STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION

GENERAL PERMIT for SEWER EXTENSION CONSTRUCTION

The Missouri Department of Natural Resources hereby issues a permit to:

Construction Permit ID:	MOGC00533
Title of Project:	Green Ridge Estates
Owner:	Bussell Building
Address:	5616 S Farm Rd 131 Brookline, MO 65619

The project will also include general site work appropriate to the scope and purpose of the project and will include all the necessary appurtenances to make a complete and usable collection system. The construction of this project will be in the vicinity of the county below and discharge to Receiving Permit ID below:

County: Greene Receiving Permit ID: MO0049522

for the construction of (described construction project):

Green Ridge Estates, Phase 1-Construction of approximately 6,100 lf of 8-inch PVC SDR-35 and 41 lf of 8-inch PVC SDR-21 gravity sewer lines with approximately 27 manholes to serve a 264 PE and a design average flow of 24,295 gpd.

Project is in the vicinity of the State Highway FF and Azalea Terrace intersection in Battlefield, Greene County and discharges to an existing system to be treated at Springfield Southwest WWTF, MO-0049522. Ronald D. Petering, Assistant Director - Environmental Services, with the City of Springfield provided an acceptance letter dated June 25, 2019. The City of Battlefield will serve as the Continuing Authority of the collection system. Frank Schoneboon, City Administrator, with the City of Battlefield provided an acceptance letter dated January 22, 2019.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (Department) As the Department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.
This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

June 28, 2019
Issue Date

Edward B. Galbraith, Director
Division of Environmental Quality

April 19, 2020
Expiration Date

Chris Wieberg, Director
Water Protection Program

APPLICABILITY

1. This permit authorizes the construction of gravity sewer extensions, force mains, and lift stations. Storage basins, considered part of the collection system, are also included. Earthen basins are not included under this General Sewer Extension Construction permit.

2. A Sewer Extension Construction Permit may be required by the department due to compliance and enforcement actions.

3. This permit does not apply to:
   A. Earthen storage basins;
   B. Projects located within an Approved Sewer Program. These include the City of Blue Springs, City of Columbia, City of Kansas City, City of Jefferson City, City of Joplin, City of Lebanon, City of Springfield, City of St. Peters, Duckett Creek Sewer District, and Metropolitan St. Louis Sewer District;
   C. Projects funded by the Department of Natural Resources;
   D. Projects that substantially deviate from the Design Guides in 10 CSR 20-8; and
   E. Exempt projects unless requested by the applicant or required by enforcement.

PREREQUISITES:

1. The General Sewer Extension Construction Permit application, appropriate fee, and a schedule for construction with the date on which construction will begin and anticipated completion date.

2. The engineering report, as required, plans and specifications each signed and sealed by a professional engineer registered in the State of Missouri. A Summary of Design is an acceptable substitute for the engineering report required by this permit prerequisite.

3. The Design Certification form signed and sealed by a professional engineer registered in the State of Missouri certifying the design of the system was done in accordance with 10 CSR 20-6 and 10 CSR 20-8.

4. A statement from the continuing authority was received accepting the wastewater for treatment.

5. A statement from the continuing authority was received accepting the responsibility for operation, maintenance, and modernization of these facilities

PERMIT CONDITIONS:

1. Contact the department's appropriate regional office 48 hours prior to starting construction. Contact information can be found at http://dnr.mo.gov/regions/regions.htm.

2. This permit authorizes the activities and scope of work detailed in the plans and specifications submitted with the request.

3. The construction must be in accordance with the design certification stating the plans and specifications comply with 10 CSR 20-6 and 10 CSR 20-8.

PERMIT CONDITIONS: (continued)

4. State and Federal Law does not permit bypassing of raw wastewater, therefore steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the department's regional office per 10 CSR 20-7.015(9)(E)2.

5. Protection of drinking water supplies shall be in accordance with 10 CSR 20-8.120(10). "There shall be no physical connections between a public or private potable water supply system and a sewer, or appurtenance thereto which would permit the passage of any wastewater or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole."

   A. Sewers in relation to water works structures shall meet the requirements of 10 CSR 23-3.010 with respect to minimum distances from public water supply wells or other water supply sources and structures.

   B. Sewer mains shall be laid at least ten feet (10') horizontally from any existing or proposed water main. The distances shall be measured edge-to-edge. In cases where it is not practical to maintain a ten foot (10') separation, the department may allow a deviation on a case-by-case basis, if supported by data from the design engineer. Such a deviation may allow installation of the sewer closer to a water main, provided that the water main is in a separate trench or on an undisturbed earth shelf located on either side of the sewer and at an elevation so the bottom of the water main is at least 18 inches above the top of the sewer. If it is impossible to obtain proper horizontal and vertical separation as described above for sewers, the sewer must be constructed of slip-on or mechanical joint pipe or continuously encased and be pressure tested to 150 pounds per square inch to assure water tightness.

