



OFFICE OF WASTEWATER MANAGEMENT

WASHINGTON, D.C. 20460

SOLICITATION OF PUBLIC COMMENT FOR PROJECT-SPECIFIC BUILD AMERICA, BUY AMERICA NONAVAILABILITY WAIVER PROPOSAL

SUBJECT: UNDER EVALUATION: Project-Specific Nonavailability Waiver of Build America, Buy America Act Requirements to Snoqualmie Pass Utility District in Washington, for Multiple Manufactured Products in the Membrane Bioreactor Wastewater Treatment Upgrade Project

Intro: This solicitation of public comment by the U.S. Environmental Protection Agency (EPA) is to evaluate a Build America, Buy America Act (BABA) waiver request submitted by an assistance recipient based on nonavailability of products for a single project.

This solicitation of public comment does not represent a final agency decision. The purpose of this proposal is to inquire whether potential alternative domestic products may be available that were not identified by the assistance recipient or through the EPA's domestic product research efforts, and whether other factors should be considered in the evaluation of a waiver.

The EPA has completed its market research efforts and was unable to identify alternative domestic products meeting the performance-based specifications, in sufficient and reasonably available quantities and of a satisfactory quality. The EPA makes every effort to locate domestic alternative products through its waiver process and the public comment period provides a meaningful opportunity to vet the Agency's interim research. In the EPA's experience, a viable domestic product is identified through public comment in many cases. Through this public comment period, commenters may provide information that indicates a waiver may not be needed. For example, if the specified items are found to be domestically available, EPA would not issue a final waiver.

Public comments are requested for 15 days (specific dates noted on the EPA's website). Please submit comments to BABA-OW@epa.gov. Please include information in the subject of the email identifying it as a public comment on this waiver request, such as "Waiver Comment: Snoqualmie Pass Nonavailability Waiver" or similar. The proposed waiver will also be posted to the Made in America website.

Background

The Buy America Preference set forth in section 70914 of the BABA included in the Infrastructure Investment and Jobs Act (Pub. L. No. 117-58), requires all iron, steel, manufactured products, and construction materials used for infrastructure projects under Federal financial assistance awards be produced in the U.S.

Under section 70914(b), the EPA may waive the application of the Buy America Preference, in any case in which it finds that: applying the domestic content procurement preference would be inconsistent with the public interest; types of iron, steel, manufactured products, or construction materials are not produced in the US in sufficient and reasonably available quantities or of a satisfactory quality; or the inclusion of iron, steel, manufactured products, or construction materials produced in the U.S. will increase the cost of the overall project by more than 25 percent. All waivers must have a written explanation for the proposed determination; provide a period of not less than fifteen (15) calendar days for public comment on the proposed waiver; and submit the proposed waiver to the Office of Management and Budget's (OMB) Made in America Office for review to determine if the waiver is consistent with policy.

Summary

Proposed Waiver: The EPA is soliciting comments regarding whether to issue a project waiver of the requirements of section 70914 of the BABA included in the Infrastructure Investment and Jobs Act (Pub. L. No. 117-58), for manufactured products used in an infrastructure project funded through the 2024 Consolidated Appropriations Act.

Waiver Type: Nonavailability of domestic products in sufficient and reasonably available quantities or of a satisfactory quality.

Waiver Level and Scope: Project level waiver for multiple manufactured products for a single project. No other project will utilize the waiver.

Proposed Waiver Description: Project-specific nonavailability waiver of BABA requirements to the Applicant in Washington for membrane bioreactor (MBR) systems, instrumentation, control systems, equalization tank mixers, and blowers for the MBR Wastewater Treatment System Upgrade project.

Project Summary:

The project will replace the existing wastewater lagoon treatment system and effluent spray field with an MBR treatment system for the Snoqualmie Pass Utility District in Washington State.

In the current system, the effluent is applied to a spray field on U.S. Forest Service (USFS) land. However, in 2009, the USFS special use permit for the spray field expired. The USFS chose not to renew the special use permit, so the Applicant had to develop a different method for wastewater treatment. In addition to the permit expiration, the Washington State Department of Ecology (Ecology) had expressed concerns with the treatment effectiveness of the spray field during the winter, when effluent is applied to snow instead of vegetation. Ecology indicated that nitrogen and phosphorous may wash into Lake Keechelus and contribute to harmful environmental conditions. This created additional necessity for the Applicant to choose a different wastewater treatment method.

The Applicant initiated project design in February 2020. In 2021, the Applicant began a pilot study involving a skid-mounted MBR system. The pilot study aimed to confirm that the MBR process could provide adequate treatment at low temperatures typically experienced at the project site in Snoqualmie Pass, Washington. The pilot study occurred between December 2021 and July 2023.

The Applicant intends to complete the treatment system upgrades based on the success of the pilot study. This will include installing the MBR treatment system, equalization tank mixers, digester blowers, drainage pumps, dewatering equipment, and controls systems for the facility.

Length of the waiver: From the effective date of the final waiver until project completion, which is estimated to be November 30, 2030.

Summary of Items Covered in the Proposed Waiver (including NAICS): The Applicant is seeking a waiver for the following products:

Membrane biological reactor (MBR) system

PSC: 4630

NAICS: 333310

BABA Category: Manufactured Product

Instrumentation

PSC: 6630

NAICS: 334516

BABA Category: Manufactured Products

Control systems

PSC: 6110

NAICS: 335314

BABA Category: Manufactured Products

Equalization tank mixers

PSC: 4630

NAICS: 333310

BABA Category: Manufactured Products

Blowers

PSC: 4140

NAICS: 333413

BABA Category: Manufactured Products

Description of Efforts Made to Avoid the Need for a Waiver

The EPA conducted market research for MBR systems, instrumentation, control systems, equalization tank mixers, and blowers in February 2025. The market research process included thorough review of the waiver request submission, examination of domestic manufacturer catalogs and other technical data and marketing materials, personal communication with domestic manufacturers, inquiries of regional project officers, and outreach to contractors and engineers with expertise and familiarity with the project. The EPA's market research identified possible domestic alternatives for all products except instrumentation. Upon further review, none of the identified domestic products met the specifications of the project. A summary of the research is included below.

