

Repetitive Loss Area #38

Audubon Creek E. 33rd St. & S. Memorial Blvd. Area



August 17, 2017



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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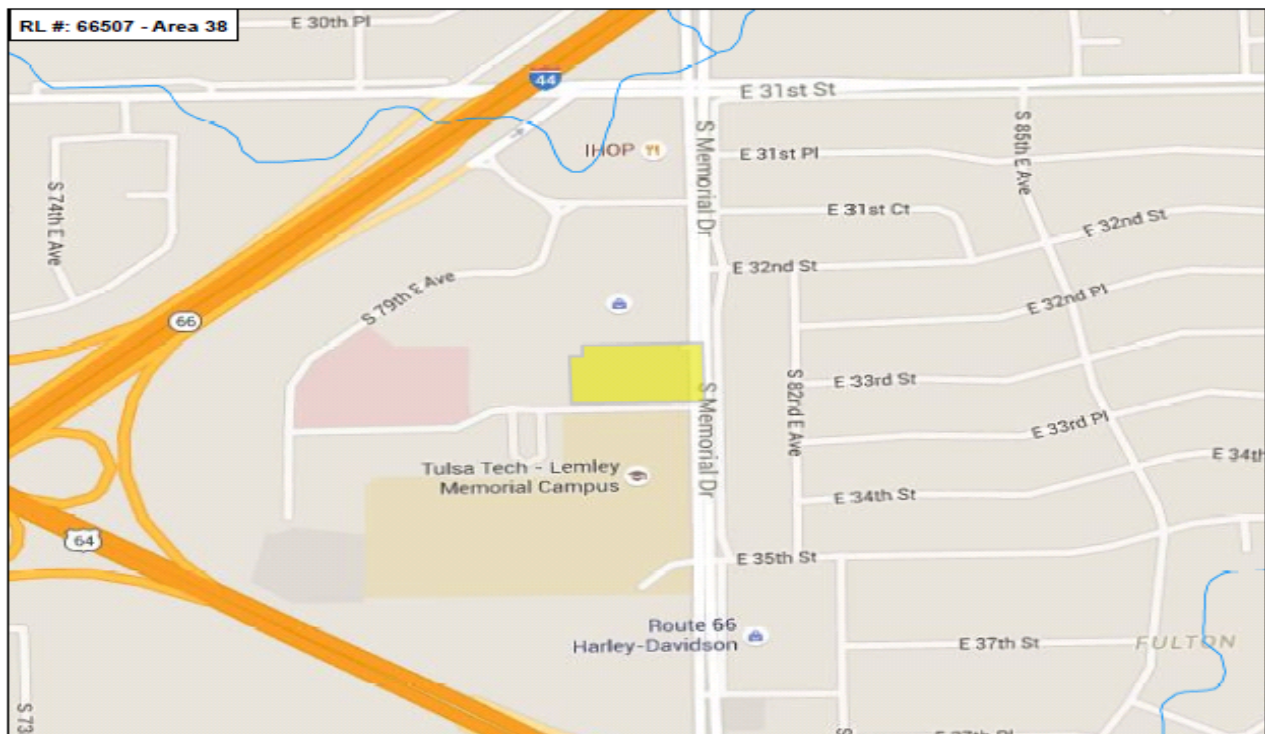
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Repetitive Loss Area # 38

