Repetitive Loss Area # 59

Joe Creek West Branch Drainage
E. 49th St. & S. Columbia Pl. Area

August 17, 2017

Flanagan & Associates, LLC
Planning Consultants

SWIFT WATER RESOURCES ENGINEERING, LLC
9 East 4th Street • Suite 301 • Tulsa, OK 74103 918-582-1380 • swre@sbcglobal.net

Bill Robison, P.E., CFM
Engineering Services

CITY OF Tulsa
A New Kind of Energy.

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 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.

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

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

Contents

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:

City of Tulsa Elected Officials

G.T. Bynum	Mayor
Vanessa Hall Harper	City Council District 1
Jeannie Cue	City Council District 2
David Patrick	City Council District 3
Blake Ewing	City Council District 4
Karen Gilbert	City Council District 5
Connie Dodson	City Council District 6
Anna America	City Council District 7
Phil Lakin, Jr.	City Council District 8
Ben Kimbro	City Council District 9

Stormwater Drainage and Hazard Mitigation Advisory Board

Dr. Judith Finn, Esq., Chair	Attorney at Law
Lynn Scofield, P.E., Vice Chair	CH2M Hill Engineering
Kyle Brierly, Member	RotoRooter Plumbing
David Williams, Ph.D, P.E. Member	US Army Corps of Engineers
Steve Walman, Member	Walman Commercial Realtors
Mark Swiney, Esq.	Board Counsel

Tulsa Technical Advisory Committee

Paul D. Zachary, P.E, CFM	Director, Engineering Services
Matt Leichti, P.E.	Manager, Project Coordination
Bill Robison, P.E., CFM	Project Manager
Brad Jackson, P.E., CFM	Lead Engineer, Stormwater Design
Laura Hendrix, CFM	Floodplain Administrator
Angela King	Records Custodian

Consultants

Flanagan & Associates, LLC
Planning Consultants
3015 E. Skelly Drive, Suite 430
Tulsa, Oklahoma 74105
(918) 749-2696 www.rdflanagan.com

Ronald D. Flanagan, CFM, Principal
John D. Flanagan, Research, Writing
Tyler Brooks, GIS Specialist
Nancy K. Edwards, Administration

Swift Water Resources Engineering, LLC
Hydrologic Engineering Consultants
9 East 4th Street, Suite 301
Tulsa, Oklahoma 74103
(918) 582-1380 swre@sbcglobal.net

