



CITY OF
Tulsa
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Repetitive Loss Area # 27

Old Joe Creek, Tributary 3
E. 71st Pl. & S. Columbia Ave. Area



August 17, 2017



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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 an 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

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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 # 27

Old Joe Creek, Tributary 3 E. 71st Pl. & S. Columbia Ave. Area

Overview

Repetitive Loss Area (RLA) #27 is located in the Woodridge Subdivision in the area of E. 71st Pl. and S. Columbia Ave. The neighborhood is at the beginning of the Old Joe Creek drainage (Tributary 3) between E. 71st and E. 72nd St., and from S. Birmingham Ave. to S. Columbia Ave. The RLA is about 1.0 mile above Tributary 3's junction with the mainstem of Old Joe Creek, at 78th and S. Lewis Ave., and 1.7 miles above Old Joe Creek's junction with the Arkansas River. There are eleven up-scale, slab-on-grade, single-family residences in the RLA, built between 1974 and 1980. The homes are in Average to Good+ condition. Between 1979 and 1997 overland flow, storm sewer backup and local site drainage problems resulted in nine flood damage claims from three properties totaling \$21,739. Seven of the nine claims were from the local Repetitive Loss Property and amounted to \$15,707 (or 72% of the claims). Two other properties made single claims for a total of \$6,032. The claims averaged about \$2,400. The southernmost property of the RLA is touched by Tulsa's Regulatory Floodplain, in an area of shallow flooding. Comments from property owners have primarily attributed local flooding to new home construction and other land changes on neighboring or nearby properties.

The homes in RLA #27 were constructed before any channelization improvements had been made along either Fred or Joe creeks. The properties of the RLA are situated in the headwaters of Tributary 3 at an elevation of between 680 and 700 feet. The land slopes to the southwest from the 750-ft. elevation contour around E. 69th St. and S. Delaware Pl. in the north and 72nd and Evanston Ave. in the east. The drainage from the east passes through Rockwood Hills Pond and then along the southern boundary of RLA #27. Before development, runoff from this area drained into Old Joe Creek near Wheeling Ave. and E. 75th St. With the channelization of Joe Creek in the late 1980s, lower Joe Creek was separated from Old Joe Creek to minimize flooding in the lower reaches of both streams. Old Joe Tributary 1 was routed south along what would be Yorktown Ave. to join Fred Creek at about 78th St., behind the Walmart Superstore. Runoff from the Woodridge Addition is now carried through storm sewers southwest to E. 75th and S. Lewis Ave., then south along Lewis until about E. 77th St., where it emerges into a grass-lined channel south of Billy Joe Daugherty Drive.

