



EDGERTON STORMWATER MASTER PLAN

December 2022

Olsson Project No. 020-2093

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ACRONYMS AND ABBREVIATIONS

AIMS.....	Automated Information Mapping System
APWA.....	American Public Works Association
BMP.....	best management practice
C/B.....	cost-to-benefit
cfs.....	cubic feet per second
EHZ.....	erosion hazard zone
EPA.....	Environmental Protection Agency
ESRI.....	Environmental Systems Research Institute
FEMA.....	Federal Emergency Management Agency
FIRM.....	Flood Insurance Rate Map
GIS.....	geographic information systems
HSG.....	hydrologic soil group
KDHE.....	Kansas Department of Health and Environment
KDOT.....	Kansas Department of Transportation
LPKC.....	Logistics Park Kansas City
LOMR.....	Letter of Map Revision
MSC.....	Map Service Center
MEP.....	maximum extent practicable
MS4.....	municipal separate storm sewer system
NOAA.....	Natural Oceanic and Atmospheric Administration
NPDES.....	Natural Pollution Discharge Elimination System
NFIP.....	Natural Flood Insurance Program
NRCS.....	Natural Resources Conservation Service
SFHA.....	Special Flood Hazard Area
TMDL.....	total maximum daily load
USDA.....	United States Department of Agriculture

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- Appendix A: Stormwater Questionnaire
- Appendix B: City Council Presentation
- Appendix C: Project Rating Forms
- Appendix D: Project Cost Estimates



1. INTRODUCTION

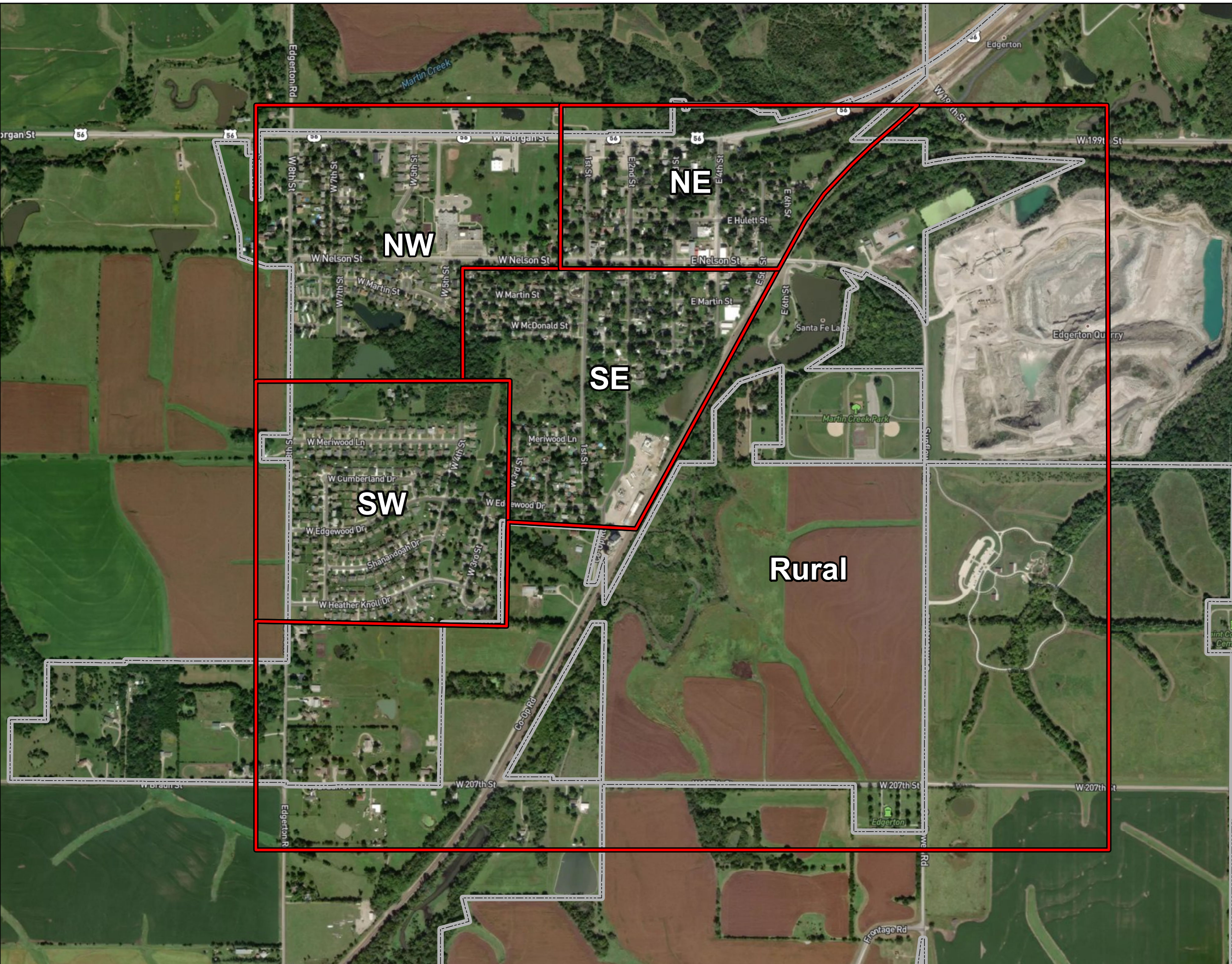
The City of Edgerton is located in the southwest corner of Johnson County, Kansas. Edgerton has a rich history; it is located near the Santa Fe Trail where early settlers traveled and camped. It was more formally established in 1870, when the railroad extended its tracks and nearby property owners relocated to start a new town closer to the railroad. Today, the city still has its small-town appeal but is poised for growth and redevelopment because of its great access to nearby highways, the creation of Big Bull Creek Park, and the construction of the BNSF Intermodal Facility and Logistics Park Kansas City (LPKC).

Stormwater management is integrally tied to the future plan for the City of Edgerton; therefore, developing a stormwater master plan is necessary. As described in the Downtown Edgerton Plan (SWT Design 2018), the city envisions a downtown that “is vibrant, connected, safe and promotes opportunity.” Within the city, known existing drainage problems can pose a risk to the safety and health of residents and the traveling public. These existing drainage problems can also limit the interest of stakeholders who may be considering redevelopment plans; the drainage problems can increase the stakeholders’ investment costs because they will have to address the problems and mitigate future problems from occurring. With an adequate stormwater system and infrastructure in place, safety concerns can be minimized, additional private investment costs for redevelopment can be reduced, and the opportunity to create a connected and vibrant community can move forward.

The City of Edgerton has a unique blend of older areas of the city, known as the downtown area, and newer sections that support a significant industrial area consisting of 13 million square feet of manufacturing and warehouse buildings, known as the Intermodal Facility and LPKC. A significant portion of the City of Edgerton’s 1,700 residents live in the older residential portion of the downtown area that contains primarily asphalt roads with roadside ditches and culverts for conveying stormwater runoff. The newer industrial area has curb and gutter with curb inlets, storm sewer pipes, and detention basins. The master plan focuses primarily on the downtown area, but it also includes a review of the newer developed areas and planning requirements currently in place.

Figure 1.
Stormwater Master Plan
Focus Area Limits
(Local City Limits)

-  Focus Area Limits
-  Overall City Limits



0 750 1,500
Feet

1 Inch = 750 Feet



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1.1. Goals & Objectives

The stormwater master plan was envisioned to assist the city with planning, budgeting, and maintaining its stormwater system as the city continues to mature and also provide for its anticipated growth. The following goals were established in the development of the master plan:

- Deliver a comprehensive yet concise action-orientated plan that accurately quantifies the stormwater improvement needs for the community and prioritizes those needs using a cost-benefit approach that is tailored for the City of Edgerton. The plan will provide a clear road map to address the city's current and future stormwater needs for flood control, erosion control, water quality, and resource protection.
- Develop a project prioritization system that is applicable to the City of Edgerton and can be easily explained to government officials and citizens.
- Identify solutions that tackle multiple objectives, wherever possible, and that work in harmony with other city infrastructure systems and plans (transportation, sidewalks, trails and parks, water, and sewer).
- Achieve financial savings through comprehensive watershed-based planning and coordination with other infrastructure master planning.
- Plan for growth as it affects the city's stormwater systems.

1.2. Work Plan

The first steps in developing the stormwater master plan were centered around collecting existing and historical data. Sections 2, 3 and 4 of this report provide details on the geographical data, digital data, and public outreach effort completed. Next, assessments of the data were completed to determine flooding, erosion, nuisance drainage issues, and the condition of the existing stormwater system as outlined in Section 5. Section 6 outlines the city's responsibilities for maintaining the stormwater system. Project areas were developed from our assessments and are described in Section 7, which also includes conceptual improvements for the project areas, prioritization of the projects, and development of a prioritized improvement program. Section 8 includes a review of the stormwater drainage studies for LPKC. Finally, Section 9 includes recommendations for maintenance, improvement projects, and funding; this section also includes a review of existing development policies and provides recommendations for implementation to incorporate best management practices (BMPs) for stormwater.

A citywide, detailed hydrologic and hydraulic analysis to determine system capacity and undersized infrastructure was not completed. Instead, the plan focused on input from city staff, citizens, and the systemwide condition inventory to identify needs for the community. Because of the age of the city and with no prior stormwater master plan in place, we anticipate that most of the older infrastructure will not meet today's design standards. If desired, future updates to

the master plan, including modeling, can be incorporated to improve the level of service within the community.

2. BACKGROUND INFORMATION

The City of Edgerton encompasses approximately 7.4 square miles and has a total estimated population in 2018 of 1,700, per the Downtown Edgerton Plan (SWT Design 2018). The City of Edgerton is located in Johnson County, Kansas, just southwest of the Kansas City metropolitan area. The city's legal limits are wide-ranging and include several annexed areas. The stormwater master plan limits referred to in this report are split up into two areas: the local city limits (urbanized portion of the city) and the overall city limits. The local city limits are located toward the southwest portion of the City of Edgerton, generally bounded between West Morgan Street/U.S. Highway 56 (north), the BNSF railway (east), West Heather Knoll Drive (south), and West Eighth Street / Edgerton Road (west); this area was the focus of the stormwater inventory and encompasses approximately 400 acres. LPKC is generally located toward the northeast portion of the overall city limits and encompasses approximately 1,700 acres. Refer to Figure 1 for a map of the city's legal limits and focus area limits.

2.1. Major Watersheds

The City of Edgerton, including LPKC and other annexed areas outside of the urban portion of the city, is located within the Bull Creek watershed and is located within Watershed Organization 4 of Johnson County. Throughout the urban portion of the city, water generally drains from west to east through Martin Creek and its tributaries before draining to Bull Creek. Water generally flows from north to south in LPKC and other portions of the city through Bull Creek and its tributaries before eventually draining to Hillsdale Lake, located in Miami County. A local watershed map focused on the overall city limits can be seen in Figure 2. A regional watershed map showing the city in relation to larger watershed boundaries can be seen in Figure 3.

2.2. FEMA Designated Flood Areas

Flooding is a costly disaster that can be avoided through careful planning and mitigation of areas that are at risk of flooding. The Federal Emergency Management Agency (FEMA) manages the National Flood Insurance Program (NFIP), which assists communities with identifying areas at risk of flooding and reducing or preventing flood risk through its floodplain management standards.

FEMA identifies a special flood hazard area (SFHA) as an area that would be inundated during a 100-year flood (a flood event having a 1 percent chance of occurring or being exceeded in any given year). These areas are identified on Flood Insurance Rate Maps (FIRMs) and have a

number of different designations depending on the type of area or flooding. The FEMA Map Service Center (MSC) was used to access and review the FIRM panels located within the overall city limits (FEMA 2021). The city is split up on seven separate FIRM panels (20091C0118G, 20091C0119G, 20091C0132G, 20091C0133G, 20091C0134G, 20091C0147G, 20091C0148G, 20091C0149G); the majority of the urban portion of the city is located on panel 20091C0132G. These panels were last updated in August 2009, except for several areas that were revised through FEMA using the Letter of Map Revision (LOMR) process.

There appear to have been two LOMRs, Case Number 15-07-2149P (effective date May 9, 2016,) and Case Number 16-07-1285X (effective date October 10, 2016,) within the overall city limits, both encompassing the same areas. The areas revised with these cases are described below:

- Martin Creek – From approximately 1,500 feet downstream of the confluence with Martin Creek Tributary D to approximately 4,350 feet upstream of the confluence with Martin Creek Tributary D
- Big Bull Creek – From approximately 1,000 feet downstream of U.S. Highway 56 to approximately 3,200 feet upstream of West 191st Street
- Bull Creek Tributary F – From just downstream of West 191st Street to approximately 2,450 feet upstream of the confluence of Big Bull Creek Tributary FC

The FIRM panels identify the SFHAs within the overall city limits as Zone AE, Floodway, and Zone X (Shaded). A map of the SFHAs located within and around the overall city limits is included in figures 2 and 3. The SFHAs located within the overall city limits are described below.

- Zone AE – Areas that are determined through detailed analyses to be subject to inundation from the 100-year flood and for which base flood elevations have been determined.
- Floodway – Portion of the SFHA that includes the channel of a river or stream and adjacent area that conveys the majority of the 100-year flood. These areas must be reserved in order to discharge the 100-year flood without increasing water surface elevations more than a designated height.
- Zone X (Shaded) – Areas that are determined to be moderate flood hazard areas and are between the limits of the base flood and the 0.2-percent-annual-chance (500-year) flood.

2.3. Historical Flooding

From August 21 through 22, 2017, the Kansas City metropolitan area experienced several rounds of heavy rainfall, especially in the southwestern portion, where some areas received

record totals. Widespread rainfall amounts ranging from 4 inches to 6 inches were recorded according to reports by the National Oceanic and Atmospheric Administration (NOAA), with isolated reports ranging from 8 inches to 10 inches, (NOAA 2017). These historic rainfall amounts in the City of Edgerton produced flooding that resulted in extensive damage to buildings, vehicles, and equipment. Elevated floodwaters also resulted in street flooding that temporarily restricted direct access to the city. Most of the damages took place at the public works facility and wastewater treatment plant, which are located adjacent to Martin Creek. The Gardner News (2018) reported uninsured loss from flood damage totaled \$1.7 million.

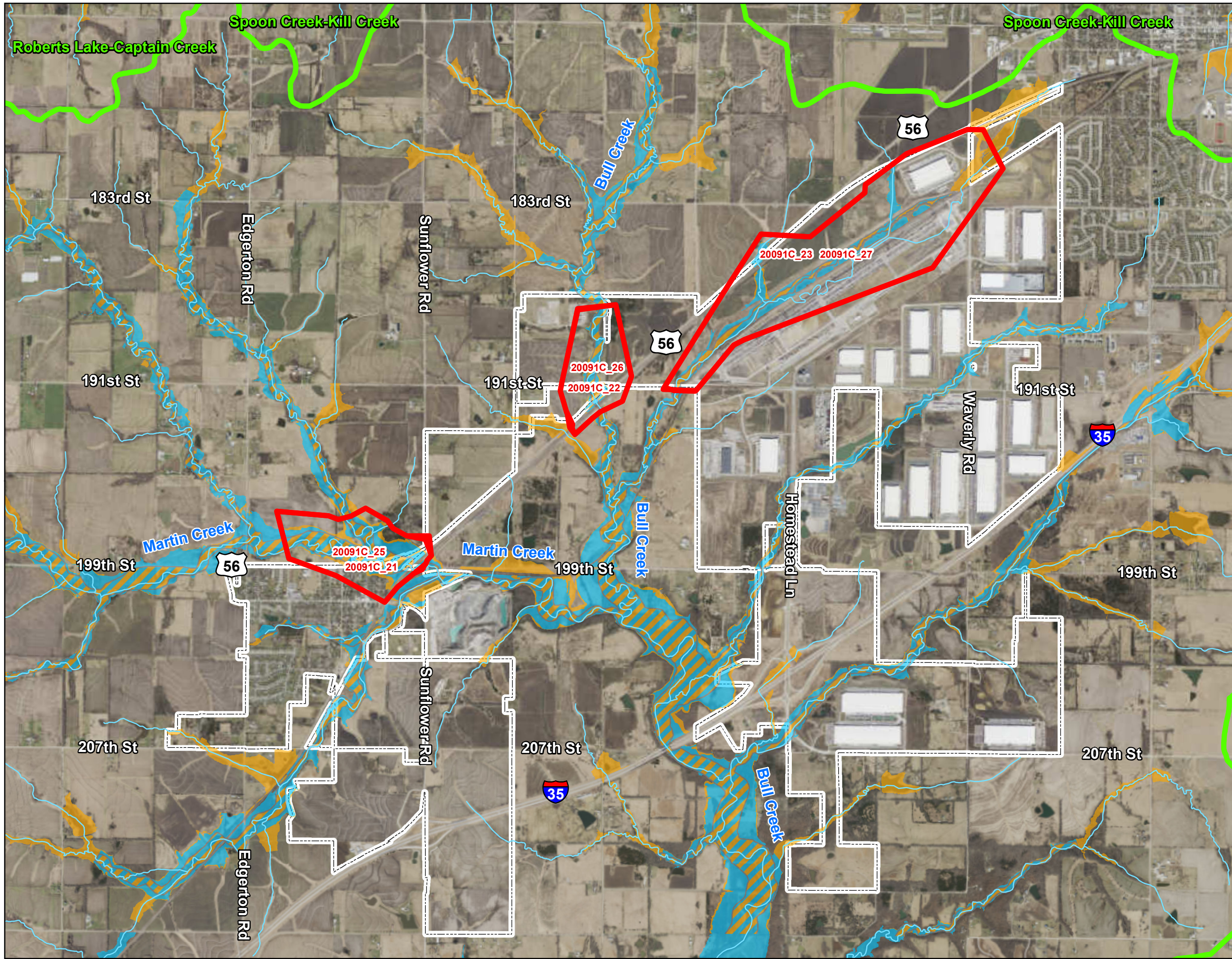







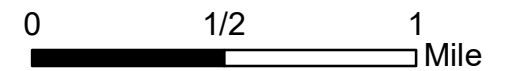


Figure 2.
Watershed Map
 (Overall City Limits)

-  Overall City Limits
-  HUC 12 Watershed Boundaries
- FEMA Current Effective Floodplain**
 -  Floodway
 -  Zone A/AE
 -  Zone X
-  LOMRs
-  Stream Centerlines

Note:
 FEMA - Federal Emergency Management Agency
 HUC - Hydrologic Unit Code
 LOMR - Letter of Map Revision

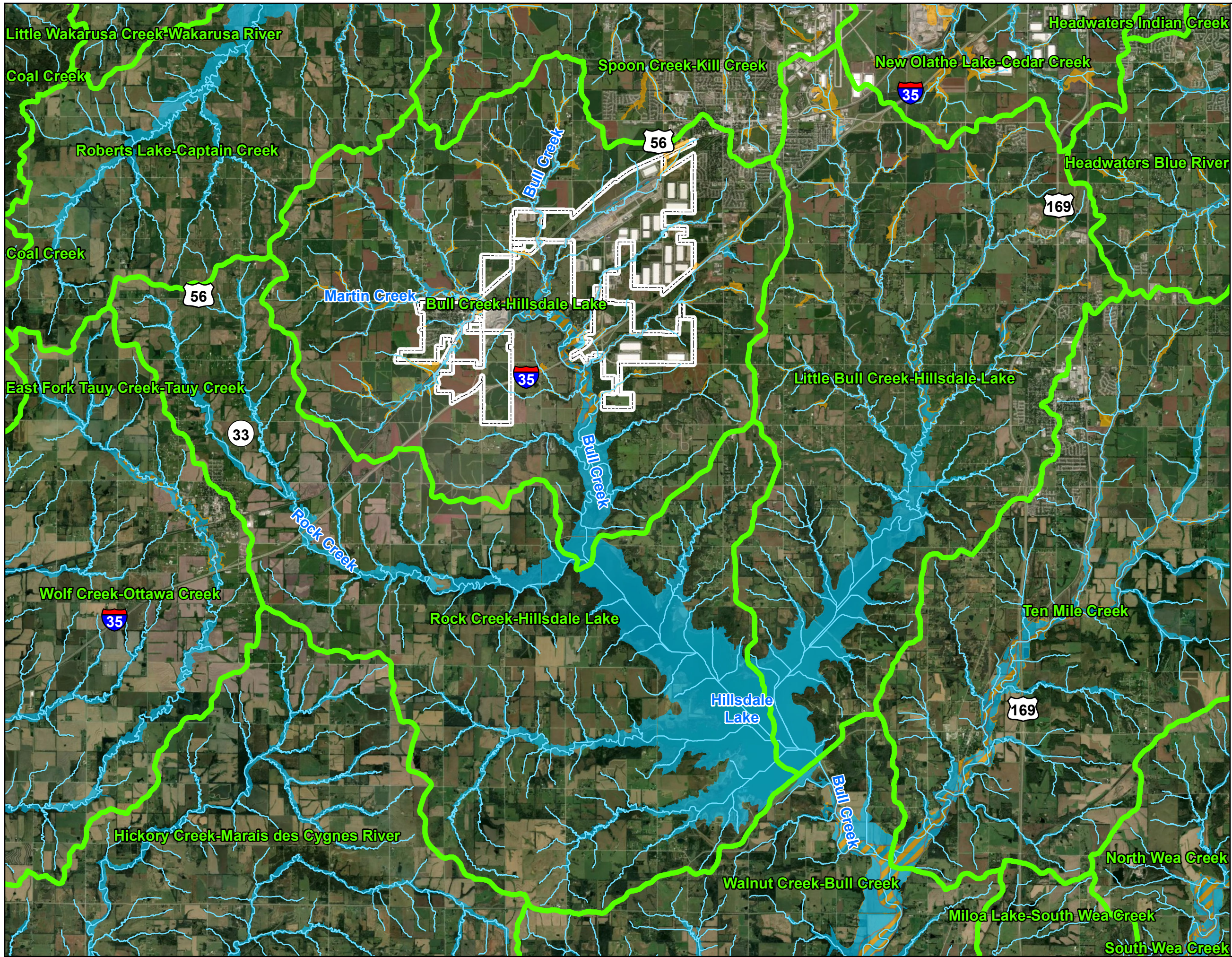








1 inch = 1/2 Mile



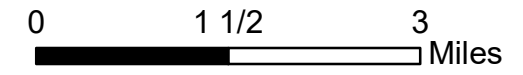
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Figure 3.
Watershed Map
 (Regional)



-  Overall City Limits
-  HUC 12 Watershed Boundaries
- FEMA Current Effective Floodplain**
 -  Floodway
 -  Zone A/AE
 -  Zone X
-  Stream Centerlines

Note:
 FEMA - Federal Emergency Management Agency
 HUC - Hydrologic Unit Code
 LOMR - Letter of Map Revision



1 Inch = 1 1/2 Miles



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2.4. Soil Types

The infiltration rate of different soil types affects the rate and volume of surface stormwater runoff. Additionally, as rural areas transition to urban areas, the increase in the amount of impervious surface area and disturbance of the natural soil profile can affect the infiltration characteristics, resulting in an increased volume of runoff. With an understanding of the local soil conditions, impervious surface, and future land use designations, we can better understand existing flooding problems and estimate future runoff increases.

The Natural Resources Conservation Service’s (NRCS) Web Soil Survey was used to determine the soil types located within the overall city limits (NRCS 2021). NRCS assigns a unique unit symbol to each soil depending on its type and slopes. Each soil is also assigned to a hydrologic soil group (HSG), which is based on runoff potential and infiltration rates. The four HSG’s are A, B, C, and D; group A soils generally have the lowest potential for runoff, and group D soils generally have the highest. Most of the soils in the City of Edgerton are either C or D soils; a small portion are B soils. A summary of soils located within the city limits is included in Table 1. A map of the HSG’s located within the city limits is displayed in Figure 4.

Table 1. Soil Types.






Map Unit Symbol	Map Unit Name	Hydrologic Soil Group	Area (acres)	Area (Percent of total)
7525	Chillicothe silt loam, 2 to 5 percent slopes	D	0.8	0.02
7603	Sibleyville loam, 3 to 7 percent slopes	C	118.8	2.51
7607	Sibleyville-Vinland loams, 3 to 7 percent slopes	C	9.1	0.19
8301	Verdigris silt loam, 0 to 1 percent slopes, frequently flooded	B	283.0	5.97
8302	Verdigris silt loam, 0 to 1 percent slopes, occasionally flooded	B	13.0	0.27
8501	Mason silt loam, 0 to 1 percent slopes, rarely flooded	C	39.8	0.84
8631	Bucyrus silty clay loam, 1 to 3 percent slopes	C	142.2	3.00
8663	Clareson-Rock outcrop complex, 3 to 15 percent slopes	D	120.0	2.53
8911	Summit silty clay loam, 1 to 3 percent slopes	D	5.7	0.12

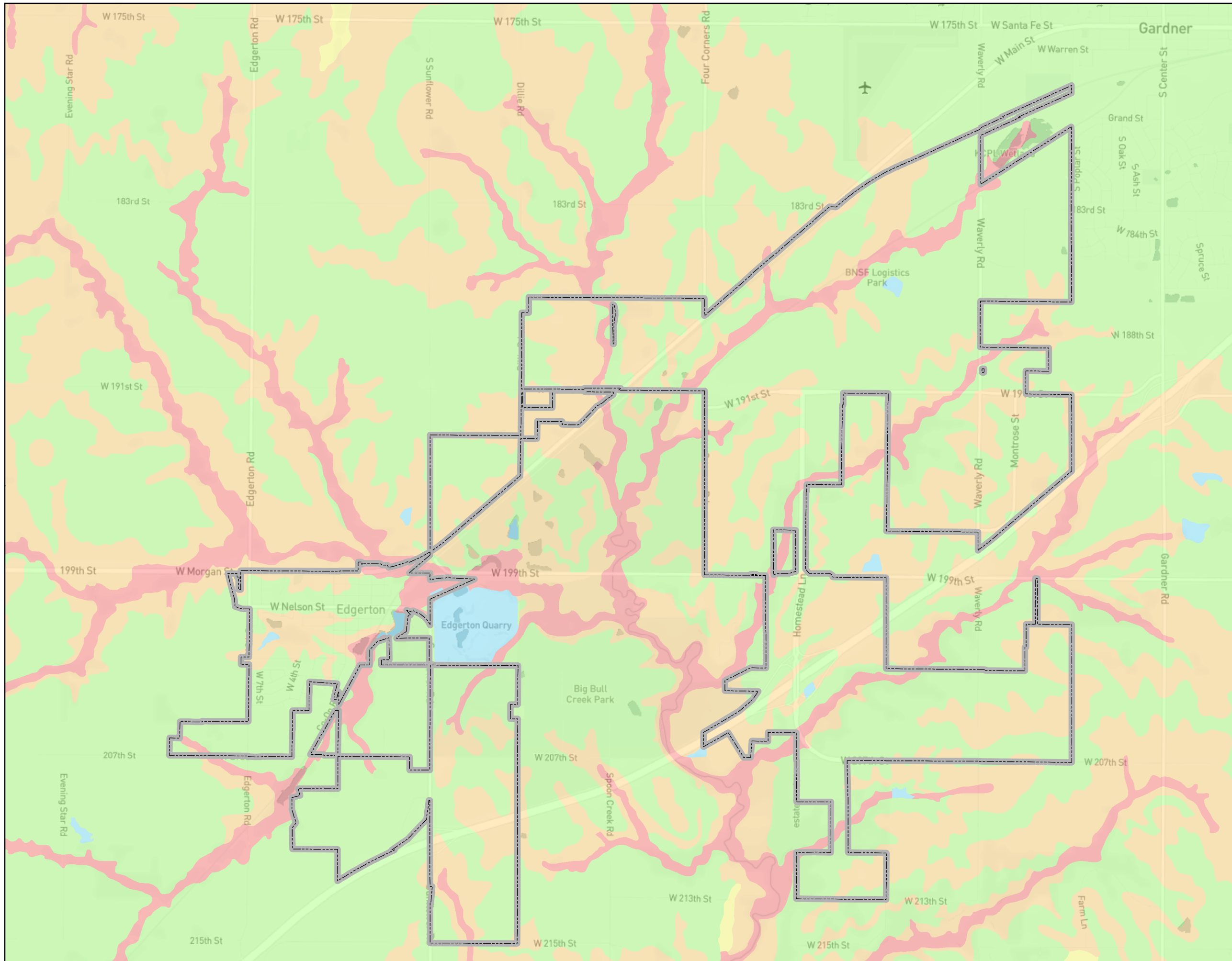
Map Unit Symbol	Map Unit Name	Hydrologic Soil Group	Area (acres)	Area (Percent of total)
8912	Summit silty clay loam, 3 to 7 percent slopes	C	1,177.7	24.84
8951	Wagstaff silty clay loam, 1 to 3 percent slopes	D	50.1	1.06
8953	Wagstaff silty clay loam, 3 to 8 percent slopes	D	1054.4	22.24
8962	Woodson silt loam, 1 to 3 percent slopes	D	1708.9	36.05
9986 / 9991 / 9999	Miscellaneous Water / Orthents, Shallow / Water	-	16.9	0.36
Total	-	-	4,740.4	100.00

**Figure 4.
Soils Map**
(Overall City Limits)

 Overall City Limits

Hydrologic Soil Group

-  B
-  C
-  C/D
-  D
-  Other



0 1/2 1 Mile

1 Inch = 1/2 Mile



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2.5. Land Use

The existing land use for the City of Edgerton is based on how land is currently zoned, as regulated by the Planning Commission of the City of Edgerton. Most of the land within the local city limits is single-family residential; agricultural and industrial are the next highest land uses. The remaining land outside the local city limits is a mixture of agricultural, industrial, commercial, and office. The LPKC area is heavily developed; most of the development is industrial, commercial, and office. Johnson County keeps a record of the existing land use through its Automated Information Mapping System (AIMS), Johnson County’s online GIS viewer and database. The existing land use was obtained from Johnson County (2021) and is summarized in Table 2. Visual representations of existing land use within the local city limits and the overall city limits are included in figures 5 and 6.

Table 2. Existing Land Use (Overall City Limits).

Land Use	Area (acres)	Area (percent of total)
Vacant Residential	68.5	1.43
Single-family Residential	242.0	5.07
Duplex or Triplex	4.8	0.10
Other Residential	49.8	1.04
Mobile Home	5.2	0.11
Office	499.6	10.47
General Commercial	108.1	2.26
Heavy Industrial	674.1	14.12
Vacant Commercial / Industrial	314.1	6.58
Agricultural	1,303.8	27.31
Government / Public	96.5	2.02
Recreational	183.1	3.84
Lake	3.0	0.06
Unassigned or Right-of-way	1,221.3	25.58
Total	4,773.9	100.00

The planned future land use for the City of Edgerton is outlined in the city’s 2011 Comprehensive Land Use Plan. A majority of the area within the local city limits is planned to be low density residential, with small portions of commercial, medium density residential, public, and other land uses. The remaining land use outside of the local city limits is planned to be primarily business park/industrial, with a smaller amount of agricultural/rural residential, commercial, parks, etc. development. The future land use map was digitized to obtain the

values shown in Table 3. Visual representations of the future land use within the local city limits and the overall city limits are included in figures 7 and 8. The city is currently underway with an update to the Edgerton Comprehensive Plan; upon completion of this update, the data presented could vary from the 2011 plan. Figure 9 includes a base map for the city from a recent comprehensive plan presentation.

Table 3. Future Land Use (Overall City Limits).

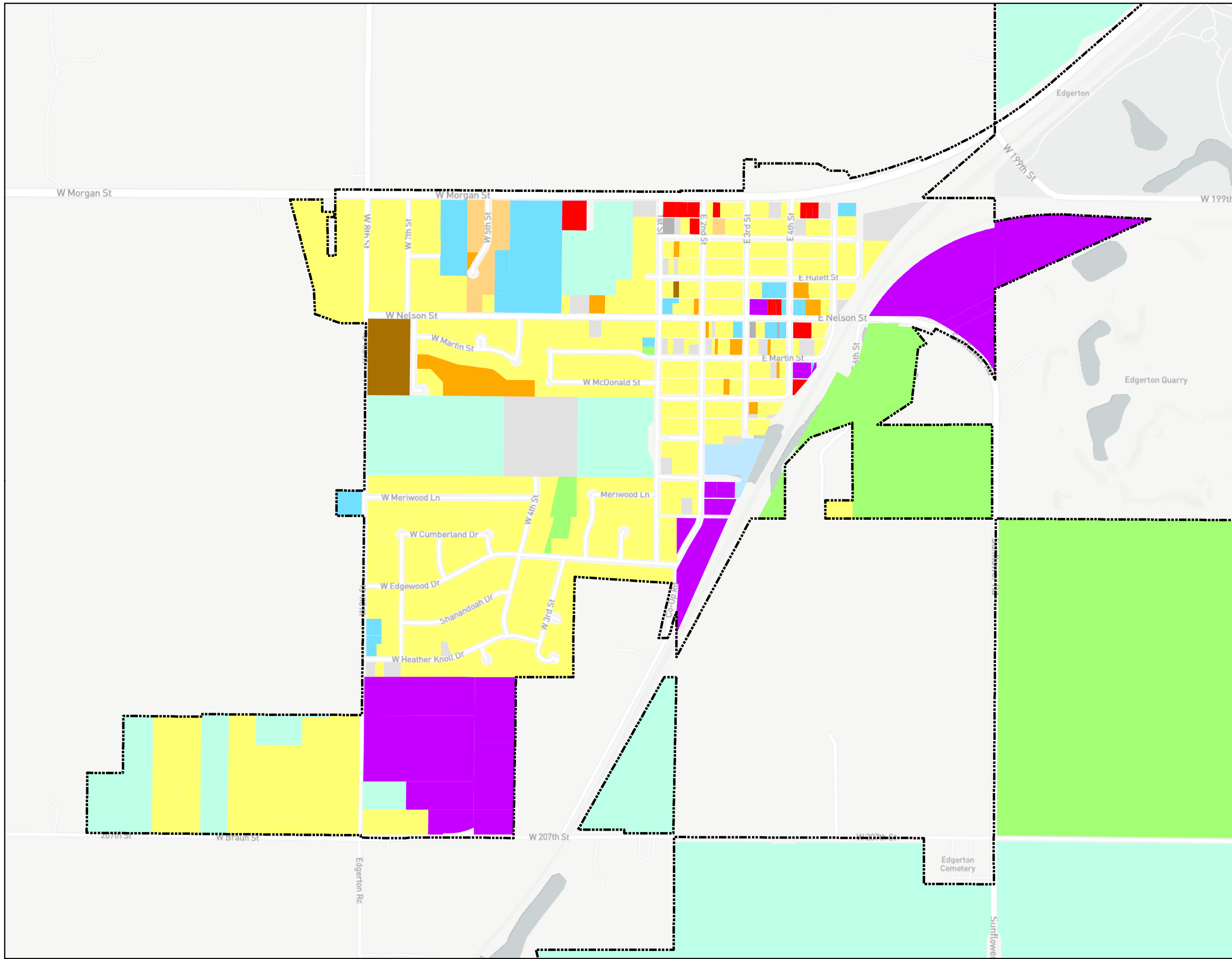
Land Use	Area (acres)	Area (percent of total)
Agricultural / Rural Residential	671.1	15.43
Commercial (Retail / Office)	304.7	7.01
Business Park / Industrial	2,173.0	49.96
Low Density Residential	608.6	13.99
Medium Density Residential	38.4	0.88
Mixed-use Office and Medium Density Residential	76.5	1.76
Mixed-use Retail, Office, and Medium Density Residential	250.8	5.77
Parks	200.8	4.62
Public	25.7	0.59
Unassigned or Right-of-way*	424.3	9.75
Total	4,773.9	100.00









*Not assigned in comprehensive plan. Calculated by subtracting the total area of all other future land uses from the total area of existing land uses.

2.6. Logistics Park Kansas City

LPKC is located toward the northeast edge of the overall city limits and is a 1,700-acre inland port that offers intermodal service, international intermodal service, and direct-rail/carload service. LPKC is the home of the BNSF Intermodal Facility, which provides railway service to numerous warehouses and distribution centers for companies such as Amazon, Jet, UPS, and many others. The development of LPKC has created economic growth and thousands of new jobs for the region. The rapidly expanding growth of LPKC and the surrounding area has benefitted the region financially and provided a substantial increase in funds available for schools, parks, and infrastructure. As mentioned previously, this stormwater master plan is focused on the long-standing, residential portion of the city. The stormwater infrastructure in LPKC is much newer compared to some of the older infrastructure throughout the rest of the city limits. Areas developed within LPKC have been reviewed by the city and conform to the city's current design criteria.