The EPA contacted 14 manufacturers and suppliers of MBR systems. The research identified one (1) domestic alternative MBR system. However, this system has not been demonstrated to perform in the specific cold climate like the MBR system used in the Applicant's pilot study. The time to redesign the project, including a new pilot study, coupled with the lead time on this product would cause significant delays to the project. The Applicant has a limited construction season due to winter weather conditions. Delays from long lead times or from redesign would significantly impact project completion.

The EPA contacted 13 manufacturers and suppliers of instrumentation. No domestic alternatives were identified during market research.

The EPA contacted nine (9) manufacturers and suppliers of control systems. One (1) domestic alternative was identified for control systems. The identified domestic control systems are not typically provided with the MBR system the Applicant used during the pilot study. The domestic control system has not been tested to meet the critical performance requirements in the project specifications that Applicant identified from the pilot study, which poses performance and reliability risks and concerns.

The EPA contacted 11 manufacturers and suppliers of equalization tank hyperbolic mixers. One (1) domestic alternative equalization tank hyperbolic mixer was identified during market research. The Applicant indicated that the identified pulse-type mixers would not perform adequately at shallow depths. The Applicant's specifications include slow-moving hyperbolic mixers to meet the varying tank levels and shallow depths of the equalization tank.

The EPA contacted ten (10) manufacturers and suppliers of blowers. One (1) domestic blower alternative was identified during market research. Following review of the product information, the Applicant indicated that the specified regenerative blower would not meet project specifications. The specifications are for positive displacement blowers, which are better suited for higher range pressure changes required by the project.

For additional information on the project and waiver request, see the attached waiver request from the Applicant and supporting documents.

Anticipated Impact if No Waiver is Issued

Absent a waiver from the EPA, the Applicant would be unable to complete the replacement of the existing treatment system, which is crucial to protecting human health and the environment. Without the new MBR system, nitrogen and phosphorous may wash into Lake Keechelus and contribute to harmful environmental conditions, particularly when effluent is applied to snow rather than vegetation. Additionally, the USFS special use permit is expired, and the Applicant is operating under a temporary agreement while the replacement of the treatment system is underway. The USFS policies no longer allow wastewater discharge to National Forest Service land, and they will not renew the permit. Without a waiver and without completion of the replacement treatment system the Applicant will be left without adequate means of disposal for partially treated wastewater.

Description of Award

Recipient Name and/or Unique Entity Identifier (UEI): Q6WFAWEBTYP3

Federal Financial Assistance Identification Number (FAIN): N/A

Federal Financial Assistance Listing Number: 66.202

Common Government-wide Accounting Classification Agency Code: 068

Federal Financial Assistance Funding Amount \$5,000,000

Total Cost of Infrastructure Expenditures: \$18,832,000

[REDACTED]

July 17, 2024

NOTE: Information in this waiver may have been redacted or removed due to issues of proprietary business information or incompatibility with Federal accessibility requirements. To request the information redacted for purposes of accessibility requirements, please email CWSRFWaiver@epa.gov.

Environmental Protection Agency
1200 Sixth Avenue, Ste. 155
Seattle, WA 98101

Re: BABA Waiver Request
Snoqualmie Pass Utility District
Phase 2 MBR Wastewater Treatment Upgrade Project
[REDACTED]

To Whom it May Concern:

Please accept this correspondence as the official request of the Snoqualmie Pass Utility District for a waiver to Build America, Buy America (BABA) requirements for the funding of the above referenced new wastewater treatment upgrade construction.

Summary of Project:

The Snoqualmie Pass Utility District Phase 2 MBR Wastewater Treatment Upgrade Project replaces the existing wastewater lagoon treatment system and spray field where the effluent from wastewater treatment lagoons is applied to US Forest Service (USFS) land. The project includes construction of a membrane bioreactor (MBR) treatment process to allow discharge of the effluent to Lake Keechelus, augmenting flow to the Yakima Watershed.

The project is needed as a result of the USFS decision to not renew the lease (expired 2009) for the spray field on which the wastewater is applied for final treatment and disposal. In addition, the Washington State Department of Ecology (Ecology) has questioned the treatment effectiveness of the spray field during the winter months since the effluent is applied to snow and not vegetation, which is the basis for removal of nitrogen and phosphorus in the effluent. Without proper removal, the nitrogen and phosphorus may be washed down into Lake Keechelus where they may contribute to harmful conditions for fish.

The project is vital to the District, the community, the County, and other stakeholders. Benefits of the project include:

- Provides improved treatment of the wastewater for the Snoqualmie Pass area.
- Eliminates the effluent discharge spray field on USFS land and returns 47.5-acre spray field for use as USFS land.
- New discharge to Lake Keechelus is required to provide a mitigated water right to support development and growth in the area without taking water away from lower Kittitas County.
- Contributes water to Yakima Watershed.

The project scope includes the following:

- Construct MBR treatment system rated for an average of 250,000 gallons per day with associated process elements.
- [REDACTED]
- [REDACTED]

- New solids treatment system to provide Class B biosolids.
- New Influent screen and grit removal system.
- New Equalization tanks for system flexibility and treatment system equipment optimization.