Audubon Creek E. 33rd St. & S. Memorial Blvd. Area

Overview

Repetitive Loss Area (RLA) #38 is comprised of three commercial buildings on four property lots in the Audubon Creek drainage. The RLA is on the northwest corner of E. 33rd St. and S. Memorial Blvd. about ½-mile east of the I-44/Broken Arrow Expressway interchange and ¼-mile south of Audubon Creek mainstem. Before development, a tributary to Audubon Creek descended from the high ground of the expressway interchange to the northeast, more or less along what is now S. 79th E. Ave. With the development of I-44, the BA Expressway and the Memorial Blvd. commercial strip, Audubon Creek was channelized briefly west of I-44 and routed through storm sewers east to about E. 30th St. and S. 84th E. Ave. Runoff from the east side of the expressway interchange either flowed down S. 79th E. Ave. towards 31st St. and the old Audubon Creek channel, or east down E. 33rd St. to RLA #38 and the low ground at E. 33rd and Memorial Blvd. Flood damage has been due to overland flow eastward from the high ground around the I-44/BA Expressway and storm sewer backup along Memorial Blvd. There is one repetitive loss property in the RLA which made claims in 1979 and 1984 for a total of \$9,807. There have been no flood claims in the RLA since 1984.



RLA #38 is located in the Audubon Creek drainage in the E. 33rd St. and Memorial Blvd. area.

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 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 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 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.

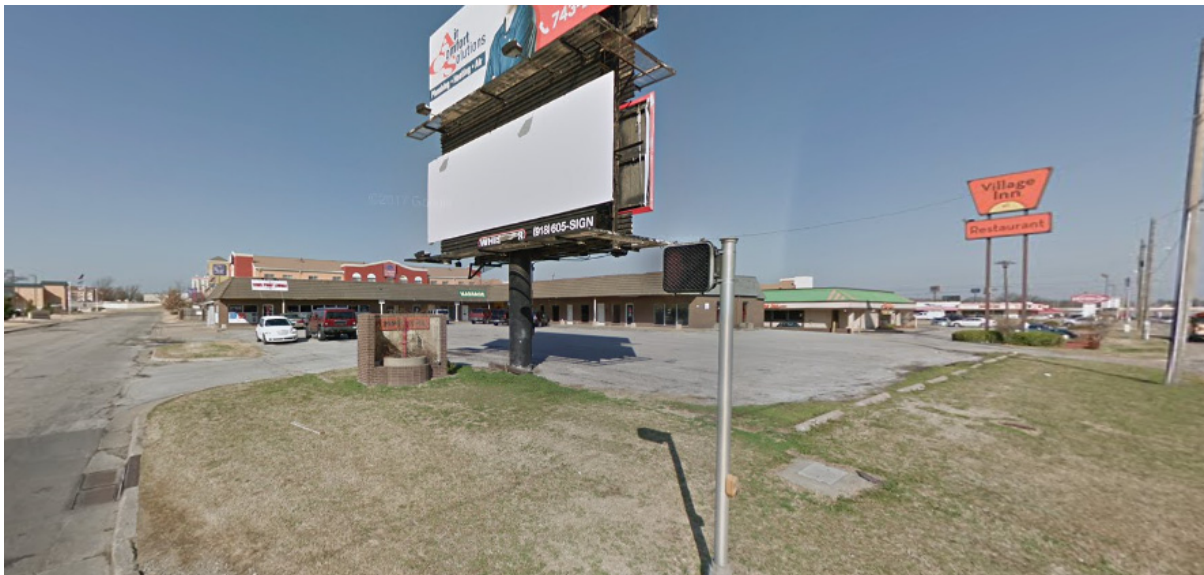
It is important to note that most of the structures in an RLA—perhaps as many as 80% or 90%—may not have experienced flooding of any kind. What they have in common is being subject to the same general geographical and flood conditions as the nearby repetitive loss property. In addition, the flooding events in question may have had little to do with overbank

flooding from a creek, but perhaps may have been the result of storm sewer backup or overland flow. The location of RLA #38 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

Audubon Creek is a 3-mile-long, left-bank tributary to Mingo Creek that drains about 2.64 square miles of east Tulsa. The creek flows generally east-northeast through residential, commercial and industrial neighborhoods to join Mingo Creek at about E. 26th St. and S. 95th E. Ave. Audubon Creek mainstem flows north and east from the high ground around E. 41st St. and Sheridan Ave., passes under I-44 and the Broken Arrow Expressway and turns east on the north side of E. 31st St. Audubon Creek is channelized briefly west of I-44 and then routed through storm sewers east to about E. 30th St. and S. 84th E. Ave. where it again emerges into an open channel until its junction with Mingo Creek at E. 26th St. and S. 95th E. Ave.

