1.1 GENERAL

1.2 Legacy Environmental shall furnish and the customer’s contractor shall install one prefabricated steel Wastewater Treatment System, complete and ready for operation in accordance with the plans and specifications stated herein. The treatment plant shall be a Legacy Environmental model _________ prefabricated steel package as manufactured by Legacy Environmental, Leeds, Alabama. The wastewater treatment system shall be of the activated sludge type, specifically known as "Complete Mix/ Extended Aeration Activated Sludge ", the system shall be designed for treating a total of ______ gallons per day of 240 mg/l-BOD5; 240 mg/l TSS domestic sewage based on composite sewage samples of the average daily flow. No substances shall be introduced in quantities, which are toxic to biological organisms. The plant shall be designed to handle average daily flows fluctuating over the range of 60% to 100% of design flow and peak hourly flow rates not to exceed 250% of design flow, with an effluent quality of 30 mg/l-BOD5; 30 mg/l TSS. The complete system shall include all necessary equipment for efficient plant operation.

1.3 The system shall be factory assembled, so far as possible, with all piping and controls. All surfaces shall be factory painted.

2.0 TANK CONSTRUCTION

2.1 All tank vessels shall be fabricated of one-fourth inch structural grade steel plated; ASTM A-36 ¼” minimum thickness joined by arc welding with fillets of adequate section for the joint involved. All walls shall be continuous and watertight and shall be supported by structural reinforcing members where required. Fabrication and erection shall conform to the appropriate requirements of "AISC Specification for Buildings". Connection shall conform to the requirements of the American Welding Society's Code and shall develop the full strength of the member. Aeration tank will have reinforcing members on 6'-0" maximum spacing and H-frame reinforcing will be provided on end walls and partition walls.

2.2 All sludge & scum return piping shall be schedule 80 PVC unless specified otherwise.

2.3 All Diffuser drop piping shall be schedule 40 galvanized steel unless specified otherwise.

2.4 The systems shall be transported to the job site in _____ section(s). The contractor shall be responsible for field assembly, including bolting or welding when required.

3.0 COATING AND CORROSION CONTROL

3.1 All vessel surfaces to be painted shall be properly prepared in a workmanlike manner to obtain a smooth, clean and dry surface. All rust, dust, and mill scale as well as other extraneous matter shall be removed by means sandblast, interior (immersion) surfaces will receive near white blast cleaning SSPC-SP10. All interior vessel surfaces shall be painted with one (1) coat of Tnemec series 46H-413 Coal Tar Epoxy, 8-10 mils total dry film thickness. All Exterior (non-immersion) vessel surfaces will receive commercial blast cleaning SSPC-SP6, and will be painted with one (1) coat of Tnemec series 46H-413 Coal Tar Epoxy, 8-10 mils total dry film thickness.

3.2 All vessel surfaces to be painted shall be properly prepared in a workmanlike manner to obtain a
smooth, clean and dry surface. All rust, dust, and mill scale as well as other extraneous matter shall be removed by means sandblast, interior (immersion) surfaces will receive near white blast cleaning SSPC-SP10. All interior vessel surfaces shall be painted with two (2) coats of Tnemec series 66 High Build Epoxy, 7-11 mils total dry film thickness. All Exterior (non-immersion) vessel surfaces will receive commercial blast cleaning SSPC-SP6, and will be painted with two (2) coats of Tnemec series 66 High Build Epoxy, 7-11 mils total dry film thickness.

3.3 Below Grade installation shall require cathodic corrosion protection, and shall be provided using _____ magnesium anodes, weighing seventeen pounds each. These shall be buried by the contractor adjacent to the tank sides and provided with good electrical contact with the tank.

3.4 The anodes shall come packed in its own low resistant back fill material with the copper lead wire brazed to the core and insulated with coal tar at that point. The anodes shall be attached to the tank vessel with a similar connector. This connection will also be coated with coal tar insulation. The anodes shall be located at least 5 feet from the tank structure and be at least ½ the distance between the grade level and the bottom of the tank.

3.5 Each of the anodes shall be located equidistant from the other anode. Each anode is to be then doused with 5 gallons of water.

4.0 FOUNDATION

4.1 A poured foundation pad shall be constructed conforming to the project specifications. The slab must be level within tolerances of 1/2" per each 10'-0" of width and within 1/4" per each 10'-0" of length. Anchor rods to be welded to tank for anchoring by the field contractor as shown on the drawings.

5.0 INLET CONNECTION

5.1 The influent connection shall be one, 6” diameter 150# standard flange. The inlet shall be located at the inlet endwall of the system.

6.0 COMMINUTOR (OPTIONAL)

6.1 There shall be furnished one (1) Grind Hog™ Heavy Duty Comminutor as manufactured by G.E.T. Industries, Inc., with a rotation in a counter-clockwise direction.

