



CITY OF
Tulsa
A New Kind of Energy.

Repetitive Loss Area #56

**Crow Creek
E. 28th 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 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

Contents

Acknowledgements	iii
Overview	1
I. Background	1
II. Location	3
III. History	5
Development.....	5
Flooding.....	5
Improvements	5
IV. Research and Analysis	5
Agencies and Organizations	5
Plans, Studies and Documents	6
Capital Improvements Plans	6
Flood Insurance Data	6
Claims Data.....	6
Field Surveys and Site Visits	7
Review Drainage Patterns.....	7
Structures	7
Structure Type.....	7
Foundation Type.....	7
Condition of Structures.....	7
Notification	7
Annual Floodplain Notification	7
Annual Repetitive Loss Area Notification.....	8
Property Owners/Residents Notification	8
Public Participation and Involvement.....	8
Property Owner Response to Notifications.....	8
Conclusions.....	8
V. Mitigation Measures	8
Individual Mitigation Measures: What You Can Do.....	8
Know and Understand Your Flood Risk.....	8
Make a Disaster Preparedness Plan	9
Create Berms, Swales or Redirected Drainage.....	9
Install Local, Property-Specific Paving, Plantings and Catchment Basins	9
Acquisition.....	9
Elevate Your Structure.....	10
Dry Floodproof Your Structure	10
Wet Floodproof Your Building.....	10
Wet Floodproof Your Garage.....	10

Elevate Damage-Prone Components	10
Maintain Nearby Streams, Ditches, and Storm Drains	10
Correct Sanitary Sewer Backup Problems	11
Purchase and Maintain Flood Insurance	11
Repetitive Loss Area Mitigation Measures: What the City Can Do.....	11
VI. Funding	11
VII. Conclusions and Recommendations	12

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 #56

Crow Creek

E. 28th St. & S. Trenton Ave. Area

Overview

Repetitive Loss Area (RLA) #56 is located along the east bank of Crow Creek, just north of E. 31st St. bridge over the creek. The seven properties in the Repetitive Loss Area are upscale, two-story, single-family residences in Good to Excellent condition. The homes were built in the Gladebrook Second and Avalon Place additions between 1948 and 1999. One of the properties made two paid flood damage claims in 1998 and 2007 for a total of \$14,945. The cause of damage was overbank flooding and overland flow. There has been no flooding in the neighborhood since 2007. All of the properties are within the City's 100-year floodplain for Crow Creek and six are touched by the creek's floodway.

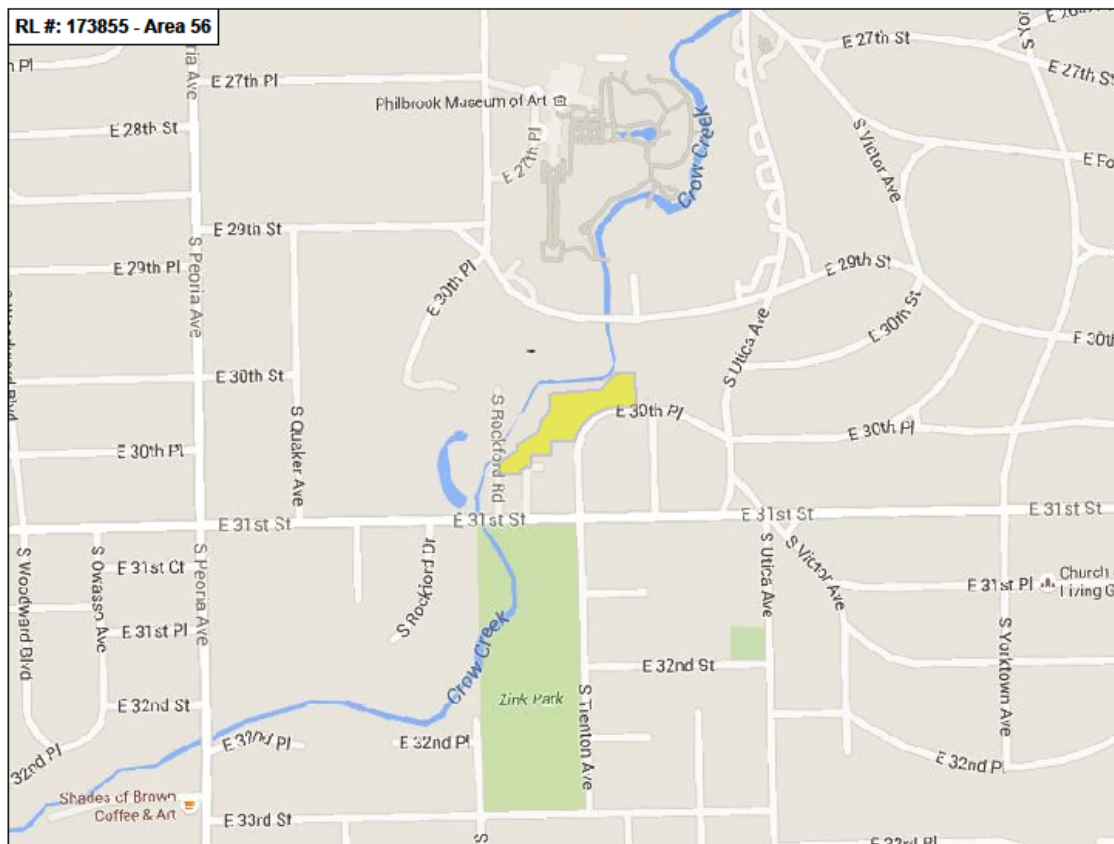
The general location of RLA #56 is shown on the map on page 2, and a more detailed aerial photo/topography map on page 4. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers and inlets system.

