BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

MARSHALL RIDGE WWTF IMPROVEMENTS
IN
McCRACKEN COUNTY, KENTUCKY

PERMIT ISSUE: _____, 2024
BID ISSUE: _____, 2024
CONSTRUCTION ISSUE: _____, 2024
RECORD ISSUE: _____, 2024

VICINITY MAP

DRAWING LIST

NOTES:
1. *Please note that only preliminary assessments have occurred to date, improvement plans have not been finalized and final design cannot be completed prior to health department clarifications. These plans represent the initial improvements recommended.*

PREPARED FOR:
CSWR
Central States Water Resources

21 DESIGN GROUP INC.
1351 Jefferson, Suite 301
Washington, MO 63090
mail@21designgroup.net
P: 636-432-5029

#	DATE	REVISION	BY
			X

21 DESIGN GROUP INC.
1351 Jefferson, Suite 301
Washington, MO 63090
mail@21designgroup.net
P: 636-432-5029

COVER SHEET
MARSHALL RIDGE WWTF IMPROVEMENTS
HARDING RIDGE ROAD
McCRACKEN COUNTY, KENTUCKY

ENGINEERING CERTIFICATE OF AUTHORITY NO. 4808
ENGINEERING LICENSE:
BENJAMIN J. KUENZEL, PE33718

STATE OF KENTUCKY · BENJAMIN J. KUENZEL · 33718 · LICENSED PROFESSIONAL ENGINEER
PRELIMINARY NOT FOR CONSTRUCTION

SEAL DATE:	07/03/2024
DRAWN BY:	CV/CMC
PROJ NUMBER:	0542-18
DATE:	07/03/2024
DRAWING NO:	C01

BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.

General Notes and Construction Specifications

1. All water and sewer main construction shall be consistent with the local municipality requirements as well as all testing and disinfection requirements of the Kentucky Sanitary Code.

2. The contractor shall obtain, erect, maintain and remove all signs, barricades, flagmen and other control devices as may be necessary for the purpose of regulating, warning or guiding traffic. Placement and maintenance of all traffic control devices shall be in accordance with the latest revision of the Manual on Uniform Traffic Control Devices.

3. Location of utilities shown on plans are approximate only, and are not necessarily complete. Contractor shall make his own investigations as to location of all existing underground structures, cables, utilities and pipe lines.

4. If existing utility lines of any nature are encountered which conflict in location with new construction, the contractor shall notify the engineer and owner so that the conflict may be resolved.

5. The contractor shall notify One Call at least 48 hours prior to construction so that each utility company can stake out any underground improvements that they may have which might interfere with the proposed construction.

6. The contractor shall be required to make arrangements for the proper bracing, shoring and other required protection of all roadways, structures, poles, cables and pipe lines, before construction begins. He shall be responsible for any damage to the streets or roadways and associated structures and shall make repairs as necessary to the satisfaction of the engineer and owner at his own expense.

7. The contractor shall be responsible for the protection of all private and public utilities even though they may not be shown on the plans. Any utility that is damaged during construction shall be repaired or replaced to the satisfaction of the engineer and owner by the contractor at his own expense.

8. The contractor shall examine the plans and specifications, visit the site of the work and inform himself/herself fully with the work involved, general and local conditions, all federal, state and local laws, ordinances, rules and regulations and all other pertinent items which may affect the cost and time of completion of this project before submitting a proposal.

9. All work and materials shall be in accordance with the code requirements mentioned in the technical specifications provided.

10. Prior to submitting his bid, the contractor shall call the attention of the engineer to any material or equipment he deems inadequate and to any item of work omitted on the plans.

11. Structures for valve vaults for water mains shall be in accordance with the improvement plans and the applicable municipality construction requirements. Where granular trench backfill is required around these structures, the cost shall be considered as incidental and shall be included in the contract unit price for the structure.

12. Frame and cover or grates for water main structures shall be as indicated within these improvement plans.

13. All final adjustments of casting will be accomplished by the use of precast concrete adjusting rings set in butyl rope joint sealant, mortar joints will not be allowed. Total height of adjusting rings used shall not exceed twelve (12") inches. cost for adjustment is considered incidental.

14. The contractor shall be responsible to place on grade and coordinate with other contractors all underground structure frames such as catch basins, inlets, manholes, hydrants, buffalo boxes, valves, etc. No additional compensation shall be paid and said adjustments shall be considered incidental to other items of construction.

15. The contractor shall restore any area disturbed to a condition equal to or better than its original use. This shall include finish grading, establishment of a vegetative cover (seeding or sod), general cleanup and pavement replacement.

16. All trenches caused by the construction of all utilities and the excavation around catch basins, manholes, inlets and other appurtenances which occur within the limits of existing or proposed pavements, sidewalks and curb and gutters or where the edge of the trench shall be within two (2') feet horizontally of said improvements shall be backfilled with compacted granular trench backfill or with approved suitable select material and properly compacted to 100% of maximum density as determined by the standard proctor dry density (ASTM d 698) compaction test. When granular material is required, the cost shall be considered incidental and shall be included in the contractors bid.

17. The depth of backfill shall be measured from the top of the pipe embedment to the finished subgrade or as noted on the plans.

