

APPENDIX K

TABLE 1
INSTALLATION DETAILS BY LIFT STATION

[illegible]

Priority: The order in which the stations are to be done

Station: The station number that is assigned by Mobile Water

Name: The name that is assigned by Mobile Water

Building: "Y" = building exists. "N" = no building

Mounting: "W" = wall mount outside of building. "S" = stand mount

Voltage: Voltage of pump motor

of Motors: Number of motors at station

Horsepower: Horsepower of pumps

Strtr Size: Recommended Nema size or existing Nema size

Xfer Swch: "Y" = a transfer switch is to be installed.

"N" = no transfer switch is needed or one exists

and is to remain as is

Starter: "I" = new starter to be installed (furnished by owner)

"R" = relocate existing starter

"IR" = one new & one relocated starter

Discount: "Y" = disconnect to be replaced or added

"N" = no changes

Control: "Y" = add all new controls. "N" = no new controls

Temperature: "Y" = Wiring to temperature switch is required

"N" = no switch exists. * = Modification required

Moisture: "Y" = Wiring to moisture switch is required

* = Modification required

PFR: "Y" = Wiring to moisture switch is required

"N" = No relay needed, one exists

Float: number of new floats needed

*** = exists in standard panel and shall be installed per electrical

drawing E-3 SEWER LIFT STATION RTU DETAILS FOR

EXISTING CONTROL PANELS

TABLE II
LOOP NUMBER ASSIGNMENTS FOR DUPLEX PUMP STATIONS

DESCRIPTION AT COMPUTER AND RTU	SYSTEM TAG NUMBER		
	LIFT STATION NUMBER	TYPE LOOP	LOOP NUMBER
General Alarm at RTU	Note 2	GA	100
Motor #1 Switch in Auto Note 1		QI	101
Start #1 Motor (RTU Only) Note 1		QS	101
Motor #1 Running		JL	101
High Moisture in Motor #1		MI	101
Over Temperature Motor #1		TI	101
Motor #2 Switch in Auto Note 1		QI	102
Start #2 Motor (RTU Only)		QS	102
Motor #2 Running		JL	102
High Moisture in Motor #2		MI	102
Over Temperature Motor #2		TI	102
LS-1 All Pumps Off Note 1		LI	103A
LS-2 Lead Pump On Note 1		LI	103B
LS-3 Lag Pump On Note 1		LI	103C
Control Door Open		QI	104
Control Panel Authorized Entry		QI	105
RTU/Radio Panel Door Open		QI	106
RTU/Radio Panel Authorized Entry		QI	107
Main Power to RTU/ Radio On/Off		QI	108
Back-Up Power Supply to RTU/Radio On/Off		QI	109
Power Failure or Phase Loss		JL	110
Flow at Station		FI	111

NOTES:

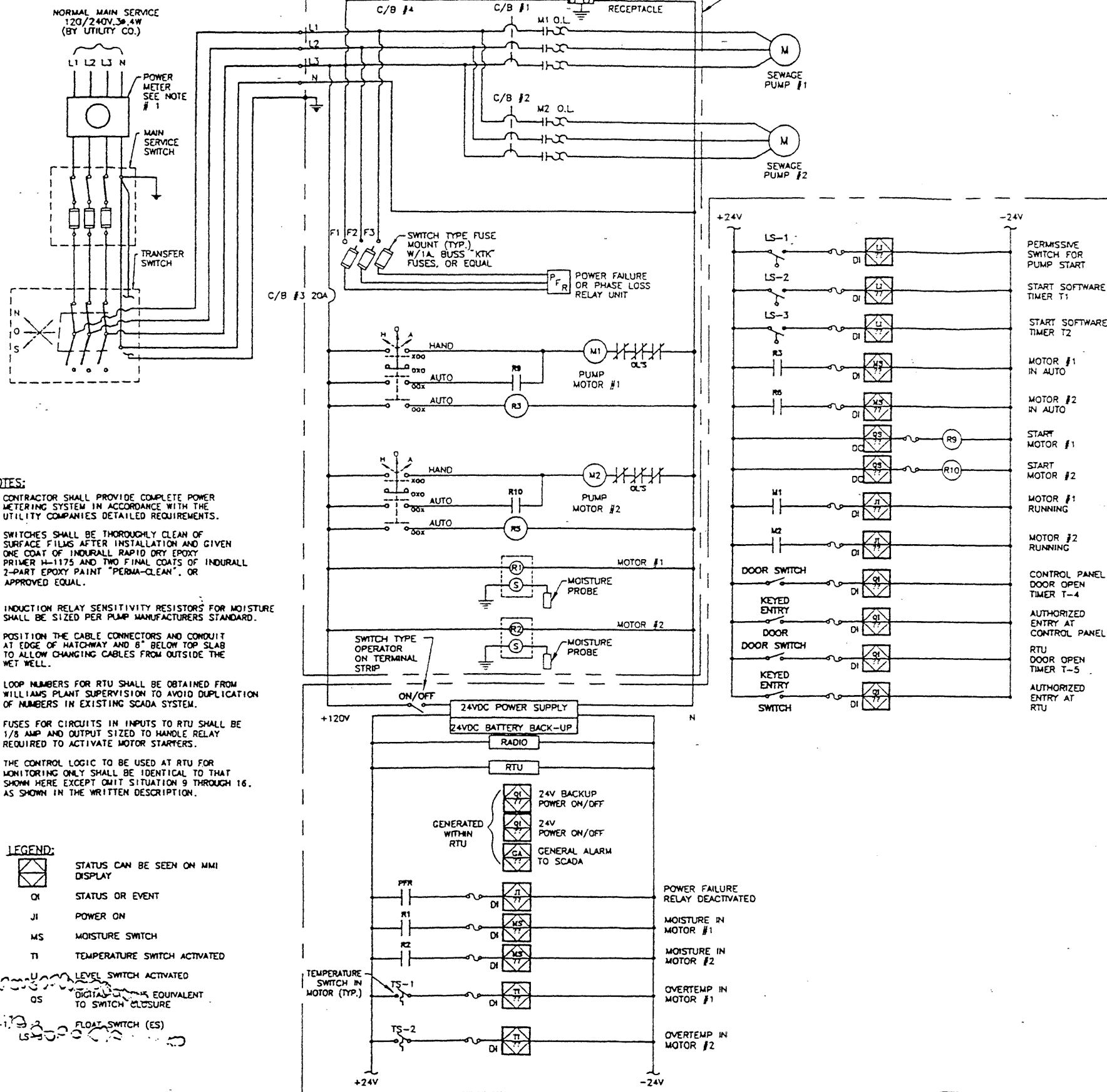
- 1.) Stations that will not have new controls will not be wired with these I/O points. Reserve loop numbers for future when these stations become remote controlled.
- 2.) Lift station numbers are to be used as assigned by Mobile Water and Sewer. The number shall be at least 3 digits (001, 011, 111, etc.).

