



Engineering
Department

(847) 853-7660
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NOTICE OF MEETING

The **Municipal Services Committee** of the Board of Trustees of the Village of Wilmette will hold a meeting on **Tuesday, July 9, 2013 at 5:00 p.m.**, in the Council Chambers at Wilmette Village Hall, 1200 Wilmette Avenue, Wilmette, Illinois.

At this meeting, the Municipal Services Committee will discuss the following:

1. Review April 18, 2013 Resident Flood Survey Results
2. Provide Update on the 2013-2015 Separate Sanitary Sewer Initiatives
 - Review Cost and Schedule for Various Projects
 - Cost / benefit analysis of Reservoir Component of the Harms Road Storage Project
3. Overhead Sewer Cost Share Program
4. Discuss New CIP Stormwater Initiative for GIS, Modeling and Hydraulic Analysis of the Separate Storm Sewer System
5. Old Business

Municipal Services Committee

Trustee Julie Wolf, Chair

IF YOU ARE A PERSON WITH A DISABILITY AND NEED SPECIAL ACCOMMODATIONS TO PARTICIPATE IN AND/OR ATTEND A VILLAGE OF WILMETTE PUBLIC MEETING, PLEASE NOTIFY THE MANAGEMENT SERVICES DEPARTMENT BY TELEPHONE AT (847) 251-2700 [TDD No. (847) 853-7634] AS SOON AS POSSIBLE.

MUNICIPAL SERVICE COMMITTEE MEETING SIGN-IN SHEET

Subject: Elmwood Avenue Right-of-Way	Meeting Date: July 9, 2013
Chairperson: Julie Wolf	Place/Room: Council Chambers

Please Print

Name	Address	Phone	E-Mail
Mary Usdrowsk	241 Kilpatrick A.	847-256-3274	
Kao Kuo Lin	235 Kilpatrick	847-251-8625	kuokaob@comcast.net
JOHN + Angela Psarianos	634 Laporte Ave	847-256-2482	Yiannis46@yahoo.com
Denise Kirshenbaum	2108 Beechwood	847-256-5424	sammuel687@comcast.net
Dave + Sue Edward	1331 Chestnut	847-251-8005 847-256-6325	edward_public@comcast.net
Hedy + Bob Davis	227 Kilpatrick		
Jeremy Weiss	427 Wilshire Dr W	847-251-6356	jeremyweiss22@comcast.net
Mitha Farahati	213 S Kenilworth Ave	847-256-5762	Mitha_Farahati@yahoo.com
Emmi Shapiro	416 Wilshire Dr. W	847-256-2346	pianomom59@comcast.net
Luxy Xing Lu	408 Wilshire Dr. W	847-888-2068	Luxing66@hotmail.com
Jeri R. Schuman	232 Kenilworth Ave	847-251-7453	
Susan Mcweeney	2139 Beechwood	847 256 3910	susanmcweeney@yahoo.com
Wendy Schultz	2130 Beechwood	847 251-8138	wcs24@msn.com

MUNICIPAL SERVICE COMMITTEE MEETING SIGN-IN SHEET

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Name	Address	Phone	E-Mail
Lynn Davis	420 Wilshire	847-251-1121	LSDD@AOL.COM
Nancy Kushner	334 Wilshire Dr East	847-256-0325	nkrnmsn@aol.com
GREG STEPHAN	141 LA PORTE	847-251-2692	GSTEPHAN@COMCAST.net
HILDE HUTCHINS	2124 KENILWORTH	847-257-5744	hutchins h@skcglobal.net
Debra Shore	100 E. Erie Chicago	847-922-0622	debra.shore@mwrp.org
Kevin Coppola	231 Kilpatrick	847-372-3701	kcoppola@ameritech.net
Joe Kurzman	243 Valley View Dr.	847-920-1145	joe.kurzman@gmail.com
STEVEN HARRIS	2425 Meadow Dr	(847) 251-4361	sharris@kentlaw.edu
Renée Sexton	1260 21st St.	847-251-4456	reneesexton@gmail.com
Chip McCall	2116 Beechwood	847-251-4880	jim.mccoll@bernstein.com
William Shapiro	406 Wilshire	847-256-3365	was256@ameritech.net
Ai Hoshino Kim	241 Valley View Dr.	847-636-6470	aimhoshino@gmail.com
Stephanie Adams	2124 Beechwood	_____	swalsey@yahoo.com
JOAN M. BINDER	203A KENILWORTH WILM		
KEVIN FLATT	2101 BEECHWOOD AVE.	847-728-0049	k.flatt@mac.com

MUNICIPAL SERVICE COMMITTEE MEETING SIGN-IN SHEET

Subject: Elmwood Avenue Right-of-Way

Meeting Date: July 9, 2013

Chairperson: Julie Wolf

Place/Room: Council Chambers

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Name	Address	Phone	E-Mail
H. Tang	2525 Wilmette Ave	847-7042072	huanghuitt@yahoo.com
Frara Dunning	342 Wilshire Dr E	256-7037	isilkalns@aol.com
Kristyn Gibson	2030 Kenilworth	251-5828	Kr_gibson@yahoo.com
MARK Weilandt	2121 Beechwood	847-251-2517	Weilandt@sbcglobal.net
Tim Fox	743 Leydon Ln	847-251-3960	tfox5@yahoo.com
Joel Feinstein	407 Wilshire Dr West	847-251-8923	joelifenstein@gmail.com
Kew Ottav	413 E Wilshire	847-251-4864	Ottav.K@concast.net
Patricia Depoli	2146 Kenilworth Ave	847-721-1289	pdepoli@gmail.com
Jeff Woodman	2025 Kenilworth Ave	713-805-9663	jeff@woodmaninsurance.com



VILLAGE OF WILMETTE

1200 Wilmette Avenue
WILMETTE, ILLINOIS 60091-0040

MEETING MINUTES

MUNICIPAL SERVICES COMMITTEE OF THE VILLAGE BOARD

MONDAY, MAY 13, 2013

11:00 A.M.

TRAINING ROOM OF VILLAGE HALL

- Members Present: Trustee Cameron Krueger, Chairman
Trustee Alan Swanson
Trustee Julie Wolf
- Members Absent: None
- Staff Present: Brigitte Mayerhofer, P.E., Director of Engineering Services
- Guests Present: Natalie Franke, 2347 Old Glenview Road
Scott Saef, Sidley Austin LLP
Amy Boyer, 2106 Lake Avenue
Beth Beucher, 1420 Sheridan Road
Mike Chookaszian, 1301 Ashland Avenue
Faith Bushnell, 802 Lake Avenue
Jan Churchwell, 1708B Northfield Square, Northfield IL.

I. CALL TO ORDER.

Chairman Krueger called the meeting to order at 11:00 a.m. Committee members Swanson and Wolf were present.

II. APPROVAL OF MINUTES; MUNICIPAL SERVICES COMMITTEE MEETING OF APRIL 2, 2013.

Chairman Krueger directed the Committee's attention to the draft minutes of the Municipal Services Committee meeting of April 2, 2013.

Trustee Swanson moved that the Committee approve the minutes. The motion was seconded by Trustee Wolf and approved by unanimous voice vote. **The motion carried.**

III. DISCUSSION OF ELMWOOD DUNES PRESERVE.

Brigitte Mayerhofer, Director of Engineering, said the Park District's Parks and Recreation Committee met in April to discuss enforcement of regulations at Elmwood Dunes Preserve. The Park District recommends minimal staff is assigned to enforce policies and ordinances on weekends and holidays starting on Memorial Day weekend and ending on Labor Day, including the Fourth of July for a total of 33 days. The Park District would hire and train the employees but stated that cost of the staff should be paid for by the Village. The cost would be just under \$8,000 and would be an unbudgeted item for the Village.

Trustee Krueger asked how an unbudgeted item would be handled.

Ms. Mayerhofer said she would have to check with the Village Manager.

Trustee Wolf said she knows that the "Friends of Elmwood" would be very happy to contribute to the cost.

Trustee Krueger noted that there would also be a yearly cost of \$1,500 for daily trash pickup and annual beach maintenance.

The Trustees agree that the Park District's suggestion for enforcement is a good plan.

Ms. Mayerhofer said staff is working on applying for a ComEd/Openlands grant for Elmwood Dunes Preserve. She also noted there is a second clean-up date for the Elmwood Dunes Preserve to be held on May 18 from 10 am-12 pm. She said Public Works will work on the temporary signage for the property and staff will also apply for grants for permanent signage on the property. Ms. Mayerhofer said the stairs that were uncovered at the last clean-up at the property are being repaired and a handrail is being built on both sides of the stairs.

Trustee Krueger said the "Friends of Elmwood Dunes" are working to raise money to do some planting on the property to discourage walking around on the property. He said a rope fence is being added to the north side of the property which will be 30' from the water's edge.

Ms. Beucher said she has concerns with people walking onto the neighboring private properties and also with animals being off leash on the property.

Trustee Krueger said the Police Department will step up their presence at the beginning of the season and issue tickets to residents who allow their dogs to be off leash on the

property.

Trustee Swanson said there will also be Park District employees to help enforce the regulations on the property. He believes as time goes on, enforcement will be easier.

Ms. Beucher asked how the property would be enforced for the “no swimming” regulation.

Trustee Swanson said when the property does not have enforcement during the week, residents can call the Police Department for enforcement but he believes most of the problems on the property will be on the weekends and holidays when there will be staff to enforce the regulations.

Mr. Saef said he hopes the Village will address the issue of Park District employees working on Village property. He suggested that there should be a plan in place if enforcement becomes a problem and is needed more often than weekends and holidays. He suggested it would be helpful to have an Elmwood Dunes liaison that could be contacted for non-emergent issues at the property.

Trustee Krueger said he would like to see emergent and non-emergent calls go through the Wilmette Police Department as the calls are documented.

Mr. Saef asked if there was a way to implement a tracking system for the property.

Trustee Wolf said that might be helpful to the Park District for staffing the property.

Ms. Mayerhofer said she would work with the Park District on a tracking system.

Mr. Saef asked if there would be any direction given to the staff regarding what to tell people using the property.

Trustee Krueger said the signage would give direction as to what activities are allowed on the Elmwood Dunes Preserve.

Trustee Swanson said staff will enforce the regulations and issue tickets to those who violate the rules.

Ms. Mayerhofer said in the beginning there will be signage posted as to what activities will be allowed on the property. In the future, they would like to post decorative informational and educational signage regarding the property.

IV. NEW BUSINESS

Ms. Mayerhofer said there were post cards sent to residents as well as a posting on the web site asking residents to fill out a flood survey. There have already been 700

responses for the flood survey which will help staff gather information on sewer back up and overland flooding. The west side of Wilmette is relatively flat and staff has been able to isolate the lower depressional areas that tended to have the most significant flooding. The priority has been on the sanitary sewer back-ups but the next step would be looking at the storm water issues. They would like to have all the information logged electronically for the future.

Amy Boyer questioned the reason for singling out the Elmwood Dunes for regulations regarding swimming as there are some people that swim the lakefront.

Trustee Krueger said they would like to make it clear that swimming is not allowed off the Elmwood beach area. The desire to be specific in the regulations is give the Police Department direction for enforcement of the property.

Trustee Swanson said the rules have to be specific as the property is not a park, it is a unique piece of Village property being used for recreational purposes.

V. **ADJOURNMENT**

Chairman Krueger asked for a motion to adjourn. Trustee Wolf moved to adjourn the meeting. The motion was seconded by Trustee Swanson. No further discussion occurred on the motion. Voting yes: Chairman Krueger, Trustee Swanson and Trustee Wolf. Voting no: none. **The motion carried.**

The meeting was thereafter adjourned at 11:52 a.m.

Minutes Respectfully Prepared by Barbara Hirsch.



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ENGINEERING
DEPARTMENT

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EMAIL: eng@wilmette.com

Date: July 1, 2013
To: Municipal Services Committee
From: Brigitte Mayerhofer, P.E., Director of Engineering
Jorge Cruz, PE, Assistant Director of Engineering
Subject: Flood Survey Summary from the April 18, 2013 Storm

Background

The April 18, 2013 storm generated 5.56 inches of rain at Wilmette's water treatment plant and approximately 5.00 inches at the storm water pump station over 24-hours. This amount of rain corresponds to 25 and 17 year rain events, respectively. In addition, the antecedent soil conditions were saturated to April 18, which magnified the overland flooding.

A review of storm records maintained by the Village since 1980 shows that four storms within the last five years (2008) were classified as 10-year storms or greater. The summary table ranking the date of the storm and the storm severity is attached. Particularly in 2013, a Chicago Tribune article noted that through June, the Chicagoland area received 28.46 inches of rain which is a record since measuring data began in 1882. This is one and one half inches more than the total rainfall in 2012. Normal Chicago rainfall within the first six months averages 16.53 inches. The article is included as an attachment.

Village Sewer Systems

Combined System, East of Ridge Road

Wilmette contains separate and combined sewer areas. East of Ridge Road, the sewer system is a combined sewer. A combined sewer accepts street runoff (clean water or storm water) and sanitary waste from private properties.

When Wilmette was incorporated in 1872, stormwater management was not a concern and construction of combination sewers were standard practice. The combination

sewers originally discharged into Lake Michigan until 1914 when the Sheridan Road interceptor was built. This new interceptor directed sanitary discharges into the North Shore Channel. The Howard Street treatment plant was constructed by 1921, at which point, this new treatment plant began treating sewage.

Since 1992, the Village of Wilmette has invested over \$29 million on sewer improvement projects east of Ridge Road. The projects in the combined sewer area include relief sewer construction, street berm installation and installation of inlet restrictors. The purpose of street berms and inlet restrictors is to detain stormwater within the public street and release it into the combined sewer at a controlled rate.

Separate System, West of Ridge Road

Village sewers west of Ridge Road are separated into sanitary and storm sewers.

Storm Sewer System

The general topography west of Ridge Road is flat with negligible changes in elevation. The result is widespread but shallow surface flooding during heavy rain events. Stormwater management was not a common practice when the separate sewers were constructed between 1930 and 1955. In addition, many building sanitary and storm laterals were constructed side by side within the same trench. This close proximity between the laterals, coupled with open joints and cracks, results in cross infiltration between the two systems.

Homes with floor elevations close to street level or with depressed garages are vulnerable to overland surface flooding during extreme rain events. Buildings can also experience flooding through basement window wells or stair wells if surface flooding reaches these points.

All of the storm sewers west of Ridge Road flow by gravity to the stormwater pump station located on Lake Avenue near Harms Road. Stormwater is then pumped to the North Branch of the Chicago River.

Sanitary Sewer System

The separate sanitary sewer system has two outfalls. The area west of Romona Road is tributary to the Harms Road interceptor (approximately 35-percent of the area) and the area east of Romona Road flows to the Princeton Place interceptor (approximately 65-percent of the area.)

Since 1992, the Village invested \$12.3 million in the separate sewer system including installation of relief sewers, a second stormwater outfall to the North Branch of the Chicago River, a backup generator at the stormwater pump station and significant investment in sewer maintenance and sewer lining which restores structural integrity to the system.

Discussion

After the April 18, 2013 rain event, the Village notified 10,866 households of an on-line flood survey. Information requested from residents included whether their home experienced a sanitary backup, street flooding and/or overland yard flooding. The deadline for residents to complete the survey was May 28, 2013. Of the 10,866 households, 1,597 residents (approximately 15%) responded.

Below is a summary of the survey responses:

Number (percent) of responses per sewer area

<u>Description</u>	<u>Separate Sewer</u>	<u>Combined Sewer</u>
Number of responses	916 (57%).....	681 (43%)

The following are categorized by sewer area

The number of residents that experienced

Sanitary Sewer Backup	396 (43%).....	206 (30%)
Street Flooding Entering Home	126 (14%).....	40 (6%)
Yard Flooding Entering Home	69 (8%).....	20 (3%)

Summary

Flood density or “heat” maps are provided for several of the data points that were collected. Based on the survey responses, the separate sewer area west of Ridge Road had a higher number of reported sanitary sewer backups than the combined sewer area. There were also a higher number of sanitary related backups than structures damaged by overland flooding. This suggests that the Village’s past investment in the combined sewer area has been successful and future plans to invest in the separate sanitary system targets the highest priority areas.

The areas of specific concern include the Kenilworth Gardens subdivision (located within a FEMA floodplain), the Hibbard Road corridor and southwest Wilmette. The following agenda materials will outline a 2013 through 2015 capital sewer program aimed at addressing the flooding problems identified in these areas.

Documents Attached

1. Summary of Sewer Improvements Dated May 17, 2013
2. Map Exhibit: Sanitary backup maps (2013, 2011, 2008 and combined years)
3. Map Exhibit: Entered home from Street flooding
4. Map Exhibit: Entered home from Yard flooding
5. Wilmette Storm Data Table
6. Sample survey
7. July 1, 2013 Tribune Article



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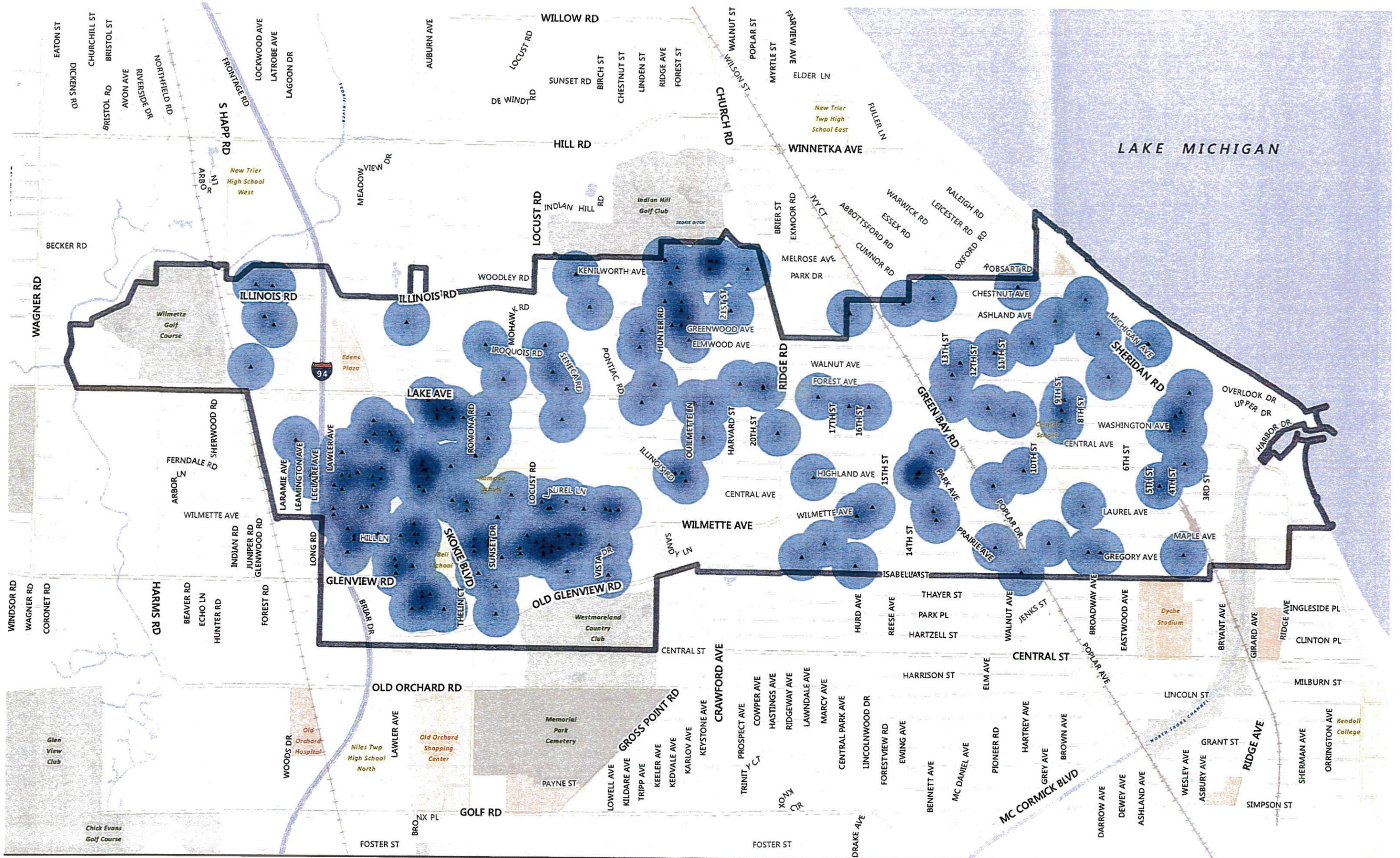
Date: May 17, 2013
To: Timothy J. Frenzer, Village Manager
From: Brigitte Mayerhofer, P.E., Director of Engineering
Subject: Summary of Sewer Improvements

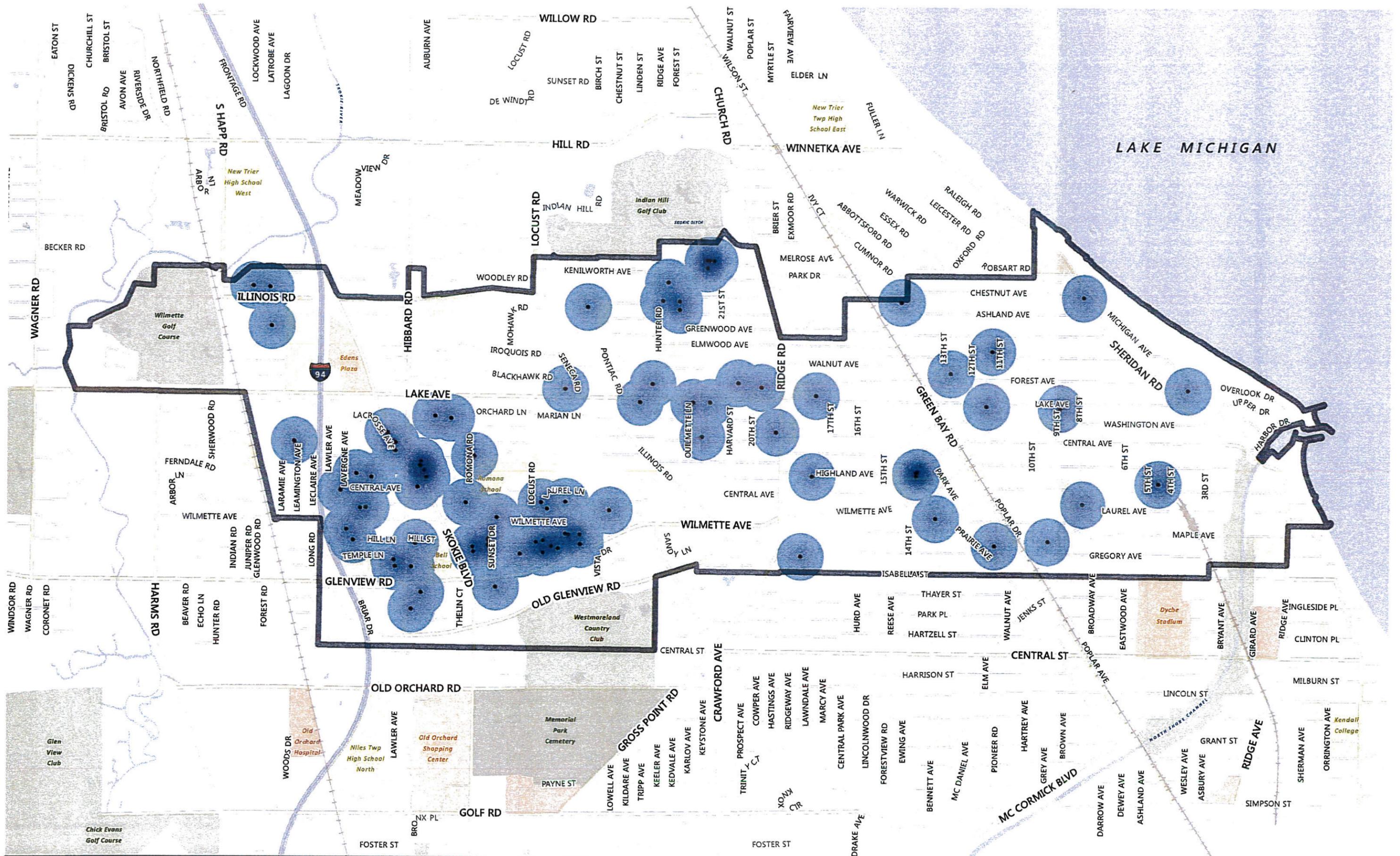
Per your request, following is a summary of sewer improvements from 1992 to the present:

Title	Year	Description	Cost
West Side Relief Sewer Improvements	1992 – 1995	Installation of Large Diameter Relief Sewers	\$9,553,000
East Side Improvements Phases 1 thru III	1992 - 1998	Large diameter relief sewers, restrictors, berms	\$24,495,376
Storm water pump station outfall	1995 - 1998	Installation of second 84-inch outfall to the North Branch	\$825,306
Harms Road Interceptor	1995	Engineering Services to perform a study	\$59,788
Green Bay Road Sewer	2000	Various sewer improvements	\$33,780
Wilmette Avenue Sewer Liner	1995	Sewer Lining	\$237,995
Washington Avenue Sewer Improvements	2002 - 2003	Relief Sewer	\$673,699
Highland Avenue Relief Sewer	2004 -2005	Installation of Relief Sewer	\$243,279
Central Avenue Relief Sewer	2004 - 2005	Installation of Relief Sewer	\$624,999

