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Design Focused Engineering

February 25, 2020

Claudette Borgersen, Clerk
Albemarle County Board of Supervisors
Department of Community Development
401 McIntire Road, North Wing
Charlottesville, Virginia 22902

RE: ZMA2018-018 River's Edge
Request for Central Sewerage System Chapter 16 Article I

Dear Ms. Borgersen,

Chapter 16 Article I of the Code of Albemarle outlines the procedures for the establishment of a central sewerage system. In conjunction with a request to rezone TMP 32-5A and 32-5A1 (the "River's Edge PRD"), which would allow a maximum of 100 dwelling units on a 32.5-acre site off Seminole Trail; River's Edge Holdings LLC and Rivers Edge Associates LLC (collectively, the "applicant") requests permission to construct a central sewerage system for the River's Edge PRD. In accordance with Sec. 16-102, please consider this request the required notice for this proposal to establish a central sewerage system.

Location:

The central sewerage system would be located on TMP 03200-00-00-005A1 and 03200-00-00-005A0 near coordinates 38.15280, -78.41699.

Connection Numbers:

The central sewerage system would serve 100 dwelling units.

Statement of Proposal and Description:

The central sewerage system would consist of a system of sewer laterals from each dwelling which would connect to a private gravity main that would drain into a private pump station. This pump station would push effluent through a private sanitary force main, where it would tie into a new public sanitary manhole just outside Rte. 29 North. From this manhole, waste will flow through a public gravity main under Rte. 29 to an existing public manhole at the Rivanna Sewer and Water Authority pump station, directly across from the site.

The intent of the River's Edge PRD is to create rental units under single ownership. The proposed development is on a single parcel with no proposed subdivision. Since the parcel is surrounded by steep slopes, floodplain, and the North Fork Rivanna River, it is impractical to extend the system to adjoining parcels. Any potential public offsite connection to a sewer system would be highly unlikely due to these conditions and the regulatory difficulty involving in crossing the North Fork Rivanna River. Since the system requires a pump station and force main line, and since it only serves a single parcel, and since future offsite public connection to any part of the sewer system on this property is unlikely, it would be impractical to burden the Albemarle County Service Authority and its constituents with the maintenance and operation of these facilities.

Granting permission of a central sewerage system will allow the Applicant to achieve one of the project's key goals: developing independent dwelling units that are environmentally and aesthetically sensitive, all without creating financial and managerial burdens for public utilities.

If you have any questions please do not hesitate to contact me at your convenience. I can be reached at: keane@shimp-engineering.com or by phone at 434-299-9843.

Regards,

Keane Rucker
keane@shimp-engineering | (434)227-5140

Copy: justin@shimp-engineering.com

ATTACHMENTS:

Three (3) copies of preliminary plans for the central sewerage system

SHIMP ENGINEERING, P.C.
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December 16, 2019

Frank Pohl
County of Albemarle
Department of Community Development
401 McIntire Road, North Wing
Charlottesville, Virginia 22902

RE: ZMA2018-018 River's Edge
Pump Station Preliminary Design

Dear Mr. Pohl,

As part of the plan requirements, we have completed a basic preliminary design for the sewer pump stations.

Flow Calculations:

A design population of 100 2-person units has an average design flow of 100 gpd/person = 200 gpd/unit.
(SCAT regs - 9VAC25-790-460-F)
The design peak capacity of the system shall be 2.5 times this avg. design flow.
(SCAT regs - 9VAC25-790-310-D)

Avg Design Flow = 100 units x 200 gpd/units = 20,000 gpd
Peak Design Flow = 2.5 x Avg Design Flow = 50,000 gpd (34.7 gpm)
Minimum design pump rate must exceed 35 gpm to allow for the Peak Design Flow.

Basic Pump Station Design:

The pump station shall be an inline underground wet well with submersible pumps that will pump effluent through a force main at select times when the sewage level reaches set elevations in the wet well. The pump station will consist of a remote monitoring system that will be managed by a contracted professional third party, a backup generator in case of loss of power, and an onsite alarm in case of failure.

Preliminary Wet Well Sizing:

The wet well will be a 60" precast lined watertight manhole. For a wet well with 10' depth well and a design lead pump switch "on" elevation at 4' above the invert, the well storage would reach 540 gal. of effluent before the lead pump engaged. In this scenario, the pump would operate roughly 37 times per day (using the avg. design flow estimate of 20,000 gpd for the 100 units from above). With this basic design, the lead pump would engage on average every 39 minutes. This cycle period minimizes potential nuisance from the pump station by ensuring the sewage does not sit long enough to go anaerobic and also ensures potential adverse noise impacts on future residents are mitigated through cycle frequency management.

Additional Design Considerations:

The following considerations are based on previous design experience with pump stations, and the final design shall account for these considerations.

1. Since the pump station will be handling raw sewage, pumps and force main must be capable of passing 2” solids. Thus, the minimum force main size should be 3”. A minimum scour velocity of 2 fps must be achieved within the force main.
2. To remove cumbersome maintenance requirements, submersible grinder pumps shall be used.
3. Two robust pumps shall be chosen to provide redundancy. Multiple switches shall be implemented which will trigger first one, then both pumps when sewer levels reach critical elevations within the wet well.
4. CCS Tracer wire shall be installed along the force main to allow for maintenance to immediately identify the location from above ground.
5. To prevent unpleasant odors, which are mainly caused by sewage going anaerobic, a small air pump and diffuser shall be installed for the wet well.
6. Fencing and vegetative screening shall be provided to make the pump less conspicuous for residents.

If you have any questions please do not hesitate to contact me at your convenience. I can be reached at: justin@shimp-engineering.com or by phone at 434-227-5140.

Regards,

Keane Rucker
keane@shimp-engineering | (434)299-9843

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ZONING MAP AMENDMENT
APPLICATION PLAN
ZMA201800018

RIVER'S EDGE
CONCEPTUAL WATER & SEWER

Additional Notes:

1. Structures to be metered according to ACSA regulations.

Existing ACSA manhole
Bore under Route 29 for public sewer
8" gravity main (typ.)
New ACSA manhole
Public water line
Existing paved road to become pedestrian path
3" force main
FEMA BFE 385.5'
FEMA BFE 392'
FEMA BFE 386'
FEMA BFE 391'
FEMA BFE 390'
FEMA BFE 389'
FEMA BFE 388'
FEMA BFE 387'
Flat Branch
WPO
Fire hydrant
4" san lat (typ.)
8" gravity main (typ.)
Pump station with underground wet well
North Fork Rivanna River
380
400
420
440
452
360

200 0 200 400 600
Graphic Scale: 1"= 200'

Key

- Retaining Wall
- FEMA BFE
- Stream
- Water Protection Ordinance Buffer
- Waterway
- Accessway
- Pedestrian Walkways
- Steep Slopes: Preserved
- Steep Slopes: Managed

TMP(s) 32-5A & 32-5A1

Submitted 17 December 2018
Revised 16 September 2019
Revised 16 December 2019
REVISED 28 FEBRUARY 2020

project: 15.064

SHIMP ENGINEERING, P.C.