TABLE III
LOOP NUMBER ASSIGNMENTS FOR SINGLE PUMP STATIONS

DESCRIPTION AT COMPUTER AND RTU	SYSTEM TAG NUMBER		
	LIFT STATION NUMBER	TYPE LOOP	LOOP NUMBER
General Alarm at RTU	Note 2	GA	100
Motor #1 Switch in Auto Note 1		QI	101
Start #1 Motor (RTU Only) Note 1		QS	101
Motor #1 Running		JI	101
High Moisture in Motor #1		MI	101
Over Temperature Motor #1		TI	101
LS-1 Pump Off Note 1		LI	103A
LS-1 Pump On Note 1		LI	103B
Control Door Open		QI	104
Control Panel Authorized Entry		QI	105
RTU/Radio Panel Door Open		QI	106
RTU/Radio Panel Authorized Entry		QI	107
Main Power to RTU/Radio On/Off		QI	108
Back-Up Power Supply to RTU/Radio On/Off		QI	109
Power Failure or Phase Loss		JI	110
Flow at Station		FI	111

NOTES:

- 1.) Stations that will not have new controls will not be wired with these I/O points. Reserve loop numbers for future when these stations become remote controlled.
- 2.) Lift station numbers are to be used as assigned by Mobile Water and Sewer. The number shall be least 3 digits (001, 011, 111, etc.).



- NOTES:**
1. CONTRACTOR SHALL PROVIDE COMPLETE POWER METERING SYSTEM IN ACCORDANCE WITH THE UTILITY COMPANIES DETAILED REQUIREMENTS.
 2. SWITCHES SHALL BE THOROUGHLY CLEAN OF SURFACE FILMS AFTER INSTALLATION AND GIVEN ONE COAT OF INDURALL RAPID DRY EPOXY PRIMER W-1175 AND TWO FINAL COATS OF INDURALL 2-PART EPOXY PAINT "PERMA-CLEAN", OR APPROVED EQUAL.
 3. INDUCTION RELAY SENSITIVITY RESISTORS FOR MOISTURE SHALL BE SIZED PER PUMP MANUFACTURERS STANDARD.
 4. POSITION THE CABLE CONNECTORS AND CONDUIT AT EDGE OF HATCHWAY AND 8" BELOW TOP SLAB TO ALLOW CHANGING CABLES FROM OUTSIDE THE WET WELL.
 5. LOOP NUMBERS FOR RTU SHALL BE OBTAINED FROM WILLIAMS PLANT SUPERVISION TO AVOID DUPLICATION OF NUMBERS IN EXISTING SCADA SYSTEM.
 6. FUSES FOR CIRCUITS IN INPUTS TO RTU SHALL BE 1/8 AMP AND OUTPUT SIZED TO HANDLE RELAY REQUIRED TO ACTIVATE MOTOR STARTERS.
 7. THE CONTROL LOGIC TO BE USED AT RTU FOR MONITORING ONLY SHALL BE IDENTICAL TO THAT SHOWN HERE EXCEPT OMIT SITUATION 9 THROUGH 16, AS SHOWN IN THE WRITTEN DESCRIPTION.

- LEGEND:**
- STATUS CAN BE SEEN ON MMI DISPLAY
 - DI STATUS OR EVENT
 - JI POWER ON
 - MS MOISTURE SWITCH
 - TI TEMPERATURE SWITCH ACTIVATED
 - LS-1 LEVEL SWITCH ACTIVATED
 - OS DIGITAL EQUIVALENT TO SWITCH CLOSURE
 - LS-1, 2, 3 FLOAT SWITCH (ES)