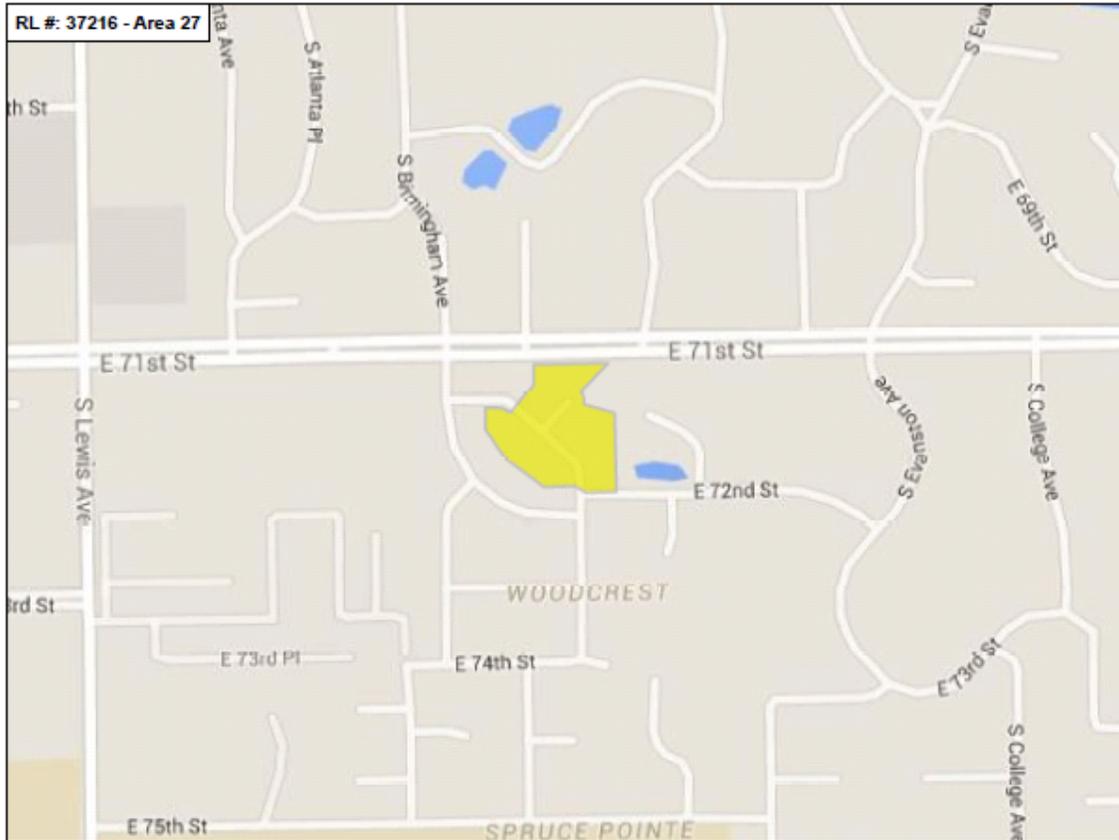
The general location of RLA #27 is shown on the map on Page 2 and on the more detailed photo/topography map on Page 4. The detailed map identifies residential properties, County Assessor parcels, floodplains and the existing storm sewers system.

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 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



RLA #27 is located between E. 71st St. and E. 72nd St., and from about Birmingham Ave. on the west to Columbia Ave. on the east.

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.

Properties that flood repeatedly—known as “repetitive loss properties,” have been a particular problem for the program, in that they make up only 1 percent of insured properties, yet 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.

A requirements of the CRS is that communities identify all repetitive loss properties in their jurisdiction and work with the owners 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 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 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 #27 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 drainage systems.

II. Location

RLA #27 is situated in the Old Joe Creek drainage basin. Old Joe Creek is about 4.5 miles in length and drains an area of 3.76 sq. miles in southeast Tulsa. The creek has several tributary branches: Old Joe Tributaries 2, 3 and 4, and Harvard, West, East, Southwood and Richmond tributaries. Old Joe Creek Tributary 3, which drains RLA #27, rises in the high ground around E. 69th and S. Delaware Pl. and 72nd and S. Evanston Ave. and flows southwest through storm sewers to about E. 75th and S. Lewis Ave., where it turns south along Lewis to emerge into a grass-lined channel just south of Billy Joe Daugherty Drive. Repetitive Loss Area #27 is located in the Woodridge Subdivision, between E. 71st and E. 72nd St., and from S. Birmingham Ave. to S. Columbia Ave.

RL #: 37216 - Area 27



III. History

Development

The homes in RLA #27 were constructed between 1974 and 1980 before any channelization improvements had been made along Joe Creek. The properties of RLA #27 are located on high ground near the origin of what used to be Old Joe Tributary 1, where the land slopes away to the southwest from the 750-ft. elevation contour around E. 69th St. and S. Delaware Pl. and E. 72nd and S. Evanston Ave. The original drainage swale passed to the south of E. 72nd St. and S. Columbia Ave. carrying runoff into Old Joe Creek Tributary 1, just west of S. Lewis and E. 75th St. With the development of Woodridge and Rockwood Hills subdivisions, runoff was subsequently carried through Rockwood Hills Pond and then through storm sewers to 77th and S. Lewis, where it emptied into an open channel on the campus of Victory Christian Church. The channelization of Joe Creek in the late 1980s separated the Fred Creek and Joe Creek drainage basins in order to minimize flooding in the lower reaches of both streams

Flooding

Between 1979 and 1997 overland flow, storm sewer backup and local site drainage problems resulted in nine flood damage claims from three properties totaling \$21,739. Seven of the nine claims were from the local Repetitive Loss Property and amounted to \$15,707 (or 72% of the claims). Two other properties made single claims for a total of \$6,032. The claims averaged about \$2,400. Comments from property owners have attributed local flooding to inadequate storm sewers, new home construction and other land changes on neighboring or nearby properties.