The overall project schedule is as follows:

- Ecology has approved the Facility Plan.
- Phase 1 of the four-phase project has been completed.
- Phase 1 of WWTP improvements provided new offices to the District and installed a skid mounted MBR treatment process rated for 25,000 gpd. This skid mounted MBR treatment process served as a pilot to confirm the [REDACTED] process can provide treatment at the low temperatures experienced at the site and was used for the final MBR equipment sizing for the Phase 2, 250,000 gpd, system. The Phase 1 WWTP was started December 1, of 2021, and operated until July of 2023.
- Phase 2 includes installation of new equalization (EQ) tanks in the location of the existing Lagoon 1. The original Facility Plan anticipated using the entire Lagoon 1 for equalization. However, during the operation of the skid mounted MBR system, it was determined the size of Lagoon 1 was too large for equalization because of algae growth in the summer, and the longer detention time in winter contributed to lower than desirable temperatures. Consequently, the Lagoon 1 modifications shown for Phase 3 in the Facility Plan will not be needed nor constructed since the new EQ tanks will be constructed as part of Phase 2 instead.
- Phase 4 will remove the spray field and decommission existing Lagoon 2. A portion of Lagoon 2 may be used for additional equalization capacity for the MBR treatment facility.

Need and justification for BABA Waiver for Phase 2 of the Project:

Program Waiver:

The WWTP process design was in the planning stages before the statutory effective date of the BABA requirements per the following schedule:

<u>Activity</u>	<u>Start Date</u>	<u>Completion Date</u>
Facility Plan	April 18, 2018	August 25, 2022 (final amendment)
Phase 1 Design	February 11, 2020	March 30, 2022
Phase 1 Construction	May 10, 2021	December 1, 2021 ¹ (Process start-up)
Phase 2 Design	March 29, 2022	Bid scheduled for September 2024
Phase 2 Construction	May 2025	November 2026

Per the November 13, 2023, Decision Memorandum regarding Amended Public Interest Waiver of Section 70914(a) of P.L. 117-58, Build America, Buy America Act, 2021 for State Revolving Fund and Water Infrastructure Projects that Initiated Design Planning prior to May 14, 2022, from Radhika Fox of USEPA, a program waiver will be granted for projects that have initiated project design planning prior to May 14, 2022, the statutory effective date of the BABA requirements should apply to the entire project.

Equipment Specific Needs:

Membrane Treatment System:

General Discussion: Although a waiver is needed for other items, the primary need is for the membrane treatment system as follows:

[REDACTED]

- The WWTP process design has been based upon the [REDACTED] membrane system technology as proven during operation of the MBR skid installed during Phase 1 of the project. The Phase 1 operation served as a pilot demonstration to prove its operation during cold weather months.

Note that due to the process guarantee requirements of the treatment system, the scope of supply for the MBR treatment system includes the instrumentation and controls for the system along with related key piping, valves, and pumping systems. Therefore, some components of the [REDACTED] may be available for purchase in the US. However, [REDACTED] equipment is purchased as a package. Since [REDACTED] is responsible for meeting the performance guarantees for the system, they should not be required to supply equipment they have not had experience with and risk compromising their system performance and reliability.

To our knowledge there are no submerged membrane manufacturers that exist in the US. Current manufacturers of submerged membranes for wastewater treatment applications include:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

Components included in the [REDACTED] scope of supply for the Snoqualmie Pass Utility District Phase 2 project and the origin of each is listed in the Scope of Supply, attached. This list shows the components that are and are not BABA compliant.

Equipment Specifications:

Attached is the specification for the [REDACTED] Equipment supplied for the Phase 1 project and [REDACTED] proposal for the Phase 2 project. Since the [REDACTED] equipment was selected for the Phase 1 project as part of a competitive bidding process and its performance was proven by the operation of skid mounted system, [REDACTED] engineers have been involved in the design process for the Phase 2 project and their equipment is being specified as a sole source with a predefined purchase price for the General Contractor to use in their bid for the entire project.

Project Costs:

The itemized engineer's cost estimate for the project is provided in Table 1. The cost of the [REDACTED] equipment is included in the list. The [REDACTED] scope of supply is approximately 8% of the entire construction costs for the project.



SECTION 40 70 11 – INSTRUMENTATION FOR PROCESS SYSTEMS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. The work of this section includes furnishing, installing, testing, startup, training, and warranty support for all process instrumentation, including flow meters, pressure sensors and transmitters, gauges, and all required appurtenances, complete and operable, as specified and shown on the plans.
- B. Electrical wiring and equipment with electrical connections and control and safety devices shall be Recognized Electrical Testing Laboratory (RETL) listed and labeled, or the Contractor shall obtain approval from the Washington State Department of Labor and Industries.
- C. All process instrumentation and appurtenances for this project shall be the products of a single manufacturer, unless otherwise noted.

1.02 RELATED SECTIONS

- A. Section 01 33 00 – Submittals Procedure
- B. Section 01 78 00 – Operation and Maintenance Manuals
- C. Division 46 – Water and Wastewater Equipment

1.03 SUBMITTALS

- A. Refer to Section 01 33 00 – Submittals Procedure, for general submittal requirements.
- B. Submit manufacturer's complete descriptive product data and specification sheets for all process instrumentation and appurtenances. Clearly identify all accessories and options being provided, as specified and shown on the Plans.
- C. Submit a copy of the manufacturer's written warranty, as specified.
- D. Submit operation and maintenance manuals in accordance with Section 01 78 00 – Operation and Maintenance Manuals.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver process instrumentation to the job site at appropriate time for installation. All equipment and materials shall be crated and/or packaged with protective wrappings to prevent damage during delivery, storage and handling.
- B. Store all equipment and materials above ground and in weather tight enclosures. Keep all equipment and materials dry and protect from excessive heat or cold.

1.05 STARTUP SERVICE

- A. The manufacturer or manufacturer's qualified representative shall provide a minimum of two (2) days of startup service to inspect the installation of all components, confirm proper setup, configuration, and operation of all process instrumentation, and instruct the Owner and Engineer in operation and maintenance of all equipment. Refer to Part 3 of this section for additional requirements.