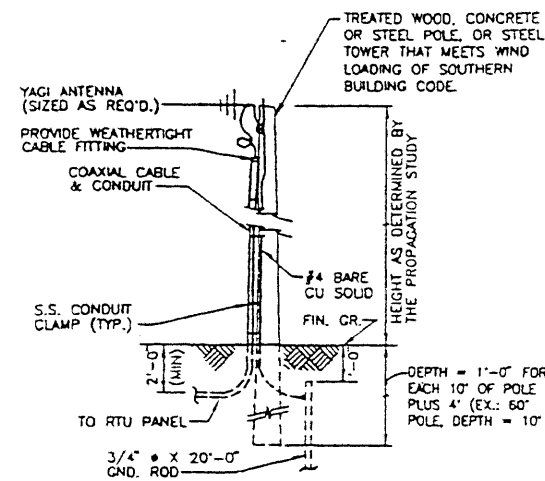
CONTROL DIAGRAM

1. 24 Volt Power Supply Off	None	Provide message to SCADA "Main Power Supply Off"	Yes	Yes	14. Falling Water in Well Goes Below Level 3	LS-3 Opens	a. Remove Output and Stop Lead Motor (De-Energize R9 or R10) Start Timer T3 b. If LS-3 Still Open After T3 Time-out, clear High Level Alarm	No	No
2. 24 Volt Backup Power Supply in Service	Automatic Switch Over When Needed	Provide message to SCADA "Backup Power Supply Activated"	Yes	Yes	15. H-O-A Switch for Motor #1 Placed in Auto	Relay R3 Activated to Close Contact R3	Notify RTU Logic That Pump Motor #1 Available	Yes	No
3. General Alarm at RTU	None	Provide message to SCADA "General Alarm in RTU" (from Self-Diagnostics)	Yes	Yes	16. H-O-A Switch for Motor #2 Placed in Auto	Relay R5 Activated to Close Contact R5	Notify RTU Logic That Pump Motor #2 Available	Yes	No
4. Power or Phase Loss	Power Failure Relay Deactivated and PFR Opens	Provide message to SCADA "Power Failure or Phase Loss"	Yes	Yes	17. Motor #1 is Started	Control Coil M1 is Activated and Closes Contact M1	Notify SCADA that Motor #1 is On	Yes	No
5. High Moisture in #1 Motor	R1 Relay Activated to Close Contact R1	Provide message to SCADA "High Moisture #1 Motor"	Yes	Yes	18. Motor #2 is Started	Control Coil M2 is Activated and Closes Contact M2	Notify SCADA that Motor #2 is On	Yes	No
6. High Moisture in #2 Motor	R2 Relay Activated to Close Contact R2	Provide message to SCADA "High Moisture #2 Motor"	Yes	Yes	19. Door to Control Panel is Opened	Contact for Door Switch Alarm	a. Start Timer Module T4. b. Provide Alarm "Unauthorized Entry" if Time-out of T4 Occurs Before Authorized Entry Key Switch Closed.	Yes	No
7. Motor #1 Overheats	Temperature Switch TS-1 Closes	Notify SCADA "Over Temperature at Motor #1"	Yes	Yes	20. Control Panel Authorization Switch Unlocked	Authorized Keyed Entry Switch Closes	Clear or Prevent Message to SCADA for "Unauthorized Entry at Control Panel"	Yes	No
8. Motor #2 Overheats	Temperature Switch TS-2 Closes	Notify SCADA "Over Temperature at Motor #2"	Yes	Yes	21. Door to RTU Opened	Contact for Door Switch Opens	a. Start Timer T5 b. Provide Alarm "Unauthorized Entry" if Time-out of T5 Occurs Before Authorized Key Switch Closed	Yes	Yes
9. Rising Water in Well Reaches Level 1	LS-1 Closes	Provide Permissive Logic to Allow Pump Motors to Start	No	No	22. RTU Enclosure Authorization Switch Unlocked	Authorized Keyed Entry Switch Closes	Clear or Prevent Message to SCADA for "Unauthorized Entry at RTU"	Yes	No
10. Falling Water in Well Goes Below Level 1	LS-1 Opens	Stop all Pump Motors with H-O-A in Automatic (Remove Power to R9 and R10)	No	No	NOTE: Signals listed as No under "Notify SCADA" shall be available upon request from the SCADA system terminals at the Williams Plant Control Room.				
11. Rising Water in Well Reaches Level 2	LS-2 Closes	a. Start Timer Module T1. b. If LS-2 Closed After Time-out of T1, Provide Output to Start Lead Motor (Energize R9 or R10)	No	No					
12. Falling Water in Well Goes Below Level 2	LS-2 Opens	a. Remove Output and Stop Lead Motor (De-Energize R9 or R10) b. Retest Lead Motor	No	No					
13. Rising Water in Well Reaches Level 3	LS-3 Closes	a. Start Timer Module T2. b. If LS-3 Closed After Time-out of T2, Provide Output to Start Lag Pump Motor (Energize R9 or R10) c. Start Timer Module T3. d. If Motor Still On After Time-out of T3, Notify SCADA of High Level.	No	No					

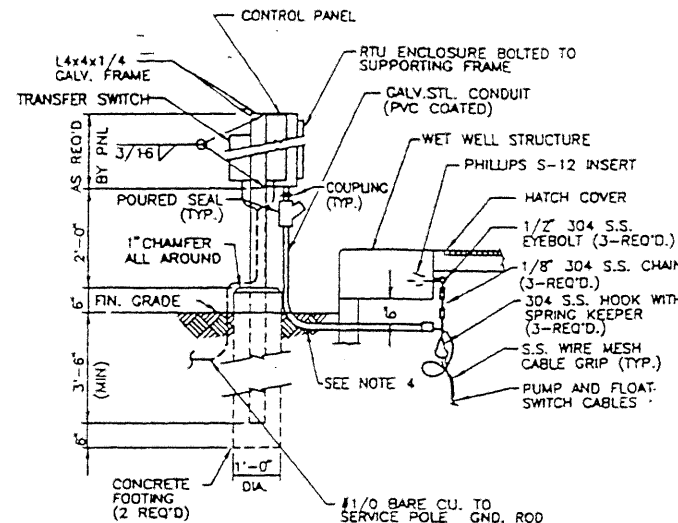
OCT 1996

DESIGNER	APPROVED	SCALE	BOARD OF WATER AND SEWER COMMISSIONERS OF THE CITY OF MOBILE, ALABAMA	SCALE N.T.S.
DRAWN BY	APPROVED		SEWAGE PUMPING STATION WIDENING AND CONTROL LOGIC	PROJECT NO.
ENGINEER				DRAWING NO. E-1
PROJECT MGR.				
CHECKED BY				

