



SPECIFICATIONS

BID 16-04

SCREW PRESS DEWATERING SKID

THE CITY OF AVON PARK FLORIDA

September - 2016

NOTICE TO BIDDERS

INVITATION TO BID # 16-04

SCREW PRESS DEWATERING SKID TECHNICAL SPECIFICATION

Sealed bids will be received by the City Manager, City of Avon Park, 110 E Main St, Avon Park, FL 33825 until 11-2-2016, no later than 2:00PM at which time and place, bids received will be publicly opened in the office of the City Manager and read aloud for the following:

SCREW PRESS DEWATERING SKID TECHNICAL SPECIFICATION

Bid Documents may be requested by visiting our Website at: <http://www.avonpark.cc> or by contacting the City of Avon Park, City Manager, Julian DeLeon @ (863) 452-4403. Bid Documents are required for bid submittal.

ADDENDA

It is the Bidders responsibility to contact the City Manager prior to submitting a bid to ascertain if any addenda have been issued, to obtain all such addenda and return executed addenda with bid. Contractor questions will be accepted for addenda until **10-20-16 at 4PM** in order to provide sufficient time for City to respond appropriately to addenda. The failure of a Bidder to submit acknowledgement of any addenda that affects the bid price(s) may be considered an irregularity and may be cause for rejection of the bid.

INSURANCE & SAFETY REQUIREMENTS

All insurance shall be secured from or countersigned by an agent or Surety Company recognized in good standing and authorized to do business in the State of Florida.

The Contractor shall, within ten (10) days of notification of award and prior to commencement, take out and maintain in full force and effect minimum insurance coverage as stated in the specifications. This insurance shall remain in effect throughout the duration of the contract.

A certificate of existing insurance coverage should be submitted with the bid as proof of insurability; if the current coverage does not meet the bid requirements, then the Bidder should request an affidavit of insurability from the Bidder's insurance agent that certifies the requirements can and will be met. Failure to provide adequate insurance coverage may be cause for disqualification as non-responsive to the bid requirements.

All insurance policies shall be issued by responsible companies authorized to do business under the laws of the state, have at least a "B" policyholder's rating, have a financial rating of at least class VI in accordance with the most current Best's Key Rating Guide, and shall be satisfactory to the city.

BID SUBMITTAL:

An original and one (1) copy (collated in sets) of the bid form supplied by the City of Avon Park and all required bid submittal data including any bidder generated specifications, drawings, etc., shall be enclosed within a sealed envelope with the words, "**SEALED BID No. 16-04 SCREW PRESS DEWATERING SKID**" and the Bidder's name and address clearly shown on the outside thereof.

Mailed bids must be received in the office of the City Manager not later than the time set forth for bid opening. The City of Avon Park, Florida will not be responsible for any lost or late arriving bids sent via U.S. Postal Service or any other delivery service.

The City of Avon Park at its sole discretion reserves the right to waive technicalities or irregularities, to reject any or all bids, and/or to accept that bid which is in the best interest of the City.

Anyone requiring reasonable accommodation as provided for in the Americans with Disabilities Act or Section 286.26 Florida Statutes should contact the City Manager 863-452-4403.

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SECTION I Terms and Conditions

A. All responses shall become the property of the City.

B. Florida Statutes 287.087, on Drug Free Work Place, 287.133(3)(a) on Public Entity

Crimes, and Section 287.134, on Discrimination, as a whole and/or as shown below, will be complied with:

287.087, Preference to businesses with drug-free workplace programs:

In order to have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Inform employees about the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection (1).
4. In the statement specified in subsection (1), notify the employees that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or no contend ere to, any violation of chapter 893 or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than 5 days after such conviction.
5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation

program if such is available in the employee's community by, any employee who is so convicted.

6. Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

NOTE: PLEASE INCLUDE YOUR "DRUG FREE" STATUS AS PART OF THE GENERAL COMMENTS IN YOUR PROPOSAL OR WHERE INDICATED ON THE BID FORM.

, Public entity crime; denial or revocation of the right to transact business with public entities:

(2)(a) A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount of \$10,000 for a period of 36 months from the date of being placed on the convicted vendor list.

, Discrimination; denial or revocation of the right to transact business with public entities:

(2)(a) An entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid on a contract or provide goods and services to a public entity, may not submit a bid on a contract with a public entity for construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not award or perform work as a contractor, supplier, subcontractor, or consultant under contract with any public entity, and may not transact business with a public entity.

- C.** Responses are due and must be received in accordance with the instructions given in the announcement page.
- D.** The City will not reimburse respondent(s) for any costs associated with the preparation and submittal of any responses.
- E.** Respondents, their agents and associates shall refrain from contacting or soliciting any City Official and that contact may be made ONLY with the individual(s) listed in this document for additional information and clarification.
- F.** Due care and diligence has been exercised in the preparation of this document and all information contained herein is believed to be substantially correct; however, the responsibility for determining the full extent of the service required rest solely with those making response. Neither the City nor its representative shall be responsible for any error or omission in the responses submitted, nor for the failure on the part of the respondents to determine the full extent of the exposures.
- G.** All timely responses meeting the specifications set forth in this document will be considered. However, respondents are cautioned to clearly indicate any deviations from these specifications. The terms and conditions contained herein are those desired by the City and preference will be given to those responses in full or substantially full compliance with them.
- H.** Each respondent is responsible for full and complete compliance with all laws, rules and regulations including those of the Federal Government, the State of Florida and the City of Avon Park. Failure or inability on the part of the respondent to have complete knowledge and intent to comply with such laws, rules and regulations shall not relieve any respondent from its obligation to honor its response and to perform completely in accordance with its response.
- I.** The CITY, at its discretion, reserves the right to waive minor informalities or irregularities in any responses, to reject any and all responses in whole or in part, with or without cause, and to accept that response, if any, which in its judgment will be in its best interest.

