

## Memorandum

**To:** Jessica Wilson and Ross Bintner, City of Edina  
**From:** Cory Anderson, Sarah Stratton, and Janna Kieffer  
**Subject:** Morningside Neighborhood Flood Risk Reduction Strategy Conceptual Study  
**Date:** November 19, 2018  
**Project:** 23271649.00

### 1.0 Purpose of Project and Project Background

This technical memorandum summarizes Barr Engineering Co.'s (Barr's) preliminary evaluation and conceptual design of potential flood risk reduction options for the Morningside neighborhood within the city of Edina. This work included a high-level evaluation of potential flood risk reduction options and development of associated planning-level opinion of probable construction costs. In parallel to Barr's work, city of Edina staff (City) have been working on an approach for summarizing impacted structures and estimating potential flood damages and we understand that this damage information (dollars) will be used in conjunction with the estimated project cost data developed by Barr to help City staff further evaluate the costs and benefits of flood risk reduction opportunities in the study area.

### 2.0 Description of Existing Conditions

The Morningside/Weber Park area is described in the City's 2018 Comprehensive Water Resources Management Plan (CWRMP, reference (1)):

*The Morningside/Weber Park area is in the far northeastern corner of Edina, bordering St. Louis Park to the north and Minneapolis to the east. The area is characterized by numerous backyard depressions and several large low-lying areas, including Weber Park. There are two large stormwater detention basins in the area, one located just north of West 42<sup>nd</sup> Street between Lynn Avenue and Kipling Avenue, and the other located just north of West 42<sup>nd</sup> Street and west of France Avenue South (in Weber Park). The area is drained by a piped outlet that conveys stormwater to Lake Bde Maka Ska (formerly named Lake Calhoun) in Minneapolis. The storm sewer and detention basins in this area were originally designed for the 2-percent-annual-chance (50-year) storm event using TP-40 rainfall frequency estimates. Portions of this area have experienced flood problems historically.*

*Model results indicate that approximately 65 principle structures and Avail Academy – Edina Campus (formerly Calvin Christian School) may be directly impacted by the 1-percent-annual-chance (100-year) flood elevations within this area. In the west part of this area, the flood elevation is approximately 872.1 feet (subwatershed MS\_26). In the southwest part of this area, the flood elevation is approximately 871.7 feet (subwatershed MS\_15). In the southeast part of this area, the flood elevation is approximately 870.1 feet*

*(subwatershed MS\_52). In subwatersheds MS\_40 and MS\_39a and MS\_39b, the flood elevation is 870.0 feet. In the smaller depressions without outlets to storm sewer such as subwatersheds MS\_58, MS\_20, MS\_22, MS\_57, MS\_17, and MS\_24, the peak flood elevations are 872.9 feet, 877.3 feet, 872.4 feet, 902.5 feet, 902.5 feet, and 872.1 feet respectively. Flood elevations in subwatersheds MS\_20 and MS\_22 are controlled by the 10-day snowmelt event, while flood elevations in the remaining subwatersheds are controlled by the 24-hour duration event.*

Flood inundation mapping for the 1-percent-annual-chance (100-year) and the 10-percent-annual-chance (10-year) storm events can be found on [Figure 12.3 of the CWRMP](#) and on the [City's Interactive Web Map](#).

### 3.0 Potential Flood Risk Reduction Options

Several potential flood risk reduction options were evaluated using the City's XP-SWMM model. Five storm recurrence intervals (i.e., 5-year, 10-year, 25-year, 50-year, and 100-year 24-hour storm events) were simulated for each flood risk reduction option to help understand the amount of improvement each option can achieve depending on the severity of the rainfall event. Barr conducted a cursory evaluation of potentially impacted structures for each potential flood risk reduction option to assess which options provided the greatest level of flood risk reduction (in terms of a reduction in the number of impacted structures). The seven options that provided the greatest level of flood risk reduction are described below and additional details are also shown on the figures included in **Attachment A**.

- **Option 2b:** Increase the size of the main trunk storm sewer along West 42<sup>nd</sup> Street and Crocker Avenue (up to 60"), including some of the lateral storm sewer (e.g., along Grimes Avenue, 24" to 48"), and construct a flood wall on the east and south sides of Weber Pond, between the pond and the adjacent residential properties, tying into West 42<sup>nd</sup> Street on the south side of Weber Pond (**Figure A-1**).
- **Option 3a:** Provide additional flood storage by excavating (i.e., lowering) the ballfield area of Weber Park and reconstructing the fields, excavating the wooded area north of Weber Pond, excavating and re-grading the low area between Lynn Avenue and Kipling Avenue north of West 42<sup>nd</sup> Street, lowering the open area between Susan Lindgren Elementary School and Monterey Avenue (Yale Gardens Park), and excavating some of the backyards between 44th Street and Branson Street. Additionally, construct a flood wall on the east and south sides of Weber Pond, between the pond and the adjacent residential properties (also included in Option 2b), and construct an earthen berm along the west side of Monterey Avenue between West 41<sup>st</sup> Street and West 42<sup>nd</sup> Street. This option would also include installation of a culvert to connect Weber Pond to the newly excavated storage in the wooded area north of West 41<sup>st</sup> Street (**Figure A-2**).
- **Option 4a:** Provide additional flood storage by excavating and re-grading the low area between Lynn Avenue and Kipling Avenue north of West 42<sup>nd</sup> Street, and installing predictive pumping

systems from the aforementioned low area and Weber Pond to the park (Minikahda Vista Park) north of Avail Academy – Edina Campus to free up flood storage capacity prior to significant rainfall events (**Figure A-3**). The predictive pumping rates were chosen to draw down these two water bodies from their normal levels to about 6-inches of water depth over a 24 hour period (recognizing that predicting storms more than 24 hours in advance is challenging). For modeling purposes, the pumping rates were assumed to be the same regardless of predicted precipitation amounts in order to maximize available flood storage.

- **Option 5a:** Provide additional flood storage by installing underground storage in Weber Park and the open area between Susan Lindgren Elementary School and Monterey Avenue (Yale Gardens Park). Water would be diverted from the storm sewer to the underground storage by installing three diversion weirs in the existing storm sewer manholes (**Figure A-4**). Pumps would be used to draw down water levels in the underground storage after precipitation events (one pump in each underground storage unit).
- **Option 7b:** A combination of Options 2b, 3a, and 4a (**Figure A-5**), which includes:
  - Increasing the size of the trunk storm sewer along West 42<sup>nd</sup> Street and Crocker Avenue (up to 60”) and some of the lateral storm sewer (e.g., along Grimes Avenue, 24” to 48”)
  - Excavating additional flood storage in the low area between Lynn Avenue and Kipling Avenue
  - Installing predictive pumping systems
  - Excavating (lowering) the open area between Susan Lindgren Elementary School and Monterey Avenue (Yale Gardens Park)
  - Constructing an earthen berm west of Monterey Avenue
  - Constructing a flood wall east and south of Weber Pond
- **Option 8:** A more simple variant of Option 3a (**Figure A-6**), which includes:
  - Excavating (i.e., lowering) the ballfields in Weber Park and excavating (to a greater extent, and deeper, than in Option 3a) the wooded area north of Weber Pond
  - Constructing a flood wall east and south of Weber Pond
  - Modifying (lowering) the inverts of the storm sewer pipe from Weber Pond to Minneapolis so that the normal water level of Weber Pond can be lowered by less than 2 feet.
- **Option 9:** A combination of Option 2b, parts of 5a, and 8 (**Figure A-7**), which includes:
  - Increasing the size of the trunk storm sewer along West 42<sup>nd</sup> Street and Crocker Avenue (up to 60”) and some of the lateral storm sewer (e.g., along Grimes Avenue, 24” to 48”)
  - Constructing a flood wall on the east and south sides of Weber Pond

- Excavating (i.e., lowering) the ballfields at Weber Park and excavating (to a greater extent) the wooded area north of Weber Pond.
- Modifying (lowering) the inverts of the storm sewer from Weber Pond to Minneapolis so that the normal water level of Weber Pond can be lowered by less than 2 feet.
- Installing underground storage in Yale Gardens Park, the required diversion weir in the nearby manhole structure, and the low-flow pump to drain the stored water.

## 4.0 Results

Barr provided tables of peak flood elevations to the City for a subsequent analysis of flood consequences and damages (reference (2)). The tables summarized flood elevations, by subwatershed, under existing conditions and under each of the seven flood risk reduction options for each of the five modeled recurrence intervals. Barr and City staff then developed a method to estimate flood damages based on the peak flood elevations and approximate home elevations. The goal of the analysis was to estimate flood risk and associated impacts at a neighborhood-scale for varying storm events. The flood damage estimates reflect “loss potential” in dollars, based on estimated flood loss potential tables published by the Federal Emergency Management Agency (FEMA) (reference (3)) and assumptions or judgments about the probability of damage given a flood level relative to the assumed (LiDAR-based) home elevations.

The methodology for quantifying flood risk accounts for probability of flood events, probability of damage, and the magnitude of damages for existing conditions and for each of the seven flood risk reduction options. This approach for quantifying flood risk considers damage due to potential direct flooding of homes at the surface, indirect flooding of homes via groundwater, and flooding of homes via sanitary sewer backups. The results are detailed in the City’s documentation (reference (4)) and are summarized below to provide a comparison of relative flood risk reduction in terms of the number of impacted principle structures. Please note that in the City’s documentation and the summary provided below, principle structures are referred to as “homes”. Additionally, homes that are referred to as “removed from risk” in the summary below are homes that are no longer at risk of damage by the three damage modes considered for storm events that have a 1%, or greater, chance of occurring each year; however, no home is ever removed from *all* flood risk. Homes described as “increased risk” would expect higher peak flood levels for some or all of the storm events modeled, and subsequently, higher expected damages in dollars. Conversely, homes described as “decreased risk” would expect lower peak flood levels for some or all of the storm events modeled, and subsequently lower expected damages in dollars.

- **Option 2b:** 26 homes were completely removed from risk, the risk was decreased for 111 homes throughout the area, and the risk was increased for 15 homes. These 15 homes are primarily around Weber Pond where water would accumulate due to the additional conveyance of storm sewer upstream. 6 of those homes where the risk increased would be protected by the flood wall, increasing the total number of homes removed from risk to 32.

