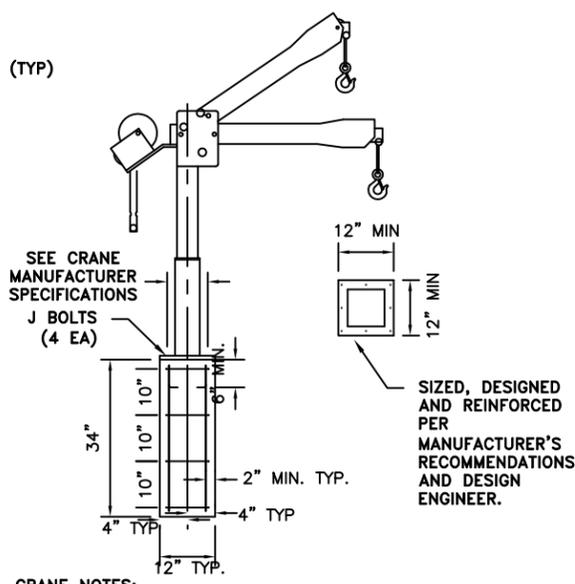


**ELEVATION**

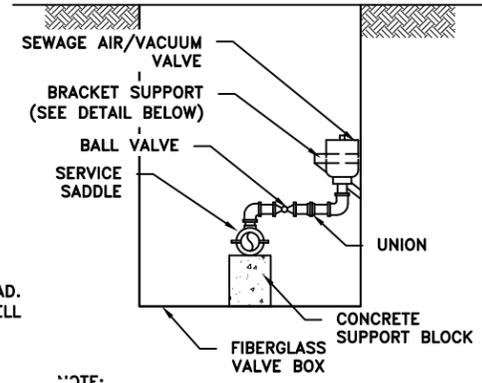
NOTE: THREADED OR FLANGED FITTINGS MAY BE PROVIDED IN THE VALVE VAULT AS DIRECTED BY AW PROJECT MANAGER.



**CRANE NOTES:**

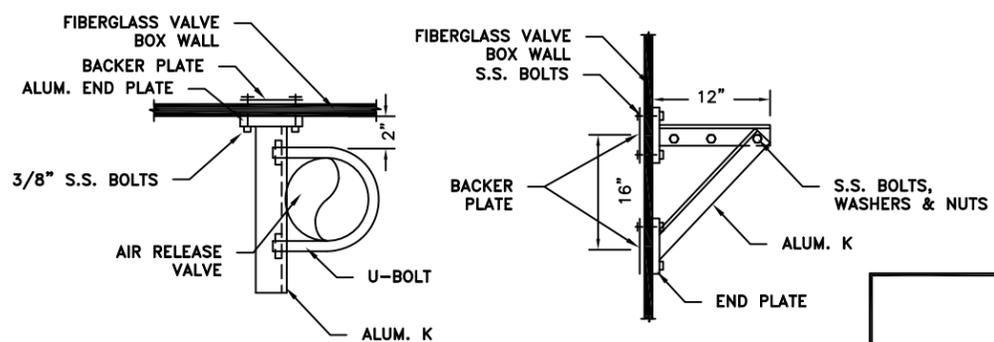
- EXCAVATE HOLE AS NEAR TO COLUMN DIMENSIONS AS POSSIBLE TO PLACE REBAR IN CENTER. FILL ENTIRE HOLE WITH CONCRETE TO CONTACT IN-SITU SOIL ON ALL SIDES.
- PRIOR TO DESIGN, THE CONTRACTOR SHALL CONFIRM WITH THE AW PROJECT MANAGER WHETHER A GANTRY OR PEDESTAL CRANE IS REQUIRED.

**PEDESTAL DETAIL FOR CRANE**



NOTE: AIR/VACUUM VALVE PIPING AND BRACKET ASSEMBLY IS NOT REQUIRED IF AIR/VACUUM VALVE IS NOT REQUIRED.

**SECTION A-A  
AIR RELEASE VALVE DETAIL**



**SUPPORT BRACKET DETAILS**

**GENERAL NOTES:**

- CONTRACTOR SHALL ADVISE ENGINEER IF UNSTABLE SOIL CONDITIONS ARE FOUND.
- CONTRACTOR IS RESPONSIBLE FOR MEANS, METHODS AND SEQUENCING OF ALL WORK.
- CONTRACTOR IS RESPONSIBLE FOR SAFETY OF ALL PERSONS ON SITE. PROVIDE NECESSARY SHORING, BRACING AND DEWATERING OF EXCAVATIONS. PROVIDE TEMPORARY PROTECTION OF EXCAVATIONS.
- INSTALLATION OF EQUIPMENT IN PUMP STATION AND VALVE PIT SHALL BE DONE IN ACCORDANCE WITH CONFINED SPACE ENTRY REGULATIONS.
- MOUNTING AND SUPPORT OF ALL EQUIPMENT TO BE DONE PER MANUFACTURER'S REQUIREMENTS. DRAWING SHOW GENERAL ARRANGEMENTS ONLY.
- TWO SETS OF SHOP DRAWINGS OF ALL COMPONENTS ARE REQUIRED. SUBMIT TO ENGINEER FOR APPROVAL BEFORE ORDERING.
- TWO SETS OF OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT REQUIRED.
- THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION MUST COMPLY WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, AS EXPANDED AND AMENDED FROM TIME TO TIME, AND ALL RULES AND REGULATIONS THERETO APPURTENANT.
- A DUPLEX SUBMERSIBLE CENTRIFUGAL GRINDER PUMP SYSTEM SHALL BE USED AS MANUFACTURED BY MYERS OR AN APPROVED EQUAL. MYERS PUMP SPECIFICATIONS AND DETAILS HAVE BEEN SHOWN.
- ALL PIPE, VENTS, CLEANOUTS, ETC SHALL PREVENT INFILTRATION AND INFLOW FROM ENTERING THE SANITARY SEWER SYSTEM. IF REQUIRED AS A RESULT OF THE PRESSURE TEST, MODIFICATIONS TO THE EXISTING SYSTEM WILL BE MADE PRIOR TO DISCHARGE TO SANITARY SYSTEM.
- PLASTIC PIPE (PVC OR HDPE) NOT PERMITTED WITHIN WET WELL OR VALVE VAULT.
- THREADED OR FLANGED FITTINGS MAY BE PROVIDED IN THE VALVE VAULT AS DIRECTED BY AW PROJECT MANAGER.
- PUMPS MUST BE LOCATED FOR EASE OF SERVICE.
- PUMP RATE CAPACITY MUST BE VERIFIED BY FIELD TEST.

**FIBERGLASS BASIN DESIGN CRITERIA:**

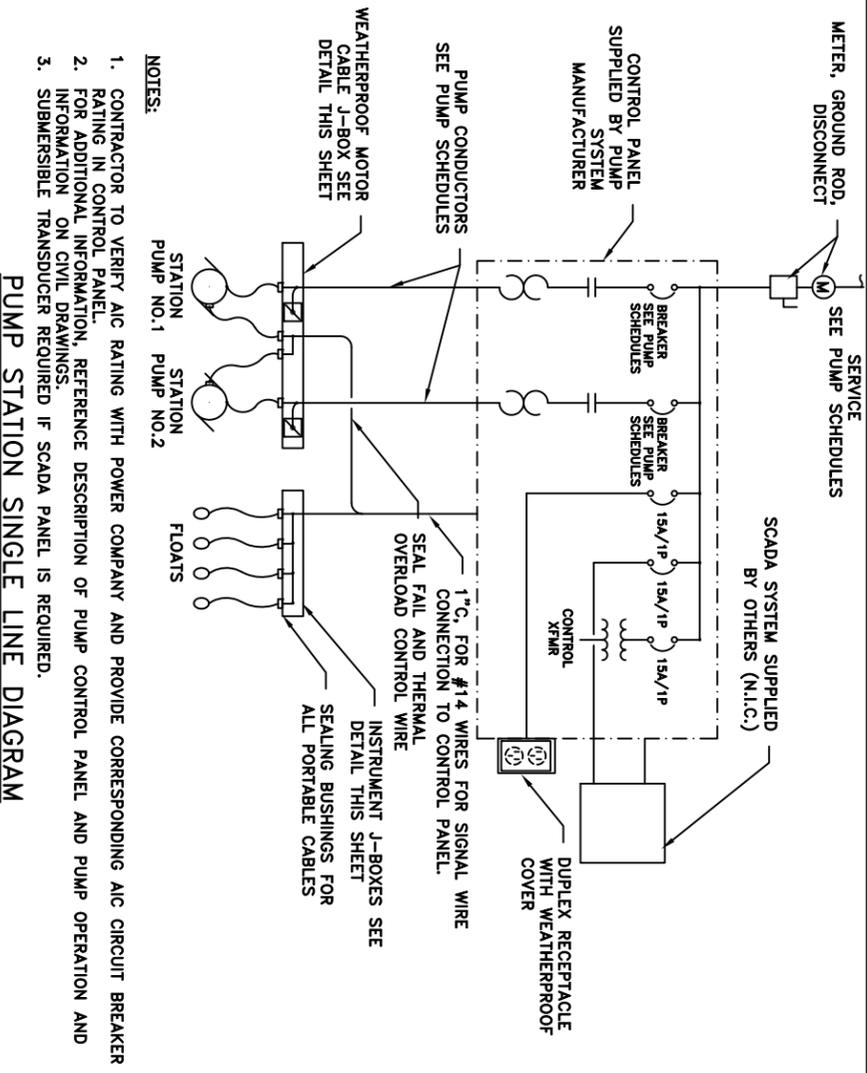
- MANUFACTURER TO DESIGN BASIN TO WITHSTAND THE FOLLOWING SCENARIOS:
- EMPTY INTERIOR, FULL DEPTH BACKFILL.
  - NO BACKFILL, INTERIOR FULL OF WATER.
  - BASIN WILL NOT FLOAT WHEN INTERIOR IS EMPTY AND SATURATED SOIL FULL DEPTH.
- MANUFACTURER TO PROVIDE CALCULATIONS TO CONFIRM BASIN MEETS THE DESIGN CRITERIA ABOVE.

DESIGN LIFT STATION LEVELS	
TOP OF LID:	-
BOTTOM OF STATION FLOOR:	-
FLOAT LOW ALARM:	-
TRANSDUCER LOW ALARM:	-
LEAD PUMP ON:	-
LEAD PUMP OFF:	-
LAG PUMP OFF:	-
LAG PUMP ON:	-
TRANSDUCER HI ALARM:	-
HIGH FLOAT HI ALARM:	-

ANTI-BUOYANCY CALCULATIONS	
1. PUMP STATION VOLUME:	
ASSUME WATER TABLE AT GROUND SURFACE	-
ASSUME NO SOIL FRICTION	-
WEIGHT OF WATER = 62.4 LB/CU FT	-
WEIGHT OF CONCRETE = 150 LB/CU FT	-
ASSUME WEIGHT OF PUMP STATION IS NEGLIGIBLE	-
2. CONCRETE WEIGHT REQUIRED = BUOYANT FORCE	
3. CONCRETE VOLUME REQUIRED =	

SEWAGE PUMP SPECIFICATIONS	
MANUFACTURER	-
TYPE	SUBMERSIBLE GRINDER
MODEL NO.	-
NUMBER REQUIRED	2
HORSEPOWER	-
DESIGN FLOW (GPM)	-
DESIGN TDH (FT)	-
VOLTAGE	-
PHASE	-
HERTZ	60
MOTOR SPEED (RPM)	-
IMPELLER DIA. (IN)	-
LEVEL CONTROL SYSTEM	FLOAT CONTROL
PUMP WEIGHT	-
RAIL SYSTEM	S.S. GUIDE RAILS
DISCHARGE SIZE	-

REVISIONS	MOAWC-WASTE WATER STANDARDS STANDARD SMALL LIFT STATION DETAILS
	MISSOURI AMERICAN WATER ST. LOUIS, MO. 63141
MISSOURI AMERICAN WATER ENGINEERING 727 CRAIG ROAD ST. LOUIS, MO. 63141	 USE DIMENSIONS ONLY SCALE N.T.S.
DRAWN BY PROJECT ENG'R APPROVED	DATE ##-##-2015 PROJECT #
USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES	MOAWC-WW-01

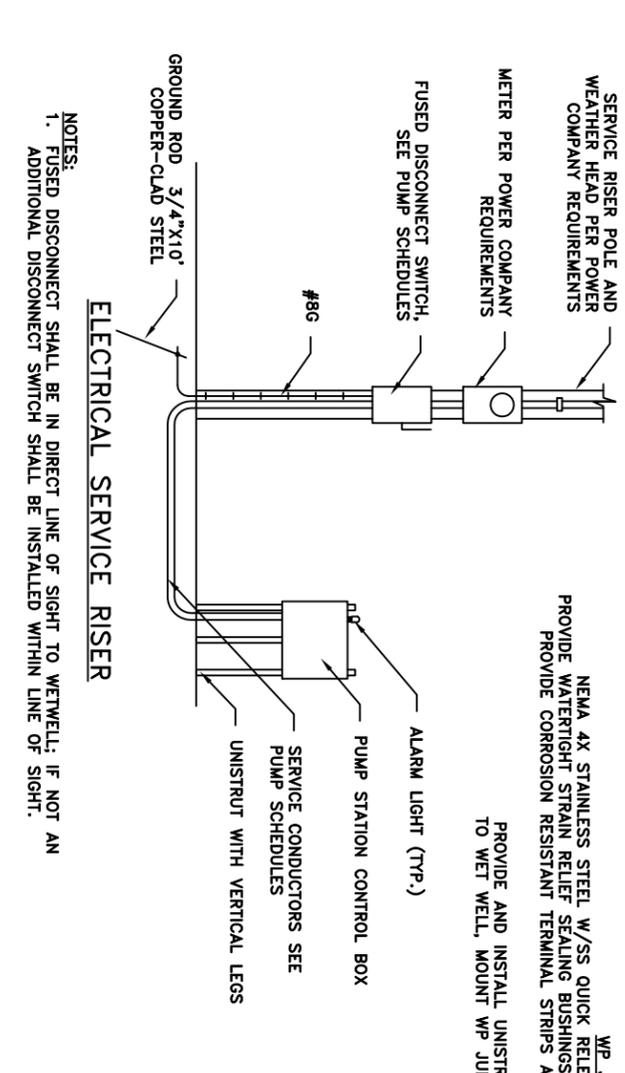


**SINGLE PHASE PUMP SCHEDULE**

HORSEPOWER	SERVICE	FUSED DISCONNECT	SERVICE CONDUCTOR	PUMP BREAKER	PUMP CONDUCTOR
5	120/240, 1 $\phi$	60/2 FUSED AT 60A	3#6 & 1#10G - 1" C	15/2	1#12 & 1#12G - 3/4" C
(EXAMPLE)	(EXAMPLE)	(EXAMPLE)	(EXAMPLE)	(EXAMPLE)	(EXAMPLE)