6.2 The comminutor Shall be designed to handle the flows indicated below, within the head loss noted.

- hydraulic Capacity ___ GPM
- satisfactory operation shall occur under conditions of zero-flow
- head loss at peak flow shall not exceed 8 inches (200)
- design shall be such that the flow enters the size reduction and screening device horizontally and exits vertically downward to facilitate the flushing solids


6.4 Cutting Elements: replaceable shear bars constructed of high quality A2 tool-steel shall be attached to the rotating drum. Each shear bar shall be machined from solid bar stock, surface ground to
establish exact tolerance, stationary cutting bar shall be of high quality 01 tool steel hardened to a minimum of 56 Rockwell C, and shall be reversible, allowing for four (4) sets of cutting edges prior to sharpening or replacement, all submerged fasteners shall be of stainless steel.

6.5 Flanged Body: the body of the comminutor shall be of high quality cast iron and so designed to allow free unobstructed flow of influent through the unit. A Neoprene “O” Ring shall seal the chamber, allowing for operation under conditions of abnormally high head, the inlet flange shall be 6” (150)

6.6 Motor: TEFC 1 hp, motor suited to outdoor weatherproof service (IP55) on ___ volt, ___ phase, ___ cycle service, close coupled

6.7 Drive Arrangement: the motor shall be close-coupled to a speed reducer drive, a heavy duty planetary gear of the totally enclosed non-vented type suitable for total submersion during emergencies, double seals on the output shaft shall ensure flood-proof operation through a reduction ratio of 35:1, the cycloidal reducer shall be capable of withstanding shock loads to 500% of its mechanical rating of 4.27 hp, and be warranted for two (2) years, the drive shall have a minimal full load efficiency of 90% and be pre-lubricated with grease, requiring routine maintenance every 500 to 1,000 hours.

7.0 INLET BAR SCREEN

7.1 A bar screen shall be provided at the influent port, to remove any unusually large solids from the incoming raw sewage. The bar screen shall be fabricated from one-half inch diameter bars spaced one-inch apart and arranged as shown on the drawings. The bars shall be sloped to permit easy cleaning of accumulating debris. A drying deck shall be furnished for drying this debris.

7.2 (Optional) A mechanical bar screen shall be provided at the influent port, to remove any unusually large solids from the incoming raw sewage. The bar screen shall be fabricated from 304 stainless steel 1, 2, 2.5, 9 and 14 mm openings which will be installed within a 304 stainless steel box, dewatering of screenings occurs automatically as material is removed up the screen, a 25 watt explosion proof (Class I, Zone I) geared motor is coupled directly to the screen, 110 volt, 1 phase which will be powered from the main control panel.

7.3 Screen Components: Gearmotor – totally enclosed non-ventilated design, TENV does not require periodic greasing or oil change, lower bearings – solid lube bearings made from UHMW, upper bearings – there is a UHMW solid sleave bearing on the motor side and a roller bearing on the opposite side, roller bearings consists of two spring clips that hold the cap over the end of the shaft, a lock collar with two (2) 13mm HHMB that attach the bearing to the body.

7.4 Frame: 304 stainless steel construction, bars – high impact plastic or 304 SS, rakes – high impact plastic or 304 SS, chain guides – are constructed of UHMW strips attached to a stainless steel angle bolted to the frame, rubber side seals and backing plates.

8.0 FLOW EQUALIZATION CHAMBER
8.1 There shall be supplied, an aerated flow equalization chamber to work in conjunction with the secondary treatment system to enable the incoming sewage flow rate to be flow equalized so as to reduce the plant surges. The influent shall enter the flow equalization tank by connection of an ___ inch diameter 150# flanged pipe connection.

8.2 The flow equalization chamber shall be provided as an integral part of the wastewater treatment system. Volume of this chamber shall not be less than ______ gallons. A duplex set of pumps shall be furnished and installed in the chamber for pumping the influent to the flow control box.

8.3 The flow proportioning facilities shall be provided at the top inside of the flow equalization chamber at the flow equalization pump discharge to reduce the pumping rate proportional to the system design flow. The chamber shall be equipped with an adjustable flat weir so that the excess pump surges shall overflow this chamber directly to the flow equalization tank. The corrected pumping flow shall pass over the "V" notch weir into the aeration chamber.

8.4 A duplex set of flow equalization pumps shall be provided within the flow equalization chamber and attached by piping and valving to the flow-proportioning chamber. The pumps shall be of the submersible type, High quality stainless steel, rated for 104º F max fluid temperature continuous operation fully submerged, or 140º F intermittent, the pump shall have a double mechanical seal with viton elastomers, shielded, pre-lubricated ball bearings rated for 50,000 hour service life; Model ___ as manufactured by Ebara International Corporation. Each pump shall be furnished with a slide rail system for ease of removal from the flow equalization chamber. The slide rail system shall be complete with rail base and upper guide assembly. The pump motor shall be _____ HP for operation on _____ Volt, _____ Phase, _____ Hz. service. The capacity of the flow equalization pumps shall be _____ GPM at a _____ TDH.