- **Option 3a:** 11 homes were completely removed from risk, the risk was decreased for 117 homes throughout the area, and the risk was increased for one home, which is near Yale Gardens Park where additional storage and the earthen berm would allow water to be stored to a higher elevation. However, the berm would separate this home from the stored water and it would be protected, increasing the total number of homes removed from risk to 12.
- **Option 4a:** 6 homes were completely removed from risk, the risk was decreased for 127 homes throughout the area, and the risk was increased for 1 home. This 1 house is east of Weber Pond. Refinement of the predictive pumping scheme may help in further protecting this home.
- **Option 5a:** 5 homes were completely removed from risk, the risk was decreased for 92 homes throughout the area, and the risk was not increased for any homes.
- **Option 7b:** 38 homes were completely removed from risk, the risk was decreased for 150 homes throughout the area, and the risk was increased for 1 home. This 1 house is near Yale Gardens Park where additional storage and the earthen berm would store water higher. However, the berm would separate this home from the stored water and it would be protected, increasing the total number of homes removed from risk to 39.
- **Option 8:** 5 homes were completely removed from risk, the risk was decreased for 74 homes throughout the area, and the risk was not increased for any homes.
- **Option 9:** 34 homes were completely removed from risk, the risk was decreased for 136 homes throughout the area, and the risk was not increased for any homes.

## 5.0 Planning-Level Opinion of Probable Construction Cost

The Engineer's planning-level opinions of probable construction cost have been developed for each of the flood risk reduction options discussed in Section 3.0 and are included as **Attachment B**. The planning-level opinions of probable construction cost are intended to provide assistance in evaluating and comparing flood risk reduction options and should not be assumed as absolute values for given options. These opinions of probable cost generally correspond to standards established by the Association for the Advancement of Cost Engineering (AACE). This cost estimate is characterized by limited project definition, wide-scale use of parametric models to calculate estimated costs (i.e., making extensive use of order-of-magnitude costs from similar projects or proposals), and uncertainty. At this stage of planning, the range of uncertainty of total project cost is high. Due to the early stage of the project, it is standard practice to place a broad accuracy range around the point cost estimate. The estimated accuracy range for the opinions of probable cost developed as part of this analysis is -30% to +50%. All estimated construction costs are presented in 2018 U.S. dollars and include costs for engineering and project administration.

Quantities are estimated with calculations based on site development assumptions as described for each potential flood risk reduction option. Dimensions, areas and volumes were assumed based on LiDAR elevation data and current understanding of proposed grading. For each potential flood risk reduction

option considered, planning-level opinion of costs do not include land acquisition or coordination with residents or other subcontractors.

The opinion of probable cost provided in this report is made on the basis of Barr Engineering's experience and qualifications and represents our best judgment as experienced and qualified professionals familiar with the project. It is acknowledged that additional investigations and additional site specific information that become available in the next stage of study or design may result in changes to the assumed configuration, cost and functioning of project features. In addition, because we have no control over the eventual cost of labor, materials, equipment or services furnished by others, or over the contractor's methods of determining prices, or over competitive bidding or market conditions, Barr cannot and does not guarantee that proposals, bids, or actual costs will not vary from the planning-level opinion of probable costs presented.

## 6.0 References

1. **City of Edina.** *2018 Comprehensive Water Resources Management Plan*. Edina, MN : s.n., July 2018.
2. **Barr Engineering Co.** *Annualized Damage Method - Barr to Edina Round 2 - with Macro.xlsm*. [Excel File] September 14, 2018.
3. **FEMA.** *Estimated Flood Loss Potential Tables. Flood Loss Estimations 2017*. [Online] [Original data source: National Flood Services, FloodTools.com] [Cited: September 1, 2018.]  
[https://www.fema.gov/media-library-data/1499290622913-0bcd74f47bf20aa94998a5a920837710/Flood\\_Loss\\_Estimations\\_2017.pdf](https://www.fema.gov/media-library-data/1499290622913-0bcd74f47bf20aa94998a5a920837710/Flood_Loss_Estimations_2017.pdf).
4. **City of Edina.** *Edina Morningside Neighborhood Flood Risk Reduction Concepts*. Edina, MN : s.n., September 2018.

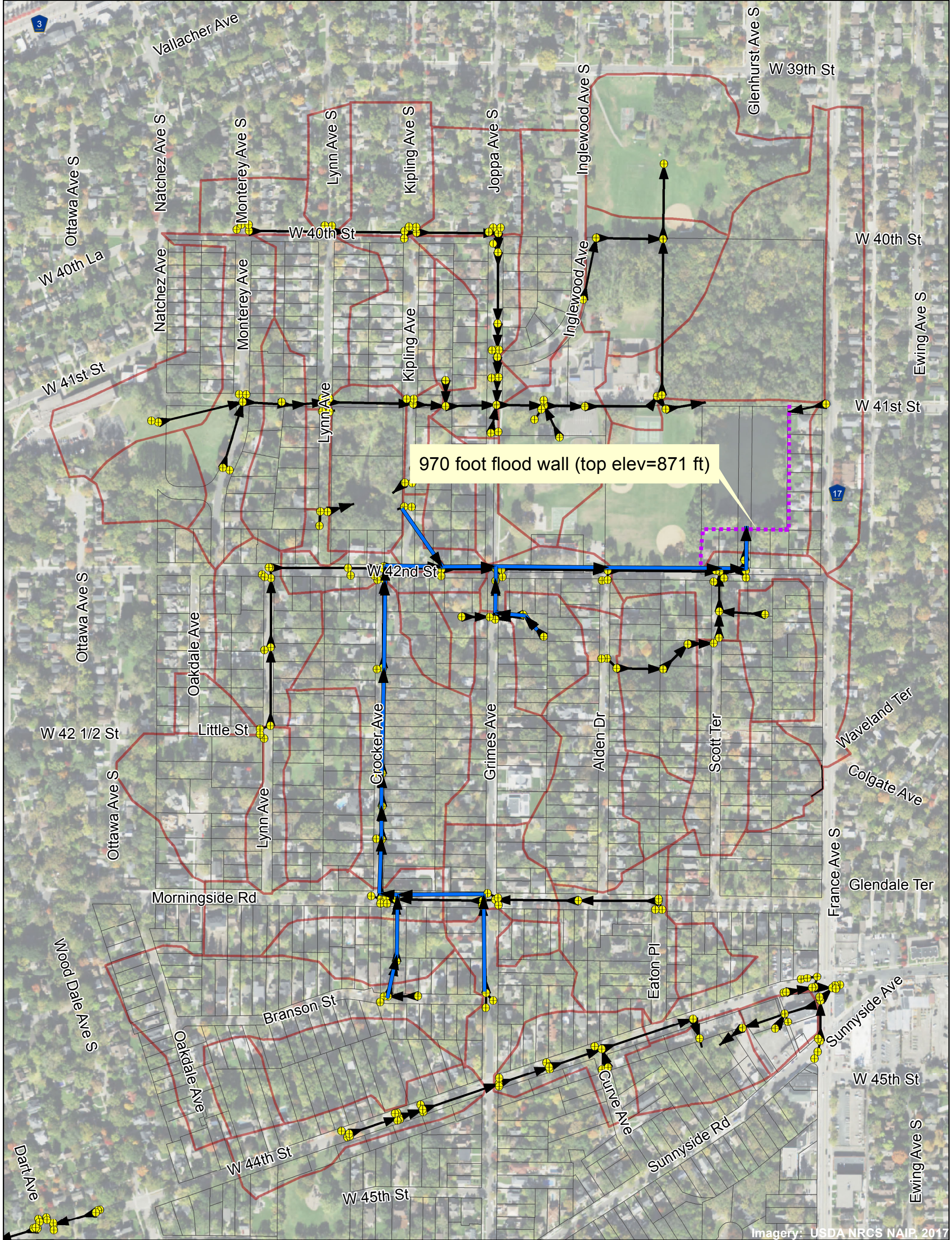
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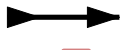


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## Attachment A

### Map Figures of the Flood Improvement Options





-  Option 2B Proposed Storm Sewer Size Increase (up to 60")
-  Option 2B Flood Wall
-  Existing Manhole/Catch Basin
-  Existing Storm Sewer
-  Subwatersheds
-  Parcels

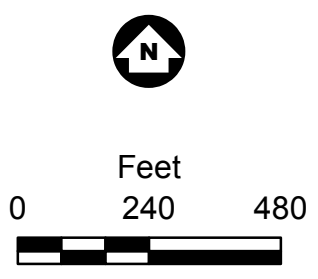
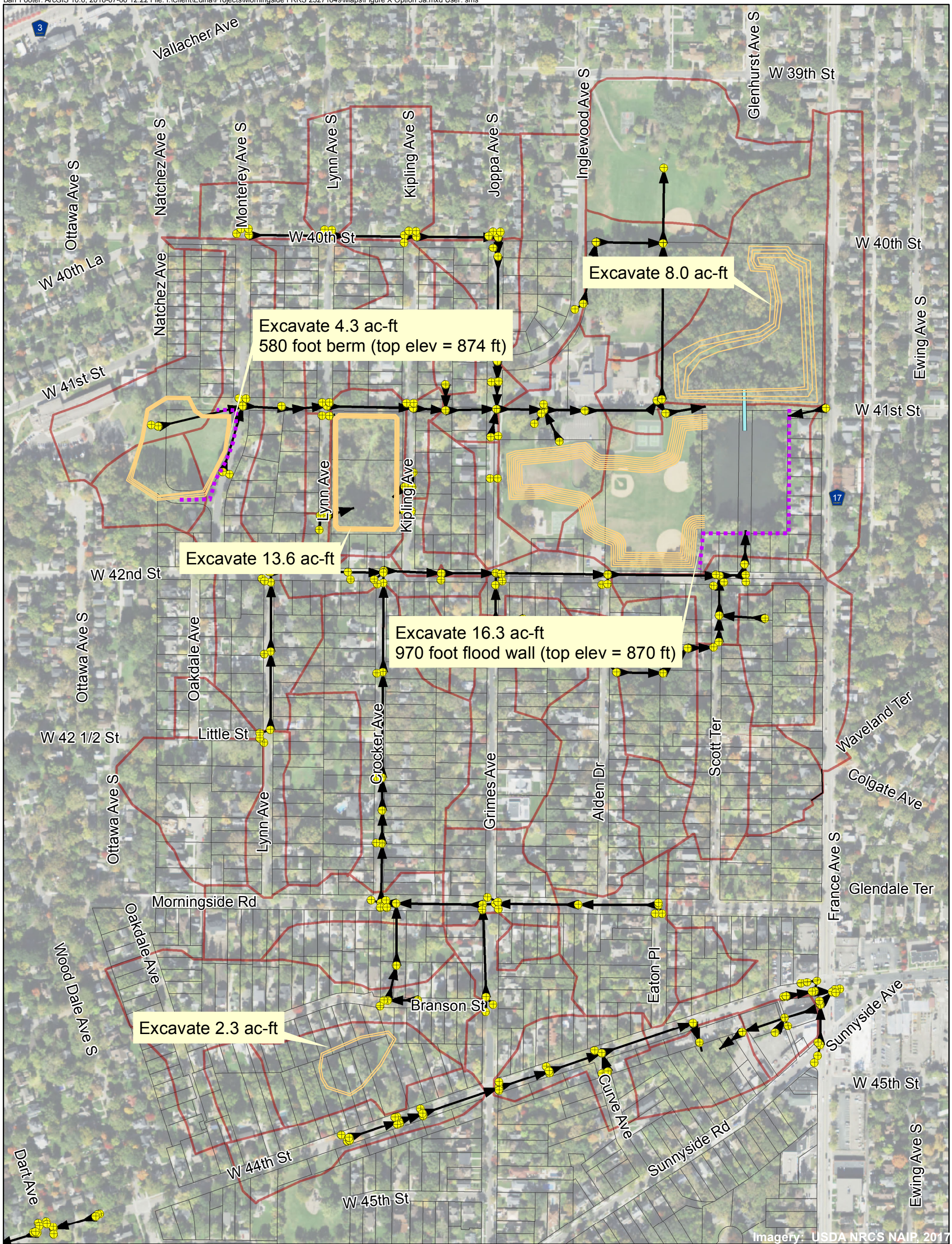