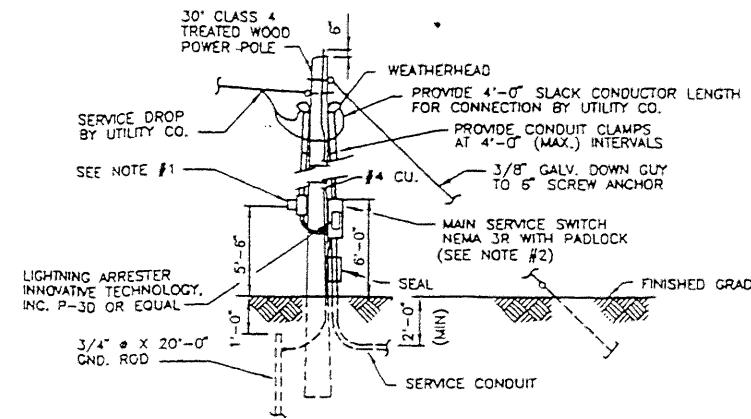
REVISION	DATE	ENG.	DATE	ISSUED FOR



ANTENNA POLE DETAIL



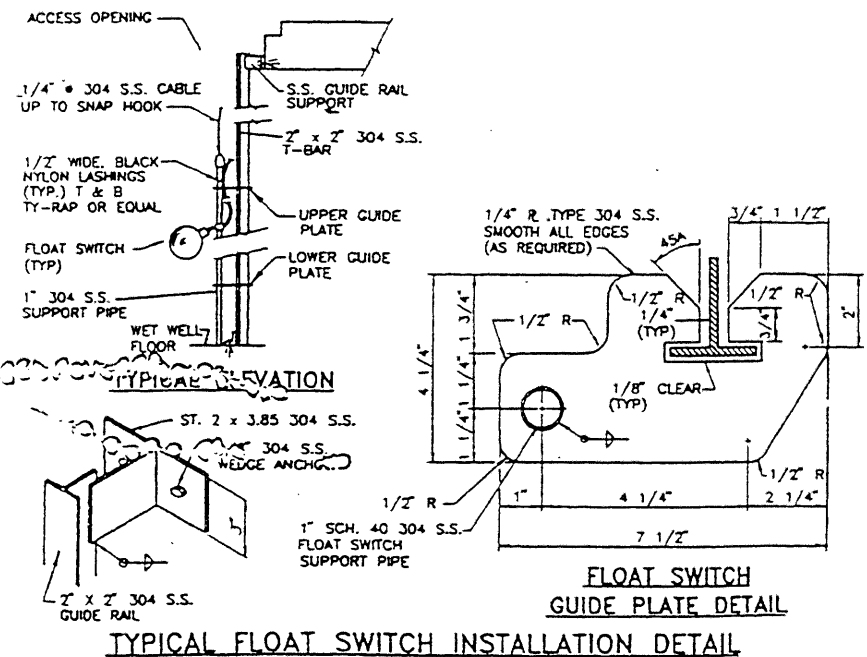
STATION ELECTRICAL DETAILS



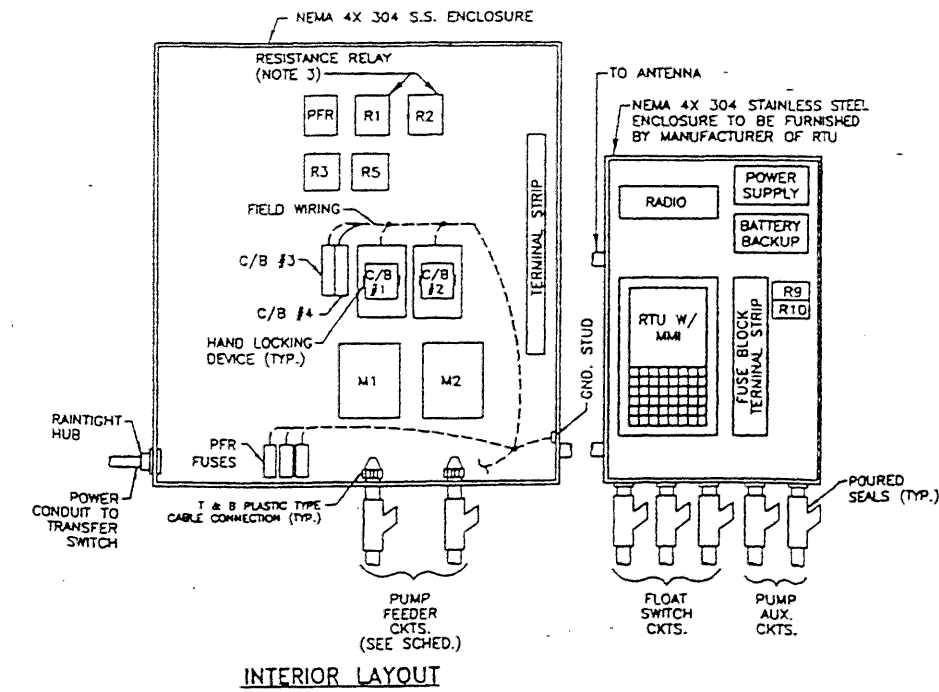
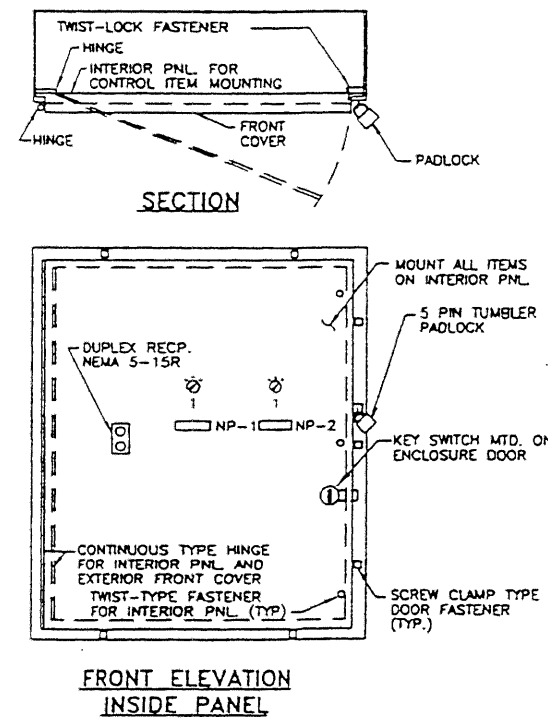
POWER POLE DETAIL