   C. Manholes shall be located with the top access at or above grade level.

   D. Manholes should be located at least ten feet (10') horizontally from any existing or proposed water main.

   E. Sewers crossing water mains shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to maintain line and grade. When it is impossible to obtain proper vertical separation as stipulated above, one of the following methods must be specified:

      1) The sewer shall be designed and constructed equal to the water pipe and shall be pressure tested to assure water tightness prior to backfilling; or
      2) Either the water main or sewer line may be continuously encased or enclosed in a watertight carrier pipe which extends ten feet (10') on both sides of the crossing, measured perpendicular to the water main. The carrier pipe shall be of materials approved by the department for use in water main construction.

PERMIT CONDITIONS: (continued)

6. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of one acre or more to obtain a Missouri State Operating Permit to discharge stormwater. The permit requires Best Management Practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the department's ePermitting system available online at www.dnr.mo.gov/env/wpp/epermit/help.htm.

   See www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm for more information.

7. A United States (U.S.) Army Corps of Engineers (COE) permit (404) and a Water Quality Certification (401) issued by the department or permit waiver may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of Jurisdictional Waters of the U.S. then a 404/401 will be required. Since the COE makes determinations on what is jurisdictional, you must contact the COE to determine permitting requirements. You may call the department's Water Protection Program at (573) 751-1300 for more information.

   See www.dnr.mo.gov/env/wpp/401/ for more information.

8. If this project eliminates a wastewater treatment facility, then a full closure plan shall be submitted to the department's appropriate regional office for review and approval of any permitted wastewater treatment system being replaced. In accordance with 10 CSR 20-6.010(12), the closure plan must meet the requirements outlined in Standard Conditions Part III, Section I, of the Missouri State Operating Permit. Closure shall not commence until the submitted closure plan is approved by the department. Form J – Request for Termination of a State Operating Permit, shall be submitted to the department's appropriate Regional Office for termination of any existing Missouri State Operating Permit, once closure is completed in accordance with the approved closure plan.

9. Submit a Statement of Work Completed Form to the department following completion of construction. Submit an electronic copy of the as built plans if the project was not constructed in accordance with previously submitted plans and specifications.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

APPLICATION FOR CONSTRUCTION PERMIT – SEWER EXTENSION

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
FEE RECEIVED	CHECK NO.
DATE RECEIVED	

NOTE ► PLEASE READ THE ACCOMPANYING INSTRUCTIONS BEFORE COMPLETING THIS FORM

1.0 APPLICATION INFORMATION (Note – If any of the questions in this section are answered NO, this application may be considered incomplete and returned.)

1.1 Is this a Federal/State funded project? ☐ YES ☑ N/A Funding Agency: _____ Project #: _____

1.2 Has the Department of Natural Resources approved the proposed project's engineering report* or a Sewer Extension Design Checklist* included?
☑ Sewer Extension Design Checklist. (N/A to department funded projects.) ☐ Engineering Report Date of Approval: _____

1.3 Is a copy of the appropriate plans* and specifications* included with this application?
☑ YES Denote which form is submitted: ☑ Hard copy (1 minimum) and ☑ Electronic copy (See instructions.) ☐ NO

1.4 Is a summary of design* included with this application? ☑ YES ☐ NO

1.5 Is the appropriate fee ($300) included with this application? ☑ YES ☐ NO

* Must be affixed with a Missouri registered professional engineer's seal, signature and date.

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT
Green Ridge Estates Subdivision

PHYSICAL ADDRESS	CITY	STATE	ZIP CODE	COUNTY
south of Azalea Terrace, east of Hwy FF	Battlefield	MO	65619	Greene

2.2 Legal Description: ¼, ¼, NW ¼, Sec. 29 , T 28-N , R 22-W

2.3 UTM Coordinates Easting (X): 470350.22 Northing (Y): 4108693.34
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

2.4 Project Components (check all that apply):
☑ Gravity sewers ☐ Pumping stations ☐ Force mains ☐ Alternative sewer system ☐ Other (Describe below.)

2.5 PROJECT DESCRIPTION
Construct a new subdivision of approximately 80 acres with electric, water, gas, and sanitary sewer utility services provided, located in Battlefield, MO, east of Highway FF between Azalea Terrace to the north and W. Farm Road 190 to the south. Fully develop Phase 1 of subdivision comprised of 92 units on approximately 40 acres.

