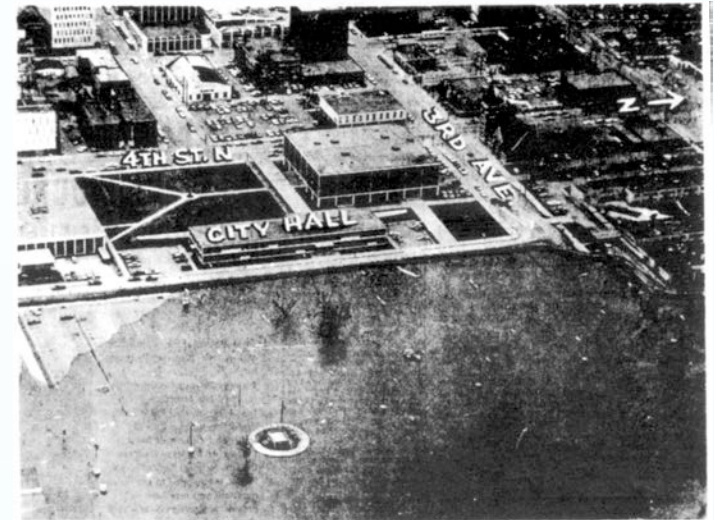


2nd Street/Downtown Flood Control Improvement Project

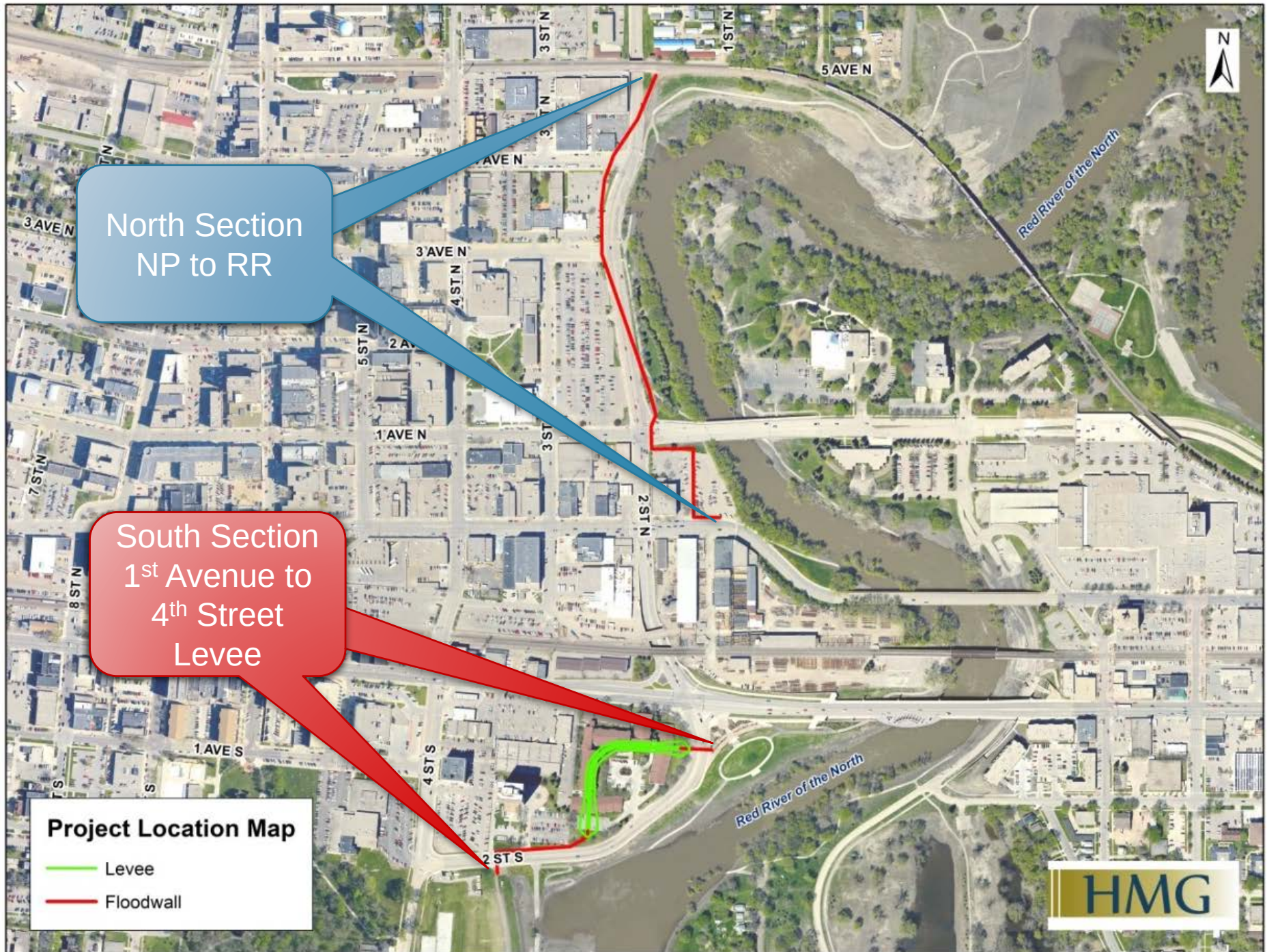
Commission Update
September 3, 2013



Dike protects Fargo's City Hall from Red flood waters.

