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CONSTRUCTION NOTES (SANITARY SEWER SYSTEM):

1. THE SUBMERSIBLE PUMPS AND MOTORS SHALL BE SIZED TO MEET THE FOLLOWING OPERATIONAL CONDITIONS, EACH PUMP SHALL HAVE A DESIGN CAPACITY OF 118 GPM, THE MINIMUM EFFICIENCY SHALL BE 45%, THE TOTAL DYNAMIC HEAD OF THE SYSTEM AS SHOWN ON THE DESIGN DRAWINGS IS 20 FEET. PROVISION HAS BEEN MADE IN THE VALVE VAULT FOR AN ORIFICE TO BE INSERTED INTO THE TRANSPORT PIPE. THE PUMP MANUFACTURER SHALL SIZE THE ORIFICE APPROPRIATELY TO MEET THE ROUIRED OPERATIONAL CONDITIONS.

2. INSTALL AND OPERATE PUMPS AND MOTORS IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

3. THE DUPLEX PUMP STATION PUMPS AND ELECTRICAL WIRING SHALL BE EXPLOSION PROOF MEETING CLASS I, DIVISION I INSTALLATIONS. THE CONTRACTOR SHALL FURNISH AND INSTALL, AS SHOWN ON THE PLANS AND DESCRIBED IN THESE SPECIFICATIONS, ONE DUPLEX SUBMERSIBLE NON-CLOG WASTEWATER SYSTEM WITH SLIDE RAIL LIFT-OUT FEATURE MOUNTED INSIDE SETIC TANK PUMP CHAMBER. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL VALVING, PIPING, ACCESS HATCHES, LEVEL SENSORS AND MOTOR CONTROLS NECESSARY TO PROVIDE THE OWNER WITH A FULLY OPERATIONAL SYSTEM. ALL INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE DRAWINGS AND MANUFACTURER'S INSTRUCTIONS.

4. PUMPS SHALL BE EBARA TYPE ODC (NO SUBSTITUTIONS). EACH PUMP SHALL ALSO BE CAPABLE OF PASSING A TWO INCH SPHERICAL SOLID.

5. THE PUMP SHALL ALLOW THE MOTOR TO OPERATE THROUGHOUT THE ENTIRE CALCULATED SYSTEM CURVE RANGE WITHOUT UTILIZING THE MOTOR 1.15 SERVICE FACTOR. UTILITY POWER AT THE SITE SHALL BE THREE PHASE 240 VOLT SERVICE.

6. THE MOTOR STATOR TEMPERATURE SHALL BE CONTINUOUSLY MONITORED BY THREE (3) LOW RESISTANT BI-METALLIC (N.C.) NORMALLY CLOSED, THERMAL SWITCHES EMBEDDED IN THE STATOR WINDINGS. THERMAL SENSOR SWITCHES SHALL BE AS ADDITIONAL SUPPLEMENT MOTOR PROTECTION AND SHALL BE WIRED IN SERIES WITH EXTERNAL, THREE LEG OVERLOAD PROTECTION PROVIDED BY THE MOTOR STARTER IN THE CONTROL PANEL.

7. THE MOTOR SHALL BE PROVIDED WITH A MOTOR MOISTURE SENSOR MOUNTED IN THE DRY SUMP RESERVOIR OF THE MOTOR STATOR HOUSING. THE SENSOR SHALL MONITOR THE MOTOR HOUSING FOR MOSITURE AND UPON DETECTION, SHALL ACTUATE THE ALARM AND SHUTDOWN THE PUMP AND MOTOR FOR PROTECTION. THE SENSOR SHALL BE MONITORED BY A SENSING RELAY REMOTELY MOUNTED IN THE CONTROL PANEL.

8. ALL EXPOSED NUTS AND BOLTS SHALL BE AISI SERIES 300 STAINLESS STEEL. ALL EXTERNAL METAL SURFACES COMING IN CONTACT WITH WASTEWATER OTHER THAN BRASS OR STAINLESS STEEL SHALL BE PROTECTED BY A SUITABLE PRIMER AND FINISHED COAT.