**THREE PHASE PUMP SCHEDULE**

HORSEPOWER	SERVICE	FUSED DISCONNECT	SERVICE CONDUCTOR	PUMP BREAKER	PUMP CONDUCTOR
5	120/240, 3 $\phi$	60/3 FUSED AT 60A	4#6 & 1#10G - 1" C	15/3	3#12 & 1#12G - 3/4" C
(EXAMPLE)	(EXAMPLE)	(EXAMPLE)	(EXAMPLE)	(EXAMPLE)	(EXAMPLE)



**ELECTRICAL SPECIFICATIONS:**

- SCOPE:
  - THE WORK INCLUDED UNDER THIS CONTRACT CONSISTS OF THE FURNISHING OF ALL LABOR, MATERIALS, TOOLS, TRANSPORTATION, SERVICES, ETC., NECESSARY TO COMPLETE THE INSTALLATION OF THE ELECTRICAL SYSTEMS AND OTHER ITEMS HEREIN LISTED. ALL AS DIRECTED BY THE ARCHITECT OR ENGINEER, WHICH WORK IS COMPRISED OF, BUT NOT LIMITED TO THE FOLLOWING PRINCIPAL ITEMS:
    - ELECTRICAL SYSTEM FOR LIGHT AND POWER:
      - 1.1.1.1. ELECTRICAL SERVICE AND DISTRIBUTION SYSTEM REVISIONS.
      - 1.1.1.2. ALL SYSTEMS, WIRING AND CONDUIT AS REQUIRED.
    - CONTROL WIRING AND ELECTRICAL INSTALLATION AND CONNECTIONS FOR ITEMS IN OTHER CONTRACTS AS MAY BE LISTED IN THE DRAWINGS.
  - RACEWAYS:
    - ALL ELECTRICAL CONDUCTORS ARE TO BE INSTALLED IN METAL RACEWAYS, UNLESS SPECIFICALLY SPECIFIED OR NOTED OTHERWISE. GALVANIZED STEEL CONDUIT AS PERMITTED BY CODE. NO CONDUIT SMALLER THAN 3/4" TO BE USED. PROVIDE FLEXIBLE CONDUIT CONNECTION FOR FINAL CONNECTION TO EACH MOTOR NOT TO EXCEED 3' IN LENGTH AND RECESSED LIGHTING FIXTURES NOT TO EXCEED 6' IN LENGTH. PROVIDE PULL WIRES IN ALL EMPTY CONDUIT SYSTEMS. IDENTIFY TERMINUS OF EACH PULL WIRE. ALL EXPOSED RACEWAYS SHALL BE INSTALLED WITH RUNS PARALLEL AND/OR PERPENDICULAR WITH BUILDING WALLS. FASTEN ALL CONDUIT EVERY 8' AND 2' FROM EACH BOX.
  - WIRES AND CABLES:
    - ELECTRICAL CONDUCTORS, SOFT ANNEALED COPPER WITH CONDUCTIVITY 98% OF THAT OF PURE, STRANDED COPPER, 90 DEGREE - 600V INSULATION AND EQUAL TO GENERAL CABLE COMPANY. WIRE AND CABLE FOR ALL FEEDERS, SUBFEEDERS, MOTOR CIRCUITS AND HIGH AMBIENT LOCATION TYPE SHALL BE THHN. ALL OTHER BRANCH CIRCUIT WIRING, SHALL BE TYPE XHHN OR THHN. MINIMUM WIRE SIZE SHALL BE #12 GAUGE AWG. CONTROL WIRING MAY BE #14 GAUGE.
  - GROUNDING:
    - GROUND ALL ELECTRICAL APPARATUS IN ACCORDANCE WITH N.E.C. AND AS SPECIFIED HEREIN. PROVIDE A SEPARATE GROUNDING CONDUCTOR FOR ALL LIGHTING, RECEPTACLE AND EQUIPMENT CIRCUITS. ALL CABINETS, SWITCHBOARDS, EQUIPMENT CASES, MOTOR FRAMES, INTERIOR METAL COLD WATER PIPING SYSTEMS, AND SYSTEM NEUTRAL CONDUCTORS SHALL BE EFFECTIVELY GROUNDING. USE SOLDERLESS PRESSURE TYPE CONNECTORS. NO PERFORATED STRAP CONNECTORS WILL BE ALLOWED. INSURE CONTINUOUS BOND WHERE FLEXIBLE CONDUIT IS USED. PROVIDE BONDING JUMPER INSIDE ALL FLEXIBLE CONDUIT. GROUNDING PER N.E.C. 250, AND ANY LOCAL REQUIREMENTS.
  - CABINETS, JUNCTION AND PULL BOXES:
    - FLUSH OR SURFACE MOUNTED AS INDICATED IN DRAWINGS. PROVIDE WHERE DIRECTED BY ENGINEER AND WHERE REQUIRED BY CODE. CONSTRUCT OF CODE GAUGE STEEL FOR FLUSH SURFACE MOUNTING.
  - OUTLET BOXES:
    - GENERAL ELECTRIC, APLETON, STEEL CITY OR RACO HOT DIPPED GALVANIZED STEEL BOXES, OR EQUAL. INSTALL AT TERMINAL OF EACH CONDUIT RUN, EACH OUTLET, OR DEVICE. PROVIDE SIZE, TYPE AND DESIGN TO SUIT STRUCTURAL CONDITIONS. ADEQUATE TO ACCOMMODATE SIZE AND NUMBER OF RACEWAYS, CONDUCTORS, DEVICE OR FIXTURE SERVED. PROVIDE PLASTER RINGS OR COVERS ON BOXES WHERE REQUIRED ON EXPOSED WORK. USE APPROVED CAST FERROUS ALLOY OUTLET, JUNCTION BOXES AND FITTINGS. FIXTURE OR DEVICE COVER SHALL COMPLETELY CONCEAL THE SIZE OUTLET BOX USED.
  - DISCONNECT SWITCHES:
    - HEAVY DUTY NEMA TYPE 'HD' - SAME MANUFACTURER AS PANELBOARDS. PLASTIC NAMEPLATE PROPERLY ENGRAVED WITH NAME OF EQUIPMENT SERVED, SECURED TO SWITCH COVER. FUSES SHALL BE BUSSMANN OF SIZES AND TYPES SCHEDULED.
    - MOTOR AND CONTROL WIRING AND CONNECTIONS:
      - THIS CONTRACTOR TO PROVIDE ALL NECESSARY CONDUIT, BOXES AND SUPPORTS TO EQUIPMENT FURNISHED BY OWNER AND AS INDICATED ON DRAWINGS. PROVIDE A DISCONNECT SWITCH AND STARTER IF REQUIRED.

**DESCRIPTION OF CONTROL PANEL:**

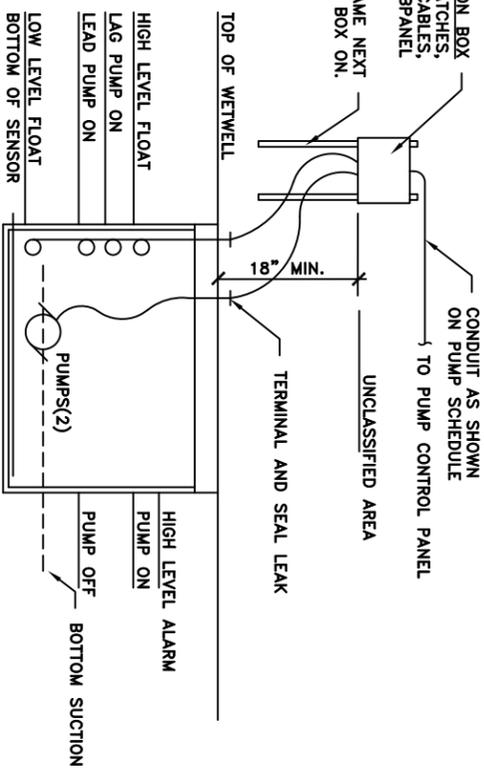
- PANEL SHALL BE PROVIDED AS PART OF PUMP STATION PACKAGE WITH MANUFACTURER UNIT SOURCE RESPONSIBILITY. BASE PANEL SHALL INCLUDE ALL CIRCUITRY TO CONTROL PUMPS INCLUDING CONTACTS, MICROPROCESSOR, MAGNETIC STARTER, CIRCUIT BREAKERS (MAIN, INDIVIDUAL PUMP AND CONTROL FUNCTIONS), ETC. PANEL SHALL BE A DUPLEX PUMP CONTROL PANEL. PANEL OPTIONS SHALL INCLUDE THE FOLLOWING:
  - DUPLEX PUMP CONTROLLER.
  - LAMINATED, ENGRAVED ID TAGS FOR EACH SWITCH AND LIGHT ON PANEL FACE.
  - LOCAL INDICATING LIGHTS FOR PUMP RUN STATUS, SEAL FAILURE ALARM, THERMAL OVERLOAD ALARM, AND LAG PUMP ON/HIGH WATER ALARM.
  - PROVIDE 120V, 15 AMP SINGLE POLE BREAKER TO SUPPLY POWER TO CONTROL TRANSFORMER FOR INSTRUMENT CONTROL POWER.
  - NEMA 3R STAINLESS STEEL ENCLOSURE, LOCKABLE.
  - PUMP ALTERNATOR RELAY (SEE NOTE 2 OF "PUMP OPERATION")
  - LIGHTNING ARRESTOR.
  - SIX-DIGIT ELAPSED TIME METER FOR EACH PUMP, NONRESETTABLE.
  - PROVIDE 120V, 15 AMP SINGLE POLE BREAKER TO SUPPLY POWER TO THE SCADA SYSTEM SUPPLIED BY OWNER.
  - H-O-A SWITCH FOR EACH PUMP.
  - AUXILIARY TELEMETRY DRY CONTACT FOR HIGH WATER LEVEL, PUMP RUN STATUS AND PUMP FAIL TO START.
  - INTEGRATED LEVEL CONTROL SYSTEM.
  - VOLTAGE MONITOR TO TAKE PUMP STARTERS OUT OF SERVICE, IF THE VOLTAGE DROPS BELOW AN ADJUSTABLE PERCENT OF NORMAL VOLTAGE.
  - A LINE VOLTAGE RATED SURGE CAPACITOR DESIGNED TO WORK ON MOTOR INSTALLATIONS AND EQUIPPED WITH AN INTERNAL AUTOMATIC DISCHARGING CIRCUIT.
  - ELECTRONIC SURGE PROTECTOR FOR 120V CIRCUIT.
  - RED FLASHING LIGHT TO ENGAGE UPON ANY ALARM CONDITION IN ITEM "C" WITH AUDIBLE HORN AND TEST BUTTON FOR ALL LIGHTS AND HORN.

**DESCRIPTION OF PUMP OPERATION:**

- WHEN SEWAGE RISES TO THE FIRST HIGH WATER LEVEL, THE LEAD PUMP SWITCH SHALL START THE LEAD PUMP. SEWAGE LEVEL WILL DECREASE TO THE LOW LEVEL SWITCH SETTING AND THE PUMP SHALL STOP.
- AN ALTERNATING RELAY SHALL INDEX ON STOPPING OF THE PUMP SO THAT THE SECOND PUMP WILL START FIRST ON THE NEXT CYCLE.
- IF THE WET WELL, LEVEL CONTINUES TO RISE WHEN THE LEAD PUMP IS IN OPERATION, THE LAG PUMP SWITCH SHALL START THE LAG PUMP. BOTH PUMPS SHALL OPERATE TOGETHER UNTIL THE LOW LEVEL SWITCH TURNS OFF BOTH PUMPS.
- IF THE LEAD PUMP SHOULD FAIL TO START, THE SECOND PUMP SHALL BE ENERGIZED BY THE LAG PUMP SWITCH AND AN ALARM SHALL BE INITIATED FOR LEAD PUMP START FAILURE.
- IF THE SEWAGE LEVEL CONTINUES TO RISE AFTER THE LAG PUMP HAS BEEN STARTED THE HIGH LEVEL ALARM SHALL BE ACTIVATED.
- IF THE SEWAGE LEVEL DROPS TO THE LOW-LEVEL ALARM, BOTH PUMPS SHALL SHUT-OFF.

