
City of Tulsa
Repetitive Loss Area Analysis
Mid Tulsa Basins

August 18, 2026



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Introduction

The National Flood Insurance Program (NFIP) is a federal program administered by the Federal Emergency Management Agency (FEMA) that provides flood insurance to property owners in participating communities. In exchange, communities agree to adopt and enforce floodplain management regulations designed to reduce future flood risk. These regulations establish minimum standards for development in flood-prone areas and are intended to minimize damage to structures and infrastructure over time. The City of Tulsa has adopted its floodplain management regulations in Title 11A of the City's Code of Ordinances.

To encourage communities to go beyond these minimum requirements, FEMA established the Community Rating System (CRS). The CRS is a voluntary program that provides flood insurance premium discounts to policyholders in communities that implement additional floodplain management, public outreach, and hazard mitigation activities.

Over time, the NFIP has continually faced the job of balancing flood claim payments with insurance premium affordability, particularly while some properties flood more frequently than others. A subset of properties that cause a disproportionate impact to this balance are repetitive loss properties. FEMA defines repetitive loss properties as any property that has been paid two or more flood insurance claims of \$1,000 or more in a 10-year period. These repetitive loss properties account for approximately 25 to 30 percent of the NFIP's total claim payments, or about \$200 million annually, while representing only 1 percent of NFIP-insured properties nationwide. To aid in managing this issue, one of the requirements of the CRS is that communities identify all repetitive loss properties in their jurisdiction and work with the owners in finding ways to reduce or eliminate future flood damage. This initiative has been very successful in reducing flood losses and claims.

Using NFIP repetitive loss data, communities must analyze and map the surrounding areas where similar flooding conditions may exist. These areas are referred to as Repetitive Loss Areas (RLAs). For each RLA, the community is required to follow a 5-step process: notify affected property owners, assess potential flood risks, and develop strategies to reduce or eliminate future flood damage. As a CRS Class 1 Community, the City of Tulsa is required to update these reports in time for its program verification cycle. The updates must review the flooding and building conditions and modify the repetitive loss areas and their analyses accordingly. This 2026 update to the repetitive loss area analysis is intended to fill this verification requirement.

Background

The City of Tulsa's flooding history dates back to before statehood and has grown with the City. In the post-World War II era, the City experienced rapid development and expansion into what has become the Mingo and Joe Creek watershed. Most of this development occurred in the low-lying floodplains of these creeks which resulted in increased flood risk.

Tulsa's rapid development during this time was not singular, many communities across the country were experiencing urbanization and increased flood loss. In response, the U.S.

Congress established the National Flood Insurance Program in 1968. The City of Tulsa joined the NFIP in 1974.

By the 1980s, Tulsa had been experiencing floods in rapid succession, with nine floods occurring over 15 years¹. Two specific storms contributed largely to the number of repetitive loss properties in the City of Tulsa: the June 1979 and May 1984 floods. As of this 2026 update, the 1984 flood is still maintained as the City's Flood of Record.

Many of the City's repetitive loss properties filed claims in 1979. Significant flooding that year occurred in the Little Joe Creek and Dirty Butter Creek watersheds². According to a June 1979 National Oceanic and Atmospheric Administration (NOAA) publication titled *Storm Data and Unusual Weather Phenomena*, four to six inches of rain fell over a two-hour period in South Tulsa accompanied by high winds³—causing damage to dozens of buildings. The impact of the storm was felt the most in the Joe Creek watershed with Little Joe Creek overtopping its banks.

Numerous repetitive loss properties in the City of Tulsa list the May 1984 storm as their most recent flood insurance claim. The creeks that were the most heavily impacted were Mingo Creek, Bigheart Creek, Harlow Creek, Flatrock Creek, Dirty Butter Creek, Coal Creek, Little Joe Creek, and Haikey Creek. A slow-moving storm caused approximately six to fifteen inches of rain to fall over an eight-hour period, occurring primarily overnight. The largest rainfall totals occurred in the Mingo Creek watershed⁴.

The 1984 storm was severe, causing 14 fatalities and injuries to hundreds of people. The impacts on infrastructure were significant, with more than 5,000 buildings affected and total losses estimated at approximately \$180 million⁵ (about \$575 million in 2026 dollars). Following the event, President Ronald Reagan issued a federal disaster declaration.

After the 1984 flood, the City created a Flood Hazard Mitigation Team to guide recovery and long-term mitigation efforts. The City has since worked to acquire flood-prone properties, implement major flood control projects, and develop basin-wide master drainage plans.

The City's ongoing investment in mitigating flood risk has resulted in a comprehensive floodplain management program. At the turn of the century, FEMA classified Tulsa as first in the nation for its floodplain management program, leading to the lowest flood insurance premiums for residents in the US. The City has continued to improve their program, joining the NFIP's Community Rating System (CRS) in 1991. As a result, Tulsa has been awarded Class I, which grants its residents a 45 percent discount on the cost of NFIP flood insurance for structures.

¹ <https://www.cityoftulsa.org/floodcontrol>

² United States Army Corps of Engineers, Southwestern Division, Tulsa District. *Tulsa Urban Study: Flooding Overview Report*. October 1982.

³ National Oceanic and Atmospheric Administration (NOAA), Environmental Data and Information Service, National Climatic Center. *Stormwater Data Volume 21, No.6*. Asheville, NC, June 1979.

⁴ National Weather Service. *Tulsa Memorial Day Flood of May 26-27, 1984*.

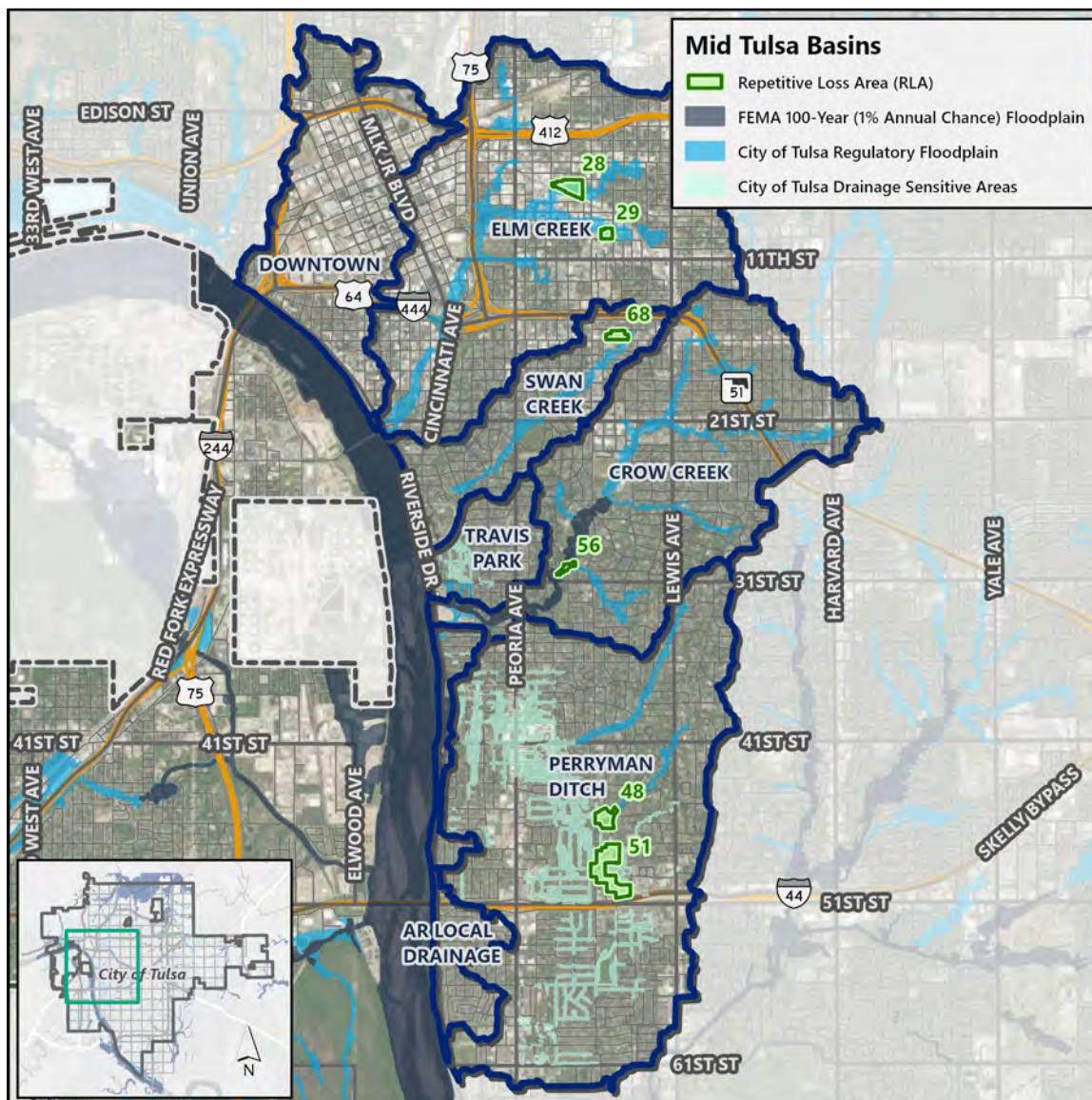
https://www.weather.gov/tsa/1984may26_tulsamemorialdayflood

⁵ United States Army Corps of Engineers, Southwestern Division, Tulsa District. *Flood of May 27, 1984*. May 1985.

Location and Drainage

The Mid Tulsa basin group is located along the tributaries of the Arkansas River between US Highway 412 and 61st St. Most of this area is covered with residential developments with several commercial districts. Elm Creek has a greater mix of commercial and industrial development, with the heaviest development being in downtown Tulsa. This basin group is covered by council districts 1, 3, 4, and 9.