9.0 FLOW EQUALIZATION AIR SUPPLY BLOWER MOTOR UNIT

9.1 For supplying the air requirement of the flow equalization chamber, _____ blower motor unit shall be furnished and installed at the location shown on the drawings. The units shall be completely factory built and tested before shipping to the project site. The blower shall be of the regenerative side channel type design complete with the accessories described below.

9.2 The blower motor unit, model __________, shall be furnished for supplying the air requirements of the flow equalization chamber.

9.3 The unit shall be capable of delivering _____ scfm when operating at 4.68 psig. The blower shall be manufactured by FPZ, Inc., Saukville, Wisconsin; or approved equal.

9.4 Impeller case shall be strongly ribbed to prevent distortion when operating at rated pressure, and be constructed of low weight cast aluminum construction, quiet operation with integral inlet and outlet muffling.

9.5 The unit shall be high efficiency / low noise impeller design, no lubrication and/or maintenance required.

9.6 The shall operate within +5 degrees F to +104 degrees F allowed ambient, mountable on any plane.
9.7 The motor shall be ____ hp for operation on _____ Volt, _____ Phase, 60 Cycle Service, 3500 RPM @ 60 Hz. Service and 2900 RPM @ 50 Hz. service. It shall be of the totally enclosed fan type, and will be directly mounted to the blower housing.

9.8 Regenerative blowers are to provide oil-free, odor-free, non-pulsating air pressure and operate at a design rating not to exceed 90% of the aeration system normal operating conditions.

9.9 The blower shall be of aluminum construction, including cast aluminum, dynamically balanced impeller, directly mounted to the motor shaft. The impeller shall be straddle mounted and include a bearing support on both sides of the impeller. Overhung impeller designs are unacceptable.

9.10 The blower motor shall be directly connected to the blower impeller and rated for a 40 Deg F ambient, TEFC (IP54) enclosure, 1.15 SF, Class H insulation and rated for service on the specified plant voltage supply.

9.11 The blower and motor noise level shall not exceed OSHA’s maximum exposure level for an eight (8) hour day level of ___ db(A) at one (1) meter distance.

9.12 The blower bearings shall be rated for a minimum of 25,000 hours, average life.

9.13 An inlet filter shall be installed with the blower. The filter shall be of heavy duty steel construction, with a polyester filter media rated 5 micron at 99.5% efficiency.

9.14 (Optional) A filter restriction gauge shall be mounted on the filter to indicate the condition of the filter media.

9.15 A pressure relief valve shall be installed and shall be of brass construction, field adjustable and set to release at a maximum of 90% of the blower and motor maximum rating.

9.16 A check valve of the split flapper design shall be installed, with an aluminum body, EPDM seals, suitable for continuous duty up to 300 Deg F. Manufacturer shall be US Valve or equal.

9.17 Blowers will receive factory mechanical run and amperage to be checked for compliance with standards.

9.18 Blowers will have minimum 3-year warranty (from date of purchase).

10.0 FLOW EQUALIZATION ELECTRICAL CONTROL CONSOLE

10.1 An electrical control panel shall be installed within a NEMA 3R/4X weatherproof enclosure with a locking hasp. The control console shall be provided for mounting as indicated on the plans. Any exterior mounting hardware shall be stainless steel or other corrosion resistant material.

10.2 The control console shall be a model ____ and shall be completely factory assembled and tested prior to shipment. The control console shall be furnished with all necessary controls for each pump and blower motor unit and associated plant equipment. Control voltage shall be 120 VAC, 1 Phase.
10.3 Controls shall be mounted to a removable sub-panel within the enclosure and shall be wired and spaced in accordance with the latest National Electrical Code. The control console shall be supplied with a properly sized magnetic-circuit breaker to act as the main disconnects for the control console. Magnetic starters with overload protection shall be supplied for all blower motor units. An electrical alternator shall be furnished to alternate the operation of each pump. The alternator shall be provided with a manual selector switch to allow manual selection of the lead pump if desired.

10.4 All wiring conductors within the control console shall be U.L. type THHN, stranded #14 AWG minimum, rated at 600 volts. Control wiring shall be numbered on each end.

10.5 Control panel and the electrical power service shall be furnished and installed by the purchaser. Wiring and conduit between the control panel and plant equipment shall be furnished by the manufacturer of the wastewater treatment plant. The panel may be detached for shipping. The main power supply shall be ____ Volt, ____ Phase, 60 Cycle. The control voltage shall be 120 Volt, 1 Phase.

10.6 Pump controls shall be of the direct acting mercury float type for complete automatic operation as follows:

10.7 Turns off both pumps and activates the electrical alternator for the next cycle

10.8 Energizes the lead pump on.

10.9 Turns flow equalization blower on & off.

10.10 Activates the lag pump on.

10.11 Activates the high level alarm.

10.12 The mercury switch consists of a steel tube that houses mercury and contacts. Contact is through mercury to mercury. No mechanical contacts.