Figure A-1

PROPOSED FLOOD RISK  
REDUCTION OPTION -  
OPTION 2B  
Morningside Neighborhood  
City of Edina

Note: Vertical datum for all listed elevations is NGVD29





- - - Option 3A Berm / Flood Wall
- Option 3A Excavation
- Option 3A Culvert
- Existing Manhole/Catch Basin
- Existing Storm Sewer
- Subwatersheds
- Parcels

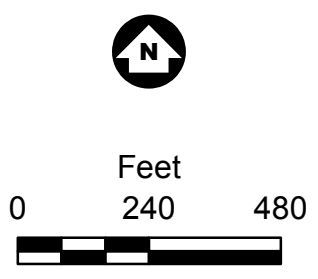
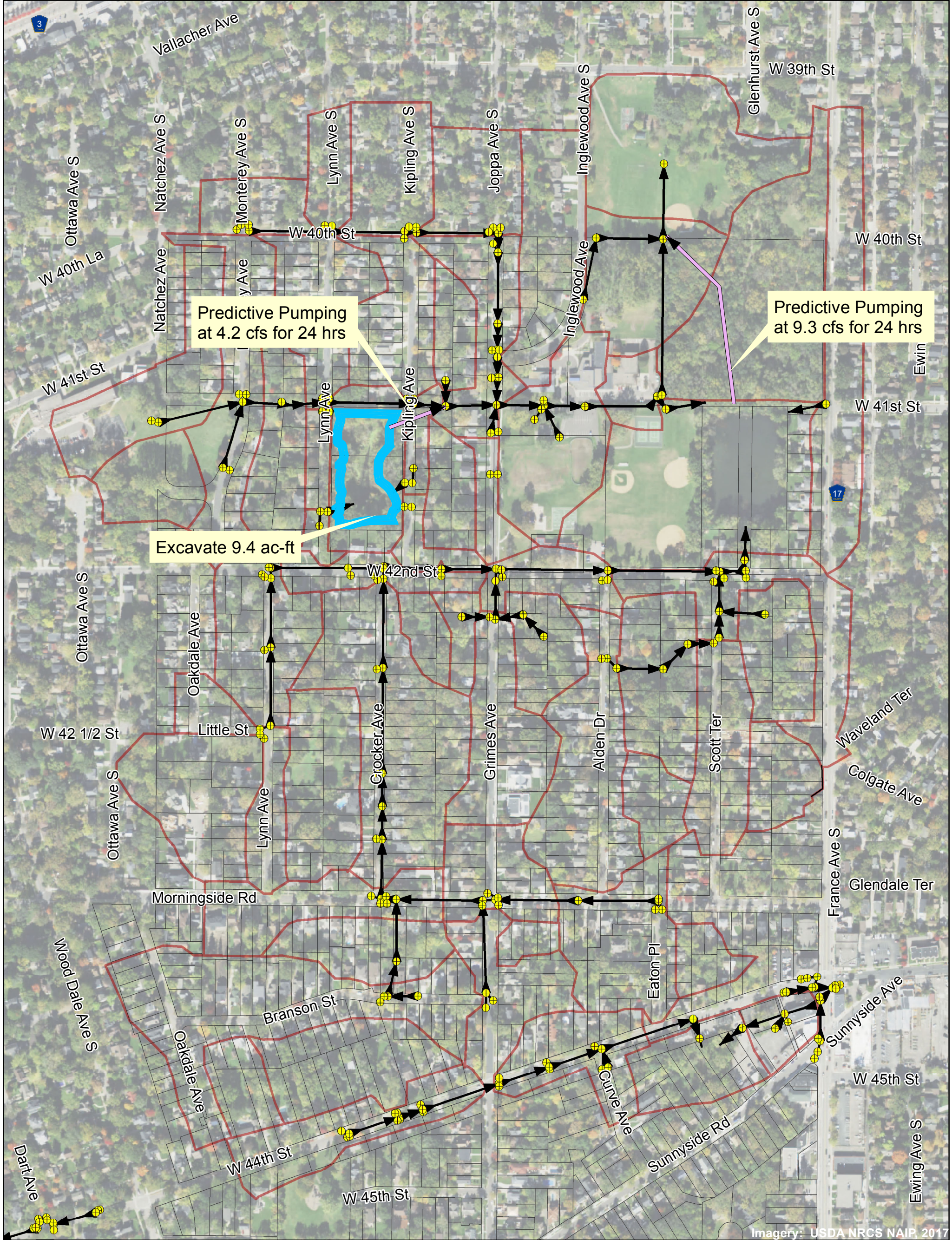





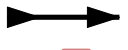


Figure A-2

PROPOSED FLOOD RISK  
REDUCTION OPTION -  
OPTION 3A  
Morningside Neighborhood  
City of Edina

Note: Vertical datum for all listed elevations is NGVD29





-  Option 4A Predictive Pumping
-  Option 4A Excavation
-  Existing Manhole/Catch Basin
-  Existing Storm Sewer
-  Subwatersheds
-  Parcels

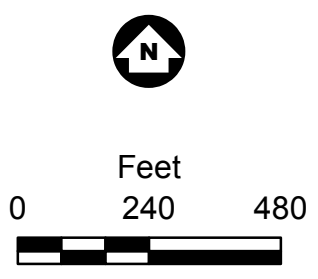
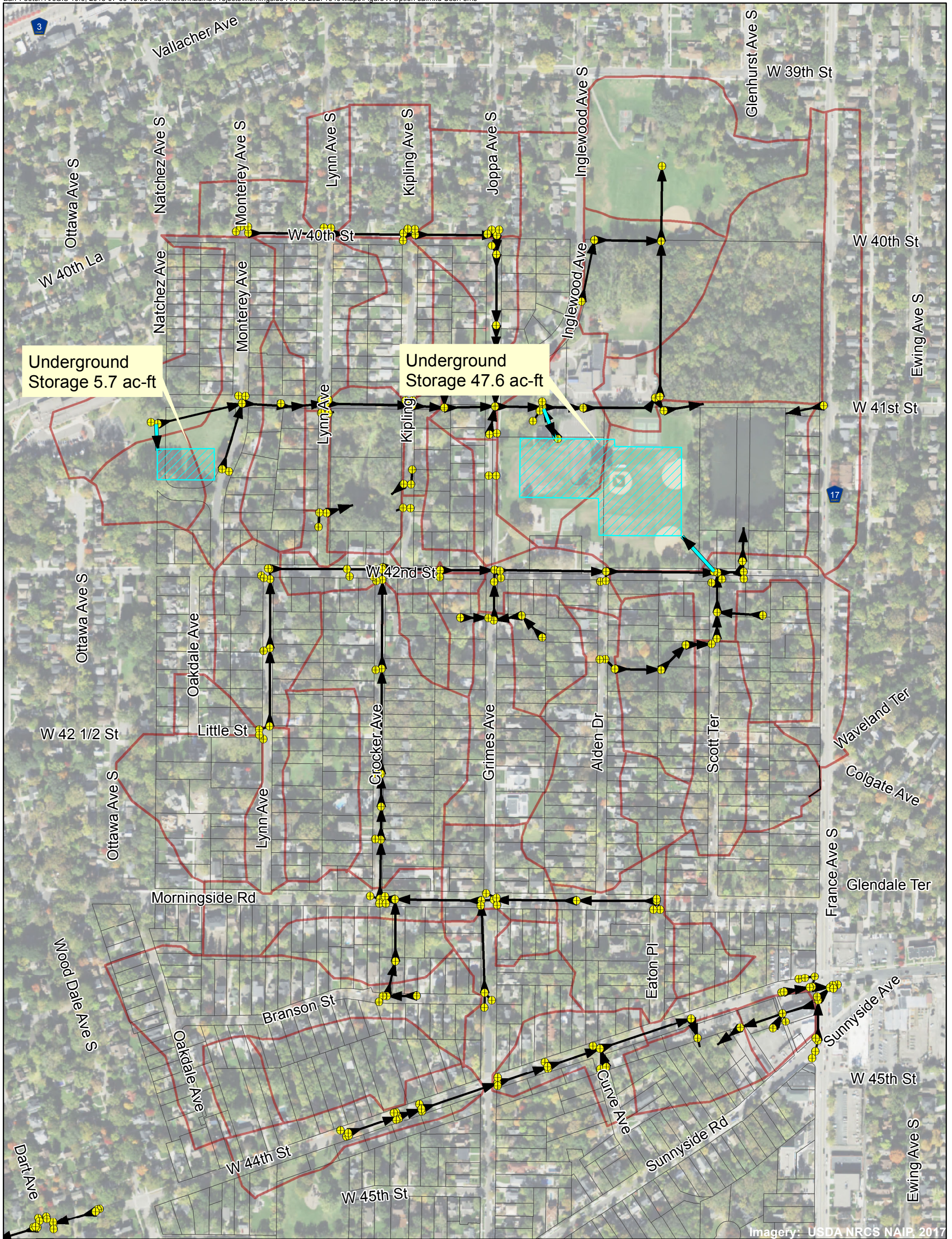








Figure A-3

PROPOSED FLOOD RISK  
REDUCTION OPTION -  
OPTION 4A  
Morningside Neighborhood  
City of Edina

Note: Vertical datum for all listed elevations is NGVD29





-  Option 5A Underground Storage
-  Option 5A Weir
-  Existing Manhole/Catch Basin
-  Existing Storm Sewer
-  Subwatersheds
-  Parcels