Figure 1: Mid Tulsa



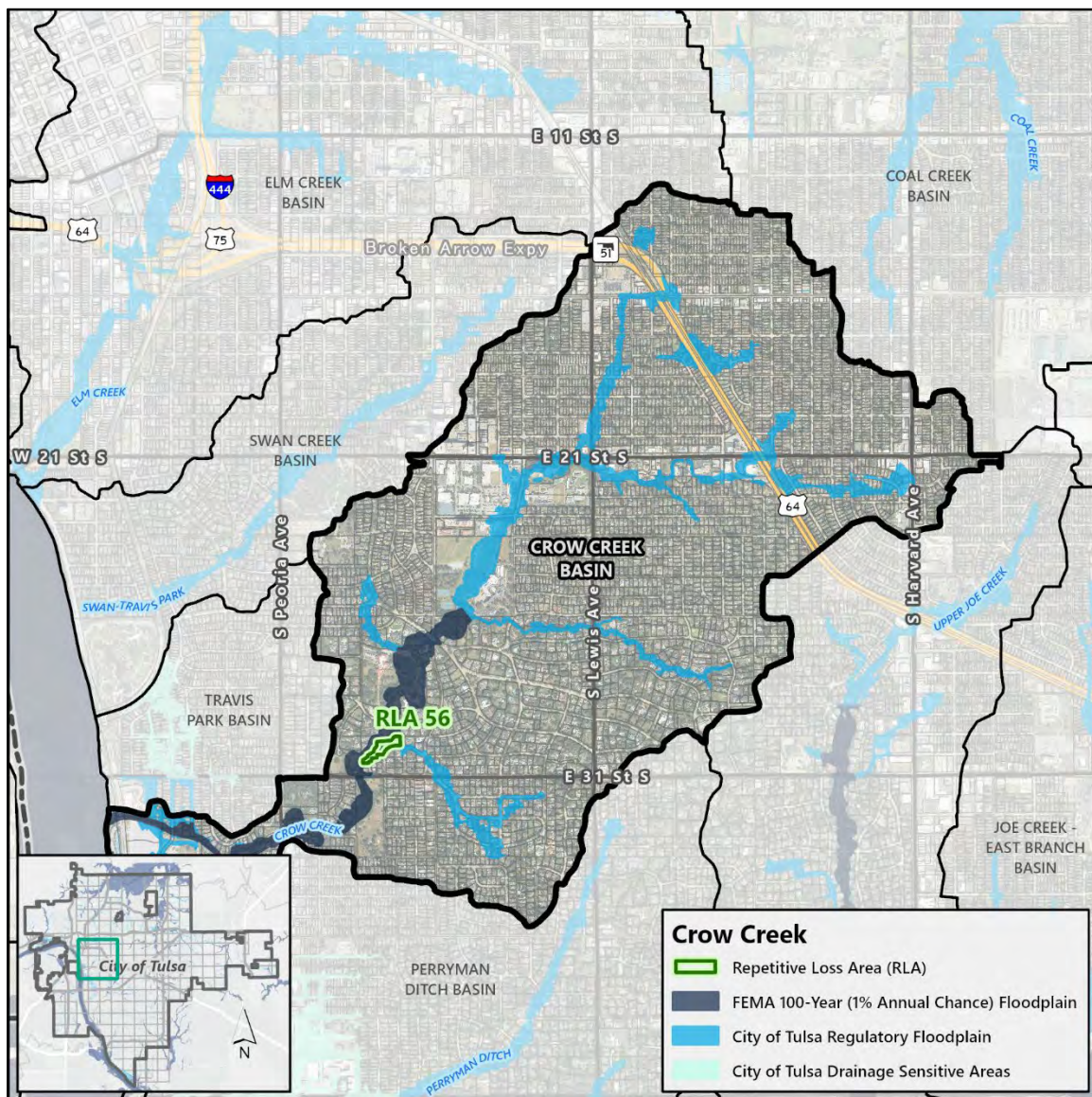
The Mid Tulsa Basin Group contains six subbasins: Crow Creek, Downtown, Elm Creek, Perryman Ditch, Swan Creek, and Travis Park, and five repetitive loss areas. The creeks within the Mid Tulsa Basins' floodplains are designated as FEMA Special Flood Hazard Area (SFHA) and City regulatory floodplain. This area historically was subject to a mix of overbank flooding

and overland flooding. The 2019 flood was the most recent event to affect this area and was estimated to be nearly a 100-year storm; however, no additional NFIP flood claims were filed in the RLAs in this basin group as a result of the event. There are three basins in the Mid Tulsa basin group that contain six unmitigated repetitive loss properties. The unmitigated repetitive loss properties are spread over five areas.

Crow Creek

Crow Creek is located in Central Tulsa. This creek is a tributary of the Arkansas River; it extends approximately 3 miles and has a contributing drainage area of 2.7 square miles. The watershed is a mix of residential and commercial land use. The creek generally flows west-southwest until its confluence with Arkansas River near the intersection of E. 31st St. and Riverside Dr. The creek and its tributaries are conveyed by open channel and storm sewer systems. Conveyance by open channel occurs along the mainstem and Left Bank Tributary 1, downstream of E. 26th Pl. and S. Lewis Ave, respectively.

Figure 2: Crow Creek Overview



Most of Crow Creek's mainstem is designated as FEMA Zone AE with Floodway, while the City of Tulsa regulatory floodplain encompasses the mainstem and several tributaries. The Crow Creek basin contains one unmitigated RLA.

RLA 56

Area Specific Flooding

Repetitive Loss Area 56, located in the Crow Creek watershed, was established in 2017. This Repetitive Loss Area is composed of seven properties located near the intersection of E. 31st St. and S. Trenton Ave. The properties were developed between 1983 and 1999 and are located in the FEMA SFHA for Crow Creek as well as the City regulatory floodplain. The FEMA floodway touches four of the structures.

Drainage conditions in this RLA indicate flooding results from both Crow Creek overflow and neighborhood overland flow caused by undersized storm sewer systems. The properties generally slope northeast toward Crow Creek with low-lying backyard areas experiencing yard inundation and possible structural flooding from the creek. The 100-year floodplain water surface elevation along the mainstem through the RLA ranges from 661.68 to 663.32 feet. Along the S. Trenton Ave. storm sewer tributary, the 100-year overland flow elevation ranges from 661.53 to 663 feet. First finished floor elevations in this RLA are both above and below the 100-year flood level. Homes with FFEs above the 100-year water surface elevation have limited freeboard and may still be at risk from storm sewer overflow along S. Trenton Ave. or flooding from the Crow Creek mainstem.

The 1989 and 2024 Crow Creek, Swan Creek, and Travis Park Master Drainage Plan mention flooding along this RLA, specifically street flooding in the 100-year event along E. 30th Street. The 1989 MDP recommended bridge and storm sewer improvements as well as channel improvements through the RLA. All but the channel improvements have been implemented, improving but not entirely mitigating flooding conditions. The 2024 MDP update listed this RLA as problem area LBO-1 and recommended increased storm sewer capacity and outfall improvements, with downstream detention to offset peak flows.

The general location of this RLA is shown on the map below. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system.

Improvements

Improvements were made to the Crow Creek drainage in accordance with the 1989 Crow Creek, Swan Creek and Travis Park Master Drainage Plan: bridge enlargements at E. 30th and E. 31st St. and an enlarged storm sewer along the Left Bank Tributary (LBO) that joins Crow Creek from the southeast. These improvements did not remove the flooding potential from the repetitive loss property, its FFE remains below the 100-year water surface elevations.

Figure 3: RLA 56



Claims Data

FLOOD INSURANCE DATA There is one repetitive loss property in this RLA. One property in the RLA has carried flood insurance and made two damage claims to the NFIP, both of which were paid, totaling \$14,945. The last claim for this RLA was filed in 2007. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, neither the repetitive loss property nor specific claim data are detailed in this plan.

Research And Analysis

The original analysis of this RLA was conducted in 2017 by the Project Team through interviews with City officials, research into Stormwater Design files, including the Crow Creek, Swan Creek, and Travis Park Master Drainage Plan, review of the City's extensive flood history documentation, assessment of insurance claims, visits to the RLA, interviews with homeowners and questionnaires mailed to the property owners and occupants soliciting information about prior and existing flooding issues, if any. For this 2026 review, additional claims data, updated topography, 311 citizen call logs, and a review of the City's CIP prioritization were used to update this analysis.

AGENCIES AND ORGANIZATIONS During the course of the 2017 RLA analysis and plan development, the Project Team solicited input from the City of Tulsa Stormwater Design, the Communications Department, and the Working in Neighborhoods Department (WIN), Indian Nations Council of Governments (INCOG), US Army Corps of Engineers (USACE), City of Tulsa Emergency Management, and Tulsa County Emergency Management. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System (CRS). In this 2026 update, the Project Team worked with City agencies to verify the status of the repetitive loss properties.

PLANS, STUDIES AND DOCUMENTS The following City of Tulsa and FEMA documents were used in the analysis:

- FEMA Flood Map Panel: 40143C0351L, October 16, 2012
- Regulatory Floodplain Map Atlas, Tulsa Engineering Services, July 2026
- City of Tulsa Stormwater Management Plan
- Stormwater Management Criteria Manual, June 2019
- Stormwater Capital Improvements List, City of Tulsa, Water and Sewer
- 2024 City of Tulsa Hazard Mitigation Plan Update, Freese & Nichols, 2024
- Guidebook to Conducting Repetitive Loss Area Analyses, UNO and FEMA
- Crow Creek, Swan Creek and Travis Park Master Drainage Plan, Final Report, CH2M Hill, May 1989
- Crow Creek, Swan Creek and Travis Park Master Drainage Plan, Addendum to the Final Report, CH2M Hill, September 1990
- Crow Creek, Swan Creek and Travis Park Master Drainage Plan, HNTB, 2024
- Repetitive Loss Area #56, Flanagan & Associates, Swift Water Resources, 2017

CAPITAL IMPROVEMENTS PLANS No City of Tulsa Capital Improvements are currently planned that could have a positive impact on the flooding problems in this Repetitive Loss Area.

FIELD SURVEYS AND SITE VISITS In 2017, site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns. During this 5-year update, these areas were reviewed using GIS data and aerial imagery along with site visits.

REVIEW DRAINAGE PATTERNS The Project Team examined aerial topography maps, master drainage plans, storm sewer plans, City Customer Care Center complaints and comments, and conducted field checks to determine area drainage patterns and identify flooding problem areas. The results of the research and analysis are described in the following paragraphs and summarized in the table below.

STRUCTURES The Project Team made a number of visits to this RLA to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

STRUCTURE TYPE The structures are all residential buildings.

FOUNDATION TYPE The type of foundation was determined by field investigation and query of Tulsa County Assessor records.

CONDITION OF STRUCTURES The condition of the residences in the RLA was determined by field investigation and the County Assessor's records. These findings are summarized in the following table.

Alias	Structure Type	Foundation Type	Year Built	Condition
Property 1	Residential	Crawl Space	1992	Good +
Property 2	Residential	Slab	1992	Good +
Property 3	Residential	Slab	1948	Good
Property 4	Residential	Slab	1995	Superior
Property 5	Residential	Slab	1983	Good
Property 6	Residential	Slab	1987	Very Good
Property 7	Residential	Slab	1999	Very Good

CONCLUSIONS Despite the previous enlargement of the bridge at E. 31st St., all the properties in this RLA remain within the 100-year floodplain and six continue to be within or touched by the floodway. The cause of flooding is from overbank flooding and overland flooding from undersized storm sewer in the neighborhood. The Crow Creek, Swan Creek, and Travis Park MDP updates list storm sewer improvements, improved conveyance along the main channel, detention, and enlarging the bridge at E. 31st St. as solutions to flooding in this area.