2.6 DESIGN INFORMATION
A. Population or number of lots to be served by this extension: 92 lots

B. Estimated flow to be contributed by this extension: Design Average Flow: 24295 gpd Design Peak Hourly Flow: 4171 gph

C. Industrial Wastes: Type: Flow: gpd

D. Receiving Sewer: Size: 8 inches Capacity: 453 gpm

3.0 PROJECT OWNER

NAME	TELEPHONE NUMBER WITH AREA CODE	EMAIL ADDRESS	
Kenny Bussell, Bussell Building	(417) 889-2067	kenny@bussellbuilding.com	
ADDRESS	CITY	STATE	ZIP CODE
5616 S. Farm Road 131	Brookline	MO	65619

4.0 CONTINUING AUTHORITY: Permanent organization that will serve as the continuing authority for the operation, maintenance and modernization of the wastewater collection system.

NAME	TELEPHONE NUMBER WITH AREA CODE	EMAIL ADDRESS	
Frank Schoneboom, City Administrator	(417) 883-5840	cityadmin@battlefieldmo.gov	
ADDRESS	CITY	STATE	ZIP CODE
5434 South Tower Drive	Battlefield	MO	65619

4.1 A letter from the continuing authority or the Continuing Authority and Receiving Wastewater Treatment Facility Acceptance form, if different than the owner, is included with this application. ☑ YES ☐ NO ☐ N/A

5.0 ENGINEER

ENGINEER NAME / COMPANY NAME	TELEPHONE NUMBER WITH AREA CODE	EMAIL ADDRESS	
Mike Beaty / Great River Engineering	(417) 886-7171	mbeaty@greatriv.com	
ADDRESS	CITY	STATE	ZIP CODE
2826 S. Ingram Mill Road	Springfield	MO	65804

6.0 RECEIVING WASTEWATER TREATMENT FACILITY

NAME	TELEPHONE NUMBER WITH AREA CODE	EMAIL ADDRESS
Springfield Southwest Wastewater Treatment Plant	(417) 891-1600	
MISSOURI STATE OPERATING PERMIT #	**DESIGN AVERAGE FLOW (GPD)**	**REMAINING CAPACITY (GPD)**
MO-0049522	64 MGD	30.6 MGD

6.1 Has the receiving treatment facility agreed to accept the additional wastewater flow? ☑ YES ☐ NO

6.2 A letter from the receiving wastewater treatment facility or the Continuing Authority and Receiving Wastewater Treatment Facility Acceptance form, if different than the continuing authority, is included with this application. ☐ YES ☑ NO ☐ N/A

7.0 PROJECT OWNER: I hereby certify that I am familiar with the information contained in this application and to the best of my knowledge and belief such information is true, complete, and accurate, and if granted this permit, I agree to abide by the Missouri Clean Water Law and all rules, regulations, orders, and decisions, subject to any legitimate appeal available to applicant under Missouri Clean Water Law.

PROJECT OWNER SIGNATURE		
PRINTED NAME		DATE
Kenny Bussell		6/19/19
TITLE OR COPORATE POSITION	**TELEPHONE NUMBER WITH AREA CODE**	**EMAIL ADDRESS**
Owner	(417) 889-2067	kenny@bussellbuilding.com

Mail completed copy to:

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
P.O. BOX 176
JEFFERSON CITY, MO 65102-0176

INSTRUCTIONS FOR COMPLETING
APPLICATION FOR CONSTRUCTION PERMIT – SEWER EXTENSION

All blanks must be filled in when the application is submitted to the Missouri Department of Natural Resources. This includes the **required signature**.

In accordance with Missouri State law RSMo 644.051.3.(2), sewer extension projects installing up to a total of 1,000 linear feet of gravity sewer or force main and/or less than two pump stations are exempt from obtaining a construction permit. Since these projects are exempt, a construction permit will not be issued for this activity and completion of this form is not required.

Note: Use the form Application for Construction Permit – Wastewater Treatment Facility, MO 780-2189, if **any** wastewater treatment component(s) are to be constructed. This form is available at dnr.mo.gov/forms/780-2189-f.pdf.

A land disturbance permit is required if construction will result in the disturbance of one or more acres of land. A land disturbance permit is available through the department's ePermitting system at dnr.mo.gov/env/wpp/epermit/help.htm. A permit fee in accordance with 10 CSR 20-6.011(2)(F)1. is required.

