WITHIN TWO WEEKS FOLLOWING FINAL INSPECTIONS THE CONTRACTOR SHALL SUBMIT ONE SET OF DRAWINGS TO THE ENGINEER OF RECORD. THE FINAL RECORD DRAWINGS SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS:
- A. DRAWING TO BE LEGIBLY MARKED TO RECORD ACTUAL CONSTRUCTION.
- B. DRAWINGS SHALL SHOW ACTUAL LOCATION OF ALL UTILITIES AND RELATED ITEMS, BOTH ABOVE AND BELOW GROUND. ALL CHANGES TO PIPING LOCATION INCLUDING HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES SHALL BE CLEARLY SHOWN AND REFERENCED TO PERMANENT SURFACE IMPROVEMENTS. DRAWINGS SHALL ALSO SHOW ACTUAL INSTALLED PIPE MATERIAL.
- C. DRAWINGS SHALL CLEARLY SHOW ALL FIELD CHANGES OF DIMENSION AND DETAIL.
- D. DRAWINGS SHALL CLEARLY SHOW ALL DETAILS NOT ON ORIGINAL CONTRACT DRAWINGS BUT CONSTRUCTED IN THE FIELD. ALL EQUIPMENT AND PIPING RELOCATIONS SHALL BE CLEARLY SHOWN.
- E. LOCATIONS OF ALL MANHOLES, HYDRANTS, VALVES AND VALVE BOXES SHALL BE SHOWN.
- F. THE CONTRACTOR SHALL PROVIDE CERTIFIED RECORD DRAWING, SIGNED AND SEALED BY A PROFESSIONAL LAND SURVEYOR. THE RECORD DRAWINGS SHALL SHOW FINAL GRADES AND LOCATIONS ON ALL UTILITIES INCLUDING THE SANITARY SEWER, WATER, PRODUCT PIPING, AND STORM WATER COLLECTION SYSTEM (I.E. PIPES, INLETS, AND PONDS). THE CONTRACTOR SHALL PROVIDE TEN COPIES OF THE CERTIFIED RECORD DRAWINGS TO THE OWNER.
9. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO COMPLY WITH AND ENFORCE ALL APPLICABLE SAFETY REGULATIONS.
10. ALL DELETERIOUS MATERIAL (I.E. MUCK, PEAT, BURIED DEBRIS) IS TO BE EXCAVATED IN ACCORDANCE WITH THESE PLANS OR AS DIRECTED BY THE OWNER'S ENGINEER OR OWNER'S SOIL TESTING COMPANY. DELETERIOUS MATERIAL IS TO BE STOCKPILED AND REMOVED FROM THE CAMPUS AREA AND PLACED ON-SITE AS DIRECTED BY THE OWNERS REPRESENTATIVE. EXCAVATED AREAS ARE TO BE BACKFILLED WITH APPROVED MATERIALS AND COMPACTED AS SHOWN ON THESE AREAS.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXCAVATIONS AGAINST COLLAPSE AND SHALL PROVIDE BRACING, SHEETING OR SHORING AS NECESSARY. TRENCHES SHALL BE KEPT DRY WHILE PIPES ARE BEING PLACED. DEWATERING SHALL BE USED AS REQUIRED, AND PERMITTED THROUGH LOCAL GOVERNMENTAL AGENCIES AND WATER MANAGEMENT DISTRICT PER CURRENT REGULATIONS AT THE SOLE COST OF THE CONTRACTOR.

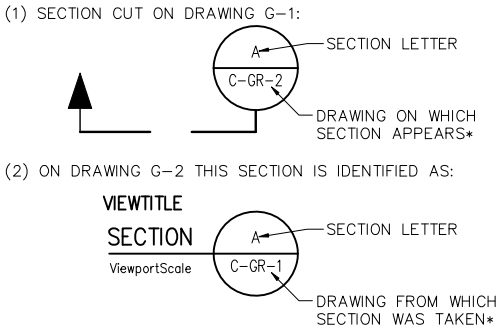
CONSTRUCTION NOTES

1. ALL MATERIALS AND WORK SHALL COMPLY WITH REQUIREMENTS OF CHAPTER 64E--6, FLORIDA ADMINISTRATIVE CODE (FAC), AND REQUIREMENTS, OF PERMITS ISSUED FOR THIS CONSTRUCTION. SHOP DRAWINGS FOR ALL COMPONENTS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO ORDERING SYSTEM COMPONENTS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR APPLYING FOR AND OBTAINING APPROPRIATE PERMITS AND FOR SCHEDULE/COORDINATING INSPECTIONS, REVIEWS, AND APPROVALS
3. LOCATIONS SHOWN ON THESE DRAWINGS ARE APPROXIMATE AND MAY BE FIELD ADJUSTED WITH APPROVAL OF OWNER AND HEALTH DEPARTMENT.
4. ENGINEER OF RECORD IS REQUIRED TO DO AN INITIAL INSPECTION. CONTRACTOR TO CALL (48) HOURS PRIOR TO INSPECTION TO REQUEST AN INSPECTOR.

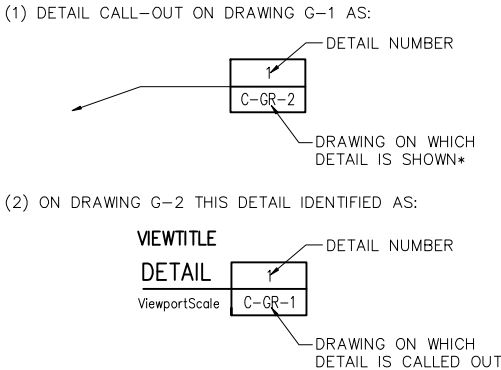
WATER AND WASTEWATER GENERAL NOTES

1. ALL WATER AND WASTEWATER INSTALLATION CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS ON DRAWINGS AND INCLUDED DETAILS.
2. IF THE VERTICAL CLEARANCE AT CROSSING POINTS OF WATER AND SANITARY SEWER LINES IS LESS THAN 18" (IN), THE SANITARY SEWER LINE SHALL THEN BE ENCASED IN A WATER TIGHT CARRIER PIPE FOR 10' (FT) EACH SIDE OF THE CROSSING POINT.
3. CONTRACTOR SHALL SUBMIT FOR REVIEW TO THE OWNER AND OWNER'S ENGINEER SHOP DRAWINGS ON ALL PRECAST AND MANUFACTURED ITEMS TO BE USED ON THIS SITE. FAILURE TO OBTAIN APPROVAL BEFORE INSTALLATION MAY RESULT IN REMOVAL AND REPLACEMENT AT CONTRACTOR'S EXPENSE. ENGINEER'S APPROVAL OF A SHOP DRAWING DOES NOT RELIEVE THE CONTRACTOR'S RESPONSIBILITY FOR THE PERFORMANCE OF THE ITEM.
4. THE CONTRACTOR IS RESPONSIBLE FOR ANY NECESSARY UTILITY FIELD LOCATIONS, RELOCATIONS AS REQUIRED, SHALL BE COORDINATED BY THE CONTRACTOR.
5. THE HORIZONTAL SEPARATION BETWEEN WATER MAINS AND PERMANENT STRUCTURES, TREES AND SANITARY SEWER MAINS SHALL BE 10' (FT) MINIMUM.
6. THE HORIZONTAL SEPARATION BETWEEN SEWER MAINS AND PERMANENT STRUCTURES AND TREES SHALL BE 15' (FT) MINIMUM.
7. WATER MAIN MATERIALS SHALL BE:  
4" - 12" MAINS SHALL BE PER AWWA, C900, DR18, CLASS 150.  
2" AND SMALLER LINES SHALL BE PVC SCHEDULE 80 WITH PRESSURE RATING OF 200.
8. SANITARY SEWER PIPE MATERIALS SHALL BE:  
4" - 8" SEWER SHALL BE PVC, SDR26 MEETING ASTM D3034.  
4" AND SMALLER LINES SHALL BE PVC SCHEDULE 80 WITH PRESSURE RATING OF 200.  
MINIMUM SLOPE FOR LATERALS SHALL BE 1.00%.
9. PROJECT IS LOCATED IN THE HILLSBOROUGH FIRE DISTRICT, STATION NO. 3.

SECTION IDENTIFICATION



DETAIL IDENTIFICATION



LEGEND			
EXISTING	99	EXISTING ELEVATION CONTOUR	SITE PLAN
	5.2	EXISTING SPOT ELEVATION	
	X	EXISTING FENCE	
	SS	EXISTING SANITARY SEWER LINE & MANHOLE	
	W	EXISTING WATER LINE & VALVE	
	ST	EXISTING STORM LINE & STRUCTURE	
	E	EXISTING ELECTRIC LINE	
	OPL	EXISTING OVERHEAD POWER LINE	
	GAS	EXISTING GAS LINE	
	*	EXISTING LIGHT	
	Ø	EXISTING UTILITY POLE	
	Ø	EXISTING WOOD POWER POLE	
	TP	EXISTING TELEPHONE PEDESTAL	
	→	EXISTING GUY ANCHOR	
	W	EXISTING WELL	
	Ø	EXISTING WATER METER	
	Ø	EXISTING FIRE HYDRANT	
	TE	EXISTING UNDERGROUND TELEPHONE LINE	
	Ø	EXISTING TREE (SIZE & TYPE)	
	Ø	EXISTING STRUCTURE	
	Ø	PROJECT BENCHMARK	
	NEW BUILDING		
	NEW SHELL GRAVEL		
	NEW GRAVITY LINE		
	NEW PRESSURE LINE		
	NEW FLOW METER		
	NEW CHECK VALVE		
	NEW BALL VALVE NORMALLY CLOSED		
	NEW BALL VALVE NORMALLY OPEN		
	NEW PINCH VALVE (PNEUMATIC) NORMALLY CLOSED		
	NEW PINCH VALVE (PNEUMATIC) NORMALLY OPEN		
	NEW RECIRCULATION VALVE		
	NEW WATER MAIN WITH GATE VALVE & BOX		
	NEW SILT FENCE LINE		
	NEW ELEVATION CONTOUR		
	NEW STORM STRUCTURE IDENTIFICATION		
	NEW SPOT ELEVATION		
	DIRECTION OF SURFACE DRAINAGE FLOW		

ELECTRICAL LEGEND

- ⓔ EQUIPMENT CONNECTION OUTLET - VERIFY LOCATION
- ⓐ JUNCTION BOX
- Ⓣ TRANSFORMER
- ⓧⓧⓧ DISTRIBUTION SWITCHBOARD OR PANELBOARD
- BRANCH CIRCUIT PANELBOARD
- CONDUIT
- HOMERUN TO PANELBOARD. "1,1" INDICATES THE PANELBOARD NUMBER. "1,3" INDICATES THE BRANCH CIRCUIT NUMBERS. HATCH MARKS DENOTE NUMBER OF CONDUCTORS EXCLUDING GROUND CONDUCTOR. NO HATCH MARKS DENOTES TWO #12 CONDUCTORS AND ONE #12 GROUNDING CONDUCTOR
- U UNDERGROUND CONDUIT
- C CONDUIT STUB--UP
- 1L1 PANELBOARD NUMBER

ELECTRICAL ABBREVIATIONS

- A AMPS
- AFF ABOVE FINISHED FLOOR
- AICS AMPS INTERRUPTING CAPACITY SYMMETRICAL
- BKR BREAKER
- C CONDUIT
- CLG CEILING
- CKT CIRCUIT
- CU COPPER
- EF EXHAUST FAN
- EMT ELECTRICAL METALLIC TUBING
- FU FUSE
- FLR FLOOR
- GFI GROUND FAULT INTERRUPTER
- GRD GROUND
- HOA HAND-OFF--AUTOMATIC
- HP HORSEPOWER
- IMC INTERMEDIATE METAL CONDUIT
- K KILO
- LTG LIGHTING
- MTD MOUNTED
- NEC NATIONAL ELECTRICAL CODE
- OHP OVERHEAD PRIMARY
- P POLE
- PWR POWER
- UGE UNDERGROUND ELECTRIC
- UL UNDERWRITERS LABORATORIES
- UNO UNLESS NOTED OTHERWISE
- V VOLTS
- VA VOLT--AMPERES
- W WATTS
- WP WEATHERPROOF
- Ø PHASE

SUMMARY OF TANKAGE

TANK	TANK DESCRIPTION	SIZE	MATERIAL
TANK 1	NEW STE TWO COMPARTMENT DOSING TANK	1050 GAL	CONCRETE
TANK 2	EXISTING STAGE 2 SEPTIC TANK	1250 GAL	CONCRETE
TANK 3	NEW DENITE FEED TANK	30 GAL	PLASTIC
TANK 4	NEW STE DRIP STORAGE TANK	300 GAL	CONCRETE
TANK 5	NEW NO3 DRIP STORAGE TANK	300 GAL	CONCRETE

SUMMARY OF PUMPS

PUMP	PUMP LOCATION	TYPE	MANUFACTURER/MAKE	MODEL
P1	TANK 2	SUBMERSIBLE	GOULDS BLASTER	33EB05
P2	TANK 1	SUBMERSIBLE	LITTLE GIANT	5--MSP
P3	TANK 1	SUBMERSIBLE	LITTLE GIANT	5--MSP
P4	TANK 1	SUBMERSIBLE	LITTLE GIANT	5--MSP
P5	DOSES INSITU STAGE 1 BIOFILTERS	PERISTALTIC	MASTERFLEX	R--07523--80
P6	RECIRCULATION DOSE TANK 1	SUBMERSIBLE	LITTLE GIANT	5--MSP
P7	RECIRCULATION DOSE TANK 2	SUBMERSIBLE	LITTLE GIANT	5--MSP
P8	RECIRCULATION DOSE TANK 3	SUBMERSIBLE	LITTLE GIANT	5--MSP
P9	RECIRCULATION DOSE TANK 4	SUBMERSIBLE	LITTLE GIANT	5--MSP
P10	NOT USED			
P11	DOSES STAGE 2 BIOFILTERS	PERISTALTIC	MASTERFLEX	R--07523--90
P12	TANK 4	SUBMERSIBLE	GOULDS BLASTER	20EB05
P13	TANK 5	SUBMERSIBLE	GOULDS BLASTER	20EB05
P14	TANK 1	SUBMERSIBLE	LITTLE GIANT	5--MSP
P15	TANK 4	SUBMERSIBLE	LITTLE GIANT	5--MSP

PLOT DATE: 5/28/2010 4:22 PM BY: EDEBACK

				DESIGNED JME	JOSEFIN M. EDEBACK Name: _____ Date: _____ Florida Professional Engineer's Registration Number: 69835
				DRAWN CMS	
				CHECKED DBS	
				PROJ. ENGR. JME	
				DLA	
				APPROVED	
5	AS-BUILTS PNRS II	05/10	-		
4	FINAL SUBMITTAL	01/10	-		
3	100% SUBMITTAL	12/09	-		
2	75% SUBMITTAL	12/09	-		
1	50% SUBMITTAL	08/09	-		
NO.	ISSUED FOR	DATE	BY		

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists  
10002 Princess Palm Avenue  
Registry One Building, Suite 200  
Tampa, Florida 33619  
Certificate of Authorization Number: 2771



**FLORIDA DEPARTMENT OF HEALTH**  
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TALLAHASSEE, FL 32399-1713  
(850)-245-4070

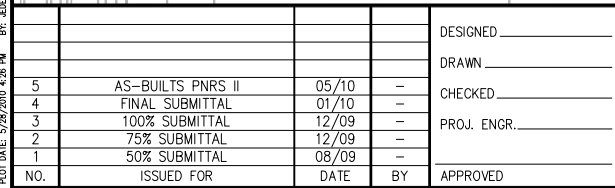
**FLORIDA DEPARTMENT OF HEALTH**  
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

LEGENDS AND NOTES

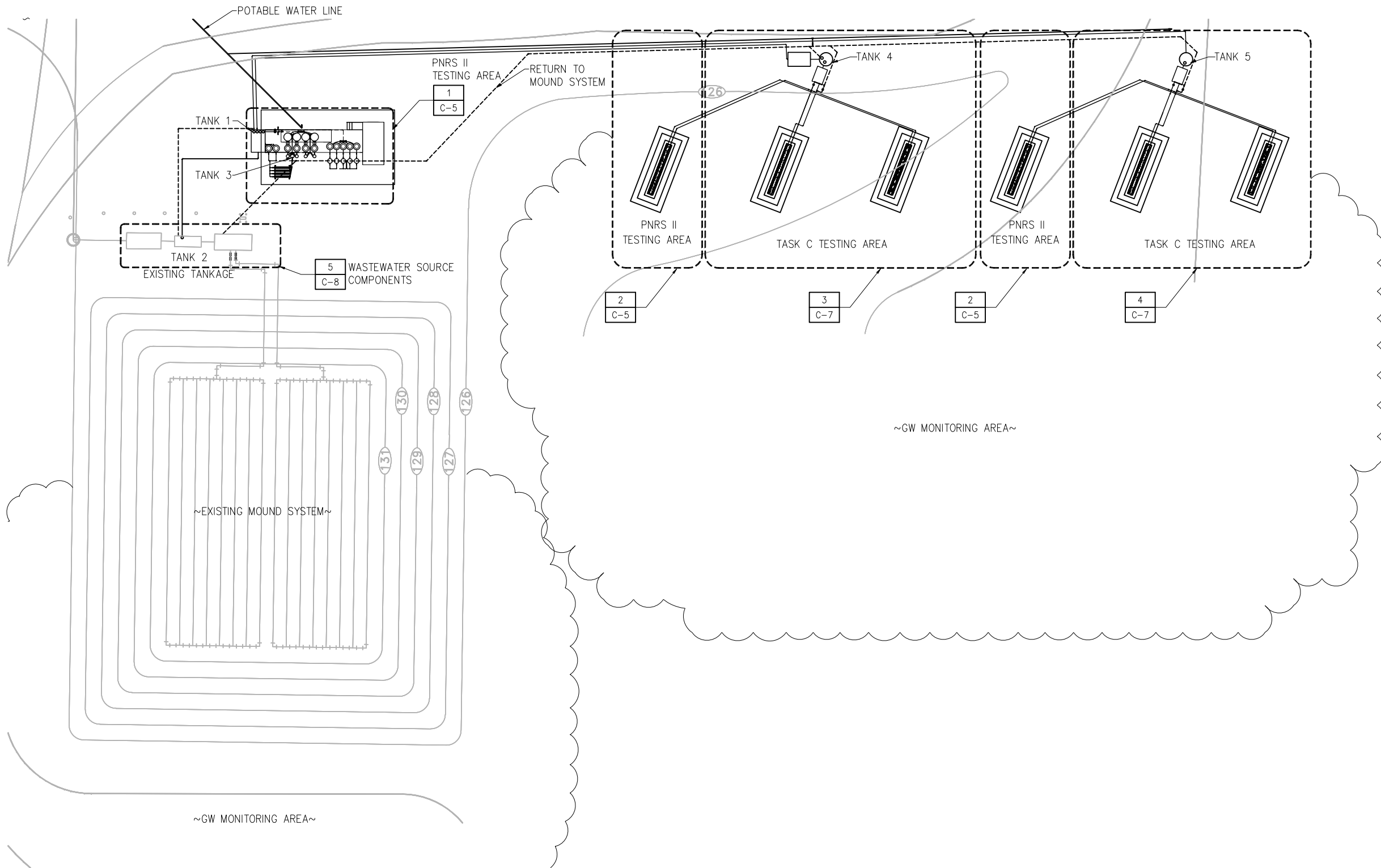
THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010 H & S JOB NUMBER 44237-001 CONTRACT NUMBER DRAWING NUMBER G-2
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File # 0144237-0001.dwg (User) by JEFFREY L. HARRIS, P.E. (User) on 5/28/2010 3:17 PM





DRAWING NUMBER  
C-1



PROPOSED SITE PLAN  
1"=20'

1"=20'-0"  
20 10 0 20'

PROJECT DATE: 5/28/2010 4:25 PM BY: EDEBACK

NO.	ISSUED FOR	DATE	BY
5	AS-BUILTS PNRS II	05/10	-
4	FINAL SUBMITTAL	01/10	-
3	100% SUBMITTAL	12/09	-
2	75% SUBMITTAL	12/09	-
1	50% SUBMITTAL	08/09	-

DESIGNED	JME
DRAWN	CMS
CHECKED	DBS
PROJ. ENGR.	JME
DLA	
APPROVED	

JOSEFIN M. EDEBACK	
Name:	Date:
Florida Professional Engineer's Registration Number: 69835	

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(850)-245-4070

<b>FLORIDA DEPARTMENT OF HEALTH</b> FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY	THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.
OVERALL PROPOSED SITE PLAN	

DATE	MAY 2010
H & S JOB NUMBER	44237-001
CONTRACT NUMBER	
DRAWING NUMBER	C-2

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Plot Date: 5/28/2010 4:28 PM By: JEDBACK

NO.	ISSUED FOR	DATE	BY
5	AS-BUILTS PNRS II	05/10	-
4	FINAL SUBMITTAL	01/10	-
3	100% SUBMITTAL	12/09	-
2	75% SUBMITTAL	12/09	-
1	50% SUBMITTAL	08/09	-

DESIGNED	JME
DRAWN	CMS
CHECKED	DBS
PROJ. ENGR.	JME
	DLA
APPROVED	

JOSEFIN M. EDEBACK	
Name:	Date:
Florida Professional Engineer's Registration Number: 69835	

