



CITY OF  
**Tulsa**  
A New Kind of Energy.

# Repetitive Loss Area #28

Elm Creek  
E. 5<sup>th</sup> St. & S. Trenton Ave. Area



August 17, 2017



**SWIFT** WATER RESOURCES ENGINEERING, LLC  
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Bill Robison, P.E., CFM  
Engineering Services





## ENGINEERING SERVICES

August 17, 2017

Dear Resident/Property Owner:

Once considered the most flood-prone city in America, Tulsa has worked hard to reduce or eliminate flooding of its homes and neighborhoods. The City joined the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) in 1974 and through decades of effort is now recognized as a national leader in flood hazard mitigation. As a result, property owners in Tulsa receive as much as 40% discount on their flood insurance.

A key component of the NFIP has been its focus on Repetitive Loss Properties, which make up only 1 percent of insured properties, but account for over 30 percent of flood insurance claims payments. A Repetitive Loss Property is defined by FEMA as any property that has been paid two or more flood insurance claims of \$1,000 or more in a 10-year time period.

The NFIP recently expanded its flood hazard mitigation program to include the identification of "Repetitive Loss Areas" (RLA)—those properties near an existing Repetitive Loss Property that may be subject to the same general flooding conditions. In most instances, 95% of the properties in an RLA will never have experienced flooding—especially if the cause of damage is shallow, overland flow due to local drainage conditions. Once the City has identified an RLA, we are required to contact the owners and residents of the area and work together to develop a plan to reduce or eliminate flooding in the neighborhood.

Your property has been identified as being in a Repetitive Loss Area. We want to re-emphasize that this does not mean your property has flooded or is even likely to flood—only that it is in the same area, and in a similar geographical situation, as an existing Repetitive Loss Property.

You can protect your property from flooding. We would like to invite you to participate in our flood prevention and mitigation efforts for your neighborhood. We need your input. What can we do, working together, to eliminate potential flood losses in your area? We look forward to hearing from you.

To learn more about your risk of flooding visit [www.floodsmart.gov](http://www.floodsmart.gov) or contact the City of Tulsa Customer Care Center at (918) 596-7777.

Sincerely,  
**CITY OF TULSA, ENGINEERING SERVICES**

Bill Robison, P.E., CFM  
Senior Special Projects Engineer  
Stormwater Project Coordination



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# Acknowledgements

The City of Tulsa Repetitive Loss Area Analysis Plans were developed by Engineering Services with local funding from the City of Tulsa in compliance with the Federal Emergency Management Agency's Community Rating System's requirements. Numerous agencies, departments, organizations and individuals participated in these studies, including:

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# Repetitive Loss Area #28

## Elm Creek E. 5<sup>th</sup> St. & S. Trenton Ave. Area

### Overview

Repetitive Loss Area (RLA) #28 is located in the Elm Creek drainage between E. 4<sup>th</sup> Pl. on the north to the MKT railroad tracks on the south, and from S. Rockford Ave. on the west to S. Troost Ave. on the east. The neighborhood is mixed, with 11 single-family residences and eight commercial/industrial properties in Fair to Average condition. Five properties have made 11 paid damage claims in 1979, 1984, 1986 and 1994 for a total of \$205,075. The cause of damage was overland flow flooding and storm sewer backup. There have been no paid claims in the neighborhood since 1994, although two unpaid claims were made in 1999. All of the properties are in the City's 100-year floodplain for Elm Creek.

The general location of RLA #28 is shown on the map on page 2, and a more detailed aerial photo/topography map on page 4. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system.

