



STORMWATER / FLOOD CONTROL

TULSA CITY COUNCIL **Capital Improvement Program Task Force** **February 14, 2013**



STORMWATER/FLOOD CONTROL PRIORITIZATION

MAJOR FLOOD AND STORMWATER MANAGEMENT PROGRAM PRIORITIZATION PROCESS

Citywide stormwater projects are scored and ranked using ten (10) criteria: Depth of Flooding in Buildings, Number of Flooded Buildings, Street Overtopping/Public Safety, Critical Facilities and Historic/Cultural Resources, Economic/Infill Development, Deliverability/Readiness-to-Proceed, Drainage System/Infrastructure Condition, Project Coordination and Timing, Environmental Impact, and Other Funding Sources. The maximum score possible is 100 points which are assigned among the ten (10) criteria as described below.

1. Depth of Flooding in Buildings(Max. Points: 20)

Flooding of buildings, especially residential, is the most significant stormwater problem. It involves economic damages, safety, health and overall quality of life. Reduction of flooding can occur either because buildings are removed from the floodplain or the frequency and depth of flooding are reduced. Residential and non-residential buildings are grouped together in the current update, and points are assigned based on the average depth of flooding per given project area and the frequency of flooding.

Depth of Flooding	Points
>1.0 foot	10
>0 to 1.0 foot	5

Frequency of Flooding:	Points
100 year event	5
10 year event	10

2. Number of Flooded Buildings.....(Max. Points: 10)

Obviously, the number of buildings inundated during a storm event impacts the economic damages, health, safety and overall quality of life in a community. As such, points are assigned, as follows, based upon the number of flooded buildings in a given project area.

Number of Flooded Buildings	Points
>20 structures	10
16 to 20	8
11 to 15	6
6 to 10	4
1 to 5	2

3. Street Overtopping/Public Safety.....(Max. Points: 10)

Since most drowning deaths caused by flood waters occur in cars, this is an important category and includes bridges, culverts and streets in the floodplain. This category is especially important, because bridge and culvert improvements (to eliminate overtopping by flood waters) are generally deferred until the improvements can be done in conjunction with structural problems or street widening. The ranking methodology used in the Citywide Plan is based on

Prioritization Process

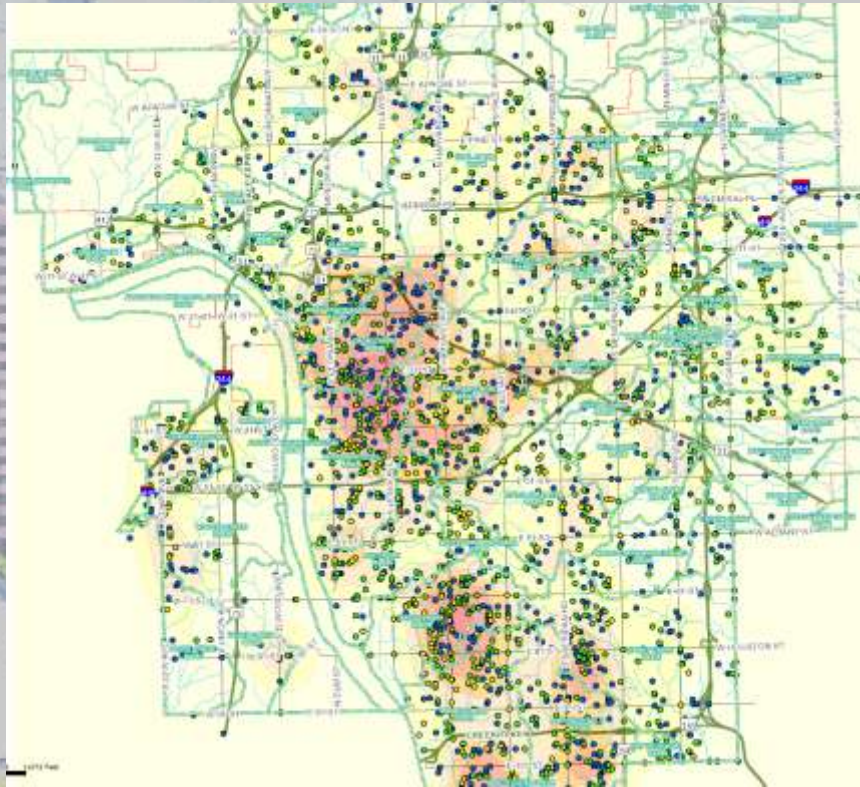
Stormwater/Flood Control Projects are scored and ranked using ten (10) criteria:

- Depth of Flooding in Buildings
- Number of Flooded Buildings
- Street Overtopping/Public Safety
- Critical Facilities/Cultural Resources
- Economic/Infill Development
- Deliverability/Readiness-to-Proceed
- Drainage System/Infrastructure Condition
- Project Coordination and Timing
- Environmental Impact
- Other Funding Sources

Projects are scored up to a maximum of 100 points.



STORMWATER/FLOOD CONTROL *PRIORITIZATION*



Citywide Comment Database

- 1996 - 2000
- 2001 - 2005
- 2006 - Present

Five-Year Comment Density

- 0-5 Comments / Sq Mile
- 5-10 Comments / Sq Mile
- 10-15 Comments / Sq Mile
- 15-20 Comments / Sq Mile
- 20-25 Comments / Sq Mile
- 25-30 Comments / Sq Mile
- 30-35 Comments / Sq Mile
- 35-40 Comments / Sq Mile

Depth & Frequency of Flooding:

Determined by modeling and call in complaints

Depth:

<1' = 5 Pts.

>1' = 10 Pts.

Frequency:

100-Yr = 5 Pts.

10-Yr = 10 Pts.

20 Point Max.

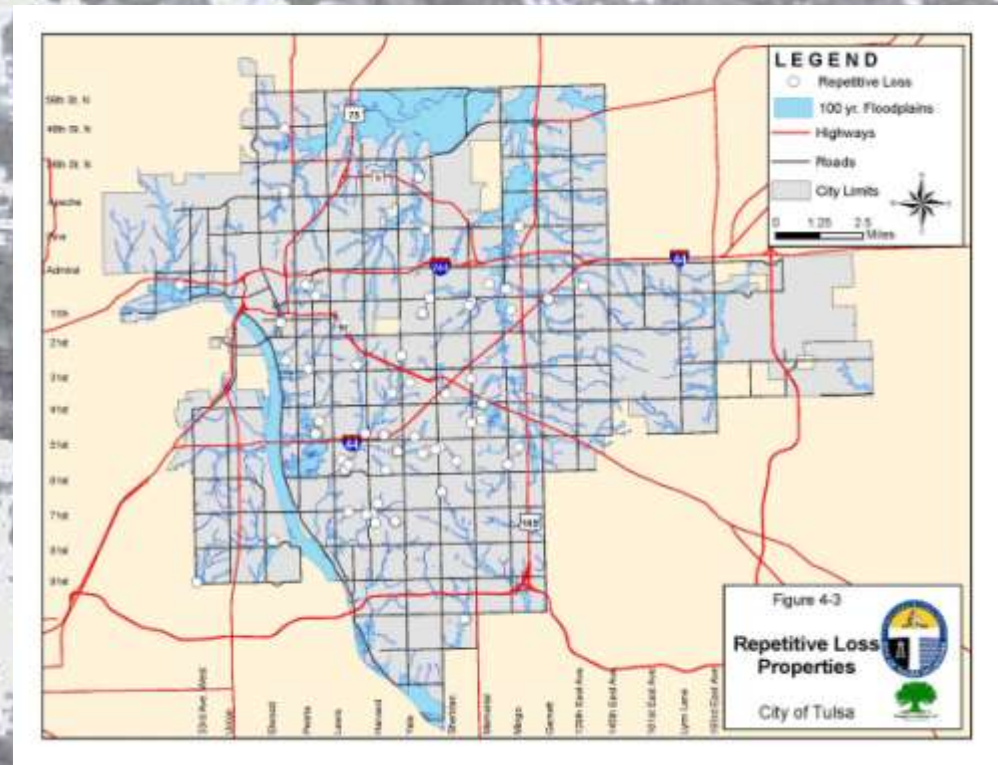


STORMWATER/FLOOD CONTROL PRIORITIZATION

Number of Flooded Buildings:

- >20 Structures = 10 Pts.
- 16-20 Structures = 8 Pts.
- 11-15 Structures = 6 Pts.
- 6-10 Structures = 4 Pts.
- 1-5 Structures = 2 Pts.