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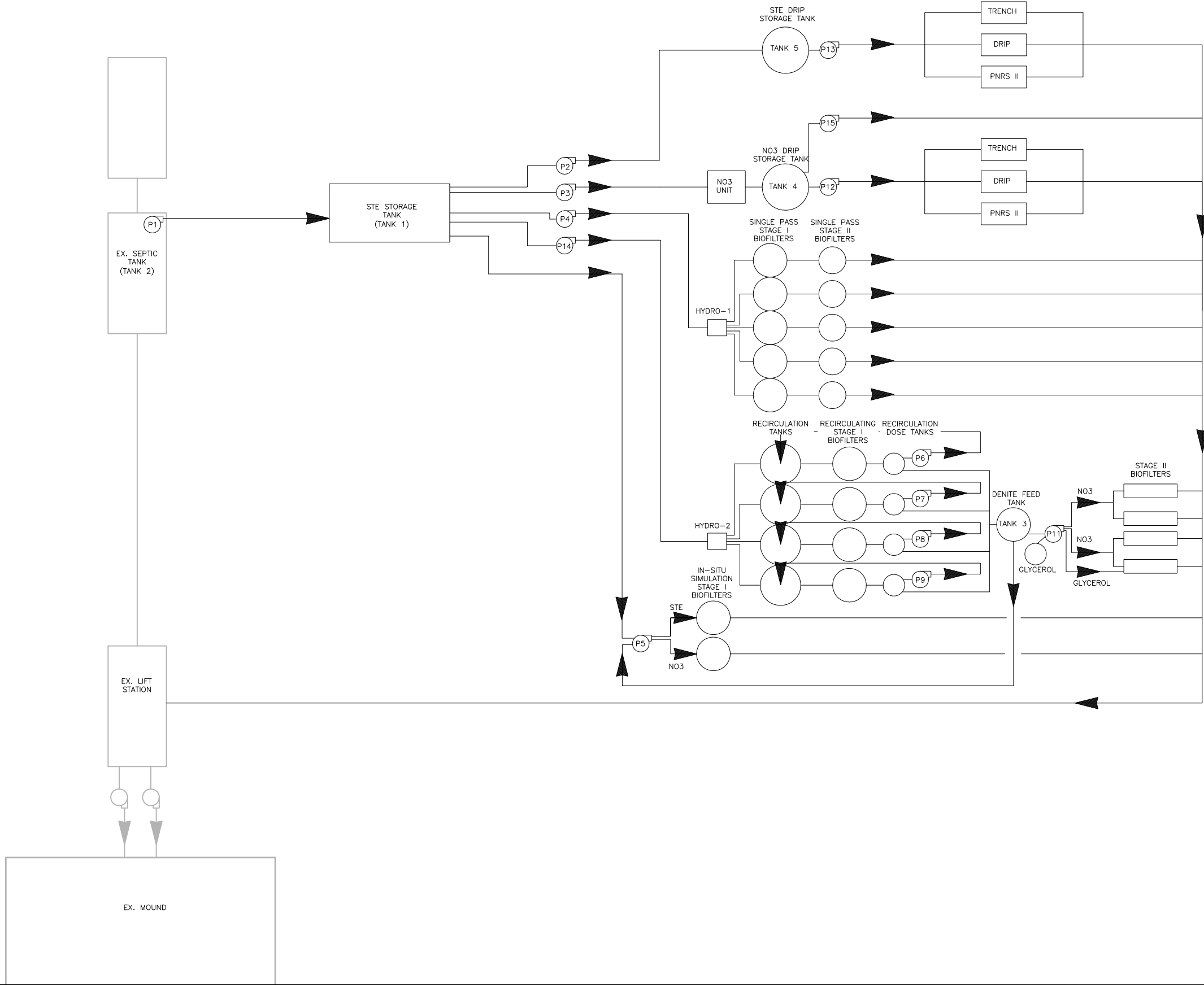
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FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

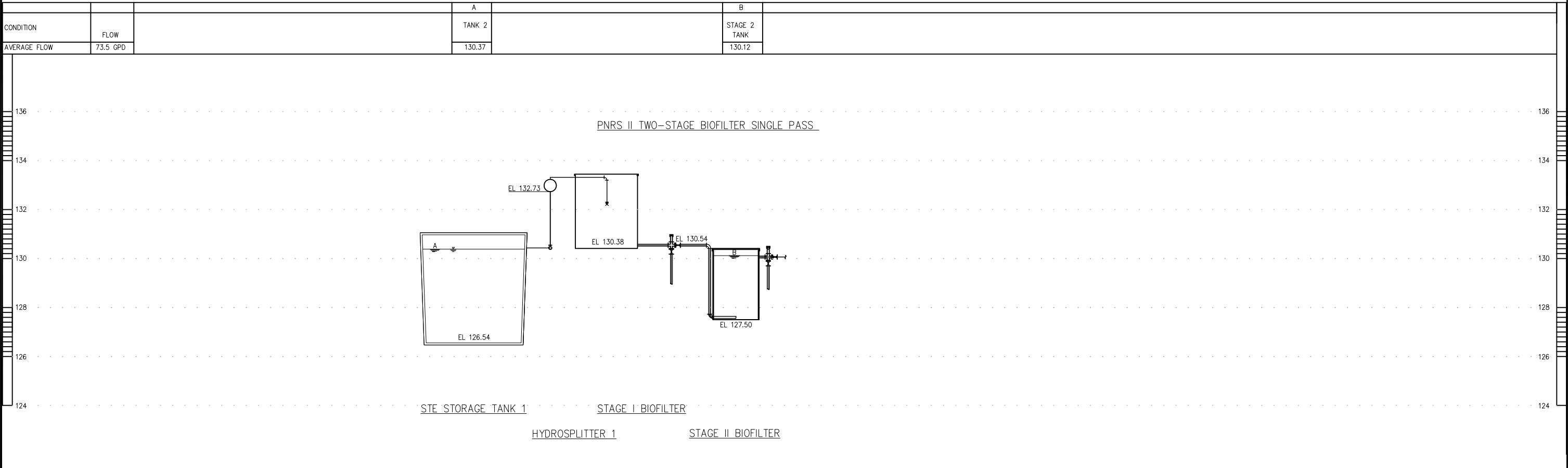
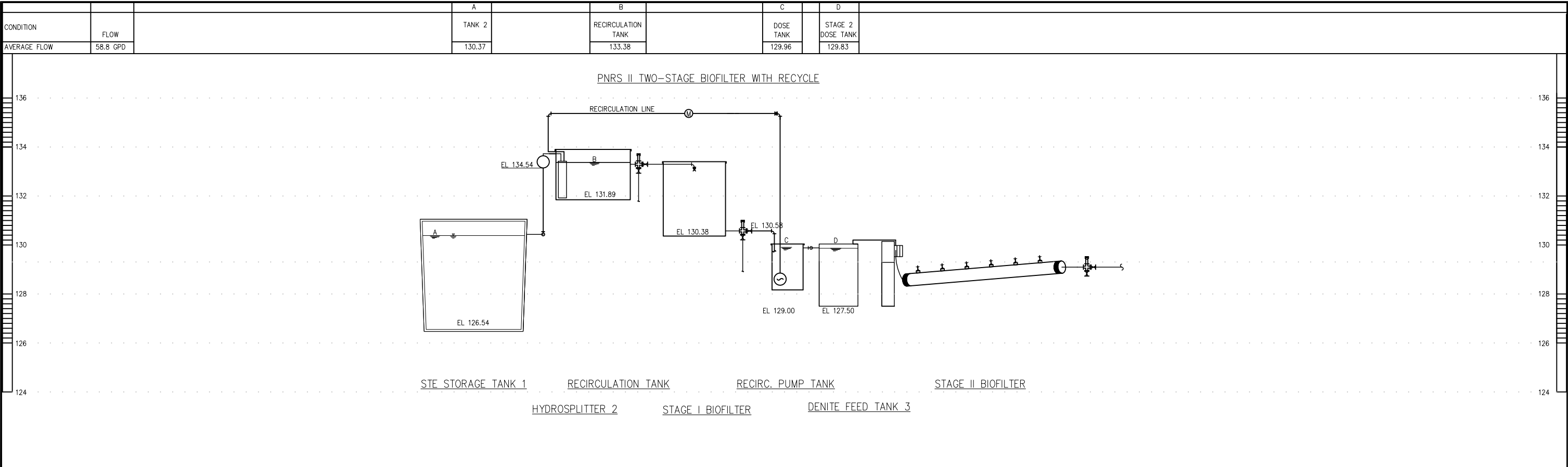
PROCESS FLOW DIAGRAM

THE SCALE BAR  
SHOWN BELOW  
MEASURES ONE  
INCH LONG ON  
THE ORIGINAL  
DRAWING.

DATE	MAY 2010
H & S JOB NUMBER	44237-001
CONTRACT NUMBER	
DRAWING NUMBER	C-3



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DRAWN	CMS
CHECKED	DBS
PROJ. ENGR.	JME
	DLA
APPROVED	

NO.	ISSUED FOR	DATE	BY
5	AS-BUILTS PNRS II	05/10	-
4	FINAL SUBMITTAL	01/10	-
3	100% SUBMITTAL	12/09	-
2	75% SUBMITTAL	12/09	-
1	50% SUBMITTAL	08/09	-

JOSEFIN M. EDEBACK
Name: _____ Date: _____
Florida Professional Engineer's Registration Number: 69835

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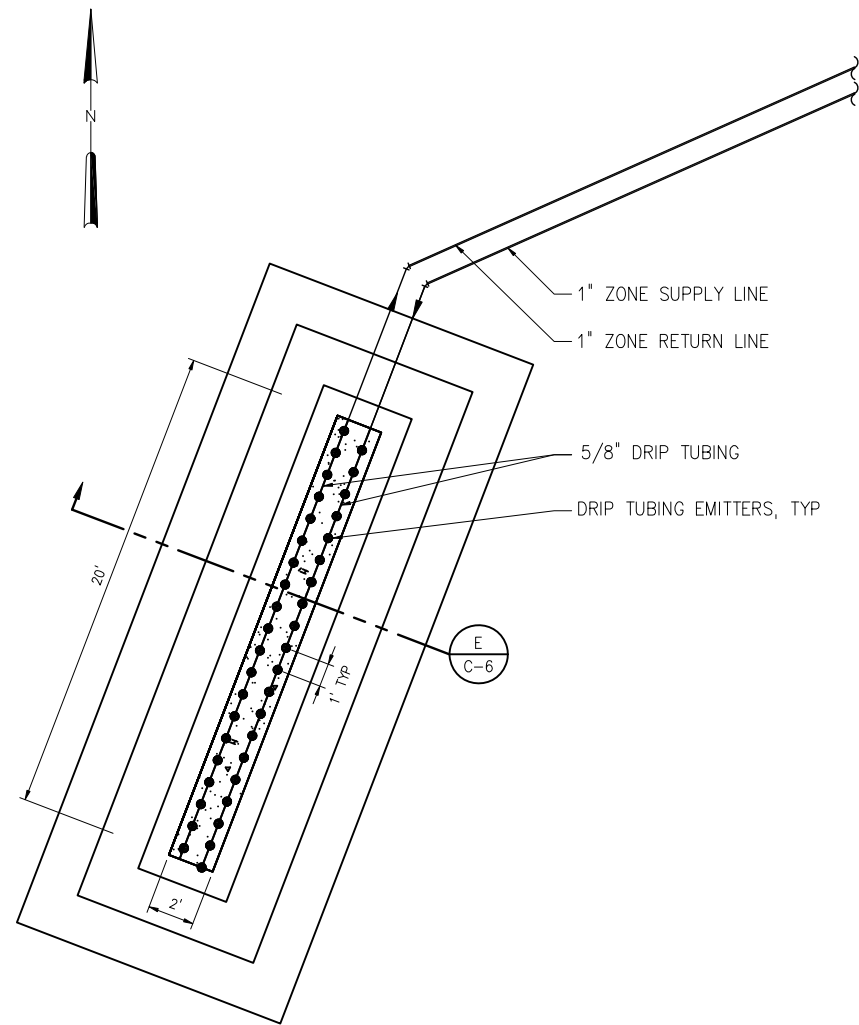
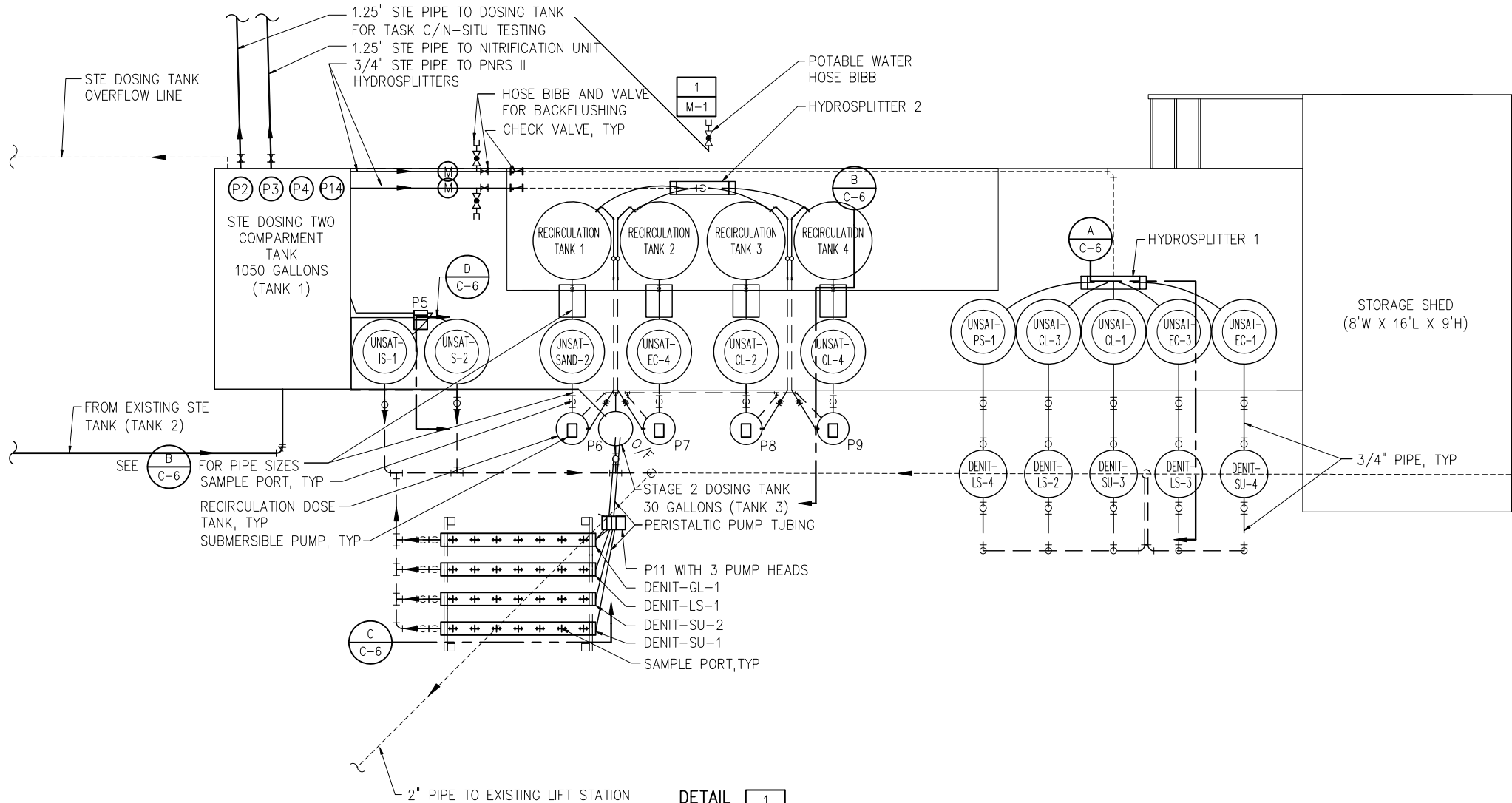
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**FLORIDA DEPARTMENT OF HEALTH**  
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY  
  
HYDRAULIC PROFILE PNRS II

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010
	H & S JOB NUMBER 44237-001
	CONTRACT NUMBER
	DRAWING NUMBER C-4

Plot Date: 5/28/2010 4:28 PM BY: JEDBACK

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DETAIL 1  
3/8"=1'-0"

DETAIL 2  
3/8"=1'-0"

SUMMARY OF PNRS II BIOFILTERS						
		BIOFILTER	TANK SIZE	MEDIA DEPTH	INITIAL SURFACE LOADING RATE	INITIAL DOSE CYCLES
						STAGE II BIOFILTER DIRECTLY CONNECTED
STAGE I BIOFILTER	(SINGLE PASS)	UNSAT-EC-1	30"ID X 36" H	15" EXPANDED CLAY	3 gal/day-ft2; 14.73 gpd	24
		UNSAT-EC-3	30"ID X 36" H	30" EXPANDED CLAY	3 gal/day-ft2; 14.73 gpd	24
		UNSAT-CL-1	30"ID X 36" H	15" CLINOPTILOLITE	3 gal/day-ft2; 14.73 gpd	24
		UNSAT-CL-3	30"ID X 36" H	30" CLINOPTILOLITE	3 gal/day-ft2; 14.73 gpd	24
		UNSAT-PS-1	30"ID X 36" H	30" POLYSTYRENE	3 gal/day-ft2; 14.73 gpd	24
		UNSAT-IS-1	30"ID X 36" H	24" MIX	0.8 gal/day-ft2; 3.92 gpd	6
	(WITH RECYCLE)	UNSAT-IS-2	30"ID X 36" H	24" MIX	0.8 gal/day-ft2; 3.92 gpd	6
		UNSAT-SAND-2	30"ID X 36" H	30" SAND	3 gal/day-ft2; 14.73 gpd	24
		UNSAT-EC-4	30"ID X 36" H	30" EXPANDED CLAY	3 gal/day-ft2; 14.73 gpd	24
		UNSAT-CL-2	30"ID X 36" H	15" CLINOPTILOLITE	3 gal/day-ft2; 14.73 gpd	24
STAGE II BIOFILTER	(CONNECTED)	UNSAT-CL-4	30"ID X 36" H	30" CLINOPTILOLITE	3 gal/day-ft2; 14.73 gpd	24
		DENIT-SU-3	22"ID X 34" H	80% SU; 20% OS	4.7 gal/day-ft2; 12.41 gpd	CONTINUOUS
		DENIT-SU-4	22"ID X 34" H	80% SU; 20% NS	4.7 gal/day-ft2; 12.41 gpd	CONTINUOUS
		DENIT-LS-2	22"ID X 34" H	50% LS; 50% EC	4.7 gal/day-ft2; 12.41 gpd	CONTINUOUS
	(COMMON TANK)	DENIT-LS-3	22"ID X 34" H	50% LS; 50% SAND	4.7 gal/day-ft2; 12.41 gpd	CONTINUOUS
		DENIT-LS-4	22"ID X 34" H	30% LS; 70% EC	4.7 gal/day-ft2; 12.41 gpd	CONTINUOUS
		DENIT-SU-1	6"ID X 72" L	80% SU; 20% OS	10 gal/day-ft2; 1.96 gpd	24
		DENIT-SU-2	6"ID X 72" L	80% SU; 20% NS	10 gal/day-ft2; 1.96 gpd	24
		DENIT-LS-1	6"ID X 72" L	50% LS; 50% EC	10 gal/day-ft2; 1.96 gpd	24
		DENIT-GL-1	6"ID X 72" L	83% EC; 17% GR	10 gal/day-ft2; 1.96 gpd	24

SU: ELEMENTAL SULFUR, LS: LIGNOCELLULOSIC, GL: GLYCEROL, OS: OYSTER SHELL, NS: SODIUM SESQUICARBONATE, EC: EXPANDED CLAY

3/8"=1'-0" 12" 0 1 2 4'

PROJECT DATE: 5/26/2010 4:27 PM BY: EDEBACK

DESIGNED	JME
DRAWN	CMS
CHECKED	DBS
PROJ. ENGR.	JME
BY	DLA
APPROVED	

JOSEFIN M. EDEBACK  
Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Florida Professional Engineer's Registration Number: 69835

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists  
10002 Princess Palm Avenue  
Registry One Building, Suite 200  
Tampa, Florida 33619  
Certificate of Authorization Number: 2771

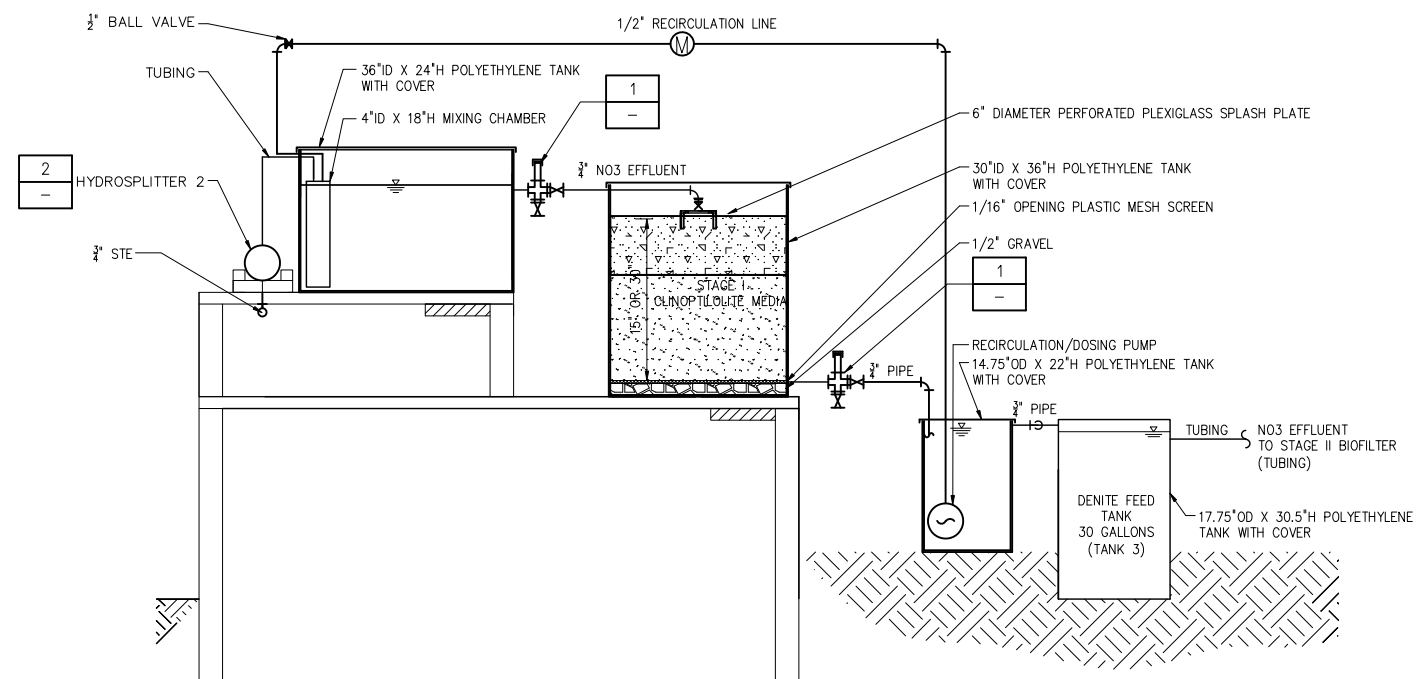
**FLORIDA DEPARTMENT OF HEALTH**  
4052 BALD CYPRESS WAY, BIN A08  
TALLAHASSEE, FL 32399-1713  
(850)-245-4070



FLORIDA DEPARTMENT OF HEALTH FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY	
PNRS II DETAILS	

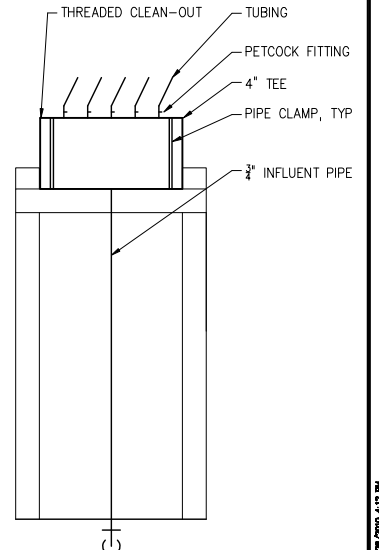
THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE	MAY 2010
	H & S JOB NUMBER	44237-001
	CONTRACT NUMBER	
	DRAWING NUMBER	C-5

