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# Public Works Committee Meeting

August 30, 2011

# Goals for August 30, 2011

## Public Works Committee Meeting

- Introduce the MSMP and complete initial overview of the MSMP.
- Review of implementation assumptions and project scheduling
- Introduce other stormwater related issues and identify potential courses of action for those issues.
- Set dates for MSMP Open Houses.

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# Introduction

## Introduction and Overview of the New Master Stormwater Management Plan

# Factors Contributing to Flooding

- Flooding in Northbrook:
  - Volume and intensity of rain
  - Loss of overland flood routes
  - Loss of depressional storage
  - Older infrastructure was built based on industry design standards which have changed over time.
  - Increased development upstream and downstream

# Development of MSMP

- Master Stormwater Management Plan
  - First Stormwater Management Plan - 1993
  - Revised twice – 1996 and last in 2002
- Stormwater Management Commission and Consulting Engineer met over the last 12 months to develop a new Master Stormwater Management Plan.

# Development of MSMP

- New MSMP views stormwater management through a different lens:
  - Projects include a variety of projects ranging in scale from larger watershed projects to smaller neighborhood projects.
  - Taking a more comprehensive approach, new plan includes recommendations on:
    - Education
    - Property Owner Programs
    - Code revision

# MSMP Structure

- Master Stormwater Management Plan
  - MSMP is organized around projects and provides an overview of each.
- Master Stormwater Management Plan Appendix
  - Provides detailed information on each project, the methodology used for analysis of the projects and other components of the plan.

# Goals of MSMP

1. Reduce structure flooding/damage as a result of stormwater.
2. Reduce street and front yard flooding to maintain access for emergency responders.
3. Manage property flooding (rear and side yard).
4. Manage development/redevelopment.

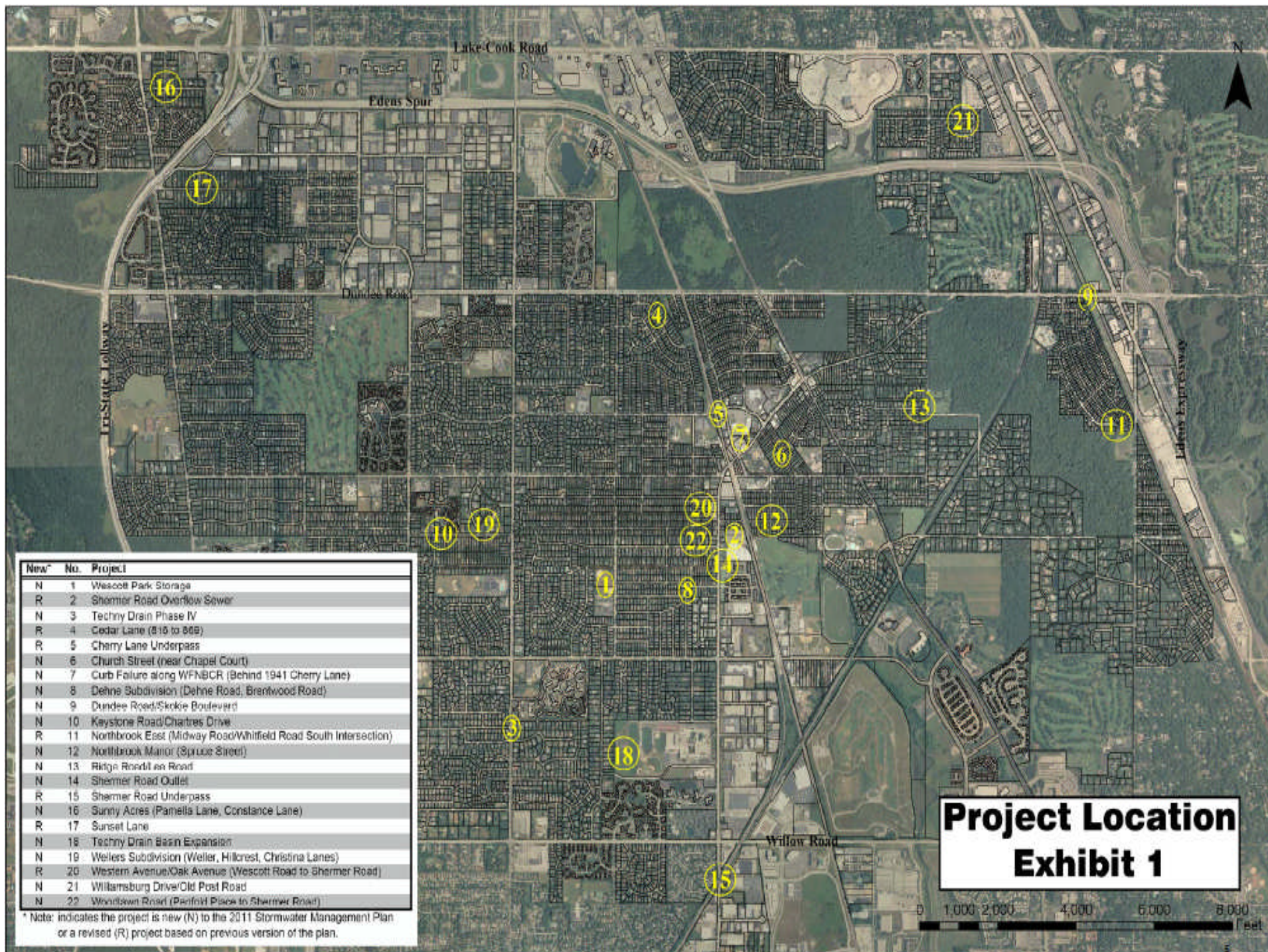
The new MSMP **will not** eliminate all flooding in the Village of Northbrook.



