



# 2024 Bond Flood Protection & Storm Drainage Subcommittee

## Technical Criteria for Flood Protection, Drainage, and Erosion Control

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# Overview



- Purpose
- Project Identification and Evaluation
- Project Categories
  - Descriptions
  - Technical Rating Criteria
- Project Scoring for 2024 Bond
- Summary of Needs and Considerations
- Questions



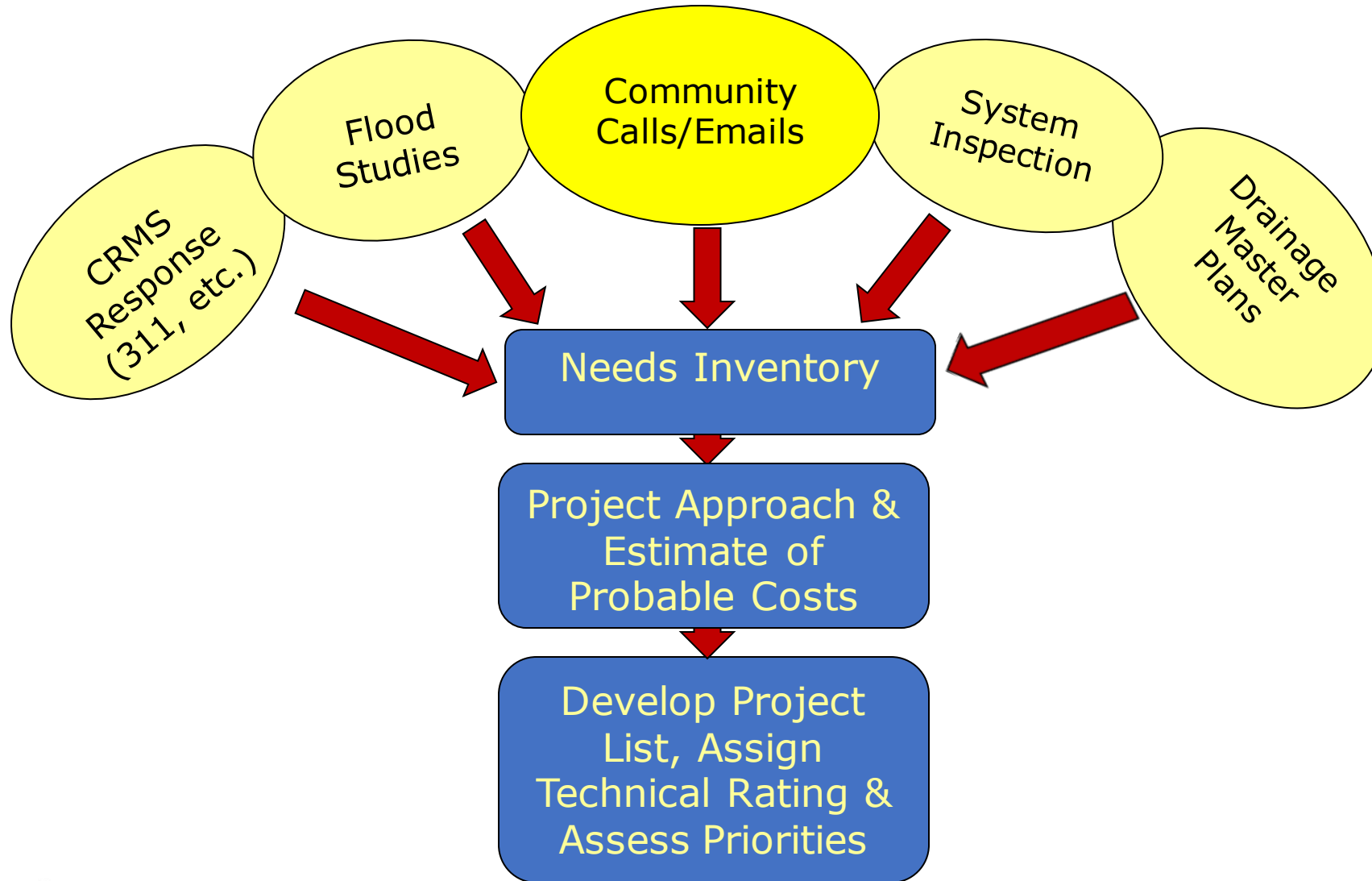
# Purpose



- Provide overview of how projects are identified
- Explain project technical criteria
- Discuss policy and goals for developing flood protection, storm drainage, and erosion projects in the 2024 Bond Program
- Introduce needs inventory and associated data