Figure 5.
Existing Land Use
 (Local City Limits)



-  Overall City Limits
-  Vacant Residential
-  Single-family Residential
-  Duplex or Triplex
-  Other Residential
-  Mobile Home
-  Office
-  General Commercial
-  Heavy Industrial
-  Vacant Commercial/Industrial
-  Agricultural
-  Government/Public
-  Recreational
-  Lake
-  Unassigned or Right-of-way



0 750 1,500
 Feet

1 Inch = 750 Feet



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Figure 6.
Existing Land Use
 (Overall City Limits)

-  Overall City Limits
-  Vacant Residential
-  Single-family Residential
-  Duplex or Triplex
-  Other Residential
-  Mobile Home
-  Office
-  General Commercial
-  Heavy Industrial
-  Vacant Commercial/Industrial
-  Agricultural
-  Government/Public
-  Recreational
-  Lake
- Unassigned or Right-of-way

0 1/2 1
 Mile

1 Inch = 1/2 Mile



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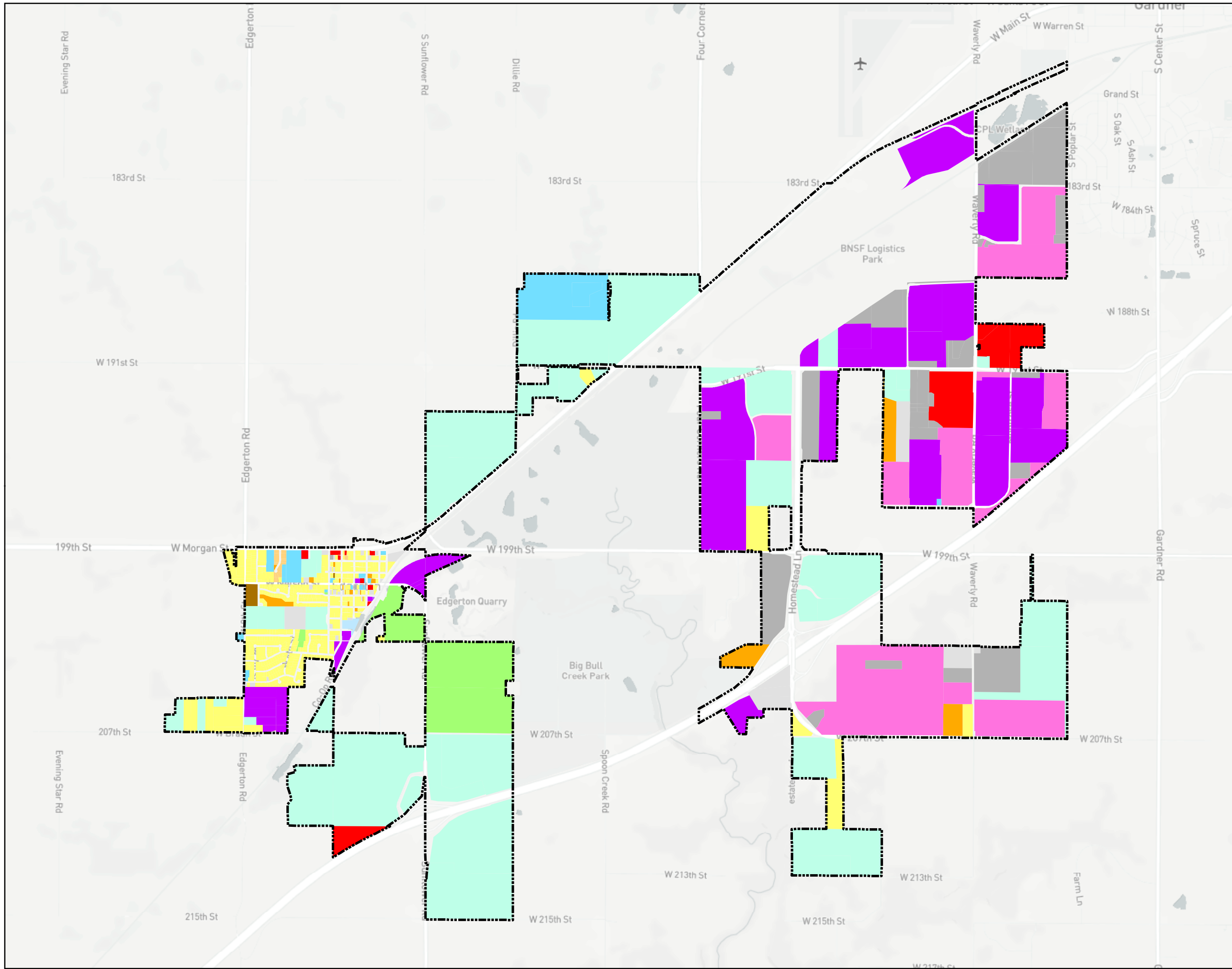










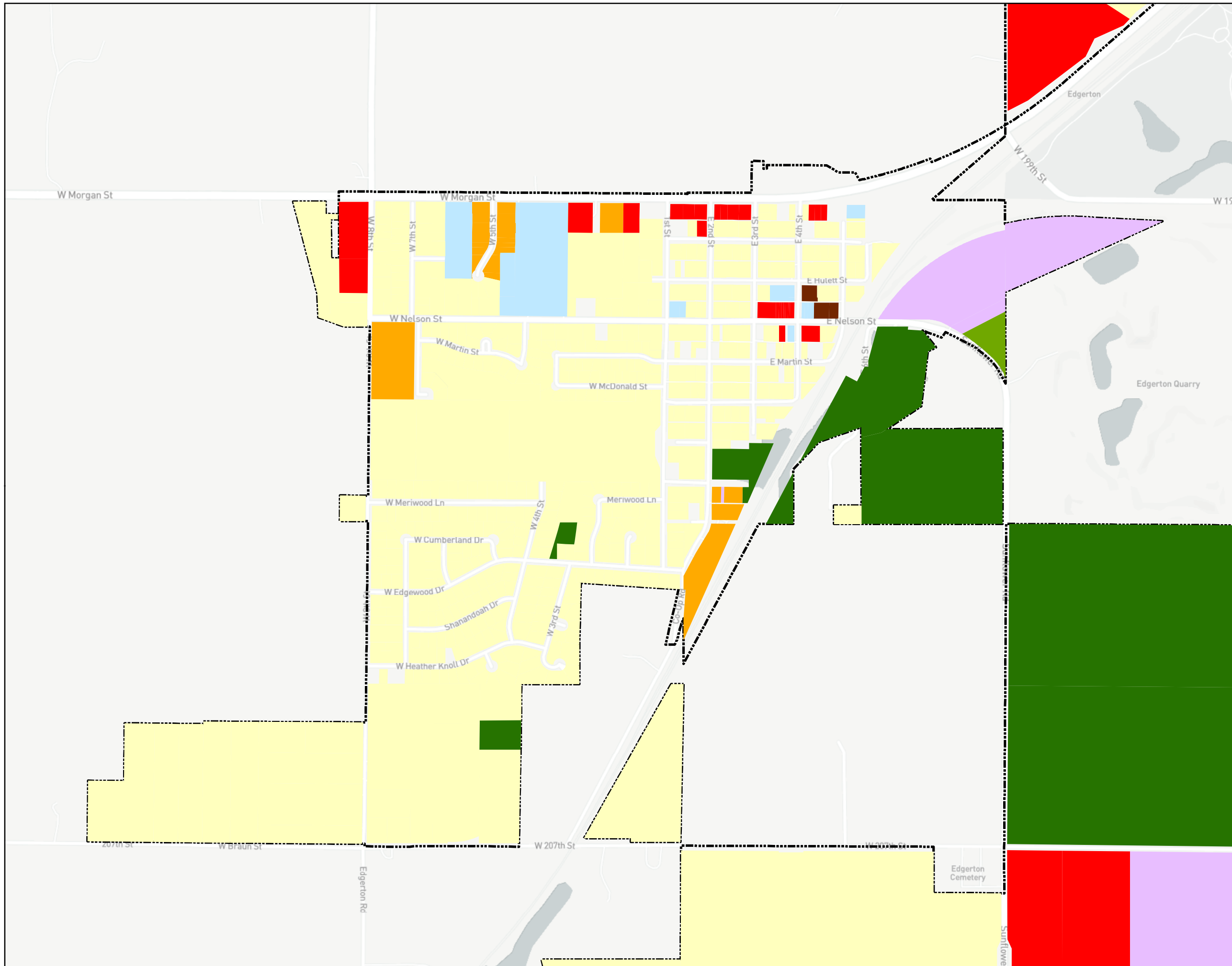


Figure 7.
Future Land Use
 (Local City Limits)

-  Overall City Limits
-  Agricultural/Rural Residential
-  Commercial (Retail/Office)
-  Business Park/Industrial
-  Low Density Residential
-  Medium Density Residential
-  Mixed-use Office and Medium Density Residential
-  Mixed-use Retail, Office, and Medium Density Residential
-  Parks
-  Public













0 750 1,500
 Feet

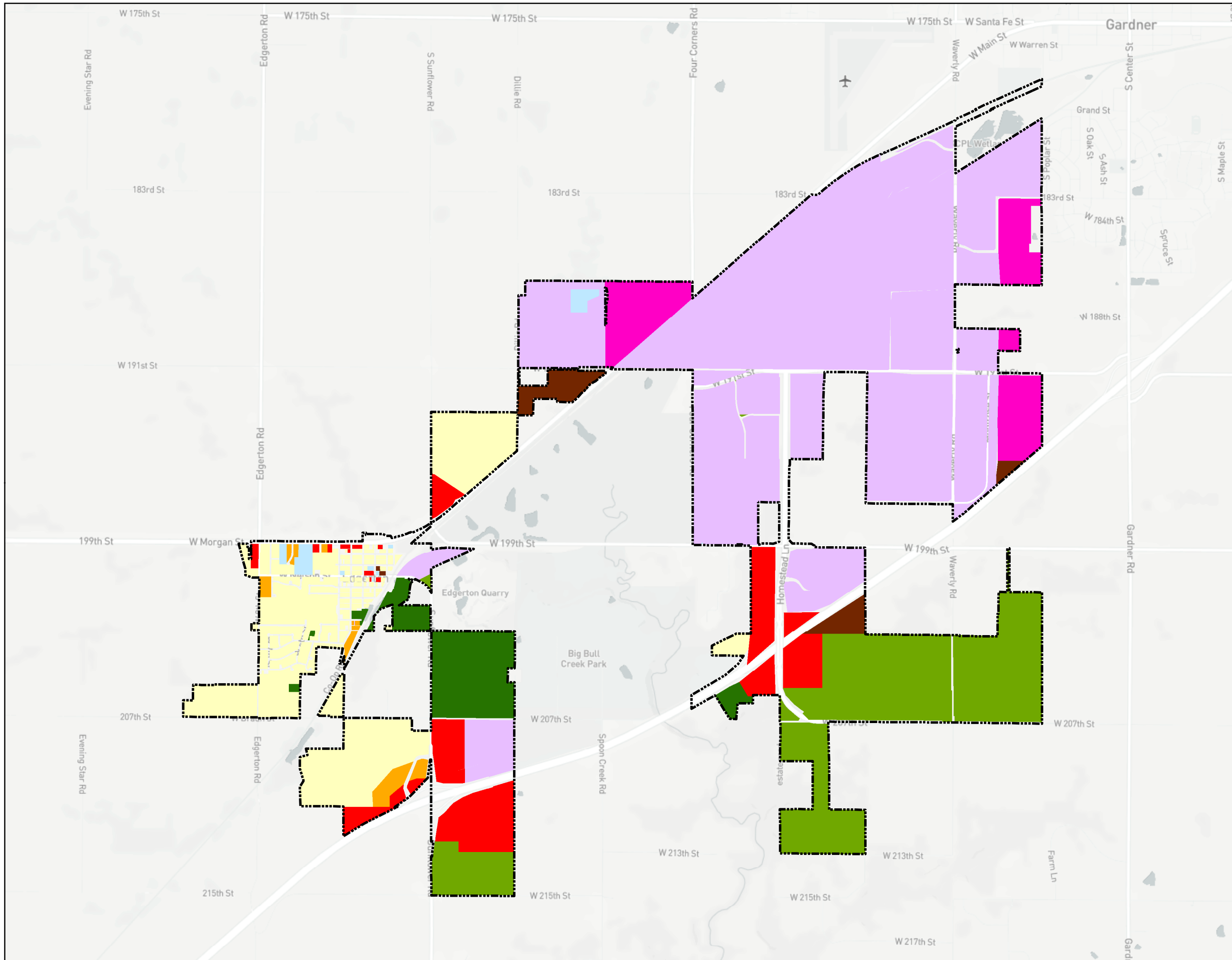
1 Inch = 750 Feet



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Figure 8.
Future Land Use
 (Overall City Limits)

-  Overall City Limits
-  Agricultural/Rural Residential
-  Commercial (Retail/Office)
-  Business Park/Industrial
-  Low Density Residential
-  Medium Density Residential
-  Mixed-use Office and Medium Density Residential
-  Mixed-use Retail, Office, and Medium Density Residential
-  Parks
-  Public

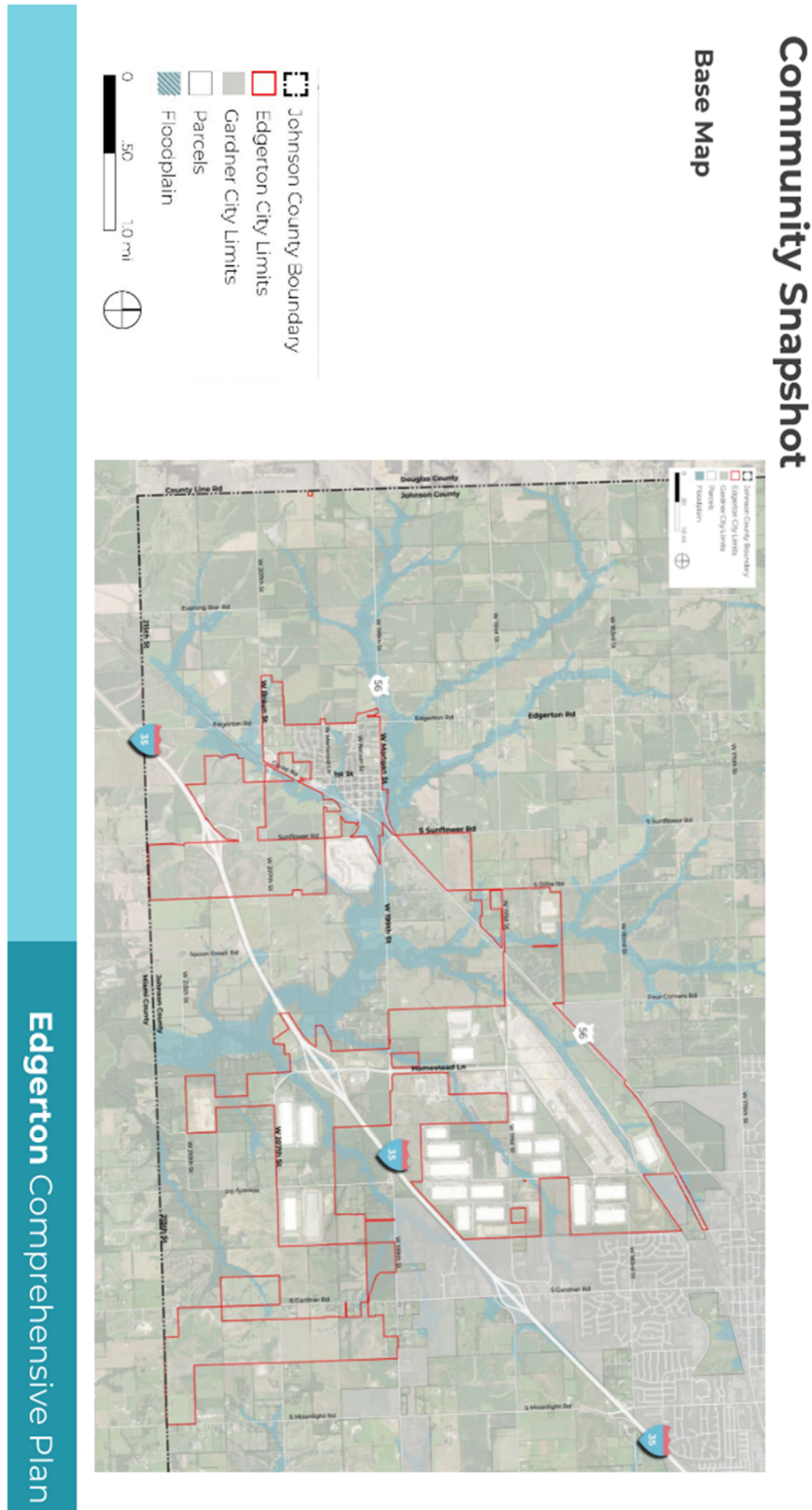


0 1/2 1 Mile

1 Inch = 1/2 Mile



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Edgerton Comprehensive Plan

Figure 9. Comprehensive Plan Updates.

2.7. Precipitation Data

The climate in the Kansas City area is characterized by wide precipitation and temperature fluctuations throughout the year. Short duration thunderstorms with high intensity rains generally occur from spring to early fall, which can produce floods with high peak runoff rates. Annual average precipitation in the metropolitan area is approximately 39 inches. Table 4 lists the monthly and seasonal distributions for the Kansas City area, 1889 to 2010 (NOAA 2021).

Table 4. Monthly Precipitation Distribution.

Month	Average Monthly Precipitation (inches)	Seasonal Precipitation
December	1.53	Winter (10 percent)
January	1.07	-
February	1.46	-
March	2.37	Spring (29 percent)
April	3.70	-
May	5.23	-
June	5.23	Summer (35 percent)
July	4.45	-
August	3.89	-
September	4.62	Fall (26 percent)
October	3.16	-
November	2.15	-
Average Yearly	38.86	-

3. DIGITAL DATA COLLECTION

Data from a variety of sources was compiled to develop a digital inventory of the city's storm sewer system. Existing digital data was collected from both the city and Johnson County, and new digital data was collected in the field. Data provided by the city via hard copy was also digitized for use in the inventory. The resulting inventory was analyzed to aid in the design of improvement projects and maintenance projects throughout the city.

3.1. GIS Data

Geographic information systems (GIS) data of local stormwater infrastructure was obtained directly from the city and from Johnson County via AIMS. The GIS data was used as the basis for locating infrastructure during field work. Other project data, such as the overall city limits, parcel information, and contours, were also obtained from AIMS.

3.2. City Crew Field Maps

Before Olsson performed field inspections, city crews located stormwater infrastructure in the field throughout the city and marked the approximate locations on hard copy maps. These hard copy maps were delivered to Olsson, digitized, and used to supplement the GIS data for field work.

3.3. As-built Data

Copies of as-built records and final plans for various locations within the city were obtained from the city. These records were used to help determine the locations of newer, existing stormwater infrastructure. Information derived from the as-builts was used to supplement the GIS data during field work.

3.4. Field Data Collection

New data on storm sewer infrastructure was collected by Olsson crews in the field. The approximate locations compiled from existing data sources assisted the field crews in locating infrastructure and in some cases, allowed crews to verify existing data rather than collect data from scratch. Details on field data collection can be found in Section 5.

4. PUBLIC OUTREACH

The citizens of the City of Edgerton were engaged in multiple ways during the master plan process. To gather more information about flooding, erosion, and drainage issues within the city, stormwater questionnaires were sent out to residents, and a public meeting was held to discuss the stormwater master plan itself. Also, while collecting field data for the inventory and condition assessment, multiple residents provided firsthand information to our team. Feedback from the questionnaires and the public meeting was used to formulate the improvement projects for the master plan.

4.1. Questionnaires

One of the first steps in communicating with residents was sending out stormwater questionnaires to residents, with the city's assistance. The questionnaires were sent through the mail to all City of Edgerton properties in September 2020. Questionnaires were also posted online through the city's webpage and social media outlets. On the questionnaires, residents were requested to report problems such as home flooding, street flooding, sanitary sewer backups, and erosion caused by stormwater. Out of approximately 800 addresses, 73 responses were received, yielding a return rate of roughly 9 percent. Of these responses, 55 indicated building and/or street flooding. Of the 55 responses reporting flooding issues, 44 contained flooding issues determined to be attributable to surface stormwater runoff and were not related to groundwater. A copy of the stormwater questionnaire and a summary table of responses are included in Appendix A. Digital copies of all returned questionnaire responses are also included.

4.2. Public Meeting

One public meeting was held to inform residents about the stormwater master plan process and to gather public comment and opinion. The meeting took place at Martin Creek Park on September 22, 2020, in the form of an open house-style meeting. Residents were presented with maps of the city depicting existing stormwater infrastructure. Residents were able to locate their homes on the maps and discuss stormwater problems with Olsson and city staff. Stormwater questionnaires were available at the meeting and residents were encouraged to fill them out. A copy of the public meeting notice is displayed in Figure 10.



Figure 10. Public Meeting Flyer.

4.3. City Council Meeting

Olsson team members attended the city council work session on November 18, 2021 and presented the stormwater master plan to officials in attendance. An outline of the presentation is included in Appendix B. Questions received from city council members and city staff were focused on:

- Maintaining the infrastructure database with future improvements and repairs to the system
- Future MS4 requirements
- Public (city-funded) versus private improvements

The stormwater masterplan was updated following city council work session to address questions and comments provided during the meeting.

5. FIELD DATA COLLECTION & CONDITION ASSESSMENT

An inventory and a condition assessment were completed for the City of Edgerton's storm sewer system. The inventory was completed by field locating and visually inspecting existing stormwater infrastructure located within the local city limits. The inventory and condition assessment were valuable evaluations of both the magnitude and condition of city-owned assets and provided up-to-date planning tools for future development within the city. A detailed property record search was not conducted to distinguish public versus privately owned infrastructure. Any stormwater infrastructure singularly serving a commercial property was not considered to be a part of the public system and was not inventoried or inspected. Infrastructure inspected included, but was not limited to, the following:

Structures

- Area inlets
- Curb inlets
- Grate inlets
- Manholes
- Junction boxes
- Underground connections
- Pipe end section entrances and exits

Pipes / Conveyance

- Driveway culverts
- Enclosed pipe systems
- Crossroad culverts

5.1. Field Data Collection

A visual field inspection was attempted on every existing public stormwater structure and pipe in the local city limits. Manhole lids were removed when possible to inspect structure interiors and connecting pipes. A condition assessment was not completed for any asset that posed a safety risk or was otherwise beyond the ability of field crews to access; such assets included those that appeared structurally unstable, those underground with no manhole access, those surrounded by thick brush, and those in high-traffic areas, among other reasons. No condition assessment was completed for pipes that were heavily obstructed because of sediment or debris. No closed-circuit television inspections of the pipe systems were completed.

Prior to field inspections, a GIS dataset of all existing stormwater infrastructure was developed using a variety of data sources (see Section 3) and loaded into the Environmental Systems Research Institute (ESRI) ArcGIS Collector application (Collector). Field crews used the dataset in Collector on an iPad to help find and record the location of each stormwater asset, and then electronically record notes and photos from each inspection. The iPad's integrated GPS receiver was used to plot an approximate location of each structure in Collector. Pipes were drawn manually in Collector using the structure locations for reference. To improve spatial accuracy, the location of each structure and pipe was later adjusted in ArcMap software to

match the most recent aerial imagery available from Johnson County AIMS. ArcMap software was also used to assign a unique asset identification number to each structure and pipe to match the existing schema used in AIMS. Inspection notes included general asset information (such as type, size, and material), notes about the asset’s condition, a general condition rating, and details about any obstructions in the asset. A copy of the complete GIS dataset including locations, notes, and photos will be delivered.

5.2. Rating System

A condition assessment was completed for each inventoried structure. Structure assessment included a visual inspection of the invert, walls, sides, top, and opening of the structure for the presence of cracking, deformation, or deterioration. Each structure was assigned a condition based on the criteria listed in Table 5. Photo examples of structure condition ratings can be seen in figures 11 - 16. A condition assessment was also completed for each inventoried pipe. Pipe assessment included a visual inspection of the walls of the pipe for the presence of corrosion, deformation, holes, and obstructions. Similar to the structures, each pipe was assigned a condition based on the criteria listed in Table 5. Obstructions did not affect a pipe’s rating. Photo examples of pipe condition ratings can be seen in figures 17 - 22.

Table 5. Structure and Pipe Condition Rating System.

Pipe Condition	Description
Excellent	No defects. Function is optimal. No action needed.
Good	Minor defects. Function is optimal. No action needed.
Fair	Moderate defects. Function is adequate. Repair by discretion.
Poor	Major defects. Function is hindered. Repair is recommended.
Failed	Irrecoverable defects. Function is lost. Replacement is recommended.
Could Not Inspect	Completely obstructed, inaccessible, or unsafe to access.

5.3. Logistics Park Kansas City Inventory

The City of Edgerton is responsible for stormwater infrastructure located within the right-of-way of LPKC; however, stormwater inspections were not completed within this area. Olsson met with city staff to discuss inspections within LPKC, and it was decided that city crews would perform these inspections. Most, if not all, of the stormwater infrastructure in this area should be in good or excellent condition, because the development in this area is recent. Stormwater infrastructure in this area has already been uploaded to AIMS based on final plans and/or as-built plans, so locations of stormwater infrastructure in LPKC should already be known. Olsson supplied the city with exhibits displaying known locations of existing stormwater infrastructure within the right-of-way of LPKC for city crews to use during inspections.



Figure 11.
Structure
Condition:
Excellent.

New structure. No visible defects, cracks, etc.



Figure 12.
Structure
Condition:
Good.

Structure shows some signs of aging or very minor defects



Figure 13.
Structure
Condition:
Fair.

Small crack in structure wall above pipe, minor deterioration



Figure 14.
Structure
Condition:
Poor.

Large crack and minor material loss in structure wall above pipe



Figure 15.
Structure
Condition:
Failed.

Heavy material loss under curb inlet throat



Figure 16.
Structure
Condition:
Could Not Inspect.

Unable to open grate inlet



Figure 17.
Pipe
Condition:
Excellent.

New pipe.
No visible
defects,
cracks, etc.



Figure 18.
Pipe
Condition:
Good.

Pipe shows
some signs
of aging or
very minor
defects



Figure 19.
Pipe
Condition:
Fair.

Minor to
moderate
corrosion
along invert
of pipe.



Figure 20.
Pipe
Condition:
Poor.

Corrosion
and minor
holes along
invert of
pipe



Figure 21.
Pipe
Condition:
Failed.

Invert of pipe
has corroded
away



Figure 22.
Pipe
Condition:
Could Not
Inspect.

Both ends of
pipe are
buried.

5.4. Results

An inspection was attempted on a total of 580 structures and approximately 24,403 linear feet of pipe as part of this master plan. A majority of the structures (498 or 86 percent) and a majority of the pipe length (22,960 linear feet or 94 percent) were rated as fair or better, requiring no repair or replacement. In addition, about a quarter of the total pipe length (5,338 linear feet or 22 percent) was found to be free of any obstructions or defects at all. However, a small portion of the structures (42 or 7 percent) and a small portion of the total pipe length (1,228 linear feet or 5 percent) was rated as poor or failed, warranting repair or replacement. In addition, about a quarter of the total pipe length (6,158 linear feet or 25 percent) was found to be obstructed. It was found that 40, or 7 percent of the structures, could not be inspected because of obstruction, inaccessibility, or safety concerns; 171 linear feet, or 0.7 percent of the total pipe length, was only partially inspected because of obstruction; 44 linear feet, or 0.2 percent of pipe, was not inspected at all because it was completely inaccessible. Any structure or pipe length that did not receive a complete inspection was rated as "Could Not Inspect." Summaries of structure conditions and pipe conditions are included in tables 6 and 7, respectively. A summary of pipe defects is included in Table 8.

Table 6. Structure Conditions Summary.

Structure Condition	Number of Structures	Percent of Total
Excellent	101	17.4
Good	248	42.8
Fair	149	25.7
Poor	31	5.3
Failed	11	1.9
Could Not Inspect	40	6.9
Total	580	100.0

Table 7. Pipe Conditions Summary.

Pipe Condition	Linear Feet of Pipe	Percent of Total
Excellent	5,866	24.0
Good	9,754	40.0
Fair	7,340	30.1
Poor	756	3.1
Failed	472	1.9
Could Not Inspect	215	0.9
Total	24,403	100.0

Table 8. Pipe Defects Summary.

Pipe Defect	Linear Feet of Pipe	Percent of Total
Corrosion	13,499	55.3
Deformation	5,671	23.2
Holes	1,235	5.1
Obstructed	6,158	25.2
Total System Length*	24,403	100.0

*Total system length does not equal the sum of the length of all defects because some pipe lengths contain multiple types of defects and others contain none.

5.5. Stormwater Infrastructure Value & Repairs

The existing stormwater system within the local city limits has an estimated total value of \$7.7 million. The existing structures have an estimated total value of \$3.8 million; an estimated \$252,000 is needed for repairs (excluding the cost of surface restoration). The existing pipes have an estimated total value of \$3.9 million, an estimated \$214,900 is needed for repairs (excluding the cost of surface restoration). Of the pipe length that is rated poor or failed, 89 percent is corrugated metal pipe. Summaries of structure repairs and pipe repairs are included in Table 9 and a summary of types of pipes in need of repair is included in Table 10.

Table 9. Repair Summary.

Structure Condition	Amount	Estimated Value*
Structure Repair (number of)	42	\$252,000
Pipe Repair (linear feet)	1,228	\$214,900

* Estimated \$6,500 per structure, \$160 per linear foot of pipe

Table 10. Pipe Types in Need of Repair.

Pipe Type	Linear Feet of Pipe	Percent of Total
Corrugated Metal Pipe	1,097	89.3
Reinforced Concrete Pipe	84	6.8
High-density Polyethylene	41	3.3
Cast Iron Pipe	6	0.5
Total	1,228	100.0

6. STORMWATER SYSTEM RESPONSIBILITIES

During rain events, impervious surfaces such as rooftops, driveways, parking lots, and roads prevent water from being absorbed in the ground. When a rainfall event occurs, the portion of water that is not absorbed into the ground becomes “stormwater runoff”. All properties contribute to stormwater runoff and property owners are responsible for maintaining storm drainage flowing from and through their property.

6.1. Maintenance of Public Drainage Areas

The city maintains the public drainage system and structures within dedicated public storm drainage easements or within the city public right-of-way. The public drainage infrastructure is composed of inlets, pipes, concrete-lined ditches, roadside ditches, and culverts installed in accordance with City standards at the time of construction and accepted by the city for maintenance. Maintenance may include the inspection, clearing and cleaning of obstructed or partially blocked infrastructure, rehabilitation, and replacement of storm drainage infrastructure. The city does not maintain property that contains public or private utility easements. The property owner is responsible for maintaining the property for which public drainage easements are located on by mowing grass, removal of trash, vegetation, debris, and yard waste. Maintenance of driveway culverts including removal of debris, trash and unwanted vegetation is the responsibility of the property owner. Refer to Section 9.3 for recommendations regarding maintenance of ditches and driveway culverts.

6.2. City-Funded Stormwater Projects

The city has limited funding to address stormwater maintenance and improvement projects. Prioritization of city funded for stormwater projects is discussed in Section 7.2. City funded stormwater projects can be categorized into two categories:

- Maintenance or improvements to the existing public storm sewer system
- Improvements to an unimproved private storm sewer system that does not meet city standards or without a storm sewer system in place

The construction of a city-funded public storm sewer system will be considered by the governing body when the following conditions are met:

- The need for a public storm sewer system has been identified by surface flooding or erosion concern
- The contributing drainage area for the identified concern exceeds 2 acres in contributing area (APWA 2011)
- The corrections of such concerns extend across public property, public right-of-way or three or more private properties

- The scope and cost of improvements requires city coordination and financial assistance in order to provide a well-engineered and financially feasible solution to address the concern
- The public as a whole benefits from the improvement of the concern, or other city infrastructure is impacted by the non-existence of a storm sewer system, for example, a public roadway flooding from the stormwater runoff from a single property

Private problems/issues were not considered for the recommended projects as outlined in this master plan. A city-funded project will not be considered when:

- Drainage problems are specific to individual properties and not contributed to or compounded by others
- Private property owner gutters, downspout, and sump pumps contributing to a drainage concern
- Groundwater concerns due to improper yard grading and drainage on individual lots

7. PROJECT PRIORITIZATION

Feedback provided through the public outreach effort and through city staff internal records of historical flooding and drainage problems within the city was used to develop project locations. These locations were pinned on aerial and topographic maps within GIS and then grouped together within the watershed. A total of 17 public projects were identified throughout the city to address current flooding, erosion, and deteriorating stormwater infrastructure problems. Projects were assigned names according to the road intersection that was closest to the cluster of pinned flooding locations. No hydrologic or hydraulic modeling was completed to confirm the magnitude and extent of the flooding problems or to design improvements recommended within the projects. Conceptual solutions developed for the projects are based on experience working on similar projects and must be refined as the projects move forward to design phases.

7.1. Prioritization Methodology

Municipalities use a variety of unique philosophies when prioritizing stormwater improvement projects. Each philosophy begins with the goals or mission of the city and its leaders and then is tailored to address the stormwater needs of the community. Prioritization will assist the city when planning future projects by allowing the efficient use of the limited funding available to address stormwater issues. For the City of Edgerton, the stormwater master plan addresses prioritization by balancing the areas of greatest need with the most cost-effective projects.

Each of the stormwater projects were ranked based on benefit scores and estimates of probable project costs to prioritize the projects. Conceptual solutions and estimates of probable

construction costs were prepared for all 17 public projects. Initially, the scope of the master plan outlined work to be completed for up to 10 projects; however, conceptual solutions and estimates were prepared for each project because the magnitude of the projects was smaller than initially expected.

A problem-severity scoring system was established as a basis for assessing and quantifying a project benefit. The system developed for the city follows methodology that has been used in other communities where project needs have been based on flooding, erosion, water quality, and replacement of the existing system. Higher benefit scores are assigned to flooding that has caused casualties, flooded buildings, flooded streets, and/or erosion, in that specific order. Flooding locations that frequently flood versus rarely flood are also scored higher on the benefit scale. Existing pipes and structures that have been identified in fair or poor condition through the condition assessment were also assigned benefit points on the basis that the project would remove and replace infrastructure that should be rehabilitated.

The proposed methodology is a prioritization tool, which is used to plan future projects efficiently. However, it can never fully account for all situations that ultimately determine the city's stormwater prioritization needs. Justification to move projects higher or lower on the priority list should always be considered. Examples of situations that have already been discussed with city staff include the following:

- Prioritization projects within the same sub-basin are recommended to be completed from the downstream to upstream direction. Upstream improvements proceeding before downstream improvements can create a negative public perception, even though no increase in stormwater runoff volume may be associated with it.
- Prioritization projects with future upstream development, should be completed prior to upstream development occurring.
- Coordination with other city improvement projects (street, sidewalk, sanitary sewer, etc.) would provide an economy of scale by completing both projects at the same time, saving the project area from being disrupted multiple times.
- Easement and property acquisition may delay project schedules and start dates. Projects that require easement from multiple properties can be delayed depending on residents' willingness to cooperate.

7.2. Project Rankings

Each project was assigned a benefit score using a rating form to position projects in order of importance. Projects were assigned point values for benefit scores based on factors such as home flooding, street flooding, erosion, and the condition of nearby stormwater infrastructure; a project with a high benefit score indicates more problems that should be corrected.

Projects were then ranked on benefit scores in order from highest score to lowest score and assigned a “benefit weight” based on this ranking. The highest scoring project was assigned a benefit weight of 100 points, and the lowest scoring project was assigned 0 points. Each project that scores lower than the highest scoring project loses 6.25 points. The second-highest scoring project receives 93.75 points, and the third-highest scoring project receives 87.50 points, for example.

A cost-to-benefit (C/B) analysis was then completed for each improvement project. This analysis was determined by dividing the estimated total project costs by the benefit score received on the project rating form; a lower C/B ratio indicates a higher prioritization. Projects were then ranked again, this time by C/B ratio, and assigned a “C/B weight” based on this ranking, similar to the process described above for benefit weight.

Finally, an overall weighted score was calculated by adding 50 percent of the benefit weight with 50 percent of the C/B weight. Projects were then ranked a final time based on this overall weighted score to determine an overall ranking. The overall scoring and ranking process for one of the identified project areas, West Seventh and West Hulett Streets, is explained below as an example:

- Benefit Weight
 - Two instances of building flooding were reported. Based on the flooding frequency reported in the questionnaires, a frequency multiplier of 3 was assigned. A severity multiplier of 1 was assigned based on the number of buildings (0.5 per building). Using the base score of 40 points assigned to “flooding of a habitable building” and accounting for these multipliers results in a score of 120 points.
 - Street flooding was reported at the north end of West Seventh Street. Based on the flooding frequency reported in the questionnaire, a frequency multiplier of 3 was assigned. A severity multiplier of 1.5 was assigned because street flooding restricts emergency vehicle access. Using the base score of 20 points for “flooding of a residential street more than 7 inches” and accounting for these multipliers results in a score of 90 points.
 - Two instances of “poor drainage” (nuisance erosion, ponding water, yard flooding, etc.) were reported. Ten points were assigned for each instance, resulting in 20 points.
 - The total benefit score for this project is 230 points, which resulted in a benefit rank of fourth out of 17 total projects. A benefit weight of 81.3 points was assigned for this ranking.
- C/B Weight
 - The estimated project cost is \$497,790.

- Dividing this cost by the benefit score of 230 points results in a C/B ratio of 2164, which resulted in a C/B rank of 12th out of 16 total projects. A C/B weight of 31.3 points was assigned for this ranking.
- Overall Ranking
 - Adding 50 percent of the benefit weight of 81.3 and 50 percent of the C/B weight of 31.3 results in a weighted score of 56.3 points. This score resulted in an overall rank of sixth out of 17 total projects.

A summary of project rankings and scoring for all 17 public projects are included in Table 11. Rating forms for each project area are included in Appendix C.

Table 11. Project Rankings.

Project Name	Estimated Project Cost	Overall Rank	Weighted Score	C/B ¹ Rank	Benefit Rank
East Second & East McDonald Streets (A)	\$194,500	1	96.9	1	2
West Eighth & West Nelson Streets (B)	\$249,600	2	75.0	5	5
West Eighth & West Nelson Streets (A)	\$183,000	3	71.9	4	7
East Fourth & East McDonald Streets	\$99,300	T-4	65.6	2	11
West Eighth Street & West Meriwood Lane (A)	\$116,600	T-4	65.6	3	10
First Street & U.S. Highway 56	\$175,700	T-6	56.3	7	9
West Seventh & West Hulett Streets	\$497,800	T-6	56.3	12	4
West Third Street & West Meriwood Lane	\$615,200	T-6	56.3	13	3
West Martin & West Fourth Streets ("Horseshoe Area")	\$2,661,300	T-9	53.1	17	1
West Eighth Street & Heather Knoll Drive (Detention Basin)	\$198,900	T-9	53.1	9	8
West Third Street & West Edgewood Drive (A)	\$525,300	11	40.6	15	6
20125 Edgerton Road (Quarry)	\$92,600	T-12	37.5	8	14
West Fourth Street & West Meriwood Lane	\$37,000	T-12	37.5	6	16
501 East Sixth Street (Edgerton City Lake Low Water Crossing)	\$154,700	14	31.3	11	13
513 Heather Knoll Circle	\$15,900	15	21.9	10	17

Project Name	Estimated Project Cost	Overall Rank	Weighted Score	C/B ¹ Rank	Benefit Rank
East Second Street & East McDonald Street	\$338,600	16	18.8	16	12
East Fifth Street & East McCarty Street	\$89,000	17	15.6	14	15

¹Cost-to-benefit ratio

7.3. Project Descriptions

Conceptual solutions and cost estimates were prepared for each project. Figure 23 shows the location of all 17 public project areas. Descriptions of project areas and figures displaying conceptual solutions of the identified project areas are outlined in the following sections. A detailed breakdown of estimated project costs is included in Appendix D.

Guidance and recommendations on public project criteria are outlined in Section 6.2. Table 12 contains a summary of the public project criteria met for each of the recommended projects. A few of the project boundaries include reported flooding or other problems that have been considered private issues based on the criteria outlined in Section 6.2. Reported problems that are located within a project boundary but are deemed to be private issues are noted under the “additional notes” paragraph for each project description and have been indicated on Figures 24-39. Private issues do not contribute to the project’s benefit score.



Table 12. Public Criteria for Each Project.