10.13 The power cord will consist of a type SJOW-A cord rated for 300 maximum capacity.

10.14 The mercury tube switch and cord are sealed in a vinyl ball with leak proof polyurethane resin.

11.0 SLUDGE HOLDING CHAMBER

11.1 An aerated aerobic digester chamber shall be provided as specified and shown on the plans. It shall be designed to hold a minimum of _____ gallons of sludge.

11.2 The digester chamber shall be constructed as an integral part of the wastewater treatment system and fabricated out of one-fourth inch steel plate. The chamber shall have the same protective coating as specified for the treatment plant. It shall also have the same structural requirements as the wastewater treatment plant.
11.3 The chamber shall be of the aerated type. Diffused air shall be supplied by the plant blower system supplying one scfm of air per foot of tank length. The diffusers shall be located parallel to and near the bottom of the tank. All piping and valves within the chamber shall be factory installed.

11.4 An airlift pump with vertically adjustable intake and air control valve shall be provided for the purpose of decanting supernatant from the aerobic digester. The airlift piping shall be schedule 40 painted steel piping, and neoprene bands shall isolate the piping from all steel surfaces. The pipe shall pivot on a swivel joint. The intake elevation adjustment shall allow the water level in the digester to be lowered a minimum of 48 inches.

11.5 The digester chamber shall be set on the same concrete foundation pad as the wastewater treatment plant and set at the location as shown on the plans.

12.0 ANAEROBIC CHAMBER (Biological Phosphorus Removal)

12.1 There shall be supplied an anaerobic zone anoxic denitrification zone ahead of the aerobic zone, using external (exogenous) carbon provided by the raw wastewater. This type of process is termed pre-denitrification. The nitrate source was provided by directing the return activated sludge to the anaerobic reactor. The tank shall be _______ gallons, and have a continuous duty mixer mounted within. Raw wastewater shall be introduced into the tank from the flow control box outlet trough, and from the return activated sludge from the clarifiers. The discharge of the return activated sludge pump piping shall be below the normal water level in the anaerobic zone to reduce splashing and turbulence.

12.2 The anaerobic zone shall feed the anoxic tank by means of an adjustable flat weir, to maintain the same weir setting as that of the clarifier outlet trough.

12.3 The mixer shall be rigidly mounted at a 20° angle near the center of the tank. It shall have a _____ diameter stainless steel shaft, powered by a _____ hp, _____ volt, 60 Hz, _____ phase TEFC motor. The mixer shall operate continuously, and be controlled from the control panel.

13.0 ANOXIC CHAMBER (Biological Nitrogen Removal)

13.1 There shall be supplied an anoxic zone denitrify the wastewater. The tank shall be _______ gallons, and have a continuous duty mixer mounted within. Wastewater shall be introduced into the tank from the flow control box outlet trough, the return activated sludge from the clarifiers, and from a recycle pump located in the aeration tank.

13.2 The anoxic zone shall feed the aeration tank by means of an adjustable flat weir, to maintain the same weir setting as that of the clarifier outlet trough.

13.3 The mixer shall be rigidly mounted at a 20° angle near the center of the tank. It shall have a _____ diameter stainless steel shaft, powered by a _____ hp, _____ volt, 60 Hz, _____ phase TEFC motor. The mixer shall operate continuously, and be controlled from the blower control panel.

13.4 The recycle pump shall be mounted in the aeration tank. The pump shall be capable of returning
between 200% and 400% of the system design flow back to the anoxic zone. It shall be hard piped with diversion valving back into the aeration tank to allow adjustment of the return from above the tank. The discharge of the recycle pump’s piping shall be below the normal water level in the anoxic zone to reduce splashing and turbulence. The pumps shall be of the submersible solids handling type, High quality stainless steel, rated for 104º F max fluid temperature continuous operation fully submerged, or 140º F intermittent, the pump shall have a double mechanical seal with viton elastomers, shielded, pre-lubricated ball bearings rated for 50,000 hour service life; Model 50 DWU6.4 as manufactured by Ebara International Corporation. The pump motor shall be _____ HP for operation on _____ Volt, _____ Phase, _____ Hz. service. The capacity of the MLSS recycle pump shall be _____ GPM at a _____ TDH., capable of pumping ___ gpm at 10’ TDH. The pump shall operate continuously, and be powered from the control panel.

14.0 AERATION CHAMBER

14.1 There shall be supplied, an aeration chamber to work in conjunction with the clarifier chamber. The aeration chamber shall conform to the following specifications:

14.2 The aeration chamber shall be of sufficient capacity to provide a minimum of 24 hours retention of the average daily flow, and/or a minimum chamber volume of _____ gallons. The vessel shall be so shaped on each side to prevent sludge accumulation, to enhance rotation of the vessel contents, and to prevent scum and froth accumulation. To insure maximum retention and eliminate short circuiting of raw sewage particles, the aeration chamber shall be constructed with air diffusers, placed longitudinally along one side of the chamber so as to, in conjunction with the flow control baffles, enhance the spiral rotation of the chamber contents. To ensure adequate circulation velocity, the proportion of the chamber width to depth, in the direction of rotation, shall not exceed 1.33 to 1. The velocity of rotation shall be sufficient to scour the bottom and prevent sludge filleting as well as to prevent the escape to the surface of minuscule air diffusion bubbles and by so causing their entrapment to provide maximum oxygenation efficiency.