(Forum Photo by John Anderson)





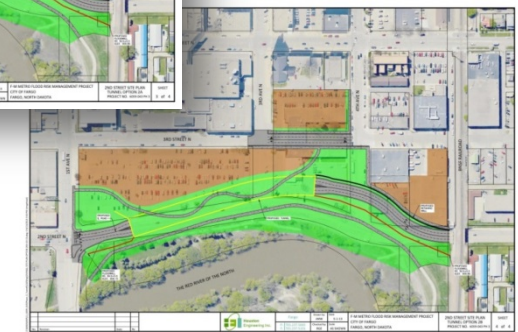
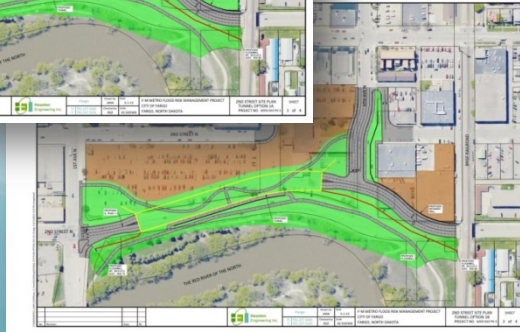
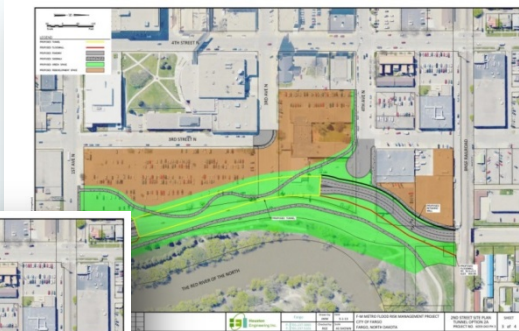
Project Considerations

- Flood protection capability
- Geotechnical stability/sustainability
- Private property impacts
- Traffic/transportation impacts
- Parking impacts
- Utility impacts
- Environmental impacts
- River connectivity
- Public green space opportunities
- Economic development opportunities
- Operation/maintenance requirements
- Costs



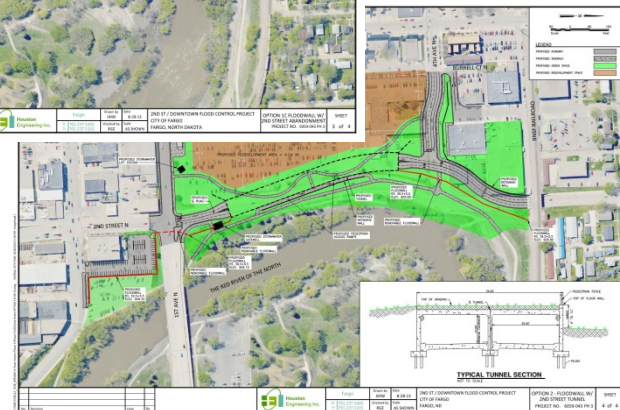
Early Concept Plan Development

- Numerous alignments
- Multiple methods
- Varied levels of protection
- Geotechnical evaluation
- Traffic analysis
- Environmental assessments
- Project costs estimates
- Preliminary design