Improvements

Improvements to Joe and Fred creeks and their tributaries by the City and the US Army Corps of Engineers between 1978 and 1981 largely solved the riverine flooding problems along both creeks, and removed many of their flood-prone reaches from both FEMA's SFHA and the City's Regulatory Floodplain. Expansion of the city's storm sewer network during the 1990s eliminated much of the overland flow and sewer backup flooding that used to occur after heavy rains in the Joe and Fred creek basins, including in RLA #27. The culverts that carry runoff from E. 71st St. on the north side of RLA #27 were enlarged and new storm sewers installed on 71st Pl., Columbia Ave., Birmingham Ave., and along 72nd St. The storm sewers on 71st St. are specifically designed to reduce street and overland flow flooding immediately behind the Repetitive Loss Property in RLA #27. These flood prevention actions by the City appear to have resolved most, if not all, of the causes of flooding in RLA #27. Nevertheless, given the contours of the terrain, individual residential landscaping and the slab on grade foundations of the homes there is likely to be some minor overland flow flooding should the basin experience extremely heavy rainfall events.

IV. Research and Analysis

The analysis of Repetitive Loss Area #27 was conducted by the Project Team through interviews with City officials, research into Engineering Services and Stormwater Drainage files, including the Fred and Joe Creek Master Drainage Plans, 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 the residences soliciting information about prior and existing flooding issues, if any.

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*
- *Fred Creek Master Drainage Plan, Interim Report*, September 1987
- *Fred Creek Basin Drainage Study Final Report*, August 1988
- 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 # 27.

Flood Insurance Data

None of the properties in RLA #27 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 property nor specific claim data are detailed in this Plan.

Claims Data.

Of the 11 properties in RLA #27, three properties have made nine claims for a total of \$21,739. One property in the RLA, the Repetitive Loss Property, has made seven flood damage claims for a total of \$15,707—in 1979, 1980, 1982, 1987, 1994, 1995, and 1997. Two other properties made single claims in 1982 for \$1,168 and \$4,864. The nine claims averaged about \$2,400 each.

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 a number of visits to RLA #27 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 #27 are all single-family residences.

Foundation Type.

The type of foundation was determined by field investigation and query of Tulsa County Assessor records. All 11 residences in RLA #27 are built on slab-on-grade foundations.

Condition of Structures.

The condition of the residences in the RLA was determined by field investigation and a search of the County Assessor’s records. The structures were all considered to be in Average to Good+ 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	1977	Good
Property 2	Single Family Res	Slab	1977	Good

Address	Structure Type	Foundation Type	Year Built	Condition
Property 3	Single Family Res	Slab	1976	Average
Property 4	Single Family Res	Slab	1976	Good
Property 5	Single Family Res.	Slab	1976	Good
Property 6	Single Family Res	Slab	1980	Good
Property 7	Single Family Res	Slab	1976	Good
Property 8	Single Family Res	Slab	1976	Good
Property 9	Single Family Res	Slab	1974	Average+
Property 10	Single Family Res	Slab	1975	Good
Property 11	Single Family Res	Slab	1975	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 #27 are notified annually that their homes are located in a Repetitive Loss Area, and are potentially subject to flood damage from overland flow and storm sewer back-up.

Property Owners/Residents Notification. 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 Study/Plan, receive their input, and discuss possible mitigation measures.

Property Owner Response to Notifications. The Repetitive Loss Property in RLA #27 is a slab-on-grade structure that received flood damage on seven occasions, largely from street flooding, storm sewer backup and overland flow. The recommended action was to add storm drains along E. 71st St., 71st Pl., Columbia Ave. and 72nd St.

Conclusions

Flooding in RLA #27 has been the result of overland flow, storm sewer backup, street flooding, new home construction, local site drainage issues and the slab-on-grade construction of the homes.