10 Point Max.





STORMWATER/FLOOD CONTROL *PRIORITIZATION*

Street Overtopping/Public Safety:

<u>Street Classification</u>	<u>Depth</u>	<u>Points</u>
Arterial Streets	>1'	10
Expressways	>1'	9
Non-Arterial Streets	>1'	8
Arterials Streets	<1'	7
Expressways	<1'	6
Non-Arterial Streets	<1'	5

- Most drowning deaths occur from driving into flood waters
- Points are assigned by depth of flooding and street classification.

10 Point Max.



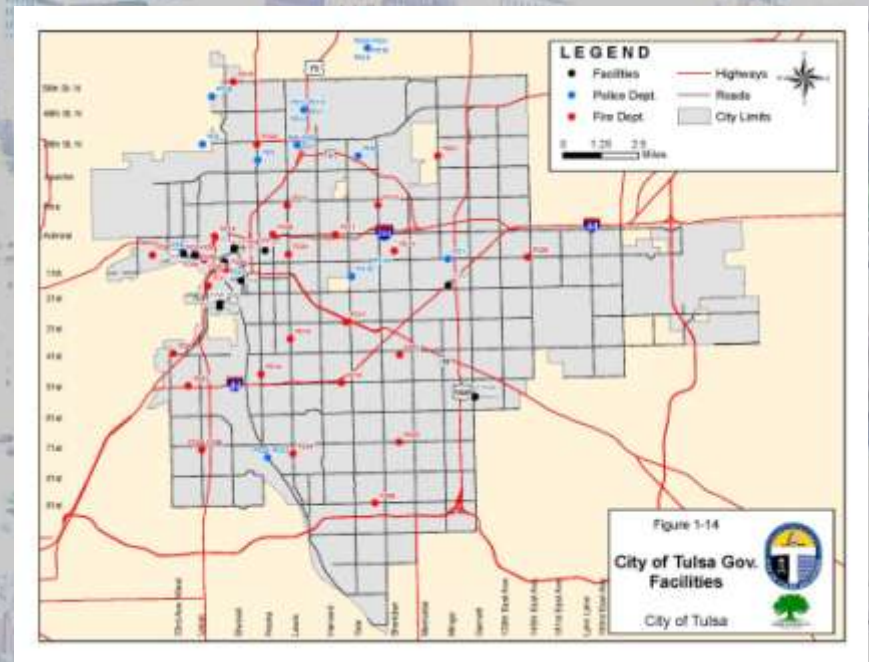
STORMWATER/FLOOD CONTROL *PRIORITIZATION*

Critical Facilities and Historic/Cultural Resources:

This criterion assigns point values for projects that protect critical community facilities.

<u>Facility Classification</u>	<u>Importance</u>	<u>Points</u>
Government Services, Utilities, Hospitals	Critical	10
Schools, Churches	Important	9
Historic/Cultural Resources	Non-Critical	5

10 Point Max.





STORMWATER/FLOOD CONTROL *PRIORITIZATION*

Economic/Infill Development:

Economic and infill development may provide alternate funding.

- Neighborhood/Commercial Revitalization Area
- Business Improvement District
- Designated Residential Infill Area
- Community Development Block Grant Area
- Brownfield Redevelopment Area



