



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

## Repetitive Loss Area #4

Rolling Hills/Spunky Creek Drainage  
E. 6<sup>th</sup> St. & S. 197<sup>th</sup> E. Ave. Area



August 17, 2017



**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





## ENGINEERING SERVICES

August 17, 2017

Dear Resident/Property Owner:

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

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

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

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

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

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

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

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



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# Acknowledgements

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## 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
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Anna America	City Council District 7
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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
Tim Lovell	Disaster Resilience Network
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](http://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](mailto:swre@sbcglobal.net)

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





# Repetitive Loss Area # 4

## Rolling Hills/Spunky Creek Drainage E. 6<sup>th</sup> St. & S. 197<sup>th</sup> E. Ave. Area

### Overview

Repetitive Loss Area (RLA) #4 is located in the Rolling Hills/Spunky Creek drainage, in the area of E. 6<sup>th</sup> St. and S. 195<sup>th</sup> E. Ave. The Repetitive Loss Area is in Wagoner County, just east of County Line Rd. (S. 193 E. Ave.). There are two commercial/ light industrial property lots in the RLA, one of which has made five damage claims: in 1978 (\$519), 1979 (\$253 and \$2,003), 1981 (\$678) and 1984 (\$32,736) for a total of \$36,736. The cause of flooding has been overland flow onto the property from the gently sloping higher ground to the south, east and west. The soil in the area is underlain by shale and generates considerable runoff during heavy rains. The two properties in the RLA are slab-on-grade structures that are situated slightly lower than street level, with large parking lots behind and shallow, inadequate bar ditches in the front.

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

### I. Background

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

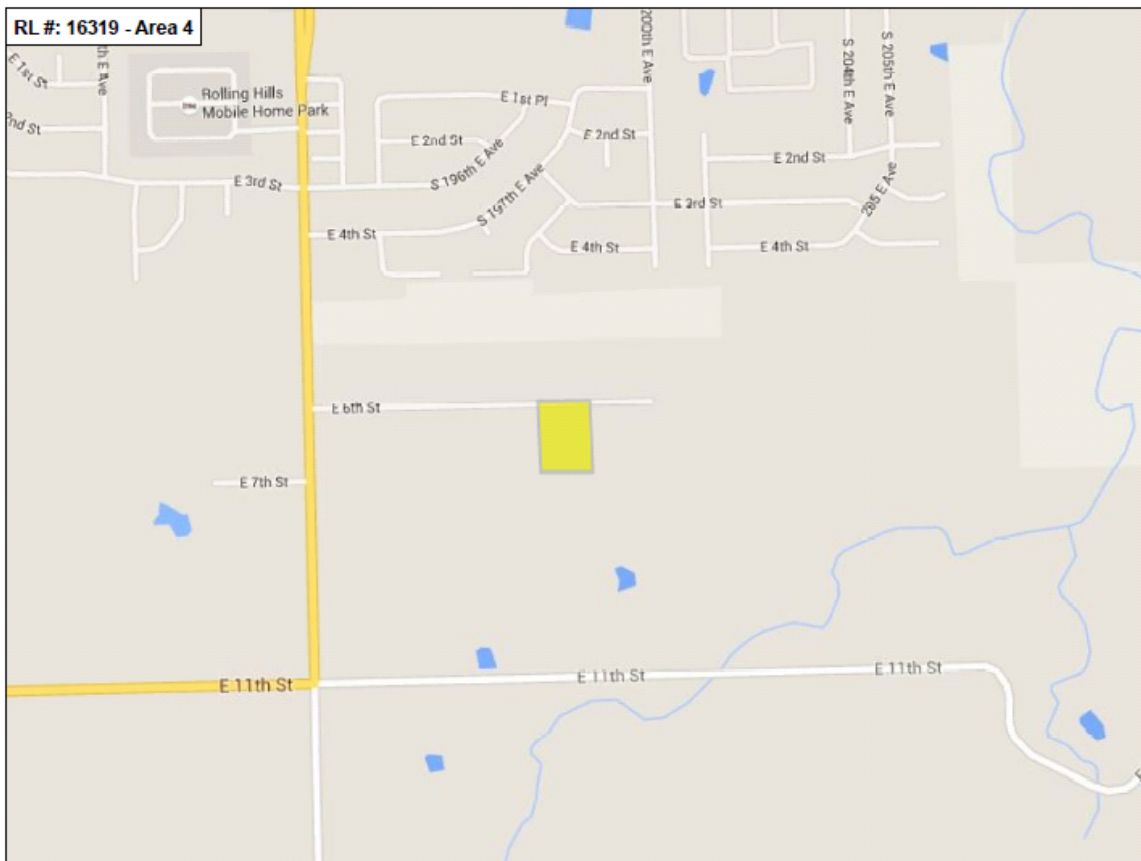
Tulsa was not unique in its rapid post-war development and attendant risks. Cities across America were experiencing similar problems as they spread out into prosperous subdivisions. In response, the U.S. Congress created the National Flood Insurance Program (NFIP) in 1968 to help property owners protect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