# Project Identification Process





# Technical Criteria



- Set of measuring tools that City staff uses to evaluate and rate projects from a technical standpoint
- Allows staff to categorize and prioritize projects objectively
- Projects are placed in the needs inventory with an initial technical score and periodically reviewed and updated by staff
- Needs inventory projects are grouped by category



# Flood Protection and Drainage Categories



- Flood Management
- Storm Drainage Relief
- Erosion Control





# Flood Management Category



Implements recommendations from Floodplain Management Plans and Studies including bridges, channels, street pump stations, storm water dams, and voluntary purchase of flood prone properties.

## Technical Ranking Criteria

Frequency of flooding

Depth of flooding (100-year frequency event)

Depth x velocity of flow

Number of structures affected

Ratio of project costs per protected structure

← Cost Benefit



# Storm Drainage Relief Category



Provides drainage relief for areas served by undersized drainage systems, including upgrades and/or extensions of storm drain systems. Also, can include repetitive loss areas

## Technical Ranking Criteria

Type/effects of flooding

Frequency of flooding

Depth of 100-year flooding

Number of affected structures

Ratio of cost/affected structure

← Cost Benefit





# Erosion Control Category



Provides armoring and erosion control for public and private\* property along natural creeks including protection for streets, bridges, alleys and homes

## Technical Ranking Criteria

Ratio of Distance to structure/depth of erosion

Rate of creek bank loss

Ratio of cost to number of structures protected ← Cost Benefit

Type of threat:

1: Homes, garages, streets, alleys, bridges

2: Pools and other permanent structures

3: Fences, yards, privately owned retaining walls

\*1985 City Council Ordinance authorized City to provide erosion protection on private property, subject to willing property owners/easements/etc.



# Example Project – Technical Rating



- Ratio of distance to structure / depth of bank
  - Distance of bank to structure – 11 ft.
  - Depth of bank – 24 ft
  - Ratio – 0.46
  - Points = 35
- Ratio of Creek Bank Loss
  - Moderate = 25 points
- Ratio of Cost/ # Structures Protected
  - Cost - \$437,500
  - Structures – 1
  - Ratio > 150,000
  - Points = 5
- Type of Threat
  - Type I – house
  - Points = 15





# Voluntary Purchase of Flood Prone Properties



- Repetitive loss voluntary purchase opportunities estimated at \$17M (2023) in needs inventory
  - Capital improvements are cost prohibitive
  - Address local or federal programs
- FEMA provides annual updates to the City of eligible properties
- Eligible for federal funding, if grant opportunities exist and are included in the City's Hazard Mitigation Plan
- Protected from disclosure of location under federal regulation





