



CITY OF
Tulsa
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Repetitive Loss Area # 8

**Fred Creek
E. 69th Pl. & S. Knoxville Pl. 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 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

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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 # 8

Fred Creek E. 69th Pl. & S. Knoxville Pl. Area

Overview

Repetitive Loss Area #8 is comprised of eight properties in the Vienna Woods and Southern Hills 3rd Additions. The neighborhood is situated in the upper reach of Fred Creek's West Tributary, along S. Knoxville Ave. between E. 67th Pl. and E. 69th Pl. The RLA is ¼-mile above the tributary's junction with Fred Creek's mainstem, and about 3 miles above where the creek joins the Arkansas River. Three of the original eight homes in the RLA made 11 flood damage claims between 1979 and 1986 for a total of \$91,664. The property damage was due to overland flow and backup from an undersized culvert beneath E. 69th Pl. The paid claims averaged about \$10,000, as two of the 11 claims were not paid. There were two Repetitive Loss Properties in the RLA. The most frequently and heavily damaged of the two was purchased by the City in 1990, removed, and the property turned into a neighborhood park. The remaining seven properties are upscale single-family, slab-on-grade, ranch-style homes built between 1969 and 1973 and currently in Good to Very Good condition.

Fred Creek's West Tributary flows in an open channel from north to south along the back property lines between S. Knoxville Pl. and S. Louisville Ave., from about E. 67th St. and S. Marion Ave. to E. 69th Pl. The stream enters a storm sewer behind the Repetitive Loss Property that has been removed and is now a park, northeast corner of S. Knoxville Pl. and E. 69th Pl.

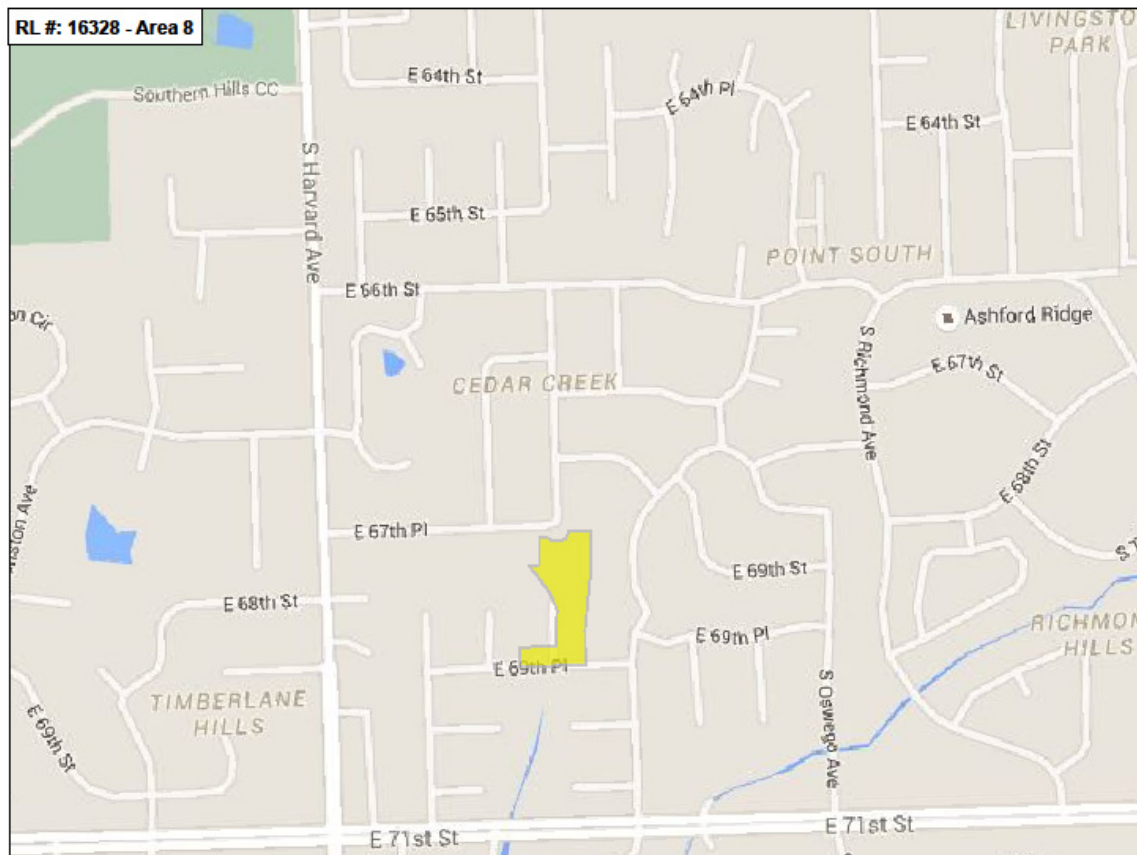
The most often damaged Repetitive Loss Property made four successful claims for \$50,994, while the other repeatedly damaged home made three claims totaling \$22,378. A third home made two successful claims for \$18,292. The flooding occurred on June 20, 1979, June 16, 1980, April 19, 1981, May 18, 1982, May 27, 1984, and September 30, 1986.

