SEWER SYSTEM IMPROVEMENTS
CROWDER STATE PARK
Trenton, Missouri

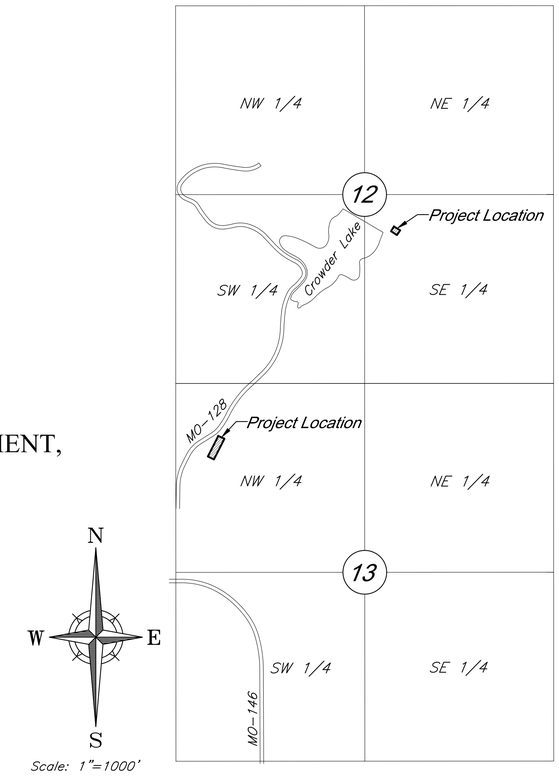
GBA

9801 Renner Blvd., Ste. 300
Lenexa, KS 66219
913.492.0400
gbateam.com

OWNER: STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR

DEPARTMENT OF
NATURAL RESOURCES
DIVISION OF STATE PARKS

PROJECT MANAGEMENT: OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION



VICINITY MAP
Sections 12 & 13-T61N-R25W

SHEET INDEX

DESIGNER: GBA

PREPARED & SUBMITTED BY:
GEORGE BUTLER ASSOCIATES, INC.
9801 RENNER BOULEVARD
LENEXA, KANSAS 66219
CONTACT: JAY HEALY P.E.
EMAIL: JHEALY@GBATEAM.COM
PHONE: 913-577-8440
FAX: 913-577-8312

STATE OF MISSOURI
JONATHAN HEALY
NUMBER PE-2010035126
9/6/24
PROFESSIONAL ENGINEER

PROJECT NUMBER: X232202

SITE NUMBER: 5107
ASSET NUMBER: 7815107029

811
Know what's **below.**
Call before you dig.
Missouri One Call System
1-800-344-7483 (DIG-RITE) or 811

SHEET NUMBER:
C-101
1 OF 6 SHEETS
SEPTEMBER 4, 2024

PROJECT CONTROL:

Coordinates Shown Hereon:

Modified State Plane (Project Ground Coordinates), NAD83
2402 – Missouri Central, U.S. Feet
Vertical – NAVD88, U.S. Feet

CAF = 1.00001696
To get to State Plane:
Coordinates x CAF = State Plane

CP #108 – Set ⅝" rebar in grass island on the West side of Highway 128
Ties:
1. 95.40 feet South to the centerline of wood park sign
2. 102.10 feet Southwest to the centerline of monument rock
3. 41.70 feet East to the West edge of Highway 128
Coordinates:
N: 1551459.44
E: 1313685.94
EL: 910.66

CP #109 – Set ⅝" rebar in grass, just Northeast of the Northeast corner of park office building
Ties:
1. 25.50 feet Northwest to the end of 12" concrete block wall
2. 40.90 feet North Northwest to the center of drop inlet
3. 73.90 feet North to the centerline of mailboxes
Coordinates:
N: 1550866.74
E: 1313586.11
EL: 913.62

CP #110 – Set ⅝" rebar on the East side of Highway 128, just North of stone house
Ties:
1. 37.60 feet North Northwest to the East face wood park sign
2. 51.90 feet South Southeast to the centerline of electrical transformer
3. 48.00 feet Northeast to the edge of asphalt at curve
Coordinates:
N: 1551239.14
E: 1313617.51
EL: 916.65

CP #111 – Set ⅝" rebar near Southwest corner of parking lot, on East side of lake
Ties:
1. 26.50 feet North to the Southwest corner of parking lot
2. 85.60 feet East to the centerline of water fountain
3. 18.50 feet Northeast to the centerline of trash container
Coordinates:
N: 1553926.57
E: 1316028.15
EL: 774.90

CP #112 – Set ⅝" rebar near Northeast corner of lake
Ties:
1. 8.00 feet South to the North edge of asphalt
2. 43.30 feet Southwest to the North edge of wood park sign
3. 30.00 feet West to the centerline of water meter
Coordinates:
N: 1554154.98
E: 1316137.70
EL: 773.07

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General Notes:

1. All Construction shall conform to the State of Missouri Technical Specifications in effect at the time of the States approval date shown on the approved plans and incorporated herein by reference.
2. All traffic control shall be the responsibility of the Contractor and shall be in conformance with the Manual of Uniform Traffic Control Devices (MUTCD).
3. Property Corners and/or Section corners disturbed or damaged by construction activities shall be reset by a Registered Land Surveyor licensed in the state of Missouri, at the Contractor's expense.
4. Construction Staking shall be the responsibility of the General Contractor.
5. The Contractor shall be responsible for the restoration of the Right-of-Way and for damaged improvements such as curbs, driveways, sidewalks, street light and traffic signal junction boxes, traffic signal equipment, irrigation systems, etc. Damaged improvements shall be repaired in conformance with the latest States standards and to the States satisfaction.
6. All work shall be confined within easements and/or construction limits as shown on the plans.
7. The Contractor shall, prior to the commencement of work, investigate surface and subsurface conditions to be encountered across the site and notify the Engineer if any discrepancies or changed conditions are noted.
8. This project will include numerous activities occurring on site including sanitary sewer, grading, utility etc. Contractor shall coordinate his work with other contractors on site.
9. All trash and debris identified on site shall be properly handled and disposed of in accordance with state of Missouri regulations.
10. Handicap parking stalls shall be marked with City/ADA approved signs and constructed in strict accordance with City/ADA standards and shall not exceed 2.00% slope in any direction. All sidewalks shall be ADA accessible with a maximum cross slope of 2.00% and a maximum longitudinal slope of 5.00%.
11. All measurements on these plans are horizontal distances, not slope distances.
12. Items not listed separately in the Summary of Quantities are subsidiary to other items.
13. All site concrete shall be KCMMB – 4,000 PSI unless otherwise noted.

Permitting:

14. Excavation for Utility work within the Right of Way requires a Right of Way work permit from the Public Works Department, in addition to all other permits.
15. Contractor is responsible for obtaining all required permits, paying all fees, and for otherwise complying with all applicable regulations governing the work.

