MEMORANDUM

September 18, 2012

TO: Anne Marin – City Administrator, Prospect Heights
Steve Skiber – Director of Building and Zoning, Prospect Heights
James H. Johnson, PE – Director of Public Works and City Engineer
James O'Neill – Public Works Foreman, Prospect Heights

COPY: *Project Files (CBBEL Project No. 11-412)*

FROM: Erik L. Gil, PE

SUBJECT: **Eastside TIF District Flooding Problem Area**
Project: 2011-12 Prospect Heights Flood Study
Location: East of Milwaukee Avenue, West of Wolf Road, south of Palatine Road, and north of Willow Road, Prospect Heights, Cook County, Illinois
Watershed: Des Plaines River (subarea adjacent to river)

INTRODUCTION

Christopher B. Burke Engineering Ltd. (CBBEL) was retained by the City of Prospect Heights (City) to perform a flood risk reduction analysis based on the flooding that occurred from the July 22-23, 2011 storm event. The primary goals of this study were to determine the extent of the flood damage, establish possible causes for the flooding and to provide potential solutions to reduce the risk of future flooding.

This memorandum documents the analysis for the Eastside TIF District Study Area. Separate memoranda will be provided for each of the other study areas, and will be assembled in a single report at the conclusion of the study.

JULY 22-23, 2011 EVENT PRECIPITATION

On July 23, 2011 the City received approximately 4.81 inches of rain in a 3-hour period that resulted in extensive flood damage in certain areas of the City. The City received 6.17 inches of rain in a 24-hour period from July 22nd to the 23rd. The rainfall totals were based on the rainfall values obtained from the gages shown in Table 1 below, which are from both the O'Hare International Airport and the Chicago Executive Airport weather gages.

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TABLE 1
July 22-23, 2011 Rainfall Values

Gage ID	Location	3-hour Total (inches)	24-hour Total (inches)
04838	Chicago Executive Airport	4.71	6.06
94846	O'Hare International Airport	6.79	8.21
	Weighted Average =	*4.81*	*6.17*
	ISWS Bulletin 70 frequency at Prospect Heights*	100-year	40-year

*Note: The stated frequency is approximate.

Two durations were chosen for discussion purposes, the 3-hour duration and the 24-hour duration. The 24-hour duration is the traditional duration used for many engineering calculations and is the typical one reported by the media. The 3-hour duration was also chosen for comparison purposes for 2 reasons. The first is that most of the flooding problem drainage areas being evaluated in this flood study respond to significant short-duration rainfall events within or shortly after a 3-hour period, that is, the flood peak is typically reached shortly after this time period if rain is no longer falling, as was the case during July 23, 2011. The Des Plaines River, for example, would not respond as quickly to a significant short-duration rainfall event. The second reason is that the rainfall totals for the most severe continuous 3-hour period at the O'Hare International Airport gage exceeded the 100-year frequency as documented in the Illinois State Water Survey (ISWS) Bulletin 70 publication, the reference used by most regulatory agencies in the northeastern Illinois area for rainfall depth design values. The Chicago Executive Airport gage did not exceed the 100-year frequency value for the 3-hour event, but it was sufficiently close to be considered as the 100-year frequency. As can be observed, the two gage values at O'Hare International Airport and at Chicago Executive Airport differed by over 2 inches of rainfall for each of the reported totals. This meant that the July 22-23, 2011 event was a relatively localized storm event. For purposes of this study, a simple weighted average between the two gages was computed to estimate the rainfall totals that fell on the City, assigning a 95% weight to Chicago Executive Airport based on distance from the City as compared to the O'Hare International Airport, which was assigned a 5% weight.

The July 22nd–23rd storm event exceeded the capacity of the storm sewer systems in the older parts of town and resulted in street, backyard, and home flooding. Approximately 161 residents within the City filled out a flood questionnaire after the July 23rd storm event.

REFERENCES AND AVAILABLE INFORMATION

- Meetings with City staff,
- Summary provided by City staff of 161 flood questionnaires submitted by City residents,
- Site visits,
- Cook County 1-foot contour aerial topography,
- City storm sewer maps,

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- United States Geological Survey (USGS) Hydrologic Atlas (HA),
- Historic Aerial Photographs,
- Federal Emergency Management Agency (FEMA) Federal Insurance Rate Maps (FIRMs)

OVERVIEW

The Eastside TIF District is located in the eastern most area of the City. In general, the study area is bounded by Palatine Road to the north, Milwaukee Avenue to the east, Willow Road to the south, and Wolf Road to the west. This study area is within the Eastside TIF District and is bounded by Apple Drive to the north and Burning Bush Drive to the west. The Village of Mount Prospect is located immediately south of the Eastside TIF District, and the Chicago Executive Airport is located to the north. The street map of this location is shown on Figure 1.

