

Agenda Report

Subject: **Stormwater Update – One Year After the July 2011 Flood**

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Date: July 12, 2012

On July 22 and 23, 2011, the Village of Winnetka was struck by a severe rainstorm which deluged the Village with approximately 6.5 inches of rainfall in about 3 hours. As a result of this extreme rainfall, there was severe flooding throughout the Village, leading to widespread property damage and basement flooding. At the time of the July 22-23, 2011 flood, stormwater management was already an elevated concern for the Village. This was primarily the result of severe flooding events in 2007 and 2008. The Village had engaged the services of Christopher B. Burke Engineering, Ltd (CBBEL) after the 2008 flood event to evaluate areas of southwestern Winnetka that suffered significant flood damage, and to develop flood risk reduction improvements to provide protection against a 10-year flood event. After receipt and discussion of that report, the Village Council extended CBBEL's engagement to evaluate and develop improvements for six additional areas throughout Winnetka. This second study was completed and presented to the Village Council at the July 12, 2011 Study Session – 10 days before the devastating July flood.

In the ensuing year, stormwater and flood relief has been elevated to the single highest priority for the Village Council, residents, and staff. The following is a summary of the Village's stormwater and flood risk reduction accomplishments since the July 2011 flood:

Stormwater Improvement Studies and Projects

Additional Stormwater Studies. In the aftermath of the July flooding event, the Village directed CBBEL to evaluate the proposed 10-year flood reduction improvements against the actual rainfall received July 22-23. Predictably, this analysis indicated that the proposed improvements would have provided little benefit in the face of such a large event. The Council then directed CBBEL to extend and expand their analysis of these 8 drainage areas to provide flood risk reduction against a much larger set of storms with 25-year, 50-year, and 100-year return periods. This analysis was completed and presented to the Village Council in October, 2011, less than 90 days after the flood. CBBEL's recommendations included significantly increasing proposed storm sewer and detention facility sizes, which raised the project cost from roughly \$15 million for 10-year improvements to roughly \$47 million for 100-year improvements.

Willow Road Tunnel Project. CBBEL's recommendations also identified a new project, consisting of a new storm sewer beneath Willow Road that would convey water from a roughly 900-acre drainage area on the west side of the Village eastward towards Lake Michigan. This project, known as the Willow Road Tunnel project, would combine

improvements for 5 of CBBEL's 8 study areas into a single project with a cost estimate of \$32.5 million (\$57 million if tunneling through rock). While a number of potential challenges and impediments are identified with this project, it has the advantage of being less costly than constructing all of the previously identified western improvements. It is also a simpler project from the perspective that there are no pumping facilities required, and the project would not require land acquisition from the many agencies that own available open space for detention. As a result, the Council directed staff to further delve into the feasibility of the proposed Tunnel project, to determine if the project can realistically be constructed for the associated cost estimate. The following steps have been completed or are nearing completion:

- Soil Borings. Soil borings were completed in December, 2011, and indicated that there were no rock outcroppings or unsuitable soils within the tunneling portion of the project.
- Political Stakeholder Meetings. Meetings were arranged in November, 2011 with key political stakeholders including U.S. Representative Dold, State Representatives Biss and Gabel, and State Senator Schoenberg, to provide background context and detail on the project and to establish working relationships to assist in navigating any potential challenges or impediments, as well as seeking possible alternative funding sources.
- Regulatory Agency Meetings. Staff arranged meetings with various regulatory agencies with jurisdiction over Lake Michigan to identify regulatory requirements and any impediments that might render the project infeasible. These meetings with the US Army Corps, Illinois Department of Natural Resources, Illinois EPA, and MWRD, took place in November and December of 2011, and again in May of 2012, at which time no significant regulatory impediments were identified, although there will certainly be permitting challenges associated with the project.
- Coastal engineering for outlet structure. A key engineering challenge associated with the project is determining the type of discharge structure required to transition an 8-foot diameter pipe to Lake Michigan. The Village has engaged Baird Associates, an international coastal engineering firm, to provide preliminary designs and cost estimates for several discharge structure options. Baird has completed their study and the results will be presented to the Council as part of the final feasibility study.
- Independent Cost Evaluation. A key factor in project feasibility is the ultimate cost of the project. Staff and CBBEL have met with representatives from Kenny Construction – a national tunneling contractor – to review the project cost estimates based on the level of detail that is known at this stage. These discussions were very productive and staff and CBBEL are working with Kenney Construction to refine routing and add detail so that Kenny Construction can provide the best cost estimates possible at this time.
- Final Feasibility Report. A final feasibility report on the tunnel option, containing all of this information, is anticipated to be presented to the Council in late August or early September.