RLA 56



Google Earth

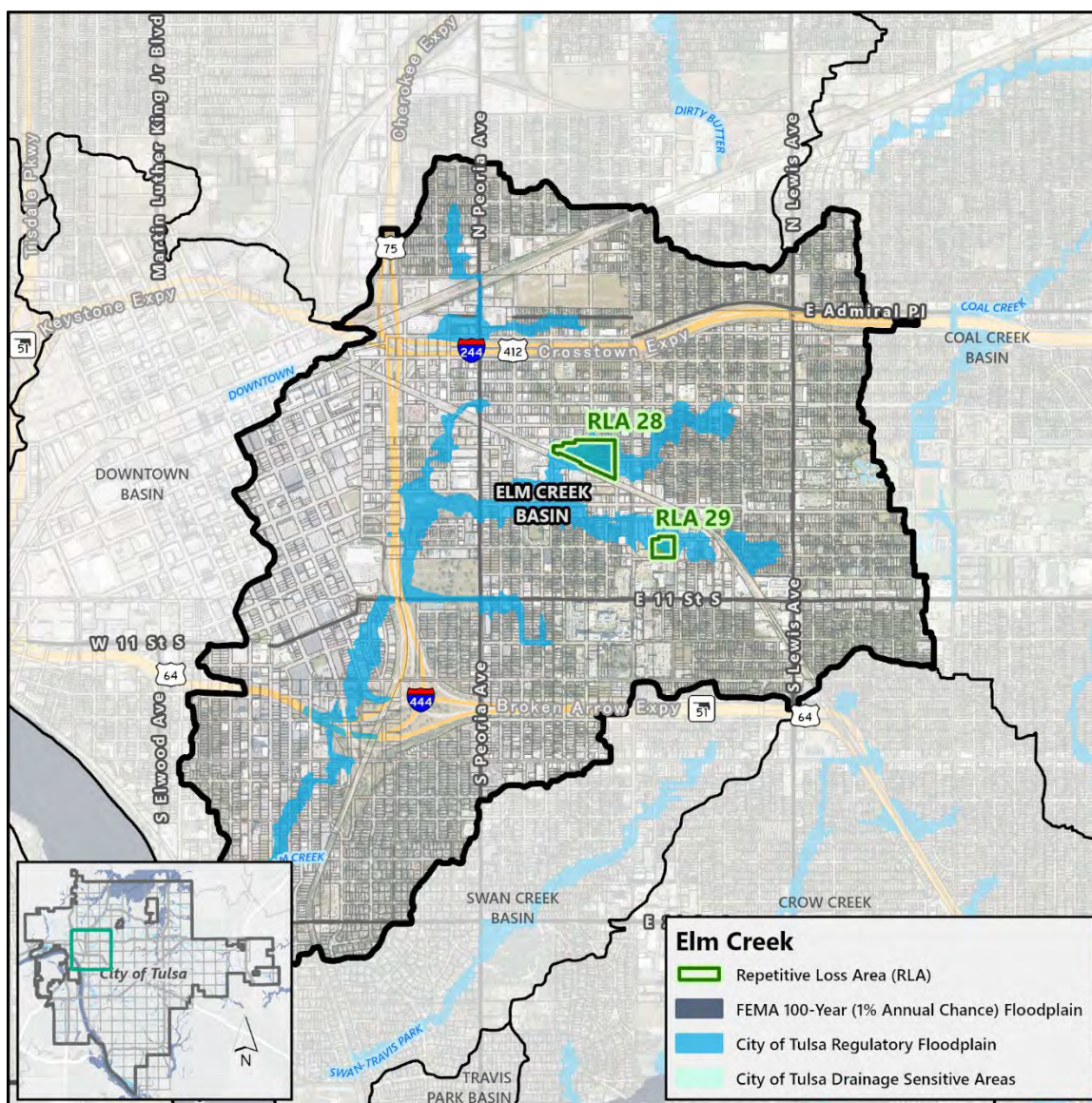
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Elm Creek

Elm Creek is located in North Central Tulsa, near downtown. This creek is a tributary of the Arkansas River, extending approximately 3 miles and has a contributing drainage area of 3.5 square miles. The watershed is a mix of residential, industrial and commercial land use. The creek generally flows west-southwest until its confluence with Arkansas River near the intersection of W. 21st St. and Riverside Dr. Elm Creek and its tributaries are primarily conveyed by storm sewer, except through Veterans Park at the confluence of its two main tributaries, which daylight at a detention facility to form the mainstem of Elm Creek which is then conveyed by storm sewer until its outfalls into the Arkansas River. Elm Creek and several of its tributaries are designated as within the City regulatory floodplain. The Elm Creek basin contains two unmitigated RLAs.

Figure 4: Elm Creek Overview



RLA 28

Area Specific Flooding

Repetitive Loss Area 28, located in the Elm Creek watershed, was established in 2017. This Repetitive Loss Area is comprised of twenty-one structures on twenty-five properties at the intersection of E. 4th St. and S. Rockford Ave. The properties in this RLA were developed between 1910 and 1985 and are located in the City of Tulsa regulatory floodplain.

Drainage conditions in this RLA indicate that flooding is due to overland flow within the neighborhood and undersized storm sewer, estimated to have a 10-year capacity. The terrain on which these properties are located is generally flat, sloping toward E. 5th St. and S. St. Louis Ave., where the storm sewer inlet is located. During exceptionally heavy rainfall, such as the May 1984 storm, the storm sewer system can become overwhelmed, causing runoff to pond along this roadway which can lead to overflow that inundates buildings throughout this RLA. The neighborhood is developed with a mix of commercial and industrial land use on the south end, leading to higher impervious cover and therefore a higher runoff potential. Five structures have been demolished in this RLA, three remain privately owned and one has been converted to a drainage easement and is maintained as open space.

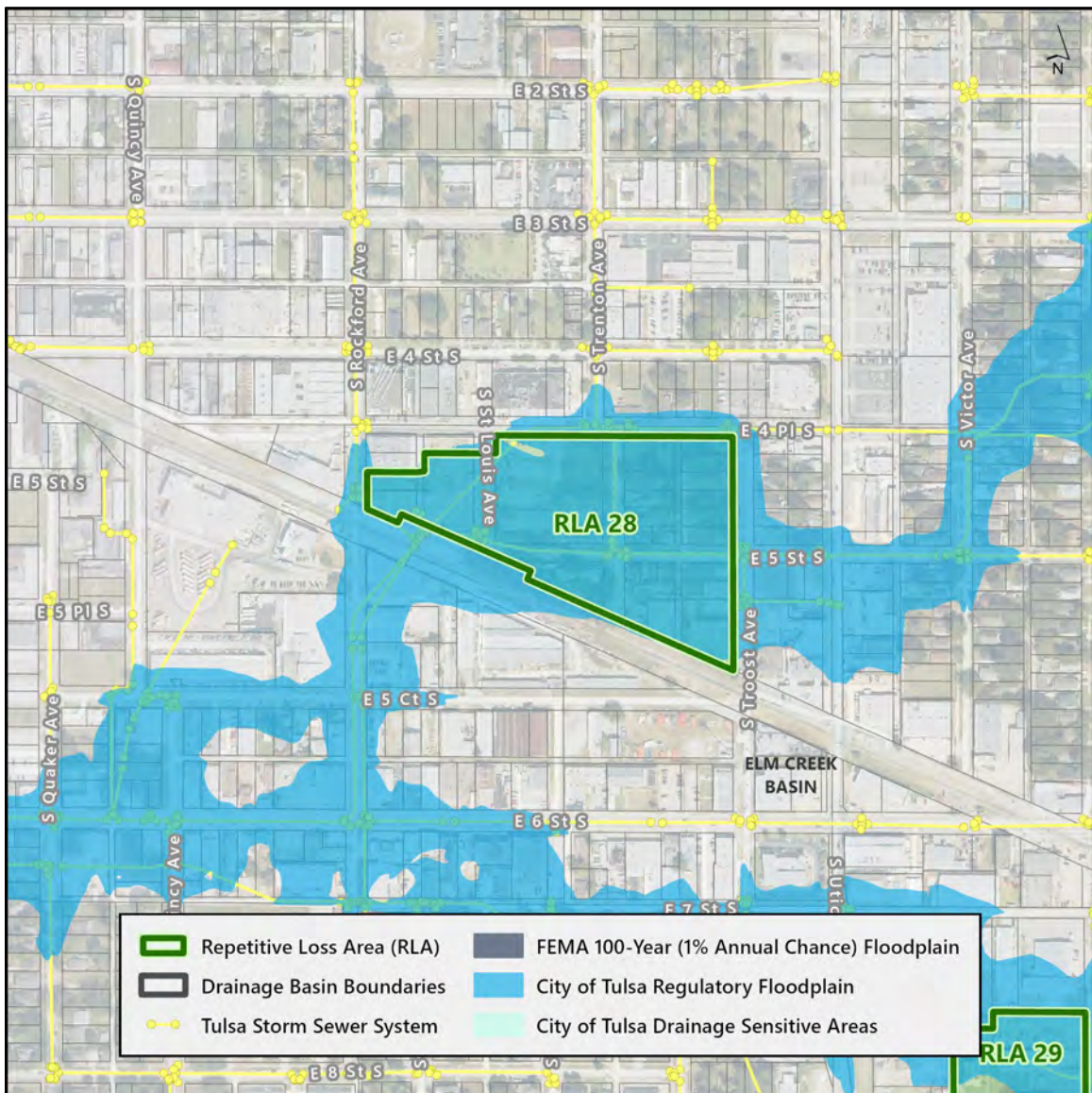
The 2008 Elm Creek Master Drainage Plan covers this RLA in its basin CPN3 (Railroad crossing and Rockford Ave.) within its problem area analysis which recommended acquiring the damaged properties and improving downstream storm sewer.

The general location of this RLA is shown on the map below. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system.

Improvements

There have been no improvements made to this RLA. Although a detention facility has been constructed downstream with accompanying storm sewer improvements, this has not eliminated flooding within this RLA, all structures remain in the City's regulatory floodplain.

Figure 5: RLA 28



Claims Data

FLOOD INSURANCE DATA There are two repetitive loss properties in this RLA. Five properties have carried flood insurance and made ten damage claims to the NFIP, eight of which were paid, totaling \$139,194. The last claim for this RLA was filed in 1995. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, neither the repetitive loss property nor specific claim data are detailed in this plan.

Research And Analysis

The original analysis of this RLA was conducted in 2017 by the Project Team through interviews with City officials, research into Stormwater Design files, including the Elm Creek Master Drainage Plan, review of the City's extensive flood history documentation, assessment of insurance claims, visits to the RLA, interviews with homeowners and questionnaires mailed to the property owners and occupants soliciting information about prior and existing flooding issues, if any. For this 2026 review, additional claims data, updated topography, 311 citizen call logs, and a review of the City's CIP prioritization were used to update this analysis.

AGENCIES AND ORGANIZATIONS During the course of the 2017 RLA analysis and plan development, the Project Team solicited input from the City of Tulsa Stormwater Design, the Communications Department, and the Working in Neighborhoods Department (WIN), Indian Nations Council of Governments (INCOG), US Army Corps of Engineers (USACE), City of Tulsa Emergency Management, and Tulsa County Emergency Management. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System (CRS). In this 2026 update, the Project Team worked with City agencies to verify the status of the repetitive loss properties.