The general location of RLA #8 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, Joe and Fred creeks. Because of the city's climate and the broad floodplains along these creeks, this growth brought with it an increased risk of flooding. And indeed, by the mid-1980s floods were occurring almost yearly and flooding had become Tulsa's most destructive natural hazard. One researcher at the time declared Tulsa "the most flood-prone community in the nation."

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



RLA #8 is located near the headwaters of the West Tributary of Fred Creek, on S. Knoxville Ave. and Knoxville Pl. between E. 67th Pl. and E. 69th Pl.

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 per 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 an “RLA.” The City is required to contact the owners of the properties in the RLA, inform them that they are located in an area subject to flooding, and develop a plan for mitigating or eliminating flooding in the area, much as has been done for the individual repetitive loss properties.

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

The location of RLA #8 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 system.

II. Location

The Fred Creek is a 4.5-mile-long, left-bank tributary to the Arkansas River that drains 3.76-square-miles of southeast Tulsa. The creek rises in five principal branches at about the 750-ft. contour in the south Tulsa hills, near E. 69th St. and S. Columbia Ave., E. 67th and S. Florence Ave., E. 66th and S. Marion Ave., E. 68th and S. Yale Ave., and E. 73rd and Yale Ave. The stream flows generally to the south and west through fully developed neighborhoods and across the



West Tributary to Fred Creek, looking downstream from E. 67th St.

RL #: 16328 - Area 8



campus of Oral Roberts University, to join the Arkansas River at about E. 83rd and Riverside Dr. The creek has been channelized through much of its lower reaches. Four Old Joe Creek Tributaries have been rerouted to join Fred Creek near E. 78th and S. Lewis Ave., and Fred Creek's mainstem itself has been re-channeled to meet the Arkansas River at about E. 83rd St., rather than following its original course to join the river near E. 91st St.

Repetitive Loss Area #8 is situated in the upper reach of Fred Creek's West Tributary, along S. Knoxville Ave. between E. 67th Pl. and E. 69th Pl. The RLA is ¼-mile above the tributary's junction with Fred Creek's mainstem, and about 3 miles above where the stream joins the Arkansas River.

West Tributary flows in an open channel from north to south through RLA #8, from about E. 67th St. and S. Marion Ave. to E. 69th Pl., along the back property lines between S. Knoxville Pl. and S. Louisville Ave. The stream enters a storm sewer just north of E. 69th Pl., behind a former Repetitive Loss Property that is now a neighborhood park.

III. History

Development

The eight properties in RLA #8 were developed between 1969 and 1973 as parts of the Vienna Woods and Southern Hills 3rd additions. There are currently seven residences in the RLA, all of them upscale single-family, ranch-style structures with on slab-on-grade foundations, and in Good to Very Good condition. The West Tributary of Fred Creek flows through an open channel on the east side of the RLA, along the back property lines between S. Knoxville Pl. and S. Louisville Ave.

