

SANITARY STUDY

DRAINAGE AREA ACREAGE: 131 ACRES

**LEE'S SUMMIT,
JACKSON COUNTY,
MISSOURI**

October 3, 2016
PREPARED BY:



RECEIVED

OCT 04 2016

Planning & Codes Admin

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3. GENERAL INFORMATION

- The study is to evaluate residential uses from:
 - i. Area Southeast of Hook Road and Pryor Road
- The site is 131.2 acres more or less
- The future development of this area is residential

The system was analyzed to drain to the existing City of Lee's Summit interceptor located north of the site area.

LIST OF ABBREVIATIONS

Gallons per Day (gpd)

Cubic Feet per Second (cfs)

Acre (ac)

Inch per hour (iph)

Time of Concentrations, T_c (min)

4. METHODOLOGY

The sanitary flows for the proposed developed were determined utilizing Section 6500 of the City of Lee's Summit Design and Construction Manual Revised September 15, 2005.

The sanitary flows for the existing site were determined utilizing Section 5500 of American Public Works Association, Standard Specifications and Design Criteria.

Peak Wastewater Flows (PWF)

Reference: Section 6501.C.1

PWF = $PBF + PIG + PIF$ (see below for definition of PBF, PIG, & PIF)

Peak Base Flows (PBF)

Reference: Section 6501.C.1.a.i

- 1,500 gpd/ac

$$PBF = 1,500 \text{ gpd/ac} * 166.3 \text{ ac} = 249,450 \text{ gpd}$$

Peak Infiltration (PIG)

Reference: Section 6501.C.1.b.i

Peak infiltration to be used for residential land in Lee's Summit is 500 gpd / ac

$$PIG = 500 \text{ gpd/ac} * 166.3 \text{ ac} = 83,150 \text{ gpd}$$

Peak Inflow (PIF)

Reference: Section 6501.C.1.c

Design for the 50-year storm event

$$Q = Kia$$

Where:

Q = peak inflow, cfs

K = inflow factor, unitless (K = 0.006 as per Design and Construction Manual)

i = rainfall intensity that corresponds to a tributary area's time of concentration, iph

A = tributary area, ac

Time of Concentration, T_c calculated by:

$$T_c (\text{min}) = 18.56 * (\text{Area, ac})^{0.2524}$$

$$T_c(\text{min}) = 18.56 * (166.3)^{0.2524}$$

$$T_c(\text{min}) = 67.5 \text{ min}$$

$$Q = 0.006 * 3.10 * 166.3$$

$$Q = 3.09 \text{ cfs} = 1,997,119 \text{ gpd}$$

$$\text{Total Flow} = 2.33 \text{ mgd (3.60 cfs)}$$

5. Existing Condition Analysis

- a. Downstream pipe system is the City of Lee's Summit Main

6. Proposed Condition Analysis

- a. Study is to evaluate the flows to the existing sewer main

7. Summary

Total site flows generated will require a 15 inch sanitary main to serve all future development in the watershed. The existing City of Lee's Summit main is a 24 inch sanitary sewer main.

8. Conclusion & Recommendations

CONCLUSION

The downstream system has capacity as per a 1998 study of the City of Lee's Summit sanitary sewer system. The proposed development will create not create a capacity issue for the downstream interceptor