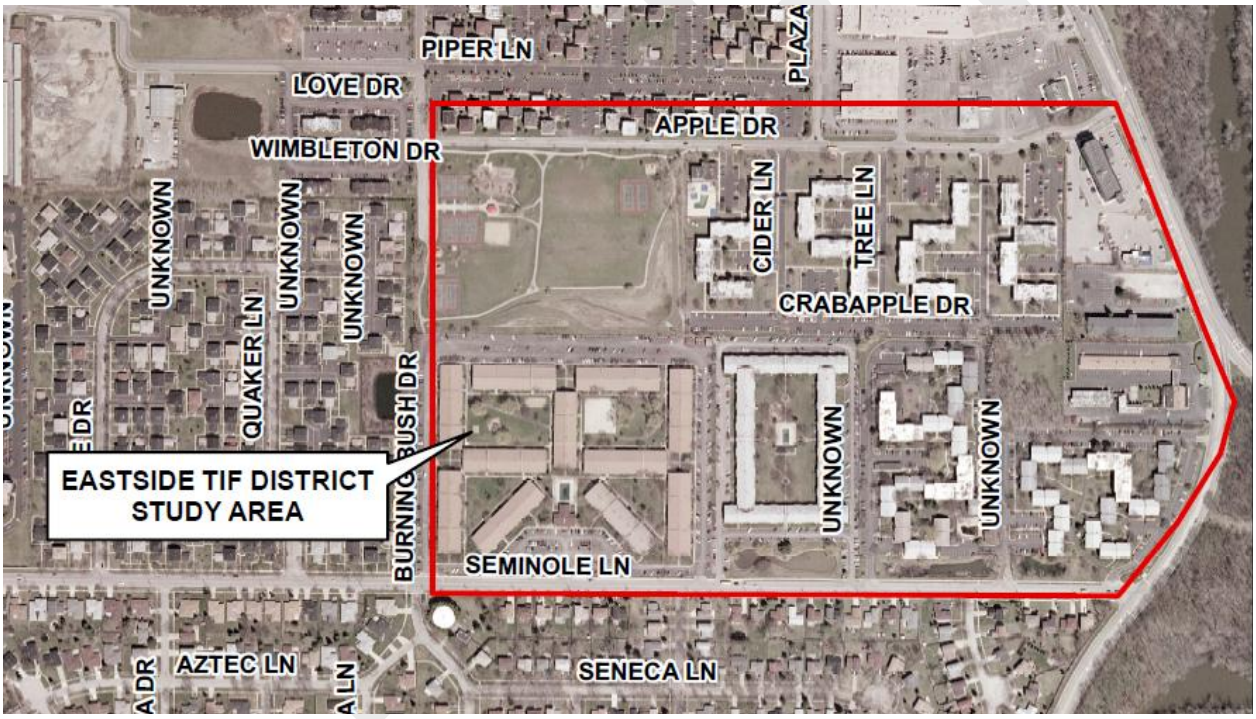

Figure 1
Eastside TIF District Study Area
Location Map

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The study area is located entirely in a Federal Emergency Management Agency (FEMA) Zone AE regulatory floodplain, according to Flood Insurance Rate Map (FIRM) Panel 207 of 832, revised August 19, 2008. The approximate floodplain elevation across the study area is 639. The ground elevations within the study area range from approximately 635 to 639. Therefore, under FEMA's 1% chance storm event (or the 100-year event) portions of the study area are inundated by as much as 4 feet of depth by the Des Plaines River.

The Eastside TIF District drains to the Des Plaines River. The most northern areas of it drain directly to the Des Plaines River, while the majority drains south into the Willow Woods Condominiums Detention Ponds system that discharges into a storm sewer that drains south into the Mount Prospect storm sewer system.

PHOTOGRAPH 1
Willow Woods Condominiums Detention Pond Outlet Looking South

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EXISTING DRAINAGE PATTERN

The historic patterns that existed prior to development in this area were of a nearly flat area that drained mostly south into a small tributary to the Des Plaines River. According to Hydrologic Investigations Atlas HA-67, Floods in Arlington Heights Quadrangle, Illinois, prepared in 1963, shown as Figure 2, this tributary drained a substantial portion of the study area. This tributary has been enclosed as the area developed, and the runoff is now conveyed via storm sewers into the Des Plaines River.