1.06 TOOLS AND SPARE PARTS

- A. Provide any other special tools or spare parts as recommended by the manufacturer.
- B. Spare parts shall be properly packaged and labeled for easy identification without opening and protection for long term storage.

1.07 WARRANTY

- A. All process instrumentation supplied under this section shall be warranted to be free from defects in workmanship, materials and design for a period of two (2) years from the date of substantial completion.
- B. All process gauges shall have a ten (10) year system warranty from the date of substantial completion.

PART 2 – PRODUCTS

2.01 GENERAL

- A. All process instrumentation shall be adequately supported and securely mounted in locations shown on the plans and as specified herein. Devices specified to have remote-mounted transmitters/signal converters shall be provided with additional support brackets and/or hardware necessary to securely mount them in locations shown on the plans. Coordinate installation with other equipment, piping, and electrical system installations.
- B. All process instrumentation shall be suitable for indoor and outdoor use, and capable of functioning in ambient temperatures ranging from -20 °F to 140 °F, and a relative humidity up to 100%. Devices located in process tanks, flumes, trenches, vaults, or any other locations susceptible to flooding or immersion, shall be watertight and adequately protected for use in such environments. Devices located in hazardous areas shall meet the area classification identified.

2.02 MANUFACTURERS

- A. [REDACTED]
- B. [REDACTED]

2.03 ELECTROMAGNETIC FLOW METERS

- A. General
 - 1. Electromagnetic type flow meters shall be provided and installed in piping where indicated in the specifications. Flow meter design, including the flow sensor, transmitter/signal converter, display, and appurtenances, is based upon [REDACTED] series flow sensor with a [REDACTED] series transmitter.

PART 2 – PRODUCTS

2.01 MBR SYSTEM PERFORMANCE REQUIREMENTS

- A. The MBR system will be sized to hydraulically convey the flows shown in Table 2-1.

TABLE 2-1: PLAN HYDRAULIC LOADING CRITERIA (5 DEGREE CELSIUS)					
PARAMETER	INFLUENT		EVENT DURATION	FREQUENCY	TOTAL DURATION
Average Annual Flow (AAF)	0.02	MGD	265 days	1/ year	265 days
Maximum Month Flow (MMF)	0.02	MGD	30 days	3/ year	90 days
Peak Daily Flow (PDF)	0.04	MGD	24 hours	9/ year	9 days
Peak Hour Flow (PHF)	0.05	MGD	3 hours	8/ year	1 days

- B. The MBR System shall be capable of treating raw wastewater at listed flows to the specified effluent criteria shown in Table 2-2.

TABLE 2-2: PLANT POLLUTANT LOADING AND EFFLUENT CRITERIA		
Parameter	Influent ¹	Effluent
Maximum Month CBOD ₅	200 mg/L	<5 mg/L
Maximum Month Daily Average TSS ^{2, 3, 5}	200 mg/L	<2 mg/L
Maximum Month Daily Average TN	-	--
Maximum Month Daily Average NH ₃ -N	-	--
Maximum Month Daily Average TP	-	--
Turbidity ⁴	--	<0.2 NTU (avg.)
Design Minimum Temperature	5°C	--
Nitrate	-	<10 mg/L
Ammonia	-	2.2 mg/L
Notes:		
1. Influent loading shall be within [± 25%] of design value.		
2. Measured TSS shall be less than or equal to 2 mg/L on 9 of 10 consecutive samples and no sample shall exceed 5 mg/L.		
3. Influent shall be screened so that at least 90% of solids with any 2 dimensions greater than or equal to 3mm in length are removed.		
4. Measured turbidity shall be less than or equal to 0.2 NTU on 9 of 10 consecutive samples and no sample shall exceed 0.5 NTU.		
5. Concentration of grit, defined as particles having a specific gravity of >1.6 and unable to pass through a 65-mesh screen (0.21mm), shall be less than 5 mg/l		

- C. Process Redundancy

1. The MBR System shall be able to treat the AAF and MMF for the duration of chemical cleaning (minimum of 4 consecutive hours) and the duration of maintenance inspection (minimum of 8 consecutive hours) with one Membrane Zone out of service.

- D. System Configuration

1. The MBR skid shall consist of the following major process components:
 - a. One (1) Anoxic (AX) tank: Minimum volume of 5,733 gallons per tank. At Anoxic tank, mixers are installed and de-nitrification process as well as alkalinity recovery process will occur.

- b. One (1) Pre-Aeration (PA) Tank: Minimum volume of 1,638 gallons. PA tank has fine bubble diffuser system to supply oxygen to biology and to intermittently agitate the tank. The air is delivered by PA blower(s).
- c. Two (2) MBR tanks: Minimum volume of 4,148 gallons per tank. Minimum total system MBR volume will be 8,296 gallons. At MBR tank, SMU(s) are installed. MBR blower will supply the air for scouring membrane surface as well as supplying oxygen for biological treatment.
- d. Control panel platform: Control panel platform consists of two floors (upper and lower) to fasten MBR System Control Panel and other required ancillaries such as permeate pump(s), MBR blower(s), PA blower(s), WAS pump(s), chemical injection system and instruments.
- e. MBR skid shall consist of the following process tanks as shown in Table 3. The overall footprint and height is limited to the values shown in Table 3. The dimensions are set for economical transportation to the project site. However, the components that are loose shipped to the project site such as ladders, handrails, piping sticking out over the tank top are NOT counted in the overall footprint or height.