# 2024 Bond Project Scoring



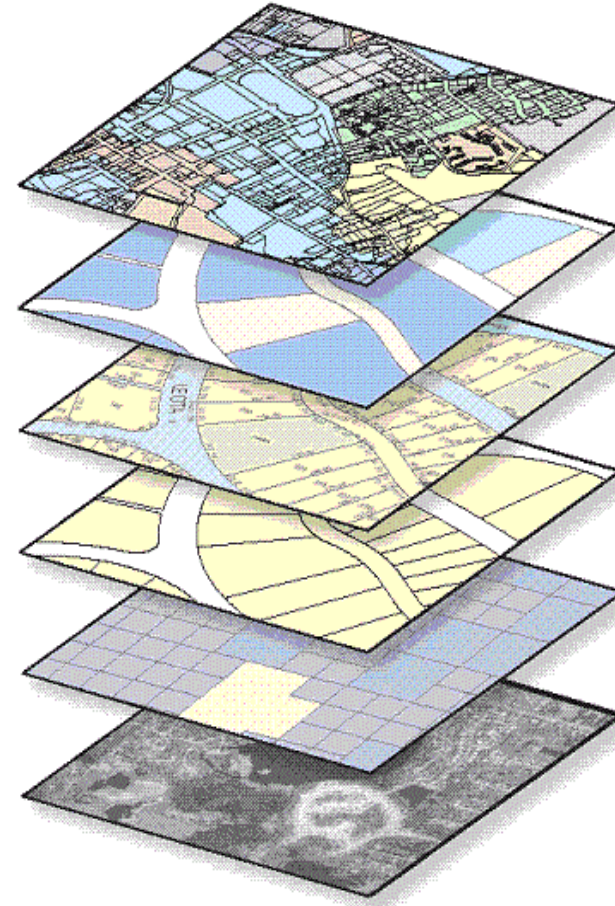
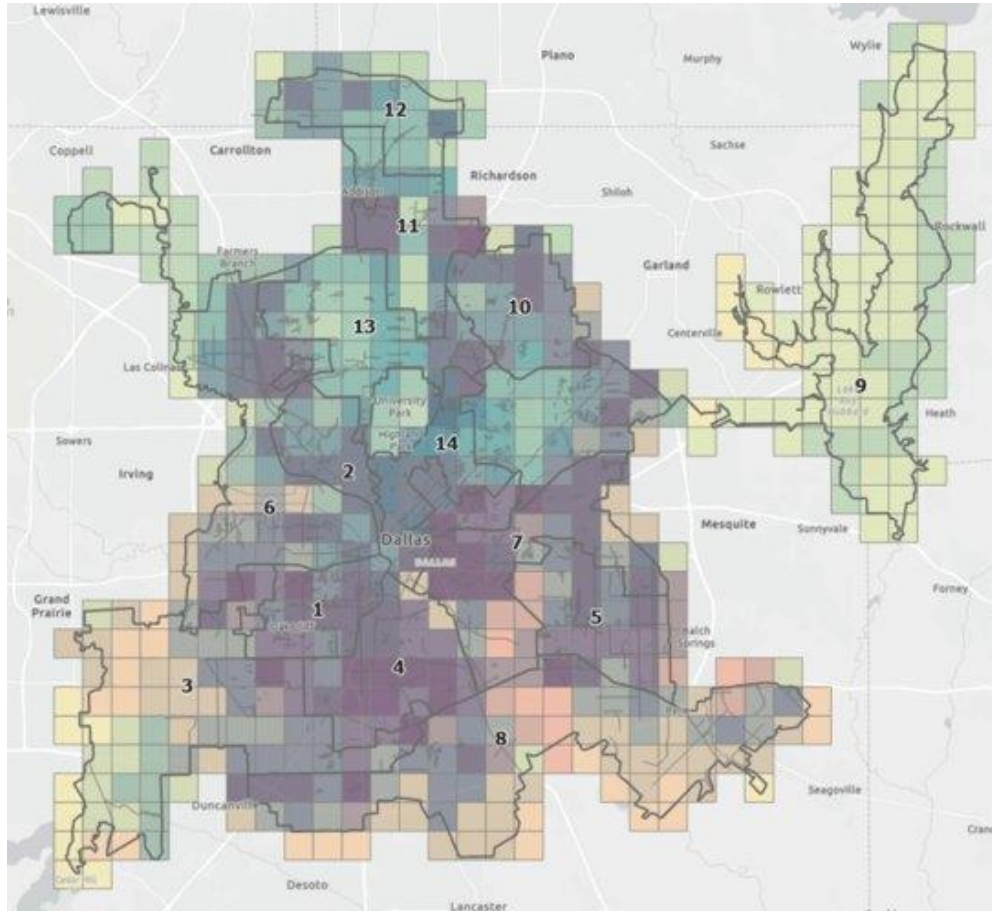
- Each Department uses their own Technical Criteria based on departmental needs/concerns
- Departments score the Needs Inventory with a maximum of 80 points.
- After the technical score has been assigned, points for 'Priority Overlays' area assigned to each project via GIS.
  - 10 points for priority/project overlays
  - 10 points for Equity



# Priority Areas – Overlay Process



- The priority areas were determined by overlaying multiple data layers (see image below) and have been added to the 'GIS Technical Scoring Tool' for reference.