9. THE DESIGN OF THE RAIL DISCONNECT SYSTEM SHALL PERMIT THE EASY REMOVAL AND REINSTALLATION OF EACH PUMPING UNIT FROM THE WET WELL FOR INSPECTION OF SERVICE WITHOUT DISCONNECTING OR DISTURBING THE DISCHARGE PIPING. THERE SHALL BE NO NEED FOR PERSONNEL TO ENTER THE WET WELL. EACH PUMP SHALL BE FITTED WITH A GUIDE RAIL BRACKET SECURELY FASTENED TO THE PUMP DISCHARGE. THE GUIDE BRACKET SHALL PROVIDE TWO STAINLESS STEEL GUIDE RAILS TO INSURE PROPER ALIGNMENT, AND STABILITY DURING INSTALLATION OR REMOVAL OF THE PUMP UNIT. ALL GUIDE RAILS AND UPPER SUPPORT BRACKETS AND HARDWARE SHALL BE STAINLESS STEEL. EACH PUMPING UNIT SHALL BE PROVIDED WITH A LIFTING CABLE OF STAINLESS STEEL CONSTRUCTION, AND OF ADEQUATE STRENGTH TO SUPPORT THE LIVE LOAD WEIGHT OF THE ENTIRE PUMP AND MOTOR ASSEMBLY.

10. PROVIDE HAND-OFF-AUTO (HOA) SELECTOR SWITCH, HORSE POWER RATED AND U.L. LISTED. SWITCH SHALL BE MOUNTED THROUGH THE DOOR TO PERMIT OPERATION WITHOUT OPENING THE PANEL DOOR.

11. THE ELECTRICAL CONTROLS SHALL BE MOUNTED INSIDE THE NEMA 3R ENCLOSURE FABRICATED OF STEEL, AND OF INNER DOOR DESIGN. ENCLOSURE DOORS SHALL BE HINGED AND EQUIPPED WITH CLOSURE LATCHING HARDWARE AND LOCKABLE IN OFF POSITION THROUGH THE DOOR DISCONNECT. THE ENCLOSURE SHALL BEAR A U.L. LABEL OF AN ENCLOSURE MANUFACTURER. THE ENCLOSURE SHALL BE PROVIDED WITH A REMOVABLE BACK PANEL FOR MOUNTING OF THE CONTROL COMPONENTS. COMPONENTS SHALL BE LABELED AND WIRES NUMBERED TO INDICATE FUNCTIONS AND PROVIDE A MEANS OF TROUBLESHOOTING. ALL COMPONENTS WILL BEAR A U.L. LABEL. THE CONTROL PANEL SHALL BE SERVICE ENTRANCE RATED.

12. EACH PUMP MOTOR SHALL BE PROVIDED WITH A NEMA 1 THROUGH-THE-DOOR MOUNTED RUNNING TIME METER OF FLUSH MOUNTING DESIGN. THE DIAL SHALL BE NON-RESETABLE AND REGISTER IN HOURS AND TENTHS OF HOURS UP TO 99999.9 HOURS. THE TIME METER SHALL BE U.L. LISTED.

13. A PHASE MONITOR RELAY SHALL BE PROVIDED TO PROTECT THE THREE PHASE MOTOR IN THE EVENT OF PHASE FAILURE, PHASE REVERSAL OR UNDER VOLTAGE. THE MOTORS SHALL BE "LOCKED OUT" UNTIL THE CONDITION IS CORRECTED.

14. INTRINSICALLY SAFE RELAYS (ISR) OF LOW CURRENT SOLID STATE DESIGN SHALL BE PROVIDED. THESE SOLID STATE RELAYS SHALL BE U.L. LISTED AND SHALL REDUCE THE CURRENT TO THE LEVEL SENSORS SO IT IS INCAPABLE OF RELEASING SUFFICIENT ENERGY TO IGNITE EXPLOSIVE GASES IN A CLASS I, DIVISION 1, GROUP C AND D EXPLOSIVE ENVIRONMENT AS DEFINED BY THE NATIONAL ELECTRIC CODE.