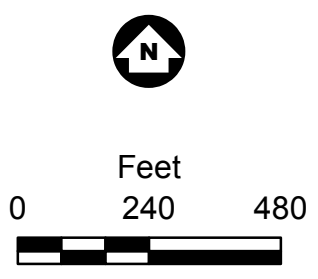
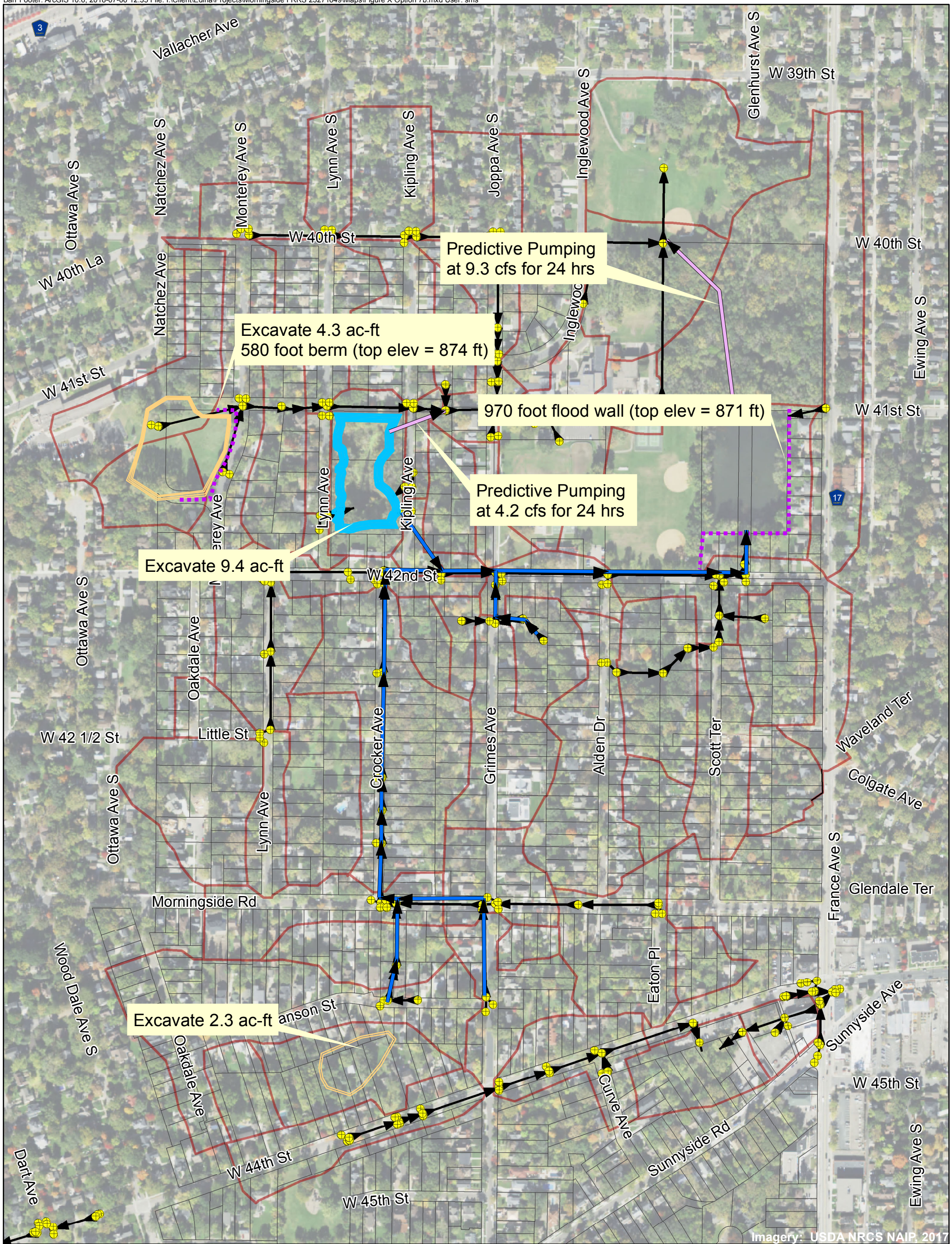


Figure A-4

PROPOSED FLOOD RISK  
REDUCTION OPTION -  
OPTION 5A  
Morningside Neighborhood  
City of Edina

Note: Vertical datum for all listed elevations is NGVD29





- ⋯ Option 3A Berm / Flood Wall
- ➔ Option 4A Predictive Pumping
- Option 4A Excavation
- Option 3A Excavation
- Existing Manhole/Catch Basin
- ➔ Existing Storm Sewer
- Subwatersheds
- Parcels

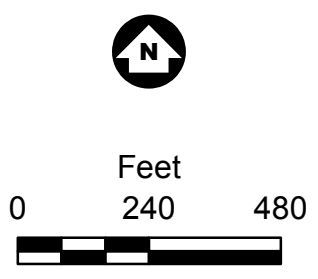


Figure A-5

PROPOSED FLOOD RISK  
REDUCTION OPTION -  
OPTION 7B  
Morningside Neighborhood  
City of Edina

Note: Vertical datum for all listed elevations is NGVD29



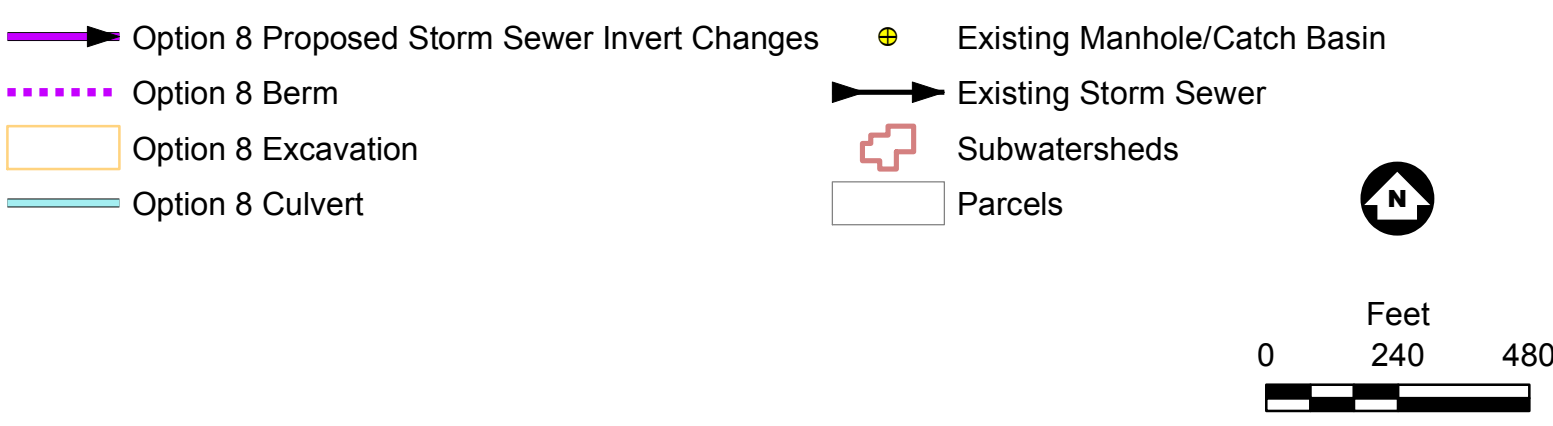
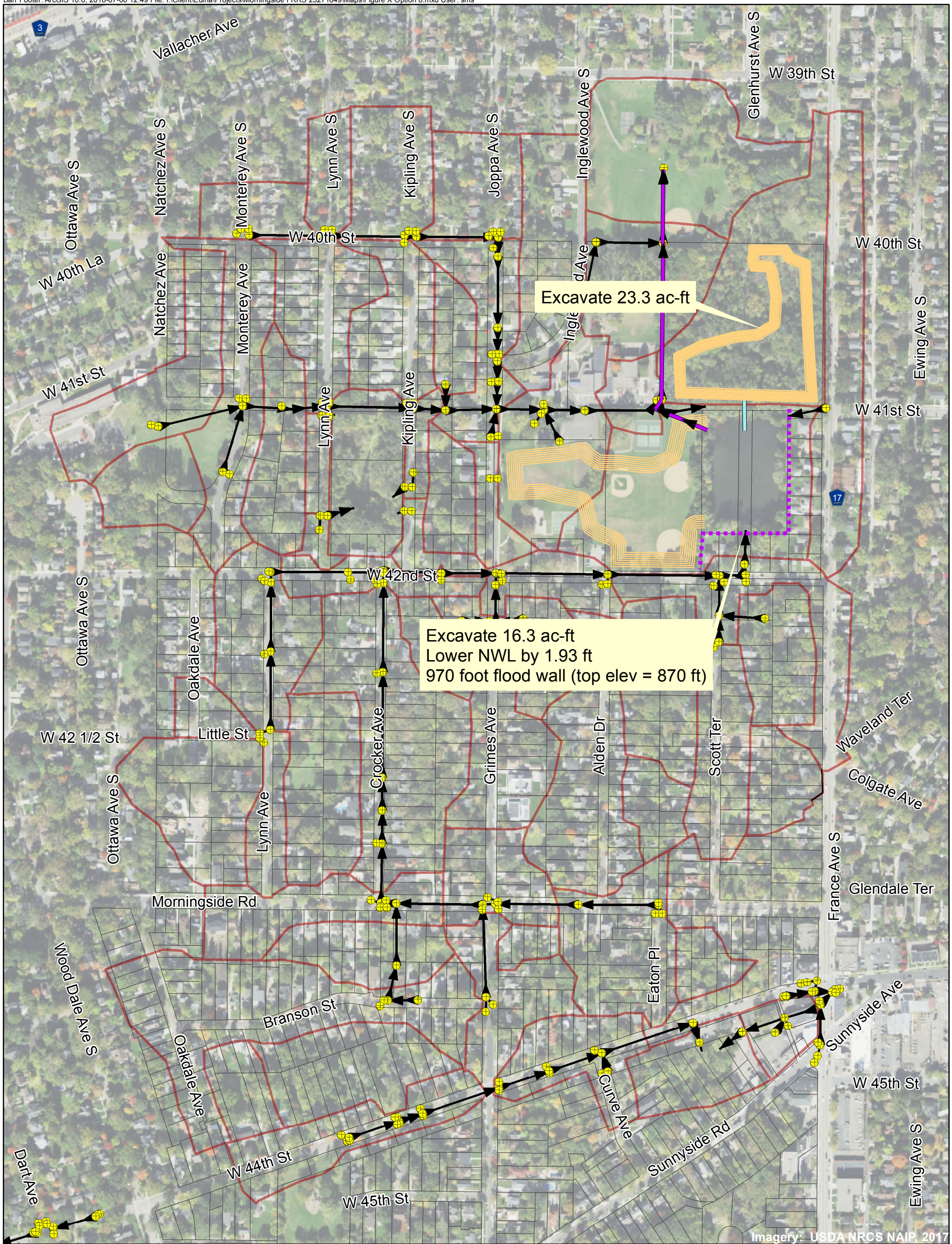
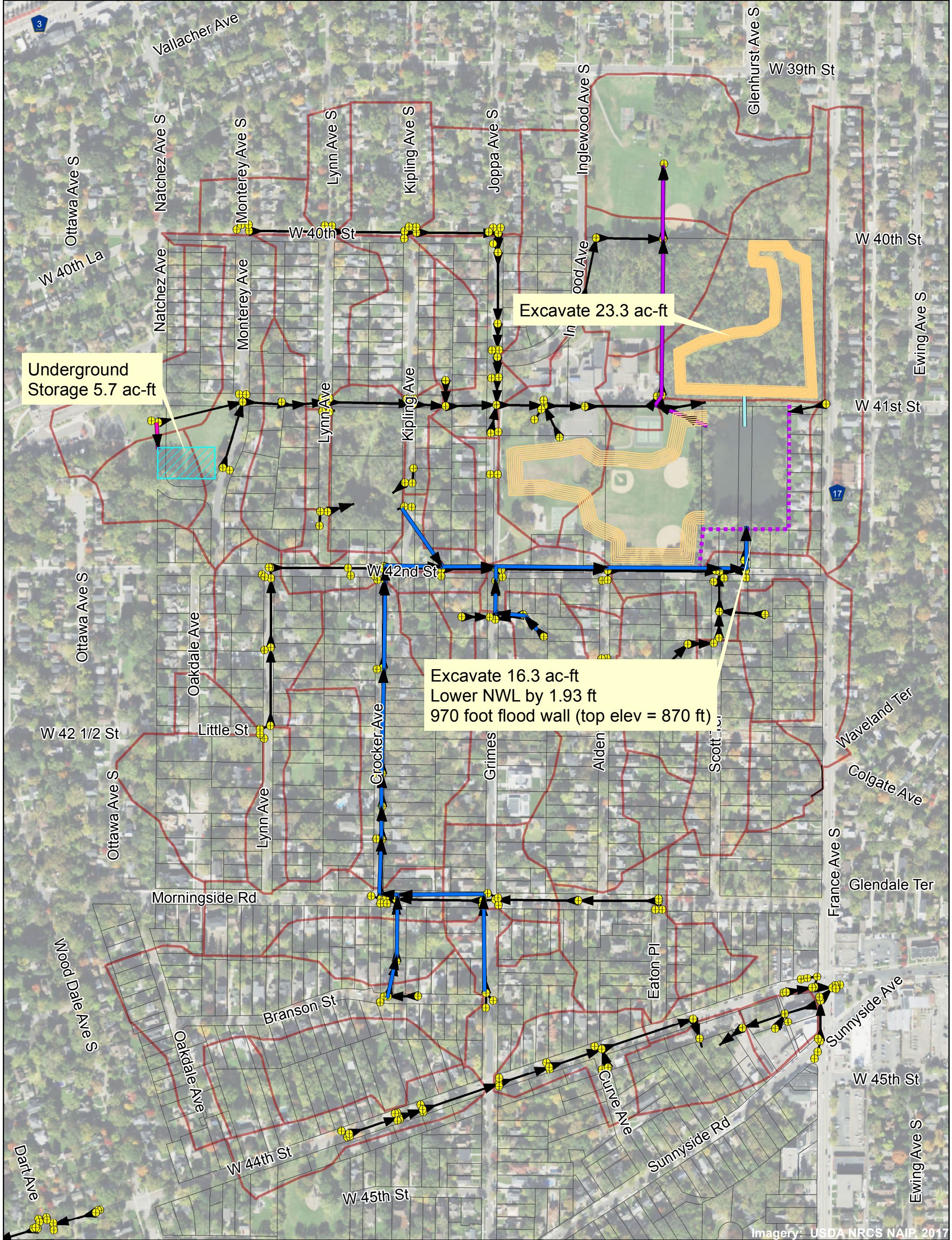