Erosion Control:

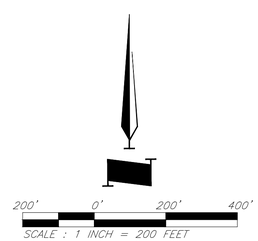
16. The Contractor is responsible for providing erosion and sediment control BMP's to prevent sediment from reaching paved areas, storm sewer systems, drainage courses, and adjacent properties. In the event the prevention measures are not effective, the contractor shall remove any debris, silt, or mud and restore the Right-Of-Way, or adjacent properties to original or better condition.
17. Contractor shall ensure that all construction shall conform to the requirements of the Stormwater Pollution Prevention Plan (SWPPP) a copy of which shall be maintained and updated on site by the Contractor.
18. The Contractor shall sod all disturbed areas within the Public Street Right-of-Way unless otherwise noted in the plans.
19. All disturbed areas, including stockpiles, staging areas, and other incidental areas of disturbance, shall be seeded or otherwise stabilized prior to the Contractor leaving the site.
20. No trees shall be damaged or removed without prior authorization from owner unless otherwise shown on this plan.

Earthwork:

21. The Contractor shall be responsible for removing and disposing of grass and vegetation that is found on site. Contractor shall strip site of organic material to a depth acceptable to the Geotechnical Engineer and prior to the placement of fill. Disposal of all debris shall be performed by the contractor in strict accordance with all applicable codes and ordinances. All clearing and grubbing, stripping, and grading operations shall be performed in accordance with the recommendations as found in the Geotechnical Report, and erosion control and grading plans for this site.
22. Slopes shall be constructed to a maximum slope of 3:1 (Horiz:Vert).
23. Unless otherwise noted, all spot elevations and contours are shown to "finish" grade surface. Contractor shall adjust for any overcut required in paving, parking, landscape, or building pad areas as defined in the Geotechnical Report, these plans, or the project specifications.
24. All temporary slopes and excavations shall conform to Occupational Safety and Health Administration (OSHA) standards for the Construction Industry (29 CFR part 1026, subpart P).
25. All excavation shall be considered unclassified, no separate payment shall be made for rock excavation.

Utility:

26. All Manholes, Catch Basins, Utility Valves, Meter Pits, and other utility equipment shall be adjusted or rebuilt to grade as required.
27. Prior to beginning work, the Contractor shall notify all utility companies who have facilities in the vicinity of the project area of the work to be performed.
28. All Utility extensions and construction shall conform to the Standards and Specifications of the applicable Utility Companies.
29. No open cutting of public streets will be allowed.



STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

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JONATHAN BEALY
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DESIGN AND CONSTRUCTION

Department of Natural Resources Missouri State Parks

SEWER SYSTEM IMPROVEMENT

CROWDER STATE PARK
76 NW Highway 128
Trenton, MO

PROJECT # X232202
SITE # 5107
ASSET # 7815107029

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: SEPT. 4, 2024

CAD DWG FILE:
DRAWN BY: DRV/JS
CHECKED BY:
DESIGNED BY: JRH

SHEET TITLE:
General Layout

SHEET NUMBER:
C-102

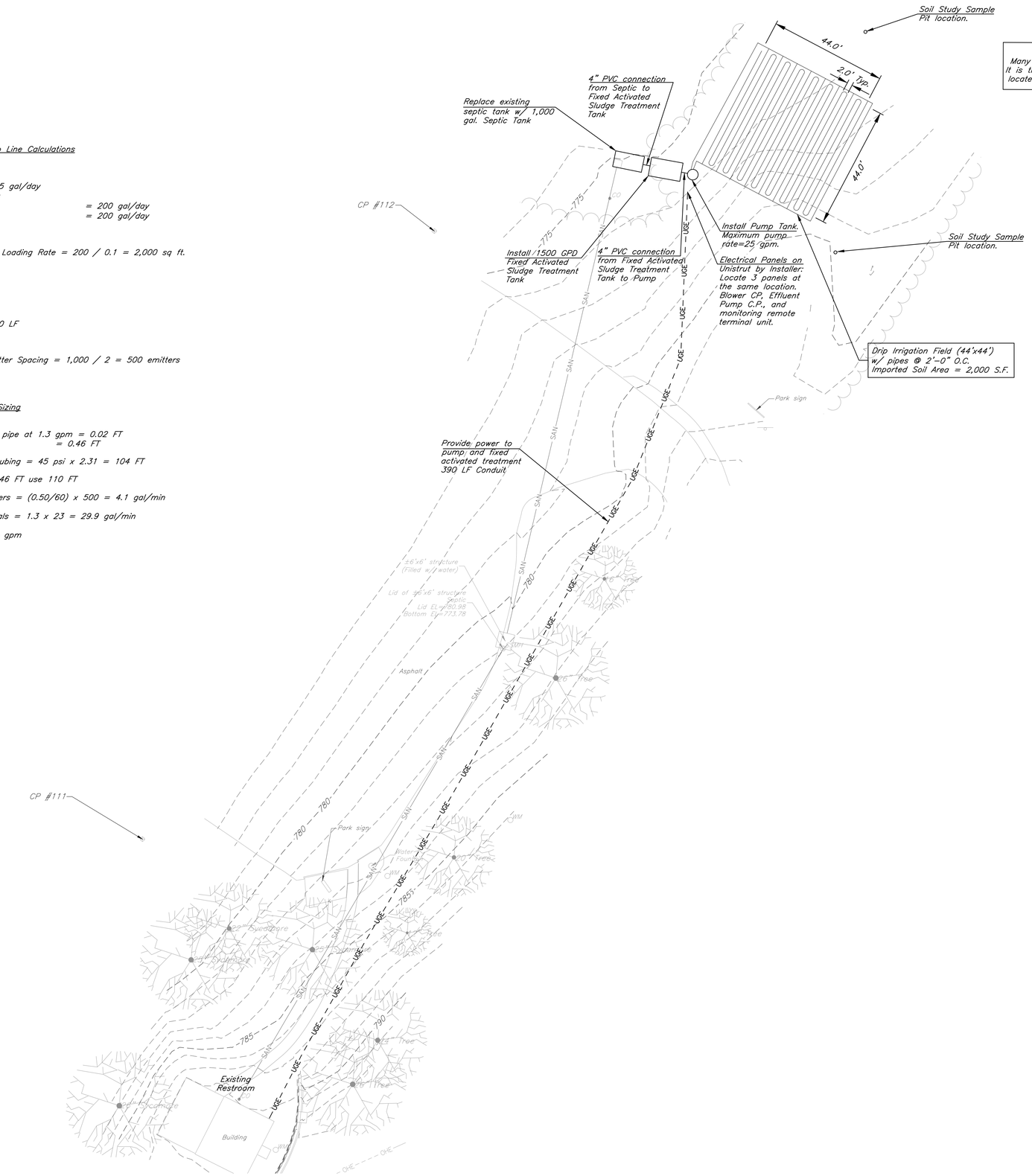
SHEET 2 OF 6
SEPT. 4, 2024

Field Sizing and Drip Line Calculations

1. Loading Rate = 0.1 gal/sq. ft * day
2. Ultimate Flow =
   Public Park Restroom = 40 persons x 5 gal/day
   = 200 gal/day
   Total Daily Flow: = 200 gal/day
   Design Ultimate Flow = 200 gal/day
3. Number of Zones = 1
4. Total Minimum Field Size = Total Daily Flow / Loading Rate = 200 / 0.1 = 2,000 sq ft.
5. Drip Line Spacing = 2 FT
6. Run Length = 43.5 FT
7. Total Number of Runs = 23
8. Total Lineal Feet of Line = 43.5 x 23 = 1,000 LF
9. Emitter Spacing = 2 FT on center
10. Total Emitters = Lineal FT of Drip Tubing/Emitter Spacing = 1,000 / 2 = 500 emitters

