AMERICAN IRON & STEEL WAIVER REQUEST REVIEW APPLICATION

STONY BROOK REGIONAL SEWERAGE AUTHORITY
(Project Owner)

Dewatered Sludge Handling Pump Replacement Project, Contract 16-1 (Project Name)

S340400-10 (NJEIFP Project No.)

GENERAL –

Description of Construction Material: *6" ball valve, ANSI 300# flanged, trunnion mounted, automated.*

Quantity and Unit of Measure: *Four (4) ea.*

Price: *$62,439.00, ea.*

Time of Delivery or Availability: *10 weeks lead time following approval*

Location of Construction Project: *Operations Building*

Name and Address of Proposed Supplier and/or Manufacturer: *Chaoda USA (model 3-BTM-2-FP-RF-WCB-11-NA-G-G) 10633 W Airport Blvd, Ste 200, Stafford, TX 77477***,** *supplied by Raritan Valve and Automation 295 Meadow Road, Edison, NJ 08817*

Detailed Justification for the Use of Foreign Construction Materials: *There is only a single manufacturer of SRF/AIS compliant ball valves that meet the specifications. The lead time for these valves is unacceptably long (24 to 26 weeks) and there is a 310% price premium.*

AVAILABILTY WAIVER REQUEST –

Domestic Supplier Information: *Chaoda USA 832-939-9944*

Project Schedule (provide NTP date, completion date, project schedule) **:**

Notice to Proceed date: 6/19/17

Completion Date: 11/18/18

Project Schedule: 518 Days

List of Supporting Documentation:

Valve Specification Section 13100
Shop Drawing Transmittal for Proposed Valve
List of Contacted Manufacturers
Project Schedule
References

Cost of All Materials on Project: $2,738,215

Cost of All AIS Components on Project: $503,788

Material Meets National Deminimis Waiver: No

Material Greater Than 50% Iron or Steel: Yes

Est. Time Material to be Installed in Project: Two (2) Weeks

Efforts to Locate Available Domestic Suppler / Manufacturer: *Contacted 21 manufacturers of ball valves that meet the specifications looking for AIS compliant valves.*

NJDEP Contacts:

- Robert M. Hopkins, P.E., Project Engineer
- William P. Machotka, P.E., Section Chief

Owner Contacts:

- Antonia Pchola, P.E., Assistant Executive Director
- Courtney Bixby, Assistant Manager of Engineering

SECTION 13100

PIPING, VALVES, AND SPECIALS

PART 1 GENERAL

1.01. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to Work of this Section.

1.02. SUMMARY

A. This section includes non-buried piping, valves, and specials.

1.03. QUALITY ASSURANCE

A. Pressure tests for pipes.

1. Test piping after installation at 400 psig (minimum) or at the pressure directed by the Engineer based on the particular application. The piping shall hold the test pressure for 2 hours without pumping. Protect or remove pressure gauges, switches, metering or control equipment prior to making tests.

2. Repair all piping not meeting test requirements.

B. Piping valves and specials specified herein shall be essentially the standard products of manufacturers who have been regularly engaged in the successful production of high quality materials of this type for at least ten years.

C. Repair or replace defective piping valves or specials.

D. The piping systems described herein shall meet all federal, state and local codes for the type of piping system.

1.04. SUBMITTALS

A. Submit shop drawings as follows:

1. Furnish detailed drawings in plan and profile for all piping three (3) inches in diameter and larger showing full details of all pipe, valves and specials.

2. Drawing scale shall be large enough to show pipe, fittings, and taps clearly.

3. Pipe and pipe supports shall not be ordered and/or fabricated until drawings are approved.

B. Manufacturers Certification.

1. Pipe and Fittings

2. Valves

C. For the hopper gates, submittals shall include the followings as a minimum:

1. Detailed custom drawings of the gate assembly with dimensional and mounting information and a listing of the materials of construction. General arrangement drawings and cut sheets are not considered acceptable drawings.

2. Operation and Maintenance Manual.

a. Submit Operation and Maintenance Manuals in accordance with requirements specified in Sections 01300. As a minimum, the following information shall be submitted:

1) Equipment descriptions

2) Operating instructions

3) Drawings.

4) Troubleshooting techniques.

5) Recommended maintenance schedule, lubricants, and spare parts.

b. Include approved shop drawings as part of the FINAL Operation and Maintenance Manual.

3. Manufacturer’s Certification of Equipment Compliance.

4. Manufacturer’s Certification of Equipment Installation.

5. Manufacturer’s Field Testing Report.

6. Manufacturer’s Training Plans and Training Report.

7. Equipment Warranty.

1.05. DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle the piping valves and specials in accordance with Division 1 General Requirements, and manufacturer's recommendations, and as supplemented herein.

B. Pipe and related materials shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped or skipped against pipe already on the ground.

C. Pipe and related materials shall at all times be handled with care to avoid damage. The interior shall be kept free from dirt and foreign matter. All pipes, valves, and appurtenances shall be carefully lowered or raised into place, with suitable equipment in a manner that will prevent damage to the material. Under no circumstances shall pipe or accessories be dropped or dumped.

D. Pipes, pipe linings, fittings, valves, and all related materials shall be thoroughly inspected for defects prior to installation. Any defective, damaged, or unsound materials, as determined by the Engineer, shall be repaired or replaced as directed, at no additional cost to the Owner.

E. All lumps, blisters, and excess coating shall be removed from the ends of each pipe. The joints shall be wire brushed and wiped clean, dry and free from oil and grease before the pipe is installed.

PART 2 PRODUCTS

2.01. PIPE, FITTINGS AND SPECIALS

A. Carbon Steel Pipe (Sludge Cake Piping)

1. Material: ASTM A-53, Grade B, Schedule 40

2. Pressure Rating:

   a. 700 psi (minimum) working pressure

   b. 2,100 psi (minimum) burst pressure (3:1 safety factor)

   c. Hydrostatically pressure test at 400 psi

3. Fittings:

   a. Segmentally welded Schedule 40 steel pipe, per ASTM A-53 Schedule 40 Grade B

   b. Long radius bends – 5:1 (minimum 3:1 only if approved by Engineer)

   c. Manufacturer: Victaulic Co., SBI, or approved equal

4. Flanged Joints

   a. Flanged Joints shall be permitted where piping is connected to pumps, lubrication rings, or valves. The pipe end and flange face shall be finish machined in a single operation. Flange faces shall be perpendicular to the pipe center line. Flanges for ball valves shall be raised face. Flanges for lubrication rings shall be flat faced.

   b. When bolting flanged joints, care shall be taken to avoid restraint on the opposite end of the pipe or fittings, which would prevent uniform gasket

compression or which would cause unnecessary stress in the flanges. One flange shall be free to move in any direction while the flange bolts are being tightened. Bolts shall be tightened gradually and at a uniform rate, to ensure uniform compression of the gasket.

c. Special care shall be taken when connecting to pumping equipment to ensure that pipe stresses are not transmitted to the pump flanges. All such piping shall be permanently supported so that accurate matching of bolt holes and uniform contact over the entire surface of abutting pump and piping flanges are obtained before installation of any bolts in those flanges. In addition, pump connection piping shall be free to move parallel to its longitudinal center line while the flange bolts are being tightened.

5. End Joints

a. Couplings shall be heavy duty castings with split design consisting of a two piece ductile or malleable iron casting, nitrile based rubber cavity gasket, and a two bolt connection. The joints shall be SBI Type SX designed for high pressure sludge cake service. Raised chamfered ends shall be supplied such that coupling increases clamping force on the end connections. Faces of the raised ends shall include male/female interlocking joint with quad ring gasket in the internal female groove for added sealing. The high pressure coupling system shall be designed for a minimum working pressure of 700 psi and burst pressure of 2,100 psi.

b. Victaulic HP70 Couplings: Sizes 2” through 12”, consisting of two ductile iron housing segments conforming to ASTM A-536, Grade 65-45-12, with key designed to clamp the bottom of the groove, Grade “E” EPDM pressure responsive gaskets, and heat-treated plated bolts and nuts conforming to the chemical and physical requirements of ASTM A449. Suitable for working pressure to 800 psi in sizes through 12”.

c. Special care shall be taken when connecting to pumping equipment to avoid transmitting pipe stresses to the pump flanges. Piping shall be permanently supported so that accurate matching of piping and abutting pump flanges is obtained before any bolts are installed in the flanges.

6. Reducers

a. Where indicated on the drawings, reducers shall be concentric pattern.

B. Stainless Steel Water Piping (Pipeline Lubrication System Piping – See Specification 11312)

1. Pipe shall be Schedule 40 manufactured from ASTM-A240 annealed and pickled sheets and plates in accordance with ASTM A778 in type 316 stainless steel. Pipe shall be manufactured to nominal pipe sizes as listed in ANSI B36.19, Table 2.

2. Fittings shall be Schedule 40, full penetration butt weld type manufactured in accordance with ASTM A774 of the same raw material and of the same thickness as

the pipe. Long radius elbows shall be smooth flow; i.e. center-line to end of elbow equals 1.5 times the nominal pipe size. All short radius, special radius, and reducing elbows diameter shall be of mitered construction with at least (5) miter sections for 90 degree bends, (3) mitered sections for 45 and 60 degree bends, and (2) mitered sections for 30 degree and smaller bends unless otherwise shown on the Drawings. Reducers shall be straight tapered, cone type. Tees, crosses, laterals and wyes shall be shop fabricated from pipe.

3. The finish on the raw material, manufactured to ASTM A240 will be No. 1, HRAP (hot rolled annealed and pickled) or better. The finish on the completed pipe and fittings shall be as specified in ASTM A778 and A774, respectively.

4. Flanged pipe ends shall be made up of type (316) stainless steel slip-on type rolled angle face rings and (primed) ductile iron back-up flanges drilled to ANSI 16.1 class 125 standard and 300 standard. The angle face ring thickness shall be equal to or greater than the wall of the pipe or fitting to which it is welded and it shall be continuously welded on both sides to the pipe or fitting. The angle leg shall not interfere with the flange bolt holes.

5. The piping will be shop prepared for pipe couplings where shown on the drawings or specified herein.

    a. Couplings on liquid lines shall be Victaulic Company, (Depend-O-Lok) Fluid Master coupling system with BUNA – N gaskets, or approved equal and on air lines shall be (Depend-O-Lok) Air Master with gaskets or approved equal. Expansion couplings shall be Victaulic Style 231 / 231S (Depend-O-Lok FxE) with gaskets or approved equal. Couplings shall be fixed Victaulic Style 232 / 232S FxF, expansion Victaulic Style 230 / 230S ExE or Victaulic Style 231 / 231S fixed by expansion FxE as noted on the drawings.

    b. The pipe shall be plain end with external weld beads ground smooth with stainless steel restraining rings welded to the pipe. Restraining rings may be field welded in those instances where field adjustment of pipe length maybe necessary. Restraining rings shall not be installed where expansion couplings are required.

6. Threaded Connections.

    a. Threaded pipe, gauge or instrument connections shall be made using stainless steel 150-pound threaded half couplings conforming to ASTM A182 or ASTM A276, shop welded to the pipe at the locations shown on the drawings.

