



Agenda Item Executive Summary

Title: Stormwater Report - July 2016 Flood Event

Presenter: Steven M. Saunders, Director of Public Works/Village Engineer

Agenda Date: 08/02/2016

Consent: YES NO

Ordinance
 Resolution
 Bid Authorization/Award
 Policy Direction
 Informational Only

Item History:

In the evening hours of July 23, the Village of Winnetka was impacted by a severe wind and rain storm that produced 4.97 inches of rain in about 6 hours. The Village responded to over 440 service calls – including 911 calls – during and immediately following the storm. These calls dealt with a variety of issues, including tree damage, power outages, stranded motorists, fire and burglar alarms triggered by the storm, and widespread flooding of streets and basements. The Fire Department responded to two house fires – one in Winnetka and one in Kenilworth – caused by lightning strikes, and there were numerous trees and branches felled by the wind, leading to power outages affecting approximately 581 customers.

Executive Summary:

The attached report outlines the details and nature of the storm and the Village's response, identifies some already-implemented projects that worked as designed, and discusses areas where additional improvements are needed.

The report also outlines ongoing activities in the Village's efforts to secure partnership and cooperation with the Cook County Forest Preserve District as outlined in Strand Associates' Final Concept Report, as well as discussing Strand's review of project phasing to identify possible projects or sub-projects that could be rapidly implemented to bring at least partial relief to areas of the Village.

Finally, the report contains a recommendation that the Village consider re-instating the unfunded Sewer Backup Prevention Program, a cost-sharing program under which the Village can partner with individual homeowners to install anti-backup devices or overhead sewer systems to guard against basement sewer backups.

Recommendation:

1. Review informational report.
2. Consider a motion authorizing expenditure of \$50,000 on the Sewer Backup Prevention Program as authorized in Section 15.24 of the Village Code.

Attachments:

1. Agenda Report
2. Sewer Backup Prevention Program Brochure

Agenda Report

Subject: **Stormwater Report – July 2016 Flood Event**

Prepared By: Steven M. Saunders, Director of Public Works/Village Engineer

Date: July 27, 2016

Description of the Storm and How the Rainfall Was Managed

1. What happened? In the evening hours of July 23, 2016, Winnetka was impacted by a severe wind and rain storm that produced 4.97 inches of rain in about 6 hours. A Cook County Precipitation Network rain gauge located in southwestern Winnetka recorded 2.73 inches of rain between 5:50 p.m. and 7:10 p.m., and an additional 2.04 inches between 9:40 p.m. and 11:00 p.m. The rain finally ceased at around 1:10 a.m. In addition to the heavy rain, there was frequent lighting accompanied by strong winds.

The Village received over 440 service calls – including 911 calls – during and immediately following the storm. These calls dealt with a variety of issues, including tree damage, power outages, stranded motorists, fire and burglar alarms triggered by the storm, and flooding of streets and basements. The Fire Department responded to two house fires – one in Winnetka and one in Kenilworth – caused by lightning strikes. Trees and branches felled by the wind led to power outages affecting approximately 581 customers.

Staff members were brought in beginning on Saturday. Extra hands were also required in our Police Department to handle the high volume of emergency and non-emergency calls. Throughout the storm and its immediate aftermath, Staff members were in the field assessing conditions, assisting residents in need, cleaning-up damage, and monitoring the functionality of our existing stormwater infrastructure. A Village-wide communication was sent out on the afternoon of July 24 to inform residents about the storm impact and request them to submit documentation of any flooding experience. The photos and narratives we have received will help to confirm and/or update the flooding models created by our consultants to-date.

Since the storm, the Village has been responding to resident inquiries and comments, collecting flood-damaged materials, and cleaning up and repairing flood-impacted infrastructure and equipment. To assist residents, additional and free debris clean-up is being offered through the end of this week.

2. How does our system work? With the exception of a narrow strip along Green Bay Road, Winnetka is a separate-sewer community, meaning that there are two separate sewer systems. The storm sewer system collects stormwater runoff from streets and yards, downspouts, and sump pump discharges, while the sanitary sewer system collects wastewater from interior plumbing systems.

The Village's storm sewers drain either to the Skokie River and its tributary, the East Diversion Ditch, or to Lake Michigan. Although the two watersheds are generally divided by the Union Pacific Railroad tracks, an area around North Shore Country Day School does drain east under the railroad towards Lake Michigan.