15. THE AUTOMATIC PUMPING CYCLE SHALL BE CONTROLLED WITH HERMETICALLY SEALED MERCURY LEVEL SENSORS TO SENSE THE WET WELL LEVEL AND CONTROL THE PUMPING CYCLES. EACH MERCURY LEVEL SENSOR SHALL BE FIELD ADJUSTABLE TO SITE SPECIFIC CONDITIONS. ELECTRICAL INTERLOCKS MAINTAIN PUMP OPERATION BETWEEN EACH LEVEL. IN ADDITION, THE HIGH WATER ALARM SENSOR SHALL ACTIVATE AN AUDIBLE-VISIBLE COMBINATION MOUNTED NEMA 3R RED LIGHT AND HORN LOCATED AT THE CONTROL PANEL. A "PUSH-TO-SILENCE" BUTTON SHALL BE PROVIDED WHICH WILL ACTIVATE A RELAY SILENCING THE AUDIBLE ALARM, THE VISUAL LIGHT WILL CONTINUE TO INDICATE AN ALARM CONDITION UNTIL THE CONDITION HAS BEEN CORRECTED.

16. PUMP OPERATION: PUMPS SHALL OPERATE ON A LEAD-LAG BASIS ALTERNATING PUMPS BETWEEN STARTS. PUMP ON LEVEL SENSOR STARTS PUMP NO. 1 WHICH OPERATES UNTILL THE PUMP OFF LEVEL SENSOR IS REACHED. WHEN THE PUMP LEVEL ON SENSOR IS REACHED AGAIN PUMP NO. 2 OPERATES UNTIL THE PUMP LEVEL OFF LEVEL SENSOR IS REACHED AND THE CYCLE REPEATS.

17. SHOULD THE LIQUID LEVEL REACH THE LAG PUMP ON LEVEL SENSOR, DUE TO GREATER THAN ANTICIPATED FLOW OR FAILURE OF THE LEAD PUMP, THE LAG PUMP ON LEVEL SENSOR SHALL START THE LAG PUMP. THE LAG PUMP OR BOTH PUMPS SHALL OPERATE UNTIL THE PUMP OFF LEVEL SENSOR IS REACHED. THE HIGH LEVEL ALARM SENSOR SHALL ACTIVATE THE AUDIO AND VISUAL ALARM LOCATED AT THE DUPLEX CONTROL PANEL AND THE AUTOMATIC DIALER LOCATED INSIDE THE MECHANICAL BUILDING.

18. FACE PIPING AND FITTINGS: DUCTILE IRON CONFORMING TO ANSI/AWWA C151/A21.51 CLASS 50 WITH COAL TAR EPOXY LINING. ALL PIPE AND FITTINGS SHALL HAVE FLANGED ENDS.

19. GATE VALVES: HAND WHEEL OPERATED RESILIENT SEATED GATE VALVES WITH FLANGED ENDS MEETING AWWA C500. VALVE BODY, BONNENT AND OPERATING NUT SHALL BE DUCTILE IRON OR CAST ENCAPSULATED WITH SYNTHETIC RUBBER OVER ALL INTERIOR AND EXTERIOR SURFACES. THE VALVE STEM SHALL BE SEALED BY AT LEAST TWO (2) O-RINGS.

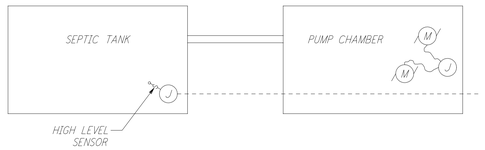
20. CHECK VALVE: APCO RUBBER FLAPPER SWING CHECK VALVE SERIES 100R OR APPROVED EQUAL. THE BODY SHALL BE LINED WITH A NATURAL RUBBER LINING. THE FLAPPER SHALL BE BUNA-N.