7. Joints.

    a. Flanges shall be provided as a minimum at all flanged valves, meters, couplings, and other equipment. Couplings will be provided as shown on the drawings.

b. Pipe and fitting spools shall be shop fabricated to the fullest extent possible in 40'0" maximum lengths with 7'6" maximum widths for efficient commercial transport to the project site. Spools with fittings may exceed 40'0" so long as length allows commercial transport. Smaller pipe spools shall be provided with joints for special handling, installation, and/or disassembly requirements.

c. All other joints required for shipping, handling and installation of the piping spools shall be flanged joints.

d. All stainless steel pipe 1/2" thru 3" shall be Schedule 40 with threaded joints.

8. Flange bolting shall be stainless steel type 316.

9. The contractor shall supply and install gaskets suitable for the intended application.

10. After the manufacture of individual stainless steel fittings and pipe lengths, they shall be pickled by immersion in a tank containing an ambient nitric-hydrofluoric acid solution made up from Oakite Deoxidizer SS, or equal, and monitored to generally maintain a 25% or higher solution by volume of water. The duration of immersion shall be 15 to 20 minutes and may be supplemented by manually scrubbing or brushing with nonmetallic pads or stainless steel wire brushes. The acid treatment shall be followed by immersion in a rinse water tank, followed if necessary by a spray rinse. The stainless steel products shall then be allowed to air dry to achieve passivation.

11. Welding of pipe spools shall be performed using welders and procedures qualified in accordance with ASME Section IX. Piping with wall thicknesses up to and including 11 gauge (0.125") shall be welded with the TIG (GTAW) process. Heavier walls shall be beveled according to procedure, root pass welded with the TIG (GTAW), and have subsequent weld passes performed using the TIG (GTAW), MIG (GMAW), or Metallic Arc (SMAW) process. Filler metal of equal or superior ELC grades only shall be added to all welds to provide a cross section at the weld equal to or greater than the parent metal. Weld deposit shall be smooth and evenly distributed; weld reinforcement shall be as follows.

Wall Thickness		Weld Reinforcement (Max)
I.D.	O.D.	
Up to 12 Ga. (0.109")	1/16"	3/32"
11 Ga. (0.125") to 3/16" PL.	3/32"	1/8"
1/4" Plate & Larger	1/8"	3/16"

12. Concavity, undercut, cracks or crevices shall not be allowed. Butt welds shall have full penetration to the interior surface and inert argon gas shielding shall be provided to the interior and exterior of the joint. Angle face rings shall be continuously welded on both sides to pipe or fitting. Exterior welds, such as the back side of face rings or flanges and structural attachments, may be welded by the MIG (GMAW) or

Metallic Arc (SMAW) process; however, care must be taken to avoid melting through to the interior surface on very light walls. Excessive weld deposits, slag, spatter and projections shall be removed by grinding. Welds on gasket surfaces shall be ground smooth.

13. Spools shall be fabricated to the "Pipe Fabrication Institute" fabricating tolerances ES-3.

14. After shop fabrication into pipe spools, exterior welds shall be manually scrubbed or brushed with nonmetallic pads or stainless steel wire brushes to remove weld discoloration, rinsed with clean water and allowed to air dry.

15. All fabricated piping shall have openings plugged and flanges secured for storage and/or transport after fabrication. All fabricated piping shall be piece marked with identifying numbers or codes which correspond to the contractor's layout and installation drawings. The marks will be located on the spools at opposite ends and 180 degrees apart.

2.02. VALVES, GATES, AND SPECIALS

A. High Pressure Ball Valves (Sludge Cake Piping)

1. General: The ball valve shall be full port, trunnion mounted, top entry, designed for high pressure service. The valves shall be API monogrammed and shall be built and audited to API 6D and ANSI standards. The valve shall consist of a full port ball that rotates on a fixed axis with an upper stem and lower trunnion. The valve shall be a bi-directional flow valve with independent sealing capability on each side of the ball. The valve shall also be a non-lubricated valve, designed for dirty service (i.e. high solids applications).

2. Materials: Conform to the requirements of ANSI B16.34 and API 6D

   a. Valve Body: Cast steel, ASTM A216, Grade WCB or forged steel, ASTM A105

   b. Valve Stem and Trunnion Stem: Stainless steel, Type 316 or 17-4 PH

   c. Ball: Stainless steel, Type 316

   d. Seat: Metal with hard facing

   e. Gear Operating Housing: Cast iron

   f. Gear: Cast iron or aluminum bronze

   g. Worm: Tool steel

3. Pressure Rating

a. Class 300 with 700 psi (minimum) working pressure

4. Manufacturers:

   a. A.E. Valves

   b. Cornerstone

   c. Forum

   d. MOGAS Industries

   e. Union Tech

   f. Approved equal

5. Valve Body: Each valve body shall be provided with either grooved or flanged ends. Actual length of valves shall be within 1/16 inch (plus or minus) of the theoretical length.

   a. Valve Body shall be Top Entry for access, maintenance, and inspection. Split body, end entry design acceptable as an alternate for consideration. Multi-purpose stem and interchangeable top plates shall permit changing from wrench to gear operator without disturbing any pressure containing parts. Provisions shall be made for emergency sealing for the stem.

   b. Valve shall be capable of double block and bleed service as standard; pressure from either side of a closed valve is stopped by seat seal so that the ball cavity may be vented to verify both upstream and downstream seat seal integrity.

6. Ball. Ball shall be full port solid ground ball. Balls shall not be restricted port. Hollow or sleeved balls are not acceptable.

7. Seats. Seats shall be of the fully metal to metal design.

8. Valve Actuators. Shall be capable of closing the valve, starting from wide open with the maximum port velocity specified and ending with a differential equal to the specified maximum shutoff pressure.

9. Rotation. Unless otherwise required by the Owner, the direction of rotation of the wheel or wrench nut to open each valve shall be to the left (counterclockwise). Each valve body or actuator shall have cast thereon the word “Open” and an arrow indicating the direction to open.

10. Handwheels. Handwheel diameters shall be at least 18 inches.

11. Chainwheels. Unless specifically required to be equipped with other types of actuators, all valves with center lines more than 7’-6” above the floor shall be provided with chainwheels and operating chains. Each chainwheel operated valve

shall equipped with a chain guide which will permit rapid handling of the operating chain without "gagging" of the wheel and will also permit reasonable side pull on the chain. Suitable actuator extensions shall be provided, if necessary, to prevent interference of chain and adjacent piping or equipment. Operating chains shall be hot-dip galvanized carbon steel and shall be looped to extend to within 4 feet of the floor below the valve.

12. Position Indicators. Unless otherwise specified, each valve shall be provided with a position indicator to display the position of the ball.

    a. Each valve actuator shall have a position indicator mounted on the end of the valve shaft. A position indicator shall also be provided on each actuator mounted thereon.

13. Shop Painting. All interior and exterior ferrous metal surfaces of valves and accessories shall be shop pained for corrosion protection. The following surfaces shall be painted:

    a. Unfinished surfaces

    b. Exterior surfaces of valves with a rust-inhibitive primer

    c. Polished or machined surfaces with a rust-preventive compound

    d. Actuators and accessories with a rust-inhibitive primer

B. Electric Motor Operators

1. The actuators shall be compatible with the high pressure ball valves specified herein and suitable for use on a nominal 480 Volt, three Phase, 60-hertz power supply and incorporate motor, integral reversing starter, local control facilities and terminals for remote control and indication connections. All motor operated valves are open / close type. End of travel switches required.

2. Manufacturer:

    a. All technologies and devices used in the actuator must have a minimum of five years of commercial operating experience for that specific manufacturer.

    b. Actuators shall be:

        i. EIM TEC2

        ii. Limitorque MX

        iii. ROTORK IQ

        iv. Approved Equal

3. Actuator Sizing:

a. The actuator shall be sized to guarantee valve closure at the specified differential pressure or head.

b. All valves shall operate in 60 seconds or less. The valve closure speed shall be field adjustable.

c. The safety margin of motor power available for operating the valve shall be sufficient to ensure torque switch trip at two times the maximum valve torque (i.e. 2:1 safety factor) with the supply voltage 10% below nominal.

4. Operating Environment: The actuator shall be capable of functioning in an ambient temperature ranging from minus -22°F (- 30°C) to +160°F (+ 70°C).

5. Motor:

a. The electric motor shall be Class F insulated with a time rating of at least 15 minutes at 104°F (40°C). A suitable self-resetting thermal protection device shall be incorporated in the motor or motor starter circuits.

6. Gearing:

a. The actuator gearing shall be totally enclosed in oil.

b. No actuator mounting restriction shall be permitted.

7. Hand Operation:

a. A handwheel shall be provided for emergency operation.

b. The handwheel shall be engaged when the motor is declutched by a lever or similar means.

c. Motor drive shall be restored automatically when the motor is energized.

d. The hand/auto selection lever should be padlockable in both "Hand" and "Auto" positions.

8. Integral Control and Protection Facilities

a. Integral starters rated for 600 starts per hour.

b. The reversing starter, control transformer, and local controls shall be integral to the actuator.

9. Integral Transformer:

a. The controls supply transformer shall be fed from two (2) of the incoming three phases.

b. Shall have the necessary tappings and be adequately rated to provide power for the following functions:

i. Energization of the contactor coils and all non-critical control functions.

ii. 24 VDC or 120 VAC output as indicated on the control system data for actuator remote controls

iii. Supply all internal control circuits

c. Fuse(s) shall protect the primary windings.

d. A self-resetting fuse shall protect secondary winding.

10. Integral Push-Buttons and Selector:

a. Shall include local controls for Open, Close, and Stop.

b. Shall include a local/remote selector switch padlockable in any one of the following three positions:

i. Local Control only.

ii. Off (No Electrical Operation).

iii. Remote Control Only.

11. Control Facilities:

a. Unless noted in the control system specification or drawings, the necessary circuits, wiring, and terminals shall be provided in the actuator for the following control functions:

iv. Removable links or contact points for external interlocks to inhibit valve opening and/or closing.

v. End of travel limit contacts that are field adjustable.

vi. Connections for external remote controls fed from an external supply of (min. 12V, max. 120V) to be suitable for any one or more of the following methods of control:

a) Open, Close, and Stop.

b) Two-Wire Control, Energize to Close (or open), De-Energize to Open (or Close).

12. The motor shall be deenergized in the event of a stall when attempting to unseat a jammed valve.

13. Torque protection reset shall not allow repeated starting in the same direction when control signal is maintained.

14. Actuator Torque Protection:

    a. Each actuator shall be provided with both open and close torque protection.

    b. For security purposes, all adjustments to torque settings shall be limited to a removable intrinsically safe blue-tooth enabled PDA.

    c. Torque sensing:

        i. Must be affected purely electrically or electronically.

        ii. Torque protection range shall be 40 to 200 percent of the rated torque.

15. Actuator Position and Status Indication:

    a. Four contacts shall be provided unless otherwise indicated in the actuator control drawings.

        i. It shall be possible to indicate any position of the valve with each contact selectable as normally open or normally closed.

        ii. The contacts shall be rated at 5A, 250VAC, 30VDC.

        iii. Unless noted the actuator shall be provided with contacts for monitoring actuator operation and availability as follows. Each contact shall be capable of providing the following status conditions as a NO or NC contact:

            a) Thermostat trip.

            b) "Remote" selected as discrete signals.

            c) Loss of main supply.

            d) Loss of internal control circuit supply.

            e) “Stop” function on actuator operated.

            f) Motor thermostat tripped (where applicable).

    b. In the event of a (main) power (supply) loss or failure, the actuator shall maintain position.