- J. Award will be made to the respondent whose submittal is determined to be the most advantageous to the City taking into consideration those responses in compliance with the requirements as set forth in this document. The City Council and Mayor reserves the right to reject any and all responses for any reason or make no award whatsoever or request clarification of information from the respondents.

- K. Any interpretation, clarification, correction or change to this document will be made by written addendum issued by the Public Works Department. Any oral or other type of communication concerning this document shall not be binding.

- L. Responses must be signed by an individual of the respondent's organization legally authorized to commit the respondent's organization to the performance of the product(s) and/or service(s) contemplated by this document.

- M. Unless otherwise stated in the specifications, the following Insurance Requirements must be met before delivery of goods and services:

Workers' Compensation: Coverage is to apply for all employees for statutory limits in compliance with the law of the State of Florida and federal laws. The policy must include Employer' Liability with a limit of \$500,000 each accident, \$500,000 each employee, \$500,000 policy limit for disease.

Commercial General Liability: Occurrence Form Required: (Contractor/vendor) shall maintain commercial general liability (CGL) insurance with a limit of not less than \$500,000 each occurrence. If such CGL insurance contains a general aggregate limit, it shall apply separately to this location/project in the amount of \$1,000,000. Products and completed operations aggregate shall be \$1,000,000. CGL insurance shall be written on an occurrence form and shall include bodily injury and property damage liability for premises, operations, independent contractors, products and completed operations, contractual liability, broad form property damage and property damage resulting from explosion, collapse or underground (x, c, u) exposures, personal injury and

advertising injury. Fire damage liability shall be included at \$100,000.

Commercial Automobile Liability Insurance: (Contractor/vendor) shall maintain automobile liability insurance with a limit of not less than \$1,000,000 each accident for bodily injury and property damage liability. Such insurance shall cover liability arising out of any auto (including owned, hired, and non-owned autos). The policy shall be endorsed to provide contractual liability coverage.

Special Requirements / Evidence of Insurance:

- a. A copy of the Contractor's / Vendor's current certificate of insurance MUST be provided with the response to this BID. A formal certificate shall be provided upon announcement that a Contractor / Vendor has been awarded the work as called for in this document. The Certificate(s) shall be signed by a person authorized by that insurer to bind coverage on its behalf. All Certificates of Insurance must be on file with and approved by the City before commencement of any work activities. The formal insurance certificate shall also comply with the following:

“The City of Avon Park”, a Political Subdivision of the State of Florida and its Elected Officials, its Agents, Employees, and Volunteers” shall be named as an “Additional Insured” on all policies except Worker's Compensation. The policy shall provide a 30-day notification clause in the event of cancellation or modification to the policy. The City will be given notice prior to cancellation or modification of any stipulated insurance.

In the event the insurance coverage expires prior to the completion of the project, a renewal certificate shall be issued 30-days prior to said expiration date. Such notification will be in writing by registered mail, return receipt to:

Avon Park City Hall, 110 East Main Street, Avon Park, FL 33825.

- b. It is the responsibility of the contractor to insure that all subcontractors comply with all insurance requirements.
- c. It should be remembered that these are minimum requirements, which are subject to modification in response to high hazard operations.

N. If the goods or services being bid are for an annual or a semi-annual contract period then Interlocal Agreements between The City of Avon Park, Highlands County, other State or City agencies, the City of Sebring and the Town of Lake Placid, and the Highlands City School Board, allow those entities to purchase goods and services through the City's bids so long as such purchases will not interfere with the timely delivery of goods and services to the City in strict conformity with all specifications of its bids. Each governmental entity will issue its own purchase orders for all purchases made and will be responsible for all payments thereof. Highlands City reserves the right to direct the successful bidder to prioritize its delivery of goods and services to the City ahead of delivery to other governmental entities purchasing under the City's bids.

O. If submitting a response for more than one bid, each bid must be in a separate envelope and correctly marked. entities purchasing under the City's bids.

P. Exhibit-H, the bid form is a required document.

SCREW PRESS DEWATERING SKID TECHNICAL SPECIFICATION

Background: The City owns an FKC Screw Press for the dewatering of secondary sludge and septic tank septage. This unit has been in successful operation since 2011. We are expanding operations to add a second unit, or an equivalent system. This specification was developed using the equipment manufactured by FKC. Other substitute Screw Presses can be considered, after field testing, if the minimum construction, design and performance standards are met. Any vendor who carries the FKC name brand may bid this purchase.

In particular, as in 2011, the City is looking to purchase a pre-assembled skid system, which will include all electrical, mechanical, and pre-wired equipment constructed at the factory. The City's only obligation will be to bring 2-phase power, and connect the sanitary sewer, and water supply.

EXHIBIT-A. Provides the required mechanical, electrical elements to the skid.