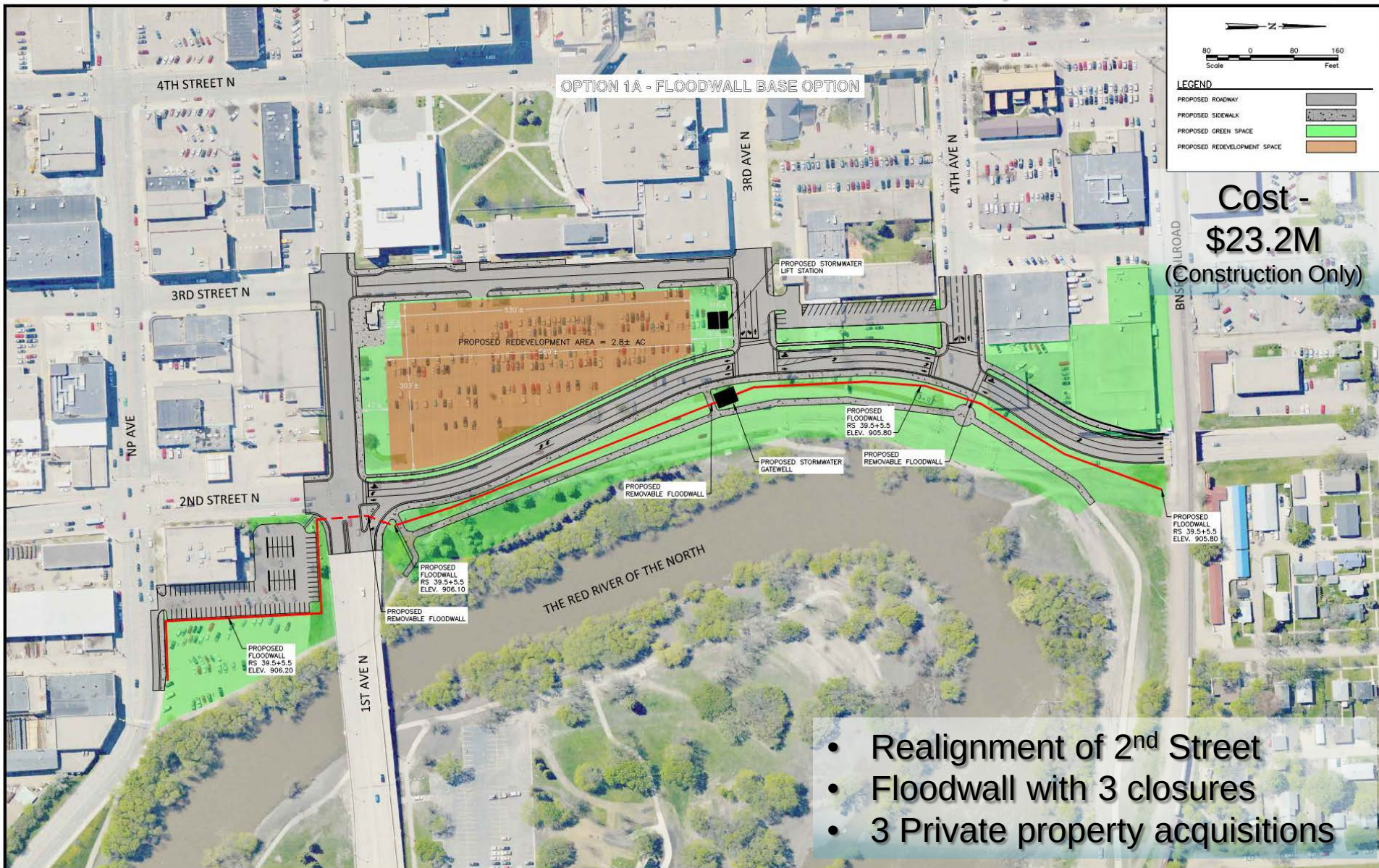


Options for Consideration

- Option 1A – Floodwall Base Option
- Option 1B – Floodwall with Additional 2nd Street Relocation
- Option 1C – Floodwall with 2nd Street Abandonment
- Option 2 – Floodwall with 2nd Street Tunnel / Grade Separation Structure



Option 1A – Floodwall Base Option



- Realignment of 2nd Street
- Floodwall with 3 closures
- 3 Private property acquisitions