18. The contractor shall be responsible for providing safe and healthful working conditions throughout the construction of the proposed improvements.

19. The engineer will be given forty-eight (48) hours notice for any staking that is to be done. The cost of stakeout is the responsibility of the contractor.

20. The contractor shall inform the engineer and owner before work commences on each category of construction, i.e. water main, grading, pavement and drainage improvement. A twenty-four (24) hour notice shall be given for any item that requires final testing and inspection such as water mains or sanitary sewers.

21. The engineer will furnish the contractor with lines and grades necessary to the proper prosecution and control of the work. The contractor shall call the attention of the engineer to any errors or discrepancies which may be suspected in lines and grades which are established by the engineer, and shall not proceed with the work until any lines and grades which are believed to be in error have been verified or corrected by the engineer or his representative.

22. All survey monuments damaged or removed during construction of this project shall be replaced by the surveyor and said cost of replacement shall be paid by the contractor.

23. The contractor will have in his possession on the job site a copy of the plans and specifications during construction.

24. If approval for any items is required, the contractor shall contact the engineer for approval prior to ordering.

25. Any drain and/or field tile encountered by the contractor during the installation of the improvements shall be returned to original condition. This work to be considered incidental to the contract.

26. All road signs, street signs and traffic signs which need to be relocated or moved due to construction shall be taken down and stored by the contractor at his own expense, except those which are necessary for proper traffic control which shall be temporarily reset until completion of construction operations. After completion of the work, the contractor shall reset, at his expense, all said signs.

27. The contractor shall dispose of all excess excavation, unsuitable and unusable materials offsite and at an approved location in a manner that public or private property will not be damaged or endangered. This work is considered as incidental to the cost of the project. Contractor to follow any local, state, and federal guidelines for disposing of material off site.

28. No trench excavations will be permitted to remain open over any weekend, night, or any time site is left unattended.

29. Band-seal style couplings shall be used when joining sewer pipes of dissimilar materials.

30. As-built drawings shall be prepared by the contractor and submitted to the engineer as soon as the site improvements are completed. Any change in length, location or alignment shall be shown in red. As-builts will be performed by a licensed surveyor. It will include the tops and flowlines of all storm and sanitary structures.

31. The contractor is responsible for coordinating any required inspections with the engineer and city or state agency.

32. Special attention is drawn to the fact that the standard specifications requires the contractor to have a competent superintendent on the project site at all times, irrespective of the amount of work sublet. The superintendent shall be capable of reading and understanding the plans and municipality construction specifications, shall have full authority to execute orders to expedite the project, shall be responsible for scheduling and have control of all work as the agent of the contractor. Failure to comply with this provision will result in a suspension of work as provided in the contract documents.

33. The engineer and owner are not responsible for the construction means, methods, techniques, sequences or procedures, time of performance, programs or for any safety precautions used by the contractor. The contractor is solely responsible for execution of his work in accordance with the contract documents and specifications.

34. The utilities shown hereon were plotted from available information and do not necessarily reflect the actual existence, non-existence, size, type, or location of these or other utilities. The contractor shall be responsible for verifying the actual location of all utilities. All utilities shall be located in the field prior to any construction of improvements. These provisions shall in no way absolve any party from complying with the underground facility safety and damage prevention act.

35. All materials and methods of construction to meet the specifications submitted for the construction permit.

36. Construction should not commence until all permits have been received from all governing agencies.

37. No land disturbance activities can be completed until all land disturbance permitting has been acquired. It is the responsibility of the contractor to verify permits are in place prior to activities. Contractor will be responsible for any fines that are incurred due activities completed prior to having necessary permitting in place.

38. All fill material shall be made of selected earth materials, free from broken masonry, rock, frozen earth, rubbish, organic material and debris.

39. Grading contractor shall keep existing roadways clean of mud and debris at all times.If the city or owner has to clean the roads it will be at the expense of the contractor.

40. All graded areas shall be protected from erosion by erosion control devices and/or seeding and mulching as required by all local and state agencies and permits.

41. No grade shall exceed a 3:1 slope except where noted.

42. Interim stormwater drainage control in the form of siltation control measures are required.

43. Adequate temporary off-street parking shall be provided for construction employees. Parking on non-surfaced areas shall be prohibited in order to eliminate the condition whereby mud from construction and employee vehicles is tracked onto the pavement causing hazardous roadway and driving conditions.

44. The contractor shall, at all times, contain mud and other spoils on the site. No vehicle, trailer or construction equipment is to deposit mud or any other material on public streets. Project will be stopped if streets are not cleaned immediately.

45. Public roadways shall be kept open to traffic during all phases of construction of improvements. No driving lanes shall be closed without prior written permission from the governing agency.

46. The contractor shall furnish, maintain, and remove traffic control devices for the purpose of regulating, warning, and directing traffic during construction in the public roadways. All flagmen, barricades, warning signs, etc. shall conform to the manual for uniform traffic control devices.

47. No investigation has been performed by the engineer regarding hazardous waste, underground conditions or utilities affecting the tract of land shown herein.