1.0 GENERAL REQUIREMENTS

It is the intent of this specification to provide a complete, operational sludge dewatering system for waste activated sludge or aerobically digested sludge. There shall be furnished one dewatering skid system consisting generally of, but not limited to, one screw press, one flocculation tank, one control panel, one conveyor, one sludge pumps, and one polymer system. The skid shall have all necessary wiring, piping, and any other necessary items completed prior to shipping for a complete system.

It is the intent of this specification that the entire sludge dewatering system be supplied by a single supplier, in order to insure coordination and proper operation of the component pieces of the system. The supplied shall have "single-source" responsibility for insuring that all components are properly furnished, installed, and placed in service. Additionally said supplier shall provide any necessary coordination required in obtaining any warranty work performed under this contract.

The City has an existing Screw Press manufactured by FKC Co., Ltd. The 5 year experience with this unit has been positive. Any authorized contractor who carries the FKC equipment and can meet this specification may bid this purchase. Alternative dewatering Screw Press systems will be considered if the specifications from this document can be met, and manufacturing firm agrees to on-site testing as determined by the City, at no cost to the City.

- A. Manufacturers shall submit certified documentation showing compliance with this specification and documentation showing compliance with the following:
 - 1. List of ten United States installations of equal type equipment package to the unit specified. The installations must be complete packaged systems similar to the one specified.
 - 2. The term "installations" shall mean individual projects/contracts. Multiple package dewatering units for a project will be considered as one installation toward meeting the experience requirements. Installations shall be only those in the United States. The installation shall include, but not be limited to, the following:

The sludge dewatering skid shall be guaranteed to achieve the following performance:

- 1) 50 GPM inlet feed rate or 0.6 to 1.0% waste activated of aerobically digested sludge.
- 2) 16 ± 1% solids discharge consistency and guaranteed to pass the "Paint Filter Test"

System performance guarantee will be based on a stable flow rate of healthy consistent quality waste activated sludge or aerobically digested sludge.

12.0 SCOPE OF SUPPLY

Supplied By Seller

Design, engineering, fabrication and delivery of one (1) dewatering skid assembled with the following components:

- Screw Press
- Flocculation Tank
- Sludge Feed Pump
- Polymer System
- Control Panel
- Headbox Transmitter
- Headbox Hi-Hi Level Conductive Switch
- Conveyor
- Marine Grade Aluminum Skid
- Emergency Stop

All piping, conduit, wiring, connections and controls integral to the Seller's equipment.

Detail drawings, parts lists, and operation and maintenance manuals for all equipment furnished.

Detailed information for use by the Purchaser's maintenance system. This information shall include detailed spare parts information and recommended preventive maintenance.

Start-up services including inspection of equipment installation prior to initial equipment rotation. Equipment installation inspection shall occur at the time of equipment start-up.

On-site training sessions for operational personnel and maintenance personnel. Training sessions shall occur at the time of equipment start-up.

On-site performance testing and equipment optimization services.

FURNISHED BY PURCHASER

Labor and material for unloading, handling, storing, and installation of equipment.

Design and construction of all foundations, structures, platforms, stairs and ladders for support and servicing of Seller's equipment.

2.2.3. Design and construction of electrical wiring and controls external to Seller's equipment.

2.2.4 Design and construction of piping and connections external to Seller's equipment. This includes, but is not limited to, piping and connections for waste solids, water, polymer and pressate.

3.0 SITE CONDITIONS

Operating Conditions

The dewatering system shall be located outdoors and components shall be designed to withstand weather condition of an outdoor installation in Central Florida.

The equipment shall be capable of operating continuously 24 hours/day, 7 days/week and must be capable of continuous operation over a 12-month period with minimal servicing and maintenance.

4.0 PROCESS DESIGN SPECIFICATIONS

Material To Be Dewatered

100% Secondary Municipal Sludge (waste activated or aerobically digested)
Inlet Consistency: 0.6 to 1.0% Total Solids

Required Performance of Dewatering Skid

Inlet Capacity: 50 GPM, not to exceed 2.60 BDST/d (bone-dry standard tons per 24 hrs operation)

Outlet Consistency: 16 \pm 1% Total Solids with polymer use
Guaranteed to pass "Paint Filer Test"

EQUIPMENT SPECIFICATIONS

One (1) Flocculation Tank

The flocculation tank(s) "wetted" parts shall be constructed of 304 stainless steel throughout.

The flocculation tank(s) will be designed for a minimum retention time of 2.0 – 3.0 minutes under the normal design flow rate. The inlet of the tank(s) will be located at the

bottom and outlet of the tank(s) will be located near the top.

The flocculation tank shall be supplied complete with an agitator. The agitator drive shall be an SEW Eurodrive Varimot speed reducer/ mechanical variator. Agitator speed shall be adjusted manually at the flocculation tank.

One (1) Screw Press

The screw press shall be a horizontal screw press and shall include the following components and features.

- a) The Screw Diameter shall be no smaller than 700mm (even if a smaller machine can meet the required capacity)
- b) Sludge inlet headbox
- c) Removable perforated press screens (wedge wire not acceptable)
- d) Screen shower headers
- e) Pressate pan shower header
- f) Split drums with flanges bolted vertically & horizontally
- g) Drum covers (top & sides)
- h) Speed reducer
- i) Inlet screw bearings
- j) Motor & motor coupling
- k) Coupling guards
- l) Structural steel machinery base
- m) Flanged filtrate outlet
- n) Adjustable spring loaded back pressure cone
- o) Flanged headbox level transmitter connection

Screw press "wetted" parts shall be constructed of 304 stainless steel throughout. Screw press structural base and other "non-wetted" parts may be constructed of carbon steel with the corrosion resistant coating described in 5.2.8. Brushes or any other material on the outside diameter of the screw flight is not acceptable. There shall not be any contact between the screw flight and the screen material.