Dosing Pump Sizing

1. Static Head = 5 FT
2. Friction Loss = 43.5 FT of 1.25" PVC Sch. 40 pipe at 1.3 gpm = 0.02 FT
   Total = 0.46 FT
3. Operating Head = Required 45 psi in dispersal tubing = 45 psi x 2.31 = 104 FT
4. Total Dynamic Head = 5 + 0.46 + 104 = 109.46 FT use 110 FT
5. Dosing Flow = (0.50 gal/hr) x Number of Emitters = (0.50/60) x 500 = 4.1 gal/min
6. Flushing Flow = 1.6 gal/min x Number of Laterals = 1.3 x 23 = 29.9 gal/min
7. Total Flow = 4.1 + 29.9 = 34 gal/min, use 35 gpm
8. Pump Requirements: 35 gpm and 110 FT TDH



"CAUTION"
Many park utilities located on site. It is the contractors responsibility to locate utilities prior to construction.

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1-800-344-7483 (DIG-RITE) or 811

REQUIREMENTS

1. Minimum area of 2,000 ft².
2. 1,000 LF of dispersal tubing placed 2 ft. O.C.
3. 23 Lengths at 44'.
4. Minimum of 500 emitters to be installed on a 2'x2' grid.
5. Supply line and return lines shall be installed at 8-10" below depth of dispersal tubing.
6. Dispersal tubing shall be installed 10" below finished grade.

Effluent Pumping:

Pump to utilize a 1/8" no vault filter/strainer integral with floats, submersible pump rated at (20) gpm. ½ Hp Thermoplastic pump 230V.
Float controls will be to start the pump and stop the pump based on and off float tips.
The High tide telemetry to record (Blower on, Pump run, and HWA.)

Imported soil:

Shall have an absorption rate of 0.1 GPD/SQFT
Imported soils must be a sandy to loamy material with less than 10% clay and less than 15% organic debris present. Contractor is responsible to acquire soil scientist approval of choice soil for use in a drip irrigation system in accordance with this plan, prior to filling.

Specifications for imported soils:

1. Physical characteristics that are uniform in texture, structure, and pore space. Imported Texture shall be sandy clay loam. Imported Structure type shall be Angular blocky or Subangular blocky or a combination of the two. Imported soil pore space shall be few and fine or common and fine.
2. Transportation methods for the soil shall ensures uniformity and consistency of the physical characteristics as close as possible to the original state upon delivery.
4. Contractor shall use methods for removal of organic layer prior to importing soil.
5. Imported soil shall not be compacted.
6. Placement of imported soil shall be in small lift increments of four to six inches.
7. Native soil is to be used for the vertical separation for the subsurface soil dispersal systems with the fill for the cap being imported soils. [10 CSR 20-8.110(7)(C)].
8. Remove existing sod prior to placing imported fill and stock pile onsite. Cover fill with removed sod.

Sanitary Sewer Note

Contractor to minimize sanitary sewer service impacts and shall coordinate with parks department any disruptions to service.

20' 0' 20' 40'
SCALE : 1 INCH = 20 FEET

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DESIGN AND CONSTRUCTION

Department of Natural Resources Missouri State Parks

SEWER SYSTEM IMPROVEMENT

CROWDER STATE PARK
76 NW Highway 128
Trenton, MO

PROJECT # X232202
SITE # 5107
ASSET # 7815107029

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: SEPT. 4, 2024

CAD DWG FILE:
DRAWN BY: DRV/JS
CHECKED BY:
DESIGNED BY: JRH

SHEET TITLE:
Sanitary Sewer - Lake Restroom

SHEET NUMBER:
C-103

SHEET 3 OF 6
SEPT. 4, 2024

Imported soil:

Shall have an absorption rate of 0.1 GPD/SQFT
Imported soils must be a sandy to loamy material with less than 10% clay and less than 15% organic debris present.
Contractor is responsible to acquire soil scientist approval of choice soil for use in a drip irrigation system in accordance with this plan, prior to filling.

Specifications for imported soils:

1. Physical characteristics that are uniform in texture, structure, and pore space. Imported Texture shall be sandy clay loam. Imported Structure type shall be Angular blocky or Subangular blocky or a combination of the two. Imported soil pore space shall be few and fine or common and fine.
2. Transportation methods for the soil shall ensures uniformity and consistency of the physical characteristics as close as possible to the original state upon delivery.
4. Contractor shall use methods for removal of organic layer prior to importing soil.
5. Imported soil shall not be compacted.
6. Placement of imported soil shall be in small lift increments of four to six inches.
7. Native soil is to be used for the vertical separation for the subsurface soil dispersal systems with the fill for the cap being imported soils. [10 CSR 20–8.110(7)(C)].
8. Remove existing sod prior to placing imported fill and stock pile onsite. Cover fill with removed sod.

Imported Soil Type	Absorption Rate
Type I	0.5–0.4
Type II	0.4–0.2
Type III	0.3–0.15
Type IVa	0.2–0.05

Sanitary Sewer Note

Contractor to minimize sanitary sewer service impacts and shall coordinate with parks department any disruptions to service.

REQUIREMENTS:

1. Minimum area of 6,250 ft².
2. 3,234 LF of dispersal tubing placed 2 ft. O.C.
3. 28 Lengths vary at 108' to 123'.
4. Minimum of 1558 emitters to be installed on a 2'x2' grid.
5. Supply line and return lines shall be installed at 8–10" below depth of dispersal tubing.
6. Dispersal tubing shall be installed at 10" below finished grade.
7. Contractor to pump out and remove existing septic tanks.