48. This plan is not a survey in any sort and shall not constitute a boundary survey.

49. Onsite utilities have been shown based on documents obtained from public entities.

50. Contractor shall comply with all OSHA requirements for safety and construction.

51. All utility trenches in paved areas shall be compacted to the requirements of the specific paving specification. Only granular material shall be used in utility trenches under paved areas.

52. All unsurfaced areas shall receive a minimum of 6" of topsoil. Contractor shall seed, fertilize, mulch, and maintain all disturbed areas until stabilization is provided meeting the technical specifications and/or direction of the Engineer.

53. The contractor is responsible for maintenance of sediment control bmps throughout the entire project.

54. All sewer laterals shall have a 2% minimum slope.

55. All storm sewer covers shall have the words "Storm Drain" cast in the top in letters three inches high. All sanitary sewer covers shall have "Sanitary Sewer" meeting same specification.

56. All frames, grates and covers shall be ductile iron, conforming to ASTM A48, Class 30 and shall be designed for heavy duty traffic.

57. Manhole steps shall be constructed of polypropylene conforming to ASTM D 4101 and shall meet current state and federal safety standards. Steps shall be Neenah R-1981-N or approved equal.

58. Pre-cast manholes shall be at least 48" diameter and conform with ASTM C478 and to design dimensions. All lift hole shall be thoroughly wetted and completed filled with mortar and smoothed. Structures shall be free of fractures or cracks. All joints between pre-cast elements on manholes shall be made with an approved bitumastic material or an approved rubber gasket. Contractor shall submit shop drawings to engineer for approval prior to ordering.

59. All storm sewer 12" to 30" in diameter shall be Corrugated Polyethylene Pipe (CPP) or High Density Polypropolene (HDPP).
A. CPP pipe and fittings shall conform to ASTM F405 and F667 and shall have a circular cross-section and have a smooth wall interior.
B. End sections shall be polyethlyene flared type with toe plates.
C. Joints shall be provided with neoprene or manufacturer's standard gaskets and meet ASTM F2881. Pipes up to shall be water tight according to D3212. Spigots shall have gaskets meeting the requirements of ASTM F477.
D. All CPP or HDPP shall be installed using embedment material meeting North Carolina Department of Transportation requirements.
E. Installation to conform to ASTM D2321 and pipe manufacturer's recommendations for backfill, bedding, installation, and minimum cover requirements.
F. Clean joints thoroughly, and coat bell, spigot and gasket with recommended lubricant before jointing.

61. Dual wall and triple wall polypropylene pipe (HDPP) shall confirm to the requirements of AASHTO M330 "Standard Specification for Polypropylene Pipe, ASTM F2736 (Dual wall) for sizes 12" to 30" and ASTM F2764 (Triple wall) for sizes 30" to 60". All polypropylene pipe shall be installed according with ASTM F2321 "Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.".