9. SUPPORTING CALCULATIONS

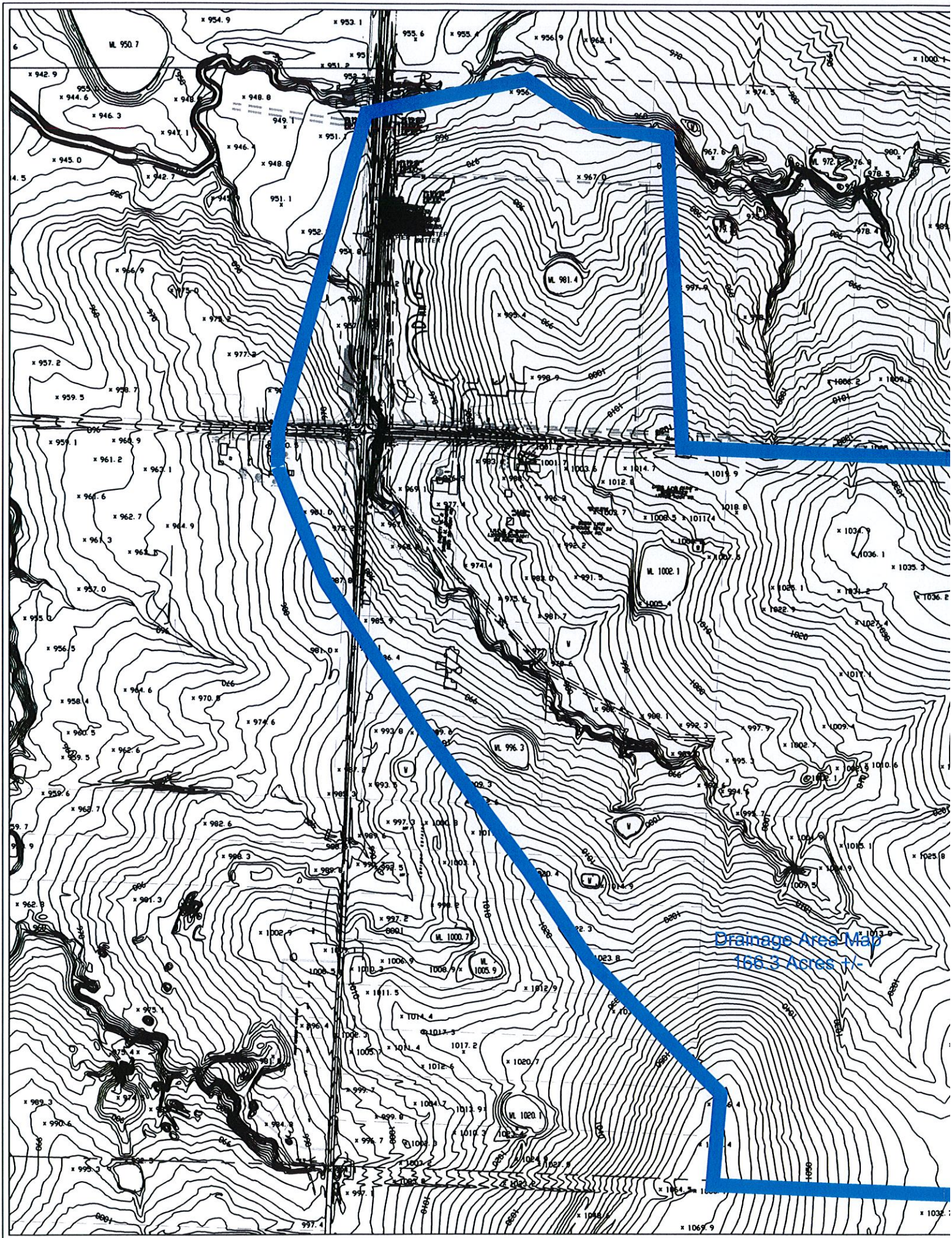
EXHIBITS:

- Sanitary flow tables

10 . MAPS & EXHIBITS

EXHIBITS:

- FIGURE 1
 - DRAINAGE MAP



City of Lee's Summit Criteria with all land developed

Line Segment	Gravity Flow Capacity CFS	Segment Flow CFS	Excess Capacity CFS	DownStream HGL	Upst H
Existing	13.92	3.6	10.32	945.32	955
A-1	5.03	3.6	1.43	956.15	958
A-2	5.04	6.22	-1.18	958.78	961
A-3	5.03	6.22	-1.19	961.43	963
A-4	5.02	6.22	-1.2	963.58	96
A-5	5.01	2.5	2.51	966.2	969
A-6	5.29	3.72	1.57	969.18	980
A-7	11.36	3.72	7.64	980.41	98