

Farmers Branch Creek Long-Term Solutions

*City Council Meeting
June 12, 2019*



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Agenda

- Introduction
- Background and Initial Study
- Key Events Timeline
- Design and Construction of Emergency Solutions
- Long-Term Design Options Evaluation
- Discussion



Meeting Objectives

- Discuss Long-Term Design Options
- Assist in Policy Decision Process
- Receive Input
- Discuss Future Steps



FNI Team



David Rivera, PhD, PE, CFM

- Professional Engineer
- Certified Floodplain Manager
- Experience: 15 years
- Senior Project Manager for environmental and stormwater projects.
- Expertise: Hydrologic and hydraulic modeling for flood control studies, flood control reservoir operations.



Scott Hubley, PE, CFM

- Professional Engineer
- Certified Floodplain Manager
- Experience: 13 years
- North Texas Stormwater Group Manager
- Expertise: Planning and design of stormwater infrastructure including closed systems, open channels, and stream restoration



John Rutledge, PE

- Professional Engineer
- Experience: 34 years
- Nationally recognized water resources professional
- Expertise: flood modeling, dam design and rehabilitation
- Engineer-of-record or lead engineer for the design of more than \$300 million of construction for dams, levees, and spillways.




Jim Keith, PE, CFM

- Professional Engineer
- Certified Floodplain Manager
- Experience: 18 years
- Dallas Stormwater Team Manager
- Expertise: flood risk management, dam and levee evaluation, master drainage plans, and flood warning systems.




FNI performed Farmers Branch Creek Watershed Study

- Completed July/2018
- Identified flooding and erosion risks
- Developed potential solutions
- Worked with Stormwater Advisory Committee to create prioritized CIP



Innovative approaches
Practical results
Outstanding service




FARMERS BRANCH CREEK WATERSHED STUDY

FBR16407

FINAL REPORT

Prepared for:
City of Farmers Branch, Texas
July 2018

Prepared by:
FREESE AND NICHOLS, INC.
2711 North Haskell Avenue, Suite 3300
Dallas, Texas 75204
214-217-2200





CIP Project Prioritization


Farmers Branch Watershed Study

City Council Study Session Meeting

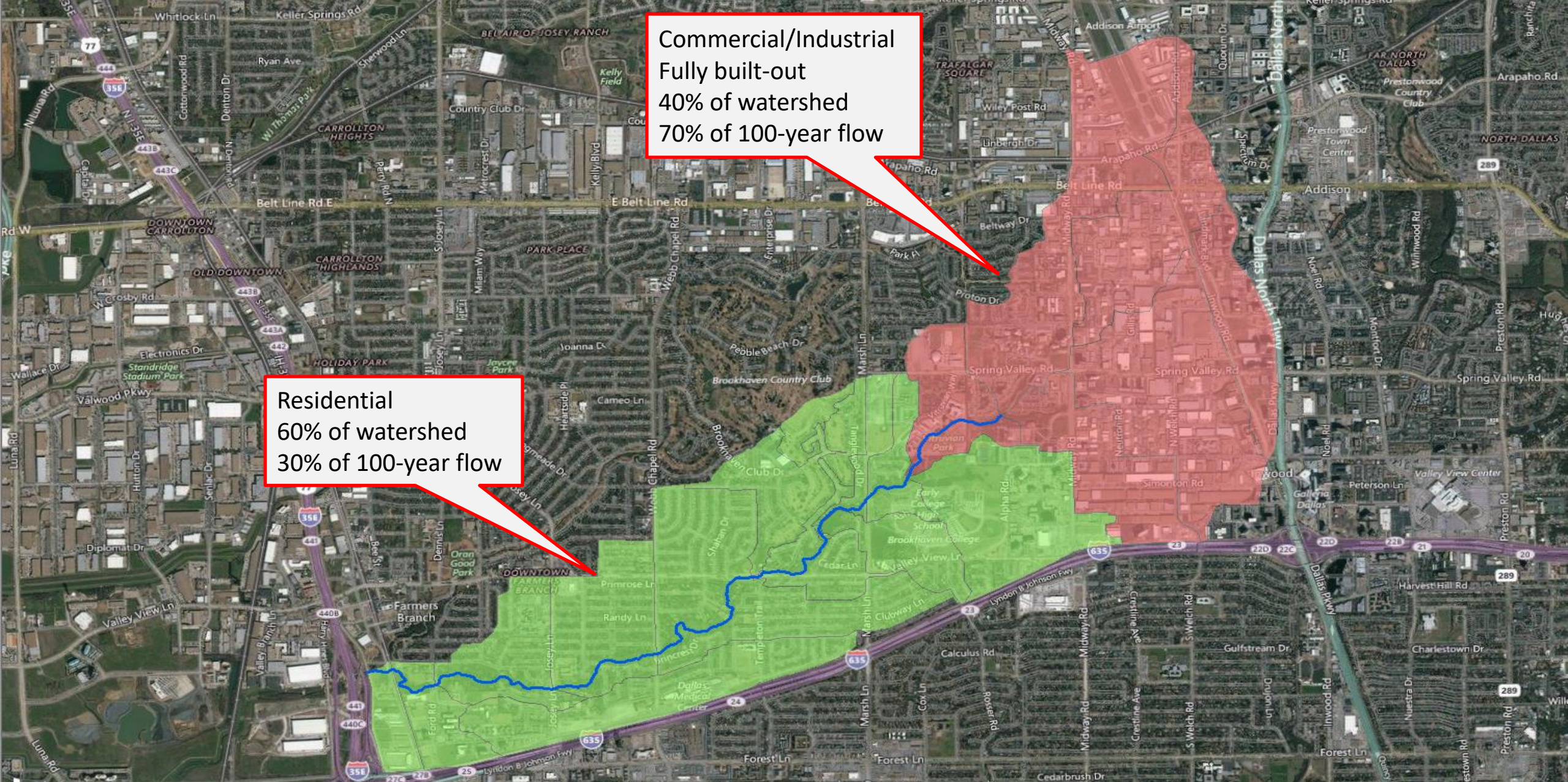
June 19, 2018



2711 N. Haskell Ave, Suite 3300
Dallas, Texas 78204
214-217-2200









61 homes in 100-year floodplain (1% annual probability)

Flooding risk over 30-yr period = 26%

Flood Risk (Prior to Sep/2018)



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Capital Improvements Program

ADJUSTED COST PROJECTIONS

Original Cost Projections \$21,726,400

CIP Projects cost adjusted

- Total Projects: \$4,469,000
 - Emergency Repairs: \$ 167,559
 - Additional Study: \$ 100,000
 - Potential Buyouts: \$1,000,000
- Adjusted Total Cost: \$5,736,559

COOKS CREEK GRANT

- Applied For 2 Grants
- \$770K Participation
- Timing mid to late 2019

OVERALL CREEK PROJECTED COST

\$6,506,559

Rank	Reference Address	Project Type	Project ID	Project Cost	Score
1	Webb Chapel Rd Bridge	Erosion Control	E16	\$623,700	10.0
2	3100 Block of Brookhollow Dr	Erosion Control	E12	\$764,340	17.3
3	2900 Block of Maydelle Ln	Erosion Control	E20	\$76,560	16.7
4	12200 Block of Treeview Ln	Erosion Control	E21	\$243,330	16.5
5	3500 Block of Valley View Ln	Erosion Control	E7	\$1,138,840	15.9
6	3300 Block of Chaparral Dr	Erosion Control	E9	\$117,690	15.6
7	3100 Block of Brookhollow Dr	Erosion Control	E10	\$214,110	15.3
8	3300 Block of Valley View Ln	Erosion Control	E8	\$128,230	14.7
9	Farmers Branch Lane	Flood Risk Reduction	FC1-Alt2	\$5,000,000	14.6
10	Josey Lane to Veronica Road	Flood Risk Reduction	FC2-Alt2	\$5,000,000	14.5
11	3200 Block of Brincrest Dr	Erosion Control	E14	\$42,550	14.3
12	2900 Block of Maydelle Ln	Erosion Control	E19	\$47,320	13.7
13	Lost Vally Dr	Erosion Control	E13	\$163,980	13.7
14	13100 Block of Glad Acres Dr	Erosion Control	E6	\$309,850	13.4
15	13200 Block of Cedar Ln	Erosion Control	E5	\$495,010	13.1
16	13800 Block of New Bark Cir	Erosion Control	E3	\$267,050	12.5
17	13800 Block of Wooded Creek Dr	Erosion Control	E4	\$53,020	12.1
18	2900 Block of Maydelle Ln	Erosion Control	E18	\$29,700	12.1
19	3000 Block of Selma Ln	Erosion Control	E17	\$131,950	11.8
20	3200 Block of Brincrest Dr	Erosion Control	E15	\$139,740	11.4
21	Farmers Branch Lane	Flood Risk Reduction	FC1-Alt1	\$2,000,000	11.4
22	3700 Block of Wooded Creek Ln	Erosion Control	E2	\$130,620	11.1
23	3900 Block of Valley View Ln	Erosion Control	E1	\$1,388,130	10.0
24	12200 Block of Brisbane Ave	Erosion Control	E11	\$105,730	9.9
24	2800 Block of Reederft Dr	Erosion Control	E22	\$59,250	9.0
26	Marsh Lane	Flood Risk Reduction	FC3-Alt2	\$5,000,000	9.5
27	2700 Block of Farmers Branch Ln	Erosion Control	E23	\$55,690	9.4
28	Josey Lane to Veronica Road	Flood Risk Reduction	FC2-Alt1	\$2,000,000	9.3
29	Marsh Lane	Flood Risk Reduction	FC3-Alt1	\$2,000,000	8.0