Spruce Outlet Area – Tower Road Relief Storm Sewer and Lloyd Outlet Storm Sewer.

One of the less capital-intensive projects recommended by CBBEL consists of splitting a single large watershed (east of Green Bay Road between Tower Road and Spruce Street) into two smaller watersheds by constructing a new outlet to Lake Michigan at Lloyd Park, diverting stormwater from the northern part of the watershed to the Lake in order to relieve flooding at the southern portion of the watershed. In addition, the far northern portion of the watershed would be diverted to the existing Lake Michigan discharge along Sheridan Road at the “Ravines”. These two projects are estimated to cost \$1.9 million. The Village Council has awarded a contract for engineering and permitting for these two projects to CBBEL, so that construction can be accomplished in 2013. Engineering is approximately 60% complete on these projects, with a Council discussion and public meeting on the projects tentatively scheduled for the August 21, 2012 Council meeting.

Northwest Winnetka Drainage Improvements. CBBEL identified improvements for a large watershed draining the northwestern portion of the Village, portions of which are subject to repetitive flooding. The proposed improvements contemplate using excess capacity that is available in the existing large stormwater basin on Forest Preserve property at the western end of Tower Road. The proposed improvements consist of increased conveyance capacity from various portions of the watershed to the storage facility, at an estimated cost of \$2.9 million. During discussion of these improvements, an area in the Forest Glen neighborhood, towards the upstream end of the watershed, was identified to have a cluster of properties that experienced overland flood damage from the July 23 storm. CBBEL was engaged to re-evaluate these improvements in light of this cluster and to develop proposed improvements for this area. This analysis is nearly complete and will be presented to the Village Council shortly. The Village has budgeted for detailed engineering of these proposed improvements in 2012, with construction anticipated in 2013.

Stormwater Master Planning. A key initiative for this year is the development of a Stormwater Master Plan. The Village has engaged the services of Baxter & Woodman to develop the stormwater master plan over the next 12 months. The overall objective of this project is to develop a clear, comprehensive, and forward-looking framework that encompasses the Village’s existing stormwater management program, presents a detailed investigation into key components of stormwater as it is related to the Village, establishes stormwater management goals for the future, presents tools to meet or exceed established goals and provides a foundation for future policy decisions. The final product will be a document which helps the Village guide the stormwater program for the next five to 10 years and beyond

Sanitary Sewer Studies and Improvements

Following the July 23 flood, the Village surveyed residents to identify sources and types of flooding that occurred. A significant number of homes reported that flooding occurred as a result of sanitary sewer backups. In response, the Village in February 2012 engaged the services of Strand Associates to complete a detailed flow monitoring analysis of the

Village's sanitary sewer system to identify areas that are subject to inflow or infiltration of stormwater or groundwater into the sewer system, which can contribute to basement backups. Strand Associates has completed their 8-week flow monitoring analysis and has developed a draft report, which will be discussed by the Village Council on July 17, 2012. The output from this project will be used to develop a prioritized plan for detailed identification and elimination of inflow and infiltration into the sanitary sewer system, to reduce the risk of basement flooding.

Resident Communications & Assistance

In the aftermath of the July 2011 flood, the Village has undertaken a number of steps aimed at either providing direct assistance to or improved communication and interaction with residents. Among these actions are:

- Website information. The Village has devoted space on its website to a complete chronology of staff and council materials related to stormwater so that the community can keep abreast of discussions and developments relating to stormwater management.
- Flood survey. The Village distributed a flooding questionnaire in September of 2011 to identify the various types and locations of flooding that occurred throughout the Village in July 2011. Over 1,000 responses were received, and the results have been and will continue to be used to fine-tune stormwater and sanitary sewer recommendations and improvements.
- Fast-track repair permit program. In the immediate aftermath of the flood, the Village Council authorized a streamlined permitting process to allow residents affected by the flood to make repairs quickly and safely. The Council also authorized waiving permit fees associated with these repairs.
- E-Mail "Stormwater comments". The Village has established the "Stormwater Comments" e-mail address as a means of soliciting information, feedback, and dialogue with residents on stormwater and flooding issues.
- Council Meetings & Updates. The Village Council has added as a regular agenda item stormwater updates to facilitate communication of ongoing stormwater planning and improvements.
- Sanitary Sewer Anti-Backup Program Enhancements. With the realization of large-scale sanitary sewer flooding, the Village Council increased Village reimbursement levels associated with the Anti-Backup Device Cost Sharing Program in September 2011. Under this program, the Village financially contributes towards the installation of overhead sewer or anti-backup devices in pre-1970 structures with gravity sewer connections, which are susceptible to basement backups. The Council increased participation limits from \$2,500 or 50% of the cost, whichever is less, to \$3,500 or 50% of the cost, whichever is less, towards the cost of installing an approved anti-backup device (\$5,000 for an overhead sewer conversion). Since the storm, approximately 24 property owners have participated in this program to protect their homes from future basement backups.
- Resident Flooding Seminar. At the Council's direction, staff is preparing for an education event aimed at informing property owners how they can take steps to

protect their property from flooding. This event, patterned after a similar event recently held in Northfield, is tentatively scheduled for Wednesday, September 19, 2012.