Project Name	Contributing Drainage Area > 2 acres	Located within Right-of-Way or Easement	Existing System Undersized or in Poor Condition	Multiple Lots (>3) Impacted	Impacts Public Infrastructure
East Second & East McDonald Streets (A)	✓	✓	-	-	✓
West Eighth & West Nelson Streets (B)	-	✓	-	-	✓
West Eighth & West Nelson Streets (A)	-	-	-	-	✓
East Fourth & East McDonald Streets	✓	✓	✓	-	✓
West Eighth Street & West Meriwood Lane	✓	✓	-	-	✓
First Street & U.S. Highway 56	✓	✓	✓	-	✓
West Seventh & West Hulett Streets	✓	✓	-	-	-

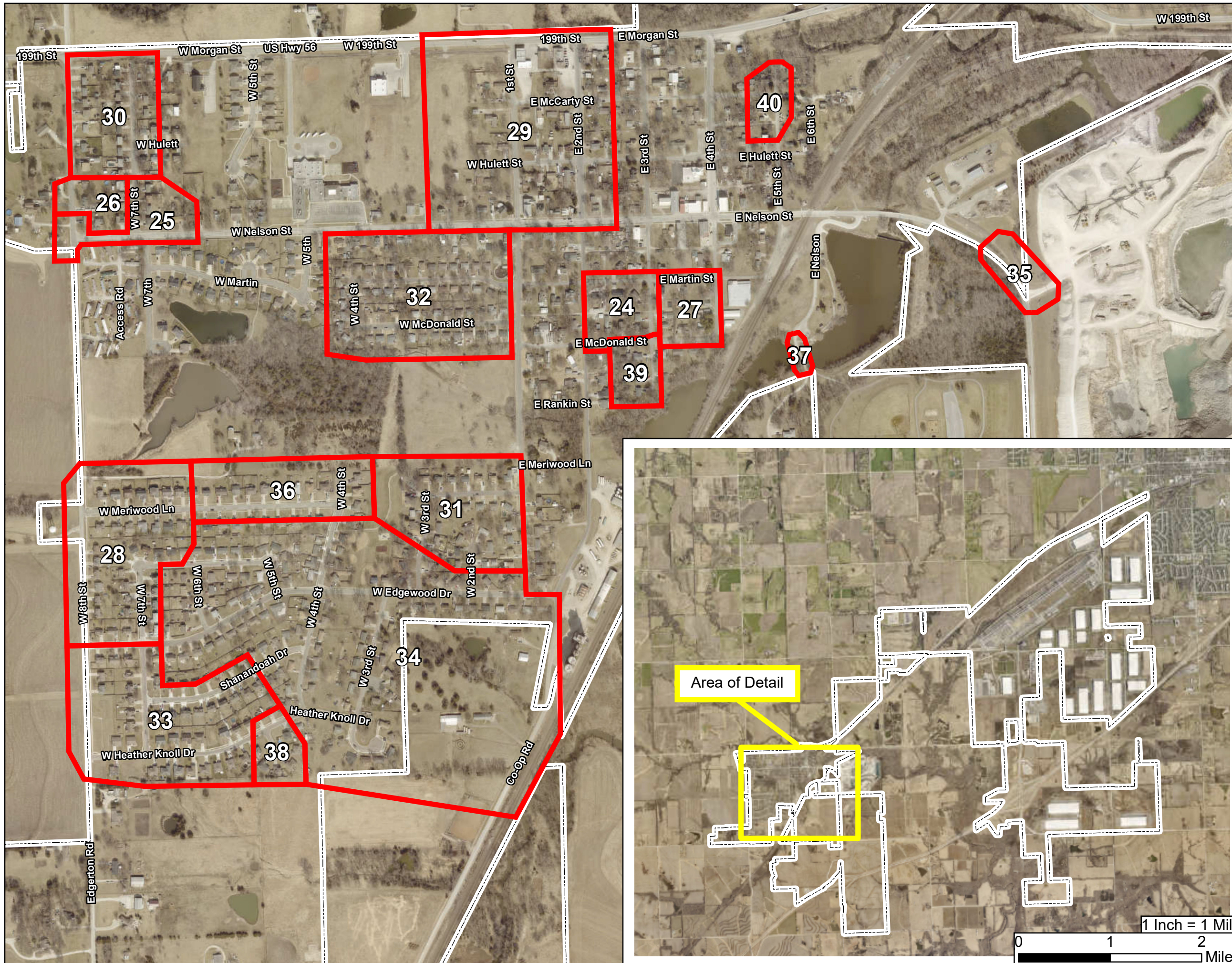
Project Name	Contributing Drainage Area > 2 acres	Located within Right-of-Way or Easement	Existing System Undersized or in Poor Condition	Multiple Lots (>3) Impacted	Impacts Public Infrastructure
West Third Street & West Meriwood Lane	✓	✓	✓	-	✓
West Martin & West Fourth Streets ("Horseshoe Area")	✓	✓	✓	✓	✓
West Eighth Street & Heather Knoll Drive (Detention Basin)	✓	✓	✓	-	✓
West Third Street & West Edgewood Drive	✓	✓	✓	-	✓
20125 Edgerton Road (Quarry)	✓	✓	✓	-	✓
West Fourth Street & West Meriwood Lane	✓	✓	✓	-	-
501 East Sixth Street (Edgerton City Lake Low Water Crossing)	✓	✓	✓	-	✓
513 Heather Knoll Circle	-	✓	✓	-	-
East Second Street & East McDonald Street (B)	✓	✓	✓	-	✓
East Fifth Street & East McCarty Street	-	✓	✓	-	✓

Figure 23.

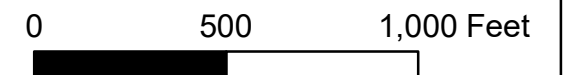
Improvement Projects Overview

-  Project Areas
-  Overall City Limits

- 24. E 2nd St & E McDonald St
- 25. W 8th St & W Nelson St (B)
- 26. W 8th St & W Nelson St (A)
- 27. E 4th St & E McDonald St
- 28. W 8th St & W Meriwood Ln
- 29. 1st St & Hwy 56
- 30. W 7th & W Hulett St
- 31. W 3rd St St & W Meriwood Ln
- 32. W Martin St & W 4th St ("Horseshoe" Area)
- 33. W 8th St & Heather Knoll Dr (Detention Basin)
- 34. W 3rd St & W Edgewood Dr
- 35. 20125 Edgerton Rd (Quarry)
- 36. W 4th St & W Meriwood Ln
- 37. 501 E 6th St (Edgerton City Lake Low Water Crossing)
- 38. 513 Heather Knoll Cir
- 39. E 2nd St & E McDonald St (B)
- 40. E 5th St & E McCarty St

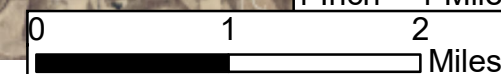


1 Inch = 500 Feet



olsson[®]

1 Inch = 1 Mile



7.3.1. East Second & East McDonald Streets (A)

Problem Description

This project is located toward the middle of the local city limits on the eastern side. An undersized crossing at the alleyway on the east side of East Second Street overtops, directing overflow toward the detached garage and residence at 200 East McDonald Street. Driveway culverts along the east side of East Third Street are likely undersized and were observed to be obstructed during inspection. These clogged driveway culverts are likely the cause of the reported street flooding along East Third Street.

City Funding Justification

The reported street flooding along East Third Street affects public roadways. The reported building flooding at 200 East McDonald Street is caused by storm sewer that is clogged and possibly undersized.

Conceptual Solution

The conceptual solution for this project is shown in Figure 24. The conceptual solution includes installing a new system of area inlets and stormwater pipe running from west to east along the north side of the alleyway between East Second Street and East Third Street. Additional grading will also take place to direct water toward the area inlet openings and away from the home at 200 E. McDonald Street. This proposed system will tie into the existing stormwater system along the west side of East Third Street. The undersized driveway culverts along the east side of East Third Street will be replaced with larger diameter pipes, and ditches in the area will be regraded to accommodate the larger pipe sizes and improve drainage. In addition, driveway culverts along the west side of East Third Street, many of which were observed to be obstructed, will be cleaned and ditches between these culverts will be regraded. Cleaning and replacing driveway culverts along both sides of East Third Street will help mitigate street flooding that was reported. The estimated project cost is **\$194,500**.

Additional Notes

None

Summary of problem:
 Clogged/undersized driveway culverts causing street flooding near 519 E 3rd St. Undersized culvert at alleyway along east side of 2nd street (between E McDonald St and E Martin St). Surface water flows along east side of house at 200 E McDonald St causing reported building flooding.

Additional notes:
 The city has an upcoming street project planned along 2nd street.

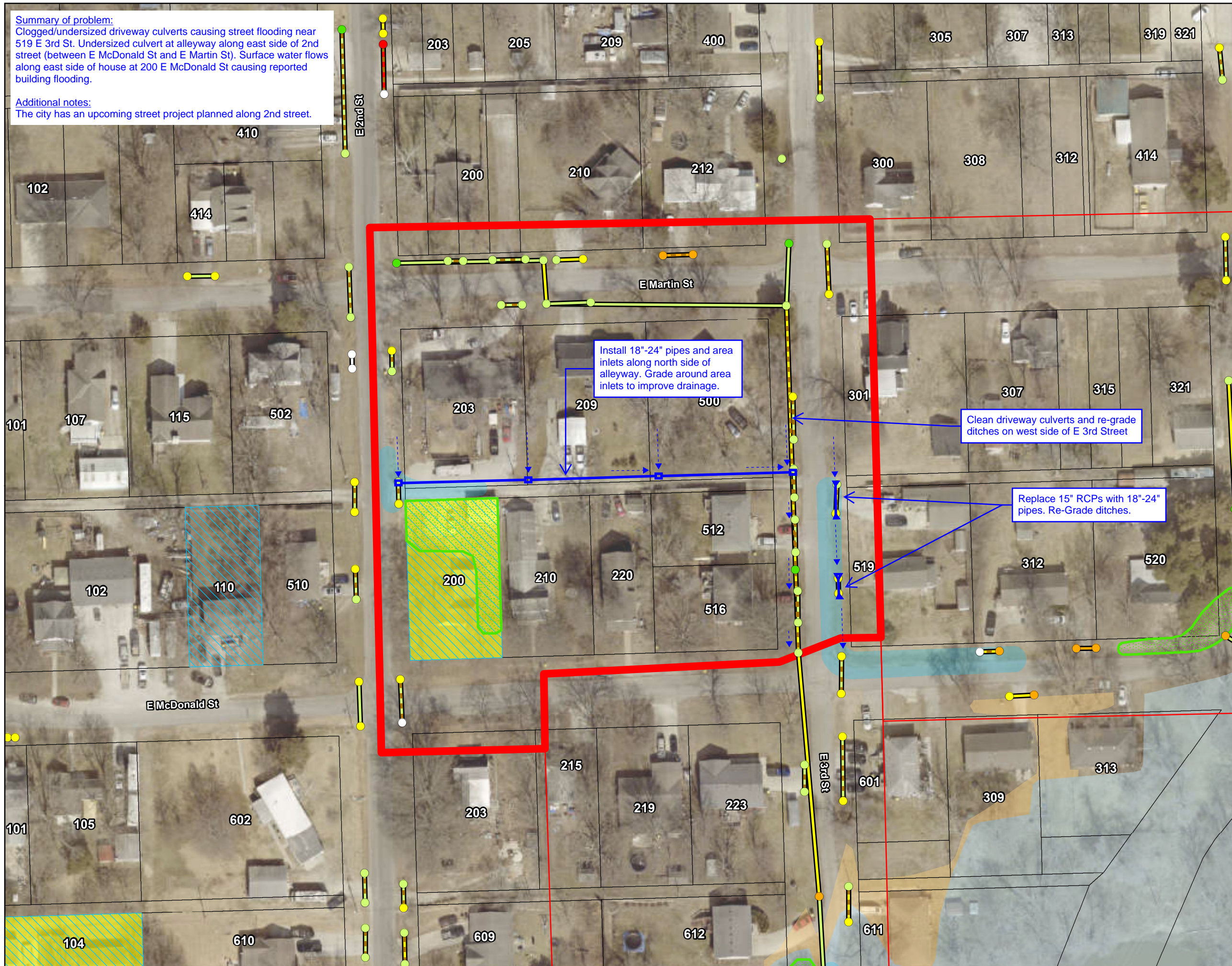
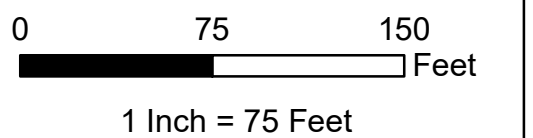


Figure 24.
 E 2nd St & E McDonald St (A)

- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
 FEMA - Federal Emergency Management Agency



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7.3.2. West Eighth & West Nelson Streets (B)

Problem Description

This project is located near the northwest corner of the local city limits. Two instances of street flooding were reported at the intersection of West Nelson Street and West Eighth Street (Edgerton Road) and the intersection of West Nelson Street and West Seventh Street.

City Funding Justification

Public roadways are affected by reported street flooding issues in the area.

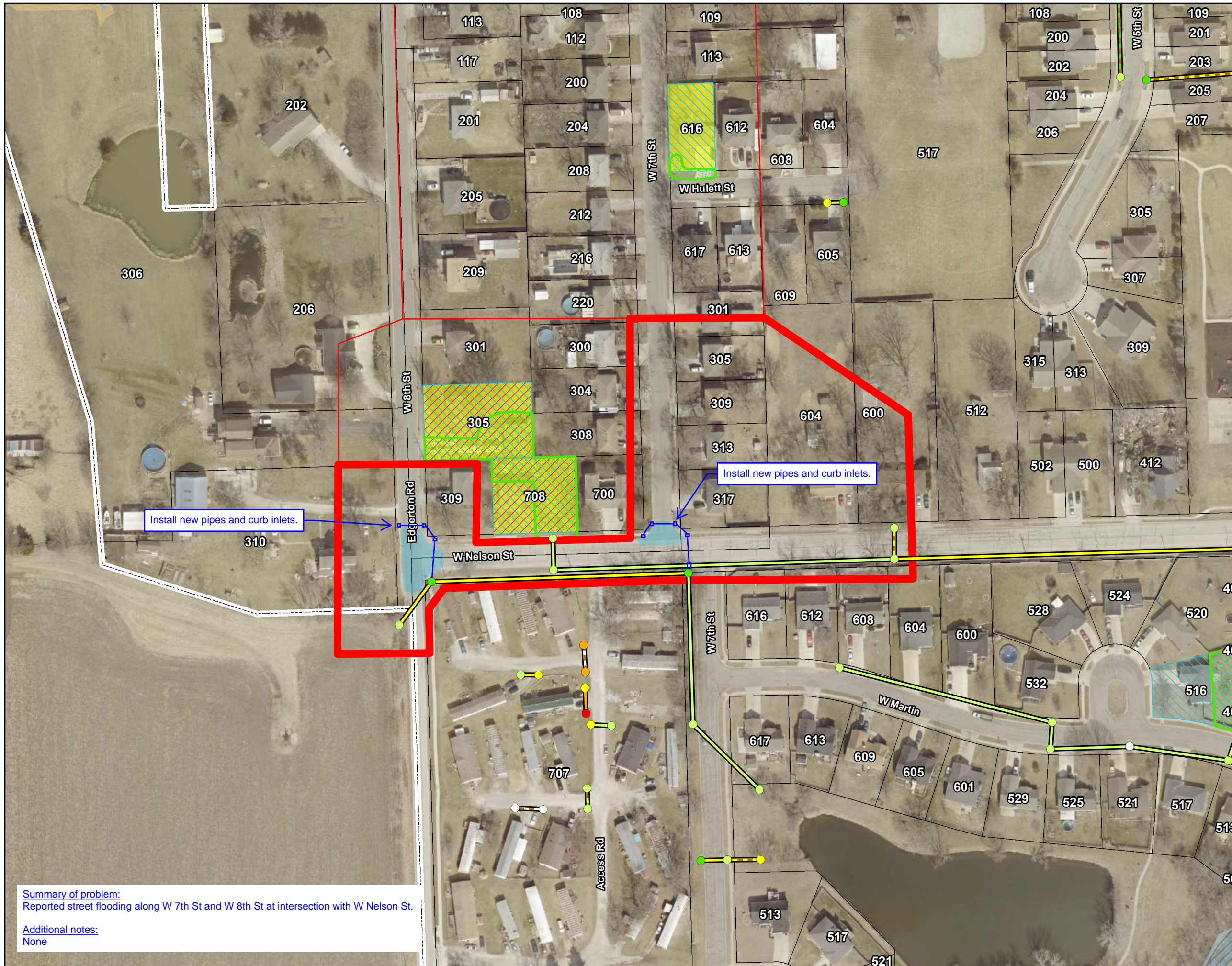
Conceptual Solution

The conceptual solution for this project is shown in Figure 25. Systems of new stormwater pipes and inlets will be installed at the aforementioned intersections to help capture runoff and mitigate reported street flooding. The estimated project cost is **\$249,600**.

Additional Notes

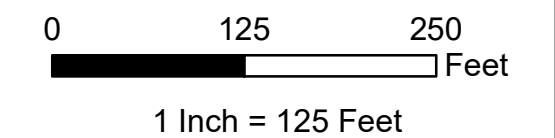
None

Figure 25.
W 8th St & W Nelson St (B)



- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

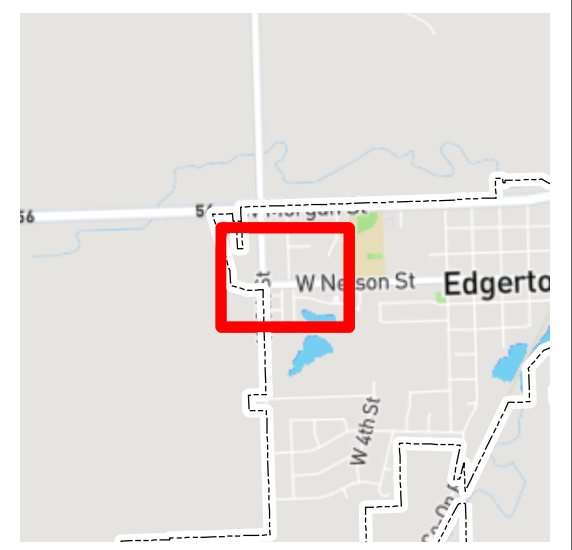
Note:
FEMA - Federal Emergency Management Agency



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Summary of problem:
Reported street flooding along W 7th St and W 8th St at intersection with W Nelson St.

Additional notes:
None



7.3.3. West Eighth & West Nelson Streets (A)

Problem Description

This project is located near the northwest corner of the local city limits. Two homes reported building flooding and sanitary sewer backups because of poor drainage throughout the rear yards in the neighborhood. During rainfall events, runoff drains from north to south throughout the rear yards of homes between West Eighth Street and West Seventh Street. There are no defined drainage paths or swales in this area, causing runoff to spread out wide and pond in low points in rear yards and around sanitary sewer manholes. It was reported that the sanitary sewer manholes frequently are submerged by more than a foot of water during intense rainfall events. Ponding water around these sanitary sewer manholes allows runoff to infiltrate into the sanitary sewer, overwhelming the system and creating backups to nearby homes. It was also reported that the city had raised the top elevation of the sanitary sewer manholes in the past, but the infiltration problems still persist.

City Funding Justification

The reported issues at 305 West Eighth Street and 708 West Nelson Street are caused by a large-scale drainage problem and lack of stormwater infrastructure, which cannot be addressed by individual property owners and affects sanitary sewer.



















Conceptual Solution

The conceptual solution for this project is shown in Figure 26. The conceptual solution includes installing a new system of area inlets and stormwater pipes throughout the rear yards in the area. Yards will be regraded to provide positive drainage toward area inlets. Regrading will guide runoff toward designated flow paths and inlets and help prevent ponding issues that are currently experienced in this area. This solution will also help prevent sanitary sewer backups because less runoff will be allowed to infiltrate into the sanitary sewer manholes in the area. The estimated project cost is **\$183,000**.

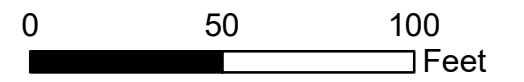
Summary of problem:
 Poor yard drainage at 305 W 8th St and 708 W Nelson St causing ponding water, erosion, building flooding and sanitary infiltration/backups.

Additional notes:
 The issues reported at 305 W 8th St and 708 W Nelson St are partially due to improper neighborhood / yard drainage but were included due to the sanitary sewer infiltration.

Figure 26.
 W 8th St & W Nelson St (A)

-  Project Areas
- Storm Infrastructure Condition**
 -  Excellent
 -  Good
 -  Fair
 -  Poor
 -  Failed
 -  Could Not Inspect
-  Obstructed Pipe
-  Nuisance Drainage Issues
-  Groundwater
-  Sanitary Backup
-  Building Flooding
-  Street Flooding
-  Parcels
-  Overall City Limits
- FEMA Floodplain**
 -  Current Effective Floodway
 -  Current Effective Zone A/AE
 -  Current Effective Zone X

Note:
 FEMA - Federal Emergency Management Agency



1 Inch = 50 Feet



7.3.4. East Fourth & East McDonald Streets

Problem Description

This project is located toward the middle of the local city limits on the eastern side. Driveway culverts along the north side of E McDonald Street are likely undersized and were observed to be obstructed during inspection. The crossroad pipe at the corner of East Fourth Street and East McDonald Street has an upstream invert elevation that sits higher than the ditch that is draining into it. This causes water to pond and erode the yard of the nearby home. In addition, several pipes along East Fourth Street were observed to be obstructed during inspection.

City Funding Justification

Existing stormwater infrastructure in the area is undersized, causing water to back up onto public roadways.

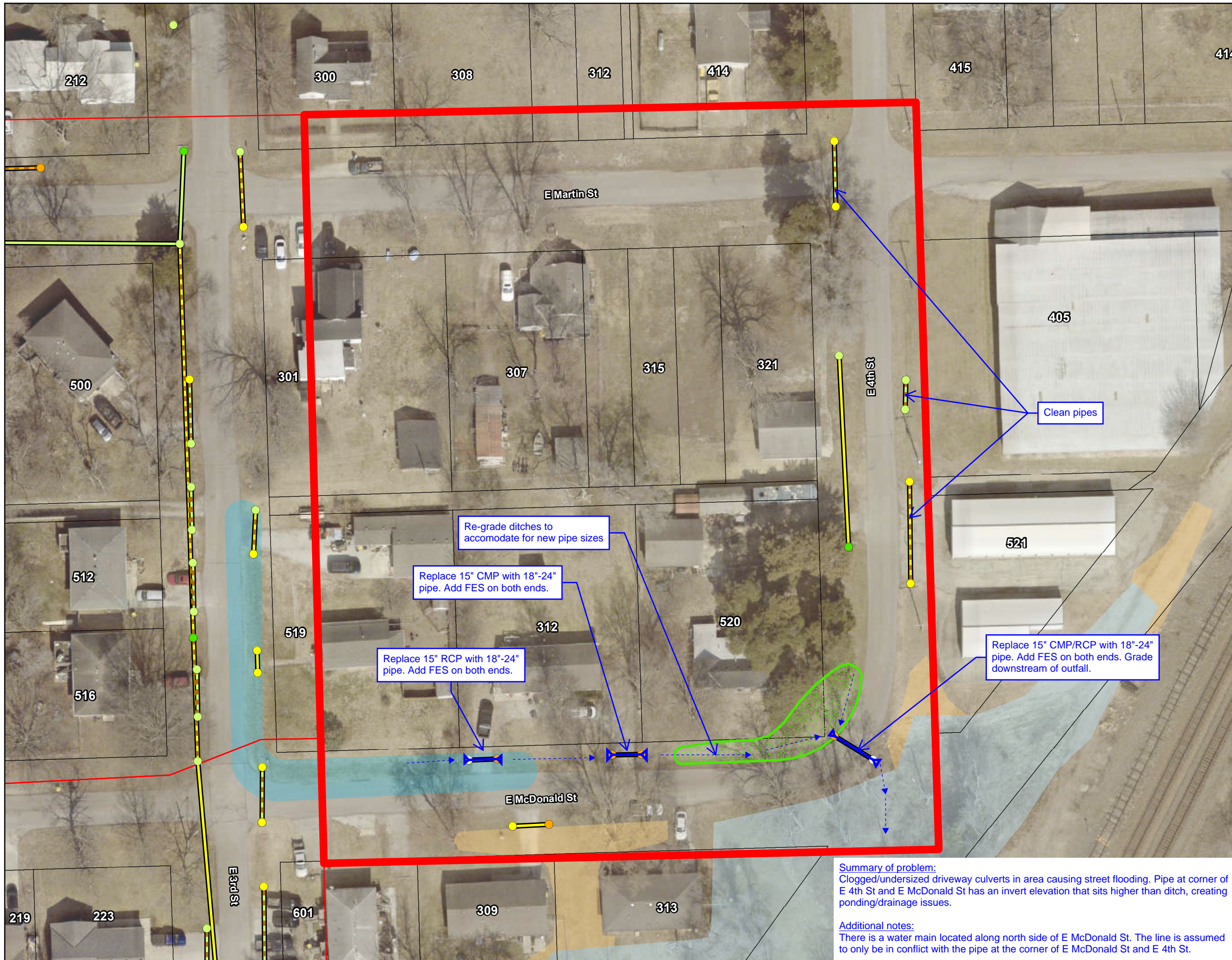
Conceptual Solution

The conceptual solution for this project is shown in Figure 27. It includes replacing the driveway culverts along the north side of East McDonald Street with larger diameter pipes. The ditches in this area will also be regraded to accommodate the increased pipe sizes and improve drainage. The crossroad pipe at the corner of East Fourth Street and East McDonald Street will be replaced with a larger diameter pipe, and the area downstream of the outfall will be graded to ensure proper drainage. Other pipes in the area observed to be obstructed will also be cleaned out. The estimated project cost is **\$99,300**.

Additional Notes

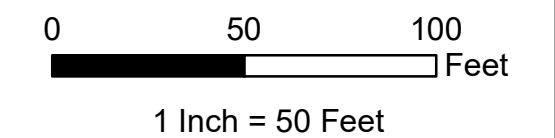
The proposed improvements may be in conflict with city-owned water mains at the corner of East McDonald Street and East Fourth Street. Waterline relocations have been accounted for in the opinion of probable cost.

Figure 27.
E 4th St & E McDonald St



- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
FEMA - Federal Emergency Management Agency



Summary of problem:
Clogged/undersized driveway culverts in area causing street flooding. Pipe at corner of E 4th St and E McDonald St has an invert elevation that sits higher than ditch, creating ponding/drainage issues.

Additional notes:
There is a water main located along north side of E McDonald St. The line is assumed to only be in conflict with the pipe at the corner of E McDonald St and E 4th St.



7.3.5. West Eighth Street & West Meriwood Lane

Problem Description

This project is located near the west end of the local city limits. Street flooding was reported along Edgerton Road (West Eighth Street) near the water tower. A nearby pipe is also in poor condition.

City Funding Justification

The reported street flooding along West Eighth Street impacts a public roadway.

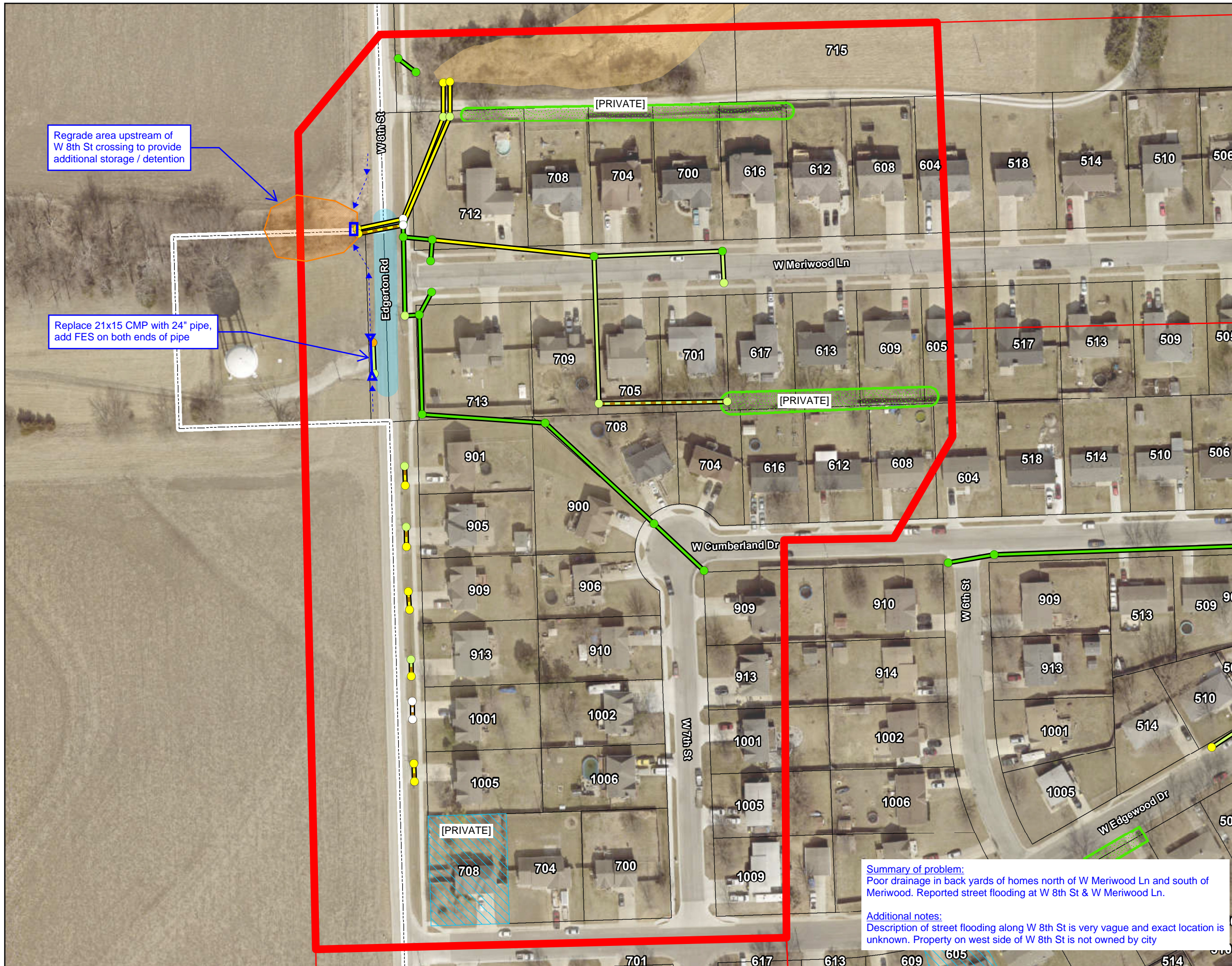
Conceptual Solution

The conceptual solution for this project is shown in Figure 28. To help address street flooding and improve drainage along Edgerton Road, the pipe crossing at the entrance to the water tower will be increased in size, and ditches along the west side of West Eighth Street will be regraded. An area just to the north of the water tower will be excavated to provide detention of runoff. This area will function as a detention basin, providing additional storage volume of runoff and detaining peak flows, which will help alleviate the reported street flooding along Edgerton Road. The estimated project cost is **\$116,600**.

Additional Notes

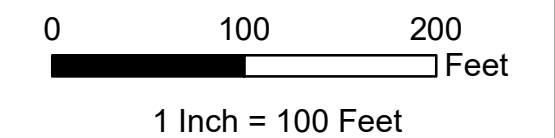
Description of street flooding in this area was vague and the location is approximated. The property on the west side of Edgerton Road is not owned by the city and will require property acquisition; this cost is not included in the opinion of probable cost.

Figure 28.
W 8th St & W Meriwood Ln



- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

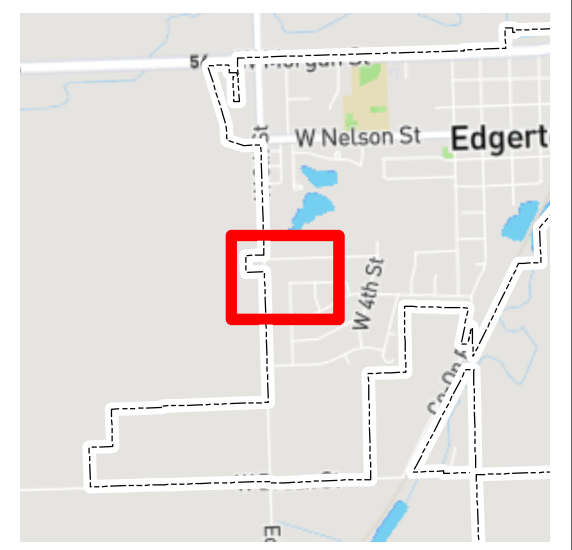
Note:
FEMA - Federal Emergency Management Agency



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Summary of problem:
Poor drainage in back yards of homes north of W Meriwood Ln and south of Meriwood. Reported street flooding at W 8th St & W Meriwood Ln.

Additional notes:
Description of street flooding along W 8th St is very vague and exact location is unknown. Property on west side of W 8th St is not owned by city



7.3.6. First Street & U.S. Highway 56

Problem Description

This project is located near the middle of the local city limits on the north side. The storm sewer system along the south side of U.S. Highway 56 has cover issues, with the top of some pipes exposed. Additionally, street flooding was reported at the north end of First Street at the intersection with U.S. Highway 56.

City Funding Justification

Existing stormwater infrastructure along south side of U.S. Highway 56 is in poor condition and is possible undersized, leading to street flooding.

Conceptual Solution

The conceptual solution for this project is shown in Figure 29. Modifications to the storm sewer along the south side of U.S. Highway 56 will also take place with project A. A 24-inch flared end section will be installed on the existing pipe at the southwest corner of the intersection of First Street and U.S. Highway 56. The ditches upstream of this pipe will also be regraded to improve drainage toward the pipe. An area inlet will be installed on the southeast side of this intersection to capture runoff in this area and help mitigate street flooding. The existing pipes in the area will be connected to the proposed area inlet. Curb and gutter may be required in the “island” between the pavements in this area to raise the grade around the existing pipes and provide cover above the top of the pipe. Installation of valley gutters around the perimeter of 101 E. Morgan Street may also be required to guide runoff toward the storm sewer, because this area is very flat. New pipes and inlets will also be installed along the south side of U.S. Highway 56 between First Street and Second Street, replacing existing pipes in the area that are undersized. The estimated project cost is **\$175,700**.

Additional Notes

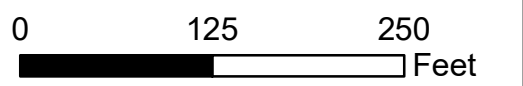
The reported flooding issues at 118 West Nelson Street and 200 East Nelson Street are due to groundwater flooding and were considered to be private issues. The flooding and erosion issues at 103 and 108 First Street have been considered private issues as well as they are located on private property and do not appear to be caused by lack of stormwater infrastructure or by a large-scale drainage problem. Much of the existing storm sewer is located within KDOT right-of-way. Prior to design of this project, coordination with KDOT should take place to determine what responsibilities and costs the city would be responsible and what KDOT would be responsible for.

Figure 29.
1st St & Hwy 56



- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
FEMA - Federal Emergency Management Agency



1 Inch = 125 Feet



Summary of problem:
Storm sewer along south side of Hwy 56 has cover issues. Reported street flooding at 1st St and Hwy 56.

Additional notes:
Much of existing storm sewer along Hwy 56 is within KDOT right-of-way. Coordination with KDOT will be needed.

Flooding / erosion issues at 103 and 108 1st St are being considered private issues as they are on private property and don't appear to be due to a lack of storm sewer in the area.

House at 203 E Morgan St has reported flooding from surface water. Runoff from alleyway and houses to south drains into back of building. This area is being considered private.



7.3.7. West Seventh & West Hulett Streets

Problem Description

This project is located near the northwest corner of the city limits. Building flooding and erosion issues were reported by the resident at 616 W. Hulett Street. Currently, no stormwater infrastructure is located in the neighborhood. The driveway at the residence at this address also slopes down toward the garage from the roadway. This causes water to flood the garage and basement area of the home when curb and gutter in the street is overtopped. The intersection of West Seventh Street and West Hulett Street is also flat. Mild slopes cause slow runoff velocities, allowing more time for runoff to pond and overtop nearby curb and gutter. The resident at 100 W. Seventh Street reported building flooding and nuisance drainage issues. Runoff flows from south to north along West Seventh Street until it reaches the dead end on the north end of the street. Sediment and debris have accumulated at the north end, causing water to back up and pond in the area until it overtops the debris and flows into the nearby ditch on the south side of U.S. Highway 56. This ditch also has little to no slope and ponds water, creating additional drainage issues.

City Funding Justification

The reported erosion issues and building flooding at 616 West Hulett Street are due to a lack of stormwater infrastructure in the area. The reported drainage and flooding issues at the north end of West Seventh Street are also due to a lack of stormwater infrastructure along the roadway.

Conceptual Solution

The conceptual solution for this project is shown in Figure 30. It includes installing a new system of curb inlets and pipes along West Seventh Street. This new storm sewer system will help capture runoff from the street before it can pond and overtop curb and gutter. Valley gutter will be installed across West Hulett Street at its intersection with West Seventh Street. The valley gutter will help direct runoff across the street at this intersection. The estimated project cost is **\$497,800**.

Additional Notes

The city indicated that KDOT has re-graded the ditch along the south side of U.S. Highway 56 since the master plan inspections. This project should be re-evaluated again in the future to determine if issues are still present. Prior to design of this project, coordination with KDOT should also take place to determine city and KDOT responsibilities. The city recently constructed a new asphalt trail along the south side of U.S. Highway 56. Efforts should be made to minimize disturbance of the trail during the design and construction process. The city indicated that flooding issues at 616 West Hulett Street may be related to water line issues, which have been addressed recently.

Summary of problem:
 Drainage issues at north end of W 7th St causing reported street and building flooding, erosion issues. House at 616 W Hulett St has reported flooding issues.

Additional notes:
 Driveway to 616 W Hulett St slopes towards garage from street. The ditch along the south side of Hwy 56 has little to no slope from east to west and ponds water. Additional coordination with KDOT will be needed to prevent ponding/erosion issues in the ditch. KDOT also re-graded this ditch recently, so future re-evaluation will be needed to determine if issues still persist. The city recently constructed a new asphalt trail along the south side of US Hwy 56. The city indicated that flooding issues at 616 West Hulett Street may be related to water line issues, which have been addressed recently.

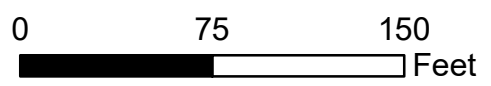
Install new system of curb inlets and 18" pipes. Regrade and stabilize ditch. Add full height curb at north end of W 7th St. May need to regrade end of intersection so that proposed inlets are in sump.

Install valley gutter to improve drainage across intersection.

