Ain't No Valley Low Enough
Valley Storage Policy Development

March 27, 2025

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Agenda

- Cumulative Impacts Defined
- Benchmarking
- Stakeholder Engagement
- Recommendations
- Analysis Examples
- Next Steps

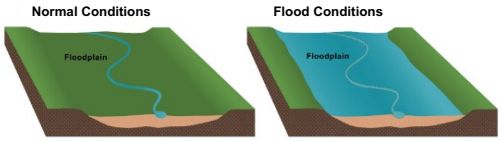
Cumulative Impacts

Single projects that have minor or immeasurable impacts to flooding alone but cause significant impacts when combined together.

More Impervious Cover (< 1 Acre)

Losses of Valley Storage

What is Valley Storage?

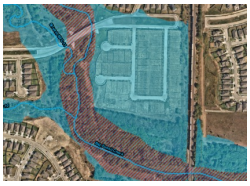


Case Study Conclusion: filling in Valley Storage increases flood risk downstream

What is Allowed Today?

Proposed fill within the 100-year FEMA floodplain is allowed

- This project meets City and FEMA floodplain regulations
- Lots were raised on fill and are no longer in the 100-year FEMA floodplain
- However, all of the development along this stream combined could create downstream impacts



2023 aerial

Benchmarking

FORT WORTH

Valley Storage Policy - FEMA

"When fill or buildings are placed in the flood fringe, the flood storage areas are lost and flood heights will go up because there is less room for the floodwaters… One approach that may be used to address this issue is to require compensatory storage to offset any loss of flood storage capacity. …Community Rating System credits are available for communities that adopt compensatory storage requirements."

https://www.fema.gov/glossary/compensatory-storage

FORT WORTH

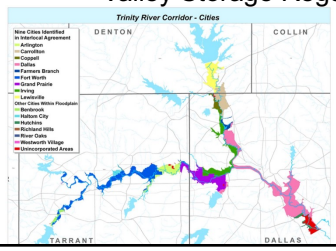
Valley Storage Policy
North Central Texas Council of Governments

"Ideally, the entire 100-year full-buildout floodplain should be avoided…and should be preserved in a natural undisturbed state where possible. Floodplain protection is complementary to riparian buffer preservation…construction can displace hydrologic storage, resulting in increased stream flows, erosion, and decreased infiltration. Loss of hydrologic storage may require creation of additional hydrologic storage elsewhere in the watershed."

Integrated Stormwater Management Manual (iSWM)
https://iswm.nctcog.org/Documents/iSWM_Criteria_Manual_01142015.pdf

FORT WORTH

Current Trinity River Valley Storage Regulations



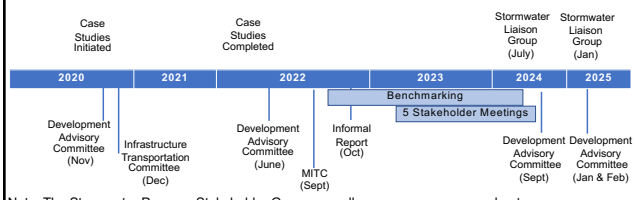
Corridor Development Certificate (CDC) Program coordinated by North Central Texas Council of Governments and reviewed by US Army Corps of Engineers

Cities in Texas and DFW with Citywide Valley Storage Regulations

- Austin
- Dallas
- Denton
- Frisco
- Garland
- Houston
- McKinney
- Plano
- San Antonio
- Several more NCTCOG communities along Trinity River Corridor

Engagement

Cumulative Impacts Initiative History



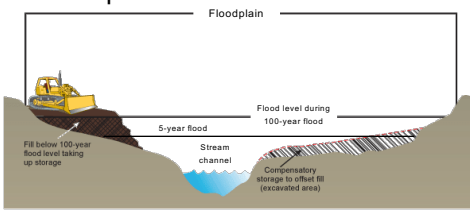
Note: The Stormwater Program Stakeholder Group annually expresses concerns about cumulative impacts of development

Key Stakeholder Feedback

- Recognized that filling in Valley Storage increases flood risk
- Agreed that we need citywide Valley Storage regulations to protect residents
- Incorporate into existing development permitting and review process
- Not increase current review timeframes
- Allow for appropriate exemptions

Recommendations

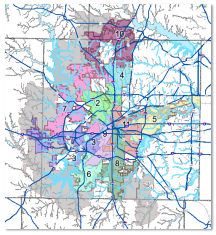
Valley Storage Preservation Proposed Recommendations



Recommendation: No loss (0.0%) in storage for 1-year, 5-year, and 100-year floods

Valley Storage Recommendation
Where?