# MSMP Projects

- New MSMP includes 22 projects.
- Projects are numbered and ranked.
- Projects are ranked based on the average of these three factors:
  - Benefit/Cost Ratio
  - Number of structures that will experience a reduction in flooding
  - Number of properties that will experience a reduction in flooding



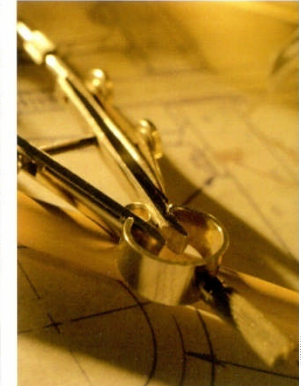
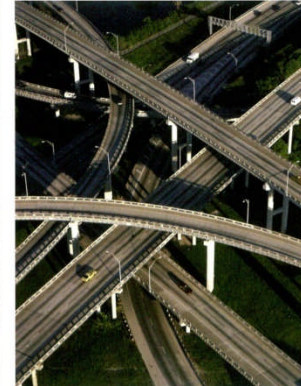




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**Presentation by HLR, Inc.**

# FULL SERVICE ENGINEERING AT A HIGHER STANDARD



## Village of Northbrook Master Stormwater Management Plan



HAMPTON, LENZINI AND RENWICK, INC.

CIVIL ENGINEERS :: STRUCTURAL ENGINEERS :: LAND SURVEYORS

# Village of Northbrook – Master Stormwater Management Plan

## Mission Statement

“The purpose of the New Master Stormwater Management Plan (MSMP) is to identify projects, programs and initiatives that will reduce flooding conditions within the Village by the most cost effective means and at the appropriate level of protection.”

# HLR's Plan Development Process

- Meet with staff and Stormwater Management Commission
- Survey residents (online via Village website)
- Review history of Village, look at floodplains, contributing factors, etc.
- Review known trouble areas
- Identify projects to be included in MSMP

## Project Analysis

Modeling methodology/Review of project areas

- Computer modeling
  - Hydraflow Hydrology
  - Interconnected Pond Routing (ICPR)
- Industry Standard
  - Rainfall Amounts
  - Rainfall Distributions
  - Runoff Amounts