Title	Year	Description	Cost
Sewer Lining and Rehabilitation	2004 - 2006	Various locations	\$861,752
Sewer Maintenance	2002 - 2005	Sewer cleaning, televising , repairs Various locations	\$278,450
Sewer Main Repairs	2001 - 2006	Point repairs associated with the annual road program	Est . \$1,200,000
Sheridan Road Sewer	2006	Design for sewer replacement	\$33,817
Ridge Road Sewer	2004	Sewer Lining	\$68,359
East Side Relief Sewer Project— Phases IV and V cont.	2004 - 2006	Installation of Relief Sewers	\$1,134,829
Sewer Lining and Rehab	2007-2009	Various Locations	\$804,774
Sewer Main Repairs	2007-2009	Various Locations	\$1,097,668
Sewer lining and Edens Rehab	2007-2009	Under Edens Expressway	\$287,318
Sewer Improvement Project	2007-2009	Relief Storm Sewers - Various Locations	\$482,438
Sheridan Road Sewer	2007-2009	Grant funded replacement	\$1,269,000
Isabella Sewer Replacement	2008	13 th to Park	\$46,777
Backup Generator at Stormwater Pump Station	2008-2010	West of Ridge Road	\$873,795
West Side Separate Sewer System Study	2009	West of Ridge Road	\$97,400
Sewer Lining and Rehabilitation	2010	Various Locations	\$905,620
Sewer Main Repairs	2010	Various Locations	\$425,000
Sewer Lining and Rehabilitation	2011	Various Locations	\$913,000
Sewer Main Repairs	2011	Various Locations	\$675,000
Sewer Lining and Rehabilitation	2012	Various Locations	\$823,635
Sewer Main Repairs	2012	Various Locations	\$366,486

Title	Year	Description	Cost
West Side Hydraulic Modeling	2012	West of Ridge Road	\$133,385
West Side Sewer Design	2013	West of Ridge Road—Various locations	\$309,990
Sewer Lining and Rehabilitation	2013	Various Locations	\$676,138
Sewer Main Repairs	2013	Various Locations	\$216,835
Isabella Street Relief Sewer	2013	Isabella Street	\$897,000
Hunter Road Back-pitched Sewer Replacement	2013	Hunter Road between Birchwood and Illinois Roads	\$200,000 (Approx. as project is currently out to bid)
Total:			\$51,825,688





**Village of Wilmette
Storms of record 1980-2013**

Rank	Date	Location	Inches	Minutes	Hours	Inches/hour	Storm Freq, yrs
1	8/2/2001	WTP	4.11	80	1.33	3.08	100
2	7/12/1981	SWPS	3.60	120	2.00	1.80	100
3	8/7/1989	SWPS	4.20	150	2.50	1.68	100
4	8/13/1987	SWPS	9.80	1440	24.00	0.41	100
5	9/12/2008	SWPS	6.60	1200	20.00	0.33	70
6	9/12/2008	WTP	6.29	1200	20.00	0.31	70
7	8/22/2002	WTP	3.85	210	3.50	1.10	50
8	8/22/2002	SWPS	3.80	210	3.50	1.09	50
9	8/16/1995	WTP	2.71	90	1.50	1.81	25
10	7/23/2011	SWPS	4.48	300	5.00	0.90	25
11	6/24/1994	SWPS	4.10	600	10.00	0.41	25
12	4/17/2013	WTP	5.56	1440	24.00	0.23	25
13	4/17/2013	SWPS	5.00	1440	24.00	0.21	17
14	8/14/1981	SWPS	2.30	60	1.00	2.30	15
15	8/18/1990	SWPS	2.75	120	2.00	1.38	15
16	7/23/2011	WTP	3.39	300	5.00	0.68	10
17	7/24/2010	SWPS	4.20	810	13.50	0.31	10
18	7/24/2010	WTP	3.81	810	13.50	0.28	10
19	7/10/2004	SWPS	2.41	100	1.67	1.45	10
20	7/19/1993	WTP	2.80	160	2.67	1.05	10
21	8/19/1990	WTP	3.75	720	12.00	0.31	10
22	10/25/1991	WTP	2.25	105	1.75	1.29	8
23	5/9/1990	WTP	3.80	840	14.00	0.27	8
24	6/19/2009	SWPS	3.96	1440	24.00	0.17	7
25	6/19/2009	WTP	3.93	1440	24.00	0.16	7
26	9/22/2006	SWPS	2.13	80	1.33	1.60	7
27	7/23/1997	WTP	2.42	150	2.50	0.97	7
28	6/26/2013	WTP	2.67	240	4.00	0.67	7
29	5/25/1991	WTP	1.40	30	0.50	2.80	5
30	8/2/1992	WTP	1.60	40	0.67	2.40	5
31	8/23/2007	SWPS	2.71	270	4.50	0.60	5
32	6/24/1994	WTP	2.62	480	8.00	0.33	5
33	2/24/1997	WTP	3.30	1260	21.00	0.16	5
34	2/24/1997	SWPS	3.30	1260	21.00	0.16	5
35	6/26/2013	SWPS	3.32	240	4.00	0.83	5
36	6/18/1993	WTP	1.53	45	0.75	2.04	4
37	8/5/1998	WTP	1.50	50	0.83	1.80	4
38	8/2/2001	SWPS	1.65	60	1.00	1.65	4
39	10/5/1991	WTP	2.54	330	5.50	0.46	4
40	5/9/1990	SWPS	2.80	720	12.00	0.23	4
41	9/8/1996	SWPS	1.89	120	2.00	0.95	3.5
42	8/11/1994	WTP	2.05	180	3.00	0.68	3.5
43	9/11/1986	SWPS	2.00	180	3.00	0.67	3.5
44	8/23/2007	WTP	2.18	270	4.50	0.48	3.50
45	10/22/1983	SWPS	2.40	420	7.00	0.34	3.5
46	11/27/1990	SWPS	2.58	690	11.50	0.22	3.5
47	7/9/2007	WTP	1.35	45	0.75	1.80	3
48	9/11/2000	WTP	1.70	80	1.33	1.28	3
49	10/17/1988	WTP	2.25	270	4.50	0.50	3

Village of Wilmette
Storms of record 1980-2013

Rank	Date	Location	Inches	Minutes	Hours	Inches/hour	Storm Freq, yrs
50	11/28/1990	WTP	2.40	510	8.50	0.28	3
51	6/13/1999	SWPS	1.50	90	1.50	1.00	2
52	7/10/2004	WTP	1.44	95	1.58	0.91	2
53	6/13/1999	WTP	1.50	100	1.67	0.90	2
54	9/11/2000	WTP	1.60	130	2.17	0.74	2
55	8/3/2004	SWPS	1.39	120	2.00	0.70	2
56	4/8/1999	SWPS	1.75	160	2.67	0.66	2
57	9/1/1989	SWPS	1.60	150	2.50	0.64	2
58	8/13/1985	SWPS	1.80	180	3.00	0.60	2
59	9/11/2000	SWPS	1.70	240	4.00	0.43	2
60	5/1/2003	WTP	1.85	300	5.00	0.37	2
61	5/1/2003	SWPS	1.80	300	5.00	0.36	2
62	10/17/1998	WTP	2.00	420	7.00	0.29	2
63	8/19/1991	SWPS	2.40	750	12.50	0.19	2
64	11/10/1995	SWPS	2.15	840	14.00	0.15	2
65	9/26/1996	SWPS	2.06	930	15.50	0.13	2
66	10/31/1994	WTP	2.11	1080	18.00	0.12	2
67	10/31/1994	SWPS	2.36	1320	22.00	0.11	2
68	5/30/2006	SWPS	0.81	45	0.75	1.08	1
69	5/30/2006	WTP	0.72	45	0.75	0.96	1
70	8/24/2004	SWPS	1.15	75	1.25	0.92	1
71	8/5/1998	SWPS	1.12	80	1.33	0.84	1
72	6/26/1993	WTP	1.48	135	2.25	0.66	1
73	8/3/2004	WTP	1.18	120	2.00	0.59	1
74	4/8/1999	WTP	1.50	160	2.67	0.56	1
75	9/13/1993	WTP	1.50	180	3.00	0.50	1
76	8/28/2004	SWPS	1.38	180	3.00	0.46	1
77	8/7/2007	SWPS	2.10	315	5.25	0.40	1
78	9/23/2006	SWPS	1.31	200	3.33	0.39	1
79	6/29/1990	SWPS	1.50	240	4.00	0.38	1
80	8/28/2004	WTP	1.31	225	3.75	0.35	1
81	8/20/2007	SWPS	1.42	270	4.50	0.32	1
82	8/20/2007	WTP	1.37	270	4.50	0.30	1
83	10/17/1998	SWPS	1.90	420	7.00	0.27	1
84	8/5/2007	WTP	1.67	375	6.25	0.27	1
85	8/5/2007	SWPS	1.61	375	6.25	0.26	1
86	7/22/1982	SWPS	1.80	420	7.00	0.26	1
87	4/23/1999	WTP	1.61	420	7.00	0.23	1
88	8/19/1999	SWPS	1.38	360	6.00	0.23	1
89	5/22/1984	SWPS	1.50	420	7.00	0.21	1
90	4/15/2001	WTP	1.60	540	9.00	0.18	1
91	3/31/1993	WTP	2.20	780	13.00	0.17	1
92	8/19/2007	SWPS	2.05	840	14.00	0.15	1
93	8/19/2007	WTP	1.82	840	14.00	0.13	1
94	11/10/1995	WTP	1.80	840	14.00	0.13	1
95	11/1/1992	WTP	1.80	870	14.50	0.12	1
96	4/20/2000	SWPS	1.52	780	13.00	0.12	1
97	9/26/1996	WTP	1.65	930	15.50	0.11	1
98	10/8/1990	WTP	1.60	1140	19.00	0.08	1

Village of Wilmette
Storms of record 1980-2013

Rank	Date	Location	Inches	Minutes	Hours	Inches/hour	Storm Freq, yrs
99	3/31/1993	SWPS	1.50	1080	18.00	0.08	1
100	5/9/1996	WTP	1.80	1440	24.00	0.08	1
101	11/4/1990	SWPS	1.60	1680	28.00	0.06	1
102	5/9/1996	SWPS	1.30	1440	24.00	0.05	1

Storm Frequency based on "Rainfall Intensity vs. Duration Chart"
from the US Dept of Commerce, Technical Paper 25 for Chicago, IL 1905-12 and 1926-51

Updated:

Nabil Quafisheh
Water Plant Supt
5/2/2003
1/22/2008
9/15/2008
7/25/2011
6/30/2013

[Edit this form](#)

2013 Engineering Flood Survey

In light of the recent rain storm on Thursday, April 18, 2013, the Village is conducting a village-wide survey to get an accurate account of street and basement flooding. This information will be used to evaluate the existing sewer systems, as well as to plan for future improvements.

We would also appreciate hearing from residents that did not experience flooding on April 18. This data will be used to determine the effectiveness of the sewer improvements installed by the Village in recent years.

This survey is different than the Cook County damage survey previously posted. If you filled out the previous survey, please fill this one out as well as the information collected is different.

If you need help with your responses or would like to request a paper survey, contact the Village's Engineering Department at 847.853.7660. Thank you in advance for your time and consideration.

* Required

1. Street Number *

Please enter the number of your street address (Example: If your address were 1200 Wilmette Ave, enter 1200).

Unit Number

If you have a unit number, please enter here (Example: If your address were 1200 Wilmette Ave Unit 2, enter Unit 2)

2. Street Name*

Please enter the name of your street address. (Example: If your address were 1200 Wilmette Ave, enter Wilmette Ave)

3. How long have you lived at this address?

Enter amount in years (examples: 3, 4.5, 7.75).

4. Did your street flood during the April 18 rain storm? *

- Yes
 No

5. If you answered yes to question 4, what was the extent of street flooding?

How far was the standing water from the street?

- Street Only
 Up to the public sidewalk
 Into my yard
 Up to my building
 Into my building

6. Did you have yard flooding during the April 18 rain storm?*

- Yes
 No

7. If you answered yes to question 6, what was the extent of your yard flooding?

- Standing water in my yard, but it dissipated in less than 24 hours
 Standing water in my yard, but it dissipated in less than one week
 Standing water in my yard that lasted longer than one week
 Standing water was so high that it entered my home

8. Did water enter your basement during the April 18 rain storm?*

- Yes
 No
 The building has no basement

9. If you answered yes to question 8, please indicate the location(s) that water entered.

Check all that apply.

- Floor drain, laundry tub, shower or toilet
 Sump pump failure
 Window well
 Doorway
 Wall or floor seepage
 Do not know

10. How deep was the water in your basement?

Estimate depth of water in inches. (example: 6, 12, 18)

Sanitary Sewer Backup

The following four questions are for homes that experienced a sewer backup from a floor drain, laundry tub, shower or toilet.

11. Approximately how many times in the last five years did you experience a sewer backup?

12. Do you recall the approximate month/year of the backup?

13. Does your building have any protection from sewer backup?

Examples include overhead sewer, flood control, standpipes...

- Yes
- No
- Don't know

14. If you answered yes to question 13, indicate the type of protection that is installed.

- Overhead sewer
- Flood Control
- Standpipes
- Backflow prevention valve
- Other

Additional Comments

Your e-mail address (optional)

If you would like to receive e-mail notifications from the Village of Wilmette via e-news, enter your e-mail address below.

Village Contact Info

Village of Wilmette Engineering Department 847.853.7660

Village website: www.wilmette.com

Never submit passwords through Google Forms.

www.chicagotribune.com/news/local/breaking/chi-experts-chicago-had-record-rainfall-for-first-six-months-20130630,0,7098399.story

chicagotribune.com

First half of year wettest on record for Chicago

By [Carlos Sadovi](#)

Tribune reporter

7:23 AM CDT, July 1, 2013

It's no surprise to those who slogged through flooded basements and even paddled to their homes: the first six months of this year were the wettest on record for the Chicago area. advertisement

Through June, 28.46 inches of precipitation was measured, an inch and a half more than we got all of last year, according to [the National Weather Service](#). The earliest measurement of six-month rainfall was in 1882, when 25.17 inches was recorded.

The 28.46-inch mark is 11.93 inches above the average of 16.53 inches that normally falls in the Chicago area the first six months. Last year, only 13.11 inches were recorded for the first six months of the year and 26.91 inches for all of 2012, the weather service said.

Other sodden starts to the year include 26.19 inches in 1975, 25.75 inches in 2009 and 25.53 inches in 1993.

Rockford registered 27.16 inches of precipitation so far this year, making it the third wettest first six months since 1906, when officials began recording.

In 1973, a record 29.82 of precipitation fell in the Rockford area. The latest rainfall is 10.04 inches above the 17.12 inches normally expected for the first six months of the year, officials said. Last year at the same time, there were only 11.04 inches in the Rockford area.

The Rockford area experienced a total of 23.35 inches for all of 2012, officials said.

chicagobreaking@tribune.com

Twitter: [@ChicagoBreaking](#)

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Engineering
Department

(847) 853-7660
Fax (847) 853-7701

DATE: July 3, 2013
TO: Municipal Services Committee
FROM: Brigitte Mayerhofer P.E., Director of Engineering
SUBJECT: 2013-2015 Capital Sewer Program

Recommendation

The purpose of this discussion is to provide updates on the following projects:

1. Hunter Road Back-Pitched Sewer
2. Local Storage Projects (Wilmette Avenue and Hibbard Road)
3. Harms Road Storage and Pump Station Project
4. Manhole Rehabilitation
5. Princeton Place / Kenilworth Gardens Study

The first attachment contains an overall schedule and individual/cumulative cost estimates for these projects. This document will be the blueprint for the future bond issues to be discussed at the Sewer and Water Capital Improvement Program meeting scheduled for July 15, 2013. The cost of the proposed program is \$21.3 million.

Background

In the last five years, the Village Board has taken the following actions to reduce flooding:

- 2009 Conducted a comprehensive engineering study of the separate sewer area located west of Ridge Road
- 2010 Installed backup generator at the Stormwater Pump Station

2012 Completed Hydraulic Sewer Modeling of the separate sanitary system

Discussion

The Village engaged the services of RJN in January of 2013 with the intent to design and implement the recommendations outlined in the 2009 and 2012 studies. Following is a brief status of each project:

1. Hunter Road Back-Pitched Sewer

This project was recommended as part of the sewer modeling work completed in 2012. A section of sanitary sewer on Hunter Road is identified as a back-pitched sewer. Back-pitched sewers are primarily a concern because they slow flow velocity, causing solids to settle in the pipe and obstructing the path of flow. Over time, debris build-up can significantly reduce the conveyance capacity of the sewer. The Hunter Road Sanitary Sewer Reconstruction Project will correct an 18-inch back-pitched sewer on Hunter beginning at Illinois Road and continuing north approximately 530 feet. The 18-inch sanitary sewer connects to the 72-inch relief sewer which flows north to the Princeton Place Interceptor outfall. This project was designed by RJN and the construction will be managed by in-house engineering staff. The project will begin the week of July 15 and be completed by mid-August.

Cost: \$246,661
Schedule: Summer, 2013

2. Local Storage Projects (Wilmette Avenue and Hibbard Road)

The hydraulic modeling also identified localized bottlenecks limiting flow in Wilmette's collection system. The first area on Wilmette Avenue will replace sections of 10 and 12 inch sanitary sewers with 18 and 24-inch sewers, respectively. The limits of the project are approximately from Locust Road to just west of Hunter Road.

A second bottleneck was identified along the Hibbard Road corridor between Wilmette Avenue and Glenview Road. To help mitigate the sewer surcharging on Hibbard Road, storage along Kilpatrick Avenue, Gregory Avenue and the north side of Glenview Road is proposed.

A letter requesting conceptual approval from the Metropolitan Water Reclamation District of Greater Chicago (MWRD) dated April 29, 2013 is attached with additional details about the project. The Village received a favorable response

from MWRD and is proceeding with the design. This project is expected to be built early in 2014.

Cost: \$1,730,000
Schedule: March, 2014

3. Harms Road Storage and Pump Station Project

ACTION: Staff is seeking concurrence on the size of the storage component for this project.

The Harms Road Storage and Pump Station Project was identified in both the 2009 and 2012 studies as an important component to address sanitary backups in the western portion of the Village. The project consists of building a large storage reservoir to store peak sanitary flows, a check valve on the Village's sanitary connection to the MWRD interceptor at Harms Road and a pump station. The Village has received conceptual approval for this project from MWRD and RJN has begun the preliminary design.

The first component of this project is to size and find a location for the storage reservoir. Several potential areas along the Lake Avenue corridor were identified as possible storage sites, however, the West Park baseball field is the most viable alternative based on size, cost and constructability.

RJN has provided a detailed analysis sizing the storage component in a memo dated July 3, 2013. After reviewing the cost / benefit analysis (cost of improvement versus number of backups eliminated) it is staff's recommendation that the 5.5 million gallon storage option be considered by the Committee.

Cost: \$11,700,000
Schedule: June, 2014

4. Manhole Rehabilitation (Phase I- Princeton Place)

A technical summary of the manhole rehabilitation program in the Princeton Place region dated July 2, 2013 and prepared by RJN is attached for review. The estimated cost for this work is \$1.39 million and the construction can begin as early as this fall.

Cost: \$1,390,000
Schedule: Fall, 2013

5. Princeton Place / Kenilworth Gardens Study

The Kenilworth Gardens subdivision has been inundated with flooding problems the past several significant rain events. Much of the area is within a special flood hazard area so street and overland flooding is prevalent. In addition, the close vicinity of the subdivision to the Princeton Place interceptor suggests that this area is one of the first to experience surcharged sewers which can lead to sewer backups. The technical memo from RJN dated July 1, 2013 includes a summary of the challenges in this area as well as several recommendations.

Additional study of the Kenilworth Gardens and Princeton Place area can begin this quarter, with implementation in 2014.

Cost: \$3,840,000
Schedule: July, 2014

Representatives from RJN will be present at the MSC meeting to answer questions related to the projects above-described.

Documents Attached

1. 2013-2015 Capital Sewer Program Schedule and Cost Summary
2. Letter from RJN to MWRD dated April 29, 2013 Requesting Conceptual Approval of the Local Storage Projects
3. Technical report reviewing Harms Road storage options prepared by RJN dated July 3, 2013
4. Technical report reviewing the Manhole Rehabilitation Program prepared by RJN dated July 2, 2013
5. Technical report reviewing Kenilworth Gardens Wet Weather Response prepared by RJN dated July 1, 2013

April 29, 2013

Ms. Maureen Durkin, P.E.
Supervising Civil Engineer
Metropolitan Water Reclamation District of Greater Chicago
111 East Erie Street
Chicago, Illinois 60611-2839

SUBJECT: VILLAGE OF WILMETTE, ILLINOIS
CONCEPTUAL APPROVAL REQUEST FOR PROPOSED LOCAL STORAGE SEWERS

Dear Ms. Durkin:

The Village of Wilmette (Village) is seeking conceptual approval from the Metropolitan Water Reclamation District of Greater Chicago (MWRD or District) to provide localized storage in two locations: on Wilmette Avenue and near Hibbard Avenue. The summary letter provided to you and follow-up meeting with District staff identified these locations for potential construction of localized storage projects.

PROJECT BACKGROUND

A comprehensive hydraulic modeling study of the Village's separate sanitary sewer system completed by RJN identified localized bottlenecks limiting flow and causing backups upstream in two areas along Hibbard Road and Wilmette Avenue. At that time, additional local storage was proposed to reduce the frequency of surcharging.

The following is a brief summary of previous correspondence on the subject project:

- 2012 – RJN completed a hydraulic modeling study of the project area.
- November 25, 2012 – RJN submitted the Summary of Sanitary Hydraulic Modeling Report to MWRD for review and comment.
- November 30, 2012 – RJN met with District staff to discuss the capital improvement program for separate sewer area (SSA).
- January, 18, 2013 – Summary Response from MWRD noting "In-line storage may be provided as needed but must be limited to an average release rate of 150 gallons per capita per day (gpcpd) for the tributary population."

WILMETTE AVENUE AREA

RJN conducted a comprehensive SSES study on behalf of the Village in 1988 and a subsequent Facility Plan in 1991. Based on these studies, the Village made significant improvements throughout the sanitary sewer system including the 72-inch oversized storage sewer on Locust Road and outlet control structure to MWRD located at Kenilworth Avenue and Princeton Place.

Page 2
Ms. Maureen Durkin, P.E.
April 29, 2013

However, as the Village's system has continued to age it has become necessary to re-evaluate the system in areas where surcharging issues persist.

The 72-inch sewer downstream along Locust Road does not currently extend to upstream areas with surcharging problems. The intent of this project will be to extend this storage capacity onto Wilmette Avenue. The existing 10-inch and 12-inch sewers on the south side of Wilmette Avenue will be removed from service following construction of the extended storage. Any existing services will be relocated to the new sewers.

Beginning from the 72-inch sewer, the storage extension will include an 18-inch sewer west from Beverly Drive to Locust Road and a 24-inch sewer east to Meadow Drive. See the attached Exhibit 'A' for locations of the improvements.

The downstream outlet for the Wilmette Avenue sewer is controlled by the Princeton Place outlet structure that was constructed as part of the original 1991 Facilities Plan improvements. This structure controls the flow from the existing 72-inch sewer and restricts the release rate into the MWRD interceptor. Because of this, we anticipate a negligible impact in release rates to the MWRD interceptor as the existing outlet control structure will continue to restrict the outlet flow to MWRD at the same rate.

RJN recommends this option since the proposed project will provide approximately 29,000 gallons of additional storage. This project will reduce the risk of sewer back-ups to tributary areas while the outlet control structure will reduce the likelihood of any increase in flows MWRD from the extended storage.

HIBBARD ROAD AREA

The preliminary design for the Hibbard Road improvements is to provide side-stream storage along Gregory Avenue, Kilpatrick Avenue, and the north side of Glenview Road. The parallel storage areas will connect to the existing Hibbard Rd sewer at two locations: Gregory Ave and Glenview Ave. Aligning the storage along Gregory Avenue, Kilpatrick Avenue, and Glenview Road will minimize the disruption to the existing utilities while also maximizing the additional storage amount provided.

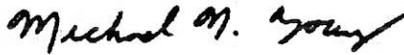
Since the existing sewers in the area are relatively shallow, the storage volume provided will be somewhat limited by minimum bury depths needed. Actual storage amounts provided will also vary greatly depending on the type of storage selected for final design i.e. circular sewers, elliptical sewers, or rectangular box-type storage. Based on preliminary calculations the additional storage volume provided will be in the range of 90,000 to 150,000 gallons. See the attached Exhibit 'B' for locations of the improvements.

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Ms. Maureen Durkin, P.E.
April 29, 2013

We do not anticipate that the release rates to MWRD will be impacted as a result of the Hibbard Road area sewer improvements. Since the conveyance capacity will not be increased on existing sewers, this alternative will have little or no impact on downstream sewers. However, the improvements can provide a significant reduction in the number of sewer back-ups for the tributary areas.

We are requesting that the District provide conceptual approval for the construction of the extended storage along Wilmette Avenue and side-stream storage adjacent to Hibbard Road as described. The Village will then begin final design and submit a formal Sewerage System Permit application. If you have any questions or would like to discuss the information in this letter, feel free to contact us at 630-682-4700.

Sincerely yours,
RJN Group, Inc.