Figure 30.
 W 7th St & W Hulett St

- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

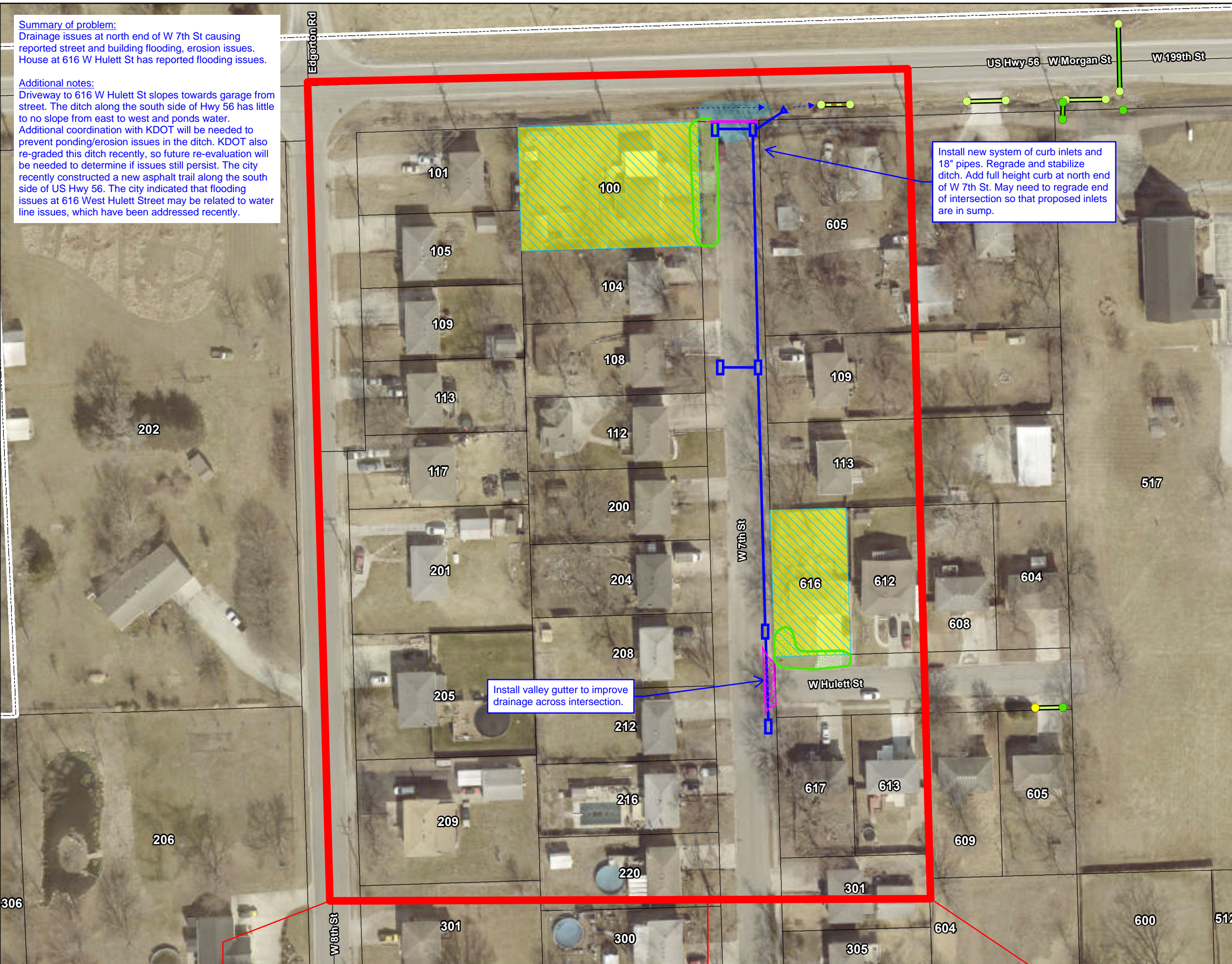
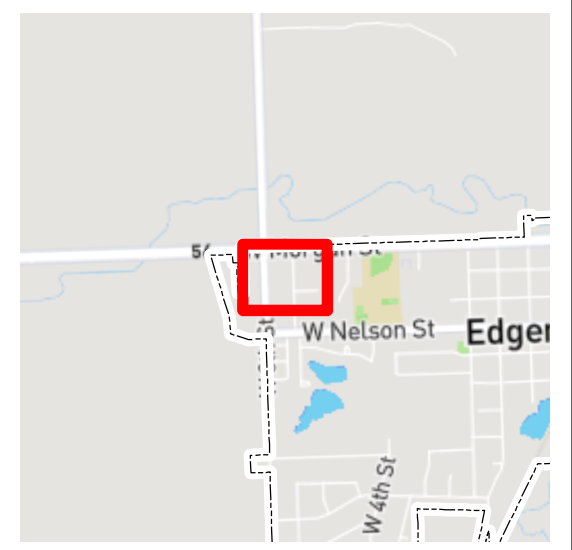
Note:
 FEMA - Federal Emergency Management Agency



1 Inch = 75 Feet



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7.3.8. West Third Street & West Meriwood Lane

Problem Description

This project is located toward the center of the local city limits. The cul-de-sac at the north end of West Second Street does not drain anywhere because of the lack of storm sewer in the area. Water ponds up in the street before it drains through yards of nearby homes, causing street flooding and erosion issues. Building flooding was reported at 900 First Street, likely because of poor drainage patterns throughout the yards. Driveway culverts along West Third Street and West Meriwood Lane were observed to be obstructed and appear to be undersized. The undersized driveway culverts create ponding and erosion issues in the ditches and front yards of homes in the neighborhood. Building flooding was reported at 203 W Meriwood Lane because of clogged and undersized driveway culverts. The driveway at this residence is also very flat, which allows runoff that overtops the driveway culvert to flow toward the garage opening of the home.

City Funding Justification

The cul-de-sac of West Second Street has no stormwater infrastructure, leaving nowhere for stormwater runoff to drain and creating drainage issues and street flooding. Existing stormwater pipes along West Meriwood Lane are undersized, causing them to become clogged and creating nuisance drainage problems. The undersized pipes also cause reported building flooding at 203 West Meriwood. Source of building flooding at 900 First Street is unknown due to a vague description but appears to be lack of stormwater infrastructure.

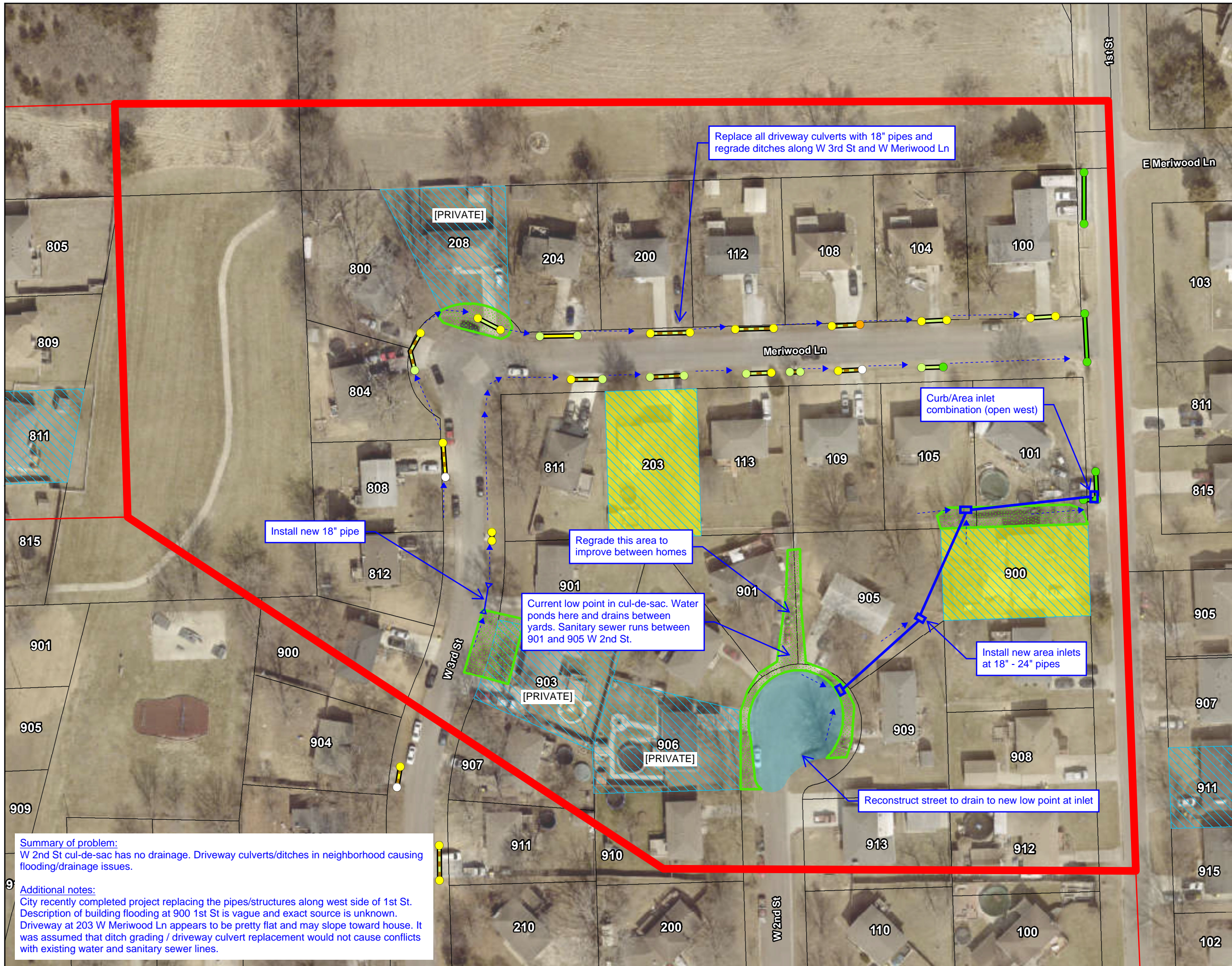
Conceptual Solution

The conceptual solution for this project is shown in Figure 31. It includes constructing a storm sewer system for West Second Street to capture runoff from the cul-de-sac. This system will consist of new stormwater pipes, curb inlets, and area inlets and will connect to the existing system along the west side of First Street. The driveway culverts along West Third Street and West Meriwood Lane will be replaced with properly sized pipes and ditches; the neighborhood will be regraded to improve drainage to the new driveway culverts. The estimated project cost is **\$615,200**.

Additional Notes

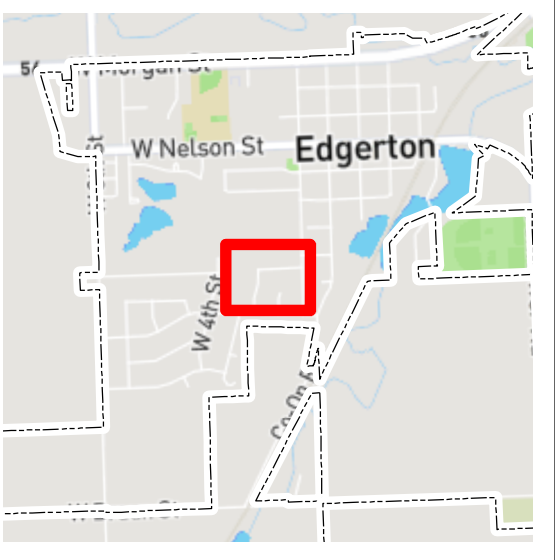
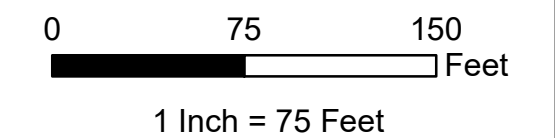
The city recently completed a project near the intersection of First Street and Meriwood Lane, which replaced stormwater pipes and structures along the west side of First Street. Existing sanitary sewer lines and waterlines are present in the ditches throughout the neighborhood. It was assumed that ditch grading and driveway culvert replacement would not create any additional conflicts with this infrastructure. Groundwater flooding reported at 906 West Second Street, 208 West Third Street, and 903 West Third Street are considered private issues and do not appear to be caused by the issues noted above.

Figure 31.
W 3rd St St & Meriwood Ln



- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
FEMA - Federal Emergency Management Agency



Summary of problem:
W 2nd St cul-de-sac has no drainage. Driveway culverts/ditches in neighborhood causing flooding/drainage issues.

Additional notes:
City recently completed project replacing the pipes/structures along west side of 1st St. Description of building flooding at 900 1st St is vague and exact source is unknown. Driveway at 203 W Meriwood Ln appears to be pretty flat and may slope toward house. It was assumed that ditch grading / driveway culvert replacement would not cause conflicts with existing water and sanitary sewer lines.

7.3.9. West Martin & West Fourth Streets (“Horseshoe” Area)

Problem Description

This project is located near the center of the local city limits and is referred to by city staff as the “Horseshoe” because of the street layout and shape of the neighborhood. The roadway grades of three residential streets (West Martin Street, West Fourth Street, West McDonald Street) are not smooth and visible undulations in the roadway are present. This is likely because of poor subgrade preparation and grading when the road was initially constructed. The varying roadway grade creates multiple low points where storm sewer inlets are not present to capture runoff from the roadway. Without proper drainage, water can pond in the streets, overtop curbs, and flow through yards. As a result of this situation, several instances of street flooding, building flooding, and nuisance drainage issues were reported, mainly along West Martin Street and West Fourth Street. An undersized stormwater inlet and pipe system located at the cul-de-sac of West Fourth Street and West McDonald Street is frequently clogged, backing up water into the street and flooding nearby homes. The storm sewer system spanning between West Martin Street and West McDonald Street runs between several homes and was observed to be in poor to failed condition and obstructed. The rear yards of homes near the southwest corner of the project boundary experience erosion issues because of runoff from homes to the north and the adjacent neighborhood to the east. This runoff has also reportedly caused damage to one resident’s deck.

City Funding Justification

Existing stormwater infrastructure throughout the neighborhood is in poor condition and likely undersized. Additional stormwater infrastructure is needed to address reported street flooding along West Fourth Street and West Martin Street and to address building flooding at several homes. Reported drainage issues and building flooding at/near 516 West Fourth Street are due to a large-scale drainage problem created by runoff generated from multiple lots.

Conceptual Solution

The conceptual solution for this project is shown in Figure 32. It includes replacing existing stormwater inlets and pipes, installing new stormwater infrastructure throughout the neighborhood, and reconstructing the streets to improve profile slopes and drainage to low points. The additional stormwater inlets and improved street slopes will help prevent water from ponding in the roadway and guide runoff toward designated low points instead of overtopping curbs and flowing through resident’s yards. The new stormwater pipes and inlets will replace existing infrastructure that is primarily in poor to failed condition and/or is undersized. A riprap-lined swale will also be constructed along the rear yards of homes near the southwest corner of the project boundary to help address erosion issues. The estimated project cost is **\$2,661,300**.

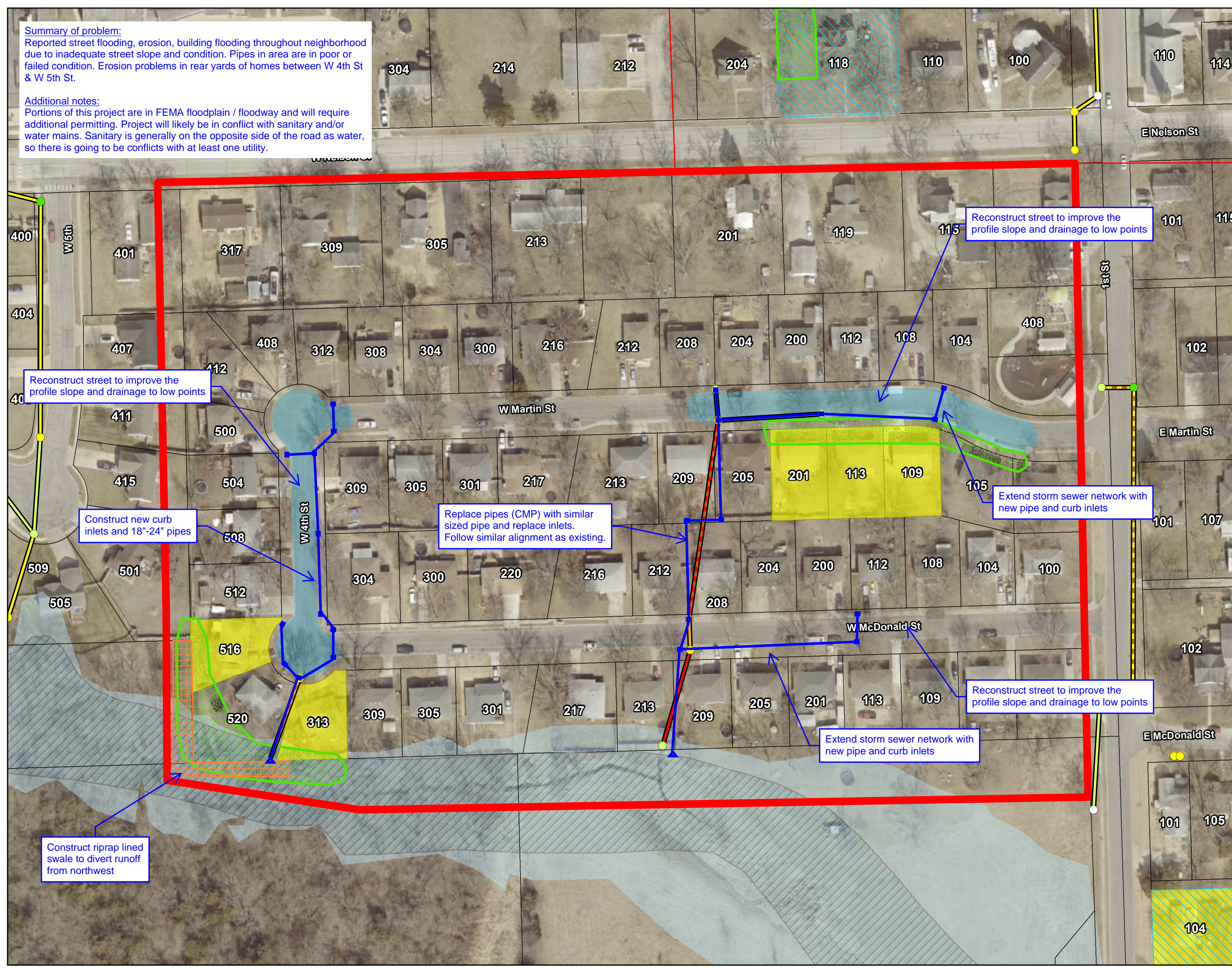
Additional Notes

Portions of this project are in the FEMA floodplain and floodway, which will require additional permitting. This project will require a number of sanitary sewer and waterline relocations, which has been accounted for in the opinion of probable cost.

Summary of problem:
 Reported street flooding, erosion, building flooding throughout neighborhood due to inadequate street slope and condition. Pipes in area are in poor or failed condition. Erosion problems in rear yards of homes between W 4th St & W 5th St.

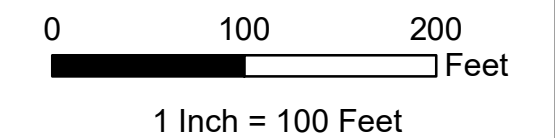
Additional notes:
 Portions of this project are in FEMA floodplain / floodway and will require additional permitting. Project will likely be in conflict with sanitary and/or water mains. Sanitary is generally on the opposite side of the road as water, so there is going to be conflicts with at least one utility.

Figure 32.
 W Martin St & W 4th St
 ("Horseshoe" Area)



- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
 FEMA - Federal Emergency Management Agency



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7.3.10. West Eighth Street & Heather Knoll Drive (Detention Basin)

Problem Description

This project is located near the southwest corner of local city limits. The existing detention basin located north of West Heather Knoll Drive and between Edgerton Road and West Seventh Street reportedly ponds several feet of water for days and up to weeks at times. The basin may not have enough storage area, causing the excessive ponding depths.

City Funding Justification

The detention basin is located on city-owned property and ponds water for excessive duration, creating a potential hazard to the public. The pipe underneath West Eighth Street is possibly undersized, causing runoff on the west side of the road to pond up and overtop the road during high intensity rainfall events.

Conceptual Solution

The conceptual solution for this project is shown in Figure 33. It includes excavating an area upstream of the detention, on the west side of Edgerton Road, to provide detention of runoff. This area will function as an additional detention basin, providing additional storage volume of runoff and further detaining peak flows. This will lower the peak flows and peak volume of water that is draining to the existing detention basin. The estimated project cost is **\$198,900**.

Additional Notes

The property on the west side of Edgerton Road is not owned by the city and will require property acquisition; this cost is not included in the opinion of probable cost. This area was noted by the city during the kickoff meeting as a potential project area.

Figure 33.
W 8th St & Heather Knoll Dr
(Detention Basin)

Summary of problem:
Field on west side of Edgerton Rd causes flooding across Edgerton Road. Detention basin pools several feet of water for days/weeks at a time.

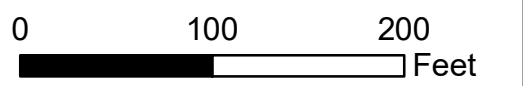
Additional notes:
Property on west side of W 8th St is not owned by city

Regrade area upstream of W 8th St crossing to provide additional storage / detention

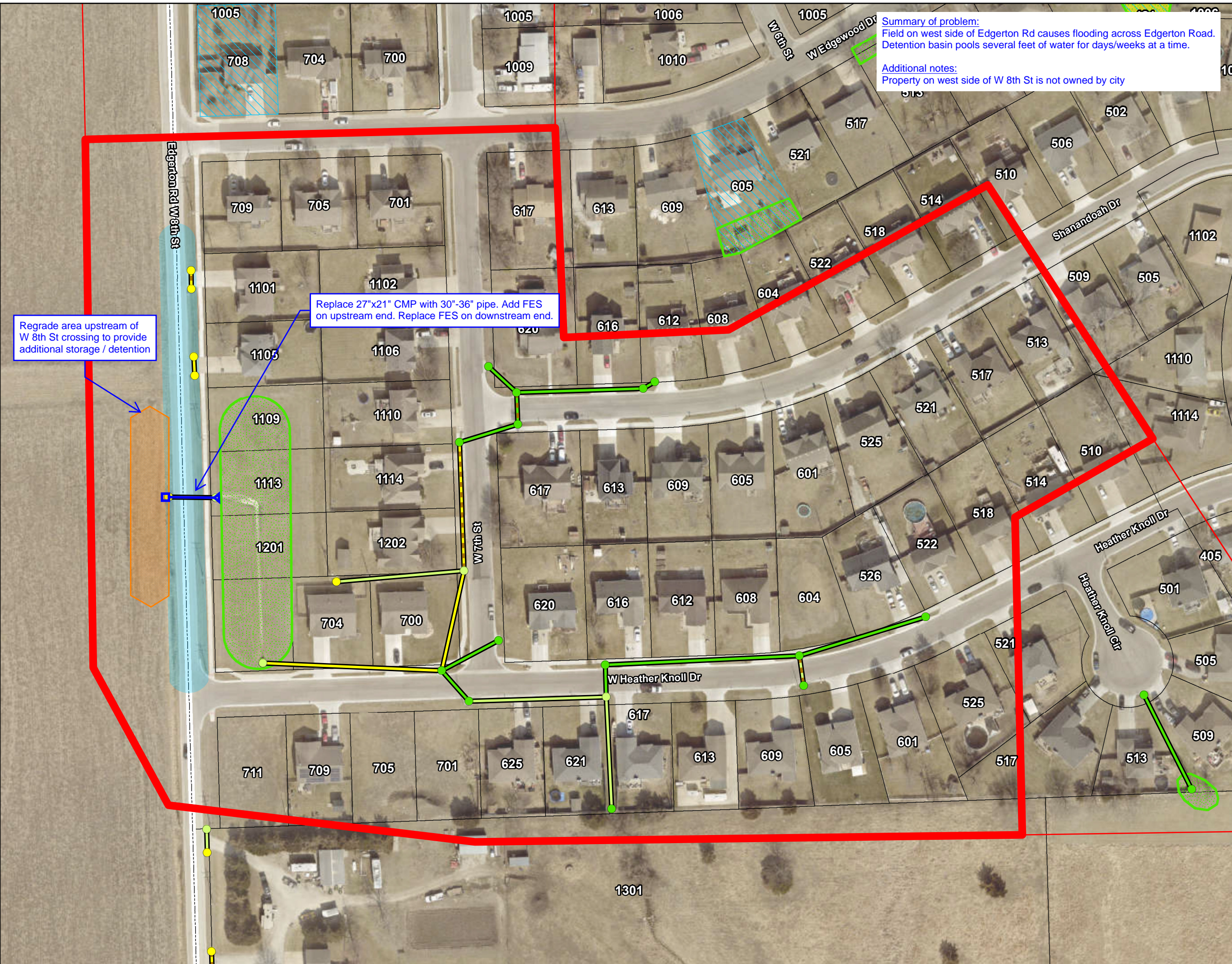
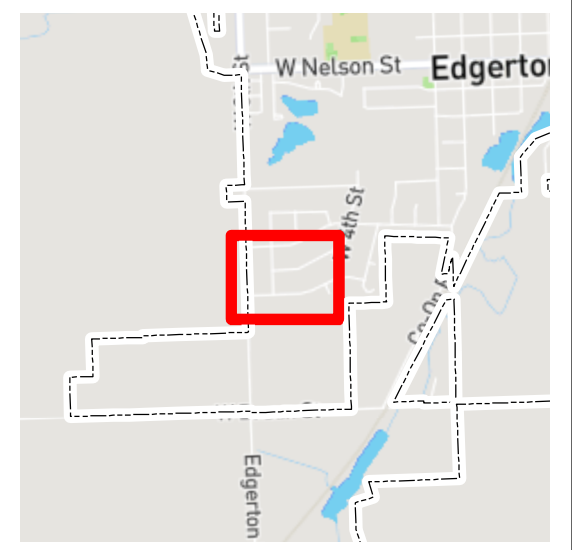
Replace 27"x21" CMP with 30"-36" pipe. Add FES on upstream end. Replace FES on downstream end.

- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
FEMA - Federal Emergency Management Agency



1 Inch = 100 Feet



7.3.11. West Third Street & West Edgewood Drive

Problem Description

This project is located near the southeast corner of the local city limits. The resident at 421 W. Edgewood Drive reported building flooding. Runoff from the rear yards of nearby homes flows to the northeast and toward the home at this address.

City Funding Justification

Reported building flooding at 1013 West Fourth Street appears to be due to a lack of stormwater infrastructure in the area. Poor condition and possibly undersized pipes along West Third Street should be replaced and likely contribute to the reported street flooding along West Third Street.

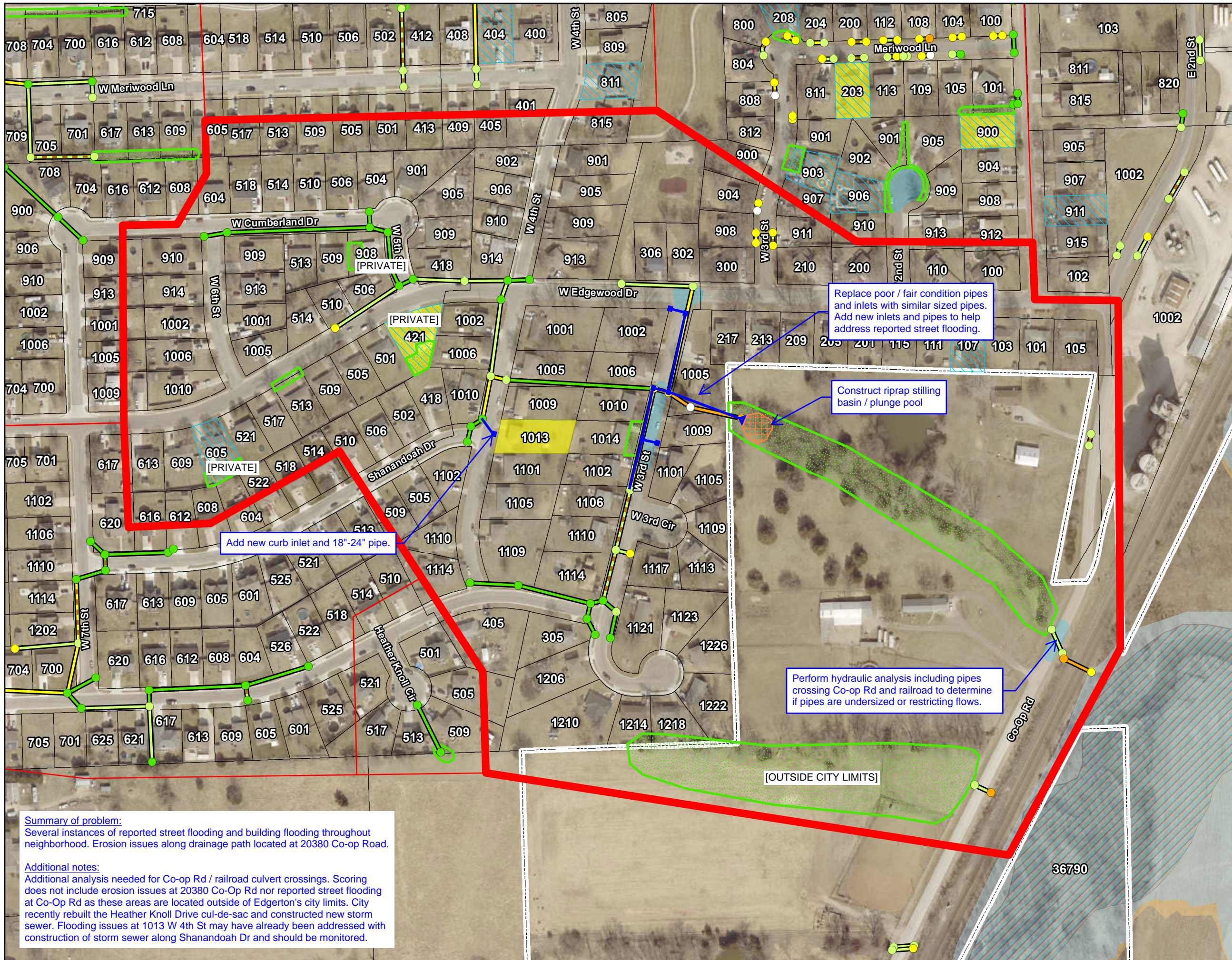
Conceptual Solution

The conceptual solution for this project is shown in Figure 34. A new curb inlet will be installed in front of the residence at 1013 W. Fourth Street, which will help capture runoff from the street before it can reach the home at this address. This inlet will connect to the existing system on the west side of West Fourth Street. Storm sewer along West Third Street and downstream will be replaced with similar-sized infrastructure to replace pipes currently in fair-to-poor condition. New inlets will also be added and connected to this system to address reported street flooding along West Third Street. A riprap stilling basin/plunge pool will be constructed downstream of the outfall of this storm sewer. The stilling basin will provide energy dissipation downstream of the outfall, lowering the velocity of runoff as it exits the storm sewer pipe and reducing the likelihood of erosion. Lastly, a hydraulic analysis of the Co-op Road and railroad culvert crossing is recommended. It is not clear if either of the culverts are undersized. Further analysis is needed to make a recommendation on repairs to either of these culverts. The estimated project cost is **\$525,300**.

Additional Notes

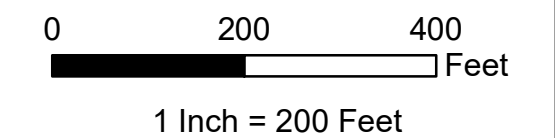
The benefit scoring for this project does not include reported erosion issues at 20380 Co-op Road nor reported street flooding along Co-op Road because these areas are located outside of the City of Edgerton's city limits. Reported building flooding at 1013 West 4th Street may have already been addressed as there are newer storm inlets along Shanandoah Drive, upstream of the home; this issue should be monitored and re-evaluated prior to design. The city recently rebuilt the cul-de sac and constructed new storm sewer along Heather Knoll Drive, near the southwest corner of the project boundary.

Figure 34.
W 3rd St & W Edgewood Dr



- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

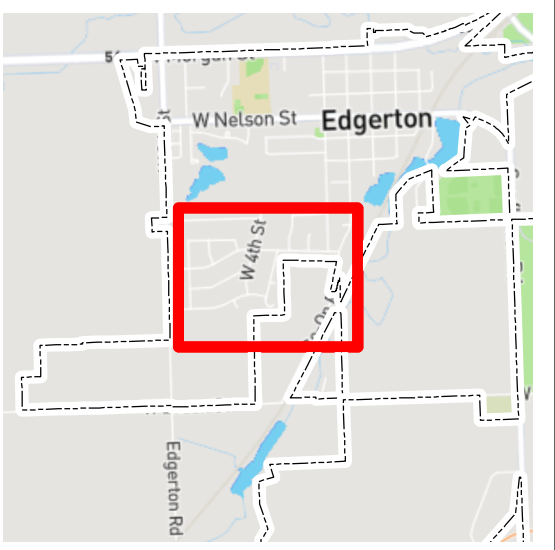
Note:
FEMA - Federal Emergency Management Agency



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Summary of problem:
Several instances of reported street flooding and building flooding throughout neighborhood. Erosion issues along drainage path located at 20380 Co-op Road.

Additional notes:
Additional analysis needed for Co-op Rd / railroad culvert crossings. Scoring does not include erosion issues at 20380 Co-Op Rd nor reported street flooding at Co-Op Rd as these areas are located outside of Edgerton's city limits. City recently rebuilt the Heather Knoll Drive cul-de-sac and constructed new storm sewer. Flooding issues at 1013 W 4th St may have already been addressed with construction of storm sewer along Shanandoah Dr and should be monitored.



7.3.12. 20125 Edgerton Road (Quarry)

Problem Description

This project is located at the east end of the local city limits at the entrance to the Edgerton Quarry. Runoff from the quarry flows down the entrance road and onto Sunflower Road. The uncontrolled runoff causes erosion along the shoulder of Sunflower Road and also deposits gravel and other debris onto the roadway.

City Funding Justification

Runoff from the entrance to the quarry causes erosional issues along Sunflower Road, a public roadway.

Conceptual Solution

The conceptual solution for this project is shown in Figure 35. It includes reconfiguring the quarry entrance to provide a low point prior to Sunflower Road. Construction of a low point in the roadway will help divert stormwater runoff away from Sunflower Road and into the nearby ditches. In addition, one of the existing undersized pipes underneath the quarry entrance will be replaced with a larger pipe. The roadside ditches upstream and downstream of this pipe will be regraded to accommodate the new pipe size and help ensure proper drainage. The estimated project cost is **\$92,600**.

Additional Notes

The city mentioned this area during the initial kickoff meeting as a potential project area. An 8-inch sanitary sewer force main along the east side of Sunflower Road will have to be protected and/or avoided with the proposed improvements.

Figure 35.
20125 Edgerton Rd (Quarry)

Summary of problem:
Runoff from entrance to quarry causes erosion along shoulder of Sunflower Rd.

Additional notes:
8" force main runs along east side of Sunflower Rd and will need to be protected / avoided with proposed improvements

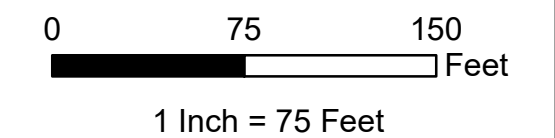


Replace 12" HDPE/18" CMP with 18" -24" pipe. Add FES on both ends. Grade upstream and downstream of culvert to accommodate for new pipe sizes.

Reconfigure intersection to provide a low point in access roadway to divert stormwater runoff away from Sunflower Road.

- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
FEMA - Federal Emergency Management Agency



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7.3.13. West Fourth Street & West Meriwood Lane

Problem Description

This project is located near the center of the local city limits. Two stormwater systems run from south to north between homes located along the north side of West Meriwood Lane. The outlets of both systems discharge short of the respective property lines to the north. This creates nuisance drainage issues for homes near the pipe outfalls. The pipes running between 412 W. Meriwood Lane and 502 W. Meriwood Lane were observed to be obstructed during inspection.

City Funding Justification

The existing pipes between 502 and 412 West Meriwood Lane and 408 and 404 West Meriwood Lane are too short in length and discharge onto private property, creating nuisance drainage problems. These issues are considered to be lack of stormwater infrastructure as the pipes are not long enough to extend past the property line.

Conceptual Solution

The conceptual solution for this project is shown in Figure 36. It includes extending both sets of pipes past the north property line. Flared end sections will be installed at the new outfall locations and the area downstream will be graded to ensure proper drainage. In addition, the pipes running between 412 W. Meriwood Lane and 502 W. Meriwood Lane will be cleaned. The estimated project cost is **\$37,000**.

Additional Notes

The city mentioned this area during the initial kickoff meeting as a potential project area. Reported groundwater flooding at 404 West Meriwood Lane and 811 West Fourth Street are considered to be private issues.

Summary of problem:
 Pipes are too short and need to be extended past north property line. The homes on north side of W Meriwood Ln and east of 604 W Meriwood Ln all drain towards the rear yard area of 404 W Meriwood Ln, which causes a large amount of surface water in this area.

Solution addresses:
 Nuisance problems at 412 and 404 W Meriwood Ln

Additional notes:
 Short pipes were mentioned by city during kickoff meeting

Extend 15" CMP with 15" pipe. Add FES. Connect with collar. Grade downstream of outfall.

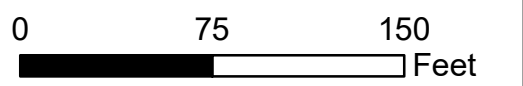
Extend 15" CMP with 15" pipe. Add FES. Connect with collar. Grade downstream of outfall.