### I. Background

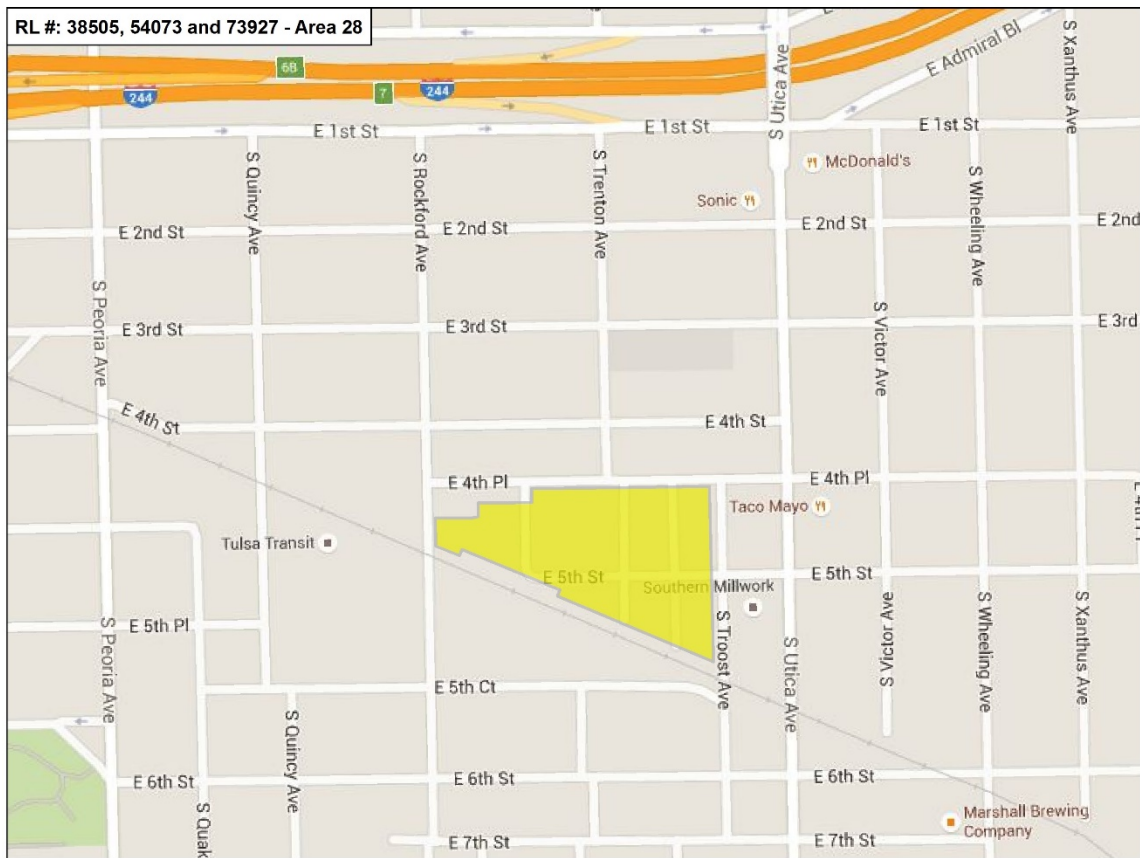
During the post-World War building boom of the 1950s and 1960s, Tulsa expanded rapidly east and south into the basins of Mingo, Joe and Fred creeks. Because of the city's climate and the broad floodplains along these creeks, this growth brought with it an increased risk of flooding. And indeed, by the mid-1980s floods were occurring almost yearly and flooding had become Tulsa's most destructive natural hazard. One researcher at the time declared Tulsa "the most flood-prone community in the nation."

Tulsa was not unique in its rapid post-war development and attendant risks. Cities across America were experiencing similar problems as they spread out into prosperous subdivisions. In response, the U.S. Congress created the National Flood Insurance Program (NFIP) in 1968 to help property owners protect themselves from flood losses. The NFIP offered flood insurance to homeowners, renters, and business owners if their community participated in the NFIP and agreed to adopt and enforce ordinances that met or exceeded FEMA requirements for reducing the risk of flooding.