File # 0144237-000-PLAN-44237-001.dwg User: jme Date: 5/26/2010 1:39 PM



SECTION A  
C-5

SECTION B  
NTS C-5



SECTION C  
C-5

SECTION D  
NTS C-5

SECTION E  
C-5

DETAIL	2
NTS	—

				DESIGNED	JME	JOSEFIN M. EDEBACK  Name: _____ Date: _____ Florida Professional Engineer's Registration Number: <u>69835</u>
				DRAWN	CMS	
				CHECKED	DBS	
5	AS-BUILTS PNRS II	05/10	—	PROJ. ENGR.	JME	
4	FINAL SUBMITTAL	01/10	—			
3	100% SUBMITTAL	12/09	—			
2	75% SUBMITTAL	12/09	—			
1	50% SUBMITTAL	08/09	—	DLA		
NO.	ISSUED FOR	DATE	BY	APPROVED		

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Environmental Engineers & Scientists

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**FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY**

## PNRS II DETAILS

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010
	H & S JOB NUMBER 44237-001
	CONTRACT NUMBER
DRAWING NUMBER C-6	



Plot Date: 5/28/2010 4:27 PM BY: JEDBACK

5	AS-BUILTS PNRS II	05/10	-
4	FINAL SUBMITTAL	01/10	-
3	100% SUBMITTAL	12/09	-
2	75% SUBMITTAL	12/09	-
1	50% SUBMITTAL	08/09	-
NO.	ISSUED FOR	DATE	BY

DESIGNED	JME
DRAWN	CMS
CHECKED	DBS
PROJ. ENGR.	JME
	DLA
APPROVED	

JOSEFIN M. EDEBACK	
Name:	Date:
Florida Professional Engineer's Registration Number: 69835	

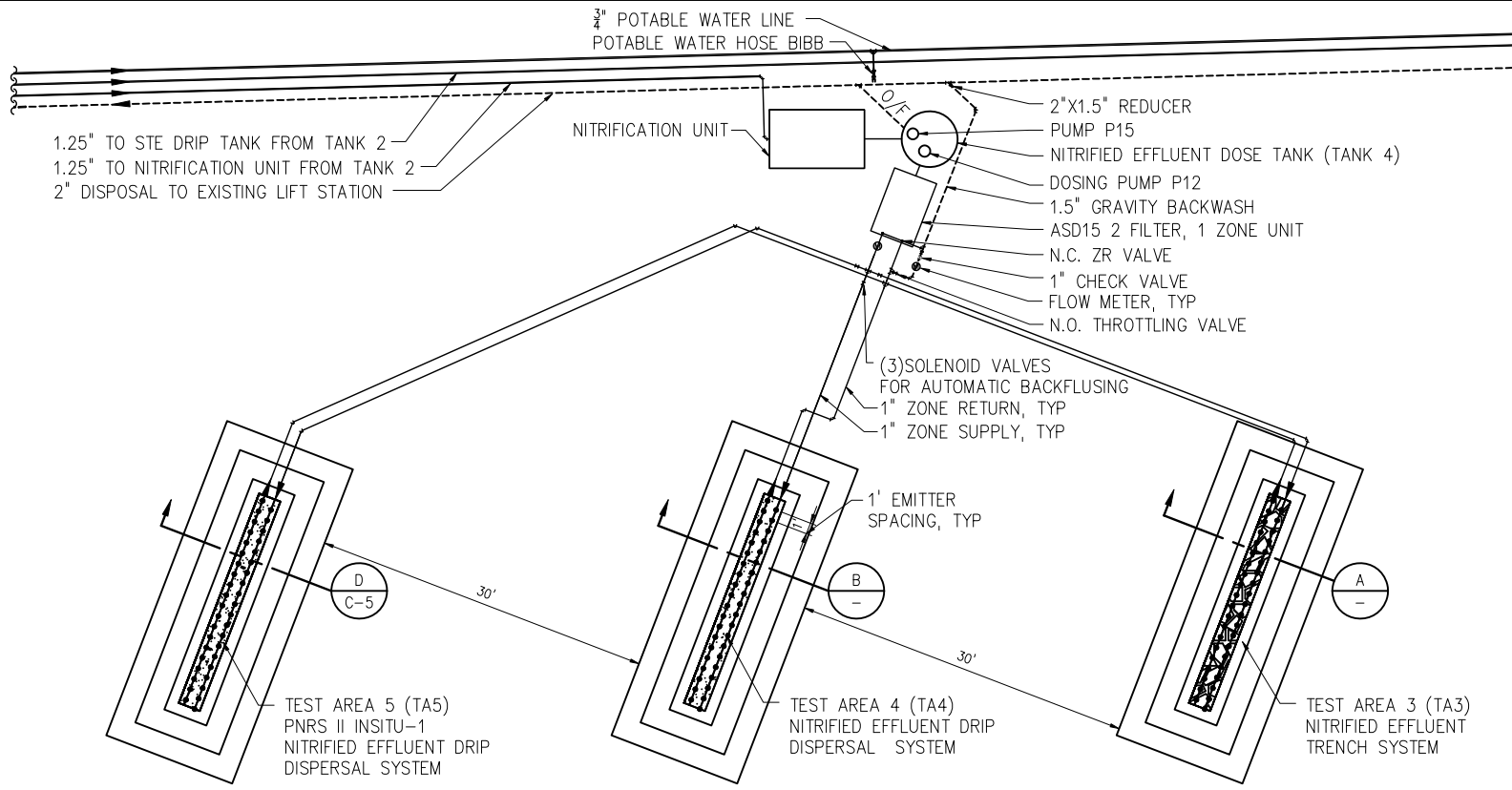
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Tampa, Florida 33619  
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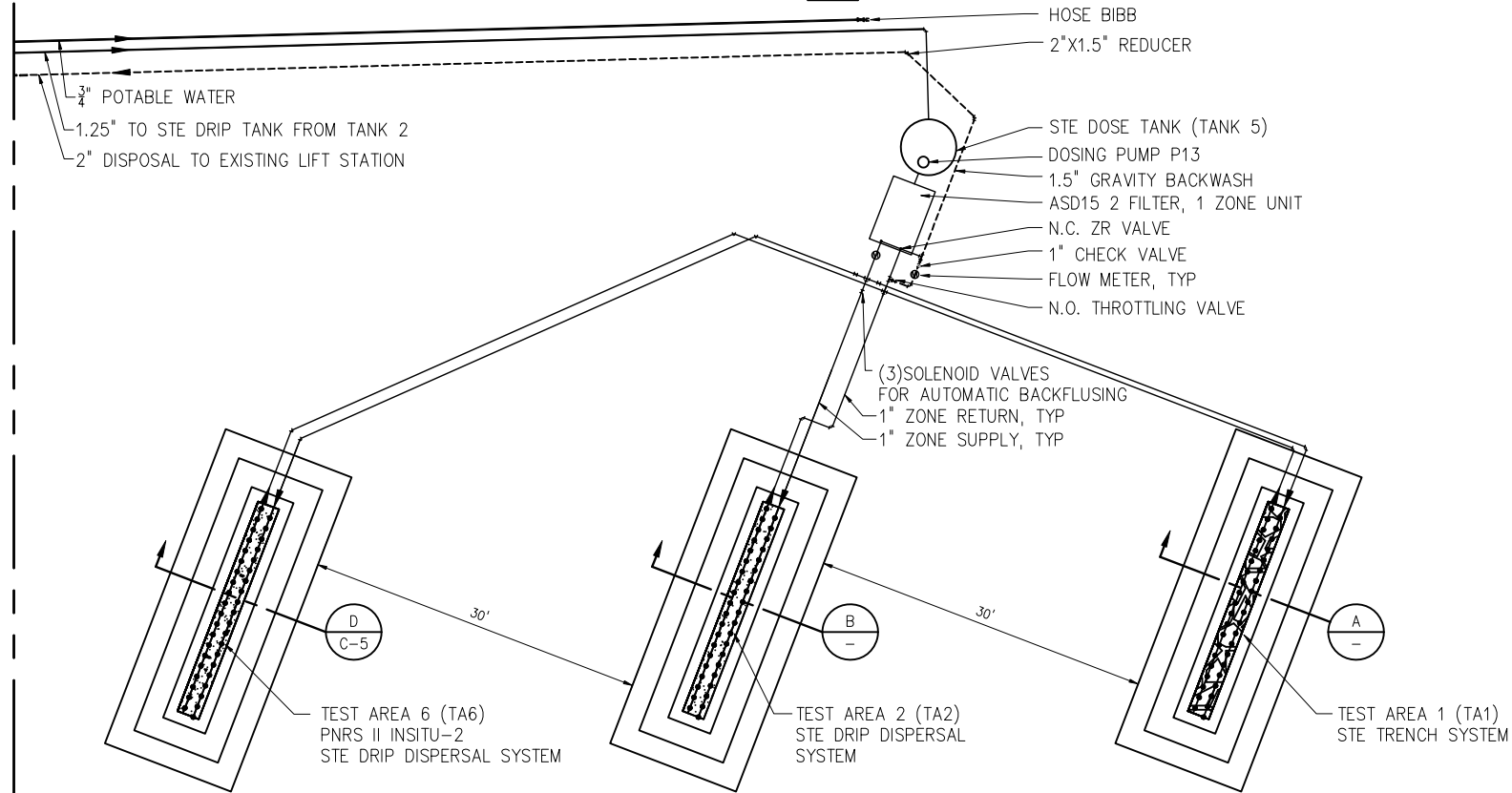
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TALLAHASSEE, FL 32399-1713  
(850)-245-4070

<b>FLORIDA DEPARTMENT OF HEALTH</b> FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY	
<b>TASK C NITROGEN FATE &amp; TRANSPORT STUDY &amp; PNRS II IN-SITU SYSTEMS</b>	

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE	MAY 2010
	H & S JOB NUMBER	44237-001
	CONTRACT NUMBER	
	DRAWING NUMBER	C-7



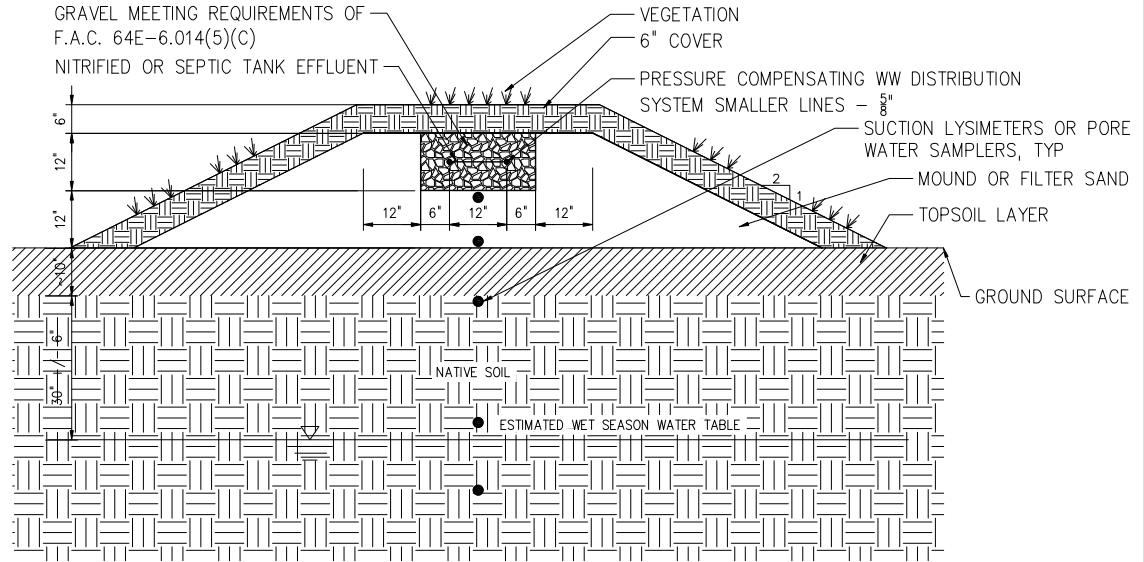
DETAIL 3  
NTS  
C-2



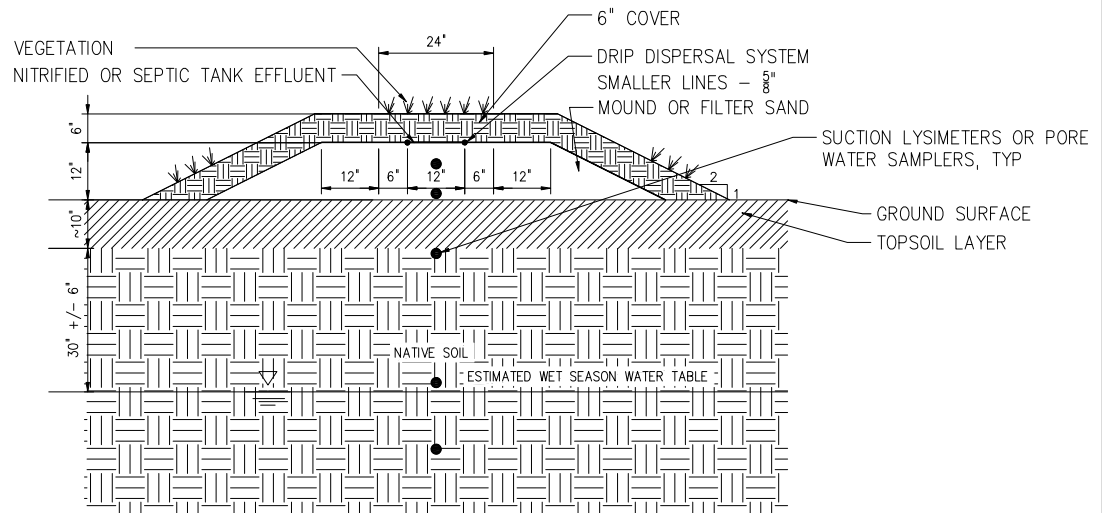
DETAIL 4  
NTS  
C-2

MATCHLINE A

MATCHLINE A



SECTION A  
NTS

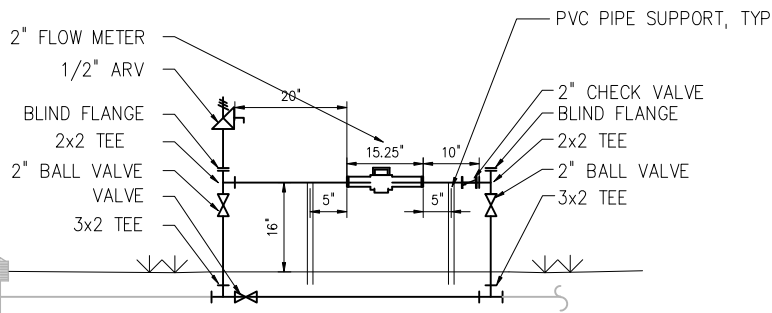
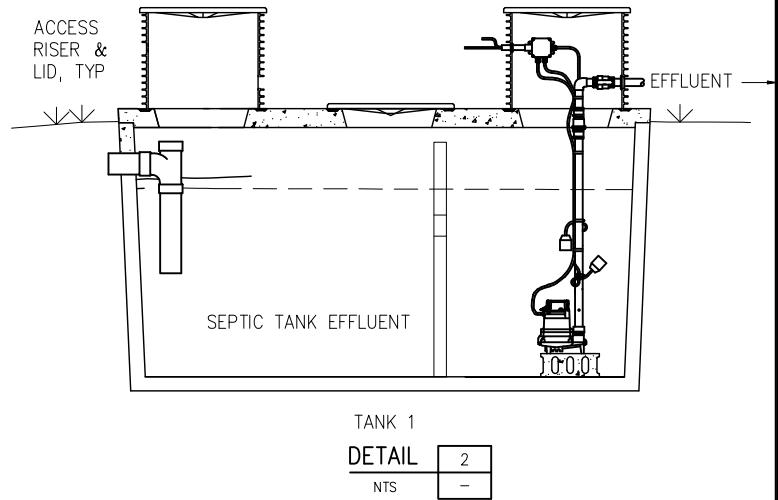
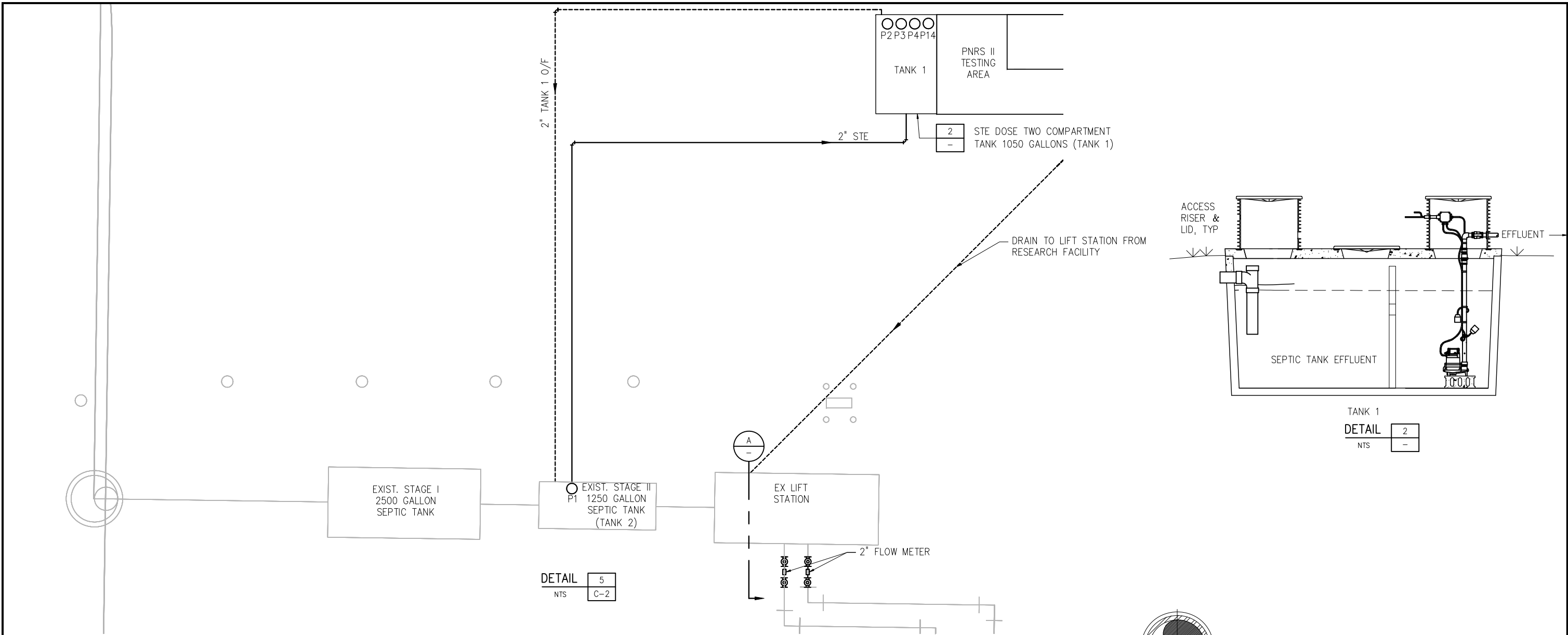


SECTION B  
NTS

#### NOTES

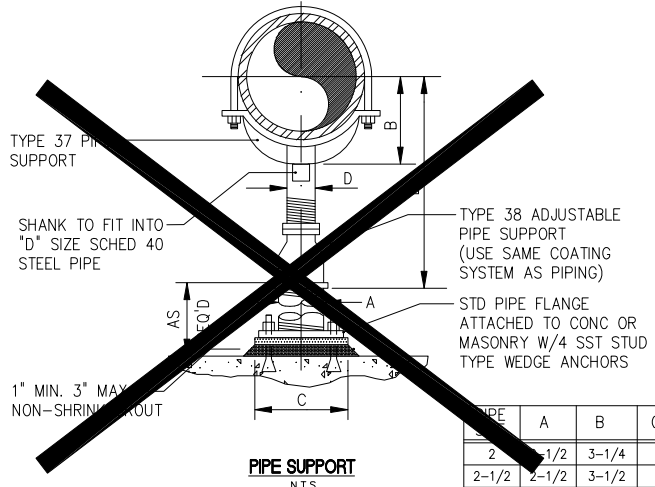
1. PROPOSED NITRIFICATION UNIT AT THIS FACILITY REFERS TO A MANUFACTURED WASTEWATER TREATMENT SYSTEM WHICH MAY UTILIZE SPECIAL EQUIPMENT AND MATERIALS SUPPLIED AS A SINGLE PACKAGE WHERE INDICATED. THIS SYSTEM WILL BE PROVIDED BY OTHERS.
2. TWO PERC-RITE DRIP DISPERSAL SYSTEMS WITH THREE ZONES EACH SHALL BE PROVIDED AS INDICATED. THE SYSTEMS SHALL INCLUDE A PRESSURE REGULATOR AND FLOW METER ON THE RETURN LINE. THE INSTALLATION OF THIS SYSTEM SHALL BE IN ACCORDANCE WITH SPECIFICATIONS AND PROCEDURES AS SUPPLIED BY THE MANUFACTURER OF THE EQUIPMENT.
3. THE DRIP TUBING SHALL BE INSTALLED BASED ON MANUFACTURER'S RECOMMENDATIONS.
4. ALL PVC PIPING AND FITTINGS SHALL BE PVC SCH 40 TYPE 1 RATED FOR PRESSURE APPLICATIONS. ALL GLUED JOINTS SHALL BE CLEANED AND PRIMED WITH PURPLE (DYED) PVC PRIMER PRIOR TO BEING GLUED.
5. ALL CUTTING OF PVC PIPE, FLEXIBLE PVC AND DRIPPER TUBING OF SIZE 1.5" OR SMALLER SHALL BE ACCOMPLISHED WITH PIPE CUTTERS APPROVED BY AMERICAN MANUFACTURING COMPANY, INC. NO SAWING OF PVC, FLEXIBLE PVC, OR DRIPPER TUBING OF SIZE 1.5" OR SMALLER IS ALLOWED.
6. ALL PVC PIPE, FLEXIBLE PVC AND DRIPPER TUBING IN THE WORK AREA SHALL HAVE THE ENDS COVERED WITH DUCT TAPE TO PREVENT CONSTRUCTION DEBRIS FROM ENTERING THE PIPE. PRIOR TO GLUING, ALL JOINTS SHALL BE INSPECTED FOR AND CLEARED OF ANY CONSTRUCTION DEBRIS.
7. ALL AUTOMATIC VALVES (ZONE VALVES & FIELD FLUSH RETURN VALVES) SHALL BE INSTALLED WITH ISOLATION VALVES, BYPASS VALVES, AND DISCONNECTS (I.E. UNIONS, FLANGES) FOR MANUAL FIELD OPERATION DURING FIELD MAINTENANCE EVENTS. ALL VALVES MUST BE PROVIDED WITH AT-GRADE ACCESS.
8. NO ACTIVITY ON DRAINFIELD AREA OTHER THAN MINIMUM IS REQUIRED TO INSTALL SYSTEMS. DO NOT PARK EQUIPMENT, DRIVE LARGE EQUIPMENT OVER OR STORE MATERIALS ON DRAINFIELD AREAS.
9. NO WET WEATHER INSTALLATION IS PERMITTED.
10. ALL FORCE MAINS SHALL BE TESTED FOR LEAKS PRIOR TO DRIP TUBING INSTALLATION AND PRIOR TO SYSTEM STARTUP. UNCOVERED FORCE MAINS SHALL BE VISIBLY INSPECTED FOR LEAKS. IF A LEAK IS SUSPECTED IN COVERED FORCE MAINS THEN THE FORCE MAIN SHALL BE RE-TESTED AT A MINIMUM PRESSURE OF AT LEAST 50 PERCENT ABOVE THE DESIGN OPERATING PRESSURE, FOR AT LEAST 30 MINUTES. THERE SHALL BE NO DISCERNIBLE LEAKAGE.
11. THE CONTRACTOR IS ADVISED THAT THE NITRIFICATION UNIT AND DRIP DISPERSAL SYSTEMS AND POSSIBLY OTHER DONATED EQUIPMENT WILL BE DELIVERED AND STORED AT THE PROJECT SITE. EXCEPT WHERE INDICATED IN CONTRACT DOCUMENTS ALL SHIPMENTS WILL BE ARRANGED BY FDOH AND THE ENGINEER. MANUFACTURERS REPRESENTATIVES WILL BE AVAILABLE FOR TECHNICAL GUIDANCE AT THE TIME OF INSTALLATION.