CONTRACTOR TO FILL OUT TO MATCH SELECTED PUMP MOTORS.

PUMPING STATION SCHEDULE									
STA. NO.	ELECTRICAL SERVICE	MAIN SERVICE		TRANSFER SWITCH	MAIN SERVICE ENTRANCE	PUMP MOTORS			
		SWITCH	DUAL EL. FUSE			HP	CKT. BKR.	STARTER	FEEDER CIRCUIT



TYPICAL FLOAT SWITCH INSTALLATION DETAIL



ELECTRICAL CONTROL PANEL DETAILS

I CONTRACTOR SHALL FURNISH THE FOLLOWING:

SYMBOL	DESCRIPTION
1	SELECTOR SWITCH-HEAVY DUTY, OIL TIGHT TYPE, 3-POSITION, WITH "HAND-OFF-AUTO" LEGEND PLATE.
NP-1*	NAMEPLATE "PUMP #1"
NP-2*	NAMEPLATE "PUMP #2"
R3, R5	CONTROL RELAY-120V, 10 AMPS; WITH CONVERTIBLE TYPE CONTACTS, NUMBER OF POLES, AS NOTED (SQUARE D 8501-X OR EQUAL.)
R1, R2	RESISTANCE RELAY-120V, 18 AMP CONTACT RATING, 10V D.C. SENSING CXT. (WARRICK 2800-100 OR EQUAL.)
PFR	POWER FAILURE RELAY UNIT-ENCLOSED TYPE PLUG-IN STYLE WITH SOCKET, 20 PERCENT ADJUSTABLE (TIME MARK MODEL B252B OR EQUAL.)
F1 THRU F3	CONTROL FUSE-CURRENT LIMITING TYPE, 1A, BUSS "KTK", OR EQUAL, WITH SWITCH TYPE MOUNT.
C/B #3, C/B #4	CONTROL CIRCUIT BREAKERS, SQUARE D TYPE "OO" OR EQUAL.
LS-1 THRU LS-3	FLOAT SWITCH CONSOLIDATED ELECTRIC FLOAT MODEL LS OR APPROVED EQUAL, PIPE MTD..

* NAMEPLATES SHALL HAVE 1/4 INCH HIGH WHITE ENGRAVED CHARACTERS ON A FLAT BLACK LAMINATED PLASTIC BACKPLATE AND SHALL BE FASTENED WITH SCREWS.

** SEE NOTE #2 FOR SPECIAL PAINTING.

II MANUFACTURER OF RTU SHALL FURNISH THE FOLLOWING:

RTU/RADIO	NEMA 4X STAINLESS STEEL ENCLOSURE TO INCLUDE:
RTU	REMOTE TELEMETRY UNIT, ARCOM OR BAILEY MODEL M1, OR BRISTOL BASCOCK MODEL 3310 PLUS TRAINING AS DETAILED IN THE SPECIFICATIONS.
RADIO	MICROWAVE DATA SYSTEM MDS MODEL 2310, 5 WATT UHF, 928 MHZ OR EQUAL.
FUSE BLOCK	AS REQUIRED FOR INPUTS AND OUTPUTS FOR RTU.
R9, R10	CONTROL RELAY-24VDC, 10 AMP CONTACT RATING, WITH CONVERTIBLE TYPE CONTACTS, NUMBERS OF POLES, AS NOTED (SQUARE D 8501-X OR EQUAL).
POWER SUPPLY	24 VOLT POWER SUPPLY ADEQUATE TO POWER RADIO, RTU, AND ALL I/O.
BATTERY BACKUP	24 VOLT BATTERY SYSTEM WITH AUTOMATIC CHARGER & BACKUP POWER ADEQUATE TO SUPPLY RADIO, RTU, AND ALL I/O 24 VOLT POWER FOR 24 HOURS.