Clean pipes

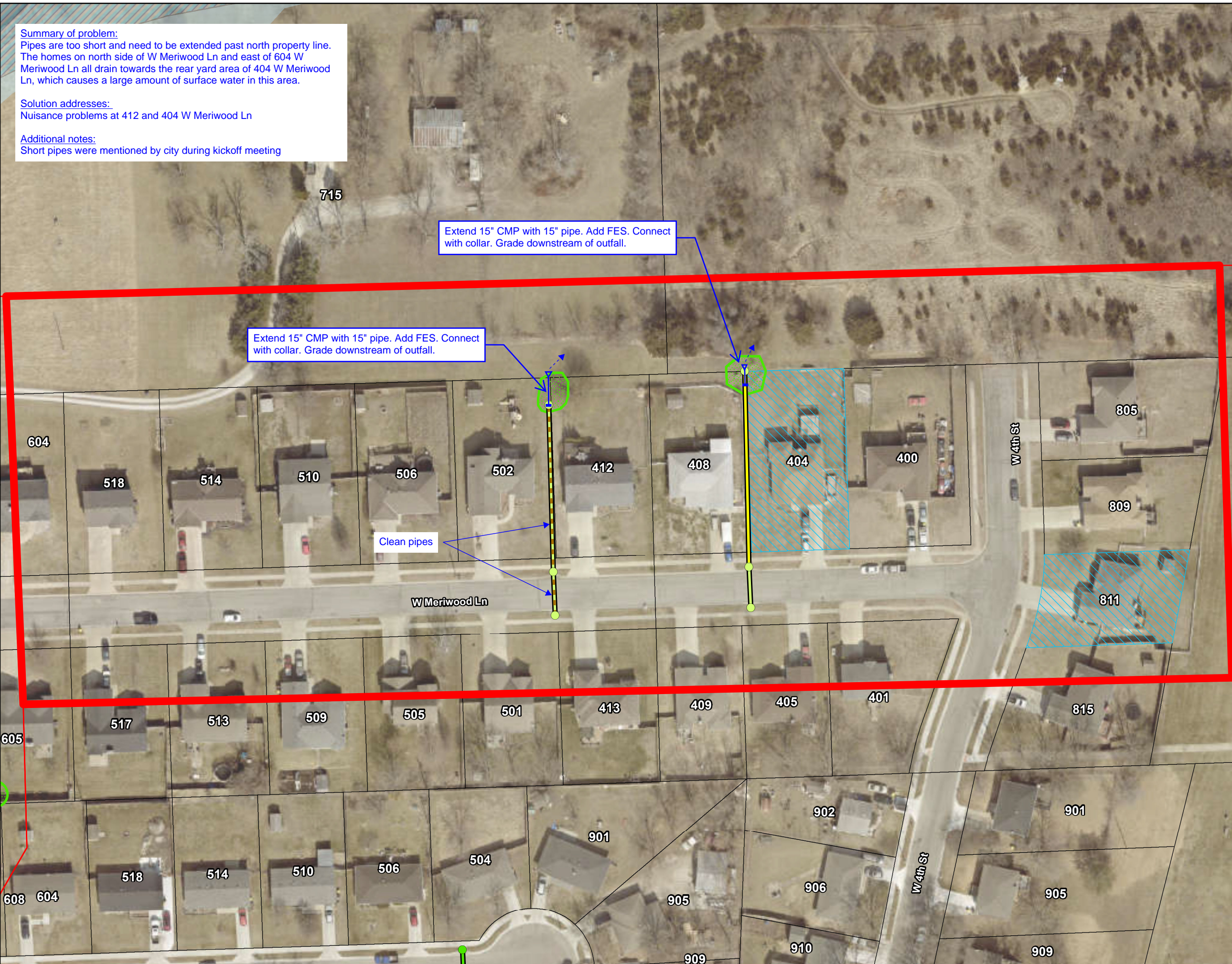
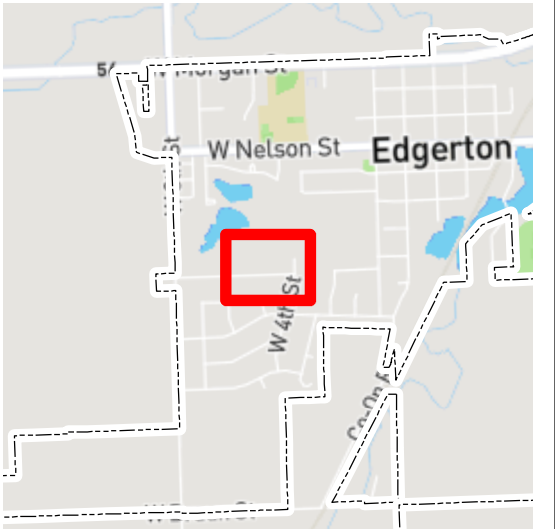
Figure 36.
 W 4th St & W Meriwood Ln

- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
 FEMA - Federal Emergency Management Agency



1 Inch = 75 Feet



7.3.14. 501 East Sixth Street (Edgerton City Lake Low Water Crossing)

Problem Description

This project is located toward the east end of the local city limits at Edgerton City Lake. A low water crossing for East Sixth Street crosses toward the middle of the lake, providing access to residential homes and Martin Creek Park. The condition of the pipes underneath the crossing were rated as failed during the field inspection; some pipes were obstructed. Erosion was also observed in this area, which threatens the condition of the roadway. Collapse of the failed pipes is possible, which would also cause a failure to the roadway.

City Funding Justification

The pipes crossing underneath the low water crossing for the lake have failed, threatening the public roadway.

Conceptual Solution

The conceptual solution for this project is shown in Figure 37. It includes replacing the existing low water crossing pipes with pipes of similar size. Additional analysis would be needed in the case of any additional upgrades to the roadway in this area. The estimated project cost is **\$154,700.**

Additional Notes

This project is located in the FEMA floodway and will require hydraulic modeling for a no-rise analysis and possibly additional permitting. If these pipes are replaced, it would be an opportune time for the city to upgrade this crossing, if desired.

405

Summary of problem:
 Low water crossing pipes are in poor/failed condition. Erosion is threatening roadway.

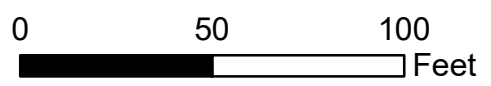
Additional notes:
 This project is in the FEMA floodway and will require a no-rise analysis at minimum. This would be an opportune time to upgrade this area rather than just removing and replacing the pipes if desired.



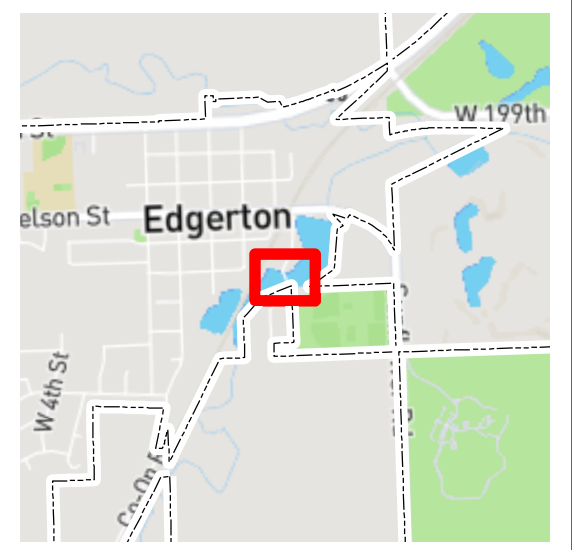
Figure 37.
 501 E 6th St
 (Edgerton City Lake
 Low Water Crossing)

- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
 FEMA - Federal Emergency Management Agency



1 Inch = 50 Feet



7.3.15. 513 Heather Knoll Circle

Problem Description

This project is located toward the south end of the local city limits. An existing stormwater pipe runs from north to south between the residences at 509 Heather Knoll Circle and 513 Heather Knoll Circle. The existing pipe currently outfalls onto the property at 513 Heather Knoll Circle, creating nuisance drainage issues at the property.

City Funding Justification

The existing pipe between 509 and 513 Heather Knoll is too short in length and discharges onto private property, creating nuisance drainage problems. This is considered as a lack of stormwater infrastructure as the pipe is not long enough to extend past the property line.

Conceptual Solution

The conceptual solution for this project is shown in Figure 38. It includes extending the existing pipe to the south past the property line at 513 Heather Knoll Circle. A flared end section will be installed at the new outfall location and the area downstream will be graded out to ensure proper drainage. The estimated project cost is **\$15,900**.

Additional Notes

The property to the south, downstream of the outfall, is owned by the city.

Summary of problem:
 Pipe located between 513 and 509 Heather Knoll Cir is too short and needs to be extended past property line.

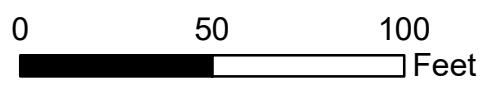
Additional notes:
 Property to south where pipe is being extended is owned by city.

Figure 38.
 513 Heather Knoll Cir



- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
 FEMA - Federal Emergency Management Agency



1 Inch = 50 Feet



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7.3.16. East Second & East McDonald Streets (B)

Problem Description

This project is located toward the middle of the local city limits on the eastern side. Building flooding was reported by the resident at 616 E. Third Street. This residence is located at the south end of East Third Street. Runoff that is not captured by the local storm sewer system overflows to the south along East Third Street and into the garage. In addition, the driveway of this home appears to be flat or have a mild slope from the street toward the garage, which directs runoff toward the home rather than away from it. In the questionnaire, the homeowner reported heavy damage to homes and vehicles from flooding experienced in spring of 2019.

City Funding Justification

Reported building flooding at 616 East Third Street is caused by a large-scale drainage problem and lack of stormwater infrastructure in the area.

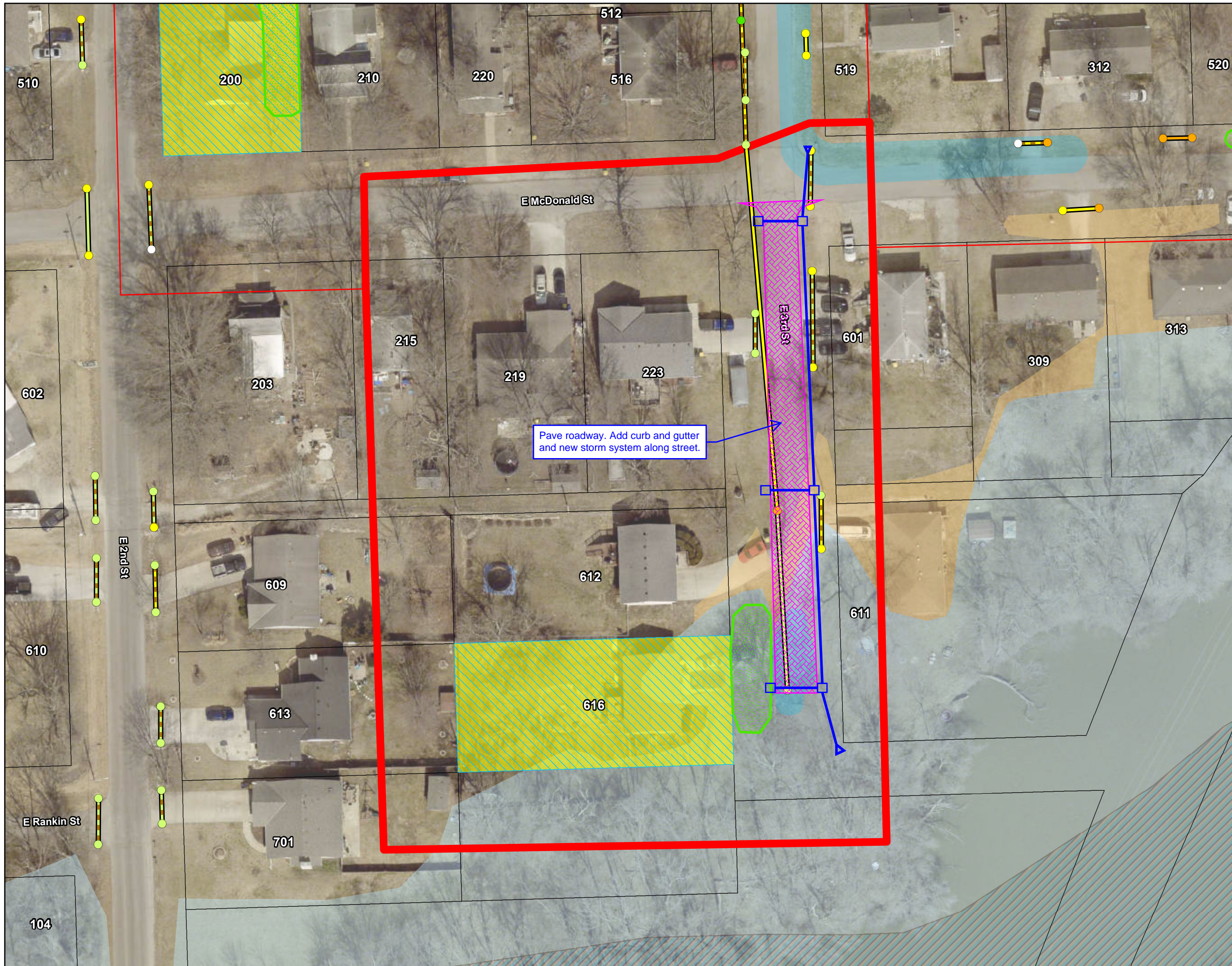
Conceptual Solution

The conceptual solution for this project is shown in Figure 39. East Third Street south of East McDonald Street will be reconstructed and a new storm sewer system consisting of pipes and curb inlets will be installed along the roadway. The existing road is gravel and the existing storm sewer in the area consists of driveway culverts, ditches, and area inlets. By installing a curb and gutter system along the roadway, runoff will be kept in the street and captured by the proposed system of curb inlets. The new roadway and storm sewer system will help capture water and direct it away before it can reach the home at 616 E Third Street. The estimated project cost is **\$338,600**.

Additional Notes

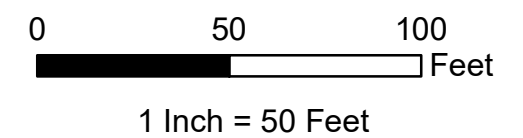
The home at 616 East Third Street is located within the FEMA Zone AE floodplain.

Figure 39.
E 2nd St & E McDonald St (B)



- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
FEMA - Federal Emergency Management Agency



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7.3.17. East Fifth & East McCarty Streets

Problem Description

This project is located near the northeast corner of the local city limits. The existing driveway and crossroad culverts in the project area are undersized and/or were observed to be obstructed during inspections, resulting in reported street flooding along Fifth Street.

City Funding Justification

Existing stormwater infrastructure in the area is undersized, causing water to back up onto public roadways.

Conceptual Solution

The conceptual solution for this project is shown in Figure 40. It includes replacing the existing driveway and crossroad culverts with new pipes of a larger diameter. The ditches in this area will also be regraded to accommodate the increased pipe sizes and improve drainage. The estimated project cost is **\$89,000**.

Additional Notes

There are possible conflicts with existing waterlines at the northwest corner of the intersection of East Fifth Street and East McCarty Street, which has been accounted for in the opinion of probable cost. Reported street flooding in this area is vague and exact location is unknown; based on a desktop review, the existing pipe size (15-inches) across East McCarty Street appears to be adequate to handle the contributing drainage area (approximately 1.5 acres), and therefore a low flooding frequency has been assumed.

Summary of problem:
 Driveway and crossroad culverts are obstructed, causing street flooding.

Additional notes:
 Flooding description for 5th st is very vague and exact location is unknown. Potential conflicts with fire hydrant / water main at northwest corner of intersection at E McCarty St and E 5th St.

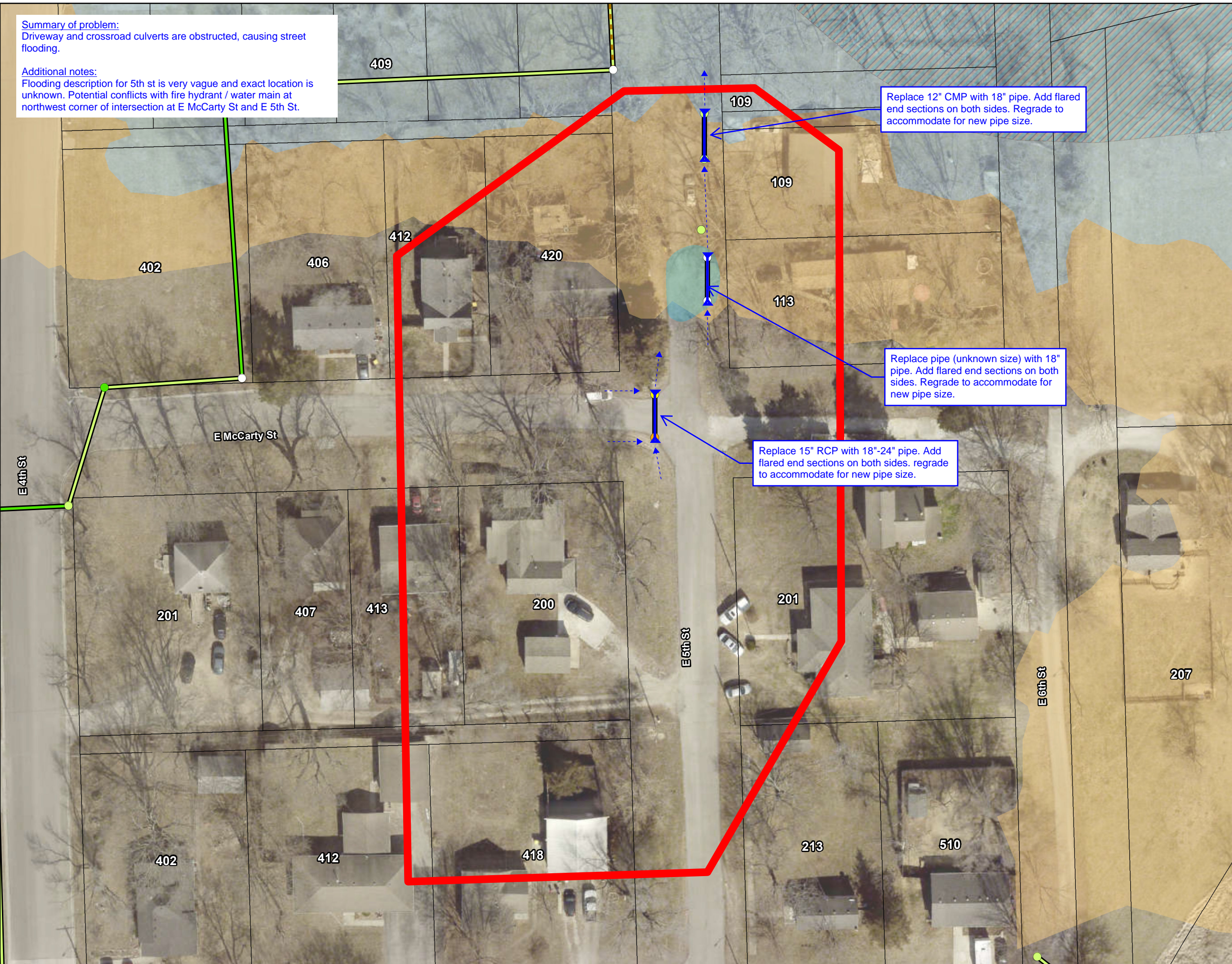
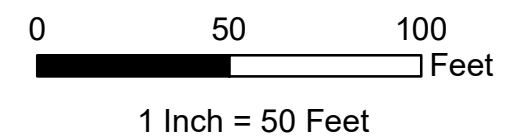


Figure 40.
 E 5th St & E McCarty St

- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- Overall City Limits
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note:
 FEMA - Federal Emergency Management Agency



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7.4. Additional Areas

A few additional areas were discussed with the city throughout the master plan process when storm drainage issues were discussed, but conceptual solutions were not developed within the master plan. A summary for each of these additional areas is provided below.

- 710 E. Nelson Street (Public Works Facility) – As described in Section 2.3, the City of Edgerton’s public works facility experienced significant flooding in August 2017. The facility is located adjacent to the Zone AE floodplain and floodway of Martin Creek and is located within the Zone X Shaded (1 percent future conditions) floodplain. Additional analysis and evaluation of this area should be conducted to determine viable solutions and the feasibility of those solutions. Potential solutions include the following:
 - Relocating the facility
 - Providing regional detention along Martin Creek upstream of the facility to lower peak flows
 - Constructing a flood control berm along the northwest side of the facility adjacent to Martin Creek
- 199th Street and Peppertree Lane (Peppertree Development) – The Peppertree Development is located adjacent to Big Bull Creek Tributary E, directly downstream of LPKC. The city has received complaints from residents claiming increases in flows and flood-related problems since development of LPKC. This area would benefit from detaining peak flows upstream, as further discussed in Section 8.2.3.
- 183rd Street and South Poplar Street – This area is located at the northeast corner of the overall city limits, at the border with the City of Gardner. Erosion and drainage problems are being experienced on the east side of a large undeveloped lot, which abuts a residential neighborhood of the City of Gardner. The lot is owned by Edgerton Land Holding Company LLC per AIMS, and it is assumed that this lot will be developed in the future as development of LPKC progresses. Overall, the issues in this area appear to be minor and should be addressed when the lot is developed in the future.

8. LOGISTICS PARK SYSTEM REVIEW

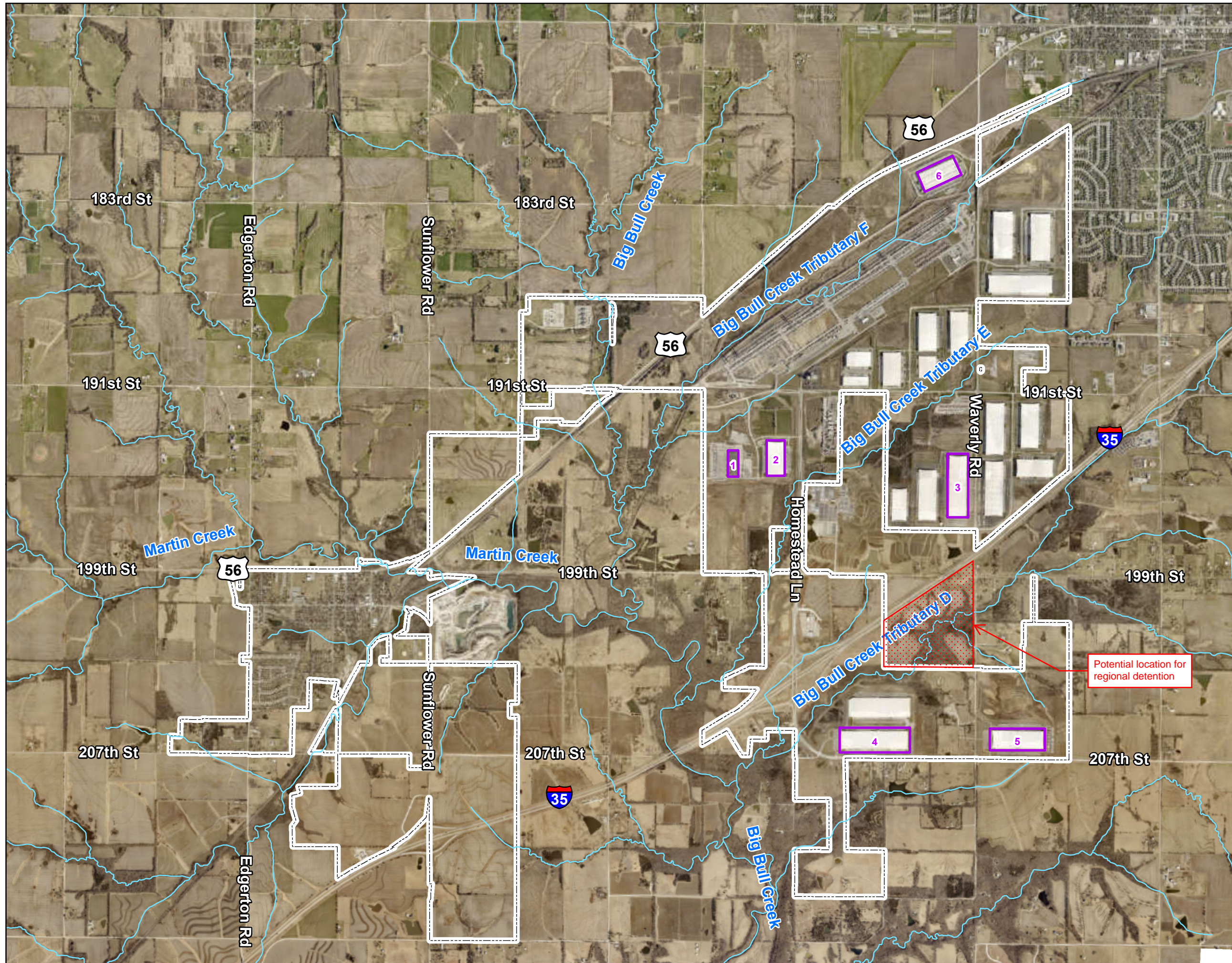
As discussed in Section 2.6, the City of Edgerton’s logistics park area is experiencing rapid growth and development. Each new development is required to submit a stormwater drainage study to the city for review prior to being developed. These studies outline drainage patterns and provide a plan for how the increased runoff resulting from the development will be handled. A review of select LPKC drainage studies was completed to analyze the proposed stormwater management methods and compare these methods with current design standards. Selected studies were determined based on their proximity to receiving waters. In total, six studies were reviewed, all of which were completed by Renaissance Infrastructure Consulting (2016, 2018, 2019). Reviewed studies are summarized below in Table 12; the locations of these studies can be seen in Figure 41.

Table 13. Reviewed Logistics Park Kansas City Studies.

Number	Study Name	Study Type	Date
1	Inland Port XXI ¹	Micro Drainage Study	February 2016
2	Inland Port XXII ²	Micro Drainage Study	December 2016
3	Inland Port XXXI, XXXII, XXXIII ³	Micro Drainage Study	February 2016
4	Project Mustang ⁴	Macro Drainage Study	April 2018
5	Inland Port 51-54 ⁵	Micro Drainage Study	May 2019
6	Inland Port XL ⁶	Micro Drainage Study	October 2019

^{1,2,3}(RIC 2016), ⁴(RIC 2018), ⁵(RIC 2019)

Figure 41.
Logistics Parks Kansas City
 Reviewed Stormwater Studies



Overall City Limits

FEMA Current Effective Floodplain

- Floodway
- Zone A/AE
- Zone X

Stream Centerlines

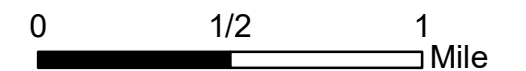
Logistic Park Studies

Study Name

1. Inland Port XXI
2. Inland Port XXII
3. Inland Port XXXI, XXXII, XXXIII
4. Project Mustang
5. Inland Port 51-54
6. Inland Port XL

Note:

FEMA - Federal Emergency Management Agency



1 inch = 1/2 Mile



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8.1. Logistics Park Kansas City System Review – Findings

The selected studies were reviewed for conformance with current design standards. The City of Edgerton does not have specific criteria for detention requirements. Section 14.1, Paragraph A of Article 14 of the city's municipal code (City of Edgerton, Kansas, 2013) states that new storm drainage shall be designed and laid out in accordance with the latest standards and design criteria published by the American Public Works Association (APWA). No additional criteria are set forth through ordinances or other means. The Kansas City Metropolitan Chapter APWA, Section 5600 Storm Drainage Systems & Facilities, or APWA 5600, indicates that the default strategy for detention shall be comprehensive control (APWA 2011). Under comprehensive control, peak runoff control is provided for the 1 percent (100-year), 10 percent (10-year), and 50 percent (2-year) design storms and volumetric and/or extended detention control of the 90 percent mean annual event storm. The post development peak discharge rates are limited by a flow in cubic feet per second (cfs) per acre. Post-development peak discharge rates and extended detention requirements for post-development are as indicated below.

- 50 percent storm peak rate (post-development) \leq 0.5 cfs per site acre
- 10 percent storm peak rate (post-development) \leq 2.0 cfs per site acre
- 1 percent storm peak rate (post-development) \leq 3.0 cfs per site acre
- 40-hour extended detention of runoff from the local 90 percent mean annual event (1.37 inches per 24-hour rainfall)

The detention design in the stormwater studies follows criteria similar to comprehensive control in the reviewed studies; however, the post-development peak runoff rates were compared to existing condition (predevelopment) runoff rates and not the rates stated in APWA. Typically, the required release rates from APWA are more conservative than the pre- and post-development scenario. Each of the studies provided an analysis of peak runoff rates for the 1 percent, 10 percent, and 50 percent design storms. The analysis methods used for calculations of peak runoff rates conform with acceptable methodologies as outlined in APWA 5600. A summary of detention strategies from the reviewed studies is provided below.

- If post-development peak runoff rates were found to be higher than predevelopment peak runoff rates, then detention was provided to lower post-development rates to at/or below predevelopment rates.
- One of the analyses showed that while on-site peak flow rates increased due to development, providing detention would not cause an increase in peak flow rates downstream, and therefore detention was not proposed. A waiver was requested for detention of the 1 percent, 10 percent, and 50 percent design storms in this scenario.
- Similar to the previous case, one analysis showed that detention was not beneficial for the higher intensity design storms (1 percent and 10 percent) but was still beneficial for

the 50 percent design storm. In this scenario, detention was provided for the 50 percent design storm and a waiver for detention was requested for detaining the 1 percent and 10 percent design storms.

- A 40-hour extended detention from the local 90 percent mean annual event was not mentioned in any of the studies and therefore was assumed to not be provided. Discussions with city staff and consultants confirmed the detention strategies summarized above. Occasionally, waivers for stormwater detention were provided in the past if detention was proven to not be beneficial. More recently, the City of Edgerton has been firmer with limiting the use of a design waiver for recent developments.

The Pepper Tree Development is located at the intersection of Pepper Tree Lane and 199th Street. This development is not located within the city limits of the City of Edgerton but is located within the limits of unincorporated Johnson County. Many of the sites within LPKC drain to Big Bull Creek Tributary E, which runs through the middle of LPKC from northeast to southwest. The Pepper Tree Development is located at the downstream end of Big Bull Creek Tributary E, at the confluence of the tributary with Big Bull Creek. The city noted that it has received complaints from homeowners in this development regarding flooding and increased runoff perceived to be attributable to development of LPKC. As mentioned previously, the current APWA design standards are more restrictive to allowable peak runoff release rates. It is recommended that the comprehensive protection strategy, outlined in this section, or other stormwater management strategies be adopted to further restrict peak flow rates and mitigate potential for flooding downstream of LPKC.

8.2. Logistics Park Kansas City System Review – Recommendations

Recommendations provided for the LPKC mirror recommendations provided to the city as a whole in Section 9. Specific recommendations to the LPKC are provided below.

8.2.1. Stormwater Detention

Stormwater management measures should be incorporated with all development to prevent downstream flooding, erosion, and impaired water quality. The comprehensive control strategy outlined in APWA was designated as the default detention criteria unless exceptions have been specifically adopted by the regulating agency. Comprehensive control provides the following benefits:

- Frequent event control to prevent stream erosion – Detention of the 50 percent design storm and 40-hour drawdown for the local 90 percent mean annual storm event targets the storm events that can negatively affect the natural stream corridor, threatening

existing infrastructure such as roadways and sanitary sewers and homes through rapid stream erosion and incision.

- Flood control – Increased impervious surface increases both the volume and velocity of stormwater that can cause flooding, which is mitigated by flood control.
- Targeted release rates – Studies have documented that measures to control post-development runoff rates to pre-development runoff rates do not sufficiently reduce runoff rates when considered at a watershed level with multiple developments and detention basins in series (McEnroe 2005). Targeted release rates have been established to specifically address development through a watershed-based approach that is typically more conservative. Targeted release rates also establish clear expectations for the development community.

Through the LPKC review, current development is following detention criteria even though the criteria are not clearly defined in the city's municipal code or other ordinances. Further clarification should be provided in city design codes or ordinances to establish expectations and allowances for situations when waivers can be considered for stormwater management.

8.2.2. Water Quality

Current APWA standards require 40-hour extended detention of runoff from the local 90 percent mean annual event, which provides benefits to water quality. Several tributaries of Big Bull Creek flow through the limits of LPKC and/or are located directly downstream of the park. Requiring extended detention for future developments will restrict the amount of sediment and pollutants that are deposited downstream, providing water quality benefits to Big Bull Creek and its tributaries and Hillsdale Lake.

8.2.3. Regional Stormwater Detention & Wetlands

Regional stormwater detention facilities are publicly owned and are typically implemented as part of a watershed-based planning process. These facilities function similar to, and provide similar benefits as, typical on-site detention basins, but they have much larger contributing drainage areas. Overall, regional stormwater detention facilities can be more cost-effective and require less surface area than on-site detention facilities.

As shown in Figure 40, several larger tributaries to Big Bull Creek flow through LPKC; the majority of the developed area drains to Big Bull Creek Tributary E. Regional detention along Big Bull Creek Tributary E would be beneficial considering the location of the Pepper Tree Development downstream. However, much of the land adjacent to the stream is already developed, which does not provide enough available land area downstream of the park for regional detention to function properly. Big Bull Creek Tributary D also flows through the park and has a large drainage area contributing to it from LPKC; much of this area is still undeveloped. A regional detention basin could be placed along this tributary, which would limit

peak flows downstream of LPKC. A potential location for this regional detention basin would be southeast of the intersection of Waverly Road and West 199th Street, as shown on Figure 41. It should be noted that this area is currently located outside of Edgerton's overall city limits and property acquisition would be required. Construction of a regional detention basin at this location would provide added benefits to water quality and peak flow reduction as mentioned previously in this section.

Several locations along Big Bull Creek are also suitable for wetlands. Wetlands are typically wide, shallow areas that are either permanently or seasonally flooded and can provide benefits to water quality and peak flow reduction in streams, similar to detention. Pollutants and sediment are washed away during rainfall events, which are then transported through runoff into nearby streams. As a stream passes through a wetland, flows are able to spread out and pass through the native vegetation and plants. The pollutants and sediment are intercepted by the wetland vegetation, which results in significant removal from the stream, benefiting water quality. As the water spreads out, velocities in the stream are lowered, helping prevent erosion from occurring downstream of the wetland. Wetlands can also include additional storage area for runoff, providing some detention of peak flows during rainfall events. Another added benefit of wetlands is the wildlife that is attracted to these areas. Ducks and other waterfowl are often drawn to these areas, providing a wildlife observation area that would be an amenity to the city and Big Bull Creek Park.

As previously mentioned, Hillsdale Lake is located downstream of Big Bull Creek and south of LPKC. The Miami County Conservation District has expressed concern to Edgerton regarding the development of LPKC and how it could affect the water quality of Hillsdale Lake. Construction of wetlands along Big Bull Creek would benefit the water quality of Big Bull Creek and Hillsdale Lake, which may ease some of the Conservation District's concerns. Construction and expansion of Big Bull Creek Park is also planned by Johnson County. A masterplan for Big Bull Creek Park was completed for Johnson County, with Phase I of construction currently in progress (JCPRD 2021). Construction of wetlands along Big Bull Creek could be phased with future construction of the park as it progresses. Future coordination efforts with Johnson County Parks and Recreation District would need to be made to accommodate for this.

9. RECOMMENDATIONS

The recommendations listed in this section are formulated to provide the city with a clear and concise plan to achieve the stormwater management goals listed in Section 1. From discussions with city staff, the city does not have a pre-determined annual budget for stormwater projects, which are addressed as the need arises.

Financial investment is recommended to address flooding and stormwater infrastructure improvements within the city. By preparing the stormwater master plan, Olsson has explored and documented the needs within the city and prepared a prioritized plan for the city to implement. Additional funding may be necessary to implement the plan and is described in detail in Section 9.4. Planning and prevention measures will help the city avoid costly improvement projects in the future, which are outlined in Section 9.5.

9.1. Improvement Projects

Through public outreach, investigations, and analyses efforts, the improvement projects were developed. The improvement projects enlarge or enhance existing infrastructure or construct systems where none currently exist. The established prioritization methodology does not take the location of the project within the watershed into consideration. Generally, projects located downstream in the watershed should be completed first to avoid aggravating drainage problems downstream. The total estimated cost for the prioritized improvement projects is approximately \$6.25 million (2021 dollars) as outlined in Table 13.

Table 14. Project Rankings.

Overall Rank	Project Name	Estimated Project Cost
1	East Second & East McDonald Streets (A)	\$194,500
2	West Eighth & West Nelson Streets (B)	\$249,600
3	West Eighth & West Nelson Streets (A)	\$183,000
T-4	East Fourth & East McDonald Streets	99,300
T-4	West Eighth Street & West Meriwood Lane	\$116,600
T-6	First Street & U.S. Highway 56	\$175,700
T-6	West Seventh & West Hulett Streets	\$497,800
T-6	West Third Street & West Meriwood Lane	\$615,200
T-9	West Martin & West Fourth Streets (“Horseshoe” Area)	\$2,661,300
T-9	West Eighth Street & Heather Knoll Drive (Detention Basin)	\$198,900
11	West Third Street & West Edgewood Drive	\$525,300
T-12	20125 Edgerton Road (Quarry)	\$92,600

Overall Rank	Project Name	Estimated Project Cost
T-12	West Fourth Street & West Meriwood Lane	\$37,000
14	501 East Sixth Street (Edgerton City Lake Low Water Crossing)	\$154,700
15	513 Heather Knoll Circle	\$15,900
16	East Second Street & East McDonald Street (B)	\$338,600
17	East Fifth Street & East McCarty Street	89,000
Total		\$6,245,000

An implementation plan is currently not proposed for the priority projects. From discussions with city staff, the city would prefer to be able to pick and choose projects as funding becomes available. It should be noted that the improvement project boundaries were created by grouping together reported drainage issues and infrastructure in poor condition. In some cases, the problems within these boundaries are independent of each other and do not need to be addressed at the same time. In these cases, the city may elect to complete only portions of a project, rather than the entire project. The additional items noted in this section should be when selecting which priority project to implement.

Design and construction cost savings can be realized by combining projects with projected costs of less than \$300,000 into a larger, single project. The city also gains an economy of scale with material and labor and the attention of a wider group of contractors who may be interested in bidding a midsize project versus a project less than \$100,000. Many of the listed projects could be considered smaller in scale by contractors, and therefore are recommended to be combined into larger projects as explained above.

It should be noted that some of the prioritized improvement projects have a lower estimated project cost and are not as complicated in nature to construct. Examples of these projects include 513 Heather Knoll Circle and West Fourth St & West Meriwood Lane, which may be able to be completed by city crews. The city should evaluate the capabilities of its city crews and if it is a better investment to have these projects completed internally, rather than through an outside contractor.

9.2. Maintenance Projects

The stormwater inventory and condition analysis identified roughly \$467,000 in existing stormwater infrastructure that is in poor or failed condition. This value includes only the material cost of the infrastructure and does not include surface restoration and other costs associated with repairing or replacing said infrastructure. This infrastructure contributes to current flooding and drainage problems throughout the city and poses a safety concern should the pipes or structures collapse. A reactive approach to replacing failed stormwater infrastructure can have

many undesirable consequences associated with it, including increasing replacement costs by 30 to 50 percent because it requires expedited work and lacks a competitive bid environment to solicit the best prices.

The goal of the city's stormwater maintenance program is to extend the life of the assets with the least amount of investment needed to complete this objective. This goal is best accomplished by addressing infrastructure when it reaches the fair to poor condition categories, when repairs are less extensive and before complete replacement is needed. Current infrastructure that is identified to be in good or fair condition will continue to deteriorate over time and eventually move into the poor category. A proactive financial investment of 5-10 years is recommended to replace the existing stormwater infrastructure that is identified to be in poor or failed condition in the condition assessment. Following this period, the city's infrastructure should be reassessed, and ongoing maintenance should be performed as an investment in the future.