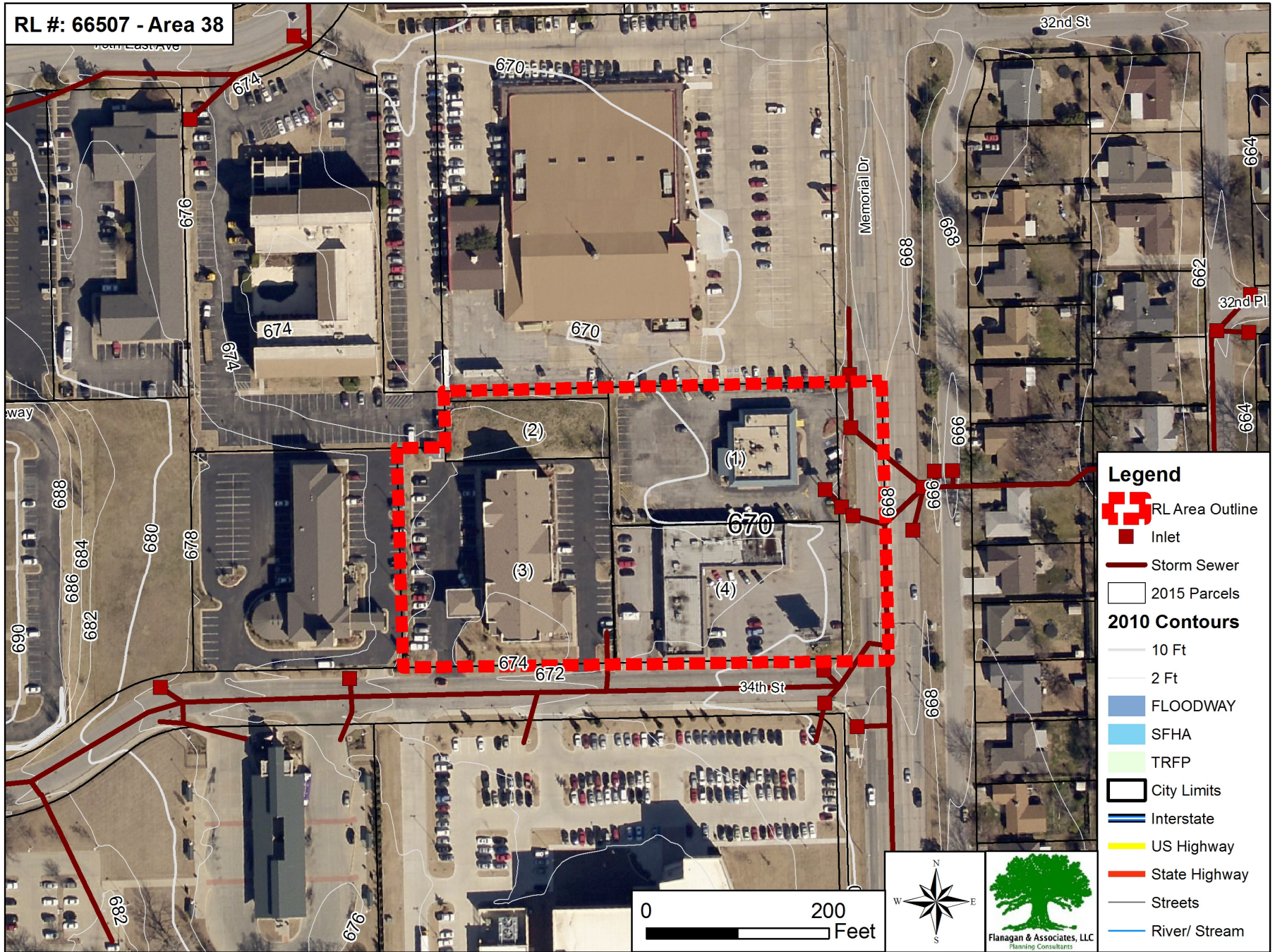
The RLA is about ½-mile east of the I-44/Broken Arrow Expressway interchange and ¼-mile south of Audubon Creek, on the northwest corner of E. 33rd St. and S. Memorial Blvd.