16. Local Display and Indications:

a. Shall show the following conditions simultaneously, either with LED's or LCD's display when they occur.

b. Valve position; full open (100%) to full close (0%).

c. Actuator torque switch trip.

d. If batteries are required, Low battery condition.

e. Actuator Fault.

f. All enclosures must be rated the same as the actuator.

17. Monitoring & Diagnostics Facilities:

a. Each actuator shall include a diagnostic module.

i. Shall store historical actuator data.

ii. The actuator supplier to allow reconfiguration and diagnostic information to be reviewed and analyzed. Shall provide a software tool as required.

b. Diagnostic data shall be available without requiring the opening of any actuator covers.

c. Diagnostic information shall be available from both an integrally mounted display window and through non-intrusive means of reading and writing data to the actuator.

18. Wiring and Terminals:

a. The terminal compartment shall be separated from the inner electrical components of the actuator by means of a watertight seal.

19. Enclosure:

a. Actuators shall be 'O' ring sealed, watertight to NEMA 4X/6 (6 ft. for 30 minutes).

b. If actuator manufacture requires an electrical connection for any storage period, it shall be the responsibility of the contractor to supply all labor and materials required to power the actuators.

c. All actuator external fasteners shall be made of stainless steel.

C. Discharge Slide Gate for Storage Hopper (Manually Operated)

1) Maximum Working Pressure: 1,260 lb/ft^2 with hopper brim full and assuming cake sludge bulk density of 70 lb/ft^3.

2) Manufacturer shall provide gate design calculations for review. Contractor shall field verify the pump hopper dimensions and provide information to the gate manufacturer prior to shop drawing submittal and fabrication.

3) Performance Requirements. Leakage for the gate shall be restricted to 0.01 gpm/ft or less of the seal perimeter.

4) Quality Assurance.

   a. All gates shall be shop inspected for proper operation prior to shipment.

   b. Welds shall be performed by welders with ASME Section IX certification.

   c. The gate manufacturer shall be ISO 9001:2008 certified.

5) Material of Construction. Type 304 or Type 304L Stainless steel, ASTM A240 or ASTM A276 unless otherwise indicated herein.

   a. All welded stainless steel components shall be constructed of Type 304L stainless steel.

   b. All non-welded stainless steel components, excluding attachment bolts and assembly bolts, shall be Type 304 or Type 304L stainless steel.

   c. Attachment bolts and assembly bolts shall be Type 316 stainless steel.

6) Slide. The slide shall consist of a stainless steel plate that is reinforced with stiffeners to withstand the required head conditions. The slide shall engage the frame a minimum of 1-inch on each side.

   a. The slide shall be reinforced with plates or channel shaped members to restrict deflection to 1/16-inch or less at the required head.

   b. The stiffeners shall be welded to the slide plate in the horizontal and vertical positions.

c. A stem connector shall be welded to the slide as a means of connecting the operating stem. The bottom portion of the stem shall be affixed to the stem connector with a minimum of two bolts.

7) Frame. The frame shall be constructed of stainless steel plate with the guide section formed into "C" shaped channel to house the seal, and shall be reinforced to withstand the required operating conditions.

a. The frame shall be a flange frame with rigid, one-piece guide assembly.

b. Lifting lugs shall be provided on all frame styles.

c. The frame shall be of the configuration as shown in the Contract Drawings.

d. The side frame shall extend to accommodate the full travel of the slide.

8) Seals. The seal system shall consist of self-adjusting UHMWPE seals with a nitrile compression cord.

a. The UHMWPE seals shall be arranged to ensure that there is no metal-to-metal contact between the slide and frame.

b. The compression cord shall be contained by the UHMWPE seal so that it shall not be in contact with the slide.

c. Seal system shall be self-adjusting for the life of the gate. Adjustable wedging devices such as wedges, wedge bars and pressure pads are not acceptable.

d. Rubber side seals and/or top seals such as J-bulb seals, P-seals and D-seals are not acceptable in lieu of UHMWPE seals.

e. The invert seal shall use a compressible rubber seal located on the bottom of the slide or in the invert of the frame.

i. The invert seal shall be of a flush bottom arrangement.

ii. The invert seal shall be mechanically fastened with stainless steel bolts.

iii. Invert seals attached solely by the use of adhesives are not acceptable.

f. All seals shall be secured with assembly bolts. All seals shall be field removable and field replaceable without the need to remove the gate frame from the wall.

g. The seal system shall have been shop tested with a 25,000 cycle operating test in an abrasive environment to confirm the ability of the seals to withstand the abrasive condition with negligible deterioration and to confirm that the leakage restriction requirement is still possible.

i. The shop test shall have been performed on a stainless steel gate and the test results shall have been certified by the manufacturer in writing.

ii. A copy of the test results from the 25,000 cycle test confirming the durability of the seal system shall be submitted for review.

9) Operating Stem

a. The operating stem shall be of stainless steel and shall be designed to transmit in compression at least 2 times the rated output of the manual operating mechanism with an 80 lbs effort.

b. The stem shall have a slenderness ratio (L/r) of less than 200.

c. The threaded portion of the stem shall have a minimum diameter of 1-1/2 inches.

i. The threads shall have machine rolled, full depth ACME threads.

ii. Stub threads are not acceptable.

d. Stop collars shall be provided to limit the travel on gates with manual operating mechanisms.

vii. Stop collars shall be bronze and shall be internally threaded and provided with set screws.

10) Operating Mechanism

a. Operating mechanisms shall be provided by the gate manufacturer.

b. Manual operators shall be yoke mounted.

i. Manual operators shall be gearbox equipped and of the handwheel type with chainwheel and chains for operating overhead gates. Refer to Article 2.02.A.2.11 in this Section for chainwheel and chains.

ii. Gear ratios shall be selected by the gate manufacturer to ensure that the maximum operating effort is 40 lbs at the design head.

iii. Gearboxes shall have ductile iron or stainless steel housings and a bronze lift nut.

iv. Mechanical bearings shall support the lift nut and input shaft (when applicable).

v. Handwheels shall be provided.

vi. Adaptor plates shall be utilized to attach the operating mechanism to the yoke. Adaptor plates shall be stainless steel and shall have a minimum thickness of 1/2-inch.

11) Finish

a. All heat tint and slag from the welding process shall be acid passivated or mechanically passivated through bead blasting in accordance with ASTM A380. Grinding or buffing is not acceptable in lieu of passivation.

b. All ferrous components shall be suitably prepared and then shop coated with primer and finish coating(s). Field coating shall be performed when required.

12) Manufacturer:

a. Model RW0900-S as manufactured by RW Gate Company.

b. Or Equal.

13) Provide a mastic and/or a resilient gasket between the gate frame and receiving flange.

D. Ball Valve (Water)

1. Quarter Turn, full port, two piece, ball valves suitable for water service with threaded female inlet and outlet, blowout proof stem, and lever handle.

2. Conforms to MSS SP-110

3. Pressure Rating: 1,000 psi non-shock cold working

4. Materials

   a. Body: Stainless Steel ASTM A351 Type CF8M

   b. Seat and Seals: PTFE

   c. Ball: Stainless Steel ASTM A276 Type 316 or ASTM A351 Type CF8M

   d. Packing Gland: Stainless Steel ASTM A276 Type 316

   e. Stem: Stainless Steel ASTM A276 Type 304

5. Manufacturer:

   a. Nibco

   b. Watts

   c. Approved Equal

E. "Y" Strainer (Water)

1. Body: Stainless Steel

2. End Connections: NPT Threaded

3. Non Shock Cold Working Pressure: 200 psi (min)

4. Strainer Screen: 316 stainless steel, 40 mesh perforated screen.

5. Manufacturer:

   a. Eaton, Model 85

   b. Approved Equal

F. Flexible Connector

1. Flexible connectors/joints shall be of a molded rubber construction. Joint construction shall consist of an elastomer tube and cover, reinforced with a suitable woven fabric. Tube and cover elastomers shall be butyl or EPDM. Joints shall be designed for minimum 5 psig positive pressure with excursions up to 10 psig.

2. Flexible connector expansion joints ends shall be a flange design with an appropriate drill pattern and be full-faced and integral to the body. Backing bars of primed carbon steel shall be provided.

3. Flexible connector expansion joints shall be capable of accommodating system and equipment movements and vibration as needed.

4. Flexible connector expansion joints shall be Flexicraft Industries, Rubber Duct Expansion Joint, or approved equal.

2.03. PIPE SUPPORTS AND HANGERS

A. Furnish and install all pipe hangers, supports, struts, structural members, k brackets, plates, anchors and other supports not specifically included under other sections. Acceptable pipe hangers, supports, and brackets shall be used such as those manufactured by Grinnell, Fee and Mason, F & S, or approved equal. Special hangers and supports, if required, shall be as shown on the Drawings or as detailed by the Contractor and approved by the Engineer.

B. Anchors and guides shall be capable of withstanding the force imposed by expansion and contraction in addition to the weight of the pipe, fluid and insulation where applicable.

1. Hangers attached to steel shall be connected with a structural welded lug Grinnell Figure 55.

C. All parts of supporting equipment shall be fabricated and assembled so that they will not be disengaged by movement of the supported pipe.

1. Hanger rod shall be provided with welded or forged eyes or suitable sockets to permit lateral movement of the piping without setting up severe bending action in the rod.

2. Pipe rings to be made of malleable iron shall be fitted with an adequate adjusting nut of the locking type threaded to a rod that will allow adjustment after erection while still supporting the load.

3. Screw adjustments shall be fabricated so that all threaded members will have a true and complete depth of thread. The turnbuckle or adjusting nut shall have its full length of thread in service while in use and the amount of adjustment shall be plainly visible at all time. All screw or equivalent adjustment shall be provided with suitable locking features.

D. Hangers and pipe supports shall be as shown on the Drawings or as follows:

1. Hangers for pipe two inches and smaller shall be split ring malleable iron.

2. Hangers for pipe larger than 2 inches shall be carbon steel adjustable clevis type.

a. For copper pipe, use copper finish carbon steel adjustable clevis.

3. Vertical pipe shall be supported at intermediate levels with carbon steel riser clamps, unless shown differently on the Drawings.

a. For copper pipe, use copper finish riser clamps.

4. Pipe hangers for PVC pipe shall be single pipe rolls.

5. Pipe saddles shall be provided at all hangers where required to protect the pipe covering. Hangers shall be made so as to fit the outside diameter of the pipe plus the saddle.

6. Pipe stanchion saddle supports shall be fabricated from steel or cast iron.

7. Pipe roller assemblies shall be cast iron with screw adjustment.

2.04. MISCELLANEOUS STEEL

A. Furnish and install all necessary steel angles, beams, channels, hanger rods or other support or suspension from building structures.

B. Contractor shall have the option to use pre-engineered support systems of electro-galvanized steel products such as Kindorf, Unistrut or Famet Channel. Mixture of support system product not permitted.

C. Design of miscellaneous steel should be the sole responsibility of the Contractor, subject to the approval of the Engineer.

D. All miscellaneous steel including pre-engineered support systems shall be painted. Painting shall be in accordance with Section 09900. Electro-galvanized surfaces shall be prepared in accordance to the paint manufacturer's instructions.