Tulsa joined the NFIP in 1974, and through great effort and considerable expense has significantly reduced its exposure to flooding. As a result, Tulsa has been awarded a Class II rating in the NFIP's Community Rating System (CRS), which grants its residents a 40 percent discount on the cost of flood insurance for structures in the Special Flood

Hazard Area (SFHA), also known as the 1% or 100-year floodplain. Since the Biggert-Waters Flood Insurance Reform Act of 2012, many properties have seen a substantial increase in their premiums, making this discount even more important.

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

Consequently, one of the requirements of the CRS is that communities identify all repetitive loss properties in their jurisdiction and work with the owners in finding ways to reduce or eliminate future flood damage. This initiative has been very successful in reducing flood losses and claims.



**RLA #4 is situated in the Spunky Creek drainage in Wagoner County, on the south side of E. 6<sup>th</sup> St., just east of County Line Rd. (193 E. Ave.)**

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 structures 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 building.

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

## **II. Location**

The two commercial buildings of RLA #4 are located in the Rolling Hills Creek watershed. Rolling Hills Creek is a 3-mile-long tributary to Spunky Creek that rises in the Indian Hills near E. Marshal St. and 177<sup>th</sup> E. Ave. and flows south, then east, to join Spunky Creek near the intersection of I-44 and the Creek Turnpike.

The RLA is in the 19500 block of E. 6<sup>th</sup> St., just over the Tulsa County line (193<sup>rd</sup> E. Ave.) in Wagoner County.

The properties are at an elevation of between 638 and 640 feet on land that slopes gently northwards down towards Rolling Hills Creek. Runoff flows from the higher ground to the south, west and east into the parking lots at the rear of the buildings in RLA #4 and into the shallow bar ditches along E. 6<sup>th</sup> St. The structures in the RLA are situated slightly below the level of E. 6<sup>th</sup> St.