February 20, 2019



Key Events Since September 2018

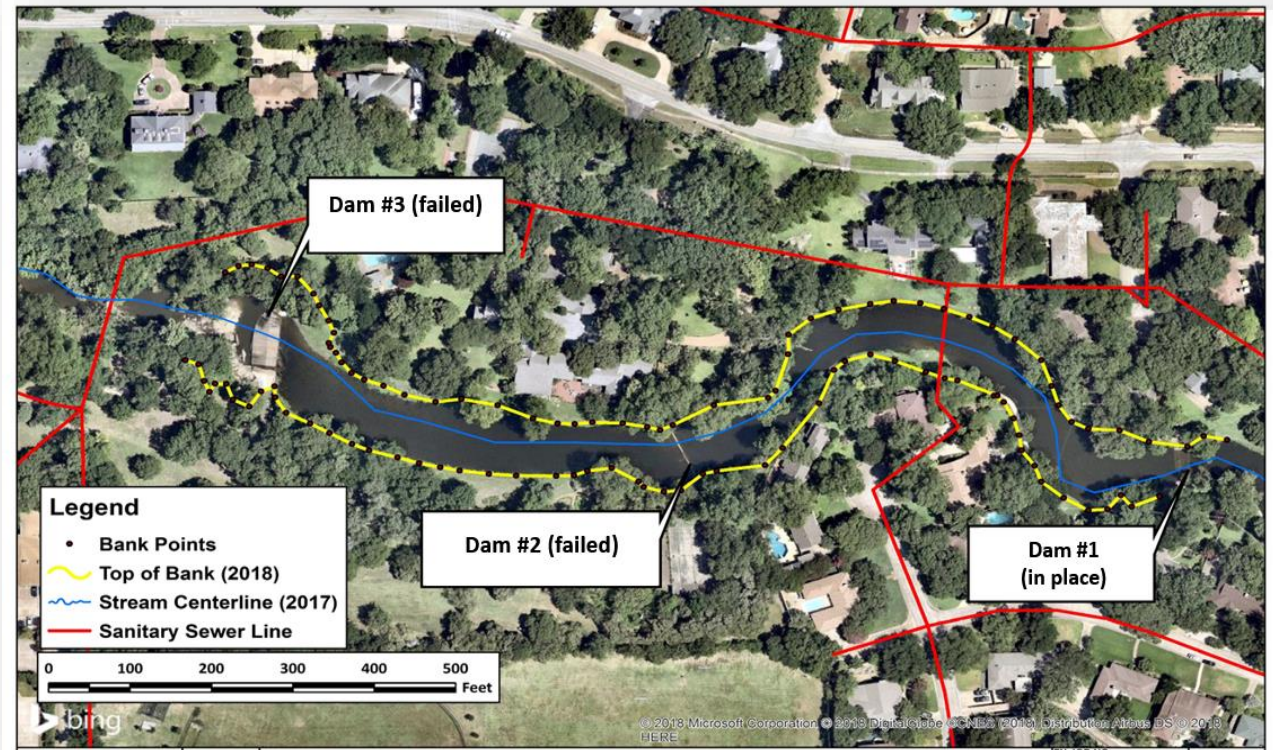
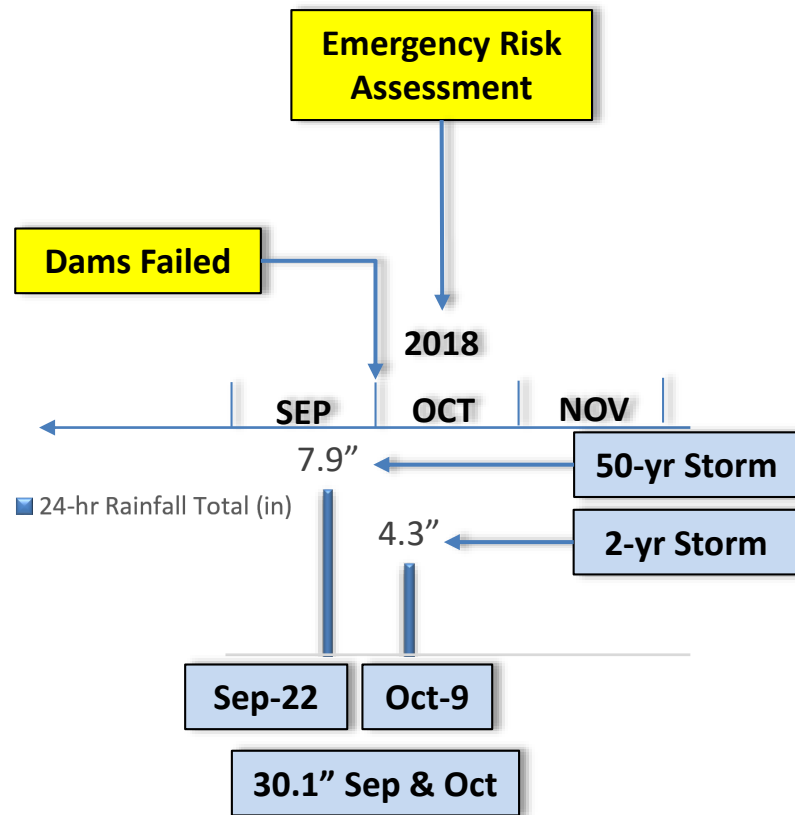


Dam #3 Prior to Record Rainfall of Sep/Oct 2018



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Sequence of Events



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Google Earth

Conditions Prior to October 2018



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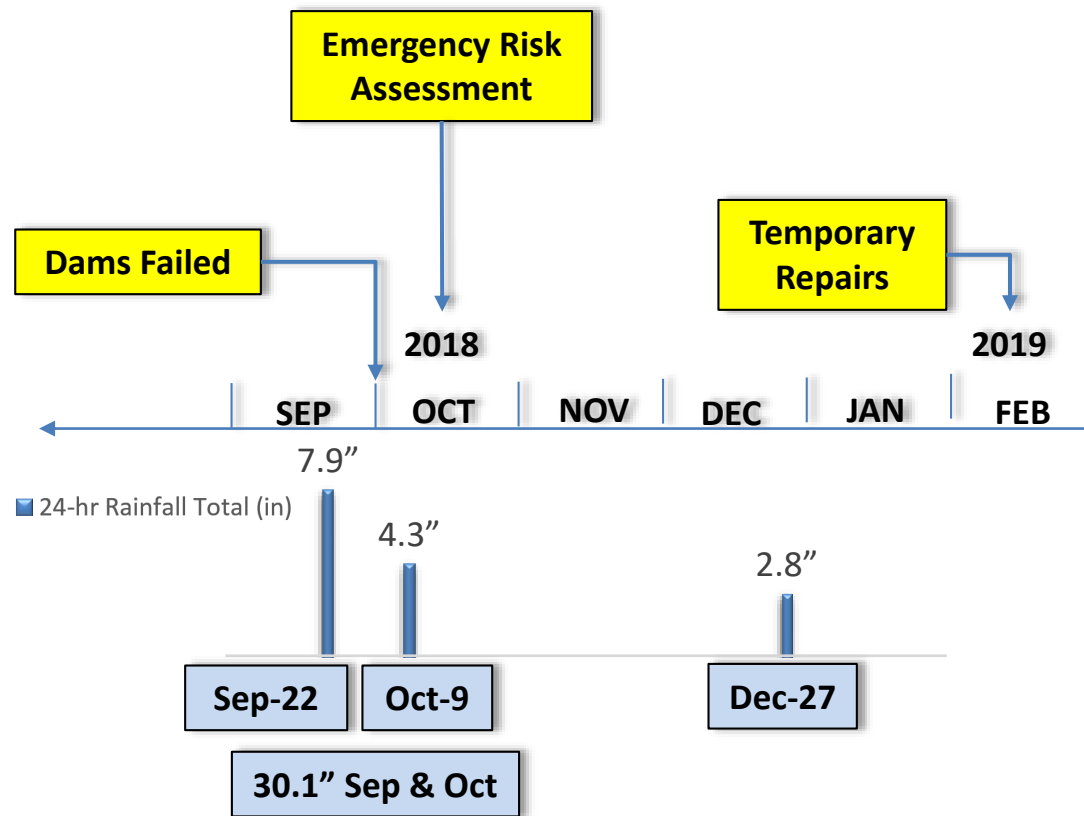