- Rivers and streams citywide
- **FEMA floodplain**
- Approximately 50 square miles of FEMA floodplain citywide to be preserved

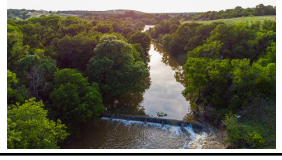


Valley Storage Recommendation
Proposed Exceptions/Exemptions

- Trinity River Corridor - Corridor Development Certificate (CDC) Program
- Stand-alone road crossings
- Utility crossings
- Bank stabilization projects

Valley Storage Recommendation
Related Initiatives

Continue working with other departments and initiatives to avoid competing regulations (e.g. Riparian Initiative, Urban Forestry)

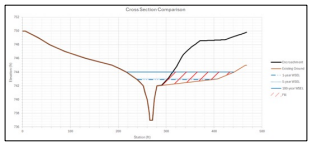


Analysis Examples

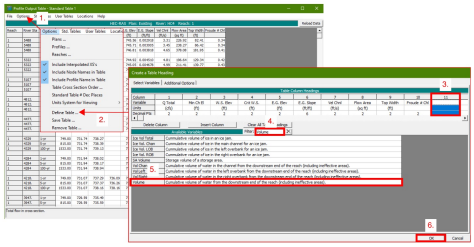
Analysis Approaches

- HEC-RAS Modeling
  - Using USACE HEC-RAS software in combination with Drainage/Flood Study
- Grading Analysis
  - Using CAD or GIS type software with the floodplain elevations

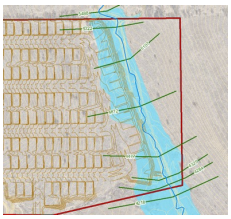
HEC-RAS Modeling Example



HEC-RAS Modeling Example



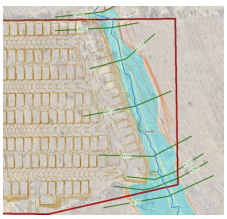
HEC-RAS Modeling Example

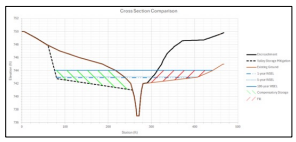


River Sta	Profile	Plan	Volume (acre-ft)
5488	1-yr	Proposed	60.57
5488	1-yr	Existing	61.30
5488	5-yr	Proposed	64.39
5488	5-yr	Existing	65.24
5488	100-yr	Proposed	109.99
5488	100-yr	Existing	111.94

Storm Event	Valley Storage Comparison @ XS 5488			
	Volume (Acre-Feet)			
	Existing	Proposed	Proposed - Existing	% Difference
1-yr	61.3	60.6	-0.7	-1.2%
5-yr	65.2	64.4	-0.8	-1.3%
100-yr	111.9	110.0	-2.0	-1.7%

HEC-RAS Modeling Example





Storm Event	Valley Storage Comparison @ XS 5488			
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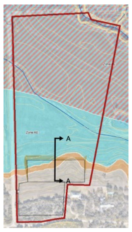
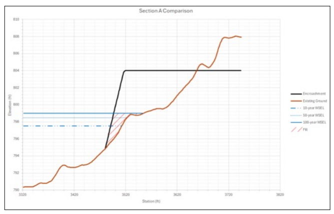
	Existing	Proposed	Proposed - Existing	% Difference
1-yr	61.3	61.4	0.1	0.2%
5-yr	65.2	65.3	0.0	0.0%
100-yr	111.9	111.9	0.0	0.0%

Grading Analysis Example





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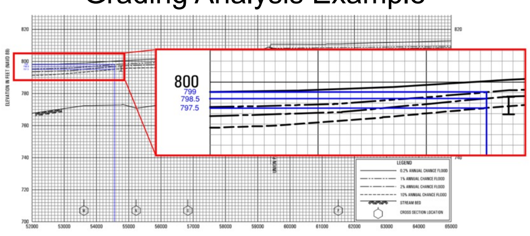