PLANS, STUDIES AND DOCUMENTS The following City of Tulsa and FEMA documents were used in the analysis:

- FEMA Flood Map Panel: 40143C0240L, October 16, 2012
- Regulatory Floodplain Map Atlas, Tulsa Engineering Services, July 2026
- City of Tulsa Stormwater Management Plan
- Stormwater Management Criteria Manual, June 2019
- Stormwater Capital Improvements List, City of Tulsa, Water and Sewer
- 2024 City of Tulsa Hazard Mitigation Plan Update, Freese & Nichols, 2024
- Guidebook to Conducting Repetitive Loss Area Analyses, UNO and FEMA
- Elm Creek Watershed Master Drainage Plan, Final Report, August 1988
- Elm Creek Master Drainage Plan, Swift Water Resources, August 2008
- Elm Creek/6th Street Drainage, Detention and Conveyance Plan, March 2010
- Repetitive Loss Area #28, Flanagan & Associates, Swift Water Resources, 2017

CAPITAL IMPROVEMENTS PLANS The City of Tulsa has planned a Capital Improvement Project that would benefit this RLA by implementing the floodproofing, acquisition, detention and stormwater system improvements recommended in the 2008 Master Drainage Plan.

FIELD SURVEYS AND SITE VISITS In 2017, site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns. During this 5-year update, these areas were reviewed using GIS data and aerial imagery along with site visits.

REVIEW DRAINAGE PATTERNS The Project Team examined aerial topography maps, master drainage plans, storm sewer plans, City Customer Care Center complaints and comments, and conducted field checks to determine area drainage patterns and identify flooding problem areas. The results of the research and analysis are described in the following paragraphs and summarized in the table below.

STRUCTURES The Project Team made a number of visits to this RLA to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

STRUCTURE TYPE The structures are a mix of residential and commercial buildings.

FOUNDATION TYPE The type of foundation was determined by field investigation and query of Tulsa County Assessor records.

CONDITION OF STRUCTURES The condition of the residences in the RLA was determined by field investigation and the County Assessor's records. These findings are summarized in the following table.

Alias	Structure Type	Foundation Type	Year Built	Condition
Property 1	Residential	Crawl Space	1910	Fair
Property 2	Vacant			
Property 3	Residential	Crawl Space	1920	Fair
Property 4	Vacant			
Property 5	Residential	Crawl Space	1910	Fair
Property 6	Commercial	Slab	1950	Good
Property 7	Vacant			
Property 8	Residential	Crawl Space	1910	Fair
Property 9	Commercial	Slab	1950	Avg
Property 10	Vacant			
Property 11	Residential	Crawl Space	1920	Fair
Property 12	Commercial	Slab	1950	Avg
Property 13	Residential	Crawl Space	1910	Avg
Property 14	Residential	Crawl Space	1910	Fair
Property 15	Residential	Crawl Space	1920	Fair
Property 16	Commercial	Slab	1980	Avg
Property 17	Residential	Conventional	1910	Fair
Property 18	Residential	Crawl Space	1935	Fair
Property 19	Residential	Conventional	1930	Fair

Property 20	Commercial	Slab	1984	Avg
Property 22	Commercial	Slab	1940	Good
Property 23	Commercial	Slab	1935	Avg
Property 24	Commercial	Slab	1950	Fair
Property 25	Commercial	Slab	1935	Avg +

CONCLUSIONS Based on flood data, the Elm Creek Master Drainage Plan, site surveys and discussions with City officials, the causes of damage have been overland flooding and storm sewer backup. All twenty-five properties in the RLA are within the City regulatory floodplain. There have been improvements made to downstream detention, but this has not mitigated the RLA. The MDP recommended acquiring the damaged properties and improving downstream storm sewer. The City of Tulsa has planned a Capital Improvement Project that would benefit this RLA by implementing the floodproofing, acquisition, detention and stormwater system improvements recommended in the 2008 Master Drainage Plan.

RLA 28



Google Earth

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RLA 29

Area Specific Flooding

Repetitive Loss Area 29, located in the Elm Creek watershed, was established in 2017. This Repetitive Loss Area is comprised of six properties located near the intersection of E. 8th St. and S. Wheeling Ave. The properties were developed between 1910 and 1945 and are located in the City regulatory floodplain.

Drainage conditions in this RLA indicate flooding is caused by neighborhood overland flow and an undersized storm sewer system, estimated to have a 10-year capacity. The properties are located on relatively flat terrain that slopes moderately north toward the historic creek bed, allowing runoff from adjacent properties to pass through the RLA and collect in low areas where ponding can occur. During exceptionally heavy rainfall, such as the May 1984 storm, the storm sewer system can become overwhelmed, causing runoff to generally follow the former stream path and inundate buildings, homes, and roadways. The surrounding neighborhood includes a mix of commercial and industrial development, which increases impervious cover and runoff potential.

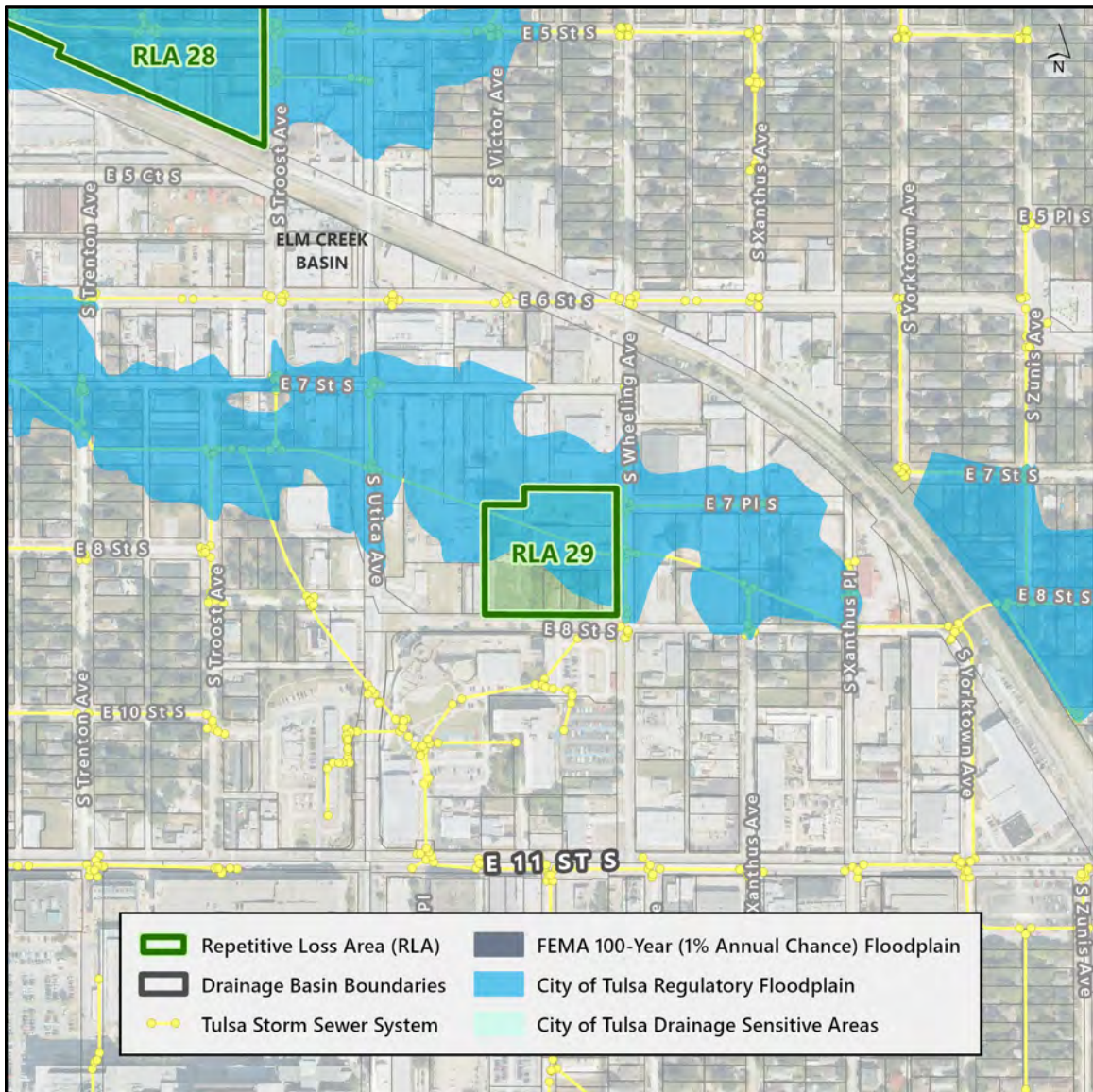
The 2008 Elm Creek Master Drainage Plan covers this RLA in its basin CPS3 (E. 7th St. and Utica Ave.) which notes the flooding due to low storm sewer capacity along this reach of Elm Creek. The MDP recommended acquisition, storm sewer improvements, channel improvements along the 7th St. canal, and detention.

The general location of this RLA is shown on the map below. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system.

Improvements

There have been no improvements made to this RLA. Although a detention facility has been constructed downstream at Centennial Park, with accompanying storm sewer improvements, this has not eliminated flooding within this RLA, and all structures still remain in the City's regulatory floodplain.

Figure 6: RLA 29



Claims Data

FLOOD INSURANCE DATA There is one repetitive loss property in this RLA. One property in the RLA has carried flood insurance and made four damage claims to the NFIP, all of which were paid, totaling \$25,758. The last claim for this RLA was filed in 1984. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, neither the repetitive loss property nor specific claim data are detailed in this plan.

Research And Analysis

The original analysis of this RLA was conducted in 2017 by the Project Team through interviews with City officials, research into Stormwater Design files, including the Elm Creek Master Drainage Plan, review of the City's extensive flood history documentation, assessment of insurance claims, visits to the RLA, interviews with homeowners and questionnaires mailed to the property owners and occupants soliciting information about prior and existing flooding issues, if any. For this 2026 review, additional claims data, updated topography, 311 citizen call logs, and a review of the City's CIP prioritization were used to update this analysis.

AGENCIES AND ORGANIZATIONS During the course of the 2017 RLA analysis and plan development, the Project Team solicited input from the City of Tulsa Stormwater Design, the Communications Department, and the Working in Neighborhoods Department (WIN), Indian Nations Council of Governments (INCOG), US Army Corps of Engineers (USACE), City of Tulsa Emergency Management, and Tulsa County Emergency Management. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System (CRS). In this 2026 update, the Project Team worked with City agencies to verify the status of the repetitive loss properties.

PLANS, STUDIES AND DOCUMENTS The following City of Tulsa and FEMA documents were used in the analysis:

- FEMA Flood Map Panel: 40143C0240L, October 16, 2012
- Regulatory Floodplain Map Atlas, Tulsa Engineering Services, July 2026
- City of Tulsa Stormwater Management Plan
- Stormwater Management Criteria Manual, June 2019
- Stormwater Capital Improvements List, City of Tulsa, Water and Sewer
- 2024 City of Tulsa Hazard Mitigation Plan Update, Freese & Nichols, 2024
- Guidebook to Conducting Repetitive Loss Area Analyses, UNO and FEMA
- Elm Creek Watershed Master Drainage Plan, Final Report, August 1988
- Elm Creek Master Drainage Plan, Swift Water Resources, August 2008
- Elm Creek/6th Street Drainage, Detention and Conveyance Plan, March 2010
- Repetitive Loss Area #29, Flanagan & Associates, Swift Water Resources, 2017

CAPITAL IMPROVEMENTS PLANS The City of Tulsa has planned a Capital Improvement Project that would benefit this RLA by implementing the floodproofing, acquisition, detention and stormwater system improvements recommended in the 2008 Master Drainage Plan.