Conditions after Storm Events of October 2018



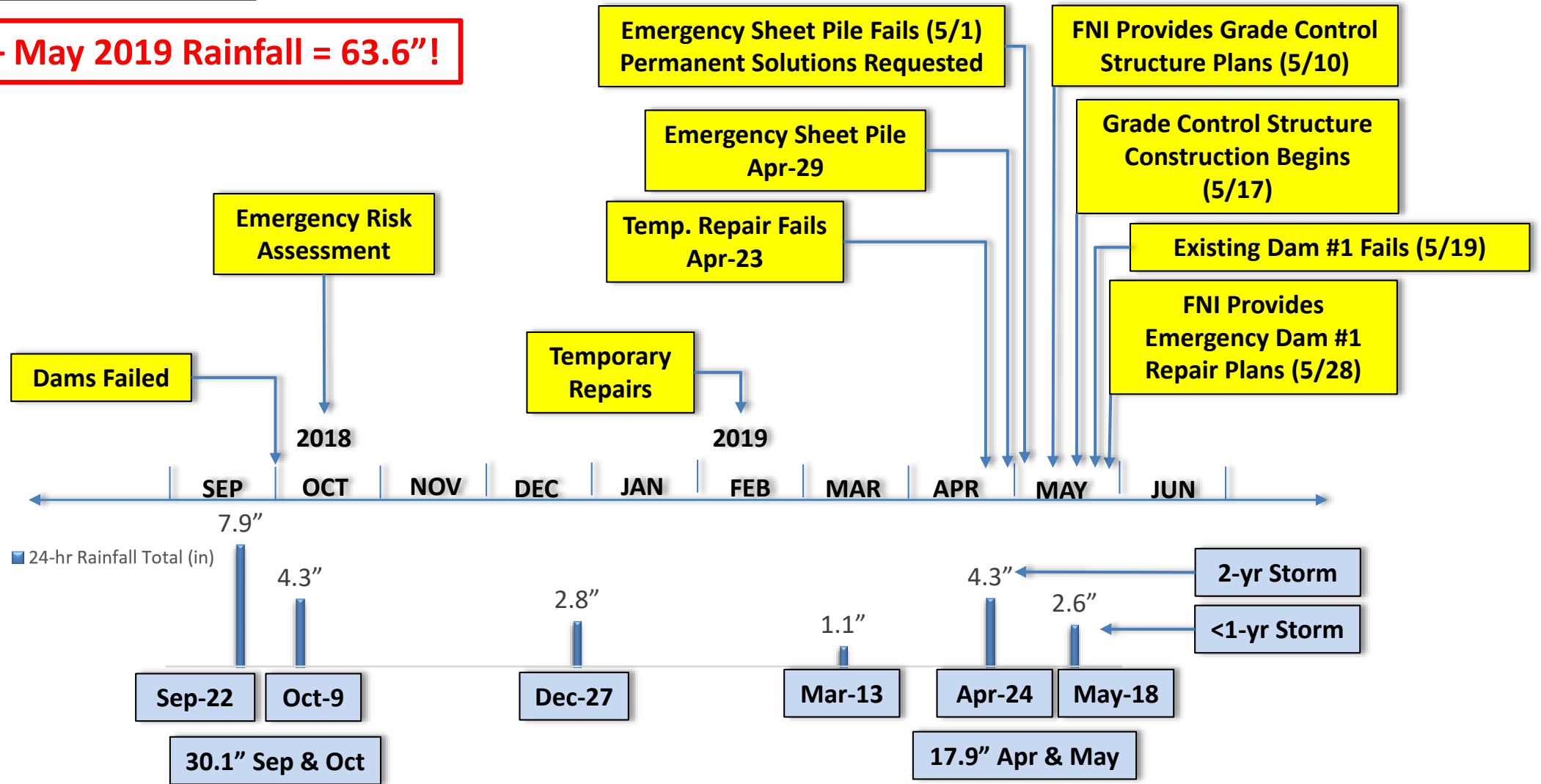
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Normal Annual Rainfall = 38"

Aug 2018 – May 2019 Rainfall = 63.6"!