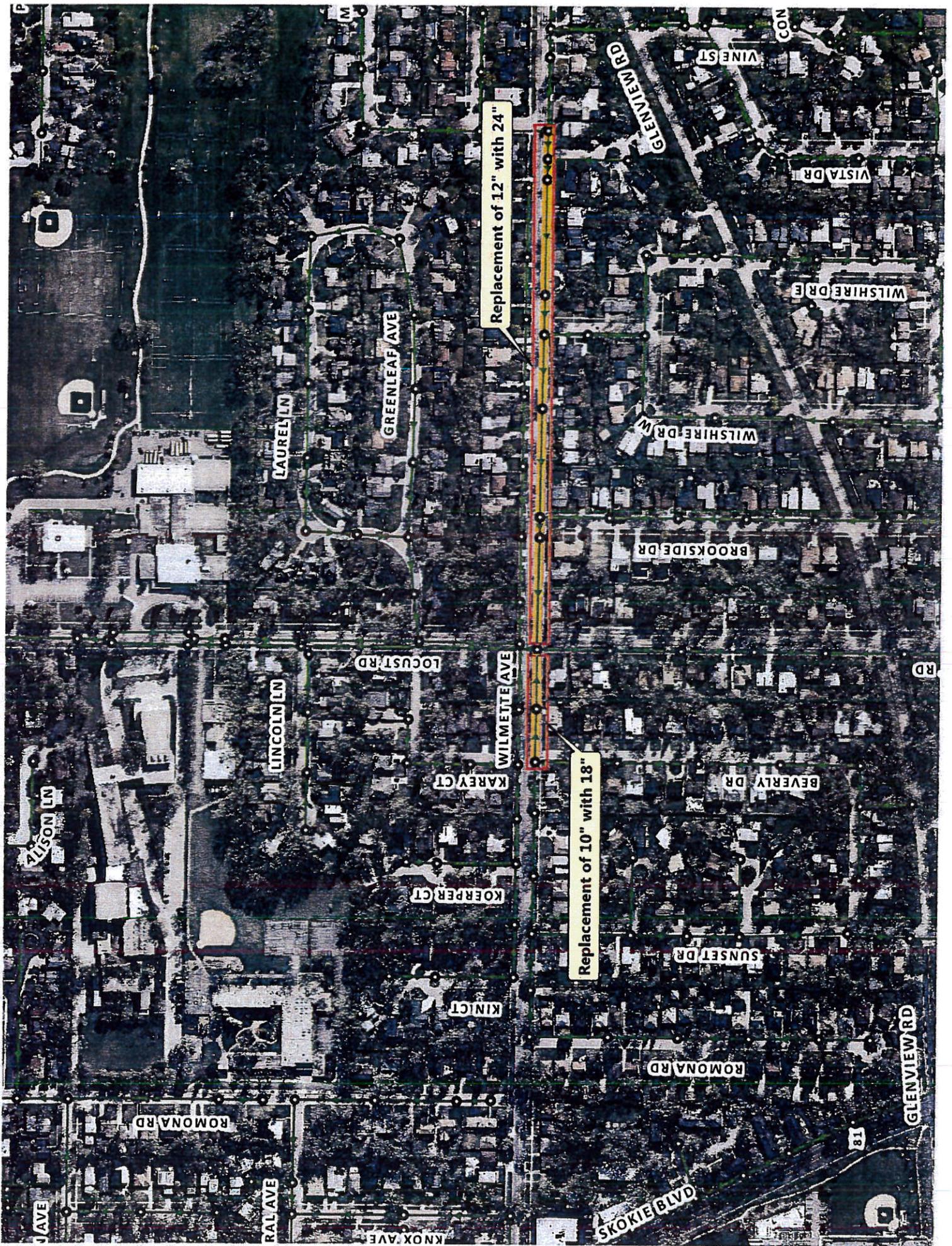


Michael N. Young, P.E.
Branch Manager



Zachary J. Matyja, P.E.
Client Manager

cc: Ms. Brigitte Mayerhofer, P.E., Village of Wilmette





Memo

To: Ms. Brigitte Mayerhofer, P.E.
From: Vincent Bergl, P.E.
Date: July 3, 2013
Re: Harms Region Storage Summary – Cost-Benefit Analysis of Storage Volume

Summary

This memorandum outlines the findings from further hydraulic modeling and analysis of the Harms Road Region sanitary sewer system and provides a cost-benefit analysis for detention storage options near the connection to the Harms Road MWRD interceptor. The sanitary sewer hydraulic model developed by RJN in 2012 was re-calibrated using flow meter data measured during the numerous spring 2013 rain events. Using this refined model, various volumes of regional storage were analyzed and compared using a detailed cost-benefit analysis. Upon analysis, it was determined that the optimal volume of storage to be provided for the Harms Road Region to cost-effectively reduce the number of basement backups is approximately 5.5 million gallons (MG). The most feasible location for this storage is West Park, which is located at an optimal location and provides the necessary area for construction (2 to 3 acres).

Background

This analysis builds upon the hydraulic model of the entire separated sanitary sewer system conducted in 2012, which provided a preliminary recommendation for large wet-weather flow detention volume in excess of one million gallons near the Harms Road Region outlet.

The Harms Road Region is one of two main regions that comprise the separated sewer area within the Village of Wilmette. It is so named because it includes all of the separated area that is tributary to the Harms Road MWRD interceptor. It accounts for approximately 35% of the separated area and generally includes the entire portion of the Village west of Romona Road.

Previous study of the region had indicated significant downstream restriction imposed by the MWRD interceptor on flow exiting the region during wet-weather events, and current flow monitoring confirmed that the outlet is susceptible to long periods of reverse flow – flow backing up from the interceptor into the Wilmette system – during large storms.

Calibration of Model

The calibration of the sanitary system model was refined using flow monitoring data collected as part of the Harms Road Region study. The current flow monitoring data, which was initiated on March 15, 2013, provides a more robust data set for calibration than the flow monitoring data from 2003 and 2011 previously used to calibrate the model.

Table 1 provides a summary of wet-weather flow data from the 2013 monitoring period used to refine the model calibration. The data was collected at RJN meter WH-01, which is located on the 36-inch Lake Avenue trunk sewer, two manholes east of the connection to the MWRD interceptor. The peaking factor is the ratio of the peak flow to the average dry-weather flow (ADWF), which is approximately 0.7 million gallons per day (mgd) based on preliminary flow analysis.

Table 1
Harms Road Region Wet-Weather Flow Data, Spring 2013

Date	Peak Hour Rainfall (in.)	Total Rainfall (in.)	Peak Flow (mgd)	Peaking Factor	Peak Level (in.)	Duration of Surge (hr:min)	Duration of Reverse Flow (hr:min)
April 8	0.37	0.55	2.45	3.5	13.2	0:00	0:00
April 10	0.35	0.96	3.73	5.3	26.3	0:00	0:00
April 15	0.12	0.46	1.75	2.5	13.4	0:00	0:00
April 18	1.38	5.14	7.45*	10.6*	212.0**	41:50	15:25
April 23	0.11	0.67	2.79	4.0	17.8	0:00	0:00
May 10	0.17	0.53	1.50	2.1	10.2	0:00	0:00
May 20	0.60	0.90	2.40	3.4	15.5	0:00	0:00
May 22	0.57	0.84	7.59	10.8	22.8	0:00	0:00
May 22***	0.61	1.51	9.54	13.6	61.0	6:00	0:00

*Peak suppressed by reverse flow from MWRD interceptor
 **Reached upper bound of depth sensor range -- actual peak level may have been higher
 *** May 22 had two separate short-duration storm events approximately 12 hours apart

Based on the 2013 flow monitoring data, the model calibration was adjusted to account for the inflow response during storm events with high antecedent ground moisture conditions and for the outlet condition at the MWRD connection during high-intensity storm events. The events primarily used to refine the model calibration were the April 18 event, a 10-year to 25-year storm, and the May 22 rain events, both short-duration events in excess of a 2-month recurrence interval which occurred approximately twelve hours apart, resulting in a total rainfall of 1.51 inches.

Development of Alternatives

Alternatives were developed and modeled to determine the impacts of detention storage at various volumes and depths. Both gravity-drained and pumped-out storage options were considered. The following alternatives were developed in detail:

- **1.5 MG, 3.0 MG, 4.5 MG, and 5.5 MG detention storage drained by gravity** – These alternatives are based on the approximate volume of usable storage beneath West Park, located south of Lake Avenue and west of Laramie Avenue, which has been identified as the most feasible site for detention storage near the Harms Road Region outlet. The volumes are for various areas up to a maximum available 250' x 350' footprint and an effective vertical operating range between elevations 608 and 616. The effective operating range is established as the lowest elevation still allowing gravity flow out (608) and the maximum elevation providing protection for the majority of properties in the Harms Road Region (616).
- **8.0 MG detention storage drained by gravity** – This alternative is based on the amount of volume that would be required to store all restricted flow during the duration of an event comparable to the April 18 storm. The 8.0 MG estimate is the volume equivalent to the Lake Avenue trunk sewer flowing full throughout the duration of the observed reverse flow condition. It is anticipated that this volume of storage would require use of multiple sites.
- **11.0 MG detention storage drained by gravity** – This alternative is based on the amount of volume that would be required to hold the water level in the Lake Avenue sewer below the approximate lowest basement elevation during the duration of an event comparable to the April 18 storm. The 11.0 MG estimate is the volume equivalent to the Lake Avenue trunk sewer flowing full for as long as the hydraulic grade line (HGL) exceeded the approximate lowest basement elevation of 612. It is anticipated that this volume of storage would require use of multiple sites.
- **9.0 MG detention storage pumped out** – This alternative is based on the approximate volume of usable storage beneath the maximum available footprint in West Park if the bottom of storage elevation were extended to elevation 602, six feet deeper than the gravity-drained option.

Each proposed alternative was modeled in conjunction with the proposed Hibbard Road area local storage currently under design, as well as a pump-over lift station that would pump flow from the Wilmette system directly to the MWRD interceptor at the MWRD-limited rate of 150 gallons per capita per day (gpcd) during wet-weather conditions. **The reduction of inflow and infiltration (I/I) through rehabilitation of the system and reduction of improper stormwater connections will be critical to reduce the number of backups and increase the benefit of the regional storage system.**

Level of Protection Analysis

The alternatives were modeled to determine their relative impacts on the HGL throughout the Harms Road Region sanitary system. Alternatives were evaluated by the level of sewer backup protection provided by the corresponding improvement.

For any given property served by the system, the level of protection is the storm with the smallest recurrence interval that would subject the property to a sewer backup. In this analysis, a property was considered subject to backup if the peak HGL level was within 6.5 feet of the ground elevation at the nearest manhole. Overhead sewer connections and individual backup protection measures were not considered in the quantification of potential sewer backups.

The results of this analysis are shown in the attached Exhibits 1 through 8.

Cost-Benefit Analysis

Each alternative was evaluated using a cost-benefit analysis. The analysis compares alternatives on the basis of cost per potential sewer backup prevented, and the marginal cost of preventing a sewer backup is established for each alternative.

To quantify the number of sewer backups prevented by each alternative, the total number of backups expected to occur within the study area in a given year was calculated for each alternative. The projected number of backups per annum was calculated by determining the total number of properties subject to backup for each design storm and multiplying these totals by the annual probability of the storm event occurring. This calculation is detailed by Tables 2A and 2B. In the table, (P) indicates the pumped-out option. Overhead sewer connections and individual backup protection measures were not considered in the quantification of potential sewer backups.

Table 2A
Predicted Number of Sewer Backups by Storm Event (Cumulative)

Storm Event	Average # of Events Per Year	Number of Properties Subject to Backup by Alternative							
		Existing Condition	1.5 MG	3.0 MG	4.5 MG	5.5 MG	8.0 MG	11.0 MG	9.0 MG (P)
2-Month	6	0	0	0	0	0	0	0	0
6-Month	2	58	0	0	0	0	0	0	0
1-Year	1	267	40	38	17	7	7	7	7
2-Year	0.5	1,213	921	231	113	103	65	65	65
5-Year	0.2	1,669	1,626	1,651	1,258	373	308	291	308
10-Year	0.1	1,711	1,680	1,679	1,679	1,553	1,228	1,213	1,178
25-Year	0.04	1,711	1,700	1,690	1,687	1,678	1,489	1,374	1,362
50-Year	0.02	1,711	1,711	1,708	1,690	1,690	1,689	1,467	1,677
100-Year	0.01	1,712	1,712	1,712	1,712	1,712	1,695	1,681	1,700

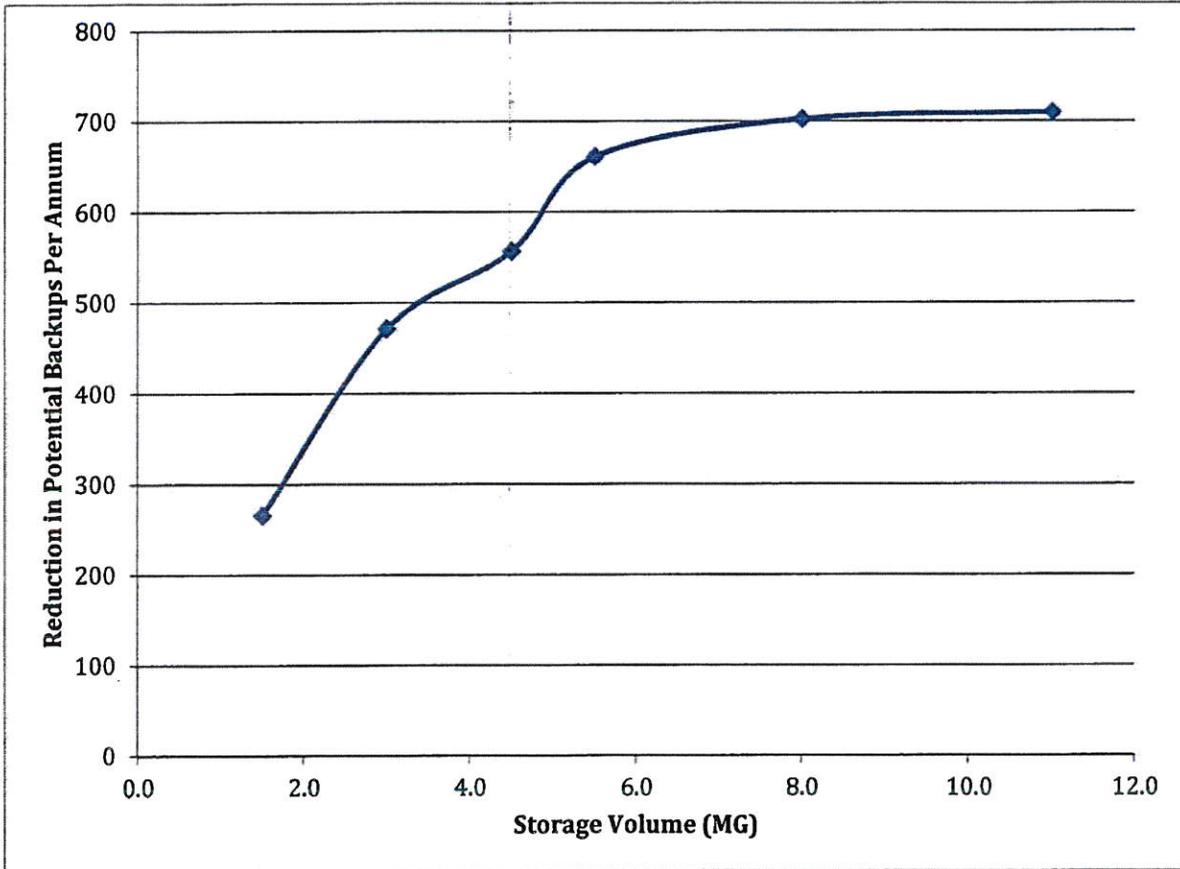
As an example, see the highlighted area of Table 2A. Under existing conditions, 1,669 properties are subject to backup in a 5-year event. With 4.5 MG of storage, that number is only reduced to 1,258, however the increase to 5.5 MG of storage reduces the number to only 373 properties.

Table 2B
Predicted Number of Sewer Backups per Annum

		Backups Per Annum by Alternative							
Storm Event	Average # of Events Per Year	Existing Condition	1.5 MG	3.0 MG	4.5 MG	5.5 MG	8.0 MG	11.0 MG	9.0 MG (P)
2-Month	6	0	0	0	0	0	0	0	0
6-Month	2	116	0	0	0	0	0	0	0
1-Year	1	209	40	38	17	7	7	7	7
2-Year	0.5	473	441	97	48	48	29	29	29
5-Year	0.2	91	141	284	229	54	49	45	49
10-Year	0.1	4	5	3	43	118	92	92	87
25-Year	0.04	0	1	0	0	5	10	6	7
50-Year	0.02	0	0	0	0	0	4	2	6
100-Year	0.01	0	0	0	0	0	0	2	0
Total		893	628	422	337	232	191	184	185

The relationship between volume of gravity-drained storage and the reduction in potential sewer backups is illustrated by Figure 1. As the figure illustrates, the benefit of additional storage volume is steepest up to 3.0 MG, and the added benefit beyond 5.5 MG tapers off as the capacity of tributary sewers to convey additional flow to the detention basin becomes a limiting factor in the effectiveness of larger storage volumes. Given the minimal benefits of volumes in excess of 5.5 M G and the added difficulty of providing storage at multiple sites, these alternatives were excluded from further analysis.

Figure 1
Reduction in Backups by Volume of Gravity-Drained Storage



The costs of the alternatives included in the analysis are listed in Table 3. Costs are preliminary, planning-level estimates. Material, excavation, and siting costs were considered in these estimates. Costs for pumping facilities were also considered in both the gravity-drained and pumped-out alternatives.

Table 3
Costs of Harms Road Storage Alternatives

Alternative	Cost
3.0 MG	\$6,900,000
4.5 MG	\$9,900,000
5.5 MG	\$11,000,000
9.0 MG (P)	\$18,000,000

The total number of backups within the study area prevented by each alternative and the cost per backup prevented is detailed in Table 4. The marginal cost for each alternative is the increase in cost divided by the decrease in potential backups as compared to the next least-cost alternative.

Table 4
Costs-Benefit Comparison of Proposed Alternatives to Existing Conditions

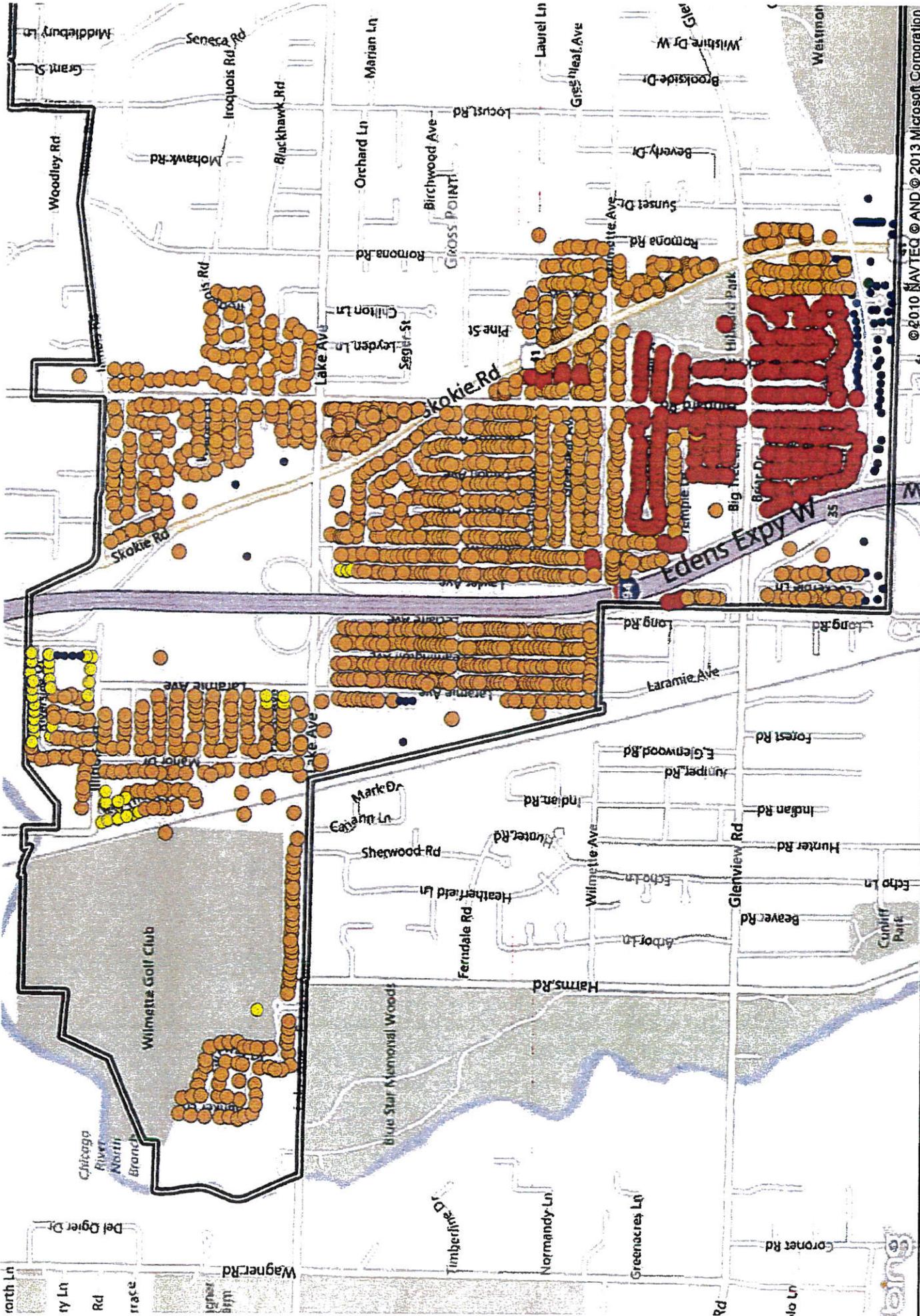
Alternative	Reduction in Backups per Annum	Total Cost	Cost per Backup Prevented	Marginal Cost per Backup Prevented
3.0 MG	471	\$6,900,000	\$14,642	
4.5 MG	556	\$9,900,000	\$17,791	\$35,294
5.5 MG	661	\$11,000,000	\$16,643	\$10,476
9.0 MG (P)	708	\$18,000,000	\$25,427	\$148,936

The marginal cost of each alternative is further detailed in Table 5. Values in the light green boxes represent the marginal cost of selecting the alternative in the corresponding dark green box over the alternative in the corresponding dark blue box. Values in the light blue boxes represent the marginal reduction in backups predicted for the alternative in the corresponding dark blue box versus the alternative in the corresponding dark green box.

Table 5
Alternative-to-Alternative Marginal Cost Comparison

	Existing Condition	3.0 MG	4.5 MG	5.5 MG	9.0 MG (P)
Existing		471	556	661	708
3.0 MG	\$14,642		85	190	237
4.5 MG	\$17,791	\$35,211		104	151
5.5 MG	\$16,643	\$21,615	\$10,528		47
9.0 MG (P)	\$25,427	\$46,901	\$53,476	\$148,968	

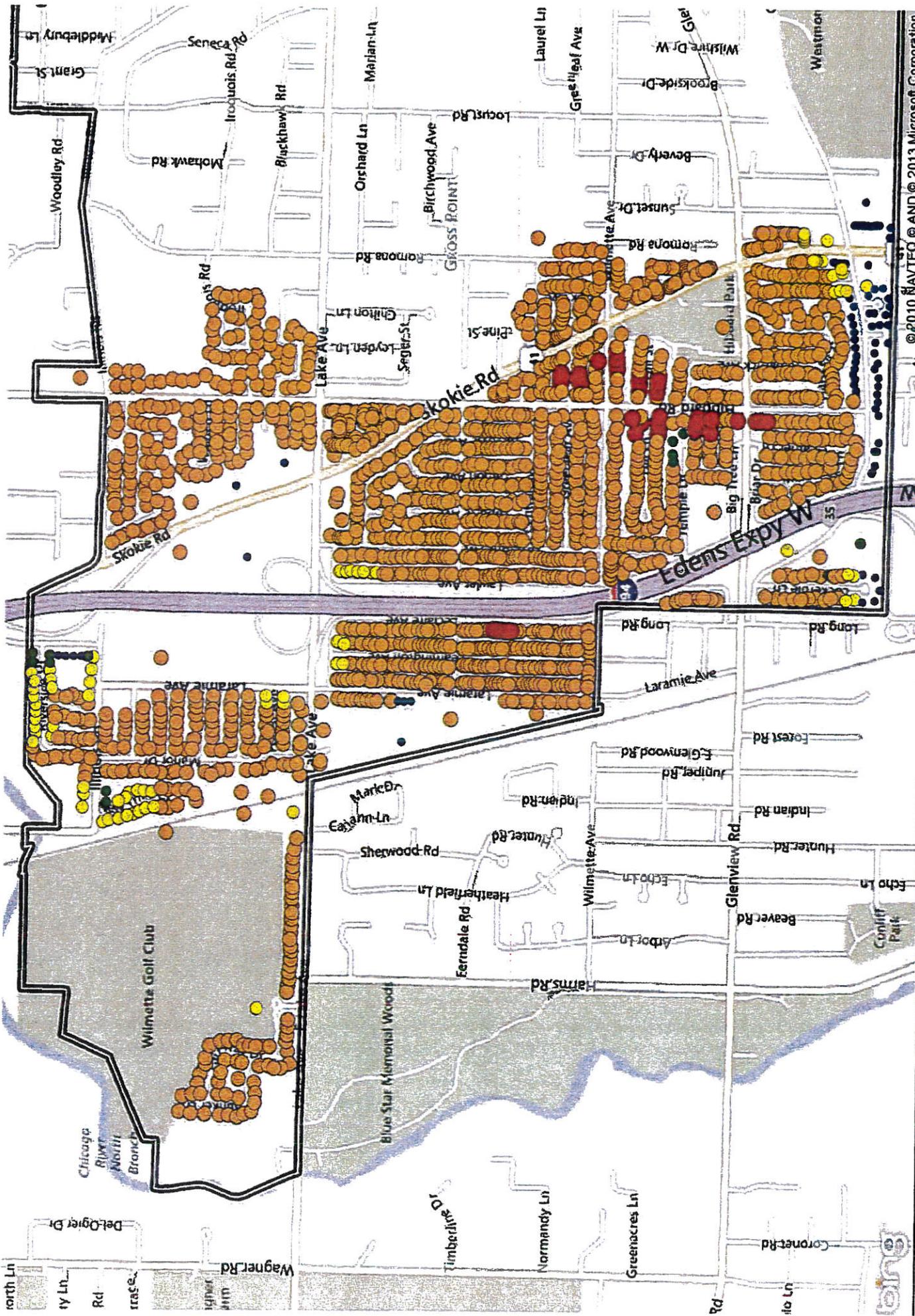
Based on this comparison, the marginal cost-benefit ratio is most favorable for the lowest-cost improvement of 3.0 MG and to an incremental increase from 4.5 MG to 5.5 MG. The marginal cost of the 9.0 MG pump-out option does not compare favorably to any of the three gravity-drained options.



