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November 2023

# Sewer Demand Report

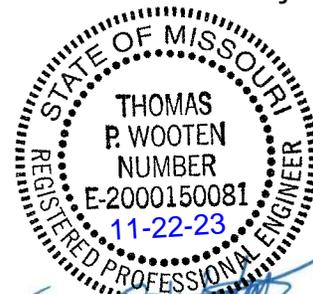
## Client

Townsend Summit, LLC  
230 Shilling Court, Suite 120  
Hunt Valley, Maryland 21031

## Project

Summit Technology Campus  
Summit Orchards North  
Jackson County, MO

P.N. 23CO10012



## Report Prepared By:

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## Introduction

This report details the preliminary design of the sewer system to support the Summit Orchards North Preliminary Development Plan (PDP), a mixed-use development, located in Lee's Summit, Missouri. See Figure 1 for a site location map.

## Project Description

Summit Orchards North is located southeast of the Interstate-470/SW Blue Parkway interchange. The entire development covers 37.9 acres, and is bordered to the south by Ward Road, to the north by I-470, to the west by Blue Parkway, and to the east by the Union Pacific Railroad.

Townsend Summit LLC proposes improvements to the existing Summit Orchards North site, including the addition of a variety of mixed business commercial and residential uses along Ward Road. In this report, the site for these improvements will be referred to as the Summit Orchards North. The current proposed building layout for can be found in the PDP.

## Existing Sewer System

The existing sewer facilities available to Summit Orchards North site are as follows:

- There is an existing sewer network along the west side of Lot 1A, that are routed to a manhole that drains into a 12" main that runs northwesterly across Hwy 470.
- There is an existing 36" sewer main northeast of Lot 1B, that runs northwest along the regional detention basin, towards Route 470.

## Proposed Sewer Facilities:

For this development, we propose placing two sewer lines. The western sewer line will serve Lots 1A-1 and 1A-2 with an 8" PVC. The proposed 8" sewer will connect to an existing manhole located along the west of Lot 1A, and will extend from this manhole to serve Lots 1A-1 & 1A-2.



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The eastern sewer line will serve Lots 1B-1, 1B-2, & 1B-3. The proposed sewer will tie into an existing manhole located along the 36" main located northeast of Lot 1B-1. The proposed sewer will utilize a 10" PVC pipe extending southwesterly into Lot 1B-1 before branching off with 8" PVC to serve Lots 1B-1, 1B-2, & 1B-3.

All sewer facilities will be constructed in accordance with DNR and Lee's Summit standards and specifications.

### Design and Methodology:

The total peak flow is calculated using methods outlined in section 6500 of the City of Lee's Summit, Missouri Design Criteria. Once PBF is determined, additional demand is added to account for inflow & infiltration. Peak infiltration is assumed to be 250-gpd/acre for non-residential land use and 500-gpd/acre for residential areas. Peak inflow is calculated using the  $Q=KiA$  method.

Tables 1 & 2 below show the peak flows that are estimated for the Summit Orchards North development.

**Table 1: Estimated Sewer Peak Flows.**

Tract/Lot	Peak Base Flow (GPD)	Peak Infiltration (GPD)	Peak Flow (GPD)
Lot 1A-1	52,500	1,860	54,360
Lot 1A-2	52,500	2,393	54,893
Lot 1B-1	24,810	8,270	33,080
Lot 1B-2	4,234	678	1,101
Lot 1B-3	5,227	410	5,637
Peak Base Flow + Infiltration			<b>149,071</b>

\*See PDP for tract/lot locations



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**Table 2: Estimated Sewer Inflow.**

Tract/Lot	Area (Acres)	T <sub>c</sub> (Min)	I (iph)*	K	Q (cfs)	Q (GPD)
Lot 1A-1	7.44	30	4.98	.003	0.11	71,840
Lot 1A-2	9.57	30	4.98	.003	0.14	92,408
Lot 1B-1	16.54	38	4.11	.006	0.41	263,618
Lot 1B-2	2.71	24	6.12	.003	0.05	32,158
Lot 1B-3	1.64	21	6.14	.003	0.03	19,525

\*Interpolated from the table in Section 6501.C.1.d of the City of Lee's Summit, Missouri Design Criteria

### Results of Analysis:

Combining the results of Tables 1 and 2 above yields a peak flow of 628,620 gpd, or 0.97 cfs for both sewer lines. This includes a peak flow of 273,501 gpd (0.42 cfs) for the west sewer line and 355,119 gpd (0.55 cfs) for the east sewer line.