Screw Press Drive

The variable speed drive shall be furnished by Seller within the control panel of the dewatering skid.

The screw press drive motor shall be as follows: 480 VAC, 3 phase, 60 Hz, Design B, TEFC Frame, Insulation Class F, 1.15 service factor.

The press shall be supplied with a Sumitomo Cyclo speed reducer with a direct couple drive or equivalent.

The press shall be driven from the Inlet end of the screw press.

All couplings and other high speed rotating parts shall be provided with OSHA approved guards.

The screw press shall be provided with lightweight stainless steel drum covers on the top and sides of the screw press drums where necessary for sanitation and personnel protection.

All piping connections shall be ANSI, class 150, standard raised face flanges.

Coating System for Carbon Steel Components

Service Preparation: Commercial surface preparation conforming to SSPC - SP3 is required as minimum surface preparation. Steel should be coated the same day it is cleaned.

5.2.8 2 Coating: Prime coats shall be a SD Sabinite Zinc chromate primer or equivalent. The finish coat shall be an alkyd resin enamel. The application, mixing coat thickness, drying time, etc. shall be per the coating manufacturer's instructions.

5.2.10 Screens shall be punched stainless steel sheet material. Wedgewire screens are not acceptable.

One (1) Sludge Feed Pumps

Sludge Feed pump shall be a NETZSCH NEMO close-coupled pump of the positive displacement, single stage, progressing cavity type or equal.

Pump Suction and Discharge Casing

The pump casing shall be designed for the type of service specified and shall be of sufficient strength, weight and metal thickness to ensure long life, accurate alignment and reliable operation. The suction casing shall be constructed of close-grained cast iron and have two clean out ports. The casing shall have connection for vents, drains, and gauges.

The suction and discharge connections shall be ANSI/B16.1 flanges sized for the pump specified. The discharge flange shall have a vent/gauge connection that can be rotated in 90° increments. The discharge support feet shall be separate from the discharge flange.

The pump shall be supplied with adequate NPT connections for stuffing box drainage, pump drainage, flushing and gauge connections.

Stator

The pump's stator shall be formed from Buna-n rubber. The stator shall be affixed to the suction casing by the use of four (4) thru-bolts for easy removal and replacement. Stators shall not be affixed to the suction casing by threaded connections or by snap rings. The suction edge of the stator shall be chamfered to allow for unrestricted flow into the pumping elements. The rubber shall be molded around the ends of the stator tube sealing at the suction and discharge to prevent leakage. The use of separate o-rings or flat rings for stator sealing shall not be required.

Rotor

The rotor shall be precision machined from tool steel with a chromium content of 11-13.5% hardened to a Rockwell C hardness of C57-60 and then covered with heavy layers of hard chrome plating. The rotor shall be driven by means of a heavy duty sealed drive train.

Drive Train

The rotor shall be driven by means of a heavy duty drive train. The rotor shall be joined to the drive shaft by means of a connecting rod with sealed pin type universal joint at each end. The sealed pin type universal joints shall be factory lubricated with oil and completely sealed from the fluid being pumped. To optimize seal and pin joint life, the connecting rod shall be of sufficient length to maintain its operating angle within 1 degree. Flexshafts, cardin joints, and unsealed pin joints are not acceptable.

Gland Housing and Stuffing Box

The pumps shall be constructed with adequately sized stuffing boxes capable of sealing the pumpage within the pump casing. The gland housing shall be field replaceable as a separate casting. The stuffing box shall be drilled and tapped for water flush or grease seal and supplied with a Teflon lantern ring. Furnish a grease zerk fitting on the box.

Pump Drive Shaft

The drive shaft shall be of the solid drive shaft design in order to avoid clogging and/or trapping of solids, which could either interrupt the movement of the connecting rod or disturb the seal of the rear pin joint. Maximum shaft deflection under normal operating conditions shall not exceed .002". The portion of the drive shaft that passes through the stuffing box shall be hard chrome plated or shall be provided with a replaceable hardened chrome plated shaft sleeve. Hollow or telescoping designed drive shafts are not acceptable.

The universal joint head shall be removable from the drive shaft to allow access to the stuffing box or mechanical seal without disturbing the drive end of the pump.

Pump Performance

The suction body of the pump shall be oversized at the entrance of the rotor and stator pumping elements to allow the free flow of high solids materials. The rotor joint head shall be set back from the stator and the leading edge of the stator shall be chamfered so not to restrict the flow into the pumping elements. If the pump does not incorporate the aforementioned features the use of a rag deflector shall be required.

One (1) Polymer System

MANUFACTURERS

- A. Provide a quantity of One (1) VeloBlend model VMN-2.5D-600-C polymer activation, blending and feed system(s) as manufactured by VeloDyne of Boulder, CO.