● Less than 1-year Protection
 ● 1-year to 5-year Protection
 ● 5-year to 25-year Protection
 ● 25-year to 100-year Protection
 Wilmette Boundary

● Greater than 100-year Protection

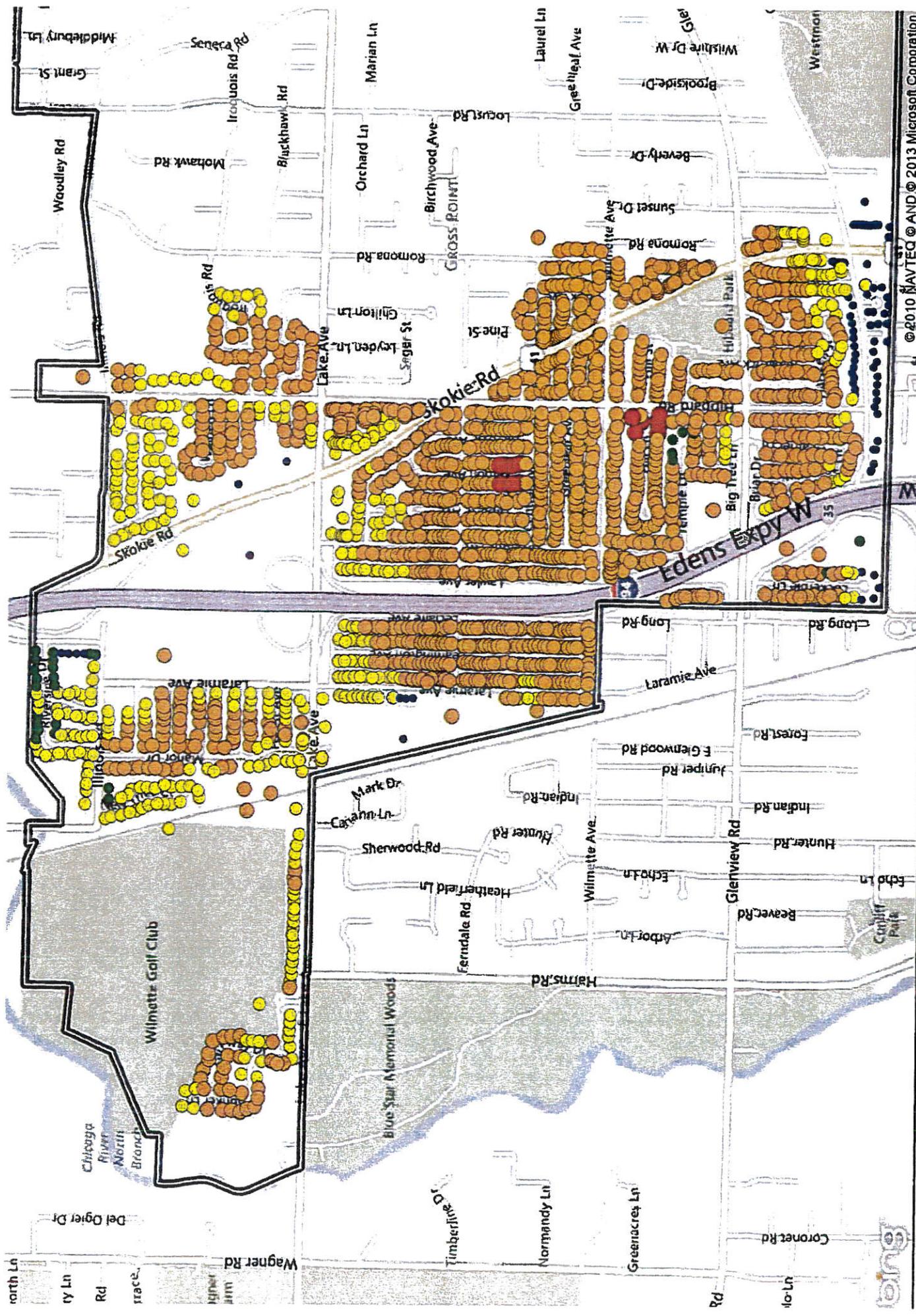
Village of Wilmette
 Exhibit 1
 Harms Rd Region - Existing Level of Protection
 June 2013



rjn group
 The Group for Creative Systems Solutions

● Less than 1-year Protection
● 1-year to 5-year Protection
● 5-year to 25-year Protection
● 25-year to 100-year Protection
 Greater than 100-year Protection
 Wilmette Boundary

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 Village of Wilmette
 Exhibit 2
 Harms Rd Region - 1.5 MG Storage, Gravity Drained
 June 2013



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Village of Wilmette
Exhibit 4
Harms Rd Region - 4.5 MG Storage, Gravity Drained
June 2013

● Less than 1-year Protection

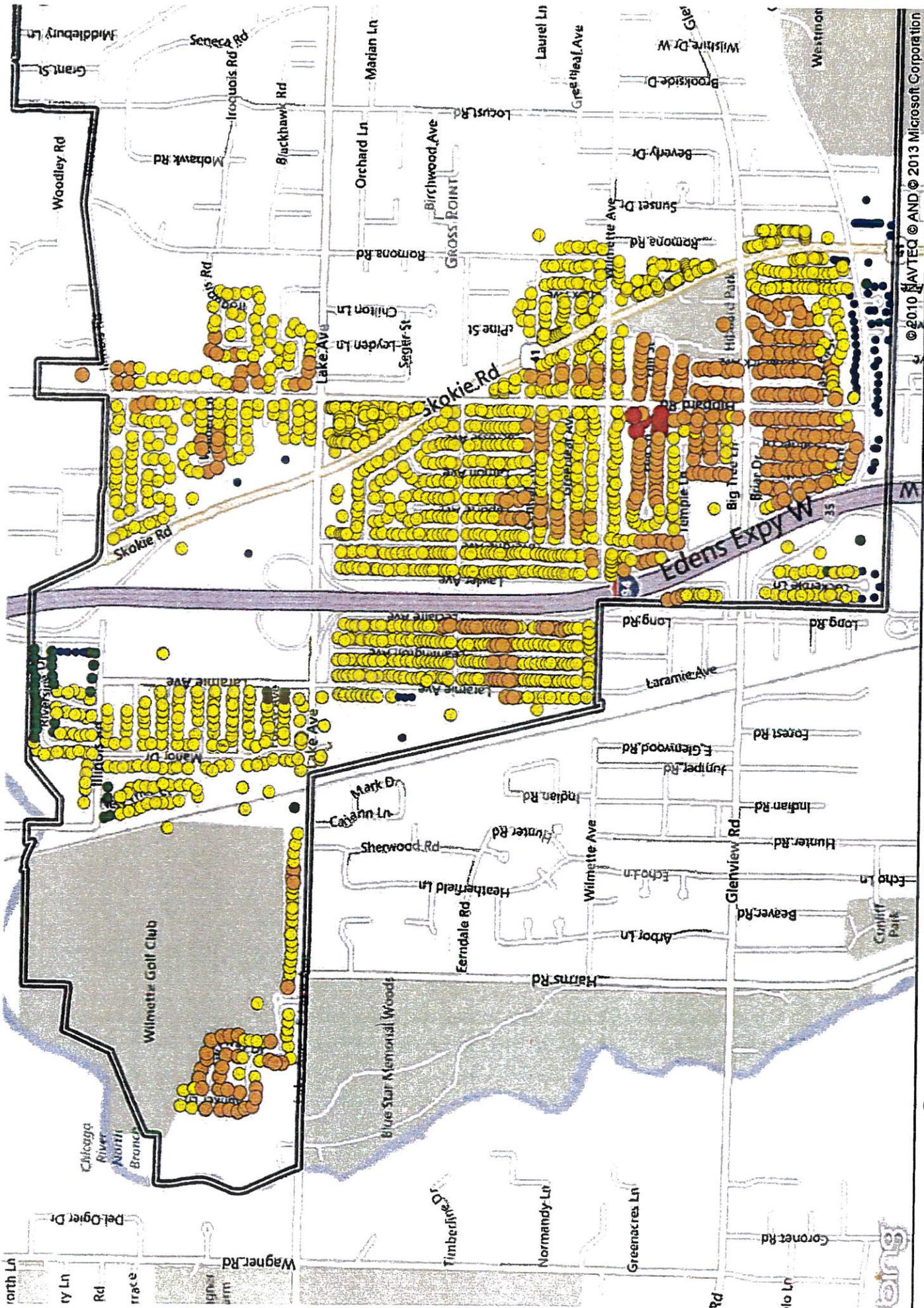
● 1-year to 5-year Protection

● 5-year to 25-year Protection

● Greater than 100-year Protection

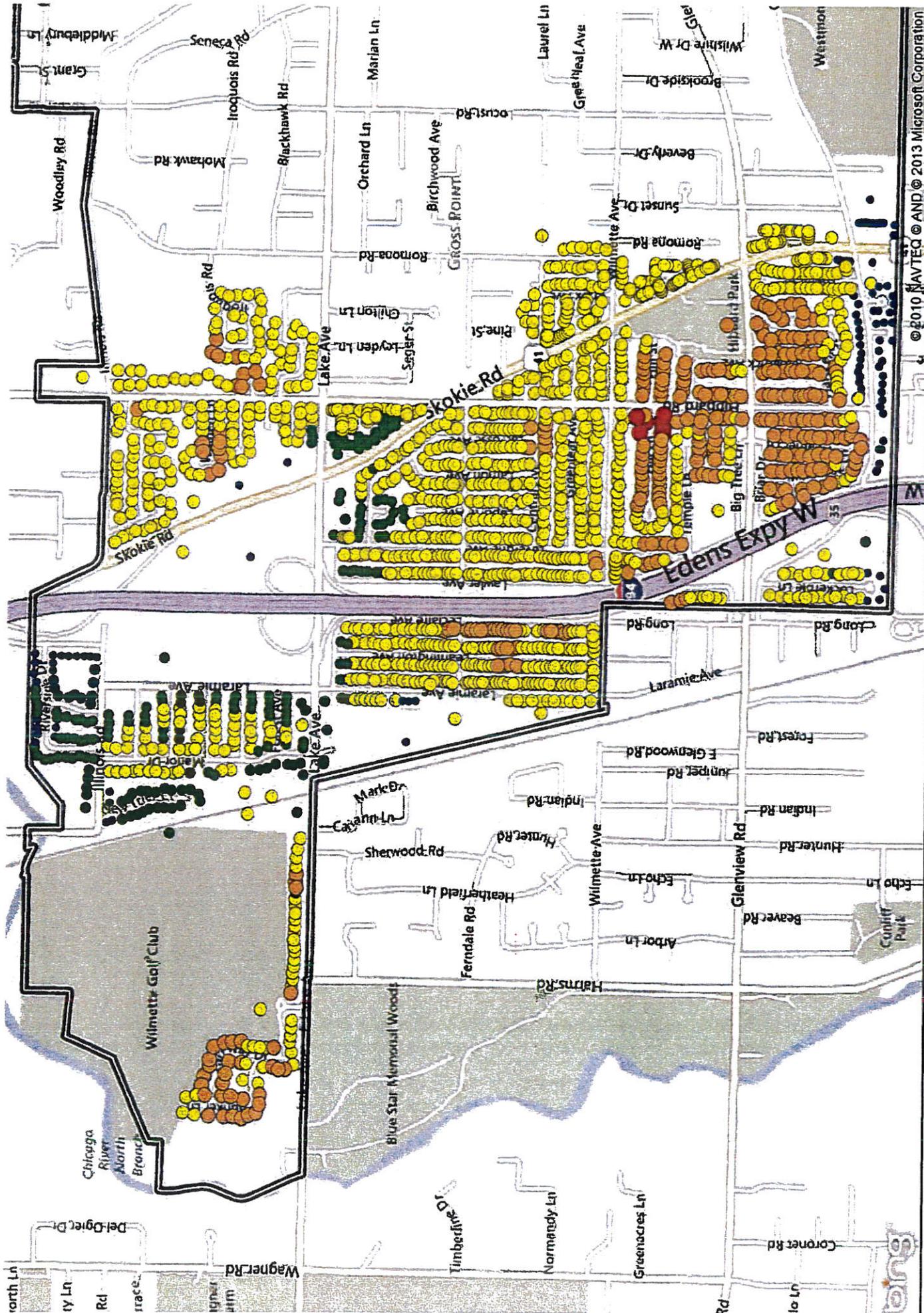
● Wilmette Boundary

rjn group
The City of Wilmette's Tree Protection Program



- Greater than 100-year Protection
- 5-year to 25-year Protection
- 25-year to 100-year Protection
- Wilmette Boundary

- Less than 1-year Protection
- 1-year to 5-year Protection



Legend:

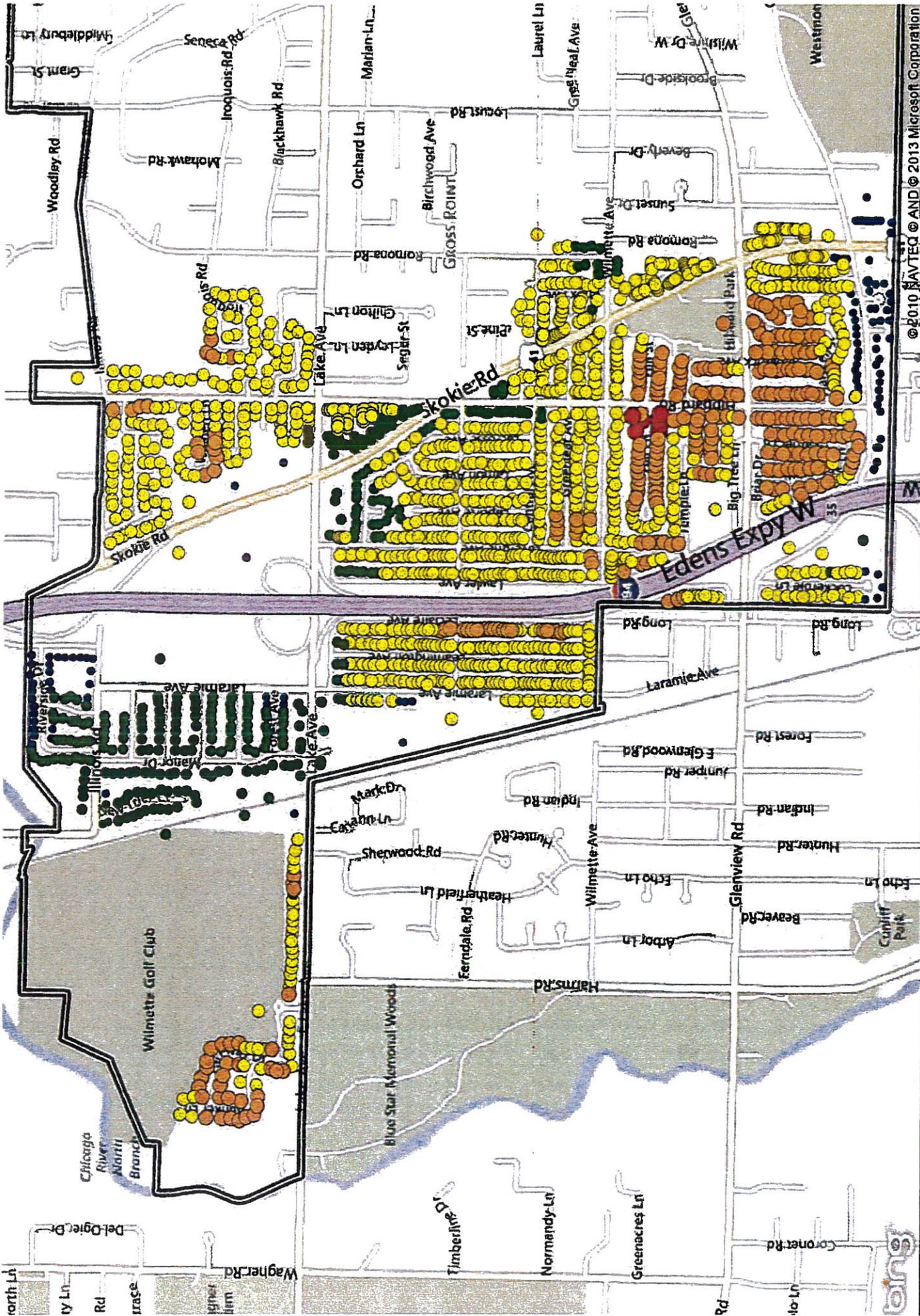
- Red circle: Less than 1-year Protection
- Orange circle: 1-year to 5-year Protection
- Yellow circle: 5-year to 25-year Protection
- Black circle: Greater than 100-year Protection

Other Symbols:

- Thick black line: Wilmette Boundary
- Black outline: Wilmotte Boundary

Map Information:

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 Village of Wilmette
 Exhibit 6
 Harms Rd Region - 8.0 MG Storage, Gravity Drained
 June 2013



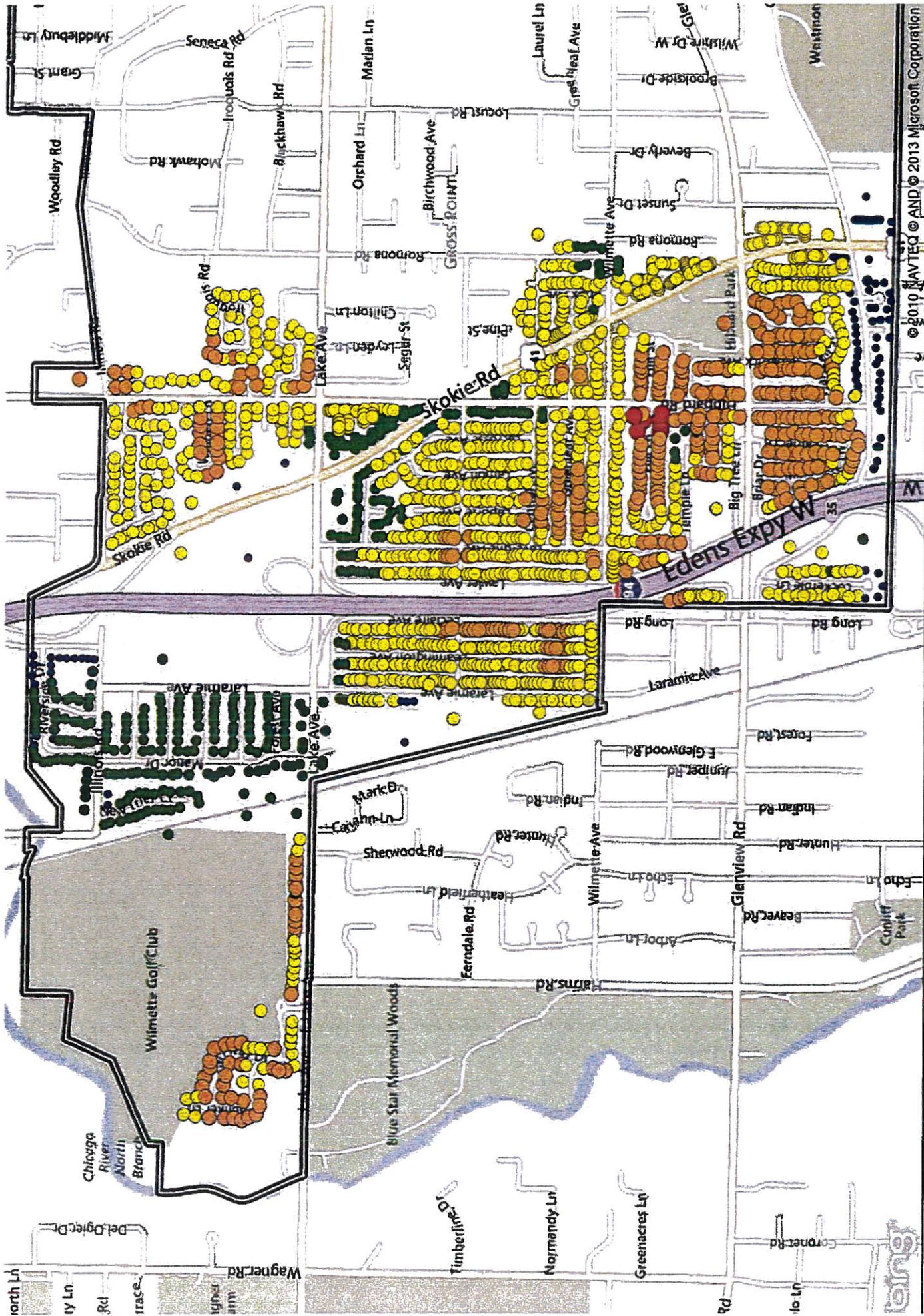
● Less than 1-year Protection
 ● 1-year to 5-year Protection
 ● 5-year to 25-year Protection
 ● Greater than 100-year Protection

 Wilmette Boundary

Village of Wilmette
 Exhibit 7
 Harms Rd Region - 11.0 MG Storage, Gravity Drained
 June 2013

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● Less than 1-year Protection
 ● 1-year to 5-year Protection
 ● 5-year to 25-year Protection
 ● Greater than 100-year Protection

 Wilmette Boundary

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Village of Wilmette
 Exhibit 8
 Harms Rd Region - 9.0 MG Storage, Pumped Out
 June 2013

July 2, 2013

Ms. Brigitte Mayerhofer, P.E.
Director of Engineering
Village of Wilmette
1200 Wilmette Avenue
Wilmette, Illinois 60091-2721

**SUBJECT: VILLAGE OF WILMETTE – 2013-2015 CAPITAL IMPROVEMENT PROGRAM
TECHNICAL SUMMARY – TASK C: MANHOLE INSPECTIONS**

Dear Ms. Mayerhofer:

RJN Group, Inc. (RJN) is pleased to submit this technical summary regarding the Manhole inspections completed within the Princeton Place interceptor basin.

PROJECT BACKGROUND

The Village of Wilmette (Village) has begun a program of inspection, analysis, and rehabilitation in the Princeton Place interceptor basin. The work in this basin will improve the aging underground infrastructure of the Village as well as reduce excess inflow and infiltration (I/I) in the sanitary sewer system. One of the tasks in this program involved inspection of selected manholes in the basin and determination of rehabilitation needs for those structures.

MANHOLE INSPECTIONS

In 2012, RJN Group, Inc. (RJN) completed a GPS survey of the Village's sanitary sewer system. In completing this, survey-grade points were taken on manholes, and a cursory inspection was performed. There are a total of 777 manholes in the basin. After completing the survey, it was determined that 653 of these manholes exhibited structural or inflow/infiltration (I/I) concerns and required a full manhole inspection. RJN field crews performed surface inspections on 523 manholes in the basin and full descent inspection on 130 manholes. The surface inspections included documentation of manhole condition including evidence of inflow or infiltration (I/I). At least three photos were taken at each manhole inspected, including an area photo, a top down photo (with north up) and a photo of the frame adjustment. In addition, any visible defects were documented with a photo. Manholes that were greater than 12' deep, showed signs critical structural concerns, contained heavy debris, or for some other reason could not be inspected from the surface were identified for confined space entry inspection. Additional condition data was gathered on these manholes on the bench and trough as well as the pipes. The data was collected in the field utilizing a digital Trimble data recorder and then was uploaded on a daily basis to a SQL database linked to the RJN copy of the Village GIS.

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 July 2, 2013

During the inspection each section of the structure: cover, frame, adjustment, corbel, wall, bench and trough, was rated based on the severity of the defects identified. The rating of each section was on a 1-5 scale shown below:

Rating	Description
1	Excellent
2	Good
3	Fair
4	Poor
5	Immediate Action

The presence of cracks, holes, missing bricks, offset frame adjustments, etc. was factored into the determination of the section rating.

In addition, each structure was rated based on the presence or evidence of I/I in the manhole at the time of inspection. The worst rating, 3, was assigned to manholes with active I/I at the time as well as other evidence of I/I. Manholes with no active I/I and no evidence of I/I were given a rating of 1. The I/I rating scale is shown below:

Rating	Evidence of I/I	Active I/I
1	No	No
2	Yes	No
3	Yes	Yes

Quality control processes were applied in the office to the collected data to ensure accuracy and consistency. This involved an initial data check as well as a thorough review of 20% of the inspected manholes utilizing field photos. In addition, a percentage of the manholes were re-inspected by a different crew to ensure consistency across crews.

REHABILITATION RECOMMENDATIONS

The final QC'd data was used to generate rehabilitation recommendations for each manhole. The summary of recommendations is shown in Appendix A. These recommendations, contained in Appendix B, include: replace cover, replace cover and frame, rehabilitate adjustment, replace adjustment, internal or external chimney seal, realign frame, cementitious coating, grout manhole joints, repair bench/trough, and grout pipe seals. The composite recommendations for a given structure could include one or more of these individual recommendations. A few manholes had special case recommendations as well.