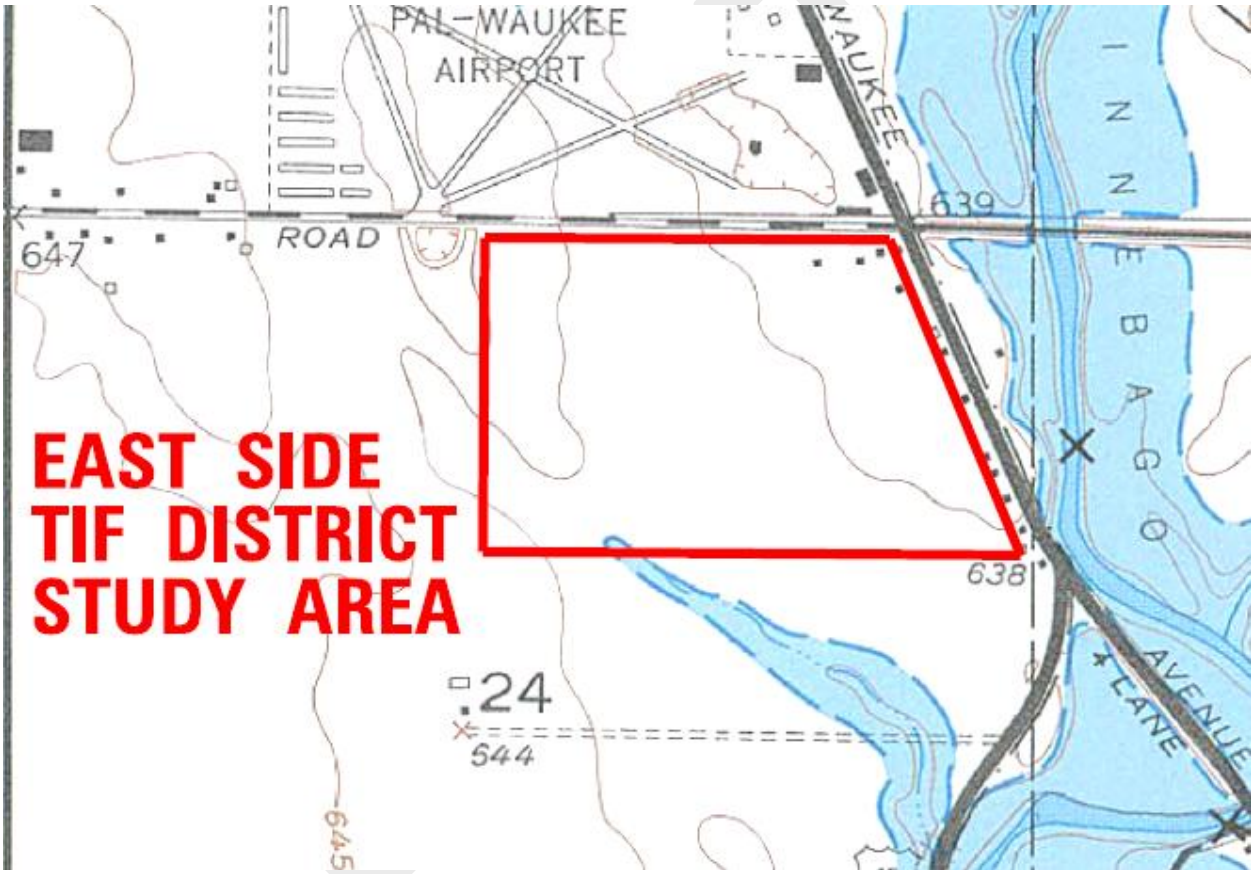

Figure 2
USGS Hydrologic Atlas

Because of its location within the Des Plaines River floodplain and generally flat terrain, the Eastside TIF District has historically experienced significant flooding. Back in the 1990s, the USACE planned and designed the Levee 37 project. This project was proposed to alleviate overbank flooding due to the Des Plaines River from affecting areas within the City of Prospect Heights and the Village of Mount Prospect. The levee portion of the project is