Figure A-6

PROPOSED FLOOD RISK  
REDUCTION OPTION -  
OPTION 8  
Morningside Neighborhood  
City of Edina

Note: Vertical datum for all listed elevations is NGVD29





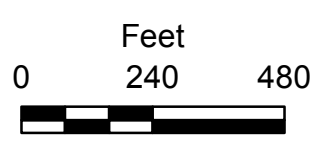
- ▶ Option 8 Proposed Storm Sewer Invert Changes
- Option 5A Underground Storage
- ▶ Option 5A Weir
- ⋯ Option 8 Berm
- Option 8 Excavation
- Option 8 Culvert
- ⊕ Existing Manhole/Catch Basin
- ▶ Existing Storm Sewer
- Subwatersheds
- Parcels



Figure A-7

PROPOSED FLOOD RISK  
REDUCTION OPTION -  
OPTION 9  
Morningside Neighborhood  
City of Edina

Note: Vertical datum for all listed elevations is NGVD29





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## Attachment B

### Engineer's Opinion of Probable Project Cost for Flood Improvement Options

<b>BARR</b> <b>PREPARED BY: BARR ENGINEERING COMPANY</b> <b>FEASIBILITY STUDY</b> <b>ENGINEER'S OPINION OF PROBABLE PROJECT COST</b> PROJECT: Morningside FRRS Study LOCATION: City of Edina PROJECT #: 23/27-1649.00 <b>OPINION OF COST - SUMMARY</b>	SHEET: 1 OF 7
	BY: KJN2 DATE: 7/6/2018
	CHECKED BY: KAL DATE: 7/6/2018
	APPROVED BY: DATE:
	ISSUED: DATE:
	ISSUED: DATE:

**Engineer's Opinion of Probable Project Cost**  
**Morningside Flood Mitigation Feasibility Project**  
**Option 2B**

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization (10%)	LS	1	\$240,000.00	\$240,000.00	1,2,3,4,5,6
B	Temporary Erosion Control	LS	1	\$30,000.00	\$30,000.00	1,2,3,4,5,6
C	Flotation Silt Curtain	LF	900	\$11.00	\$9,900.00	1,2,3,4,5,6
D	Remove and Dispose of Existing Storm Sewer	LF	4,580	\$20.00	\$91,600.00	1,2,3,4,5,6
E	Remove and Dispose of Existing Manhole/Catch Basin	Each	22	\$750.00	\$16,500.00	1,2,3,4,5,6
F	24" RC Pipe Sewer (Furnish and Install) (12 - 13' depth)	LF	278	\$110.00	\$30,580.00	1,2,3,4,5,6,7
G	36" RC Pipe Sewer (Furnish and Install) (8 - 13' depth)	LF	710	\$170.00	\$120,700.00	1,2,3,4,5,6,7
H	48" RC Pipe Sewer (Furnish and Install) (15' depth)	LF	368	\$270.00	\$99,360.00	1,2,3,4,5,6,7
I	60" RC Pipe Sewer (Furnish and Install) (8 - 10' depth)	LF	840	\$225.00	\$189,000.00	1,2,3,4,5,6,7
J	60" RC Pipe Sewer (Furnish and Install) (10 - 16' depth)	LF	2,630	\$340.00	\$894,200.00	1,2,3,4,5,6,7
K	Construct Drainage Structure SD-48	LF	14	\$372.00	\$5,208.00	1,2,3,4,5,6
L	Construct Drainage Structure SD-60	LF	56	\$608.00	\$34,048.00	1,2,3,4,5,6
M	Construct Drainage Structure SD-72	LF	14	\$804.00	\$11,256.00	1,2,3,4,5,6
N	Construct Drainage Structure SD-84	LF	224	\$1,450.00	\$324,800.00	1,2,3,4,5,6
O	Casting Assembly	Each	22	\$750.00	\$16,500.00	1,2,3,4,5,6
P	Tie-In Existing Storm Sewer Main to Manhole	Each	6	\$1,000.00	\$6,000.00	1,2,3,4,5,6
Q	Connect CB Leads to Constructed Storm Sewer	Each	38	\$700.00	\$26,600.00	1,2,3,4,5,6
R	Excavation	CY	1,110	\$4.00	\$4,440.00	1,2,3,4,5,6
S	Offsite Disposal of Excavated Material	CY	890	\$16.00	\$14,240.00	1,2,3,4,5,6
T	Site Grading	SY	2,230	\$2.00	\$4,460.00	1,2,3,4,5,6
U	Reinforced Structural Concrete Flood Wall	CY	450	\$1,000.00	\$450,000.00	1,2,3,4,5,6
V	Clearing and Grubbing	AC	1	\$6,000.00	\$6,000.00	1,2,3,4,5,6
W	Tree 2", B&B	Each	20	\$500.00	\$10,000.00	1,2,3,4,5,6
X	Turf Establishment (w/ Disc Anchored Mulch)	AC	1	\$3,000.00	\$3,000.00	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				\$2,638,000.00	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (30%)				\$791,000.00	1,5,8
	ESTIMATED CONSTRUCTION COST				\$3,429,000.00	1,2,3,4,5,6,7,8
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION (30%)				\$1,029,000.00	1,2,3,4,5,8
	RESIDENTIAL/CONSTRUCTION PERMANENT EASEMENT				\$11,000.00	1,2,3,5,8
	ESTIMATED TOTAL PROJECT COST				\$4,469,000.00	1,2,3,4,5,6,7,8
	<b>ESTIMATED ACCURACY RANGE</b>			<b>-30%</b>	<b>\$3,129,000.00</b>	5,8
				<b>50%</b>	<b>\$6,704,000.00</b>	5,8

Notes
<sup>1</sup> Limited Design Work Completed
<sup>2</sup> Quantities Based on Design Work Completed.
<sup>3</sup> Unit Prices Based on Information Available at This Time.
<sup>4</sup> Minimal Soil and Field Investigations Completed. Costs do not include remediation of contaminated soils (if found).
<sup>5</sup> This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -30% to +50%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.
<sup>6</sup> Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.
<sup>7</sup> Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials
<sup>8</sup> Estimate costs are reported to nearest thousand dollars.