#	DATE	REVISION	BY
			X

21 DESIGN GROUP INC.
1351 Jefferson, Suite 301
Washington, MO 63090
mail@21designgroup.net
P: 636-432-2097

GENERAL NOTES

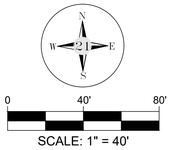
MARSHALL RIDGE WWTF IMPROVEMENTS
HARDING RIDGE ROAD
McCRACKEN COUNTY, KENTUCKY

ENGINEERING CERTIFICATE OF AUTHORITY NO. 4808
ENGINEERING LICENSE:
BENJAMIN J. KUENZEL, PE33718

STATE OF KENTUCKY
BENJAMIN J. KUENZEL
33718
LICENSED PROFESSIONAL ENGINEER
PRELIMINARY NOT FOR CONSTRUCTION

SEAL DATE:	07/03/2024
DRAWN BY:	CV/CMC
PROJ NUMBER:	0542-18
DATE:	07/03/2024
DRAWING NO:	C02

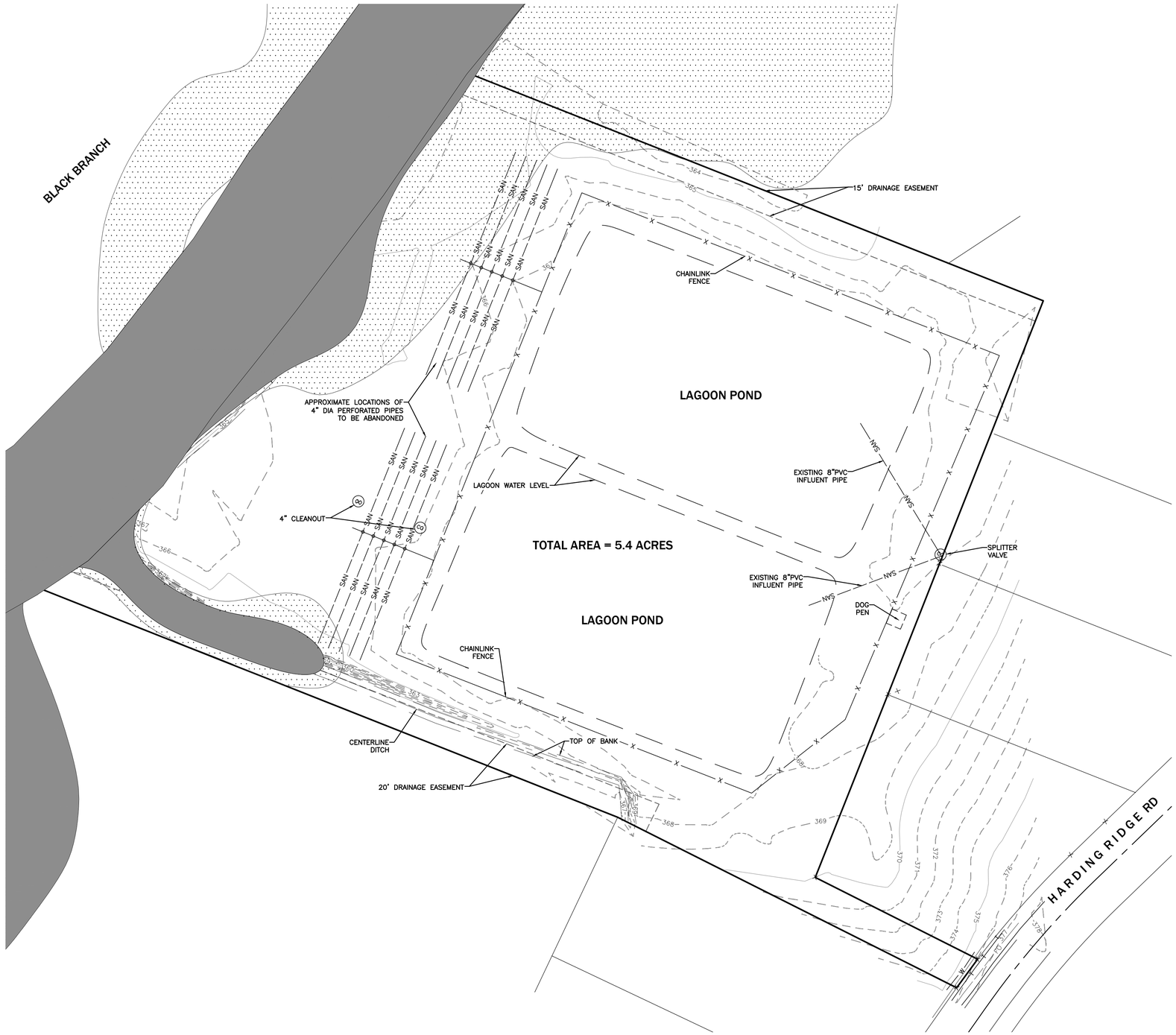
BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.



DRAWING LEGEND

DESCRIPTION	EXISTING
Easement	
Setbacks	
Property Lines	
Underground Electric	AE
Tree Line	
Sanitary Manhole	S
Utility Pole	
Fire Hydrant	
Telephone Box	T
Water Valve	
Gas Valve	G
Sign	
Grated Inlet	
Catch Basin	
Grated Curb Inlet	

NOTES:
1. *ALL SURVEYING WORK WAS PERFORMED BY SITEWORX SURVEY & DESIGN, LLC*
2. *CONTRACTOR TO FIELD VERIFY ALL UTILITY LOCATIONS AND ELEVATIONS BEFORE STARTING ANY WORK.*
3. *ELEVATIONS ARE BASED ON NAVD 88 DATUM, GEOID 12B, UTILIZING THE KY. VRS NETWORK.*