No.	Revision	Date	By

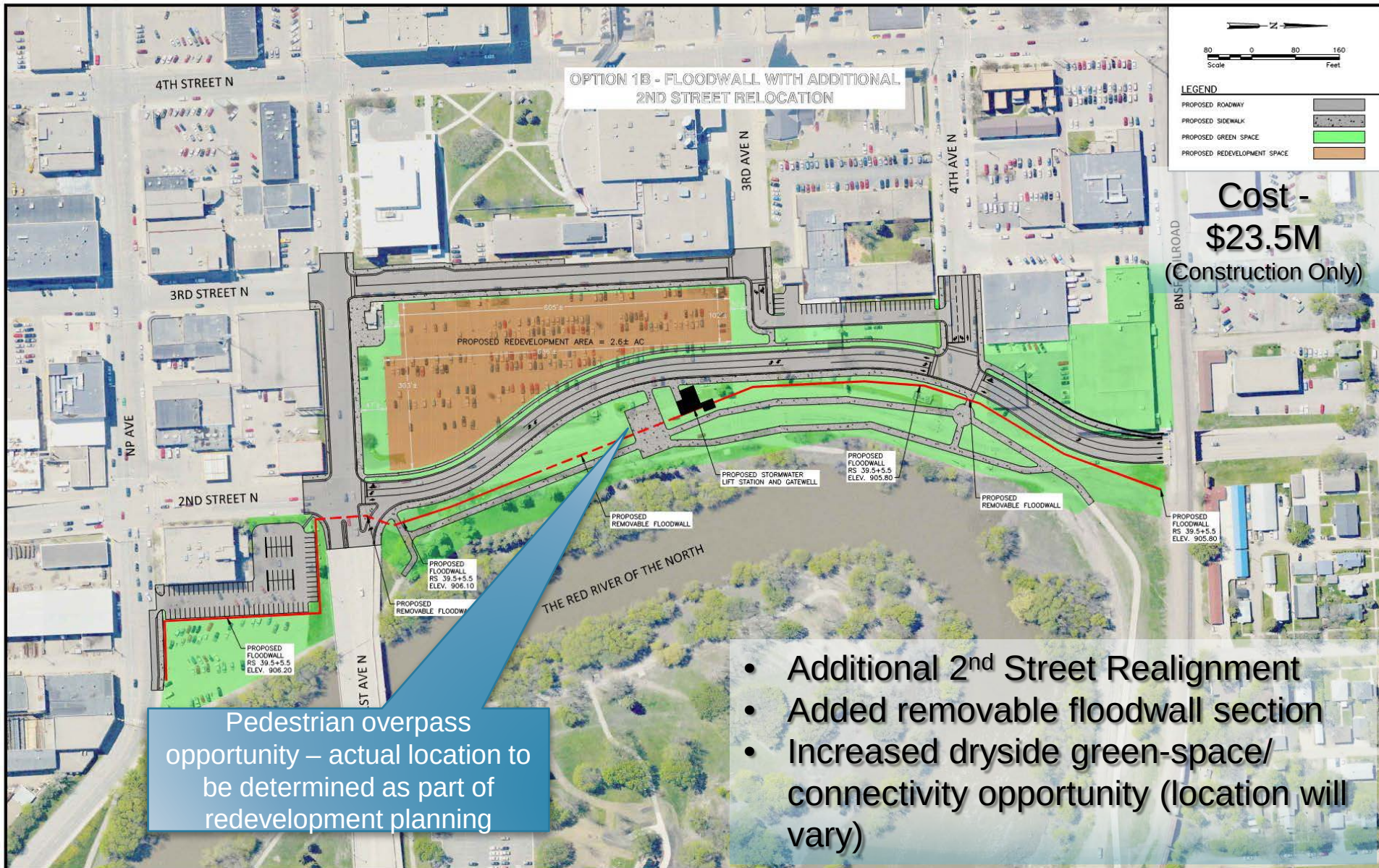


Fargo	Drawn by JMW	Date 8-28-13
P: 701.237.5065 F: 701.237.5101	Checked by RGE	Scale AS SHOWN

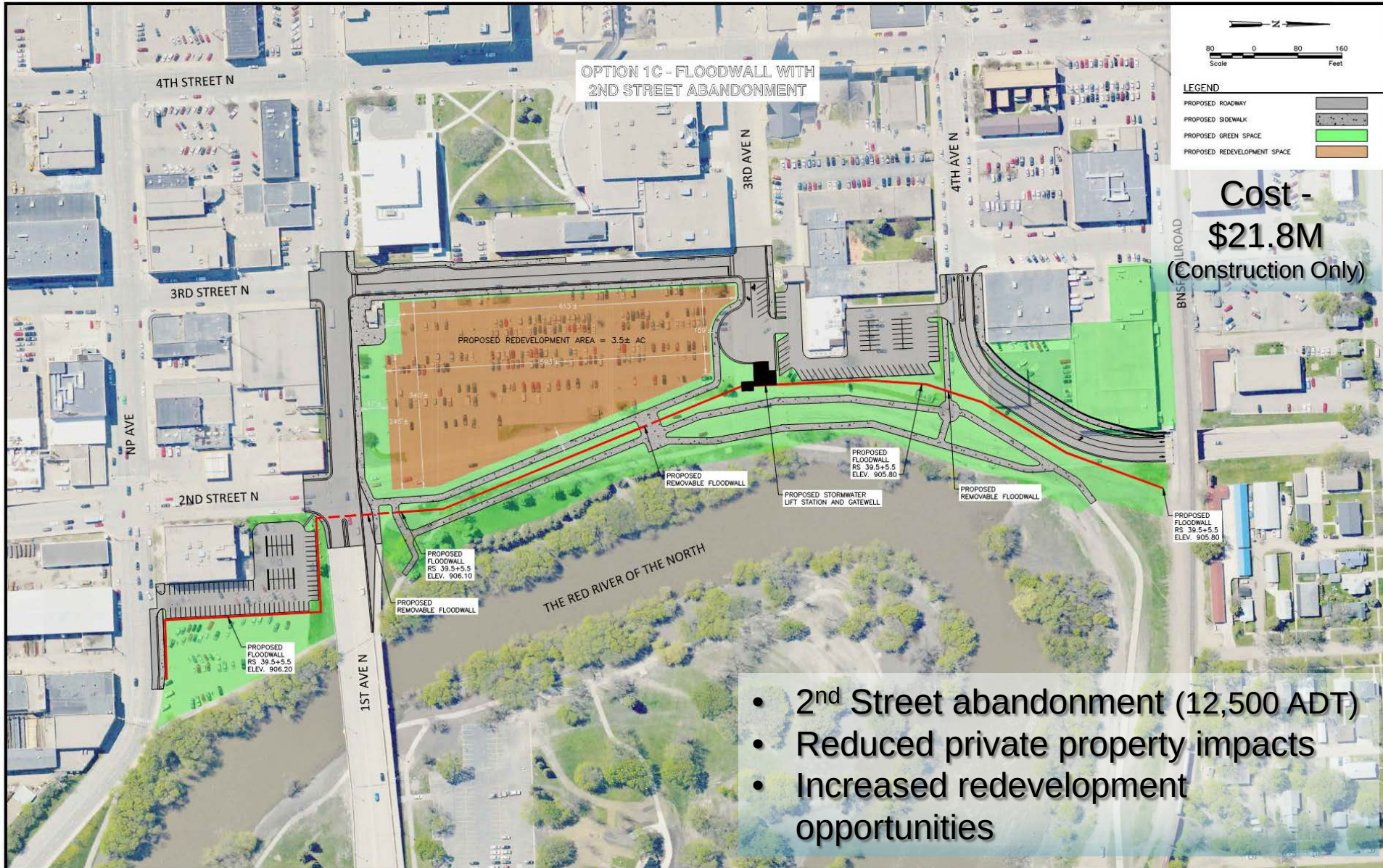
2ND ST / DOWNTOWN FLOOD CONTROL PROJECT CITY OF FARGO FARGO, ND

OPTION 1A BASE FLOODWALL OPTION PROJECT NO. 6059-043 PH3	SHEET 1 of 4
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Option 1B – Floodwall – Added 2nd Street Relocation