FIELD SURVEYS AND SITE VISITS In 2017, site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns. During this 5-year update, these areas were reviewed using GIS data and aerial imagery along with site visits.

REVIEW DRAINAGE PATTERNS The Project Team examined aerial topography maps, master drainage plans, storm sewer plans, City Customer Care Center complaints and comments, and conducted field checks to determine area drainage patterns and identify flooding problem areas. The results of the research and analysis are described in the following paragraphs and summarized in the table below.

STRUCTURES The Project Team made a number of visits to this RLA to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

STRUCTURE TYPE The structures are a mix of residential and commercial buildings.

FOUNDATION TYPE The type of foundation was determined by field investigation and query of Tulsa County Assessor records.

CONDITION OF STRUCTURES The condition of the residences in the RLA was determined by field investigation and the County Assessor's records. These findings are summarized in the following table.

Alias	Structure Type	Foundation Type	Year Built	Condition
Property 1	Commercial	Slab	1945	Avg
Property 2	Residential	Crawl Space	1910	Avg
Property 3	Residential	Crawl Space	1920	Avg
Property 4	Residential	Crawl Space	1920	Avg
Property 5	Commercial	Slab	1940	Avg
Property 6	Commercial	Slab	1940	Avg

CONCLUSIONS Based on flood data, the Elm Creek Master Drainage Plan, site surveys and discussions with City officials, the causes of damage have been overland flooding and storm sewer backup. All six properties in the RLA are within the City regulatory floodplain. There have been improvements made to downstream detention and storm sewer, but this has not mitigated the RLA. The MDP recommends acquisition, storm sewer improvements, channel improvements along the 7th St. canal, and detention. The City of Tulsa has planned a Capital Improvement Project that would benefit this RLA by implementing the floodproofing, acquisition, detention and stormwater system improvements recommended in the 2008 Master Drainage Plan.

RLA 29



Google Earth

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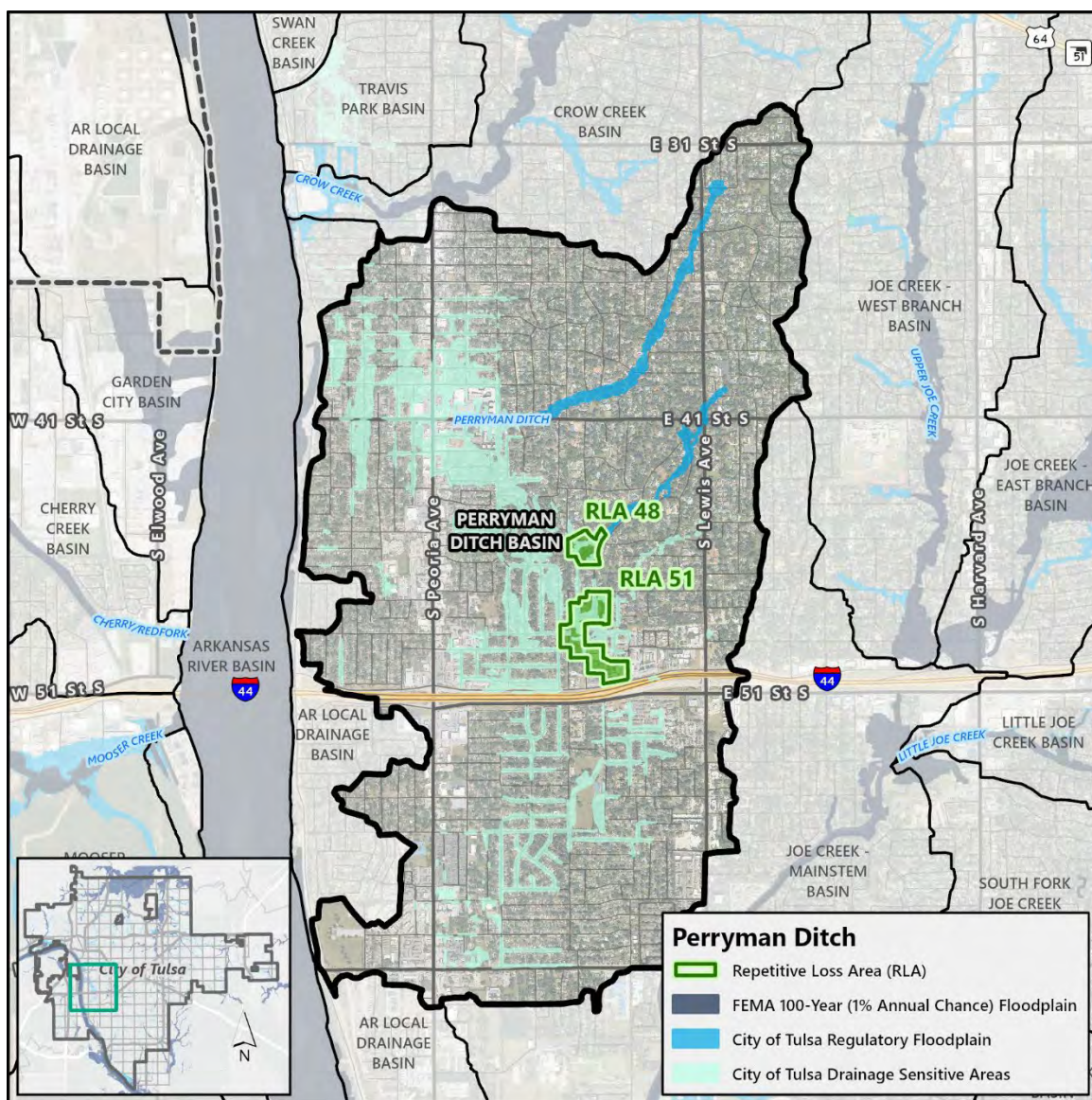
6.43 ft



Perryman Ditch

Perryman ditch is located in Mid Tulsa. This creek is a tributary of the Arkansas River; it has three major branches; 41st St. branch, 51st St. branch, and the southern branch. These streams are almost entirely conveyed by storm sewer. The 51st St. branch daylights for 0.25 miles through Bolewood Acres neighborhood, the southern branch daylights through Heller Park and is then captured by storm sewer until its outfall to the Arkansas River. The total stream distance of the 41st St. branch is approximately 2.2 miles, the 51st St. branch extends approximately 2.25 miles, and the southern branch extends approximately 1.56 miles. The contributing drainage area is 4.19 square miles. The watershed is mostly covered in residential land use with two primary commercial corridors, one along S. Peoria Ave. and one along I-44.

Figure 7: Perryman Ditch Overview



These Perryman Ditch tributaries are not located in the FEMA SFHA but are within the City regulatory floodplain. The lower reaches of Perryman Ditch, mostly west of S. Lewis Ave., are designated as “Drainage Sensitive Areas” (DSA). The City defines DSA as *“Drainage Sensitive Area (DSA) is the area outside the designated FEMA Special Flood Hazard Area and outside the designated regulatory floodplain. The area is subject to flooding during the one percent (1%) or greater annual chance of flooding to depths of 6” or greater where a clearly defined channel does not exist, where the path of flooding is unpredictable and where velocity flow may not be evident. Such flooding is characterized by ponding or sheet flow.”* The Perryman Ditch basin contains one unmitigated RLA and one mitigated RLA that is currently undergoing a status change based on a completed project.

RLA 48

Area Specific Flooding

Repetitive Loss Area 48, located in the Perryman Ditch watershed, was established in 2017. This Repetitive Loss Area is comprised of nine properties at the intersection of E. 45th Pl. S. and S. Victor Ave. The properties in this RLA were developed between 1952 and 1973 and are located in the City regulatory floodplain.

Drainage conditions in this RLA indicate flooding is caused by storm sewer backup, overland flow, and overbank flooding from inadequate channel capacity along the 0.25-mile-long open channel in the Bolewood Acres neighborhood. The properties slope inward toward the channel and then flatten in the southern portion of the RLA near E. 45th Pl., where floodwater can spread out and threaten slab-on-grade structures.

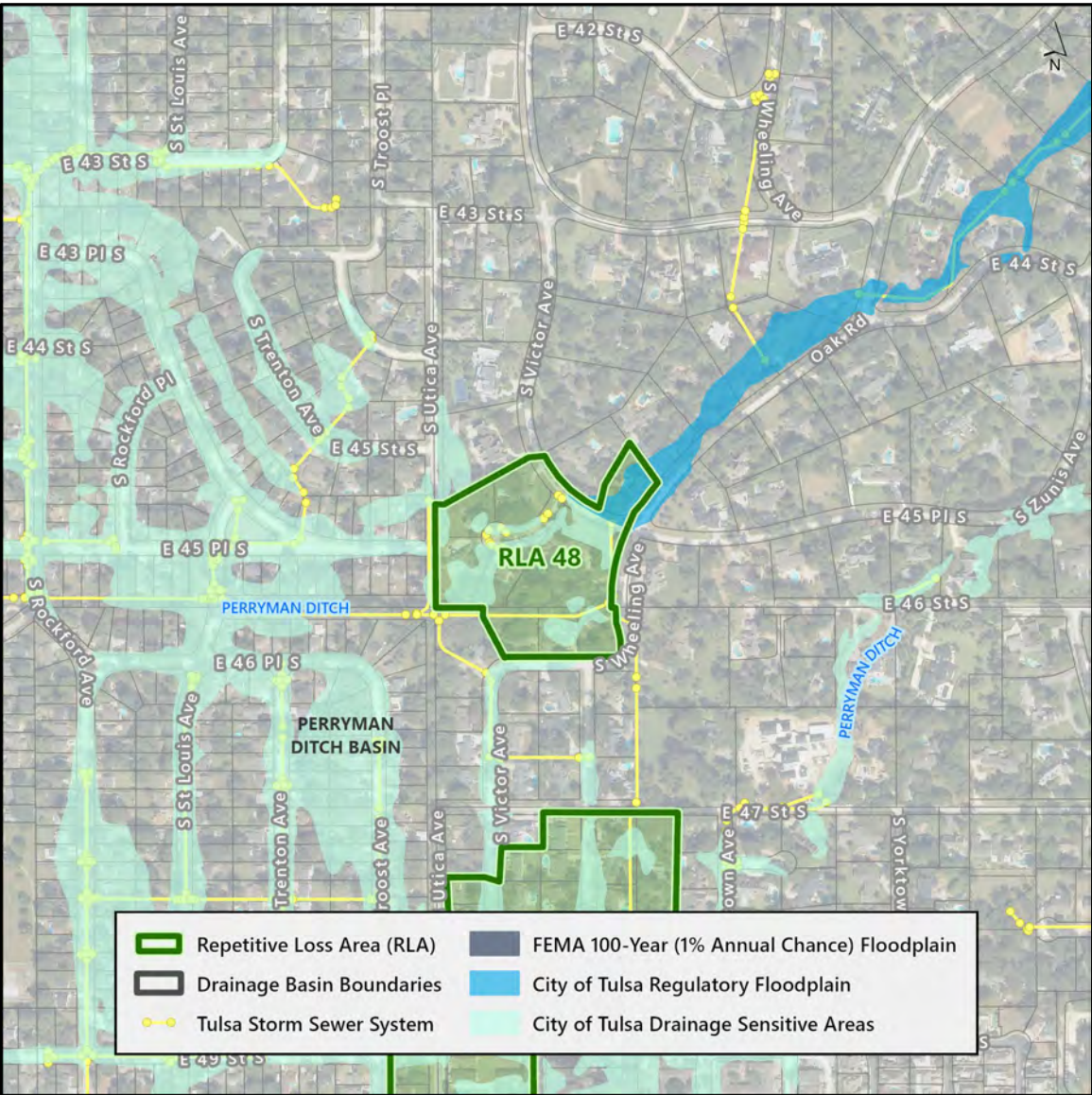
The 2024 Perryman Ditch Master Drainage Plan covers this RLA in its Problem Area 15 North within its problem area analysis, which describes flooding depths of 15 inches within this RLA due to the overland flow and storm sewer backup. The MDP recommends upstream detention and storm sewer diversion that is capable of conveying the 100-year event to mitigate flooding in this area.