EQUIPMENT

A. Multi-zone Hydro-mechanical Mixing Chamber:

1. The polymer blending system is a critical part of the process and must be designed to provide optimal performance and reliability under all operating conditions. These specifications are based on the VeloBlend™ technology. Other technologies will be considered only if they are proven to provide an equal level of performance and reliability under all operating conditions as the system specified herein. The polymer blending technology on this project must have a minimum track record of five (5) years and a minimum of 600 installations. A list of references testifying to the systems ability to meet the above requirements must accompany the manufacturer's proposal.
2. A hydro-mechanical blending device shall be provided. The device shall be capable of operating on plant water pressure alone at 30 psid. In addition, the system shall be capable of producing its mixing energy independent of plant water pressure through a variable intensity, controllable stainless steel mechanical mixer. The system shall be capable of producing high, non-damaging mixing energy at all flow rates without damage to the polymer's molecular structure. In order to prevent polymer build-up, the mixing chamber shall maintain high velocity in the entire chamber - at no time shall there be low velocity within any portion of the mixing chamber.
3. Both the mechanical and non-mechanical mixing zones shall be clear to view the mixing action and blending effectiveness. Acrylic chambers prone to becoming brittle over time and cracking, or opaque PVC pipe shall not be acceptable to meet this requirement.
4. The mixing chamber shall have a maximum rated pressure of 100 psi. Provide a pressure relief on the mixing chamber, adjustable between 25 and 100 psi. The valve shall have a brass, stainless steel or PVC body with stainless steel, Viton and Teflon internals. All holes tapped in plastic shall have helicoil inserts for increased strength.
5. In order to handle the wide range of polymers available, independent of water pressure, a variable speed stainless steel mechanical mixing impeller shall be provided. Plastic impellers shall not be acceptable. The impeller shall be designed to produce both axial and radial flow to optimize mixing effectiveness and to effectively inducing high, non-damaging mixing energy over the systems full flow range. The specially designed impeller shall be controlled by an SCR motor controller and driven by a wash-down duty motor. The mixer drive shaft shall be sealed by a mechanical seal which shall have an integrally mounted and factory plumbed seal flushing valve. A drain port behind the seal shall be provided in the mixing chamber to drain the polymer solution in case of a seal failure. The seal shall be easily accessible for replacement. Systems without a seal flushing system shall not be considered. All bearings shall be external from the mixing chamber. Internal bearings shall not be acceptable. Systems which rely on high shear and or constant speed impellers or that rely on close tolerances for blending shall not be acceptable.
6. Systems that rely solely on water pressure to create mixing energy will be considered only if provided with an integrally mounted dilution water booster pump and if the system meets the above polymer mixing criteria. A VFD motor controller shall be provided to control the pressure and therefore mixing energy generated by the booster pump. Booster pumps shall be multi-staged and of stainless steel construction. The booster pump shall be capable of generating 75 psid independent of water supply pressure which shall be verified at system start-up. In the event the booster pump cannot produce 75

psid of water pressure a properly sized booster pump shall be installed at supplier's expense. Under no circumstances shall systems that rely solely on plant water pressure to create mixing energy be acceptable.

7. Provide a neat polymer check valve specifically designed to isolate neat polymer from dilution water. The valve shall be designed with an open, unobstructed path to the valve seat. The valve body shall be constructed of Teflon with Viton seals. The valve poppet and spring shall be stainless steel and designed to prevent polymer from flowing through the spring, causing build-up and plugging. Plastic spring covers shall not be used. The valve shall be readily accessible for cleaning and shall not require tools for removal, cleaning or replacement. Conventional check valves, valves that rely on ball seals, and or check valves that are installed inside the mixing chamber, or which require mixing chamber disassembly for servicing will not be accepted. The locking pin used to hold the valve in place shall be attached to the mixing chamber with a lanyard.

B. Dilution Water Assembly

1. Provide a 1" dilution water inlet assembly.
2. The dilution water flow rate shall be monitored by a Rotameter type flow meter having a range of 1 to 10 GPM. A union shall be provided on the Rotameter to allow easy removal for cleaning.
3. The unit shall have an electric solenoid valve for on/off control of total dilution water flow.
4. A differential pressure type low water differential pressure alarm shall be provided. The switch shall be adjustable between 10 and 25 psid.
5. Provide a 2-1/2" stainless steel liquid filled pressure gauge to monitor dilution water inlet pressure.

C. Diaphragm Type Neat Polymer Metering Pump

1. The unit shall have one (1) neat polymer metering pump(s) integrally mounted on the systems skid. The metering pump(s) shall have a range of 0.025 to 2.5 GPH. Unit shall have a neat polymer metering pump. Pump shall be positive displacement, diaphragm type. Polymer pump head shall be fabricated of clear acrylic and shall have a priming port.
2. Provide a metering pump priming assembly including vacuum device and valve.

D. Solution Discharge Assembly

1. Provide a 1" polymer solution discharge assembly.
2. Provide a 2-1/2" stainless steel liquid filled pressure gauge to monitor system discharge pressure.

E. Controls

- a. A control panel integral to the systems frame shall be provided. The enclosure shall be rated NEMA 4X and constructed of FRP. The control panel shall consist of all digital displays, potentiometers, switches, lights, relays, and other control devices required for a complete operable system. The control panel and all components shall be industrial duty. All skid mounted electrical components interconnected to the control panel shall terminate at numbered and labeled terminal blocks. The terminal blocks shall be sized for 14 ga. wire. Wires shall be neatly run through wire race-way and numbered with adhesive type labels. The control panel shall be positioned such that there are no obstructions in front of the control panel per related NFPA requirements. Control features shall include the following:

5.5 Control Panel

Enclosure shall be NEMA 4 stainless steel with dimensions no less than 48"x24"x10".