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 Crow 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.



RLA #56 is situated along the east bank of Crow Creek just north of E. 31st St., between S. Rockford Rd. on the west and S. Troost Ave. on the east.

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.

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 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 #56 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

Crow Creek is a 6.8-mile-long, left bank tributary to the Arkansas River that drains an area of 2 sq. miles in Tulsa, rising near 21st and S. Lewis and flowing generally west southwest to join the Arkansas River at near E. 33rd St. and Riverside Dr. The upper reach of the stream is carried in storm sewers, but emerges on the grounds of Cascia Hall Preparatory School,

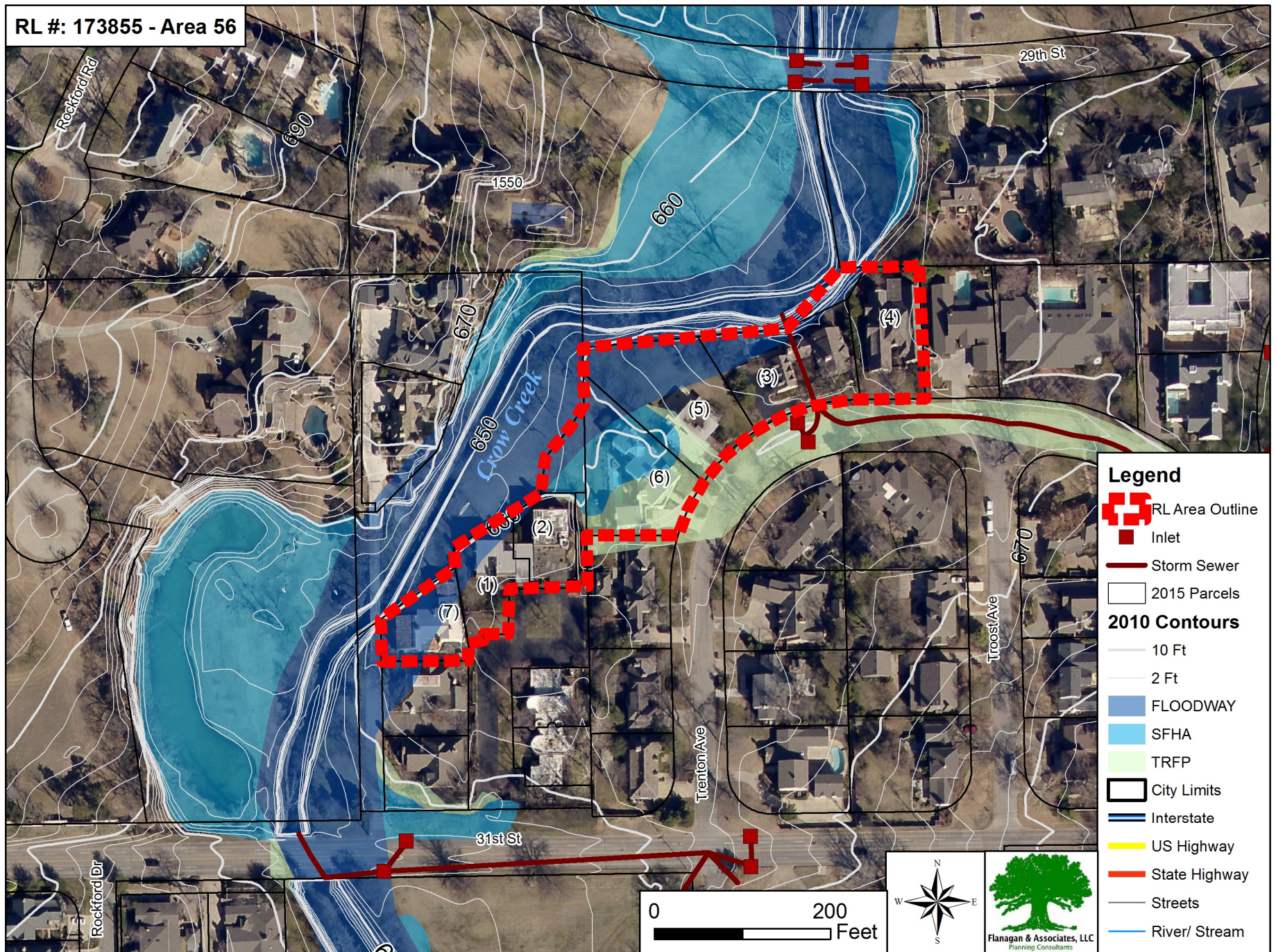
The seven single-family residences of RLA #56 are situated along the east bank of Crow Creek just north of E. 31st St. bridge, between S. Rockford Rd. and S. Troost Ave., at an elevation of between 660 and 668 feet. All of the properties are within the City of Tulsa’s 100-