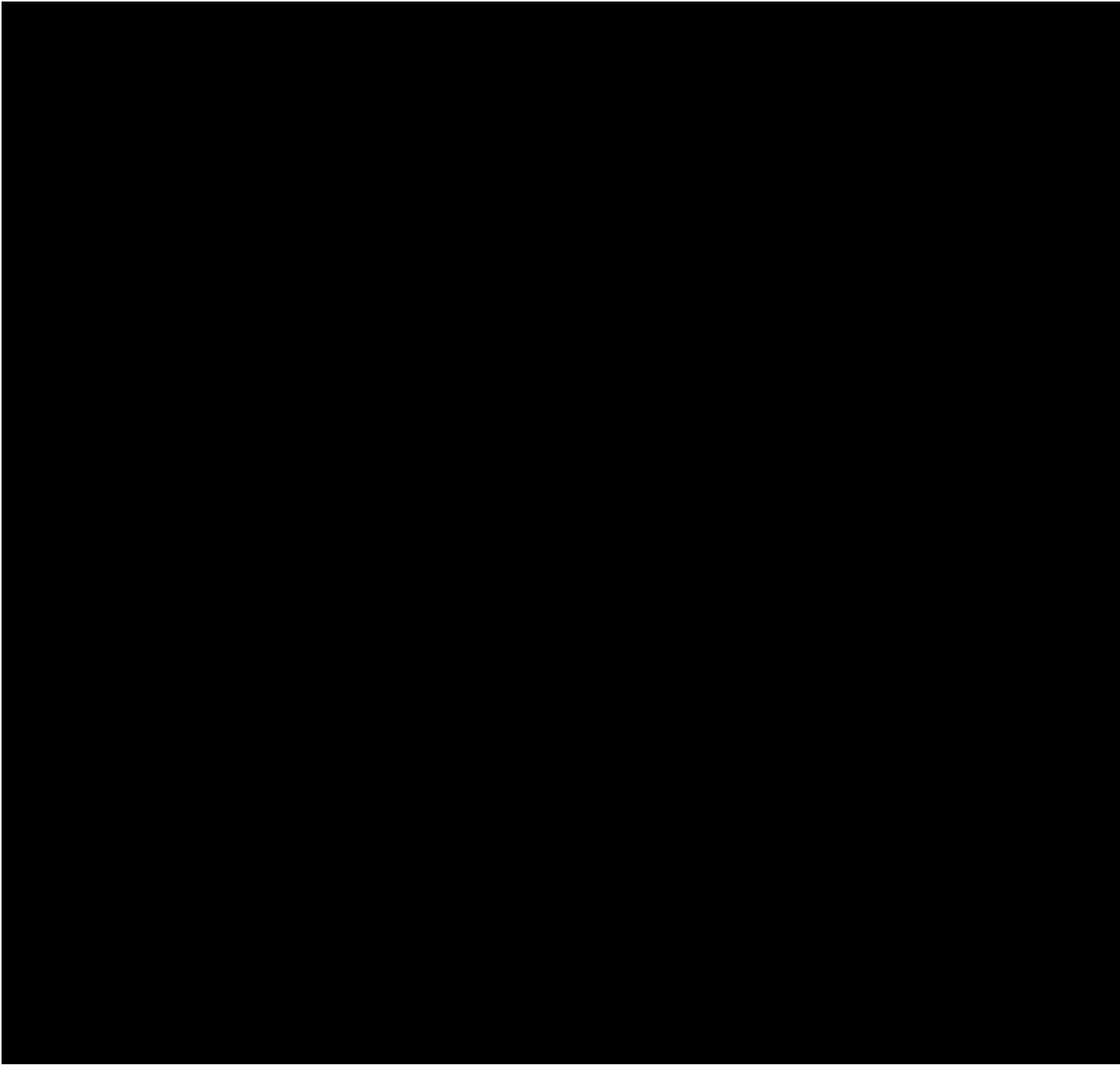
TABLE 3: SPECIFICATION OF MBR SKID	
Anoxic Tank Volume	5,733 Gallons
Pre-Aeration Tank Volume	1,638 Gallons
One MBR Tank Volume	4,148 Gallons
Total MBR Tank Volume	8,296 Gallons
Total Tank Volume	15,667 Gallons
Overall Footprint of skid	45' x 8.6'
Overall height of skid	12'

- E. The allowable MLSS concentration in the MBR Tanks shall range between 8,000 mg/l and 15,000 mg/l.
- F. The MBR basins shall be considered part of the biological process when calculating aerobic volume requirements.
- G. Membrane CIP Procedures
 - 1. Membrane subunits shall be cleaned in place in order to maintain production capacity and meet performance requirements specified herein. The allowable frequency of listed CIP methods shall be as follows:
 - a. Maintenance Clean frequency shall be as necessary.
 - b. Recovery Clean frequency shall not exceed 2/yr.
- H. For MBR Systems that require Recovery Cleaning as part of routine maintenance:
 - 1. Tank liners shall be required for Membrane Zones to protect against corrosion or deterioration of wall materials.
 - 2. All fasteners, including nuts, bolts, screws, cables, washers and other appurtenances, associated with the SMU shall be manufactured from Type 316L stainless-steel.
- I. The MBR shall be designed to operate at or below a trans-membrane pressure (TMP) of 3 psig.

2.07 BLOWERS

- A. Blowers shall be provided complete with inlet filters, discharge silencers, pressure relief valves, check valves, motors, temperature and pressure gauges, over-temperature sensor/switch, expansion joints, baseplates, and vibration isolating mounts.
- B. Process aeration blowers shall be sized to maintain a residual DO of 2.0 mg/l at MMF flow rates and loadings and a minimum of a 2:1 turndown. Process aeration system shall include a standby blower of equal or greater capacity to the duty blowers.
- C. MBR scour air blowers shall be sized such that sufficient scour air is provided to support MMF flows as described in this Specification without requiring additional maintenance cleans. The scour air system shall include a standby blower of equal or greater capacity to the duty blowers.