**ELECTRICAL GENERAL PROVISIONS:**

- STANDARDS, REGULATIONS AND CODES:
  - THE WORK SHALL COMPLY WITH THE EDITION OF THE APPLICABLE STANDARDS, REGULATIONS AND CODES CURRENTLY IN FORCE OF ALL STATE AND LOCAL AUTHORITIES HAVING JURISDICTION, WHERE QUANTITIES, SIZES, OR OTHER REQUIREMENTS INDICATED ON THE DRAWINGS OR HEREIN SPECIFIED ARE IN EXCESS OF THE STANDARD OR CODE REQUIREMENTS, THE SPECIFICATIONS AND/OR DRAWINGS SHALL GOVERN. IN THE ABSENCE OF OTHER APPLICABLE LOCAL CODES, ACCEPTABLE TO THE ARCHITECT/ENGINEER, THE NATIONAL ELECTRICAL CODE SHALL APPLY TO THIS WORK.
  - THE CONTRACTOR SHALL COMPLY WITH RULES AND REGULATIONS OF PUBLIC UTILITIES AND LOCAL DEPARTMENTS AFFECTED BY CONNECTIONS OF SERVICES. THE CONTRACTOR SHALL PAY ALL FEES ASSOCIATED THERE WITH.
  - THE ELECTRICAL CONTRACTOR SHALL BE LICENSED TO PERFORM ELECTRICAL WORK IN THE LOCAL AREA IN WHICH THE PROJECT IS LOCATED.
  - ALL PRODUCTS AND TYPES OF CONSTRUCTION SHALL MEET OR EXCEED THE LATEST EDITION OF APPLICABLE STANDARDS OF MANUFACTURER, TESTING, PERFORMANCE AND INSTALLATION.
- SEE AMERICAN WATER STANDARD ELECTRICAL PROVISIONS SPECIFICATIONS



**REVISIONS**

NO.	DATE	DESCRIPTION
1.	04/15/2015	MOAWC-WASTE WATER STANDARDS STANDARD SMALL LIFT STATION PLAN

MISSOURI AMERICAN WATER ENGINEERING  
ST. LOUIS, MO. 63141

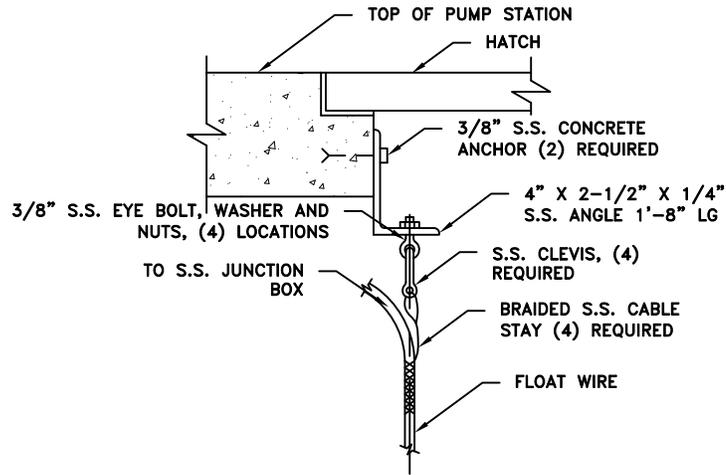
MISSOURI AMERICAN WATER  
ST. LOUIS, MO. 63141

MISSOURI AMERICAN WATER ENGINEERING  
727 CRAIG ROAD  
ST. LOUIS, MO. 63141

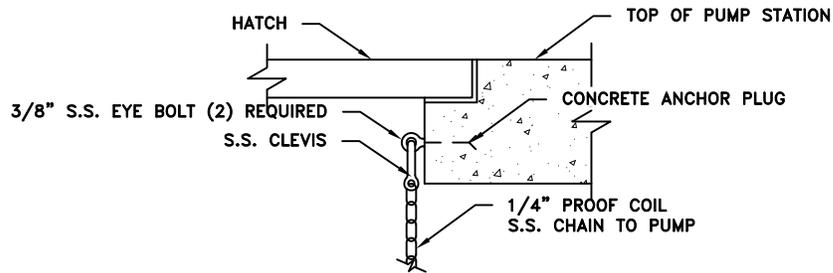
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PROJECT: STANDARD SMALL LIFT STATION PLAN  
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USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES

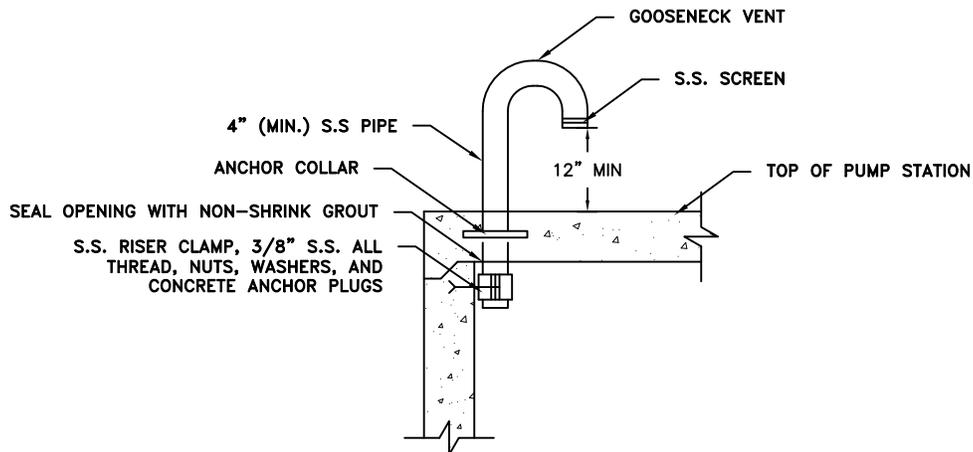
MISSOURI AMERICAN WATER  
AMERICAN WATER  
MOAWC-WW-02



TYPICAL FLOAT HANGER BRACKET DETAIL



TYPICAL PUMP LIFT CHAIN ANCHOR DETAIL



TYPICAL PUMP STATION VENT DETAIL

REVISIONS

MOWAC WASTE WATER STANDARDS

PUMP STATION  
DETAILS

MISSOURI AMERICAN WATER  
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MISSOURI AMERICAN WATER ENGINEERING  
727 CRAIG ROAD  
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MISSOURI  
AMERICAN WATER

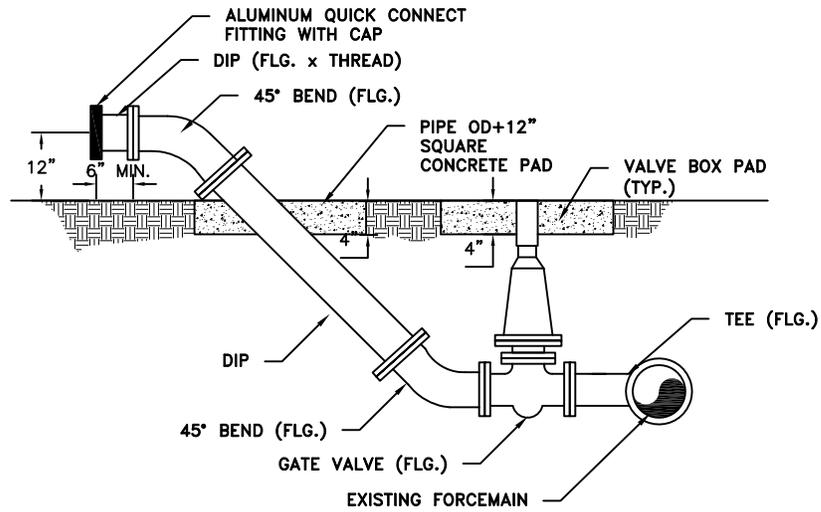
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APPROVED

DATE ##-##-2015  
PROJECT IP

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MOAWC-WW-03



## EMERGENCY PUMP CONNECTION

### NOTES:

1. EMERGENCY CONNECTION PIPE SIZE SHALL BE DEPENDANT ON THE EXISTING FORCEMAIN SIZE AND PUMPING REQUIREMENTS.
2. PIPE AND VALVE LOCATED ALONG EMERGENCY CONNECTION LINE TO BE SAME SIZE AS FORCE MAIN.

### REVISIONS

### MOWAC WASTE WATER STANDARDS EMERGENCY PUMP CONNECTION DETAIL

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727 CRAIG ROAD  
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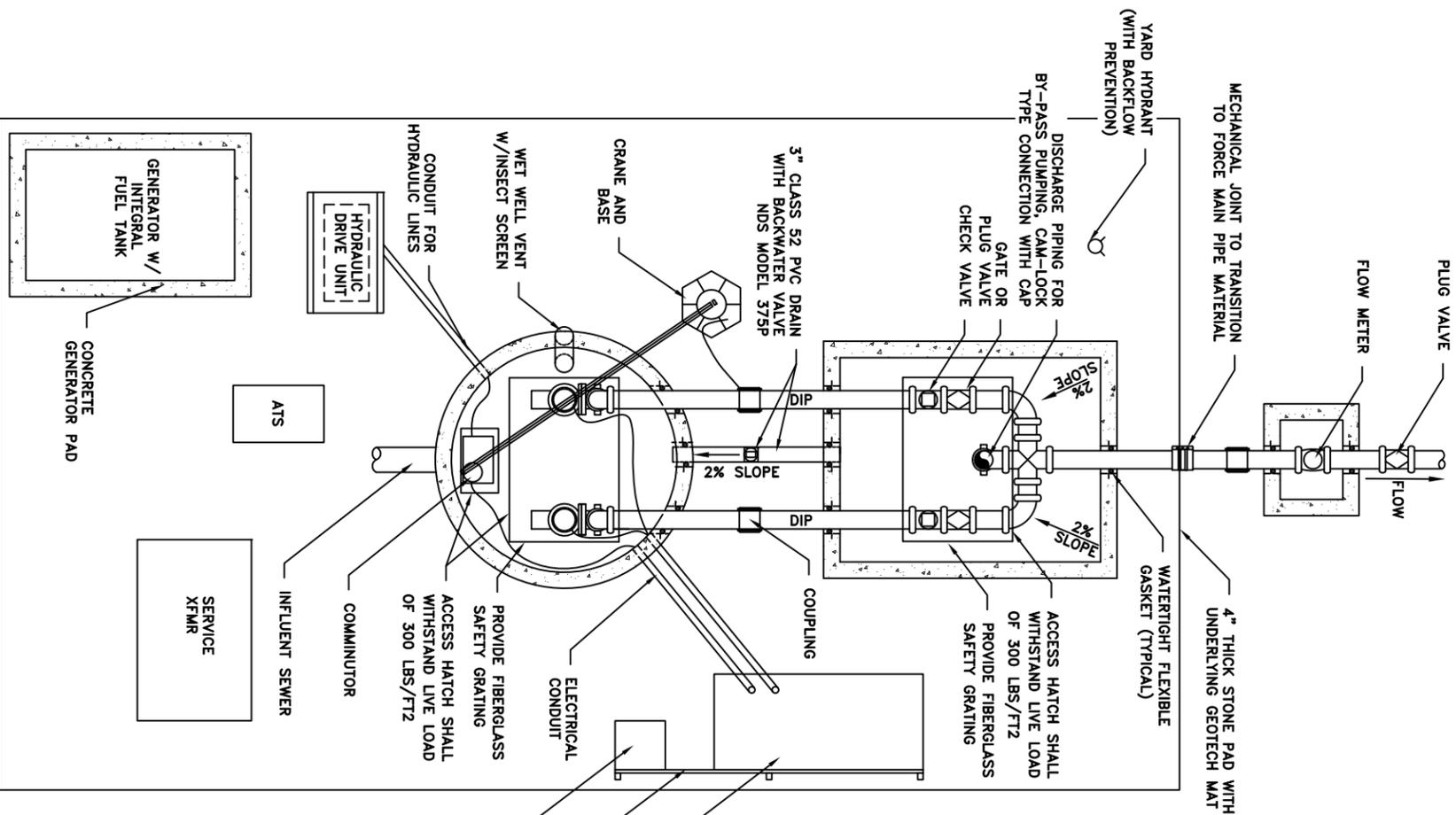
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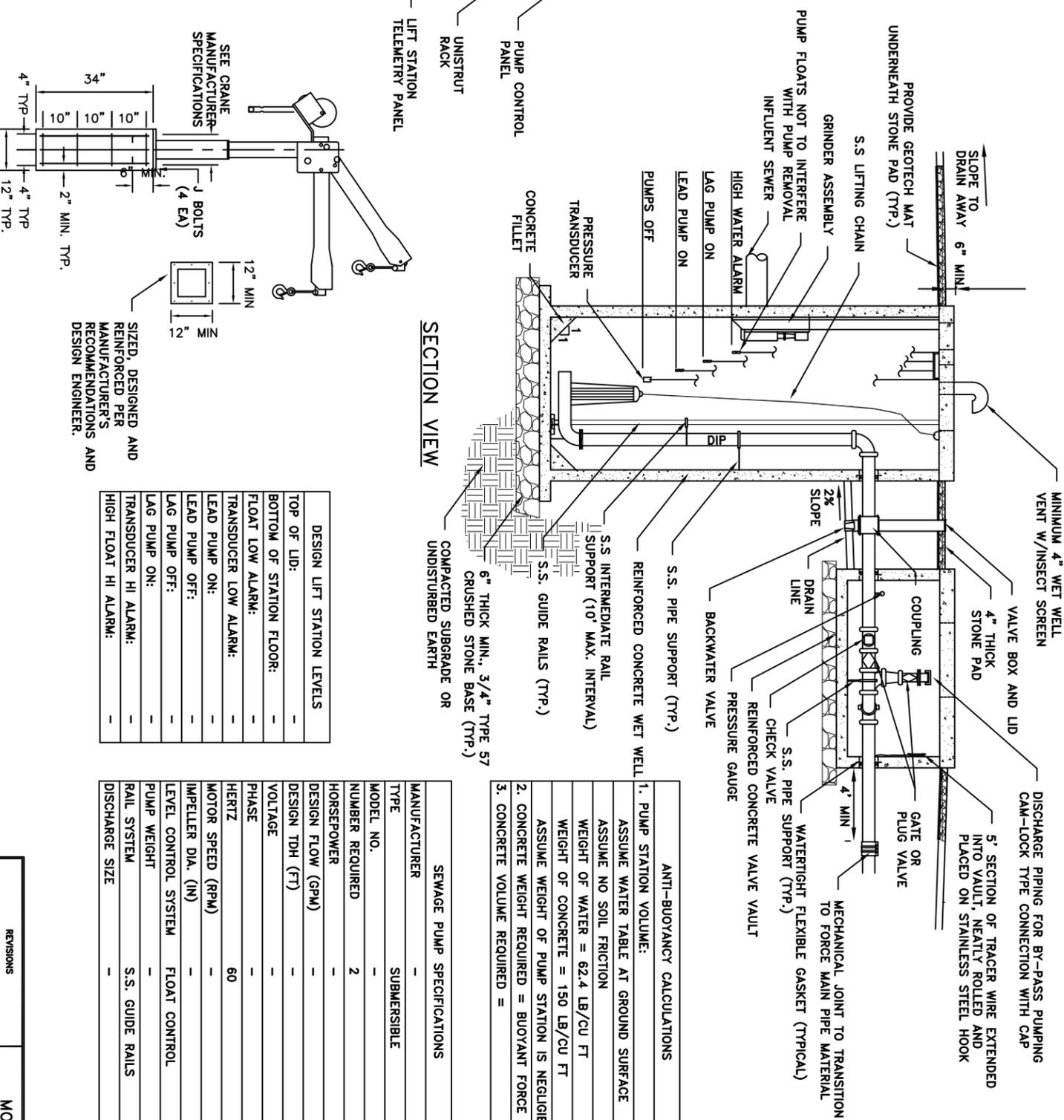
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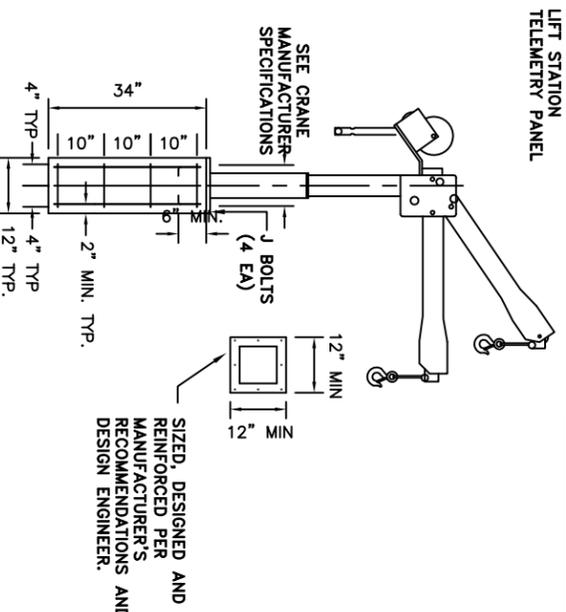
PLAN VIEW