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99% complete, with the remaining component being an opening left with the levee system to allow Des Plaines River water to flood the areas until the mitigating Heritage Park storage area is completed next year. Once Heritage Park improvements are complete, the levee system will be completed, and a 1% chance or 100-year level of protection will be achieved. The Levee 37 flood control project consists of approximately of 9,000 LF of floodwall including a small portion of levee, three pumping stations, a number of gravity outlet structures, a roadway closure structure and a road raise. The floodwall runs along the eastside of Des Plaines River Road from Euclid Avenue to Milwaukee Avenue, and continues along the eastside of Milwaukee Avenue from Des Plaines River Road to Palatine Road then west along the north side of Palatine Road to a tieback into high ground. The road closure structure will consist of a double swing gate structure across Milwaukee Avenue on the north side of Palatine Road. A road raise on Milwaukee Avenue, extending from its intersection with Des Plaines River Road proceeds to the east from this intersection and was constructed by IDOT. The construction of the road raise eliminated the need to install a large vertical closure gate at the intersection of Milwaukee Avenue and Des Plaines River Road. However, the Levee 37 system was not designed to specifically alleviate local or interior flooding west of the levee (the interior drainage system), but due to its pumping stations, it may have the benefit of reducing the backwater (tailwater) condition that used to impact the storm sewer systems that drain the study area.

The current land use of the study area consists of an industrial park on the northwest corner of the study area, a commercial area on the northeast corner, a park district recreational area in the center of the area, and multi-family residential units in the remaining portions of the study area.

Old Willow Falls

This is a multi-family residential development consisting of condominiums and a detention pond. The development drains north to south into a detention pond and also receives stormwater runoff from Willow Heights Condominiums to the west and River Trails Condominiums to the north. There is street ponding along the western parking lot due to a 8" restrictor in the storm sewer system from Willow Heights Condominiums. The City has indicated that there are flooding problems in the development.

Willow Heights Condominiums

This is a multi-family residential development consisting of condominiums. This development does not have any open-space detention ponds. The parking lot of Willow Heights is used for detention storage and ponding occurs in the parking lot due to the 8" restrictor in the east parking lot adjacent to the Old Willow Falls west parking lot. The development drains west to east into the Old Willow Falls storm sewer system and takes stormwater runoff from the Quincy Park Subdivision to the west. There is ponding in the parking lot because the parking lot functions as the detention pond for the development. The City has indicated that flooding occurs in the development; however, it appears that the flooding problems can be attributed to the parking lot functioning as a detention basin as it was designed to perform.

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Willow Woods Condominiums
This is a multi-family residential development consisting of condominiums and two detention ponds. The development drains north to south into the two detention ponds. The east detention pond drains into the west detention pond which discharges into the storm sewer system on Old Willow Road. The development receives stormwater runoff from Willow Trails Park to the northwest, from River Trails Condominiums to the north, and from Apple Drive to the north. There is street/parking lot ponding reported.

River Trails Condominiums
This is a multi-family residential development consisting of condominiums. There are no detention ponds in this development. The development drains north to south into the Willow Woods storm sewer system. The development receives stormwater runoff from Palwaukee Plaza from the north and along Apple Lane to the north. The detention storage for River Trails Condominiums is located in small street/parking lot "pockets" throughout the development. Street ponding occurs at the intersection of Crabapple Drive and Tree Lane and along Tree Lane.

Palwaukee Plaza
This is a commercial development which has no detention ponds. The development drains west to east into the storm sewer system that discharges into the Des Plaines River. Any overflow drains to the south to the River Trails Condominiums. The development receives stormwater runoff form Country Pine Apartments to the west. There is street ponding in the parking lot of Palwaukee Plaza. The City has indicated that there are historical flooding problems in the area.

There were no flood questionnaires returned in this study area.

STORMWATER DEFICIENCIES

Based on field visits, assessment of the topography, verbal communication with Public Works staff, and the limited existing storm sewer system shown on the City atlases for this area, the following stormwater deficiencies have been identified for this area:

1. In general, the study area is a highly impervious watershed system with limited storage areas, and a private storm sewer system. The result is significant street flooding. There does not appear to be land available to expand the existing detention ponds which would be the cost effective option.
2. There is one area in which the flow is being restricted due to the size of the storm sewer pipe. The storm sewer line that discharges into the Old Willow Falls detention basin and originates at the west parking lot of the Willow Heights Condominiums consists of a 15"-12"-8"-18". The 12" and 8" storm sewer pipes are located in the parking lots at the property boundary of the Willow Heights Condominiums and the

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Old Willow Falls Condominiums. This restriction causes stormwater runoff to pond in the parking lot of the Willow Heights Condominiums, which acts as a detention for the runoff from the condominiums. It is assumed that this restriction in the storm sewer exists to provide detention storage for the Willow Heights Condominiums. Therefore, upsizing the 12" and 8" storm sewer pipes is not recommended if the parking lot of the condominiums is to continue to serve as a detention area. However, the ponding at the west parking lot of the Old Willow Falls Condominiums could be caused by clogging of the inlet grate structure.