PART 3 EXECUTION

3.01. GENERAL

A. The Drawings indicated the general arrangement of the plant piping, fixtures, and equipment. Carefully investigate all conditions affecting the work prior to submitting a bid and so coordinate the piping to prevent interferences with architectural, structural, electrical and mechanical features, and other piping. If interferences do develop, submit details of proposed departures from the Drawings to the Engineer for approval.

B. Because of the small scale of the Drawings, it is not possible to indicate all offsets, fittings, couplings, unions, hangers, supports, and accessories which may be required. Furnish all such materials as may be required to meet such conditions, at no additional cost to the Owner.

C. Lay work out in advance. Any excess cutting will not be permitted. Run piping parallel to the lines of the building unless shown otherwise or noted on the Drawings. Cut pipe accurately to measurements established at the structure, and worked into place without springing or forcing, properly clearing all openings. No jacking will be allowed. Remove burrs by reaming. Carefully cut pipe. Repair any damage to the building, piping, wiring, or equipment, as a result of cutting for installation, by skilled mechanics of the trade involved, at no additional expense to the Owner.

D. Make changes in direction by fittings, with the exception that bending will be permitted in sizes up to and including 2 inches provided a hydraulic pipe bender is used. Pipes showing kinks or other defects after bending shall be rejected.

E. Close pipe openings with caps or plugs during installation. Tightly cover equipment and protect against dirt, water, and chemical or mechanical injury. At the completion of the work, thoroughly clean, adjust, and operate the materials and equipment.

F. Install all piping in a manner that will insure it being permanently watertight.

G. Do not have piping interfere with any openings, lights, doors, windows, or other such items. Install piping above openings, doors or windows.

H. Do not erect joints or fittings over any motors, switchboards, panels, or other electrical equipment.

I. Provide hose end valves where shown on the Drawings and at all low points permitting complete drainage of the system.

J. Install all pipe in a manner permitting free expansion and contraction.

K. Complete all work and the execution of same in a first-class workmanlike manner and conform to the best mechanical practice. Conform the entire installation with all pertinent codes and regulations, local, municipal, county, and state authorities, the National Board of Fire Underwriters, the National Electric Code, and other regulatory bodies having jurisdiction over this class of work. Where applicable, bear stamps or seals of the NBFU, ASME, AMCA, NEMA, and other industry-relating groups on all materials and equipment.

L. Correct defective work at no cost to the Owner.

3.02. PIPE AND FITTINGS

A. Carbon Steel Pipe.

1. Flanged Joints. Remove rust-preventing grease from the flanges using a solvent-soaked rag. Wipe clean all dirt and grit from the flanges and gasket. Accurately align the flanges using a spirit level, and support the pipe properly before the gasket sealing of the joint. Give bolts threads a light coat of thread lubricant, then insert and turn the nuts up by hand. Pull up bolts with a wrench employing the crossover method. Provide bolt lengths and required torques in strict accordance with the manufacturer's requirements.

B. Stainless Steel Pipe & Fittings

1. Installation:

a. Pipe ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove.

b. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified.

2. Training:

a. A factory trained field representative (direct employee) shall provide onsite training for contractor's field personnel in the proper use of grooving tools, application of groove, and installation of grooved piping products.

3. Application:

a. Use grooved couplings and fittings on applicable systems in accordance with manufacturer's recommendations.

b. Unions are not required in installations using grooved mechanical couplings. (The couplings shall serve as unions.)

c. Grooved joint products may be installed in all locations as permitted by the engineer and local code.

d. Use grooved end valves where possible. Install grooved joint flange adapters where flanged or lug type valves are necessary.

e. The coupling manufacturer's representative shall periodically visit the jobsite and review installation. Contractor shall remove and replace any joints deemed improperly installed.

3.03. HIGH PRESSURE BALL VALVES

A. Contractor shall field verify end-to-end length of all existing valves being replaced and coordinate with the valve manufacturer's shop drawing submittal.

B. Existing motorized valves MV-7, MV-8, MV-9, and MV-10 have grooved ends, but the use of either grooved or flanged valves is acceptable. Contractors are responsible for all incidental work associated with each option, including pipe cutting, transition pieces, special couplings/adapters, pipe flanges, etc. necessary for a complete and operable system.

C. Install valves in accordance with manufacturer's recommendations and as noted hereinabove for the particular joint involved.

D. Locate all operators so they are easily operated. Valves 6'-0" and higher above operations floor level shall be equipped with chainwheel operators. Final orientation of valves shall be approved by the Engineer.

E. Install valve extension stems and stem guide at the locations shown on the Drawings. Locate operating nut 4-inches below top of grating. Stem guides shall be spaced at 10'-0" center to center maximum.

3.04. ELECTRIC MOTOR OPERATORS

A. Startup:

1. Each actuator shall be supplied with a startup kit comprising installation instruction, electrical wiring diagram, and sufficient spare cover screws and seals to make good any site losses during the commissioning period.

B. Warranty:

1. Each actuator shall be warranted for a minimum of 24 months of operation or up to a maximum of 36 months from shipment.

2. Warranty shall be held in effect regardless of pre-commissioning conditions in a typical indoor or outdoor environment as long as the actuators are not left disassembled or are not physically abused.

C. Training:

1. Manufacturer shall provide training onsite for OWNER designated personnel. Training sessions in accord with shall be a minimum of one 8 hour day and shall cover operation, set-up, maintenance and repair of the actuator.

D. Spare Parts:

1. two electronic modules (plug and play).

2. any required special tools.

3.05. GATE

A. Installation shall be performed in accordance with the gate manufacturer's installation instructions and the approved installation drawings.

3.06. SUPPORT

A. Support pipes grouped close together with bottoms at the same elevation by means of a trapeze hanger. Fasten all hangers to the building structure. Install hangers supported from building steel by beam clamps, steel angles, clips or using concrete inserts in new concrete and expansion anchors in existing concrete unless otherwise noted.

B. On straight runs of pipe, space hangers or supports not over 8 feet apart for copper, steel and ductile iron piping, unless shown differently on the Drawings. Install a hanger not over 12 inches from each change in direction of pipes.

C. For straight runs of PVC pipe, space hangers not over 4 feet apart. Provide each fitting with one hanger. Install hangers entirely separate from hangers for any other pipe and locate them so that there will be no strain on any joint. Support all PVC pipe in conformance with the manufacturer's recommendations.

D. Support vertical pipes at each floor and brace between floors with lateral supports at intervals not exceeding 10 feet.

3.07. ELECTROLYSIS CONTROL

A. Install copper tubing in such a way as not to touch or come in contact in any way with ferrous metals. Where copper tubing, piping or fittings are anchored, supported or may come in

contact with metal construction, install an insulating nonconductor spacer to assure prevention of electrolysis.

B. Provide copper or copperized hangers large enough to accommodate the tubing or insulating pipe covering where applicable. Do not support or secure copper tubing lines to ferrous metals.

C. When copper piping or tubing is connected to ferrous piping or equipment, install with the use of a dielectric union or fitting.

3.08. EXPANSION AND CONTRACTION OF PIPING

A. Make allowable throughout for expansion and contraction of the pipe. Anchor horizontal runs of pipe over 50 feet in length to the wall or to the supporting construction about midway on the run to force expansion equally toward the ends.

3.09. CLEANING AND PAINTING

A. At the completion of the work, clean and paint all equipment, pipes, valves, and fittings in accordance with Section 09900, Painting, of these Specifications. Repair any damage to parts of the building, its finish, or furnishings to the satisfaction of the Engineer.

END OF SECTION

13 10 00 01

Sketch 1

SUBMITTAL TO STONY BROOK REGIONAL SEWERAGE AUTHORITY

Date	Project Name & Contract No.	Location	Spec Section	Sequent No.	Rev.
	Dewatered Sludge Handling Pump Replacment Project, Contract 16-1	SBRSA - 290 River Road Princeton, NJ 08540			

TO:	**STONY BROOK REGIONAL SEWERAGE AUTHORITY** **290 RIVER ROAD** **PRINCETON, NJ 08540** Attn: Courtney Bixby	FROM:	**MBE Mark III Electric, Inc.** **213 Main Street** **Madison, NJ 07940**

ITEM NO.	DESCRIPTION OF ITEM (NAME, TYPE, SIZE, CAPACITY, SPECIFIC USE, ETC.)	MANUFACTURER OR DESIGNER	NO. OF COPIES	CONTRACT DRAW REF	ENGINEERS USE	
					ACTION CODE	REVIEWED BY
	Raritan High Pressure Ball Valves					
	As shown in Motorized Valve Location Sketch					
	Trunnion Non-AIS					

THIS CERTIFIES THAT ALL ITEMS SUBMITTED HEREWITH HAVE BEEN CHECKED BY THE CONTRACTOR, ARE IN CONFORMANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, EXCEPT AS NOTED, AND ARE APPROVED BY THE CONTRACTOR FOR THIS PROJECT.

Special Instructions

Signature & Title

FOR ENGINEERS USE

GHD

By

Date

Enclosures:

Items:

1/25/18

01B

RARITAN VALVE & AUTOMATION
P.O. Box 10120
New Brunswick, NJ 08906
PHONE: 732.572.2555 FAX: 732.572.2001
E-MAIL: Info@RaritanValve.com WEB: www.RaritanValve.com

DEWATERED SLUDGE HANDLING PUMP REPLACEMENT PROJECT
STONY BROOK REGIONAL SEWERAGE AUTHORITY
CONTRACT: 16-1
PROJECT NO.: S340400-10

SUBMITTAL REVISED
ADDENDUM 2 SPECIFICATION SECTION 13100 2.02
HIGH PRESSURE BALL VALVE
ELECTRIC MOTOR OPERATOR

Contractor:
MBE Mark III Electric, Inc.
215 Main Street
Madison, NJ 07940

Supplier:
Raritan Valve & Automation
295 Meadow Road
Edison, NJ 08817

RARITAN VALVE & AUTOMATION
P.O. Box 10120
New Brunswick, NJ 08906
PHONE: 732.572.2555 FAX: 732.572.2001
E-MAIL: Info@RaritanValve.com WEB: www.RaritanValve.com

Contents:

RARITAN VALVE & AUTOMATION
P.O. Box 10120
New Brunswick, NJ 08906
PHONE: 732.572.2555 FAX: 732.572.2001
E-MAIL: Info@RaritanValve.com WEB: www.RaritanValve.com

Manufacturer and Supplier Information:

Manufacturer:
Chaoda USA, LLC.
10663 W.Airport Blvd.; Suite 200
Stafford, TX 77477
Ph: 832-939-9944

Supplier:
Raritan Valve & Automation
295 Meadow Road
Edison, NJ 08817
Ph: 732-572-2555

AUMA Actuators
100 Southpointe Blvd.
Canonsburg, PA 15317
Ph: 724-743-2862

Raritan Valve & Automation
295 Meadow Road
Edison, NJ 08817
Ph: 732-572-2555

Parts and Service Contacts:

Manufacturer:
Chaoda USA, LLC.
10663 W.Airport Blvd.; Suite 200
Stafford, TX 77477
Ph: 832-939-9944

Supplier:
Raritan Valve & Automation
295 Meadow Road
Edison, NJ 08817
Ph: 732-572-2555