File: C:\V4237-000\PNRS II\Task C\Task C-7.dwg Plot Date: 5/28/2010 4:27 PM BY: JEDBACK



NOTES:

1. PROVIDE HALF ROUND RIGID INSULATION & INSULATION PROTECTION SHIELD, SIMILAR TO ANVIL FIG.167 OR COOPER B-LINE B3151 WHEN PIPING IS INSULATED.
2. PROVIDE NEOPRENE WAFFLE ISOLATION PAD SIMILAR TO MASON TYPE "W" OR KORFUND KORPAD 40, UNDER SUPPORT FOOT WHEN PIPING IS TO BE ISOLATED OR FIRST SUPPORT ADJACENT TO MECHANICAL EQUIPMENT.
3. FOR BASE, HEIGHT, & FLANGE DIMENSIONS, SEE TABLE TO RIGHT.
4. SST=TYPE 316



PIPE	A	B	C	D	E	
					MIN.	MAX.
2	1-1/2	3-1/4	9	1-1/2	7 - 3/4	12-3/4
2-1/2	2-1/2	3-1/2	9	1-1/2	8	13
3	2-1/2	3-3/4	9	1-1/2	8-1/4	13-1/4
3-1/2	2-1/2	4	9	1-1/2	8-1/2	13-1/2
4	3	4-1/4	9	2-1/2	9-1/4	14

				DESIGNED _____ JME	<div>JOSEFIN M. EDEBACK</div> <div>Name: _____ Date: _____</div> <div>Florida Professional Engineer's Registration Number: 69835</div>
				DRAWN _____ CMS	
				CHECKED _____ DBS	
5	AS-BUILTS PNRS II	05/10	—	PROJ. ENGR. _____ JME	
4	FINAL SUBMITTAL	01/10	—		
3	100% SUBMITTAL	12/09	—		
2	75% SUBMITTAL	12/09	—		
1	50% SUBMITTAL	08/09	—	DLA	
NO.	ISSUED FOR	DATE	BY	APPROVED	

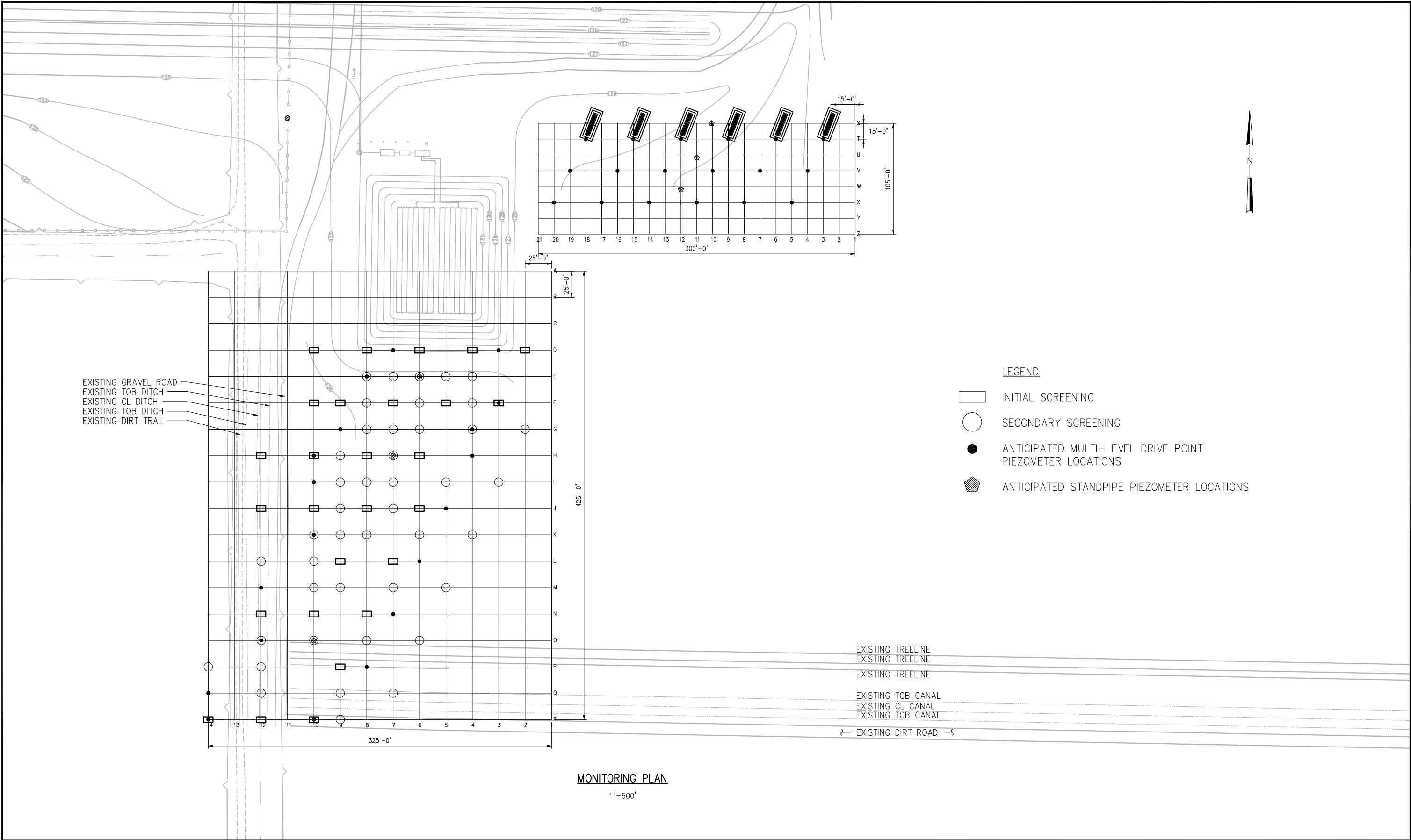
**HAZEN AND SAWYER**  
Environmental Engineers & Scientists  
10002 Princess Palm Avenue  
Registry One Building, Suite 200  
Tampa, Florida 33619  
Certificate of Authorization Number: 2771



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TALLAHASSEE, FL 32399-1713  
(850)-245-4070

**FLORIDA DEPARTMENT OF HEALTH**  
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY  
WASTEWATER SOURCE COMPONENTS DETAILS

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010 H & S JOB NUMBER 44237-001 CONTRACT NUMBER DRAWING NUMBER C-8
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MONITORING PLAN  
1"=500'

				DESIGNED	JME
				DRAWN	CMS
				CHECKED	DBS
				PROJ. ENGR.	JME
				DLA	
				APPROVED	
NO.	ISSUED FOR	DATE	BY		
5	AS-BUILTS PNRS II	05/10	-		
4	FINAL SUBMITTAL	01/10	-		
3	100% SUBMITTAL	12/09	-		
2	75% SUBMITTAL	12/09	-		
1	50% SUBMITTAL	08/09	-		
NO.	ISSUED FOR	DATE	BY		

JOSEFIN M. EDEBACK  
Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Florida Professional Engineer's Registration Number: 69835

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Environmental Engineers & Scientists  
10002 Princess Palm Avenue  
Registry One Building, Suite 200  
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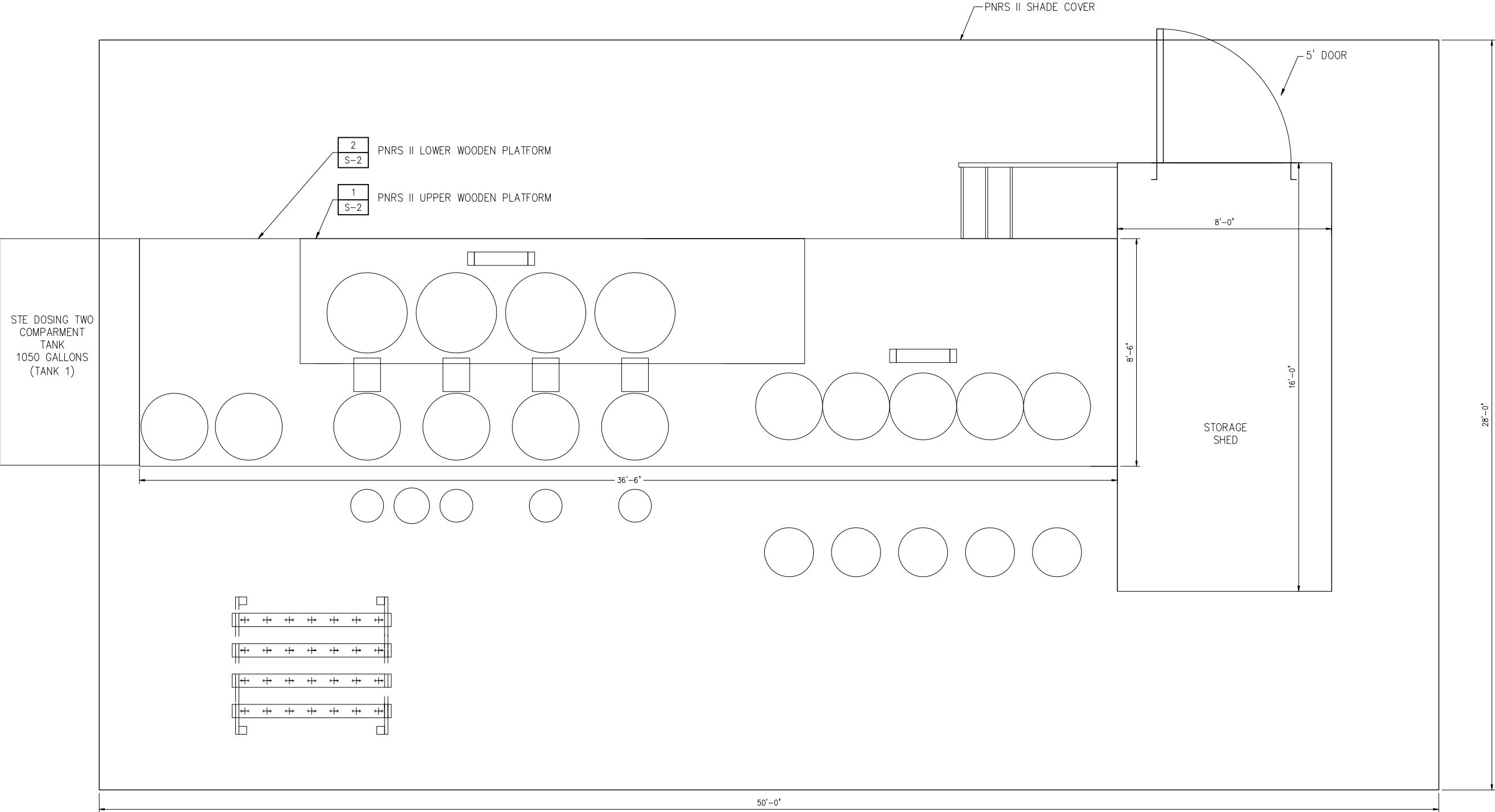


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TALLAHASSEE, FL 32399-1713  
(850)-245-4070

FLORIDA DEPARTMENT OF HEALTH FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY		THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010 H & S JOB NUMBER 44237-001 CONTRACT NUMBER DRAWING NUMBER C-9
MONITORING PLAN			

Plot Date: 5/28/2010 4:28 PM BY: JEDEBACK

File: C:\44237-000\H&S\44237-001\Drawings\03 MONITORING PLAN.dwg Plotted by: jmedback Date: 5/28/2010 4:28 PM



PROPOSED SITE PLAN  
1/2"=1'-0"

Plot Date: 5/28/2010 4:28 PM BY: JEDBACK

				DESIGNED	AVF
				DRAWN	GPB
				CHECKED	AFH
5	AS-BUILTS PNRS II	05/10	-	PROJ. ENGR.	SJ
4	FINAL SUBMITTAL	01/10	-		
3	100% SUBMITTAL	12/09	-		
2	75% SUBMITTAL	12/09	-		
1	50% SUBMITTAL	08/09	-		
NO.	ISSUED FOR	DATE	BY	APPROVED	

SHAJAN JOYKUTTY
Name: _____ Date: _____
Florida Professional Engineer's Registration Number: 43323

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

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Registry One Building, Suite 200  
Tampa, Florida 33619  
Certificate of Authorization Number: 2771

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(850)-245-4070

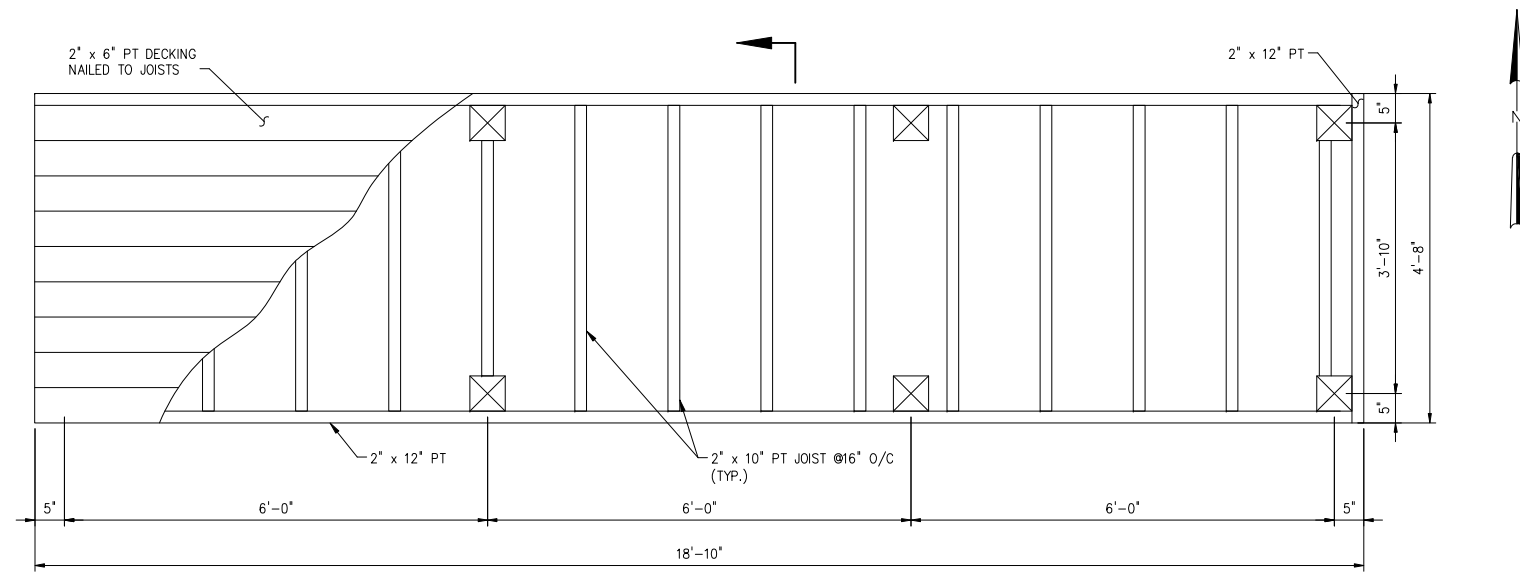
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FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

PNRS II STRUCTURAL SITE PLAN

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010
	H. & S. JOB NUMBER 44237-001
	CONTRACT NUMBER
	DRAWING NUMBER S-1

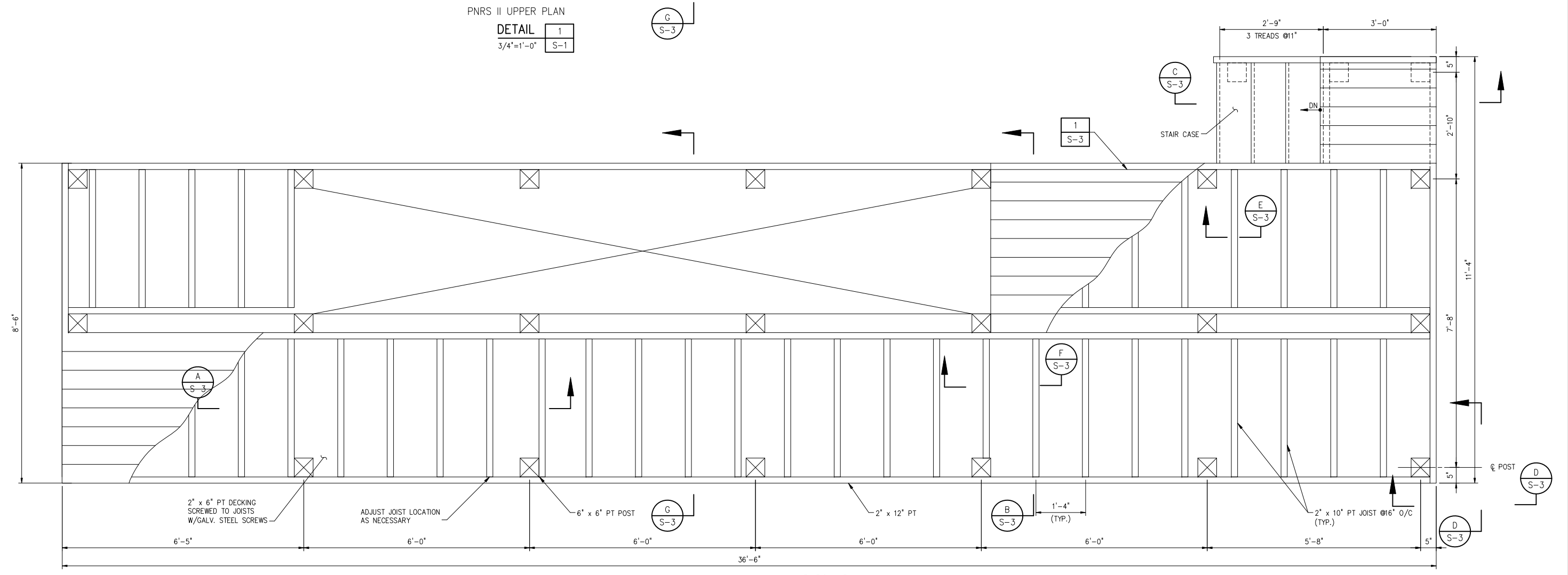
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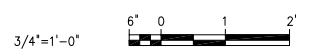
PNRS II UPPER PLAN

DETAIL	1
3/4"=1'-0"	S-1



PNRS II PLAN

DETAIL	2
3/4"=1'-0"	S-1



Plot Date: 5/28/2010 4:28 PM BY: JEDBACK

NO.	ISSUED FOR	DATE	BY
5	AS-BUILTS PNRS II	05/10	-
4	FINAL SUBMITTAL	01/10	-
3	100% SUBMITTAL	12/09	-
2	75% SUBMITTAL	12/09	-
1	50% SUBMITTAL	08/09	-

DESIGNED	AVF
DRAWN	GPB
CHECKED	AFH
PROJ. ENGR.	SJ
DLA	
APPROVED	

Name: SHAJAN JOYKUTTY, PE Date: \_\_\_\_\_  
Florida Professional Engineer's Registration Number: 43323

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Registry One Building, Suite 200  
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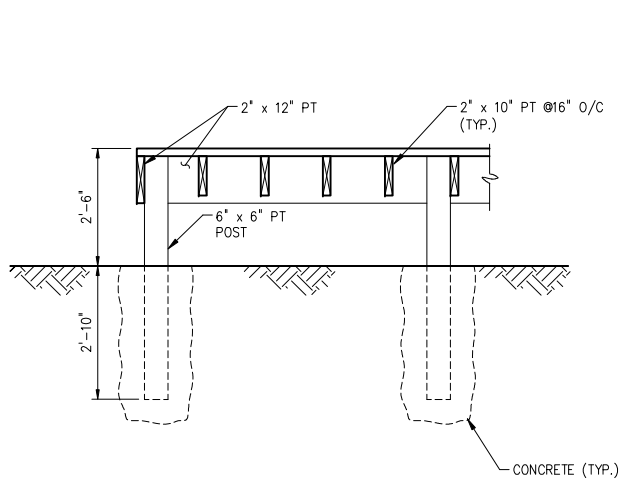
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FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

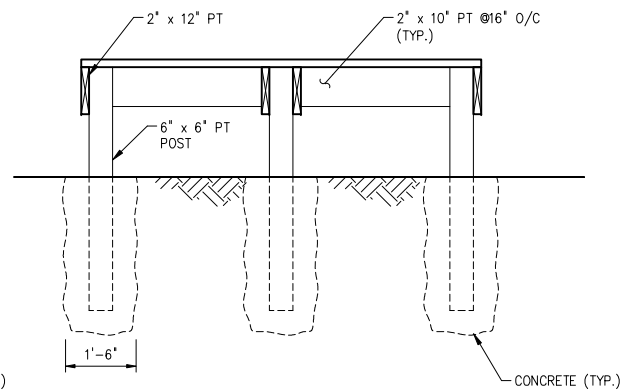
**PNRS II STRUCTURAL SITE PLAN AND DETAILS**

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE	MAY 2010
	H & S JOB NUMBER	44237-001
	CONTRACT NUMBER	
	DRAWING NUMBER	S-2