A cost estimate is provided based on the recommendations for each manhole. The costs used for each recommendation are listed in the table below:

Rehabilitation Recommendation	Unit Rehab Cost	Unit
Replace Cover	\$150	Each
Replace Cover & Frame	\$700	Each
Rehab Adjustment	\$300	Each
Replace Adjustment	\$500	Each
Internal Chimney Seal	\$500	Each
External Chimney Seal	\$500	Each
Realign Frame	\$400	Each
Cementitious Coat	\$135	Vert. Ft
Grout Manhole Joints	\$500	Each
Repair Bench / Trough	\$1,000	Each
Grout Pipe Seal	\$500	Each
Grout Bench to Wall Interface	\$1,000	Each
Fill in Blocked off Pipe with Concrete, Grout Joints	\$500	Each
Replace Existing Chimney Seal	\$500	Each
Restoration-Paved	\$600	Each
Restoration-Non Paved	\$300	Each

* Costs, except restoration, are for materials and labor only. Restoration is additional

RANKING

Each manhole was then ranked relative to all other manholes inspected. This ranking was based on the number of immediate action or poor (5 or 4) ratings that the structure received, the total defect score for the manhole, as well as the I/I rating for the manhole. There were 33 manholes that had at least one section that was rated as a 5 (immediate action). These manholes, Group A on the table in Appendix B, have significant defects and are at the top of the priority ranked list for rehabilitation. These manholes should be rehabilitated first by the Village. The next group of manholes down the priority ranking, Group B, consisted of 282 manholes with at least three sections rated 4 (poor). These structures contain major defects and should be addressed as a high priority.

The remaining manholes with at least one or two sections with a 4 rating were identified as Group C, and this group numbers 250. These structures can be addressed at a lower priority by the Village as funding allows. In general, these manholes are in better condition and thus the rehabilitation cost per manhole is less.

Exhibit A shows the location of the manholes in rehabilitation groups A, B, and C.

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July 2, 2013

The remaining manholes either had no ratings of 4 or were removed from the list. Eleven manholes were removed from the evaluation because they will be abandoned or replaced as part of the Wilmette Avenue Local Storage Project.

RECOMMENDATIONS

The complete list of rehabilitation recommendations is contained in Appendix B together with estimated costs for each manhole. The summary of the costs for rehabilitation groups A, B, and C are listed below:

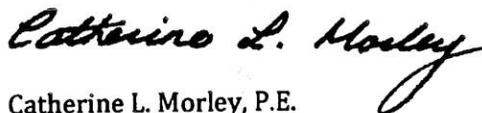
Rehabilitation Group	Number of Structures	Cost
A	33	\$100,080
B	282	\$811,050
C	250	\$399,958
Total	565	\$1,311,088

It is recommended that the Village rehabilitate, at a minimum, rehabilitation groups A and B. Completing repairs in all three groups, A, B, and C, would provide for the greatest amount of I/I reduction as well as the greatest economy of scale regarding rehabilitation construction costs. Completing all recommended rehabilitation work would align with the Village's commitment to tightening the public system as much as practical and economical in conjunction with the current mainline CIPP lining program.

It has been a pleasure working with the Village of Wilmette on this project. Thank you for your cooperation and please contact us if you have any questions or require further clarification.

Sincerely yours,

RJN Group, Inc.



Catherine L. Morley, P.E.
Project Manager



Zachary J. Matyja, P.E.
Client Manager

ENCLOSURES

APPENDIX A
REHABILITATION RECOMMENDATION SUMMARY TABLE

Rehabilitation Recommendation Summary Table

Rehabilitation Recommendation	Unit	Group A	Group B	Group C	Total Quantity	Total Rehab Cost
Replace Cover	Each	2	13	8	23	\$3,450
Replace Cover & Frame	Each	3	4	2	9	\$6,300
Rehab Adjustment	Each	12	226	152	390	\$117,000
Replace Adjustment	Each	15	4	2	21	\$10,500
Internal Chimney Seal	Each	28	273	232	533	\$266,500
External Chimney Seal	Each	3	7	3	13	\$6,500
Realign Frame	Each	0	3	1	4	\$1,600
Cementitious Coat	Vert.Ft.	228	2640	1300	4168	\$562,738
Grout Manhole Joints	Each	3	6	15	24	\$12,000
Repair Bench / Trough	Each	20	167	22	209	\$209,000
Grout Pipe Seal	Each	17	133	36	186	\$93,000
Grout Bench to Wall Interface	Each	1	6	2	9	\$9,000
Fill in Blocked off Pipe with Concrete, Grout Joints	Each	0	2	0	2	\$1,000
Replace Existing Chimney Seal	Each	0	0	1	1	\$500
Restoration-Paved	Each	15	0	0	15	\$9,000
Restoration-Non Paved	Each	0	7	3	10	\$3,000
TOTAL:						\$1,311,088

APPENDIX B
PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

Group	ASSET ID	Surface	Address	Replace Cover & Frame	Rehab Adjustment	Replace Adjustment	Internal Chimney Seal	External Chimney Seal	Realign Frame	Cementitious Cost	Grout Manhole Joints	Repair Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
A	1996	Paved	420 PINECREST LN	X			X			X		X	X			\$ 3,095
A	2176	Paved	93 INDIAN HILL RD			X	X			X		X	X			\$ 3,972
A	1755	Non-Paved	242 WESTMORELAND DR		X		X			X		X	X			\$ 3,279
A	1139	Paved	901 LAKE AVE		X		X				X	X	X			\$ 4,808
A	1757	Non-Paved	324 BEVERLY DR				X					X	X			\$ 3,394
A	1992	Paved	1944 PINE MANOR DR			X				X		X	X			\$ 4,238
A	2024	Paved	558 HUNTER RD		X		X			X		X	X			\$ 2,923
A	1061	Paved	2351 THORNWOOD AVE				X			X		X	X			\$ 4,880
A	2017	Paved	2201 ILLINOIS RD		X		X			X		X	X			\$ 4,555
A	1759	Paved	320 BEVERLY DR		X		X			X		X	X			\$ 2,853
A	1032	Paved	1936 CHESTNUT AVE			X	X			X		X	X			\$ 4,072
A	2022	Paved	548 HUNTER RD		X		X			X		X	X			\$ 2,475
A	1116	Paved	907 PAVANEE RD	X			X					X	X			\$ 3,300
A	1123	Paved	1064 CHEROKEE RD				X					X	X			\$ 3,100
A	2174	Paved	92 INDIAN HILL RD			X	X			X		X	X			\$ 3,256
A	1534	Paved	7 GLENVIEW RD	X			X			X		X	X			\$ 2,627
A	1756	Paved	238 WESTMORELAND DR				X			X		X	X		Grout Bench to Wall Interface	\$ 3,952
A	1364	Paved	1151 SENECA RD		X		X			X		X	X			\$ 2,300
A	1230	Paved	2084 ELMWOOD AVE		X		X			X		X	X			\$ 2,537
A	1037	Paved	2153 CHESTNUT AVE			X	X			X		X	X			\$ 3,684
A	1942	Paved	118 HOLLYWOOD CT		X		X					X	X			\$ 800
A	1798	Paved	337 WILSHIRE DR E			X						X	X			\$ 2,800
A	1761	Paved	2727 WILMETTE AVE									X	X			\$ 1,500
A	2116	Paved	2319 SCHILLER AVE			X	X			X		X	X			\$ 3,860
A	1342	Paved	545 WASHINGTON AVE			X	X			X		X	X			\$ 2,916
A	2130	Paved	0000 RIDGE RD			X	X			X		X	X			\$ 3,714
A	2003	Paved	525 PINECREST LN		X		X			X		X	X			\$ 1,610
A	1034	Paved	2037 CHESTNUT AVE			X	X			X		X	X			\$ 2,507
A	1977	Paved	2137 SANDY LN				X			X		X	X			\$ 2,202
A	1999	Paved	445 PINECREST LN									X	X			\$ 897
A	2166	Paved	2847 BIRCHWOOD AVE			X	X			X		X	X			\$ 2,918
A	1027	Paved	2041 KEELWORTH AVE			X	X			X		X	X			\$ 3,432
A	1345	Paved	903 PONTIAC RD			X	X					X	X			\$ 1,600
B	2192	Non-Paved	418 VINE CT	X			X			X		X	X			\$ 4,128
B	1969	Paved	2047 WILMETTE AVE				X			X		X	X			\$ 4,133
B	1303	Paved	2101 SCHILLER AVE	X			X			X		X	X			\$ 3,754
B	1264	Paved	901 YALE ST	X			X			X		X	X			\$ 3,973
B	1111	Paved	54 MIDDLEBURY LN		X		X			X		X	X			\$ 3,097
B	2049	Paved	2800 BIRCHWOOD AVE		X		X			X		X	X			\$ 3,588
B	2100	Paved	2415 BIRCHWOOD LN	X			X			X		X	X			\$ 4,081
B	1986	Paved	2218 OLD GLENVIEW RD			X	X			X		X	X			\$ 2,813
B	1952	Paved	2007 WILMETTE AVE				X			X		X	X			\$ 3,364
B	1944	Non-Paved	2034 ANSDALE LN		X		X			X		X	X			\$ 3,049
B	1967	Paved	428 ILLINOIS RD		X		X			X		X	X			\$ 4,715
B	1950	Paved	1925 WILMETTE AVE		X		X			X		X	X			\$ 3,568
B	1256	Paved	2229 LAKE AVE		X		X			X		X	X			\$ 4,572
B	2185	Paved	2315 LAKE AVE	X			X			X		X	X			\$ 4,078
B	2101	Paved	2407 BIRCHWOOD AVE		X		X			X		X	X			\$ 4,109
B	1365	Paved	1148 SENECA RD		X		X			X		X	X			\$ 5,027
B	2183	Paved	2351 LAKE AVE		X		X			X		X	X			\$ 4,106
B	2198	Non-Paved	2632 WILMETTE AVE		X		X			X		X	X			\$ 3,866
B	2014	Paved	469 HIGHCREST DR		X		X			X		X	X			\$ 3,373
B	1585	Paved	2724 GREENLEAF AVE		X		X			X		X	X			\$ 3,306
B	1067	Paved	2300 HUNTER RD		X		X			X		X	X			\$ 4,687
B	2119	Non-Paved	2621 LAKE AVE		X		X			X		X	X			\$ 3,886
B	1062	Paved	2323 THORNWOOD AVE		X		X			X		X	X			\$ 4,884
B	1760	Paved	314 BEVERLY DR		X		X			X		X	X			\$ 3,358

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

Group	ASSET ID	Surface	Address	Replace Cover & Frame	Rehab Adjustment	Replace Adjustment	Internal Chimney Seal	External Chimney Seal	Resalign Frame	Cementitious Coat	Grout Manhole Joints	Repair Bench / Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
B	1547	Paved	2501 GREENLEAF AVE	X			X			X		X				\$ 2,433
B	2272	Paved	2946 LAKE AVE		X		X			X		X				\$ 3,623
B	1260	Paved	501 OREGON LN		X		X			X		X				\$ 1,710
B	1976	Paved	2213 SANDY LN		X		X			X		X				\$ 1,089
B	2109	Non-Paved	2519 MARIAN LN			X		X		X		X				\$ 3,628
B	1582	Paved	2740 LINCOLN LN		X		X			X		X				\$ 2,799
B	1823	Non-Paved	412 VINE ST		X		X			X		X				\$ 2,860
B	1580	Paved	630 ILLINOIS RD		X		X			X		X				\$ 4,093
B	1801	Paved	322 WILSHIRE DR E		X		X			X		X				\$ 2,543
B	2286	Non-Paved	450 SUNSET DR			X		X		X		X				\$ 4,553
B	1972	Paved	2148 WILMETTE AVE		X		X			X		X				\$ 4,433
B	1971	Paved	2127 WILMETTE AVE				X			X		X				\$ 5,791
B	1577	Paved	623 ILLINOIS RD				X			X		X				\$ 4,131
B	1504	Paved	803 HARVARD ST		X		X			X		X				\$ 4,021
B	1968	Paved	416 ILLINOIS RD		X		X			X		X				\$ 4,096
B	1951	Paved	1591 WILMETTE AVE				X			X		X				\$ 2,161
B	1970	Paved	2111 WILMETTE AVE		X		X			X		X				\$ 4,565
B	1255	Paved	901 CORNELL ST		X		X			X		X				\$ 4,376
B	2266	Paved	2327 ILLINOIS RD		X		X			X		X				\$ 3,666
B	2067	Paved	806 REDAUB LN		X		X			X		X				\$ 2,937
B	1995	Non-Paved	423 CEDAR LN		X		X			X		X				\$ 4,029
B	1765	Paved	2745 WILMETTE AVE		X		X			X		X				\$ 3,799
B	1100	Paved	1212 CLEVELAND ST		X		X			X		X				\$ 2,463
B	1975	Paved	419 ALPINE LN		X		X			X		X				\$ 3,483
B	2016	Paved	511 ILLINOIS RD		X		X			X		X				\$ 4,113
B	2121	Paved	910 OSAGE LN		X		X			X		X				\$ 2,536
B	1824	Paved	2421 WILMETTE AVE		X		X			X		X				\$ 3,772
B	1593	Paved	512 MOBERGER CT		X		X			X		X				\$ 2,644
B	2172	Paved	2301 CRESTVIEW LN		X		X			X		X				\$ 4,384
B	1261	Paved	825 OREGON LN		X		X			X		X				\$ 3,160
B	1265	Paved	2125 LAKE AVE		X		X			X		X				\$ 3,160
B	1530	Paved	2413 MEADOW DR S		X		X			X		X				\$ 2,824
B	1819	Paved	317 VISTA DR		X		X			X		X				\$ 3,940
B	1164	Paved	1122 MOHAWK RD		X		X			X		X				\$ 3,475
B	1373	Paved	905 OTTAWA LN		X		X			X		X				\$ 2,834
B	1332	Paved	729 RIDGE RD		X		X			X		X				\$ 3,920
B	1579	Paved	613 ILLINOIS RD		X		X			X		X				\$ 4,004
B	1140	Non-Paved	2833 LAKE AVE				X			X		X				\$ 4,214
B	1618	Paved	645 WASHINGTON AVE				X			X		X				\$ 3,634
B	2277	Paved	2216 WILMETTE AVE		X		X			X		X				\$ 3,944
B	1141	Paved	900 SEMINOLE RD		X		X			X		X				\$ 4,595
B	2065	Paved	2834 ORCHARD LN		X		X			X		X				\$ 3,664
B	1269	Paved	2103 LAKE AVE		X		X			X		X				\$ 4,175
B	2199	Paved	2626 WILMETTE AVE		X		X			X		X				\$ 3,193
B	1273	Paved	2027 LAKE AVE		X		X			X		X				\$ 3,762
B	1630	Paved	700 ROMONA RD		X		X			X		X				\$ 4,190
B	1236	Paved	2236 ELMWOOD AVE		X		X			X		X				\$ 3,480
B	1985	Paved	2232 WILMETTE AVE		X		X			X		X				\$ 3,334
B	2148	Paved	1011 PONTIAC RD		X		X			X		X				\$ 2,999
B	1144	Paved	922 SEMINOLE RD		X		X			X		X				\$ 3,083
B	2170	Paved	2707 INOQUOIS RD		X		X			X		X				\$ 3,894
B	1044	Paved	2033 THORNWOOD AVE		X		X			X		X				\$ 2,580
B	1274	Paved	928 CAMBRIDGE LN		X		X			X		X				\$ 3,183
B	1252	Paved	935 CORNELL ST		X		X			X		X				\$ 2,197

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

Group	ASSET ID	Surface	Address	Replace Cover & Frame	Rehab Adjustment	Replace Adjustment	Internal Chimney Seal	External Chimney Seal	Resign Frame	Cementitious Cost	Grout Manhole Joints	Repair Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
B	2240	Paved	310 RIDGE RD		X		X			X		X				\$ 2,664
B	1178	Paved	2841 ILLINOIS RD		X		X			X		X				\$ 2,256
B	1829	Paved	2400 CONCORD LN		X		X			X		X				\$ 2,380
B	1281	Paved	1925 LAKE AVE		X		X			X		X				\$ 3,296
B	1966	Paved	2022 WILMETTE AVE		X		X			X		X				\$ 3,805
B	1945	Paved	238 HOLLYWOOD CT		X		X			X		X				\$ 2,252
B	2114	Paved	2349 SCHILLER AVE		X		X			X		X				\$ 2,198
B	2150	Paved	915 PAWNEE RD		X		X			X		X				\$ 2,245
B	1076	Paved	1064 ELMWOOD AVE		X		X			X		X				\$ 3,410
B	1018	Non-Paved	85 INDIAN HILL		X		X			X		X				\$ 2,583
B	1136	Paved	1049 PONTIAC RD		X		X			X		X				\$ 2,892
B	1114	Paved	65 INDIAN HILL RD		X		X			X		X				\$ 2,754
B	1108	Paved	1212 COLGATE ST		X		X			X		X				\$ 2,006
B	1825	Non-Paved	422 VINE CT		X		X			X		X				\$ 2,737
B	1993	Paved	1933 CENTRAL AVE		X		X			X		X				\$ 2,664
B	2078	Paved	805 CHILTON LN		X		X			X		X				\$ 3,465
B	1319	Paved	700 HARVARD ST		X		X			X		X				\$ 3,981
B	1953	Paved	2022 WILMETTE AVE		X		X			X		X				\$ 3,730
B	2275	Paved	2409 LAKE AVE		X		X			X		X				\$ 3,444
B	2201	Paved	2012 CENTRAL AVE		X		X			X		X				\$ 1,405
B	1142	Paved	000 LAKE		X		X			X		X				\$ 4,450
B	1624	Non-Paved	615 PINE ST		X		X			X		X				\$ 3,983
B	1769	Paved	447 LOCUST RD		X		X			X		X				\$ 3,028
B	1283	Paved	1066 RIDGE		X		X			X		X				\$ 2,914
B	2276	Paved	1938 LAKE AVE		X		X			X		X				\$ 3,712
B	1214	Paved	2335 GREENWOOD AVE		X		X			X		X				\$ 3,345
B	1277	Paved	2003 LAKE AVE		X		X			X		X				\$ 3,718
B	2015	Paved	474 HIGHCREST DR		X		X			X		X				\$ 2,259
B	1073	Paved	2104 ELMWOOD AVE		X		X			X		X				\$ 2,043
B	1068	Paved	2305 GREENWOOD AVE		X		X			X		X				\$ 2,656
B	1054	Paved	1148 ILLINOIS RD		X		X			X		X				\$ 3,210
B	1219	Paved	2100 GREENWOOD AVE		X		X			X		X				\$ 2,624
B	1753	Paved	241 SUNSET DR		X		X			X		X				\$ 2,283
B	2118	Non-Paved	2601 LAKE AVE		X		X			X		X				\$ 3,238
B	1939	Paved	235 RIDGE RD		X		X			X		X				\$ 2,769
B	2026	Paved	2245 ILLINOIS RD		X		X			X		X				\$ 3,358
B	1301	Paved	2133 SCHILLER AVE		X		X			X		X				\$ 2,489
B	2103	Paved	2336 BIRCHWOOD AVE		X		X			X		X				\$ 2,542
B	2184	Paved	2325 LAKE AVE		X		X			X		X			Grout Bench to Wall Interface	\$ 4,710
B	2208	Paved	433 SUNSET DR		X		X			X		X				\$ 2,614
B	2200	Non-Paved	2640 WILMETTE AVE		X		X			X		X				\$ 3,434
B	1772	Non-Paved	405 LOCUST RD		X		X			X		X				\$ 2,603
B	2268	Non-Paved	400 VINE ST		X		X			X		X				\$ 3,800
B	1134	Paved	2418 PONTIAC RD		X		X			X		X				\$ 2,300
B	1979	Paved	2219 SANDY LN		X		X			X		X				\$ 3,161
B	1997	Paved	435 PINECREST LN		X		X			X		X				\$ 2,640
B	1537	Paved	2423 WILMETTE AVE		X		X			X		X				\$ 2,880
B	1009	Paved	1944 BEECHWOOD AVE		X		X			X		X				\$ 2,650
B	2180	Paved	555 ILLINOIS RD		X		X			X		X				\$ 3,744
B	1099	Paved	1229 MIDDLEBURY LN		X		X			X		X				\$ 2,699
B	2018	Non-Paved	2111 CHESTVIEW LN		X		X			X		X				\$ 2,542
B	2181	Paved	519 ILLINOIS RD		X		X			X		X				\$ 3,650
B	1592	Paved	2817 WILMETTE AVE		X		X			X		X				\$ 2,772
B	1746	Paved	2817 WILMETTE AVE		X		X			X		X				\$ 3,164
B	1988	Paved	2150 OLD GLENVIEW RD		X		X			X		X				\$ 2,446
B	1974	Paved	437 ALPINE LN		X		X			X		X				\$ 3,488
B	1583	Non-Paved	2727 LINCOLN LN		X		X			X		X				\$ 2,502

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

Group	ASSET ID	Surface	Address	Replace Cover & Frame	Rehab Adjustment	Replace Adjustment	Internal Chimney Seal	External Chimney Seal	Realign Frame	Cementitious Coat	Grout Manhole Joints	Repair Bench / Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
B	2173	Paved	468 ILLINOIS RD				X			X		X				\$ 4,131
B	1766	Non-Paved	2739 WILMETTE AVE		X					X		X				\$ 3,240
B	2096	Paved	706 ILLINOIS RD		X		X			X		X				\$ 3,596
B	1007	Paved	2041 CHESTNUT AVE		X		X			X			X			\$ 3,009
B	2058	Paved	820 ROMONA RD		X		X			X						\$ 2,878
B	1036	Paved	2132 CHESTNUT AVE		X		X			X			X			\$ 3,186
B	1146	Paved	2728 BLACKHAWK RD		X		X			X			X			\$ 3,429
B	2050	Paved	2837 BIRCHWOOD AVE		X		X			X			X			\$ 2,853
B	1973	Paved	447 ALPINE LN		X		X			X			X			\$ 4,183
B	2105	Paved	2449 CARDINAL LN		X		X			X			X			\$ 2,753
B	1043	Paved	2010 THORNWOOD AVE		X		X			X			X			\$ 2,070
B	1233	Paved	2114 ELMWOOD AVE		X		X			X			X			\$ 2,488
B	1050	Paved	1133 HUNTER RD		X		X			X			X			\$ 4,186
B	1013	Paved	1133 RIDGE RD		X		X			X			X			\$ 3,012
B	1042	Paved	2132 BEECHWOOD AVE	X			X			X			X			\$ 1,730
B	1363	Paved	1942 THORNWOOD AVE		X		X			X			X			\$ 3,100
B	1333	Paved	1120 SENECA RD		X		X			X			X			\$ 1,834
B	1295	Paved	2032 LAKE AVE		X		X			X			X			\$ 2,778
B	1087	Paved	2425 KENILWORTH AVE		X		X			X			X			\$ 3,571
B	1059	Paved	2521 THORNWOOD AVE		X		X			X			X			\$ 4,254
B	1346	Paved	912 PONTIAC RD		X		X			X			X			\$ 2,191
B	2169	Paved	1042 PONTIAC RD		X		X			X			X			\$ 2,300
B	1127	Paved	1046 PAWNEE RD		X		X			X			X			\$ 2,070
B	2171	Paved	1051 ROMONA RD		X		X			X			X			\$ 2,861
B	1945	Non-Paved	110 WESTMORELAND DR		X		X			X			X			\$ 2,165
B	1248	Paved	2244 IROQUOIS RD	X			X			X			X			\$ 3,432
B	2144	Paved	1235 PRINCETON PL		X		X			X			X			\$ 4,208
B	1328	Paved	2301 HUNTER RD	X			X			X			X			\$ 1,393
B	1954	Paved	2121 PARKVIEW CT	X			X			X			X			\$ 2,319
B	1535	Non-Paved	2401 WILMETTE AVE		X		X			X			X			\$ 2,049
B	1849	Paved	145 SUNSET DR		X		X			X			X			\$ 2,360
B	1341	Paved	1910 WASHINGTON AVE	X			X			X			X			\$ 2,787
B	1799	Paved	306 WILSHIRE DR E		X		X			X			X			\$ 2,576
B	1594	Paved	518 IAN CT		X		X			X			X			\$ 1,455
B	1802	Paved	342 WILSHIRE DR E		X		X			X			X			\$ 2,529
B	1763	Paved	415 BEVERLY DR		X		X			X			X			\$ 5,013
B	1039	Paved	2235 CHESTNUT AVE		X		X			X			X			\$ 4,044
B	1038	Paved	2214 CHESTNUT AVE		X		X			X			X			\$ 2,904
B	1343	Paved	2300 IROQUOIS RD		X		X			X			X			\$ 3,218
B	1051	Paved	1913 THORNWOOD		X		X			X			X			\$ 2,830
B	1762	Non-Paved	435 BEVERLY DR		X		X			X			X			\$ 3,891
B	1576	Paved	2347 POMONA LN		X		X			X			X			\$ 1,705
B	1031	Paved	2229 KENILWORTH AVE		X		X			X			X			\$ 1,650
B	1270	Paved	935 HARVARD ST		X		X			X			X			\$ 2,636
B	1536	Paved	2411 WILMETTE AVE	X			X			X			X			\$ 2,596
B	1821	Paved	403 VISTA DR		X		X			X			X			\$ 1,886
B	1768	Paved	2700 WILMETTE AVE		X		X			X			X			\$ 1,675
B	1820	Paved	335 VISTA DR		X		X			X			X			\$ 2,049
B	1764	Non-Paved	2112 OLD GLENVIEW RD		X		X			X			X			\$ 1,738
B	1964	Paved	345 BEVERLY DR		X		X			X			X			\$ 1,657
B	2206	Non-Paved	2739 WILMETTE AVE		X		X			X			X			\$ 2,508
B	2004	Paved	1915 HIGHLAND AVE		X		X			X			X			\$ 1,948
B	2007	Paved	2033 HIGHLAND AVE		X		X			X			X			\$ 1,948
B	1133	Paved	2427 IROQUOIS RD		X		X			X			X			\$ 1,995
B	2129	Paved	344 RIDGE RD		X		X			X			X			\$ 1,995
B	2011	Paved	445 HIGHCREST DR		X		X			X			X			\$ 1,995