2 Points/Ea.

10 Point Max.

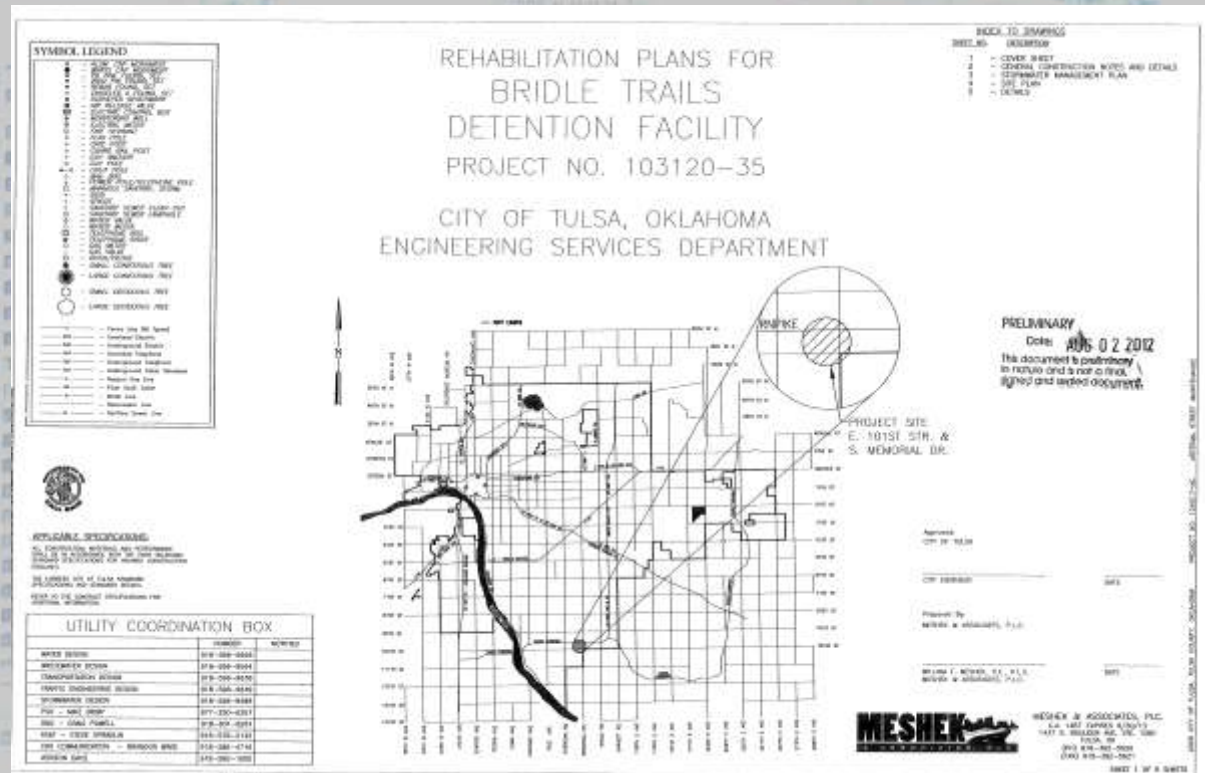


STORMWATER/FLOOD CONTROL *PRIORITIZATION*

Deliverability/Readiness to Proceed:

- Has the design been completed?
- Right of Way Acquired?
- Utilities relocated?

5 Point Max.





STORMWATER/FLOOD CONTROL *PRIORITIZATION*

Drainage System/Infrastructure Condition:

Allocates points based on the condition of existing stormwater infrastructure

- **Bridges & Drainage Structures defective or inadequate capacity**
- **Storm sewer systems in need of major repairs**
- **Open Channels in need of major repair or capacity enhancement**
- **Coordination with other projects such as street rehabilitation**



10 Point Max.



STORMWATER/FLOOD CONTROL *PRIORITIZATION*

Project Coordination & Timing:

Allocates points based on the relationship to other projects

- Operations, PED, Transportation, Water, Wastewater
- Must be completed with or prior to another project – High Score
- Not needed for several years – 0 Points

10 Point Max.





STORMWATER/FLOOD CONTROL *PRIORITIZATION*

Environmental Impact:

- **Ecosystem Restoration**
- **Low Impact development**
- **Improved water quality or natural hydrology**
- **Restore or improve fish and wildlife habitat or stream connectivity**
- **Other benefits such as education, recreation, open space preservation**



5 Point Max.



STORMWATER/FLOOD CONTROL *PRIORITIZATION*

Other Funding Sources:

Allocates points for projects eligible for state or federal grants.