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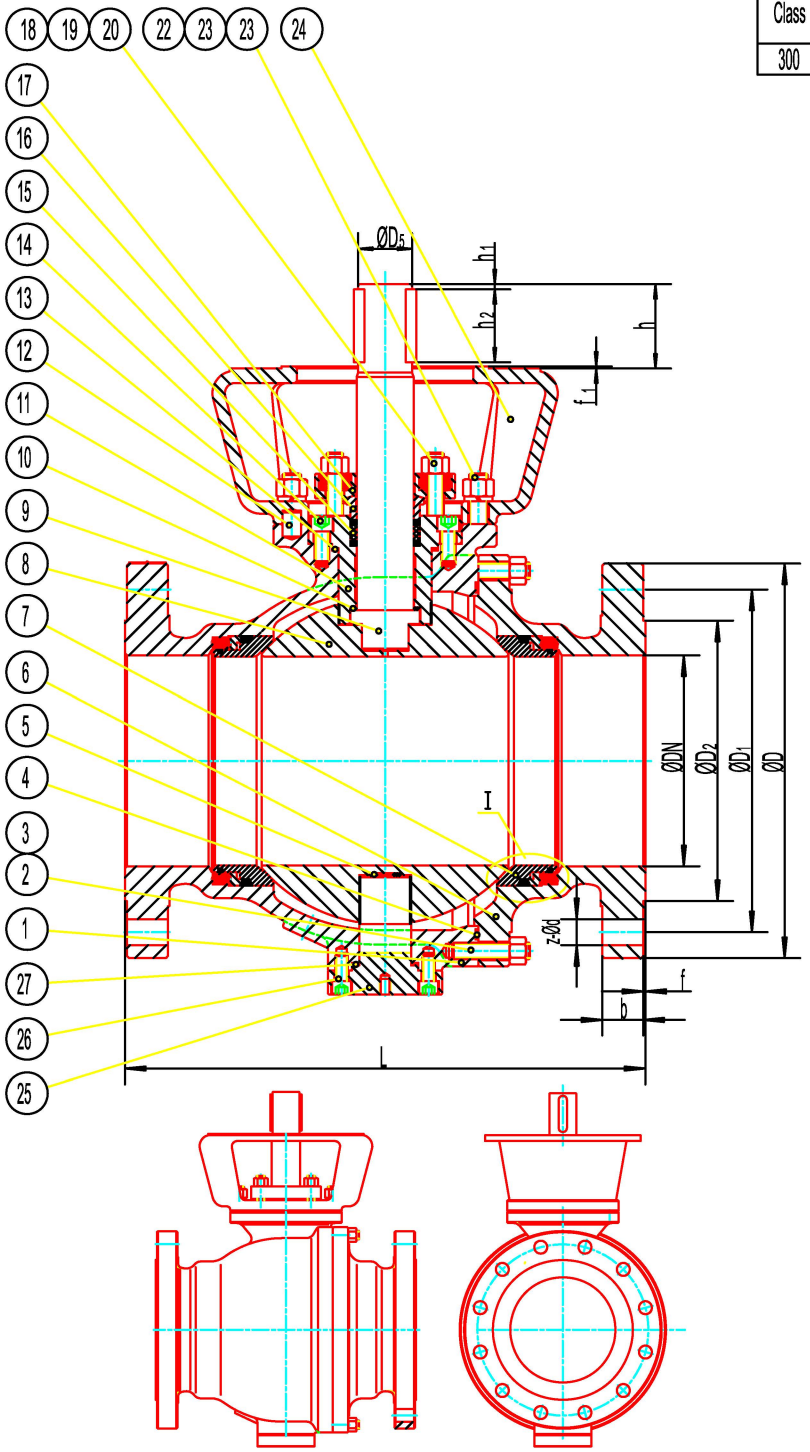
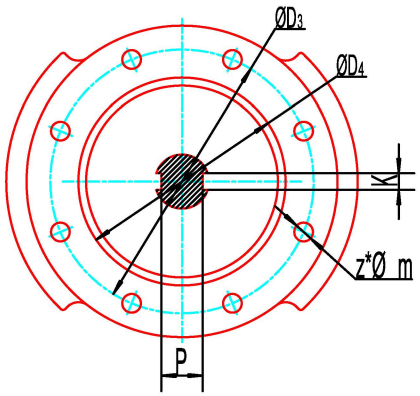
EQUIPMENT LIST –
High Pressure Ball Valve, Manual
& with Electric Motor Operator

Manufacturer:	Chaoda USA LLC.
Model:	3-BTM-2-FP-RF-WCB-11-NA-G-BS
Description:	6" full port ball valve, trunnion mounted, double block & bleed, ANSI 300 flanged ends, A216 WCB cast steel body, 316 stainless steel ball and seat with CCC coating, 17-4PH stem, with manual gear operator
Quantity:	2
Drawings:	3-BTM-2-FP-RF-WCB-11-NA-G-BS
Manufacturer:	AUMA Actuators, Inc.
Model:	GS100.3
Description:	Worm gear operator with 18" handwheel
Quantity:	2
Drawings:	Configuration F22537_CHAODA_GS DDS00E21000010000 dimensional drawing S0700423 handwheel drawing

Manufacturer:	Chaoda USA LLC.
Model:	3-BTM-2-FP-RF-WCB-11-NA-G-BS
Description:	6" full port ball valve, trunnion mounted, double block & bleed, ANSI 300 flanged ends, A216 WCB cast steel body, 316 stainless steel ball and seat with CCC coating, 17-4PH stem, with electric motor operator
Quantity:	4
Drawings:	3-BTM-2-FP-RF-WCB-11-NA-G-BS
Manufacturer:	AUMA Actuators, Inc.
Model:	SA07.6-54B/GS100.3
Description:	Electric motor actuator, multi-turn with ¼-turn worm gear, NEMA 4X/6P enclosure, open/close operation
Quantity:	4
Drawings:	Configuration F22537_CHAODA_SA-GS DDS00E411AAAAL021 dimensional drawing TPCA-3A2-1D1-A000TPA00R100-0I1-000 -S REV-008 – AUMA wiring diagram
Tags:	MV-7, MV-8, MV-9, MV-10

Class	Size	Dimensions(mm)																	
		L	DN	D	D_1	D_2	b	f	z-d	h	h_1	h_2	f_1	D_3	D_4	D_5	K	P	n*m
300	6	403	150	320	269.9	215.9	35	2	12-22	67	5	56	2	165	130	46	14	35	4*22





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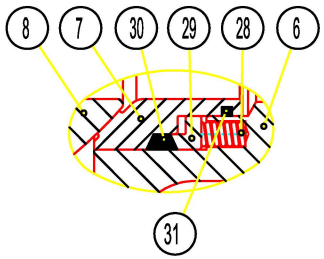


1. Flange dimensions to ASME B16.5
2. Face to Face dimensions to ANSI B16.10
3. Manufacture in accordance with API 6D
4. Valves tested to API 598
5. Fire safe to API 607.

Part No	Parts Name	Materials
31	Graphite ring	Graphite
30	Seat seal	Graphite
29	Seat seal gland	ASTM A182 F316
28	Spring	Inconel X750
27	Gasket	SS316+Graphite
26	Screw	ASTM A193 B7
25	Trunnion	A105
24	Yoke	ASTM A216 WCB
23	Spring washers	ASTM 1566
22	Nut	ASTM A194 2H
21	Bolt	ASTM A193 B7
20	Belleville spring	SS301
19	Nut	ASTM A194 2H
18	Bolt	ASTM A193 B7
17	Gland flange	ASTM A105
16	Gland	ASTM A182 F316
15	Packing	Graphite
14	Screw	ASTM A193 B7
13	Gasket	SS316+Graphite
12	Pin	ASTM A182 F6a
11	Compression Cover	ASTM A216 WCB
10	Upper seal	ASTM A182 F316
9	Stem	17-4PH
8	Ball	ASTM A182 F316+CrC
7	Seat	ASTM A182 F316+CrC
6	Bonnet	ASTM A216 WCB
5	Adjusting washer	ASTM A182 F316
4	Gasket	SS316+Graphite
3	Nut	ASTM A194 2H
2	Bolt	ASTM A193 B7
1	Body	ASTM A216 WCB

Revisions		
A		
B		
C		
D		
E		

Drawn By	CXY	Date	201-10-17
Checked By			
Approved By			
Certified By			

Chaoda Valves
Wenzhou China

ISO-9001

Desc:

General Assembly Drawing

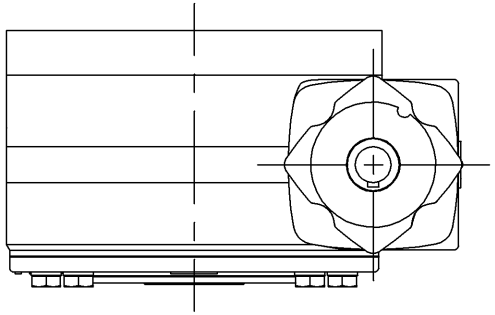
CL300-6" Metal Seated Trunnion Ball Valve

Scale:	DWG No.:	Rev.:
	3-BTM-2-FP-RF-WCB-11-CrC-G-BS	

Product Configuration (F22537_CHAODA_GS)

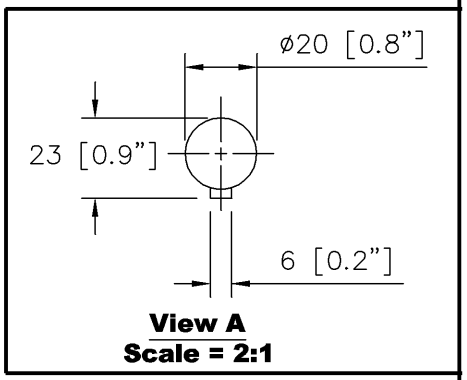
Configured by: Raritan Valve Automation
Configured on: 1/3/2018
Printed: 1/3/2018

DESCRIPTION	GS100.3/
DEVICE CHARACTERISTICS	
AUMA product	Quarter-turn manual gearbox
Rated output torque [lbs.ft.]	2,950
Rated output torque [inch.lbs.]	35,400
Rated output torque [Nm]	4,000
Approximate weight (lbs.)	72
SERVICE CONDITIONS	
Version	Weather-proof (non-hazardous location)
Operating mode	Manual operation
Enclosure protection	IP68
Color	AUMA silver-grey (similar to RAL 7037)
Ambient temperature	-40 °C to +80 °C (-40 °F to +176 °F)
Nameplates	English - aluminum (EN-AL)
Corrosion protection	KN
GS GEARBOX	
GS model	GS 100.3
Reduction ratio i	52:1
Mechanical adv.	20.2
Valve coupling	Unbored valve shaft coupling
Explosion protection	(M000) without
Swing angle	92 degrees, adjusted at factory •
Turns for 90°	13
Version	RR: input shaft clockwise, clockwise rotation of the valve shaft
Valve attachment	FA16 according to MSS SP-101 without spigot
Housing material	Cast iron housing GJL-250 •
Worm wheel material	Bronze worm wheel
Gearbox input	(EW20) without input flange, input shaft Ø=20mm
Handwheel	18" steel handwheel, 20mm bore
Lubricant	F15 - Shell ALVANIA 1029 grease
Enclosure	IP68-8 - continuous submersible duty, max. 26' (8m) head of water, with pointer cover •
DRAWINGS	
OUTPUT DRIVE/MOUNTING FLANGE DWG	SK099241
HAND WHEEL DRAWING	S0700423
ACTUATOR DIMENSIONAL DWG	DDS00E21000010000
OPERATION MANUALS	
GEARBOX OPERATION MANUAL	Part-turn gearboxes GS 50.3 - GS 250.3



Notes:

1. Metric tolerance per ISO 2768-m. Dimensions in brackets [] are in inches and rounded to one decimal place.
2. See appropriate mounting flange drawing for detail.
3. Buried service cover - 154mm [6.1"].
4. See appropriate drawing for manual operator details.