The general location of this RLA is shown on the map below. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system

Improvements

The storm drainage system south from this RLA has been disconnected in several places to reduce congestion at S. Victor Ave. This improvement has aided in reducing flooding conditions but there is still an excess of approximately 1,000 CFS of overflow from the storm sewer at S. Victor Ave.

Figure 8: RLA 48



Claims Data

FLOOD INSURANCE DATA There is one repetitive loss property in this RLA. Two properties in the RLA have carried flood insurance and made four damage claims to the NFIP, all of which were paid, totaling \$12,916. The last claim for this RLA was filed in 2001. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, neither the repetitive loss property nor specific claim data are detailed in this plan.

Research And Analysis

The original analysis of this RLA was conducted in 2017 by the Project Team through interviews with City officials, research into Stormwater Design files, including the Perryman Ditch Master Drainage Plan, review of the City's extensive flood history documentation, assessment of insurance claims, visits to the RLA, interviews with homeowners and questionnaires mailed to the property owners and occupants soliciting information about prior and existing flooding issues, if any. For this 2026 review, additional claims data, updated topography, 311 citizen call logs, and a review of the City's CIP prioritization were used to update this analysis.

AGENCIES AND ORGANIZATIONS During the course of the 2017 RLA analysis and plan development, the Project Team solicited input from the City of Tulsa Stormwater Design, the Communications Department, and the Working in Neighborhoods Department (WIN), Indian Nations Council of Governments (INCOG), US Army Corps of Engineers (USACE), City of Tulsa Emergency Management, and Tulsa County Emergency Management. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System (CRS). In this 2026 update, the Project Team worked with City agencies to verify the status of the repetitive loss properties.

PLANS, STUDIES AND DOCUMENTS The following City of Tulsa and FEMA documents were used in the analysis:

- FEMA Flood Map Panel: 40143C0352M, October 16, 2012
- Regulatory Floodplain Map Atlas, Tulsa Engineering Services, July 2026
- City of Tulsa Stormwater Management Plan
- Stormwater Management Criteria Manual, June 2019
- Stormwater Capital Improvements List, City of Tulsa, Water and Sewer
- 2024 City of Tulsa Hazard Mitigation Plan Update, Freese & Nichols, 2024
- Guidebook to Conducting Repetitive Loss Area Analyses, UNO and FEMA
- Perryman Ditch Master Drainage Plan, Meshek & Associates, 2024
- Repetitive Loss Area #48, Flanagan & Associates, Swift Water Resources, 2017

CAPITAL IMPROVEMENTS PLANS No City of Tulsa Capital Improvements are currently planned that could have a positive impact on the flooding problems in this Repetitive Loss Area.

FIELD SURVEYS AND SITE VISITS In 2017, site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns.

During this 5-year update, these areas were reviewed using GIS data and aerial imagery along with site visits.

REVIEW DRAINAGE PATTERNS The Project Team examined aerial topography maps, master drainage plans, storm sewer plans, City Customer Care Center complaints and comments, and conducted field checks to determine area drainage patterns and identify flooding problem areas. The results of the research and analysis are described in the following paragraphs and summarized in the table below.

STRUCTURES The Project Team made a number of visits to this RLA to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

STRUCTURE TYPE The structures are all residential buildings.

FOUNDATION TYPE The type of foundation was determined by field investigation and query of Tulsa County Assessor records.

CONDITION OF STRUCTURES The condition of the residences in the RLA was determined by field investigation and the County Assessor's records. These findings are summarized in the following table.

Alias	Structure Type	Foundation Type	Year Built	Condition
Property 1	Residential	Crawl Space	1973	Good
Property 2	Residential	Slab	1972	Good
Property 3	Residential	Slab	1972	Good
Property 4	Residential	Crawl Space	1952	Excellent
Property 5	Residential	Slab	1967	Good
Property 6	Residential	Crawl Space	1964	Good
Property 7	Residential	Crawl Space	1964	Good
Property 8	Residential	Crawl Space	1959	Good
Property 9	Residential	Slab	1972	Very Good

CONCLUSIONS Based on flood data, the Perryman Ditch Master Drainage Plan, site surveys and discussions with City officials, the causes of damage have been overbank flooding and storm sewer backup. All nine properties in the RLA are within the City regulatory floodplain. The downstream improvements to the storm sewer have likely reduced flooding conditions but have not mitigated this RLA. The MDP recommends upstream detention and storm sewer improvements at S. Victor Ave. Acquisition is also a potential solution to reduce the repetitive flooding in the area.

RLA 48



Google Earth

© 2026 Google

7.54 ft

RLA 51

Area Specific Flooding

Repetitive Loss Area 51, located in the Perryman Ditch watershed, was established in 2017. This Repetitive Loss Area is comprised of fifty structures on thirty-eight properties at the intersection of E. 50th St. and S. Utica Ave. The properties in this RLA were developed between 1957 and 1974 and are located in the City of Tulsa regulatory floodplain.

Drainage conditions in this RLA indicate that flooding is due to overland flow, storm sewer backup and overbank flooding from inadequate channel capacity for the stretch of open channel along the east side of the RLA between E. 48th Pl. and S. Skelly Dr. The terrain on which these properties are located is relatively flat, where overland flow would spread, threatening slab-on-grade structures. The drainage ditches used to convey water are inadequate for larger frequency events.

Drainage improvements to this area were made to this RLA on two separate occasions, the first was a City flood control project in 2004 which included acquisition and demolition of a building as well as regrading to promote drainage to the open channel at E. 47th Pl. The second was the ODOT I-44 widening project completed in 2009-2010, which included significant culvert enlargements and storm sewer improvements along I-44. These two projects have drastically reduced the floodplain through this area and mitigated the repetitive flooding issues.

The Perryman Ditch Master Drainage Plan covers this RLA in its Problem Area 15 North. This MDP update accounts for the 2004 and 2010 projects, 30 structures in the RLA were removed from the 100-year floodplain. All repetitive loss properties first finished floor elevations are above the estimated post-project 100-year water surface elevation. The recommendation of upstream detention and storm sewer improvements would further reduce the floodplain in this neighborhood.

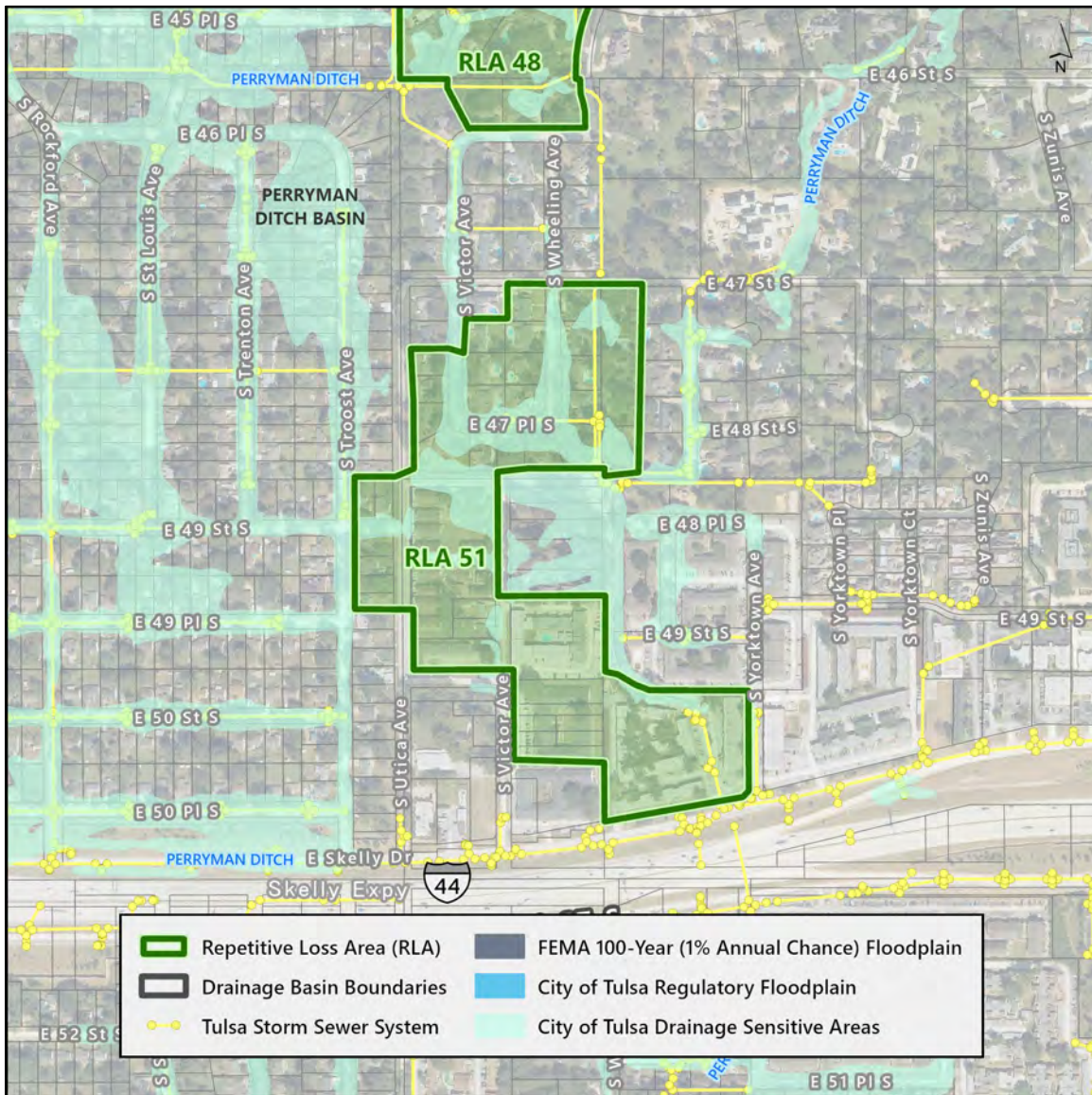
The general location of this RLA is shown on the map below. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system.