NOTES:

- CONTRACTOR SHALL PROVIDE COMPLETE METERING SYSTEM IN ACCORDANCE WITH THE UTILITY COMPANIES DETAILED REQUIREMENTS.
- SWITCHES SHALL BE THOROUGHLY CLEAN OF SURFACE FILMS AFTER INSTALLATION AND GIVEN ONE COAT OF INDOURALL RAPID DRY EPOXY PRIMER H-1175 AND TWO FINAL COATS OF INDOURALL 2-PART EPOXY PAINT "PERMA-CLEAN", OR APPROVED EQUAL.
- INDUCTION RELAY SENSITIVITY RESISTORS SHALL BE SIZED AS PER PUMP MANUFACTURERS STANDARD.
- POSITION THE CABLE CONNECTORS AND CONDUIT AT EDGE OF HATCHWAY AND 8" BELOW TOP SLAB TO ALLOW CHANGING CABLES FROM OUTSIDE THE WET WELL. CONTRACTOR SHALL MEET CODE WITH BURIED CONDUIT.
- LOOP NUMBERS FOR RTU SHALL BE OBTAINED FROM WILLIAMS PLANT SUPERVISION TO AVOID DUPLICATION OF NUMBERS IN EXISTING SCADA SYSTEM.
- FUSES FOR INPUT CIRCUITS TO RTU SHALL BE 1/8 AMP AND OUTPUT SIZED TO HANDLE RELAYS REQUIRED TO ACTIVATE MOTOR STARTERS.
- RADIOS AND RTU'S SHALL BE ISO 9000 CERTIFIED.
- RTU MANUFACTURER SHALL BE RESPONSIBLE FOR EVERYTHING IN RTU/RADIO CABINET.

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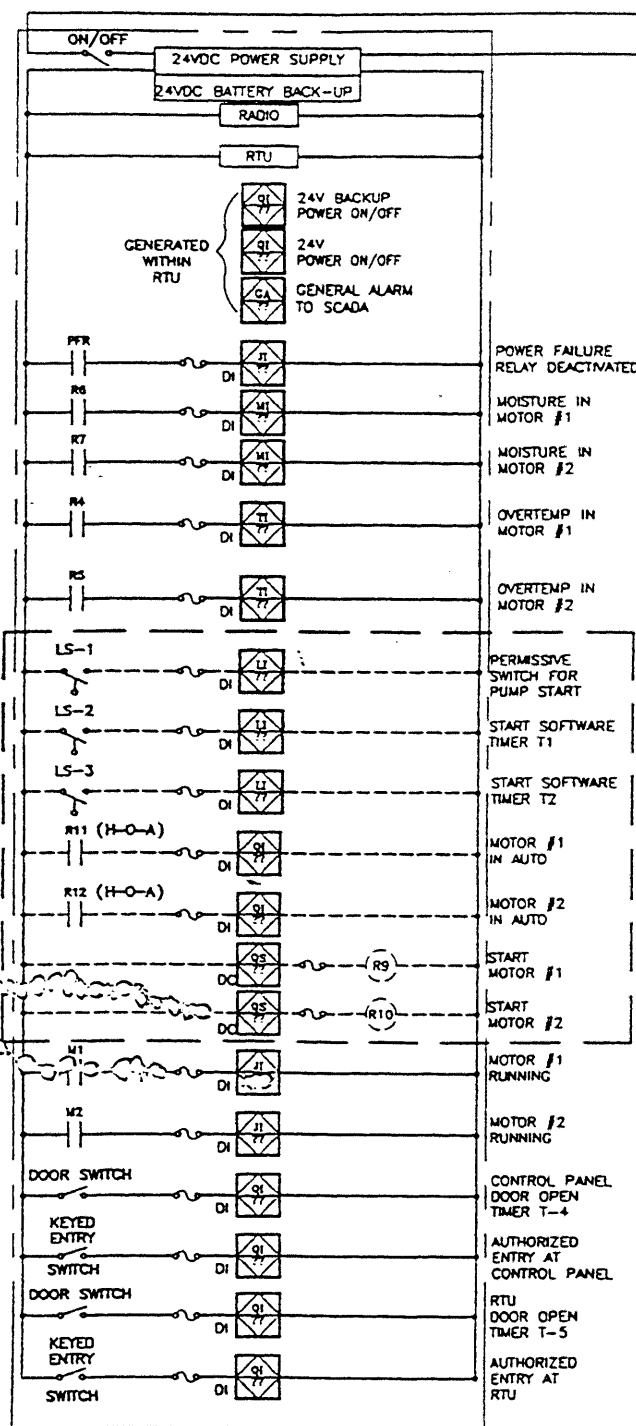
REVISION	DATE	ENG.	DATE	ISSUED FOR

VERIFY SCALES	DESIGNER	APPROVED	SEAL
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWN BY	APPROVED	
0 1"	ENGINEER		
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	PROJECT MGR.		
	CHECKED BY	DATE	