#	DATE	REVISION	BY
			X

21 DESIGN GROUP INC.
1351 Jefferson, Suite 301
Washington, MO 63090
mail@21designgroup.net
P: 636-432-2097

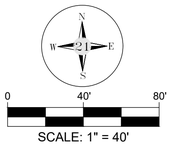
EXISTING CONDITIONS

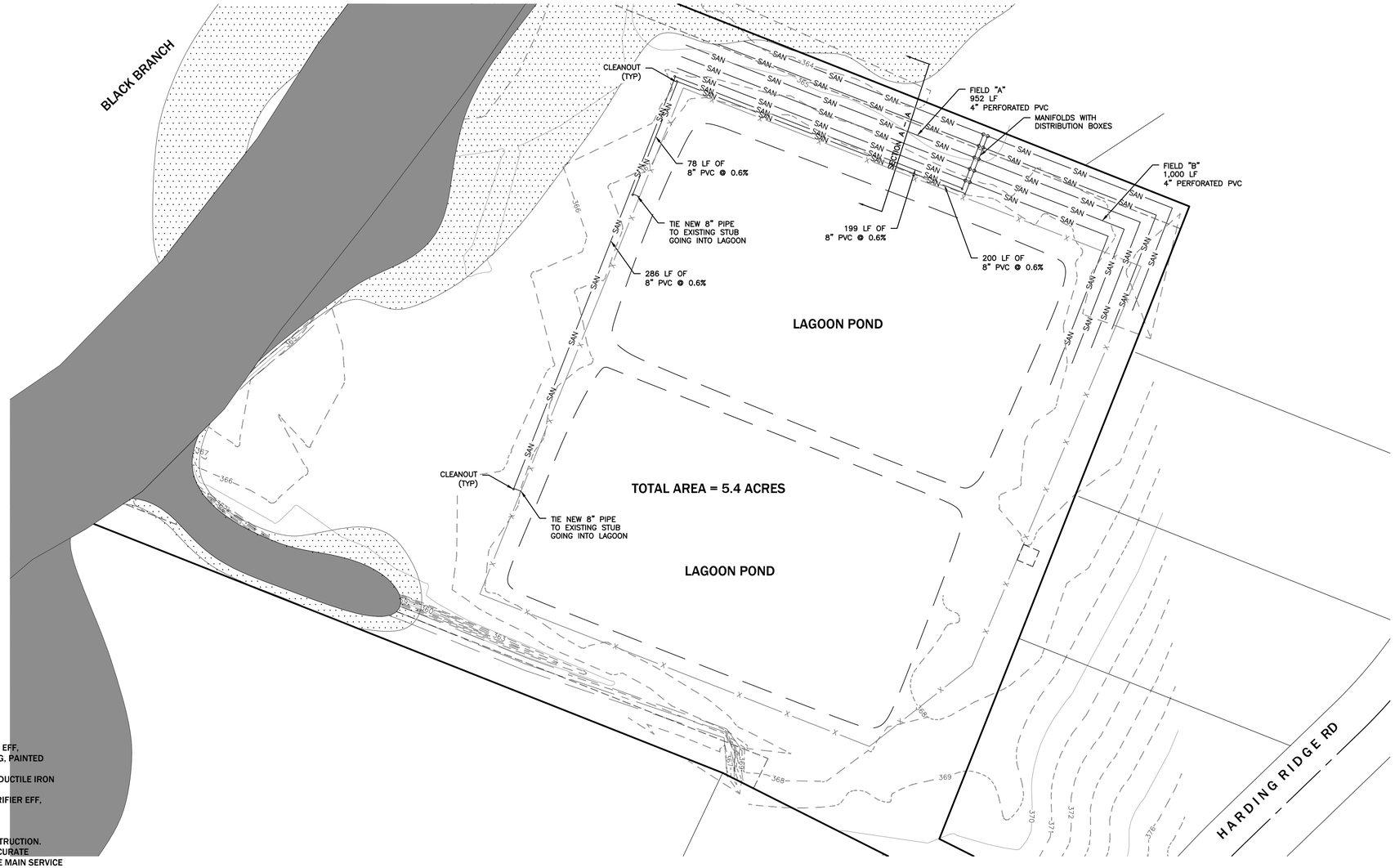
MARSHALL RIDGE WWTF IMPROVEMENTS
HARDING RIDGE ROAD
McCRACKEN COUNTY, KENTUCKY

ENGINEERING CERTIFICATE OF AUTHORITY NO. 4808
ENGINEERING LICENSE:
BENJAMIN J. KUENZEL, PE33718

SEAL DATE:	07/03/2024
DRAWN BY:	CV/CMC
PROJ NUMBER:	0542-18
DATE:	07/03/2024
DRAWING NO:	C03

BAR IS ONE INCH ON OFFICIAL DRAWINGS. 0 1" IF NOT ONE INCH, ADJUST SCALE ACCORDINGLY.





NOTES:

LIQUID PIPING MATERIALS:

- ABOVE GRADE: FOR RS, RAS, WAS, SCUM, MBBR EFF, CLARIFIER EFF, CCT/POST-AER EFF USE SCH.80 PVC WITH UV INHIBITOR COATING, PAINTED CARBON STEEL, 304SS, OR DUCTILE IRON PIPE.
- BELOW GRADE FORCE MAIN: FOR RS FM USE SDR-21 PVC WITH DUCTILE IRON FITTINGS, HDPE OR DUCTILE IRON PIPE.
- BELOW GRADE GRAVITY: FOR RAS, WAS, SCUM, MBBR EFF, CLARIFIER EFF, CCT/POST-AER EFF USE SDR-35 PVC OR HDPE.

SANITARY SEWER NOTES:

1. THE SEWER DESIGN DOES NOT ALLOW FOR BASEMENT CONSTRUCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING ACCURATE AS-BUILT RECORDS OF THE SEWER MAIN, LATERALS, & FORCE MAIN SERVICE LATERALS AND SHALL BE REFERENCED TO THE NEAREST DOWNSTREAM MANHOLE AND MEASURED ALONG THE CENTERLINE OF THE SEWER MAIN. THE LENGTH OF THE LATERAL SHALL BE MEASURED AT RIGHT ANGLES FROM THE CENTERLINE OF THE TEE TO THE END OF THE LATERAL. THE DEPTH OF THE LATERAL SHALL BE MEASURED FROM THE TOP OF THE GROUND TO THE TOP OF THE LATERAL. THE AS-BUILT PLANS SHALL BE SUBMITTED TO THE ENGINEER UPON COMPLETION OF CONSTRUCTION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES PRIOR TO THE START OF CONSTRUCTION FOR VERIFICATION AND LOCATION OF UTILITIES.