RLA #38 is located on the northwest corner of E. 33rd St. and S. Memorial Blvd. The repetitive loss property is in the small shopping center and suffered overland flow and storm sewer backup flooding in 1979 and 1984.

The three commercial buildings that make up RLA #38 are along E. 33rd St. on the west side of Memorial Blvd., about ¼-mile south of the open channel of Audubon Creek just before it enters a storm sewer on the west side of I-44 and E. 31st St. Water running off the high ground on the east side of the I-44/BA Expressway interchange either flows north down S. 79th E. Ave., or east down E. 33rd St. to storm sewers along S. Memorial Blvd.

The structures of RLA #38 are slab-on-grade at elevations of between 660 and 680 feet. Flood damage has been the result of overland flow and storm sewer backup. Subsequent channel modifications to lower Audubon Creek and the expansion of the storm sewer system along Memorial Blvd. have largely eliminated flooding in RLA #38.



III. History

Development

The properties in RLA #38 were developed on unplatted land between 1965 and 2002. The terrain on which the buildings are located slopes gently to the northeast. The commercial properties in the RLA include a small shopping center, a restaurant and a motel. One lot in the northwest quadrant of the RLA has remained undeveloped.

Flooding

The *Upper Mill, Audubon and Jones Creeks Basin Drainage Study*, written in 1993, mentions severe flooding along Audubon Creek in May 1984. The Master Drainage Plan attributed flooding to undersized storm sewers, culverts and bar ditches and to overland flow. In the case of RLA #38, runoff from the commercial buildings and parking lots on the high ground east of the I-44/BA Expressway interchange flows downhill to the north and east, either down S. 79th E. Ave. towards E. 31st St., or downhill to the east along E. 33rd St. towards the storm sewers along Memorial Blvd. The owner of the repetitive loss property stated that the overland flow was coming from the motels immediately west of the property.

One property in RLA #38, the repetitive loss property, has submitted two claims for flood damage to structure and contents—one for \$3,653 on June 22, 1979 and another for \$6,154 on May 27, 1984, for a total of \$9,807. There have been no flood damage claims in the RLA since 1984.

Improvements

The Master Drainage Plan for the basin identified the most cost-effective structural solutions (channel improvements, enlarged conduits, and stormwater detention) for Audubon Creek—specifically, a stormwater detention facility on the south side of the Broken Arrow Expressway immediately north of the PSO substation, improved channels on Audubon Creek west of I-44 and east of Memorial Blvd., undergrounding Audubon Creek from I-44 and 31st St. downstream to E. 30th and S. 83rd E. Ave., and increasing the size and number of sewer inlets along E. 33rd St. and S. Memorial Blvd. These changes were made in the 1980s and 1990s as part of the Audubon Creek Phase III improvements, and appear to have largely eliminated overland flow flooding and sewer backup problems in RLA #38 for the 100-year storm. However, flooding could occur during storms of greater magnitudes, like the 300-year storms of 1974 and 1984.