## 2 Points Each, up to 10 points total

High Crime Areas

TOD (DART Sites)

Market Value Analysis

311 Service Requests

Identifying calls for Flooding, Speeding, Traffic Calming, Potholes, Street Resurfacing, and Illegal Dumping

Intersection/ Project Overlay

## Up to 10 Points

Equity Impact Assessment (EIA) Score

- Entire City is ranked 1-5
- EIA score multiplies ranking by 2 for total points used





# Summary of Projects and Cost Estimates



Category	Number of Projects	Total Cost <sup>[1]</sup>
Erosion Control	113	<del>\$72,737,500</del> \$83,648,125
Flood Management <sup>[2]</sup>	141	<del>\$1,033,255,000</del> \$1,188,243,250
Storm Drainage	169	<del>\$1,136,598,000</del> \$1,307,087,700
Totals	423	<del>\$2,242,590,500</del> \$2,578,979,075



Aug 23, 2022 — Alcalde Street

[1]: In 2023 dollars; red escalated by 5% per year to 2026

[2]: Excluding active Dallas Floodway Projects funded by the USACE





# Evaluation Process



## Technical Criteria

- ***Primary Focus: Public Safety!!***
- Project cost effectiveness
- Number of people and properties benefitted

## Balancing Criteria:

- Supports Neighborhood and Community Needs
- Supports Economic Development
- Supports enhanced Quality of Life and Environmental Initiatives
- Leverages matching funds, cost share agreements

## Typical Priority Order:

*Critical Infrastructure*

*Community Needs*

*Other Projects with Local Impact as Funding Allows*



# Needs Inventory



- Living list of identified projects that have been evaluated and scored by staff based on technical criteria
- Anticipated project scope determined by studies, master plans, preliminary engineering, and staff evaluation
- Cost estimates based on previous studies and staff evaluation (typically high-level estimates)
- Technical scores, scope, and cost estimates reviewed periodically and at time of new service requests or changes in site conditions



# Needs Inventory



NeedsID	ProjectID	Name	Program	Project Type	Category	Department	Description	Council	Score	Estimate	CreatedOn	ModifiedOn
3538	PB174642	Brooklawn 6718	Flood Protection and Storm Drainage	New	Erosion Control	DWU	Brooklawn Branch - Private - Threat to home; 175 LF gabion wall, 15' height. Evaluate for voluntary purchase	3	53.2	\$612,500	11/20/2014	4/4/2024
24420	TWM000075	Woody Branch Floodplain Management Study	Flood Protection and Storm Drainage	New	Flood Management	DWU	Floodplain Management study of the Woody Branch Watershed to determine flood control and erosion control options.	CW	130	\$320,000	12/28/2016	4/28/2023
42570	FP22511	Sanford Ave Relief System (Little Forest Hill) Phase 2	Flood Protection and Storm Drainage	New	Storm Drainage	DWU	Continuation of the Sanford Ave Relief System project. 100-year drainage improvements from Sanford Ave @ Daytonia to Tavaros @ Forest Hills Blvd.	9	81	\$3,520,000	11/1/2022	4/24/2023
3647	PB2206	Groveland 8920, San Leandro 90222, and Eustis Ave 8802	Flood Protection and Storm Drainage	New	Storm Drainage	DWU	Analysis, design, & const. 100-year drainage improvements. Either upsize pipe, enclose channel, and/or construct parallel system. Address outfall/channel erosion.	9	60	\$4,500,000	11/20/2014	4/24/2023
3803	PB3259	Ravinia South, 503	Flood Protection and Storm Drainage	New	Storm Drainage	DWU	Evaluate for Voluntary Purchase or design/construct capital drainage Project. Non-Repetitive Loss property. Site 16L 1997 Misc Flooding Report	1	33	\$835,000	11/20/2014	4/21/2023
33237	FP20F04	North Davillia Drive Estates Channel Improvements (3755 Clover Lane)	Flood Protection and Storm Drainage	Rehabilitation	Flood Management	DWU	Design & Const of channel replacement of the North Davillia Drive Estates from Clover Lane to Lenel Place.	6	66	\$5,020,000	10/27/2020	4/20/2023
42564	FP23E04	Preston Creek 6144	Flood Protection and Storm Drainage	New	Erosion Control	DWU	White Rock Creek Tributary 6 - Private - home threatened, 11' from bank 24' deep. Approx. 125 LF of erosion protection	11	72	\$437,000	3/28/2023	4/10/2023





