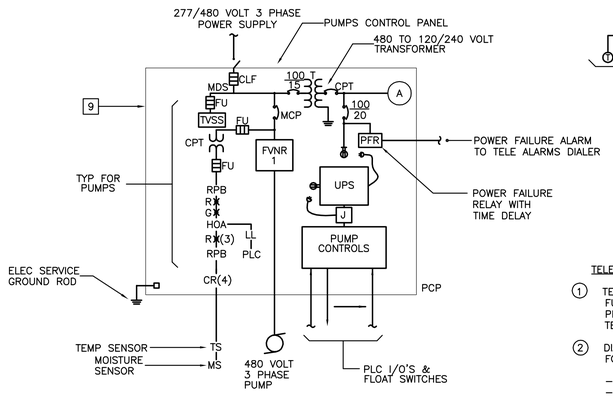
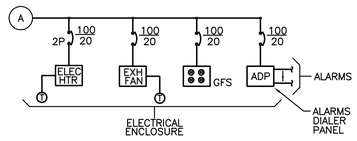


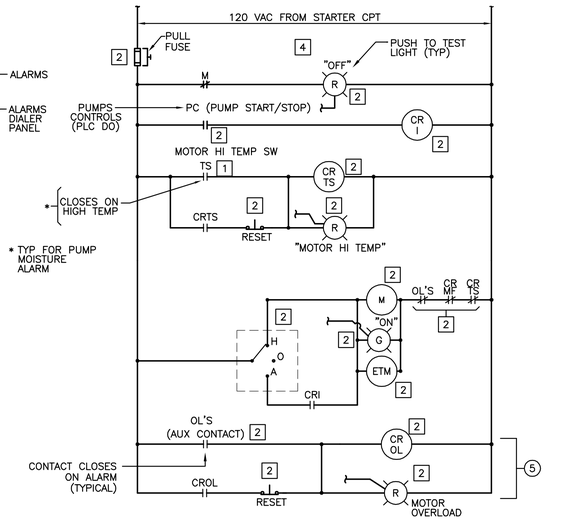
TYPICAL
PUMPS CONTROL PANEL POWER DISTRIBUTION SYSTEM RISER DIAGRAM

NOT TO SCALE



TELEPHONE ALARMS DIALER PANEL NOTES

1. TELE ALARMS DIALER PANELS SHALL BE FURNISHED BY THE PROJECT I&C SUPPLIER AND INTEGRATED INTO I&C SYSTEM.
2. DIALER SHALL BE FOUR ZONE TYPE AS FOLLOWS:
   - CRITICAL PROCESS
   - NON-CRITICAL PROCESS
   - INTRUSION
   - EMERGENCY
3. DIALER SHALL BE PROGRAMMED PER ADVISEMENT BY OWNER AND ENGINEER FOR PROPER ALARMS RESPONSE.



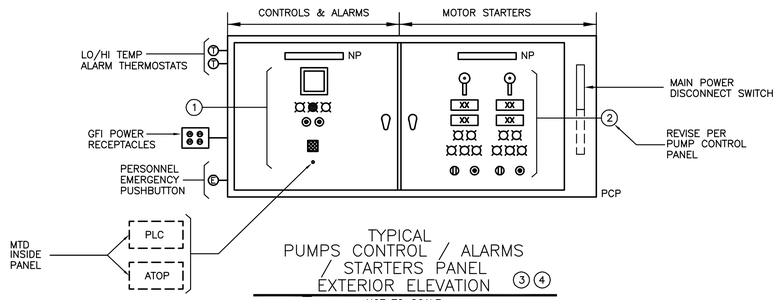
TYPICAL PUMP MOTOR WIRING DIAGRAM*

NOT TO SCALE

*WIRING DIAGRAMS

1. ELEMENTARY DIAGRAMS ARE ONLY PROVIDED FOR REFERENCE. EC SHALL COORDINATE PUMPS AND CONTROLS/ALARMS WIRING, PRIOR TO ANY ROUGH WIRING.
2. INDICATING LIGHTS DO NOT INDICATE "PUSH-TO-TEST" WIRING.