The city's maintenance program priorities should focus on the following:

1. Clearing obstructions – The system inventory identified numerous pipes that have become obstructed with sediment or debris. When conveyance structures become obstructed, the capacity of the system is compromised and can no longer function as originally designed. Vacuum trucks and jet cleaning of existing pipes and excavation of excess sediment can significantly improve the capacity of the existing systems.
2. Pipe lining – As corrugated metal pipe ages it oxidizes and corrodes and holes form along the invert or bottom of the pipe. If left unchecked these holes continue to grow, allowing bedding and soil surrounding the pipe to migrate through the pipe, which ultimately causes the pipe to collapse. Several trenchless methods, including cured-in-place pipe lining, can mitigate this process and renew the pipe to ensure its service life is extended for several years.
3. Pipe replacement – Sections of pipe that have structurally deformed or already collapsed must be replaced. Replacement of the pipe requires open excavation of the surrounding ground and restoration of the surface features (roadways, driveways, sidewalks) upon completion.
4. Ditch grading and driveway culvert replacement – Some of the neighborhoods within the local city limits are serviced by stormwater infrastructure consisting of roadside ditches and driveway culverts. Many of the inspected driveway culverts were observed to be undersized and/or obstructed with sediment, preventing runoff from being conveyed through the pipes. Undersized driveway culverts should be replaced with adequately sized pipes (15-inch minimum pipe diameter) to help mitigate future obstructions. Adjacent ditches should be re-graded to accommodate for the new, larger pipe sizes. Refer to Section 8.3 for additional discussion of this topic.

5. Structure replacement – Inlet and junction structures that are in poor condition must be reconstructed. As with pipe replacement, surrounding surface features must be restored.

The cost to replace infrastructure is greater than the estimated material cost of the infrastructure mentioned at the beginning of this section due to associated surface restoration costs. The adjusted cost to replace infrastructure identified in poor or failed condition is roughly \$1,126,400. This value was calculated by assuming \$10,000 per structure replacement and \$500 per linear foot of pipe replacement, and \$15 per linear foot of obstructed pipe.

9.3. Ditches and Driveway Culverts

Currently the city does not have a stormwater policy or ordinance regarding the maintenance of ditches and driveway culverts. From discussions with city staff, that the city has re-graded ditches and cleared driveway culverts in the past. This has been at a limited capacity and as the need arises. It is recommended that the city adopt a stormwater policy that includes guidelines and criteria regarding maintenance of ditches and driveway culverts.

Olsson reached out to several other municipalities within the Kansas City metropolitan area regarding ditches and driveway culverts. Response varied from city to city, with lack of funding and staffing to address driveway culverts being the primary reason cities have not adopted maintenance responsibilities to manage these areas within their stormwater system. Since a significant portion of the drainage concerns within Edgerton can be attributed to driveway culverts and ditches, we recommend implementation of policy or ordinance similar to the City of Shawnee, Kansas. Shawnee has adopted a policy statement (PS-08) regarding the city's stormwater management program, that considers ditches and driveway culverts to be part of the city's publicly maintained drainage system since this infrastructure is located within the right-of-way. Key points from this policy are summarized below:

- Roadside ditches and driveway and pedestrian access culverts in the right-of-way are part of the public storm drainage system
- The initial cost and construction of new driveway culverts in the right-of-way shall be the responsibility of the landowner
- Existing driveway culverts located in the right-of-way which need replacement due to deterioration or insufficient capacity shall be repaired/replaced by the city
- Smaller scale stormwater infrastructure cleaning and repairs are typically completed by the city, but may need to be contracted out in some cases
- The criteria for establishing priority of maintenance work are based on public safety, protection of public infrastructure and protection of private property
- Landowners are responsible for performing routine maintenance such as mowing and clearing leaves/debris from road ditches and driveway culverts

Olsson recommends adoption of a similar stormwater policy or ordinance that incorporates roadside ditches and driveway culverts within the right-of-way as part of the public storm drainage system. Repairs to driveway culverts and re-grading of ditches could be addressed as the need arises and as funding is available. This maintenance should be prioritized based off set criteria such as public safety and protection of infrastructure.

Based on city maintenance staffing levels and capabilities, driveway culverts and ditches could be re-graded or replaced by internal staff. In some cases, it may be beneficial to have a contractor experienced in this type of work complete areas that require surveying or are larger projects than the city staff can complete.

The city may consider adopting criteria in addition to those listed above. Additional criteria and items to consider when adopting a policy are listed below:

- Throughout the master planning process, the city has expressed desire to have greater control over the initial installation of driveway culverts to ensure they are constructed properly and adequately sized. Proper installation also helps extend the lifespan of the culvert and minimize on-going maintenance.
- The city should have final say of determining if a pipe has deteriorated and reached the end of its serviceable life, i.e., if complete replacement of a driveway culvert is required or if minor fixes can be implemented to maintain the function of the pipe; criteria for determining pipe condition is outlined in Section 5.2. Olsson recommends that if the city determines a pipe should be replaced, then the city should pay for the replacement of the pipe and associated surface restoration items. Any improvements or restoration in addition to this should be at the cost of the property owner.
- The cost for a new driveway culvert for reasons other than pipe deterioration should be at the expense of the property owner and not the city. For example, if a property owner wishes to expand their driveway, and the existing pipe is in serviceable condition, the cost to lengthen the existing culvert or install a new culvert should be at the cost of the property owner.

9.4. Funding

Additional funding may be needed to fund the improvement projects. Potential funding sources for stormwater related projects are available and include the following:

- Sales tax
- General obligation (GO) bonds
- Stormwater utility fee
- Kansas Department of Health and Environment (KDHE) - Kansas Water Pollution Control Revolving Fund

- United States Department of Agriculture (USDA), Rural Development - Water & Waste Disposal Loan & Grant Program
- Johnson County Stormwater Management Program

Each mechanism has been used by numerous municipalities both locally and across the country to fund stormwater improvements and maintenance. There is no one-size-fits-all approach because each option carries its share of advantages and disadvantages, and proper application ultimately depends on the community’s goals, needs, and financial position. Table 15 briefly summarizes additional funding sources the city could consider.

Table 15. Summary of Potential Stormwater Program Funding Mechanisms.

Funding Option	Basic Structure	Recommended Application	Advantages	Disadvantages or Limitations
Sales Tax	A dedicated amount of local sales tax is authorized for public improvements and maintenance.	Contribute to funding the improvement projects.	Part of the revenue is generated by out-of-town visitors.	Revenue can fluctuate greatly from year to year. Takes time to build funds; not ideal for completing projects.
GO ¹ Bonds	Low-interest debt instrument typically used by cities to fund public infrastructure.	Bond improvement projects	Large amount of funds available up front to address most severe problems quickly Low interest	City pays interest Not practical for multiple small cost repairs
City Stormwater Fees	Property owners are charged a monthly fee to fund the stormwater program.	Fund annual maintenance of the existing system	Steady, predictable annual funding stream Fee can be structured to be equitable, based on runoff generation.	Takes time to build funds; not ideal for completing larger projects.
KDHE ² Revolving Fund	State provides financial assistance in the form of loans for water quality projects	Contribute to funding the improvement projects that provide benefits to water quality.	State funds available up front to address most severe problems quickly.	Priority given to projects that achieve major water quality objectives and eliminate health hazards City pays interest State and federal regulations may increase project costs

Funding Option	Basic Structure	Recommended Application	Advantages	Disadvantages or Limitations
USDA ³ Loan / Grant	Program that provides funding for stormwater drainage and other projects in rural areas.	Contribute to funding improvement projects.	Long-term, low-interest, fixed interest Grants may be combined with loans to keep costs reasonable if funds are available	City pays interest State and federal regulations may increase project costs
Johnson County Stormwater Management Program	Program that provides funding for stormwater management, flood risk reduction and infrastructure improvements.	Contribute to funding the improvement projects and maintenance projects	Maintenance and flood reduction projects are funded up to 50% of the total cost, watershed level improvements will be funded up to 100% of the total costs	Requires additional inspections. Stormwater infrastructure must be video inspected and assigned a rating. Funding is limited and competitive with other Johnson County cities.

¹General Obligation, ²Kansas Department of Health and Environment, ³United States Department of Agriculture

9.5. Planning & Prevention Measures

The City of Edgerton is developing and growing on the periphery of the greater Kansas City metropolitan area. Future growth is anticipated throughout Edgerton in the undeveloped portions of the local city limits and throughout Logistics Park KC, where development continues to grow at a rapid pace. Planning and prevention measures undertaken now can put the city in the best situation to avoid costly improvement projects in the future and to minimize the need for maintenance dollars for the upkeep of its infrastructure.

9.5.1. Design Standards and Ordinance Review

City ordinances and codes typically dictate the design and standards established for each community. Currently, the city has adopted a Unified Development Code, a Municipal Code, and a Building and Construction Code. Article 14 of the Municipal Code (City of Edgerton, Kansas, 2013) outlines the design standards and requirements for improvements. The requirements provided in Section 14.1 for streets, sanitary sewers, and storm drains is very general and mentions adoption of the latest Standard Specifications and Design Criteria published by the Kansas City Metropolitan Chapter APWA. Specific standards that are adopted are not listed, which can leave certain items open to interpretation. It is recommended that the city create a design and construction manual that adopts and lists specific standards and requirements for infrastructure improvements.

9.5.2. Stream Buffer & Erosion Hazard Zones

The current stormwater master plan focused primarily on the city's enclosed storm sewer system. Many communities within the Kansas City metropolitan area have experienced development problems in the past when residential, commercial, and industrial projects have encroached on stream corridors. Urbanization changes the volume and timing of stormwater runoff within a watershed. Streams respond to urbanization and increased runoff by deepening, widening, and changing their alignment until they reach a state of equilibrium within the watershed. Stream erosion and instability can threaten both private and public property, infrastructure, and utilities. Cities are faced with the challenges of intervening to stop these changes and to protect development that was built within the stream corridor. Mitigating the impact of changes within streams is an expensive endeavor.

Designating land adjacent to a stream to be preserved or left undeveloped is a best practice to prevent future challenges and help to preserve water quality. Stream buffers or erosion hazard zones (EHZ) are established methods accepted by cities across the country to preserve land adjacent to streams. Current watershed planning that is being completed by Johnson County developed EHZ to identify at-risk infrastructure and for future planning that will preserve the stream corridor and prevent development from encroaching on streamways that will respond with change because of urbanization. The developed EHZ from Johnson County are recommended to be reviewed and adopted as stream preservation areas.

9.5.3. Floodplain Management

The SFHAs located within the overall city limits are Zone AE, Floodway, and Zone X as described in Section 2.3. These are areas where detailed hydrologic and hydraulic analyses have been performed and base flood elevations have been established. FEMA regulates streams that have a contributing drainage area greater than one square mile. As outlined in Section 2.2, there are a number of FEMA designated flood areas throughout Edgerton's overall city limits. These designated flood areas are primarily Zone AE floodplain and floodway, and therefore detailed hydraulic studies have been performed and base flood elevations have been established. Johnson County revised the floodplain mapping throughout the county in the early to mid-2000's, which included the aforementioned hydraulic studies and floodplain mapping. As previously noted, FIRM Panels within the overall city limits were accessed and downloaded using the FEMA MSC (2021). A review of the FIRM panels within the overall city limits shows an effective date of 8/3/2009 for each panel. Edgerton should continue to update floodplain mapping within the overall city limits and participate in any future re-mapping efforts with Johnson County.

According to FEMA's current Community Status Book Report for the State of Kansas, Edgerton currently participates in FEMA's National Flood Insurance Program; however, Edgerton is not a

part of FEMA's Community Rating System (CRS) program according to FEMA's current list of Community Rating System (CRS) Eligible Communities (FEMA 2021). This program is a voluntary program for communities that exceed minimum requirements for the NFIP, which incentivizes floodplain management practices. Additional discounts on flood insurance premiums are provided for properties located within a community that participates in this program. Credits can be earned by the community by through various activities related to floodplain management. These activities are outlined by FEMA (2018) in the CRS publication, and vary from maintaining elevation certificates for new construction to acquiring and/or relocation flood prone buildings, and are categorized as follows:

- Public Information
- Mapping and Regulations
- Flood Damage Reduction
- Flood Preparedness

The discount on the flood insurance premium increases as more credits are acquired by the community. To apply for this program, an application must be submitted to the regional FEMA office with proof that the community is implementing activities that warrant a minimum of 500 CRS credit points. A CRS coordinator must also be appointed by the community to coordinate with FEMA and ensure that the CRS practices are being implemented. It is recommended the Edgerton participate in the CRS program to provided discounted rates on flood insurance to residents and improve floodplain management standards.

9.5.4. Stormwater Design Criteria & Best Management Practices

A post-construction stormwater BMP is designed to infiltrate and slowly release stormwater runoff during a rainfall event. BMPs can be designed to collect pollutants and sediment from impervious surfaces and improve water quality downstream within the watershed. Water bodies and streams such as Martin Creek, Big Bull Creek and Hillsdale Lake would benefit if pollutants such as nitrogen and sediment were collected upstream within the watershed, thus reducing algae blooms, and improving the clarity of the water. A city ordinance is recommended to address volume and quality control for stormwater discharges from developed sites. Guidance on BMPs for the Kansas City metropolitan area are outlined in the Mid-America Regional Council's Manual of Best Management Practices for Stormwater Quality (MARC 2012).

9.5.5. Municipal Separate Storm Sewer System Permit

A municipal separate storm sewer system (MS4) permit is a type of permit required by the Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES). The Clean Water Act (CWA) prohibits entities from discharging pollutants through point sources into a water of the U.S. unless it has obtained an NPDES permit. This permit

outlines restrictions, regulations, and other requirements to ensure that discharges do not harm water quality.

MS4s are systems owned by public entities designed to collect and convey stormwater that discharges into waters of the U.S. These systems generally consist of storm inlets and pipes, gutters, ditches, swales, manmade channels, and other similar features. MS4s are split into Phase I (large and medium MS4s) and Phase II (small MS4s) categories based on populations and other factors; however, not all small MS4s are regulated or required to obtain an NPDES permit. The EPA has delegated authority for issuance and administration of NPDES permits to state agencies and other entities; the KDHE is the permitting authority for the state of Kansas. As of 2020, 56 effective NPDES permits have been issued in the state of Kansas for counties, cities, and state agencies. KDHE's designation process for MS4 permits is summarized below (KDHE 2021).

- Method 1 – automatic designation of small MS4s located in census-designated urbanized areas
- Method 2 – based on the four following factors:
 - Population (based on the most recent decennial census)
 - Consideration for all cities with populations greater than 10,000 located outside an urbanized area
 - Required for all cities with populations greater than 25,000 located outside an urbanized area
 - Location
 - MS4s located outside of an urbanized area can be designated by this method
 - MS4s located in urbanized areas are automatically designated per Method 1
 - Population Density - Designated if a municipality has a population density of at least 1,000 per square mile and the municipality meets the location and total maximum daily load (TMDL) criteria
 - TMDL - Designated if the MS4 is adjacent to streams or lakes identified as impaired in a TMDL and the criteria for location and population density are met
- Method 3 – based on interconnection to a downstream MS4 and substantial pollutant contribution to the downstream MS4
- Method 4 – based on a submittal of a valid petition and proximity to receiving waters identified in a TMDL as impaired

Currently, the City of Edgerton is not required to have an MS4 permit. Areas within the overall city limits of the City of Edgerton either do not qualify as an urbanized area per the 2010 census or do not meet the required population, location, or other requirements for an

MS4 permit designation; however, as the City of Edgerton continues to grow in size and population, consideration should be given toward the requirements for an NPDES permit because one may be needed in the future. KDHE requires the preparation of a stormwater management program, also referred to as a stormwater management plan, for all designated MS4 permits. One of the purposes of the stormwater management plan is to provide a clear outline for the program that most individuals can follow. This helps in the case of job turnover or role changes so that a new individual in charge of the program, who may have less experience, can ensure that projects achieve compliance with the MS4 permit. The stormwater management program should implement a program meeting the requirements of the MS4 permit, which are summarized below (KDHE 2021).

- Reduce pollutant discharge from MS4s to the maximum extent practicable (MEP)
 - MEP involves the implementation of BMPs
 - Recommendations for BMPs are outlined in Section 8.5.4
- Implement the six minimum control measures (EPA fact sheet number in parenthesis)
 - Public Education and Outreach (2.3)
 - Public Participation and Involvement (2.4)
 - Illicit Discharge Detection and Elimination (2.5)
 - Construction Site Stormwater Runoff Control (2.6)
 - Post-construction Stormwater Management in New Development and Redevelopment Projects (2.7)
 - Pollution Prevention / Good Housekeeping for Municipal Operations (2.8)
- Satisfy requirements, statutes, and regulations for the MS4 NPDES permit, the CWA, and Kansas surface water quality

Although they both may provide similar objectives, the stormwater management plan should not be confused with the stormwater master plan (this document). Recommendations from the stormwater master plan may be integrated into the stormwater management plan. A detailed document outlining KDHE's designation process, MS4 permit requirements, EPA fact sheets, a list of current MS4 permitted entities, and other information can be found at KDHE's website.

10. REFERENCES

- APWA (American Public Works Association, Kansas City Metropolitan Chapter). (2011). "Division V Section 5600 Storm Drainage Systems & Facilities".
- City of Edgerton, Kansas. (2011). "Comprehensive Land Use Plan."
- City of Edgerton, Kansas. (2013). "Municipal Code." *Chapter XIII – Streets and Sidewalks*.
- FEMA (Federal Emergency Management Agency). (2021). "Community Rating System Eligible Communities." <https://www.fema.gov/sites/default/files/documents/fema_april-2021-eligible-crs-communities.pdf> (Jun. 2, 2021).
- FEMA (Federal Emergency Management Agency). (2021). "Community Status Book Report, Kansas." <<https://www.fema.gov/cis/KS.html>> (Jun. 2, 2021).
- FEMA (Federal Emergency Management Agency). (2021). "FEMA Flood Map Service Center." <<https://msc.fema.gov/portal/home>> (Feb. 24, 2021).
- FEMA (Federal Emergency Management Agency). (2018). "National Flood Insurance Program Community Rating System." *FEMA B 573 / 2018*.
- JCPRD (Johnson County, Kansas Parks and Recreation District). (2021). "Big Bull Creek Park Project." <<https://www.jcprd.com/258/Big-Bull-Creek-Park-Project>> (Apr. 28, 2021).
- Johnson County, Kansas. (2021). "Automated Information Mapping System." <<https://maps.jocogov.org/ims/>> (Feb. 18, 2021).
- KDHE (Kansas Department of Health and Environment. (2021). "Municipal Stormwater Program." <<https://www.kdheks.gov/muni/ms4.htm>> (May 27, 2021).
- MARC (Mid-America Regional Council). (2012). "Manual of Best Management Practices for Stormwater Quality."
- McEnroe. (2005). "Investigation of Technical Issues in Stormwater Detention with Preliminary Recommendations."

NOAA (National Oceanic and Atmospheric Administration). (2017). "Significant Flooding Event of August 21st-22nd, 2017."
<<https://www.weather.gov/eax/SignificantFloodingEventofAugust21st-22nd2017>>
(Mar. 22, 2021).

NOAA (National Oceanic and Atmospheric Administration). (2021). "Kansas City Monthly Precipitation." <<https://www.weather.gov/eax/monthlypcpn>> (Mar. 10, 2021).

Northpoint Development. (2021). "Logistics Park Kansas City."
<<https://www.logisticsparkkc.com/about-lpkc/>> (Apr. 14, 2021).

NRCS (Natural Resources Conservation Service). (2021). "Web Soil Survey"
<<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>> (Feb. 10, 2021).

RIC (Renaissance Infrastructure Consulting). (2016). "Micro Stormwater Drainage Study."
Inland Port XXI. Southwest Corner of 191st and Essex Road, Edgerton, KS.

RIC (Renaissance Infrastructure Consulting). (2016). "Micro Stormwater Drainage Study."
Inland Port XXII. Southwest Corner of 191st and Homestead Lane, Edgerton, KS.

RIC (Renaissance Infrastructure Consulting). (2016). "Micro Stormwater Drainage Study."
Inland Port XXXI, XXXII & XXXIII. Northwest Corner of 196th and Waverly Road, Edgerton, KS

RIC (Renaissance Infrastructure Consulting). (2018). "Macro Stormwater Drainage Study."
Project Mustang. Northeast of 207th St. and Homestead Lane, Edgerton, KS.

RIC (Renaissance Infrastructure Consulting). (2019). "Micro Stormwater Drainage Study."
IP 51-54. 207th Street and Waverly Road, Edgerton, Johnson County, KS.

RIC (Renaissance Infrastructure Consulting). (2019). "Micro Stormwater Drainage Study."
Inland Port XL, Rail Serve Storm Study. Logistics Park, Edgerton, KS. Northwest Corner of Waverly and 183rd St.

SWT Design. (2018). "Downtown Edgerton Plan."

The Gardner News. (2018). "Edgerton Flood Damages Total \$1.7 Million".
<<https://gardnernews.com/2018/03/01/edgerton-flood-damages-total-1-7-million/>>
(Mar. 22, 2021).

APPENDIX A

Stormwater Questionnaire

The City of Edgerton is conducting a stormwater masterplan and needs your input to evaluate potential stormwater flooding and erosion problems in the City. This comprehensive study includes an analysis of the existing stormwater collection system. We need your help to identify problem areas and determine the cause. Upon completion, the City's engineering consultant (Olsson, Inc), will create a plan with recommendations for prioritizing infrastructure upgrades to reduce or eliminate flooding and to target future development and system expansion. We need your help to determine where flooding may occur in public areas. This does not include nuisance yard flooding or problems due to poor yard grading. The master plan will assist the City's elected leaders in planning and budgeting for future stormwater projects.

Olsson will also be completing a stormwater system inventory over the next few months. Team members from Olsson will wear reflective vests and may be on your property collecting information about existing pipe/structure sizes and condition of the existing stormwater system. The collection will generally be done during normal business hours and Olsson employees will carry badges and other identification. If you have any questions, you can call City Hall at 913.893.6231.

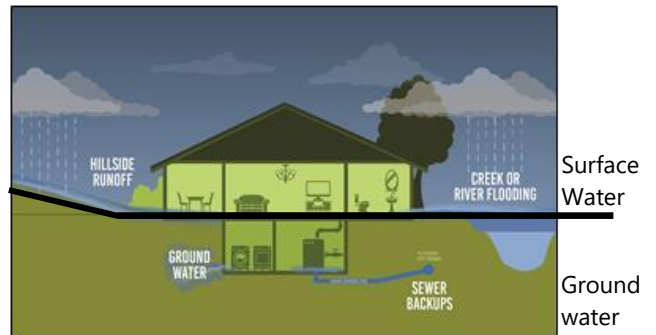
Name: _____ Address: _____

Phone: _____ Email: _____

1. How long have you owned/lived at this location? _____
2. How many times has your building experienced stormwater flooding (surface water entering your home or attached garage) in that time? _____

Approximate dates of flooding and amount of rainfall (if known): _____

3. Flooding during heavy rain can occur for many different reasons. See Figure 1 to the right. Please indicate which of the following has caused the flooding you listed above?



_____ (Surface water) Rainfall from streets, gutters, neighboring yards, ditches, creeks, etc, which runs on top of the ground (as surface water) into a surface level opening of the building, such as a door or basement window.

_____ (Ground Water) Rainfall soaking into the ground and running as groundwater into the basement due to cracks in the wall or floor or through the foundation drains

_____ Other reasons (please explain): _____

4. For the flooding listed, where specifically is water entering the building? (check all that apply)
- | | | | |
|-------------|--------------------|--------------------|----------------------------|
| _____ Doors | _____ Windows | _____ Window Wells | _____ Attached Garage Door |
| _____ Walls | _____ Floor Cracks | _____ Floor Drains | _____ Sump Pump |
| _____ Other | | | |

5. For the flooding listed, describe the impact to your home or garage: _____

6. If you've experienced stormwater flooding or erosion, what appears to be the source or cause?

- Garbage/debris/overgrowth clogging nearby storm sewer drains or pipes
- Floodwater from a nearby creek or stream that overflows the banks and enters your home
- Not enough storm water drains to capture runoff
- Stormwater pipes that do not drain
- Ponding near a pipe or stormwater drain
- Water overtopping a ditch
- Clogged or crushed driveway culvert
- Stormwater carried in street overtops curbs
- Improper yard drainage
- Other: _____

7. Using your answer in Question 6, please tell us where the problem is occurring.

8. Have nearby streets where you live/own been flooded? If so, where and how often? How deep was the water? _____

9. Does surface water cause erosion which threatens your property or the street where you live/own?
 Yes No Please explain: _____

10. Additional comments. Please share any other concerns you may have regarding flooding and stormwater in your neighborhood that are not addressed in the sections above:

We appreciate your assistance in this effort. A response is helpful even if you have not experienced or witnessed problems in the past.

Return this form to either City Hall or the City's engineering consultant via MAIL, FAX, EMAIL, THE DROP BOX OUTSIDE CITY HALL, or at EDGERTONKS.ORG.

City Hall
Attn: Kara Banks
404 E Nelson St.
Edgerton, KS 66021
Phone: 913.893.6231
kbanks@edgertonks.org

Olsson
Attn: Brent Johnson, PE
7301 W. 133rd St, Ste. 200
Overland Park, KS 66213
Fax: 913.381.1174
bmjohnson@olsson.com

An open house style meeting will be held at Martin Creek Park on September 22 from 4:00 p.m. — 6:00 p.m. for residents to learn more about the masterplanning process. Individual meetings are available for anyone unable to attend. Call City Hall to set up a time.

Name	Address	Surface Water Erosion	Groundwater Flooding	Sanitary Backup	Building Flooding	Street Flooding
James Gerdes	501 Heather Knoll Dr					
Bill Booton	203 W Meriwood Ln		✓		✓	
Kristi Cook/Espinosa	100 W Meriwood Ln					
Logan Key	200 E McCarty St					
Brian Peters	903 W 3rd St	✓	✓			
Virgil Florence	605 W Hulett St					
Chris Collier	113 W Meriwood Ln					✓
Cindy Shay	708 W Nelson St	✓	✓	✓	✓	✓
Lance Hughey	605 W Edgewood Dr		✓			
Jeremy Little	404 W Meriwood Ln		✓			
Shirley Hill	1010 W 3rd					
Dan Oneal	201 W Martin St	✓			✓	✓
Greg Champion	708 W Edgewood Dr		✓			
Dave Hayden	313 W McDonald St				✓	✓
Phyllis Harris	118 W Nelson St		✓			
Deborah Wilbur	1014 W 3rd St	✓				✓
Holly & Joe Hewer	305 W 8th St	✓	✓	✓	✓	✓
Doug Williams	113 W 7th St					
Suanna Bunce	913 W 8th St					
James Coolberth	906 W 2nd St	✓	✓			✓
Ron Conus	605 W Meriwood Ln					
Gilbert and Laurie Pottorff	811 W 4th St		✓			
Casse Withrow	708 W Cumberland Dr					
John Marsh	200 E McDonald St	✓	✓		✓	✓
David Lammers	107 W Edgewood Dr		✓			
Keith Buntmeyer	108 1st St		✓		✓	✓
Christopher Miller	208 W Meriwood Ln		✓			
Monica Martin	908 W. 5th St					
Kim Denny	413 E McCarty St					✓
Larry Pearce	105 W Martin St	✓				✓
Larry Pearce	109 W Martin St	✓			✓	✓
Larry Pearce	113 W Martin St	✓			✓	✓
Lonnie Pannell	519 E 3rd St					✓
Mary Elizabeth Brown	911 1st St		✓			✓
Deb Lebakken	900 W 7th St					
Barbara Terry	210 E McDonald St					
Michael C Francis	109 W 7th St					✓
David W. Eastwood	200 E Nelson St		✓			
Rick Ford	608 W Martin St					
Noel Oliver	113 E 5th St					✓
Brandy A	516 W Martin St		✓			
Lori Smith	310 W 8th St					
Rodger Strout	500 E 3rd St					
Auge S Crisler	400 E 2nd St					
Shana Sanford	110 E McDonald St		✓			
Pam Andres	616 W Hulett St	✓	✓		✓	✓
HM and BK Damet	202 W 8th					
James A Kennedy	202 E 2nd St					
Terry Nugen	107 E Martin St					
Pam Sill	20468 Co-Op Rd	✓				✓
Paul Fibelkorn	1106 W 7th St					✓
Rachel and Brian Hilliard	1013 W 4th St				✓	
Linda Heider	2256 N 100th Rd					
Ronald Walter	39575 W 199th St					
Debbie Harris-Eckhoff	126 E 2300 Rd					
Michael Sampugnaro	513 Edgewood Dr					
Randy Stegman	109 W Meriwood Ln					✓
Robert A Green	900 1st St	✓	✓		✓	✓
Rosemarie Cordero	104 E Rankin St		✓		✓	✓
Sean & Buffy Hilton	616 E 3rd St	✓	✓		✓	✓
Jamie Frost	400 W 5th St					
Clay Longanecker	616 W Meriwood					
Silvia Berumen	117 W 8th St					✓
Michael Curtis	609 W Meriwood Ln	✓				
Teresa Dillard	309 E McDonald					✓
Tim Conely	421 W Edgewood Dr		✓		✓	
Raymond Dill	202 E 3rd St					
Tom Fay	201 W 5th St					
Tom Barlett	203 E Morgan St		✓		✓	
Tricia Orrison	100 W 7th St		✓	✓	✓	✓
William Laface	516 W 4th St	✓			✓	✓
David Dwyer	121 E 2300 Rd					

APPENDIX B

City Council Presentation

olsson

**Stormwater Masterplan Presentation
November 18, 2021**

AGENDA

- 1 GOALS
- 2 PROCESS
- 3 SYSTEM DOCUMENTATION & CONDITION ASSESSMENT
- 4 PUBLIC OUTREACH
- 5 DRAINAGE PROBLEM IDENTIFICATION
- 6 IMPROVEMENT PROJECTS
- 7 PROJECT SCORING & PRIORITIZATION
- 8 RECOMMENDATIONS & DISCUSSION TOPICS



GOALS

- Deliver a comprehensive action-orientated plan that quantifies and prioritizes those stormwater needs
- Identify solutions that tackle multiple objectives, wherever possible, and coordinate work with other city infrastructure systems and plans
- Plan for growth and implement best management practices



PROCESS

Assessing the needs
of the community

INVENTORY
& ASSESS



SEEK CITY &
PUBLIC INPUT



GROUP
PROBLEM AREAS

Creating a work plan

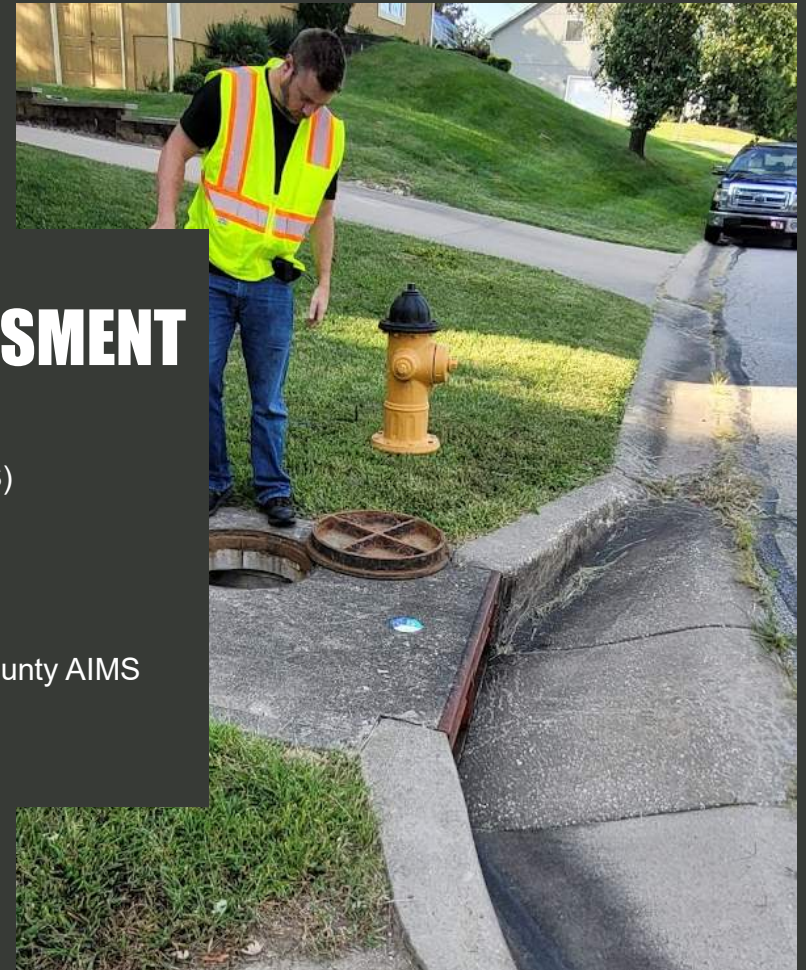
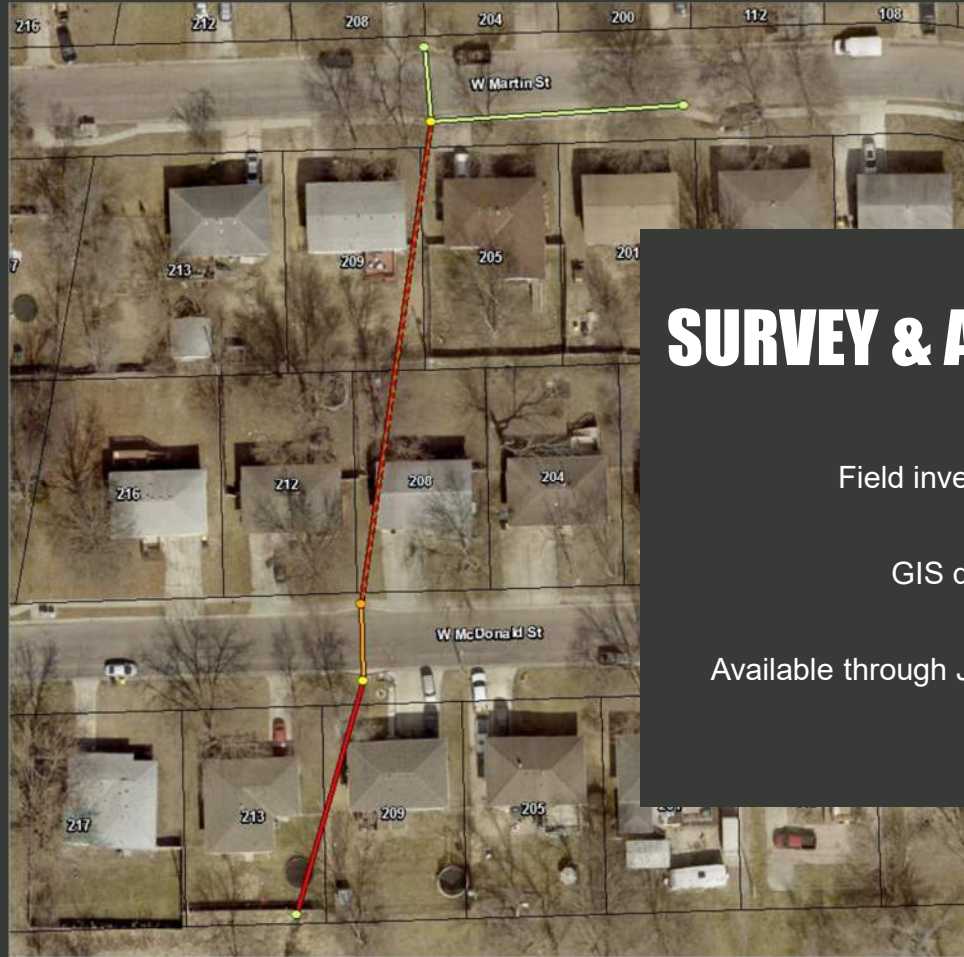
CONCEPTUAL
SOLUTIONS



SCORE &
PRIORITIZE



PRIORITIZED
PLAN



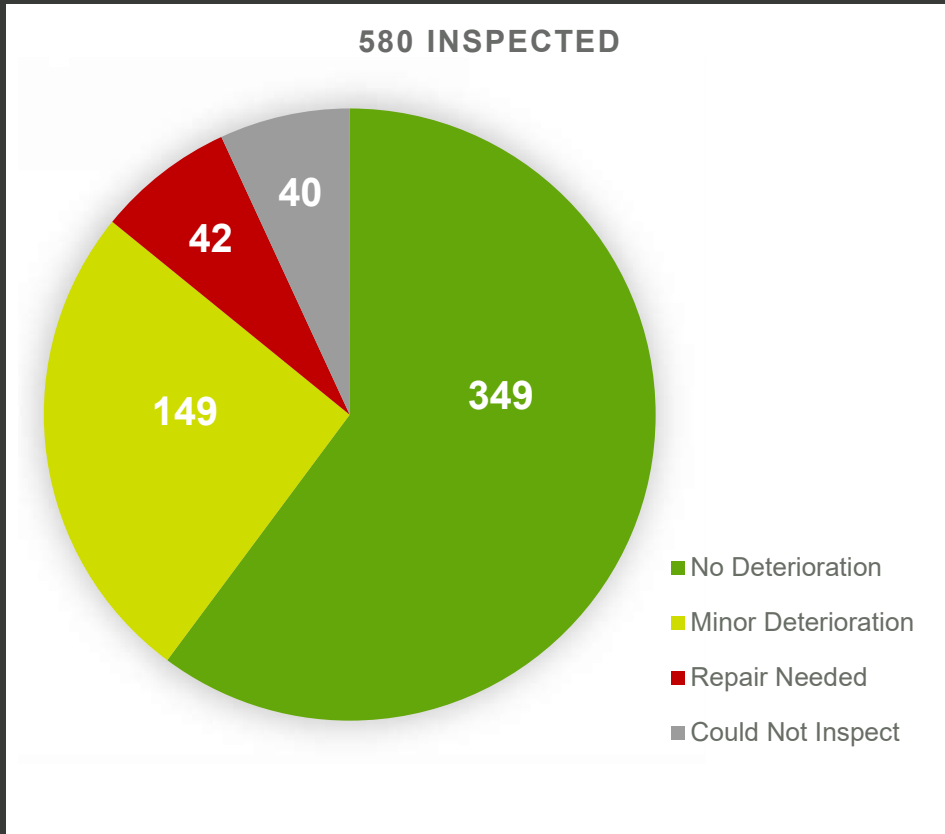
SURVEY & ASSESSMENT

Field inventory (GPS)