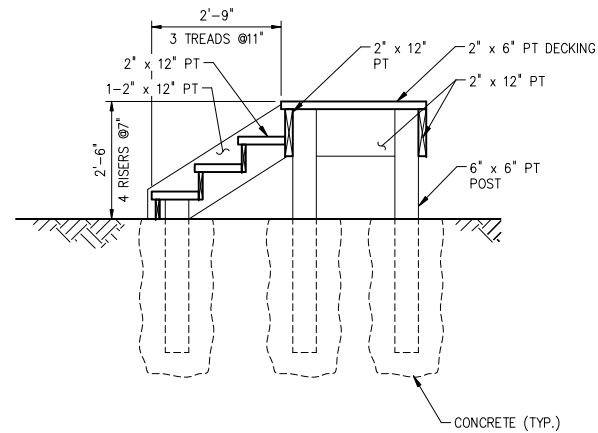
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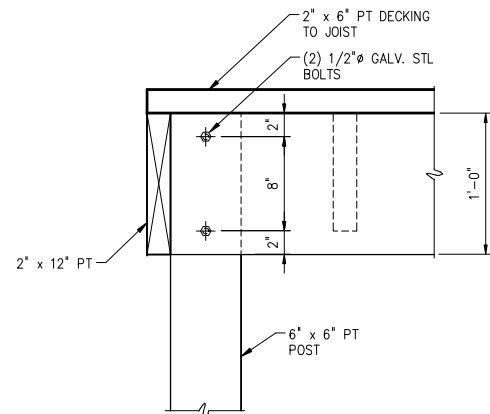
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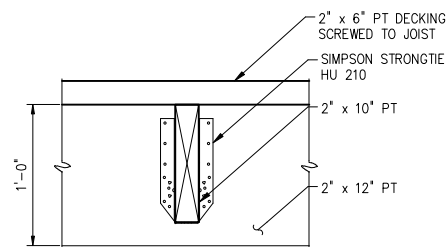
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1/2"=1'-0"



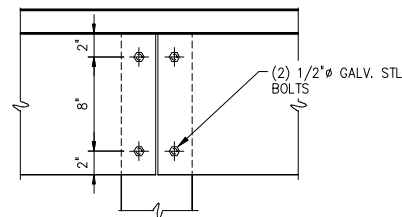
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1/2"=1'-0"



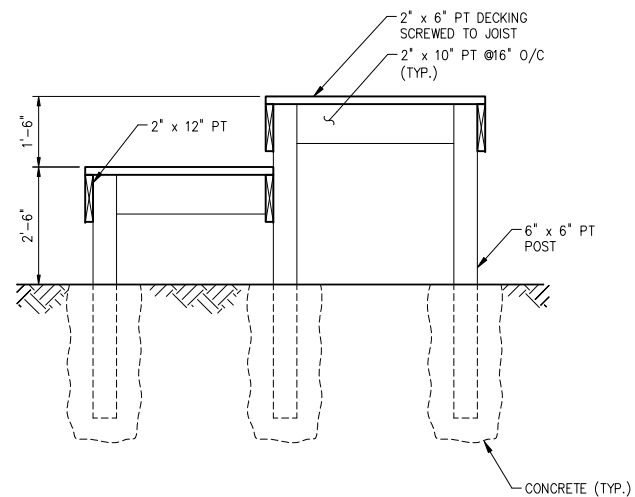
SECTION D  
1-1/2"=1'-0"



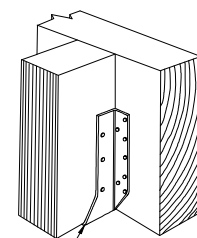
SECTION E  
1-1/2"=1'-0"



SECTION F  
1-1/2"=1'-0"

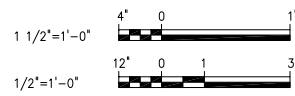


SECTION G  
1/2"=1'-0"



HU 210 JOIST HANGER BY—  
SIMPSON STRONG TIE, FASTEN WITH  
(8) 1/2" x 1 3/4" LONG AND (6) 10d  
x 1 1/2" LONG NAILS FOR JOIST  
(N.O.A. #03-0123.05)

DETAIL 1  
N.T.S.



PLT DATE: 5/28/2010 4:28 PM BY: JEDBACK

NO.	ISSUED FOR	DATE	BY
5	AS-BUILTS PNRS II	05/10	—
4	FINAL SUBMITTAL	01/10	—
3	100% SUBMITTAL	12/09	—
2	75% SUBMITTAL	12/09	—
1	50% SUBMITTAL	08/09	—

DESIGNED	AVF
DRAWN	GPB
CHECKED	AFH
PROJ. ENGR.	SJ
APPROVED	—

Name: SHAJAN JOYKUTTY, PE Date: 4/3/2010  
Florida Professional Engineer's Registration Number: 43323

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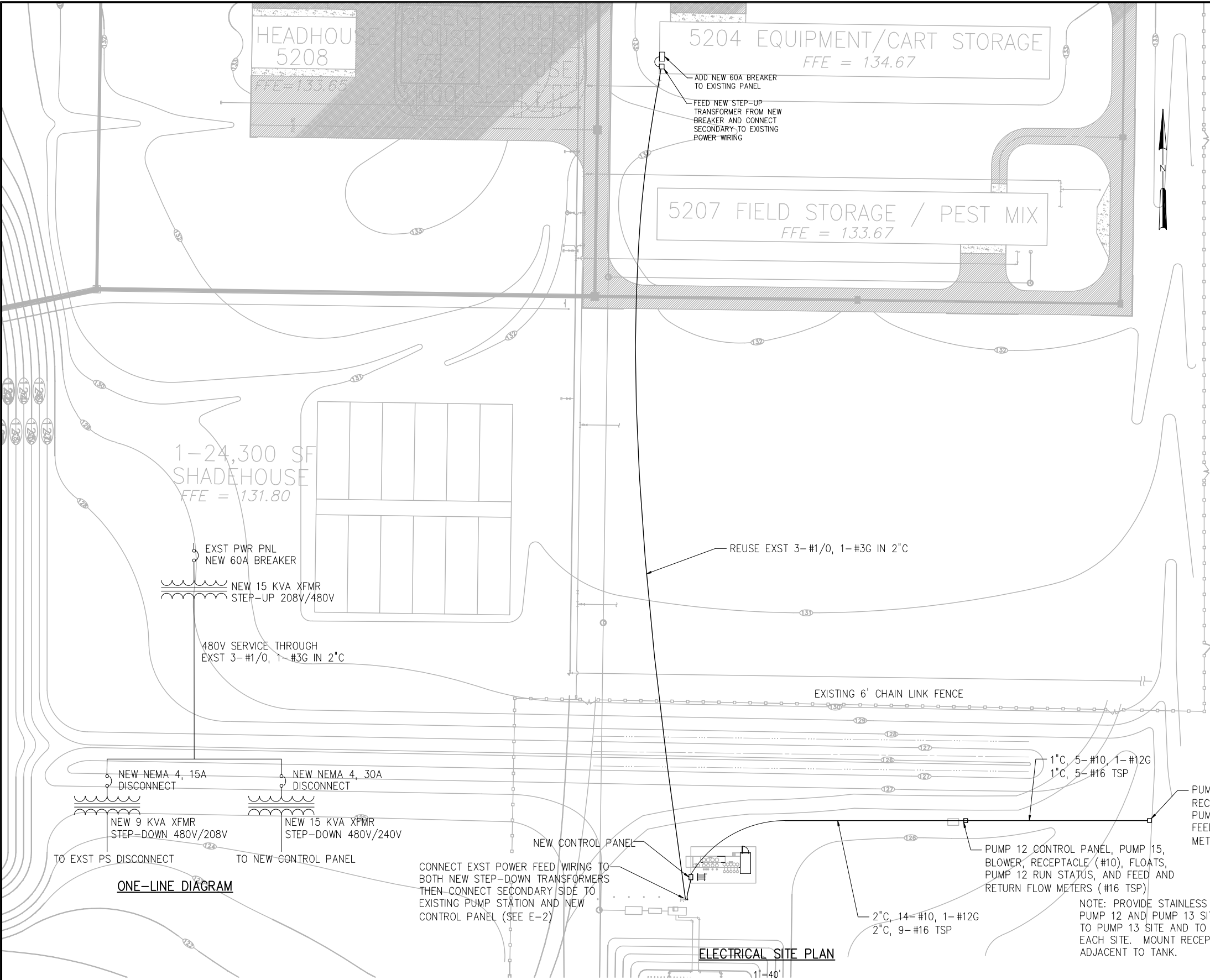
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FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY  
PNRS II STRUCTURAL SITE PLAN AND DETAILS

THE SCALE BAR  
SHOWN BELOW  
MEASURES ONE  
INCH LONG ON  
THE ORIGINAL  
DRAWING.

DATE	MAY 2010
H & S JOB NUMBER	44237-001
CONTRACT NUMBER	—
DRAWING NUMBER	S-3

File: 0:\4237-000\PNRS II\4237-001\Drawings\03-Structural\03-1 Structural Site Plan and Details.dwg Scale Date: 5/28/2010 4:28 PM





ELECTRICAL NOTES

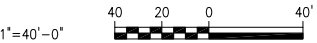
- COORDINATE LOCATIONS OF ELECTRICAL EQUIPMENT, DEVICES, OUTLETS, FIXTURES, ETC. WITH CIVIL, STRUCTURAL, MECHANICAL, AND INSTRUMENTATION DRAWINGS PRIOR TO ROUGH-IN WORK. DO NOT SCALE ELECTRICAL.
- ALL WIRE SHALL BE COPPER.
- PROVIDE INSULATED GROUNDING CONDUCTOR FROM EACH EQUIPMENT CONNECTION AND OUTLET TO GROUNDING BAR IN PANELBOARDS.
- PROVIDE AN INSULATED GROUNDING CONDUCTOR IN ALL FEEDER AND BRANCH CIRCUITS.
- CONTRACTOR SHALL PROVIDE ADDITIONAL JUNCTION BOXES, CONDUCTORS AND OTHER MATERIALS AND LABOR NECESSARY TO CONNECT PARALLEL FEEDER RUNS WHERE SUCH FEEDERS EXCEED CONNECTION CAPACITY OF CIRCUIT BREAKERS, PANELBOARDS AND OTHER CONNECTION POINTS.
- RISER DIAGRAMS SHOW ONLY THE GENERAL CONFIGURATION OF THE SYSTEM. REFER TO THE APPROPRIATE DRAWINGS FOR EXACT DEVICE, QUANTITIES AND LOCATIONS.
- ALL ELECTRICAL EQUIPMENT, DEVICES, ETC. LOCATED OUTDOORS SHALL BE WEATHERPROOF.
- REFER TO STRUCTURAL DRAWINGS FOR CONCRETE WORK.
- EXISTING UTILITIES AND OTHER UNDERGROUND OR CONCEALED ITEMS ARE SHOWN FOR REFERENCE ONLY. ADDITIONAL ITEMS NOT SHOWN MAY BE PRESENT AND LOCATIONS MAY DIFFER FROM THAT SHOWN. CONTRACTOR SHALL EXCAVATE AND CONDUCT DEMOLITION SO AS TO AVOID DAMAGE TO EXISTING ITEMS, SHALL NOTIFY OWNER AND ENGINEER AT ONCE OF ALL DAMAGE AND SHALL REPAIR DAMAGE TO ORIGINAL CONDITION TO THE SATISFACTION OF OWNER AND ENGINEER AT NO CHANGE IN CONTRACT AMOUNT.

ELECTRICAL SPECIFICATIONS

1. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY FOR THE INSTALLATION OF A COMPLETE ELECTRICAL SYSTEM AS INDICATED WITHIN THESE DRAWINGS.
  2. ALL WORK SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES AND ORDINANCES AND WITH MANUFACTURERS RECOMMENDATIONS. ALL WORK, MATERIALS AND EQUIPMENT SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE 2002 EDITION.
  3. ALL MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN A NEAT, FIRST CLASS, WORKMANLIKE MANNER, TO THE APPROVAL OF THE ENGINEER AND GOVERNING AUTHORITIES.
  4. **GUARANTEES AND SERVICE:** IN ADDITION TO THE MANUFACTURERS STANDARD GUARANTEES, THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS, EQUIPMENT AND WORKMANSHIP AGAINST DEFECTS FOR ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE, AND SHALL CORRECT ANY DEFECTS AT NO ADDITIONAL COST TO THE OWNER. ALL LAMPS SHALL BE GUARANTEED FOR 30 DAYS.
  5. **CONDUIT AND WIRING:** THE CONTRACTOR SHALL PROVIDE COPPER CONDUCTORS IN METALLIC RACEWAY. CONDUITS SHALL CONTAIN AN INSULATED GREEN GROUND CONDUCTOR. FOLLOW RULES AND REGULATIONS OF THE NEC FOR PROPER INSTALLATION REGARDING INSTALLATION AND SUPPORT.
- CONDUIT SHALL BE INSTALLED AS NOTED. IF NOT SPECIFICALLY ADDRESSED THE FOLLOWING SHALL APPLY: (A) PROVIDE RIGID ALUMINUM IN EXPOSED LOCATIONS, (B) PROVIDE PVC (POLY VINYL CHLORIDE) UNDERGROUND, (C) PROVIDE LIQUID-TITE FLEXIBLE METALLIC CONDUIT FOR EQUIPMENT CONNECTIONS WHERE POSSIBILITY OF VIBRATION EXISTS. PROVIDE FITTINGS AS MANUFACTURED FOR CONDUIT USED.
- PROVIDE COPPER CONDUCTORS WITH DUAL RATED THWN-THHN TYPE INSULATION.

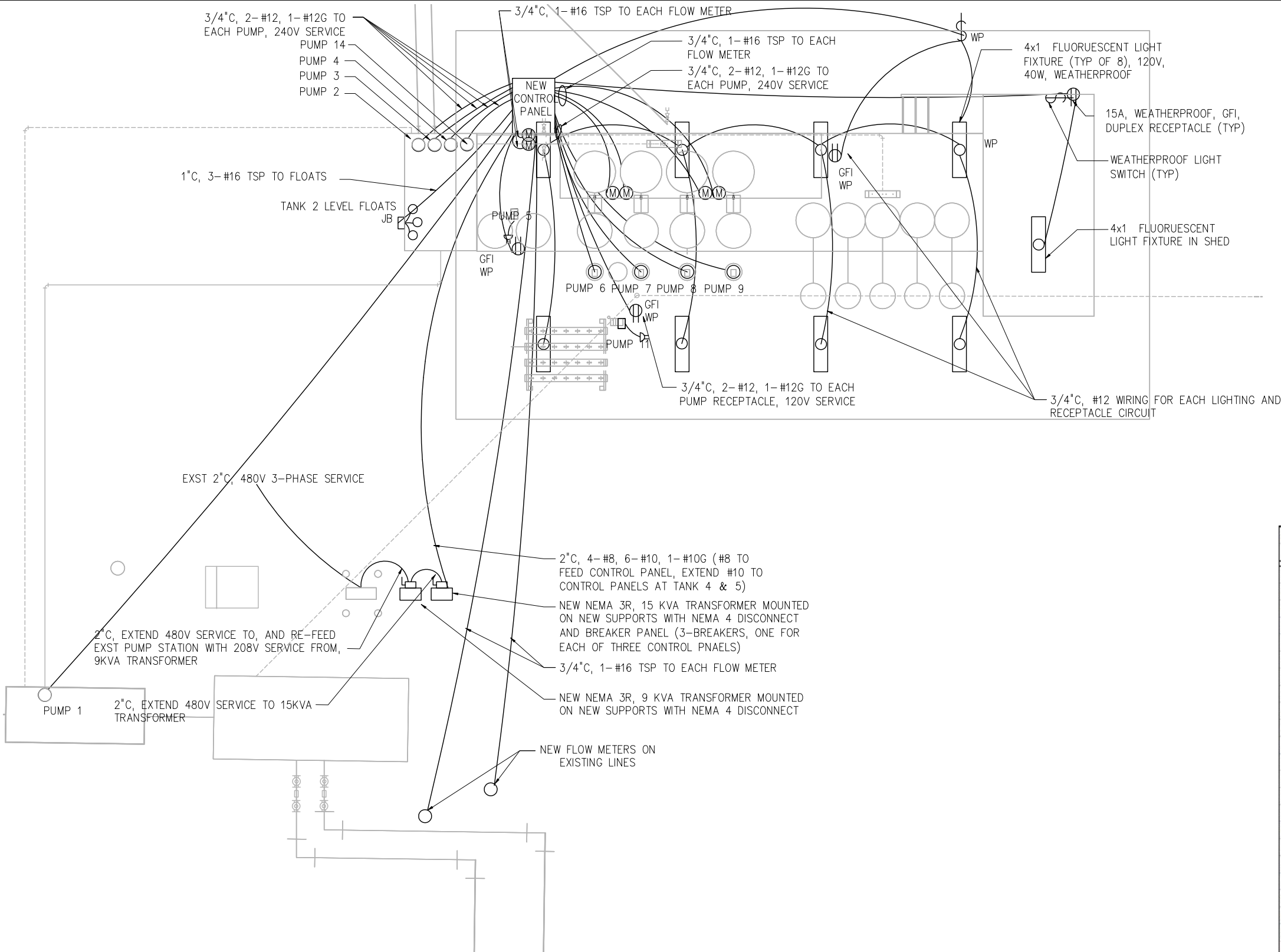
ONE-LINE DIAGRAM

ELECTRICAL SITE PLAN



<div><div>5/28/2010 4:29 PM</div><div>BY: JEBACK</div></div>				<div>DESIGNED DBS</div> <div>DRAWN CMS</div> <div>CHECKED JB</div> <div>PROJ. ENGR. DBS</div> <div>BY DLA</div> <div>APPROVED</div>		<div>DANIEL B. SCHMIDT</div> <div>Name: _____ Date: _____</div> <div>Florida Professional Engineer's Registration Number: 40233</div>		<div><div>HAZEN AND SAWYER</div><div>Environmental Engineers &amp; Scientists</div><div>10002 Princess Palm Avenue</div><div>Registry One Building, Suite 200</div><div>Tampa, Florida 33619</div><div>Certificate of Authorization Number: 2771</div></div>		<div>FLORIDA DEPARTMENT OF HEALTH</div> <div>4052 BALD CYPRESS WAY, BIN A08</div> <div>TALLAHASSEE, FL 32399-1713</div> <div>(850)-245-4070</div>		<div>FLORIDA DEPARTMENT OF HEALTH</div> <div>FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY</div>		<div>THE SCALE BAR</div> <div>SHOWN BELOW</div> <div>MEASURES ONE</div> <div>INCH LONG ON</div> <div>THE ORIGINAL</div> <div>DRAWING.</div>		<div>DATE MAY 2010</div> <div>H &amp; S JOB NUMBER 44237-001</div> <div>CONTRACT NUMBER</div> <div>DRAWING NUMBER E-1</div>		<div>ELECTRICAL SITE PLAN</div>	
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CONTROL PANEL POWER DISTRIBUTION

Circuit Description	Breaker/ Fuse	A kVA	B kVA	C kVA
Receptacle and Lights	15	2.7	0.0	0.0
Control Panel Light	5	0.0	0.2	0.0
Pump 1	10	0.2	2.3	2.3
Pump 2	5	1.0	1.0	0.2
Pump 3	5	1.0	0.2	1.0
Pump 4	5	0.2	1.0	1.0
Pump 5	2	0.2	0.0	0.0
Pump 6	5	1.0	1.0	0.2
Pump 7	5	1.0	0.2	1.0
Pump 8	5	0.2	1.0	1.0
Pump 9	5	1.0	1.0	0.2
Pump 10	2	0.0	0.2	0.0
Pump 11	2	0.0	0.0	0.2
Receptacle at STE	15	0.0	2.1	0.0
Receptacle at NO3	15	0.0	0.0	2.1
Pump 12	10	2.3	2.3	0.2
Pump 13	10	2.3	0.2	2.3
Pump 14	5	0.2	1.0	1.0
Pump 15	5	1.0	0.2	1.0
STE Blower	2	0.1	0.0	0.0
STE Valve 1	2	0.0	0.1	0.0
STE Valve 2	2	0.0	0.0	0.1
PLC Power	5	0.0	0.0	0.8
Total Connected Load		14.7	14.2	14.9

ELECTRICAL SITE PLAN

1/4"=1'-0"

Plot Date: 5/28/2010 4:29 PM BY: JEB/BACK

5	AS-BUILTS PNRS II	05/10	-
4	FINAL SUBMITTAL	01/10	-
3	100% SUBMITTAL	12/09	-
2	75% SUBMITTAL	12/09	-
1	50% SUBMITTAL	08/09	-
NO.	ISSUED FOR	DATE	BY

DESIGNED	DBS
DRAWN	CMS
CHECKED	JB
PROJ. ENGR.	DBS
	DLA
APPROVED	

DANIEL B. SCHMIDT	
Name:	Date:
Florida Professional Engineer's Registration Number: 40233	