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

Group	ASSET ID	Surface	Address	Replace Cover & Frame	Rehab Adjustment	Replace Adjustment	Internal Chimney Seal	External Chimney Seal	Realign Frame	Cementitious Cost	Grout Manhole Joints	Repair Bench / Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
B	2018	Paved	5721 ORCHARD LN		X		X			X		X				\$ 2,995
B	1072	Paved	2418 GREENWOOD AVE		X		X			X		X				\$ 2,749
B	1266	Paved	935 AMHERST LN		X		X			X		X				\$ 2,671
B	2098	Paved	2450 BIRCHWOOD LN		X		X			X		X				\$ 2,214
B	1121	Paved	1027 CHEROKEE RD		X		X			X		X				\$ 2,181
B	1103	Paved	1213 DARTMOUTH ST		X		X			X		X				\$ 2,213
B	2138	Paved	1313 BEECHWOOD AVE		X		X			X		X				\$ 2,477
B	1827	Non-Paved	323 VINE ST		X		X			X		X				\$ 2,100
B	1546	Paved	2516 LAUREL LN		X		X			X		X				\$ 2,637
B	1994	Paved	1915 CENTRAL AVE		X		X			X		X				\$ 2,126
B	1169	Paved	1040 ROMONA RD		X		X			X		X				\$ 1,662
B	1079	Paved	1130 ILLINOIS RD		X		X			X		X				\$ 4,754
B	2152	Paved	717 OUILLETTE LN		X		X			X		X				\$ 1,891
B	1796	Paved	419 WILSHIRE DR W		X		X			X		X				\$ 1,632
B	1160	Paved	1212 MOHAWK RD		X		X			X		X				\$ 2,707
B	1299	Paved	2145 SCHILLER AVE		X		X			X		X				\$ 2,000
B	1234	Paved	2200 ELMWOOD AVE		X		X			X		X				\$ 2,128
B	1080	Paved	2500 PRINCETON PL		X		X			X		X				\$ 1,800
B	2155	Paved	711 RIDGE RD		X		X			X		X				\$ 1,853
B	1109	Paved	1229 COLGATE ST		X		X			X		X				\$ 1,734
B	1591	Paved	528 INN CT		X		X			X		X				\$ 2,087
B	1226	Paved	1914 ELMWOOD AVE		X		X			X		X				\$ 1,813
B	2120	Paved	809 SHARONA LN		X		X			X		X				\$ 2,183
B	1752	Paved	315 SUNSET DR		X		X			X		X				\$ 2,506
B	1940	Paved	235 RIDGE RD		X		X			X		X				\$ 1,630
B	1115	Paved	909 CHEROKEE RD		X		X			X		X				\$ 1,798
B	1285	Paved	1041 RIDGE		X		X			X		X				\$ 1,705
B	1991	Paved	519 HIGHLAND AVE		X		X			X		X				\$ 2,015
B	1998	Paved	445 PINECREST LN		X		X			X		X				\$ 1,549
B	2259	Paved	322 RIDGE RD		X		X			X		X				\$ 1,440
B	1589	Paved	500 COEPPER CT		X		X			X		X				\$ 1,941
B	1754	Paved	229 SUNSET DR		X		X			X		X				\$ 2,378
B	1284	Paved	1016 RIDGE		X		X			X		X				\$ 1,819
B	1097	Paved	1224 GRANT ST		X		X			X		X				\$ 2,093
B	1225	Paved	1131 RIDGE RD		X		X			X		X				\$ 2,526
B	2182	Paved	511 ILLINOIS RD		X		X			X		X				\$ 4,307
B	1098	Paved	1210 MIDDLEBURY LN		X		X			X		X				\$ 1,666
B	1122	Paved	1041 CHEROKEE RD		X		X			X		X				\$ 1,835
B	2146	Paved	2335 THORNWOOD AVE		X		X			X		X				\$ 2,017
B	2099	Paved	2711 ORCHARD LN		X		X			X		X				\$ 2,558
B	2054	Paved	2712 BIRCHWOOD AVE		X		X			X		X				\$ 2,407
B	1309	Paved	627 BIRCHWOOD AVE		X		X			X		X				\$ 2,022
B	2009	Paved	428 HIGHCREST DR		X		X			X		X				\$ 2,123
B	2055	Paved	706 ROMONA RD		X		X			X		X				\$ 3,783
B	1808	Paved	341 WILSHIRE DR E		X		X			X		X				\$ 1,547
B	1748	Paved	410 SUNSET DR		X		X			X		X				\$ 2,398
B	1124	Paved	2349 ROCKWOOD DR		X		X			X		X				\$ 3,285
B	1812	Paved	2530 OLD GLENVIEW RD		X		X			X		X			Fill in Blocked off Pipe Joints	\$ 2,800
B	1030	Paved	2211 KENILWORTH AVE		X		X			X		X				\$ 4,206
B	1588	Paved	2725 WILMETTE AVE		X		X			X		X				\$ 3,029
B	1800	Paved	314 WILSHIRE DR E		X		X			X		X				\$ 1,583
B	1962	Paved	2136 OLD GLENVIEW RD		X		X			X		X				\$ 1,671
B	1229	Paved	2014 ELMWOOD AVE		X		X			X		X				\$ 2,399
B	1989	Paved	435 RIDGE RD		X		X			X		X				\$ 2,031
B	2005	Paved	1929 HIGHLAND AVE		X		X			X		X				\$ 2,248
B	2006	Paved	2002 HIGHLAND AVE		X		X			X		X				\$ 1,813

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

Group	ASSET ID	Surface	Address	Replace Cover	Replace Cover & Frame	Rehab Adjustment	Adjustment	Internal Chimney Seal	External Chimney Seal	Resign Frame	Cementitious Coat	Grout Manhole Joints	Repair Bench / Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
B	1987	Non-Paved	2204 OLD GLENVIEW RD											X			\$ 1,500
B	1148	Paved	2122 BLACKHAWK RD			X					X						\$ 1,769
B	1112	Paved	64 INDIAN HILL RD								X		X				\$ 2,091
B	2019	Paved	2229 CRESTVIEW LN			X					X						\$ 1,921
B	1956	Paved	2107 FAIRVIEW CT			X					X						\$ 1,691
B	1797	Paved	420 WILSHIRE DR E								X						\$ 1,648
B	2097	Paved	2407 BIRCHWOOD LN			X					X						\$ 3,562
B	1279	Paved	914 COLUMBUS LN			X					X						\$ 2,275
B	1119	Paved	2323 HOOLOUIS RD			X					X						\$ 3,339
B	1215	Paved	2215 GREENWOOD AVE			X					X						\$ 1,837
B	1562	Non-Paved	541 LINCOLN LN								X						\$ 3,032
B	1817	Paved	245 VISTA DR			X					X						\$ 1,833
B	1775	Paved	237 LOCUST RD			X					X						\$ 1,968
B	1323	Paved	2033 WASHINGTON AVE			X					X						\$ 2,181
B	2089	Paved	801 WESTWOOD LN								X						\$ 1,891
B	1035	Paved	2115 CHESTNUT AVE			X					X						\$ 2,845
B	1517	Paved	534 MEADOW DR N			X					X						\$ 2,446
B	2207	Non-Paved	500 WILMETTE AVE			X					X						\$ 2,191
B	1538	Non-Paved	501 MEADOW DR W			X					X						\$ 2,029
B	1077	Paved	2421 ELMWOOD AVE			X					X						\$ 3,000
B	1147	Paved	2744 BLACKHAWK RD			X					X						\$ 2,433
B	2160	Paved	2012 SCHILLER AVE										X		Grout Bench to Wall Interface		\$ 2,500
B	1021	Non-Paved	71 INDIAN HILL								X						\$ 2,200
B	1026	Paved	2030 KENILWORTH AVE			X					X						\$ 1,607
B	1217	Paved	2132 GREENWOOD AVE			X					X						\$ 1,470
B	1014	Paved	2149 BEECHWOOD AVE								X			X			\$ 2,150
B	1216	Paved	2145 GREENWOOD AVE			X					X						\$ 1,597
B	1033	Paved	1949 CHESTNUT AVE			X					X						\$ 1,826
B	2140	Paved	2030 CHESTNUT AVE			X					X						\$ 1,570
B	2112	Non-Paved	711 RIDGE RD			X					X						\$ 1,783
B	1312	Paved	2625 MARIAN LN			X					X						\$ 2,122
B	1045	Paved	2000 BIRCHWOOD AVE			X					X						\$ 2,272
B	1008	Paved	2116 THORNWOOD AVE			X					X						\$ 1,645
B	1058	Paved	2100 THORNWOOD AVE			X					X						\$ 1,507
C	1120	Paved	2544 ILLINOIS RD			X					X			X			\$ 4,240
C	1990	Paved	1015 CHEROKEE RD								X						\$ 650
C	1347	Paved	501 CENTRAL AVE			X					X						\$ 1,846
C	1057	Paved	1011 HOOLOUIS RD			X					X						\$ 1,300
C	1083	Paved	7501 THORNWOOD AVE								X						\$ 3,531
C	1064	Paved	2327 COLGATE ST			X					X						\$ 1,300
C	1588	Paved	1231 HUNTER RD			X					X						\$ 3,779
C	2044	Paved	1817 LOCUST RD			X					X						\$ 3,396
C	1082	Paved	746 LOCUST RD								X						\$ 500
C	2075	Paved	2301 KENILWORTH AVE	X							X						\$ 650
C	1095	Paved	741 LOCUST RD			X					X						\$ 3,694
C	2280	Paved	2619 GRANT ST			X					X						\$ 4,450
C	1155	Paved	25 LOCUST RD			X					X						\$ 4,521
C	1369	Paved	1154 LOCUST RD			X					X						\$ 3,974
C	1001	Non-Paved	900 SENECA RD			X					X		X				\$ 3,502
C	1131	Paved	1944 RIDGE RD			X					X						\$ 1,930
C	2020	Non-Paved	1064 MIAMI RD								X						\$ 1,344
C	1803	Paved	536 HUNTER CT			X					X						\$ 1,414
C	2037	Paved	330 WILSHIRE DR E			X					X						\$ 1,470
C	1221	Paved	2737 ORCHARD LN			X					X						\$ 1,948
C	1267	Paved	2014 GREENWOOD AVE			X					X						\$ 2,079
C	1102	Paved	918 AMHERST LN			X					X						\$ 1,880
C		Paved	1213 PRINCETON PL								X						\$ 3,443

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

Group	ASSET ID	Surface	Address	Replace Cover & Frame	Replace Cover	Rehab Adjustment	Repl Adjust	Internal Chimney Seal	External Chimney Seal	Realign Frame	Cementitious Cost	Grout Manhole Joints	Repair Bench / Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
C	2056	Paved	2819 BIRCHWOOD AVE					X			X			X			\$ 2,064
C	1143	Paved	901 LOCUST RD			X		X			X						\$ 3,379
C	2179	Paved	1032 LOCUST RD			X		X				X					\$ 3,841
C	2040	Paved	2701 ORCHARD LN			X		X				X					\$ 3,860
C	1145	Paved	933 LOCUST RD			X		X									\$ 800
C	1065	Paved	2245 HUNTER RD									X		X			\$ 3,844
C	2012	Paved	456 HIGHCREST DR					X			X						\$ 1,502
C	1070	Paved	2343 GREENWOOD AVE			X		X			X						\$ 1,834
C	2107	Paved	2431 CARDINAL LN					X			X						\$ 1,341
C	1063	Paved	1154 ILLINOIS RD			X		X			X						\$ 1,764
C	2115	Non-Paved	2323 SCHILLER AVE					X			X						\$ 1,621
C	2161	Paved	235 RIDGE RD			X		X			X						\$ 1,732
C	1578	Paved	614 ILLINOIS RD			X		X			X	X					\$ 2,783
C	1316	Paved	2124 BIRCHWOOD AVE									X		X			\$ 2,529
C	1575	Paved	2412 POMONA LN					X			X						\$ 2,566
C	1545	Paved	2630 LAUREL LN									X					\$ 1,000
C	1101	Paved	1229 CLEVELAND ST			X		X			X						\$ 1,764
C	1573	Paved	2448 POMONA LN			X		X			X						\$ 1,343
C	1356	Paved	1356 BROOKS RD			X		X				X		X			\$ 1,300
C	1957	Paved	2112 OLD GLENVIEW RD					X			X		X				\$ 2,762
C	1740	Paved	330 ROMONA RD					X			X			X			\$ 1,911
C	2008	Paved	2012 HIGHLAND AVE			X		X			X						\$ 1,765
C	2193	Paved	422 VINE CT			X		X			X						\$ 1,495
C	1947	Paved	2029 HOLLYWOOD CT			X		X			X						\$ 1,786
C	1940	Paved	213 WESTMORELAND DR			X		X			X						\$ 1,786
C	1561	Paved	600 LOCUST RD			X		X			X		X				\$ 2,924
C	1528	Paved	2319 MEADOW DR S			X		X			X		X				\$ 1,800
C	1179	Paved	1035 PAVINEE RD			X		X			X						\$ 1,740
C	1359	Paved	1016 SENECA RD			X		X			X						\$ 2,060
C	2099	Paved	2416 BIRCHWOOD LN			X		X			X						\$ 1,795
C	1327	Paved	2301 HUNTER RD			X		X			X		X				\$ 1,800
C	1329	Paved	2244 HUNTER RD			X		X			X		X				\$ 1,800
C	1231	Paved	2100 ELWOOD AVE					X			X			X			\$ 2,226
C	2167	Paved	918 CHEROKEE RD			X		X			X						\$ 1,732
C	1519	Paved	2424 MEADOW DR N					X			X		X				\$ 1,956
C	1128	Paved	1056 PAVINEE RD					X			X						\$ 1,270
C	1060	Paved	2419 DARTMOUTH ST			X		X			X						\$ 3,464
C	1358	Paved	1001 SENECA RD					X			X			X			\$ 2,065
C	1162	Non-Paved	1000 MOHAWK RD			X		X			X			X			\$ 1,300
C	1069	Paved	2323 GREENWOOD AVE			X		X			X			X			\$ 1,300
C	1518	Paved	2318 MEADOW DR N			X		X			X			X			\$ 1,944
C	1158	Paved	2819 BROOKS RD					X			X			X			\$ 2,010
C	1078	Paved	1110 SENECA RD			X		X			X			X			\$ 1,740
C	2147	Paved	1036 MIAMI RD			X		X			X						\$ 1,603
C	1340	Paved	1945 12TH ST					X			X						\$ 1,287
C	1023	Paved	1943 KEHLWORTH AVE					X			X						\$ 1,432
C	1297	Paved	2226 SCHILLER AVE			X		X			X						\$ 1,556
C	1529	Non-Paved	2427 MEADOW DR S					X			X						\$ 1,062
C	1308	Paved	707 DULLETTE LN			X		X			X						\$ 1,916
C	2108	Paved	2511 MARIAN LN					X			X			X			\$ 2,134
C	1106	Paved	1932 SCHILLER AVE					X			X						\$ 1,375
C	1980	Paved	401 SANDY LN					X			X						\$ 1,418
C	1828	Non-Paved	2415 CONCORD LN			X		X			X						\$ 1,826
C	2001	Paved	429 PINE MANOR DR			X		X			X						\$ 1,624
C	2094	Paved	744 ILLINOIS RD			X		X			X						\$ 1,877
C	2141	Paved	2240 KEHLWORTH AVE			X		X			X			X			\$ 1,300
C	2142	Paved	2232 BEECHWOOD AVE					X			X						\$ 1,785

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

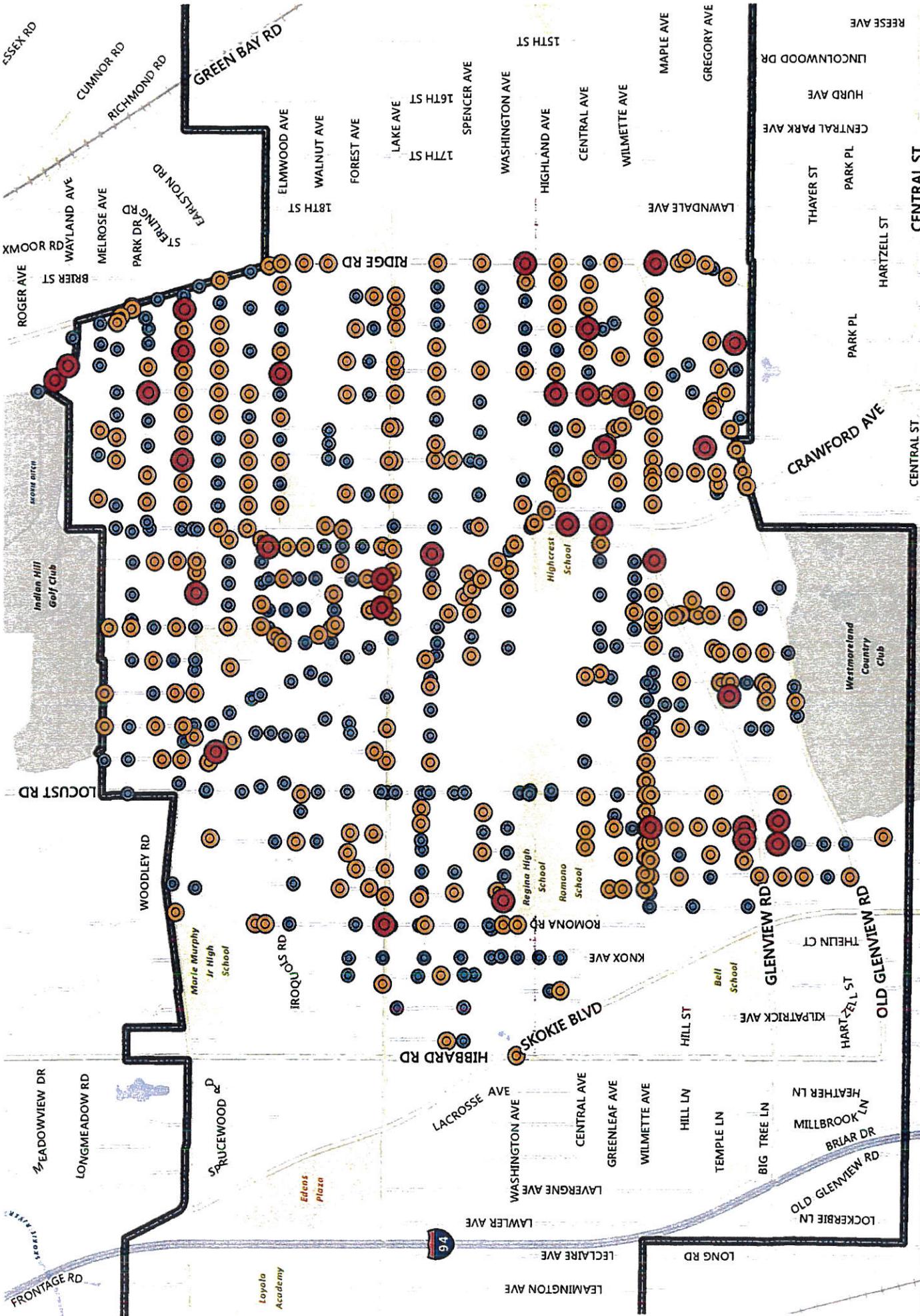
Group	ASSET ID	Surface	Address	Replace Cover & Frame	Rehab Adjustment	Replace Adjustment	Internal Chimney Seal	External Chimney Seal	Realign Frame	Cementitious Cost	Grout Manhole Joints	Repair Bench / Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
C	2205	Paved	2847 WILMETTE AVE		X		X						X			\$ 1,900
C	1138	Paved	921 ROMONA RD		X		X					X				\$ 1,800
C	NEWNH	Non-Paved	2917 CROFTREE LN	X		X				X						\$ 3,134
C	1842	Paved	2738 WESTMORELAND DR		X		X			X						\$ 1,921
C	2002	Paved	435 PINE MAHOR DR				X			X						\$ 1,102
C	1208	Paved	2834 INDIANWOOD RD	X			X			X						\$ 1,984
C	1525	Paved	527 MEADOW DR W		X		X			X						\$ 1,376
C	2092	Non-Paved	2919 CROFTREE LN		X		X			X						\$ 2,110
C	1235	Paved	2210 ELMWOOD AVE		X		X			X						\$ 2,158
C	2157	Paved	1133 RIDGE RD		X		X			X						\$ 1,975
C	1016	Paved	2544 BEECHWOOD AVE		X		X			X						\$ 2,668
C	2106	Paved	2443 CARDINAL LN				X			X						\$ 1,995
C	1355	Paved	1101 ILLINOIS RD		X		X			X						\$ 1,964
C	1028	Paved	2120 KENLWORTH AVE		X		X			X						\$ 3,039
C	1244	Non-Paved	2137 IROQUOIS RD		X		X						X			\$ 1,100
C	1241	Paved	1003 KNOLL LN		X		X			X						\$ 2,048
C	2064	Paved	825 ROMONA RD		X		X			X						\$ 1,900
C	2086	Non-Paved	741 WESTWOOD LN		X		X			X						\$ 1,840
C	1126	Paved	1018 PAWNEE RD				X			X						\$ 1,656
C	1002	Non-Paved	2010 BEECHWOOD				X			X						\$ 1,811
C	1833	Paved	2347 OLD GLENVIEW RD		X		X			X						\$ 1,961
C	1818	Paved	231 VISTA DR		X		X			X						\$ 1,918
C	1029	Paved	2140 KENLWORTH AVE		X		X			X						\$ 3,187
C	1805	Paved	317 WILSHIRE DR W		X		X			X			X			\$ 1,900
C	2057	Non-Paved	2917 ORCHARD LN		X		X			X						\$ 2,562
C	2070	Paved	2807 ORCHARD LN		X		X			X						\$ 1,941
C	1302	Paved	2116 SCHILLER AVE				X			X			X			\$ 2,199
C	2048	Paved	2741 ALISON LN		X		X			X						\$ 1,644
C	2047	Non-Paved	2725 ALISON LN				X			X			X			\$ 1,953
C	1526	Non-Paved	2323 MEADOW DR S		X		X			X		X			Grout Bench to Wall Interface	\$ 2,800
C	2069	Paved	2743 ORCHARD LN		X		X			X						\$ 1,833
C	2191	Non-Paved	439 WILSHIRE DR W		X		X			X						\$ 2,037
C	2137	Paved	1927 CHESTNUT AVE		X		X			X			X			\$ 2,200
C	1048	Paved	2215 THORNWOOD AVE		X		X			X						\$ 1,883
C	1581	Paved	2245 HUNTER RD		X		X			X						\$ 2,585
C	2196	Non-Paved	2530 WILMETTE AVE		X		X			X			X			\$ 2,246
C	2110	Paved	2532 MARIAN LN		X		X			X						\$ 1,970
C	1012	Paved	2119 BEECHWOOD AVE				X			X			X			\$ 1,500
C	1228	Paved	2000 ELMWOOD AVE		X		X			X			X			\$ 1,900
C	1278	Paved	925 COLUMBUS LN		X		X			X						\$ 1,834
C	2156	Paved	1249 RIDGE RD		X		X			X						\$ 1,748
C	1024	Paved	1938 KENLWORTH AVE		X		X			X						\$ 1,706
C	1047	Paved	2151 THORNWOOD AVE		X		X			X						\$ 1,453
C	1005	Paved	2042 BEECHWOOD AVE		X		X			X						\$ 2,158
C	2175	Paved	550 INDIAN HILLS		X		X			X						\$ 2,012
C	1025	Paved	2011 KENLWORTH AVE		X		X			X						\$ 1,745
C	1550	Paved	2539 GREENLEAF AVE		X		X			X						\$ 1,800
C	1041	Paved	1930 THORNWOOD AVE		X		X			X						\$ 1,696
C	1052	Paved	1225 RIDGE RD		X		X			X						\$ 2,100
C	1046	Paved	2111 THORNWOOD AVE		X		X			X						\$ 1,372
C	1586	Paved	2710 GREENLEAF AVE				X			X						\$ 1,425
C	2197	Paved	2550 WILMETTE AVE				X			X		X			Grout Bench to Wall Interface	\$ 3,999
C	1569	Non-Paved	790 LOCUST RD	X		X				X						\$ 2,000
C	1625	Paved	620 PINE ST		X		X			X						\$ 800
C	1963	Paved	2136 OLD GLENVIEW RD				X			X		X				\$ 2,479
C	1841	Paved	214 WESTMORELAND DR				X			X						\$ 1,580