3. The area is located in the Des Plaines River floodplain. However, as previously described, overbank flooding due to a rising Des Plaines River will be eliminated up to the design 100-year elevation due to the Levee 37 project once it is completed. Backwater effects into the storm sewers from the Des Plaines River, a historic deficiency, will also be significantly reduced due to the functioning of the Levee 37 pumping stations.
4. There is an open-grate top of a manhole structure at the end of the 48" reinforced concrete pipe (RCP) which outfalls at the Willow Woods West Detention Pond. There is a low-flow opening at this structure and any surcharge flows would bubble from the top of the structure through the grate. The invert of this opening is low enough so that most of the 36" sewer line through the River Trails Condominiums parking lot should be dry during dry periods (only the last leg of the 36" system before it enters the Willow Woods Condominiums system would have ponded water); however, it is not low enough to drain the 48" RCP, which is constantly under water. Prior to the City's televising and cleaning, there was an obstruction somewhere between the parking lot and the Willow Woods West Detention Pond that was blocking the sewer line from draining by gravity to the invert of the structure opening at the pond. If this obstruction is removed (as it has been), the stormwater ponding can be significantly reduced (but not eliminated) during moderate storm events.
5. Also, the 48" storm sewer pipe through the Willow Woods Condominiums is lower than the downstream storm sewer system in the Village of Mount Prospect. Without pumping or lowering the storm sewer system through the Village of Mount Prospect, the 48" RCP will always remain ponded (unless during extreme drought periods, the Willow Woods Condominiums West basin would dry up such that its normal water level (NWL) would be below the 48" system's invert).

APPROACH TO SOLUTIONS

This area experiences flooding because this area is relatively flat and has historically benn impacted by the flood levels in the Des Plaines River. While the storm sewer provides a means of draining this area, its capacity is exceeded for moderate to significant storm events, and the area floods. Some portions of this area were developed prior to the requirement for detention storage.

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There are no available photographs for this area during the July 23, 2011 storm event. The City has recently completed sewer cleaning operations, and found obstructions in the system, which have since been cleared.

In general, structural approaches for alleviating flooding problems can be categorized into two types: storage creation, or conveyance improvements. Typically, conveyance improvements alone may cause impacts to downstream properties, and detailed modeling would be necessary to determine the location and magnitude of these impacts, which is beyond the scope of this study.

Aside from possible public improvements, it is recommended that the City encourage all residents to flood-proof their homes, which in this study area would require the cooperation of all the residents within a building, especially those who have experienced flooding in the past. This will reduce the risk of future flooding due to overland flow, seepage and sump pump failures. A list of simple and inexpensive flood-proofing measures has been included as Attachment 1 of this memorandum. This recommendation is in addition to any other drainage improvements on public or private property.

There are various approaches to alleviating flooding for this area, some of which have already occurred or soon will be completed but are listed for completeness.

- Protect the area from overbank flooding. Levee 37 was designed to protect this area from the FEMA 1% chance flood, and when the existing openings are closed, will function as such.
- Reduce the backwater (or tailwater) impacts from the Des Plaines River into the existing storm sewers that drain this area. This system is either operational or nearly operational with 2 pump stations that discharge runoff from the study area into the Des Plaines River. The impacts of this improvement have likely not been observed yet as the Des Plaines River has not significantly flooded when the system has been operational. While no modeling has been performed for this study, the USACE has indicated that there were no interior drainage issues with the pumps operating.
- Clean the existing storm sewer system. This was completed by the City as part of the overall Drainage Study. The results of this work were that the Willow Woods Condominiums storm sewer system was obstructed by significant debris, and this debris has been cleaned.
- Perform modeling to determine if the entire system can be optimized; however, the above-described improvements, either already completed or soon to be completed as mentioned are anticipated to improve the flooding problems of this area.