IV. Research and Analysis

The analysis of Repetitive Loss Area #38 was conducted by the Project Team through interviews with City officials, research into Engineering Services and Stormwater Drainage files, including the *Upper Mill, Audubon and Jones Creeks Basin Drainage Study*, 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 property owners and occupants 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*
- *Stormwater Design Criteria Manual: Critical Neighborhood Flood Control Projects*
- *Stormwater Capital Improvements List*, City of Tulsa, Engineering Services
- *Upper Mill, Audubon and Jones Creeks Basin Drainage Study, Tulsa, OK*, FHC Inc., May 28, 1993
- *Mill, Jones and Audubon Creeks Basin Drainage Study, Tulsa, OK*, FHC Inc., October 29, 1992
- "The Effects of Urbanization on the Mingo Creek Watershed," Tim Mars, 1984
- *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 # 38.

Flood Insurance Data

None of the properties in RLA #38 currently carries flood insurance.

Claims Data.

As stated above, one property in RLA #38, the repetitive loss property, has submitted two claims for flood damage to structure and contents—one for \$3,653 on June 22, 1979 and another for \$6,154 on May 27, 1984, for a total of \$9,807. There have been no flood damage claims in the RLA since 1984.

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 #38 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 #38 are comprised of three commercial buildings on four property lots.

Foundation Type.

The type of foundation was determined by field investigation and query of Tulsa County Assessor records. The commercial buildings are all built on concrete slabs.

Condition of Structures.

The condition of the structures in the RLA was determined by field investigation and a search of the County Assessor's records. The structures were considered to be in Fair to Average condition. These findings are summarized in the following table.

Properties in the RLA

Address	Structure Type	Year Built	Foundation Type	Building Condition	Flood plain
Property 1	Commercial	1970	Slab	Average	Audubon Creek
Property 2	Vacant				
Property 3	Commercial	2002	Slab	Average	Audubon Creek
Property 4	Commercial	1965	Slab	Fair	Audubon Creek

Notification

Annual Floodplain Notification. Each year, in March, the City of Tulsa notifies all property owners and occupants within a 100-year floodplain that their properties are subject to flooding and informs them of what steps they can take to protect their buildings, contents and employees, including the purchase of flood insurance.

Annual Repetitive Loss Area Notification. Property owners and occupants in Repetitive Loss Area #38 are notified annually that their structures are located in a Repetitive Loss Area, and are potentially subject to flood damage from storm sewer backup, street flooding and overland flow.

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 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 response to notification. The owner of the repetitive loss structure stated that the flooding was coming from the motel to the west. Another comment was essentially the same, that flooding was overland flow from higher ground to the west.

Conclusions

Flooding issues in RLA #38 have been due to overland flow and storm sewer backup. The high ground east of the I-44/BA Expressway interchange slopes eastward from 730 ft. elevation to 660 ft. at E. 33rd St. and S. Memorial Dr. The high ground east of the interchange has been developed with large commercial structures and parking lots, which generate considerable runoff that flows either down S. 79th E. Ave. to the north or to the east towards Memorial Blvd. down E. 33rd St. According to local landowners, it is this overland flow from the high ground to the west that has caused storm sewers to be overwhelmed in the low ground along Memorial Blvd., where Audubon Creek has been routed underground through an undersized sewer system with an inadequate number of inlets. The PSO detention facility along with the channel improvements and storm sewer enlargements that were part of the Audubon Creek Phase II and III projects have increased the carrying capacity of the channel and sewers and largely eliminated overland flow flooding in RLA #38, as there have been no flood claims since 1984.

V. Mitigation Measures

Overview

The construction of the PSO detention facility between the Broken Arrow Expressway and I-44, the concrete channel along Audubon Creek west of I-44 and east of Memorial Blvd., and the enlargement of the sewer system on E. 33rd St. and along Memorial Blvd. have done much to reduce flooding on this reach of Audubon Creek. The RLA is not in either FEMA's or the City of Tulsa's regulatory floodplains. Nevertheless, the properties

in the RLA remain at some risk of shallow flooding from storms greater than a 100-year event, like those of 1974 and 1984.

