

SECTION 1. EXECUTIVE SUMMARY

In October 2021, The City of Jenks requested Meshek & Associates, LLC (Meshek) to conduct a hydrologic and hydraulic (H&H) study for a 124-acre commercial and residential area south of downtown. The study area is bound to the north by E. “A” St., bound to the south and east by the Jenks levee, and bound to the west by the railroad. This project area is considered Phase 1 of a citywide drainage study. The Phase 1 area has no named creeks or tributaries but does contain storm sewers, culverts, and drainage ditches. The area is in the FEMA Zone X (0.2% annual chance) floodplain of the Arkansas River. There are no established floodplains for the local drainage area. See **Figure 1-1** for an area map.

This study uses detailed 2-dimensional hydraulic modeling to establish existing conditions and fully urbanized conditions 1% annual chance (100-year) and 0.2% annual chance (500-year) floodplains. These floodplains represent flooding due to local runoff in the Phase 1 area drainage basin. These are not FEMA floodplains and will have no impact on flood insurance rates. The floodplains are intended to inform the public about the local flood risks.

After receiving public input and modeling the existing conditions flooding, four problem areas were identified as seen in **Figure 1-2**. Problem Areas 1 and 2 involve street flooding along E. Main Street. Problem Area 3 is the residential area south of E. Main Street. This area lacks positive drainage which results in frequent and widespread street and yard flooding. Problem Area 4 is a frequently flooded cul-de-sac located at E. Beaver St. and east of S. 7th St. No structure flooding occurs in any of the problem areas. Therefore, conceptual drainage designs focus on mitigating flooding in the streets and adjacent properties. Alternatives and cost estimates were developed for each alternative. Designs are based on fully urbanized land use conditions.

The recommendation for Problem Area 1 is replacing the existing storm sewer system with a new system capable of conveying the 100-year flow. A smaller system with a 10% annual chance (10-year) design was considered. However, the larger system is recommended due to the low overall cost differential between the two options. A third alternative was considered which proposed 13 small detention areas with the hope of reducing the overall cost of a system-wide improvement. However, the alternative was unable to provide any financial benefit and is not recommended.

The City prepared a solution that addresses the flooding at Problem Area 2 before this study began. Design plans are nearly complete for a new storm sewer system as part of the Main Street reconstruction project which improves the street west of N. 1st Street and east of N. Date Street. The design has a 1% annual chance flow capacity and is funded for construction. No other alternatives were considered at this problem area.

At Problem Area 3, several 1% annual chance storm sewer designs, a 10% annual chance storm sewer design, and a 20% annual chance (5-year) open ditch design were analyzed. Since there are no flooded buildings, the 1% annual chance design is not warranted. The

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smaller 10% annual chance design will effectively mitigate the drainage problems and prevent flooding during most rainfall events. This design is ultimately safer and more aesthetic than the 20% annual chance open ditch option. The 10% annual chance sewer alternative is therefore recommended. The 10% annual chance design removes upstream floodplain storage which is conveyed downstream into Veteran's Park. Additional storage volume is needed at Veteran's Park to prevent an adverse impact to the floodplain. Excavation areas were identified that can provide the needed compensatory storage volume. These areas have minimal impact to existing park amenities.

Problem Area 4 considered three alternatives. These alternatives focus on effectively draining the cul-de-sac rather than preventing street flooding altogether. The recommended option is a small storm sewer pipe and inlet at the E. Beaver Street cul-de-sac that will connect to a future storm sewer along S. 7th Street. The existing storm water pump station is to be removed. The S. 7th Street storm sewer is designed and funded. This alternative provides the most effective drainage solution at the lowest cost compared to the other alternatives.

Table 1-1 summarizes the alternative projects and their cost estimates. Recommended alternatives are highlighted. **Figure 1-2** displays the layout of the recommended designs. The designs are conceptual in nature. The placement of the storm sewers shown on the figures are approximate and may be placed anywhere within the City right-of-way limits. The preference for placement is under existing drainage ditches rather than under roadways. Recommendations were chosen by weighing the overall cost of the project with the overall flood mitigation benefits and needs of the community.

Implementation of the projects may require phased construction as funding becomes available over time. These stormwater projects should be constructed from the downstream end to the upstream end. Phasing the construction in this manner ensures that upstream improvements do not cause downstream flooding. The exact locations of potential phases were not considered in this conceptual study. Construction phasing can be determined during project design.