After receiving a complete application, the Department enters the application information into the Missouri Clean Water Information System. You may search for the status of a construction permit online at dnr.mo.gov/mocwis_public/applicationInprocessSearch.do.

1.1 Check appropriate box. If the project is funded with federal or state monies, supply the funding agency name and project number.

1.2 Check appropriate box and provide the date of department approval.
Per 10 CSR 20-8.110(3)(C), engineering reports must be approved by the department prior to the submittal of plans and specifications and a construction permit application. "Engineering reports must be completed for projects involving gravity sewers, pressure sewer systems, wastewater pumping stations, and force mains" in accordance with 10 CSR 20-8.110(4)(A)4. A completed Sewer Extension Design Checklist may be substituted for an engineering report for projects not funded through the department. The form is included following these instructions.
Engineering reports do not have to be submitted for projects limited to only 8-inch gravity sewer extensions, unless required by the department. See 10 CSR 20-8.110(4)(A)4.A.
The department has developed a fact sheet to aid in the development of an approvable engineering report. This document is available online at dnr.mo.gov/pubs/pub2415.htm.

1.3 Check appropriate box. Provide a hard copy of the appropriate plans and specifications for department review when applying for a construction permit per 10 CSR 20-8.110(3)(C). A Missouri registered professional engineering seal, signature and date is required on each sheet of the plans and the cover of the technical specifications.

The department will accept plans and specifications in electronic form on a CD in Adobe® PDF searchable format. If the plans are scanned, set the resolution to a minimum of 200 dpi at 17 by 22 inches.

Note: Additional sets of plans and specifications may be required by the department for final approval and issuance of the construction permit. See 10 CSR 20-8.110(6)(A)1.

1.4 Check appropriate box. A summary of design shall accompany the plans and specifications when applying for a construction permit per 10 CSR 20-8.110(5). The department has developed a fact sheet to aid in the development of an acceptable summary of design. This document is available online at dnr.mo.gov/pubs/pub2417.htm.

1.5 Check the appropriate box. Include fee with application.
$300 per 10 CSR 20-6.011(2)(K)3, for a sewer extension 1,000 feet or more and/or two or more pump stations.
Note: Incomplete permit applications or related engineering documents will be returned by the department if they are not completed in the time frame established by the department in a comment letter to the project owner. Permit fees for returned applications shall be forfeited. See 10 CSR 20-6.010(4)(E). Permit fees for applications being processed by the department that are withdrawn by the applicant shall be forfeited. See 10 CSR 20-6.011(5)(B).

2.1 Provide the project name and physical location by street name or address.

2.2 Provide the project legal description. The department's mapping system is available online at dnr.mo.gov/internetmapviewer.

2.3 A Global Positioning System, or GPS, is a satellite-based navigation system. The department prefers that a GPS receiver is used and the displayed coordinates submitted. If access to a GPS receiver is not available, use a mapping system to approximate the coordinates.

2.4 Check all of the applicable boxes.
The Department considers anything other than a gravity sewer system to be an alternative sewer system. Examples of these systems are grinder pump pressure sewers, septic tank effluent pump, or STEP, sewers, septic tank effluent gravity, or STEG, sewers or small diameter gravity sewers.

2.5 Briefly describe the project by providing the applicable following information:
A. Total number of manholes.
B. Size of sewers and the total linear feet of each size.
C. Number of lift stations and design average flow and peak hourly flow capacities of each lift station.
D. Size and length of force mains.
E. Alternative sewer size and length, plus the number of components (e.g. septic tanks, grinder pumps, etc.)

2.6 Provide the project design information and when required in the units specified.
A. Provide the population or number of lots to be served by the proposed sewer extension.
B. Provide the estimated design flow information in accordance with 10 CSR 20-8.110(4)(C)4.A.
Design average flow – The design average flow is the average of the daily volumes to be received for a continuous 12 month period expressed as a volume per unit time. However, the design average flow for facilities having critical seasonal high hydraulic loading periods (e.g., recreational areas, campuses and industrial facilities) shall be based on the daily average flow during the seasonal period.
Design peak hourly flow – The design peak hourly flow is the largest volume of flow to be received during a one hour period expressed as a volume per unit time.
C. Provide the type and flow in gallons per day of industrial wastes received by the propose sewer extension.
D. Provide the receiving sewer size in inches and capacity in gallons per minute.

3.0 Complete the project owner information. Include the legal name and address.

4.0 Complete the continuing authority contact information. If same as the Project Owner, write "Same as above". Include the permanent organization that will serve as the continuing authority for the operation, maintenance and modernization of the wastewater collection system. See 10 CSR 20-6.010(3) for the regulatory requirement regarding continuing authority.