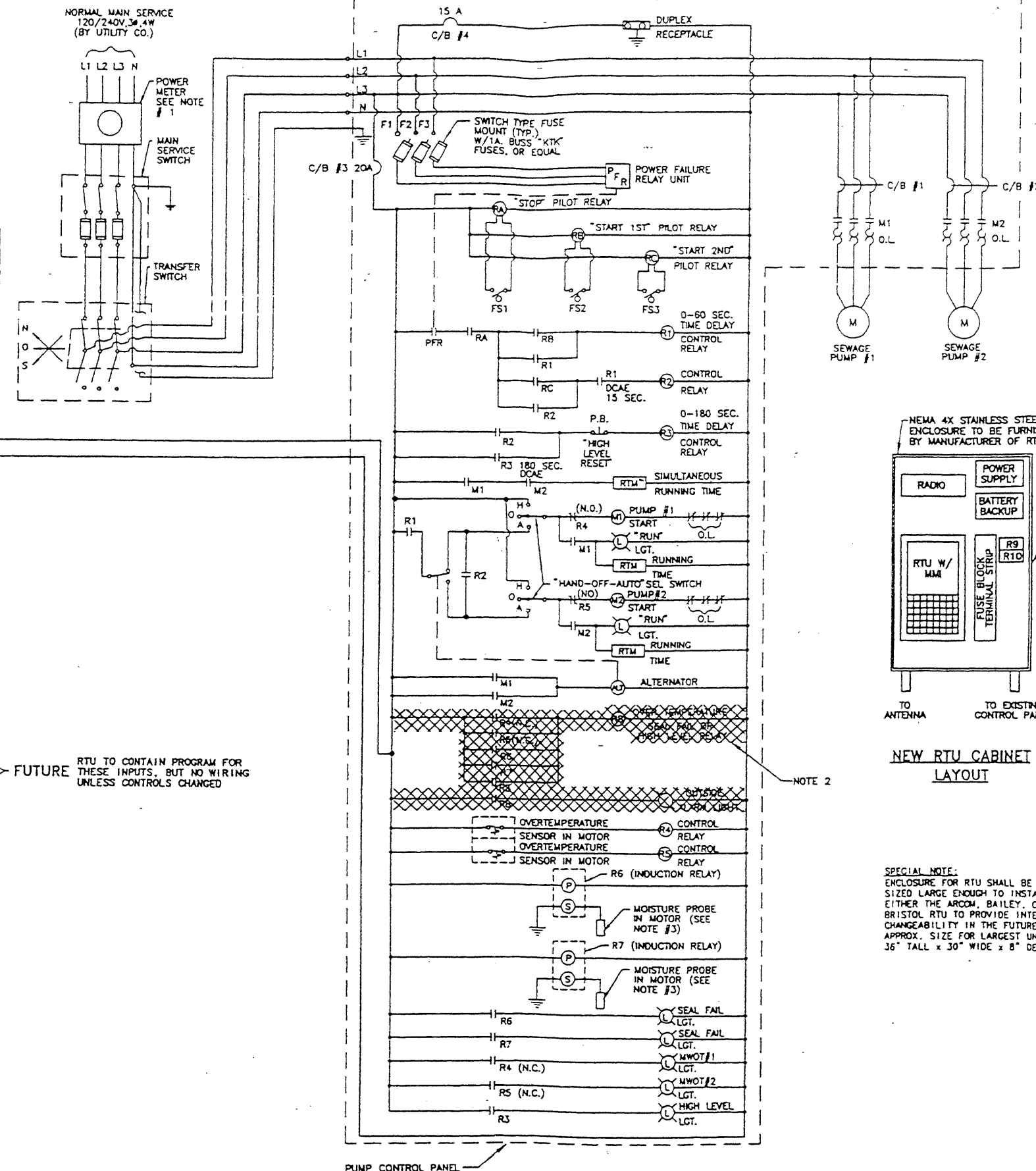
BOARD OF WATER AND SEWER COMMISSIONERS
OF THE CITY OF MOBILE, ALABAMA

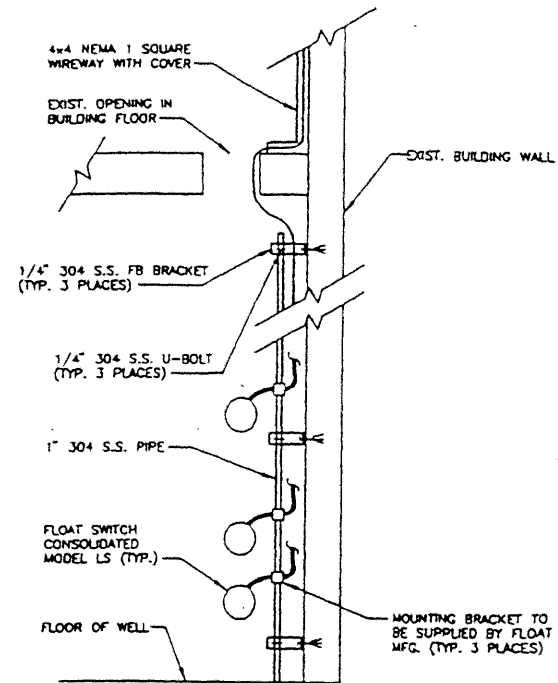
SEWAGE PUMPING STATION
ELECTRICAL DETAILS FOR

SCALE	N.T.S.
PROJECT NO.	
DRAWING NO.	E-2

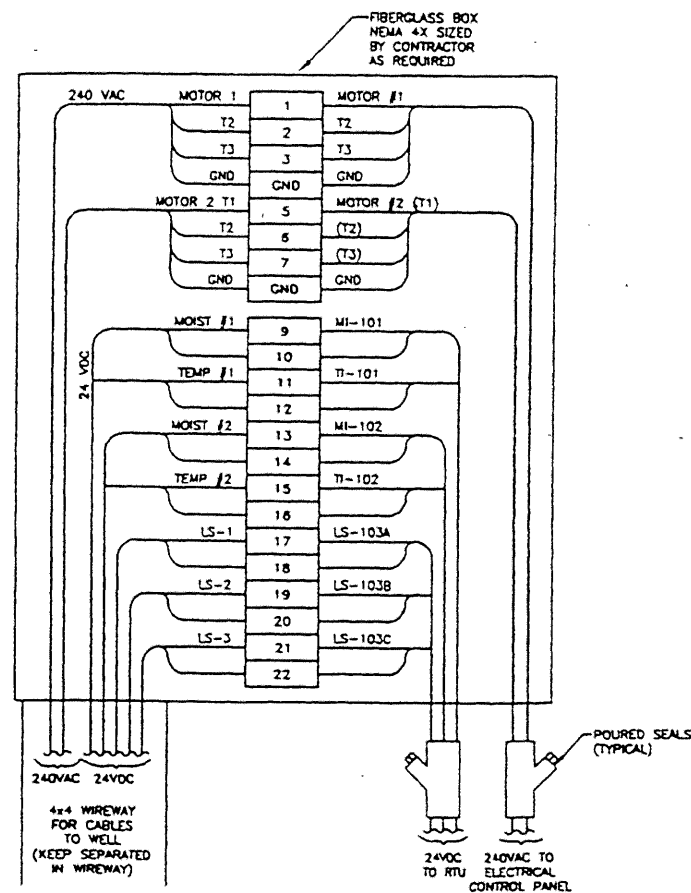


NEW RTU CABINET



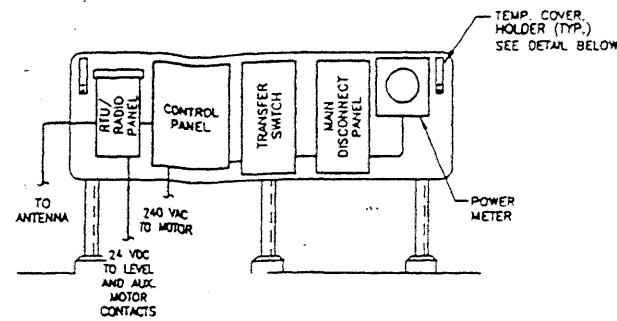


FLOAT SWITCH INSTALLATION DETAIL
(INSIDE EXISTING BUILDING)
N.T.S.

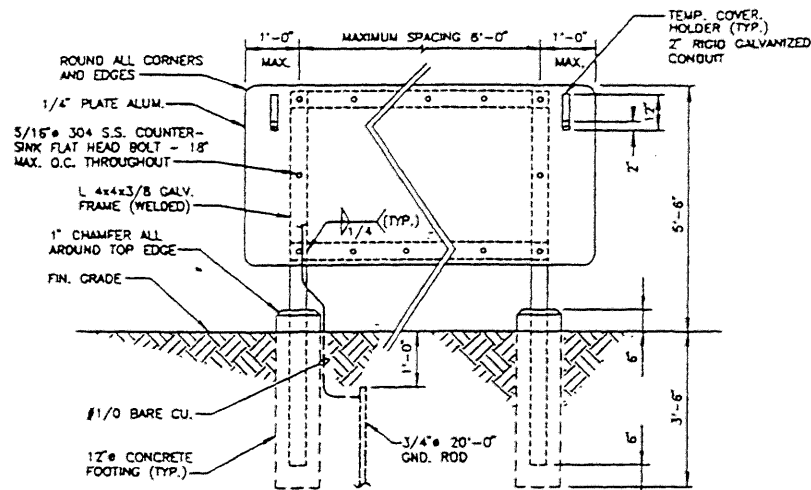