Looking north on Crow Creek from the E. 31st St. Bridge

year floodplain for this reach of Crow Creek, and five are either within or touched by the creek’s floodway. The 100-year floodplain through the RLA reaches to the 657-ft. contour at the E. 31st St. bridge and to the 661-ft. contour at E. 30th Pl. All of the residences have their first-finished-floor elevations above the level of the 100-year flood.

RL #: 173855 - Area 56



Legend

- RL Area Outline
- Inlet
- Storm Sewer
- 2015 Parcels
- 2010 Contours**
 - 10 Ft
 - 2 Ft
- FLOODWAY
- SFHA
- TRFP
- City Limits
- Interstate
- US Highway
- State Highway
- Streets
- River/ Stream

III. History

Development

The homes in RLA #56 were constructed between 1984 and 1991 as part of the Gladebrook Second AMD Resubdivision and the Avalon Place addition. The homes in the RLA are all upscale, two-story structures in Good to Excellent condition.

Flooding

The flood events that resulted in two paid damage claims in RLA #56 occurred in October 1998 and September 2007. Damage was due to overbank flooding and overland flow.

Improvements

Improvements were made to the Crow Creek drainage in accordance with the *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 (LB0) that joins Crow Creek from the southeast in RLA #56. Although the improvements did not remove any of the properties in RLA #56 from the 100-year floodplain, the MDP determined that the first floor elevations of all the structures along this reach of the creek were above the level of the 100-year flood.

IV. Research and Analysis

The analysis of Repetitive Loss Area #56 was conducted by the Project Team through interviews with City officials, research into Engineering Services and Stormwater Drainage files, including the *Crow Creek, Swan Creek and Travis Park Master Drainage Plan*. The review also included study of the City's extensive flood history documentation, assessment of insurance claims, field trips to the RLA, interviews with home 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
- *Crow Creek, Swan Lake, Travis Park Master Drainage Plan, Interim Report*, CH2M Hill, March 1987
- *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
- *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 #56. There are storm sewer improvement and regional detention facilities on the existing CIPs for Crow Creek along with Master Drainage Plan recommendations that are not yet on the CIPs. None are presently funded.

Flood Insurance Data

Four of the six properties in the RLA currently carry 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.

One property in RLA #56 has made two paid flood damage claims totaling \$14,945—one in 1998 (\$1,907) and a second in 2007 (\$13,038). The individual claims averaged about \$6,500.

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 #56 to determine the situation and condition of the structures. Three of the seven properties in the RLA are in a gated community with restricted access. Visual analysis was verified by queries of Tulsa County Assessor data.

Structure Type.

The structures in RLA #56 are all upscale single-family residences.

Foundation Type.

The type of foundation was determined by query of Tulsa County Assessor records. Five of the homes are slab-on-grade, one is on a crawl space and another on a conventional foundation.

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 Average condition. These findings are summarized in the following table.