- Federal Emergency Management Agency
- Oklahoma Water Resource Board
- Environmental Protection Agency
- Oklahoma Department of Transportation



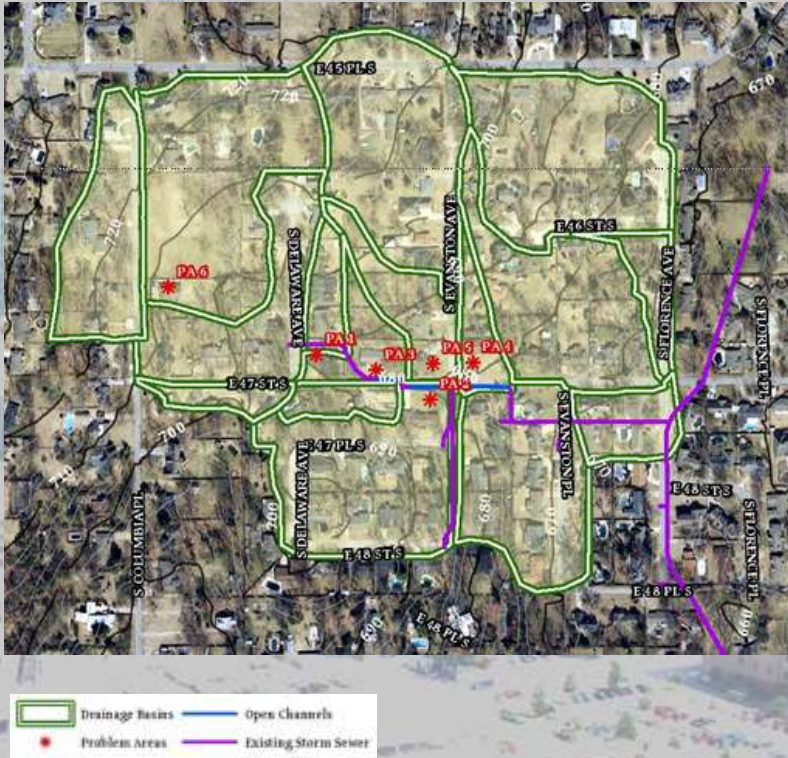
10 Point Max.



JOE CREEK

47th STREET STORM SEWER RELIEF LINE

Cost Estimate \$4 Million



47th Street, Delaware to Florence

Numerous homes and streets flood in moderate rainfall events



PERRYMAN DITCH

PHASE 3, ROCKFORD AVE. STORM SEWER

Cost Estimate \$4.7 Million

- Project extends I-44 storm sewer trunk line into neighborhood
- Reduces or eliminates street flooding north of I-44, Quincy to Troost
- Protects structures from flooding

City of Tulsa Citywide Projects Prioritization		CIP #: 446 - FC11-001	TOTAL POINTS:
Creek Name:	Perryman Ditch	FMA PE4, 6	52
Project Name:	51st Street - Phase III		
Project Description:	Rockford Ave Storm Sewer from 51st St. to 49th St.		
2. Number of Flooded Buildings Points	20	Average Depth of Flooding	1.84
3. Street Overtopping / Public Safety	10	# of Flooded Buildings in Project Area	77
4. Critical Facilities and Historical / Cultural Resources Points	8	Street Overtopping Classification	>1 Nonarterial
5. Economic / Infill Development Points - Is the project location in:	10	Facility Classification	1-Critical
	4	North / Comm Revitalization Area?	2
		Business Improvement District?	2
		Designated Residential Infill Area?	
		CDBG Area?	
		Brownfield Redevelopment Area?	
6. Deliverability / Readiness to Proceed Points		PlansAppr/Complt: ROW/Utility/Relocate?	
7. Drainage System / Infrastructure Condition Points		Number of Deficient Structures	
		Storm Sewer Conditions	
		Reach Condition Indicator	
8. Project Coordination and Timing Points		Ecosystem Restoration?	
9. Environmental Impact Points		Low Impact Development or Rain Gardens?	
		Improve Existing Water Quality/Natural Hydrology?	
		Restore/Preserve Fish and Wildlife Habitat?	
		Education, Quality of Life, Recreation, Other Benefits?	
10. Other Funding Sources Points			
Comments:		CIP#: Perryman Ditch - I-44 Storm Sewer (PE4, 6)	Project Costs: \$4,670,000
Notes On Beneficial Impacts:			
PE4, floodproof 5 buildings, PE6 is 51st System. See PE8,9,10. Half of downstream benefits go to diversion, or 77 buildings and \$1,084,500. From P II-13, direct benefits are \$372,960 AAD, or \$4,255,500 PW, for total of \$5,340,000. PI-4, shows 244 buil			