All the equipment integrally mounted to the dewatering skid receives power from and is logically controlled by the control panel. The following is a list of power & logic control that comes with the control panel for equipment integral to the skid:

- PLC – Automation Direct
- HMI – Maple System 7" Touch Screen
- VFD for Screw Press – Altivar
- VFD for Sludge Feed Pump – Altivar
- Motor Starter for Flocculation Tank
- Motor Starter for Conveyor
- HOA switch for Sludge Feed Pump
- HOA switch for Flocculation Tank
- HOA switch for Polymer System
- HOA switch for Screw Press
- HOA switch for Conveyor
- ALARM Indicator for Sludge Pump
- ALARM Indicator for Headbox Hi Level
- ALARM Indicator for Polymer System
- ALARM Indicator for Screw Press
- ALARM Indicator for Conveyor
- Speed adjustment for Screw Press
- Speed adjustment for Sludge Feed Pump
- Speed Display for Screw Press
- Speed Display for Sludge Feed Pump
- Emergency E-Stop Push Button
- Control Panel Main Power Supply Disconnect Switch
- 4-20 mA Digital Output for Polymer System
- 4-20 mA Digital Input for Headbox Level Transmitter
- Contact for Polymer System Start
- Contact for Polymer System Run
- Contact for Polymer System Alarm
- Contact for Sludge Low Flow Alarm
- Contact for Headbox Hi-Hi Level Switch Alarm

The following is a list of power & logic control that comes with the control panel for equipment that is not integral to the dewatering skid and can be used by the Owner for other applications:

- Contact for Remote Dewatering System Stop
- Contact for Remote Dewatering System Alarm

One (1) Headbox Level Transmitter

Headbox level Transmitter shall be a JOWA Consilium Aquatape Level Gauge or approved equal.

The aquatape shall relay a 4 – 20 mA signal which will be used to accurately monitor the headbox level.

One (1) Headbox Hi-Hi Level Switch

Headbox Hi-Hi Level Switch shall be an Omega LVCN4121-12 Conductive Level Switch Controller with a 24 Vdc power supply and internal relay.

The following specifications apply to the Level Switch:

Power Supply: 24 Vdc ($\pm 10\%$)
 Current Consumption: Max 2 VA
 Temperature Range: -10 to 82 degrees C
 Max Pressure: 290 PSI (20 BAR)
 Wetted Materials: 316 Stainless Steel Enclosure
 Material: Glass Filled Nylon Standard
 Electrical Connection: Cable Entry and 1/2" NPT Conduit
 Process Connection: 3/4" NPT
 Output: 5A SPDT relay (250 Vac max)
 Time Delay: 0.1 to 5 Seconds nominal
 Sensitivity Adjustment: 0.5 to 50K Ohms
 Electrodes: 316 Stainless Steel
 Output Voltage of Electrodes: 12 V to 100 Hz
 Weight: Approx. 2.7 Kg
 Protection Class: NEMA 4 (IP65)

Sludge Discharge Chute and Conveyor

Dewatering sludge from the Screw Press shall discharge to a Austin Mac sludge conveyor or equal. The conveyor system shall be designed to handle 14 percent to 18 percent sludge (dry solid basis) at rates up to 30 cubic feet per hour (1300 wet pounds per hour of sludge at 16 percent solids by weight). This screw conveyor system shall convey dewatering sludge to the center of a sludge holding box with 8 sidewalls.

The conveyor shall be a minimum of 9 inches in diameter. Construction of the outside troughs shall be minimum 12 gauge 304SS. End flanges shall be of similar construction with support foot for anchorage. All support members and mounting hardware shall be 304SS.

The auger shall be shaftless and of Mild Steel construction with pitches designed to transport the material referenced above.

Sludge shall be directed to the conveyor system and splashing prevented through the use of a 14 gauge 304SS hopper and splashguards. Slope on side walls of hopper shall not exceed 30 degrees from the vertical. Construction shall be welded with interconnections of 304SS hardware.

The drive shall consist of belts or gearbox output constant speed with 3.0 HP 3/60/480V, 3P, 1800 RPM premium efficiency electric motor (TEFC), Class F insulation, SF = 1.15, rated for continuous service. The belt drive/gearbox shall be directly coupled to the auger shaft with support part of the conveyor support structure.

The screw conveyor shall be mounted on an incline. The maximum incline of the screw conveyor shall not exceed 30 degrees. The screw assembly shall be supported by an UHMW lining in the trough and sealed bearings at the drive end of the screw assembly.

All necessary support brackets and support stands shall be provided as part of the package.

The conveyor shall come complete with conduit and wiring from the drive motor to the inlet end of the conveyor. The conduit and wiring shall terminate at a junction box for easy electrical connection of the conveyor to the package dewatering skid.

Marine Grade Aluminum Skid

The skid shall be 20' long by 8' wide and shall be comprised of 5052 bright aluminum 1/2" tread plate fastened on structural 6061-T6 aluminum 6" channel. All other aluminum sheets, plates, bars, angles and structural shapes shall also be grade 6061-T6.

Screw press shall be raised off the tread plate decking with structural support legs to accommodate conveyor accepting product from the screw press discharge box.

The entire skid shall be capable of being lifted, moved and set using the four lifting points found and indicated on the screw press channel foundation.

All equipment integral to the skid shall be secured with stainless steel anchor bolts and nuts mounted through drilled holes in flat bar welded to the aluminum structure.