ANTICIPATED FLOW

41 SINGLE FAMILY RESIDENCES
x 3-1/3 AVERAGE NUMBER OF BEDROOMS PER DWELLING
136.5 BEDROOMS
x 120 GAL/BEDROOM/DAY
16,398 GALLONS OF TOTAL DAILY WASTE
x 5 SQ FT/GAL
81,990 SQ FT OF LAGOON WATER SURFACE AREA REQUIRED
82,000 SQ FT OF LAGOON WATER SURFACE AREA PROVIDED

LATERAL FIELD SIZING:

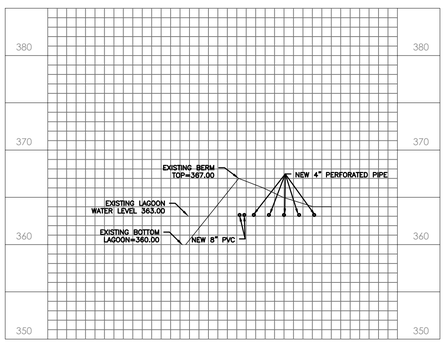
ANTICIPATED DAILY FLOW: 16,398 GAL

PER 902.010.085 SECTION 6(11) (d)
LATERAL LENGTH PER GALLON 0.10 LF/gal

TOTAL LENGTH REQUIRED: 16,398 GAL * 0.10 LF/gal = 1,640 LF

TOTAL LENGTH PROVIDED: 1,952 LF

SECTION A – A



NOTES:

1. *Please note that only preliminary assessments have occurred to date, improvement plans have not been finalized and final design cannot be completed prior to health department clarifications. These plans represent the initial improvements recommended.*

#	DATE	REVISION	BY
			X

21 DESIGN GROUP INC.
1351 Jefferson, Suite 301
Washington, MO 63090
mail@21designgroup.net
P: 314-402-0097

PRELIMINARY SITE/DRAINFIELD PLAN

MARSHALL RIDGE WWTF IMPROVEMENTS
HARDING RIDGE ROAD
McCRACKEN COUNTY, KENTUCKY

ENGINEERING CERTIFICATE OF AUTHORITY NO. 4808
ENGINEERING LICENSE:
BENJAMIN J. KUENZEL, PE33718

SEAL DATE:	07/03/2024
DRAWN BY:	CV/CMC
PROJ NUMBER:	0542-18
DATE:	07/03/2024
DRAWING NO:	C04

SECTION 02720 DIVISION 2 - SITE WORK

SANITARY SEWER

SCOPE:
The Contractor shall furnish all material, equipment, tools, and labor necessary to install gravity sewer systems as shown on Construction Drawings.

SUBMITTALS:
A. Submit six (6) copies of shop drawings, specifications, lists of material, and other data of all sanitary sewer materials needed to provide compliance with the specified requirements herein.

MATERIALS:

A. Defective Materials:
The Contractor shall be responsible for all material furnished by him, and shall replace at hist own expense all such material found defective in the manufacture or damaged in handling after delivery by the manufacturer. This shall include the furnishing of all material and labor as required for the replacement of material found defective prior to final acceptance of the work or prior to expiration of warranties.

B. Storage of Materials:
The Contractor shall be responsible for the safe storage of materials furnished by or to him and accepted by him and intended for the work until it has been incorporated in completed project. Material, all pipes, fittings, and other accessories shall be kept free from dirt and foreign matter at all times.

C. Pipe Materials:
Provide pipe and associated materials of the size indicated on the Construction Drawings and meeting the following requirements:

1) Plastic Pipe and Fittings:
A. General: Plastic gravity sewer pipe and fittings shall be type PSM Polyvinyl Chloride (PVC) sewer pipe conforming to 0g to the requirements of ASTM Specification D3034 or ASTM ES for PVC Eg pipe and fittings with a minimum standard dimension ratio (SDR) of **35.** The PVC compound used in the manufacture of pipe and fittings shall meet or exceed the requirements for classes 12454-8 or 12454-C as defined by ASTM D1784. An approved equal plastic pipe and joining system is the Ultra Rib PVC gravity sewer pipe conforming to ASTM Specifications D 3212 and F 412.

SECTION 02746 DIVISION 2 - SITE WORK

ABSORPTION LAGOON & LATERAL FIELD SYSTEM

SCOPE:
Provide all material, labor & equipment necessary to complete the Absorption Lagoon, Lateral Field System, piping, and valves as shown on the drawings.

SUBMITTALS:

Submit six (6) specifications of copies of shop drawings, list of materials, all piping and valving material needed to prove compliance with the requirements set forth herein.

ABSORPTION LAGOON:

Excavation of the absorption lagoon shall be done using a bulldozer or similar track type equipment to reduce compaction of the lagoon bottom. Lagoon bottoms shall be uniformly level and shall be constructed to provide a maximum wastewater depth below the overflow outlet of four and one-half (4-1/2) feet, and a minimum freeboard height of two (2) feet.

Containment berming, dikes, or dams may be of excavated materials, if sufficient clay content exists in the soil to prevent seepage between the berm and the original soil surface after compaction to 95% of standard proctor and are "keyed" into the original soil beneath for at least two (2) feet at the base. All fill material shall be free of debris and vegetation. Berms, dikes or dams shall be constructed on (three (3) feet vertical to one (1) foot horizontal) slope. The lagoon shall be enclosed within a six (6) foot high fence or its equivalent with a locked gate.