GIS database

Available through Johnson County AIMS

STRUCTURES

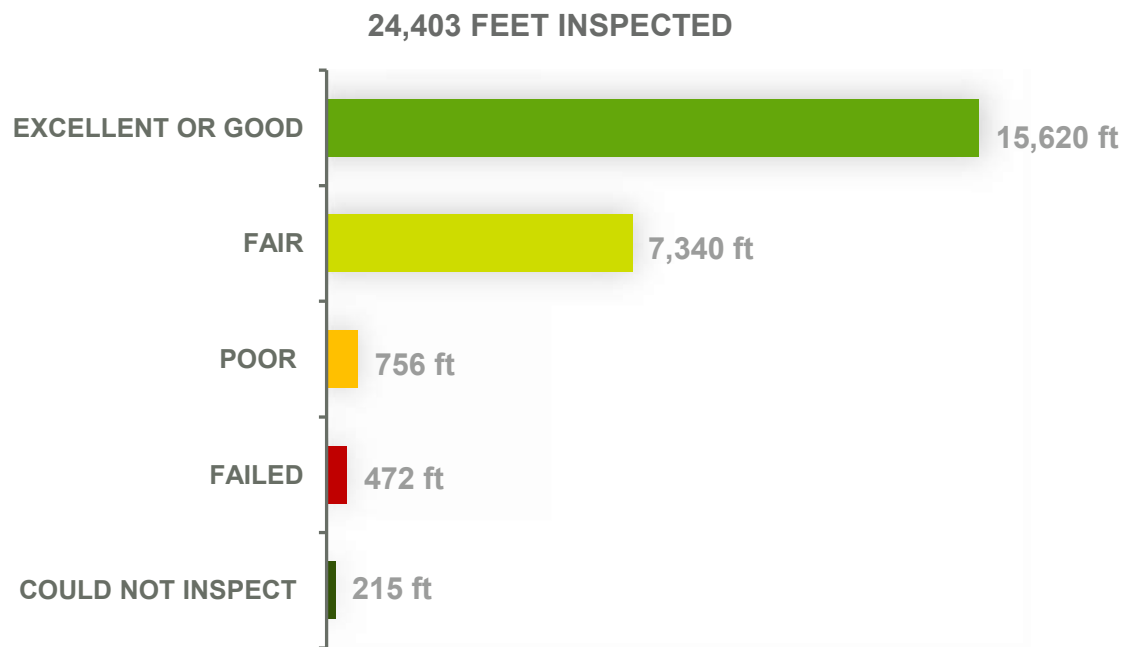


Inlets, junction boxes & manholes

System value \$3.8M

Estimated \$250k structure replacements needed

PIPES



System value \$3.9M

Estimated \$215K in pipe repairs needed
(excludes surface restoration)

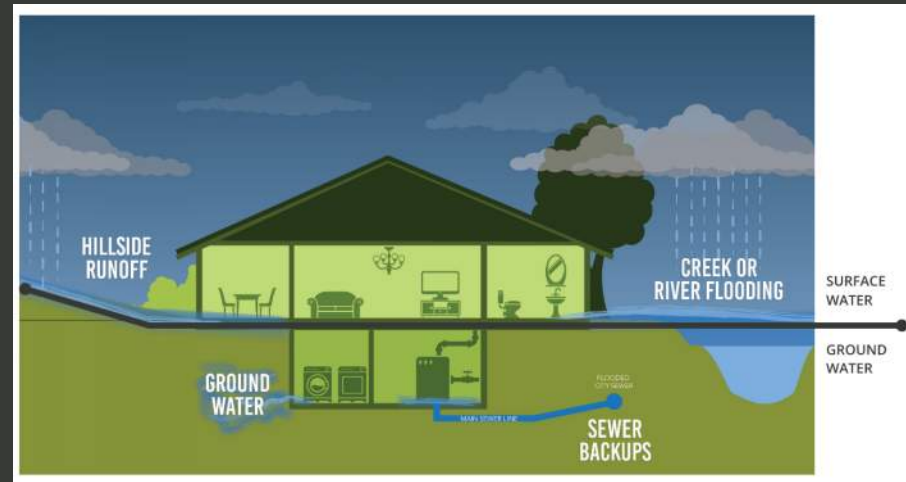
Nearly 90% of pipe material is CMP



PUBLIC OUTREACH

STORMWATER MASTERPLAN PUBLIC OPEN HOUSE

Tuesday, September 22
4:00 p.m. - 6:00 p.m.
Martin Creek Park Shelter



QUESTIONNAIRES

Paper copies sent by the city

Online questionnaires available on the city's website and social media outlets

RESPONSES

73 in total – return rate of 9%

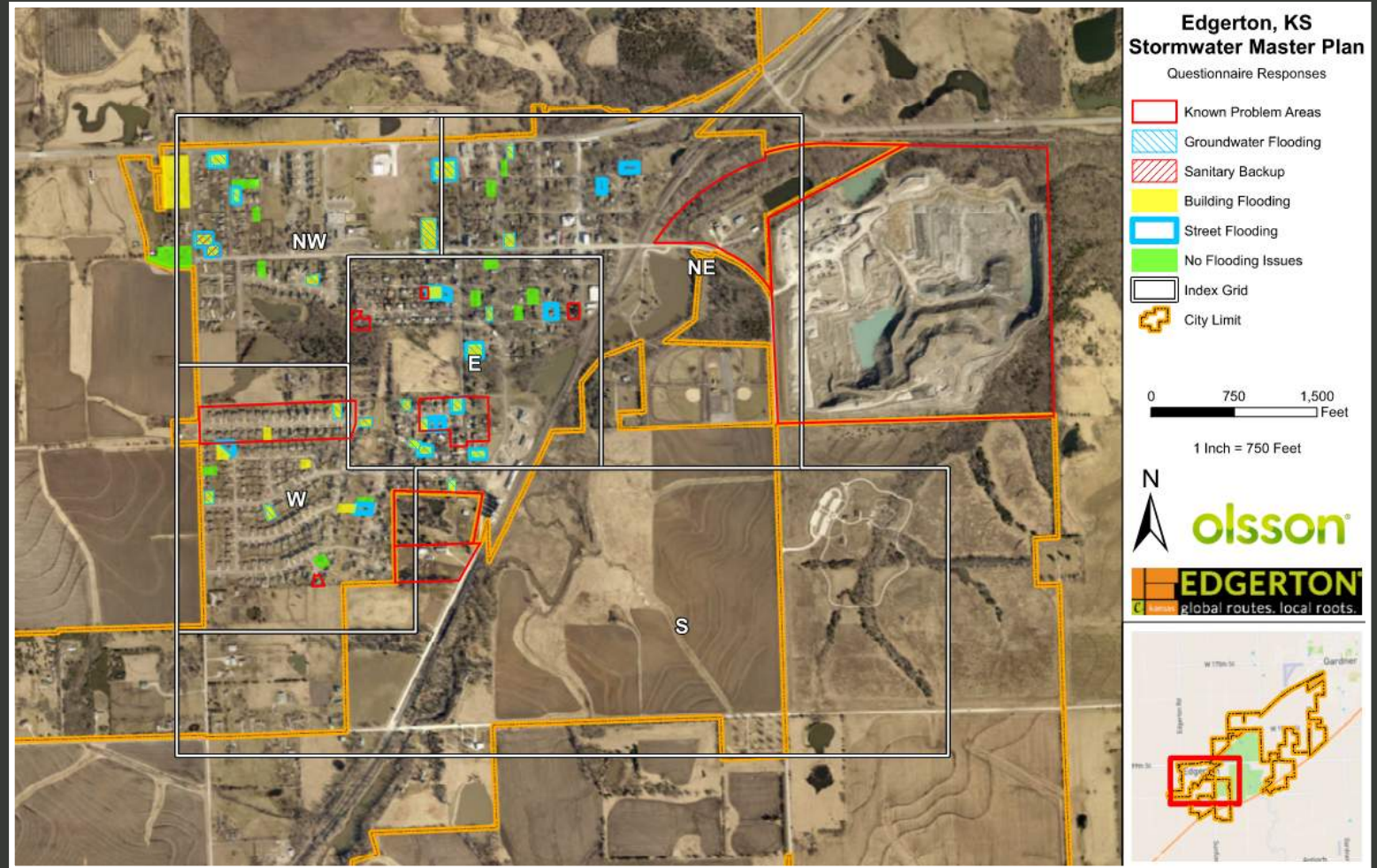
55 of those responses indicated building and street flooding

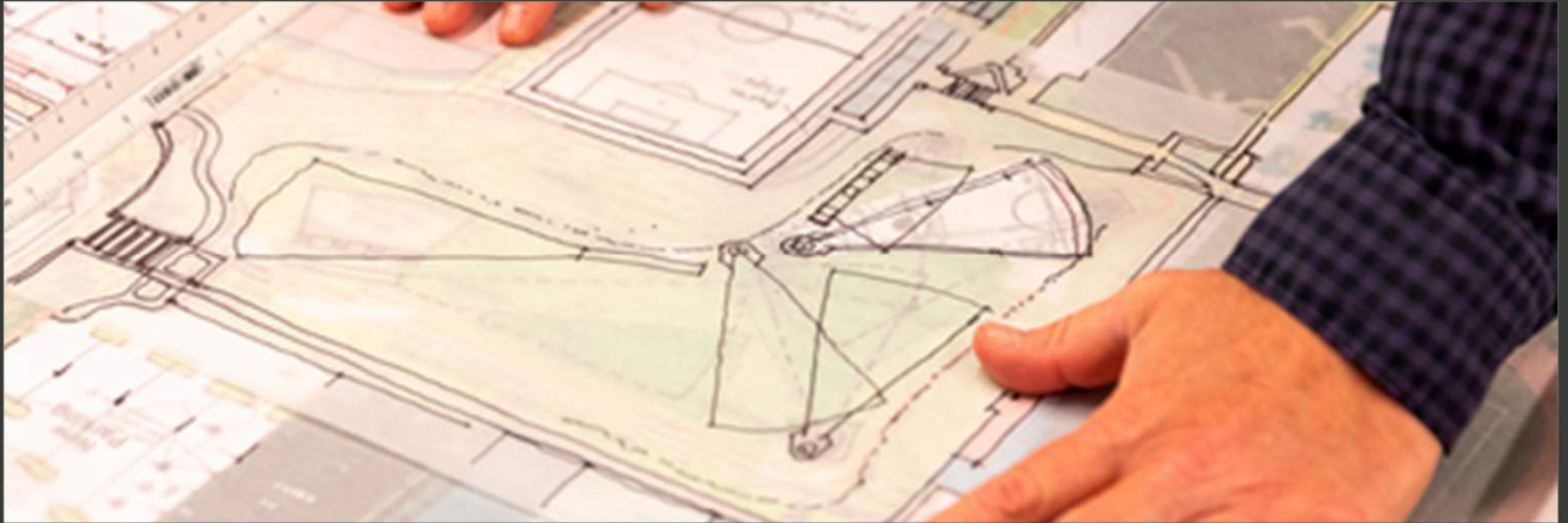
OPEN HOUSE MEETING (9/22/2020)

Olsson and city staff was on hand to answer questions and discuss stormwater concerns with residents.



MAPPED STORMWATER ISSUES





PRIORITIES & GROWTH CONSIDERATIONS

PRIORTIZATION METHODOLOGY

- ① **BENEFIT SCORES ASSIGNED TO:**
 - Loss of life
 - Flooding of buildings
 - Flooding of arterial, collector and residential streets
 - Erosion threatening buildings or other infrastructure
 - System condition ratings for “fair” or “poor” condition

- ② **CATEGORIES ARE WEIGHTED TO CONSIDER:**
 - Frequency
 - Severity

- ③ **COST TO BENEFIT RATIO DETERMINED**

- ④ **WEIGHTED AVERAGE OF BENEFIT SCORES AND C/B RATIO**



RECOMMENDED PROJECT PROGRESSION

PROJECT RANK	LOCATION	EST. PROJECT COST
1	W 8th St & W Nelson St	\$378,608
2	E 2nd St & E McDonald St	\$537,060
3	E 4th St & E McDonald St	\$99,255
4	1st St & Hwy 56	\$250,800
5	E 5th St & E McCarty St	\$89,040
6	W Martin St & W 4th St ("Horseshoe" Area)	\$2,661,315
7	W 8th St & Heather Knoll Dr (Detention Basin)	\$198,930
8	W 7th St & W Hulett St	\$497,790
8	104 Rankin St	\$70,860
10	W 3rd St & Meriwood Ln	\$672,580
11	W 3rd St & W Edgewood Dr	\$615,225
12	20125 Edgerton Rd (Quarry)	\$92,610
12	W 4th St & W Meriwood Ln	\$37,020
14	W 8th St & W Meriwood Ln	\$328,170
15	501 E 6th St (Edgerton City Lake Low Water Crossing)	\$154,650
16	513 Heather Knoll Cir	\$15,900

GROWTH CONSIDERATIONS

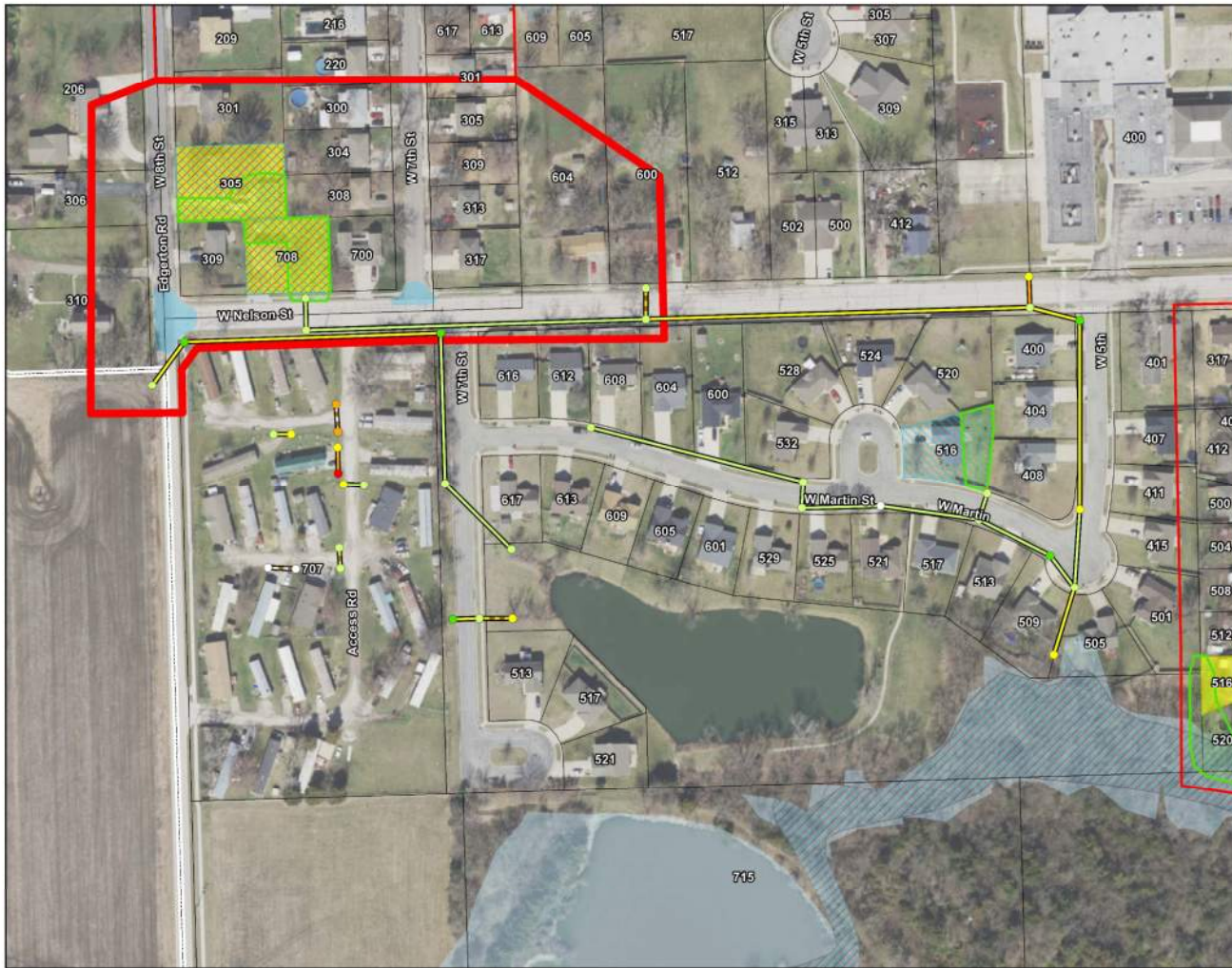


- Design Standards and Ordinance Update
- Adopt Stream Buffers or Erosion Hazard Zones
- Participate in FEMA Community Rating System
- Adopt Storm Water Quality Best Management Practices
- Prepare for Future MS4 requirements

DISCUSSION TOPICS



- ① Stormwater Improvement Projects
- ② Investment in Maintenance
- ③ Public vs Private Systems
- ④ Funding



**Edgerton, KS
Stormwater Master Plan
Project Areas**
1. W 8th St & W Nelson St

- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 125 250 Feet
 1 Inch = 125 Feet





**Edgerton, KS
Stormwater Master Plan
Project Areas
2. E 2nd St & E McDonald St**

- Project Areas
- Storm Infrastructure Condition**
 - Excellent
 - Good
 - Fair
 - Poor
 - Failed
 - Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues**
 - Groundwater
 - Sanitary Backup
 - Building Flooding
 - Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
 - Current Effective Floodway
 - Current Effective Zone A/AE
 - Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 75 150 Feet
 1 Inch = 75 Feet





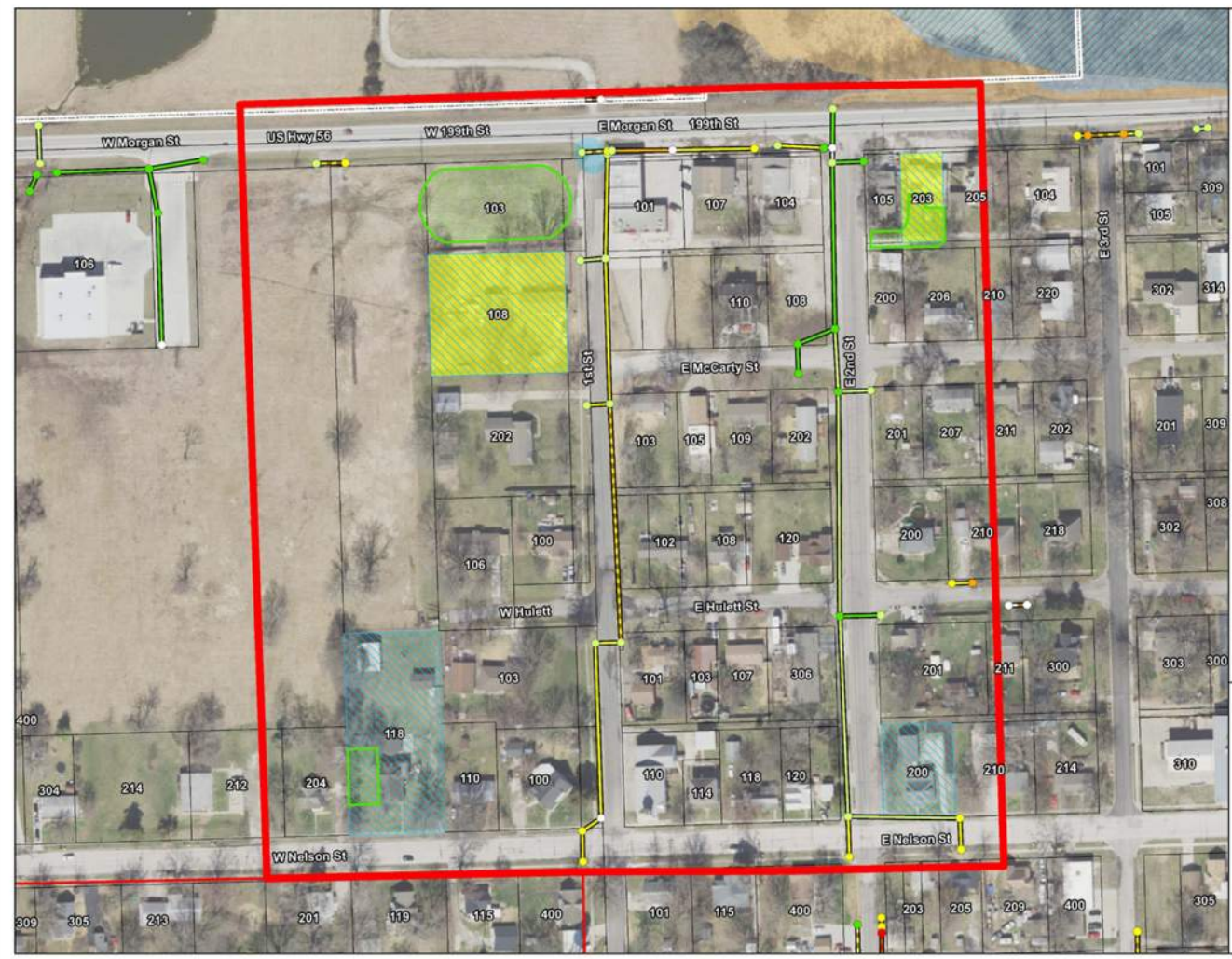
**Edgerton, KS
Stormwater Master Plan
Project Areas
3. E 4th St & E McDonald St**

- Project Areas
- Storm Infrastructure Condition**
 - Excellent
 - Good
 - Fair
 - Poor
 - Failed
 - Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues**
 - Groundwater
 - Sanitary Backup
 - Building Flooding
 - Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
 - Current Effective Floodway
 - Current Effective Zone A/AE
 - Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 50 100 Feet
 1 Inch = 50 Feet



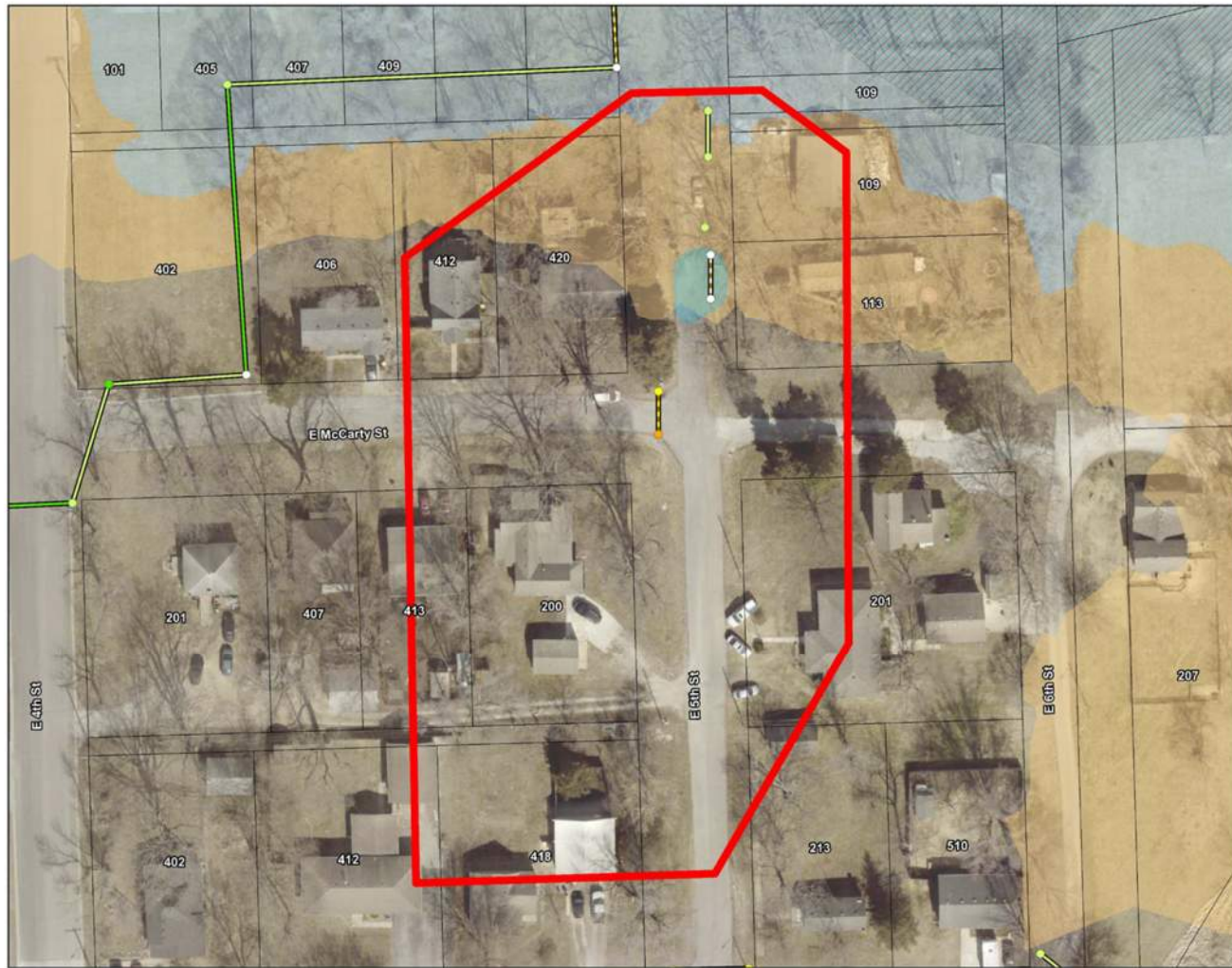
**Edgerton, KS
Stormwater Master Plan
Project Areas
4. 1st St & Hwy 56**



- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 125 250 Feet
 1 Inch = 125 Feet



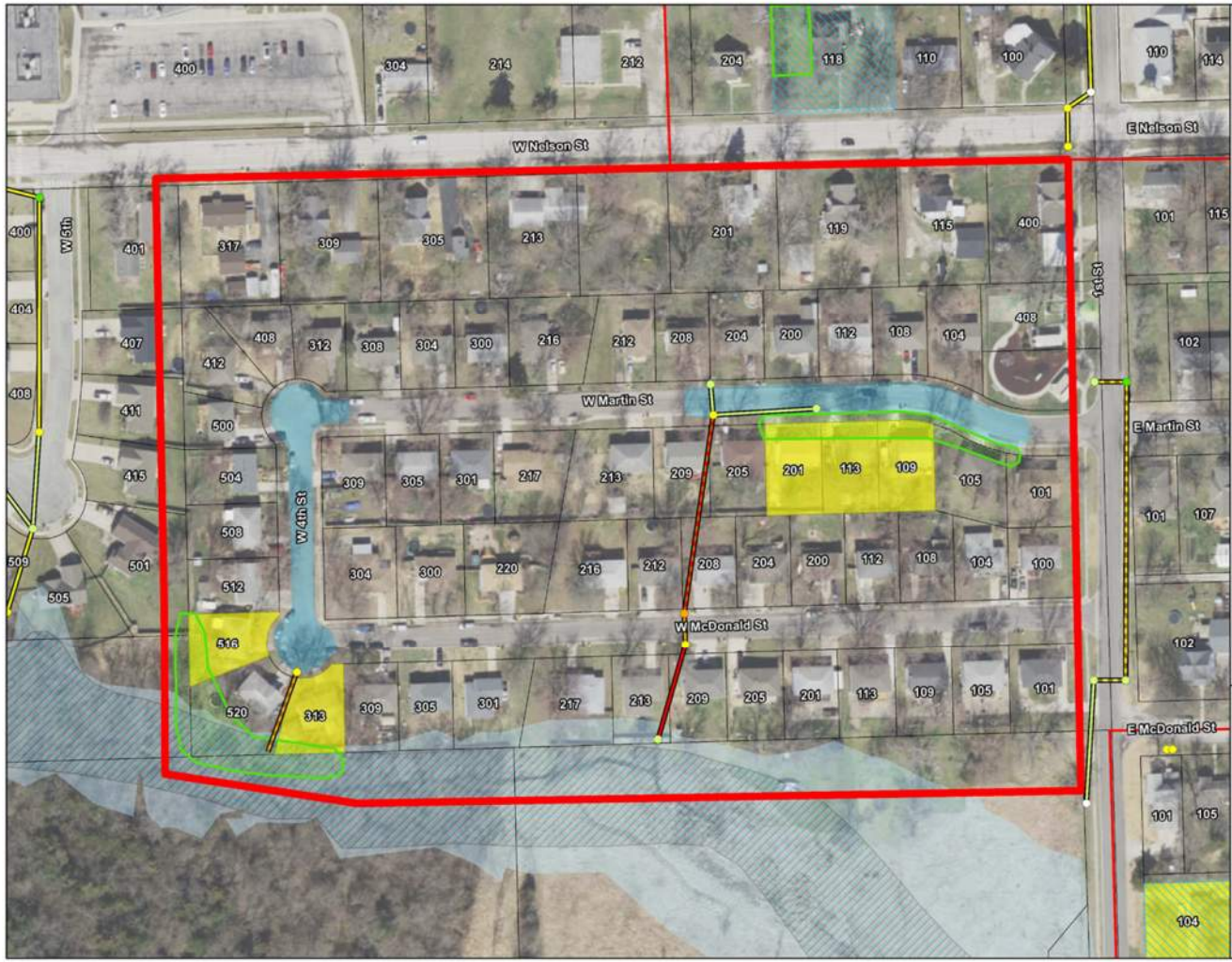


**Edgerton, KS
Stormwater Master Plan
Project Areas
5. E 5th St & E McCarty St**

- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues**
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 50 100 Feet
 1 Inch = 50 Feet





**Edgerton, KS
Stormwater Master Plan
Project Areas
6. W Martin St & W 4th St
("Horseshoe" Area)**

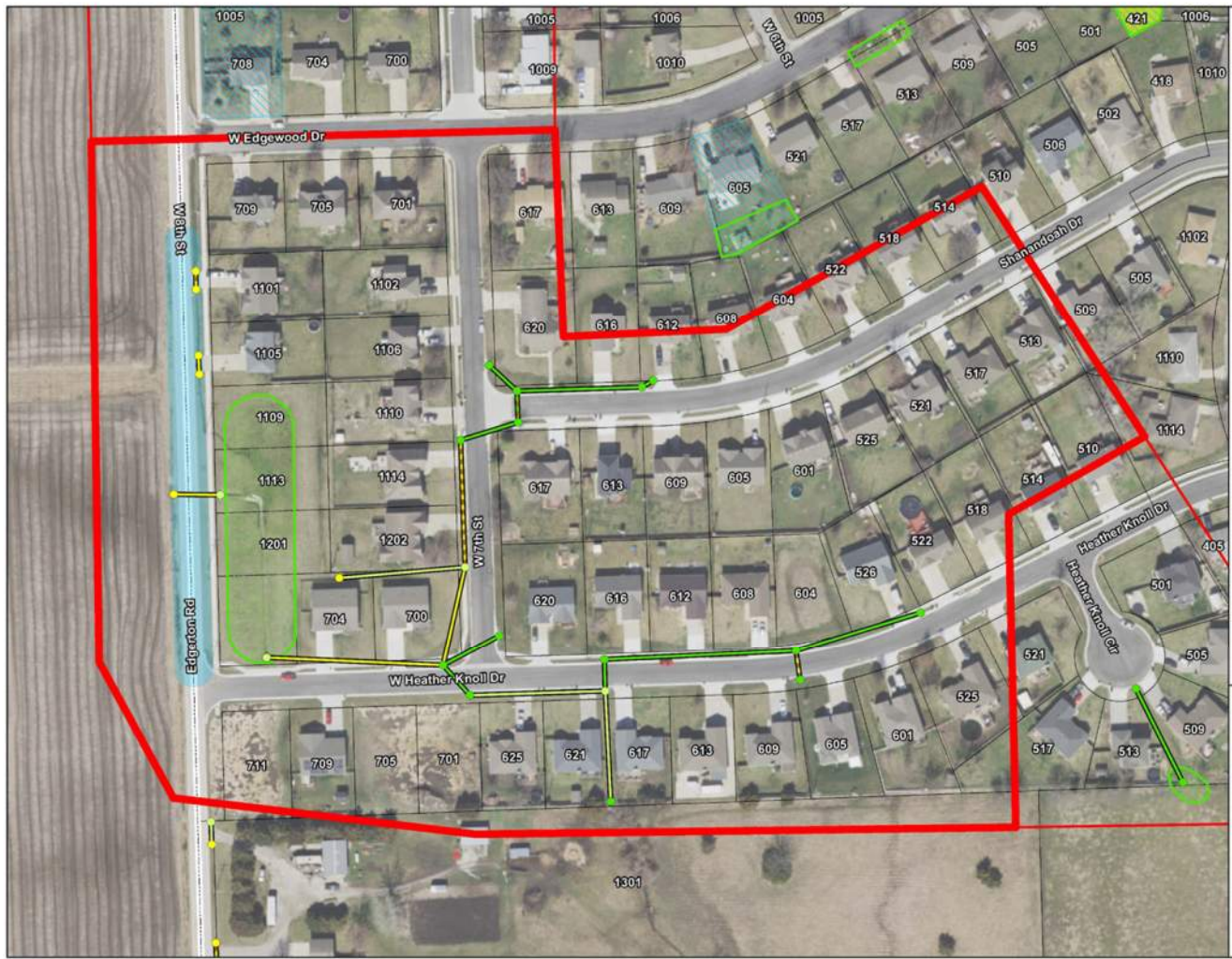
- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone AJAE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 100 200 Feet
 1 Inch = 100 Feet



olsson





**Edgerton, KS
Stormwater Master Plan
Project Areas
7. W 8th St & Heather Knoll Dr
(Detention Basin)**

- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 100 200 Feet
 1 Inch = 100 Feet





**Edgerton, KS
Stormwater Master Plan
Project Areas
8. W 7th St & W Hulet St**

- + Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- - - Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 75 150
 Feet
 1 Inch = 75 Feet





Edgerton, KS Stormwater Master Plan Project Areas 9. 104 Rankin St

- Project Areas
- Storm Infrastructure Condition**
 - Excellent
 - Good
 - Fair
 - Poor
 - Failed
 - Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
 - Current Effective Floodway
 - Current Effective Zone A/AE
 - Current Effective Zone X

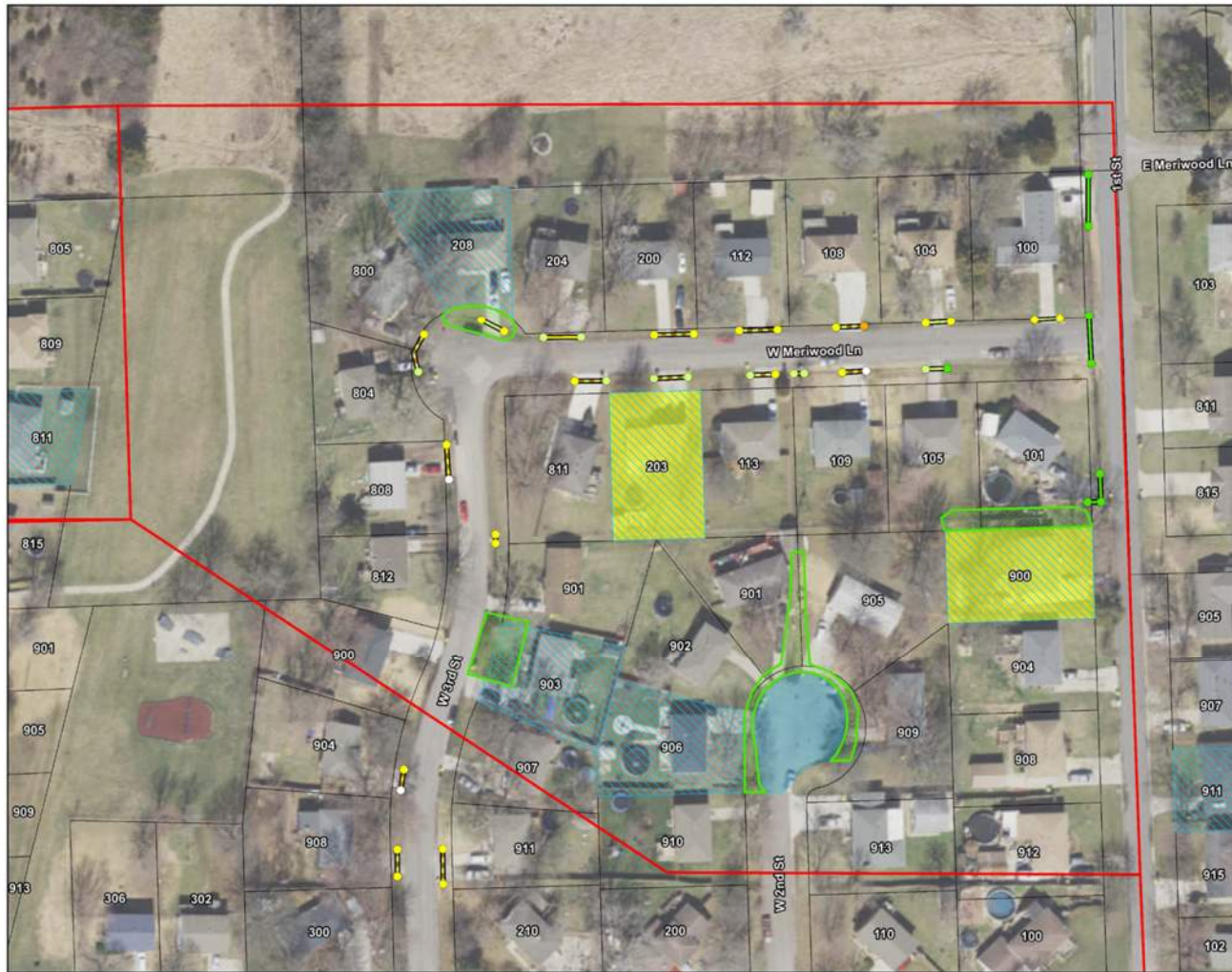
Note: FEMA - Federal Emergency Management Agency

0 50 100 Feet

1 Inch = 50 Feet

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**Edgerton, KS
Stormwater Master Plan
Project Areas
10. W 3rd St & Meriwood Ln**