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

Group	ASSET ID	Surface	Address	Replace Cover & Frame	Replace Cover	Rehab Adjustment	Replace Adjustment	Internal Chimney Seal	External Chimney Seal	Realign Frame	Cementitious Coat	Grout Manhole Joints	Repair Bench / Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
C	2072	Paved	901 LAKE AVE	X				X									\$ 650
C	1360	Paved	1028 SENECA RD					X			X						\$ 1,804
C	2244	Paved	1012 ILLINOIS RD			X		X									\$ 800
C	1095	Paved	1210 ILLINOIS RD			X		X									\$ 1,800
C	1350	Paved	996 ILLINOIS RD			X		X									\$ 800
C	1339	Paved	2013 WASHINGTON AVE			X		X									\$ 1,800
C	1161	Paved	2717 IROQUOIS RD			X		X									\$ 2,385
C	1362	Paved	1064 SENECA RD			X		X									\$ 800
C	2151	Paved	925 PANHUE RD			X		X									\$ 800
C	2177	Paved	94 INDIAN HILL RD			X		X									\$ 1,288
C	1132	Paved	2407 IROQUOIS RD			X		X									\$ 800
C	1361	Paved	1043 SENECA RD			X		X									\$ 800
C	1093	Paved	2545 KENILWORTH AVE			X		X									\$ 800
C	1152	Paved	1016 LOCUST RD			X		X									\$ 800
C	1154	Paved	901 LOCUST RD			X		X									\$ 800
C	1153	Paved	1044 LOCUST RD			X		X									\$ 800
C	1150	Paved	2707 LOCUST RD			X		X									\$ 650
C	2086	Paved	272 LAKE AVE	X				X									\$ 800
C	1566	Paved	701 LOCUST RD			X		X									\$ 800
C	1085	Paved	7 KENILWORTH AVE			X		X									\$ 800
C	2288	Paved	7 KENILWORTH AVE			X		X									\$ 800
C	1074	Paved	2326 ELWOOD AVE			X		X									\$ 800
C	1071	Paved	2406 GREENWOOD AVE			X		X									\$ 800
C	1307	Paved	1916 SCHILLER AVE			X		X									\$ 1,368
C	1621	Non-Paved	615 KNOX AVE			X		X									\$ 2,314
C	2082	Paved	841 LETDEN LN			X		X									\$ 800
C	1814	Paved	2530 OLD GLENVIEW RD			X		X									\$ 1,769
C	1959	Paved	2036 PIONEER LN			X		X									\$ 800
C	1548	Paved	2522 GREENLEAF AVE			X		X									\$ 1,526
C	1314	Paved	700 HARVARD ST			X		X									\$ 800
C	2263	Paved	1140 ILLINOIS RD			X		X									\$ 800
C	1743	Paved	422 ROMONA RD			X		X									\$ 800
C	2209	Paved	2032 CENTRAL AVE			X		X									\$ 800
C	1317	Paved	2201 BIRCHWOOD AVE			X		X									\$ 800
C	1965	Paved	2040 OLD GLENVIEW RD			X		X									\$ 1,769
C	1245	Paved	2130 IROQUOIS RD			X		X									\$ 800
C	1130	Paved	1025 MIAMI RD			X		X									\$ 500
C	1571	Paved	709 LOCUST RD			X		X									\$ 800
C	2111	Paved	815 LOCUST RD			X		X									\$ 800
C	1567	Paved	1817 LOCUST RD			X		X									\$ 800
C	1344	Paved	934 HUNTER RD			X		X									\$ 800
C	1089	Paved	2501 KENILWORTH AVE			X		X									\$ 800
C	1249	Paved	2247 LAKE AVE			X		X									\$ 800
C	1310	Paved	1912 BIRCHWOOD AVE			X		X									\$ 800
C	1371	Paved	2543 BLACKHAWK RD			X		X									\$ 1,390
C	1173	Paved	1151 ROMONA RD			X		X									\$ 500
C	1577	Paved	2247 MEADOW DR S			X		X									\$ 800
C	2066	Paved	2828 ORCHARD LN			X		X									\$ 800
C	1523	Paved	2436 MEADOW DR N			X		X									\$ 946
C	1157	Paved	1021 ROMONA RD			X		X									\$ 1,461
C	1520	Paved	2400 MEADOW DR N			X		X									\$ 500
C	1104	Paved	1231 DARTMOUTH ST			X		X									\$ 800
C	1253	Paved	918 CORNELL ST			X		X									\$ 1,560
C	1063	Paved	2300 THORNWOOD AVE	X				X									\$ 650
C	2187	Paved	2062 OLD GLENVIEW RD			X		X									\$ 1,850
C	1531	Paved	435 COWE LN			X		X									\$ 1,332
C	2145	Paved	2347 THORNWOOD AVE			X		X									\$ 800

PUBLIC SECTOR REHABILITATION RECOMMENDATIONS

Group	ASSET ID	Surface	Address	Replace Cover & Frame	Rehab Adjustment	Replace Adjustment	Internal Chimney Seal	External Chimney Seal	Resign Frame	Cementitious Cost	Grout Manhole Joints	Repair Bench/Trough	Grout Pipe Seal	No Recommendation	Additional Recommendations	Cost
C	1176	Paved	1163 ILLINOIS RD	X			X					X				\$ 1,650
C	1337	Paved	2112 WASHINGTON AVE				X			X						\$ 1,473
C	1351	Paved	1030 ILLINOIS RD		X		X									\$ 800
C	1811	Paved	407 WILSHIRE DR W		X		X									\$ 800
C	1210	Paved	2924 LAKE AVE				X			X						\$ 2,039
C	1745	Paved	2847 WILMETTE AVE				X			X		X				\$ 1,000
C	1707	Non-Paved	2938 INDIANWOOD RD				X			X						\$ 1,708
C	2104	Paved	2421 CARDINAL LN				X			X						\$ 1,976
C	NEWMAH	Paved	2527 LAUREL LN		X		X									\$ 800
C	1257	Paved	934 OXFORD LN		X		X									\$ 800
C	1353	Paved	1050 ILLINOIS RD				X			X						\$ 1,534
C	1570	Paved	1817 LOCUST RD								X					\$ 2,531
C	2060	Paved	801 ROMONA RD		X		X			X						\$ 800
C	1271	Paved	519 HARVARD ST				X			X						\$ 1,480
C	2068	Paved	803 REDBUD LN				X			X						\$ 800
C	1075	Paved	2442 ELMWOOD AVE		X		X									\$ 800
C	1167	Paved	1035 MOHAWK RD		X		X			X		X				\$ 2,218
C	1218	Paved	2117 GREENWOOD AVE				X			X		X				\$ 1,800
C	2063	Paved	722 ROMONA RD		X		X									\$ 800
C	1334	Paved	2710 WASHINGTON AVE		X		X									\$ 1,000
C	1135	Paved	1023 PONTIAC RD								X					\$ 800
C	2081	Paved	719 CHILTON LN		X		X			X						\$ 1,465
C	1305	Paved	2000 SCHILLER AVE				X			X						\$ 800
C	2085	Paved	740 SEGER ST		X		X			X						\$ 1,442
C	1672	Paved	611 KNOX AVE				X			X						\$ 1,448
C	1019	Non-Paved	82 INDIAN HILL				X									\$ 800
C	1749	Paved	407 SUNSET DR		X		X									\$ 800
C	1623	Paved	2924 WASHINGTON AVE		X		X									\$ 800
C	1315	Paved	2105 BIRCHWOOD AVE	X			X									\$ 650
C	1813	Paved	2536 OLD GLENVIEW RD		X		X									\$ 800
C	1110	Paved	2626 GRANT ST				X			X						\$ 1,121
C	1275	Paved	913 CAMBRIDGE LN									X				\$ 500
C	2079	Paved	740 CHILTON LN				X									\$ 500
C	1233	Paved	2130 ELMWOOD AVE		X		X									\$ 800
C	1349	Paved	918 ILLINOIS RD		X		X									\$ 800
C	1807	Paved	325 WILSHIRE DR W									X				\$ 500
C	1156	Paved	1154 LOCUST RD		X		X									\$ 800
C	2161	Paved	1976 WASHINGTON AVE				X			X						\$ 1,221
C	1559	Paved	519 GREENLEAF AVE									X				\$ 1,000
C	1850	Paved	211 SUNSET DR				X			X						\$ 1,587
C	1747	Paved	436 SUNSET DR				X			X						\$ 1,378
C	2013	Paved	461 HIGHCREST DR				X			X						\$ 1,580
C	2153	Paved	2505 THORNWOOD AVE				X			X						\$ 3,647
C	2062	Non-Paved	712 ROMONA RD								X					\$ 500
C	2195	Paved	2516 WILMETTE AVE		X		X									\$ 800
C	1223	Paved	1930 GREENWOOD AVE				X			X						\$ 800
C	2077	Paved	875 CHILTON LN		X		X									\$ 1,081
C	1961	Paved	2111 PIONEER LN		X		X									\$ 800
C	1010	Paved	2011 BEECHWOOD AVE				X			X						\$ 800
C	1049	Paved	2333 THORNWOOD AVE				X			X					Replace Existing Chimney Seal	\$ 2,199
C	1370	Paved	2604 BLACKHAWK RD		X		X									\$ 800
C	2053	Paved	2728 BIRCHWOOD AVE		X		X									\$ 800
C	1795	Paved	431 WILSHIRE DR W		X		X									\$ 800
C	2113	Non-Paved	2609 MARIAN LN				X			X						\$ 1,766
C	2158	Paved	1910 BRIDGE RD		X		X									\$ 800
C	1006	Paved	2101 KENILWORTH AVE		X		X									\$ 800
C	1227	Paved	1930 ELMWOOD AVE		X		X									\$ 800



Village of Wilmette
 Exhibit A
 Manhole Rehabilitation Recommendations
 July 2013

Memo

To: Brigitte Mayerhofer, P.E.
From: Zach Matyja
Date: July 1, 2013
Re: Kenilworth Gardens Wet Weather Response

The purpose of the memorandum is to respond to your concerns about the wet weather flooding issues experienced by residents of the Kenilworth Gardens (KG) sewer basin during storm events in 2013.

It is our opinion that there are three issues at work in this area which is what exasperates the problems for the local residents.

REGIONAL ISSUES

Kenilworth Gardens is tributary to the Princeton Place sewer basin in the Village. Specifically, the sewers in this area drain to the 120" sewer that was installed in the 1980's to provide storage and extra capacity during large rain events. KG is the low point both geographically as well as it's connection hydraulically in the basin. Because of this, when I/I issues begin to form in the larger basin, the KG area is one of the first places where the problems will be noticed. In the April storm event, the 120" sewer was surcharged for nearly 15 hours.

The region itself needs to be studied to see what the best options for regional solutions are. Our flow monitoring data collected to date has shown us that even in large events, the Village is able to get flow out of the system and into the MWRD interceptor. Because of this, a pump over solution would likely net very little if any benefit to the basin. The next study will determine if and where storage can be of a benefit to the system, or if flow reduction will be necessary to see benefits to the problem areas.

INFILTRATION

Without having meters on the KG basin outlets this spring, it is not possible to know if flow continues to exit the basin during storm events. However, our flow monitoring study performed last year did show that peaking factors for the KG basin were very high (17.8 in a 1-year / 2-hour event, 29.8 in a 5-year / 2-hour event). Additionally, RJN reviewed building inspection data collected in 1987. At that time, it was suspected that there were as many as 327 foundation drains within the basin. Because KG is in a lower lying area near a floodplain, it is assumed that groundwater levels are closer to the surface.

Connected foundation drains and leaky laterals can be major contributors to flows in an area subject to high groundwater levels.

STORMWATER ISSUES

As the flood surveys have shown, and as you are aware, the KG area is also subject to a number of stormwater flow issues with many residents reporting surface flooding of streets, sidewalks, and even flooding into homes through window wells. When stormwater ponds over sanitary sewers, inflow from cross connections, leaky sewers and laterals, or other sources is greatly increased. Even a broken cleanout in a flooding prone area can provide a very large source of inflow to a sanitary sewer.

CONCLUSIONS

In summary, the flow monitoring completed to date has shown that the entire Princeton Place basin has high flow rates during wet weather events, and that the Kenilworth Gardens area is certainly a large contributor to these. A regional study is important to determine what can be done at that level to reduce the frequency and duration of backups.

However, it is important to note that a regional approach will not be sufficient in the Kenilworth Gardens area due to the significant amount of I/I entering the system as indicated from the flow monitoring completed in 2012. Every effort should be taken to tighten the system and eliminate I/I both on the public and private side, particularly in areas prone to flooding.

RECOMMENDATIONS

Given all the information presented above, we have the following recommendations:

- Perform a study of the Princeton Place Interceptor Basin. Use flow monitoring data from Spring 2013 to update the hydraulic model and reassess the need for pump over, storage, flow reduction, or other regional improvements.
- Perform a full SSES for the Kenilworth Gardens area. All manholes in the basin have been inspected, and rehabilitation should be completed in 2013. The Village should focus on lining any remaining non-PVC sewers in the basin. Smoke testing, building inspections, and dye flooding should be completed to find any sources of inflow and infiltration. A pilot lateral televising program would also prove beneficial.
- Complete a stormwater study to determine if there are ways to reduce pooled water within the basin area.
- Because of the characteristics of this basin, it is inevitable that there are properties that will continue to flood on a regular basis even with flow reduction and regional solutions. Because of this, an overhead sewer program is recommended for those residences most in need of protection.

We look forward to meeting with the Village at the next Municipal Services Committee meeting at 5:00 pm on July 9, 2013.



Engineering
Department

(847) 853-7660
Fax (847) 853-7701

DATE: July 1, 2013

TO: Municipal Services Committee

FROM: Brigitte Mayerhofer, P.E., Director of Engineering
Daniel Manis, P.E., Civil Engineer

SUBJECT: Overhead Sewer Cost Sharing Program

Recommendation

The purpose of this agenda item is to allow the Municipal Services Committee an opportunity to discuss a cost sharing program for the construction of flood control systems on private property.

Background

Village sewers have proven to be vulnerable to excessive inflow and infiltration during large storm events. Inflow is the discharge of storm water from direct connections to the sewerage system from private sources like perimeter foundation drains and downspouts. Infiltration is the collection of storm water induced ground water in the sewerage system through wide joints in deteriorated sewer mains and private sewer services. The additional storm water and normal sewerage flows collectively can overwhelm the system and cause surcharging or backup of the sewer main. Consequently, sewer main surcharging can result in the backup of sewerage up private lateral sewer service pipes connecting building structures to the sewer main resulting in basement or lower level flooding. To prevent the threat of basement flooding due to surcharging sewers property owners are encouraged to install flood control systems.

The three most common types are overhead plumbing (interior injector pit), modified overhead plumbing (exterior pit), and sewer lateral check valves. Conversion of traditional gravity sewers to overhead plumbing is universally regarded as the most effective flood control system and required by the plumbing code for all new construction.

In order to incentivize homeowners to install flood control systems, area communities have implemented various types of cost sharing programs. These programs typically reimburse a portion of the construction costs associated with flood control system installation up to a predetermined amount. Attachment 1 provides a table listing area municipalities with assistance programs along with additional relevant information.

Discussion

Village engineering staff and consultants are currently planning and constructing improvements to the west side sanitary sewer system. Additionally, many of the long range relief sewers improvements have already been constructed on the east side combined sewer system. While these improvements to the sewerage systems will help reduce the frequency and severity of basement flooding due to sewer main surcharging, they will not completely prevent flooding. As established by flood surveys collected by the Village, there is a need for an additional layer of protection against flooding for property owners. Flood control systems alone benefit the individual property owner but coupled with cost sharing program participation requirements for storm water disconnections and service lateral rehabilitation, there is a demonstrated benefit to the entire system by greatly reducing the amount of inflow and infiltration that enter the sewerage system. Flood protection cost sharing programs offer a solution for property owners that may not be attainable without Village assistance while also providing a public benefit.

Potential Benefits

- Reduction of storm water inflow from private connections to the public sewerage system (only when disconnection of sources of storm water is a requirement)
- Reduction of storm water infiltration from deteriorated private sewer service laterals to the public sewerage system (only when replacement or lining of the sewer service lateral is a requirement)
- Cost effective solution to help prevent basement flooding for homes built prior to when the Village code mandated overhead plumbing

- Preserves the Village status as a desirable community to live and deters the potential stigma of being a “flood community” while protecting property values

If the Village is interested in pursuing a flood control cost sharing program, the following variables shall be considered:

A. What type of flood controls would be eligible?

- Overhead plumbing/sewers are most effective; it is the only flood control allowed for many of the researched cost sharing programs (staff recommended)
- Modified overhead is not as effective but is less costly
- Check valves are least costly and more prone to failure especially if not maintained properly

B. What contingencies should be included?

- Perimeter/footing drain disconnection from sanitary and combined sewers (staff recommended)
- Downspout disconnection from sanitary and combined sewers (staff recommended)
- Stairwell drain disconnection from sanitary and combined sewers (staff recommended)
- Sewer service lateral lining or replacement (staff recommended)

C. Who would be eligible?

- First come, first served is most common practice (staff recommended)
- High risk areas only
- Separate vs. combined sewer systems

D. What type of reimbursement level would be desirable?

- 50% to a maximum dollar amount is most common
- Less than 50% would deter participation
- More than 50% would limit number of participants
- Should dollar amount reflect program contingencies? (higher amount for more program conditions)
- Should dollar amount equal the anticipated average estimated construction cost

Overhead Sewer Conversion	\$8,000 to \$14,000
Perimeter Drain Disconnection	\$1,500 to \$5,000 (if applicable)
Sewer Service Rehabilitation	\$6,000 to \$12,000

In conclusion, the 2014 CIP includes \$100,000 for a cost sharing program in the operating budget. It is anticipated that this item will be further discussed by the full Village Board at the July 15, 2013 Sewer and Water CIP meeting.

Attachments

1. Summary of Regional Cost Sharing Programs (1 page)
2. Village of Glenview Program Summary (2 pages)
3. City of Elmhurst Program Summary (5 pages)
4. Village of Arlington Heights Program Summary (5 pages)

Summary of Regional Cost Sharing Programs

Municipality	Pop.	Program Name	Program Inception	Rebate	Eligible Flood Control Systems	Contingencies	Funding Source	Budgeted	Participation
Arlington Heights	75,400	Sewer Back-up Rebate Program	2006	50% up to \$7,500	Overhead & modified overhead sewers, half of service line rehab, & check valves	No special conditions	Water and Sewer Fund and Flood Bond Fund	\$50,000 per year, \$380,000 (2011)	18 or 19 2006 to July 2011, 75 after July 2011, 10+ applications YTD
Elmhurst	44,400	Overhead Sewer Program	Approx. 2002	50% up to \$5,000 or \$3,000 for check valve	Overhead sewer and check valves	Any source of storm water must be disconnected	?	\$450,000 (2010), \$150,000 (2013)	90 applications (2010), 77 applications (2013)
Glencoe	8,800	Sanitary Sewer Flood Prevention Rebate Program	2004	50% up to \$2,000	Overhead sewer or modified overhead (back water)	Perimeter drains must be disconnected	General Fund - Operating	\$6,000 to \$14,000 per year	2 to 7 completed per year
Glenview	44,900	Overhead Sanitary Sewer Service Conversion Program	2010	50% up to \$7,500	Overhead sewers only	Perimeter or any over outside drains must be disconnected and sewer lateral service line must be replaced or lined	Sanitary Sewer Fund	\$90,000 per year	4 to 13+ per year
Lombard	43,460	Overhead Sewer Grant Program	1998	75% up to \$5,000	Overhead sewers only	?	Water/Sewer - Capital	\$50,000 (2011), \$75,000 (2012)	38 (2011), 12 (2012), 24+ (2013)
Northbrook	33,200	50/50 Overhead Sewer Conversion Program	2010	50% up to \$5,000	Overhead sewers only	Perimeter or any over outside drains must be disconnected	Sanitary Sewer Fund - Enterprise	\$50,000 per year	10 (2010), < 10 (2011), 6-7 (2012), 5+ (2013)
Palatine	68,900	Basement Protection Program	Approx. 2006	50% up to \$6,000, also offer 10 year loans attached to water billing	Overhead sewer or other flood control devices	Perimeter drains must be disconnected	Sewer Fund - Capital Improvements	\$25,000 per year	Fluctuates, additional funds in wet years, extra 30k for 2013
River Forest	11,220	Program to Protect Basements	1995	50% up to \$4,000 & 80% up to \$6,000 (high risk) & 80% up to \$7,500 (high risk & poor access)	Overhead sewer, check valves, & modified overhead	Roof drain/downspout disconnection, allows connections of perimeter drains in combined sewer areas	Water and Sewer Fund	\$67,000 per year	?
Schaumburg	74,600	Overhead Sewer Installation Assistance Program	Approx. 2008	50% up to \$5,000	Overhead sewers only	No special conditions	General Fund	\$50,000 per year	4 to 5 per year
Wheaton	55,420	Overhead Sewer Private Property Protection Program	?	50% up to \$3,000	Overhead sewers only	?	Sewer Fund - Maintenance	\$45,000 per year	Varies, they do exceed budget during wet years

Note: Additional communities with programs not listed above include Des Plaines, Morton Grove, Barrington, Niles, and Lisle

Storm Water Task Force Cost Sharing Programs

Overhead Sanitary Sewer Service Conversions



What is it?

A voluntary financial assistance program available to eligible homeowners who would like to update their current plumbing system to reduce the risk of sanitary sewer backups.

Program provides a 50% Village/50% Homeowner cost-share of up to \$7,500 reimbursement (\$15,000 total project costs).

Why a Cost-Share?

Sanitary sewer backups have a direct impact on public health and property values. The Storm Water Task Force (SWTF) identified sanitary sewer backups as the most severe type of flooding and unacceptable for Glenview.

As many as 3,200 residents have been identified in a neighborhood vulnerable to sanitary sewer backups. Many of these residents have homes that were constructed when building standards allowed for gravity foundation drain connections and less rigorous sanitary sewer service requirements.

Though the Village continues to maintain and improve its public sewer system, residents without overhead sewers can remain vulnerable to flooding caused by infiltration of storm water into private sewer services and public sewers. Conversion to overhead sewers along with removal of private sources of infiltration will significantly reduce the risk of basement backups for individual homeowners.



Basement BackUp - Glenview

Who Benefits?

- Homeowner
- Neighborhood
- Village

Potential Users?

Open to Village Residents who are connected to a Village of Glenview maintained sanitary sewer with gravity sewer service susceptible to a sanitary sewer backup.

Any resident who has converted to an overhead system including the removal of all storm discharges to the sanitary system after September 13, 2008 are eligible for reimbursement.

What are the benefits?

- Reduces the risk of sanitary backups into homes.
- Reduces storm water infiltration into the Village sewer system by requiring participants to be "ICAP Compliant". ICAP stands for Inflow Infiltration (I/I) Corrective Action Plan that requires all communities to reduce daily flows to MWRD interceptors through the reduction of storm water (I/I).
- Maintains Village reputation as a desirable community within which to live and/or work and deters potential stigma of becoming a "flood" community.

The proposed 2010 Budget of \$350,000 would support overhead sewer conversions for approximately 70 properties (calculated using a \$10,000 total project cost with a \$5,000 Village cost-share as an estimated average).

Storm Water Task Force Cost Sharing Programs

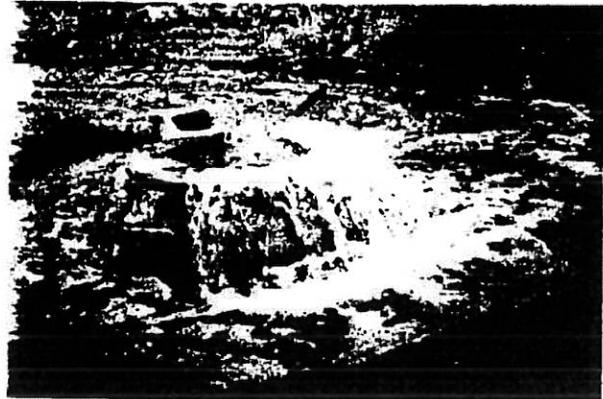
Overhead Sanitary Sewer Service Conversions



Are there eligibility requirements?

Yes, there are four requirements for cost-sharing eligibility:

- Construction must include the installation of a sump pit under the basement or crawl space, an ejector pump, and a watertight sewer line to existing gravity sewer service.
- Line rehabilitation of private service to the Village mainline connection.
- Removal of all storm connections to the sanitary system.
- *Village reimbursement will be based on a minimum of three cost estimates and homeowner approval of contractor.*



What is covered?

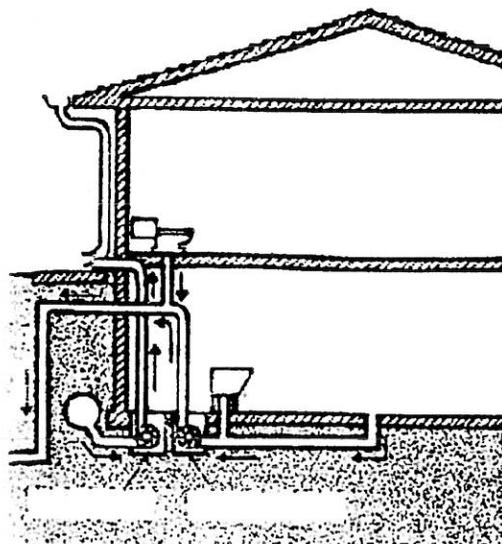
- All material and labor costs for plumbing system conversion
- Installation of a separate storm sewer system to handle stormwater flows
- Installation of cleanouts
- Lining or replacement of sanitary service from home to the main line connection.
- Topsoil, sod, curb, gutter and road patch.

What isn't covered?

- Permit Fees
- Architectural Fees
- Rodding and/or televising of the sanitary service
- Incidental costs such as interior redecorating - drywall repairs, paint, carpet, and flooring.
- Decorative exterior plantings (bushes, trees, plants, etc.) and hardscape (retaining walls, pavers).

Expectations of a Successful Program

- 100% utilization of funding allocations
- Reduction in reported basement flooding calls
- A positive change in public perception



City of Elmhurst



OVERHEAD SEWER PROGRAM

(CITY COST SHARING – 50% of ELIGIBLE COSTS, UP TO \$5,000)

IN ORDER TO QUALIFY FOR THE CITY OF ELMHURST OVERHEAD SEWER COST SHARING PROGRAM:

The perimeter drain tile and any other source of storm water must be disconnected from the city sanitary sewer. Installation of a sump pit and sump pump is required. The sump pump is to discharge the storm water onto the ground, to the front or rear of the property. Or, the sump pump discharge may be connected to the storm sewer in the street via underground pipe, SDR 26 PVC minimum 4" diameter. If additional storm water is being conveyed (such as rear yard drain or downspouts) then use a 6" diameter pipe SDR 26.

(Note: This requirement is not applicable if a proper sump pit for perimeter drain tile already exists.)