LATERAL FIELD SYSTEM:
A. System Layout:
1. All systems shall be installed in the flagged area set aside such purpose. Installation of the system in any other prohibited without the written consent of the local health department Certified Inspector.

2. Layout of the system on the site by the Certified Installer shall be accomplished by using suitable stakes or markers to locate excavation sites for system components, and shooting of surface grades **to** establish necessary excavation depths to assure proper elevation "fall" in the system. Lateral trenches shall be laid out to follow parallel **to** the surface contour lines of the site.

3. Maximum length for individual lateral trenches for gravity distribution systems shall be no more than two hundred (200) feet.

4. Lateral trenches for **gravity** distribution systems shall be spaced a minimum of eight (8) feet on centers. Lateral trench spacing shall be increased two (2) feet on centers on all sites with slopes greater than **15**% and less than 20%. On slopes greater than slopes greater than 20%, each 5% increase in slope, or fraction thereof, shall require an additional spacing of **two** (2) feet on centers for lateral trenches.

B. Excavation Requirements:
1. Only that heavy equipment necessary to the installation of an onsite sewage disposal system shall be permitted in the flagged aside for the system. Such equipment shall be operated a s to minimize **travel** over, and compaction of, the system area.
2. Excavation of the lateral field shall be restricted by the soil moisture conditions of that portion of the area at the intended depth of excavation for all soil texture classes listed in Soil Group IV. Such restriction shall apply for all system installations taking place during the months of November through May, or anytime immediately after heavy rainfall. Soil moisture conditions shall be determined by test excavation to the intended depth of the lateral trenches or beds. A small portion of soil excavated from that depth shall be rolled between thumb and fingers. If the soil can be rolled into a "wire" shaped form which does not easily crumble, the soil is too wet to work and will compact and seal absorption surfaces. If a "wire" form cannot be rolled and the soil crumbles, excavation can proceed.
3. Excavations for lateral trenches shall be made specified by the Certified Inspector based on site evaluation results. Maximum trench or bed depth (from grade) for a conventional onsite sewage disposal system shall be considered as being twenty four (24) inches. Minimum trench width for gravelless pipe shall be eighteen (18) inches to a maximum of twenty four (24) inches. Minimum or maximum trench width shall be as per manufacturer's specifications for leaching chambers. Trench grade for gravelless pipe shall be level.

C. Distribution Boxes:

Distribution boxes shall be installed level, and all piping connections shall be watertight. Such components showing structural damage on delivery, or damaged in placement shall be replaced with undamaged component.

1. Outlet leader piping shall be extended past the inside sidewall of the box at least three-fourths (**3/4**) of an inch but no greater than one (**1**) inch to allow for the attachment of plastic caps or plugs by solvent welding or cementing. Once attached, the water level is raised to the desired point on the caps **or** plugs, the level is marked on **all** caps or plugs, and a knife is used to cut out the upper portion of the cap or plug to or plug to the level marked.
2. Additional water is carefully added while closely observing the water as **it** enters the outlets. If the outlets are properly leveled, all outlet lines will begin to receive water at the same level and time. If one or more lines are receiving water while others remain dry, adjustments to those higher outlets will be necessary. Fine adjustment is then made by shaving down the cutouts on the caps or plugs until leveling is achieved.
3. Special leveling devices in the form of caps or inserts designed for this purpose shall be used where available.

D. Non-perforated Plastic Pipe:

Non-perforated plastic pipe shall be used as leader piping to connect outlets in the distribution box(es) to the perforated lateral lines in gravity distribution systems, and shall extend two (2) feet into all trenches or beds before connection to perforated lateral lines.

All leader piping connected to equal flow boxes shall be installed at no greater than one-eighth (1/8) inch per foot slope for the first five (5) feet of run from the box which will restrict the flow velocity of effluent.

A. Lateral Lines:
Lateral lines for conventional gravity distribution trenches or beds shall be laid as follows:

1. A six (6) inch deep layer of approved trench rock or other fill material must be placed in the trench or bed carefully to prevent the sealing of the absorption qualities of the soil from fill impact, and then leveled;
2. Lateral piping is placed and leveled on the trench fill materials in the center of the trench (or properly spaced in beds), and retained in place to prevent movement, while additional trench fill material is then added to a level of two (2) inches above the top of the top of the lateral piping, for a total of twelve (12) inches of trench fill material;
3. Other methods of **lateral** piping and trench rock placement may be approved by the Water Cabinet upon demonstration of equivalency compliance.
4. A two (2) to four (4) inch layer of approved barrier material, straw or a single layer of synthetic filter fabric, is then placed over the trench **fill** material **to** prevent entry of backfill soil fines.
5. Pipe material for lagoon and drain field shall comply with Section 02720 - Pipe Material, Sub-Section 1. a. unless otherwise noted in the construction drawings.

EFFLUENT PIPING:
Installation of effluent piping to an absorption lagoon and overflow piping to the lateral field system shall be as follows:

A. Gravity Inflow Piping:
Non-perforated gravity flow piping shall be laid in an excavated trench into the lagoon and anchored to a poured concrete, three (3) foot square, four (4) inch thick apron. The inlet tee shall be installed horizontal and anchored to the concrete pad.