Improvements

There have been several improvements made to this RLA that have mitigated the flooding risk. The first was done in 2004, which included the acquisition and demolition of a property, the lot is reserved as an open space storm water area. The land was graded to allow flow from E. 47th Pl. to more effectively drain to the Perryman Ditch due south of this property. In 2010 the I-44 corridor improvements were completed. This project upgraded the existing storm sewer system along the roadway that drains the downstream end of this RLA. The previous 78" RCP was replaced with a triple cell 10' x 10' RCB that outfalls to the Arkansas River, drastically reducing the floodplain. The resulting floodplain can be seen in the RLA map below. There have been no flooding claims since these improvements. A complaint was made in 2025 about nuisance yard and street flooding but did not indicate that structural flooding was an issue.

The City submitted paperwork in 2023 to change the status of the repetitive loss properties in this area, seven of the eight submittals were successful. The remaining repetitive loss property was also mitigated by this project, and the City will follow up to ensure that its status is changed.

Figure 9: RLA 51



Claims Data

FLOOD INSURANCE DATA There is one repetitive loss property in this RLA and seven mitigated repetitive loss properties. Twenty properties in the RLA have carried flood insurance and made sixty damage claims to the NFIP, forty-eight of which were paid, totaling \$382,292. The last claim for this RLA was filed in 2003. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, neither the repetitive loss property nor specific claim data are detailed in this plan.

Research And Analysis

The original analysis of this RLA was conducted in 2017 by the Project Team through interviews with City officials, research into Stormwater Design files, including the Perryman Ditch Master Drainage Plan, review of the City's extensive flood history documentation, assessment of insurance claims, visits to the RLA, interviews with homeowners and questionnaires mailed to the property owners and occupants soliciting information about prior and existing flooding issues, if any. For this 2026 review, additional claims data, updated topography, 311 citizen call logs, and a review of the City's CIP prioritization were used to update this analysis.

AGENCIES AND ORGANIZATIONS During the course of the 2017 RLA analysis and plan development, the Project Team solicited input from the City of Tulsa Stormwater Design, the Communications Department, and the Working in Neighborhoods Department (WIN), Indian Nations Council of Governments (INCOG), US Army Corps of Engineers (USACE), City of Tulsa Emergency Management, and Tulsa County Emergency Management. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the NFIP's Community Rating System (CRS). In this 2026 update, the Project Team worked with City agencies to verify the status of the repetitive loss properties.

PLANS, STUDIES AND DOCUMENTS The following City of Tulsa and FEMA documents were used in the analysis:

- FEMA Flood Map Panel: 40143C0352M and 40143C0354M, October 16, 2012
- Regulatory Floodplain Map Atlas, Tulsa Engineering Services, July 2026
- City of Tulsa Stormwater Management Plan
- Stormwater Management Criteria Manual, June 2019
- Stormwater Capital Improvements List, City of Tulsa, Water and Sewer
- 2024 City of Tulsa Hazard Mitigation Plan Update, Freese & Nichols, 2024
- Guidebook to Conducting Repetitive Loss Area Analyses, UNO and FEMA
- Perryman Ditch Master Drainage Plan, Meshek & Associates, 2024
- Repetitive Loss Area #51, Flanagan & Associates, Swift Water Resources, 2017

CAPITAL IMPROVEMENTS PLANS No City of Tulsa Capital Improvements are currently planned that could have a positive impact on the flooding problems in this Repetitive Loss Area.

FIELD SURVEYS AND SITE VISITS In 2017, site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns. During this 5-year update, these areas were reviewed using GIS data and aerial imagery along with site visits.

REVIEW DRAINAGE PATTERNS The Project Team examined aerial topography maps, master drainage plans, storm sewer plans, City Customer Care Center complaints and comments, and conducted field checks to determine area drainage patterns and identify flooding problem areas. The results of the research and analysis are described in the following paragraphs and summarized in the table below.

STRUCTURES The Project Team made a number of visits to this RLA to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

STRUCTURE TYPE The structures are a mix of residential and commercial buildings.

FOUNDATION TYPE The type of foundation was determined by field investigation and query of Tulsa County Assessor records.

CONDITION OF STRUCTURES The condition of the residences in the RLA was determined by field investigation and the County Assessor's records. These findings are summarized in the following table.

Alias	Structure Type	Foundation Type	Year Built	Condition
Property 1	Residential	Slab	1947	Good
Property 2	Residential	Slab	1968	Good
Property 3	Residential	Slab	1965	Good
Property 4	Residential	Slab	1967	Good
Property 5	Residential	Crawl Space	1968	Avg
Property 6	Residential	Slab	1968	Good
Property 7	Residential	Slab	1971	Very Good
Property 8	Residential	Slab	1968	Good
Property 9	Residential	Slab	1965	Good
Property 10	Residential	Slab	1974	Good
Property 11	Residential	Slab	1971	Good +
Property 12	Residential	Slab	1966	Excellent
Property 13	Residential	Crawl Space	1966	Avg
Property 14	Vacant			
Property 15	Residential	Slab	1974	Good
Property 16	Residential	Slab	1965	Good
Property 17	Residential	Crawl Space	1968	Good
Property 18	Residential	Slab	1976	Avg
Property 19	Residential	Crawl Space	1950	Good +

Property 20	Residential	Crawl Space	1950	Good +
Property 21	Residential	Crawl Space	1950	Good +
Property 22	Residential	Crawl Space	1950	Good +
Property 23	Residential	Crawl Space	1950	Good +
Property 24	Residential	Crawl Space	1950	Good +
Property 25	Residential	Crawl Space	1960	Avg
Property 26	Residential	Crawl Space	1962	Avg
Property 27	Multiple Unit	Slab	1963	Fair
Property 28	Multiple Unit	Slab	1963	Avg
Property 29	Commercial	Slab	1970	Avg
Property 36	Multiple Unit	Slab	1966	Fair
Property 37	Residential	Crawl Space	1960	Excellent
Property 38	Condo	Slab	1973	Good

CONCLUSIONS Based on flood data, the Perryman Ditch Master Drainage Plan, site surveys and discussions with City officials, the causes of damage have been overland flow, storm sewer backup and overbank flooding from inadequate channel capacity for the stretch of open channel along the east side of the RLA between E. 48th Pl. and S. Skelly Dr. The terrain is generally flat with inadequate slopes to convey runoff to a collection point of the storm sewer system. Ditches along the roadway are undersized and can overtop in larger events. Two major flood control projects were undertaken by the City of Tulsa and have drastically reduced the floodplain throughout this area, removing 30 structures. All repetitive loss properties have first finished floor elevations about the 100-year water surface elevation. There have been no flood claims filed since these improvements. The more recent citizen complaints that have been filed cite nuisance yard and street flooding but not flooding of structures. Properties in this RLA may still be at risk of flooding due to inadequate ditch sizes along the roadway through the neighborhood, but the larger concerns of repetitive flooding have been mitigated by the various stormwater improvement projects. For more localized flooding concerns, property owners can undertake individual mitigation actions as described in the Mitigation Measures section of this report.

The City submitted paperwork in 2023 to change the status of the repetitive loss properties in this area, seven of the eight submittals were successful. The remaining repetitive loss property was also mitigated by this project, and the City will follow up to ensure that its status is changed.

RLA 51



Google Earth

© 2026 Google

5.54 ft



Notifications

ANNUAL FLOODPLAIN NOTIFICATION Each year the City notifies all homeowners and residents living in a 100-year floodplain that their properties are subject to flooding and informs them of what steps they can take to protect their residences and families, including the purchase of flood insurance.

ANNUAL REPETITIVE LOSS AREA NOTIFICATION Residents in Repetitive Loss Areas are notified annually that their homes are located in a Repetitive Loss Area and are potentially subject to flood damage from overland flow and storm sewer back-up.

PROPERTY OWNERS/RESIDENTS NOTIFICATION In 2017, property owners and residents/occupants were advised of the Repetitive Loss Area study and analysis by letter, were sent a questionnaire soliciting information and input, and asked to contact the City for more information or a copy of the completed RLA Plan.

PUBLIC PARTICIPATION AND INVOLVEMENT City Staff/Consultants interviewed homeowners to brief them on the Repetitive Loss Area Analysis Study/Plan, receive their input, and discuss possible mitigation measures.

PROPERTY OWNER RESPONSE TO NOTIFICATIONS

- Crow Creek: There were no responses to notifications sent to this property during the 2017 study. Unrelated to the 2017 notification, in 2024, the City received a complaint about continued street flooding within RLA 56.
- Elm Creek: There were no responses to notifications sent to this property during the 2017 study. As of this 2026 update there have been no additional reports of flooding in RLA 29 and RLA 28.
- Perryman Ditch: In RLA 48 there were several responses to the 2017 outreach. Both indicated that there is continued overland flow through properties in the RLA 1. In 2025 there was a single resident that reported structural flooding on two occasions that year. In RLA 51 during the 2017 outreach period, six property owners had stated there were no instances of flooding on their property. One reported the last flood was in 1980, and another reported two occasions of yard and street flooding, one in 2015 and one in 2016. Two other owners claimed they had not flooded since the 2010 I-44 storm sewer improvements.

Mitigation Measures

Overview

The 2024 Crow Creek, Swan Creek, and Travis Park Master Drainage Plan identifies the most cost-effective structural solutions for RLA 56: channelization along Crow Creek and storm sewer improvements. There are presently no funded Capital Improvement Projects for future flood control projects in this area.

The 2008 Master Drainage Plan for Elm Creek identified the most cost effective solutions for RLA 29 to be acquisition, storm sewer improvements, channel improvements along the 7th St. canal, and detention. There are presently no funded Capital Improvement Projects for future flood control projects in this area. The MDP acquisition and downstream storm sewer improvements for RLA 28. The City of Tulsa has planned a Capital Improvement Project that would benefit these RLAs by implementing the floodproofing, acquisition, detention and stormwater system improvements recommended in the 2008 Master Drainage Plan.

The 2024 Master Drainage Plan for this reach of Perryman Ditch identified the most cost-effective structural solutions to mitigate flooding in RLA 48 and 51. They are included in Problem Area 15- North. The recommended action is storms sewer diversion capable of containing the 100-year event. There are presently no funded Capital Improvement Projects for future flood control projects that would benefit this area.

Individual Mitigation Measures: What You Can Do

Individual property protection actions are usually undertaken by property owners on a lot-by-lot, building-by-building basis, and include private floodproofing, moving mechanical equipment above flood levels, installing French drains and minor site grading to move local drainage to the street, sanitary sewer backup protection, and flood insurance.

The City of Tulsa is willing to have a stormwater engineer do a site visit to assist you in analyzing your specific drainage problems and discuss potential solutions. Contact the Customer Care Center at 311 or (918) 596-7777.