PERRYMAN DITCH

PHASE 4, ROCKFORD AVE. STORM SEWER

Cost Estimate \$1.6 Million

- Project extends Perryman Ditch Phase 3 Stormsewer further into neighborhood
- Reduces or eliminates street flooding from 49th to 46th Street, Rockford to Troost
- Protects structures from flooding

City of Tulsa Citywide Projects Prioritization CIP #: 446-FC11-002

Creek Name: Perryman Ditch FASA: PE4, 6

Project Name: 51st Street - Phase IV

Project Description: Rockford Ave Storm Sewer from 49th St. to 46th St.

TOTAL POINTS: 52

 Tulsa
A New Kind of Energy.

20	Average Depth of Flooding	1.84
10	# of Flooded Buildings in Project Area	77
8	Street Overflooding / Public Safety	>1 Nonarterial
10	Critical Facilities and Historical / Cultural Resources Points	1-Critical
4	5. Economic / Job Development Points - Is the project location in:	2
	Wetland / Green Infrastructure Area?	
	Business Improvement District?	2
	Designated Recreation / WMA Area?	
	OSB Area?	
	Brownfield Redevelopment Area?	
	6. Deliverability / Readiness to Proceed Points	
	Plan/Type/Comp?	
	ROW/Utility/Relocation?	
	7. Drainage System / Infrastructure Condition Points	
	Number of Detention Basins	
	Storm Sewer Condition	
	Reach Condition Indicator	
	8. Project Coordination and Timing Points	
	9. Environmental Impact Points	
	Resource Resistant?	
	Low Impact (Soil/Grasses or Bare Ground)?	
	Improve Existing Water Quality/Nonpoint Hydrology?	
	Reduce/Potential Risk and Wildlife Habitat?	
	10. Other Funding Sources Points	
	Education, Quality of Life, Recreation, Other Benefits?	

Project Costs: \$1,570,000

Comments: CIP#: Perryman Ditch - I-44 Storm Sewer (PE4, 6)

Notes On Beneficial Impacts:
PE4, floodproof 5 buildings, PE6 is \$1st System. See PE8,9,10. Half of downstream benefits go to diversion, or 77 buildings and \$1,084,500. From P II-13, direct benefits are \$372,980 AAD, or \$4,255,500 PW, for total of \$5,340,000. PI-4, shows 244 buildings.

Citywide Project Prioritization City of Tulsa - Meshek Associates, PLC 2011



STORMWATER/FLOOD CONTROL

EXISTING BACKLOG

High Priority: \$73.8 Million

Medium Priority: \$132.8 Million

Citywide Projects: \$72.5 Million

- Bridge & Culvert Replacement
- Channel Erosion & Stabilization
- Concrete Channel Rehabilitation
- Storm Sewer Repair & Construction
- Detention Facility Rehabilitation
- Coordinating Disciplines: Operations/PED/Trans/Water/Wastewater, etc.

Total All Categories: \$279.1 Million



STORMWATER/FLOOD CONTROL

LOCAL MATCH FOR FEDERAL GRANTS

City Wide Matching Funds **\$1 Million**

- **Federal Emergency Management Agency (FEMA)**
- **Hazard Mitigation Grant Program**
- **Flood Mitigation Assistance**
- **Repetitive Loss Program**
- **Severe Repetitive Loss Program**
- **Cooperating Technical Partner Program Grants**
- **Other Federal Grants**



CITY OF TULSA

STORMWATER/FLOOD CONTROL

SUMMARIZED PROJECT NEEDS

Project	Cost, (\$ 000)
Joe Creek - 47th Street Relief Line	\$ 4,000
Perryman Ditch - Phase 3	\$ 4,700
Perryman Ditch – Phase 4	\$ 1,600
Local Match For Federal Grants	\$ 1,000
Total	\$11,300



Questions?

CITY OF TULSA ENGINEERING SERVICES:

Project Manager – Bill Robison, PE, Lead Engineer, Project Planning and Coordination

Section Manager - Matt Liechti, PE, Manager, Project Planning and Coordination

Director - Paul Zachary, PE