The Village's sanitary sewers drain to a network of intercepting sewers operated by the Metropolitan Water Reclamation District of Greater Chicago ("MWRD"). These intercepting sewers convey wastewater to the North Side Treatment Plant at Howard Street and McCormick Boulevard in Skokie, where it is treated and discharged to the North Shore Channel and, ultimately, to the North Branch of the Chicago River.

3. What about the Wilmette Locks? If there is a most frequently asked question received by staff, it is: "Have the Wilmette Locks been opened yet?" or some variant thereof. The "locks" at Wilmette Harbor actually refers to a 32-foot gate mechanism that operates as a level control on the North Shore Channel. In its normal closed configuration, this gate prevents treated or partially treated sewage from flowing into Lake Michigan, instead directing wastewater and stormwater south into the North Branch of the Chicago River. When the gate is opened, a combination of wastewater and stormwater is directly discharged to Lake Michigan.

According to the MWRD, the primary purpose of opening this gate is to prevent overbank flooding on the North Shore Channel and the North Branch of the Chicago River, by allowing a second outlet for the channel. Shortly after midnight, the MWRD notified the Village that the gate was opened. This was done to prevent serious overbank flooding along the Channel and the North Branch of the Chicago River.

Opening the gate at the Wilmette Locks does not affect either the level of Lake Michigan or the level of the Skokie River, meaning that the Village's storm sewer systems are completely independent of this gate. Because of the complexity of the Village's 43 separate connections to several different MWRD intercepting sewers, it is less clear whether this operation has any effect on the operation of the Village's sanitary sewer system.

4. Projects completed to-date. Following is a description of the projects the Village has completed to-date as part of the Stormwater Management Program. A more complete history of stormwater infrastructure evaluations and Council action can be found on the Village website at: <http://www.villageofwinnetka.org/residents/stormwater-management/council-action/>.

- **Winnetka Avenue Pump Station** – A Cook County Forest Preserve ditch that enters the Skokie River is the main discharge point for storm sewers in western Winnetka. However, in heavy rains, river waters rise above the ditch and Winnetka's water must be evacuated via pumping. The new pump station, completed in August, 2014, increases the pumped discharge capacity by 50 percent and improves flow in existing upstream storm sewers.

- **Ash Street Pump Station** – In September of 2015, the Village finished work to completely replace the dated pump station at Ash Street and Hibbard Road. The new facility includes new, larger pumps that are sized more properly to feed the nearby discharge point.
- **Northeast Winnetka**
 - *Lloyd Outlet* – The Village completed its first stormwater management program project back in December, 2013, when it separated the large Spruce Street stormwater outlet into two distinct drainage areas. This project is reducing flooding from Maple Street south to approximately Spruce Street.
 - *Tower Relief Sewer* – In September, 2014, the Village installed a new relief sewer along Old Green Bay Road to alleviate flooding along Spruce Street east to Lake Michigan and along Tower Road east of Old Green Bay Road.
- **Northwest Winnetka** – Delivering flood relief to Northwest Winnetka homeowners required constructing a brand new, large-diameter storm sewer system under Tower Road, Grove Street, Edgewood Lane, and Forest Glen Drive. The stormwater is now conveyed to the Tower Road lagoon located on Cook County Forest Preserve property, south of Tower Road and west Heather Lane. This project was funded in part by the Metropolitan Water Reclamation District (MWRD). The Village applied for and received a \$2 million funding commitment from the MWRD to offset construction costs.

5. What worked? Last year, the Village completed a major storm sewer improvement in northwestern Winnetka in the Forest Glen, Tower, Greenwood, Grove, and Edgewood neighborhoods. These areas, which would typically experience street and structure flooding in a rain like this, reported no such flooding. In fact, staff received three calls or e-mails that expressed thoughts similar to the following: *“There is no more flooding in front of my house (lowest point on Tower Rd.) thanks to the excellent sewer project that was completed last year. IT REALLY WORKS. The heavy rain we had last week would have put the street, our driveway and front yard under water. We didn't even know we had a heavy rain. A miracle, thanks for all that you and your staff has done to correct the problem.”*