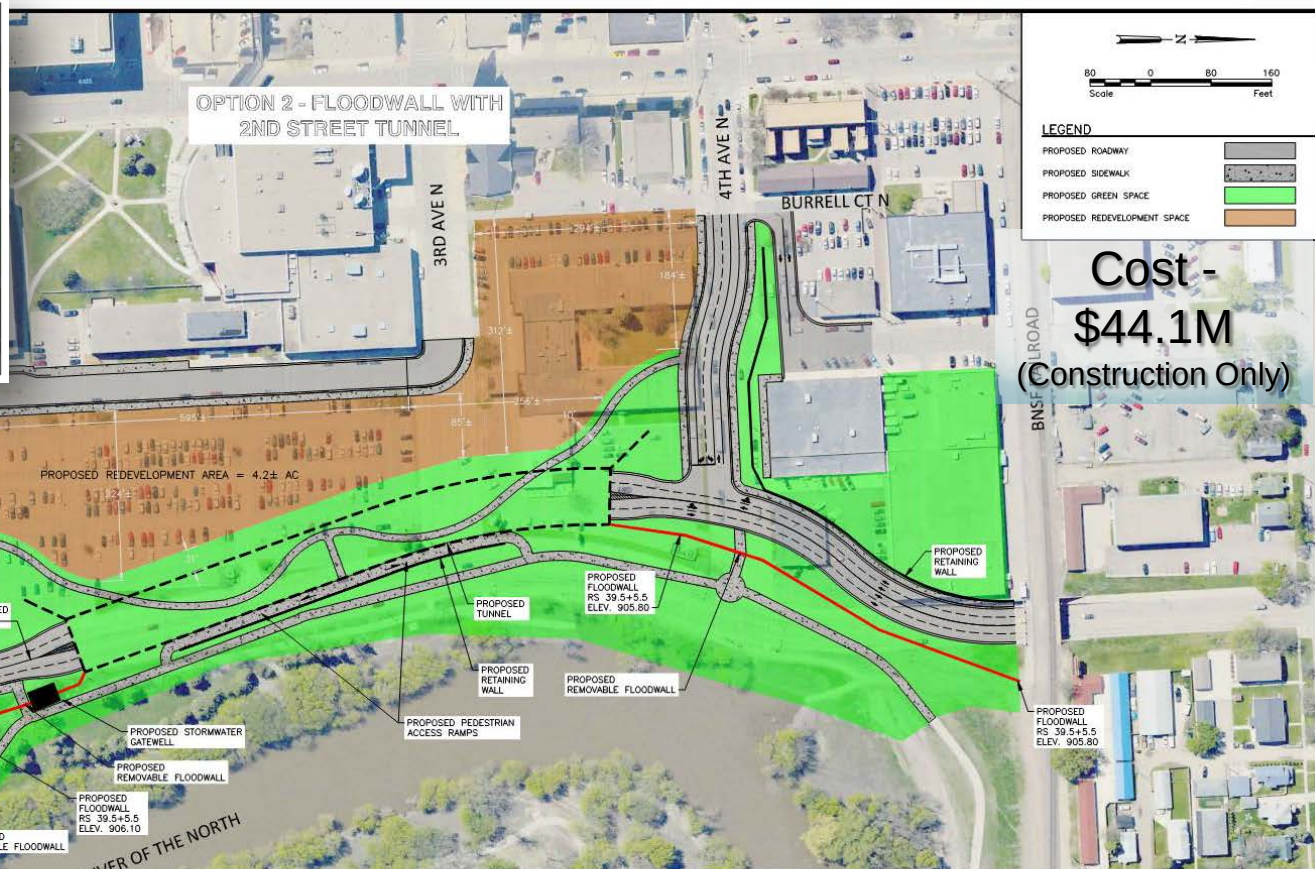
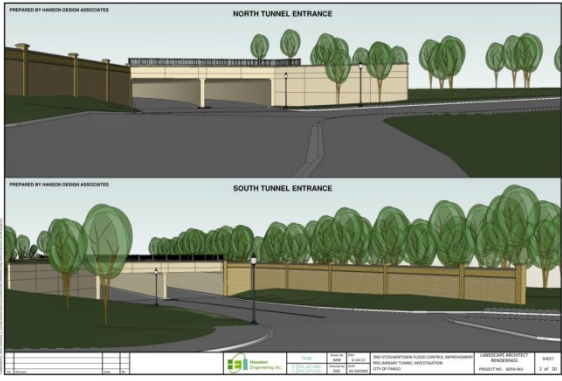
Option 1C – Floodwall – 2nd Street Abandonment



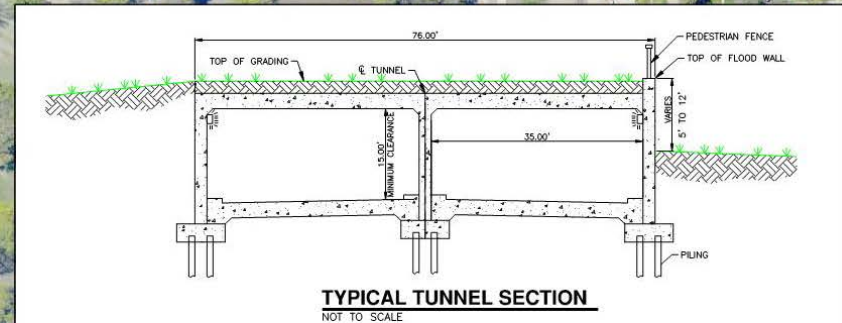
- 2nd Street abandonment (12,500 ADT)
- Reduced private property impacts
- Increased redevelopment opportunities