SECTION VIEW

CRANE NOTES:

- EXCAVATE HOLE AS NEAR TO COLUMN DIMENSIONS AS POSSIBLE TO PLACE REBAR IN CENTER. FILL ENTIRE HOLE WITH CONCRETE.
- PRIOR TO DESIGN, THE CONTRACTOR SHALL CONFIRM WITH THE AWP PROJECT MANAGER WHETHER A GANTRY OR PEDESTAL CRANE IS REQUIRED.



DESIGN LIFT STATION LEVELS
TOP OF LID: -
BOTTOM OF STATION FLOOR: -
FLOAT LOW ALARM: -
TRANSUDGER LOW ALARM: -
LEAD PUMP ON: -
LEAD PUMP OFF: -
LAG PUMP OFF: -
LAG PUMP ON: -
TRANSUDGER HI ALARM: -
HIGH FLOAT HI ALARM: -

SEWAGE PUMP SPECIFICATIONS	
MANUFACTURER	-
TYPE	SUBMERSIBLE
MODEL NO.	-
NUMBER REQUIRED	2
HORSEPOWER	-
DESIGN FLOW (GPM)	-
DESIGN TDH (FT)	-
VOLTAGE	-
PHASE	-
HERTZ	60
MOTOR SPEED (RPM)	-
IMPELLER DIA. (IN)	-
LEVEL CONTROL SYSTEM	FLOAT CONTROL
PUMP WEIGHT	-
RAIL SYSTEM	S.S. GUIDE RAILS
DISCHARGE SIZE	-

- ANTI-BUOYANCY CALCULATIONS
- PUMP STATION VOLUME:  
ASSUME WATER TABLE AT GROUND SURFACE  
ASSUME NO SOIL FRICTION  
WEIGHT OF WATER = 62.4 LB/CU FT  
WEIGHT OF CONCRETE = 150 LB/CU FT  
ASSUME WEIGHT OF PUMP STATION IS NEGLIGIBLE
  - CONCRETE WEIGHT REQUIRED = BUOYANT FORCE
  - CONCRETE VOLUME REQUIRED =

PUMP STATION GENERAL NOTES:

- THIS DETAIL IS NOT FOR CONSTRUCTION AND SHALL BE USED FOR TYPICAL LAYOUT AND LIFT STATION REQUIREMENTS ONLY. COMPLETE LIFT STATION DESIGN AND ANALYSIS SHALL BE DESIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
- FOR ELECTRICAL REQUIREMENTS, SEE DETAIL MSG-WW-02.
- NO SUBSURFACE INVESTIGATIONS WERE PERFORMED. SUBCONTRACTOR SHALL ADVISE ENGINEER IF UNSTABLE SOIL CONDITIONS ARE FOUND.
- SUBCONTRACTOR IS RESPONSIBLE FOR MEANS, METHODS AND SEQUENCING OF ALL WORK. SUBCONTRACTOR IS RESPONSIBLE FOR SAFETY OF ALL PERSONS ON SITE. PROVIDE NECESSARY SHORING, BRACING AND Dewatering OF EXCAVATIONS. PROVIDE TEMPORARY PROTECTION OF EQUIPMENT. INSTALLATION OF EQUIPMENT IN PUMP STATION AND VALVE PIT SHALL BE DONE IN ACCORDANCE WITH CONFINED SPACE ENTRY REGULATIONS.
- MOUNTING AND SUPPORT OF ALL EQUIPMENT TO BE DONE PER MANUFACTURER'S REQUIREMENTS. DRAWING SHOW GENERAL ARRANGEMENTS ONLY.
- SHOP DRAWINGS OF ALL COMPONENTS ARE REQUIRED. SUBMIT TO ENGINEER FOR APPROVAL BEFORE ORDERING.
- TWO SETS OF OPERATION AND MAINTENANCE MANUALS FOR ALL EQUIPMENT REQUIRED.
- THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION MUST COMPLY WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, AS EXPANDED AND AMENDED FROM TIME TO TIME, AND ALL RULES AND REGULATIONS THERETO APPURTENANT.
- ALL MEDIUM SIZED LIFT STATIONS SHALL BE PROVIDED WITH AN EMERGENCY BACK-UP GENERATOR. ALL MEDIUM SIZED LIFT STATIONS SHALL BE PROVIDED WITH SCADA MONITORING AND CONTROL.
- ALL PIPE, VENTS, CLEANOUTS, ETC SHALL PREVENT INFILTRATION AND INFLOW FROM ENTERING THE SANITARY SEWER SYSTEM, IF REQUIRED AS A RESULT OF THE PRESSURE TEST. MODIFICATIONS TO THE EXISTING SYSTEM WILL BE MADE PRIOR TO DISCHARGE TO SANITARY SYSTEM.
- LIFT STATION SITE SHALL BE ENCLOSED WITH 8' OR 6' HIGH FENCE WITH A MINIMUM OF 1 OR 3, RESPECTIVELY, STRAND BARBED WIRE AROUND AND PROVIDED WITH A VEHICLE GATE. PEDESTRIAN GATES PROVIDED WHERE REQUIRED BY AMERICAN WATER.
- SERVICE LINE TO YARD HYDRANT TO BE PROVIDED WITH BACKFLOW PREVENTION DEVICE IN ACCORDANCE WITH LOCAL REGULATIONS.

REVISIONS

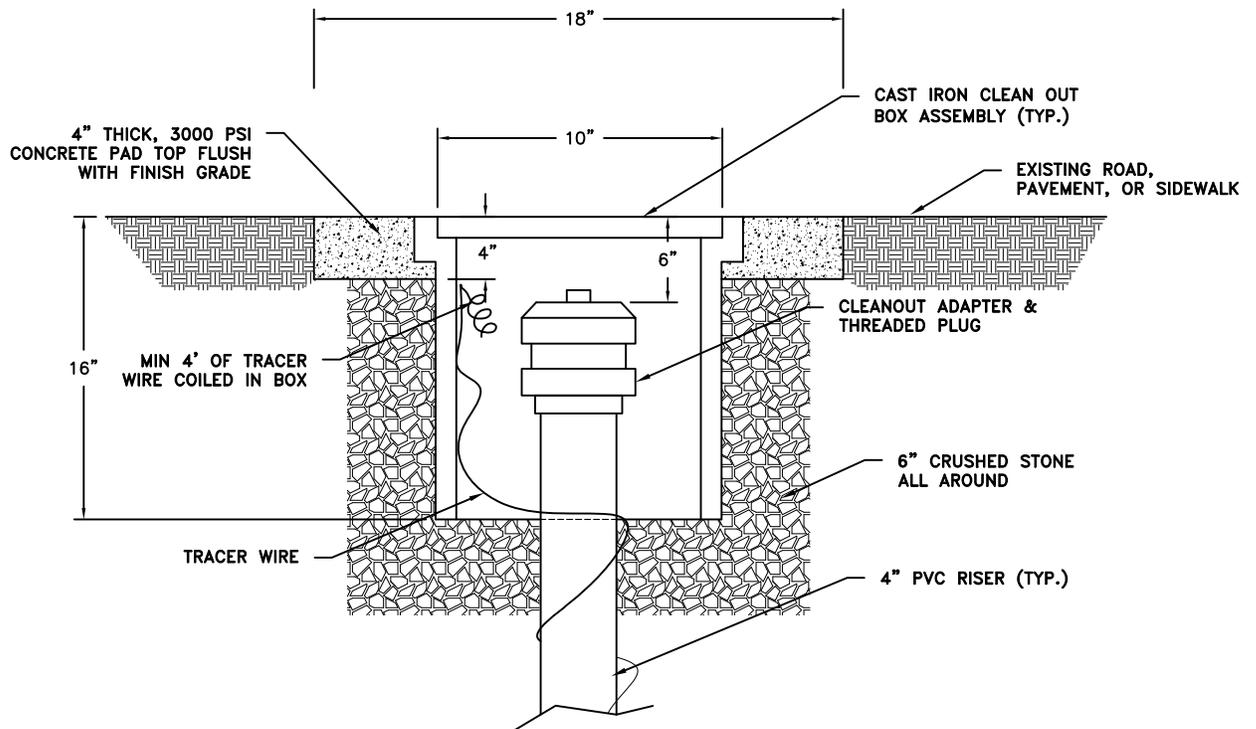
MOAWC-WASTE WATER STANDARDS  
STANDARD MEDIUM LIFT STATION  
TYPICAL LAYOUT DETAIL

MISSOURI AMERICAN WATER

MISSOURI AMERICAN WATER ENGINEERING  
727 CRAIG ROAD  
ST. LOUIS, MO. 63141

DRAWN BY: [Name]  
PROJECT ENGR: [Name]  
DATE: 11/14/2015  
SCALE: N.T.S.

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MISSOURI AMERICAN WATER  
MOAWC-WW-05



## CLEANOUT DETAIL

REVISIONS

MOWAC WASTE WATER STANDARDS

CLEANOUT  
DETAIL

MISSOURI AMERICAN WATER  
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MISSOURI AMERICAN WATER ENGINEERING  
727 CRAIG ROAD  
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MISSOURI  
AMERICAN WATER