CONTROL DEVICE AND LOCATION SCHEDULE	
1	MOTOR FIELD DEVICE, LOCATED AT OR NEAR MOTOR OR EQUIPMENT
2	REMOTE CONTROLS/ALARMS/INDICATORS, LOCATED AT THE PUMPS CONTROL PANEL



TYPICAL
PUMPS CONTROL / ALARMS / STARTERS PANEL EXTERIOR ELEVATION (3)(4)

NOT TO SCALE

PUMPS CONTROL/ALARMS/STARTERS PANEL NOTES

1. PUMPS CONTROLS & ALARMS SHALL INCLUDE THE FOLLOWING:
   - PLC OPERATOR INTERFACE TERMINAL UNIT
   - RED LED INDICATING ALARM LIGHTS FOR PLC AND UPS FAILURES
   - MOMENTARY PUSHBUTTONS FOR ALARM SILENCE AND RESET
   - ELECTRONIC ALARMS BUZZER
2. PUMP STARTERS SHALL INCLUDE THE FOLLOWING
   - PUMPS POWER CIRCUIT BREAKERS LOCKABLE DISCONNECT SWITCHES
   - DIGITAL (NON-RESET) ELAPSED TIME RUNNING METERS
   - DIGITAL (NON-RESET) PUMPS CYCLE COUNTER
   - LED RED AND GREEN "ON/OFF" STATUS INDICATING LIGHTS
   - RED LED INDICATING ALARM LIGHTS FOR MOTOR OVERLOAD, HIGH TEMP & STARTER FAULT
   - "HAND/OFF/AUTO" SELECTOR SWITCH
   - "MOMENTARY PUSHBUTTON FOR PUMP FAILURE "RESET"
3. PANEL SHALL BE FACTORY ASSEMBLED, WIRED AND 100% TESTED PRIOR TO SHIPMENT TO THE PSS. PANEL SHALL BE A UL LISTED ASSEMBLY.
4. PLC OIT SHALL HAVE DISPLAYS FOR CONTROL, ALARMS, STATUS & SIGNALS INCLUDING AND NOT LIMITED TO
   - SCREEN SAVER
   - PROCESS MIMIC
   - SECURITY
   - INTRUSION
   - PUMPS
   - ALARMS HISTORY
   - PROCESS SET-POINTS

ENGINEER SHALL PROVIDE TECHNICAL I&C CONTROL STRATEGIES AFTER CONTRACT AWARD.