Properties in the RLA

Address	Structure Type	Foundation Type	Year Built	Condition
Property 1	Single Family Res.	Slab	1987	Excellent
Property 2	Single Family Res	Slab	1983	Good
Property 3	Single Family Res	Slab	1992	Very Good
Property 4	Single Family Res	Crawl Space	1992	Good Plus
Property 5	Single Family Res	Conventional	1948	Good
Property 6	Single Family Res	Slab	1995	Excellent
Property 7	Single Family Res	Slab	1999	Very Good

Notification

Annual Floodplain Notification. Each year, in March, 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 Area #56 are notified annually that their homes are in a Repetitive Loss Area, and are potentially subject to damage from overbank flooding on Crow Creek.

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 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. There have been three responses to notification from property owners and residents in RLA #56. One property owner said the property has not flooded since purchase in 1992, although the street floods occasionally; another said the property has not flooded since purchase in 2005; and a third said the property has not flooded since purchase in 2015.

Conclusions

Based on flood data, the *Crow Creek, Swan Creek, Travis Park Master Drainage Plan*, site surveys and feedback from residents and homeowners, the causes of damage have been overbank flooding and overland flow. All seven properties in the RLA are within the 100-year floodplain of Crow Creek and five are within or touched by the creek's floodway. However, all residences have their first-finished-floor elevations above the level of the 100-year flood.

V. Mitigation Measures

Overview

The Master Drainage Plan for this reach of Crow Creek identifies the enlargements of bridges at E. 31st St. and E. 30th St. and individual floodproofing as the most cost-effective solutions for flooding in RLA #56. 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.

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). Six of the seven properties in RLA #56 have elevation certificates. 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.

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 residence 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 #56.



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

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 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 (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 #56, demolition, acquisition and relocation may be the most feasible and cost-effective option. Given the quality of homes and the nature of the flood risk, acquisition is not a likely option for the structures in RLA #56.

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 homes in RLA #56 is a likely candidate for elevation.

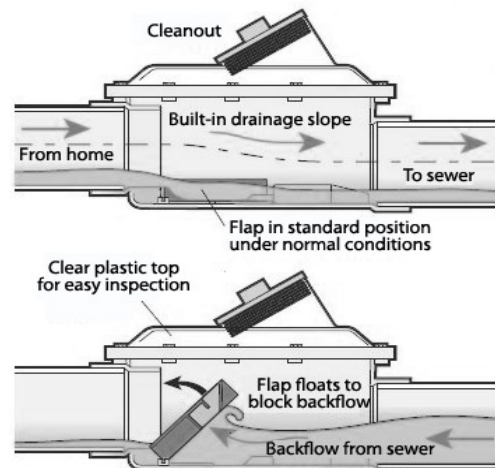
Dry Floodproof Your Structure. This can include actions that seal a structure and prevent floodwaters from entering. This method is best in areas where flood depths are no more than two or three feet. Buildings can be made watertight by sealing the walls with waterproof coatings, impermeable membranes, 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. Floodway blocking on Crow Creek will increase overbank flooding. Bar ditches and storm sewer inlets must be kept clear of debris. Residents and property owners should do their part in maintaining the channel. Do not attempt to clear debris from the creek during a flood event.



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

Correct Sanitary Sewer Backup Problems. Sanitary sewer backup can be a cause of home damage in low-lying, flood-prone areas like RLA #56. 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 are may be appropriate for RLA #56.

- Extend and/or improve the storm sewer system to better collect storm water runoff.
- Create overland flow path to allow better drainage of ponded water to the Creek.
- Acquire flood prone properties on a voluntary basis.
- Improve conveyance in the Creek to mitigate overbank flooding.
- Improve downstream hydraulic structures (bridges, culverts, etc.) to reduce backwater in the RLA.
- Construct upstream detention to reduce storm water runoff into the RLA.

VI. Funding

Due to the nature of the flooding problems, floodproofing remains the preferred option for the homes in RLA #56. The funding of improvements to individual properties—such as berms and flood walls—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 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 enlargement of the bridge at E. 31st St., all the properties in RLA #56 remain within the 100-year floodplain and six continue to be within or touched by the floodway. Due to the nature of the neighborhood and quality of the homes, and the fact that all properties have their first finished floor elevations above the level of the 100-year storm, and homeowners have rejected a proposal by the City to widen the channel through the neighborhood, acquisition and floodproofing are the best remaining options.

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 and overbank flooding. The City of Tulsa is ready to assist in this effort with professional advice.