Design and Construction of Emergency Solutions



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Sewer Line

Sheet Piles

Sheet Pile Drop Structure Under Construction



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Dam #1 fails - May 19, 2019

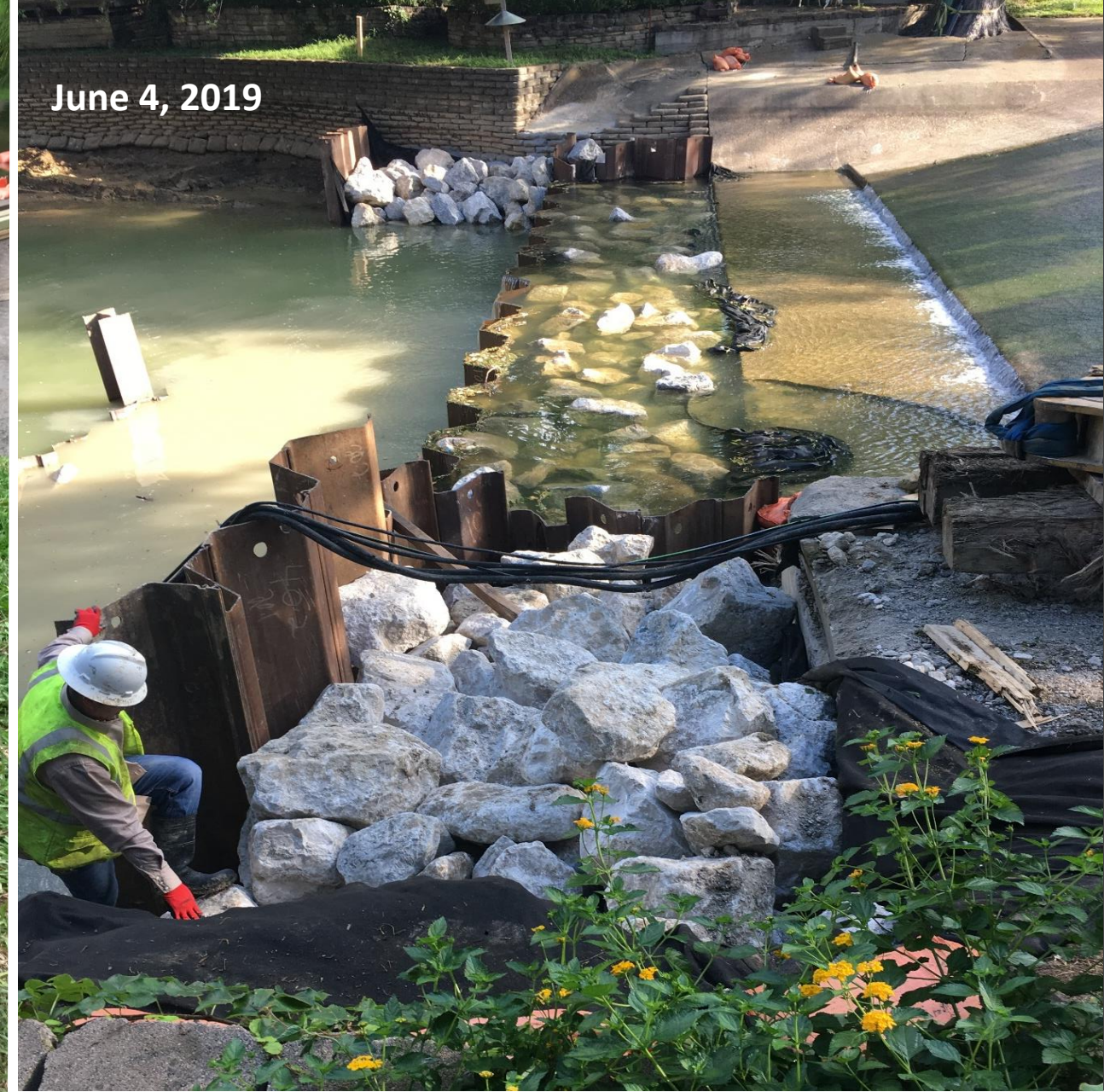


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May 28, 2019



June 4, 2019

Dam # 1 Emergency Repairs



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1.Time
2.Weather

Sheet Piles – Emergency Solution



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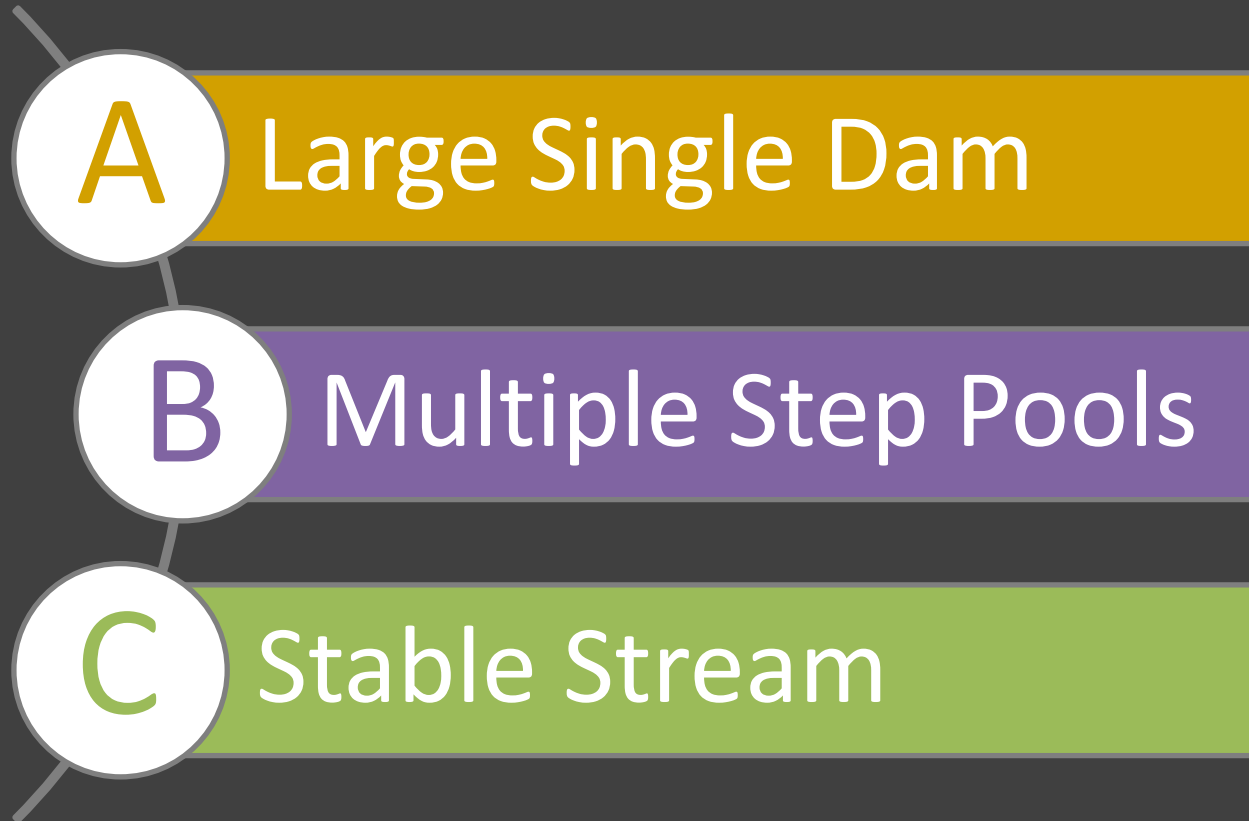


Options for Long-Term Solutions

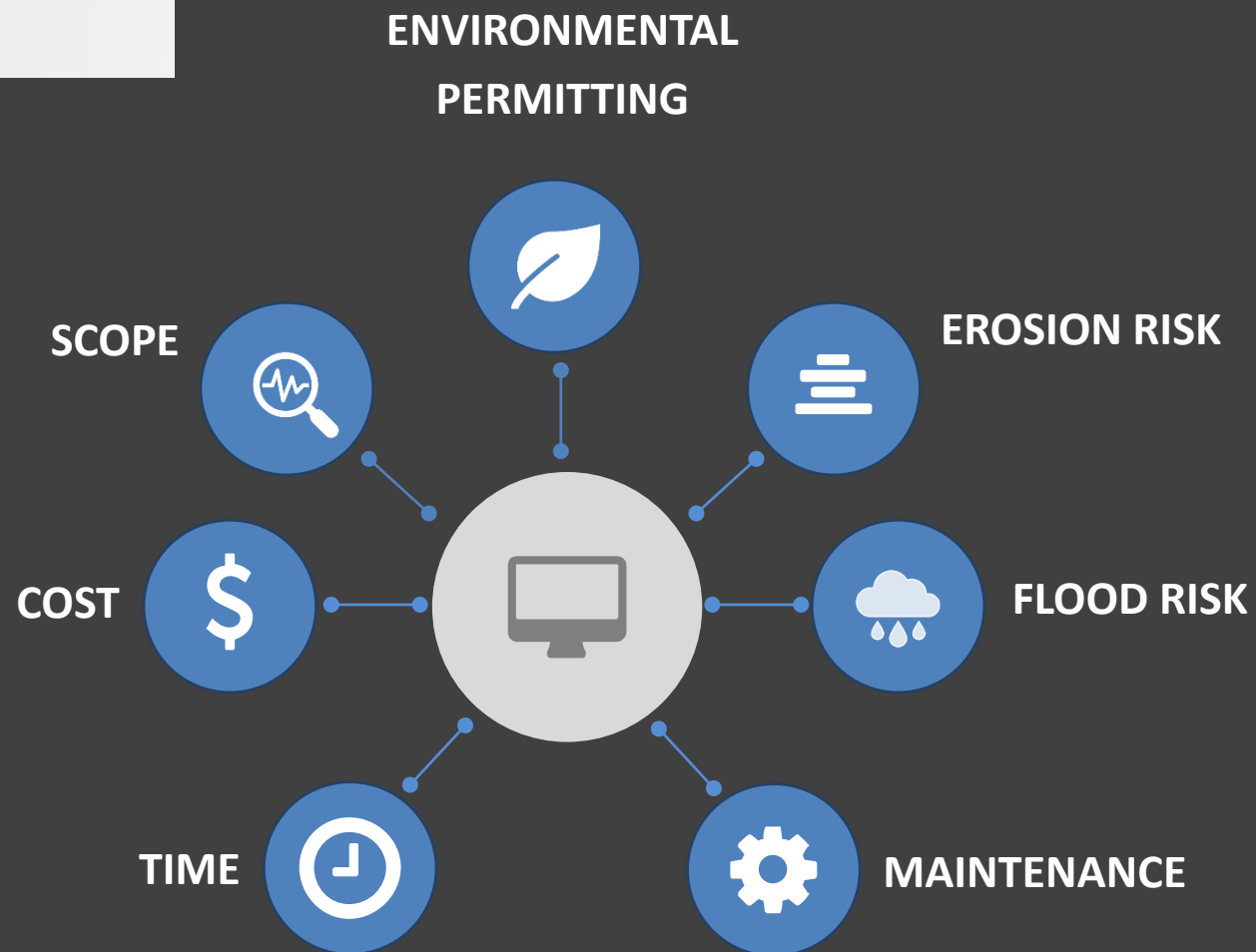


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Comparison Criteria



Option A – Large Single Dam



Option A – Large Single Dam

4627 SW Loop 820
Fort Worth, Texas

Google

Street View - Dec 2018



Evaluating Solutions



Scope



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Option A – Large Single Dam



Option A – Large Single Dam



Option A – Large Single Dam

	Scope	✓ Complete drop structure to protect sanitary sewer line, repairs to Dam #1, Restore Dam #3 to original 14 ft height, localized and reach scale bank stabilization.
	Time	✓ Design and Construction – 1.5 years Permitting – 6 months to 2 years
	Cost	✓ \$5,600,000 (Does not include current improvements)
	Maintenance	✓ High long-term maintenance. Easement acquisition will be required. Dredging program is required (5-yr intervals).
	USACE	✓ Nationwide Permits with Pre-Construction Notification, or standard Individual Permit (IP)
	Flood Risk	✓ Increases flood risk to Pre-September 2018 levels (highest risk level)
	Erosion Risk	✓ Provides localized long-term protection against erosion. Restored pool level provides additional erosion protection.