The Village operates stormwater pumping stations at Tower Road, Sunview Lane, Ash Street, Mt. Pleasant Street, Evergreen Lane, and Winnetka Avenue. None of these pump stations lost electrical service during or after the storm, and based on staff observations and on pump hour meters, each of the pump stations functioned during and after the storm. The improved Winnetka Avenue pump station functioned as designed, lowering the level of the main outlet ditch by Sunday morning, with assistance from additional dedicated pumping, allowing tributary systems to quickly drain out. The Ash Street Pump Station capacity and reliability upgrades also functioned as designed, running throughout the storm. Recall that in previous events in 2011 and 2013, this pump station failed due to

reliability and clogging issues, extending the duration of flooding in the Ash-Cherry-Oak area. While this area did not fully drain until early- to mid-afternoon after the storm, the improved reliability and capacity of this pump station reduced the duration of flooding, especially after the Hibbard Road system cleared.

5. What didn't work? Portions of the recent northeast Winnetka improvements along Tower Road, Old Green Bay Road, Tower Manor, as well as the Lloyd Park outlet, worked well and reduced or eliminated flooding, especially on Tower Manor, but there were still a few properties on the north side of Tower Road in the project area that experienced overland flooding. Village staff and the project design engineer are reviewing these improvements and the experience of affected homeowners to understand what factors contributed to this lingering flooding in these areas.

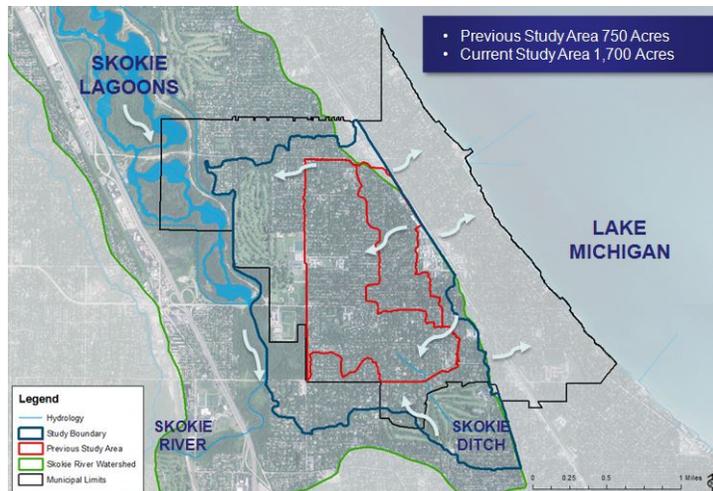
While the Village has completed sanitary sewer repairs, lining, and manhole improvements in eight sewer basins that experienced high numbers of basement sewer backups in the 2011 storm, the number of backups that were reported last week indicates that there are still areas where sanitary sewer backups are occurring. Since the completion of the *Sanitary Sewer Evaluation Survey – Flow Monitoring Study* performed by Strand Associates in 2012, the Village has implemented various improvements. Below is a summary of the sanitary sewer projects the Village has completed since the 2011 event:

- 2013 - Entered into a contract with Baxter and Woodman to perform smoke testing and external home inspections (performed during the smoke testing) in those areas of town noted by the Strand Report as having the highest priority of I/I entering the system. These areas included mostly southeast and southwest sections of the Village.
- 2013 – 2016 The Village's annual sewer relining program has an annual budget of \$150,000. Locations throughout the Village are chosen based on their priority in the 2012 Strand Report, as well as staff closed-circuit television (CCTV) investigations. Since 2012 the Village has relined approximately 16,500 LF feet of sanitary sewer lines of various diameter.
- Public Works staff has performed increased CCTV inspections of manholes and the sewer system (ongoing annually).
- Late 2014/early 2015 - Staff sent letters to homeowners whose property showed indicated of illegal connections to the sanitary sewer (i.e. window wells, downspouts, yard drains, etc.). Staff met with homeowners and recommended corrective measures to ensure the disconnection of these illegal connections and performed detailed home inspections to ensure compliance.
- 2014-2015 – Performed Sanitary Sewer Manhole Rehabilitation Project. Internal relining of 169 sanitary sewer manholes; replacement of 60 manhole covers; and installation of internal chimney seals to prevent water from entering the system via the frame and cover.
- 2015 - The Village improved the sanitary sewer lift station at Ash Street to improve reliability and pumping volume.