21. INSTALL PUMPS AND MOTORS IN ACCORDANCE WITH SHOP DRAWINGS AND MANUFACTURER'S RECOMMENDATIONS.

22. SET PUMPS TO PROVIDE A CONSTANT CENTERLINE ALIGNMENT THROUGH ALL DISCHARGE AND SUCTION PIPING.

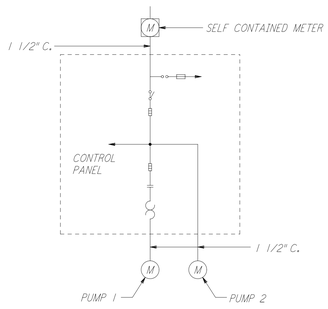
23. INSTALL ACCESS FRAME AND HATCH IN LOCATION REQUIRED BY PUMP MANUFACTURER.

24. INSTALL ELECTRICAL AND PUMP CONTROLS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.



NOTES:

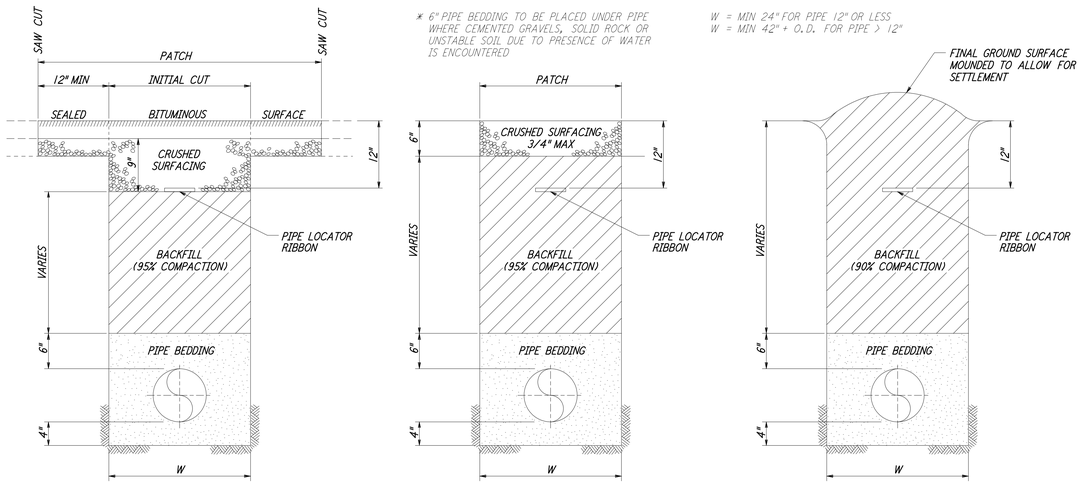
1. WIRING TO BE APPROVED BY PUMP AND DUPLEX CONTROL MANUFACTURER.



ONE LINE POWER DIAGRAM
NOT TO SCALE

NOTES:

1. SEE SHEET WA-C-002 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.



TYPE "A" SURFACE REPAIR
(EXISTING BITUMINOUS SURFACE)

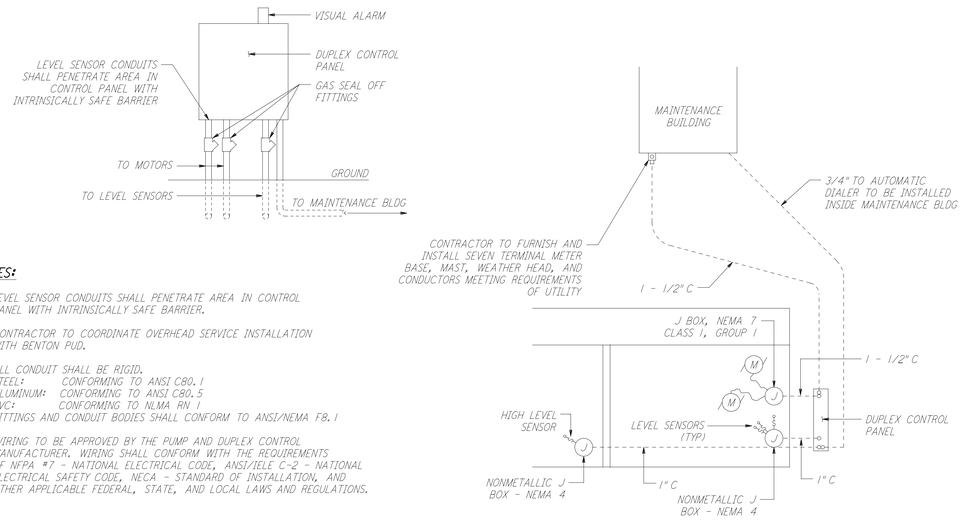
TYPE "B" SURFACE REPAIR
(EXISTING GRAVEL SURFACE)