Tulsa joined the NFIP in 1974, and through great effort and considerable expense has significantly reduced its exposure to flooding. As a result, Tulsa has been awarded a Class II rating in the NFIP's Community Rating System (CRS), which grants its residents a 40 percent discount on the cost of flood insurance for structures in the Special Flood Hazard Area (SFHA), also known as the 1% or 100-year floodplain. Since the Biggert-

Waters Flood Insurance Reform Act of 2012, many properties have seen a substantial increase in their premiums, making this discount even more important.

For its part, the NFIP is continually faced with the job of paying claims while trying to keep the price of flood insurance at an affordable level. Properties that flood repeatedly—known as “repetitive loss properties,” have been a particular problem for the program: Although they make up only 1 percent of insured properties, they account for one-third of all claims payments (about \$200 million a year, or \$4.5 billion to date). A repetitive loss property is defined by FEMA as any property that has been paid two or more flood insurance claims of \$1,000 or more in a 10-year period.



**RLA #28 is located in the Elm Creek drainage at E 5<sup>th</sup> St. and S. Trenton Ave.**

Consequently, 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.

FEMA has recently extended its repetitive loss program to include “Repetitive Loss Areas” (RLA). To maintain a Class II rating in the CRS, Tulsa is now required to analyze the area surrounding each of its repetitive loss properties and identify any neighboring properties (including uninsured ones) that may be subject to the same general flooding conditions. This group of nearby properties is then designated as an RLA. The City is required to contact the owners of the properties in the RLA, inform them that they are

located in an area subject to flooding, and develop a plan for mitigating or eliminating flooding in the area, much as has been done for the individual repetitive loss properties.

It is important to note that most of the homes in an RLA—perhaps as many as 80% or 90%—may not have experienced flooding of any kind. What they have in common is being subject to the same general geographical and flood conditions as the nearby repetitive loss property. It should also be stressed that the flooding events in question may have had little or nothing to do with overflow from a creek, but perhaps may have been the result of storm sewer backup or overland flow from a neighbor’s property into a low-lying, slab-on-grade home or garage.

The location of RLA #28 is shown on the aerial photo/topography map on page 4, below. The map identifies residential properties, County Assessor parcels, floodplains, and the existing storm sewers and inlets systems.