KNOW AND UNDERSTAND YOUR FLOOD RISK As stated above, being located in a Repetitive Loss Area does *not* mean a property will flood. Nevertheless, it is important that residents and property owners in flood hazard areas know and understand their flood risk and take what steps they can to protect their homes, families and possessions. City staff are available to explain the local flood risk, interpret floodplain maps, and determine if an area or property has drainage problems or a history of prior flooding. Staff can also discuss the ways a specific property can be protected from flooding. An Elevation Certificate can help define a property's flood risk under various rainfall scenarios (e.g., in a 10-year, 50-year, 100-year, or 300-year storm). You can receive a free flood zone determination by contacting the City with the correct legal description and street address, or the Tax Assessor/Parcel Number of the property.

The City maintains their Regulatory Floodplain map atlas on their website:
<https://cityoftulsa.org/government/departments/water-and-sewer/flood-control>

MAKE A DISASTER PREPAREDNESS PLAN It is always a good idea for residents and property owners in flood hazard zones to prepare a disaster preparedness and response plan that addresses all the steps and details that will demand attention once a flood watch or warning is issued. A Building Permit is required to install a safe room in a flood-prone area.

CREATE BERMS, SWALES OR REDIRECTED DRAINAGE Flood waters can be diverted away from properties using berms, brick planter boxes and swales, but these may not be done in ways that cause damage to other properties. Owners and residents can request a meeting with a City Engineer to discuss the best ways to solve existing drainage problems, and whether a Building Permit will be required. Contact the Customer Care Center at 311 or (918) 596-7777.

INSTALL LOCAL, PROPERTY-SPECIFIC PAVING, PLANTINGS AND CATCHMENT BASINS City Engineering staff can explain the natural functions of floodplains and how they act to slow and purify urban runoff and reduce flooding. Staff can also suggest low-impact development projects which imitate natural floodplain functions by slowing runoff and filtering out impurities. These include such things as rain gardens, catchment basins and pervious paving materials.

ACQUISITION The City of Tulsa has a repetitive loss acquisition program to purchase repeatedly flooded properties. This voluntary program offers owners who are in this situation a way out. The City applies to FEMA for funds using the Hazard Mitigation Grant Program. Once the grant is awarded, the property is appraised as if it were not a flooded



This platform and wall protect the home and air conditioning equipment from shallow flooding.

property and the offer for the property is based on this appraisal. In addition to getting the best possible price, the owner receives moving expenses, a \$1,000 stipend for purchasing a home outside the floodplain, and a 30-day rent free period after closing in which to move. All closing costs and other fees are paid by the City. Once the owner has moved out, the home is demolished and restored as open space to protect the natural and beneficial function of the floodplain. If you would like more information about this program, contact the Customer Care Center at 311 or (918) 596-7777. Acquisition is

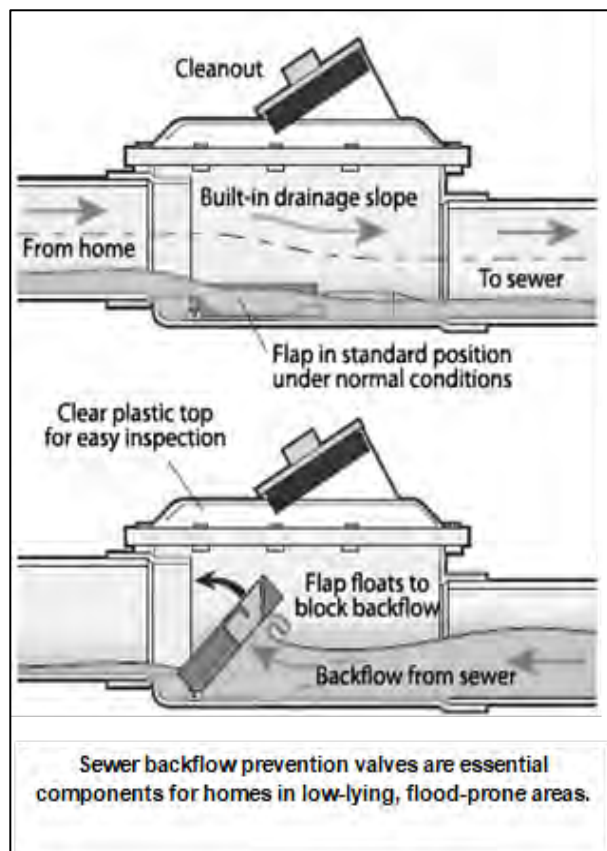
usually not feasible or cost effective for areas of shallow flooding. If a property is located in a FEMA Floodway or Special Flood Hazard Area, demolition, acquisition and relocation may be feasible and cost-effective.

ELEVATE DAMAGE-PRONE COMPONENTS Critical items such as furnace or air conditioning units should be elevated to avoid flood damage. This should be done for components that are in the wet floodproofed area of the building as well as for units that are outside of the structure but subject to shallow flooding.

ELEVATE YOUR STRUCTURE Elevating the structure is only suitable for areas of shallow flooding and is usually not feasible or cost-effective for masonry homes built on concrete slabs. It can sometimes be cost-effective for wood frame buildings on crawlspaces. None of the buildings in these RLAs are a candidate for elevation.

DRY FLOODPROOF YOUR STRUCTURE This can include actions that seal a structure and prevent floodwater from entering. This method is best in areas where flood depths are no more than two or three feet. Buildings can be made watertight by sealing the walls with waterproof coatings, impermeable membranes, or additional layers of masonry or concrete. Doors, windows, and other openings below the base flood elevation must also be equipped with permanent or removable shields, and backflow valves must be installed in sewer lines and drains. Dry floodproofing needs to be designed by an engineer to ensure the structure can resist the force of the water.

WET FLOODPROOF YOUR BUILDING Wet floodproofing allows water to enter a structure, while removing, protecting or elevating items that can be damaged, such as air conditioning equipment. This is often used on structures with crawl spaces and shallow flood depths. The City does not allow basements in flood-prone areas, or the wet floodproofing of basements.



WET FLOODPROOF YOUR GARAGE The garage, with its slab-on-grade construction, is one of the most vulnerable areas of your home to overland flow flooding. Remove, relocate, protect or elevate items that can be damaged from flooding.

CORRECT SANITARY SEWER BACKUP PROBLEMS. Sanitary Sewer backup can be a problem in low-lying, flood-prone areas. The installation of backflow prevention valves on your sanitary sewer lines is highly recommended.

PURCHASE AND MAINTAIN FLOOD INSURANCE Flood Insurance is available and recommended for the structure and contents for all properties in Tulsa. A large percentage of all flood claims are for properties that are outside the FEMA floodplain. Because of the City of Tulsa's sustained efforts to reduce

flooding, you are entitled to a discount on your flood insurance. A property does not have to be in a floodplain to qualify for flood insurance.

MAINTAIN NEARBY STREAMS, DITCHES, AND STORM DRAINS Local flooding can often be caused by brush and other debris blocking drainage ways and culverts. Residents and property owners should do their part in keeping inlets and drainage ways clear of brush and debris. Do not attempt to clear debris during a flood event.

Repetitive Loss Area Mitigation Measures: What the City Can Do

The City of Tulsa is actively committed to the following floodplain management activities:

- Preventative activities to keep flood problems from getting worse.
- Natural resource protection activities to preserve or restore natural areas or the natural functions of floodplain and watershed areas.
- Emergency services measures taken during an emergency to minimize its impact.
- Structural projects to keep flood waters away from properties.
- Public information activities to advise property owners, potential property owners, and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of local floodplains.

As funding becomes available for this Repetitive Loss Area, the City will undertake a more detailed mini-master drainage plan to identify alternative solutions to the flooding problems and recommend a public works project. The actual construction of any public works project may require the acquisition of properties and/or drainage easements. The City will continue to fulfill its maintenance responsibility for channels, drainageways, and storm sewer inlets and pipes. At this time, the City has identified the following actions which may be appropriate for these RLAs.

- Extend and/or improve the storm sewer system to better collect storm water runoff.
- Create overland flow paths to allow better drainage of ponded water to the Creek. This solution is recommended in areas where ponded water could be relieved with a swale or channel.
- Create berms or swales to direct runoff away from residential properties. This solution is used to divert flowing waters away from structures and can only be used within the City's property or right of way.
- Construct upstream detention.
- Acquire flood-prone properties on a voluntary basis. This solution is only recommended for residential properties.

Funding

The City will investigate the availability of funding for the public works actions listed above. Funding for ongoing City maintenance responsibilities is provided by the Stormwater Utility Fee. Funding for a public works project is dependent on several factors, including the prioritized ranking of the project with other Capital Improvement projects, inclusion in future street maintenance projects, being part of a project in a Bond Issue, etc. In the case that the nature of the flooding problems is localized, and minor damage is involved, the funding for

needed improvements will have to be borne by the individual homeowner. Another potential funding source is FEMA's Hazard Mitigation Grant Program (HMGP), which can be implemented after a Presidential Major Disaster Declaration in the State.

Recommendations

CROW CREEK

Overbank and overland flooding have continued to threaten the properties in RLA 56. The MDP Recommendations in this area are to improve storm sewer system and its outfall, detention, and channelization of Crow Creek. Local flooding solutions include creating overland flow paths and implementing berms/swales to better allow drainage of ponding water.

ELM CREEK

Limited storm sewer capacity and overland flow continue to be the primary cause of flooding within the Elm Creek RLAs. The City has installed a detention facility downstream of these areas with accompanying storm sewer improvements, but this did not mitigate the repetitive loss properties. The MDP suggests increased storm sewer capacity, detention, and acquisition to deal with the ongoing flooding problems. The City of Tulsa has planned a Capital Improvement Project that would benefit these RLAs by implementing the floodproofing, acquisition, detention and stormwater system improvements recommended in the 2008 Master Drainage Plan. For the localized flooding concerns, solutions include creating overland flow paths and implementing berms/swales to better allow drainage of ponding water, and flood proofing as appropriate.

PERRYMAN DITCH

Overbank and overland flooding from undersized ditches and storm sewer have continued to threaten properties in RLA 48. The MDP recommends upstream detention and storm sewer diversion capable of conveying the 100-year flow. This would reduce flood conditions in the RLA. Another solution would be to acquire the flood-prone properties within the City regulatory floodplain and maintain them as open space.

The historic cause of flooding in RLA 51 is due to overland flow from inadequate drainage conditions along the relatively flat terrain, inadequate drainage ditches, and storm sewer backup. The City has undertaken two large flood control projects and greatly reduced flood risk within the area, removing 30 structures from the floodplain in this RLA alone. Since these improvements, no claims have been filed, and the residential complaints pertain to roadway and yard flooding. Flood risk still exists to these slab-on-grade homes in larger frequency events. For the localized flooding concerns, solutions include creating overland flow paths and implementing berms/swales to better allow drainage of ponding water, and flood proofing as appropriate.

The City submitted paperwork in 2023 to change the status of the repetitive loss properties in this area, seven of the eight submittals were successful. The remaining repetitive loss property was also mitigated by this project, and the City will follow up to ensure that its status is changed.

Property owners are encouraged to maintain flood insurance. The City of Tulsa is a Community Rating System (CRS) Class I Community, and all homeowners qualify for up to a 45% discount on their flood insurance premiums. Homeowners are also encouraged to undertake individual mitigation measures to reduce their risk of overland flooding. The City of Tulsa is ready to assist in this effort with professional advice.