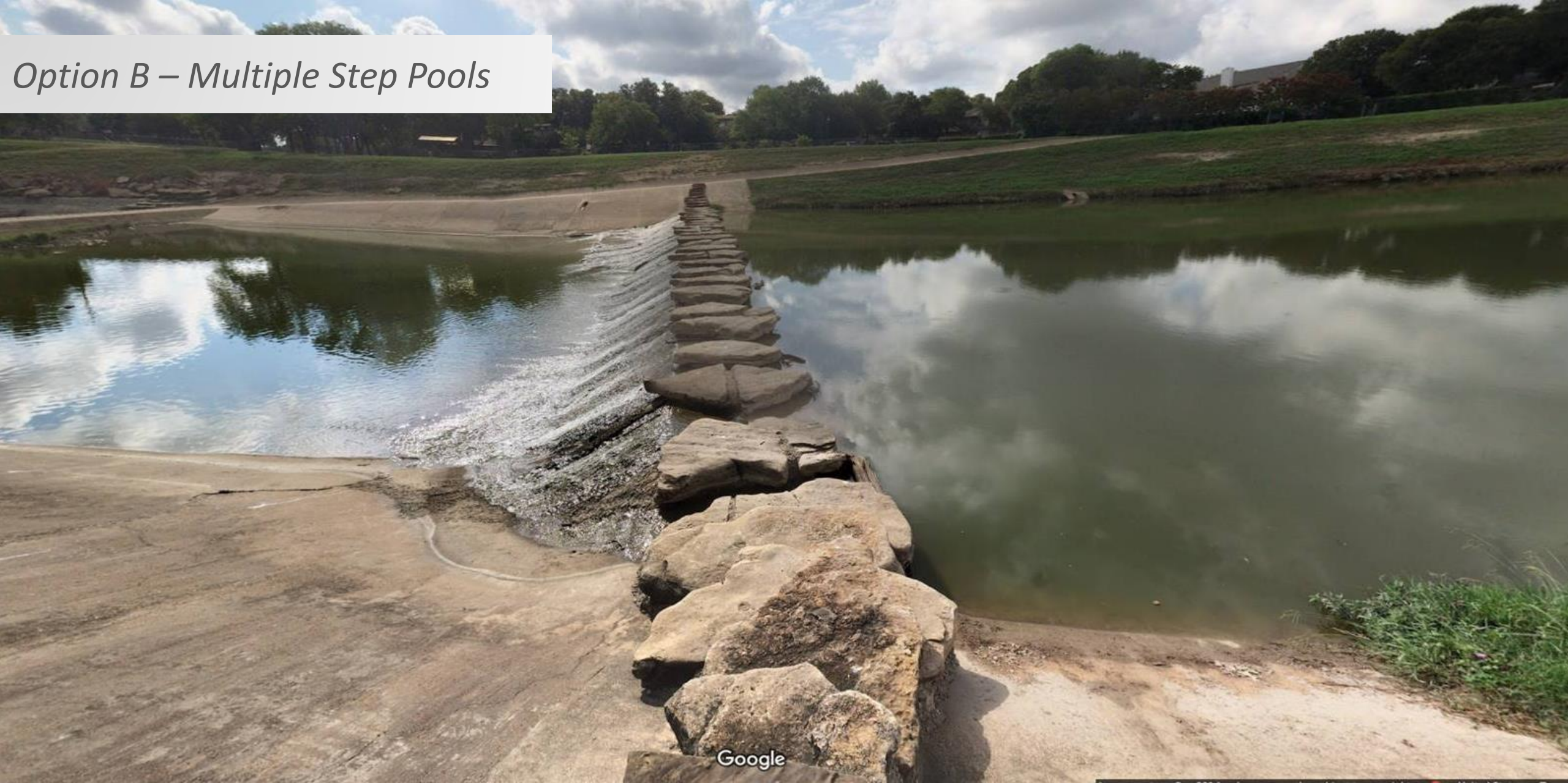
Option B – Multiple Step Pools



Option B – Multiple Step Pools



Option B – Multiple Step Pools



Google

Evaluating Solutions



Aesthetics



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Option B – Multiple Step Pools



Complete drop structure to protect sanitary sewer line and convert to low water dam, repairs to Dam #1, Restore Dam #3 to lower height (6 ft), localized and reach scale bank stabilization.



Design and Construction – 1.5 years
Permitting – 6 months to 2 years



\$4,700,000 (Does not include current improvements)



High long-term maintenance. Easement acquisition will be required. Dredging program is required (5-yr intervals).



Request waiver of NWP 13 linear foot and volume limits for reach scale bank stabilization, but USACE could require standard Individual Permit (IP)



Flood risk lower than Pre-September 2018 levels, but higher than current condition.



Provides localized long-term protection against erosion. Restored pool level provides additional erosion protection.



