Sanitary Sewer Study

Lot 7 and Tract C
Streets of West Pryor
Lee's Summit, MO

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Prepared By:

SM Engineering
5507 High Meadow Circle
Manhattan, KS 66503

Samuel D. Malinowsky, P.E.

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INTRODUCTION

This sanitary sewer study is being prepared to address the proposed development on Lot 7 and Tract C of the Streets of West Pryor. Kaw Valley Engineering prepared a study in September of 2018 to address the additional flow as a result of the Streets of West Pryor development. This study addresses the increase in flow associated with the increased density proposed for Lot 7 and Tract C on the west end of the Streets of West Pryor. This study will use the same methodology of the original study and revise the charts in the KVE study based on the increased density. There are 2 basins that this affects. The west basin sanitary sewer system which begins on Autumn Lane south of Lowenstein with an outfall to the west. Also the south basin system which begins at the east end of the park on Lowenstein and continues to the south. These 2 basins are depicted in Appendix A.

PROPOSED DEVELOPMENT

The revised preliminary development plan for Lot 7 and Tract C of the Streets of West Pryor shows constructing an 83 unit townhome development on tract C. The original plan showed that this area would be comprised of a 29 lot single family development. On Lot 7 we are proposing to construct a 184 unit apartment complex as well as an 88 room hotel. Originally the plan was for a 166 unit senior housing facility with the hotel lot being part of a shared amenity area. As such there will be an increase in the potential sanitary sewer flow. The additional flow is summarized in Table B1 shown in Appendix B. The information shown in black is data taken from the original study for Streets of West Pryor with the information in red being the densities planned for the revised preliminary development plan for Lot 7 and Tract C.

PROPOSED FLOW TO DOWNSTREAM SYSTEM

To determine the effect on the downstream system as a result of the increased density the new flow data was applied to the downstream pipe network. This additional flow was then analyzed to see what effect it had on the existing pipe network and what improvements were warranted. Tables B2 and B3, shown in Appendix B, illustrate the increased flow in the south and the west pipe network.

SOUTH SYSTEM

In the original study the senior housing facility was shown to drain to the south basin. The revised plan shows the 184 unit apartment complex also draining to the south basin. The slight increase in density results in an increase of 0.02 cfs draining to the south basin. To determine if the downstream network had excess capacity to handle the increased flow we compared the new flow values to the pipe capacity of each line in the system. After comparison no lines were seen to be over capacity. As such the existing pipe network can handle the increased flow.

WEST SYSTEM

Per the original Streets of West Pryor development plan the only new development that was proposed to drain to the west system were the 29 residential lots. The revised plan for Lot & and Tract C proposes to have the 83 townhomes along with the 88 unit hotel drain to the west basin. This increased density results in an increase of 0.06 cfs to the west basin over what was originally proposed.

As indicated in the original report there were capacity issues in the downstream reaches of the existing system. This resulted in the potential surcharging of the system. To determine the effect the additional flow would have we input a portion of the existing system into Stormwater Studio by Hydrology Studios. We ran the analysis on 4 scenarios.

1. The existing system with no additional flows from the Streets of West Pryor
2. The existing system with the flows previously approved for the Streets of West Pryor preliminary development plan
3. The existing system with the additional flows as a result of the increased density in the proposed amended Streets of West Pryor preliminary development plan
4. The existing system with the additional flows as a result of the increased density in the proposed amended Streets of West Pryor preliminary development along with upsizing Line Number 5 to 10”

The results of this analysis is shown in Appendix C.

As shown in the printouts, the additional flow from the current approved PDD will cause 4 of the downstream lines to surcharged. Lines 5, 6, 7 and 8 show surcharges above the crown of the pipe of 1.29 ft. to 3.45 ft. With the additional increase in flow from the proposed amended PDD the same 4 lines show a surcharge. These surcharges are between 3.45 ft. and 4.52 ft. above pipe crown. However, in no case is the surcharge above the manhole rim elevation.

As indicated in the original report to eliminate the surcharge would require upsizing line 5 from 8” to 10”. This is still the case and would eliminate any surcharge as shown from the hydraulic analysis printout in the appendix.

CONCLUSION

Based on the above discussion the affect the proposed increase in sanitary sewer flow to the south and west basin was analyzed. As shown, the south system will continue to operate as designed with minimal surcharge potential.

The increased flow to the west system will increase the potential surcharge depths in 4 sections of the downstream line. However, in no case is the surcharge depth ever above the rim of any existing manhole rim. As discussed, this surcharge could be eliminated if one section of line is increased in size.