TYPE "C" SURFACE REPAIR

NOTES:

1. ALL LOOSE AND FOREIGN MATERIAL SHALL BE REMOVED FROM THE FACE OF THE EXISTING BITUMINOUS SURFACE-CUT.
2. ANY FRACTURED BITUMINOUS SYRFACE BEYOND THE FACE OF THE SURFACE-CUT SHALL BE REMOVED.
3. THE FACE OF THE BITUMINOUS SURFACE-CUT MUST BE PRIMED BEFORE APPLYING PATCH.
4. PATCH SHALL NOT OVERLAP THE EXISTING BITUMINOUS SURFACE.
5. THE PATCH THICKNESS SHALL BE FOUR (4) INCHES OR EQUAL TO THE EXISTING ASPHALT THICKNESS, WHICHEVER IS GREATER.
6. CRUSHED SURFACING SHALL BE 5/8 INCH. MINUS CRUSHED SURFACING MEETING THE REQUIREMENTS OF WSDOT/APWA 1996 STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, SECTION 9.03.9 (3) FOR TOP COURSE.
7. COMPACTION TESTS SHALL BE PERFORMED IN ACCORDANCE WITH ASSHTO T-99. PERFORM ONE (1) TEST AT START OF THE WORK AND THEN ONE (1) TEST FOR EACH 100 FEET OF TRENCH AT THREE (3) FOOT VERTICAL INTERVALS INCLUDING THE TOP OF THE BACKFILL AND WHEN MATERIALS OR PROCEDURES CHANGE.

TRENCH BACKFILL AND SURFACE REPAIR
NOT TO SCALE



NOTES:

1. LEVEL SENSOR CONDUITS SHALL PENETRATE AREA IN CONTROL PANEL WITH INTRINSICALLY SAFE BARRIER.
2. CONTRACTOR TO COORDINATE OVERHEAD SERVICE INSTALLATION WITH BENTON PUD.
3. ALL CONDUIT SHALL BE RIGID.
   STEEL: CONFORMING TO ANSI C80.1
   ALUMINUM: CONFORMING TO ANSI C80.5
   PVC: CONFORMING TO NLMA RN 1
   FITTINGS AND CONDUIT BODIES SHALL CONFORM TO ANSI/NEMA FB.1
4. WIRING TO BE APPROVED BY THE PUMP AND DUPLEX CONTROL MANUFACTURER. WIRING SHALL CONFORM WITH THE REQUIREMENTS OF NFPA #7 - NATIONAL ELECTRICAL CODE, ANSI/IELE C-2 - NATIONAL ELECTRICAL SAFETY CODE, NECA - STANDARD OF INSTALLATION, AND OTHER APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.

DUPLEX PUMP STATION ELECTRICAL PLAN VIEW
NOT TO SCALE

LIGO-D980695-00-O

REFERENCES

DRAWING NO.	DESCRIPTION

REVISIONS

NO.	DATE	BY	CHKD	ENGR	PROJ	DESCRIPTION
0	5/15/98	WRB				ISSUED FOR AS-BUILT

FOR CONSTRUCTION		
DRAWN	WRB	9/28/95
CHECKED	ML	7/9/96
ENGINEER	JB	7/9/96
PROJ	MDW	7/9/96

AS-BUILT DRAWINGS

PARSONS
100 WEST WALNUT STREET
PASADENA, CALIFORNIA

LIGO
CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY
SITE NO. 1 - HANFORD, WASHINGTON

TITLE: CIVIL UTILITY DETAILS SHEET 3

SCALE	CONTRACT NUMBER	PROJECT NUMBER
AS NOTED	PP150969	8094

SHEET NUMBER: WA-C-057
REVISIONS: 0