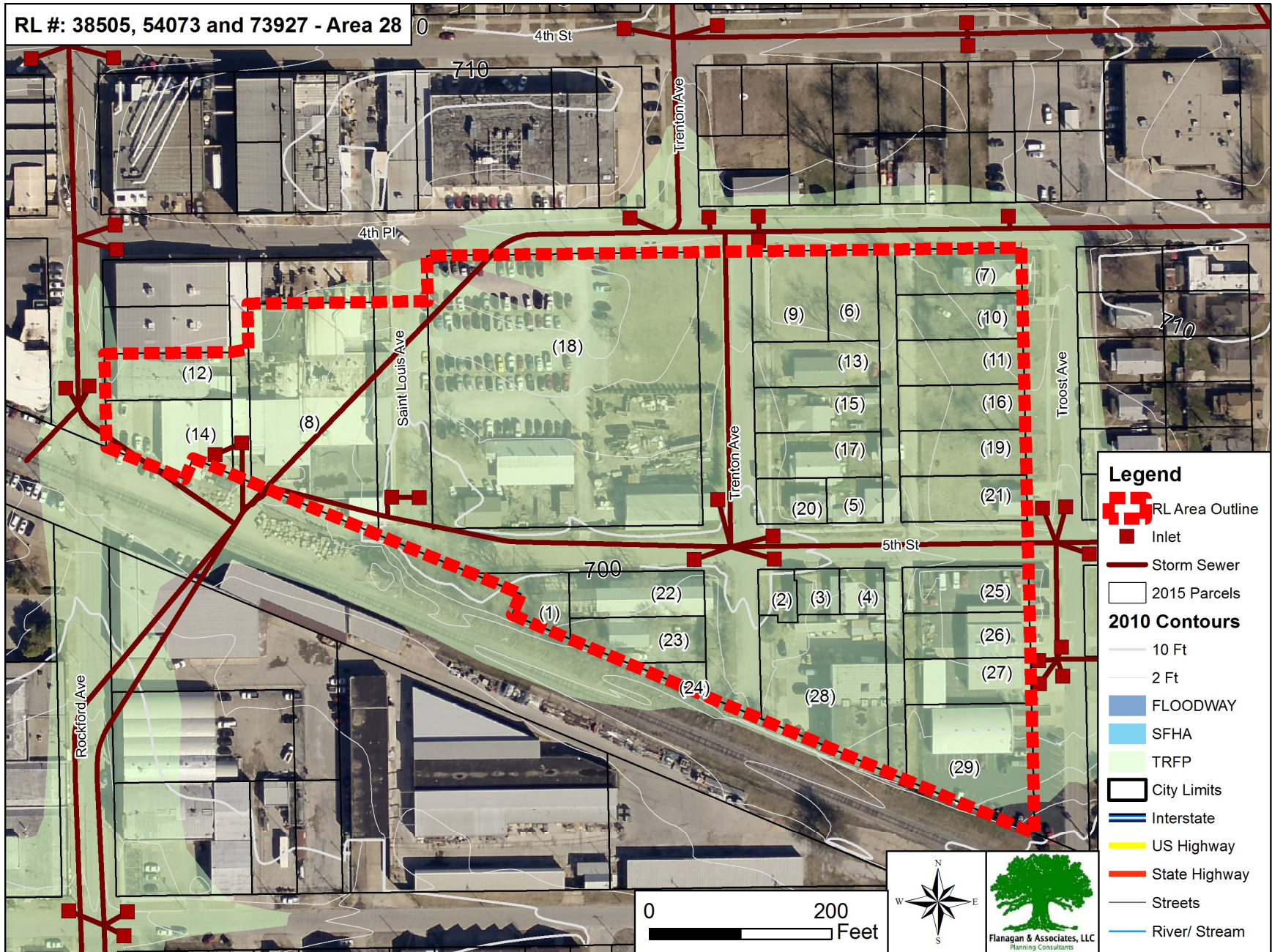
## **II. Location**

Elm Creek is a 3.3-mile-long, left bank tributary to the Arkansas River that drains an area of 3.4 sq. miles in central Tulsa. Except for a brief appearance at the Centennial Park detention facility, the creek is carried entirely in storm sewers from its sources near S. Lewis Ave. to the Arkansas River just south of the 21<sup>st</sup> St. bridge.

Repetitive Loss Area #28 is located along the Central Park North (CPN) branch of Elm Creek, which has its source near E. 3<sup>rd</sup> St. and S. Lewis Ave. The RLA is between E. 4<sup>th</sup> Pl. on the north and the MKT railroad tracks, and from S. Rockford Ave. on the west to S. Troost Ave. on the east. In this reach of the stream, stormwater runoff was carried in conduits designed to carry the 10-year storm. During exceptionally heavy rainfall, such as in May 1984, the storm sewer system was overwhelmed and runoff followed generally along the swale of the former stream, inundating buildings, homes and roadways.



**Centennial Park detention facility on Elm Creek near downtown Tulsa**



### **III. History**

#### ***Development***

The homes and commercial buildings in RLA #28 were constructed between 1910 and 1950 in the Hackathorn addition, with one additional commercial building added in 1984.

#### ***Flooding***

The flood events that resulted in 11 paid damage claims in RLA #28 occurred in June 1979 (two claims), May 1984 (three claims), September-October 1986 (two claims), July 1994 (two claims), and May -June 1995 (two claims). Damage was due to storm sewer backup, street flooding and overland flow.

#### ***Improvements***

Improvements were made to the Elm Creek drainage in accordance with the *Elm Creek Master Drainage Plan*, which determined that storm sewer expansion, detention and floodproofing was the best option for this reach of the creek. A major detention facility was constructed in Central Park—now Centennial Park, and parallel storm sewers installed in the 1990s. These measures have not eliminated all overland flow flooding during exceptionally heavy storms or removed RLA #28 from the City's Regulatory Floodplain. All structures in RLA #28 continue to be within the City's 100-year floodplain and at risk of shallow flooding.