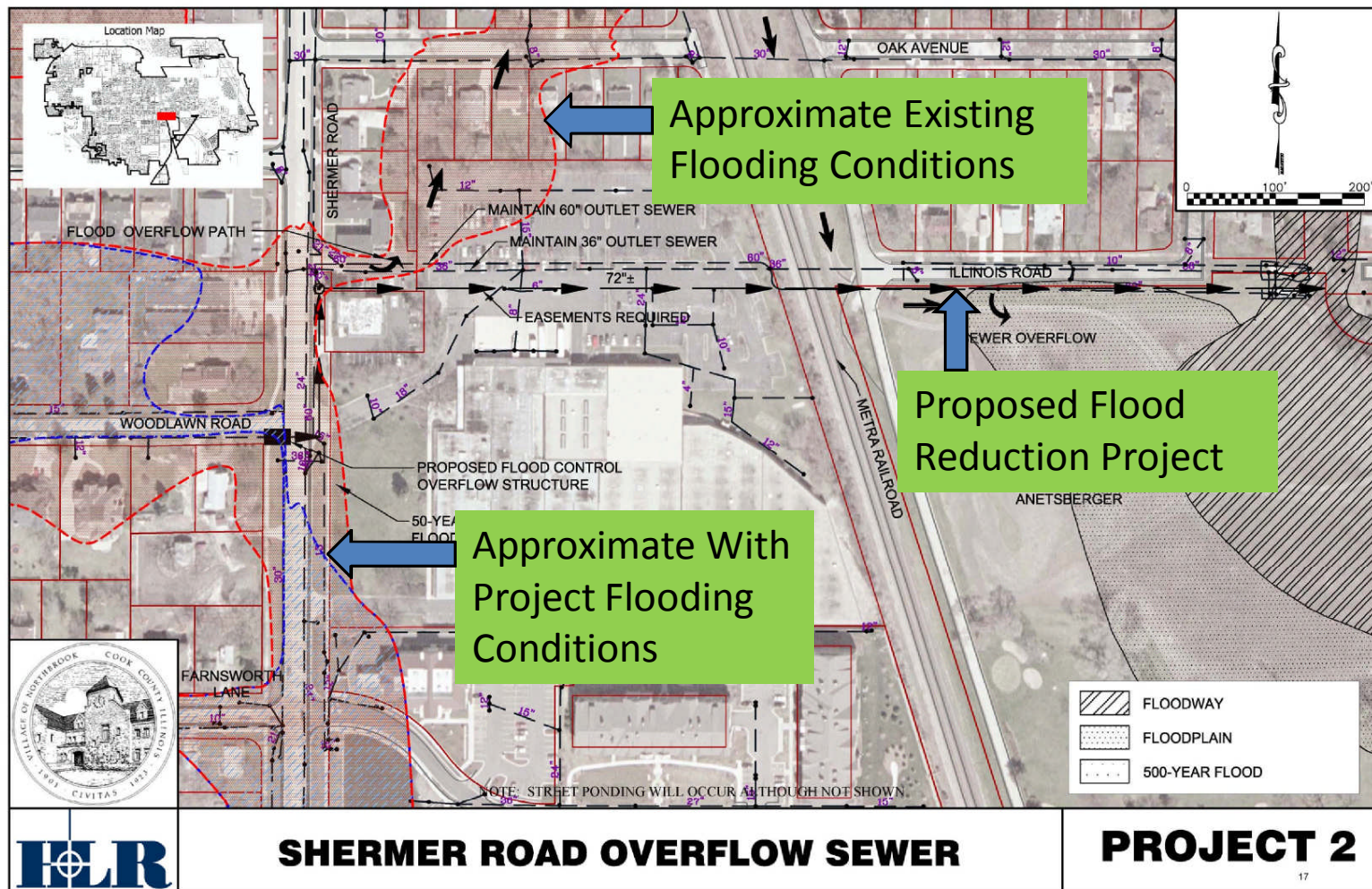
# Overview of assumptions made as part of modeling

- Previous reports and studies for Village are accurate
- Current Conditions based on Village GIS data
  - Location, size, and elevation of storm sewer
  - Village 1' contour data from 1991
  - Aerial Photograph from 2005
- Ponding based on overflow contour
- Mainline sewer used to determine flooding; branches and laterals not used
- Backyard flooding based on mainline flooding



# Village of Northbrook – Master Stormwater Management Plan

## How to read project diagrams



## Project Breakdown

### Watershed Projects

- Three (3) projects within the MSMP
- Target large drainage problems
- Flooding from lack of conveyance or overflow route
- Provides benefits to the greatest number of structures
- Most expensive to implement

### Neighborhood Projects

- Nineteen (19) projects within the MSMP
- Target smaller drainage problems
- Flooding from lack of conveyance or overflow route
- Provide benefits to smaller number of properties
- Less expensive than Watershed Project

## Project Analysis

### Property Owner Programs

- Four (4) programs within the MSMP
- Property owners initiate to correct localized drainage problems
- Assist property owners financially or with expertise within the Village