Flooding

Flood damage in the RLA has been the result of overland flow and backup flooding along the West Tributary, primarily due to an undersized culvert beneath E. 69th Pl. The three properties that have submitted damage claims are along the west bank of this tributary, immediately upstream from 69th Pl. The six flood events that generated the RLA's nine paid claims occurred on June 20, 1979, June 16, 1980, April 19, 1981, May 18, 1982, May 27, 1984, and September 30, 1986. Two of the residences were Repetitive Loss Properties, one of which made four paid claims for a total of \$50,994 and the other three paid claims for \$22,378.

Improvements

In 1990 the City purchased and removed the most frequently and heavily damaged Repetitive Loss Property in RLA #8 and turned it into a neighborhood park.

On the recommendations of the Fred Creek Master Drainage Plan, the City replaced the twin 42-inch RCP culverts at 69th Pl. with a 12-ft. x 6-ft. RCB, and placed a 5-ft. x 5-ft. RCB in parallel with the existing twin 54-inch RCP storm sewer. These actions appear to have solved the backup flooding behind E. 69th Pl. Although the streets in the neighborhood will continue to be overtopped during 100-year events, it is not anticipated that such flooding will impact any remaining structures.

IV. Research and Analysis

The analysis of Repetitive Loss Area #8 was conducted by the Project Team through interviews with City officials, research into Engineering Services and Stormwater Drainage files, including the Fred 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 the residences soliciting information about prior and existing flooding issues, if any. The Repetitive Loss Properties in RLA #8 were two slab-on-grade structures that were damaged on six occasions because of backup from overland flow and an undersized culvert beneath E. 69th Pl.

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
- *Fred Creek Master Drainage Plan, Interim Report*, September 1987
- *Fred Creek Master Drainage Study, Final Report*, August 1988
- *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 # 8. There are storm sewer improvement and regional detention facilities on the existing CIPs for Fred Creek along with Master Drainage Plan recommendations that are not yet on the CIPs. None are presently funded.

Flood Insurance Data

One property in the RLA currently carries flood insurance. Because the Privacy Act of 1974 (5 USC 522a) restricts the release of flood insurance policy and claims data to the public, neither the Repetitive Loss property nor specific-property claim data are detailed in this Plan.

Claims Data.

Three properties in RLA #8 have made a total of 11 flood damage claims, nine of which were paid, for a total of \$91,664. The floods for the paid claims occurred in 1979 (three claims for a total of \$32,626), 1980 (two claims for \$5,686), 1981 (one claim for \$41,212), 1982 (one claim for \$8,210), 1984 (one claim for \$692), and 1986 (one claim for \$3,638). The nine paid claims averaged about \$10,000 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 #8 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 #8 are all single-family residences.

Foundation Type.

The type of foundation was determined by field investigation and query of Tulsa County Assessor records. All residences in RLA #8 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 Good to Very 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	1973	Very Good
Property 2	Single Family Res	Slab	1973	Good
Property 3	Single Family Res	Slab	1973	Good
Property 4	Single Family Res	Slab	1967	Good
Property 5	Single Family Res.	Slab	1971	Good
Property 6	Single Family Res	Slab	1969	Good
Property 7	City Park		1990	Avg
Property 8	Single Family Res	Slab	1969	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 #8 are notified annually that their homes are located in a Repetitive Loss Area, and are potentially subject to flood damage from overland flow and 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 Repetitive Loss Area Analysis Study/Plan, receive their input, and discuss possible mitigation measures.

Property Owner Response to Notifications. There have been two comments concerning flooding from property owners in the RLA. One resident reported that there had been no flooding at the property since its purchase in 1999, and the other that there had been no flooding since moving into the home in 2012.