Mark Swift, P.E., CFM
Angela Swift, CPA, CEO

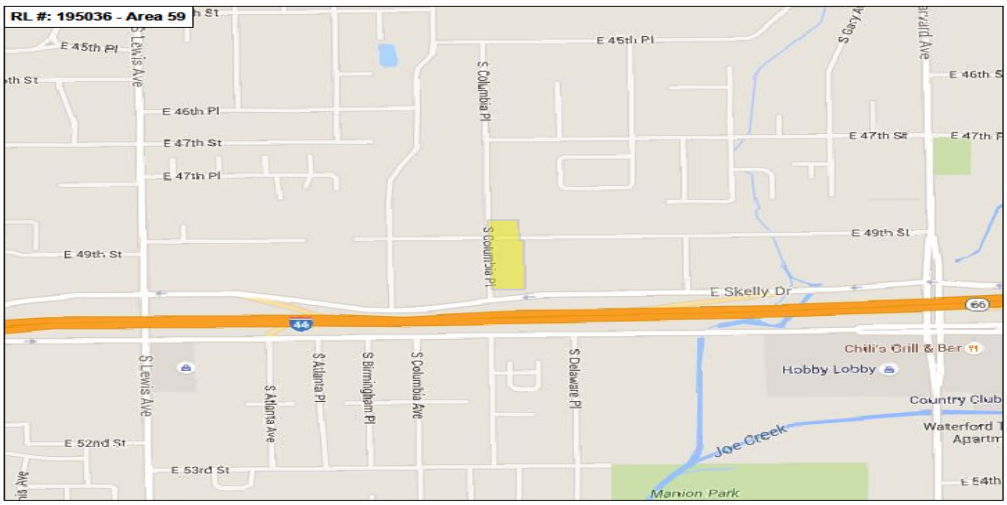
Repetitive Loss Area # 59

Joe Creek Drainage
E. 49th St. & S. Columbia Pl. Area

Overview

Repetitive Loss Area (RLA) #59 is located on the east side of S. Columbia Pl. from just beyond E. 49th St. on the north to E. Skelly Dr. (I-44) on the south. The RLA is in the Upper Joe Creek drainage about 5 miles above Joe Creek's junction with the Arkansas River. There are six properties in the RLA: five ranch-style single-family residences in Average to Good+ condition and one commercial building in Fair+ condition. Two of the residences are built on crawl spaces, two are slab-on-grade, and one has a conventional foundation. The commercial building is also slab-on-grade. The properties in the RLA are in a former drainage that sloped away to the southeast to join Upper Joe Creek at about 51st and College Ave. Subsequent construction of the Skelly Bypass (I-44) and a row of office buildings immediately south of the Repetitive Loss Property obscured the original drainage pattern. Runoff in the neighborhood is carried in bar ditches to stormwater drains that pass under Skelly Dr. and join Upper Joe Creek beneath I-44. In 2007 and 2010 heavy rains caused bar ditches to overfill and the resulting overland flow flooding generated two damage claims from one property (the local Repetitive Loss Property) totaling $11,688: The claim in 2010 was considerably higher than that in 2007.

The general location of RLA #59 is shown on the map below and on the more detailed photo/topography map on page 5. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers system.



RLA #59 is located on the east side of S. Columbia Pl. from just beyond E. 49th St. on the north to E. Skelly Dr. (I-44) on the south.

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 and Joe 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 to reduce 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 time 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 to find 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 residents and owners of the properties in all its RLAs, 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 is being done for the individual Repetitive Loss Properties.

It is important to note that most of the homes in a Repetitive Loss Area—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 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 #59 is shown on the aerial photo/topography map on page 5, below. The map identifies properties, County Assessor parcels, floodplains and the existing storm drainage system.

II. Location

Joe Creek is about 6.5 miles in length and drains an area of 13.7 sq. miles in southeast Tulsa. The creek has several tributary branches (East and West Joe Creek, Little Joe and South Joe) that converge near E. 53rd and S. Evanston Ave., at Manion Park, just north of Eisenhower International School, to form lower Joe Creek mainstem. The mainstem and its tributaries have been channelized through much of their lengths.

RLA #59 is about ¼-mile west of where the West Branch of Joe Creek emerges from underground and passes beneath Skelly Dr. and I-44.

The West Branch of Upper Joe Creek, itself, rises near E. 23rd St. and S. Harvard Ave. and flows generally south to join Joe Creek mainstem at Manion Park, a distance of about 3 miles, almost all of which is underground. The creek surfaces at E. 28th St. and S. Florence Ave. as the source of a neighborhood amenity lake, and then is again carried through pipes to E. 49th St., where it merges with the East Branch. The West Branch of Joe Creek is channelized from E. 49th St. south to Manion Park and from there downstream to the Arkansas River.

RLA #59 is about one-quarter mile west of where Upper Joe Creek passes under Skelly Dr. and I-44. Runoff from the RLA is carried southeast through bar ditches and surface culverts until it passes beneath Skelly Dr., then flows eastward along the north side of I-44, where it joins Upper Joe Creek via underground storm sewers. Altogether, it is 3.9 miles from RLA #59 to the Arkansas River.

III. History

Development

In its natural, pre-construction condition the land on which RLA #59 is situated sloped to the southeast, and runoff found its way to Upper Joe Creek near what would have been E. 51st St. and College Ave. Construction of homes in the area in the late 1940s and early

1950s, the building of Skelly Bypass (now I-44) in 1956, and then a commercial complex along Skelly Dr. in 1971 filled in the natural drainage, replacing it with bar ditches, surface culverts and storm sewers beneath Skelly Dr. and I-44.

Flooding

There was significant flooding on Joe Creek in October 1959, May 10-11, 1970 (Mothers Day flood), June 7-9, 1974, May 31, 1976 (Memorial Day flood), June 21, 1979, June 17, 1980, May 27, 1984 (another Memorial Day flood), August 11, 1992, May 7, 1993, July 1994, May 6, 2000, May 8, 2007, and May 20, 2010. According to newspaper reports, flooding was particularly bad on Joe Creek in 1974 and 1976, although not necessarily along this reach. The storms that resulted in the two damage claims in RLA #59 totaling $11,688 occurred in 2007 and 2010.