14.3 An air distribution manifold shall be installed longitudinally on one side of the tank with diffuser drop assemblies connected thereto.

14.4 Each diffuser drop assembly shall be equipped with an air regulating and/or shutoff valve, a disconnecting union and a diffuser bar with non-clog air diffuser nozzles mounted thereon at approximately 70” centers. With this spacing, the airflow per diffuser shall range from 1 to 30 SCFM. This minimum air velocity shall be maintained to insure sufficient velocity for self-cleaning. The diffusers shall be parallel to and near the base of the vessel sidewall and at an elevation, which will provide the optimum diffusion and mixing of the vessel contents. The oxygen transfer capacity of each diffuser shall be such that an adequate supply of oxygen will be maintained in the aeration chamber to meet treatment requirements of the design sewage load.

14.5 The diffusers will be a Model CYCLONE™ as manufactured by AEROMIX Systems, Inc., Minneapolis, Minnesota. The diffusers will be manufactured to produce a double shear when air is released. The air is sheared as it discharges the air orifice of the air diffuser body and again as it crosses over the diaphragm baffle. The air check diaphragm located on top of the diffuser is molded directly to the diffuser body, preventing the cap from blowing off when excess CFM is delivered to the diffuser. The diffuser will be supplied with standard male pipe thread connections.

15.0 CLARIFIER CHAMBER
15.1 There shall be furnished a clarifier chamber to work in conjunction with the aeration chamber of that system. The clarifier shall conform to the following specifications:

15.2 The clarifier chamber shall be of such size as to provide a minimum of four (4) hours retention, based upon the same design flow rate governing the aeration chamber, and shall have proper baffling to prevent short circuiting and to provide maximum uniform retention. The clarifier inlet shall be baffled to prevent short-circuiting and provide maximum uniform solids settling area. The bottom of the chamber shall be formed into an inverted pyramidal hopper or hoppers. The flat bottom area of each hopper shall not exceed one square foot. The slope of the hopper walls shall not be less than 1.7 vertical to 1.0 horizontal. Settled sludge shall be returned from the clarifier sludge hopper to the aeration chamber by the positive sludge return system, consisting of an airlift pump. The clarifier effluent shall pass over the edge of the baffled adjustable effluent weir into the effluent trough and then out of the chamber. The weir plate will be constructed of 1/8" galvanized steel and will be gasketed with 1/4" neoprene.

16.0 SLUDGE RECIRCULATION SYSTEM

16.1 There shall be installed within the clarifier chamber, a positive sludge recirculation system, consisting of _____, _____ diameter airlift sludge return assembly, meeting the following specifications: The airlift pump system shall have the recirculation capacity ranging from 0% to 150% of the design flow. The airline supplying air to the pump shall be equipped with a gate valve varying the capacity of the pump. The airlift pump shall be firmly supported and shall be equipped with a clean-out plug to allow for easy cleaning and maintenance.

17.0 SCUM RECIRCULATION SYSTEM

17.1 There shall be installed within the clarifier chamber a positive scum and skimming recirculation system consisting of _____, _____ diameter airlift skimming device meeting the following specifications: The skimming device shall be of the positive airlift pump type, located in a position to skim and return floating material to the aeration chamber. The airline supplying air to the skimming device shall be equipped with a gate valve to regulate the rate of return.

17.2 The scum intake shall be equipped with an adjustable assembly, which will enable exact positioning of the skimmer at water level without placing a hand under the water.

18.0 MAIN AERATION AIR SUPPLY BLOWER MOTOR UNITS

18.1 For supplying the air requirement of this wastewater treatment system, two (2) blower motor units shall be furnished and installed at the location shown on the drawings. All units shall be completely factory built and tested before shipping to the project site. The units shall be completely factory built and tested before shipping to the project site. The blower shall be of the regenerative side channel type design complete with the accessories described below.

18.2 The blower motor unit, model __________, shall be furnished for supplying the air requirements of the flow equalization chamber.
18.3 The unit shall be capable of delivering _____ scfm when operating at 4.68 psig. The blower shall be manufactured by FPZ, Inc., Saukville, Wisconsin; or approved equal.

18.4 Impeller case shall be strongly ribbed to prevent distortion when operating at rated pressure, and be constructed of low weight cast aluminum construction, quiet operation with integral inlet and outlet muffling.

18.5 The unit shall be high efficiency / low noise impeller design, no lubrication and/or maintenance required.

18.6 The shall operate within +5 degrees F to +104 degrees F allowed ambient, mountable on any plane.

18.7 The motor shall be ___ hp for operation on _____ Volt, _____ Phase, 60 Cycle Service, 3500 RPM @ 60 Hz. Service and 2900 RPM @ 50 Hz. service. It shall be of the totally enclosed fan type, and will be directly mounted to the blower housing.