ALTERNATIVE DRAINAGE SOLUTIONS

The possible drainage solutions for the Eastside TIF District study area were developed at a concept level based on feasibility of implementation and cost effectiveness. Based on this

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analysis and the understanding that the Levee 37 project is planned to be operational by 2014, CBBEL identified the following alternatives to reduce the risk of flooding in this area:

1. The 36"-48" system from the River Trails Condominiums to the Willow Woods West Detention Facility should be cleaned and televised. The size of the system appears to be adequate for its designed rainfall event. By cleaning this system and assuming that no rehabilitation to the sewer line is necessary (it has been assumed that the pipe does not need repairs), the Willow Woods West Detention Pond will experience higher water levels than it currently does, but that the adjacent parking area should experience less inundation. It appears that the City's televising found that the main blockage was occurring within the 48" pipe between the condominiums. This televising and cleaning should be performed at least every 5 years.
2. The Willow Trails Park can be modified to provide more storage and to directly take the outflow from the Quincy Park detention basin. The Quincy Park detention basin should be pumped after the detention basin is full or the end of the storm event. The water from the Quincy Park basin enters the detention area of the park where it is restricted by a 12" pipe before entering the 30" RCP. By providing more storage and restricting this flow, the River Trails Condominiums storm sewer system can be surcharged to a lesser extent during storm events alleviating some of the flooding at the Tree Lane and Crabapple Drive intersection. This component will require coordination with the Park District.
3. Modify the outlet structure of the Willow Woods Condominiums West Detention Basin, dredge approximately one foot of the pond below NWL, and lower the outlet invert by replacing the 48" pipe from the structure to the next manhole structure. Approximately 75 feet of storm sewer would be replaced. The purpose of this modification is to lower the invert of the outlet by 1 ft from. The goal of this is to provide more hydraulic head to the 36"-48" storm sewer system by lowering the normal water of the basin. Although some additional storage will be provided by this project, the improved conveyance of the 36"-48" storm sewer system is its main benefit. The additional storage can be considered as a factor of safety for overtopping the Willow Woods West detention basin in the events lower than the 10-year event. This project will require considerable coordination with the Village of Mount Prospect.
4. To reduce ponding in the center parking lot of the River Trails Condominiums, the vacant lot west of the Excel Inn can be excavated to provided approximately 2.2 acre-feet of additional detention storage. This storage area will drain into the 21"-24" RCP storm sewer system along the east side of Willow Woods West basin. The outlet of the storage area consists of a 12" RCP storm sewer with a 3" restrictor. This storage area should reduce the ponding in the center parking lot of the River Trails Condominiums for the storm events less than the 10-year event.
5. In order to reduce the ponding areas in the parking lot of the Willow Heights Condominiums and the Old Willow Falls condominiums, the existing storm sewer line through this area needs to be upsized, an additional storm system needs to be

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added parallel to the existing storm sewer, and the Old Willow Falls basin needs to be enlarged. The extent of this basin expansion would be expected to be significant.

RECOMMENDATIONS

Based on this analysis, CBBEL presents the pros and cons of each alternative, and provides estimated costs and a recommendation.

TABLE 2
Eastside TIF Flooding Problem Area
Alternatives Analysis Summary

Alternative	Description	Pros	Cons
1	Televise and clean the sewer system that drains into the Willow Woods West Detention Facility	• Cost effective • May substantially reduce flooding within the Willow Woods area • Least impact to residential properties	• Will not solve flooding in other areas
2	Provide additional storage at the Willow Trails Park	• May lower the flooding levels for smaller storms • Will decrease inundation times • Least impact to residential properties	• Will not eliminate flooding or level of inundation for large storm events • Will require coordination with the Park District • Park will be subject to more water inundation
3	Lower 48 inch outlet at the Willow Woods West Detention Facility by about 1 foot and dredge the pond	• May lower the flooding levels for smaller storms • Will decrease inundation times • Least impact to residential properties	• Will not eliminate flooding or level of inundation for large storm events • Will require coordination and agreement from the Village of Mount Prospect • Will require modeling
4	Create storage at the wooded vacant lot west of Excel Inn	• May lower the flooding levels for smaller storms • Will decrease inundation times • Least impact to residential properties	• Will not eliminate flooding or level of inundation for large storm events • Will require land acquisition • Tree screening will be eliminated
5	Deepen the Old Willow Falls detention basin and add a pump station	• May lower the flooding levels for smaller storms • Will decrease inundation times	• Will not eliminate flooding or level of inundation for large storm events • Will mainly alleviate flooding at Old Willow Falls and Willow Heights • Will require authorization from the Old Willow Falls residents • Relatively high cost

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Table 3 below provides a summary of conceptual cost estimates associated with each of the above alternatives. The detailed conceptual cost estimates can be found under Attachment 2.