All electrical and power conduit shall be routed below the aluminum trade plate within the dimensions of the skid. Conduit shall be liquid-tight flexible nonmetallic type.

Piping between the sludge feed pump, flocculation tank and screw press shall be 304 stainless steel. Piping from the polymer systems to the sludge feed line and/or flocculation tanks shall be flexible hose type.

Access by a ship ladder will be provided so visual inspection of the flocculation tank can be seen from the top of the platform.

6.0 IN-SERVICE TESTS

The dewatering equipment will be tested at the job site under actual operating load conditions before final acceptance.

When the dewatering equipment, including all controls and associated equipment have been installed, started-up, and operating under stable conditions, the Purchaser will notify the Seller. At such time as directed by the Purchaser, the Seller's service engineer will direct a performance test to test the equipment's ability to meet the performance guarantee described in Section 4.2.

7.0 GUARANTEES

The Seller shall guarantee that the dewatering equipment will consistently dewater solids per Section 4.2 when the sludge conditions are per Section 4.1.

The Seller shall guarantee the screw press to be free of mechanical defects due to labor or materials for a period of 18 months from delivery or for a period of twelve (12) months from start- up, whichever occurs first.

The Seller shall repair and/or replace any parts proven to be defective, within the guarantee period, FOB the job site at the Seller's expense.

In the event the equipment does not meet the performance specified in 4.2, the Seller shall make whatever modification or additions are required to bring the equipment into compliance at no additional cost to the Purchaser.

8.0 DOCUMENT SUBMITTAL

The Seller shall furnish, as applicable, hard copies and electronic copies of the following documents in fulfillment of an order:

Preliminary drawings for Purchaser's review and approval prior to start of manufacture. These shall include equipment outline drawings and loading drawings. Preliminary drawings shall be submitted within three (3) weeks after placement of order.

Certified drawings for engineering and installation of equipment.

Recommended spare parts list.

Drawings shall show all pertinent information including: dimensions, loading information,

equipment layout and arrangement, piping connections and location, etc.

9.0 OPERATIONS AND MAINTENANCE MANUALS

9.1 The Seller shall furnish no later than thirty (30) days prior to shipment of the equipment two (2) complete sets of operation and maintenance (O&M) manuals to the Purchaser for the Purchaser's use. The O&M manuals shall present the information in an orderly and professional manner and shall include the following:

- Complete set of equipment arrangement and dimensional drawings.
- Installation instructions.
- Detailed operating instructions which describe the flocculation tank, rotary screen thickener, and screw press operation and control parameters.
- Preventative maintenance instructions detailing lubrication procedures and detailed maintenance instructions which describe procedures for adjustment, disassembly, and reassembly etc.
- Complete parts list keyed to sectional drawings of the equipment.
- Start-up checklist, maintenance inspection checklist, and performance data sheets.

10.0 PREPARATION FOR SHIPMENT

Each individual package, crate or skid shall be tagged in accordance with the Purchaser's instructions prior to shipment.

Prior to delivery, Purchaser shall be supplied with detailed packing lists, shipping weights, and shipping container arrangement drawings.

EXHIBIT-H Bid Form

Line No	Activity	Bid Amount
1	Screw Press equipment cost	\$
2	Delivery cost	\$
4	Total Cost	\$

Certification: I understand that pricing will remain the same for a period of 6 months as quoted on line item (4) from notice of award letter.