18.8 Regenerative blowers are to provide oil-free, odor-free, non-pulsating air pressure and operate at a design rating not to exceed 90% of the aeration system normal operating conditions.

18.9 The blower shall be of aluminum construction, including cast aluminum, dynamically balanced impeller, directly mounted to the motor shaft. The impeller shall be straddle mounted and include a bearing support on both sides of the impeller. Overhung impeller designs are unacceptable.

18.10 The blower motor shall be directly connected to the blower impeller and rated for a 40 Deg F ambient, TEFC (IP54) enclosure, 1.15 SF, Class H insulation and rated for service on the specified plant voltage supply.

18.11 The blower and motor noise level shall not exceed OSHA’s maximum exposure level for an eight (8) hour day level of ___ db(A) at one (1) meter distance.

18.12 The blower bearings shall be rated for a minimum of 25,000 hours, average life.

18.13 An inlet filter shall be installed with the blower. The filter shall be of heavy duty steel construction, with a polyester filter media rated 5 micron at 99.5% efficiency.

18.14 (Optional) A filter restriction gauge shall be mounted on the filter to indicate the condition of the filter media.

18.15 A pressure relief valve shall be installed an shall be of brass construction, field adjustable and set to release at a maximum of 90% of the blower and motor maximum rating.

18.16 A check valve of the split flapper design shall be installed, with an aluminum body, EPDM seals, suitable for continuous duty up to 300 Deg F. Manufacturer shall be US Valve or equal.

18.17 Blowers will receive factory mechanical run and amperage to be checked for compliance with standards.

18.18 Blowers will have minimum 3-year warranty (from date of purchase).
19.0 AERATION ELECTRICAL CONTROL CONSOLE

19.1 An electrical control panel shall be installed within a NEMA 3R/4X weatherproof enclosure with a locking hasp. The control console shall be provided for mounting as indicated on the plans. Any exterior mounting hardware shall be stainless steel or other corrosion resistant material.

19.2 The control console shall be a model _____ and shall be completely factory assembled and tested prior to shipment. The control console shall be furnished with all necessary controls for each blower motor unit and associated plant equipment. Control voltage shall be 120 VAC, 1 Phase.

19.3 Controls shall be mounted to a removable sub-panel within the enclosure and shall be wired and spaced in accordance with the latest National Electrical Code. The control console shall be supplied with a properly sized magnetic-circuit breaker to act as the main disconnects for the control console. Magnetic starters with overload protection shall be supplied for all blower motor units. To vary the air supply, a program timer shall be supplied. An electrical alternator shall be used to alternate the operation of each blower motor unit. An electrical alternator shall be provided with a manual selector switch to allow manual selection of the lead blower if desired.

19.4 The 24-hour, 7-day time clock shall be capable of being programmed to control the blower run cycle and to adjust both the start set point and the blower run time. The clock shall also include a skip-a-day feature which will allow a separate program for weekends (when required). The clock shall be by Paragon, Model #1015.

19.5 All wiring conductors within the control console shall be U.L. type THHN, stranded #14 AWG minimum, rated at 600 volts. Control wiring shall be numbered on each end.

19.6 All wire and conduit required between the control panel and the electrical power service should be furnished and installed by the purchaser. Wiring and conduit between the control panel and plant equipment shall be furnished by the manufacturer of the wastewater treatment plant. The panel may be detached for shipping. The main power supply shall be ____ Volt, ____ Phase, 60 Cycle. The control voltage shall be 120 Volt, 1 Phase.

20.0 FROTH CONTROL SYSTEM (OPTIONAL)

20.1 There shall be installed within the wastewater treatment system all necessary equipment for controlling the froth in the aeration chamber. This shall include the froth pump, spray nozzles, piping, water manifold and all other necessary auxiliary equipment. The froth pump shall be a _____ horsepower, _____ Volt, _____ Phase, rated at _____ GPM at _____ TDH. The pump shall operate submerged with a positive suction head. It shall be installed in one corner of the clarifier chamber near the inlet, at least two (2) inches below water level. A screen of sufficient size will be located around the pump. Sufficient self-cleaning spray nozzles shall be attached to the water manifold to insure a uniform continuous sharp flat spray along the entire length of the aeration chamber, opposite the air diffusers.

20.2 The spray nozzles shall be that which will open automatically for self-cleaning with each pump start-up surge and then close. The spray nozzle will produce a flat spray pattern 60" wide at a
distance of 18”. Contaminated liquids may be used; simply lifting the cap will purge the nozzle of any blockage. The nozzle is constructed of a non-corrosive material with a 1/2” male threaded connection.