- D. MBR scour air blowers shall accommodate a minimum surge of 1.5 psig under normal operating conditions.
- E. All blowers for this project shall be the products of a single manufacturer, and shall be standard units manufactured by one of the following:
- | | |
|---|---|
| ■ | ■ |
| ■ | ■ |
| ■ | ■ |
- F. Blowers shall be regenerative type and have a maximum noise level of 80 dBA at one meter from the unit.
- G. Blowers shall be capable of operating from a 3-phase, 480V, 60Hz, AC power supply. Blower motors shall be NEMA "Premium Efficient," and shall be capable of operating under a maximum ambient temperature of 40 °C (104 °F).



2.10 INSTRUMENTATION

- A. Process instrumentation devices shall be as specified in Section 40 70 11.
- B. Identification Tags: All field instruments shall have identification tags meeting the following requirements.
 - 1. Tag number of instruments shall be established by the MBR System Supplier and approved by the Engineer.
 - 2. Tags shall be made of stainless steel, engraved with 3/16-inch letters, and attached using a stainless steel cable.
 - 3. Instruments mounted on or within control panels and enclosures shall have the identification tag installed so that the engravings are easily visible to service personnel.

2.11 MBR SYSTEM CONTROL PANEL

- A. General:
 - 1. The MBR Supplier shall furnish a MBR System Control Panel that fits on the skid without conflicting with ancillary equipment.
 - 2. Control Panels shall be manufactured in accordance with ISO 9000-2001 specifications and shall be so constructed for the application of UL Listing Label by an approved UL Control Panel Assembly Facility with all the required labels properly attached.
 - 3. The size of the panel shall be determined by the MBR Supplier.
 - 4. MBR System Control Panel shall be pre-mounted, pre-wired and pre-tested before ship-out so that there will be no need for field wiring or field testing before starting MBR skid.
 - 5. The main control panel shall be suitable for operation from a single-point 480 VAC, 60 Hz, 3-phase power supply.
- B. Control Panel Features:
 - 1. NEMA 4/12 powder coated steel enclosure (Hoffman or equal) with 2 doors. The size and quantity of panels shall be determined by the MBR supplier so that the MBR System Control Panel will physically fit at the floor level without conflicting to the other ancillary equipment.
 - 2. NEMA 4/12 air conditioner.
 - 3. [REDACTED] remote access VPN firewall.
 - 4. [REDACTED] processor.
 - 5. Redundant 24 VDC power supply for field devices.
 - 6. Ethernet switches.
 - 7. Relays, circuit breakers.
 - 8. All I/O points wired to terminal blocks.
 - 9. Terminal blocks and fuse blocks for all I/O points.

10. Surge suppressor on AC mains.
11. LED panel light.
12. Convenience power outlet.
13. Door handle.
14. UPS system allowing operation through power losses of up to 3 minutes.
15. Fabricated and listed per UL 508a requirements.
16. Complete, documented control panel functionality test, including point-to-point testing of all I/O channels.
17. Detailed panel drawings and loop interconnects.
18. Submittals as required.
19. [REDACTED] VFDs with 3% line reactors, including over-current and over-heat protections.

Constant torque VFDs shall be provided for any constant torque loads. Provisions shall be made for motor controllers to accept drive motor winding thermostat wiring.
20. HOA switches (HAND-OFF-AUTO switches) on the front of the panel to allow the operator to manually start/stop without accessing 480VAC area in the panel.
21. Name plates for HOA switches.
22. Emergency stop button on the front of the panel.
23. Fuses for each size.

C. PLC I/O Counts and I/O cards:

1. To be determined by the MBR supplier and panel manufacturer based on the P&ID provided by the MBR supplier.
2. Provide one spare I/O card for every 10 cards, or fraction thereof, of each type of card installed.

D. HMI System Hardware and Software Features:

1. The MBR skid manufacturer shall supply a control system software program for the MBR process system and provide one copy of the control program on a thumb drive.
2. 19 inch NEMA 4/12 Hope Industrial Touchscreen Operator Interface, with [REDACTED].
3. [REDACTED], 100 Display.
4. [REDACTED] HMI configuration Software.