				 Houston Engineering Inc.	Fargo		Drawn by JMW	Date 8-28-13	2ND ST / DOWNTOWN FLOOD CONTROL PROJECT CITY OF FARGO FARGO, NORTH DAKOTA	OPTION 1C FLOODWALL W/ 2ND STREET ABANDONMENT PROJECT NO. 6059-043 PH 3	SHEET 3 of 4
					P: 701.237.5065 F: 701.237.5101	Checked by RGE	Scale AS SHOWN				
No.	Revision	Date	By								

Option 2 – Floodwall – 2nd Street Tunnel/Grade Separation



- Tunnel – Increased redevelopment opportunities
- Improved river visibility/connectivity
- Additional private property impacts



				 Houston Engineering Inc.	Fargo		Drawn by JMW	Date 8-28-13	2ND ST / DOWNTOWN FLOOD CONTROL PROJECT CITY OF FARGO FARGO, ND	OPTION 2 - FLOODWALL W/ 2ND STREET TUNNEL PROJECT NO. 6059-043 PH 3	SHEET 4 of 4
No. Revision Date By					P: 701.237.5065 F: 701.237.5101	Checked by RGE	Scale AS SHOWN				

Option Consideration Comparison

Option	Flood protection capability	Private property impacts		Traffic/transportation impacts	Parking impacts	Utility impacts	Environmental impacts	River connectivity / visibility	Public green space opportunities (acres)	Redevelopment opportunities (acres)			Operation/maintenance requirements	Costs (millions - Construction Only)
		Number of structure acquisitions	Approx. Assessed Value							Outside LDZs/MDZs	within LDZs (450-ft)	within MDZs (350-ft)		
<i>“all options meet flood protection needs and are technically feasible”</i> Option 1A Floodwall Base Option	Good	2.5	\$2.8M	Low	Low	High	Low	Low	2.8	0.96	1.35	0.49	Low	\$23.2M
Option 1B Floodwall with Additional 2nd Street Relocation	Good	2.5	\$2.8M	Low	High	High	Low	Medium	2.6	1.00	1.40	0.20	Medium	\$23.5M
Option 1C Floodwall with 2nd Street Abandonment	Good	2	\$2.2M	High	Low	High	Low	High	3.5	0.94	1.47	1.09	Low	\$21.8M
Option 2 Floodwall with 2nd Street Tunnel	Good	3	\$4.8M	Low	High	High	Low	High	4.2*	2.34*	1.73	0.13	High	\$44.1M

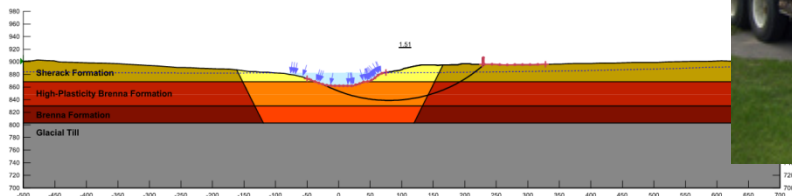
Redevelopment/Setback Requirements

Geotechnical Stability Requirements

- Soil Borings
- Slope Stability Evaluation
- Foundation Bearing Capacity
- Seepage Analysis
- Settlement Analysis
- Minimum Design Requirements (USACE and FEMA)

Fargo-Moorhead Flood Risk Management Project, Fargo In-Town Levee/Floodwall
Seepage and Slope Stability Analysis: Cross-Section 20240+78
3.1.1 Slope Stability, Proposed Conditions - ESSA Large Entry-Exit (50% Exceedance)
File Name: Cross-Section 20240+78.gsz
Last Saved Date: 5/5/2013

Factor of Safety: 1.51



Name: Sherack Formation (Drained) Model: ShearNormal Fn Unit Weight: 120 pcf Strength Function: B-4 @ Depth 30 ft - Fully Softened (LL = 55) Phi-B: 0°
Name: High-Plasticity Bremsa Formation (Drained) Model: ShearNormal Fn Unit Weight: 105 pcf Strength Function: B-3 @ Depth 65 ft - Fully Softened (LL = 115) Phi-B: 0°
Name: Bremsa Formation (Drained) Model: ShearNormal Fn Unit Weight: 105 pcf Strength Function: B-4 @ Depth 45 ft - Fully Softened (LL = 85) Phi-B: 0°
Name: Glacial Till (Drained) Model: Botrock (Impervious)
Name: Sherack Formation - Shear Zone (Drained) Model: ShearNormal Fn Unit Weight: 120 pcf Strength Function: B-4 @ Depth 30 ft - Fully Softened (LL = 55) Phi-B: 0°
Name: High-Plasticity Bremsa Formation - Shear Zone (Drained - 50% Exceedance) Model: ShearNormal Fn Unit Weight: 105 pcf Strength Function: Calibrated High-Plasticity Bremsa (50% Exceedance) Phi-B: 0°
Name: Bremsa Formation - Shear Zone (Drained - 50% Exceedance) Model: ShearNormal Fn Unit Weight: 105 pcf Strength Function: Calibrated Bremsa (50% Exceedance) Phi-B: 0°
Name: Proposed Floodwall Model: High Strength Unit Weight: 150 pcf