- Property visits and assistance. In the 12 months since the flood, field and engineering staff have met with many property owners to review drainage conditions on their property to counsel and assist them in addressing drainage or flooding issues on their properties. Many of these property owners have gone on to take advantage of the Sanitary Sewer Anti-Backup Program.

Floodplain Management

The Village is situated such that portions of western and southwestern Winnetka are located within the floodplain of the Skokie River. The Village has over 700 parcels located in the regulatory floodplain. As a means of managing development and protecting property in the floodplain, the Village participates in the National Flood Insurance Program. Under this program, administered by FEMA, the Village has adopted and enforces development regulations for properties located within the floodplain, and FEMA makes available flood insurance for properties located within the floodplain. In April of 2012, the Village formally applied for FEMA's Community Rating System (CRS). The CRS recognizes community efforts beyond FEMA's minimum floodplain standards by reducing flood insurance premiums for the community's property owners. The CRS is similar to – but separate from – the private insurance industry's programs that grade communities on the effectiveness of their fire suppression and building code enforcement. CRS discounts on flood insurance premiums range from 5% up to 45%. Those discounts provide an incentive for new flood protection activities that can help save lives and property in the event of a flood. FEMA has already completed their field audit of the Village's program and the Village is working with FEMA to demonstrate compliance with activities that increase rating points. It typically takes 12 to 24 months for a community to complete the CRS process and be formally accepted.

Operations and Maintenance

In addition to large capital programs, the Village has undertaken numerous ongoing maintenance activities and small improvements designed to maintain the systems that convey floodwater and sanitary sewage. Among these actions:

- Elder Lane Outfall Cleanup. There has been quite a bit of publicity over the past few years concerning bacteria-related beach closures in Winnetka, particularly at the Elder Lane Beach. The Winnetka Park District has consulted over the past few years with the Illinois Department of Public Health and researchers from the University of Illinois-Chicago to attempt to identify the source of the bacteria that requires these closures. Village staff has participated in this work. These investigations have identified that a significant source, but probably not the only source, of bacteria at Elder Lane Beach is likely the storm sewer discharge located directly adjacent to the swimming beach. As a result of these investigations, Public Works staff has been aggressively investigating the storm sewer system tributary to Elder Lane beach over the past two years for possible cross-

connections. To date, over 15 such cross-connections have been identified and corrected. The significant majority of these cross-connections have been found to be leaking private service pipes serving single-family homes. When private cross-connections are identified, contact is made with the property owner, who is required to repair the defect. Depending on the circumstances, repair of these defects can be many thousands of dollars and consequently a significant amount of staff time and assistance is often required. Two instances of leaking Village pipes were identified and repaired. The Winnetka Park District takes daily water samples at Elder Lane Beach, which are tested for bacteria to determine if the beach is open or closed for swimming. For the past several years, Elder Lane Beach has been one of the most frequently closed beaches on Lake Michigan. Park District staff has informed me that their sampling results have necessitated **zero bacteria-related beach closures at Elder Lane for the 2012 swim season to date**, so it appears that the Village's efforts over the past couple of years have been effective in this regard.

- **Sanitary Sewer Lining Program.** The Village has an ongoing program for lining sanitary sewers to provide additional structural life and to reduce infiltration of groundwater. The 2011 lining program included large sections of sanitary sewer along the "tree streets", which experienced such significant flooding in July 2011. This work was completed as part of a joint project with several other municipalities in fall 2011.
- **Miscellaneous Cleaning and Repairs.** Staff continues to clean and televise storm and sanitary sewers as part of routine and ongoing maintenance. Our systems are in good operating condition but occasional repairs, such as replacing a broken flapgate on the Tower Road outlet and regular clearing and cutting of root obstructions are ongoing items.

This report is provided as a resource so that Village citizens and policy makers can see the scope of activities large and small undertaken in the year since the devastating flood. While there is much work to do, the Village has embarked on a course of action that will result in improved stormwater drainage and a reduced risk of flooding in the future.

Recommendation:
Informational Report