**RLA #4 has shallow bar ditches in gently sloping terrain.**

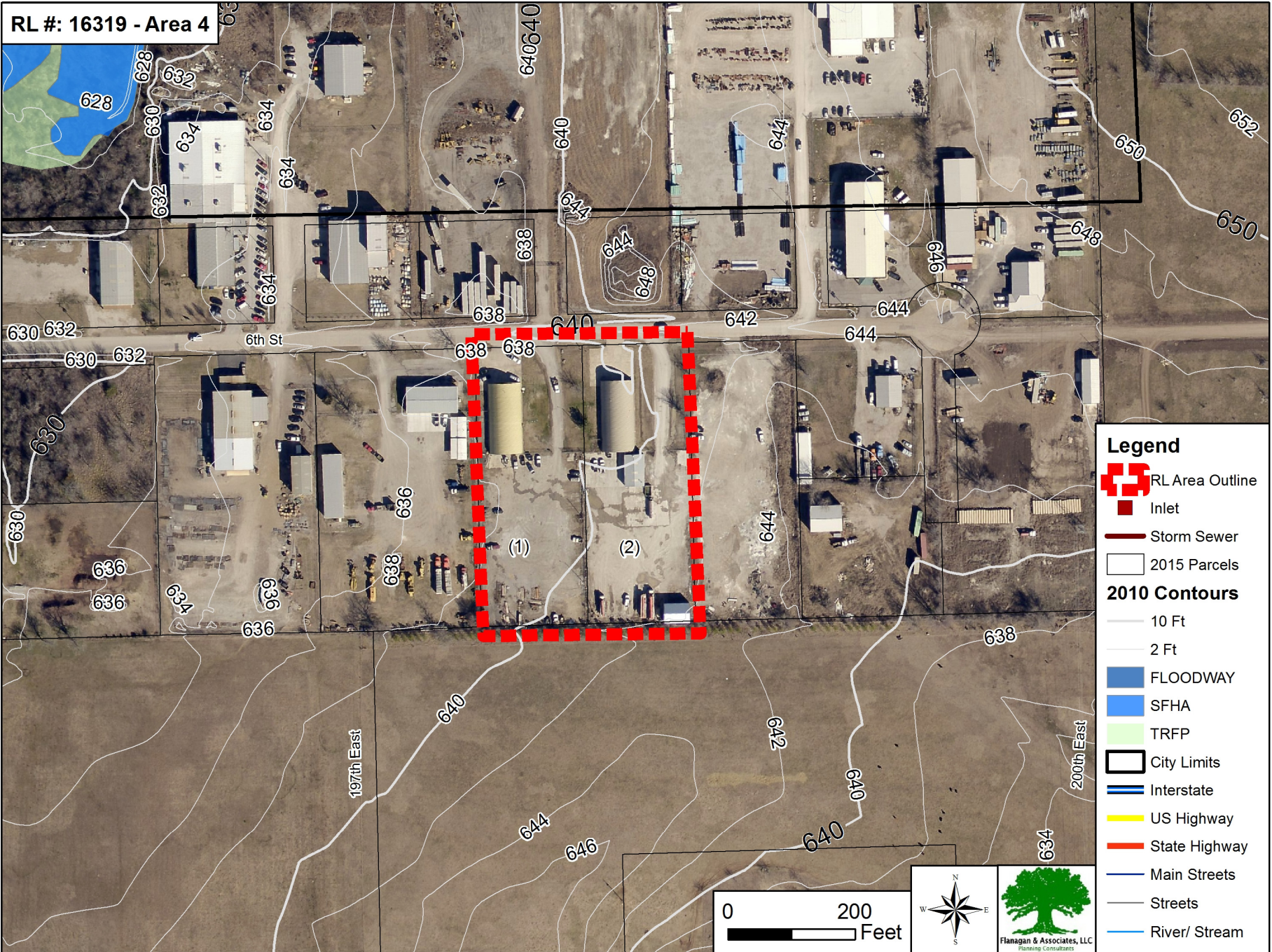
## **III. History**

### ***Development***

The structures in RLA #4 were developed in early 1970s.

### ***Flooding***

The flood events that resulted in five paid damage claims in RLA #4 occurred in June 1978, June 1979 (two claims), May 1981, and May 1984. Damage was due to street and bar ditch flooding and overland flow.



### ***Improvements***

There have been no improvements in the immediate area of RLA #4 that have had a significant impact on reducing the flood hazard.

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

The analysis of Repetitive Loss Area #4 was conducted by the Project Team through interviews with City officials, research into Engineering Services and Stormwater Drainage files, including a review of the City's extensive flood history documentation, assessment of insurance claims, field trips to the RLA, interviews with property owners and questionnaires mailed to the property owners soliciting information about prior and existing flooding issues.

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

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

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

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

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

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

- FEMA Flood Map 40145C0020J
- *Flood Insurance Rate Map*, City of Tulsa, October 16, 2012
- *Regulatory Floodplain Map Atlas*, Tulsa Engineering Services, October 2016
- *Spunky and Adams Creeks Master Drainage Plan, Final Report*, January 1989
- *2014 City of Tulsa Hazard Mitigation Plan Update*, Flanagan & Assoc., 2014

- City of Tulsa *Stormwater Management Plan*
- Stormwater Design Criteria Manual: Critical Neighborhood Flood Control Projects
- Stormwater Capital Improvements List, City of Tulsa, Engineering Services
- *Guidebook to Conducting Repetitive Loss Area Analyses*, UNO and FEMA

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

No City of Tulsa Capital Improvements are currently planned that could have a positive impact on the flooding problems in Repetitive Loss Area #4. There are storm sewer improvement and regional detention facilities on the existing CIPs for Spunky Creek along with Master Drainage Plan recommendations that are not yet on the CIPs. None are presently funded.

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

Neither 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 properties nor address-specific claim data are detailed in this Plan.

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

One property in RLA #4 has made five paid flood damage claims totaling \$36,189— one in 1978 (\$519), two in 1979 (\$2,256), one in 1981 (\$678) and one in 1984 (\$32,736). The individual claims averaged about \$7,200.

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

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

### ***Review Drainage Patterns.***

The Project Team examined aerial topography maps, master drainage plans, storm sewer plans, City Customer Care Center complaints and comments, and conducted field checks to determine area drainage patterns and identify flooding problem areas. The results of the research and analysis are described in the following paragraphs and summarized in the table below.

### ***Structures***

The Project Team made visits to RLA #4 to determine the situation and condition of the structures. Visual analysis was verified by queries of Wagoner County Assessor data.

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

The structures in RLA #4 are both light industrial/commercial quonset hut-style buildings.

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

The type of foundation was determined by field investigation and query of Wagoner County Assessor records. The two structures have slab-on-grade foundations.