View A
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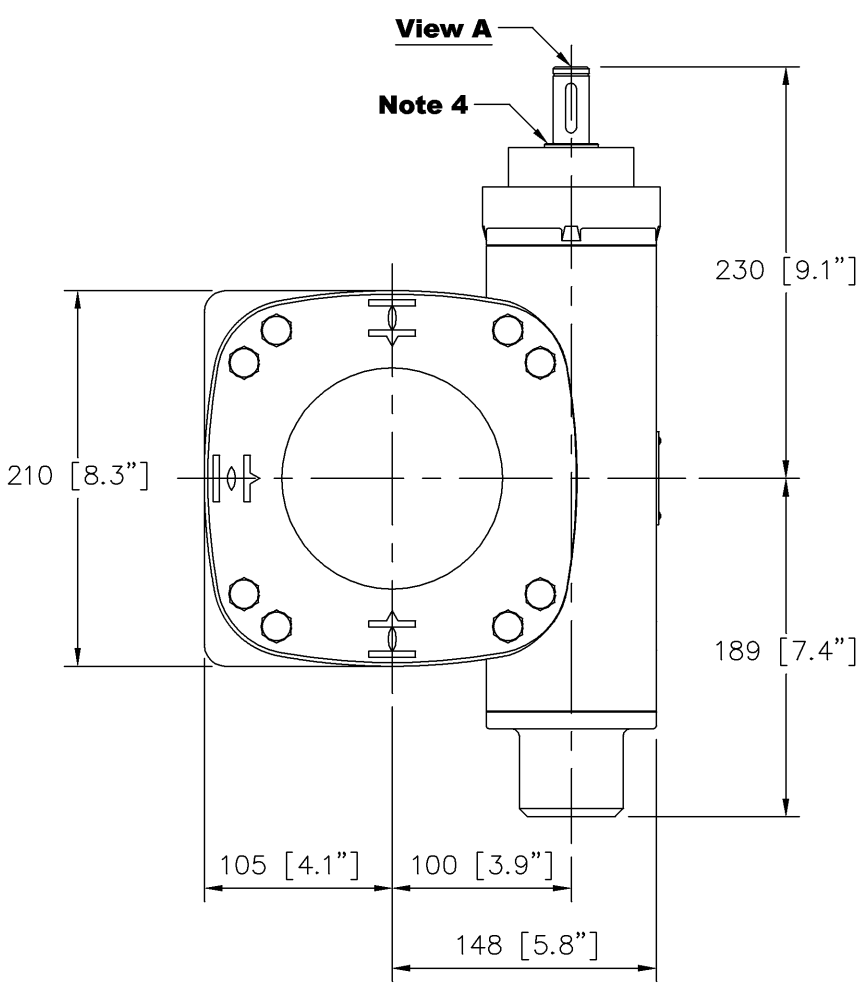
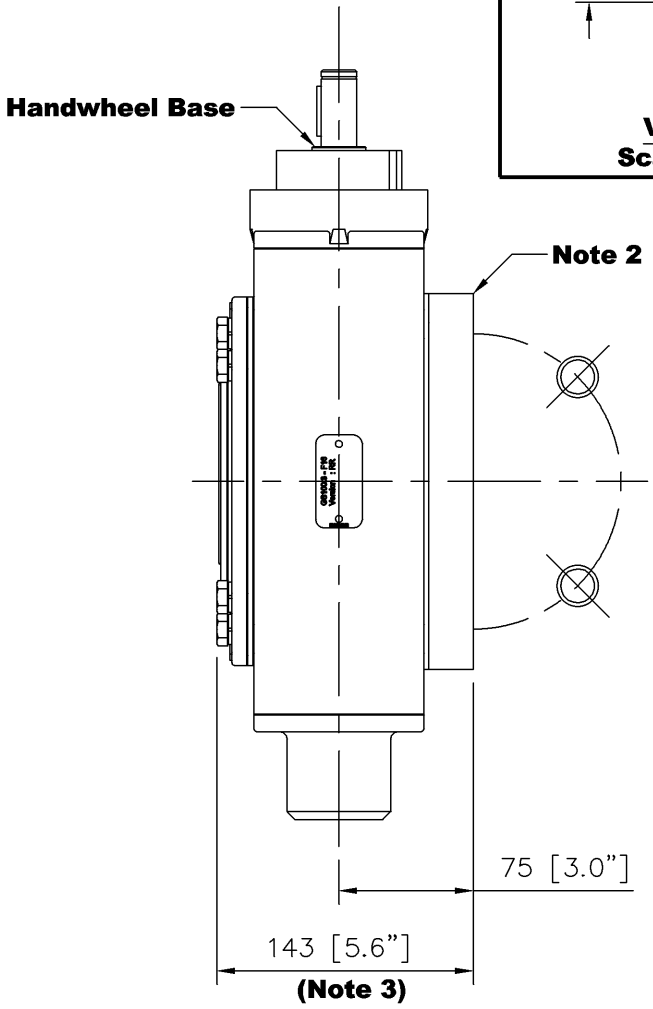


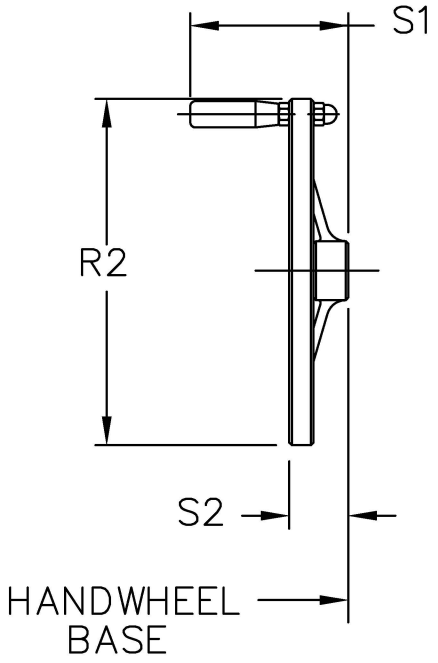


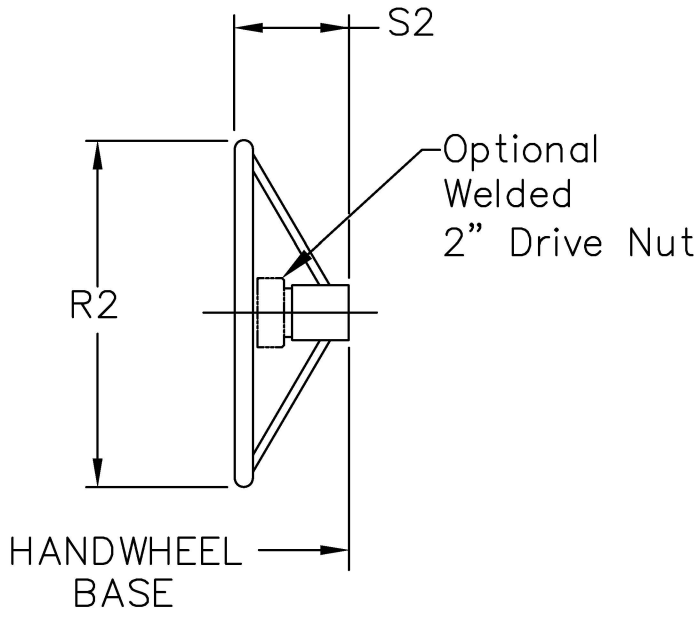
(Note 3)

AUMA ACTUATORS INC.	**Torque only** **GS 100.3 - F(A)16** **RR / RL - position A**	**No actuator** **No motor** **No HW / No MTG Flange**	**No controls** **Gearbox only**	FIRST ISSUE DESCRIPTION	TK 09/14/17 / BY / DATE BF 09/14/17 / APP / DATE 0 / REV **DDS00E21000010000**

AUMA ACTUATORS, INC.

PITTSBURGH, PA 15205





ALUMINUM HANDWHEELS

R2	S1	S2
5.0	3.3	1.4
5.5	4.1	1.6
6.5	4.1	1.6
8.0	4.3	1.8
10.0	4.4	2.0
12.5	5.9	2.2
16.0	6.2	2.5
20.0	6.5	2.8
25.0	6.7	2.9
31.5	7.3	3.5

STEEL HANDWHEELS

R2	S2
12.0	5.63
14.0	5.50
16.0	6.12
18.0	6.63
20.0	7.25
24.0	8.75
30.0	10.38
36.0	10.00

AUMA HANDWHEELS

BY/DATE	APP/DATE	DWG. No.	REV
MK 4/16/13	CA 04/16/13	S0700423	3

Product Configuration (F22537_CHAODA_SA-GS)

Configured by: Raritan Valve Automation
Configured on: 1/3/2018
Printed: 1/3/2018

DESCRIPTION	SA07.6/GS100.3/AC01.2
DEVICE CHARACTERISTICS	
AUMA product	Quarter-turn electric actuator
Rated output torque [lbs.ft.]	2,950
Rated output torque [inch.lbs.]	35,400
Rated output torque [Nm]	4,000
Approximate weight (lbs.)	149
SERVICE CONDITIONS	
Version	Weather-proof (non-hazardous location)
Operating mode	OPEN - CLOSE duty
Enclosure protection	NEMA types 4X/ 6P •
Color	AUMA silver-grey (similar to RAL 7037)
Ambient temperature	-30 °C to +70 °C (-22 °F to +158 °F)
Nameplates	English - aluminum (EN-AL)
Corrosion protection	KN
ELECTRICAL DATA	
Mains voltage	480 Volts AC
Phase	3-Ph
Frequency	60 Hz
Type of duty	S2 - 15 min.
Motor protection	(D-1T-O140) 3 thermal switches, 1 N.C. contact per phase wired in series 140°C, class F insulation, tropicalized winding
Motor type	3 ph AC motor type AD/VD
MOTOR DATA	
Motor designation	AD00063-4-0.20
Nominal power (HP)	1/4
Nominal power (kW)	0.20
Nominal speed (RPM)	1,680
Nominal current (FLA)	1.6
Current approx. Imax. (RTA)	2.0
Starting current (LRA)	4.6
Service factor	1.0
COS	0.42
ACTUATOR FEATURES	
SA model	SA 07.6
Output speed	54 RPM
Valve attachment	FA10
Output drive	FA10-B3 Ø=20mm; key width=6mm; key height 6mm

Torque switches	(0-M) torque sensing via MWG
Limit switches	(0-M) limit sensing via MWG
Position transm.	(30.2) MWG absolute encoder for AC 01.2
Turns per stroke	52 turns per stroke at output drive act.
Operating time (seconds)	58
Stem protection tube	Without stem tube, with protective screw plug, thread form G1-1/4"
Heater	(22.5) 24 V in combination with controls: 5 W
Motor heater	(0) without
Torque switching	Setting range 15-45 lbs.ft.
Set to close lbs.ft.	30
Set to open lbs.ft.	30
Handwheel	6.3" (160mm)
Close direction	RH - clockwise
Limit switching	(200) 1-500 rev/stroke adjustable MWG
Lubricant	F15 - Shell ALVANIA 1029 grease
Electrical connection	(S0-000) actuator plug for mounting AM/SEM/AC