# Needs Inventory Statistics



CD	Erosion (\$)	% of Total CD Needs by \$	Flood Mngmt (\$)	% of Total CD Needs by \$	Storm Drainage (\$)	% of Total CD Needs by \$	Total Needs (\$)	% of All Needs by \$	Total Needs (\$) 2026 Cost Estimate (Assume 5% Inflation per year)
1	\$6,352,500.00	5.4%	\$49,665,000.00	42.4%	\$61,115,000.00	52.2%	<b>\$117,132,500.00</b>	4.6%	<b>\$134,150,375.00</b>
2	\$1,600,000.00	0.5%	\$189,795,000.00	55.3%	\$152,065,000.00	44.3%	<b>\$343,460,000.00</b>	13.4%	<b>\$394,979,000.00</b>
3	\$7,987,000.00	15.4%	\$33,460,000.00	64.3%	\$10,553,000.00	20.3%	<b>\$52,000,000.00</b>	2.0%	<b>\$59,800,000.00</b>
4	\$10,038,000.00	11.3%	\$20,761,000.00	23.4%	\$58,054,000.00	65.3%	<b>\$88,853,000.00</b>	3.5%	<b>\$102,180,950.00</b>
5	\$1,085,000.00	3.6%	\$27,782,000.00	91.3%	\$1,555,000.00	5.1%	<b>\$30,422,000.00</b>	1.2%	<b>\$34,985,300.00</b>
6	\$8,487,500.00	2.6%	\$254,710,000.00	79.3%	\$58,025,000.00	18.1%	<b>\$321,222,500.00</b>	12.5%	<b>\$369,405,875.00</b>
7	\$6,972,000.00	9.0%	\$44,981,000.00	57.8%	\$25,920,000.00	33.3%	<b>\$77,873,000.00</b>	3.0%	<b>\$89,553,950.00</b>
8	\$1,424,500.00	1.1%	\$127,142,000.00	97.4%	\$2,005,000.00	1.5%	<b>\$130,571,500.00</b>	5.1%	<b>\$150,157,225.00</b>
9	\$11,651,500.00	5.0%	\$52,142,000.00	22.4%	\$168,740,000.00	72.6%	<b>\$232,533,500.00</b>	9.1%	<b>\$267,413,525.00</b>
10	\$7,868,000.00	26.8%	\$10,222,000.00	34.8%	\$11,261,000.00	38.4%	<b>\$29,351,000.00</b>	1.1%	<b>\$33,753,650.00</b>
11	\$3,244,000.00	13.6%	\$195,000.00	0.8%	\$20,405,000.00	85.6%	<b>\$23,844,000.00</b>	0.9%	<b>\$26,535,100.00</b>
12	\$4,147,500.00	45.5%	\$-	0.0%	\$4,960,000.00	54.5%	<b>\$9,107,500.00</b>	0.4%	<b>\$10,473,625.00</b>
13	\$1,880,000.00	1.4%	\$23,975,000.00	17.6%	\$110,470,000.00	81.0%	<b>\$136,325,000.00</b>	5.3%	<b>\$156,773,750.00</b>
14	\$-	0.0%	\$54,000,000.00	50.5%	\$53,000,000.00	49.5%	<b>\$107,000,000.00</b>	4.2%	<b>\$123,050,000.00</b>
CW	\$-	0.0%	\$355,625,000.00	41.1%	\$509,205,000.00	58.9%	<b>\$864,830,000.00</b>	33.7%	<b>\$994,554,500.00</b>
<b>Totals*</b>	<b>\$72,737,500.00</b>	<b>2.8%</b>	<b>\$1,244,455,000.00</b>	<b>48.5%</b>	<b>\$1,247,333,000.00</b>	<b>48.6%</b>	<b>\$2,564,525,500.00</b>	<b>100%</b>	<b>\$2,947,766,825.00</b>