### **IV. Research and Analysis**

The analysis of Repetitive Loss Area #28 was conducted by the Project Team through interviews with City officials, research into Engineering Services and Stormwater Drainage files, including the *Elm Creek Watershed Master Drainage Plan*, and the *Elm Creek/6<sup>th</sup> St. Drainage, Detention and Conveyance Plan*. The review also included review of the City's extensive flood history documentation, assessment of insurance claims, field trips to the RLA, interviews with property owners and questionnaires mailed to the residences soliciting information about prior and existing flooding issues.

#### ***Agencies and Organizations***

The City of Tulsa's Storm Drainage & Hazard Mitigation Advisory Board (SDHMAB), which also serves as the City's Hazard Mitigation and CRS Committee, and the CRS Public Participation Involvement & Information Committee (PPI) met monthly during the two-year Repetitive Loss Area Planning process. Each committee was updated on the status of the planning process, discussed issues, and provided guidance. Research and analysis were done in accordance with guidelines from the Federal Emergency Management Agency (FEMA), the National Flood Insurance Program (NFIP) and the Community Rating System (CRS).

Local, State & Federal Agencies and non-profit organizations are represented on the PPI Committee. The RLA plans were discussed at the PPI Committee meetings, and other agencies such as TAEMA were contacted by phone or email. The RLA plans were presented to City Council for adoption; the agenda was made public and furnished to the media. The council meeting is a public meeting and the local media was present at the

meeting. In addition the council meetings are aired on our local government network TV channel TGOV.

Participating agencies and organizations involved were: City of Tulsa (CoT) Storm Drainage & Hazard Mitigation Advisory Board, CRS PPI Committee, CoT Communications Department, CoT Development Services, Working in Neighborhoods, CoT Engineering Services, CoT Finance Department, CoT Legal Department, CoT Streets & Stormwater, CoT Water & Sewer Department, Child Care Resource Center, Indian Nations Council of Governments, Tulsa Area Emergency Management Agency (TAEMA), Disaster Resilience Network, Metropolitan Environmental Trust, Oklahoma Insurance Department, Tulsa Association of Realtors, U.S. Army Corps of Engineers.

### ***Plans, Studies and Documents***

The following City of Tulsa and FEMA documents were used in the analysis:

- FEMA Flood Map 40143C0369L
- *Flood Insurance Rate Map*, City of Tulsa, October 16, 2012
- *Regulatory Floodplain Map Atlas*, Tulsa Engineering Services, October 2016
- *Elm Creek Watershed Master Drainage Plan, Final Report*, August 1988
- *Elm Creek/6<sup>th</sup> Street Drainage, Detention and Conveyance Plan*, March 2010
- *2014 City of Tulsa Hazard Mitigation Plan Update*, Flanagan & Assoc., 2014
- *City of Tulsa Stormwater Management Plan*
- Stormwater Design Criteria Manual: Critical Neighborhood Flood Control Projects
- Stormwater Capital Improvements List, City of Tulsa, Engineering Services
- *Guidebook to Conducting Repetitive Loss Area Analyses*, UNO and FEMA

### ***Capital Improvements Plans***

No City of Tulsa Capital Improvements are currently planned that could have a positive impact on the flooding problems in Repetitive Loss Area #28. There are storm sewer improvement and regional detention facilities on the existing CIPs for Elm Creek along with Master Drainage Plan recommendations that are not yet on the CIPs. None are presently funded.

### ***Flood Insurance Data***

None of the 19 properties in the RLA currently carries flood insurance. 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 properties nor address-specific claim data are detailed in this Plan.