GS GEARBOX

GS model	GS 100.3
Reduction ratio i	208:1
Mechanical adv.	77.0
Valve coupling	Unbored valve shaft coupling
Explosion protection	(M000) without
Mounting position	Position A
Swing angle	92 degrees, adjusted at factory •
Version	RR: input shaft clockwise, clockwise rotation of the valve shaft
Valve attachment	FA16 according to MSS SP-101 without spigot
Housing material	Cast iron housing GJL-250 •
Worm wheel material	Bronze worm wheel
Gearbox input	(FA10-EW20) FA10, input shaft Ø=20mm
Lubricant	F15 - Shell ALVANIA 1029 grease
Enclosure	IP68-8 - continuous submersible duty, max. 26' (8m) head of water, with pointer cover •

ACTUATOR CONTROLS

AUMATIC version	AC 01.2
Feedback E2	MWG magnetic limit/ torque sensor (non-intrusive setting)
Max. motor power	(B00.01) Contactors for power class A1
Motor protection	(C00.01) thermal switch, automatic reset
Interface	(D00.01) Parallel I/O Interface
Positioner	(F00.01) Without, prepared for retrofit •
Input signals	(R00.01) CLOSE, OPEN, STOP, EMERGENCY •
Control voltage	(E00.02) 100 - 120 V AC
Electronics supply	(A10.01) 24 V DC internal •
Output aux. voltage	(A30.02) 115 V AC - 30mA •
Output contacts	(H00.03) 6 output contacts: 6 NO/NC without common 5A •
Output signals	(S00.01) default setting: Fault, End pos. CLOSED, End pos. OPEN, Selector sw. REMOTE, Torque fault CLOSE, Torque fault OPEN
Local controls	(L00.01) selector switch LOCAL-OFF-REMOTE with padlock; push buttons OPEN-STOP-CLOSE-RESET; large graphic LCD with 200 x 100 pixels; Bluetooth enabled

Indication lights	(L10.02) CLOSED:green, TRQ-CL:blue, TH:yel., TRQ-OP:violet, OPEN:red, BLUETOOTH:blue (with numbers) •
Face plate	(EN-ES-FR) English-Spanish-French •
Tolerance mains voltage	(A40.01) +/- 10%
Electrical connection	(SH-080) plug/socket 100mm, 2 x ¾" NPT; 1 x 1 ¼" NPT •
Heater	(Q00.01) heater 24 V, internal supply •
Analog output 1	(P00.02) Position feedback: 4-20mA
Analog output 2	(P10.02) Torque feedback: 4-20mA
Blinker version	(N00.02) lights illuminated in mid travel (electronic)
Display language	English
Switch off in CLOSE	(042.01) Limit
Switch off in OPEN	(043.01) Limit
Self retaining LOCAL	(033.03) In direction OPEN and CLOSE
Self retaining REMOTE	(052.00) OFF
Safety mode	(153.01) OFF
Emergency function	(140.01) OFF
Mounting position	Position A
Mounting pos. local controls	Position A-1, selector switch at 6 o'clock in relation to base of controls (standard for SA/SQ)

OPTIONAL EXTRAS

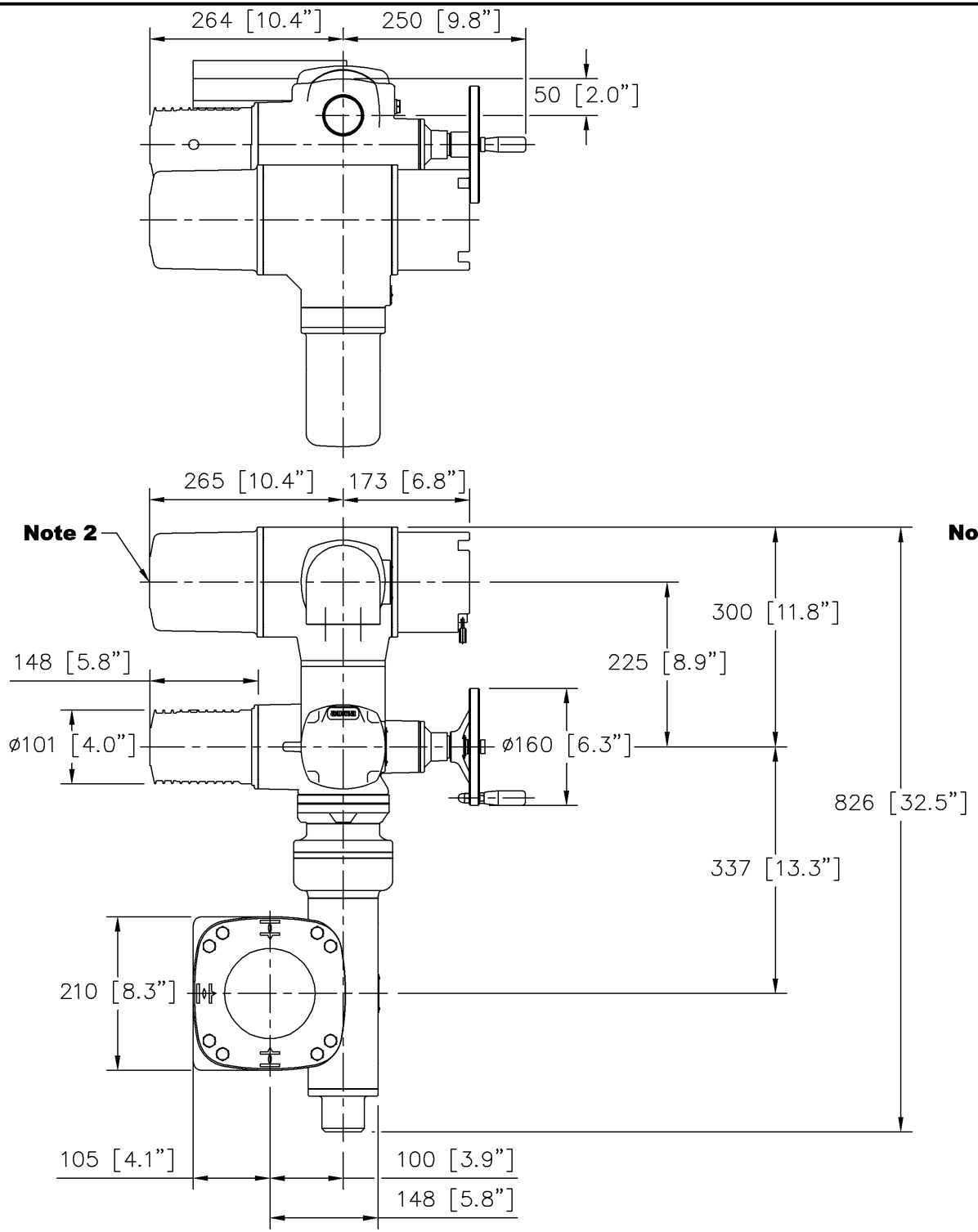
Double sealed at customer connection XK	Yes

DRAWINGS

ACTUATOR SCHEMATIC WIRING DWG	TPCA-3A2-1D1-A000TPA00R100-0I1-000 -S
OUTPUT DRIVE/MOUNTING FLANGE DWG	SK099241
ACTUATOR DIMENSIONAL DWG	DDS00E411AAAAL021

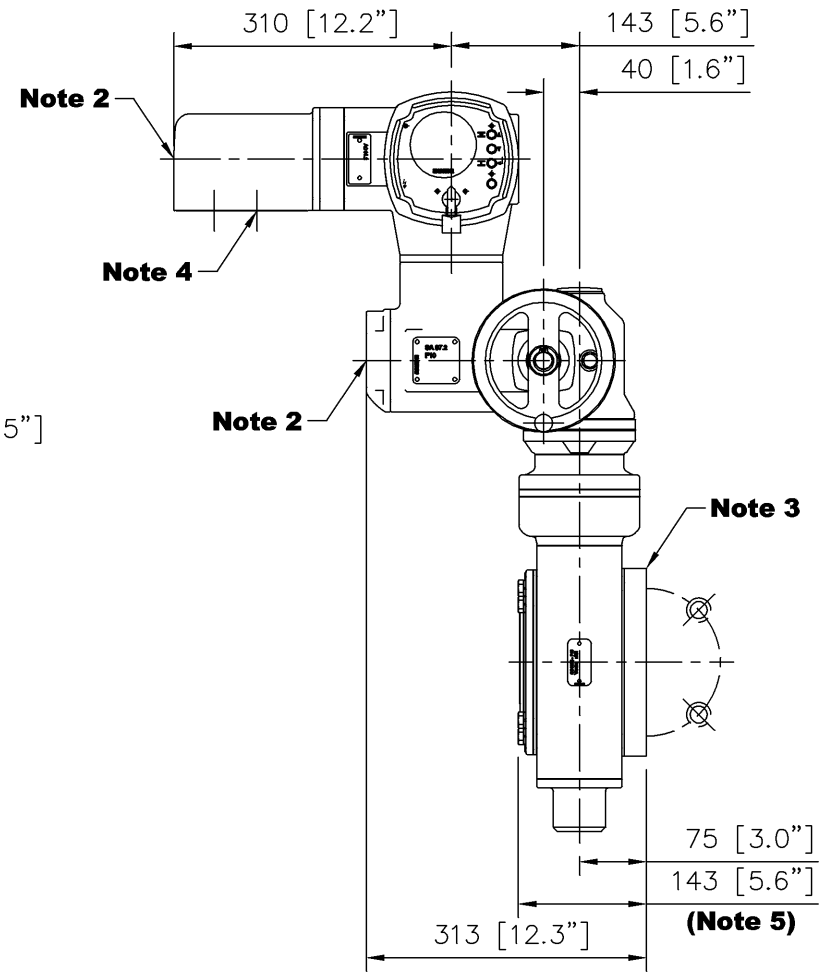
OPERATION MANUALS

GEARBOX OPERATION MANUAL	Part-turn gearboxes GS 50.3 - GS 250.3
DEVICE INTEGRATION MANUAL	Actuator controls AUMATIC AC 01.2/ACExC 01.2 Parallel
ACTUATOR OPERATION MANUAL	SA(R) 07.2 - 16.2 with AC 01.2 Parallel Non-intrusive