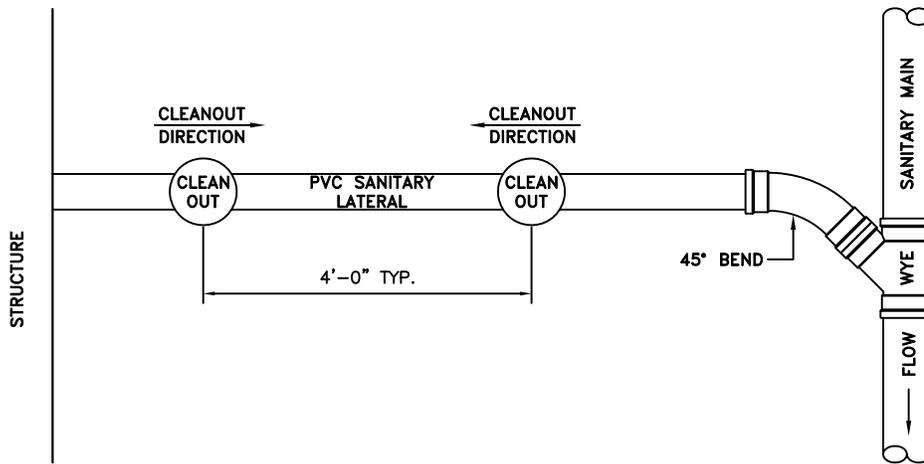
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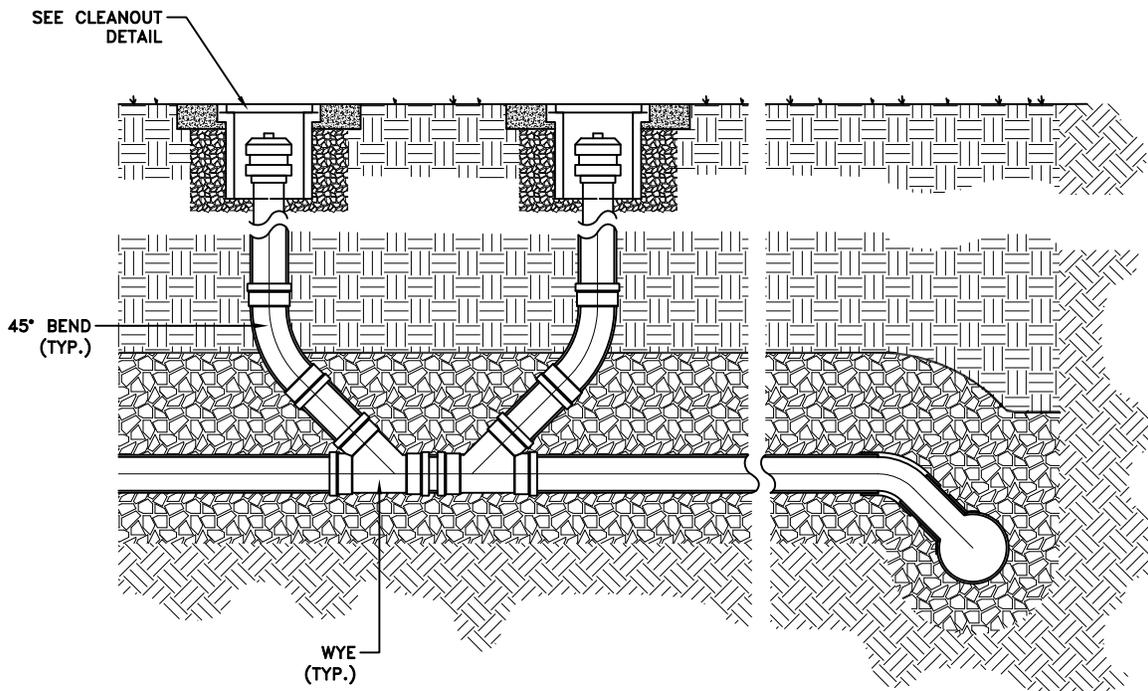
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FOR CONSTRUCTION PURPOSES

MOAWC-WW-07



PLAN



PROFILE

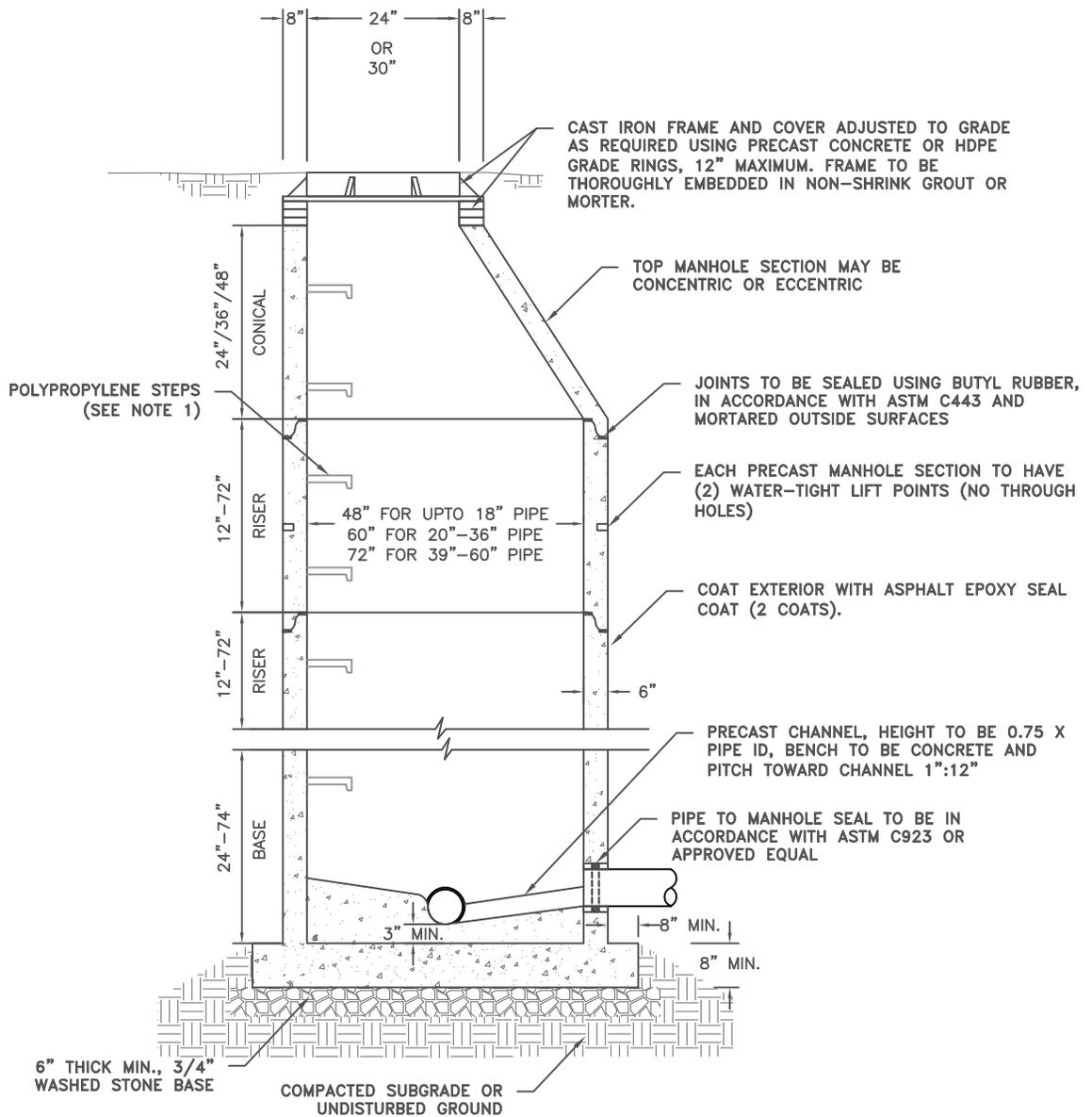
## DUAL-DIRECTIONAL CLEANOUT

**NOTES:**

1. FOR STRUCTURES WITH MORE THAN ONE SANITARY SEWER SERVICE LINE, COMBINED SANITARY SERVICES ARE NOT PERMITTED WITHOUT WRITTEN APPROVAL FROM AMERICAN WATER. EACH SANITARY LATERAL SHALL BE EXTENDED TO THE SEWER MAIN.
2. CLEANOUT SIZE SHALL MATCH SANITARY LATERAL SIZE.
3. POINT OF DEMARCATION FOR SERVICE LINE OWNERSHIP SHALL BE PER PRIME CONTRACT BETWEEN AW AND THE GOVERNMENT.
4. INSTALLATION, BEDDING, AND BACKFILL SHALL BE IN ACCORDANCE WITH AW STANDARD SPECIFICATIONS.

<p style="text-align: center; margin: 0;">REVISIONS</p>	<p><b>MOWAC WASTE WATER STANDARDS</b></p> <p><b>DUAL-DIRECTIONAL CLEANOUT</b></p> <p><b>DETAIL</b></p>
	<p>MISSOURI AMERICAN WATER ST. LOUIS, MO. 63141</p>
	<p>MISSOURI AMERICAN WATER ENGINEERING 727 CRAIG ROAD ST. LOUIS, MO. 63141</p>
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	<p style="text-align: center;">USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES</p>
	<p><b>MOAWC-WW-08</b></p>





## STANDARD PRECAST MANHOLE

### NOTES:

1. MANHOLE STEPS ARE TO BE 12" OC.
2. PRECAST CONCRETE MANHOLE DESIGN AND REINFORCEMENT SHALL CONFORM TO ASTM C478, LATEST REVISION WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
3. MAXIMUM PIPE O.D. TO BE 31.5" FOR 180° THRU 135° DEFLECTION AND 25" FOR 90° DEFLECTION.
4. PRECAST CONCRETE STRUCTURE TO BE WET CAST WITH MONOLITHIC BASE SECTION.
5. MANHOLES RECEIVING FORCE MAINS SHALL BE PROVIDED WITH FIBERGLASS LINING OR GAS-RESISTANT EPOXY COATING.

### REVISIONS

### MOWAC WASTE WATER STANDARDS STANDARD PRECAST MANHOLE DETAIL

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ST. LOUIS, MO. 63141



MISSOURI  
AMERICAN WATER

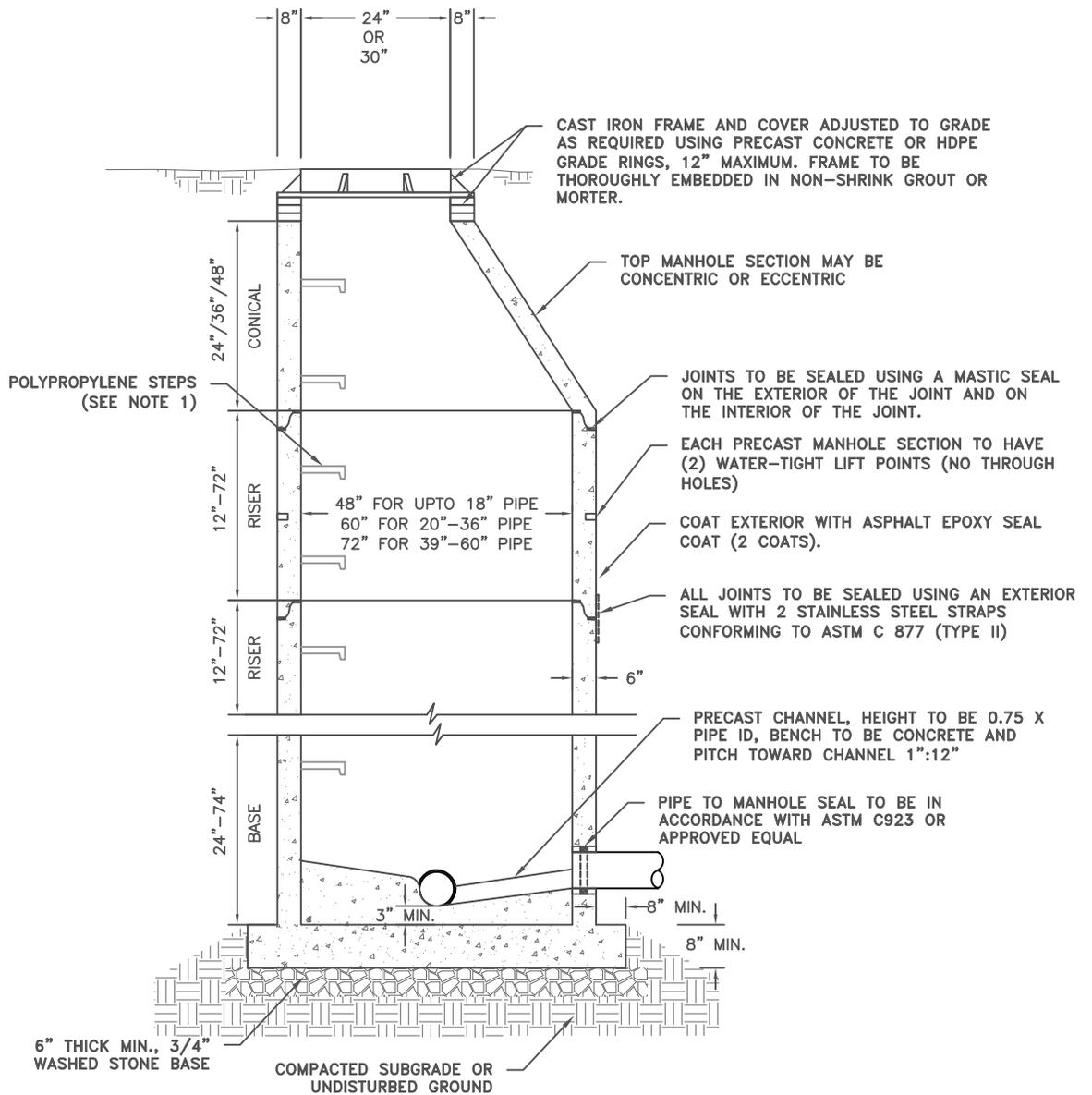
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## ALTERNATIVE PRECAST MANHOLE

### NOTES:

1. MANHOLE STEPS ARE TO BE 12" OC.
2. PRECAST CONCRETE MANHOLE DESIGN AND REINFORCEMENT SHALL CONFORM TO ASTM C478, LATEST REVISION WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
3. MAXIMUM PIPE O.D. TO BE 31.5" FOR 180° THRU 135° DEFLECTION AND 25" FOR 90° DEFLECTION.
4. PRECAST CONCRETE STRUCTURE TO BE WET CAST WITH MONOLITHIC BASE SECTION.
5. MANHOLES RECEIVING FORCE MAINS SHALL BE PROVIDED WITH FIBERGLASS LINING OR GAS-RESISTANT EPOXY COATING.