Grading Analysis Example

Existing Storage Area Volume

Elevation (ft)	Area (acres)	Volume (acre-ft)
774	0.001	0.0
774.5	0.012	0.0
775	0.244	0.1
775.5	0.294	0.2
776	0.319	0.4
776.5	0.336	0.5
777	0.35	0.7
777.5	0.36	0.9
778	0.371	1.1
778.5	0.38	1.2
779	0.391	1.4
779.5	0.399	1.6
780	0.408	1.8
780.5	0.416	2.0
781	0.425	2.2
781.5	0.433	2.5
782	0.441	2.7
782.5	0.447	2.9
783	0.462	3.1
783.5	0.459	3.4
784	0.466	3.6
784.5	0.471	3.8
785	0.477	4.1
785.5	0.481	4.3
786	0.488	4.5
786.5	0.493	4.8
787	0.499	5.0
787.5	0.505	5.3
788	0.567	5.5
788.5	1.004	5.9
789	1.335	6.5
789.5	2.177	7.4
790	3.35	8.8
790.5	5.115	10.9
791	7.476	14.1
791.5	9.996	18.4
792	13.168	24.2
792.5	15.528	31.4
793	17.508	39.6
793.5	19.066	48.8
794	19.873	58.5
794.5	20.359	68.6
795	20.793	78.9
795.5	21.154	89.4
796	21.373	100.0
796.5	21.487	110.7
797	[illegible]	121.6
797.5	21.642	132.3
798	21.709	143.1
798.5	21.878	154.0
799	22.134	165.0

Existing Storage Area Volume

Elevation (ft)	Area (acres)	Volume (acre-ft)
797.5	21.642	132.3
798	21.709	143.1
798.5	21.878	154.0
799	22.134	165.0

Proposed Storage Area Volume

Elevation (ft)	Area (acres)	Volume (acre-ft)
797.5	21.572	131.0
798	21.662	141.5
798.5	21.839	152.1
799	22.103	162.8

Proposed Storage Area Volume

Elevation (ft)	Area (acres)	Volume (acre-ft)
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782.5	0.447	2.9
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783.5	0.459	3.4
784	0.466	3.6
784.5	0.471	3.8
785	0.477	4.1
785.5	0.481	4.3
786	0.488	4.5
786.5	0.493	4.8
787	0.499	5.0
787.5	0.506	5.3
788	0.567	5.5
788.5	1.004	5.9
789	1.335	6.5
789.5	2.177	7.4
790	3.35	8.8
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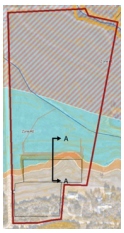
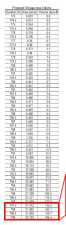
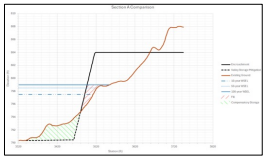
792	13.168	24.2
792.5	15.528	31.4
793	17.508	39.6
793.5	19.065	48.8
794	19.873	58.5
794.5	20.346	68.5
795	20.642	78.7
795.5	21.063	89.0
796	21.328	99.6
796.5	21.431	110.1
797	21.508	120.6
797.5	21.572	131.0
798	21.662	141.5
798.5	21.839	152.1
799	22.103	162.8

Valley Storage Comparison				
Storm Event	Volume (Acre-Feet)			
	Existing	Proposed	Proposed - Existing	% Difference
10-yr (797.5')	132.3	131.0	-1.3	-1.0%
50-yr (798.5')	154.0	152.1	-1.9	-1.2%
100-yr (799')	165.0	162.8	-2.2	-1.3%

Grading Analysis Example







Proposed Storage Area Volume

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793	21.372	134.4
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Valley Storage Comparison

Storm Event	Volume (Acre-Feet)			
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10-yr (797.51')	132.3	134.4	2.1	1.6%
50-yr (798.5')	154.0	155.7	1.7	1.1%
100-yr (799')	165.0	166.4	1.4	0.8%

Valley Storage Ordinance Recommendation Next Steps

Spring/Summer 2025

- Council Member 1 on 1s
- Informal Report to City Council
- Recommended ordinance updates to Council for adoption

Questions and Feedback