<b>BARR</b> <b>PREPARED BY: BARR ENGINEERING COMPANY</b> <b>FEASIBILITY STUDY</b> <b>ENGINEER'S OPINION OF PROBABLE PROJECT COST</b> PROJECT: Morningside FRRS Study LOCATION: City of Edina PROJECT #: 23/27-1649.00 <b>OPINION OF COST - SUMMARY</b>	SHEET: 2 OF 7
	BY: KJN2 DATE: 7/6/2018
	CHECKED BY: KAL DATE: 7/6/2018
	APPROVED BY: DATE:
	ISSUED: DATE:
	ISSUED: DATE:
	ISSUED: DATE:

**Engineer's Opinion of Probable Project Cost**  
**Morningside Flood Mitigation Feasibility Project**  
**Option 3A**

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization (10%)	LS	1	\$270,000.00	\$270,000.00	1,2,3,4,5,6
B	Temporary Erosion Control	LS	1	\$30,000.00	\$30,000.00	1,2,3,4,5,6
C	Dewatering	LS	1	\$50,000.00	\$50,000.00	1,2,3,4,5,6
D	Flotation Silt Curtain	LF	1,000	\$11.00	\$11,000.00	1,2,3,4,5,6
E	Remove Existing Sports Infrastructure	LS	1	\$15,000.00	\$15,000.00	1,2,3,4,5,6
F	Excavation	CY	72,903	\$4.00	\$291,613.33	1,2,3,4,5,6
G	Off Site Disposal of Excavated Material	CY	72,290	\$16.00	\$1,156,634.07	1,2,3,4,5,6
H	Site Grading	SY	125,540	\$2.00	\$251,080.00	1,2,3,4,5,6
I	Place On-Site Soil for Berm Construction	CY	1,504	\$5.00	\$7,518.52	1,2,3,4,5,6
J	36" RC Pipe Sewer (Furnish and Install) (5' - 8' depth)	LF	50	\$110.00	\$5,500.00	1,2,3,4,5,6,7
K	36" RC Pipe Sewer Flared End Section (Furnish and Install)	Each	2	\$1,540.00	\$3,080.00	1,2,3,4,5,6
L	MnDOT Class IV RipRap with Filter Fabric	TON	53	\$100.00	\$5,275.00	1,2,3,4,5,6
M	Reinforced Structural Concrete Flood Wall	CY	450	\$1,000.00	\$450,000.00	1,2,3,4,5,6
N	Clearing and Grubbing	AC	9	\$6,000.00	\$54,000.00	1,2,3,4,5,6
O	Upland Native Vegetation	AC	5	\$5,000.00	\$25,000.00	1,2,3,4,5,6
P	Tree 2", B&B	Each	150	\$500.00	\$75,000.00	1,2,3,4,5,6
Q	Turf Establishment (w/ Disc Anchored Mulch)	AC	17	\$3,000.00	\$52,314.05	1,2,3,4,5,6
R	Sod	SY	4,840	\$6.00	\$29,040.00	1,2,3,4,5,6
S	Erosion Control Blanket	SY	29,476	\$2.00	\$58,951.20	1,2,3,4,5,6
T	Wetland Restoration	AC	2.5	\$10,000.00	\$25,000.00	1,2,3,4,5,6
U	Reconstruction of Baseball Field	LS	1	\$75,000.00	\$75,000.00	1,2,3,4,5,6
V	Reconstruction of Ice Rink	LS	1	\$25,000.00	\$25,000.00	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				\$2,966,000.00	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (30%)				\$890,000.00	1,5,8
	ESTIMATED CONSTRUCTION COST				\$3,856,000.00	1,2,3,4,5,6,7,8
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION (30%)				\$1,157,000.00	1,2,3,4,5,8
	RESIDENTIAL/CONSTRUCTION PERMANENT EASEMENT				\$56,000.00	1,2,3,5,8
	ESTIMATED TOTAL PROJECT COST				\$5,069,000.00	1,2,3,4,5,6,7,8
	<b>ESTIMATED ACCURACY RANGE</b>			<b>-30%</b>	<b>\$3,549,000.00</b>	5,8
				<b>50%</b>	<b>\$7,604,000.00</b>	5,8

Notes
<sup>1</sup> Limited Design Work Completed
<sup>2</sup> Quantities Based on Design Work Completed.
<sup>3</sup> Unit Prices Based on Information Available at This Time.
<sup>4</sup> Minimal Soil and Field Investigations Completed. Costs do not include remediation of contaminated soils (if found).
<sup>5</sup> This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -30% to +50%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.
<sup>6</sup> Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.
<sup>7</sup> Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials
<sup>8</sup> Estimate costs are reported to nearest thousand dollars.



<b>BARR</b> <b>PREPARED BY: BARR ENGINEERING COMPANY</b> <b>FEASIBILITY STUDY</b> <b>ENGINEER'S OPINION OF PROBABLE PROJECT COST</b> PROJECT: Morningside FRRS Study LOCATION: City of Edina PROJECT #: 23/27-1649.00 <b>OPINION OF COST - SUMMARY</b>	SHEET: 3 OF 7
	BY: KJN2 DATE: 7/6/2018
	CHECKED BY: KAL DATE: 7/6/2018
	APPROVED BY: DATE:
	ISSUED: DATE:
	ISSUED: DATE:
	ISSUED: DATE:

**Engineer's Opinion of Probable Project Cost**  
**Morningside Flood Mitigation Feasibility Project**  
**Option 4A**

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization (10%)	LS	1	\$186,000.00	\$186,000.00	1,2,3,4,5,6
B	Temporary Erosion Control	LS	1	\$30,000.00	\$30,000.00	1,2,3,4,5,6
C	Excavation	CY	15,165	\$4.00	\$60,661.33	1,2,3,4,5,6
D	Off Site Disposal of Excavated Material	CY	15,165	\$16.00	\$242,645.33	1,2,3,4,5,6
E	Site Grading	SY	14,520	\$2.00	\$29,040.00	1,2,3,4,5,6
F	Opti CMAC Predictive Pumping Control System (Furnish and Install)	Each	2	\$85,000.00	\$170,000.00	1,2,3,4,5,6
G	2,000 GPM Pumping Station (Includes Building Structure, Electric Supply, Control Panel)	LS	1	\$500,000.00	\$500,000.00	1,2,3,4,5,6
H	4,000 GPM Pumping Station (Includes Building Structure, Electric Supply, Control Panel)	LS	1	\$700,000.00	\$700,000.00	1,2,3,4,5,6
I	Pumping Station Outlet Piping (Furnish and Install)	LF	1,116	\$40.00	\$44,640.00	1,2,3,4,5,6,7
J	Pumping Station Inlet Suction Piping (Furnish and Install)	LF	24	\$40.00	\$960.00	1,2,3,4,5,6,7
K	Tie-In Storm Sewer to Existing Manhole	Each	2	\$1,000.00	\$2,000.00	1,2,3,4,5,6
L	Clearing and Grubbing	AC	3.2	\$6,000.00	\$19,239.67	1,2,3,4,5,6
M	Upland Native Vegetation	AC	0.7	\$5,000.00	\$3,500.00	1,2,3,4,5,6
N	Tree 2", B&B	Each	50	\$500.00	\$25,000.00	1,2,3,4,5,6
O	Turf Establishment (w/ Disc Anchored Mulch)	AC	0.5	\$3,000.00	\$1,500.00	1,2,3,4,5,6
P	Erosion Control Blanket	SY	1,452	\$2.00	\$2,904.00	1,2,3,4,5,6
Q	Wetland Restoration	AC	2	\$10,000.00	\$20,000.00	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				\$2,038,000.00	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (30%)				\$611,000.00	1,5,8
	ESTIMATED CONSTRUCTION COST				\$2,649,000.00	1,2,3,4,5,6,7,8
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION (30%)				\$795,000.00	1,2,3,4,5,8
	ESTIMATED TOTAL PROJECT COST				\$3,444,000.00	1,2,3,4,5,6,7,8
	<b>ESTIMATED ACCURACY RANGE</b>			<b>-30%</b>	<b>\$2,411,000.00</b>	5,8
				<b>50%</b>	<b>\$5,166,000.00</b>	5,8

Notes
<sup>1</sup> Limited Design Work Completed
<sup>2</sup> Quantities Based on Design Work Completed.
<sup>3</sup> Unit Prices Based on Information Available at This Time.
<sup>4</sup> Minimal Soil and Field Investigations Completed. Costs do not include remediation of contaminated soils (if found).
<sup>5</sup> This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -30% to +50%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.
<sup>6</sup> Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.
<sup>7</sup> Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials
<sup>8</sup> Estimate costs are reported to nearest thousand dollars.

<b>BARR</b> <b>PREPARED BY: BARR ENGINEERING COMPANY</b> <b>FEASIBILITY STUDY</b> <b>ENGINEER'S OPINION OF PROBABLE PROJECT COST</b> PROJECT: Morningside FRRS Study LOCATION: City of Edina PROJECT #: 23/27-1649.00 <b>OPINION OF COST - SUMMARY</b>	SHEET: 4 OF 7
	BY: KJN2 DATE: 7/6/2018
	CHECKED BY: KAL DATE: 7/6/2018
	APPROVED BY: DATE:
	ISSUED: DATE:
	ISSUED: DATE:
	ISSUED: DATE:

**Engineer's Opinion of Probable Project Cost**  
**Morningside Flood Mitigation Feasibility Project**  
**Option 5A**

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization	LS	1	\$576,000.00	\$576,000.00	1,2,3,4,5,6
B	Temporary Erosion Control	LS	1	\$30,000.00	\$30,000.00	1,2,3,4,5,6
C	Remove Existing Sports Infrastructure	LS	1	\$15,000.00	\$15,000.00	1,2,3,4,5,6
D	Excavation	CY	785,587	\$4.00	\$3,142,346.67	1,2,3,4,5,6
E	Excavate and Haul offsite	CY	112,933	\$16.00	\$1,806,933.33	1,2,3,4,5,6
F	Site Grading	SY	43,560	\$2.00	\$87,120.00	1,2,3,4,5,6
G	Salvage and Replace Existing Topsoil	CY	7,260	\$9.00	\$65,340.00	1,2,3,4,5,6
H	StormTrap Subsurface Storage	CF	2,866,250	\$6.00	\$17,197,500.00	1,2,3,4,5,6
I	500 GPM Pump (Subsurface Storage Drawdown)	Each	1	\$30,000.00	\$30,000.00	1,2,3,4,5,6
J	3,500 GPM Pump (Subsurface Storage Drawdown)	Each	1	\$300,000.00	\$300,000.00	1,2,3,4,5,6
K	36" RC Pipe Sewer (Furnish and Install) (10' - 15' depth)	LF	300	\$215.00	\$64,500.00	1,2,3,4,5,6,7
L	42" RC Pipe Sewer (Furnish and Install) (10' - 15' depth)	LF	50	\$270.00	\$13,500.00	1,2,3,4,5,6,7
M	Construct Drainage Structure SD-72 w/ Weir (Diversion Structure)	Each	3	\$15,000.00	\$45,000.00	1,2,3,4,5,6
N	Tie-In Existing Storm Sewer to Manhole	Each	5	\$1,000.00	\$5,000.00	1,2,3,4,5,6
O	Clearing and Grubbing	AC	1	\$6,000.00	\$6,000.00	1,2,3,4,5,6
P	Tree 2", B&B	Each	25	\$500.00	\$12,500.00	1,2,3,4,5,6
Q	Turf Establishment (w/ Disc Anchored Mulch)	AC	9.0	\$3,000.00	\$27,000.00	1,2,3,4,5,6
R	Reconstruction of Baseball Field	LS	1	\$75,000.00	\$75,000.00	1,2,3,4,5,6
S	Reconstruction of Ice Rink	LS	1	\$25,000.00	\$25,000.00	1,2,3,4,5,6
CONSTRUCTION SUBTOTAL					\$23,524,000.00	1,2,3,4,5,6,7,8
CONSTRUCTION CONTINGENCY (30%)					\$7,057,000.00	1,5,8
ESTIMATED CONSTRUCTION COST					\$30,581,000.00	1,2,3,4,5,6,7,8
ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION					\$1,100,000.00	1,2,3,4,5,8
ESTIMATED TOTAL PROJECT COST					\$31,681,000.00	1,2,3,4,5,6,7,8
<b>ESTIMATED ACCURACY RANGE</b>				<b>-30%</b>	<b>\$22,177,000.00</b>	5,8
				<b>50%</b>	<b>\$47,522,000.00</b>	5,8

Notes
<sup>1</sup> Limited Design Work Completed
<sup>2</sup> Quantities Based on Design Work Completed.
<sup>3</sup> Unit Prices Based on Information Available at This Time.
<sup>4</sup> Minimal Soil and Field Investigations Completed. Costs do not include remediation of contaminated soils (if found).
<sup>5</sup> This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -30% to +50%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.
<sup>6</sup> Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.
<sup>7</sup> Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials
<sup>8</sup> Estimate costs are reported to nearest thousand dollars.