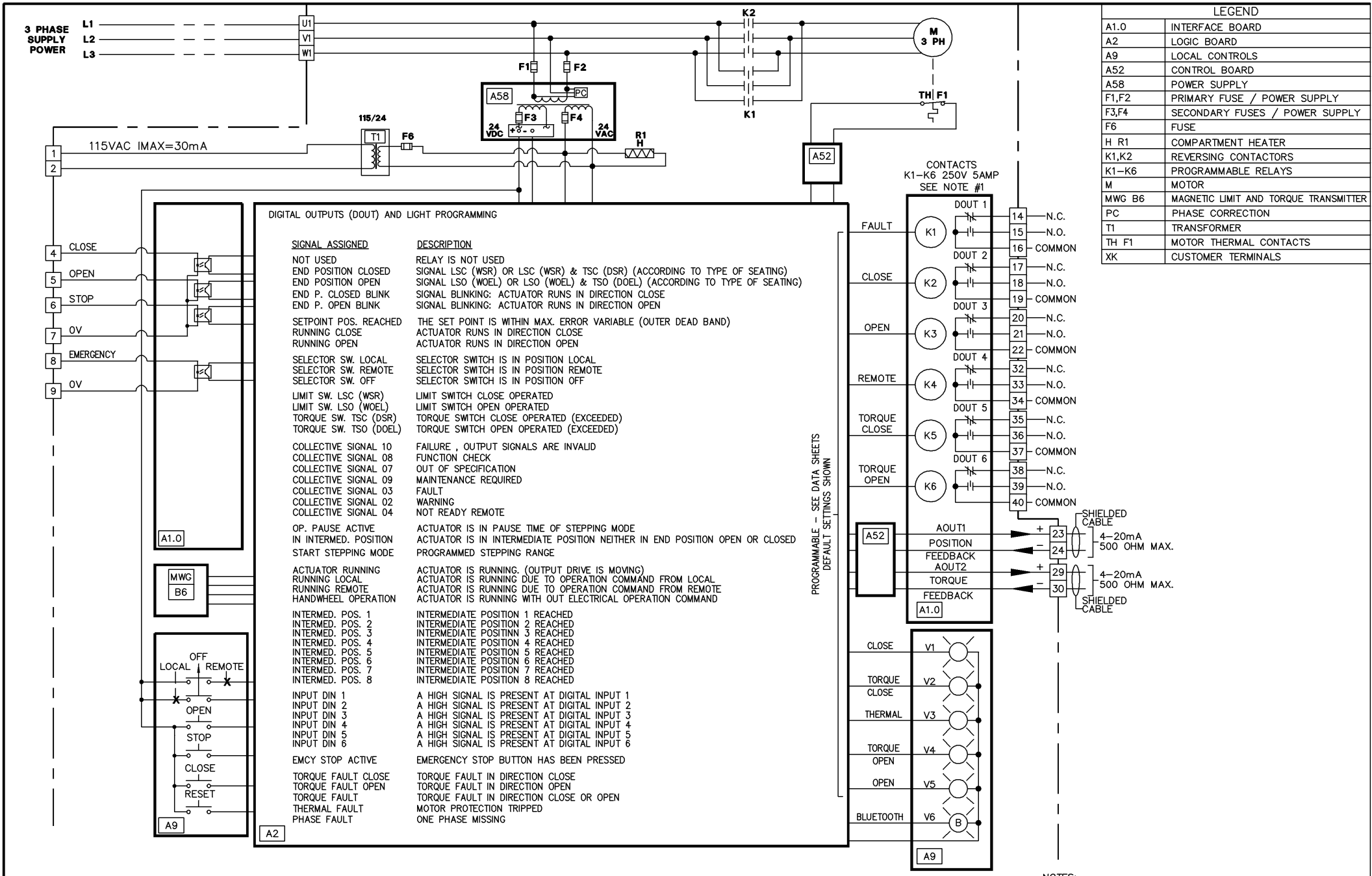


Notes:

1. **Metric tolerance per ISO 2768-m. Dimensions in brackets [] are in inches and rounded to one decimal place.**
2. **Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.**
3. **See appropriate mounting flange drawing for detail.**
4. **See data sheets for conduit entries.**
5. **Buried service cover - 154mm [6.1"].**



auma AUMA ACTUATORS, INC.	**Torque only** **GS 100.3 - 126:1,160:1,208:1 - F(A)16** **RR / RL - position A**	**SA(R) 07.2 / 07.6** **Motor 3 phase** **Handwheel - 6.3"**	**AC01.2** **P&S - 100mm - DS** **Matic Pos - A / P&S Pos - A**	REVISED TITLE BLOCK TO ADD RATIOS DESCRIPTION	TK 06/06/2016 / GR 06/06/2016 BY / DATE / APP / DATE	2 REV
					DDS00E411AAAAL021	



NOTES:

1. STATUS RELAYS INDICATED WITH DEFAULT SETTINGS AND ARE SHOWN WITH VALVE IN MID POSTION AND WITHOUT POWER.
2. – – – – FIELD WIRING BY OTHERS

auma® ACTUATORS INC. SCHEMATIC WIRING

AUMATIC

DWG. No. TPCA–3A2–1D1–A000TPA00R100–0I1–000 –S

SCHEMATIC DWG.	DESCRIPTION	BY/DATE	APP/DATE	REV
2011.03.10	ADDED A52 BOARD	MC 11/03/2016	PM 11/03/2016	8

LIST OF CONTACTED VENDORS

Stony Brook Sludge Pump Replacement
High Pressure Ball Valves

Named Manufacturers

Manufacturer	Trunnion (Y/N)	AIS (Y/N)
A.E.Valves	Yes	No
Cornerstone	Yes	Yes
Forum	Yes	No
Mogas	*	Yes
Union Tech	No	Yes

* Mogas does not show a trunnion valve on their website. By phone they say they offer a trunnion valve, but it is a new product not yet in complete production.

Manufacturers Not Named

Manufacturer	Trunnion (Y/N)	AIS (Y/N)
Argus	Yes	No
Balon	Yes	No
Bonney Forge	Yes	No
Cameron/Grove	Yes	No
Cameron/TK	Yes	No
Cameron/WKM	Yes	No
DHV Industries	Yes	No
Emerson	Yes	No
FB Valve	Yes	No
Flo-Tite	Yes	No
Flowserve/Valbart	Yes	No
Habonim	Yes	No
ISV	Yes	No
SCV Southern California Valve	Yes	No
SPX/M&J	Yes	No
ValvTechnologies	Yes	No
Volk Flow Controls	Yes	No

ID	Task Mode	Task Name	Duration	Start
1		**Stony Brook Project Duration**	**518 days**	**Mon 6/19/17**
2		**Notice to Proceed**	**0 days**	**Mon 6/19/17**
3		**Major Equipment Lead Times**	**231 days**	**Mon 6/19/17**
7		FRP Building	173 days	Mon 6/19/17
8		Valves	70 days	Tue 1/30/18
9		Flexible Connections	35 days	Mon 2/5/18
4		Biosolids Pumping System	175 days	Mon 7/17/17
5		Screws	173 days	Wed 7/19/17
6		Knife Gates	173 days	Wed 7/19/17
10		Mobilization	15 days	Fri 9/15/17
11		Excavate and Pour Duct Bank	5 days	Wed 1/31/18
13		Excavate/Pour FRP Building Slab	10 days	Wed 1/31/18
14		Install FRP Building	5 days	Thu 2/15/18
12		Rough-in Wiring for Pumps 1-4	25 days	Thu 2/22/18
16		Rough-in Wiring for Pumps 5-7	25 days	Thu 3/29/18
17		Replace High Pressure Valve MV-7 and MV-9	5 days	Tue 5/8/18
18		Replace High Pressure Valve MV-8 and MV-10	5 days	Tue 5/15/18
15		Remove Doors and Stairs	5 days	Tue 5/22/18
27		**Pump 3 Duration**	**21 days**	**Thu 3/29/18**
28		(16hr shutdown) Remove Pump 3, Piping, and Powerp	1 day	Thu 3/29/18
30		(16hr shutdown) Remove and Replace Knifegate	1 day	Thu 3/29/18
29		Replace Feedhopper	1 day	Fri 3/30/18
31		Replace Flexible Connection	1 day	Fri 3/30/18
33		Install New Pump/Powerpack/Control Panel	12 days	Mon 4/2/18
32		High Pressure Bypass Valve	1 day	Wed 4/18/18
34		Install New Bypass Piping	3 days	Wed 4/18/18
35		**Pump 4 Duration**	**21 days**	**Tue 4/24/18**
36		(16hr shutdown) Remove and Replace Knifegate	1 day	Tue 4/24/18
37		(16hr shutdown) Remove Pump 4, Piping, and Powerp	1 day	Tue 4/24/18
39		Flexible Connection	1 day	Wed 4/25/18
40		Replace Feedhopper	1 day	Wed 4/25/18
41		Install New Pump/Powerpack/Control Panel	12 days	Thu 4/26/18
38		High Pressure Bypass Valve	1 day	Mon 5/14/18
42		Install New Bypass Piping	3 days	Mon 5/14/18
23		**Pump 1 Duration**	**35 days**	**Fri 5/18/18**
24		Remove Pump 1 Piping and Powerpack	1 day	Fri 5/18/18
25		Remove and Replace Screws in Bin 1	13 days	Mon 5/21/18
26		Install New Pump/Powerpack/Control Panel	11 days	Thu 6/7/18
19		**Pump 2 Duration**	**35 days**	**Fri 6/22/18**
20		Remove Pump 2 Piping and Powerpack	1 day	Fri 6/22/18
21		Remove and Replace Screws in Bin 2	13 days	Mon 6/25/18
22		Install New Pump/Powerpack/Control Panel	11 days	Thu 7/12/18
43		**Pump 5 Duration**	**22 days**	**Fri 7/27/18**
44		Remove Pump 5, Piping, and Powerpack	4 days	Fri 7/27/18
45		Form and Pour Pipeline Lube Pads	3 days	Thu 8/2/18
46		Install New Pump/Powerpack/Control Panel	18 days	Thu 8/2/18
47		Install New Pipeline Lube System	10 days	Tue 8/7/18
48		**Pump 6 Duration**	**22 days**	**Tue 8/28/18**
49		Remove Pump 6, Piping, and Powerpack	4 days	Tue 8/28/18
50		Form and Pour Pipeline Lube Pads	3 days	Mon 9/3/18
51		Install New Pump/Powerpack/Control Panel	18 days	Mon 9/3/18
52		Install New Pipeline Lube System	10 days	Thu 9/6/18
53		**Pump 7 Duration**	**22 days**	**Thu 9/27/18**
54		Remove Pump 7, Piping, and Powerpack	4 days	Thu 9/27/18
55		Form and Pour Pipeline Lube Pads	3 days	Wed 10/3/18
56		Install New Pump/Powerpack/Control Panel	18 days	Wed 10/3/18
57		Install New Pipeline Lube System	10 days	Mon 10/8/18
58		Paint	10 days	Mon 10/22/18
59		**Closeout**	**16 days**	**Sat 11/3/18**
60		**End of Contract**	**0 days**	**Sun 11/18/18**

Project: Stony Brook Project Sc
Date: Tue 1/30/18

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Baseline | Baseline Milestone | Baseline Summary | Progress | Manual Progress | Slippage | Critical Path

CHAODA RECENT HEAVY SLURRY SERVICES

VALVE SIZES	PRESSURE CLASSES	END USER	SERVICE
10" - 14"	150 & 300	SUNCOR CANADA	Oil Sands Sludge/Effluent
10"	1500	CNRL CANADA	Oil and Catalyst with Entrained Hydrogen
12"	300	BASF	Ethylene Quench Furnace with Coking
1" - 20"	150 - 2500	SHENHUA CHINA	Coal Liquefaction Process - Dry and Wet Slurries; Waste Sludges
1" - 14"	150 - 600	SINOPEC CHINA	Coal Liquefaction Process - Dry and Wet Slurries; Waste Sludges