## Project Ranking

### Project numbering

- Projects listed alphabetically and assigned a project number with Watershed Projects first and Neighborhood Projects second

### Project Ranking

- Benefit Cost Ratio
  - Benefit to property owners based on the difference between existing and with project damages
  - Cost of the project
- Structures Benefited
  - Structure no longer floods or
  - Structure flooding significantly reduced
- Properties Benefited
  - Flooding reduced on the property



## Damage Analysis

### DEC-2 Software

- Model calculates the overall damage to flooded structures
- Input
  - Flood Levels
  - Property Values
  - First Floor Elevation
  - Low Entry Elevation
  - Basement
  - Damage Curves
- Output
  - Damage to Structure
  - Damage to Contents

## Damage Analysis

### Benefit Cost Ratio

- Flood damages based on:
  - Structure
  - Contents
  - Associated
  - Automobile
  - Exterior
  - Displacement
  - Lost wages and income
  - Public Works costs
- Damage Costs per year are evaluated over a 50-year project life with 4% interest rate
- Compared to the cost of project

## Damage Analysis

### Procedures and Assumptions

- Conceptual hydrologic and hydraulic modeling
- Property values based on Cook County Assessors and Zillow.com
- 1<sup>st</sup> floor of all structures are 2' above estimated low contour elevation
- Low entry is 1' below 1<sup>st</sup> floor
- All structures have 8' basements
- 1991 contour elevations used
- If DEC-2 model was not used structural, content and associated damages were estimated
- Cost of Public Works cleanup and assistance

# Village of Northbrook – Master Stormwater Management Plan

## Projects

		RANK <sup>1,2</sup>	SCORE	PROJECT NUMBER	PROJECT													
						OPTIMUM LEVEL OF PROTECTION (YEARS) <sup>3</sup>	BENEFIT-COST RATIO (B/C)	RANK BY BENEFIT-COST RATIO (B/C)	ESTIMATED NUMBER OF DAMAGED STRUCTURES BENEFITED <sup>4</sup>	RANK BY ESTIMATED NUMBER OF DAMAGED STRUCTURES BENEFITED <sup>4</sup>	ESTIMATED NUMBER OF PROPERTIES BENEFITED <sup>5</sup>	RANK BY ESTIMATED NUMBER OF PROPERTIES BENEFITED <sup>5</sup>	ESTIMATED TOTAL COST (2011 DOLLARS) <sup>6</sup>	AVERAGE COST PER DAMAGED STRUCTURE BENEFITED <sup>7</sup>	AVERAGE COST PER PROPERTY BENEFITED <sup>8</sup>			
PROJECT RANKING TABLE	1	2.67	3	Techny Drain Phase IV	100	10.57	1	10	4	82	3	\$798,000	\$79,800	\$9,700				
	2	4.67	2	Shermer Road Overflow Sewer	50	1.92	6	17	1	22	7	\$1,327,000	\$78,100	\$60,300				
	2	4.67	11	Northbrook East (Midway Road/Whitfield Road South Intersection)	50	2.18	5	11	3	29	6	\$718,000	\$65,300	\$24,800				
	4	5.33	1	Wescott Park Storage	25	0.33	12	12	2	91	2	\$8,200,000	\$683,300	\$90,100				
	5	6	10	Keystone Road/Chartres Drive	10	3.05	4	5	5	17	9	\$635,000	\$127,000	\$37,400				
	6	6.33	16	Sunny Acres (Pamella Lane, Constance Lane)	10	4.16	2	3	6	14	11	\$614,000	\$204,700	\$43,900				
	7	7	14	Shermer Road Outlet	10	0.85	7	0	9	42	5	\$13,000	N/A	\$300				
	8	8	5	Cherry Lane Underpass	10	3.51	3	1	8	10	13	\$246,000	\$246,000	\$24,600				
	9	9.33	20	Western Avenue/Oak Avenue (Wescott Road to Shermer Road)	10	0.07	18	0	9	106	1	\$631,000	N/A	\$6,000				
	9	9.33	18	Techny Drain Basin Expansion	10	0.16	15	0	9	60	4	\$268,000	N/A	\$4,500				
	11	10	21	Williamsburg Drive/Old Post Road	10	0.16	15	2	7	18	8	\$270,000	\$135,000	\$15,000				
	12	10.33	12	Northbrook Manor (Spruce Street)	10	0.07	18	0	9	60	4	\$446,000	N/A	\$7,400				
	13	11	22	Woodlawn Road (Penfold Place to Shermer Road)	10	0.23	14	0	9	15	10	\$140,000	N/A	\$9,300				
	14	11.33	9	Dundee Road/Skokie Boulevard	10	0.84	8	0	9	4	17	\$51,000	N/A	\$12,800				
	15	11.67	6	Church Street (near Chapel Court)	10	0.54	10	0	9	5	16	\$80,000	N/A	\$16,000				
	16	12	4	Cedar Lane (816 to 869)	10	0.76	9	0	9	3	18	\$42,000	N/A	\$14,000				
	17	12.67	13	Ridge Road/Lee Road	10	0.35	11	0	9	3	18	\$60,000	N/A	\$20,000				
	18	13.33	8	Dehne Subdivision (Dehne Road, Brentwood Road)	10	0.10	17	0	9	8	14	\$109,000	N/A	\$13,600				
	19	13.67	17	Sunset Lane	10	0.05	20	0	9	13	12	\$432,000	N/A	\$33,200				
	20	14	7	Curb Failure along WFNBCR (Behind 1941 Cherry Lane)	10	0.27	13	0	9	1	20	\$41,000	N/A	\$41,000				
	21	15	19	Weller's Subdivision (Weller, Hillcrest, Christina Lanes)	10	0.04	21	0	9	7	15	\$784,000	N/A	\$112,000				
	22	16.67	15	Shermer Road Underpass	50	0.04	21	0	9	1	20	\$332,000	N/A	\$332,000				
TOTAL COST OF ALL PROJECTS											\$16,237,000							