<b>BARR</b> <b>PREPARED BY: BARR ENGINEERING COMPANY</b> <b>FEASIBILITY STUDY</b> <b>ENGINEER'S OPINION OF PROBABLE PROJECT COST</b> PROJECT: Morningside FRRS Study LOCATION: City of Edina PROJECT #: 23/27-1649.00 <b>OPINION OF COST - SUMMARY</b>	SHEET: 5 OF 7
	BY: KJN2 DATE: 7/6/2018
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	ISSUED: DATE:
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**Engineer's Opinion of Probable Project Cost**  
**Morningside Flood Mitigation Feasibility Project**  
**Option 7B**

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization (10%)	LS	1	\$455,000.00	\$455,000.00	1,2,3,4,5,6
B	Temporary Erosion Control	LS	1	\$30,000.00	\$30,000.00	1,2,3,4,5,6
C	Excavation	CY	26,923	\$4.00	\$107,693.33	1,2,3,4,5,6
D	Off Site Disposal of Excavated Material	CY	25,200	\$16.00	\$403,194.07	1,2,3,4,5,6
E	Site Grading	SY	40,712	\$2.00	\$81,424.44	1,2,3,4,5,6
	Place On-Site Soil for Berm Construction	CY	1,504	\$5.00	\$7,518.52	1,2,3,4,5,6
F	Reinforced Structural Concrete Flood Wall	CY	450	\$1,000.00	\$450,000.00	1,2,3,4,5,6
G	Flotation Silt Curtain	LF	900	\$11.00	\$9,900.00	1,2,3,4,5,6
H	Remove and Dispose of Existing Storm Sewer	LF	4,580	\$20.00	\$91,600.00	1,2,3,4,5,6
I	Remove and Dispose of Existing Manhole/Catch Basin	Each	22	\$750.00	\$16,500.00	1,2,3,4,5,6
J	24" RC Pipe Sewer (Furnish and Install) (12 - 13' depth)	LF	278	\$110.00	\$30,580.00	1,2,3,4,5,6,7
K	36" RC Pipe Sewer (Furnish and Install) (8 - 13' depth)	LF	710	\$170.00	\$120,700.00	1,2,3,4,5,6,7
L	48" RC Pipe Sewer (Furnish and Install) (15' depth)	LF	368	\$270.00	\$99,360.00	1,2,3,4,5,6,7
M	60" RC Pipe Sewer (Furnish and Install) (8 - 10' depth)	LF	840	\$225.00	\$189,000.00	1,2,3,4,5,6,7
N	60" RC Pipe Sewer (Furnish and Install) (10 - 16' depth)	LF	2,630	\$340.00	\$894,200.00	1,2,3,4,5,6,7
O	Construct Drainage Structure SD-48	LF	14	\$372.00	\$5,208.00	1,2,3,4,5,6
P	Construct Drainage Structure SD-60	LF	56	\$608.00	\$34,048.00	1,2,3,4,5,6
Q	Construct Drainage Structure SD-72	LF	14	\$804.00	\$11,256.00	1,2,3,4,5,6
R	Construct Drainage Structure SD-84	LF	224	\$1,450.00	\$324,800.00	1,2,3,4,5,6
S	Casting Assembly	Each	22	\$750.00	\$16,500.00	1,2,3,4,5,6
T	Tie-In Storm Sewer Main to Manhole	Each	9	\$1,000.00	\$9,000.00	1,2,3,4,5,6
U	Connect CB Leads to Constructed Storm Sewer	Each	38	\$700.00	\$26,600.00	1,2,3,4,5,6
V	Opti CMAC Predictive Pumping Control System (Furnish and Install)	Each	2	\$85,000.00	\$170,000.00	1,2,3,4,5,6
W	2,000 GPM Pumping Station (Includes Building Structure, Electric Supply, Control Panel)	LS	1	\$500,000.00	\$500,000.00	1,2,3,4,5,6
X	4,000 GPM Pumping Station (Includes Building Structure, Electric Supply, Control Panel)	LS	1	\$700,000.00	\$700,000.00	
Y	Pumping Station Outlet Piping (Furnish and Install)	LF	1,116	\$40.00	\$44,640.00	1,2,3,4,5,6,7
Z	Pumping Station Inlet Suction Piping (Furnish and Install)	LF	24	\$40.00	\$960.00	1,2,3,4,5,6,7
AA	Clearing and Grubbing	AC	6	\$6,000.00	\$33,994.49	1,2,3,4,5,6
BB	Upland Native Vegetation	AC	0.7	\$5,000.00	\$3,500.00	1,2,3,4,5,6
CC	Wetland Restoration	AC	2.0	\$10,000.00	\$20,000.00	1,2,3,4,5,6
DD	Tree 2", B&B	Each	150	\$500.00	\$75,000.00	1,2,3,4,5,6
EE	Turf Establishment (w/ Disc Anchored Mulch)	AC	4.7	\$3,000.00	\$14,134.85	1,2,3,4,5,6
FF	Sod	SY	4,840	\$3.00	\$14,520.00	1,2,3,4,5,6
GG	Erosion Control Blanket	SY	5,324	\$2.00	\$10,648.00	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				\$5,001,000.00	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (30%)				\$1,500,000.00	1,5,8
	ESTIMATED CONSTRUCTION COST				\$6,501,000.00	1,2,3,4,5,6,7,8
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION (30%)				\$1,950,000.00	1,2,3,4,5,8
	RESIDENTIAL/CONSTRUCTION PERMANENT EASEMENT				\$56,000.00	1,2,3,5,8
	ESTIMATED TOTAL PROJECT COST				\$8,507,000.00	1,2,3,4,5,6,7,8
	<b>ESTIMATED ACCURACY RANGE</b>			<b>-30%</b>	<b>\$5,955,000.00</b>	5,8
				<b>50%</b>	<b>\$12,761,000.00</b>	5,8

Notes
<sup>1</sup> Limited Design Work Completed
<sup>2</sup> Quantities Based on Design Work Completed.
<sup>3</sup> Unit Prices Based on Information Available at This Time.
<sup>4</sup> Minimal Soil and Field Investigations Completed. Costs do not include remediation of contaminated soils (if found).
<sup>5</sup> This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -30% to +50%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.
<sup>6</sup> Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.
<sup>7</sup> Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials
<sup>8</sup> Estimate costs are reported to nearest thousand dollars.



<b>BARR</b> <b>PREPARED BY: BARR ENGINEERING COMPANY</b> <b>FEASIBILITY STUDY</b> <b>ENGINEER'S OPINION OF PROBABLE PROJECT COST</b> PROJECT: Morningside FRRS Study LOCATION: City of Edina PROJECT #: 23/27-1649.00 <b>OPINION OF COST - SUMMARY</b>	SHEET: 6 OF 7
	BY: KJN2 DATE: 7/6/2018
	CHECKED BY: KAL DATE: 7/6/2018
	APPROVED BY: DATE:
	ISSUED: DATE:
	ISSUED: DATE:
	ISSUED: DATE:

**Engineer's Opinion of Probable Project Cost**  
**Morningside Flood Mitigation Feasibility Project**  
**Option 8**

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization (10%)	LS	1	\$278,000.00	\$278,000.00	1,2,3,4,5,6
B	Temporary Erosion Control	LS	1	\$30,000.00	\$30,000.00	1,2,3,4,5,6
C	Dewatering	LS	1	\$50,000.00	\$50,000.00	1,2,3,4,5,6
D	Flotation Silt Curtain	LF	1,000	\$11.00	\$11,000.00	1,2,3,4,5,6
E	Remove Existing Sports Infrastructure	LS	1	\$15,000.00	\$15,000.00	1,2,3,4,5,6
F	Excavation	CY	64,998	\$4.00	\$259,992.00	1,2,3,4,5,6
G	Off Site Disposal of Excavated Material	CY	64,778	\$16.00	\$1,036,448.00	1,2,3,4,5,6
H	Site Grading	SY	87,070	\$2.00	\$174,140.00	1,2,3,4,5,6
I	Reinforced Structural Concrete Flood Wall	CY	450	\$1,000.00	\$450,000.00	1,2,3,4,5,6
J	Remove and Dispose of Existing Storm Sewer	LF	1,190	\$20.00	\$23,800.00	1,2,3,4,5,6
K	Remove and Dispose of Existing Manhole/Catch Basin	Each	4	\$750.00	\$3,000.00	1,2,3,4,5,6
L	30" RC Pipe Sewer (Furnish and Install) (8 - 16' depth)	LF	910	\$160.00	\$145,600.00	1,2,3,4,5,6,7
M	42" RC Pipe Sewer (Furnish and Install) (8 - 16' depth)	LF	280	\$250.00	\$70,000.00	1,2,3,4,5,6,7
N	Construct Drainage Structure SD-60	LF	16	\$608.00	\$9,728.00	1,2,3,4,5,6
O	Construct Drainage Structure SD-72	LF	42	\$804.00	\$33,768.00	1,2,3,4,5,6
P	Casting Assembly	Each	4	\$750.00	\$3,000.00	1,2,3,4,5,6
Q	Tie-In Storm Sewer Main to Manhole	Each	3	\$1,000.00	\$3,000.00	1,2,3,4,5,6
R	Connect CB Leads to Constructed Storm Sewer	Each	2	\$700.00	\$1,400.00	1,2,3,4,5,6
S	6' x 8' Box Culvert (Furnish and Install)	LF	100	\$1,000.00	\$100,000.00	1,2,3,4,5,6,7
T	6' x 8' Box Culvert End Section (Furnish and Install)	Each	4	\$10,000.00	\$40,000.00	1,2,3,4,5,6
U	MnDOT Class IV RipRap with Filter Fabric	TON	248	\$100.00	\$24,800.00	1,2,3,4,5,6
V	Clearing and Grubbing	AC	5	\$6,000.00	\$30,000.00	1,2,3,4,5,6
W	Upland Native Vegetation	AC	4.5	\$5,000.00	\$22,500.00	1,2,3,4,5,6
X	Tree 2", B&B	Each	100	\$500.00	\$50,000.00	1,2,3,4,5,6
Y	Turf Establishment (w/ Disc Anchored Mulch)	AC	13.0	\$3,000.00	\$38,969.01	1,2,3,4,5,6
Z	Erosion Control Blanket	SY	24,200	\$2.00	\$48,400.00	1,2,3,4,5,6
AA	Reconstruction of Baseball Field	LS	1	\$75,000.00	\$75,000.00	1,2,3,4,5,6
BB	Reconstruction of Ice Rink	LS	1	\$25,000.00	\$25,000.00	1,2,3,4,5,6
CC	Wetland Restoration	AC	0.5	\$10,000.00	\$5,000.00	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				\$3,058,000.00	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (30%)				\$917,000.00	1,5,8
	ESTIMATED CONSTRUCTION COST				\$3,975,000.00	1,2,3,4,5,6,7,8
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION (30%)				\$1,193,000.00	1,2,3,4,5,8
	RESIDENTIAL/CONSTRUCTION PERMANENT EASEMENT				\$11,000.00	1,2,3,5,8
	ESTIMATED TOTAL PROJECT COST				\$5,179,000.00	1,2,3,4,5,6,7,8
	<b>ESTIMATED ACCURACY RANGE</b>			<b>-30%</b>	<b>\$3,626,000.00</b>	5,8
				<b>50%</b>	<b>\$7,769,000.00</b>	5,8