Option C – Stable Stream



Option C – Stable Stream



Option C – Stable Stream



Evaluating Solutions



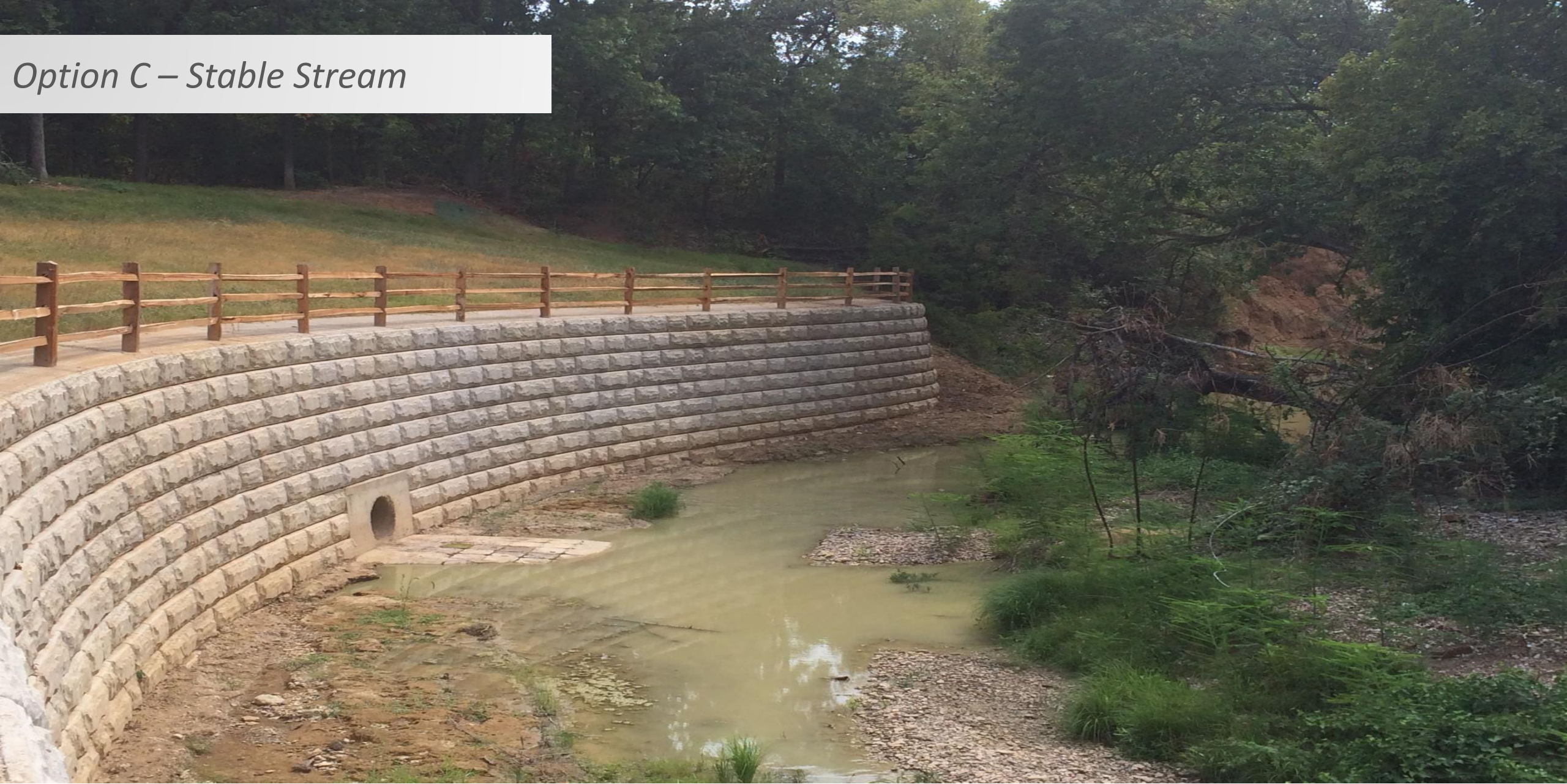
Aesthetics







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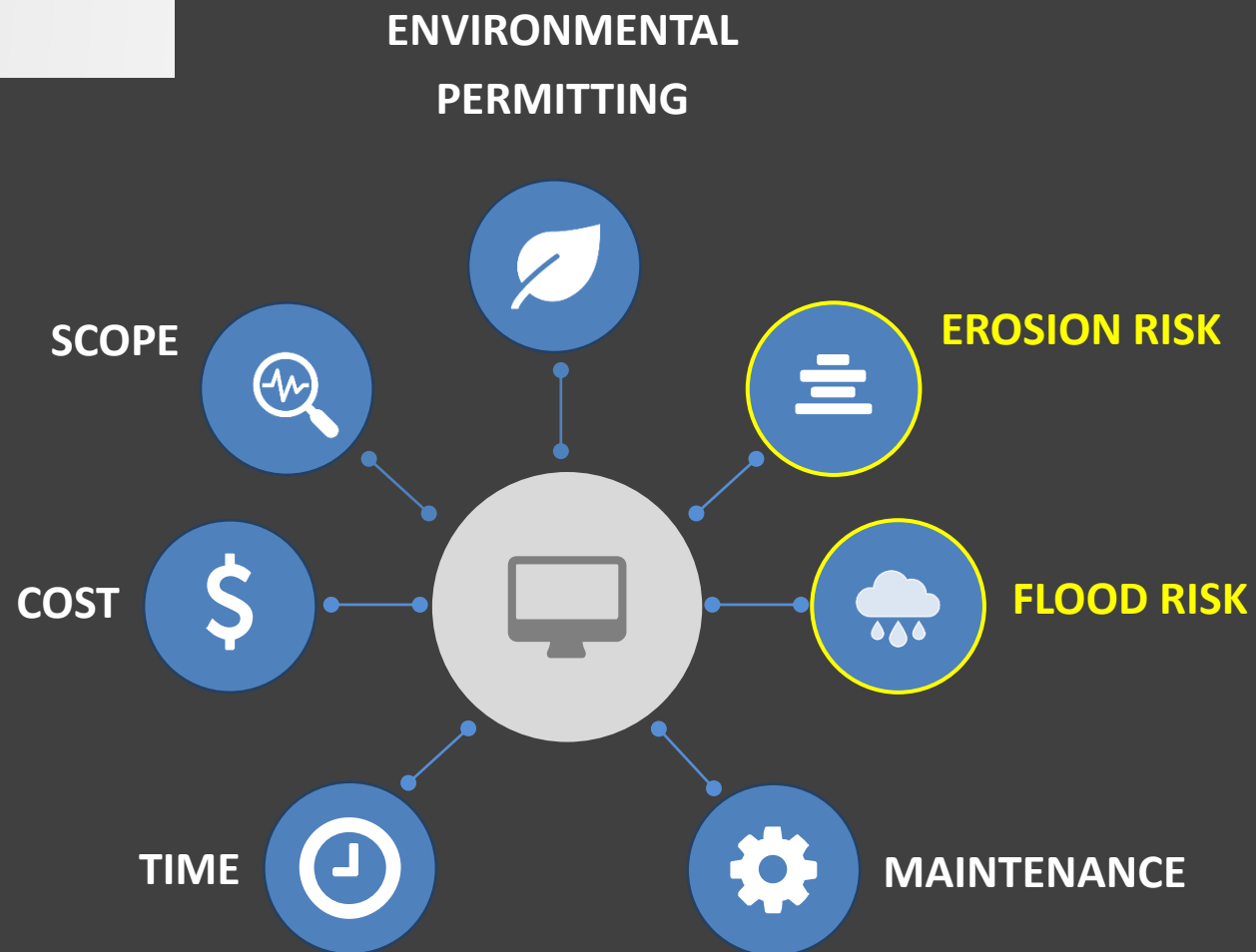
Option C – Stable Stream



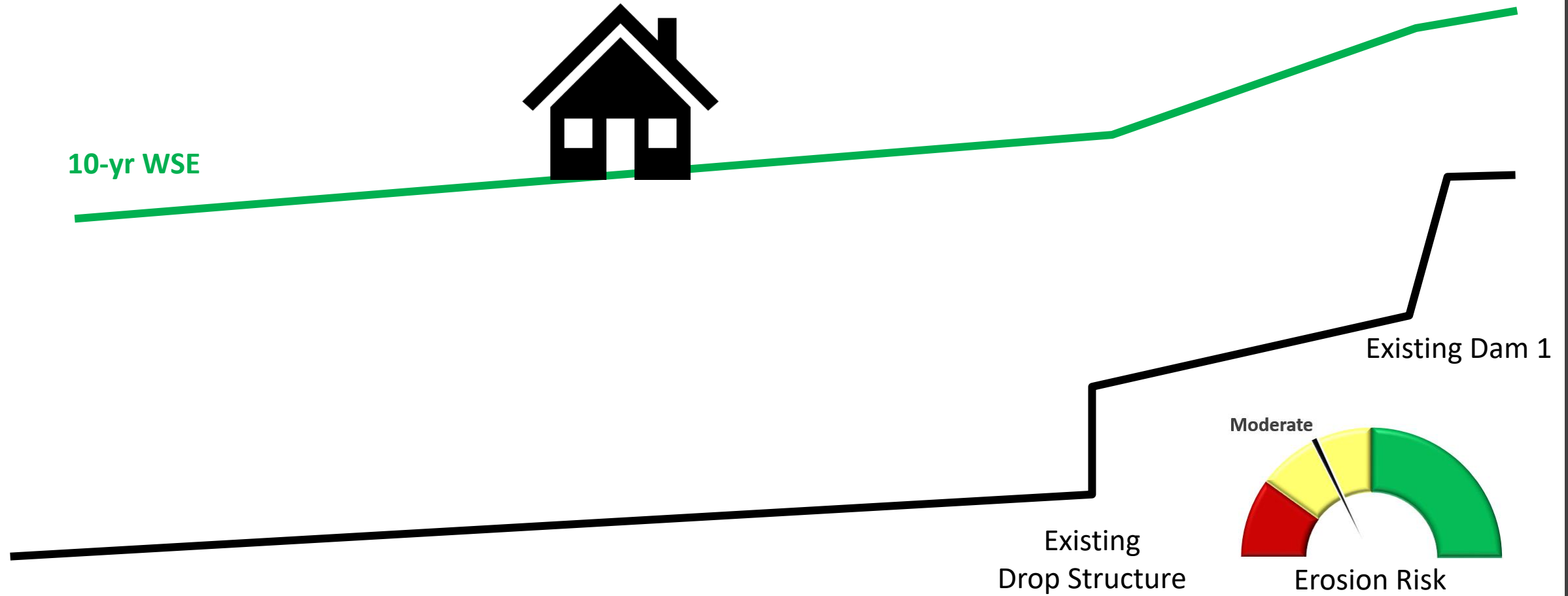
Option C – Stable Stream

	Scope	✔ Complete drop structure to protect sanitary sewer line and repairs to Dam #1. Localized and reach scale bank stabilization.
	Time	✔ Design and Construction – 1 year Permitting – 6 to 18 months
	Cost	✔ \$3,200,000 (Does not include current improvements)
	Maintenance	✔ Initial moderate maintenance to establish vegetation. Low maintenance requirements afterwards. Easement acquisition will be required.
	USACE	✔ Request waiver of NWP 13 linear foot and volume limits for reach scale bank stabilization but USACE could require standard Individual Permit (IP)
	Flood Risk	✔ Maintains current flood risk (lowest risk level among alternatives)
	Erosion Risk	✔ Provides localized long-term protection against erosion. Reach scale bank stabilization provides additional erosion protection.