PUMPS CONTROL PANEL
POWER DISTRIBUTION DIAGRAM NOTES

1. PUMPS CONTROL PANEL'S "FVNR" MOTOR STARTERS CONTROLLERS SHALL BE FURNISHED WITH THE FOLLOWING MINIMUM FEATURES
   - DEDICATED CONTROL POWER TRANSFORMER
   - FULL VOLTAGE NEMA "1" SIZE COMBINATION MAGNETIC MOTOR STARTER WITH "MCP" TYPE CIRCUIT BREAKERS AND ELECTRONIC ADJUSTABLE TYPE OVERLOAD RELAYS
   - NEMA TYPE ANALOG CONTROLS AND INDICATORS
   - ELECTRICALLY INDEPENDENT CONTROLS
   - FRONT PANEL MOUNTED LOCKABLE CIRCUIT BREAKER HANDLES (ONE FOR EACH PUMP FOR MAINTENANCE AND OPERATOR SAFETY)
2. MAIN POWER DISCONNECT SWITCH (SIZED PER PNLBD'S FEEDER CIRCUIT BREAKERS) WITH CURRENT LIMITED FUSES, LOCKABLE AND SERVICE ENTRANCE RATED.
3. DRY TYPE 480 TO 120/240 VOLTS TRANSFORMER WHICH IS SIZED FOR THE ENCLOSURE'S ELECTRIC HEATER, FAN, UPS AND MOTOR STARTERS CONTROLS.
4. ELECTRIC SERVICE RATED ELECTRONIC TYPE TRANSIENT VOLTAGES SURGE SUPPRESSOR.
5. THERMAL MAGNETIC CIRCUIT BREAKERS WHICH ARE MOUNTED INSIDE THE PUMPS CONTROL PANEL FOR TRANSFORERM MAIN, UPS, HEATER AND EXHAUST FAN POWER SUPPLY OVER-CURRENT PROTECTION.
6. UTILITY POWER FAILURE THREE PHASE ELECTRONIC TYPE RELAY WITH INTEGRAL "OFF" TIME DELAY.
7. UNINTERRUPTIBLE POWER SUPPLY (SIZED TO POWER PLC, RELAYS AND TELELEPHONE ALARMS DIALER) WITH "UPS" FAILURE CONTACT. NOTE, A SECOND POWER FAILURE RELAY WITH TIME DELAY IS AN ACCEPTABLE CONTRACT DEVIATION TO A UPS FAIL CONTACT.
8. PANEL SEGREGATED INTO STARTERS AND CONTROLS/ALARMS SECTIONS AS INDICATED ON THE ELEVATION.
9. PANEL SHALL BE FACTORY ASSEMBLED, WIRED AND 100% TESTED INCLUDING HAVING A UL LISTED ASSEMBLY RATING (IE - STICKER).

PUMPS CONTROL PANEL LOGIC NOTES

1. PUMPS CONTROL PANEL SHALL BE DESIGNED FOR CONTROL OF SEWAGE DISPOSAL PUMPS VIA TANK MOUNTED FLOAT SWITCHES.
2. THE PUMPS CONTROLS SHALL INCLUDE THE FOLLOWING MINMUM FEATURES.
   - HAND-OFF-AUTO SELECTOR SWITCHES
   - ON/OFF LED INDICATING LIGHTS
   - MOTOR OVERLOAD, MOTOR HIGH TEMPERATURE AND LEAK FAULT LED ALARM INDICATING LIGHTS
   - ALARMS RESET PUSHBUTTONS
   - DIGITAL NON-RESET ELAPSED TIME METERS
3. THE SEWAGE DISPOSAL SITES SHALL HAVE THE FOLLOWING ALARMS VIA THE PLC OPERATOR INTERFACE TERMINAL (OIT) AND ANALOG LED INDICATING LIGHTS AND PUSHBUTTONS
   - PUMP FAILURE (EACH PUMP)
   - TANK LOW LEVEL
   - TANK HIGH LEVEL
   - UTILITY POWER FAIL
   - PLC FAIL
   - UPS FAIL
   - PERSONNEL EMERGENCY
   - ELECTRICAL ENCLOSURE INTRUSION
   - ENCLOSURE LO/HI TEMPERATURE
4. THE ALARMS SHALL BE CLASSIFIED AS CRITICAL PROCESS, NON-CRITICAL PROCESS AND EMERGENCY AND CONNECTED TO THE TELEPHONE ALARMS DIALER ZONES. THE ZONES SHALL BE PROGRAMMED PER THE SCHOOL FOR APPROPRIATE RESPONSE (IE - DPW, POLICE OR FIRE DEPT) BY THE TOWN'S EXISTING CENTRAL STATION MONITORING COMPANY VIA A DIGITAL TELE COMMUNICATOR.
5. PLC & OIT OPERATING LOGIC SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING:
   - PUMPS LEVEL AND CYCLE TIME CONTROL AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER'S
   - PUMPS LEAD/LAG AUTOMATIC ALTERNATION WITH 1/2-AUTO-2/1 OIT SCREEN CONTROLS.
   - PUMPS STAGER STARTING ON LOSS OF POWER AND RESTORATION
   - INTRUSION SECURITY SIGN-ON WITH EXIT AND ENTRANCE TIME DELAYS. NOTE, BUZZER SHALL BEEP DURING TIME DELAYS
   - ALARMS WITH BOTH AUDIBLE AND INDICATING LIGHTS OPERATION PER ENGINEER ADVISEMENT