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, 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 property owners in flood hazard areas know and understand their flood risk and take what steps they can to protect their buildings, furnishings and equipment. 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 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 structures using berms, brick planter boxes and swales, but these may not be done in ways that cause damage to other properties. Owners and occupants 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 is the most feasible solution for areas with flooding due to overland flow, as is the case with several properties in RLA #38.



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 with 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. To get 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 #38. However, 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 structures built on concrete slabs. It can sometimes be cost-effective for wood frame buildings on crawlspaces. The structures in RLA #38 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 floodproofing needs to be designed by an engineer to ensure the structure can resist the force of the water.

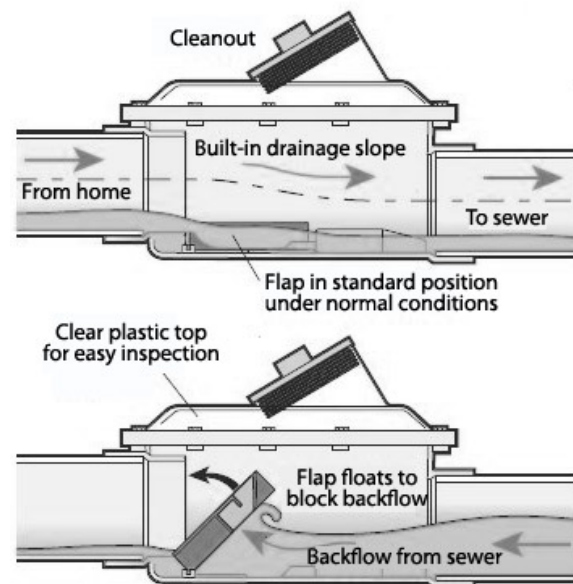
Wet Floodproof Your Building. Wet floodproofing allows water to enter a structure, while removing, protecting or elevating items that can be damaged, such as air conditioning equipment. This is often used on structures with crawl spaces and shallow flood depths. The City does not allow basements in flood-prone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

Correct Sewer Backup Problems. Sewer backup can be a problem in low-lying, flood-prone areas like RLA #38. The installation of backflow prevention valves in sewer lines is recommended.

Maintain Nearby Streams, Ditches, and Storm Drains. Local flooding can often be caused by brush and other debris blocking drainage ways and culverts. Culvert blocking by limbs, grass cuttings and other debris could contribute to future flooding in RLA #38. Storm sewer inlets must be regularly inspected and kept free of blockage. Residents and property owners should do their part to keep storm drains and bar ditches clear of brush and debris, and report trees that have fallen into the creek channel and are blocking flow. Do not attempt to clear debris during a flood event.



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

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 appropriate for RLA #38.

- Extend and/or improve the storm sewer system to better collect storm water runoff.

VI. Funding

Due to the nature of the flooding problems and the localized damages involved in RLA #38, the funding of needed improvements will have to be borne by the individual property owner.

VII. Conclusions and Recommendations

Repetitive Loss Area #38 is comprised of three commercial buildings on four property lots in the Audubon Creek drainage, located on the northwest corner of E. 33rd St. and S. Memorial Blvd. Overland flow runoff from the high ground east of the I-44/Broken Arrow Expressway interchange flows downhill to the north along S. 79th E. Ave. to E. 31st St. and to the east down E. 33rd St. to Memorial Blvd. Audubon Creek is carried in storm sewers from I-44 to E. 30th St. and S. 83rd E. Ave. During very heavy rainfall events, like the 300-year storm of May 1984, runoff overwhelmed storm sewers along Memorial Blvd. and pooled in the low ground at E. 33rd and S. Memorial Blvd., causing flood damage to one property. Subsequent improvements to the Audubon Creek channel and to the storm sewer system that carries the creek between I-44 and E. 30th St. and S. 83rd E. Ave. have largely solved the flooding problems for RLA #38. There have been no flood damage claims since 1984. Nevertheless, storms greater than 100-year magnitudes—like that of 1984, could again result in overland flow flooding in the RLA.