20.3 The froth pump piping shall have the provisions for connection of a garden hose for wash-down purposes.

21.0 SERVICE WALKWAY

21.1 A service walkway shall be provided for the service area only (all tank openings) to service the plant equipment. Grating panels shall each consist of one-piece skid resistant steel plate. All grating panels shall be constructed of 18 gauge, galvanized sheet steel with maximum yield strength of 37,000 PSI. Each grating panel has a standard 9-inch surface width, and a 2-1/2-inch rib depth. Furthermore, each panel shall be so supported as to have a safe uniform load carrying capacity of 50 pounds per square foot. Refer to the attached load-bearing chart for grating carrying capacity.

21.2 A 45 degree access stairway shall be provided leading to the walkway for the service area only to service the plant equipment. Grating panels shall each consist of one-piece skid resistant steel plate. All grating panels shall be constructed of 18 gauge, galvanized sheet steel with maximum yield strength of 37,000 PSI. Each grating panel has a standard 9-inch surface width, and a 2-1/2-inch rib depth. Furthermore, each panel shall be so supported as to have a safe uniform load carrying capacity of 50 pounds per square foot. Refer to the attached load-bearing chart for grating carrying capacity.

21.3 Handrailing system to be constructed from 1-1/2” OD schedule 40 painted steel pipe. The railing shall consist of two rails supported by posts on spans not to exceed 8’-0” O.C. the top rail shall be 42” from the walkway surface, and the middle rail to be 18” below. Construction shall be welded, with four-bolt stanchion connection to the tank surface at each post.

22.0 DISINFECTION CHAMBER

22.1 A baffle type disinfection chamber shall be provided, constructed as an integral part of the wastewater treatment system. The chamber shall be installed immediately following the clarifier. The chamber shall be sized for a capacity of _____ gallons. Baffles shall be provided to eliminate short-circuiting and shall be designed to keep floating material from leaving the chamber.

22.2 The chamber shall have the same protective coating as specified for the wastewater treatment system. The chamber shall have the same structural requirements as the wastewater treatment plant. Sufficient flow baffles will be supplied to assure proper mixing of the chlorine solution with the plant effluent.

22.3 The chlorination equipment shall consist of solid chlorine tablet type feed, Norweco model ______. The chlorinator shall have the capacity of disinfecting the effluent from the secondary treatment system. The chlorinator shall be mounted at the inlet end of the disinfection chamber at the location on the drawings.
22.4 (Optional) The dechlorination equipment shall consist of solid chlorine tablet type feed, Norweco model ______. The dechlorinator shall have the capacity of dechlorinating the effluent from the disinfection chamber. The dechlorinator shall be mounted at the inlet end of the dechlorination chamber at the location on the drawings.

22.5 (Optional) An ultra-violet type disinfection chamber shall be provided, constructed as an integral part of the secondary treatment system. The contact chamber shall be installed immediately following the clarifier chamber.

22.6 The disinfection chamber shall have the same protective coating as specified for the secondary treatment system. The tank shall have the same structural requirements as the secondary treatment system.

22.7 The disinfection equipment shall consist of one (1) ultra-violet type disinfection unit, model ______, as manufactured by Trojan Technologies, Inc. The UV unit shall have the capacity of disinfecting the effluent from the secondary treatment system. The UV unit shall be mounted at the inlet end of the chambers at the location shown on the drawings.

23.0 EFFLUENT FLOW MEASUREMENTS

23.1 For measuring the flow rate through the wastewater treatment system, a flow-measuring weir shall be supplied. The weir shall be a _____ degree "V" notch weir located at the outlet end of the disinfection tank.

23.2 For measuring the flow rate, an ultrasonic flowmeter with recorder shall be installed. The unit shall record, indicate, and totalize the flow through the wastewater treatment system, the system shall be mounted within a NEMA 4X weatherproof enclosure with a locking hasp complete with a 100 watt thermostat controlled silicone rubber insulated general purpose heater interior mounted. All components shall be pre-mounted and pre-wired with a circuit protection breaker powered from the main control console. The control console shall be provided for mounting as indicated on the plans. All exterior mounting hardware shall be stainless steel or other corrosion resistant material.

23.3 The proposed ultra-sonic flowmeter will have a range and blanking distance to 10'-0".

23.4 All Components shall be installed within a NEMA 4X fiberglass weatherproof enclosure with a locking hasp. The flowmeter/chart recorder shall be provided for mounting as indicated on the plans. Any exterior mounting hardware shall be stainless steel or other corrosion resistant material. Components shall be pre-wired and pre-tested (calibrated) at the factory prior to shipment.

24.0 SPARE PARTS

24.1 The following spare parts shall be supplied by the manufacturer of the treatment system as spare parts for the operation of the system:

24.2 One spare control relay for each type supplied

24.3 One spare alternator as required for each type supplied
25.0 DELIVERY INSTRUCTIONS

25.1 In almost every case, special lowboy trucks do shipment of your treatment system. When your plant is shipped by our truck, delivery will be made directly to the job site. The field contractor must furnish the equipment necessary to unload the plant and set it on the foundation pad.