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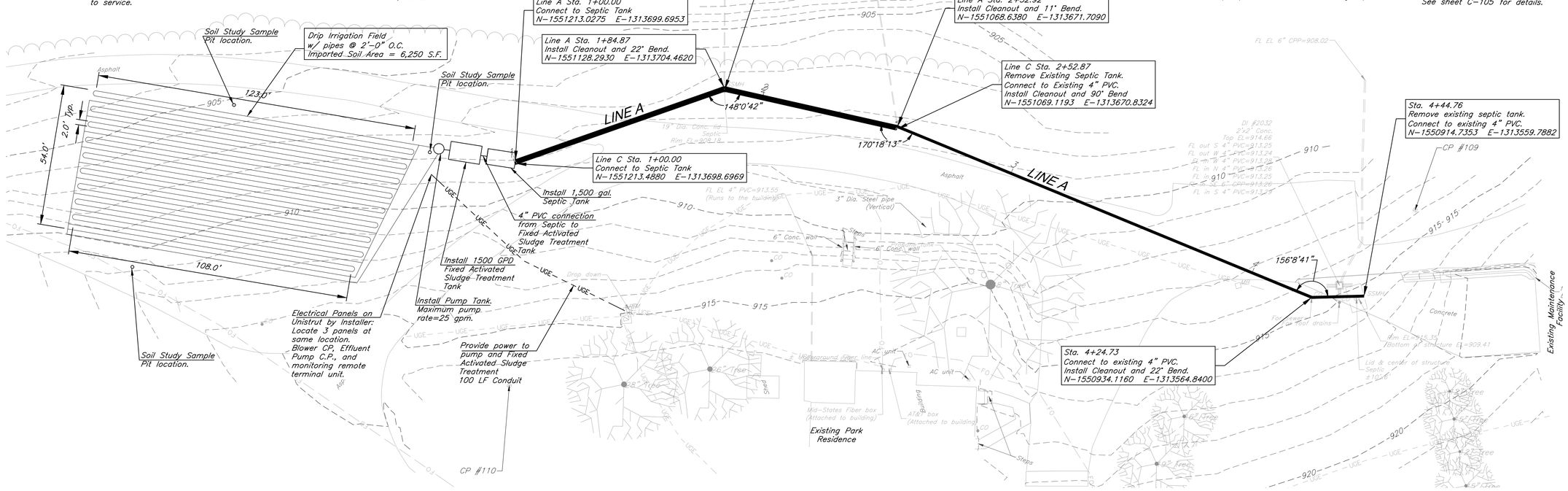
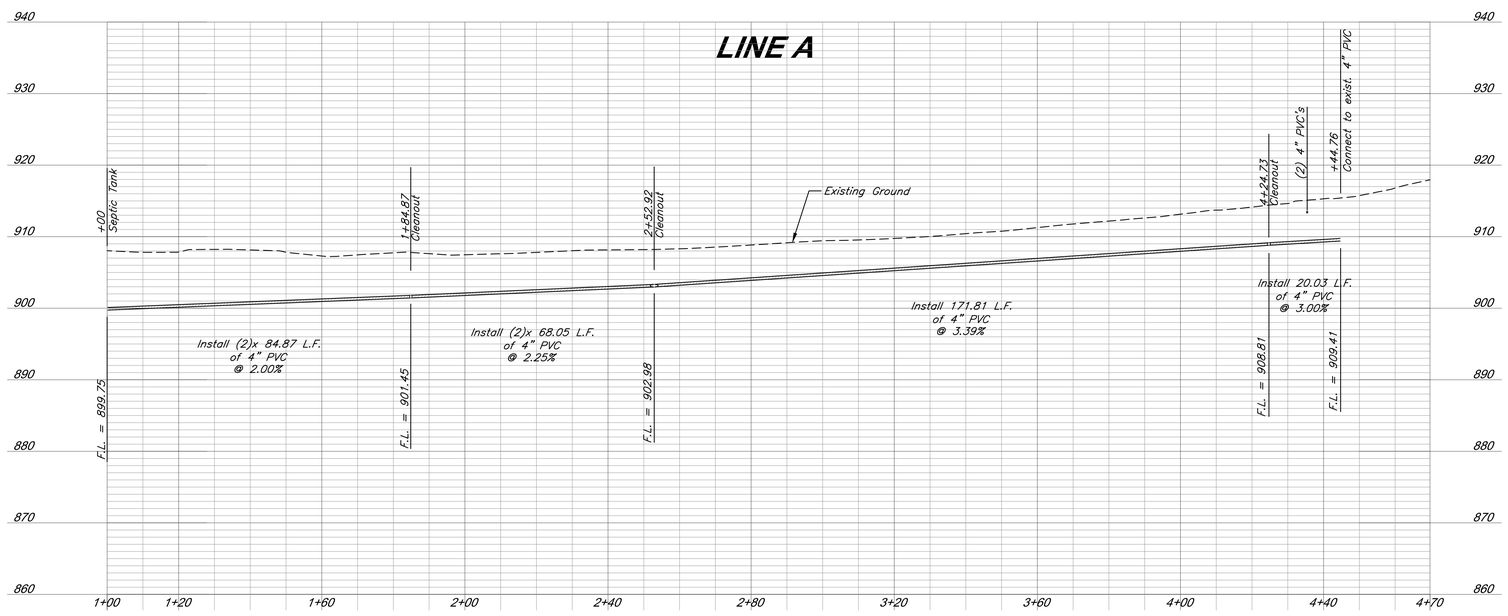
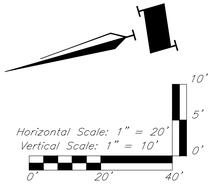
NOTE:
See sheet C–105 for details.







Field Sizing and Drip Line Calculations

1. Loading Rate = 0.1 gal/sq. ft * day
2. Ultimate Flow =
   Residential Single Family Restroom = 120 gal/day * 3 Bedrooms = 360 gal/day
   Service Station – 250 gal/day * 1 toilet = 250 gal/day
   Total Daily Flow: = 610 gal/day
   Design Ultimate Flow = 610 gal/day
3. Number of Zones = 1
4. Total Minimum Field Size = Total Daily Flow / Loading Rate = 610 / 0.1 = 6,100 sq ft.
5. Drip Line Spacing = 2 FT
6. Run Length = 122 FT average
7. Total Number of Runs = 26
8. Total Lineal Feet of Line = 122 x 26 = 3,172 LF
9. Emitter Spacing = 2 FT on center
10. Total Emitters = Lineal FT of Drip Tubing/Emitter Spacing = 3,172 / 2 = 1,586 emitters

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Department of Natural Resources Missouri State Parks