OVERHEAD SEWER PROGRAM

Table of Contents

	<u>Page</u>
Program Description, What is it? How does it work?	2-3
Sketch A – “Before” - Typical Gravity Sewer System	4
Sketch B – “After” - Typical Overhead Sewer System	5
General Plumbing Notes	6
Instructions; How To Apply	7
• Overhead Sewer Permit Application	8
• General Information Form	9
• Homeowner Participation Agreement	10
Request For Reimbursement Form	11

Issued: September 2, 1997
Revised September 16, 2010
Revised December 21, 2012

OVERHEAD SEWER PROGRAM

1. What is it?

The Overhead Sewer Program was established to provide financial assistance to homeowners who desire to protect their home from flooding during a heavy rain event. Eligible homeowners may qualify for a 50% cost sharing, up to a maximum of \$5,000.00 for installing an overhead sewer system which can protect their basements from sewer back-up. Some “modified” overhead sewer designs may also qualify.

2. How does the Overhead Sewer work?

Typically, homes which have experienced sewer back-ups and flooded basements during a heavy rain event have a gravity type sewer (see sketch “A” on page 4). The existing sewer underneath the basement floor, drains to the sewer in the street by gravity. When the City sanitary sewers become overloaded the gravity type sewer is subject to back-up.

Changing the basement plumbing to an Overhead Sewer (see sketch B on page 5) can protect the basement from back-ups. Basically the plumbing in the basement gets re-plumbed and directed to an ejector pit. The ejector pit lifts the sewage up and overhead, then down to about mid-height of the basement wall, where it exits the foundation wall to the outside of the building. Once outside, there is a “steep slope” section of pipe where it continues to the lateral line and then to the City sewer. If the City sewer backs-up, the homeowner is better protected, as the water will most likely only back-up into the “steep slope” area of the pipe, and not into the house.

3. Is there anything else I should know?

Yes, in order to qualify for this program, the proposed Overhead Sewer remedy by your plumber must accomplish several things.

First, the perimeter draintile and any other source of storm water must be disconnected from the sanitary sewer. Installation of a sump pit and pump is required. The sump pump is to discharge the storm water onto the ground, to the front or rear of the property. Or, the sump discharge may be connected to the storm sewer in the street via underground pipe, SDR 26 PVC minimum 4” dia. If additional storm water is being conveyed (such as a rear yard drain or downspouts) then use a 6” dia. pipe SDR 26. (Note: This requirement is not applicable if a proper sump pit for perimeter draintile already exists.)

OVERHEAD SEWER PROGRAM

Secondly, an overhead sewer needs to be installed per sketch B, page 5. The plumber needs to provide two sets of drawings which communicate all of the work being performed. A detailed and itemized invoice for all work being performed is required to be submitted to the City for review, for City Cost Sharing. (certain modified overhead sewer designs may also qualify)

Install at least one “clean-out”, outside of the house.

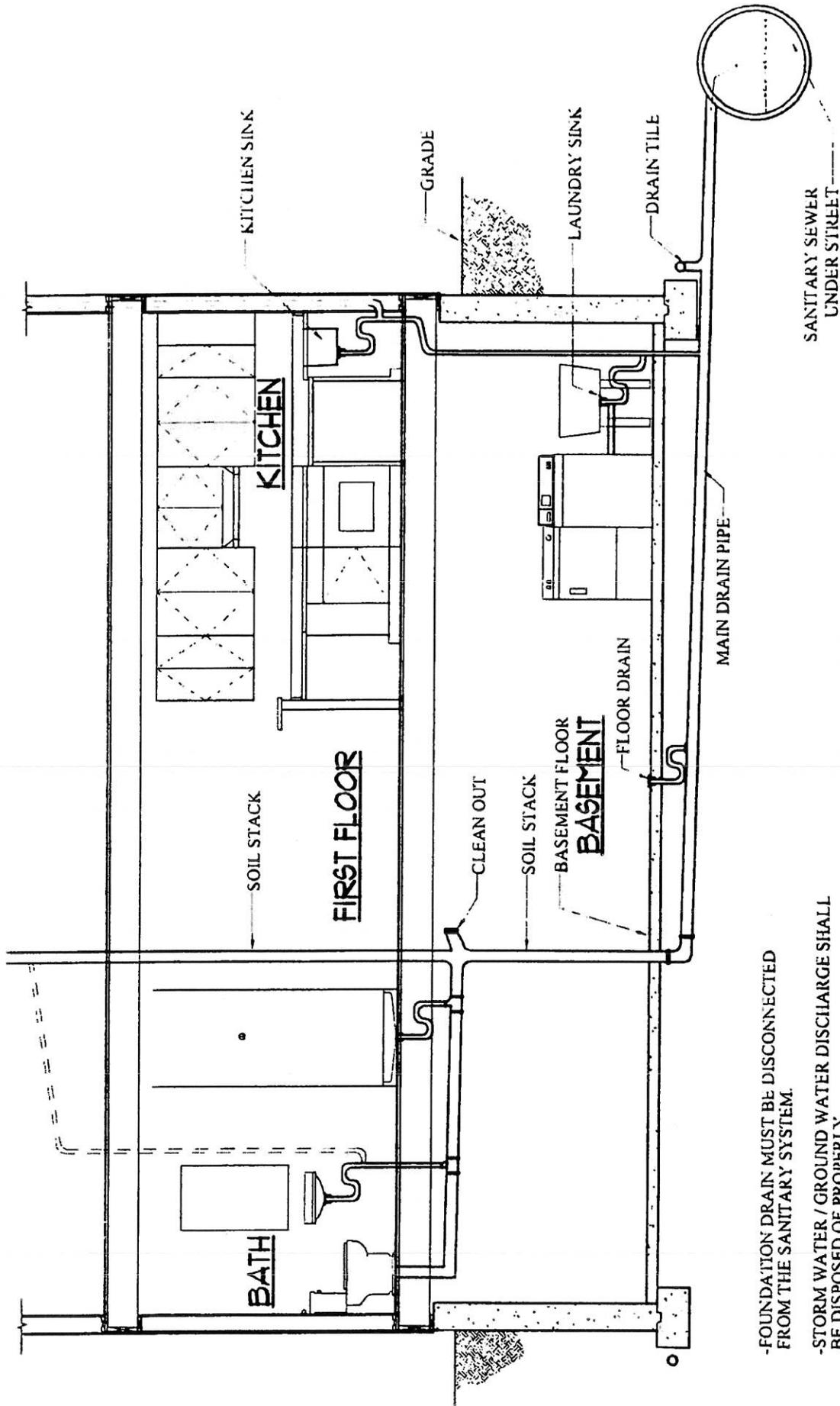
Furthermore, there are certain costs which are eligible for City Cost Sharing and others that are not.

Eligible costs are as follows:

- Cost of location, excavation and exposure of the house lateral sewer line including the support of existing structures for re-connection of a new overhead sewer to the existing lateral.
- Cost of a new sump pit, ejector pump and associated electrical and plumbing work needed to lift sanitary drainage from basement plumbing fixtures to an overhead sewer.
- Cost of trenching and concrete floor repairs.
- Cost of grass seeding to restore disrupted grass/lawns.
- Battery backup system for the new sump pump.
- Applicable permit fees.
- Installation of storm water sumps or associated piping pits or materials.

Non-Eligible Costs

- Removal and Replacement of interior walls and finishes.
- Use of materials not meeting the requirements of the City’s guide specifications or City codes.
- Ancillary homeowner improvements not necessary to provide sanitary sewer back-up protection of the basement.
- Planting or replacement of new landscaping (bushes, trees, sod, fences, walls, etc.)
- New electrical panels and/or upgrading the house electrical supply.



-FOUNDATION DRAIN MUST BE DISCONNECTED FROM THE SANITARY SYSTEM.

-STORM WATER / GROUND WATER DISCHARGE SHALL BE DISPOSED OF PROPERLY.

-IN SOME HOMES, THE BASEMENT WASH TUB, FLOOR DRAINS AND KITCHEN PLUMBING MAY DISCHARGE TO AN EXTERIOR CATCH BASIN LOCATED BEHIND OR ALONG SIDE THE BUILDING

- SOME HOME MAY ALSO HAVE A FOUNDATION DRAIN WITH A GRAVITY CONNECTION TO A SUMP PUMP IN THE BASEMENT

BEFORE

SKETCH A : EXAMPLE OF A TYPICAL GRAVITY DRAINAGE SYSTEM

VILLAGE OF ARLINGTON HEIGHTS



Sewer Back-up Rebate Program



VILLAGE OF ARLINGTON HEIGHTS

33 S. Arlington Heights Rd.
Arlington Heights, IL 60005
Phone: (847) 368-5560
Fax: (847) 368-5975
Website: www.vah.com

INTRODUCTION

The Village of Arlington Heights has established a "Sewer Back-up Rebate Program" (SBRP) to assist residents who install/installed an overhead sanitary sewer system. The SBRP provides financial assistance to residents to install overhead sanitary sewer systems.

The systems, designed to prevent sewage from backing up the sanitary sewer and coming into a house or building, modify an existing gravity system to allow the sanitary service line to leave the building at an elevation at or near the street level before dropping into the sanitary line. This system also includes a back water valve which prevents the backflow of sewage during excessive rain events. Overhead sewer systems meet the Village's current building codes and are now required in new homes with basements.

Homeowners who currently occupy single-family homes are eligible to participate in this "SBRP" program. The SBRP is not available for Multi-family dwellings and commercial properties. Village residential property owners may be eligible for a rebate of 50%, up to a maximum of \$7,500.00, for the cost of the sanitary sewer flood mitigation/prevention system installed. The homeowner shall be responsible for the remaining costs, including but not limited to "restoration costs", such as replacement costs for floor tile or other floor coverings, sidewalks, streets, curbs, parkway, restoration of landscaping, any drywall or paneling, and any painting that may be necessary after completion of the work.

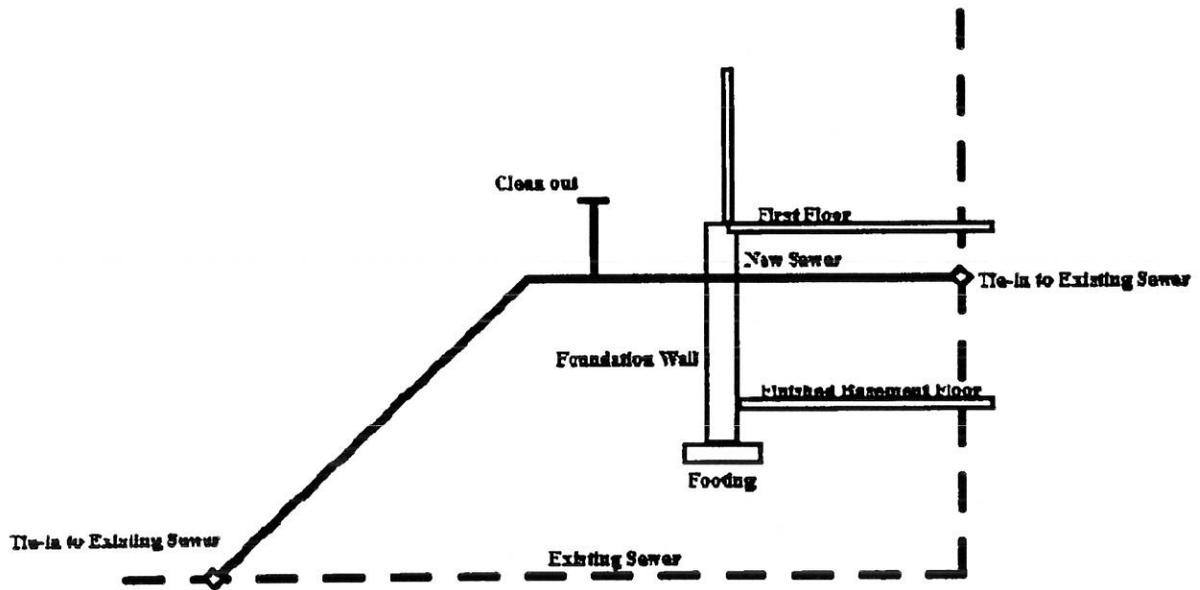
Since July 1, 2006, single-family homeowners were eligible to apply for the Village's Sewer Back-up Rebate Program. The rebate can now be applied to any eligible project completed after July 1, 2006. Information on the program can be downloaded from the Village's website at www.vah.com or can be picked up in the Department of Building & Health Services at Village Hall. The Department of Building & Health Services will accept applications for this program at any time during the year, and process them in the order in which they are received. Applications from the program's participants will be accepted until the Fiscal Year funding for the program is depleted.

The SBRP was established to assist residents who use a gravity sewer and have experienced sanitary sewer back-ups in their houses. The SBRP then uses a preventive step to reduce such incidents of flooding occurrences by allowing homeowners to install an overhead sanitary sewer system in those houses built prior to when the code mandated the installation of such systems in new residential construction. It is important to note that while this program addresses sanitary sewer back-up in houses, it does not impact storm water flooding.

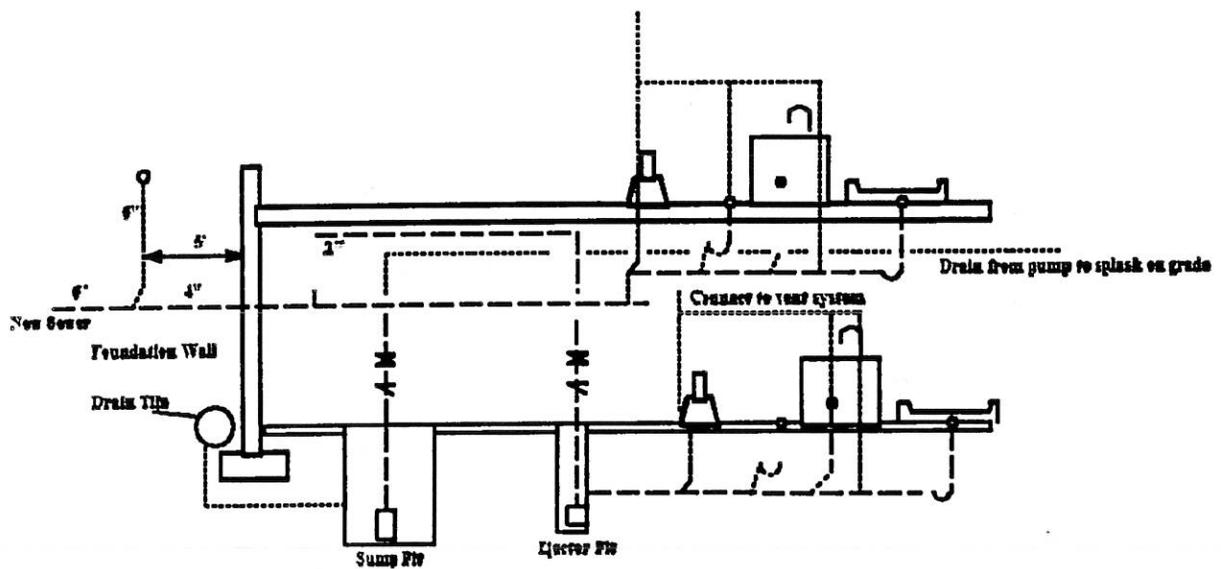
The difference in the height elevation between the discharge of the overhead sewer line and the level of the Village's sewer main provides a margin of safety when flood conditions exist. The ejector system collects sewage from basement or sub-levels, and pumps the sewage into the overhead system. In the event of power failure, plumbing facilities (bathrooms, laundry, etc.) in lower levels should not be used.

The overhead system is illustrated below in drawings 1 and 2:

Sewer Rebate Drawing # 1



Sewer Rebate Drawing 2



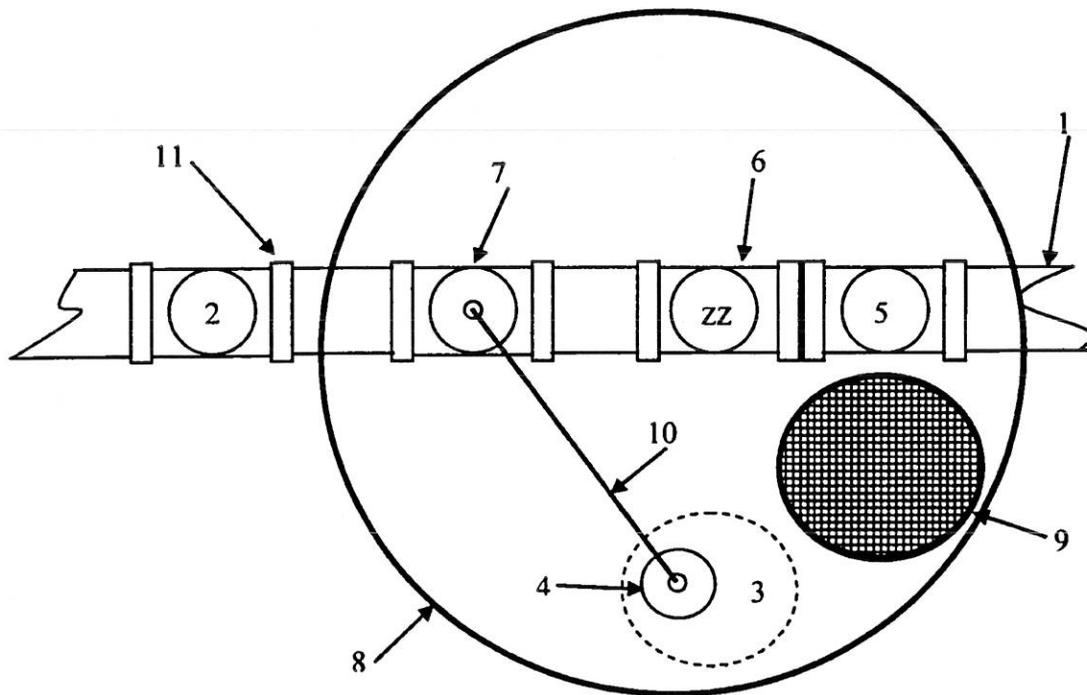
There are some instances when an overhead sewer system may not be feasible or practical in certain situations. This may be partly due to sewer elevation differences, the conditions of finished basements, and the locations of certain fixtures within homes, etc. For such cases, an alternate flood control system has also been approved by the Village.

This alternate flood control system is designed to prevent sewage from backing up from the Village sanitary sewer and entering into the house or building. The design is based on the installation of a manhole and valve system that will be located on the private sewer line between the Village sewer and the building. Please refer to the Drawings #3 and #4 as shown.

When sewage backs up because flood conditions in the Village's collection system, the check valve #1 (shown in Drawing #3) will close, keeping all sewage at the street side of the system. A second check valve is also installed for added protection in the event check valve #1 fails.

During sewage backup, the sewer system from the house can still operate through the 2-inch ejector pumping system. The residential sanitary sewer wastewater will discharge out of the overflow pipe and into the sump pit. Once the sewage reaches a certain level in the pit, the ejector pump will be activated to discharge the sewage through the 2-inch plastic pipe to the street side of the sewer line. The check valve #3 has to be installed on this 2-inch line to prevent any sewage backflow through the pump. The flood control system is illustrated in drawings #3 and #4:

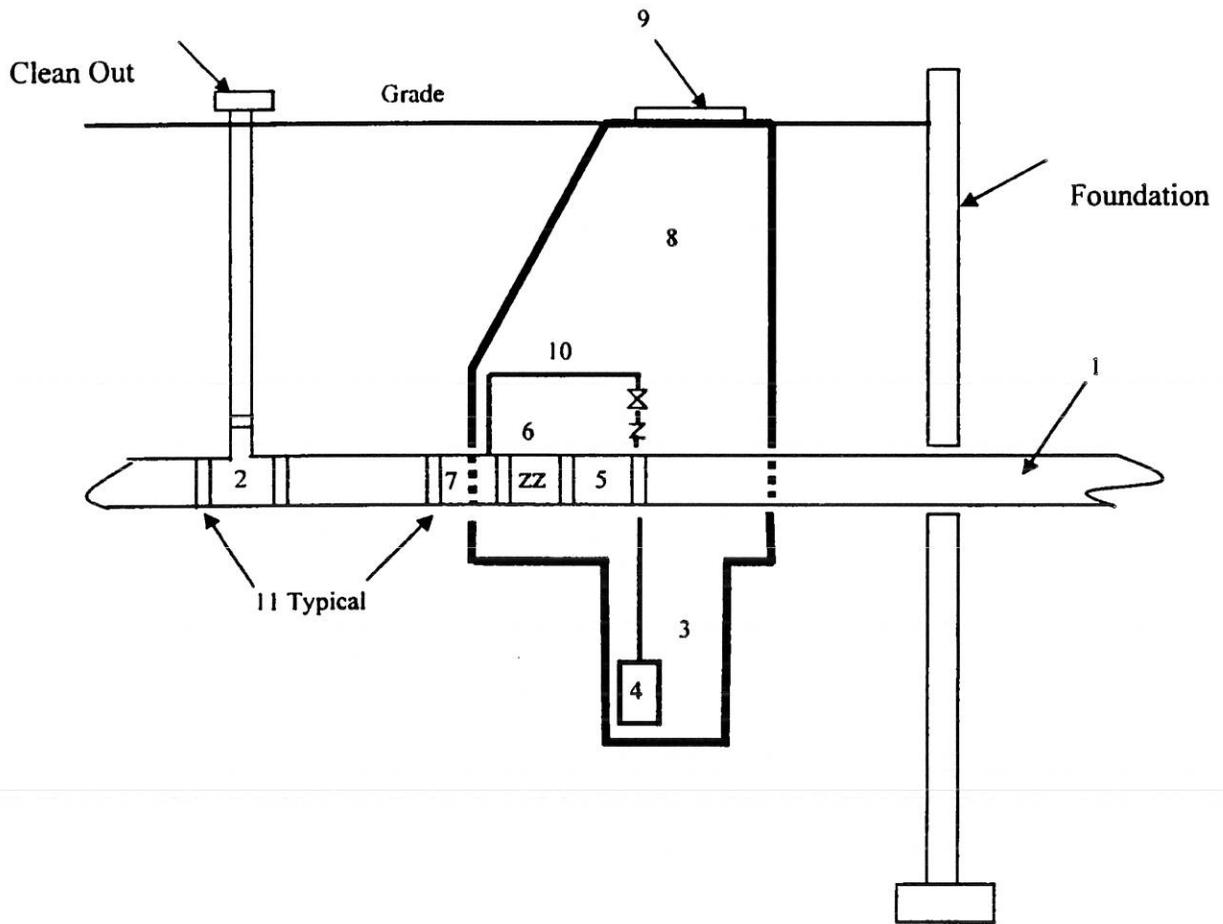
SEWER REBATE DRAWING #3



- 1 = SDR 26 Pipe
- 2 = SDR 26 6x6 Tee for clean out
- 3 = Min. 24" PVC / Fiberglass Pump Pit
- 4 = Ejector Pump - Check & Ball Valve Combo
- 5 = Overflow Tee
- 6 = Double Check Valve

- 7 = 6" x 2" Tee for Ejector Sump Discharge
- 8 = 5' Concrete Pit
- 9 = Cast Iron Frame & Lid
- 10 = 2" PVC Pipe
- 11 = Non-Shear Coupling

**SEWER REBATE
DRAWING # 4**



- 1 = SDR 26 Pipe
- 2 = SDR 26 6x6 Tee for clean out
- 3 = Min. 24" PVC / Fiberglass Pump Pit
- 4 = Ejector Pump – Check & Ball Valve Combo
- 5 = Overflow Tee
- 6 = Double Check Valve

- 7 = 6" x 2" Tee for Ejector Sump Discharge
- 8 = 5' Concrete Pit
- 9 = Cast Iron Frame & Lid
- 10 = 2" PVC Pipe
- 11 = Non-Shear Coupling



1200 WILMETTE AVENUE
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ENGINEERING
DEPARTMENT

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EMAIL: eng@wilmette.com

Date: July 3, 2013
To: Municipal Services Committee
From: Brigitte Mayerhofer, P.E., Director of Engineering
Subject: Separate Storm Sewer Study Proposed in 2014 Capital Improvement Program

Background

As discussed in the previous agenda items, the Village has vulnerabilities in both the separate sanitary and storm sewer systems located west of Ridge Road. While a significant focus has been on the sanitary system, the engineering staff recommends similar work begin on the storm sewer component. The April 18, 2013 storm in particular, resulted in overland storm flooding that inundated structures. While standing water in the street is generally considered acceptable during extreme rain events, it is concerning when water levels rise so high that homes are flooded.

The purpose of this agenda item is to offer the Committee an opportunity to ask questions about the storm sewer study proposed in the 2014-2018 CIP. If there is support for this project, the proposed bond issue could include the \$265,000 budgeted for this project.

Document Attached

1. Separate Storm Sewer Study Detail from the Capital Improvement Program

Separate Storm Sewer Study	2014	\$265,000	Bond
Sewer Fund- Sewer Improvements - Sewer Collection System			
-	Critical		
X	Recommended		
-	Contingent on Funding		

Project Description & Justification

In light of the April 2013 rain event and the prevalence of overland flooding throughout the west side of Wilmette, this study will provide the following:

- Evaluation of April 2013 Resident Surveys
- GPS Field Survey of Separate Storm Sewer System and Development of GIS Database
- Hydraulic Modeling of the Existing Storm Collection System
- Development of Proposed Storm Sewer Improvements
- Review and Recommendations for the Pumping Capacity of the Storm water Pump Station

Similar to the hydraulic modeling of the sanitary sewer system in 2012, this study will determine where there are bottlenecks in the separate storm sewer system and recommend locations for improving capacity and providing storage to reduce the potential for detrimental overland flooding. A preliminary report indicates that 155 households during the April 2013 rain event experienced structure flooding from water rising from the street and across front yards.

Project Update

This is a new project for 2014.

Project Alternative

Operating Budget Impact

Is this purchase _____ routine or non-routine?

NON-ROUTINE	
Maintenance Costs	None
Personnel Costs	None
Training Costs	None