Option C – Stable Stream



Flood
Risk

Erosion
Risk



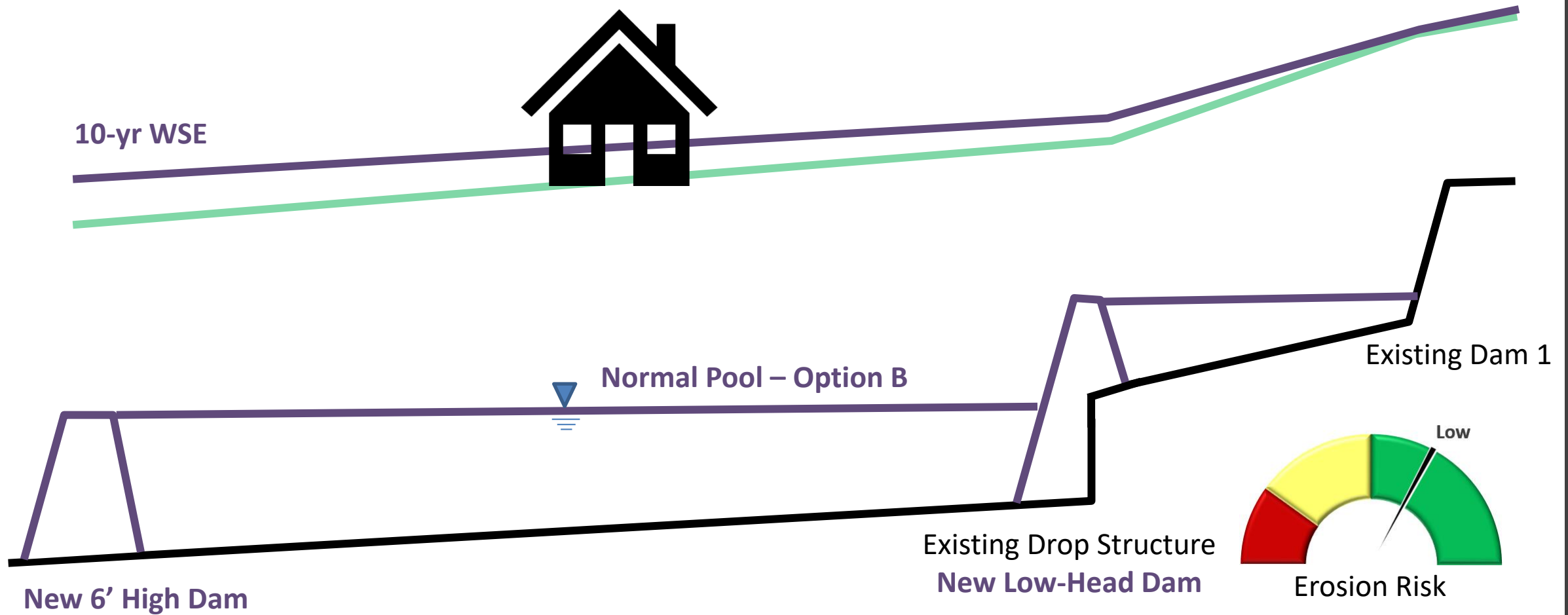
10-yr Storm



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Option B – Multiple Step Pools



Flood
Risk

Erosion
Risk



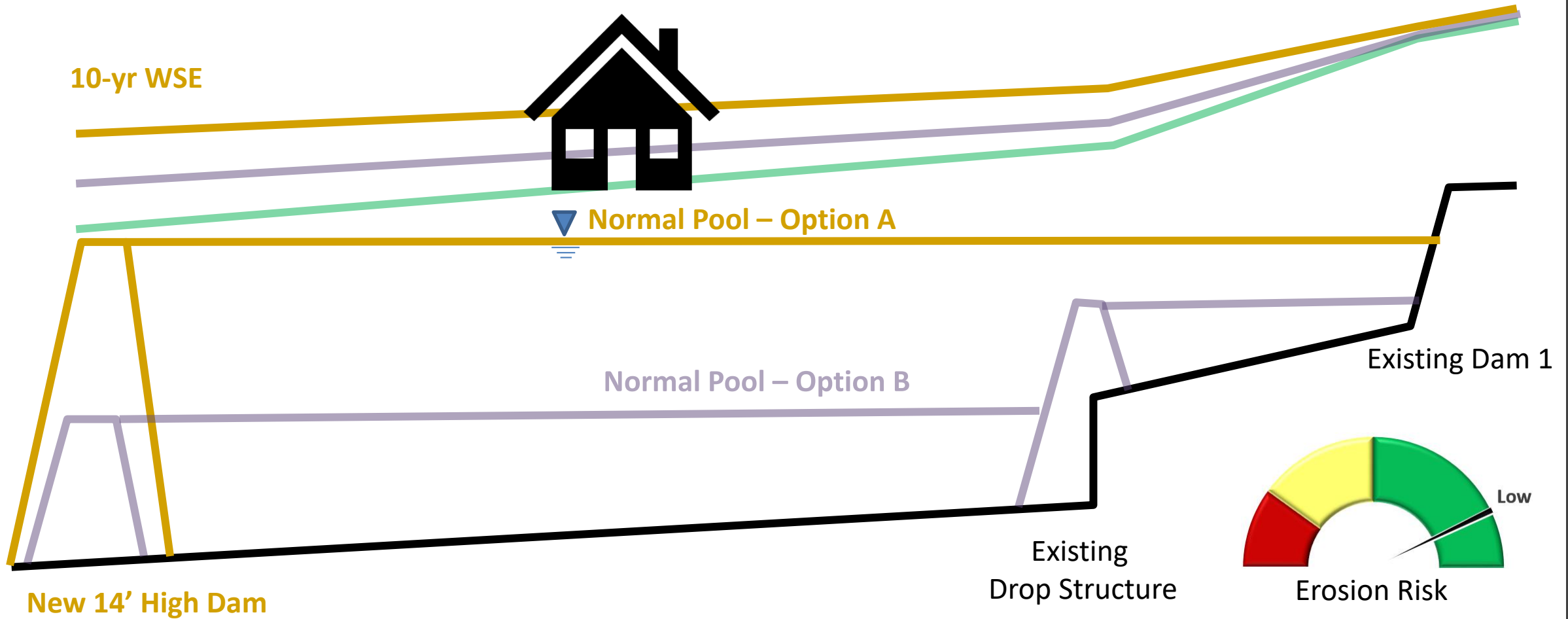
10-yr Storm



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Option A – Single Large Dam



Flood
Risk

Erosion
Risk



10-yr Storm



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Option A – Large Single Dam

19 Properties Potentially Flooded
Min-Max Flood Depths: 1' - 4'

Evaluating Solutions



Flood
Risk

10-yr Storm



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Option B – Multiple Step Pools

17 Properties Potentially Flooded
Min-Max Flood Depths: 1'- 3.5'

Evaluating Solutions



Flood
Risk

10-yr Storm



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Option C – Stable Stream

16 Properties Potentially Flooded
Min-Max Flood Depths: 1' - 3.5'

Evaluating Solutions



Flood
Risk

10-yr Storm



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Option A – Large Single Dam

21 Properties Potentially Flooded
Min-Max Flood Depths: 1.5' - 5.5'

Evaluating Solutions



Flood
Risk

100-yr Storm



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Option B – Multiple Step Pools