### REVISIONS

### MOWAC WASTE WATER STANDARDS STANDARD PRECAST MANHOLE DETAIL

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MISSOURI  
AMERICAN WATER

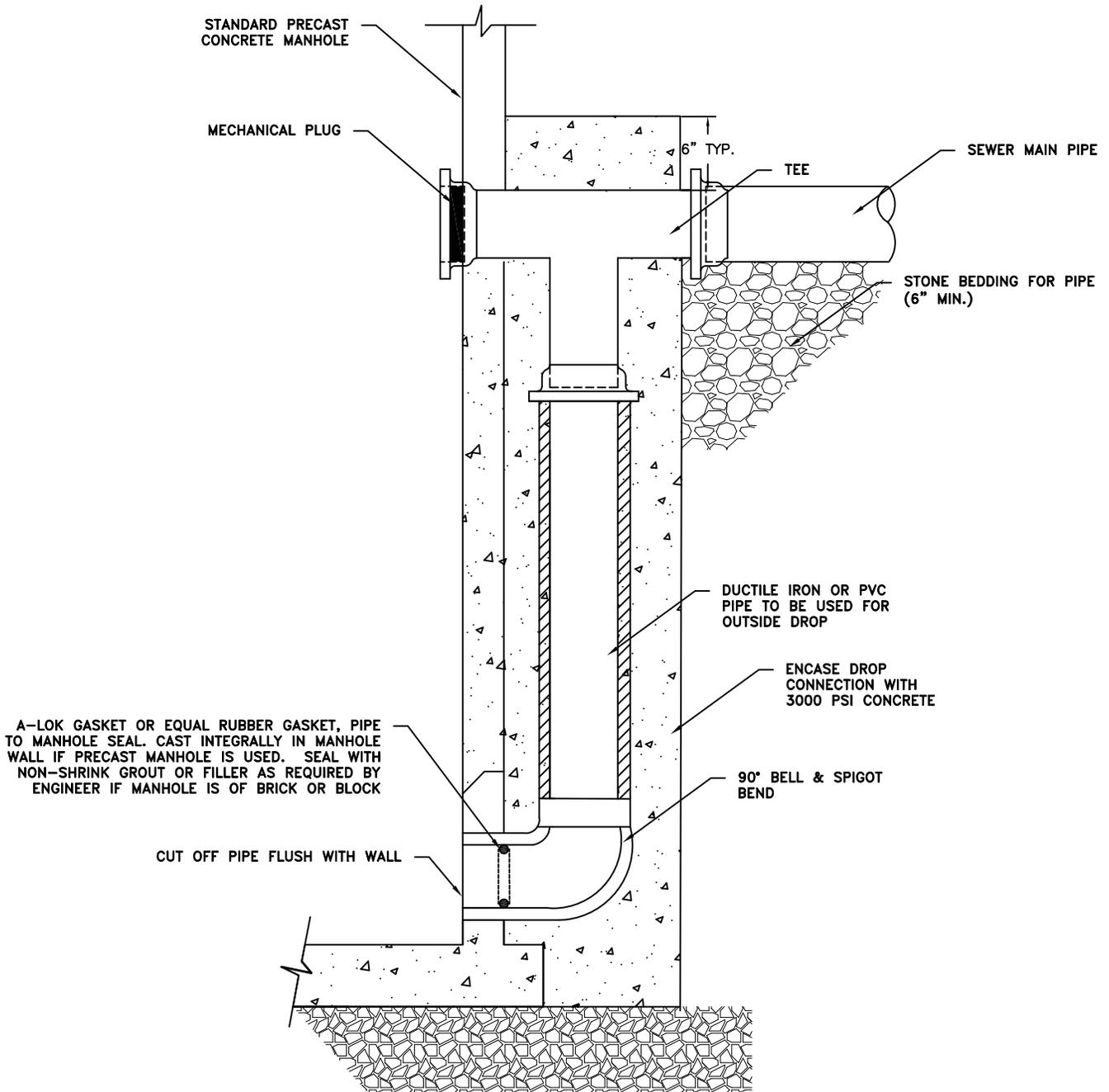
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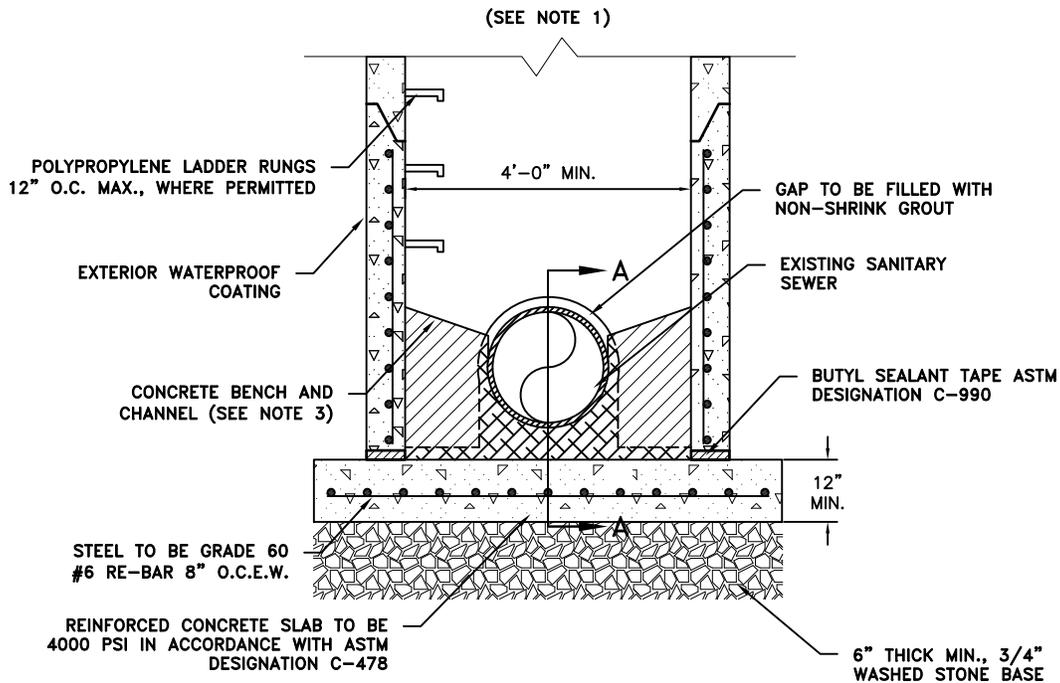
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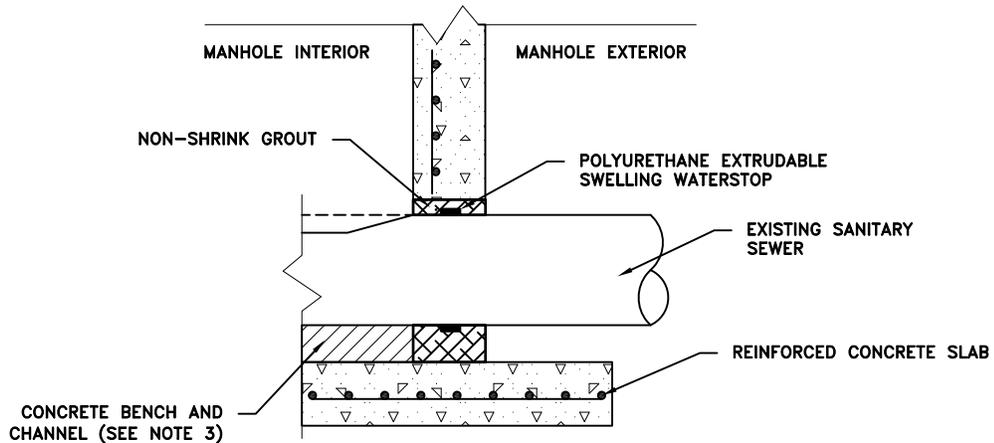
A-LOK GASKET OR EQUAL RUBBER GASKET, PIPE TO MANHOLE SEAL. CAST INTEGRALLY IN MANHOLE WALL IF PRECAST MANHOLE IS USED. SEAL WITH NON-SHRINK GROUT OR FILLER AS REQUIRED BY ENGINEER IF MANHOLE IS OF BRICK OR BLOCK

## TYPICAL OUTSIDE DROP CONNECTION

<p style="text-align: center; margin: 0;">REVISIONS</p>	<p><b>MOWAC WASTE WATER STANDARDS</b></p> <p><b>TYPICAL OUTSIDE DROP CONNECTION</b></p> <p><b>DETAIL</b></p>
	<p>MISSOURI AMERICAN WATER ST. LOUIS, MO. 63141</p>
	<p>MISSOURI AMERICAN WATER ENGINEERING 727 CRAIG ROAD ST. LOUIS, MO. 63141</p>
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	<p style="text-align: center;">USE APPROVED DRAWINGS ONLY FOR CONSTRUCTION PURPOSES</p>
	<p><b>MISSOURI AMERICAN WATER</b></p> <p><b>MOAWC-WW-10</b></p>



**PLAN**



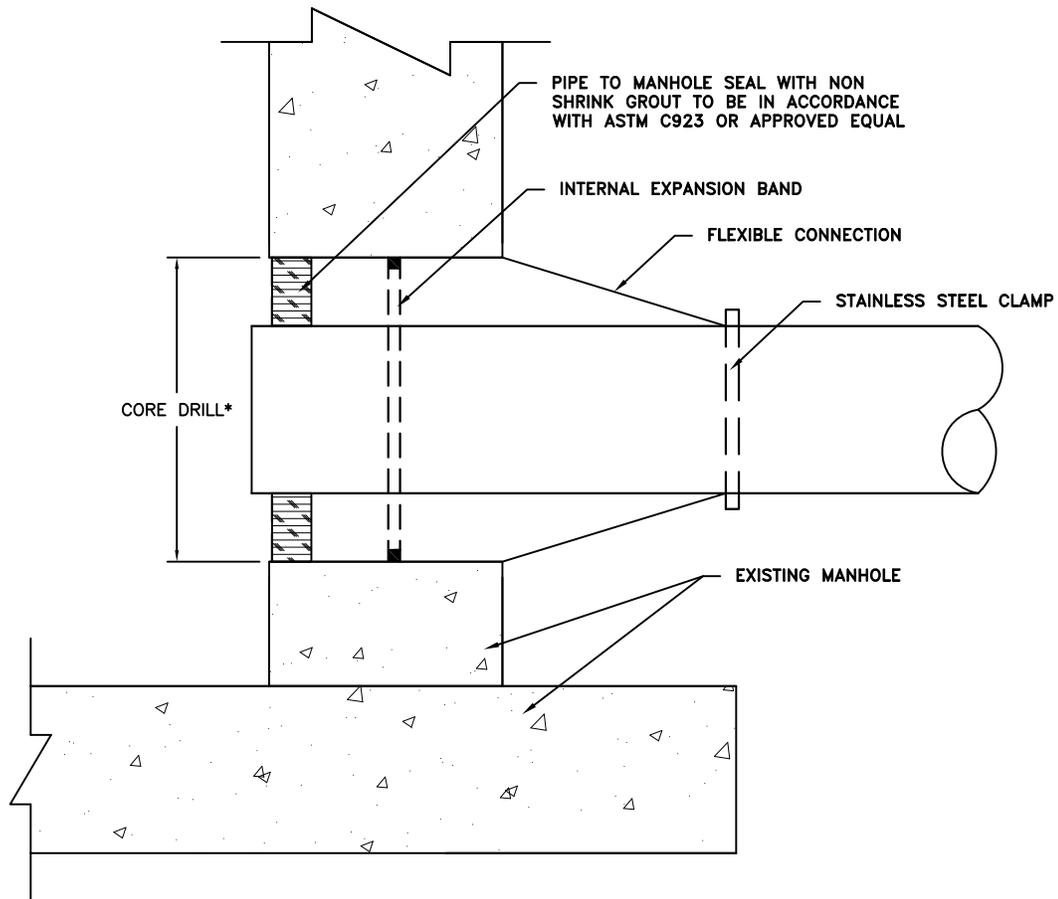
**SECTION A-A**

**DOGHOUSE MANHOLE**

**NOTES:**

1. SEE PRECAST STANDARD MANHOLE DETAIL FOR TYPICAL INSTALLATION.
2. PRECAST MANHOLE SECTIONS TO BE IN ACCORDANCE WITH ASTM DESIGNATION C478.
3. SOLID CONCRETE BENCH AND CHANNEL TO BE CONSTRUCTED BY CONTRACTOR.
4. EXTERIOR COATING NOT REQUIRED IN TEXAS..

<p>REVISIONS</p>	<p>MOWAC WASTE WATER STANDARDS</p> <p>DOGHOUSE MANHOLE DETAIL</p>	
	<p>MISSOURI AMERICAN WATER ST. LOUIS, MO. 63141</p>	
	<p>MISSOURI AMERICAN WATER ENGINEERING 727 CRAIG ROAD ST. LOUIS, MO. 63141</p>	
	<p>DRAWN BY PROJECT ENG'R APPROVED</p>	<p>DATE ##-##-2015 PROJECT IP</p> <p>USE DIMENSIONS ONLY SCALE N.T.S.</p>
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## CONNECTION TO EXISTING MANHOLE

### NOTES:

1. CORE DRILL NEW PIPE OPENING.
2. INSERT NEW FLEXIBLE CONNECTOR.
3. AFTER INSERTION OF NEW PIPE, MANHOLE SHALL BE VACUUM TESTED IN ACCORDANCE WITH SPECIFICATIONS.