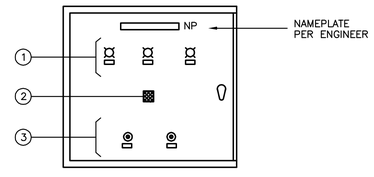
INSTRUMENTATION & CONTROL
SEWAGE DISPOSAL SYSTEMS ALARMS PANEL

1. RED LED (PUSH-TO-TEST) INDICATING LIGHTS FOR:
   - FLORENCE SAWYER SCHOOL RE-CIRC TANK AND PUMP CHAMBER FAIL
   - EMERSON SCHOOL 12,000 GALLON PUMP CHAMBER FAIL
   - EMERSON SCHOOL RE-CIRC TANK AND PUMP CHAMBER FAIL
2. ELECTRONIC ALARMS BUZZER (ADJUSTABLE dBA SOUND OUTPUT)
3. MOMENTARY PUSHBUTTONS FOR ALARMS "SILENCE" AND "RESET"
4. ON ALARM, BUZZER "ON" AND AFFECTED ALARM LIGHT BLINKS (ADJUSTABLE TIME DELAY ON BUZZER OPERATION).

   "SILENCE" BUTTON, STOPS BUZZER AND ALARM LIGHT STEADY "ON".

   "RESET" BUTTON, ALARM LIGHT "OFF" AFTER ALARM CONDITION CLEARED.
5. PANEL INTERIOR SHALL CONTAIN AS A MINIMUM THE FOLLOWING:
   - 5A @ 120VAC CIRCUIT BREAKER
   - AC & DC CONTROL RELAYS
   - AC TIMIING RELAYS

   I&C SUPPLIER HAS OPTION TO USE PLC AND OIT FOR LOGIC AND DISPLAYS.
6. ALARM PANEL SHALL BE FACTORY ASSEMBLED, WIRED AND TESTED INCLUDING UL LISTED ASEEMBLY STICKER



SEWAGE DISPOSAL SYSTEMS ALARM PANEL (4)(5)

NOT TO SCALE

ELECTRICAL DRAWINGS REFERENCE NOTES

1) FOR SYMBOLS, ABBREVIATIONS & GENERAL NOTES, REFER TO DWG # E-1.
2) FOR ELECTRICAL SITE PLAN & DETAILS, REFER TO DWGS # E-2 & E-3.
3) FOR TANKS POWER PLANS AND DETAILS, REFER TO DWG # E-4.
4) FOR ELECTRICAL ENCLOSURES PLANS AND DETAILS, REFER TO DWG # E-5.
5) FOR PWR AND TELE SYSTEMS RISER DIAGRAMS, REFER TO DWG # E-6.
6) FOR ELECTRICAL DETAILS, REFER TO DWG # E-7.
7) FOR ELECTRICAL SCHEDULES REFER TO DWG # E-8.
8) FOR ELECTRICAL SPECIFICATIONS, REFER TO DWG # E-9.

ELECTRICAL DETAILS & WIRING DIAGRAMS

EMERSON & SAWYER SCHOOLS
SEWAGE DISPOSAL SYSTEM
50 MECHANIC ST. BOLTON, MASS

DWG. NO
E-7

PREPARED FOR: TOWN OF BOLTON
P.O. 278
BOLTON, MA 01740

TEL: (978) 779-2297
DATE: JANUARY 13, 2005

NO.	DATE	DESCRIPTION	BY		
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				DRAWN BY: DGK	1-13-05
				CHECKED BY: WPE	1-13-05

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