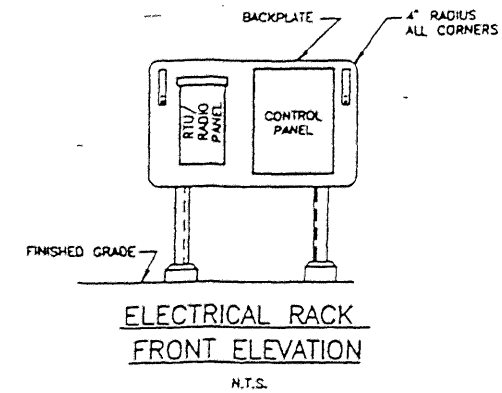


NEW TERMINATION JUNCTION BOX
INSIDE BUILDING

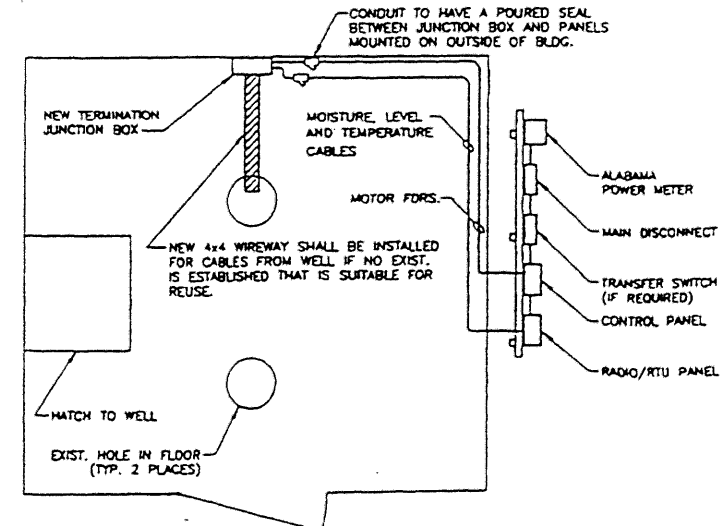
ALL WIRING FROM INSIDE WELL TO PANEL MOUNTED ON OUTSIDE OF BLDG. SHALL TERMINATE JUNCTION POINT IN THIS BOX
N.T.S.



TYPICAL RACK FRONT WITH TRANSFER SWITCH
(AT EXISTING BUILDING)
N.T.S.



TYPICAL EQUIPMENT MOUNTING RACK
SCALE: 1/2" = 1'-0"



SAMPLE PLAN VIEW
(FOR REPRESENTATIVE PURPOSE ONLY)

NOTE:
1. LOCATION OF EQUIPMENT RACKS TO BE APPROVED BY OWNER.