The greatest contribution to flooding in RLA #59 are the general slope of the land to the southeast, the bar ditches and driveway culverts along S. Columbia Pl. and E. 49th St., the low-lying building lots (some beneath street level), the lack of curbing, the slightly raised parking and building lot at the south end of the RLA, and the slab-on-grade construction of some of the structures. In particular, the bar ditches and driveway culverts often suffer debris blockage that often results in yard and structure flooding.

Clogged bar ditches, below street level construction and slab-on-grade buildings contribute to flooding in RLA #59.

Improvements

Improvements to the Joe Creek channel by the City and the US Army Corps of Engineers between 1978 and 1981 improved drainage along Joe Creek and its tributaries. The City also enlarged the storm sewer system within the Joe Creek drainage in the 1990s to solve chronic storm sewer backup problems at numerous locations in the basin. The expansion of I-44 in 2010-2012 increased drainage beneath the freeway and reduced backup flooding in the area.

IV. Research and Analysis

The analysis of Repetitive Loss Area #59 was conducted by the Project Team through interviews with City officials, research into Engineering Services and Stormwater Drainage files, including the Joe Creek Master Drainage Plan, review 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 owner and residents soliciting information about prior and existing flooding issues, if any.


RL #: 195036 - Area 59
700
680
49th St
Columbia Pl
Skelly Dr
44
(1)
(2)
(3)
(4)
(5)
(6)
0
200
Feet
N
W
E
S
Flanagan & Associates, LLC
Planning Consultants
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

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:

- *Flood Insurance Rate Map*, City of Tulsa, October 16, 2012
- *Regulatory Floodplain Map Atlas*, Tulsa Engineering Services, October, 2016
- *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
- *Joe Creek Flood Survey and Study*, Owen, Mansur & Steele, 1955
- *Joe Creek East and West Branches Master Drainage Plan, Interim Report*, W.R. Holway & Assoc., March 1988
- *Joe Creek East and West Branch Master Drainage Plan, Final Report*, W.R. Holway & Assoc., 1989.
- *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 # 16. There are storm sewer

improvement and regional detention facilities on the existing CIPs for Little Joe Creek along with Master Drainage Plan recommendations that are not yet on the CIPs. None are presently funded.

Flood Insurance Data

None of the six properties in the RLA currently carries flood insurance.

Claims Data.

Between 2007 and 2010 clogged/inadequate bar ditches, overland flow and low-lying, slab-on-grade structures generated two damage claims from one property totaling $11,688. There was one claim in 2007 and one in 2010. On both occasions, heavy rain resulted in widespread street flooding in South Tulsa and in the Joe Creek basin. 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.

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 flood 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 RLA #59 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 #59 are five single-family residences and one commercial office building.

Foundation Type.

The types of foundations were determined by field investigation and query of Tulsa County Assessor records. Two of the single-family residences are built on crawl spaces, two are slab-on-grade, and one is on a conventional foundation. The commercial building is also slab-on-grade.

Condition of Structures.

The condition of the structures in the RLA was determined by field investigation and a search of the County Assessor's records. The single-family residences were in Average to

Good+ condition and the commercial building in Fair+ condition. These findings are summarized in the following table.

Properties in the RLA

Address	Structure Type	Foundation Type	Year Built	Condition
Property 1	Residential	Crawl Space	1948	Good
Property 2	Commercial	Slab	1971	Fair+
Property 3	Residential	Slab	1979	Good
Property 4	Residential	Crawl Space	1930	Average
Property 5	Residential	Conventional	1951	Good+
Property 6	Residential	Slab	1983	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, businesses and families, including the purchase of flood insurance.

Annual Repetitive Loss Area Notification. Residents and property owners in Repetitive Loss Area #59 are notified annually that their properties are located in a Repetitive Loss Area, and are potentially subject to flood damage from overland flow and bar ditch backup.

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 was one response from one property owner in the RLA that there has been one flooding event since 1993, which was caused by inadequate street drainage and overland flow.