In addition to sanitary sewer backups, there are still many areas of the Village where potential flood reduction improvements have been identified by consultants Baxter & Woodman, and Christopher B. Burke, but these improvements have not been programmed into the Village's long-term capital plan. These areas include additional portions of eastern and central Winnetka. Significant street and property flooding occurred in these locations. Staff suggests that in light of the areas that experienced significant flooding, it may be an appropriate time to revisit the Village's Stormwater Master Plan and discuss any re-prioritization of recommended projects. It would not require advancing any improvements ahead of the Strand Concept Vision, but as we approach the annual budget process, future planned projects could be programmed into the Capital Budget for further vetting and long term revenue forecasting.

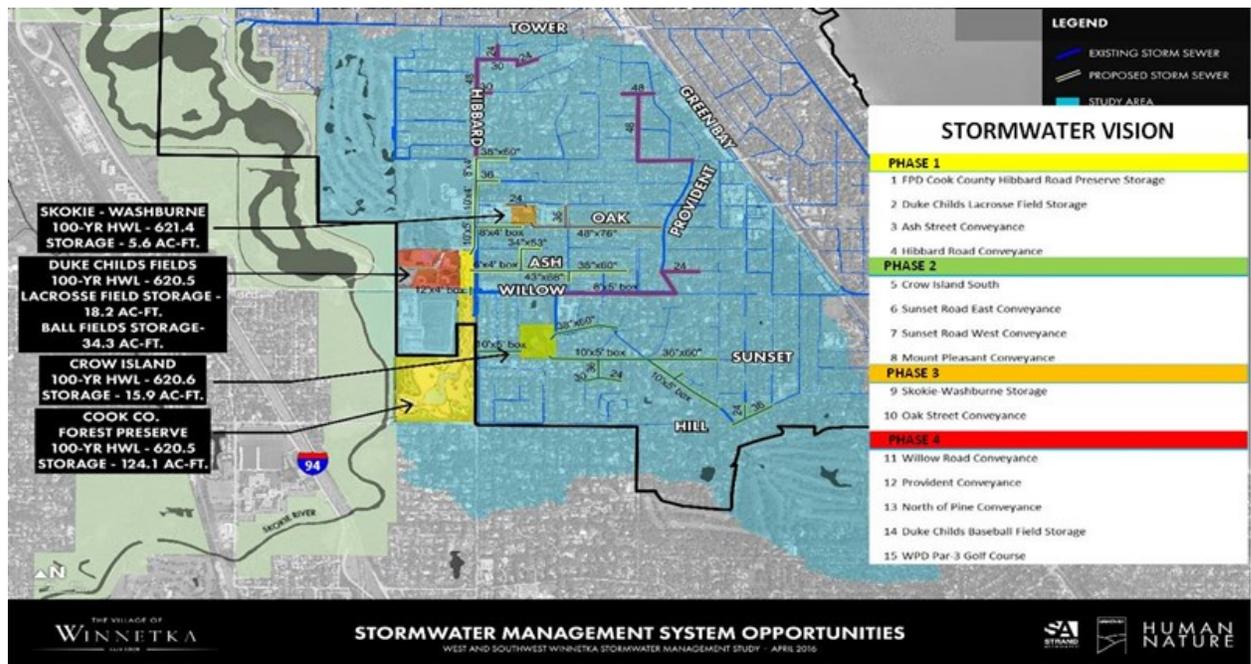
Status of Strand Stormwater Plan

Last fall, the Village engaged Strand Associates to re-evaluate the Village's western drainage basins for creative, cost-effective improvements for the 100-year event, taking into account the Village's flood-control goals and objectives. Strand has evaluated a variety of grey and green infrastructure approaches, conveyance, detention, property buyout or individual protection retrofit programs, and a host of other traditional and emerging stormwater management technologies. The study area boundaries are shown below:



The key portion of Strand's work was a robust, "no stone unturned" sustainable watershed evaluation to identify and evaluate a wide range of potential flood risk reduction strategies. These include individual homeowner or neighborhood-scale improvements and regulatory or zoning changes, and large-scale stormwater storage and conveyance improvements. Using a sustainable watershed evaluation process, Strand assessed 44 stormwater management opportunities that could meet the Village's flood protection goals in practical, feasible, creative, and cost-effective ways.