1. A post indicator valve shall be installed on each 8" diameter PVC effluent line into the lagoon. The valves shall be installed per manufactures instructions and in accordance with the construction drawings. Post indicator valve shall be Mueller or approved equal.

B. Overflow Piping:
Overflow piping consists of a supported, vertically tee oriented connected to a non-perforated gravity flow plastic pipe which conducts overflow to the distribution box(es) of the lateral field. The overflow should be located at a point within the lagoon that is furthest distance from the inlet apron. The upper leg of the tee shall be covered with galvanized one-fourth (1/4) inch square screen wire and the lower leg extended downward to within three and one-half (3-1/2) feet of the lagoon bottom.

1. All submerged piping into and out of a lagoon shall be provided with suitable water stops or leak collars with a minimum extension of twelve (12) inches on all sides of the pipe.

BACKFILLING AND FINISH GRADES:
A. General:
When manufacturer's installation instructions require specific backfilling procedures to protect component warranties, prevent damage, or prevention floatation of the component due to ground water pressure, those procedures shall be followed. Soil for backfilling gravelless pipe trenches shall be loose and friable. Soil aggregates (clods or clumps) shall be no larger than one-half (1/2) inch in any dimension for backfill in contact with the pipe and filter wrap to assure proper operation. Use of large clods or clumps of soil backfill is prohibited. If soil excavated from trenches will not meet criteria, suitable backfill soil shall be obtained elsewhere.

B. Lateral Trenches:
Backfilling of lateral trenches or drainage trenches shall be accomplished with minimal compaction of soil fill, and soil fill material shall be left mounded four (4) to six (6) inches above grade trenches to allow for settling. Backfilling over lateral beds shall be accomplished through the use of lightweight wheeled or crawler type tractors to minimize compaction, and shall be left mounded four (4) to six (6) inches above grade to allow for settling.

1. Backfilling shall not be done until after the system has been inspected and approved to that point of construction by a Certified Inspector.

C. Finish Grading:
Finish grading over the onsite sewage system shall be performed in such a manner as to minimize compaction through the use of lightweight equipment. Such grading shall be restricted to work necessary to provide positive surface drainage away from the system, especially the lateral field. Final grading over staked or flagged system components shall be accomplished manually, or with lightweight equipment using extreme care to prevent damage to or misalignment of components.

1. Finish grading work which removes soil from the system area, **or** which results in that area being used to dispose of excess soil graded from other areas on the site, shall be prohibited.

2. Finish grading on other areas of the site shall be done in such a manner as to divert surface water runoff from driveways, patios, downspouts, slopes, ditches, gullies, etc., away from the area where the system is installed. When site conditions are such that normal grading procedures cannot divert all such runoff, diversion ditches, swales, berms, or other such diversion drainage means shall be constructed to divert runoff away from system.

3. Seeding and maintenance of lagoon slopes and drain field shall be in accordance with Section 02936 Seeding of these Specifications.

SYSTEM SETBACK REQUIREMENTS:
Minimum setback distances shall be required for installation of onsite sewage disposal systems from structures, water supplies, roads, streams, bodies of water, and other structural or topographic features, as listed below:

Lagoon and lateral trenches shall be installed a minimum distance from the following structures or topographic features as measured from the structure to the sidewall of the lagoon or lateral trench.

Property lines - 50 feet

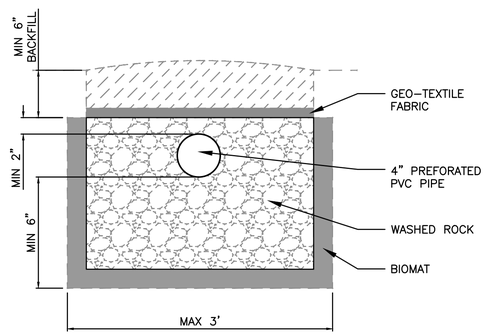
Building Foundations - 10 feet

Streams - 25 feet

Drainage Ditches - 25 feet

Buried Water Lines or Utility Lines - 10 feet

Utility Easements - 10 feet



PERFORATED PIPE DETAIL

NOTES:
1. *Please note that only preliminary assessments have occurred to date, improvement plans have not been finalized and final design cannot be completed prior to health department clarifications. These plans represent the initial improvements recommended.*

#	DATE	REVISION	BY
			X

21 DESIGN GROUP INC.
1351 Jefferson, Suite 301
Washington, MO 63090
mail@21designgroup.net
P: 636-432-2097

PRELIMINARY DETAIL SHEET

MARSHALL RIDGE WWTF IMPROVEMENTS
HARDING RIDGE ROAD
McCRACKEN COUNTY, KENTUCKY

ENGINEERING CERTIFICATE OF AUTHORITY NO. 4808
ENGINEERING LICENSE:
BENJAMIN J. KUENZEL, PE33718

SEAL DATE:	07/03/2024
DRAWN BY:	CV/CMC
PROJ NUMBER:	0542-18
DATE:	07/03/2024
DRAWING NO:	C05