<b>Notes</b>	
1	Limited Design Work Completed
2	Quantities Based on Design Work Completed.
3	Unit Prices Based on Information Available at This Time.
4	Minimal Soil and Field Investigations Completed. Costs do not include remediation of contaminated soils (if found).
5	This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -30% to +50%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.
6	Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.
7	Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials
8	Estimate costs are reported to nearest thousand dollars.

<b>BARR</b> <b>PREPARED BY: BARR ENGINEERING COMPANY</b> <b>FEASIBILITY STUDY</b> <b>ENGINEER'S OPINION OF PROBABLE PROJECT COST</b> PROJECT: Morningside FRRS Study LOCATION: City of Edina PROJECT #: 23/27-1649.00 <b>OPINION OF COST - SUMMARY</b>	SHEET: 7 OF 7
	BY: KJN2 DATE: 7/6/2018
	CHECKED BY: KAL DATE: 7/6/2018
	APPROVED BY: DATE:
	ISSUED: DATE:
	ISSUED: DATE:

**Engineer's Opinion of Probable Project Cost**  
**Morningside Flood Mitigation Feasibility Project**  
**Option 9**

Cat. No.	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
A	Mobilization/Demobilization (10%)	LS	1	\$741,000.00	\$741,000.00	1,2,3,4,5,6
B	Temporary Erosion Control	LS	1	\$30,000.00	\$30,000.00	1,2,3,4,5,6
C	Dewatering	LS	1	\$50,000.00	\$50,000.00	1,2,3,4,5,6
D	Flotation Silt Curtain	LF	1,000	\$11.00	\$11,000.00	1,2,3,4,5,6
E	Remove Existing Sports Infrastructure	LS	1	\$15,000.00	\$15,000.00	1,2,3,4,5,6
F	Excavation	CY	113,398	\$4.00	\$453,592.00	1,2,3,4,5,6
G	Off Site Disposal of Excavated Material	CY	101,885	\$16.00	\$1,630,154.67	1,2,3,4,5,6
H	Site Grading	SY	96,750	\$2.00	\$193,500.00	1,2,3,4,5,6
I	Salvage and Replace Existing Topsoil	CY	7,260	\$9.00	\$65,340.00	1,2,3,4,5,6
J	Reinforced Structural Concrete Flood Wall	CY	450	\$1,000.00	\$450,000.00	1,2,3,4,5,6
K	6' x 8' Box Culvert (Furnish and Install)	LF	100	\$1,000.00	\$100,000.00	1,2,3,4,5,6,7
L	6' x 8' Box Culvert End Section (Furnish and Install)	Each	4	\$10,000.00	\$40,000.00	1,2,3,4,5,6
M	MnDOT Class IV RipRap with Filter Fabric	TON	248	\$100.00	\$24,800.00	1,2,3,4,5,6
N	Remove and Dispose of Existing Storm Sewer	LF	5,770	\$20.00	\$115,400.00	1,2,3,4,5,6
O	Remove and Dispose of Existing Manhole/Catch Basin	Each	26	\$750.00	\$19,500.00	1,2,3,4,5,6
P	24" RC Pipe Sewer (Furnish and Install) (12 - 13' depth)	LF	278	\$110.00	\$30,580.00	1,2,3,4,5,6,7
Q	30" RC Pipe Sewer (Furnish and Install) (8 - 16' depth)	LF	910	\$160.00	\$145,600.00	1,2,3,4,5,6,7
R	36" RC Pipe Sewer (Furnish and Install) (8 - 13' depth)	LF	710	\$170.00	\$120,700.00	1,2,3,4,5,6,7
S	42" RC Pipe Sewer (Furnish and Install) (8 - 16' depth)	LF	280	\$250.00	\$70,000.00	1,2,3,4,5,6,7
T	48" RC Pipe Sewer (Furnish and Install) (15' depth)	LF	368	\$270.00	\$99,360.00	1,2,3,4,5,6,7
U	60" RC Pipe Sewer (Furnish and Install) (8 - 10' depth)	LF	840	\$225.00	\$189,000.00	1,2,3,4,5,6,7
V	60" RC Pipe Sewer (Furnish and Install) (10 - 16' depth)	LF	2,630	\$340.00	\$894,200.00	1,2,3,4,5,6,7
W	Construct Drainage Structure SD-48	LF	14	\$372.00	\$5,208.00	1,2,3,4,5,6
X	Construct Drainage Structure SD-60	LF	72	\$608.00	\$43,776.00	1,2,3,4,5,6
Y	Construct Drainage Structure SD-72	LF	70	\$804.00	\$56,280.00	1,2,3,4,5,6
A	Construct Drainage Structure SD-84	LF	224	\$1,450.00	\$324,800.00	1,2,3,4,5,6
AA	Casting Assembly	Each	26	\$750.00	\$19,500.00	1,2,3,4,5,6
BB	Tie-In Storm Sewer Main to Manhole	Each	9	\$1,000.00	\$9,000.00	1,2,3,4,5,6
CC	Connect CB Leads to Constructed Storm Sewer	Each	40	\$700.00	\$28,000.00	1,2,3,4,5,6
DD	72" Diameter Weir Manhole (Diversion Structure)	Each	1	\$15,000.00	\$15,000.00	1,2,3,4,5,6
EE	StormTrap Subsurface Storage	CF	304,920	\$6.00	\$1,829,520.00	1,2,3,4,5,6
FF	500 GPM Pump (Subsurface Storage Drawdown)	Each	1	\$30,000.00	\$30,000.00	1,2,3,4,5,6
GG	Clearing and Grubbing	AC	5	\$6,000.00	\$30,000.00	1,2,3,4,5,6
HH	Upland Native Vegetation	AC	5	\$5,000.00	\$22,500.00	1,2,3,4,5,6
II	Tree 2", B&B	Each	100	\$500.00	\$50,000.00	1,2,3,4,5,6
JJ	Turf Establishment (w/ Disc Anchored Mulch)	AC	15.0	\$3,000.00	\$44,969.01	1,2,3,4,5,6
KK	Erosion Control Blanket	SY	24,200	\$2.00	\$48,400.00	1,2,3,4,5,6
LL	Reconstruction of Baseball Field	LS	1	\$75,000.00	\$75,000.00	1,2,3,4,5,6
MM	Reconstruction of Ice Rink	LS	1	\$25,000.00	\$25,000.00	1,2,3,4,5,6
NN	Wetland Restoration	AC	0.5	\$10,000.00	\$5,000.00	1,2,3,4,5,6
	CONSTRUCTION SUBTOTAL				\$8,151,000.00	1,2,3,4,5,6,7,8
	CONSTRUCTION CONTINGENCY (30%)				\$2,445,000.00	1,5,8
	ESTIMATED CONSTRUCTION COST				\$10,596,000.00	1,2,3,4,5,6,7,8
	ENGINEERING, DESIGN, PERMITTING, AND CONSTRUCTION OBSERVATION (30%)				\$3,179,000.00	1,2,3,4,5,8
	RESIDENTIAL/CONSTRUCTION PERMANENT EASEMENT				\$11,000.00	1,2,3,5,8
	ESTIMATED TOTAL PROJECT COST				\$13,786,000.00	1,2,3,4,5,6,7,8
	<b>ESTIMATED ACCURACY RANGE</b>			<b>-30%</b>	<b>\$9,651,000.00</b>	5,8
				<b>50%</b>	<b>\$20,679,000.00</b>	5,8

Notes
<sup>1</sup> Limited Design Work Completed
<sup>2</sup> Quantities Based on Design Work Completed.
<sup>3</sup> Unit Prices Based on Information Available at This Time.
<sup>4</sup> Minimal Soil and Field Investigations Completed. Costs do not include remediation of contaminated soils (if found).
<sup>5</sup> This feasibility-level (Class 4, 10-15% design completion per ASTM E 2516-06) cost estimate is based on feasibility-level designs, alignments, quantities and unit prices. Costs will change with further design. Time value-of-money escalation costs are not included. A construction schedule is not available at this time. Contingency is an allowance for the net sum of costs that will be in the Final Total Project Cost at the time of the completion of design, but are not included at this level of project definition. The estimated accuracy range for the Total Project Cost as the project is defined is -30% to +50%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The contingency and the accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency. Operation and Maintenance costs are not included.
<sup>6</sup> Estimate costs are to design, construct, and permit each alternative. The estimated costs do not include maintenance, monitoring or additional tasks following construction.
<sup>7</sup> Furnish and Install pipe cost per lineal foot includes all trenching, bedding, backfilling, compaction, and disposal of excess materials
<sup>8</sup> Estimate costs are reported to nearest thousand dollars.