Rank based on Benefit-Cost Ratio, Structures Benefited, and Properties Benefited



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# Implementation Plan

Review and discussion of process used to develop individual project implementation schedules and placement into Capital Improvement Plan (CIP) format

# Implementation Plan

- Master Stormwater Management Plan approved by Stormwater Commission.
- Public Works Committee Reviews MSMP
- Administration & Finance (Acting as COW) reviews funding options
- Village Board Provides Policy Direction for MSMP Implementation.
- Now What?

# Implementation Plan

- Project rankings are intended to help set priority of projects, however the ranking does not mean that projects will be or can be built in rank order.

# Implementation Plan External Factors

- Land Aquisition
- Private Property Easement Dedication
- License Agreements
- Intergovernmental Agreements
- Sequencing for Interdependent Project

# Implementation Assumptions

- Each project was reviewed independently.
- Opportunities for land acquisition must be ongoing regardless of the project's schedule.
- The procurement of the necessary agreements and easements will be included in the final engineering design phase for each project.
- Final engineering design will not begin for any project until all necessary land has been acquired.
- One year for final engineering was allotted for projects needing 2 easements, two years for projects needing 3 or more easements.

# Implementation Assumptions

- The ability to begin some projects is contingent upon the completion of others.
- Project construction may be limited or stopped during the winter months.
- Appropriate Staffing to manage projects.
- All costs are in 2011 dollars.

[illegible]



## Village of Northbrook Master Stormwater Management Plan

### Project: Northbrook East (Midway Road/Whitfield Road South Intersection)

Project Number: 11

Project Ranking: 3

**Project Description:** This project involves the construction of a 3.5 acre-foot detention facility on Village owned property located between Dell and Sunset Ridge Roads in the southern section of the Northbrook East subdivision. Final engineering has been authorized by Resolution 11-R-58 and is currently underway.