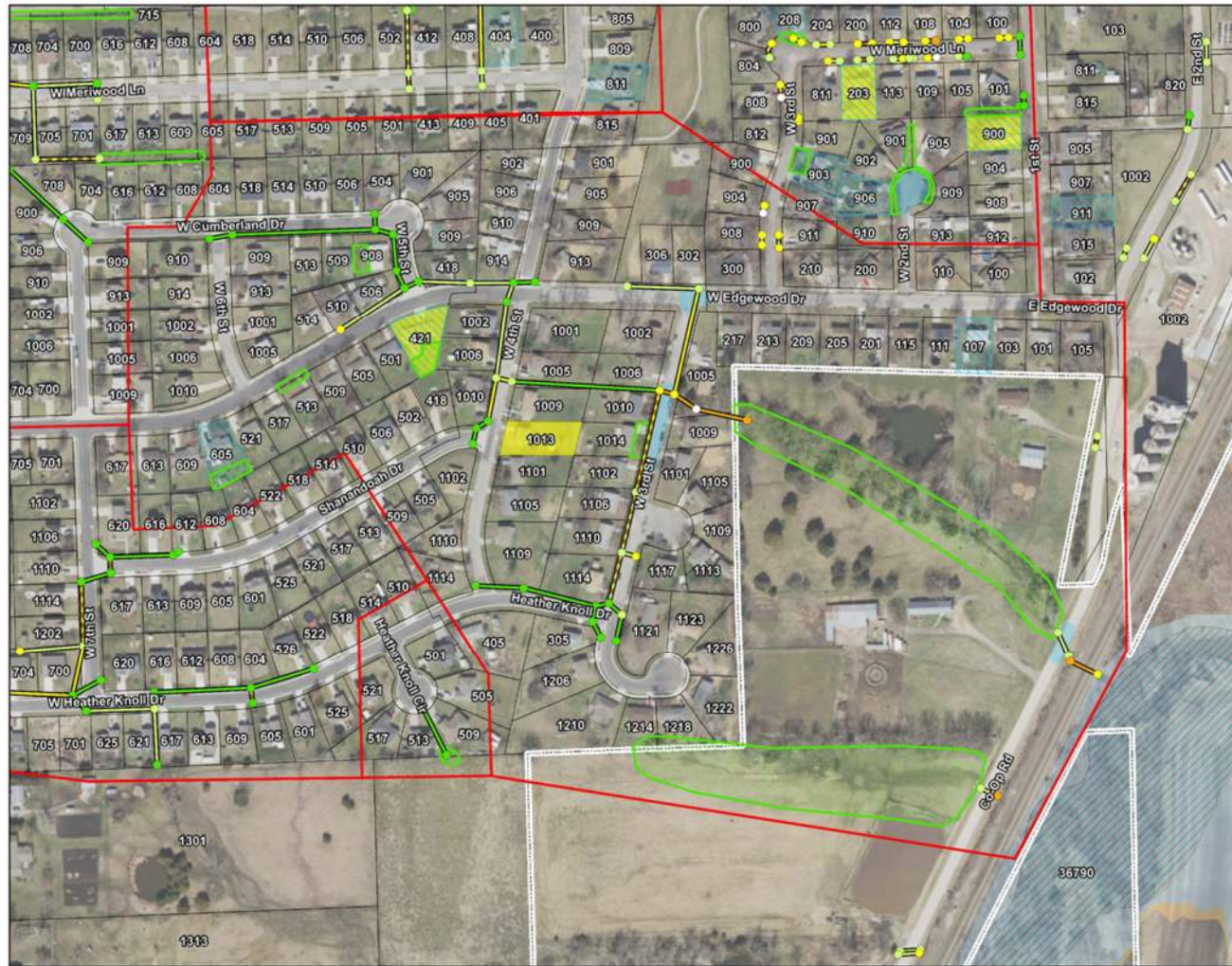
- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency

0 75 150 Feet

1 Inch = 75 Feet





**Edgerton, KS
Stormwater Master Plan
Project Areas**
11. W 3rd St & W Edgewood Dr

- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
0 200 400 Feet
1 Inch = 200 Feet





**Edgerton, KS
Stormwater Master Plan
Project Areas
12. 20125 Edgerton Rd (Quarry)**

- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency

0 75 150 Feet

1 Inch = 75 Feet

N



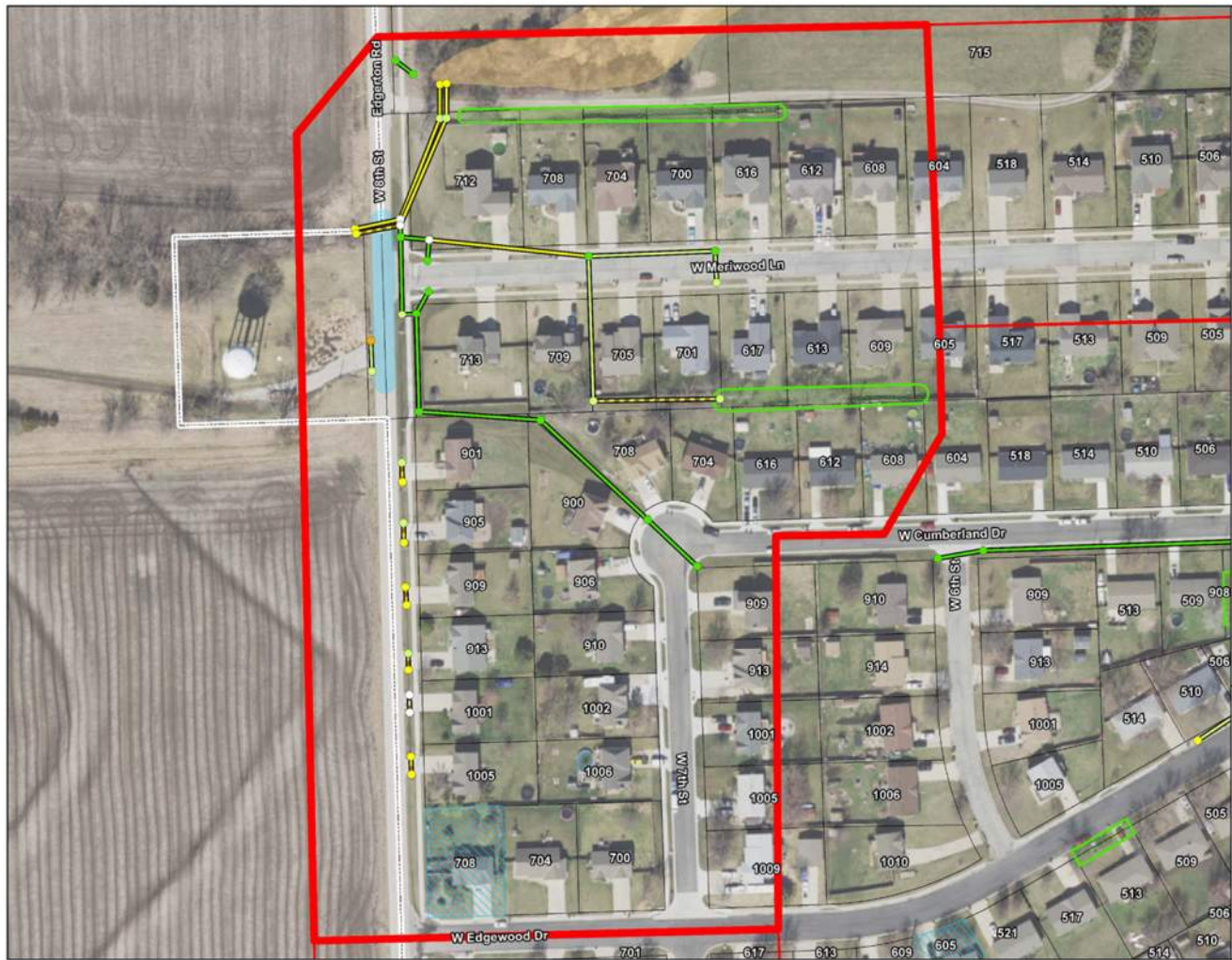


**Edgerton, KS
Stormwater Master Plan
Project Areas**
13. W 4th St & W Meriwood Ln

- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 75 150 Feet
 1 Inch = 75 Feet





**Edgerton, KS
Stormwater Master Plan
Project Areas
14. W 8th St & W Meriwold Ln**

- Project Areas
- Storm Infrastructure Condition**
- Excellent
- Good
- Fair
- Poor
- Failed
- Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
- Current Effective Floodway
- Current Effective Zone A/AE
- Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 100 200 Feet
 1 Inch = 100 Feet







**Edgerton, KS
Stormwater Master Plan
Project Areas
16. 513 Heather Knoll Cir**

- Project Areas
- Storm Infrastructure Condition**
 - Excellent
 - Good
 - Fair
 - Poor
 - Failed
 - Could Not Inspect
- Obstructed Pipe
- Nuisance Drainage Issues
- Groundwater
- Sanitary Backup
- Building Flooding
- Street Flooding
- Parcels
- City Limit
- FEMA Floodplain**
 - Current Effective Floodway
 - Current Effective Zone A/AE
 - Current Effective Zone X

Note: FEMA - Federal Emergency Management Agency
 0 50 100 Feet
 1 Inch = 50 Feet



APPENDIX C

Project Rating Forms

Project: 2020 Stormwater Master Plan
 Client: City of Edgerton, KS
 Olsson Proj. No. 020-2093
 Date: 9/6/2022



Project Rank	Weighted Score*	C/B Weight	C/B Rank	C/B Ratio	Estimated Project Cost	Benefit Weight	Benefit Rank	Benefit Rating	Flood Score	Condition Score	Project Name	Comments
1	96.9	100.0	1	657	\$194,460	93.8	2	296	273	23	E 2nd St & E McDonald St (A)	Stormwater system in area is in fair shape, with a large number of clogged driveway culverts. One home reporting street and building flooding due to surface water.
2	75.0	75.0	5	1230	\$249,593	75.0	5	203	203	0	W 8th St & W Nelson St (B)	Reported street flooding along 7th Street & 8th Street
3	71.9	81.3	4	1144	\$183,015	62.5	7	160	160	0	W 8th St & W Nelson St (A)	Reported building flooding and sanitary backups at two properties. Improper yard drainage causes water to pond in rear yards at NE corner of intersection, causing erosion problems and water to infiltrate into sanitary sewer.
4	65.6	93.8	2	911	\$99,255	37.5	11	109	100	9	E 4th St & E McDonald St	Ditch at SE corner of 520 E 4th St sits lower than the crossroad pipe, causing water to pond. Reported street flooding at intersection of E 3rd St & E McDonald St by multiple homes due to poor ditch grading and clogged culverts. Majority of pipes in area are in poor to fair condition and/or clogged.
4	65.6	87.5	3	1014	\$116,595	43.8	10	115	112	3	W 8th St & W Meriwood Ln	Reported street flooding along W 8th St.
6	56.3	62.5	7	1331	\$175,650	50.0	9	132	112	20	1st St & Hwy 56	Pipes along south side of Hwy 56 have minimal cover and are exposed in areas. Reported street flooding at intersection of 1st St & Hwy 56.
6	56.3	31.3	12	2164	\$497,790	81.3	4	230	230	0	W 7th St & W Hulett St	Water flows north along W 7th St to dead end. Lack of stormwater infrastructure in area causing reported street flooding along W 7th St and building flooding at two properties. Ditch along south side of W Morgan St has little slope and ponds water, creating further drainage issues along W 7th St.
6	56.3	25.0	13	2313	\$615,225	87.5	3	266	250	16	W 3rd St & Meriwood Ln	Driveway culverts and ditches along W 3rd St and W Meriwood Ln are undersized, causing pipe clogging, erosions issues, and one instance of building flooding. W 2nd St cul-de-sac has no drainage
9	53.1	6.3	17	4465	\$2,661,315	100.0	1	596	550	46	W Martin St & W 4th St ("Horseshoe" Area)	Poor street grades cause street and building flooding problems in neighborhood. Stormwater infrastructure in area is in poor condition. Runoff from adjacent neighborhood to west flows into the rear yards of the properties at the southwest corner of the limits, creating ponding and erosion issues.
9	53.1	50.0	9	1353	\$198,930	56.3	8	147	122	25	W 8th St & Heather Knoll Dr (Detention Basin)	The detention basin NE of W 8th St & Heather Knoll Drive has low capacity and is likely undersized. It currently ponds large amounts of water over extended periods. Reported street flooding across W 8th St caused by heavy runoff from fields west of the detention basin.
11	40.6	12.5	15	2824	\$525,325	68.8	6	186	130	56	W 3rd St & W Edgewood Dr	Storm sewer system crossing 3rd St discharges onto property at 20380 Co-Op Rd. Property owner claims that the flows have increased over time, causing the drainage path to move and knock over trees. Storm sewer system is also in poor condition at downstream end of network. Reported street flooding along W 3rd St.
12	37.5	56.3	8	1342	\$92,610	18.8	14	69	60	9	20125 Edgerton Rd (Quarry)	Water sheet flows down the drive entrance to the quarry and causes erosion / deposition problems on Sunflower Road.
12	37.5	68.8	6	1277	\$37,020	6.3	16	29	20	9	W 4th St & W Meriwood Ln	Pipes between 404/408 and 412/502 Meriwood Ln are too short, creating nuisance drainage issues.
14	31.3	37.5	11	1983	\$154,650	25.0	13	78	70	8	501 E 6th St (Edgerton City Lake Low Water Crossing)	Pipes underneath low water crossing have failed and/or are obstructed.
15	21.9	43.8	10	1590	\$15,900	0.0	17	10	10	0	513 Heather Knoll Cir	Pipe running along the east side of property at 513 Heather Knoll Cir is too short and should be extended past fence line.
16	18.8	6.3	16	3164	\$338,550	31.3	12	107	100	7	E 2nd St & E McDonald St (B)	One home reporting street and building flooding due to surface water, obstructed pipes along E 3rd Street
17	15.6	18.8	14	2698	\$89,040	12.5	15	33	30	3	E 5th St & E McCarty St	Reported street flooding along E 5th St. Culverts in area are obstructed.

*50% Benefit Weight + 50% C/B Weight

Description of Problem:

Stormwater system in area is in fair shape, with a large number of clogged driveway culverts. One home reporting street and building flooding due to surface water.

Special Comments:

None

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40	3	0.5	100%	60
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25	3	1.5	100%	112.5
5	Flooding of residential street of more than 7 inches	3, 4, 6	20	3	1.5	100%	90
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				10
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5	4.59		100%	22.95
Project Total Benefit Points							295.45

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area: W 8th St & W Nelson St (B)

Description of Problem:
Reported street flooding along 7th Street & 8th Street

Special Comments:
None

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25	3	1.5	100%	112.5
5	Flooding of residential street of more than 7 inches	3, 4, 6	20	3	1.5	100%	90
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5				
Project Total Benefit Points							202.5

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area:

W 8th St & W Nelson St (A)

Description of Problem:

Reported building flooding and sanitary backups at two properties. Improper yard drainage causes water to pond in rear yards at NE corner of intersection, causing erosion problems and water to infiltrate into sanitary sewer.

Special Comments:

None

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40	3	1	100%	120
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20				
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30		1	100%	30
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				10
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5				
Project Total Benefit Points							160

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area:

E 4th St & E McDonald St

Description of Problem:

Ditch at SE corner of 520 E 4th St sits lower than the crossroad pipe, causing water to pond. Reported street flooding at intersection of E 3rd St & E McDonald St by multiple homes due to poor ditch grading and clogged culverts. Majority of pipes in area are in poor to fair condition and or/clogged.

Special Comments:

None

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20	3	1.5	100%	90
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				10
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10	0.16		100%	1.6
13	System condition rated "Fair or Obstructed"	12	5	1.43		100%	7.15
Project Total Benefit Points							108.75

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area: W 8th St & W Meriwood Ln

Description of Problem:

Reported street flooding along W 8th St.

Special Comments:

Nuisance drainage issues in rear yards of homes are private

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25	3	1.5	100%	112.5
5	Flooding of residential street of more than 7 inches	3, 4, 6	20				
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5	0.5		100%	2.5
Project Total Benefit Points							115

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area:

1st St & Hwy 56

Description of Problem:

Pipes along south side of Hwy 56 have minimal cover and are exposed in areas. Reported street flooding at intersection of 1st St & Hwy 56.

Special Comments:

Reported flooding and drainage issues at 103 and 108 E 1st St and 203 E Morgan St are private issues.

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25	3	1.5	100%	112.5
5	Flooding of residential street of more than 7 inches	3, 4, 6	20				
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10	0.84		100%	8.4
13	System condition rated "Fair or Obstructed"	12	5	2.14		100%	10.7
Project Total Benefit Points							131.6

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area:

W 7th St & W Hulett St

Description of Problem:

Water flows north along W 7th St to dead end. Lack of stormwater infrastructure in area causing reported street flooding along W 7th St and building flooding at two properties. Ditch along south side of W Morgan St has little slope and ponds water, creating further drainage issues along W 7th St.

Special Comments:

W Morgan St (Highway 56) is maintained by KDOT.

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40	3	1	100%	120
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20	3	1.5	100%	90
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				20
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5				
Project Total Benefit Points							230

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area:

W 3rd St & Meriwood Ln

Description of Problem:

Driveway culverts and ditches along W 3rd St and W Meriwood Ln are undersized, causing pipe clogging, erosions issues, and one instance of building flooding. W 2nd St cul-de-sac has no drainage

Special Comments:

City recently replaced stormwater infrastructure along west side of 1st St.

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40	3	1	100%	120
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20	3	1.5	100%	90
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				40
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5	3.08		100%	15.4
Project Total Benefit Points							265.4

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS

Project Area:

W Martin St & W 4th St ("Horseshoe" Area)

2020 Stormwater Master Plan

Description of Problem:

Poor street grades cause street and building flooding problems in neighborhood. Stormwater infrastructure in area is in poor condition. Runoff from adjacent neighborhood to west flows into the rear yards of the properties at the southwest corner of the limits, creating ponding and erosion issues.

Special Comments:

Pipe and flooding issues at southwest corner of project limits is included with the potential project for 520 W 4th St; repairs to the pipe may be combined with this project depending on extent of street repairs. Rear yards at SW corner of limits are located in Zone AE floodplain and floodway of Martin Creek Tributary CA.

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40	3	2.5	100%	300
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20	3	3	100%	180
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30		2	100%	60
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				10
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10	4.57		100%	45.7
13	System condition rated "Fair or Obstructed"	12	5				
Project Total Benefit Points							595.7

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area: W 8th St & Heather Knoll Dr (Detention Basin)

Description of Problem:

The detention basin NE of W 8th St & Heather Knoll Drive has low capacity and is likely undersized. It currently ponds large amounts of water over extended periods. Reported street flooding across W 8th St caused by heavy runoff from fields west of the detention basin.

Special Comments:

None

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25	3	1.5	100%	112.5
5	Flooding of residential street of more than 7 inches	3, 4, 6	20				
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				10
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5	4.83		100%	24.15
Project Total Benefit Points							146.65

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area:

W 3rd St & W Edgewood Dr

Description of Problem:

Storm sewer system crossing 3rd St discharges onto property at 20380 Co-Op Rd. Property owner claims that the flows have increased over time, causing the drainage path to move and knock over trees. Storm sewer system is also in poor condition at downstream end of network. Reported street flooding along W 3rd St.

Special Comments:

Additional analysis will be required to determine if pipes under Co-Op Rd are undersized. Scoring does not include erosion issues at 20380 Co-Op Rd nor reported street flooding at Co-Op Rd as these areas are located outside of Edgerton's city limits. Reported building flooding at 1013 W 4th St is private issue

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40	3	0.5	100%	60
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20				
6	Widespread or long-term ponding in streets	3, 4, 5	20	3		100%	60
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				10
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10	2.05		100%	20.5
13	System condition rated "Fair or Obstructed"	12	5	7.1		100%	35.5
Project Total Benefit Points							186

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths *=1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area: 20125 Edgerton Rd (Quarry)

Description of Problem:

Water sheet flows down the drive entrance to the quarry and causes erosion / deposition problems on Sunflower Road.

Special Comments:

City noted that Sunflower Rd is a M&O priority.

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20				
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30		2	100%	60
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10	0.83		100%	8.3
13	System condition rated "Fair or Obstructed"	12	5				
Project Total Benefit Points							68.3

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths *=1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area:

W 4th St & W Meriwood Ln

Description of Problem:

Pipes between 404/408 and 412/502 Meriwood Ln are too short, creating nuisance drainage issues.

Special Comments:

City noted this area during kickoff meeting

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20				
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				20
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5	1.73		100%	8.65
Project Total Benefit Points							28.65

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area: 501 E 6th St (Edgerton City Lake Low Water Crossing)

Description of Problem:

Pipes underneath low water crossing have failed and/or are obstructed.

Special Comments:

Low water crossing is located in Zone AE floodplain and floodway for Martin Creek Tributary C. Permitting will be needed for any repairs from the City and potentially KS DWR and FEMA.

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20				
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30		2	100%	60
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10		1	100%	10
12	System condition rated "Poor or Failed"	13	10	0.72		100%	7.2
13	System condition rated "Fair or Obstructed"	12	5				
Project Total Benefit Points							77.2

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area:

513 Heather Knoll Cir

Description of Problem:

Pipe running along the east side of property at 513 Heather Knoll Cir is too short and should be extended past fence line.

Special Comments:

City recently acquired property to the south.

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20				
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				10
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5				
Project Total Benefit Points							10

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Description of Problem:

One home reporting street and building flooding due to surface water, obstructed pipes along E 3rd Street

Special Comments:

None

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40	3	0.5	100%	60
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20	1	1.5	100%	30
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				10
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5	1.33		100%	6.65
Project Total Benefit Points							106.65

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

Stormwater Masterplan Project Rating Table

City of Edgerton, KS
2020 Stormwater Master Plan

Project Area:

E 5th St & E McCarty St

Description of Problem:

Reported street flooding along E 5th St. Culverts in area are obstructed.

Special Comments:

None

Project Benefit Rating

Factor #	Description of Problems Addressed by Project	Eliminates Factor	Rating Points	Frequency Multiplier	Severity Multiplier	% Resolved by Project*	Total Points
1	Loss of Life	N/A	40				
2	Flooding of habitable building	N/A	40				
3	Flooding of arterial street of more than 7 inches	4, 5, 6	30				
4	Flooding of collector street of more than 7 inches	3, 5, 6	25				
5	Flooding of residential street of more than 7 inches	3, 4, 6	20	1	1.5	100%	30
6	Widespread or long-term ponding in streets	3, 4, 5	20				
7	Erosion threatens habitable buildings, utilities, streets, bridges	8	30				
8	Poor drainage causes nuisance erosion, ponding water, etc.	7	10				
9	Erosion causes imminent drainage structure collapse	10, 11	30				
10	Erosion causes marginal drainage structural collapse	9, 11	15				
11	Erosion causes failure of drainage structure	9, 10	10				
12	System condition rated "Poor or Failed"	13	10				
13	System condition rated "Fair or Obstructed"	12	5	0.46		100%	2.3
Project Total Benefit Points							32.3

* % flood or erosion reduction achieved based on # structures removed or % of necessary base flood level reduction

Applies to #	Frequency Multiplier	Multiplier Value
2-6	One time in ten years or by 10- to 100-year design storm	1
2-6	Two times in ten years or by 5- to 10-year design storm	2
2-6	Three or more times in 10 years or less than under 5-year design	3
12-13	One multiplier point per 100' of system replaced	1

Other Factors	
	Y or N?
Benefits other infr.	Y
Outside cost support	N
Regional benefits	N
Aesthetics	N

Applies to #	Severity Description	Multiplier Value
1	Number of known deaths * =1 for each death	8
2	No. of buildings flooded historically or by 100-year design storm	0.5/bldg
3-5	Restricts emergency vehicles	1.5
7	Nuisance erosion creates maintenance problems	1
7	Moderate erosion, failure of structure or facility within next 5 years possible	2
7	Severe erosion, failure of structure or facility imminent	3
9-11	Collapse causes flooding of land by 100-year design storm	1
9-11	Collapse causes flooding of garages/outbuildings by 100-year design storm	1.5
9-11	Collapse causes 1-3 habitable buildings to be flooded	2
9-11	Collapse causes 4-6 habitable buildings to be flooded	3
9-11	Collapse causes more than 6 habitable buildings to be flooded	4

APPENDIX D

Project Cost Estimates



Engineers Opinion of Project Cost

Client: City of Edgerton, KS
 Project: Edgerton, KS Stormwater Master Plan - Project Areas
 Olsson Project Number: 020-2093

Date: 9/6/2022

Item	Quantity	Unit	Unit Cost \$	TOTAL	
Project Area 1 - E 2nd St & E McDonald St (A)					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 15,000.00	\$15,000
2	18" RCP	400	LF	\$ 180.00	\$72,000
3	4' x 4' Area Inlet	4	Each	\$ 5,500.00	\$22,000
4	Gravel Driveway	20	SY	\$ 30.00	\$600
5	Concrete Driveway	60	SY	\$ 100.00	\$6,000
6	Ditch / Swale Grading	280	LF	\$ 30.00	\$8,400
7	Pipe Cleaning	76	LF	\$ 15.00	\$1,140
8	Sod	450	SY	\$ 10.00	\$4,500
	Construction Subtotal				\$129,640
	Contingency (30%)				\$38,892
	Surveying & Engineering				\$25,928
	Project Area 1 Total				\$194,460
Project Area 2 - W 8th & W Nelson St (B)					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 18,000.00	\$18,000
2	18" RCP	154	LF	\$ 180.00	\$27,720
3	6' x 4' Curb Inlet	8	Each	\$ 6,500.00	\$52,000
4	ADA Ramp	4	Each	\$ 2,000.00	\$8,000
5	Curb & Gutter	100	LF	\$ 50.00	\$5,000
6	Sidewalk	145	SF	\$ 15.00	\$2,175
7	Street Repair	170	SY	\$ 180.00	\$30,600
8	Sod	100	SY	\$ 10.00	\$1,000
9	Water Main Relocation	80	LF	\$ 180.00	\$14,400
10	Water Service Line Relocation	1	Each	\$ 3,500.00	\$3,500
11	Sanitary Sewer Encasement	20	LF	\$ 200.00	\$4,000
	Construction Subtotal				\$166,395
	Contingency (30%)				\$49,919
	Surveying & Engineering				\$33,279
	Project Area 2 Total				\$249,593
Project Area 3 - W 8th & W Nelson St (A)					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 13,000.00	\$13,000
2	Preconstruction Survey	2	Each	\$ 600.00	\$1,200
3	18" RCP	212	LF	\$ 180.00	\$38,160
4	6' x 4' Curb Inlet	8	Each	\$ 6,500.00	\$52,000
5	Ditch / Swale Grading	85	LF	\$ 30.00	\$2,550
6	Curb & Gutter	100	LF	\$ 50.00	\$5,000
7	Fence Replacement	120	LF	\$ 45.00	\$5,400
8	Sidewalk	80	SF	\$ 15.00	\$1,200
9	Sod	350	SY	\$ 10.00	\$3,500
	Construction Subtotal				\$122,010
	Contingency (30%)				\$36,603
	Surveying & Engineering				\$24,402
	Project Area 3 Total				\$183,015
Project Area 4 - E 4th St & E McDonald St					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 8,000.00	\$8,000
2	18" RCP	32	LF	\$ 180.00	\$5,760
3	24" RCP	25	LF	\$ 220.00	\$5,500
4	18" RCP FES	2	Each	\$ 1,500.00	\$3,000
5	24" RCP FES	1	Each	\$ 1,600.00	\$1,600
6	Ditch / Swale Grading	260	LF	\$ 30.00	\$7,800
7	Pipe Cleaning	108	LF	\$ 15.00	\$1,620
8	Gravel Driveway / Alleyway	485	SY	\$ 30.00	\$14,550
9	Street Repair	38	SY	\$ 180.00	\$6,840
10	Sod	700	SY	\$ 10.00	\$7,000
11	Water Main Relocation	25	LF	\$ 180.00	\$4,500
	Construction Subtotal				\$66,170
	Contingency (30%)				\$19,851
	Surveying & Engineering				\$13,234
	Project Area 4 Total				\$99,255
Project Area 5 - W 8th St & W Meriwood Ln					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 8,000.00	\$8,000
2	24" RCP	34	LF	\$ 220.00	\$7,480
3	24" RCP FES	2	Each	\$ 1,600.00	\$3,200
4	Concrete Driveway	45	SY	\$ 100.00	\$4,500
5	Ditch / Swale Grading	185	LF	\$ 30.00	\$5,550
6	Detention Construction & Outlet Structure	1	LS	\$ 30,000.00	\$30,000
7	Sod	1,000	SY	\$ 10.00	\$10,000
8	Water Main Relocation	50	LF	\$ 180.00	\$9,000
	Construction Subtotal				\$77,730
	Contingency (30%)				\$23,319
	Surveying & Engineering				\$15,546
	Project Area 5 Total				\$116,595
Project Area 6 - 1st St & Hwy 56					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 13,000.00	\$13,000
2	24" RCP	120	LF	\$ 220.00	\$26,400
3	45" x 29" RCEP	72	LF	\$ 350.00	\$25,200
4	24" RCP FES	1	Each	\$ 1,600.00	\$1,600
5	5' x 5' Area Inlet	1	Each	\$ 6,500.00	\$6,500
6	Curb & Gutter	100	LF	\$ 50.00	\$5,000
7	Valley Gutter	80	SY	\$ 125.00	\$10,000
8	Ditch / Swale Grading	40	LF	\$ 30.00	\$1,200
9	Asphalt Pavement	280	SY	\$ 100.00	\$28,000
10	Sod	20	SY	\$ 10.00	\$200
	Construction Subtotal				\$117,100
	Contingency (30%)				\$35,130
	Surveying & Engineering				\$23,420
	Project Area 6 Total				\$175,650

Project Area 7 - W 7th & W Hulett St					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 40,000.00	\$40,000
2	18" RCP	532	LF	\$ 180.00	\$95,760
3	18" RCP FES	1	LF	\$ 1,500.00	\$1,500
4	6' x 4' Curb Inlet	6	Each	\$ 6,500.00	\$39,000
5	ADA Ramp	2	Each	\$ 2,000.00	\$4,000
6	Curb & Gutter	440	LF	\$ 50.00	\$22,000
7	Valley Gutter	330	SF	\$ 125.00	\$41,250
8	Sidewalk	1560	SF	\$ 15.00	\$23,400
9	Concrete Driveway	60	SY	\$ 100.00	\$6,000
10	Ditch / Swale Grading	100	LF	\$ 30.00	\$3,000
11	Street Repair	160	SY	\$ 180.00	\$28,800
12	Sod	100	SY	\$ 10.00	\$1,000
13	Seed & Mat	250	SY	\$ 5.00	\$1,250
14	Water Main Relocation	80	LF	\$ 180.00	\$14,400
15	Water Service Line Relocation	3	Each	\$ 3,500.00	\$10,500
				Construction Subtotal	\$331,860
				Contingency (30%)	\$99,558
				Surveying & Engineering	\$66,372
				Project Area 7 Total	\$497,790
Project Area 8 - W 3rd St & W Meriwood Ln					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 60,000.00	\$60,000
2	Preconstruction Survey	4	Each	\$ 600.00	\$2,400
3	18" RCP	655	LF	\$ 180.00	\$117,900
4	18" RCP FES	34	Each	\$ 1,500.00	\$51,000
5	6' x 4' Curb Inlet	2	Each	\$ 5,500.00	\$11,000
6	4' x 4' Area Inlet	2	Each	\$ 6,500.00	\$13,000
7	Ditch / Swale Grading	1120	LF	\$ 30.00	\$33,600
8	Concrete Driveway	500	SY	\$ 100.00	\$50,000
9	Fence Replacement	100	LF	\$ 45.00	\$4,500
10	Street Reconstruction	610	SY	\$ 75.00	\$45,750
11	Sod	1,700	SY	\$ 10.00	\$17,000
12	Sanitary Sewer Encasement	20	LF	\$ 200.00	\$4,000
				Construction Subtotal	\$410,150
				Contingency (30%)	\$123,045
				Surveying & Engineering	\$82,030
				Project Area 8 Total	\$615,225
Project Area 9 - W Martin & W 4th St ("Horseshoe" Area)					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 280,000.00	\$280,000
2	Preconstruction Survey	8	Each	\$ 600.00	\$4,800
3	18" RCP	780	LF	\$ 180.00	\$140,400
4	24" RCP	478	LF	\$ 220.00	\$105,160
5	30" RCP	110	LF	\$ 250.00	\$27,500
6	24" RCP FES	1	Each	\$ 1,600.00	\$1,600
7	30" RCP FES	1	Each	\$ 1,800.00	\$1,800
8	6' x 4' Curb Inlet	20	Each	\$ 6,500.00	\$130,000
9	4' x 4' Area Inlet	2	Each	\$ 5,500.00	\$11,000
10	Curb & Gutter	4,000	LF	\$ 50.00	\$200,000
11	ADA Ramp	2	Each	\$ 2,000.00	\$4,000
12	Sidewalk	850	SF	\$ 15.00	\$12,750
13	Concrete Driveway	1,425	SY	\$ 100.00	\$142,500
14	Riprap	300	SY	\$ 180.00	\$54,000
15	Street Reconstruction	5,600	SY	\$ 75.00	\$420,000
16	Sod	4,000	SY	\$ 10.00	\$40,000
17	Seed & Mat	1,000	SY	\$ 5.00	\$5,000
18	Water Main Relocation	540	LF	\$ 180.00	\$97,200
19	Water Service Line Relocation	23	Each	\$ 3,500.00	\$80,500
20	Sanitary Sewer Encasement	80	LF	\$ 200.00	\$16,000
				Construction Subtotal	\$1,774,210
				Contingency (30%)	\$532,263
				Surveying & Engineering	\$354,842
				Project Area 9 Total	\$2,661,315
Project Area 10 - W 8th St & Heather Knoll Dr (Detention Basin)					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 12,000.00	\$12,000
2	36" RCP	50	LF	\$ 300.00	\$15,000
3	36" RCP FES	1	Each	\$ 3,000.00	\$3,000
4	Concrete Trail	100	SF	\$ 15.00	\$1,500
5	Detention Construction & Outlet Structure	1	LS	\$ 40,000.00	\$40,000
6	Street Repair	84	SF	\$ 180.00	\$15,120
7	Sod	1,000	SY	\$ 10.00	\$10,000
8	Water Main Relocation	200	LF	\$ 180.00	\$36,000
				Construction Subtotal	\$132,620
				Contingency (30%)	\$39,786
				Surveying & Engineering	\$26,524
				Project Area 10 Total	\$198,930
Project Area 11 - W 3rd St & W Edgewood Dr					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 37,000.00	\$37,000
2	18" RCP	90	LF	\$ 180.00	\$16,200
3	24" RCP	170	LF	\$ 220.00	\$37,400
4	30" RCP	210	LF	\$ 250.00	\$52,500
5	57" x 38" RCAP	186	LF	\$ 400.00	\$74,400
6	57" x 38" RCAP FES	1	Each	\$ 4,800.00	\$4,800
7	6' x 4' Curb Inlet	7	Each	\$ 6,500.00	\$45,500
8	Curb & Gutter	280	LF	\$ 50.00	\$14,000
9	Fence Replacement	50	LF	\$ 45.00	\$2,250
10	Concrete Driveway	100	SY	\$ 100.00	\$10,000
11	Riprap	50	SY	\$ 180.00	\$9,000
12	Street Repair	140	SY	\$ 180.00	\$25,200
13	Sod	450	SY	\$ 10.00	\$4,500
14	Water Main Relocation	60	LF	\$ 180.00	\$10,800
				Construction Subtotal	\$343,550
				Contingency (30%)	\$103,065
				Surveying & Engineering (Includes Hydraulic Analysis)	\$78,710
				Project Area 11 Total	\$525,325

Project Area 12 - 20125 Edgerton Rd (Quarry)					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 12,000.00	\$12,000
2	24" RCP	82	LF	\$ 220.00	\$18,040
3	24" RCP FES	2	Each	\$ 1,600.00	\$3,200
4	Ditch / Swale Grading	40	LF	\$ 30.00	\$1,200
5	Street Reconstruction	320	SY	\$ 75.00	\$24,000
6	Sod	330	SY	\$ 10.00	\$3,300
				Construction Subtotal	\$61,740
				Contingency (30%)	\$18,522
				Surveying & Engineering	\$12,348
				Project Area 12 Total	\$92,610
Project Area 13 - W 4th St & W Meriwood Ln					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 5,000.00	\$5,000
2	Preconstruction Survey	4	Each	\$ 600.00	\$2,400
3	15" RCP	34	LF	\$ 150.00	\$5,100
4	15" RCP FES	2	Each	\$ 1,200.00	\$2,400
5	Concrete Collar	2	Each	\$ 750.00	\$1,500
6	Ditch / Swale Grading	40	LF	\$ 30.00	\$1,200
7	Pipe Cleaning	172	LF	\$ 15.00	\$2,580
8	Sod	450	SY	\$ 10.00	\$4,500
				Construction Subtotal	\$24,680
				Contingency (30%)	\$7,404
				Surveying & Engineering	\$4,936
				Project Area 13 Total	\$37,020
Project Area 14 - 501 E 6th St (Edgerton City Lake Low Water Crossing)					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 15,000.00	\$15,000
2	44" x 27" RCAP	70	LF	\$ 350.00	\$24,500
3	44" x 27" RCAP FES	6	Each	\$ 4,000.00	\$24,000
4	Street Repair	220	SY	\$ 180.00	\$39,600
				Construction Subtotal	\$103,100
				Contingency (30%)	\$30,930
				Surveying & Engineering	\$20,620
				Project Area 14 Total	\$154,650
Project Area 15 - 513 Heather Knoll Cir					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 2,500.00	\$2,500
2	Preconstruction Survey	4	Each	\$ 600.00	\$2,400
3	15" RCP	12	LF	\$ 150.00	\$1,800
4	15" RCP FES	1	Each	\$ 1,200.00	\$1,200
5	Fence Replacement	20	LF	\$ 45.00	\$900
6	Ditch / Swale Grading	20	LF	\$ 30.00	\$600
7	Sod	120	SY	\$ 10.00	\$1,200
				Construction Subtotal	\$10,600
				Contingency (30%)	\$3,180
				Surveying & Engineering	\$2,120
				Project Area 15 Total	\$15,900
Project Area 16 - E 2nd St & E McDonald St (B)					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 25,000.00	\$25,000
2	18" RCP	60	LF	\$ 180.00	\$10,800
3	24" RCP	310	LF	\$ 220.00	\$68,200
4	24" RCP FES	2	Each	\$ 1,600.00	\$3,200
5	6' x 4' Curb Inlet	6	Each	\$ 6,500.00	\$39,000
6	Curb & Gutter	570	LF	\$ 50.00	\$28,500
7	Gravel Driveway	100	SY	\$ 30.00	\$3,000
8	Street Reconstruction	600	SY	\$ 75.00	\$45,000
9	Sod	300	SY	\$ 10.00	\$3,000
10	Water Main Relocation	20	LF	\$ 180.00	\$3,600
11	Water Service Line Relocation	1	Each	\$ 3,500.00	\$3,500
				Construction Subtotal	\$225,700
				Contingency (30%)	\$67,710
				Surveying & Engineering	\$45,140
				Project Area 16 Total	\$338,550
Project Area 17 - E 5th St & E McCarty St					
1	Mobilization, Sitework & Traffic Control	1	LS	\$ 6,000.00	\$6,000
2	18" RCP	72	LF	\$ 180.00	\$12,960
3	18" RCP FES	6	Each	\$ 1,500.00	\$9,000
4	Gravel Driveway	50	SY	\$ 30.00	\$1,500
5	Ditch / Swale Grading	110	LF	\$ 30.00	\$3,300
6	Street Repair	45	SY	\$ 180.00	\$8,100
7	Sod	250	SY	\$ 10.00	\$2,500
8	Water Main Relocation	50	LF	\$ 180.00	\$9,000
9	Water Service Line Relocation	2	Each	\$ 3,500.00	\$7,000
				Construction Subtotal	\$59,360
				Contingency (30%)	\$17,808
				Surveying & Engineering	\$11,872
				Project Area 17 Total	\$89,040
SUMMARY					
				TOTAL	\$6,244,923



EDGERTON STORMWATER MASTER PLAN

December 2022

Olsson Project No. 020-2093