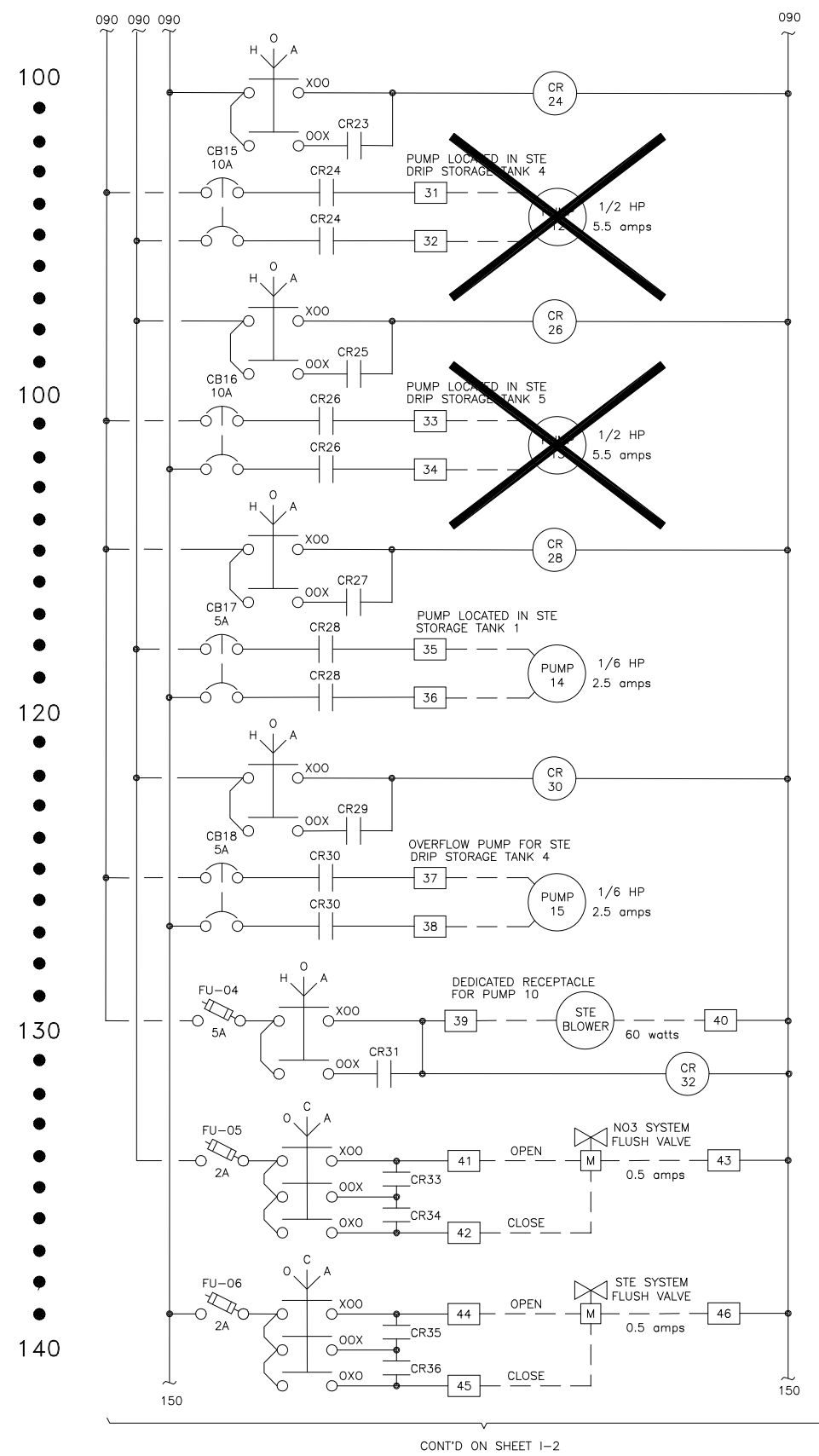
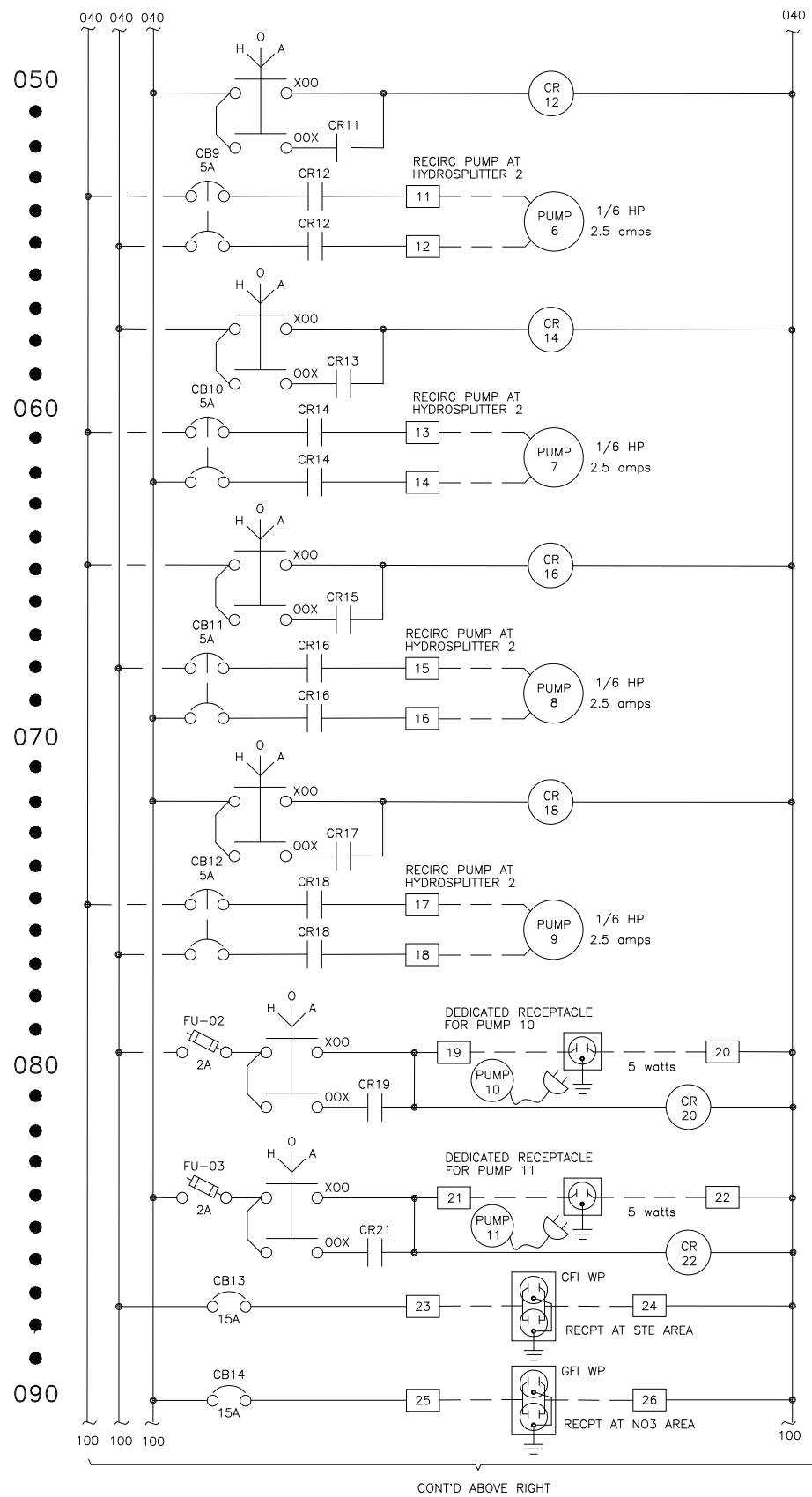
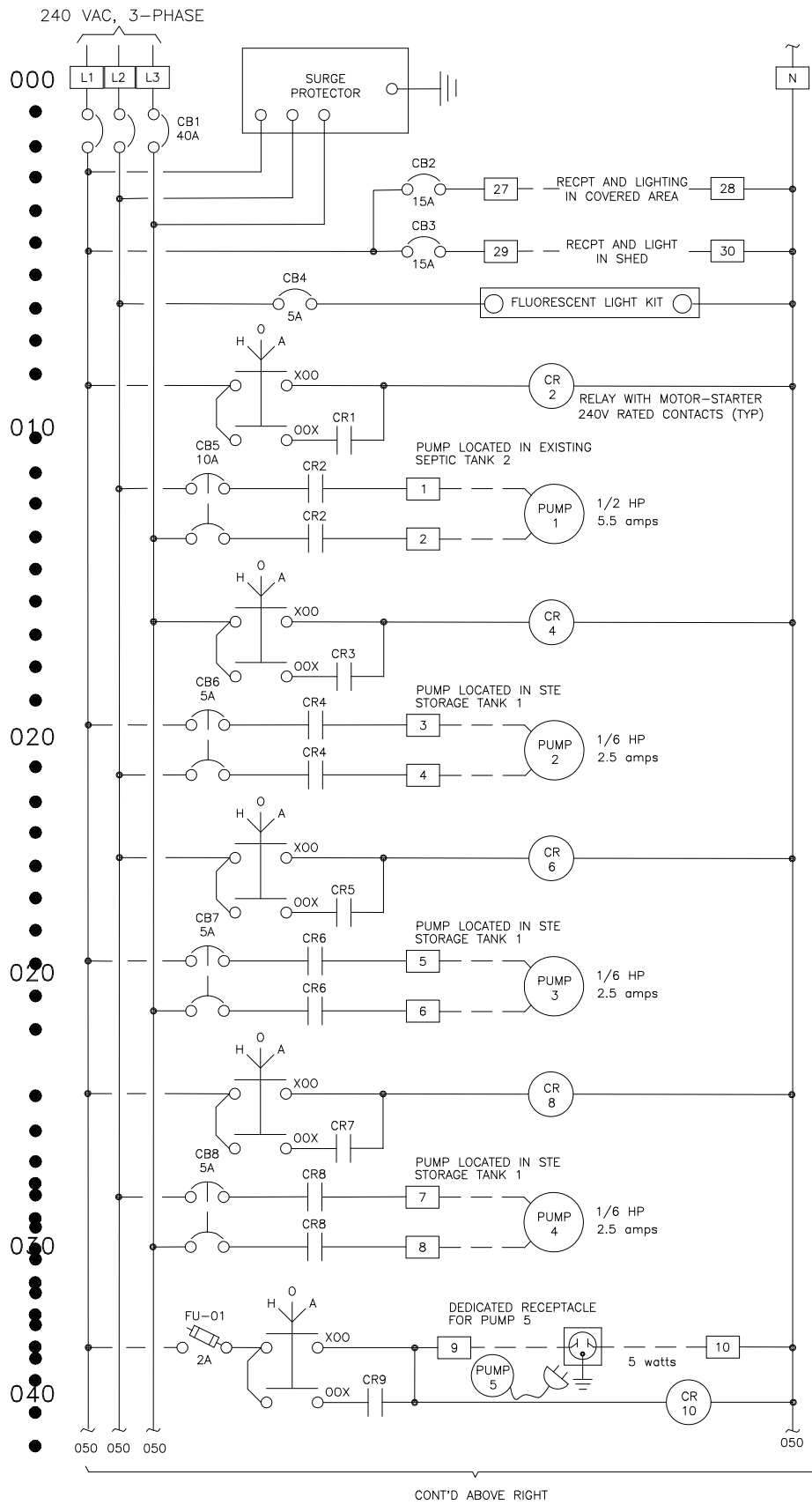
**HAZEN AND SAWYER**  
Environmental Engineers & Scientists  
10002 Princess Palm Avenue  
Registry One Building, Suite 200  
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TALLAHASSEE, FL 32399-1713  
(850)-245-4070

FLORIDA DEPARTMENT OF HEALTH FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY	ELECTRICAL SITE PLAN AND DETAILS

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010
	H & S JOB NUMBER 44237-001
	CONTRACT NUMBER
	DRAWING NUMBER E-2

File: G:\44237-000-001\44237-001\Drawings\01-2 ELECTRICAL SITE PLAN AND DETAILS.dwg Saved by: jeb/BACK Save Date: 4/30/2010 3:50 PM



REV DATE: 5/28/2010 4:35 PM BY: JEBACK

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4	FINAL SUBMITTAL	01/10	-
3	100% SUBMITTAL	12/09	-
2	75% SUBMITTAL	12/09	-
1	50% SUBMITTAL	08/09	-

DESIGNED	DBS
DRAWN	CMS
CHECKED	JB
PROJ. ENGR.	DBS
	DLA
APPROVED	

DANIEL B. SCHMIDT  
Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Florida Professional Engineer's Registration Number: 40233

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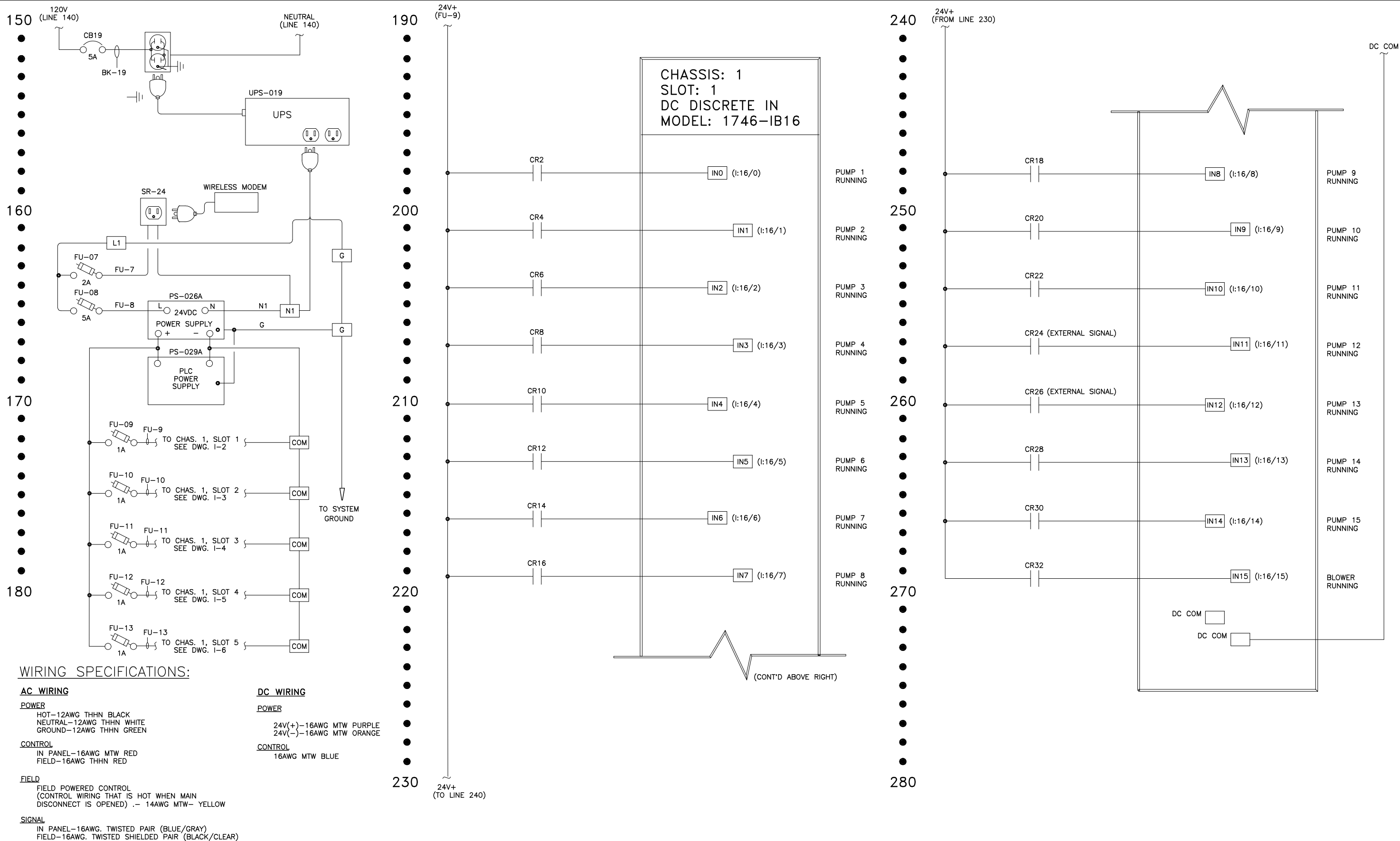
**FLORIDA DEPARTMENT OF HEALTH**  
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

PANEL POWER

THE SCALE BAR  
SHOWN BELOW  
MEASURES ONE  
INCH LONG ON  
THE ORIGINAL  
DRAWING.

DATE	MAY 2010
H & S JOB NUMBER	44237-001
CONTRACT NUMBER	
DRAWING NUMBER	I-1

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**WIRING SPECIFICATIONS:**

**AC WIRING**

**POWER**

HOT-12AWG THHN BLACK  
NEUTRAL-12AWG THHN WHITE  
GROUND-12AWG THHN GREEN

**CONTROL**

IN PANEL-16AWG MTW RED  
FIELD-16AWG THHN RED

**FIELD**

FIELD POWERED CONTROL  
(CONTROL WIRING THAT IS HOT WHEN MAIN DISCONNECT IS OPENED) - 14AWG MTW- YELLOW

**SIGNAL**

IN PANEL-16AWG. TWISTED PAIR (BLUE/GRAY)  
FIELD-16AWG. TWISTED SHIELDED PAIR (BLACK/CLEAR)

**DC WIRING**

**POWER**

24V(+)-16AWG MTW PURPLE  
24V(-)-16AWG MTW ORANGE

**CONTROL**

16AWG MTW BLUE

FIELD TOWNSHIP TRUSTED SHIELDED TANK (DBAR) SLEARY					
				DESIGNED_____DBS	DANIEL B. SCHMIDT  Name: _____ Date: _____ Florida Professional Engineer's Registration Number: 40233
				DRAWN_____CMS	
				CHECKED_____JB	
				PROJ. ENGR._____DBS	
				DLA	
				APPROVED	
NO.	ISSUED FOR	DATE	BY		
5	AS-BUILTS PNRS II	05/10	—		
4	FINAL SUBMITTAL	01/10	—		
3	100% SUBMITTAL	12/09	—		
2	75% SUBMITTAL	12/09	—		
1	50% SUBMITTAL	08/09	—		

DANIEL B. SCHMIDT  
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**FLORIDA DEPARTMENT OF HEALTH**  
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATIGIES STUDY

DI MODULE 1

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010 H & S JOB NUMBER 44237-001 CONTRACT NUMBER DRAWING NUMBER I-2
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290  
300  
310  
320  
330

STE TANK 1  
LOW LEVEL

STE TANK 1  
HIGH LEVEL

STE TANK 1  
LOW LOW LEVEL

NO3 DRIP STORAGE  
TANK 4  
HIGH LEVEL

NO3 DRIP STORAGE  
TANK 4  
LOW LEVEL

NO3 DRIP STORAGE  
TANK 4  
LOW LOW LEVEL

STE DRIP STORAGE  
TANK 5  
HIGH LEVEL

STE DRIP STORAGE  
TANK 5  
LOW LEVEL

24V+  
(FU-10)

CHASSIS: 1  
SLOT: 2  
DC DISCRETE IN  
MODEL: 1746-IB16

INO (I:16/0)

IN1 (I:16/1)

IN2 (I:16/2)

IN3 (I:16/3)

IN4 (I:16/4)

IN5 (I:16/5)

IN6 (I:16/6)

IN7 (I:16/7)

(CONT'D ABOVE RIGHT)

24V+  
(TO LINE 340)

340  
350  
360  
370  
380

STE DRIP STORAGE  
TANK 5  
LOW LOW LEVEL

24V+  
(FROM LINE 330)

IN8 (I:16/8)

IN9 (I:16/9)

IN10 (I:16/10)

IN11 (I:16/11)

IN12 (I:16/12)

IN13 (I:16/13)

IN14 (I:16/14)

IN15 (I:16/15)

DC COM

DC COM

DC COM

Plot Date: 5/28/2010 4:35 PM BY: JEB/BACK

				DESIGNED	DBS
				DRAWN	CMS
				CHECKED	JB
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4	FINAL SUBMITTAL	01/10	-		
3	100% SUBMITTAL	12/09	-		
2	75% SUBMITTAL	12/09	-		
1	50% SUBMITTAL	08/09	-		
NO.	ISSUED FOR	DATE	BY	APPROVED	

DANIEL B. SCHMIDT  
Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Florida Professional Engineer's Registration Number: 40233

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FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

DI MODULE 2

THE SCALE BAR  
SHOWN BELOW  
MEASURES ONE  
INCH LONG ON  
THE ORIGINAL  
DRAWING.

DATE MAY 2010  
H & S JOB  
NUMBER 44237-001  
CONTRACT NUMBER  
DRAWING NUMBER  
1-3

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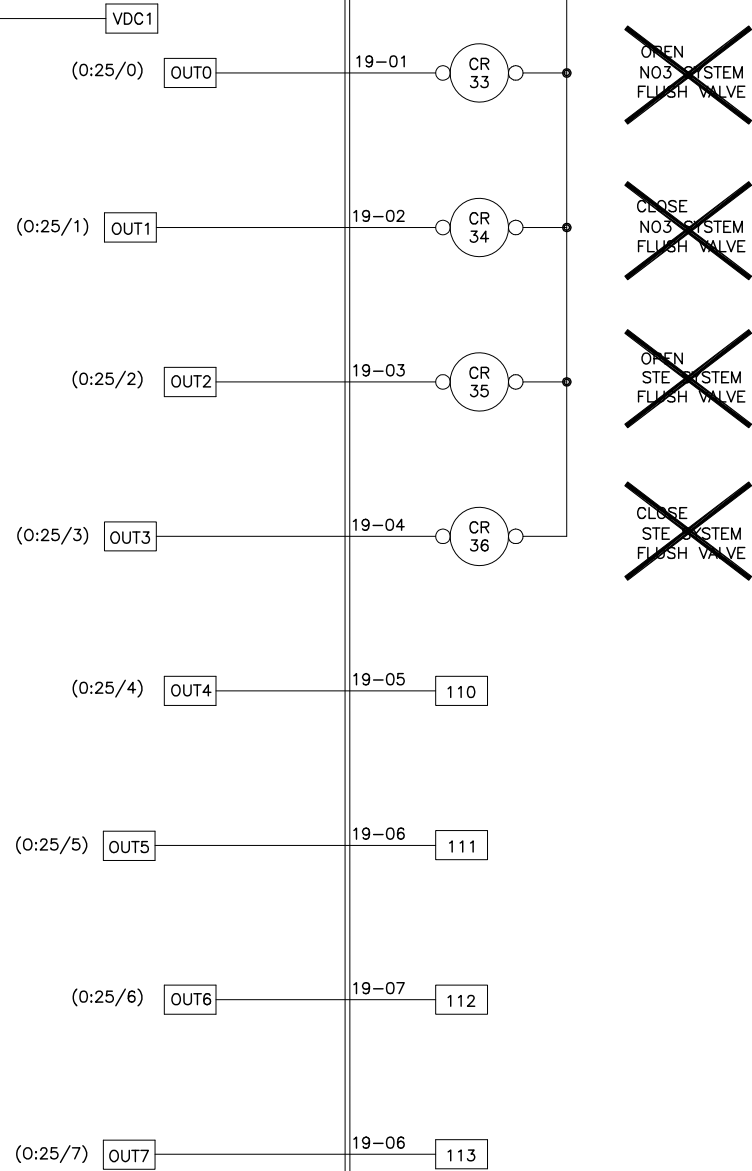