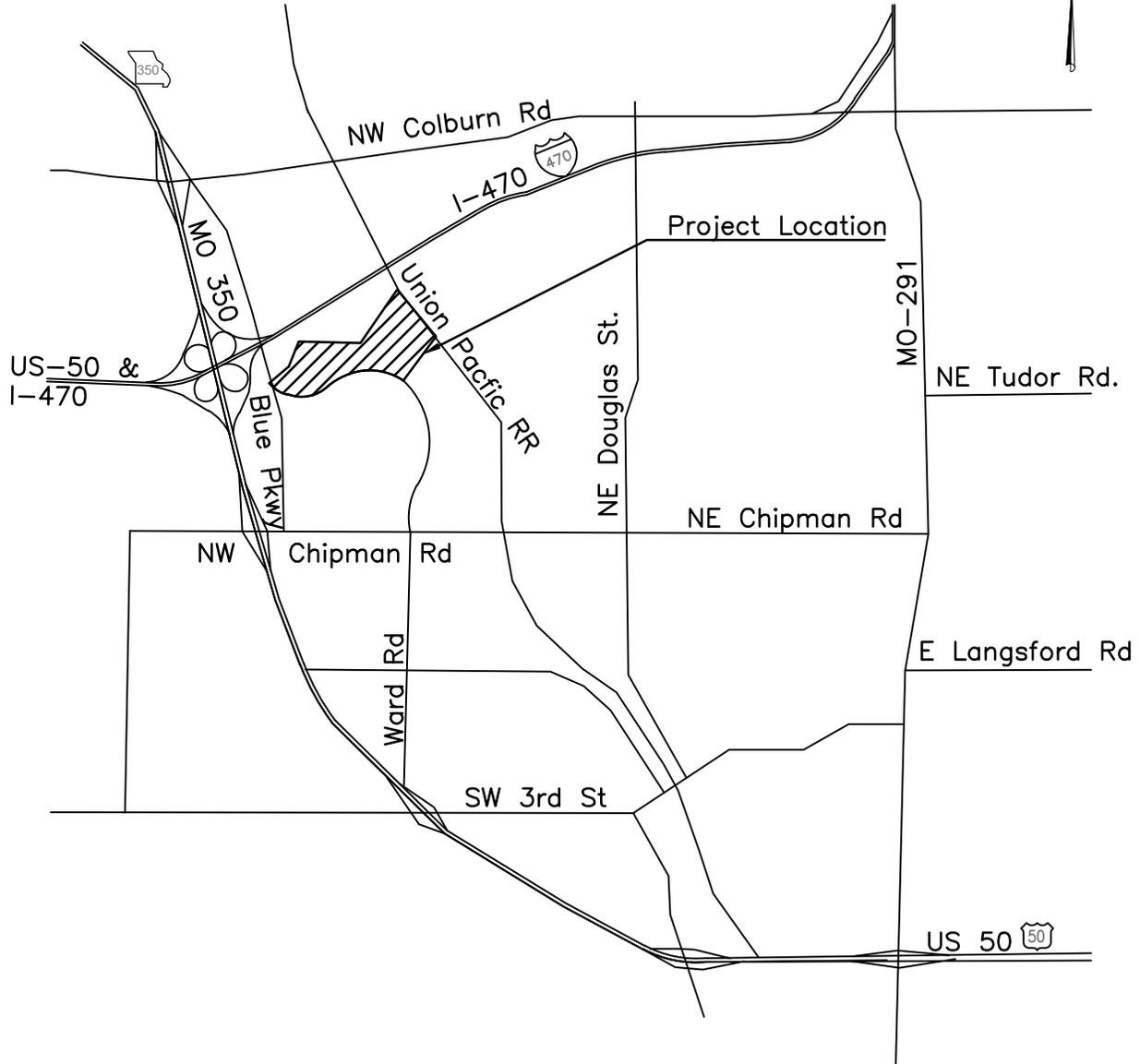
Manning's Equation supports that an 8" PVC pipe at minimum grade has sufficient capacity to carry the 0.42 cfs flow of the western sewer line. Manning's Equation also supports that an 8" PVC pipe at minimum grade will have capacity to carry the 0.55 cfs flow for the eastern sewer line. As an added factor of safety, the proposed eastern main sewer line is a 10" PVC. The remainder of sewer lines serving various future developments is sized at 8" PVC.

Refer to the PDP for the layout of the proposed sewer routes.



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# SITE LOCATION MAP



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TOWNSEND - SUMMIT ORCHARDS NORTH PDP

1201 & 1151 NW WARD RD.,  
LEE'S SUMMIT, MO

DRAWN BY:  
CVM  
DATE:  
11-15-2023