TABLE 3
Eastside TIF Flooding Problem Area
Alternatives Analysis Cost Summary

Alternative	Description	Estimated Cost
1	Televise and clean the sewer system that drains into the Willow Woods West Detention Facility	$13,100
2	Provide additional storage at the Willow Trails Park	$570,000
3	Lower 48 inch outlet at the Willow Woods West Detention Facility by about 1 foot and dredge the pond	$170,000
4	Create storage at the wooded vacant lot west of Excel Inn	$420,000
5	Deepen the Old Willow Falls detention basin and add a pump station	$2,170,000

Based on this analysis, CBBEL recommends that:

- The City should allow the Levee 37 project to be completed so that the full benefits to the storm sewer system can be observed during significant events.
- The City should regularly maintain the 36”-48” storm sewer system.
- The City should explore adding stormwater storage, such as Alternatives 2 and 4, as described above to further reduce parking lot flooding.

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Attachment 1

Flood-proofing Techniques

TIPS ON FLOOD PREVENTION FOR HOMEOWNERS

- Clean gutters and install gutter covers to prevent clogging.
- Redefine and clear swales throughout yard to allow an appropriate drainage way for storm water runoff.
- Raise the low entry elevation at which storm water can enter your home by berming around basement doorways or windows. A pump may be required to drain water away from inside the berm.
- Verify existing sump pump and outlet pipe have sufficient capacity for discharging during intense storm events.
- Provide a relief outlet for the sump pump outside of the house that is a safe distance from the foundation in case of surcharge, frozen outlet pipe, or other blockage.
- Install a backup source of power for sump pump in case of electrical power failure.
- Extend downspouts away from the foundation 5-10 feet.
- Repair foundation cracks throughout basement to prevent seepage.
- Raise the low-entry elevation of window wells and/or install drains in the window wells and connect them to the sump pump system.
- Install glass block windows in place of basement windows (except escape window) to prevent water inflow or infiltration.
- If a storm sewer structure is adjacent to the lot, an underdrain system could be installed to collect excess runoff, any remaining seepage or any infiltration resulting from hydrostatic pressure.
- For homes with a reverse-slope driveway, raise the sidewalk elevation to reduce the risk of standing water in the street draining down the driveway and into the garage.
- To further reduce the risk of flooding for homes with reverse slope driveways, it may be necessary to convert the lower level garage into a basement and completely fill in the reverse-slope driveway.

The recommendations provided above may not eliminate flooding or flood damage within the residence; however, if installed correctly they should effectively reduce the risk of flooding. It is should also be noted that any of the recommendations may be implemented

individually, however, many suggestions may be used in conjunction with one another to provide a greater impact in helping to reduce the risk of future flood damage.

WEBSITE LINKS FOR FLOOD PREVENTION

Lake County Stormwater Management Commission Website
http://www.co.lake.il.us/smc/citizens/default.asp

"Repairing Your Flooded Home" by FEMA and the Red Cross
http://www.co.lake.il.us/smc/fwa/ARC_RepFloodedHome.pdf

"Drainage Around Your Home" by the National Resource Conservation Service
http://www.co.lake.il.us/smc/citizens/drainbro.pdf

"Homeowners Guide to Retrofitting: Six Ways to Protect Your Home from Flooding" by FEMA
http://www.fema.gov/rebuild/mat/rfit.shtm

"Guide to Flood Protection in Northeastern Illinois" by the Illinois Association for Floodplain and Stormwater Management
http://www.illinoisfloods.org/documents/Guide_to_Flood_Prot--March_06.pdf

Attachment 2
Cost Estimates

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Project# 110412
Date: September 17, 2012

Prospect Heights, Proposed Drainage Improvements
EASTSIDE TIF DISTRICT FLOODING PROBLEM AREA - ALTERNATE 1

ITEMS	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
CLEAN AND TELEVISE STORM SEWER	FOOT	2000	$3.50	$7,000.00

SUB TOTAL =	$7,000.00
CONTINGENCY (30%) =	$2,100.00
CONSTRUCTION TOTAL =	$9,100.00
REVIEW TAPES AND MAKE REPAIR RECOMMENDATIONS=	$4,000.00
TOTAL PROJECT COST INCLUDING ENGINEERING =	$13,100.00