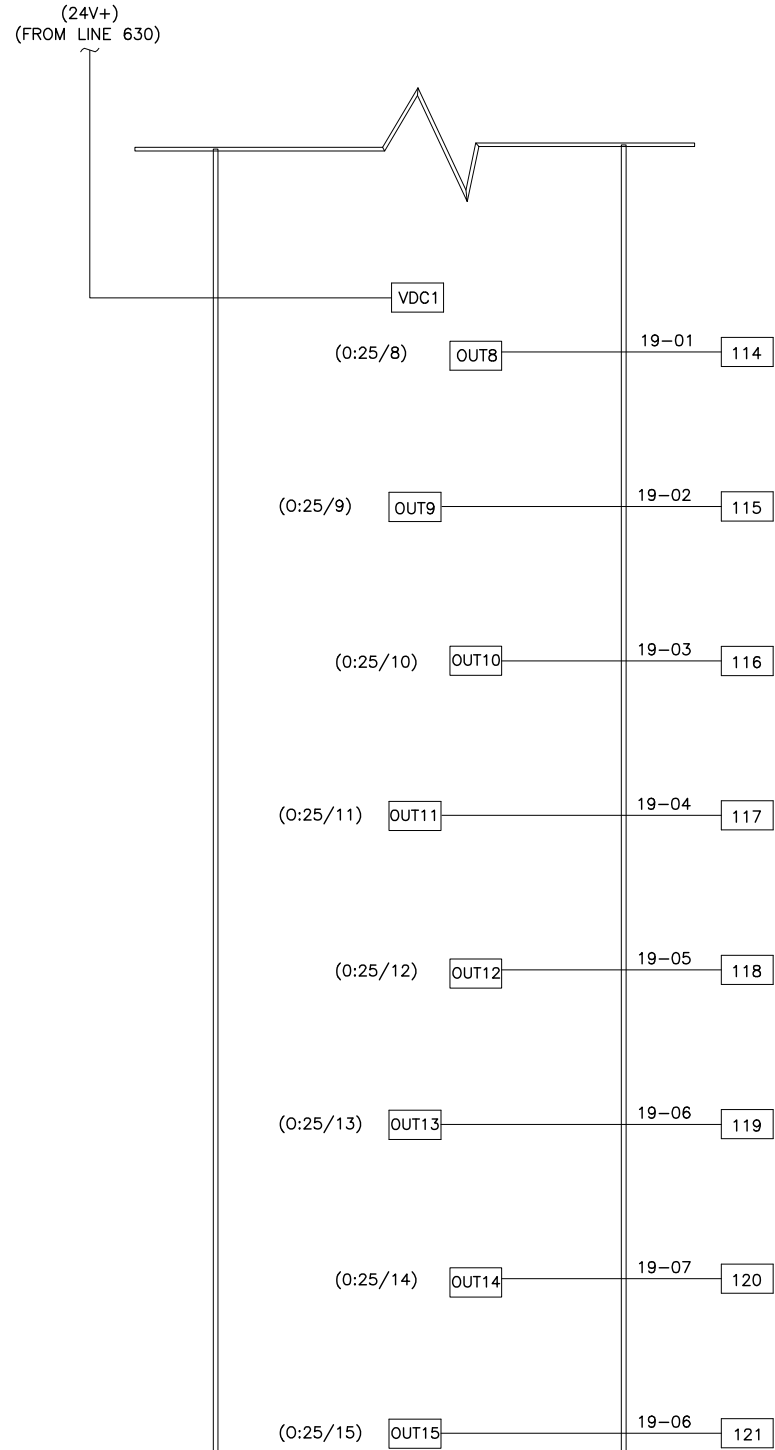
Plot Date: 5/28/2010 4:35 PM BY: JEB/BACK

590  
600  
610  
620  
630

CHASSIS: 1  
SLOT: 6  
RELAY OUTPUT  
MODEL: 1746-OW16



640  
650  
660  
670  
680



				DESIGNED DBS
				DRAWN CMS
				CHECKED JB
				PROJ. ENGR. DBS
				DLA
				APPROVED
5	AS-BUILTS PNRS II	05/10	-	
4	FINAL SUBMITTAL	01/10	-	
3	100% SUBMITTAL	12/09	-	
2	75% SUBMITTAL	12/09	-	
1	50% SUBMITTAL	08/09	-	
NO.	ISSUED FOR	DATE	BY	

DANIEL B. SCHMIDT
Name: _____ Date: _____
Florida Professional Engineer's Registration Number: 40233

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FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

DO MODULE 2

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010
	H & S JOB NUMBER 44237-001
	CONTRACT NUMBER
	DRAWING NUMBER I-6

Plot Date: 5/28/2010 4:35 PM BY: JEDBACK

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3	100% SUBMITTAL	12/09	-	
2	75% SUBMITTAL	12/09	-	
1	50% SUBMITTAL	08/09	-	

DESIGNED	DBS
DRAWN	CMS
CHECKED	JB
PROJ. ENGR.	DBS
	DLA
APPROVED	

DANIEL B. SCHMIDT	
Name:	Date:
Florida Professional Engineer's Registration Number: 40233	

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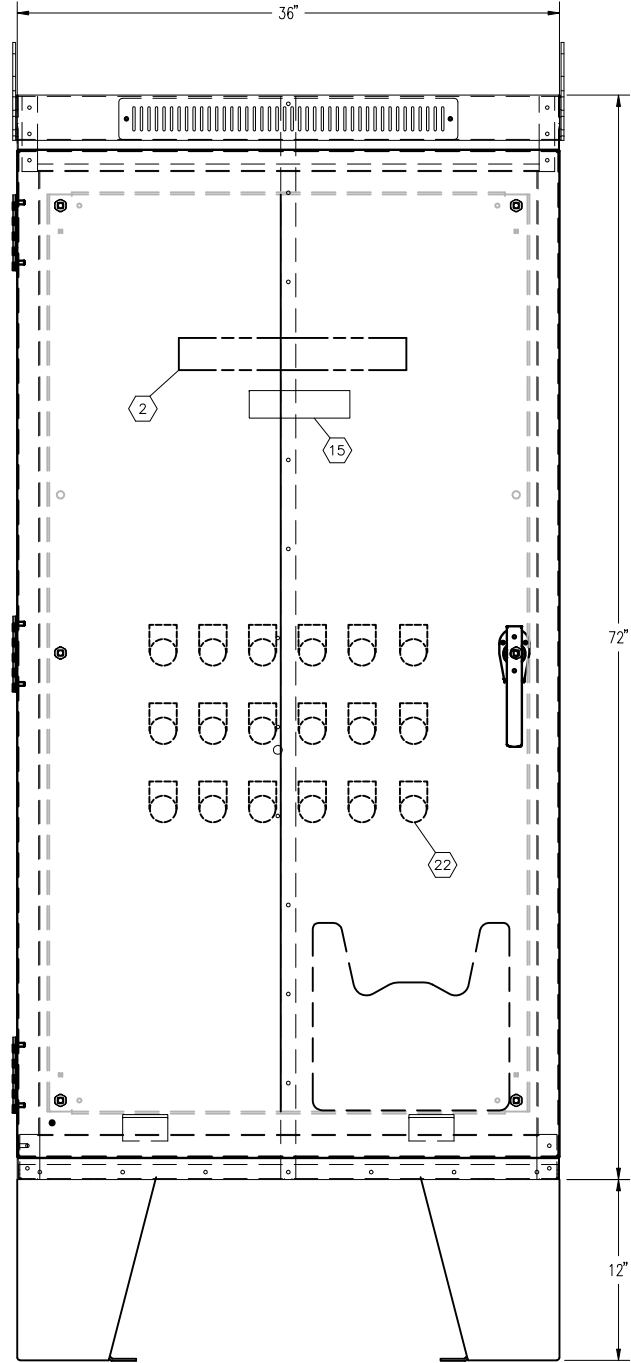


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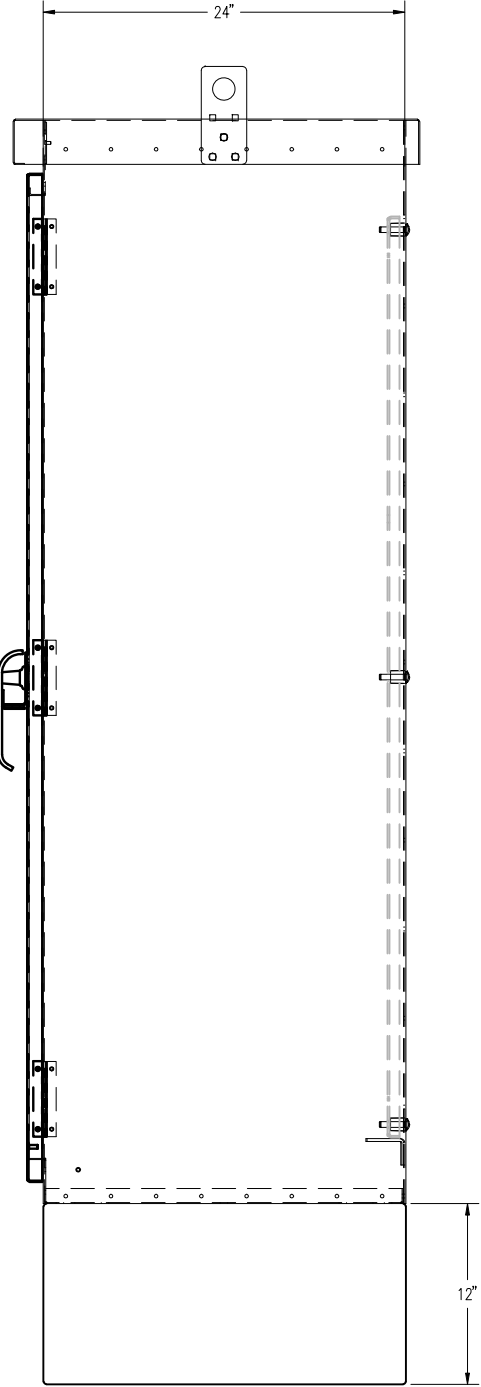
**FLORIDA DEPARTMENT OF HEALTH**  
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

PANEL ELEVATIONS

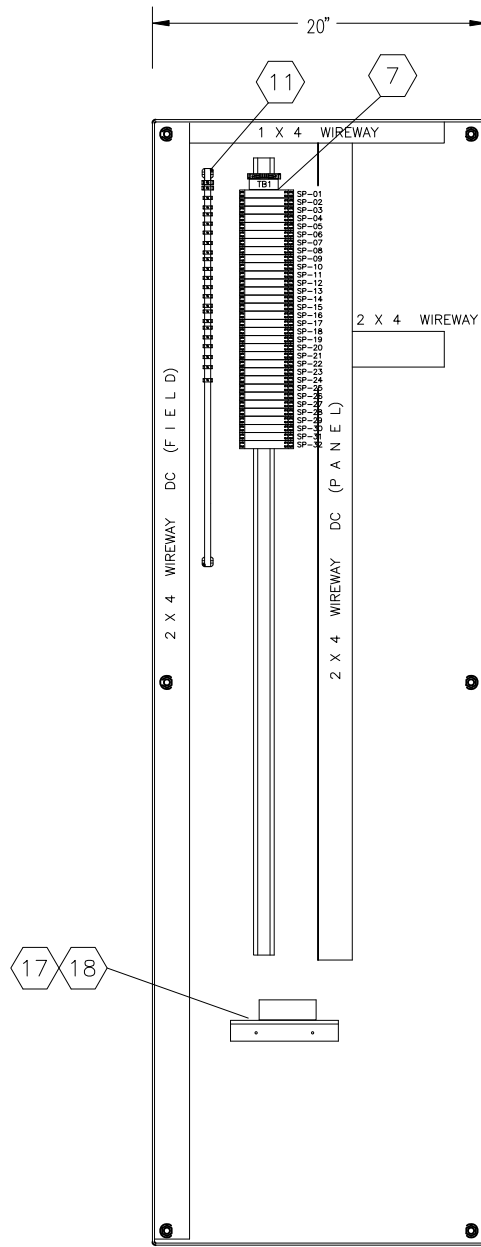
THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE	MAY 2010
	H & S JOB NUMBER	44237-001
	CONTRACT NUMBER	
	DRAWING NUMBER	1-7



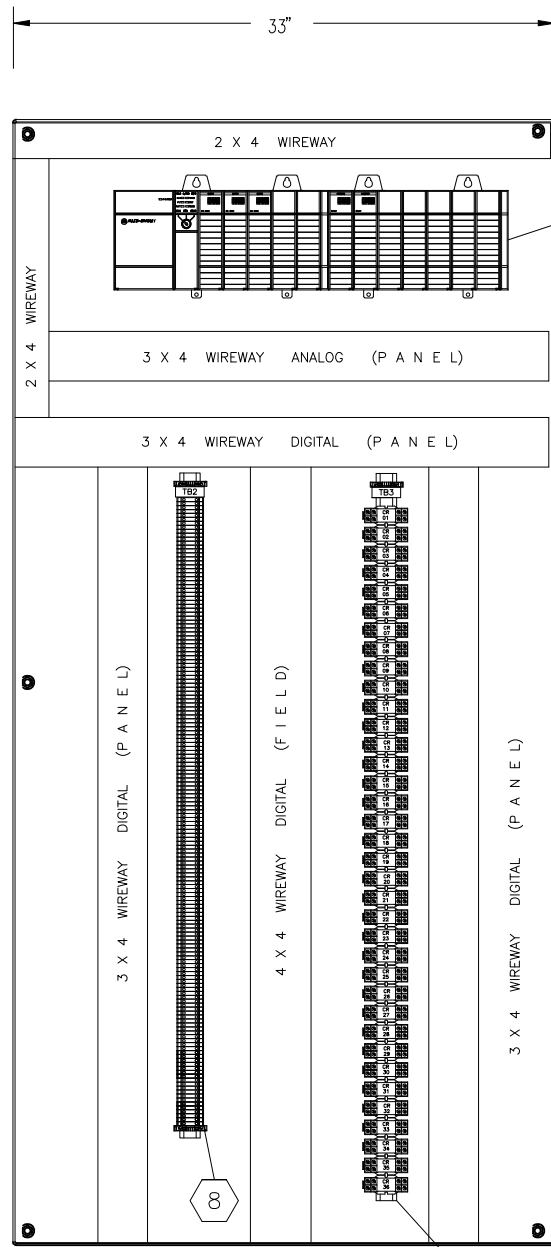
FRONT VIEW



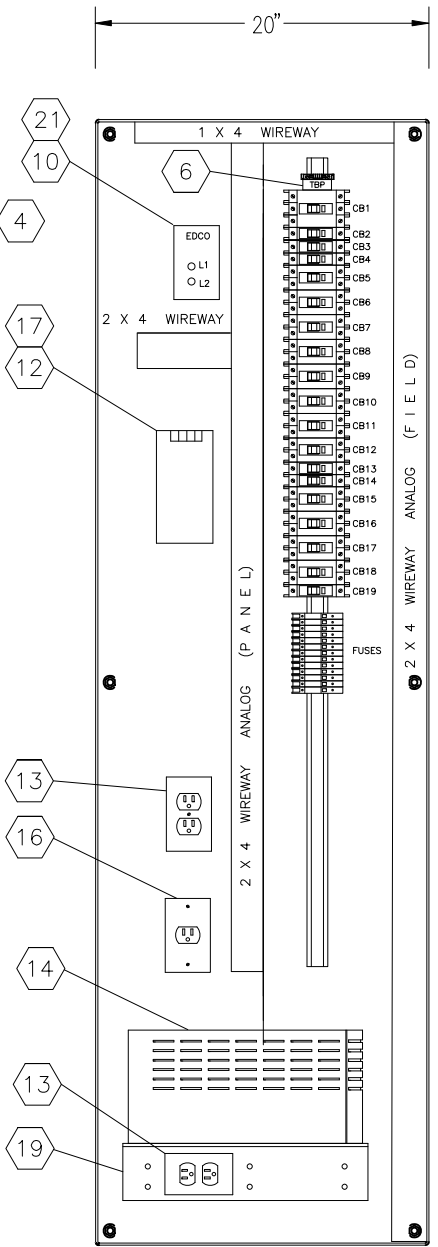
RIGHT SIDE VIEW



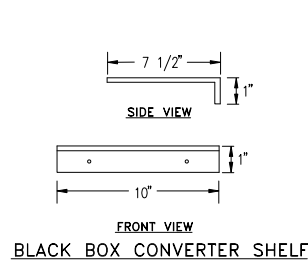
LEFT SUBPANEL



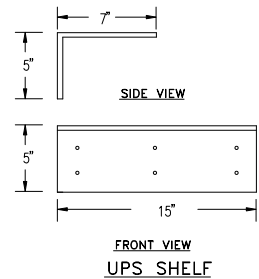
BACK SUBPANEL



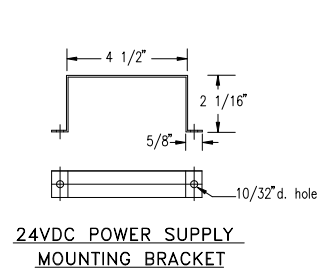
RIGHT SUBPANEL



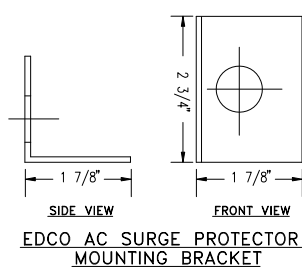
BLACK BOX CONVERTER SHELF



UPS SHELF



24VDC POWER SUPPLY MOUNTING BRACKET



EDCO AC SURGE PROTECTOR MOUNTING BRACKET

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PLOT DATE: 5/28/2010 4:35 PM BY: JEDERBACK

BILL OF MATERIALS				
ITEM	QTY	DESCRIPTION	MFR	PART NO.
①	1	ENCLOSURE, 74" X 36" X 24", NEMA 3R, STEEL	HOFFMAN	A-72R3624FSLP
	1	INNER PANEL, 68" X 33"	HOFFMAN	TBD
	2	INNER PANEL, 68" X 20"	HOFFMAN	TBD
	1	DEAD FRONT PANEL DOOR	HOFFMAN	TBD
	1	PRINT POCKET	HOFFMAN	TBD
	9	QUICK RELEASE LATCHES	HOFFMAN	TBD
	1	PAD LOCKABLE HASP	HOFFMAN	TBD
②	2	FLUORESCENT LIGHT KIT	HOFFMAN	X-LF116D18
③	A/R	WIREWAY (SIZED AS SHOWN)	PANDUIT	- - - - -
④		PLC CONSISTING OF:		
	1	13 SLOT CHASSIS, SLC 500	ALLEN BRADLEY	1746-A13
	1	POWER SUPPLY, 24VDC	ALLEN BRADLEY	1746-P3
	1	SLC 5/05 PROCESSOR	ALLEN BRADLEY	1747-L552
	3	16-POINT DISCRETE INPUT MODULE	ALLEN BRADLEY	1746-IB16
	2	16-POINT DISCRETE OUTPUT MODULE	ALLEN BRADLEY	1746-OW16
	11	CARD SLOT FILLER	ALLEN BRADLEY	1746-N2
	1	COMMUNICATIONS CARD	ALLEN BRADLEY	TBD
⑤		NOT USED		
⑥		TBP CONSISTING OF (TAG "TBP"):		
	5	TERMINAL BLOCK	ALLEN BRADLEY	1492-W4
	3	GROUND TERMINAL BLOCK	ALLEN BRADLEY	1492-WG4
	2	FUSED TERMINAL BLOCK, W/BLOWN FUSE INDICATOR	ENTRELEC	111 043.15
	2	FUSE INDICATOR	ENTRELEC	167 075.25
	6	FUSE, 1 AMP (TAG "FU-XX")	LITTLEFUSE	313001
	6	FUSE, 2 AMP (TAG "FU-XX")	LITTLEFUSE	313002
	1	FUSE, 5 AMP (TAG "FU-XX")	LITTLEFUSE	313005
	1	JUMPER BAR	ENTRELEC	173 510.20
	1	END PLATE	ENTRELEC	118 503.27
	2	END CLAMP	ALLEN BRADLEY	1492-EA35
	1	PARTITION PLATE	ALLEN BRADLEY	1492-PP3
	1	CIRCUIT BREAKER, 40 AMP, 3-POLE (TAG "MAIN CB")	SQUARE-D	QOU-340
	12	CIRCUIT BREAKER, 10 AMP, 2-POLE (TAG "CB-X")	SQUARE-D	QOU-210
	2	CIRCUIT BREAKER, 15 AMP, SINGLE-POLE (TAG "CB-X")	SQUARE-D	QOU-115
	4	CIRCUIT BREAKER, 10 AMP, SINGLE-POLE (TAG "CB-X")	SQUARE-D	QUO-110
⑦	24	TB1 CONSISTING OF (TAG "TB1"): SIGNAL SURGE SUPPRESSER (TAG "SP-X")	EDCO	TBD
⑧	145	TB2 CONSISTING OF (TAG "TB2"): TERMINAL BLOCK (NUMBERED BLOCKS)	ALLEN BRADLEY	1492-W4
	1	END PLATE	ALLEN BRADLEY	1492-EB3
	2	END CLAMP	ALLEN BRADLEY	1492-EA35
⑨		TB3 CONSISTING OF (TAG "TB3"):		
	2	END PLATE	ALLEN BRADLEY	1492-EB3
	4	END CLAMP	ALLEN BRADLEY	1492-EA35
	12	RELAY, MOTOR-STARTER RATED (TAG "CR-XX") *	IDEC	TBD *
	24	RELAY, 120VAC, 2PDT (TAG "CR-XX")	IDEC	RH2B-UAC120V
	36	RELAY SOCKET	IDEC	SH2B-O5
⑩	1	POWER LINE PROTECTOR (TAG "PANEL SURGE PROTECTOR")	EDCO	EMC-240B
⑪		GROUND BUS CONSISTING OF:		
	1	BUS BAR	WEIDMULLER	34890
	30	SMALL TYPE CLAMP	WEIDMULLER	31650
	2	LARGE TYPE CLAMP	WEIDMULLER	31660
	2	END COVER	WEIDMULLER	29986
⑫	1	POWER SUPPLY, 24VDC, 10A (TAG "DC POWER SUPPLY")	MEAN WELL	S-240-24
⑬	2	GFCI DUPLEX RECEPTACLE W/FACE PLATE	PASS&SEYMOUR	1591
	2	SINGLE GANG BOX	STEEL CITY	5836 1 1/2
⑭	1	UNINTERRUPTIBLE POWER SUPPLY	LIEBERT	POWERSURE 700

\* MOTOR-STARTER RATED RELAYS TO HAVE 120V COIL  
 240V CONTACTS FOR MOTOR, 120V CONTACTS FOR CONTROL

BILL OF MATERIALS (CONT'D)				
ITEM	QTY	DESCRIPTION	MFR	PART NO.
⑮	1	PANEL NAMEPLATE (SEE SCHEDULE TO RIGHT)	TDC	CUSTOM
⑯	1	SIMPLEX RECEPTACLE W/FACE PLATE	HUBBELL	5261
	1	SINGLE GANG BOX	STEEL CITY	5836 1 1/2
⑰	1	WIRELESS MODEM	TBD	TBD
⑱	1	MOUNTING BRACKET	-	CUSTOM
⑲	1	UPS SHELF	-	CUSTOM
⑳	1	24VDC POWER SUPPLY MTG. BRACKET	-	CUSTOM
㉑	1	EDCO AC SURGE PROTECTOR MTG. BRACKET	-	CUSTOM
㉒	1	3-POSITION SELECTOR SWITCHES (ON DEAD FRONT)	A/B	BULLETIN 800

PANEL TAG SCHEDULE			
FIRST LINE	SECOND LINE	TYPE	SIZE
PER BOM	PER BOM (IF NEEDED)	WHT W/BLK LETTERS	1/2" x 1" (MIN)

PANEL TAGS  
 MATERIAL : ADHESIVE BACK, LAMINATED PLASTIC.  
 LETTERS : 1/4-INCH MINIMUM, HELVETICA MEDIUM, UNLESS OTHERWISE NOTED.


