Off-Site Wastewater Capacity Analysis

Copies of this and other Development Packet Chapters are available online at:

https://www.roundrocktexas.gov/city-departments/planning-and-development-services/land-development-permits/site-development/

Contents:

Offsite Wastewater Capacity Analysis:

Purpose:

The offsite wastewater capacity analysis aims to show that the proposed development will not have any adverse effects on the wastewater system under build-out conditions. Adverse effects are defined as exceeding 65% of the capacity of the pipe flowing full under peak dry weather events or 80% / 85% (based on pipe size) of the capacity of the pipe flowing full under peak wet weather events.

The offsite wastewater capacity analysis shall be completed per the City of Round Rock Utility Criteria Manual - Section 1.6.3(A).

Study Determination:

1. All properties are assumed to require a wastewater capacity analysis unless determined unnecessary by the Planning and Development department.
2. The Planning and Development department will set the boundaries of the wastewater capacity analysis. The study's boundaries will be decided based on the proposed development's perceived downstream impact on the wastewater system.
3. The Utility Criteria Manual – Section 1 should be referenced for wastewater system requirements.

Submittal Requirements:

1. Cover sheet with:
    a. Project Name
    b. Address
    c. Permit Number
    d. Signed and dated Seal of Engineer
2. Written summary of offsite wastewater assumptions, calculations, and associated findings.
3. A map detailing all aspects of the analysis. The map should include:
    a. The proposed development.
    b. The proposed development’s connection point to the existing wastewater system.
    c. The wastewater system (pipe and manholes) included in the evaluation. Manholes should be labeled according to the UID number and match the calculation spreadsheet.
    d. Upstream properties included in the analysis. Property labels to match callouts in the calculation spreadsheet.
    e. Downstream properties included in the analysis. Property labels to match callouts in the calculation spreadsheet.
    f. Highlighted pipe segments exceeding the City of Round Rock design criteria.
4. Offsite wastewater capacity analysis calculations
    a. The wastewater capacity analysis must be set up in an easy-to-follow Excel spreadsheet based on the example included. The analyzed segments shall be labeled in the spreadsheet and match the labels on the map submitted with the analysis.

b. Each pipe segment from the proposed development's connection point to the analysis's termination should be evaluated individually.
c. The calculations should be submitted as a PDF and as an Excel spreadsheet file.

Determination of Living Unit Equivalents:

1. The wastewater LUE count for the proposed development will be based on the type of development. Reference Table 2 in Appendix A.
2. Undeveloped properties in the City of Round Rock Wastewater CCN must be included in the analysis. Refer to the Future Land Use Map and Table 1 in Appendix A for LUE assumptions.
3. An easy-to-follow Excel spreadsheet shall clearly show how the LUE count for each parcel of land was calculated.

Determination of Wastewater Flow and Pipe Capacity:

The flowing full pipe capacity for each pipe segment should be determined. The following items should be listed in individual columns as part of this calculation.

1. Pipe Characteristics
    a. Upstream Manhole UID & Size
    b. Downstream Manhole UID & Size
    c. Pipe Diameter (in)
    d. Pipe Length (ft)
    e. Pipe Slope (%) shall be based on survey information or construction record drawings
    f. Pipe Slope Information Source (Survey or Record Drawings)
2. Determine Wastewater Flow in Pipe Segment (Reference Utility Criteria Manual – Section 1, 1.6.3.A)
    a. Contributing Areas Listed
    b. Total LUEs
    c. Average Dry Weather Flow (ADWF) Calculation (gpm)
    d. Peak Dry Weather Flow (PDWF) Calculation (gpm)
    e. Total Contributing Area (acres)
    f. I&I Calculation (gpm)
    g. Peak Wet Weather Flow (PWWF) Calculation (gpm)
3. Determine Pipe Capacity in Pipe Segment (Reference Utility Criteria Manual – Section 1, 1.6.3.B)
    a. Calculated Full Pipe Capacity (gpm)
    b. Maximum PDWF Allowed – 65% of Full Pipe Capacity (gpm)
    c. Maximum PWWF Allowed – 80% or 85% (based on pipe size) of Full Pipe Capacity (gpm)
        i. For mains 15 inches in diameter or smaller, PWWF must not exceed 85% of the capacity of the pipe flowing full.
        ii. For mains 18 inches in diameter or larger, PWWF must not exceed 80% of the capacity of the pipe flowing full.
        iii. Where the calculated PDWF or PWWF exceeds the allowed capacity, these pipe segments shall be highlighted in red.

Calculation Assumptions:

The flowing assumptions and calculations should be used in the wastewater capacity analysis. These assumptions are from the City of Round Rock Utility Criteria Manual.

- Average Dry Weather Flow (gpm)
    a. $F = \frac{80 \frac{gal.\ per\ person}{day} \cdot LUEs \cdot 3.5}{1440}$
- Peak Dry Weather Flow (gpm)
    a. $PDWF = \left(\frac{18+(0.018 \cdot F)^{0.5}}{4+(0.018 \cdot F)^{0.5}}\right) \cdot F$
- Inflow and Infiltration (gpm)
    a. Assume 750 gallons per acre per day.
    b. I&I shall be calculated for each of the contributing areas in the wastewater basin.
- Peak Wet Weather Flow (gpm)
    a. PWWF = PDWF + I&I

Appendix A

Table 1 – Existing Development LUE Assumptions

Existing Developments (Residential)	LUE Conversion
Single Family Residence:	1 LUE per Unit
Duplex:	0.7 LUEs per Unit
Triplex; Fourplex:	0.7 LUEs per Unit
Condo or Apartment Unit:	0.5 LUEs per Unit
Hotel or Motel Room:	0.25 LUEs per Unit
Existing Developments (Commercial)	**LUE Conversion**
Office	3000 sqft per LUE
Office Warehouse	4000 sqft per LUE
Retail; Shopping Center	1660 sqft per LUE
Restaurant; Cafeteria	200 sqft per LUE
Hospital	1 Bed per LUE
Rest Home	4 Beds per LUE
Church (Worship Services Only)	70 Seats per LUE
High / Middle School (Includes Gym and Cafeteria)	13 Students per LUE
Elementary School (Includes Gym and Cafeteria)	15 Students per LUE

Table 2 – Undeveloped Land LUE Assumptions

Land Use	LUE/ac
Single-Family Residential	3.0
Multi-Family Residential	12.0
Mixed Use	8.5
Commercial	5.0
Employment Center	3.0
Industrial	3.0
Public Facilities	3.1