\* BRICK MANHOLES CAN NOT BE CORE DRILLED

### REVISIONS

MOWAC WASTE WATER STANDARDS  
CONNECTION TO EXISTING MANHOLE  
DETAIL

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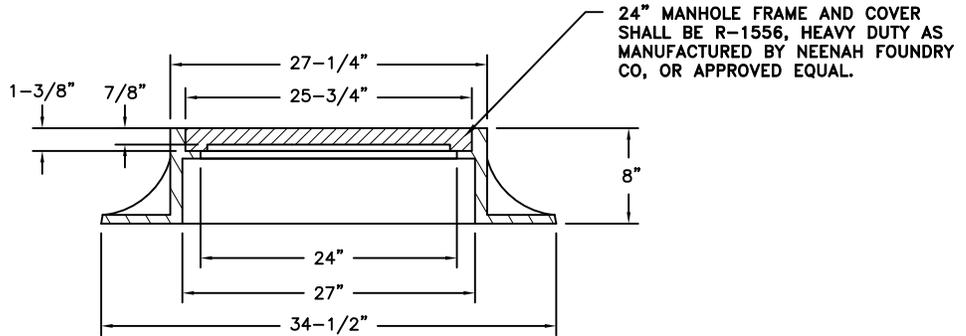
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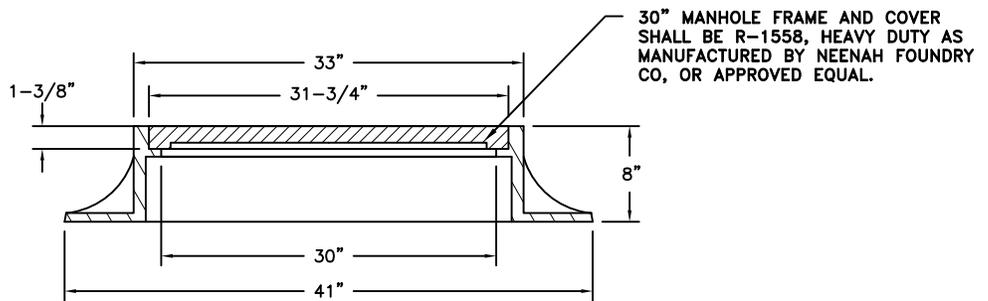
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24" MANHOLE FRAME AND COVER



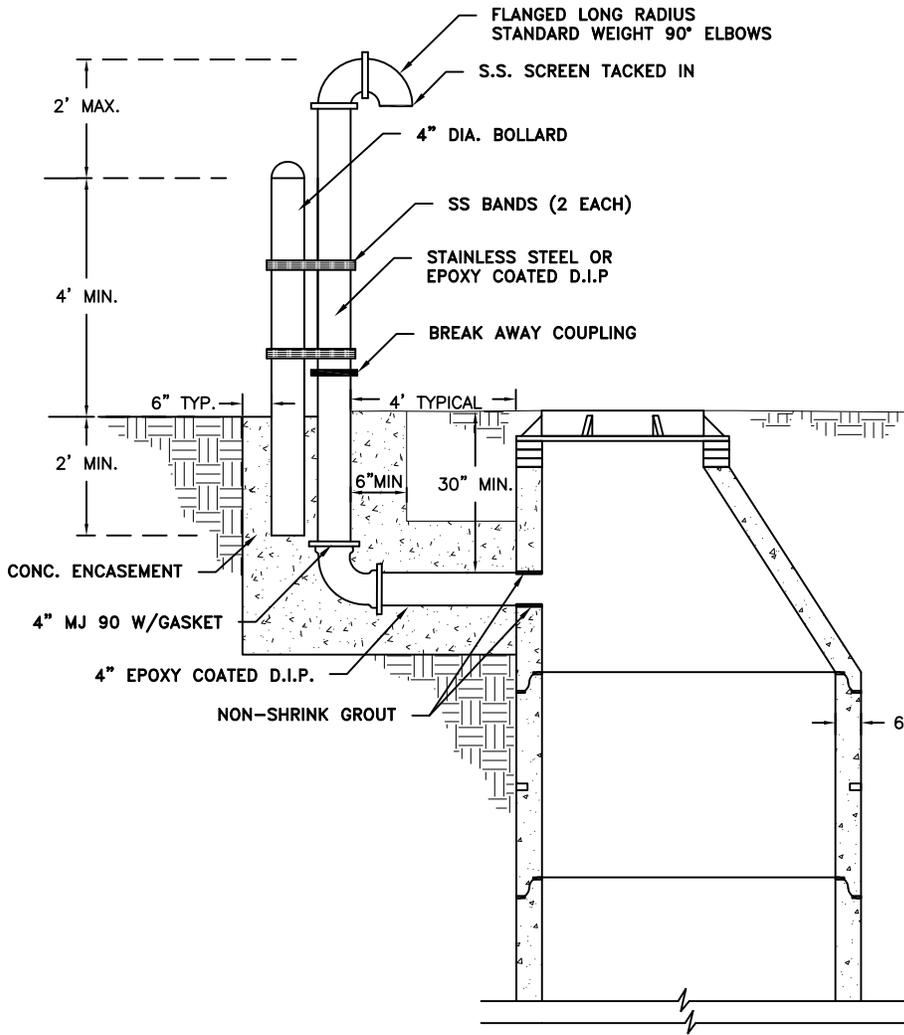
30" MANHOLE FRAME AND COVER

## MANHOLE FRAME AND COVER DETAIL

**NOTE:**

24" MANHOLE OPENING IS NOT PERMITTED IN TEXAS.

	REVISIONS	MOWAC WASTE WATER STANDARDS MANHOLE FRAME AND COVER DETAIL	
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		MISSOURI AMERICAN WATER ENGINEERING 727 CRAIG ROAD ST. LOUIS, MO. 63141	 <b>MISSOURI AMERICAN WATER</b>
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## TYPICAL MANHOLE VENT

### NOTES:

1. VENT OPENING SHALL BE MIN. 4'-0" ABOVE FINISHED GRADE OR MIN. 1' ABOVE 100 YEAR FLOODPLAIN ELEVATION.
2. PRIME AND PAINT EXPOSED DIP USING TWO COATS OF POLYURETHANE. COLOR TO BE SELECTED BY PROJECT MANAGER FROM MANUFACTURER'S STANDARD COLORS.

### REVISIONS

### MOWAC WASTE WATER STANDARDS

### MANHOLE VENT DETAIL

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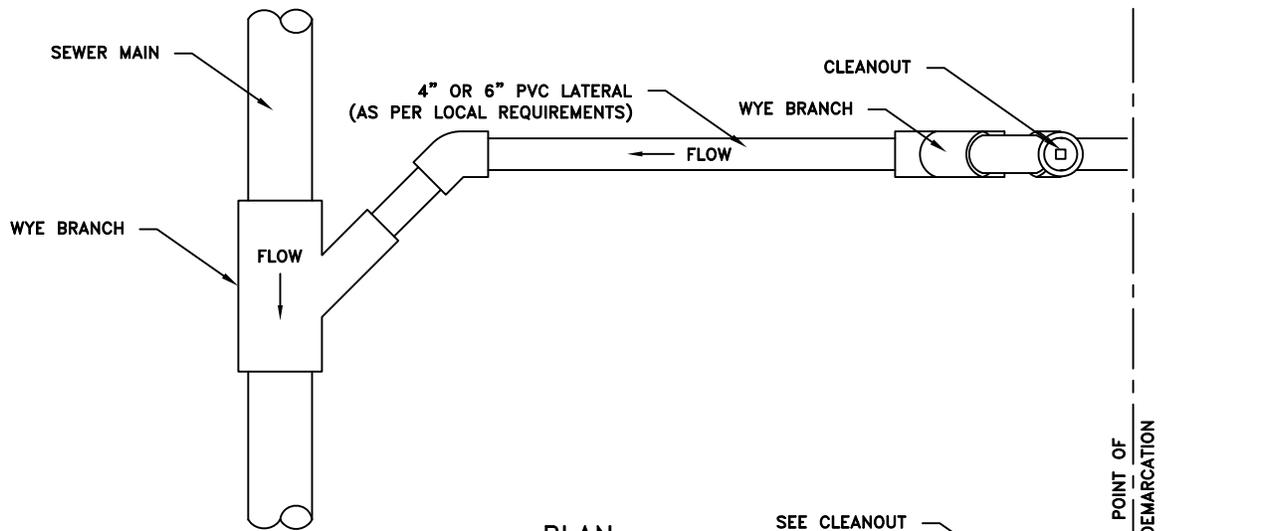
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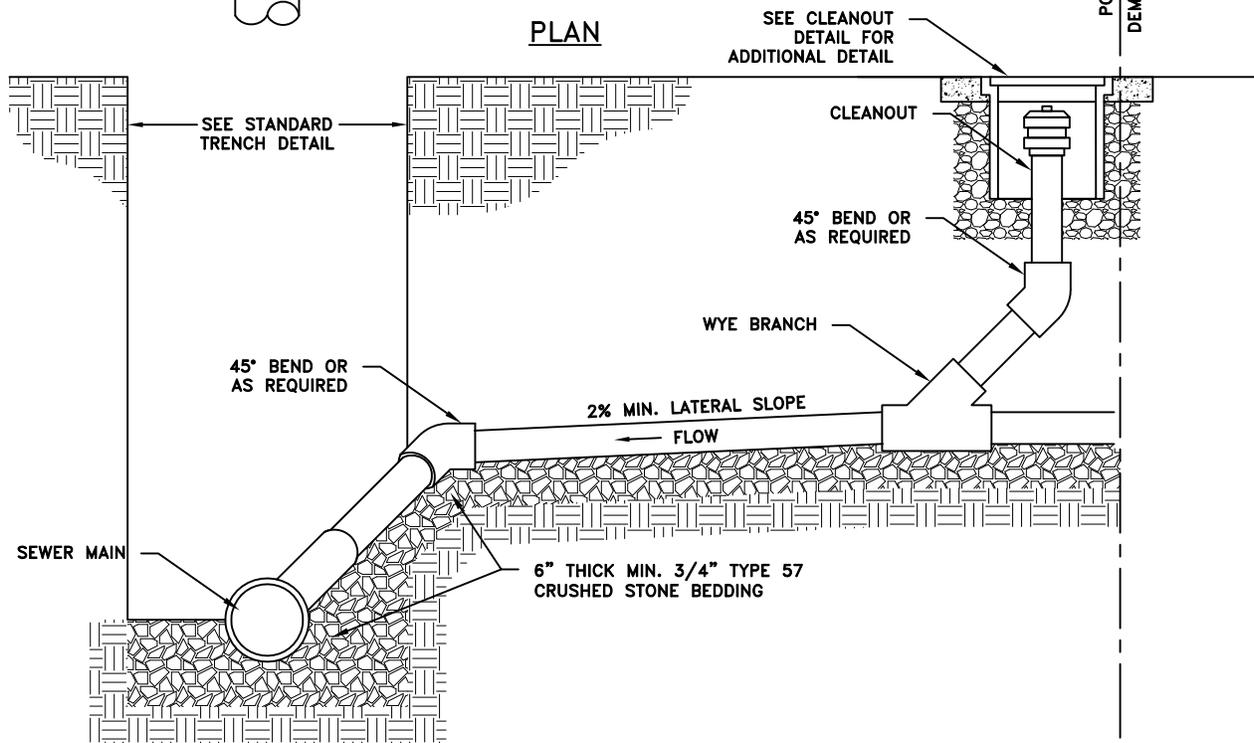
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**PLAN**



**PROFILE**

# SANITARY SEWER LATERAL

REVISIONS

MOWAC WASTE WATER STANDARDS

SANITARY SEWER LATERAL  
DETAIL

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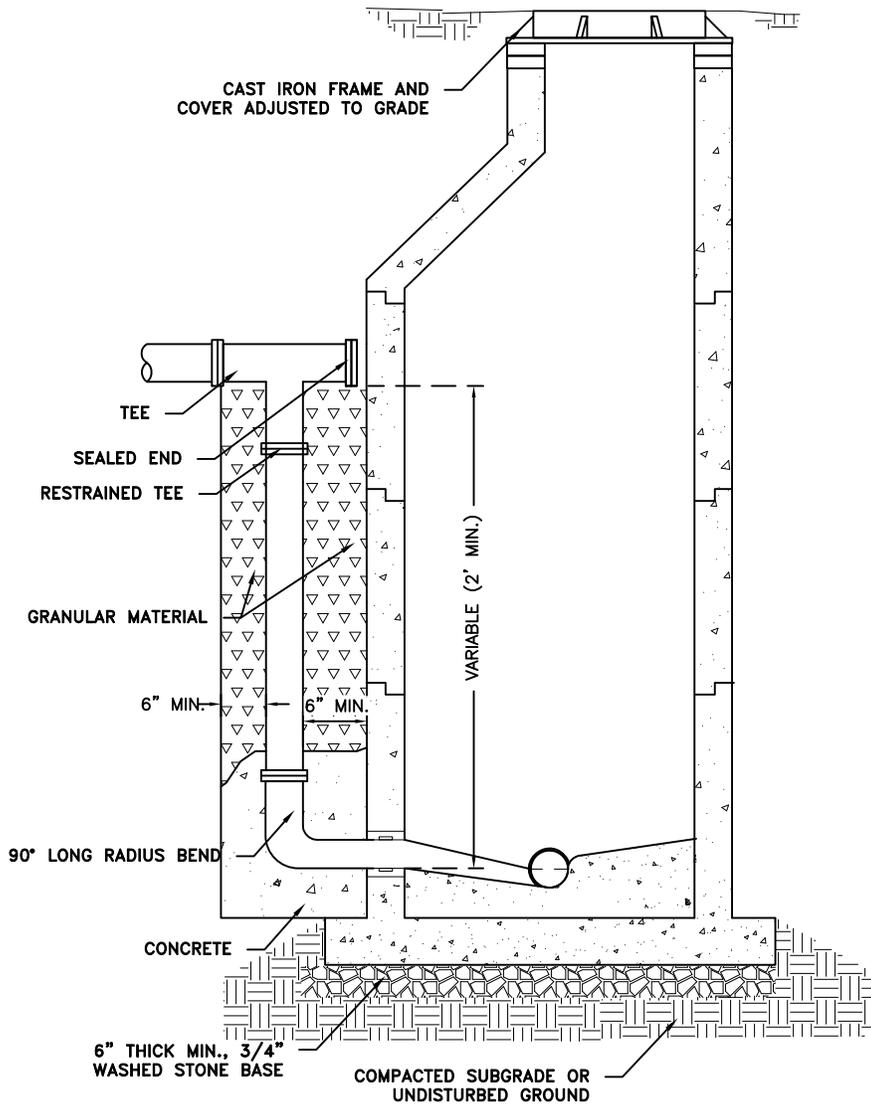
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N.T.S.