PANEL NAMEPLATE	
TYPE	BLK W/WHT LETTERS
SIZE	1" x 3"
1ST.LINE	FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES PROJECT
2ND.LINE	CONTROL PANEL

PANEL NAMEPLATE  
 MATERIAL : ADHESIVE BACK, LAMINATED PLASTIC.  
 LETTERS : 1/2-INCH HELVETICA MEDIUM

					DESIGNED DBS	<div> <div>HAZEN AND SAWYER</div> <div>Environmental Engineers &amp; Scientists</div> <div>                     10002 Princess Palm Avenue                      Registry One Building, Suite 200                      Tampa, Florida 33619                      Certificate of Authorization Number: 2771                 </div> </div>
					DRAWN CMS	
					CHECKED JB	
					PROJ. ENGR. DBS	
					DLA	
					APPROVED	
5	AS-BUILTS PNRS II	05/10	-		DANIEL B. SCHMIDT	Name: _____ Date: _____ Florida Professional Engineer's Registration Number: 40233
4	FINAL SUBMITTAL	01/10	-			
3	100% SUBMITTAL	12/09	-			
2	75% SUBMITTAL	12/09	-			
1	50% SUBMITTAL	08/09	-			
NO.	ISSUED FOR	DATE	BY			



FLORIDA DEPARTMENT OF HEALTH  
 4052 BALD CYPRESS WAY, BIN A08  
 TALLAHASSEE, FL 32399-1713  
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FLORIDA DEPARTMENT OF HEALTH FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY		THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING. 	DATE	MAY 2010
BILL OF MATERIALS			H & S JOB NUMBER	44237-001
			CONTRACT NUMBER	
			DRAWING NUMBER I-8	

File = G:\44237-0001\PN\44237-001\Drawings\06-Bill of Materials\Drawings\06-Bill of Materials.dwg, Scale = 1/8"=1'-0", Date = 1/28/2010 4:35 PM

FUNCTIONAL CONTROL DESCRIPTIONS

1.01 THE REQUIREMENT

- A. Furnish, test, install and place in satisfactory operation all PLC control strategies, operator interface programming, and related programming as noted herein.
- B. The PLC programming and operator interface is to be fully tested at the manufacturer's shop prior to shipping. Once delivered, the programming is to be checked out prior to operation of the system and is to be demonstrated to the Engineer that the programs perform all functions as intended.
- C. All control functions are to be performed by the PLC. The operator interface is to be used for manual override of equipment, adjustment of setpoints, and to download stored data from the PLC.

1.02 OPERATOR INTERFACE

- A. The PLC shall communicate with a laptop computer which shall function as the operator interface. The operator interface software shall be supplied with the PLC control panel and be set up to provide full access to the PLC for operator manual override of all equipment, ability to make adjustments to setpoints, download stored data from the PLC, and make modifications to the PLC program itself as needed.
- B. The PLC shall include a data storage module capable of storing up to a month of data as described herein. The operator interface laptop will be used to download the data on a periodic basis. Data shall be transferable in MS Excel spreadsheet format.
- C. The following displays shall be created and stored on the laptop for operator interface:

Menu Bar – menu bar across the top of each display to provide quick access to any display.

Control Display – Tabular display of all pumps, blower, and valves. For each device, provide an ON / OFF / AUTO button (OPEN / CLOSE / AUTO for valves) for point and click control of the equipment. For each device, provide a RED run indicator (open indicator for valves) that is grey when not running (or valve closed). For each pump and blower, provide the totalized runtime value calculated by the PLC (in hours and tenths of hours up to 999,999.9). For each pump with an associated flow meter, provide the totalized flow value calculated by the PLC. For each pump, blower, or valve on timer control, provide indication of time remaining until (or time HH:MM of) next start or, if running, time remaining until the equipment stops (or closes). For each pump whose normal sequence can be interrupted, provide indication of the override (low level shutoff or Pump “X” running interrupt).

Setpoint Display – Tabular display(s) for all control setpoints as described herein with simple point and click access to each setpoint that allows value changes by typing in a numeric value and pressing the ENTER key.

Timer Setpoint Display – For all timer setpoints, provide a 24–hour, bar graph format display to show the relative on and off times of each pump and blower.

1.03 PUMP 1 – EXISTING SEPTIC TANK 2 TO STE STORAGE TANK 1

- A. Control Description: Pump shall start on LOW level in STE STORAGE TANK 1 and stop on HIGH level in STE STORAGE TANK 1. If PUMP 13 is running as part of its normal timed sequence, delay start of PUMP 1 until that sequence is complete.
- B. Data Storage: Record totalized runtime, daily pump runtime, and number of starts per day.

1.04 PUMP 2 – STE STORAGE TANK 1 TO STE DRIP STORAGE TANK 5

- A. Control Description: Pump shall start on LOW level in STE DRIP STORAGE TANK 5 and stop on HIGH level in STE DRIP STORAGE TANK 5. Pump shall stop on LOW LOW level in STE STORAGE TANK 1 and remain off until LOW level in STE STORAGE TANK 1 is reached. If PUMP 14 is running as part of its normal timed sequence, delay start of PUMP 2 until that sequence is complete.
- B. Data Storage: Record totalized runtime, daily pump runtime, and number of starts per day.

1.05 PUMP 3 – STE STORAGE TANK 1 TO NITRIFICATION UNIT

- A. Control Description: Pump shall start up to 8 times a day and run for a set amount of time. Provide 8 individual start times based on a 24–hour clock format (HH:MM). Provide 1 global cycle duration timer for all 8 start times. The 8 start times and the 1 cycle duration time setpoint shall be adjustable from the operator interface. Pump shall stop on LOW LOW level in STE STORAGE TANK 1 and remain off until LOW level in STE STORAGE TANK 1 is reached.
- B. Data Storage: Record totalized runtime and daily pump runtime.

1.06 PUMP 4 – STE STORAGE TANK 1 TO HYDROSPPLITTER SYSTEM 1

- A. Control Description: Pump shall start a set number of times a day (up to 24 times) and run for a set amount of time. The number of start times a day and the cycle duration time setpoint shall be adjustable from the operator interface. The PLC shall divide the number of start times a day entered into 1,440 minutes (24 hours) to determine the start times of the pump starting from midnight. For example, if 18 times a day were selected, the pumps would start every 80 minutes (00:00, 01:20, 02:40 .... 21:20, 22:40). For uneven values, the PLC shall round to the nearest minute. Pump shall stop on LOW LOW level in STE STORAGE TANK 1 and remain off until LOW level in STE STORAGE TANK 1 is reached.
- B. Data Storage: Record totalized runtime and daily pump runtime. Receive pulse input from flow meter and record totalized daily volume pumped. One pulse equals one gallon.

1.07 PUMP 5 – STE STORAGE TANK 1 TO IN–SITU SYSTEM

- A. Control Description: Pump shall start up to 6 times a day and run for a set amount of time. Provide 6 individual start times based on a 24–hour clock format (HH:MM). Provide 1 global cycle duration timer for all 6 start times. The 6 start times and the 1 cycle duration time setpoint shall be adjustable from the operator interface.
- B. Data Storage: Record totalized runtime and daily pump runtime. Calculate totalized daily volumes pumped based on pump flow rate entered by operator (calculated from pump maximum capacity, frequency, and stroke length set at pump).

1.08 PUMPS 6 THROUGH 9 – HYDROSPPLITTER SYSTEM 2 RECIRCULATION PUMPS

- A. Control Description: Pumps shall start when PUMP 14 starts and each pump shall run for a set amount of time. Provide 1 global cycle duration timer for each individual pump. The cycle duration time setpoint shall be adjustable from the operator interface.
- B. Data Storage: Record totalized runtime and daily pump runtimes.

1.09 PUMPS 10 AND 11 – DENITE FEED FROM TANK 3

- A. Control Description: Each pump shall start a set number of times a day (up to 24 times) and run for a set amount of time. The number of start times a day and the cycle duration time setpoint shall be adjustable from the operator interface and each pump shall run off individual setpoints. The PLC shall divide the number of start times a day entered into 1,440 minutes (24 hours) to determine the start times of the pump starting from 15 minutes after midnight. For example, if 13 times a day were selected, the pumps would start every 110.77 minutes (00:15, 02:06, 03:57 .... 20:33, 22:24). For uneven values, the PLC shall round to the nearest minute as indicated in example.
- B. Data Storage: Record totalized runtime and daily pump runtimes. Calculate totalized daily volumes pumped based on pump flow rate entered by operator (calculated from pump maximum capacity, frequency, and stroke length set at pump).

1.10 PUMP 12 – NO3 DRIP STORAGE TANK 4 TO NO3 DRIP SYSTEM

- A. Control Description: Pump shall start up to 6 times a day and run for a set amount of time. Provide 6 individual start times based on a 24–hour clock format (HH:MM). Provide 1 global cycle duration timer for all 6 start times. The 6 start times and the 1 cycle duration time setpoint shall be adjustable from the operator interface. Pump shall stop on LOW LOW level in NO3 DRIP STORAGE TANK 4 and remain off until LOW level in NO3 DRIP STORAGE TANK 4 is reached. Pump shall also start with flush cycle (see VALVE 1 controls).
- B. Data Storage: Record totalized runtime. Record separate daily runtimes for the timed sequence described above and for the flush sequence. Receive pulse inputs from the supply and return flow meters and record totalized daily volume pumped as supply only (subtract return flow from supply flow). One pulse equals one gallon.

1.11 PUMP 13 – STE DRIP STORAGE TANK 5 TO STE DRIP System

- A. Control Description: Pump shall start up to 6 times a day and run for a set amount of time. Provide 6 individual start times based on a 24–hour clock format (HH:MM). Provide 1 global cycle duration timer for all 6 start times. The 6 start times and the 1 cycle duration time setpoint shall be adjustable from the operator interface. Pump shall stop on LOW LOW level in STE DRIP STORAGE TANK 5 and remain off until LOW level in STE DRIP STORAGE TANK 5 is reached. Pump shall also start with flush cycle (see VALVE 2 controls).
- B. Data Storage: Record totalized runtime. Record separate daily runtimes for the timed sequence described above and for the flush sequence. Receive pulse inputs from the supply and return flow meters and record totalized daily volume pumped as supply only (subtract return flow from supply flow). One pulse equals one gallon.

1.12 PUMP 14 – STE STORAGE TANK 1 TO HYDROSPPLITTER SYSTEM 2

- A. Control Description: Pump shall start a set number of times a day (up to 24 times) and run for a set amount of time. The number of start times a day and the cycle duration time setpoint shall be adjustable from the operator interface. The PLC shall divide the number of start times a day entered into 1,440 minutes (24 hours) to determine the start times of the pump starting from 30 minutes after midnight. For example, if 16 times a day were selected, the pumps would start every 90 minutes (00:30, 02:00, 03:30 .... 21:30, 23:00). For uneven values, the PLC shall round to the nearest minute. Pump shall stop on LOW LOW level in STE STORAGE TANK 1 and remain off until LOW level in STE STORAGE TANK 1 is reached.
- B. Data Storage: Record totalized runtime and daily pump runtime. Receive pulse input from flow meter and record totalized daily volume pumped. One pulse equals one gallon.

1.13 PUMP 15 – NO3 DRIP STORAGE TANK 4 TO GRAVITY SUMP

- A. Control Description: Pump shall start on HIGH level in NO3 DRIP STORAGE TANK 4 and stop on LOW level in NO3 DRIP STORAGE TANK 4. If PUMPs 3 or 13 are running as part of their normal timed sequences, delay start of PUMP 15 until those sequences are complete.
- B. Data Storage: Record totalized runtime, daily pump runtime, and number of starts per day.

1.14 BLOWER – NO3 SYSTEM

- A. Control Description: Blower shall start based on a repeat cycle ON / OFF timer. Separate ON and OFF times, in minutes, shall be provided that are adjustable from the operator interface. If 0 minutes are entered for ON time, the blower shall never run. If 0 minutes are entered for OFF time, the blower shall run continuously.
- B. Data Storage: Record totalized runtime.

1.15 VALVE 1 – NO3 DRIP SYSTEM FLUSH

- A. Control Description: Once per day, as determined by a flush time setting (HH:MM), the valve shall open. Once the valve is confirmed open, Pump 12 shall start and run for a set amount of time. Once timed out, the pump shall stop first, then the valve shall be closed. If Pump 12 is already running as part of its normal timed sequence, start of the flush cycle shall be delayed until that sequence is complete and the pump has shut off. The flush start time and cycle duration setpoint shall be adjustable from the operator interface.
- 1.16 VALVE 2 – STE DRIP SYSTEM FLUSH
- A. Control Description: Once per day, as determined by a flush time setting (HH:MM), the valve shall open. Once the valve is confirmed open, Pump 13 shall start and run for a set amount of time. Once timed out, the pump shall stop first, then the valve shall be closed. If Pump 13 is already running as part of its normal timed sequence, start of the flush cycle shall be delayed until that sequence is complete and the pump has shut off. The flush start time and cycle duration setpoint shall be adjustable from the operator interface.

1.17 POWER DISTRIBUTION CALCULATION

- A. Control Description: Odd numbered pumps 1–15 and Valve 1 are powered from one pole of the main power feed to the panel. Even numbered pumps, the blower, and Valve 2 are powered from the other pole. Pumps 1, 12, and 13 draw 5.5 amps. Pumps 2, 3, 4, 6, 7, 8, 9, 14, and 15 draw 2.5 amps. Pumps 5, 10, and 11, the blower, and the two valves draw less than 1 amp. Logic described above for permissives and selected time settings should minimize the number of pumps running at one time. However, the PLC shall calculate the estimated amp draw (sum of the values listed above) for each pole for the equipment running at any time. If the estimated value exceeds 30 amps, the PLC shall delay start of any additional equipment until the amp draw decreases below 30 amps.
- B. Data Storage: Record highest estimated daily amp draw.

1.18 TIME OF DAY RESET

- A. Control Description: Provide means for operator to enter the hour and minute of the day and then reset the PLC clock to match this time. Display of actual PLC time is to be shown on the Control Display.

Plot Date: 5/28/2010 4:35 PM By: JEB/BACK

				DESIGNED DBS	<div>DANIEL B. SCHMIDT</div> <div>Name: _____ Date: _____</div> <div>Florida Professional Engineer's Registration Number: 40233</div>
				DRAWN CMS	
				CHECKED JB	
5	AS–BUILTS PNRS II	05/10	–	PROJ. ENGR. DBS	
4	FINAL SUBMITTAL	01/10	–	DLA	
3	100% SUBMITTAL	12/09	–	APPROVED	
2	75% SUBMITTAL	12/09	–		
1	50% SUBMITTAL	08/09	–		
NO.	ISSUED FOR	DATE	BY		

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Certificate of Authorization Number: 2771



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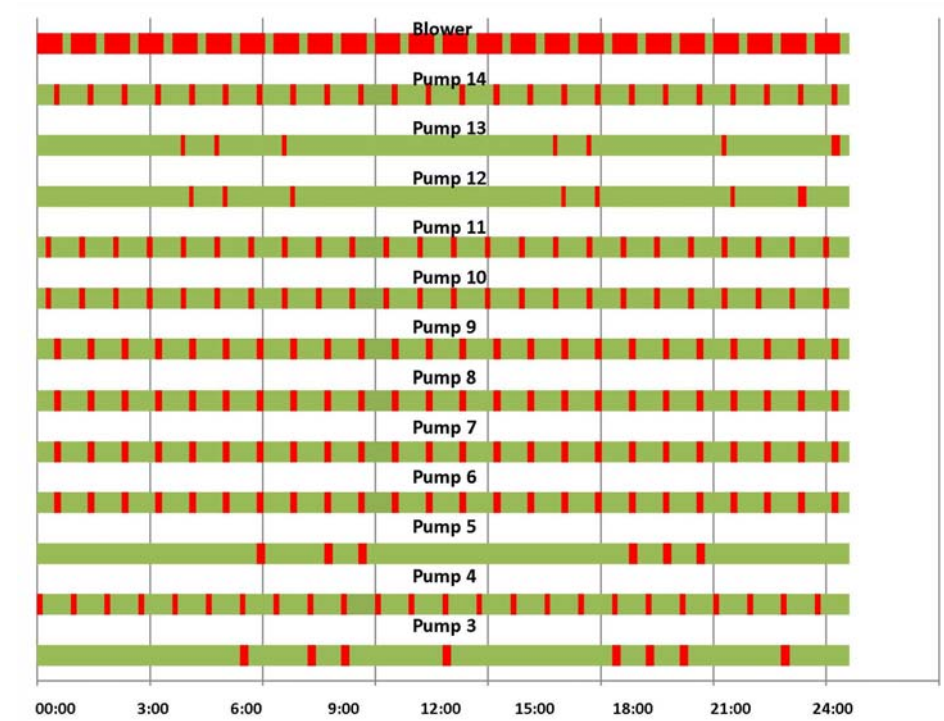
FLORIDA DEPARTMENT OF HEALTH FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATIGIES STUDY		THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE MAY 2010 H & S JOB NUMBER 44237–001 CONTRACT NUMBER DRAWING NUMBER I–9
FUNCTIONAL CONTROL DESCRIPTIONS			

File: 01-44237-000-1P14-44237-001-1.dwg Project: 01-44237-001-1.dwg Date: 5/28/2010 4:35 PM By: JEB/BACK

## CONTROL DISPLAY

		Device Control			Status	Total Runtime	Totalized Flow (gal)	Time to Next Start	Cycle Interruption
PUMP 1	Septic Tank 2 to STE Storage Tank 1	ON	OFF	AUTO	RUNNING	005,480.0			No
PUMP 2	STE Storage Tank 1 to STE Drip Storage Tank 5	ON	OFF	AUTO	STOPPED	005,480.0			No
PUMP 3	STE Storage Tank 1 to NO3 Drip Storage Tank 4	ON	OFF	AUTO	STOPPED	000,340.0		06:00	No
PUMP 4	STE Storage Tank 1 to Hydrosplitter System 1	ON	OFF	AUTO	STOPPED	000,080.7	524,453	02:40	No
PUMP 5	STE Storage Tank 1 to In-Situ System	ON	OFF	AUTO	STOPPED	000,111.3	103,024	08:15	
PUMP 6	Hydrosplitter System 2 Recirculation	ON	OFF	AUTO	RUNNING	000,148.5		10.3 min	
PUMP 7	Hydrosplitter System 2 Recirculation	ON	OFF	AUTO	RUNNING	000,148.5		10.3 min	
PUMP 8	Hydrosplitter System 2 Recirculation	ON	OFF	AUTO	RUNNING	000,148.5		10.3 min	
PUMP 9	Hydrosplitter System 2 Recirculation	ON	OFF	AUTO	RUNNING	000,148.5		10.3 min	
PUMP 10	Feed from Denite Feed Tank 3	ON	OFF	AUTO	RUNNING	000,030.0	010,231	03:57	
PUMP 11	Feed from Denite Feed Tank 3	ON	OFF	AUTO	RUNNING	000,030.0	010,231	03:57	
PUMP 12	NO3 Drip Storage Tank 4 to NO3 Drip System	ON	OFF	AUTO	STOPPED	005,480.0	705,480	09:45	Low Level
PUMP 13	STE Drip Storage Tank 5 to STE Drip System	ON	OFF	AUTO	STOPPED	000,340.0	685,301	09:45	No
PUMP 14	STE Storage Tank 1 to STE Hydrosplitter System 2	ON	OFF	AUTO	RUNNING	000,080.7	705,480	10.3 min	No
PUMP 15	NO3 Drip Storage Tank 4 to Gravity Sump	ON	OFF	AUTO	STOPPED	000,111.3			No
BLOWER	NO3 System Air Supply Blower	ON	OFF	AUTO	RUNNING	102,533.6		24.3 min	
VALVE 1	NO3 Drip Storage Tank 4 Flush Valve	OPEN	CLOSE	AUTO	CLOSED			22:30	
VALVE 2	STE Drip Storage Tank 5 Flush Valve	OPEN	CLOSE	AUTO	CLOSED			23:00	
11:43	PLC TIME	Existing System Flows:			Meter 1	685,301	Meter 2	685,301	

## TIMECHART



SETPOINT DISPLAY

		Start Times (HH:MM)	Cycle Time (min)			Number of Starts / Day	Cycle Time (min)
PUMP 3	STE Storage Tank 1 to NO3 Drip Storage Tank 4	06 : 00	15	PUMP 4	STE Storage Tank 1 to Hydrosplitter System 1	24	10
		08 : 00					
		09 : 00					
		12 : 00					
		17 : 00					
		18 : 00					
PUMP 5	STE Storage Tank 1 to In- Situ System	06 : 30	15	PUMP 10	Feed from Denite Feed Tank 3	24	10
		08 : 30					
		09 : 30					
		17 : 30					
		18 : 30					
		19 : 30					
PUMP 12	NO3 Drip Storage Tank 4 to NO3 Drip System	04 : 30	8	PUMP 14	STE Storage Tank 1 to Hydrosplitter System 2	24	10
		05 : 30					
		07 : 30					
		15 : 30					
		16 : 30					
		20 : 30					
PUMP 13	STE Drip Storage Tank 5 to STE Drip System	04 : 15	8	BLOWER	NO3 System Air Supply Blower	45	15
		05 : 15					
		07 : 15					
		15 : 15					
		16 : 15					
		20 : 15					
VALVE 1	NO3 Drip Storage Tank 4 Flush Valve	22 : 30	15	Pump 6	Hydrosplitter System 2 Recirculation	12	Cycle Time (min)
VALVE 2	STE Drip Storage Tank 5 Flush Valve	23 : 30	15	Pump 7	Hydrosplitter System 2 Recirculation	12	Off Time
Pump 10 Feed Rate:	03	gph	Pump 8	Hydrosplitter System 2 Recirculation	12		
Pump 11 Feed Rate:	03	gph	Pump 9	Hydrosplitter System 2 Recirculation	12		

CUT DATE: 5/28/2010 4:30 PM					DESIGNED _____ DBS	DANIEL B. SCHMIDT  Name: _____ Date: _____ Florida Professional Engineer's Registration Number: <u>40233</u>
					DRAWN _____ CMS	
	5	AS-BUILTS PNRS II	05/10	-	CHECKED _____ JB	
	4	FINAL SUBMITTAL	01/10	-	PROJ. ENGR. _____ DBS	
	3	100% SUBMITTAL	12/09	-		
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	1	50% SUBMITTAL	08/09	-		
	NO.	ISSUED FOR	DATE	BY	APPROVED _____	

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FLORIDA DEPARTMENT OF HEALTH  
FLORIDA ONSITE SEWAGE NITROGEN REDUCTION STRATEGIES STUDY

FUNCTIONAL CONTROL DESCRIPTIONS

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.	DATE	MAY 2010
	H & S JOB NUMBER	44237-001
	CONTRACT NUMBER	
	DRAWING NUMBER I-10	