25.2 When the plant arrives at the job site, the owner's contractor should have available the necessary equipment to unload and set the vessel on the foundation pad. A crane of adequate size is the easiest and fastest method. Lifting lugs are provided on the vessel to simplify handling. After setting the plant in position, a check should be made to see that it is level, and in the correct position.

25.3 Our package steel treatment systems shall be completely assembled units and are shipped as a unit where shipping height limitations permit this procedure. If a portion of the equipment must be removed to meet shipping height limitations, this equipment will be packaged separately at the factory for field assembly. This equipment and tankage should be field assembled and installed by the owner's contractor in the field.

25.4 Please refer to the pre-plant delivery instructions.

26.0 PLANT START-UP

26.1 At the time the wastewater treatment system is filled with water or sewage, and all power connections have been completed, and all equipment is approved for service, the contractor shall provide the services of a representative of the manufacturer who shall instruct the owner's representative in the proper operation and maintenance of the wastewater treatment system, including instructions in conducting all required operational tests. The manufacturer's representative shall furnish at this time, a service manual on the equipment installed within the wastewater treatment system.

27.0 MANUFACTURER QUALIFICATIONS

27.1 The manufacturer of specified equipment must have a minimum of five (5) years active experience in the design and manufacture of similar wastewater treatment equipment, and upon request, furnish supporting evidence.

27.2 The manufacturer of specified equipment must have a minimum of five-(5) year’s active experience in the design and manufacture of similar wastewater treatment equipment, and upon request, furnish supporting evidence. Consideration will be given only to products of manufacturers who can demonstrate that their equipment fully complies with all requirements of the specifications and contract documents. The equipment shall be supplied by a firm which has been regularly engaged in the design, fabrication, assembly, testing, start-up and service of full scale treatment systems, of the same model and size as proposed, operating in the U.S., with similar characteristics.
28.0 FIELD CONTRACTOR RESPONSIBILITY

28.1 The field contractor shall perform and/or make the following arrangements:

28.2 Field unloading and setting of the wastewater treatment plant on its foundation pad, anchoring in position as defined by the contract specifications.

28.3 Assemble into position, at the location shown on the plans, the ancillary equipment, which has been disconnected at the factory for shipping purposes.

28.4 Interconnection of piping and wiring which may have been disconnected at the factory for shipping purposes.

28.5 Tie-in of all piping, power and wiring connections to site utilities and electrical cable entries into control panels. The power required at power block or main circuit breaker is _____ Volt, _____ Phase, 60 Hz.

28.6 Furnish foundation pad to set the system on.

28.7 Attach system to foundation pad by anchoring.

28.8 Touch-up painting of those areas damaged during installation.

28.9 Install drain plugs and fill tankage with water to prevent flotation (if required). This is to be done before back filling.

28.10 Install the magnesium anode packages as shown on the plans.

29.0 EQUIPMENT WARRANTY

29.1 Legacy Environmental warrants to the original purchaser all new equipment manufactured by it to be free of defects in material and workmanship; and at the election of Legacy Environmental will repair or replace, f.o.b. it's factories or other locations designated and as determined by Legacy Environmental any part or parts returned to it, transportation/freight prepaid, which examination shall show to have failed under normal use and service by the original user within two (2) year's following initial shipment by Legacy Environmental. Such repair or replacement shall be free of charge except for freight and those parts such as media, chemicals, oil, grease, belts and like that are consumable under normal use. Legacy Environmental obligation under this warranty is conditioned upon it receiving prompt written notice within 30 days of claimed defects during the one year warranty period is limited to repair or replacement as aforesaid. No allowance will be made for labor, transportation, or other charges incurred in the replacement of repaired defective parts and/or equipment furnished.

29.2 THIS WARRANTY, INCLUDING THE STATED REMEDIES, IS EXPRESSLY MADE BY LEGACY ENVIRONMENTAL AND IS ACCEPTED BY ORIGINAL PURCHASER IN LIEU OF ALL OTHER WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, WHETHER WRITTEN, ORAL, EXPRESS,
IMPLIED OR STATUTORY. LEGACY ENVIRONMENTAL NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME IT FOR ANY OTHER LIABILITIES WITH RESPECT TO IT'S EQUIPMENT. LEGACY ENVIRONMENTAL SHALL NOT BE LIABLE FOR NORMAL WEAR AND TEAR, NOR FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGE DUE TO IN-OPERABILITY OF ITS EQUIPMENT FOR ANY REASON NOR ON ANY CLAIM THAT ITS EQUIPMENT WAS NEGLIGENTLY DESIGNED OR MANUFACTURED.

29.3 This warranty shall not apply to equipment or parts thereof which have been altered or repaired outside of a Legacy Environmental factory or damaged by improper installation, storage, application, erosion, or corrosion of any sort, or subjected to misuse, abuse, neglect or accident. This warranty is null and void if payment is delayed, not made, or if not in accordance with the terms and conditions of Legacy Environmental equipment proposal.

29.4 Legacy Environmental makes no warranty with respect to parts, accessories, or components manufactured by others. The warranty applicable to such items that is offered by their respective manufactures.