**Locations Impacted by the Project:** 1100 Blocks of Midway, Whitfield, and Dell Roads.

**Properties Impacted:** 29 properties will experience a reduction in flooding.

**Structures Impacted:** 11 of the 29 properties impacted will experience a reduction in structure flooding.

**Additional Study Needed:** Additional study of this project is not needed.

**Design:** Design of the Northbrook East project is anticipated to take 9 months.

**Construction:** Construction of the Northbrook East project is anticipated to take 9 months.

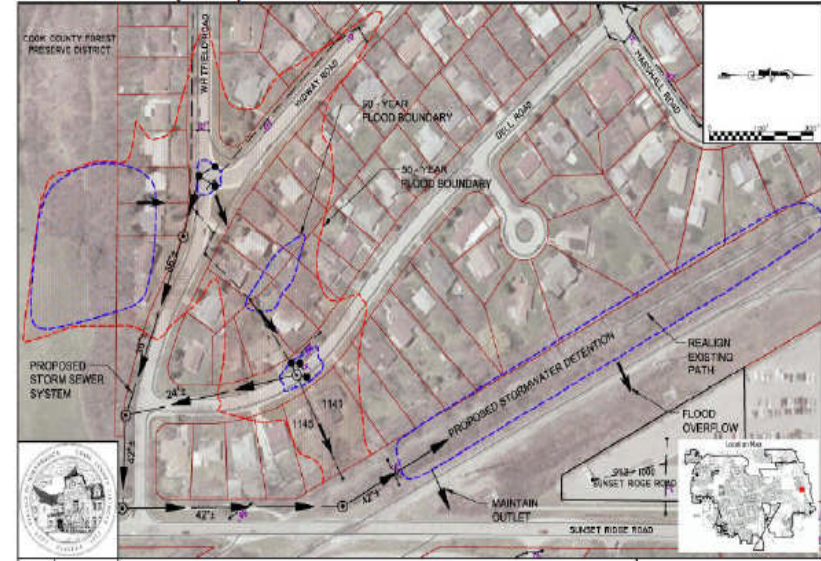
**External Factors Affecting Design and Construction Timelines:** There are no external factors affecting design and construction of this project.

**Photos of Flooding in the Project Area:**



## Village of Northbrook Master Stormwater Management Plan

Northbrook East Project Map:



Project Funding:

Storm Water Management	FY 2011/2012	FY 2012/2013	FY 2013/2014	FY 2014/2015	FY 2015/2016	FY 2016/2017	FY 2017/2018	FY 2018/2019	FY12-19 Total
Property and Easement Acquisition									\$0
Design/Final Engineering	\$90,215								\$90,215
Construction		\$624,000							\$624,000
<b>Fiscal Year Totals</b>	<b>\$90,215</b>	<b>\$624,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$714,215</b>

### Planned Financing

Annual Funding	FY 2011/2012	FY 2012/2013	FY 2013/2014	FY 2014/2015	FY 2015/2016	FY 2016/2017	FY 2017/2018	FY 2018/2019	FY12-19 Total

Financing and funding of those stormwater projects recommended by the Public Works Committee will be integrated into the Villages Capital Improvement Plan which will be discussed by the Administration and Finance Committee (serving in a Committee of the Whole capacity that includes the entire Village Board). That information will be added to the tables above after the Committee's discussion.



# Implementation Plan

- What Does Having MSMP Projects in CIP Format Do?

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# Other Issues

Review of issues identified since  
MSMP development

# Other Stormwater Related Issues

- Stormwater Management will continue to be a challenge; areas will suffer flooding, external factors will change and the Village is subject to regulatory authority beyond our control.

# Other Stormwater Related Issues

- Review of Village's code enforcement practices.
  - Past and current code enforcement have been complaint driven.
  - Should enforcement become more proactive?
- Code Enforcement Issues:
  - Downspout and sump pump connections to storm sewers
  - Property grading issues
  - Obstructions in flood routes (fences, sheds, etc.)
- These issues shall be reviewed on a parallel course with the MSMP.
- Staff is in the process of reviewing and developing enforcement programs which include a community wide educational component for the next Public Works Committee meeting.

# Other Stormwater Related Issues

- Village needs to grow Resident Education/Outreach Programs in areas such as:
  - Property maintenance to help prevent flooding
    - Plumbing and sump pump maintenance
    - Proper grading
    - Proper downspout placement and direction
  - Landscaping improvements exacerbating flooding issues
    - Blocking overland flood routes
    - Raising grades of property
  - Refocus 50/50 Private Property Drainage Program
    - No longer just looking at traditional infrastructure but also look at green infrastructure like native plantings, rain barrels, rain gardens, and bio-swales to help mitigate stormwater issues.

The seal of the Village of Northbrook, Cook County, Illinois, is a circular emblem. The outer ring contains the text "VILLAGE OF NORTHBROOK" at the top, "COOK COUNTY ILLINOIS" on the right, "1907" at the bottom left, and "1923" at the bottom right. The word "CIVITAS" is centered at the bottom. The inner circle features a detailed illustration of a large, multi-story building with a prominent central tower and arched windows, set against a background of stylized trees and a landscape.

# Questions