4.1 Check appropriate box. Include a letter signed by the continuing authority (if not same as the project owner) stating they will "accept, operate and maintain" the sewer extension. The continuing authority may also complete the Continuing Authority and Receiving Wastewater Treatment Facility Acceptance form in lieu of a letter.
If the continuing authority will not accept and agree to operate and maintain the sewer extension, this application will be considered incomplete.

5.0 Complete the engineer contact information.

6.0 Complete the receiving wastewater treatment facility information. Include the Missouri State Operating Permit number, the design average flow and the available remaining capacity in gallons per day, or gpd.

6.1 Check appropriate box. The receiving wastewater treatment facility must be notified and agree to the proposed sewer extension and additional flow, prior to submitting a construction permit to the department.
If the receiving wastewater treatment facility will not accept the wastewater, this application will be considered incomplete.

6.2 Check appropriate box. Include a letter from the receiving wastewater treatment facility (if not same as the continuing authority) acknowledging and accepting the additional flow from the proposed sewer extension.

7.0 All applications must be signed as follows in accordance with 10 CSR 20-6.010(2)(B) and the signatures must be **original**:
A. For a corporation, by an officer having responsibility for the overall operation of the regulated facility or activity or for environmental matters.
B. For a partnership or sole proprietorship, by a general partner or the proprietor.
C. For a municipal, state, federal or other public facility, by either a principal executive officer or by an individual having overall responsibility for environmental matters at the facility.

Mail the completed form and applicable fee to the department.

If there are any questions concerning this form, please contact the Department of Natural Resources, Water Protection Program at 800-361-4827 or 573-751-1300 or visit dnr.mo.gov/env/wpp/permits/ww-construction-permitting.htm.

SEWER EXTENSION DESIGN CERTIFICATION

Answer all questions yes, no, or N/A. Answer N/A only if the question is clearly not applicable to the design of the proposed sewer extension **OR** if a deviation was previously allowed by the department in the approval of Standard Specifications or Standard Detail Sheets.

7.0 SEWER EXTENSION CHECKLIST – Part 1					
	REGULATION		YES	NO	N/A
1.	8.110(6)(C) 8.020(4)	Is there a detailed plan showing tributary area, boundaries, pertinent elevations, topography, existing and proposed facilities?	✓		
2.	8.120(3)	Does the sewer receive only sewage and not combined sewage?	✓		
3.	8.120(4)(B) 8.020(9)(B)	Is the design flow based on 100 gpcd with a peaking factor of 4? Is the design flow based on the design peak hourly flow in accordance with 8.110(4)(C)4?	✓		
4.	8.120(5)(G) 8.020(9)(A)	Does the sewer pipe comply with ASTM standards for sewer pipe?	✓		
5.	8.120(5)(I)4 8.020(9)(A)	Are the joints sealed to prevent infiltration > 100 gal/inch of pipe dia/mile/day for receiving WWTF with a design flow > 22,500 gpd, and >200 gal/inch of pipe dia/mile/day for receiving WWTF with a design flow ≤ 22,500 gpd?	✓		
6.	8.120(5)(D)4 8.120(6)(A) 8.020(9)(C)	Are manholes located at all changes in grade, size or alignment, at all intersections, and at distances of not greater than 400 feet for sewers 15 inches and less, or 500 feet for sewers 18 – 30 inches?	✓		
7.	8.120(5)(A) 8.020(9)(B)	Is the gravity sewer no less than 8" in diameter?	✓		
8.	8.020(9)(B)	Are sewers for **schools, resorts and similar establishments, and subdivisions located in rural areas**, is the sewer pipe at least 6 inches in diameter, laid at a slope of 0.60 feet/100 feet with appropriate bedding specifications and at least 30" of cover?	✓		
9.	8.120(5) 8.020(9)(B)2	Is all sewer pipe constructed with a slope to obtain mean velocities of not less than 2 feet per second?	✓		
10.	8.120(5)(B) 8.020(9)(B)1	Is the pipe covered with at least 36" of soil if receiving WWTF has a design flow of >22,500 gpd or 30" for a design flow of ≤ 22,500 gpd?	✓		
11.	8.120(5)(D)6	If the sewer is on a 20% or greater slope, is it anchored securely and in accordance with requirements?	✓		
12.	8.120(5)(G)3 8.020(9)(A)2	Is the pipe material adapted to local conditions, and designed to prevent damage from superimposed loads?	✓		
13.	8.120(5)(H)	Is the pipe installation, embedment, and backfill designed to prevent damage to the pipe and its joints?	✓		
14.	8.120(5)(H)5	Is flexible pipe designed to pass a deflection test run 30 days after backfill using a minimum mandrel or ball size of 95% of pipe ID?	✓		
15.	8.120(5)(H)	Are methods employed to provide adequate control of siltation and erosion during construction?	✓		
16.	8.120(6)(C) 8.020(9)(C)	Are manholes at least 48 inches in diameter with a clear opening of 22 inches?	✓		
17.	8.120(6)(A)4 8.020(9)(C)	Where cleanouts are used at the end of a lateral instead of a manhole, they are a minimum diameter of 8 inches, and the lateral length is not greater than 150 feet?	✓		
18.	8.120(6)(D) 8.020(9)(C)	Are the manholes designed and/or specified to have flow channels in the bottom that conforms in shape and slope of the sewer?	✓		
19.	8.120(6)(F) 8.020(9)(C)	Are the manholes precast or poured in place concrete with watertight connections and conform to the "Frame and Cover" requirements?	✓		
20.	8.120(6)(G)	Do the specifications include a requirement for inspection and testing for manholes?	✓		
21.	8.120(6)(E)1	Are sewers 24 inches or less laid straight between manholes?	✓		
22.	8.120(6)(F)1	When a smaller sewer joins a larger one, is the 0.8 depth point of both sewers at the same elevation in the manhole?	✓		
23.	8.120(7)	Do the inverted siphons have two barrels with at least a pipe size of 6 inches?	✓		
24.	8.120(8) 8.020(9)(A)5	Is the top of all sewers entering or crossing streams at least 3 feet below the natural stream bottom, perpendicular to the stream, and constructed of cast- or ductile-iron pipe?	✓		
25.	8.120 (9) 8.020(9)(A)5	Are all aerial crossings ductile iron pipe with mechanical joints, supported at all pipe joints and designed to withstand freezing and a 50-year flood?	✓		
26.	8.120(10)(C) 8.020(9)(A)	Are sewers and manholes located at least 10 feet horizontally and 18 inches vertically from any existing or proposed water line?	✓		