Signature of Authorized Agent

Firm Name: _____

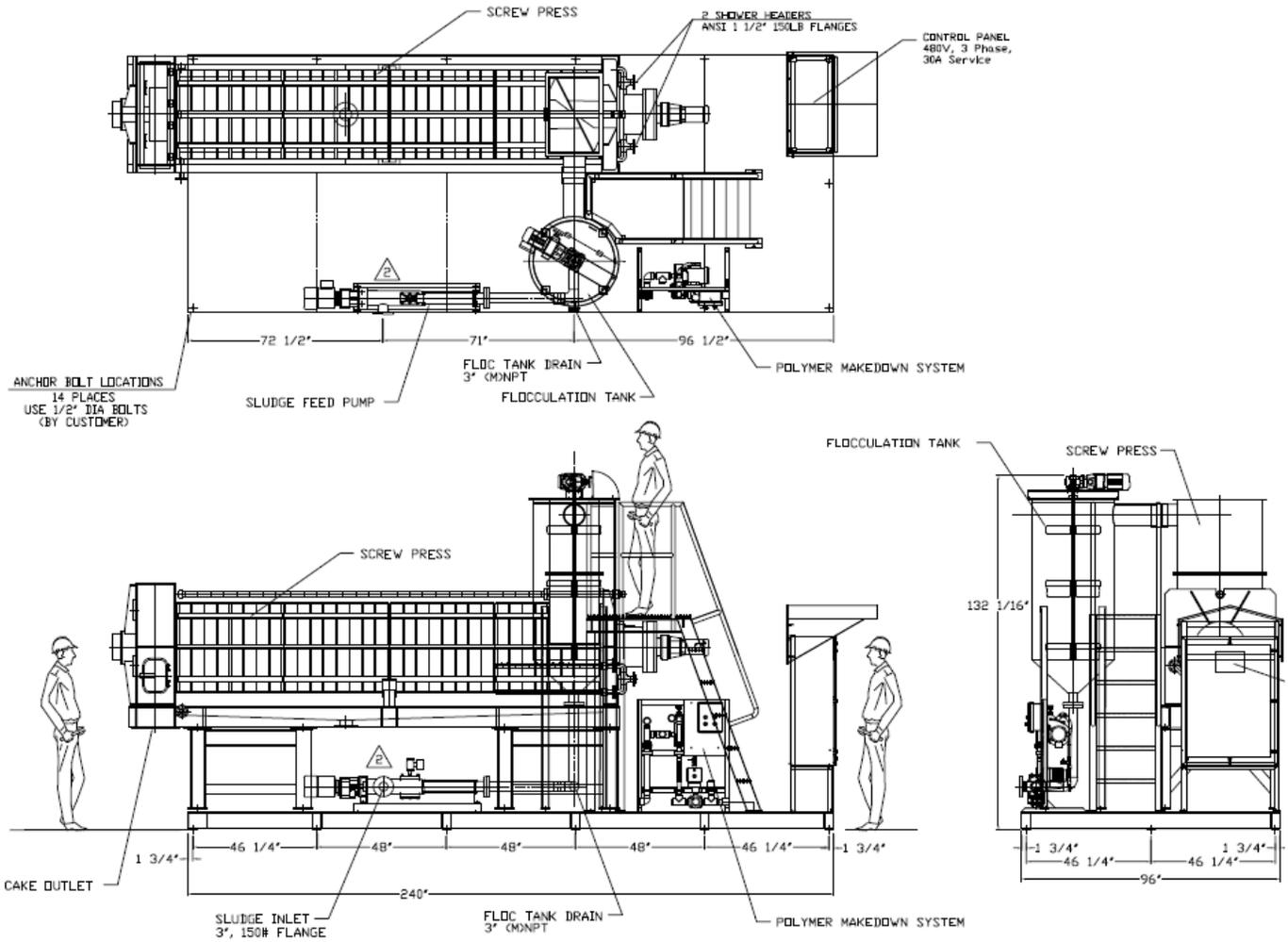
Authorized agent name and title _____

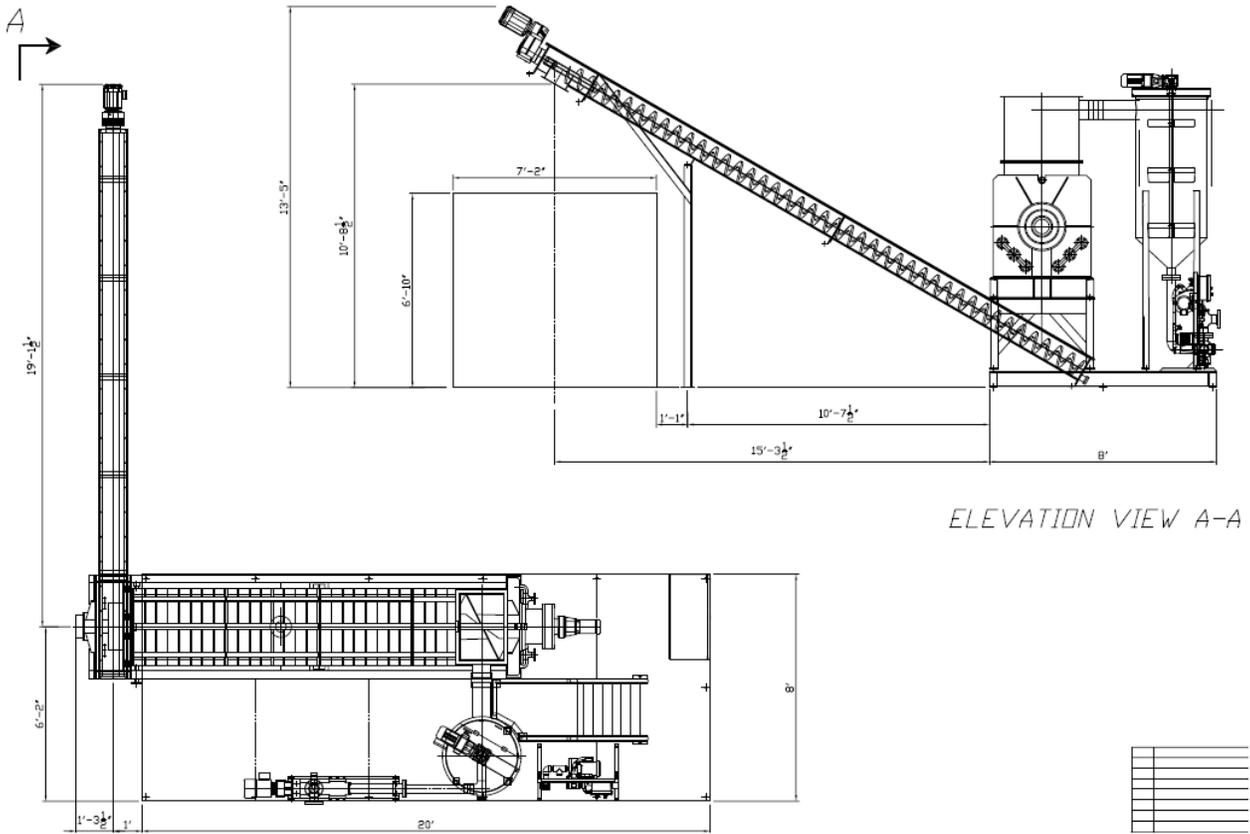
Email _____

Phone _____

Address: _____

EXHIBIT-A





ELEVATION VIEW A-A