E. PLC and HMI Programming:

1. PLC Programming following MBR Supplier Control Narratives and using PLC Programming Standards.

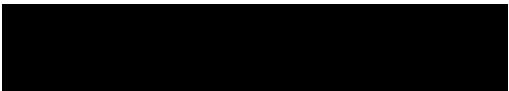
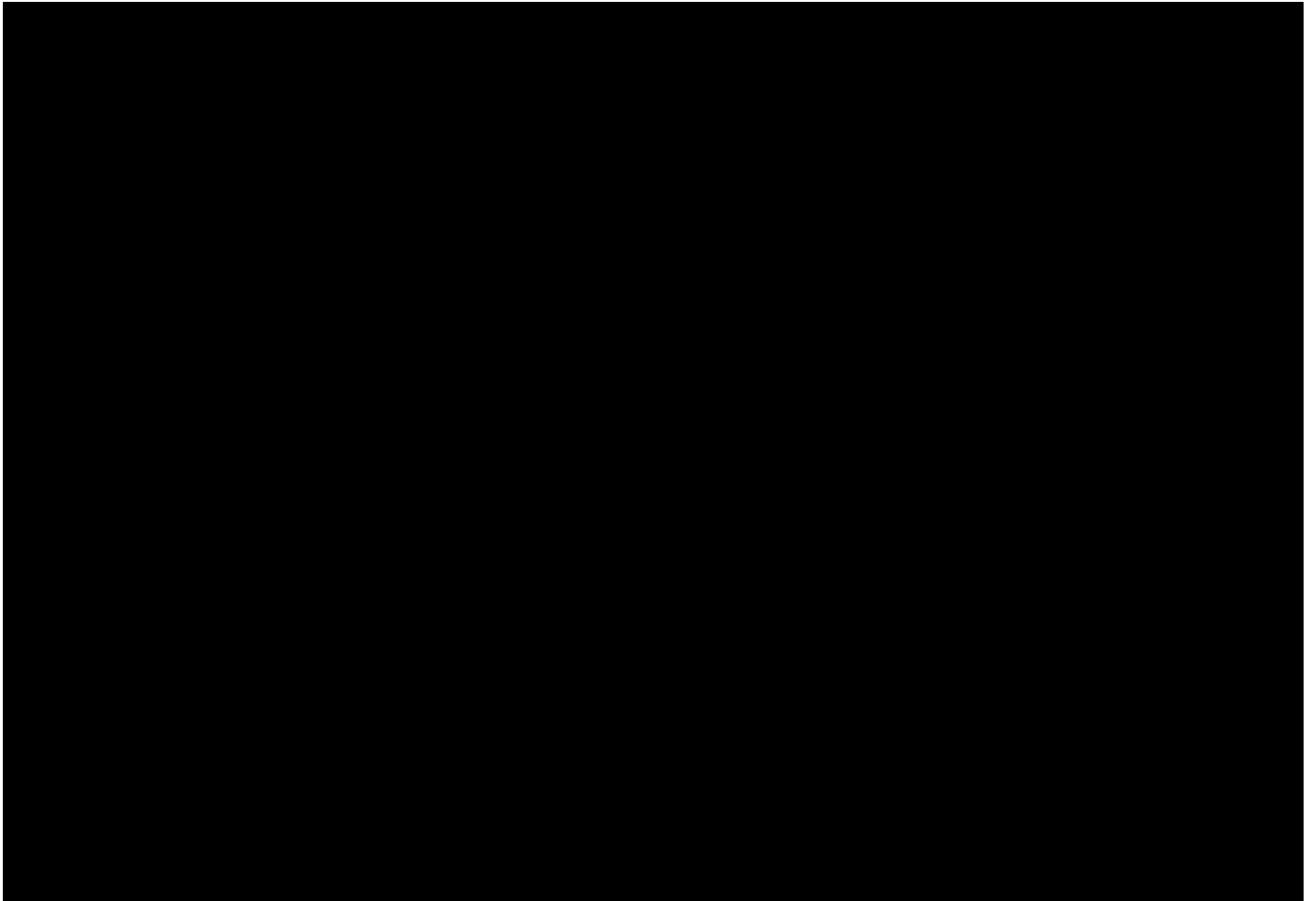
2. HMI Programming following MBR Supplier Control Narratives using HMI Programming Standards.
3. PLC/HMI programming FAT at the MSM shop or Remotely witnessed.

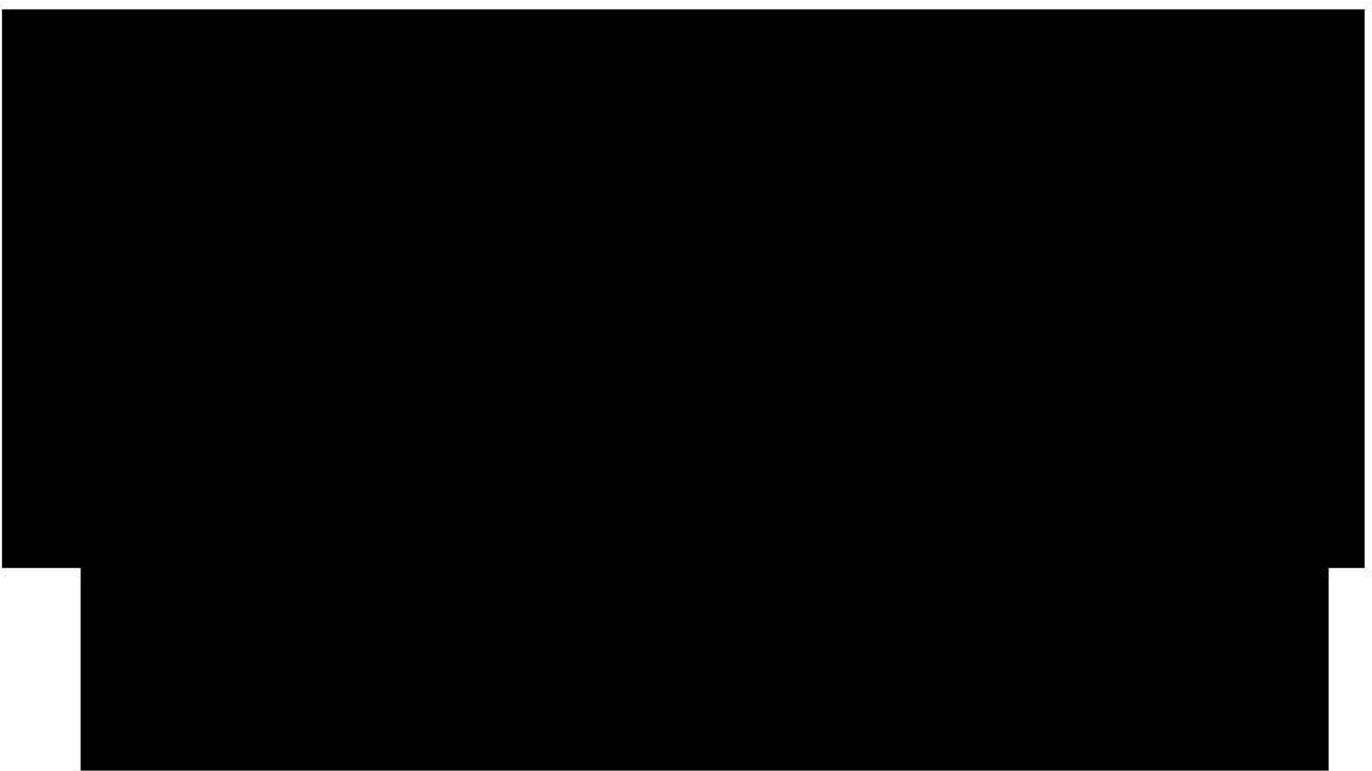
F. Engineering:

1. Control panel design, drawings, and wiring schematics in AutoCAD.
2. Loop wiring (point-to-point) drawings in AutoCAD.
3. Submittal documents.
4. 100% design documentation.
5. As-delivered documentation.
6. As-built documentation .