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Legend

- Study Area
- Surveyed Inlets
- Surveyed Storm Sewer
- Inlet
- Existing Storm Sewer
- Existing Culvert
- Existing Ditch
- Jenks Levee
- Jenks City Limits

FEMA SFHA Floodplains

- 1 Pct. Chance - Zone AE
- Floodway
- 0.2 Pct. Chance - Zone X

Location Map



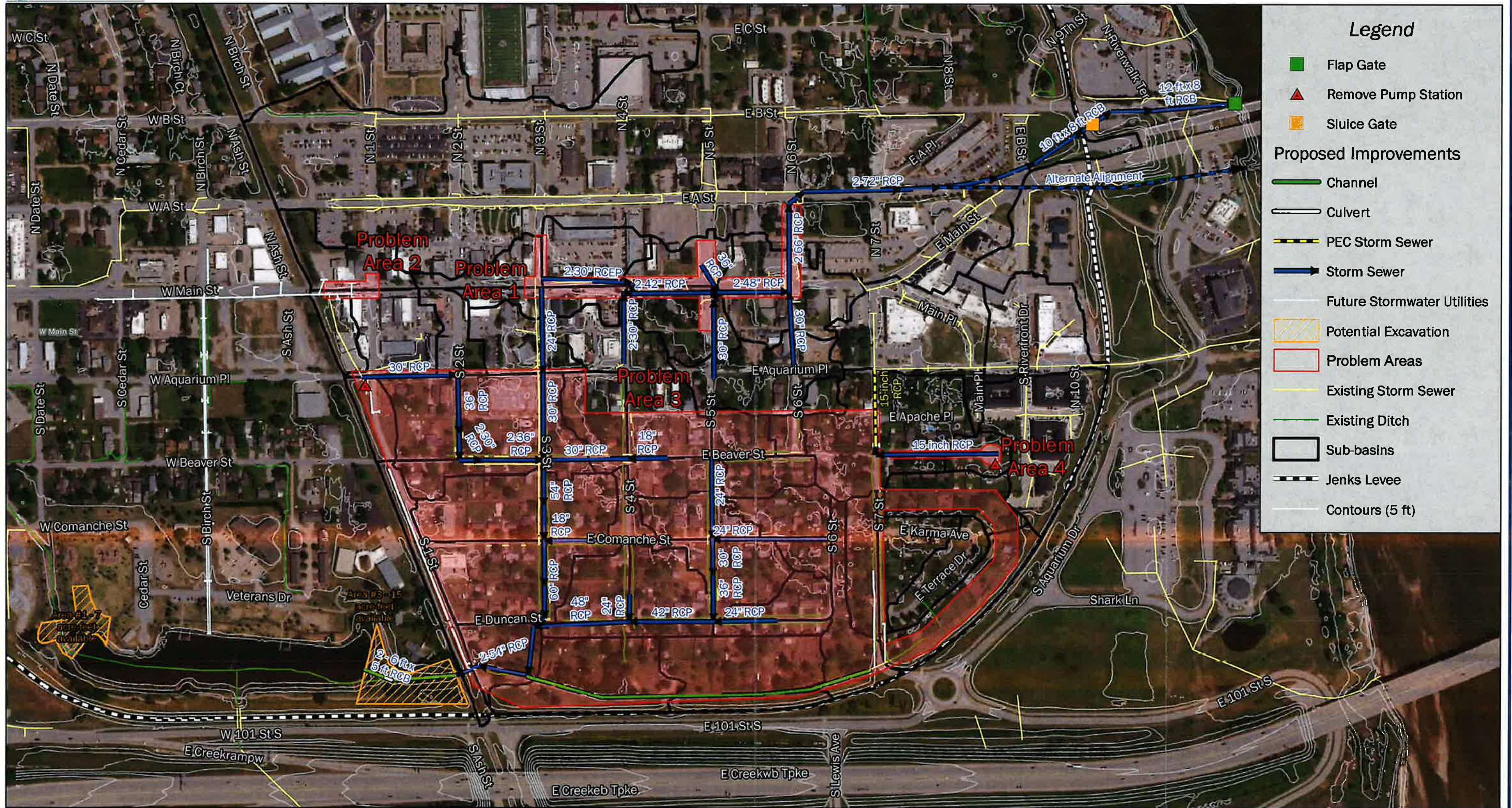
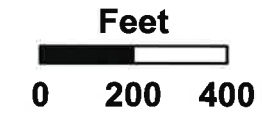
Figure 1-1

Table 1-1: Summary of Recommendations

Problem Area	Alternative #	Project Description	Cost (\$)
Problem Area 1	1	Upgrade Storm Sewer System (1% Annual Chance Design)	\$13,535,000
	2	Upgrade Storm Sewer System (10% Annual Chance Design)	\$11,069,000
Problem Area 2	1	Upgrade Storm Sewer System (1% Annual Chance Design)	Already Funded
Problem Area 3	1	Westbound Storm Sewer System to Veterans Park (1% Annual Chance Design)	\$9,173,000
	2	Eastbound Storm Sewer System to the Arkansas River (1% Annual Chance Design)	\$19,959,000
	3	Split Direction Storm Sewer System (1% Annual Chance Design)	\$15,583,000
	4	Westbound Storm Sewer System to Veterans Park (10% Annual Chance Design)	\$6,484,000
	5	Open Ditch Improvements (20% Annual Chance Design)	\$5,972,000
Problem Area 4	1	Replace Pump Station	\$117,000
	2	Regrade E. Beaver St.	\$356,000
	3	Add Storm Sewer to 7th St. Improvements	\$112,000
Total Cost of Recommendations*			\$20,131,000

*The recommended alternatives are highlighted

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Summary of Recommendations