## FORCE MAIN DISCHARGE MANHOLE DETAIL

**NOTES:**

1. FORCEMAIN SHALL TERMINATE BELOW MANHOLE INVERT WITH THE TOP OF PIPE MATCHING THE WATER LEVEL IN THE MANHOLE AT DESIGN FLOW.
2. THIS DETAIL SHALL ONLY BE UTILIZED WHEN THE INVERT OF AN INCOMING FORCE MAIN IS 24" OR MORE ABOVE THE MANHOLE INVERT.
3. MANHOLES THAT ARE UTILIZED AS THE RECEIVING MANHOLE OF A FORCE MAIN SHALL BE PROVIDED WITH A FIBERGLASS LINER OR SEWER GAS RESISTANT EPOXY COATING TO HELP PREVENT THE EARLY DETERIORATION OF THE MANHOLE DUE TO THE PRESENCE OF CORROSIVE GASES.

REVISIONS

MOWAC WASTE WATER STANDARDS  
FORCE MAIN DISCHARGE MANHOLE  
DETAIL

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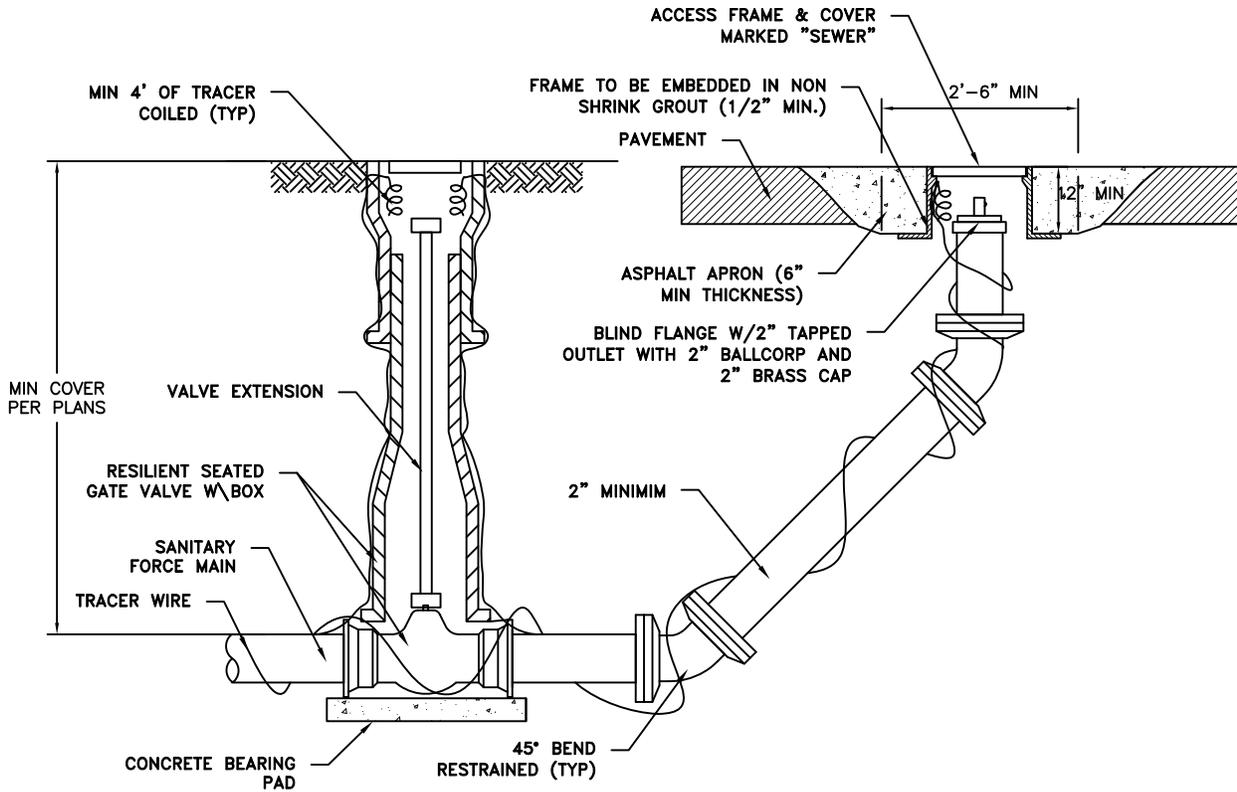
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## SANITARY FORCE MAIN CLEANOUT DETAIL

### NOTES:

1. VALVES, VALVE BOXES AND VALVE EXTENSIONS SHALL MEET THE SAME REQUIREMENTS AS SHOWN IN THE STANDARD WATER DETAILS.
2. VALVE MARKER POSTS SHALL MEET THE SAME REQUIREMENTS AS SHOWN IN THE WATER DETAILS AND BE PAINTED AS SPECIFIED IN THE STANDARD CONSTRUCTION NOTES.
3. ALL DIP AND FITTING SHALL BE PROTECTOR 401 EPOXY COATED. ALL PIPE AND FITTINGS SHALL BE RESTRAINED JOINT.

### REVISIONS

### MOWAC WASTE WATER STANDARDS SANITARY FORCE MAIN CLEANOUT DETAIL

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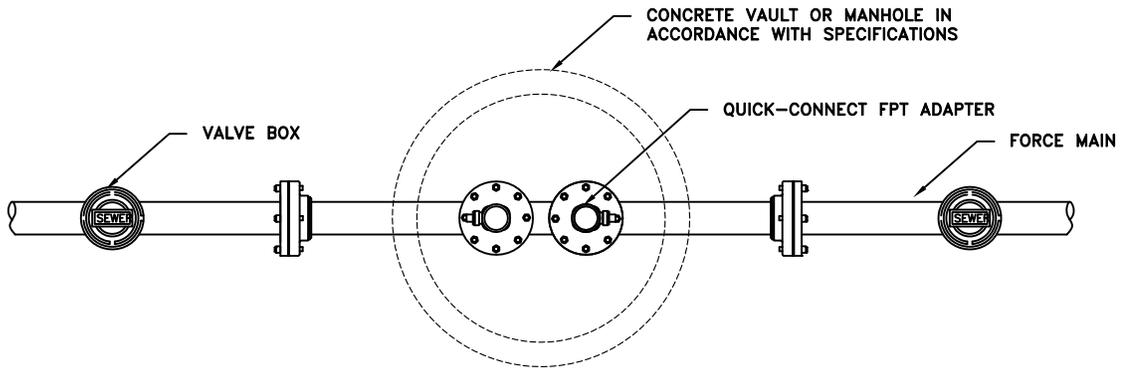
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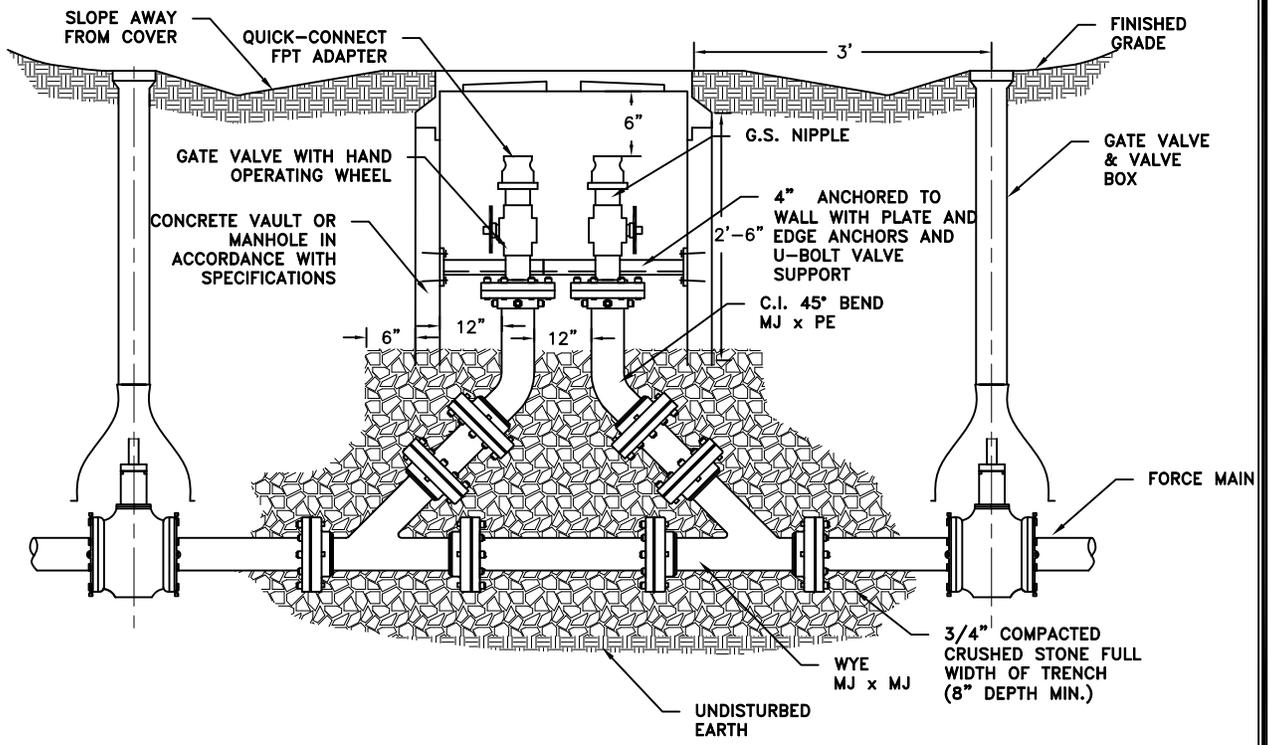
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PLAN VIEW



PROFILE

# FORCE MAIN DUAL CLEAN OUT MANHOLE

**NOTE:**

1. RISER PIPES SHALL BE SAME DIAMETER AS FORCE MAIN.
2. FOR RISERS SMALLER THAN 2", GATE VALVES MAY BE REPLACED WITH BALL VALVES.

REVISIONS

MOWAC WASTE WATER STANDARDS  
 FORCE MAIN DUAL CLEANOUT MANHOLE  
 DETAIL

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 ST. LOUIS, MO. 63141



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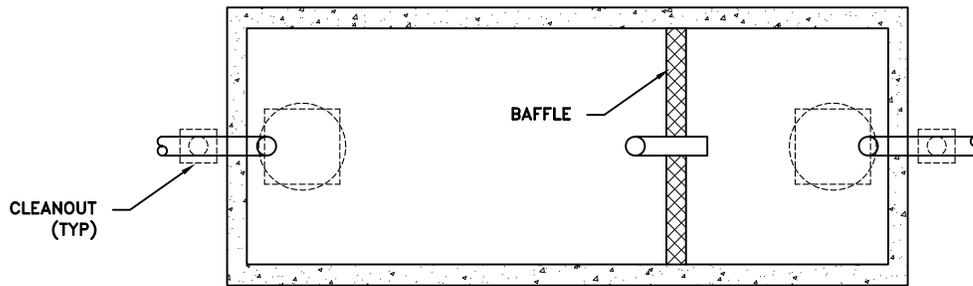
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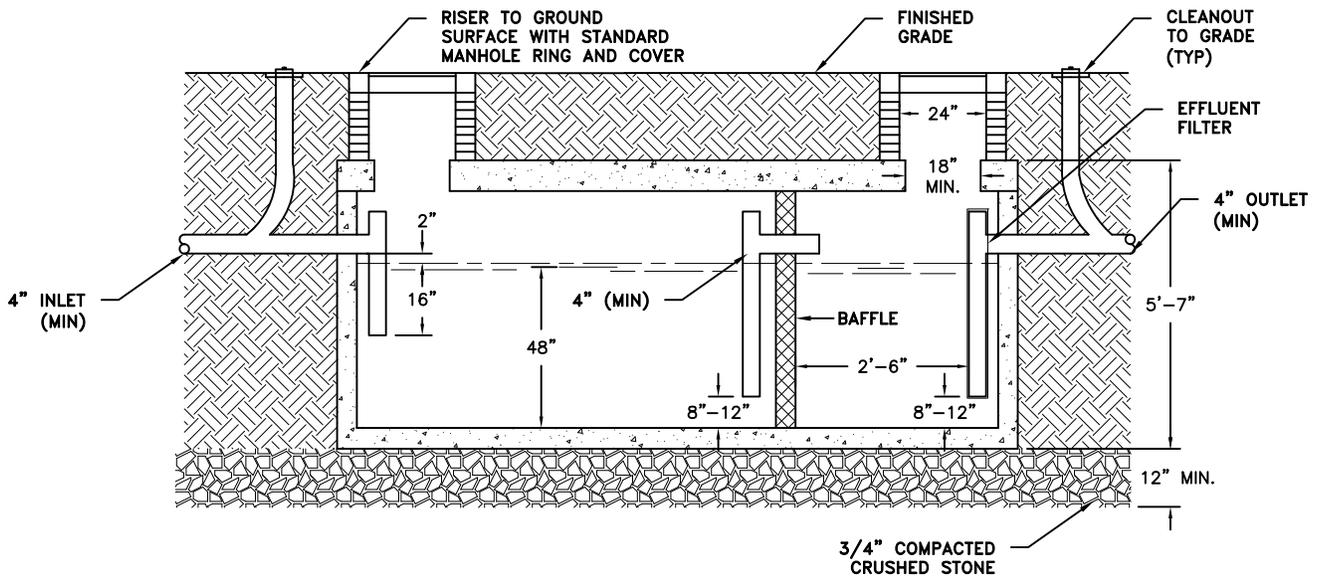
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PLAN



ELEVATION

NOTE:  
INLET INVERT SHALL BE AT LEAST TWO INCHES ABOVE THE OUTLET INVERT.

## TYPICAL UNDERGROUND GREASE TRAP DETAIL

REVISIONS

MOWAC WASTE WATER STANDARDS  
TYPICAL UNDERGROUND GREASE TRAP  
DETAIL

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