G. Remote Access Device:

1. Provide the following equipment to permit remote access for troubleshooting and programming as necessary:
 - a. [REDACTED] or equivalent.
 - b. [REDACTED] or equivalent.





PART 2 – PRODUCTS

2.01 GENERAL REQUIREMENTS

- N. Hyperbolic mixers and appurtenance shall be as manufactured by [REDACTED] [REDACTED] Engineer approved equal. If any other manufacturer is proposed by the Contractor, it shall be the responsibility of the Contractor to perform any required redesign and coordination associated with, but not limited to, mechanical equipment layout, electrical wiring, conduit and controls, and structural/architectural work, at no additional cost to the Owner.
- O. Mixers shall be of the non-clogging, vertical shaft, hyperbolic-body type. Each mixer assembly shall consist of a dry installed heavy-duty speed reducer with hollow shaft, electric gearmotor, baseplate, composite FRP shaft, and composite hyperbolic mixer body. The mixer should have a steady stationary flow pointed downward parallel to the mixer shaft. The highest speeds and turbulent fluctuations should be produced in the bottom area. On the water surface, no or little surface turbulence should appear.
- P. The mixer and its appurtenances shall be specifically designed for continuous duty operation in a submerged application in a wastewater equalization basin with variable operating levels. The mixers shall not overload the motors at any point within the operating limits recommended by the mixer manufacturer.
- Q. The mixer shall be designed as a vertical shaft mixer with a dry installed motor. The entire weight of the mixer shall be supported by a bridge/walkway as shown on the Plans. During operation, the mixer should not generate any upward forces on the bridge construction.
- R. All anchor bolts and fasteners shall Type 316 stainless steel unless otherwise indicated. Refer to Section 05 50 11 – Miscellaneous Metals, and elsewhere within this section for additional fastener requirements.

2.02 SERVICE CONDITIONS AND PERFORMANCE REQUIREMENTS

- A. The mixers shall be capable of completely mixing the equalization tanks under the following conditions, and meeting the following performance requirements:

SERVICE CONDITIONS AND PERFORMANCE REQUIREMENTS		
Number of Mixers	2	1
Mixer Type	Hyperbolic	Hyperbolic
Tank Contents	Raw Wastewater	Raw Wastewater
Type of Tank	Concrete, Open Top	Concrete, Open Top
Basin Dimensions (each)	113 ft x 40 ft	30 ft x 40 ft
Water Depth	10.5 ft	10.5 ft
Tank Bottom Configuration	Flat	Flat
Nominal Mixer Speed	18.7 RPM	18.7 RPM
Motor Horsepower	7.5 hp	1.5 hp
Motor Speed	1,800 RPM	1,800 RPM

2.03 MIXER DRIVE

- A. Drives shall be rated for continuous 24 hours per day operation in accordance with the latest applicable AGMA standards for enclosed gear drives. The thermal rating of the speed reducer shall exceed the design mechanical rating to eliminate the need for external coolers. External cooling devices are not acceptable. The manufacturer shall certify, in writing, that the speed reducer is designed to the applicable AGMA Standards.
- B. The gear drive assembly for each mixer shall consist of parallel-shaft helical gearmotor as designed by [REDACTED], or approved equal.
- C. The gear drive assembly shall have a high-quality corrosion protection coating, robust weather protective hood, and PTC resistor for thermal protection of the motor.
- D. The gear box housing shall be cast iron covered with an acrylic coating, having a thickness of at least 6.0 mil. The gear box shall be connected to the mounting base using a flange connection with 316 additional stainless steel nuts and bolts.
- E. The gear box speed shall not exceed 27 rpm. The calculated lifetime L10 of the bearings shall exceed 100,000 hours.
- F. The drive motors shall be a squirrel cage induction motor, 460 V, 3 phase, 60 Hz, 1,800 RPM, Class F insulation. Motors shall be equipped with a weather protection hood and integral thermal overloads mounted in the motor windings.

2.04 MOUNTING BASE

- A. The mounting base of each mixer shall consist of a gear base plate mounted in rubber buffers connected permanently to the bridge/supports by bolted connection. The plate shall be able to be leveled using the threaded bolts, which can be adjusted in height.
- B. The rubber buffers shall absorb start-up torque, prevent any transfer of vibrations to the bridge and constitute the galvanic separation of the mixer from its surroundings.
- C. The mounting base shall be supplied with a fastening set for connection to the bridge/walkway as shown on the Plans.

2.05 SHAFT

- A. The drive shaft of the mixer shall be made from FRP.
- B. At the top end of the mixer shaft, there shall be a tappet for the connection to the gear hollow shaft.
- C. At the lower end there, shall be a flange connection to the mixer body itself.
- D. All bolted connections shall utilize 316 stainless steel hardware.

2.06 HYPERBOLIC MIXER BODY

- A. Each hyperbolic mixer body shall be manufactured of FRP and be a streamlined stress-free body without any mounted or fitted parts.
- B. The transport ribs which accelerate the flow shall be integrated in the mixer body
[REDACTED]
- C. The mixer body shall be coated with a special gel coat to provide a polished surface.
- D. The hyperbolic mixer shall have laminated stainless steel insert nuts.

2.07 FACTORY PERFORMANCE TESTING

- A. The hyperbolic mixer manufacturer shall perform the following inspections and tests on each unit before shipment:
 - 1. Hyperbolic mixer body diameter, motor rating, and electrical connections shall be checked for compliance with contract requirements.
 - B. Certified copies of all test procedures and results shall be provided to the Engineer prior to shipment.
- 