27.	8.120(10) 8.020(9)(A)4	Is the sewer free from physical connections to a potable water supply system and no water pipes come in contact with a sewer manhole?	✓		
28.	8.020(9)(B)	If your system is for a subdivision in a metropolitan area, or in a rural area adjacent to a regional system where incorporation into a region is feasible, is the sewer pipe at least 8 inches in diameter, laid at a slope of 0.40 feet/100 feet with appropriate bedding specifications and at least 30" of cover?	✓		
Part 1		**I answered YES to questions 1 – 28. ☑ YES**			

8.0 PUMP STATION CHECKLIST – Part 2

	REGULATION		YES	NO	N/A
29.	8.130(3)(A) 8.020(10)(A)	Is the pump station designed to withstand the 100-year flood, and to remain fully operational and accessible during the 25-year flood?			✓
30.	8.130(3)(B) 8.020(10)(A)	Is the dry well completely separate from the wet well and is a suitable and safe means of access provided to each?			✓
31.	8.130(4)(C) 8.020(10)(A)	If the design flow is 1 mgd or less, are there at least 2 pumps or pneumatic ejectors of the same capacity, each capable of handling flows in excess of the expected maximum flow?			✓
32.	8.130(4)(C)	If the design flow is greater than 1 mgd, are there at least 3 pumps capable of handling maximum sewage flow when 1 unit is out-of-service?			✓
33.	8.130(4)(C) 8.020(10)(B)	Are the pumps capable of passing spheres of at least 3 inches in diameter, and connected with at least 4 inch piping?			✓
34.	8.130(4)(C)	Are the pumps able to operate at varying delivery rates to permit discharging sewage at its rate of delivery?			✓
35.	8.130(4)(E) 8.020(10)(B)	Are there suitable shutoff and check valves on the discharge line of each pump and shutoff valves on suction line of each wet/dry well pump?			✓
36.	8.130(4)(E) 8.020(10)(B)	Are check valves between the pump and the shutoff valve, on horizontal portion of the discharge pipe, and outside wet well?			✓
37.	8.130(4)(F) 8.020(10)(B)	Is the wet well floor sloped a minimum of 1:1 to the bottom?			✓
38.	8.130(4)(G) 8.020(10)(B)	Is there separate mechanical ventilation for wet and dry well pump pits below the ground surface?			✓
39.	8.130(4)(H)	Flow Measurement? **If yes**, how and where is it measured.			✓
40.	8.130(4)(I)	Does all potable water at station comply with 8.140 (8) B?			✓
41.	8.130(7) 8.020(10)(B)	Is there an alarm for power failure, pump failure, lag pump, high level, and unauthorized entry?			✓
42.	8.130(8) 8.020(10)	Overflow prevented or minimized? **If yes**, indicate method used.			✓
43.	8.020(10)(B)	Is there 24 hour retention of peak flows?			✓
44.	8.130(11)(A) 8.020(9)(D)	Is the force main velocity of ≥ 2 ft/s maintained?			✓
45.	8.130(11)(B) 8.020(9)(D)	Are air relief valves located at high points in the force main to prevent air locking?			✓
46.	8.130(11)(C) 8.020(9)(D)	Is the force main connection to the manhole less than 2 feet above invert?			✓
47.	8.130(11)(D) 8.020(9)(D)	Are the force main and fittings designed to withstand normal pressure and surges?			✓
48.	8.130(11)(E)	Are all aerial crossings supported at all pipe joints and designed to withstand freezing and a 50-year flood?			✓
49.	8.130(11)(E)	Are all force mains entering or crossing streams constructed of cast- or ductile-iron pipe, cross perpendicular and ≥ 3 feet below the natural stream bottom?			✓
50.	8.130(11)(F)	Is friction loss calculated in the force main design based on the Hazen and Williams formula?			✓
51.	8.130(11)(G)	Is the force main located at least 10 feet horizontally and 18 inches vertically from any existing or proposed water line?			✓
52.	8.130(11)(H)	Is the force main properly identified to avoid confusion with water mains?			✓
53.	8.130	Instructions and Equipment. Sewage pumping stations and their operators should have a complete set of operational instructions, including emergency procedures, maintenance schedules, special tools and spare parts as may be necessary.			✓
Part 2		**I answered yes to questions 29 – 53. (N/A if no Pump Stations) ☐ YES ☑ N/A**			