SEWER SYSTEM IMPROVEMENT

CROWDER STATE PARK
76 NW Highway 128
Trenton, MO

PROJECT # X232202
SITE # 5107
ASSET # 7815107029

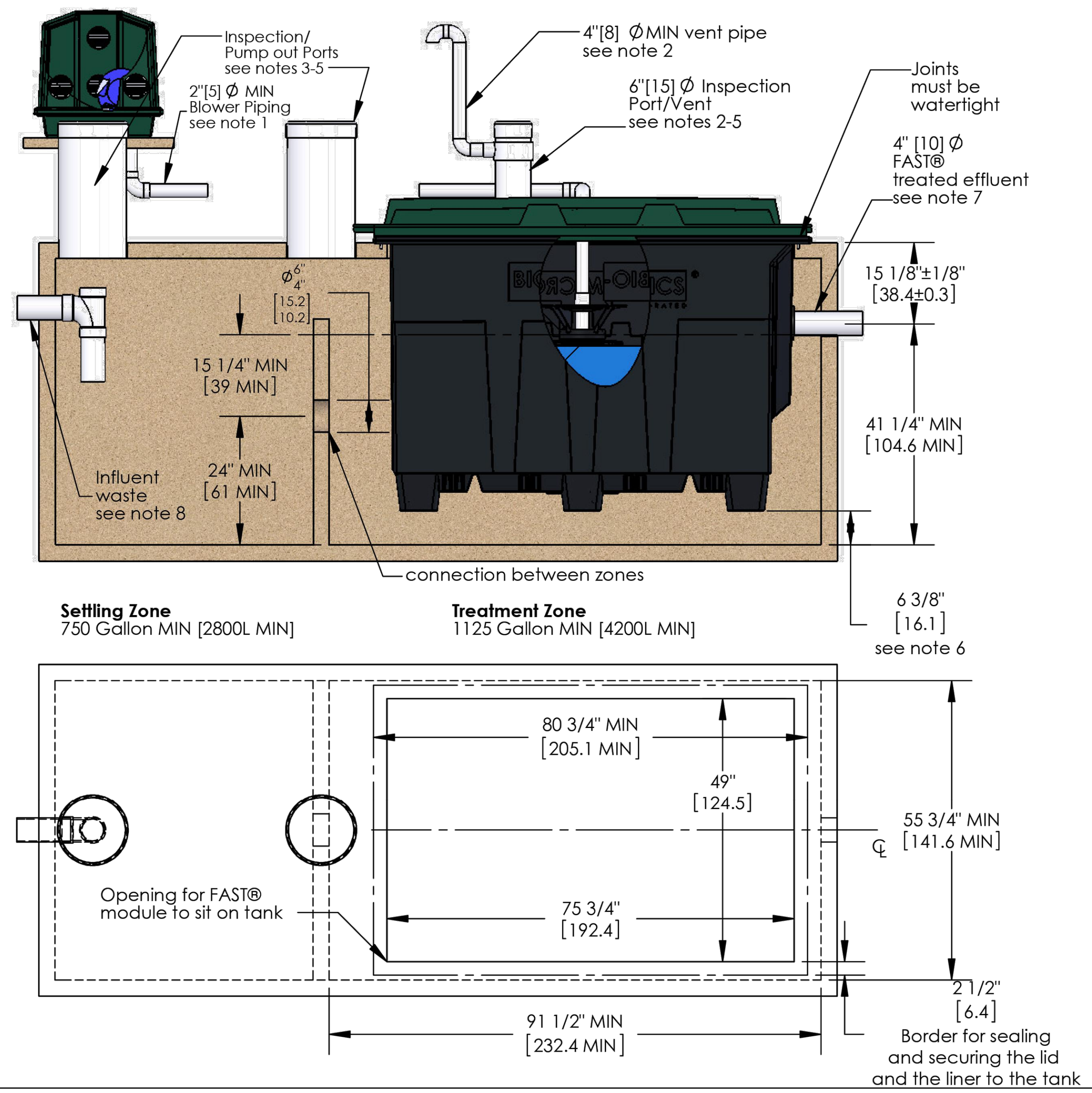
REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: SEPT. 4, 2024

CAD DWG FILE:
DRAWN BY: DRV/JS
CHECKED BY:
DESIGNED BY: JRH

SHEET TITLE:
Sanitary Sewer - Entry

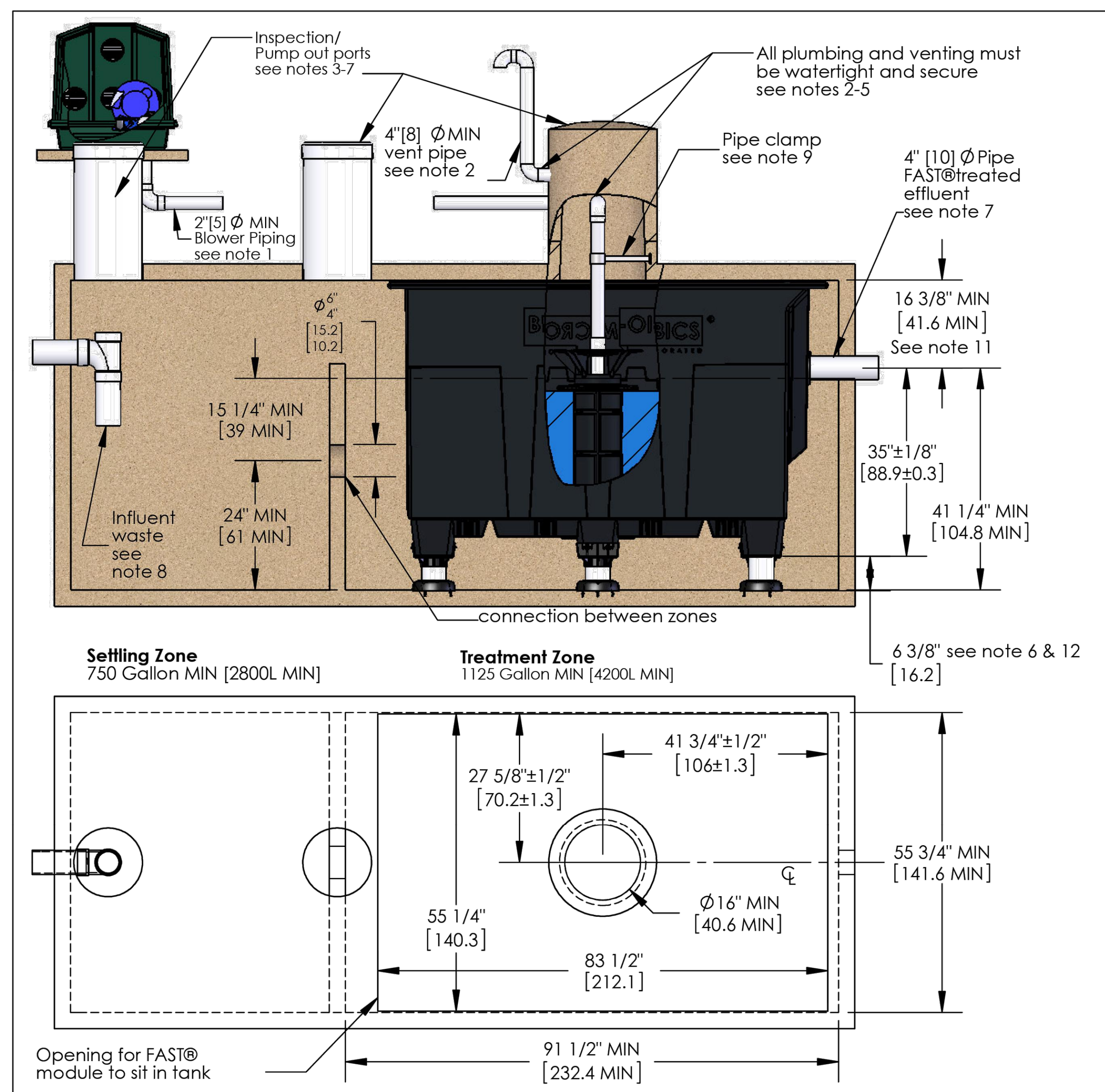
SHEET NUMBER:
C-104

SHEET 4 OF 6
SEPT. 4, 2024



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 42" X 28" X 2" [105 X 70 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 9 sq in. [58 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid, and treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. Installations using a FAST® system lid are capable of withstanding AASHTO H-10 equivalent loads. Any installation in which a FAST lid is buried deeper than 3 feet, or where additional loading conditions may occur, a professional engineer should be consulted. FAST® with feet option should be considered. Refer to Installation Manual for more details.
10