Note: Total different from Needs Summary because some projects are listed under multiple Council Districts



# Citywide Projects



- System-wide project or projects that have regional impact
- Serve multiple council districts or can be considered City-wide programs
- Typically have higher costs but not always
- Examples for Flood Protection and Storm Drainage:
  - Drainage Basin Relief Systems (Mill Creek – recall the tour)
  - Levee Drainage Systems (Able Pump Stations – tour)
  - Floodplain Management Studies
  - Voluntary Purchase Programs



# Flood Management & Drainage Considerations



- Majority of flood protection category to focus on **Citywide** projects?
- Prefer a **neighborhood** focus?
- **Mix** of Citywide and neighborhood projects



May 2021: 25-Year Storm - Meaders Ln



# Erosion Control Considerations



- Continue to provide erosion control to **private** property?
- Place higher weight to **public infrastructure** or focus on **private property** for bond?
- Provide erosion control on **residential, non-rental property** only?



Summer Creek Circle



# Voluntary Purchase Considerations



- Purchase Flood Prone Properties?
- If so, strictly use FEMA guidelines of purchase of repetitive loss properties that are identified in their database only?
- Consider purchase of properties where the cost of related improvements exceeds the cost of purchase?



# Additional Bond Considerations



- Attempt to provide the same value of improvements to each CD?
- Base recommendations on project score?
- Recommendations based on ratio of needs in each CD?
- Recommendations based on combination of above?
- Consider amount of time project has been in the Needs Inventory?
- Consider number of documented service requests for location?





# Additional Bond Considerations(Cont'd)



- Proximity to other selected projects?
- Allocation of funding by type of project? As an example, 20% for EC and 80% for FM and SD.
- Include projects already in 10-year capital plan if they can be started/completed sooner by Bond?
- Include signature project?
- Provide cost cap on individual project, and consider higher value for signature project and/or Citywide projects?





# Questions?



# 2024 Bond Flood Protection & Storm Drainage Subcommittee

## Technical Criteria for Flood Protection, Drainage, and Erosion Control

The logo of the City of Dallas, featuring a stylized white 'D' with a three-lobed leaf inside, set against a dark blue background with a fine white grid pattern.

**City of Dallas**

Matt Penk, P.E., Assistant Director  
Eduardo Valerio, P.E., Assistant Director  
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Dallas Water Utilities  
May 25, 2023



**EROSION CONTROL CRITERIA RATING FORM  
DALLAS WATER UTILITIES STORMWATER OPERATIONS**

This category would provide armoring of natural creek banks to protect soil against further erosion loss. Potential projects are classified by type as follow:

- Type I: Threat to houses, attached garages, streets, alleys and bridges.
- Type II: Threat to pools and other permanent structures not included in Type I.
- Type III: Threat to fences, yards and private retaining walls.

Project:		Date:
Criteria		Points
1	Ratio of (distance creek bank to structure/depth of creek)	
2	Rate of creek bank loss	
3	Ratio of (cost/number of structures protected)	
4	Type of Threat	
Total Points:		
<b>SCORE = (TOTAL POINTS X 0.8696) + (3 - Ratio Value) =</b>		

Criteria:

1. Ratio of (distance to structure)/(depth)

<u>Ratio value</u>	<u>Points</u>	<u>Ratio value</u>	<u>Points</u>	Distance (FT): _____
0 to 0.25	40	1.26 to 1.50	10	Depth (FT): _____
0.26 to 0.59	35	1.51 to 2.00	5	Ratio (RV): _____
0.60 to 1.00	30	Greater than 2.00	0	
1.01 to 1.25	20			