***Condition of Structures.***

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

**Properties in the RLA**

Address	Structure Type	Foundation Type	Year Built	Condition
Property 1	Commercial	Slab-on-Grade		Average
Property 2	Commercial	Slab-on-Grade		Average

***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.** Property owners in Repetitive Loss Area #4 are notified annually that their structures are in a Repetitive Loss Area, and are potentially subject to damage from overland flow flooding.

**Property Owners/Residents Notification.** Property owners and occupants were advised of the Repetitive Loss Area study and analysis by letter, were sent a questionnaire soliciting information and input, and asked to contact the City for more information or a copy of the completed RLA Plan.

**Public Participation and Involvement.** City Staff/Consultants interviewed property owners to brief them on the Repetitive Loss Area Analysis Study/Plan, receive their input, and discuss possible mitigation measures.

**Property Owner Response to Notifications.** There have been no responses to notification from property owners and residents in RLA #4.

***Conclusions***

Based on flood data and site analysis, the cause of flooding has been overland flow onto the property from the gently sloping higher ground to the south, east and west. The soil in the area is underlain by shale and generates considerable runoff during heavy rains. The two properties in the RLA have slab-on-grade structures that are situated slightly lower than street level, with large parking lots behind and shallow, inadequate bar ditches in the front.

**V. Mitigation Measures**

***Overview***

The City of Tulsa identifies floodproofing, berms, bar ditch enlargement and other individual site protection measures as the most cost-effective solution for flooding in RLA #4. There are presently no funded Capital Improvement Projects for future flood control projects that would benefit this area.

### ***Individual Mitigation Measures: What You Can Do***

Individual property protection actions are usually undertaken by property owners on a lot-by-lot, building-by-building basis, and include private floodproofing, moving mechanical equipment above flood levels, installing French drains and minor site grading to move local drainage to the street, sanitary sewer backup protection, and flood insurance.

The City of Tulsa is willing to have a stormwater engineer do a site visit to assist you in analyzing your specific drainage problems and discuss potential solutions. Contact the Customer Care Center at (918) 596-7777, or go online to [www.cityoftulsa.org/connect/contact-the-city](http://www.cityoftulsa.org/connect/contact-the-city).

**Know and Understand Your Flood Risk.** As stated above, being located in a Repetitive Loss Area does *not* mean a property will flood. Nevertheless, it is important that residents and property owners in flood hazard areas know and understand their flood risk and take what steps they can to protect their homes, families and possessions. City staff is available to explain the local flood risk, interpret floodplain maps, and determine if an area or property has drainage problems or a history of prior flooding. Staff can also discuss the ways a specific property can be protected from flooding. An Elevation Certificate can help define a property's flood risk under various rainfall scenarios (e.g., in a 10-year, 50-year, 100-year, or 300-year storm). You can receive a free flood zone determination by contacting the City with the correct legal description and street address, or the Tax Assessor/Parcel Number of the property.

**Make a Disaster Preparedness Plan.** It is always a good idea for residents and property owners in flood hazard zones to prepare a disaster preparedness and response plan that addresses all the steps and details that will demand attention once a flood watch or warning is issued. A Building Permit is required to install a safe room in a flood-prone area.

**Create Berms, Swales or Redirected Drainage.** Flood waters can be diverted away from your structures using berms, brick planter boxes and swales, but these may not be done in ways that cause damage to other properties. Owners and residents can request a meeting with a City Engineer to discuss the best ways to solve existing drainage problems, and whether a Building Permit will be required. This may be the most feasible solution for areas with flooding due to overland flow, as in RLA #4.



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

**Install Local, Property-Specific Paving, Plantings and Catchment Basins.** City Engineering staff can explain the natural functions of floodplains and how they act to slow and purify urban runoff and reduce flooding. Staff can also suggest low-impact development projects which imitate



natural floodplain functions by slowing runoff and filtering out impurities. These include such things as rain gardens, catchment basins and pervious paving materials.

**Acquisition.** The City of Tulsa has a repetitive loss acquisition program to purchase repeatedly flooded properties. This voluntary program offers owners who are in this situation a way out. The City applies to FEMA for funds using the Hazard Mitigation Grant Program. Once the grant is awarded, the property is appraised as if it were not a flooded property and the offer for the property is based on this appraisal. In addition to getting the best possible price, the owner receives moving expenses, a \$1,000 stipend for purchasing a home outside the floodplain, and a 30-day rent free period after closing in which to move. All closing costs and other fees are paid by the City. Once the owner has moved out, the home is demolished and restored as open space to protect the natural and beneficial function of the floodplain. If you would like more information about this program contact the Customer Care Center at (918) 596-7777.