NOTES

1. Airline piping to FAST® may not exceed 100 FT [30m] total length and have a maximum of 4 elbows in the piping system. For distances greater than 100 FT [30m] consult factory. Blower must be located above flood levels on a concrete base 42" X 28" X 2" [105 X 70 X 5cm] min.
2. Vent to desired location and cover opening with a vent grate with at least 9 sq in.[60 sq. cm] open surface area. Secure with stainless steel screws. Vent piping must not allow condensate build up or create back pressure. Vent must be above finished grade or higher (see sheet 4 of 4).
3. All appurtenances to FAST® (e.g. tanks, access ports, electrical, etc.) must conform to all applicable country, state, province, and local plumbing and electrical codes. Pump out access shall be adequate to thoroughly clean out both zones.
4. All inspection, viewing and pump out ports must be secured to prevent accidental or unauthorized access.
5. Tank, piping, conduit, etc. are provided by others. Blower control system by Bio-Microbics, Inc. See Installation Manual.
6. If less than the specified minimums are considered necessary, consult factory for guidance.
7. All piping and ancillary equipment installed after FAST must not impede or restrict free flow of effluent.
8. The tank(s) shall be designed to prevent air passage between the settling zone/tank and the treatment zone and preventing an air lock. Examples include a baffle wall sealed to the lid or treatment zone inlet line with a pipe cap. Consult factory for guidance.
9. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2' min [60 cm]. See alternate air supply option on sheet 4 of 4.
10. Specialized treatment levels may require specific features to be incorporated into the design. Consult factory for guidance.
11. Min. height may be reduced, consult factor and reference "Low Profile Module Procedure.pdf"
12. Refer to sheet 4 of 4 for leg extensions requirements.

Specifications for MicroFAST 1.50 Wastewater Treatment System

1. GENERAL
The contractor shall furnish and install (1) MicroFAST®1.50 treatment system as manufactured by Bio-Microbics, Inc. The treatment system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include FAST® system insert, leg extensions, or lid, blower assembly, blower controls and alarms. All other items will be provided by others.
The MicroFAST 1.50 unit shall be situated within a 1125 gallon [4200 L] minimum compartment as shown on the drawings. Suggested maximum settling zone is (1)X the daily flow. Tank must provide adequate pump out access and conform to local, state, and all other applicable codes. The contractor shall coordinate the proper fabrication of the tank between the tank and FAST system suppliers as well as the installation of the FAST unit, and delivery to the job site.

2. OPERATING CONDITIONS
The MicroFAST 1.50 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from (6) six to (21) twenty-one people and not to exceed 1500 US Gallons per day (5600 LPD) provided the waste contains nothing that will interfere with biological treatment. The FAST system is a biological treatment system not meant for non-biodegradable or industrial wastewater.

3. MEDIA
The FAST media shall be manufactured of rigid PVC, polyethylene, or polypropylene and it shall be supported by the polyethylene insert. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids descend through the media to the bottom of the septic tank.

4. BLOWER
The MicroFAST 1.50 unit shall come equipped with a regenerative type blower capable of delivering 20-45 CFM [38-85 m3/hr]. The blower assembly shall include an inlet filter with metal filter element. The blower shall be mounted outside the tank on a contractor supplied concrete base. Blower piping to the tank shall use non-corrosive material (PVC, Galvanized, or Stainless Steel). Do not run galvanized pipe inside the treatment tank. Refer to Installation Manual for further details.

5. REMOTE MOUNTED BLOWER
The blower must not set in standing water and its elevation must be higher than the normal flood level. A two-piece, rectangular housing shall be provided. The discharge air line from the blower to the MicroFAST System, shall be provided and installed by the contractor.

6. ELECTRICAL
The electrical source should be within 150 feet [45 meters] of the blower, consult local codes for longer wiring distances. All wiring must conform to all applicable codes(IEC, NEC, etc.). Wiring distances must prevent significant voltage loss. Input power on 60Hz electrical systems 110/220VAC, 1Ø, 5/2.5 FLA, on 50 Hz electrical systems 220VAC, 1Ø, 5.7 FLA. Other voltages and phase are also available. Actual power consumption varies with site conditions. All conduit and wiring shall be supplied by contractor.

7. CONTROLS
The control panel provides power to the blower with an alarm system consisting of a visual and audible alarm capable of signaling blower circuit failure and high water conditions. The control panel is equipped with SFR® (Sequencing Fixed Reactor) timed control feature. A manual silence button is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS
All work must be done in accordance with local codes and regulations. Installation of the FAST 1.5 shall be done in accordance with the written instructions provided by the manufacturer. Manuals shall be furnished, which will include a description of system installation, operation, and maintenance procedures.

9. FLOW AND DOSING
FAST systems have been successfully designed, tested and certified receiving gravity, demand-based influent flow. When influent flow is controlled by pump or other means to help with highly variable flow conditions, then multiple dosing events should be used to maximize performance. The flow rate shall not exceed 7.8 gpm (28 Lpm) with a maximum hourly flow not to exceed 10% of the design daily flow (150 gph (570 LPH)).

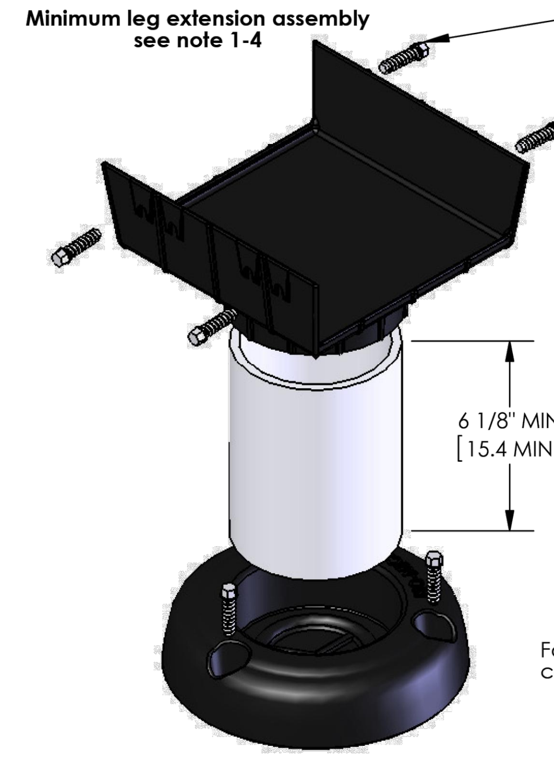
10.WARRANTY
Bio-Microbics, Inc. warrants all new residential FAST® models (MicroFAST® 0.50, 0.625, 0.75, 0.90, and 1.5) against defects in materials and workmanship for a period of two years after installation or three years from date of shipment which ever occurs first. All other FAST® system models are warranted for a period of one year after installation or eighteen months from date of shipment, whichever occurs first. All are subject to the following terms and conditions below:

During the warranty period, if any part is defective or fails to perform as specified when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions provided by Bio-Microbics, Inc., Bio-Microbics, Inc. will repair or replace at its discretion such defective parts free of charge. Defective parts must be returned by owner to Bio-Microbics, Inc.'s factory postage paid, if so requested. The cost of labor and all other expenses resulting from replacement of the defective parts and from installation of parts furnished under this warranty and regular maintenance items such as filters or bulbs shall be borne by the owner. This warranty does not cover general system misuse, aerator components which have been damaged by flooding or any components that have been disassembled by unauthorized persons, improperly installed or damaged due to altered or improper wiring or overload protection. This warranty applies only to the treatment plant and does not include any of the structure wiring, plumbing, drainage, septic tank or disposal system. Bio-Microbics, Inc. reserves the right to revise, change or modify the construction and/or design of the FAST system, or any component part or parts thereof, without incurring any obligation to make such changes or modifications in present equipment. Bio-Microbics, Inc. is not responsible for consequential or incidental damages of any nature resulting from such things as, but not limited to, defect in design, material, or workmanship, or delays in delivery, replacements or repairs.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED. BIO-MICROBICS SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

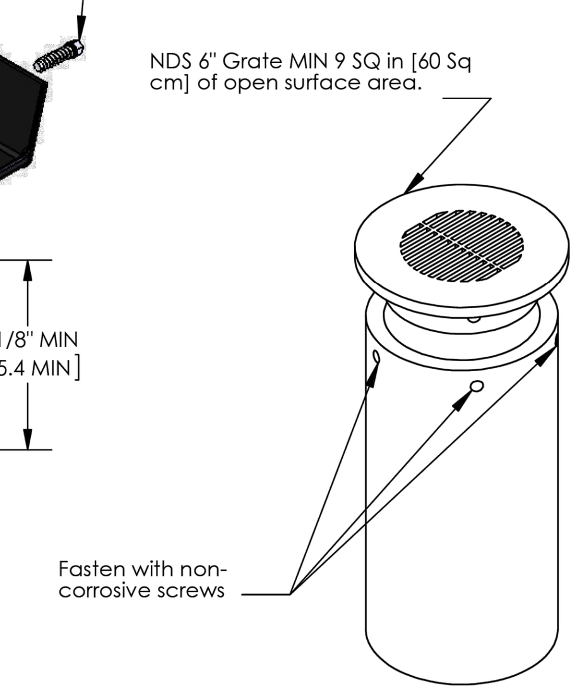
NO REPRESENTATIVE OR PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY OR TO ASSUME FOR BIO-MICROBICS, INC., ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF ITS PRODUCTS. Contact your local distributor for parts and service.

Minimum leg extension assembly see note 1-4



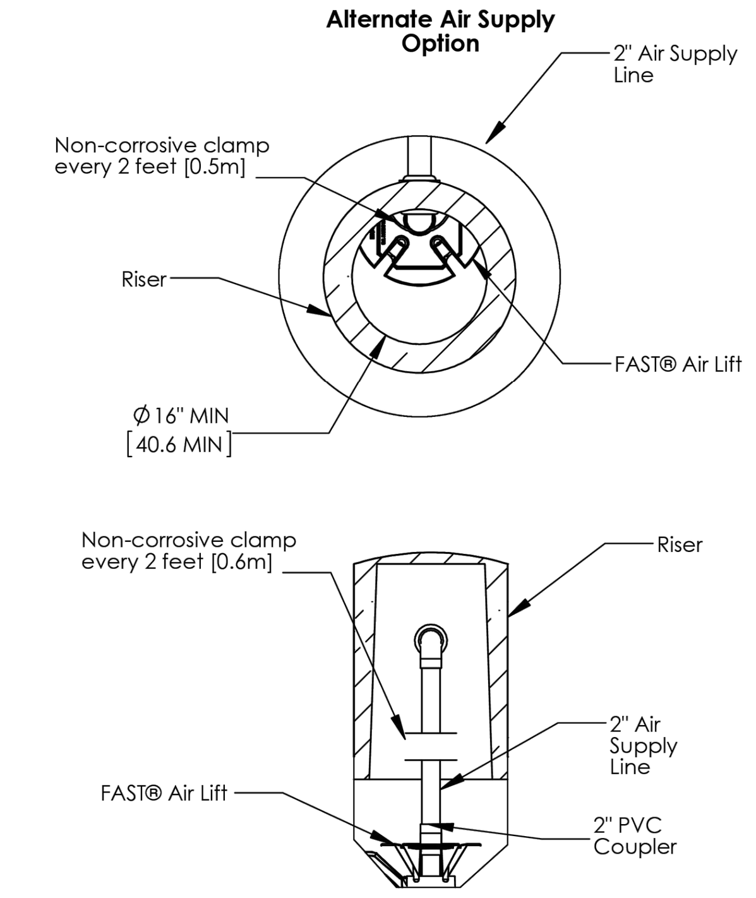
DETAIL
SCALE 1 : 5

FAST® Lid Vent Option



DETAIL
SCALE 1 : 4

Alternate Air Supply Option



Notes
1. Secure leg extension to the FAST® unit by placing two screws on each side of the leg extension (4 screws per foot are included).
2. Cut 4" schd. 40 PVC pipe (not included) to obtain the desired height. Minimum pipe length of 6 1/8" [15.56cm] will provide minimum clearance of 10". For heights greater than 18" [45.7cm] use schd. 80 PVC pipe (not included). Consult factory for extending leg beyond 36"[90cm].
3. Anchor the leg extensions to the tank with non-corrosive hardware (not included) at the provided mounting points.
4. If less than the specified minimums are considered necessary, consult factory for guidance.
5. The air supply line into the FAST® unit must be secured to prevent vibration induced damage. The air supply line should be secured with a non-corrosive clamp every 2ft [0.6m] minimum.
6. Tank, anchors, piping conduit, blower, housing pad and vents are provided by others.

STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR

STATE OF MISSOURI
JONATHAN
HEALY
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9/6/24
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OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES
MANAGEMENT,
DESIGN AND CONSTRUCTION

Department of Natural
Resources Missouri
State Parks

SEWER SYSTEM
IMPROVEMENT

CROWDER STATE PARK
76 NW Highway 128
Trenton, MO

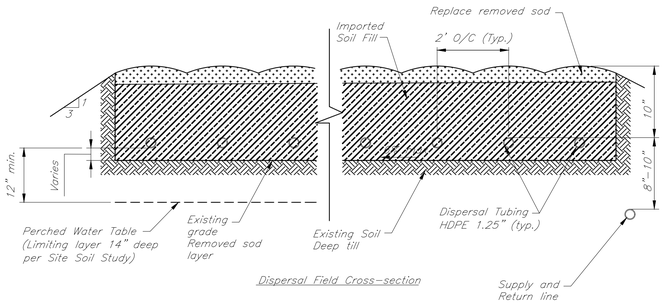
PROJECT # X232202
SITE # 5107
ASSET # 7815107029

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: SEPT. 4, 2024

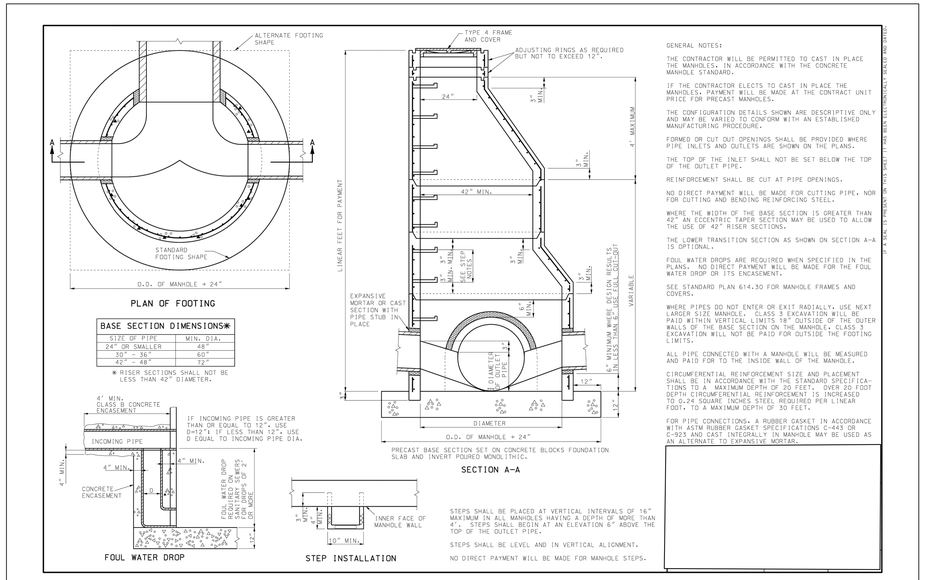
CAD DWG FILE:
DRAWN BY: DRV/JS
CHECKED BY:
DESIGNED BY: JRH

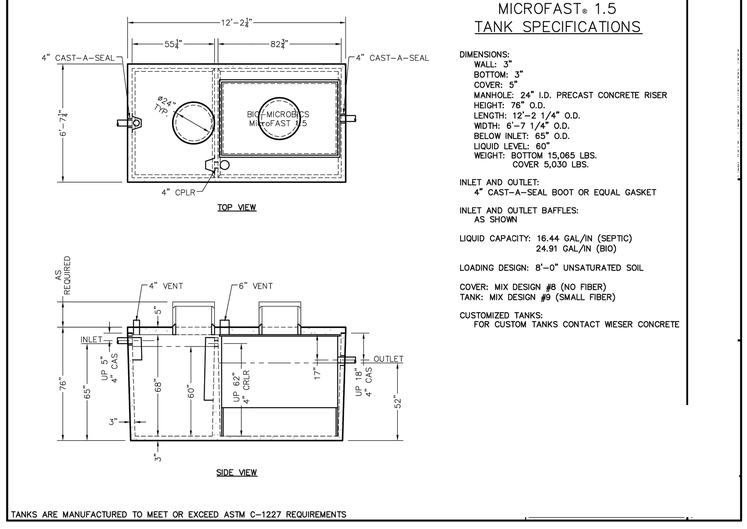
SHEET TITLE:
Detail Sheet

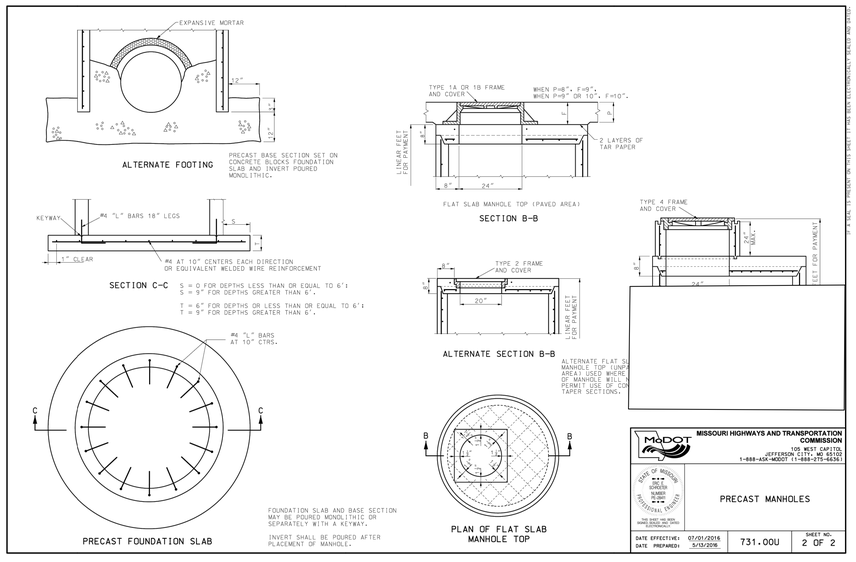
SHEET NUMBER:
C-105

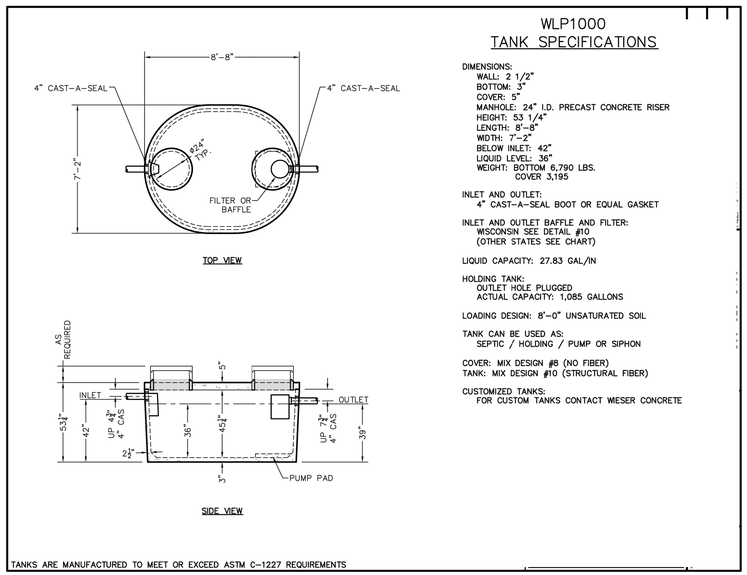


Dispersal Field Cross-section









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SHEET 6 OF 6
SEPT. 4, 2024