None of the residences in the RLA is within FEMA's SFHA or the City of Tulsa's Regulatory Floodplain (TRFP), although the edge of one property is touched by an area of shallow flooding according to the TRFP. All of the structures in the RLA have slab-on-grade foundations and are between 680 and 700 elevation. The surrounding land rises to the north and east to an elevation of between 750 and 790 feet. The old drainage ways from the high ground to the north and east passed through the area now occupied by RLA #27. With development, runoff has been carried through storm sewers. Property owners have complained of new home construction, inadequate storm sewers, and other site drainage changes that have resulted in local flooding. Landscaping improvements and

additional storm sewers added by the City in the 1990s have largely solved flooding problems in the neighborhood. Based on flood data, site surveys and feedback from residents and homeowners, the remaining drainage problems are due to the slab-on-grade construction of the homes and overland flow.

V. Mitigation Measures

Overview

The Master Drainage Plan for this reach of Old 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.

Individual Flood Protection 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. Dry floodproofing is not recommended for residential structures.

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 give recommendations. 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.



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 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. Contact the Customer Care Center at (918) 596-2100. This may be the most feasible solution for areas with flooding due to overland flow, as in RLA #27.

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.

Acquisition is usually not feasible or cost effective for areas of shallow flooding, as in RLA #27. 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 homes in RLA #27 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 elevated to avoid flood damage. This should be done for components that are in the wet-floodproofed area of the building as well as for units that are outside of the structure but subject to shallow flooding.

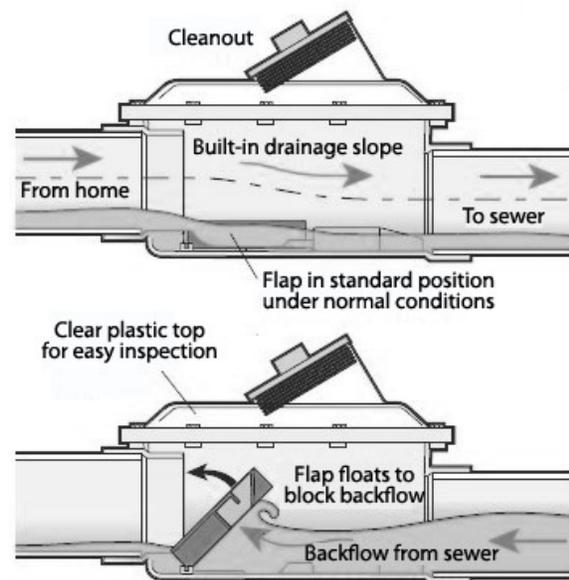
Maintain Nearby Streams, Ditches, and Storm Drains: Local flooding can often be caused by brush and other debris blocking drainage ways and culverts. Drainage ways must be regularly inspected and kept free of blockage. Residents and property owners should do their part in keeping inlets and culverts clear of brush and debris.

Correct Sanitary Sewer Backup

Problems. Sanitary sewer backup can be a problem in low-lying, flood-prone areas like RLA #27. The installation of backflow prevention valves in 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 #27.

- Extend and/or improve the storm sewer system to better collect storm water runoff.
- Create berms or swales to direct runoff away from residential properties.
- Acquire flood prone properties on a voluntary basis.

VI. Funding

Due to the nature of the flooding problems and the localized, minor damages involved in RLA #27, the funding of needed improvements to individual properties—such as berms and floodproofing—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

The addition of storm sewers by the City of Tulsa in the 1990s along E. 71st St., S. Columbia Ave. and E. 72nd St., have largely reduced the storm sewer backup and street flooding as a source of flood damage in RLA #27. There have been no flood damage claims from the RLA since 1997. Overland flow, local site drainage and landscape modifications, along with the slab-on-grade construction of the homes, remain the major causes of flooding. Only one property in the RLA is touched by an area of shallow flooding, according to the City's Regulatory Floodplain. Due to the slab-on-grade construction of the homes, property owners are encouraged to keep drainage ways and culvert free of debris and maintain flood insurance on both their homes and contents. 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.