### ***Claims Data.***

Six properties in the RLA made 11 paid damage claims for a total of \$205,075: two in 1979 for \$44,778; three in 1984 for \$112,120; two in 1986 for \$5,976; two in 1994 for \$33,775; and two in 1995 for \$8,426. Two claims were made in 1999, but were not paid. The individual claims averaged about \$18,500.

### ***Field Surveys and Site Visits***

Site visits were conducted during the study, primarily to confirm foundation type and view local on-site overland flow drainage patterns.

### ***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 visits to RLA #28 to determine the situation and condition of the structures. Visual analysis was verified by queries of Tulsa County Assessor data.

### ***Structure Type.***

The structures in RLA #28 are a mixture of commercial buildings and single-family residences.

### ***Foundation Type.***

The type of foundation was determined by field investigation and query of Tulsa County Assessor records. All the residences are built on crawl spaces and the commercial buildings on slab foundations.

### ***Condition of Structures.***

The condition of the residences in the RLA was determined by field investigation and the County Assessor's records. The structures are in Fair to Average condition. These findings are summarized in the following table.

**Properties in the RLA**

<b>Address</b>	<b>Structure Type</b>	<b>Foundation Type</b>	<b>Year Built</b>	<b>Condition</b>
Property 1	Single-Family Res.	Crawl Space	1910	Fair Plus
Property 2	Single-Family Res.	Crawl Space	1920	Fair Plus
Property 3	Single-Family Res.	Crawl Space	1910	Fair Plus
Property 4	Commercial	Slab-on-Grade	1950	Average
Property 5	Single-Family Res.	Crawl Space	1910	Fair Plus
Property 6	Commercial	Slab-on-Grade	1950	Average
Property 7	Single Family Res.	Crawl Space	1920	Fair Plus
Property 8	Commercial	Slab-on-Grade	1950	Average
Property 9	Single Family Res.	Crawl Space	1910	Fair Plus
Property 10	Single Family Res.	Crawl Space	1910	Fair Plus
Property 11	Single Family Res.	Crawl Space	1920	Fair Plus
Property 12	Single Family Res.	Conventional	1910	Fair Plus
Property 13	Single Family Res.	Crawl Space	1935	Fair Plus
Property 14	Single Family Res.	Conventional	1930	Fair Plus
Property 15	Commercial	Slab-on-Grade	1935	Low Plus

Address	Structure Type	Foundation Type	Year Built	Condition
Property 16	Commercial	Slab-on-Grade	1984	Average
Property 17	Commercial	Slab-on-Grade	1940	Fair
Property 18	Commercial	Slab-on-Grade	1935	Average
Property 19	Commercial	Slab-on-Grade	1950	Average

### ***Notification***

**Annual Floodplain Notification.** Each year, in March, the City notifies all property owners 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 Area #28 are notified annually that their properties are in a Repetitive Loss Area, and are potentially subject to damage storm sewer backup and overland flow.

**Property Owners/Residents Notification.** 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 property owners and residents to brief them on the Repetitive Loss Area Analysis Study/Plan, receive their input, and discuss possible mitigation measures.

**Property Owner Response to Notifications.** There have been no responses to notification from property owners and residents in RLA #28.

### ***Conclusions***

Based on flood data, the *Elm Creek Master Drainage Plan*, site surveys and feedback from residents and homeowners, the causes of damage have been storm sewer backup and overland flow. All 19 properties in the RLA are within the City of Tulsa’s 100-year floodplain.

## **V. Mitigation Measures**

### ***Overview***

The Master Drainage Plan for this reach of Elm Creek identifies detention, storm sewer enlargement and floodproofing as the most cost-effective solutions for flooding in RLA #28. The City of Tulsa has constructed a major detention facility at Centennial Park and significantly increased the storm sewer capacity throughout the Elm Creek basin, particularly in this reach of the stream. 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 (918) 596-7777, or go online to [www.cityoftulsa.org/connect/contact-the-city](http://www.cityoftulsa.org/connect/contact-the-city).