9.0 SUCTION LIFT PUMP CHECKLIST – Part 3					
	REGULATION		YES	NO	N/A
54.	8.130(5)	Are the suction lift pumps of the self priming or vacuum priming type?			✓
55.	8.130(5)(A)	Are the self-priming pumps capable of rapid priming and re-priming at the "lead pump on" elevation automatically under design operating conditions? The combined total of dynamic suction lift at the "pump off" elevation and required net positive suction head at design operating conditions shall not exceed twenty-two feet (22') (6.7m).			✓
56.	8.130(6)(C)	Is the control panel located outside the wet well, protected by a conduit seal, and have a junction box between the controls and the wet well that allows disconnection?			✓
57.	8.130(6)(D)	Are the valves located in a separate pit that can be drained?			✓
Part 3		**I answered yes to questions 54 – 57. (N/A if no Suction Lift Pumps)** ☐ **YES** ☑ **N/A**			

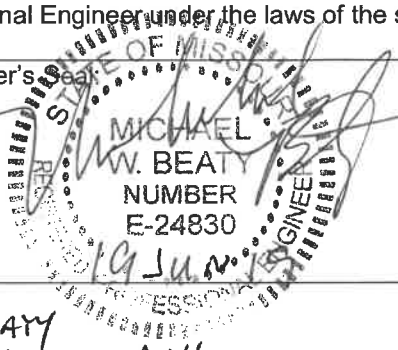
9.0 GRINDER PUMP CHECKLIST – Part 4					
	REGULATION		YES	NO	N/A
58.	8.130(9)(A) 8.020(9)(B)	Are the grinder units capable of reducing any material to a size that the materials will pass through the pump unit and force main without plugging or clogging?			✓
59.	8.130(9)(B) 8.020(9)(B)	Is there at least 50 gallons of storage in the grinder pump unit or enough storage to accommodate normal peak flows for periods of eight to twelve (8–12) hours?			✓
60.	8.130(9)(C) 8.020(10)(B)	Are there audiovisual alarms capable of alerting the resident and operating personnel in the area for units serving a single home? This may be used in lieu of the alarm system specified in 8.130 (7).			✓
61.	8.130(9)(D) 8.020(10)(B)	Are gate valves provided on the service line near the common forcemain?			✓
62.	8.130(9)(E) 8.020(10)(C)	Is the force main cleansing velocity of at least 2 feet per second maintained at the design average flow?			✓
63.	8.130(9)(F)	Is there a suitable method of cleaning the force main whenever the velocity in the force main may be less than two feet (2') per second (0.61m/s) before ultimate development is reached?			✓
64.	8.130(9)(G)	Are units serviceable and replaceable under wet conditions without electrical hazard to repair personnel and electrical equipment suitable for hazardous locations (National Electrical Code, Class I, Group D, Division 1 location).			✓
65.	8.130(9)(H) 8.020(9)(D)	Is there 1 standby unit for each 50 units or fraction thereof for WWTF >22,500 gpd provided? For WWTF ≤ 22,500 gpd, is there a 24 hour repair time either by replacement or repair with spare pump units stocked as follows: Installations — Spare Units 1 - 10 — 1 10 - 20 — 2 20 - 40 — 3 40 - 60 — 4 60 - 100 — 5 100 - 200 — 6 over 200 — 3% of installations?			✓
66.	8.130(9)(I) 8.020(9)(D)	Are provisions in place to avoid interruption of service due to mechanical or power failure by providing standby power, storage capacity or interconnection with another disposal system?			✓
Part 4		**I answered yes to questions 58 – 66. (N/A if no Grinder Pumps)** ☐ **YES** ☑ **N/A**			