Directory: P:\Mpls\34 ND\09\34091004 Fargo Moorhead Metropolitan Feas. Study\Work\Final Design_FY 2012-2013\Task Order 13\200_Geotech_2nd_S1_Floodwall\Models\GeoStudio Models (Final Setbacks)

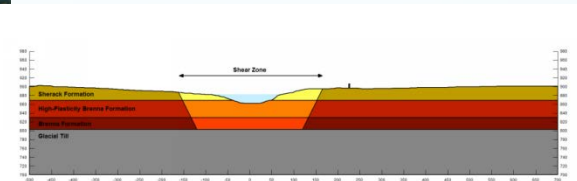
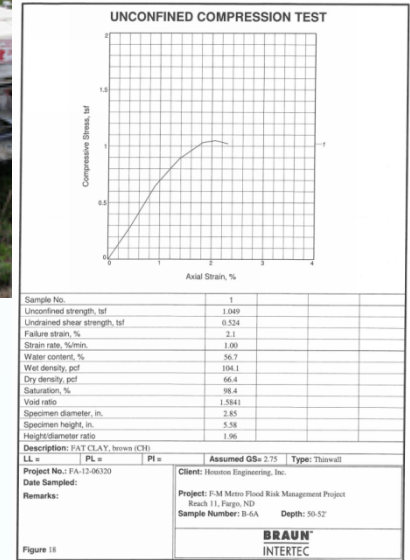


Figure 6 Model Geometry at Cross-Section 20240+78

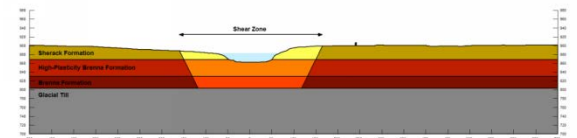
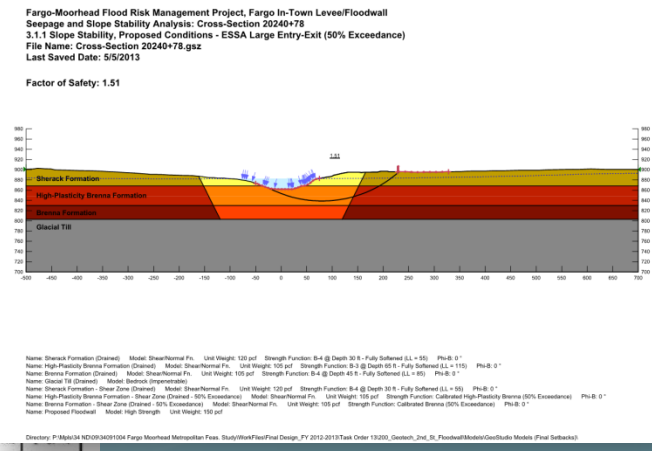
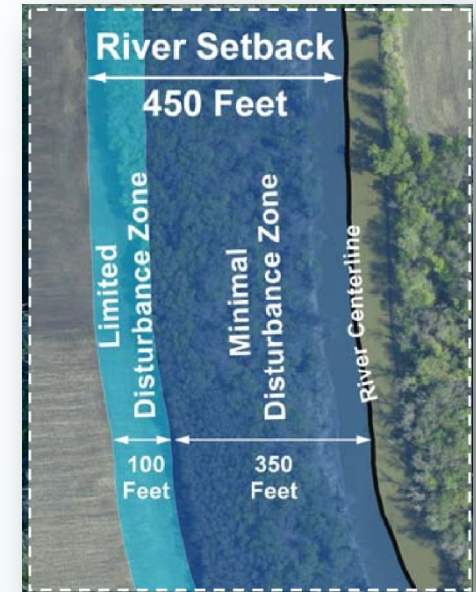
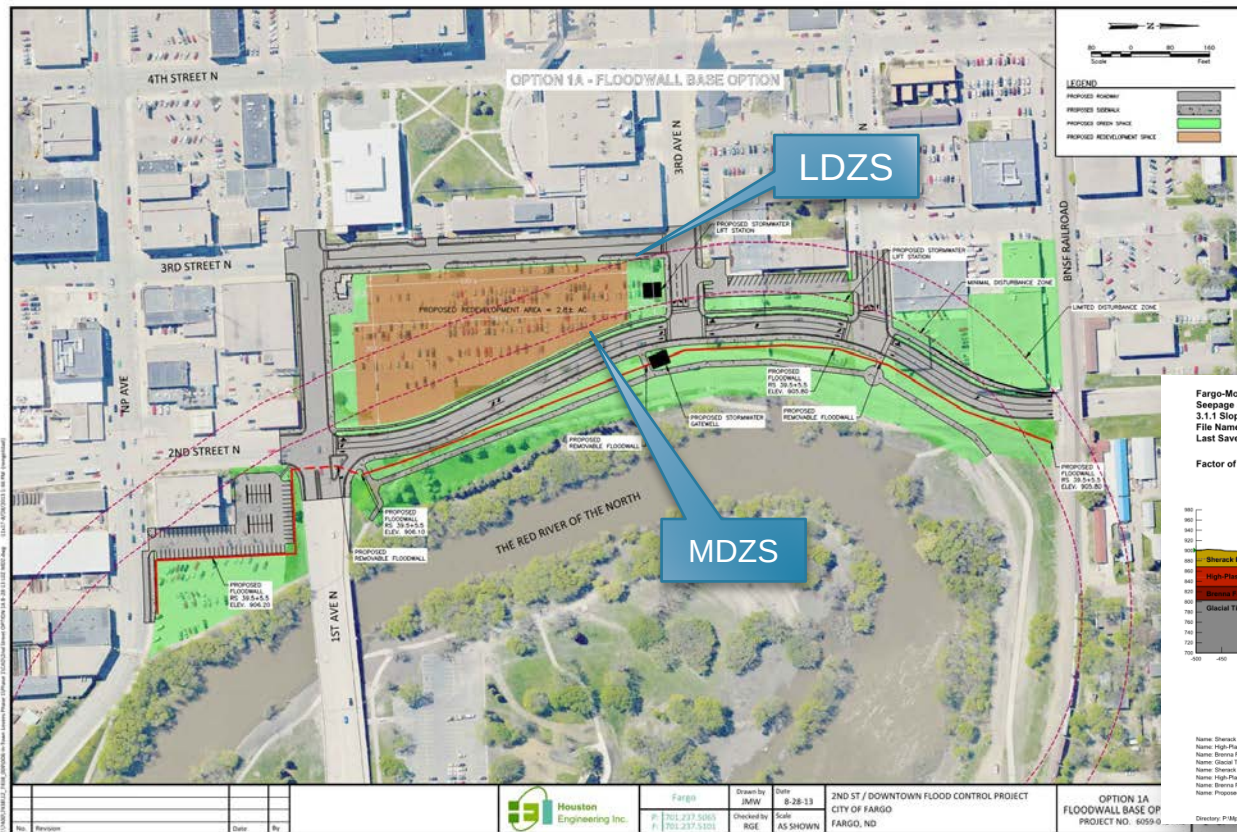