On June 7, 2016, Strand presented their Final Concept Report to the Village. After carefully considering the feasibility, practicality, cost, benefit, and measure of protection of each opportunity, Strand has proposed a combination of projects that produce a desirable balance of flood reduction, cost-effectiveness, and phased implementation. This series of projects, if fully implemented, would significantly reduce the number of homes in the watershed that are at risk of overland flooding during the design event. The proposed Vision consists of 15 discrete stormwater storage and conveyance projects, water quality management improvements, and distributed green infrastructure improvements, in four phases. The current Stormwater Vision is shown in the figure below:



There are critical community partners in the watershed that are integral to successful and sustainable stormwater and flood mitigation improvements. Strand has helped the Village to explore collaboration with stakeholders whose goals are directly impacted by stormwater issues and will also benefit from the Village’s stormwater management efforts. Strand has also conducted an extensive public participation effort to gain valuable input from the community and to better understand the needs, desires, and opportunities addressed by the identified alternatives. The estimated project cost to implement all four phases, including engineering and necessary contingencies, is \$57,717,000 in current dollars.

Summary and additional detail about the Strand engagement process and Concept Vision is available on the Village’s website at: villageofwinnetka.org/residents/stormwater-alternatives-evaluation/.

At the June 14 Study Session, the Village Council further discussed the Concept Report and identified two key activities as immediate next steps. First, it is clear that the success

of the concept vision relies heavily on a strong, cooperative relationship with the Cook County Forest Preserve District (CCFPD). The Council therefore directed staff to identify the various steps, submittals, agreements, and open issues that need to be worked through with the Forest Preserve District to secure their cooperation in modifying and restoring a portion of District property south and west of Hibbard and Willow Roads. This would allow better storage and conveyance of stormwater in a way that is in keeping with the District's land-use goals and policies. Staff has met and discussed the project with District staff and Commissioner Suffredin. Currently, the two agencies are working to identify a set of milestones, approvals, submittal dates and requirements, and other conditions that, if satisfactorily met, should lead to consideration and approval by the Forest Preserve Board.

Second, recognizing that the above discussions will take time, and some of the projects may not be constructed for several years, Strand was asked to identify whether portions of some improvements, or other strategies, could be quickly designed and implemented in a way that brings faster relief to portions of the project area. Strand will report back to the Council prior to the formulation of the 2017 Budget, so that any appropriate "quick-wins" can be considered for funding.

Sewer Backup Prevention Program

In 2006, the Village implemented a cost-sharing program to encourage and assist homeowners to install anti-backup protective systems to reduce sanitary sewer backup. Installations of anti-backup devices or conversions to overhead sewer are the only activities eligible under the program, which is limited to unprotected single-family residential buildings. The program contributes 50% of the cost up to \$3,500 (\$5,000 for overhead sewer installations) up to the funding limit set annually in the budget by the Village Council.

Beginning with the FY 2014 Budget, the Village Council de-funded the program, for the purpose of shifting these funds towards direct Village improvements, rather than private property protection measures. Prior to 2014, the Village budgeted \$15,000 to \$30,000, with occasional mid-year increases in storm years, annually since program inception. A copy of the prior program brochure is attached here for reference.

This program, authorized by the Village Code, is similar to programs offered by most area municipalities, and provides several benefits. First, the Village can partner directly with affected citizens to prevent basement backups, reducing insurance claims, loss of property and possessions, and reducing exposure to potential public health risks. Second, the Village can directly improve the quality of life for residents plagued by persistent sewer backups. Finally, the program is cost effective on a per-home basis, as basin-wide sanitary sewer improvements can cost significantly more per home, especially in some of the Village's fairly small sewer basins.

Staff has evaluated the status of several projects in the Sewer Fund and proposes allocating \$50,000 to the anti-backup program to cover all requests currently in process. We propose the additional funding would be allocated based on the following:

FY 2016 Sewer Fund Capital Funding – Budget Account 540.70.01-670

Item	FY 2016 Budget	Estimated	Over/(Under) Budget
Excavator Purchase	\$18,000	\$18,000	\$0.00
Sheridan Rd. Pump Replacement	\$50,000	\$50,000	\$0.00
System I/I Eng. and Repairs	\$300,000	\$250,000	(\$50,000)
Trenchless Lining	\$150,000	\$150,000	\$0.00
TOTALS	\$518,000	\$468,000	(\$50,000)

Recommendation:

1. Review informational report.
2. Consider a motion authorizing expenditure of \$50,000 on the Sewer Backup Prevention Program authorized in Section 15.24 of the Village Code.