**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 is 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.



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

**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 your buildings and residences 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. This may be the most feasible solution for areas with flooding due to overland flow, as in RLA #28.

**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 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 structure 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 (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, as is the case for all properties in RLA #28, demolition, acquisition and relocation may be a cost-effective option.

**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. Some of the homes in RLA #28 may be candidates for elevation.

**Dry Floodproof Your Structure.** This can include actions that seal a structure and prevent floodwaters 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 sanitary sewer lines and drains. Dry flood-proofing needs to be designed by an engineer to ensure the structure can resist the force of the water.

**Wet Floodproof Your Building.** Wet flood-proofing 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, elevate, or otherwise protect items that can be damaged from flooding.

**Elevate Damage-Prone Components** such as furnace or air conditioning units. 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.

**Maintain Nearby Streams, Ditches, and Storm Drains.** Local flooding can often be caused by brush and other debris blocking drainage ways and culverts. Storm sewer inlet blocking can contribute to overland flow flooding and must be kept clear of debris. Residents and property owners should do their part in maintaining drainageways.

**Correct Sanitary Sewer Backup Problems.** Sanitary sewer backup can be a cause of property damage in low-lying, flood-prone areas like RLA #28. 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 insurance 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.

**Repetitive Loss Area Mitigation Measures: What the City Can Do**

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

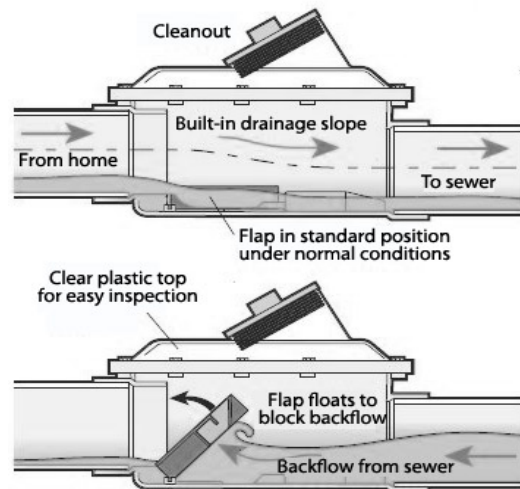
- Preventative activities to keep flood problems from getting worse.
- Natural resource protection activities to preserve or restore natural areas or the natural functions of floodplain and watershed areas.
- Emergency services measures taken during an emergency to minimize its impact.
- Structural projects to keep flood waters away from properties.
- Public information activities to advise property owners, potential property owners, and visitors about flood 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 RLA #28.

- Extend and/or improve the storm sewer system to better collect storm water runoff.
- Acquire flood prone properties on a voluntary basis.

**VI. Funding**

Due to the nature of the flooding problems and the damages involved in RLA #28, acquisition and floodproofing remain the preferred options for some at risk properties. The funding of other improvements to individual properties—such as berms—will have to be borne by the homeowner. The City will investigate the availability of funding for the public works actions listed above. Funding for ongoing City maintenance



**Sewer backflow prevention valves are essential components for homes in low-lying, flood-prone areas.**

responsibilities is provided by the Stormwater Utility Fee. Funding for a public works project in this RLA is dependent of several factors, including the prioritized ranking of the project with other Capital Improvement projects, inclusion in future street maintenance projects, being part of a Bond Issue project, etc. The City will investigate the possibility of increasing the storm sewer capacity with any future street projects in the area. 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.

## **VII. Conclusions and Recommendations**

Despite the installation of a major detention facility at Centennial Park, storm sewer backup and overland flow flooding has continued to threaten properties and structures in the 100-year floodplain of RLA #28.

Homeowners are encouraged to maintain flood insurance. The City of Tulsa is a Community Rating System (CRS) Class II Community, so all homeowners qualify for up to a 40% discount on their flood insurance premiums. Homeowners are also encouraged to undertake individual mitigation measures to reduce their risk of overland flow flooding. The City of Tulsa is ready to assist in this effort with professional advice.