Figure 7 Model Geometry at Cross-Section 20243+60

Redevelopment/Setback Requirements

River Setback Requirements – Stability Concerns

- Minimal Disturbance Zone Setback (MDZS) – 350ft
 - *ESSENTIALLY NO “DISRUPTIVE” ACTIVITY ALLOWED*
- Limited Disturbance Zone Setback (LDZS) – 450ft
 - *ONLY LIMITED “DISRUPTIVE” ACTIVITY ALLOWED*
 - *Development would require wavier*
- No Impact to Floodwall Stability would be required.



Option Consideration Comparison

Option	Flood protection capability	Private property impacts		Traffic/transportation impacts	Parking impacts	Utility impacts	Environmental impacts	River connectivity / visibility	Public green space opportunities (acres)	Redevelopment opportunities (acres)			Operation/maintenance requirements	Costs (millions - Construction Only)
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Additional Aesthetic Enhancement Opportunities



Covington KY –
Adjacent
Development
Example



Grand Forks – Aesthetic
Treatment Example



East Grand Forks
– Removable
Panel Example



Questions?



Website & Public Comment

www.CityofFargo.com/2ndStFloodProtection



City Info

Residential

Search...

2nd Street North
4th Street South Levee
Coulees Crossing
Harwood Drive Levee
Mickelson Field Area
Oakcreek/Copperfield Court
River Vili
Rose Creek North Side



[Home](#) > [City Info](#) > [Departments](#) > [Engineering](#) > [Flood Control](#)

2nd Street North Flood Control

The City of Fargo has developed four options to help reduce downtown area along 2nd Street North from approximately NP Avenue North. These four options provide the same levels of protection and opportunities for defining our river corridor through the inclusion of:

- Enhanced public space options
- Area for future redevelopment that is protected from frequent flooding
- Ways of maintaining various levels of connectivity to the river

Background

As anyone familiar with a Fargo flood fight knows, the portion of the river from NP Avenue to 6th Avenue North, requires the construction of a levee whenever the river is projected to reach major flood stage of 30-feet or higher. This temporary levee protects areas of downtown Fargo from floodwaters and has been installed five times in the last five years. It was actually required to be installed two times in 2013 alone due to summer floods.

While the City has been successful to date in holding back the river with temporary measures, it is vital to establish permanent protection that is more reliable than the emergency efforts. To advance toward that goal the City has developed four options, listed on the right column of this page, for potential flood risk reduction projects.

Public Survey

2nd Street Flood Risk Reduction Public Comment

Name (optional):

What city do you live in? (required):

Fargo

Email Address (required):

Please rank which elements are most important (1-4): (required):

1
2
3
4

Which option do you prefer: (required)

(Please refer to the project homepage for more information on these options)

- ☐ 1A – Floodwall, maintain 2nd Street. \$23.2 million.
☐ 1B – Floodwall, maintain 2nd Street, ability to accommodate grade separated pedestrian connection. \$23.5 million.
☐ 1C – Floodwall, abandon 2nd Street. \$21.8 million.
☐ 2 – Floodwall with grade separated traffic and pedestrian facilities (tunnel). \$44.1 million.

Additional Comments (optional):

comment link below:

[Comment now!](#)

Your input will help guide Fargo City Commissioners as they make the final decision.