Fast Track Certification Statement

☒ I have answered **YES** to Checklist items Part 1, and **N/A** to Part 2, Part 3 and Part 4 above, or
☐ I have answered **YES** to Checklist items Part 1, Part 2, and **YES** or **N/A** to Part 3 and Part 4 above, and hereby certify that the design plans and specifications for this project, to the best of my knowledge, conform to the requirements listed above. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

I hereby certify that this plan, specification, and/or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Missouri."

Missouri Professional Engineer's Seal:



Name: Michael W Beaty
Street Address: 2826 S. Ingram Mill
City: Springfield State: MO Zip Code: 65804

Phone Number: 417-886-7171 Email: mbeaty@greatriv.com

Question Answered N/A	Explanation (i.e. no pump station, no manholes, etc.) or previous approval Title and Date
33	*The pumps are grinder pumps.*
PART 2	- No Pump Station
PART 3	" "
PART 4	" "

Detailed Review Track Certification Statement

I have answered **NO** or **N/A** Checklist item Part 1 or **NO** to one of the Checklist items Part 2, Part 3, or Part 4 above because the design does not conform with **all** of the requirements in The Missouri Department of Natural Resources Division 20 – Clean Water Commission Chapter 8 Guidelines (10 CSR 20-8). I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

I hereby certify that this plan, specification, and/or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Missouri."

Missouri Professional Engineer's Seal:

Name:
Street Address:
City: State: Zip Code:

Phone Number: Email:

List of regulations not complied with (attach additional pages if needed):

Question Answered No or N/A	**Explanation for N/A (i.e. no pump station, no manholes, etc.) or Justification for deviation**
41	*The pump station is locked so no alarm for unauthorized entry.*

Green Ridge Estates
Sanitary Sewer Calculations

Phase I

Number of Buildable Single Family Lots (assume 2.6 people per home)	92 0.17 lb BOD/person 75-100 GPD/person
Swimming Pool & Pool House Lot (assume 25 people)	1 0.06 lb BOD/person 15 GPD/person

Average Daily Flow from Development: 92 x 2.6 x 100 + 25 x 15 = 24,295 GPD

Average Daily BOD from Development: 92 x 2.6 x 0.17 + 25 x 0.06 = 42.2 lb BOD

$$\text{Peaking Factor} = \left(\frac{18+\sqrt{\frac{\text{Population Equivalent}}{1{,}000}}}{4+\sqrt{\frac{\text{Population Equivalent}}{1{,}000}}}\right)$$

Peaking Factor = 4.12

Peak Daily Flow = 24,295 * 4.12 = 100,095 GPD

Peak Hourly Flow = 4,171 GPH

STATE OF MISSOURI
TIMOTHY LEE SCHOENHOFF
NUMBER PE-2018000267
PROFESSIONAL ENGINEER

1-21-19

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Total Build Out

Number of Buildable Single Family Lots	180
(assume 2.6 people per home)	0.17 lb BOD/person
	75-100 GPD/person
Swimming Pool & Pool House Lot	1
(assume 25 people)	0.06 lb BOD/person
	15 GPD/person

Average Daily Flow from Development: 180 x 2.6 x 100 + 25 x 15 = 47,175 GPD

Average Daily BOD from Development: 180 x 2.6 x 0.17 + 25 x 0.06 = 81.1 lb BOD

$$\text{Peaking Factor} = \left(\frac{18+\sqrt{\frac{\text{Population Equivalent}}{1{,}000}}}{4+\sqrt{\frac{\text{Population Equivalent}}{1{,}000}}}\right)$$

Peaking Factor = 3.99

Peak Daily Flow = 47,175 * 3.99 = 188,228 GPD

Peak Hourly Flow = 7,843 GPH

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