21 Properties Potentially Flooded
Min-Max Flood Depths: 1.5' - 5'

Evaluating Solutions



Flood
Risk

100-yr Storm



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Option C – Stable Stream

20 Properties Potentially Flooded
Min-Max Flood Depths: 1.5' - 5'

Evaluating Solutions



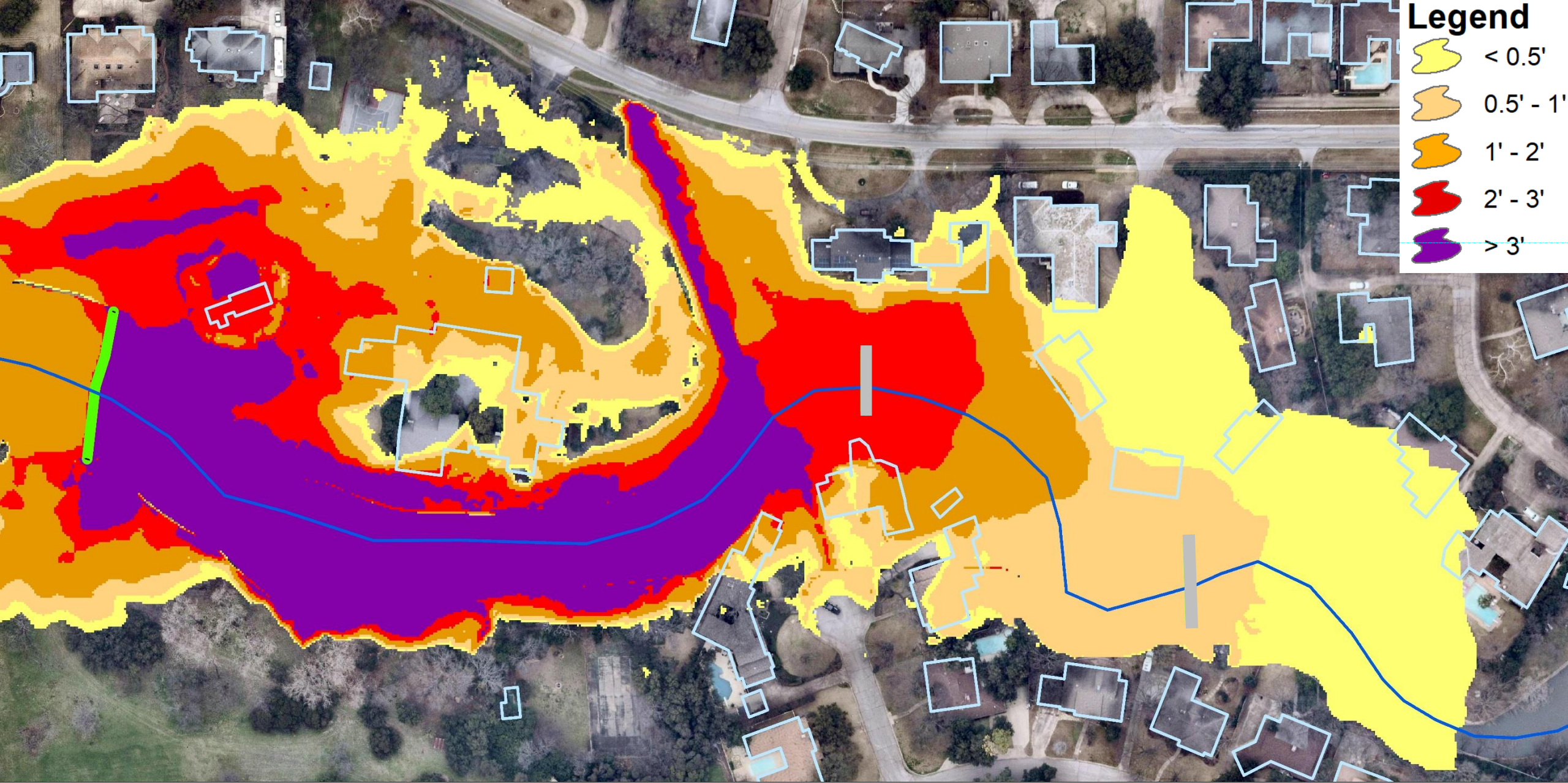
Flood
Risk

100-yr Storm



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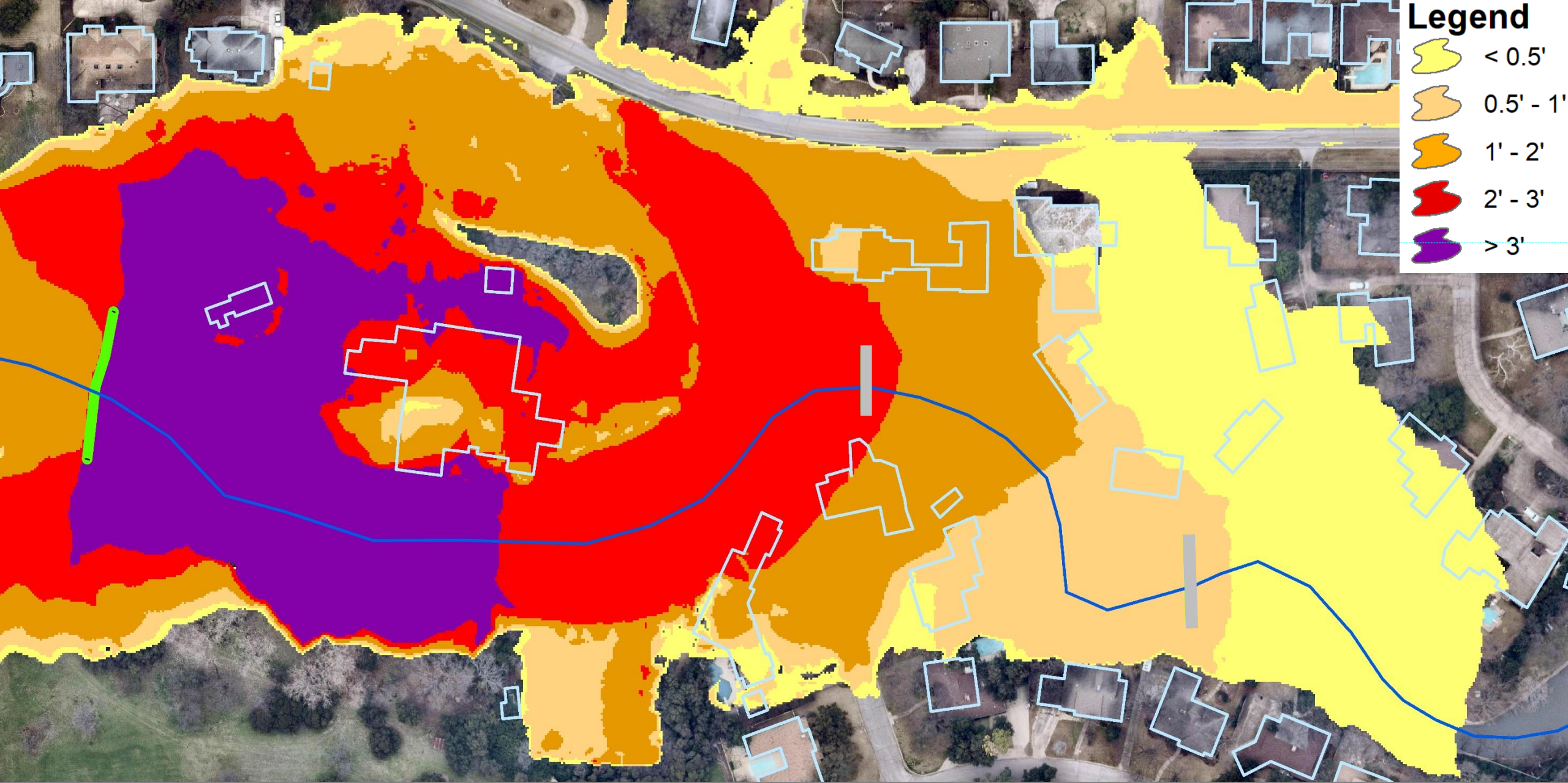
Flood
Risk

10-yr Flood Depth Difference
Current Conditions vs. 14' High Dam



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Flood
Risk

*100-yr Flood Depth Difference
Current Conditions vs. 14' High Dam*



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Options Comparison

	Option A	Option B	Option C	
Criteria	Large Single Dam	Multiple Step Pools	Stable Stream	
Cost (\$)	\$5,600,000	\$4,700,000	\$3,200,000	
Flood Risk	VERY HIGH	HIGH	MODERATE	
Erosion Risk	LOW	LOW	MODERATE	
Time (Design, permitting, construction)	1.5 – 3 years	1.5 – 3 years	1.5 – 2.5 years	
Easement Needs	HIGH	HIGH	HIGH	
Maintenance	HIGH	HIGH	MODERATE	LOW
Permitting	HIGH	HIGH	HIGH	
Access Needed	✓	✓	✓	



Discussion