Conclusions

Flooding in RLA #8 has been the result of overland flow and overbank flooding from the West Tributary to Fred Creek due to an undersized culvert beneath E. 69th Pl. All of the structures in the RLA have slab-on-grade foundations and are at between 690 and 716 feet elevation. Three properties have made nine paid claims for a total of \$91,664. There

were originally two Repetitive Loss Properties in the area. The most frequently and heavily damaged of the two was removed in 1990 and the site turned into a neighborhood park. Subsequent channel improvements, culvert enlargement and the addition of a parallel storm sewer have solved the overbank flooding along this reach of the West Tributary and removed the neighborhood from FEMA's 100-year floodplain. Nevertheless, three properties still remain within or touched by the Tulsa's Regulatory Floodplain, which is more stringent than FEMA's SFHA. 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 potential overland flow and street flooding during 100-year storms.

V. Mitigation Measures

Overview

The Master Drainage Plan for this reach of the West Tributary identifies the most cost-effective structural solutions, while the Non-Structural Plan identifies buildings where structural measures are not cost-effective, and acquisition is the recommended solution. As noted above, The culvert beneath E. 69th Pl. was enlarged, a parallel storm sewer installed and the most frequently damaged property acquired by the City and removed.

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, 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). 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 people living in flood hazard zones to have 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 #8.



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 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 #8. If a property is located in a FEMA Floodway or Special Flood Hazard Area, demolition, acquisition and relocation may be feasible and cost-effective—this was done for one property in RLA #8.

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 #8 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.

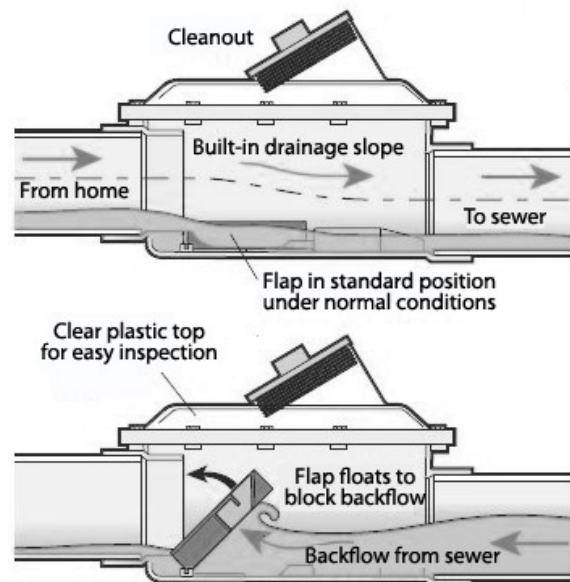
Wet Floodproof Your Garage. The garage, with its slab-on-grade construction, is one of the most vulnerable areas of your home to overland flow flooding. Remove, relocate, elevate, or otherwise protect items that can be damaged from flooding.

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. Channel blocking by limbs, grass cuttings and other debris in the largely natural course of the West Tributary through RLA #8 could contribute to future flooding. The channel must be regularly inspected and kept free of blockage. 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 #8. The installation of backflow prevention valves in 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



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

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 appropriate for RLA #8.

- Extend and/or improve the storm sewer system to better collect storm water runoff.
- Acquire flood prone properties on a voluntary basis.
- Improve conveyance of Creek to mitigate overbank flooding.

VI. Funding

Due to the nature of the flooding problems and the localized, minor damages involved in RLA #8, 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

Due to channel improvements and the installation of a parallel storm sewer and a larger culvert under E. 69th Pl., overbank flooding along this stretch of the West Tributary is no longer a major problem. Three properties in RLA #8 remain within or touched by an area of shallow flooding, according to the City's Regulatory Floodplain. The *Fred Creek*

Master Drainage Plan cautions that some street and yard flooding could continue to occur during storms of a 100-year magnitude or greater—particularly as there is a low spot in 69th Pl. just to the west of the intersection with Knoxville Pl. Consequently, slab-on-grade properties in the neighborhood will continue to be at some risk of flood damage.

Homeowners 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 advice.