Conclusions

There are six properties—five single-family residences and one commercial building—in RLA #59. The RLA is in the Upper Joe Creek drainage, and is about one-quarter mile west of the creek, which passes beneath Skelly Dr. and I-44 just south of E. 49th St. and S. College Ave. There is one Repetitive Loss Property in the RLA, which has made flood damage claims in 2007 and 2010 for a total of $11,688. The causes of flooding are local drainage issues: clogged or inadequate bar ditches and culverts, lower than street level structures, lack of curbing, overland flow to the southeast, and the slab-on-grade foundation of the commercial structure and some of the residences.

V. Mitigation Measures

Overview

The Master Drainage Plan for Joe Creek identifies the most cost-effective structural solutions (channel improvements, enlarged inlets and storm sewers, stormwater detention ponds) for the area. The Non-Structural Plan identifies buildings where a structural solution is not cost-effective, and acquisition is the recommended solution. There are presently no funded Capital Improvement Projects for future channel improvements or detention ponds in this area. The *Joe Creek Master Drainage Plan* is in the process of being updated, and additional structural and non-structural solutions may be identified.

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, 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). 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 structures using such things as 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 (918) 596-7777. Berms or redirected drainage may be the most feasible solution for areas with flooding due to overland flow, as in RLA #59.

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 have 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.

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

Acquisition is usually not feasible or cost effective for areas of shallow flooding, as in RLA #59. 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 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 structures in RLA #59 is a 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 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.

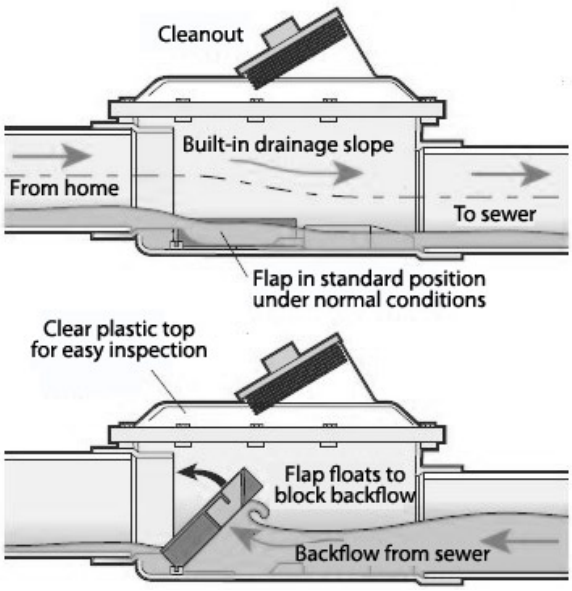
Wet Floodproof Your Garage. The garage, with its slab-on-grade construction, is one of the most vulnerable areas of your home to overland flow flooding. Remove, relocate, elevate, or otherwise protect items that can be damaged from flooding.

Elevate Damage-Prone Components. Critical items such as furnace or air conditioning units should be protected. 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. Although this is not a major problem for the West Branch of Joe Creek in this reach, debris can—and has—blocked bar ditches and storm sewer inlets in RLA #59. 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.

Correct Sanitary Sewer Backup Problems. Sanitary sewer backup can be a problem in low-lying, flood-prone areas like RLA #59. The installation of backflow prevention valves on sanitary sewer lines is 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.



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

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 appropriate for RLA #59.

- Create overland flow path to allow better drainage of ponded water to the Creek.
- Acquire flood prone properties on a voluntary basis.
- Improve roadside ditches and drainage structures to improve drainage.

VI. Funding

Due to the nature of the flooding problems and the localized, minor damages involved in RLA #59, the funding of needed individual improvements 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

RLA #59 is situated in a gentle, shallow swale that in its natural condition drained southeast into the West Branch of Upper Joe Creek. Home and street construction, the building of the Skelly Bypass (I-44), and the development of a line of office buildings along Skelly Dr., altered the original drainage pattern of the neighborhood. In addition, several properties in the RLA have first finished floor elevations that are lower than the roadway—which can be a problem for slab-on-grade structures along streets that have bar ditches and no protective curbing. This is clearly the issue for the Repetitive Loss Property in RLA #59, and a potential problem for other properties in the RLA.

Property owners are encouraged to maintain flood insurance. The City of Tulsa is a Community Rating System (CRS) Class II Community, and 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 flooding. The City of Tulsa is ready to assist in this effort with professional advice.