2. Rate of creek bank loss

<u>Rate</u>	<u>Points</u>	<u>Rate</u>	<u>Points</u>
Rapid	40	Moderately slow	20
Moderately fast	30	Slow	10
Moderate	25	Very slow	5

3. Ratio of (cost)/(number of structures protected)

<u>Ratio</u>	<u>Points</u>	Length of Wall (FT): _____
0 to 50,000	20	Unit Price (\$/LF) _____
50,001 to 150,000	15	Estimated Cost (\$) _____
Greater than 150,000	5	No. of Structures: _____
		Ratio: _____

4. Type of threat

<u>Type</u>	<u>Points</u>
I	15
II	5
III	0

Comments:

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**FLOOD MANAGEMENT CRITERIA RATING FORM  
DALLAS WATER UTILITIES STORMWATER OPERATIONS**

This category includes sites for which channel improvements, levees, detention basins, or bridge or culvert replacements are necessary to reduce flooding; also included is the voluntary purchase of homes in the flood plain when no other viable alternative exists.

Project:		Date:
	Criteria	Points
1	Frequency of flooding	
2	Depth of flooding	
3	Depth and velocity of flow over bridges (100-year)	
4	Number of affected structures X 3	
5	Ratio of (cost/affected structures)	
		<b>SCORE:</b>

Criteria:

1. Frequency of flooding

<u>Frequency</u>	<u>Points</u>	<u>Frequency</u>	<u>Points</u>
2-year or less	25	25-year	15
5-year	20	100-year	10
10-year	18		

2. Depth of flooding (100-year)

<u>Depth</u>	<u>Points</u>	<u>Depth</u>	<u>Points</u>
4 feet or more	30	1 to 2 feet	15
2 to 4 feet	25	less than 1 foot	5

3. Depth and velocity of flow over bridges (100-year)

Depth of flow on roadway (FT): \_\_\_\_\_  
 Velocity over roadway (FPS): \_\_\_\_\_  
 Points: \_\_\_\_\_

4. Number of affected structures X 3

Affected structures include the following: residential structures, commercial structures, roadways, and bridges.

No.: \_\_\_\_\_  
 x        3  
 Points: \_\_\_\_\_

5. Ratio of cost per affected structure

<u>Value</u>	<u>Points</u>
Less than 100,000	10
100,000 to 500,000	5
Greater than 500,000	1

Estimated Cost (\$): \_\_\_\_\_  
 No. of Structures: \_\_\_\_\_  
 Ratio: \_\_\_\_\_

Comments:

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**STORM DRAINAGE RELIEF SYSTEM CRITERIA RATING FORM  
DALLAS WATER UTILITIES STORMWATER OPERATIONS**

This category includes additional drainage inlets and storm sewer pipe systems to optimize existing inadequate drainage system in developed areas.

Project:		Date:
Criteria		Points
1	Type/Effect of flooding	
2	Frequency of flooding	
3	Depth of flooding	
4	Number of affected structures X 3	
5	Ratio of cost per affected structure	
		<b>Score:</b>

Criteria:

1. Type/Effect of flooding

<u>Type/Effect</u>	<u>Points</u>
Multiple structures	20
Single structure	10
Street only	5

2. Frequency of flooding

<u>Frequency</u>	<u>Points</u>	<u>Frequency</u>	<u>Points</u>
2-year or less	25	25-year	15
5-year	20	100-year	10
10-year	18		

3. Depth of flooding (100-year)

<u>Depth</u>	<u>Points</u>	<u>Depth</u>	<u>Points</u>
4 feet or more	30	1 to 2 feet	15
2 to 4 feet	25	less than 1 foot	5

4. Number of affected structures X 3

Affected structures include the following: residential structures, commercial structures, roadways, and bridges.

No.: \_\_\_\_\_  
x 3  
Points: \_\_\_\_\_

5. Ratio of cost per affected structure

<u>Value</u>	<u>Points</u>
Less than 100,000	10
100,000 to 500,000	5
Greater than 500,000	1

Estimated Cost (\$): \_\_\_\_\_  
No. of Structures: \_\_\_\_\_  
Ratio: \_\_\_\_\_

Comments:

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