Acquisition is usually not feasible or cost effective for areas of shallow flooding. If a property is located in a FEMA Floodway or Special Flood Hazard Area, demolition, acquisition and relocation may be the most feasible and cost-effective option. The properties in RLA #4 are probably not candidates for Acquisition.

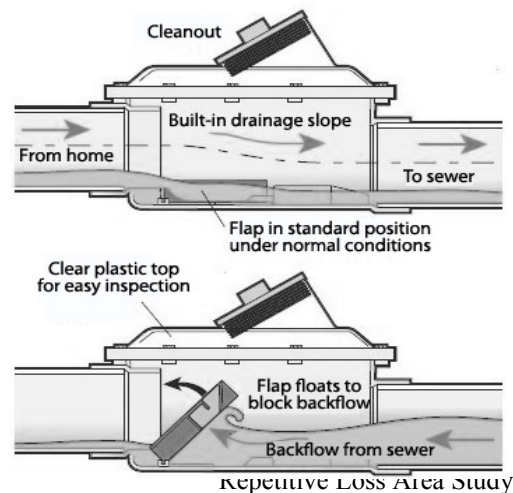
**Elevate Your Structure.** Elevating the structure is only suitable for areas of shallow flooding, and is usually not feasible or cost-effective for masonry homes built on concrete slabs. It can sometimes be cost-effective for wood frame buildings on crawlspaces. Most likely, the structures in RLA #4 are not candidates for elevation.

**Dry Floodproof Your Structure.** This can include actions that seal a structure and prevent floodwaters from entering. This method is best in areas where flood depths are no more than two or three feet. Buildings can be made watertight by sealing the walls with waterproof coatings, impermeable membranes, or additional layers of masonry or concrete. Doors, windows, and other openings below the base flood elevation must also be equipped with permanent or removable shields, and backflow valves must be installed in sanitary sewer lines and drains. Dry flood-proofing could well be an option for the properties in RLA #4, but should be designed by an engineer to ensure the structure can resist the force of the water.

**Wet Floodproof Your Building.** Wet flood-proofing allows water to enter a structure, while removing, protecting or elevating items that can be damaged, such as air conditioning equipment. This is often used on structures with crawl spaces and shallow flood depths. The City does not allow basements in flood-prone areas, or the wet floodproofing of basements.

**Wet Floodproof Your Garage or Storage Areas.** The garage or storage area, with their slab-on-grade construction, are vulnerable to overland flow flooding. Remove, relocate, elevate, or otherwise protect items that can be damaged from flooding.

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



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

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. Bar ditches and culverts must be kept clear of debris. Residents and property owners should do their part in maintaining these drainage structures. Do not attempt to clear debris during a flood event.

**Correct Sanitary Sewer Backup Problems.** Sanitary sewer backup can be a cause of property damage in low-lying, flood-prone areas like RLA #4. The installation of backflow prevention valves on your sanitary sewer lines is highly recommended.

**Purchase and Maintain Flood Insurance.** Flood Insurance is available and recommended for the structure and contents for all properties in Tulsa. A large percentage of all flood insurance claims are for properties that are outside the FEMA floodplain. Because of the City of Tulsa's sustained efforts to reduce flooding, you are entitled to a discount on your flood insurance. A property does not have to be in a floodplain to qualify for flood insurance.

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

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

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

As funding becomes available for this Repetitive Loss Area, the City will undertake a more detailed Mini-Master Drainage Plan to identify alternative solutions to the flooding problems and recommend a public works project. The actual construction of any public works project may require the acquisition of properties and/or drainage easements. The City will continue to fulfill its maintenance responsibility for channels, drainageways, and storm sewer inlets and pipes. At this time, the City has identified the following actions which ~~are~~ may be appropriate for RLA #4.

- Create berms and swales to direct stormwater runoff away from structures.
- Create overland flow path to allow better drainage of ponded water.
- Acquire flood prone properties on a voluntary basis.
- Construct upstream detention to reduce storm water runoff into the RLA.

#### **VI. Funding**

Due to the nature of the flooding problems and the damages involved in RLA #4, floodproofing and local site drainage measures such as swales and berms, remain the

preferred options for the structures in RLA #4. The funding of improvements such as berms and floodproofing will have to be borne by the property owner. 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**

Flood damage in RLA #4 has been due to overland flow from the north, west and east into the parking lots at the rear of the properties, the inadequate bar ditches and drainage in the generally level terrain, the slab-on-grade construction of the buildings set slightly lower than street level, and the shallow soil in the area that is underlain by shale and generates considerable runoff during heavy rains.

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