NOTE: THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISTION, TEMPORARY OR CONSTRUCTION EASEMENTS, OR RELOCATING ANY UTILITIES

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Prospect Heights, Proposed Drainage Improvements
EASTSIDE TIF DISTRICT FLOODING PROBLEM AREA - ALTERNATE 2

ITEMS	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
TREE REMOVAL	ACRE	0.2	$15,000.00	$3,000.00
TREE ROOT PRUNING	EACH	10	$200.00	$2,000.00
EARTH EXCAVATION	CU YD	4840	$40.00	$193,600.00
TOPSOIL FURNISH AND PLACE, 4"	SQ YD	14000	$5.00	$70,000.00
SEEDING WITH EROSION CONTROL BLANKET	SQ YD	14000	$5.00	$70,000.00
STABILIZED CONSTRUCTION ENTRANCE	EACH	1	$3,500.00	$3,500.00
TRAFFIC CONTROL	LSUM	1	$5,000.00	$5,000.00
CONSTRUCTION LAYOUT	LSUM	1	$20,000.00	$20,000.00

SUB TOTAL =	$367,100.00
CONTINGENCY (30%) =	$110,130.00
CONSTRUCTION TOTAL =	$477,230.00
DESIGN ENGINEERING (10%) =	$35,792.25
CONSTRUCTION OBSERVATION (10%) =	$35,792.25
PERMITTING (5.0%) =	$18,355.00
TOTAL PROJECT COST INCLUDING ENGINEERING =	$567,169.50

NOTE: THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISTION, TEMPORARY OR CONSTRUCTION EASEMENTS, RELOCATING ANY UTILITIES, OR RELOCATING ANY PRIVATE PROPERTY.

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Prospect Heights, Proposed Drainage Improvements
EASTSIDE TIF DISTRICT FLOODING PROBLEM AREA - ALTERNATE 3

ITEMS	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
EARTH EXCAVATION	CU YD	900	$40.00	$36,000.00
TOPSOIL FURNISH AND PLACE, 4"	SQ YD	2670	$5.00	$13,350.00
SEEDING WITH EROSION CONTROL BLANKET	SQ YD	2670	$5.00	$13,350.00
STABILIZED CONSTRUCTION ENTRANCE	EACH	1	$3,500.00	$3,500.00
STONE RIPRAP, CLASS A4	SQ YD	20	$30.00	$600.00
TRENCH BACKFILL, SPECIAL	CU YD	40	$45.00	$1,800.00
STORM SEWER, RCP 48"	FOOT	70	$120.00	$8,400.00
PROPOSED MANHOLE, 6' DIA	EACH	1	$5,000.00	$5,000.00
PRECAST REINFORCED CONCRETE FLARED END SECTIONS 48" WITH GRATE	EACH	1	$2,500.00	$2,500.00
CLASS D PATCHES, 12 INCHES	SQ YD	30	$75.00	$2,250.00
CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	20	$40.00	$800.00
TRAFFIC CONTROL	LSUM	1	$8,000.00	$8,000.00
CONSTRUCTION LAYOUT	LSUM	1	$15,000.00	$15,000.00

SUB TOTAL =	$110,550.00
CONTINGENCY (30%) =	$33,165.00
CONSTRUCTION TOTAL =	$143,715.00
DESIGN ENGINEERING (10%) =	$10,778.63
CONSTRUCTION OBSERVATION (10%) =	$10,778.63
PERMITTING (5.0%) =	$5,527.50
TOTAL PROJECT COST INCLUDING ENGINEERING =	$170,799.75

NOTE: THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISTION, TEMPORARY OR CONSTRUCTION EASEMENTS, RELOCATING ANY UTILITIES, OR RELOCATING ANY PRIVATE PROPERTY.

Christopher B. Burke Engineering, Ltd.
9575 West Higgins Road, Suite 600
Rosemont, Illinois 60018
Project# 110412
Date: September 17, 2012

Prospect Heights, Proposed Drainage Improvements
EASTSIDE TIF DISTRICT FLOODING PROBLEM AREA - ALTERNATE 4

ITEMS	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
TREE REMOVAL	ACRE	1.2	$15,000.00	$18,000.00
TREE ROOT PRUNING	EACH	20	$200.00	$4,000.00
EARTH EXCAVATION	CU YD	3550	$40.00	$142,000.00
TOPSOIL FURNISH AND PLACE, 4"	SQ YD	6000	$5.00	$30,000.00
SEEDING WITH EROSION CONTROL BLANKET	SQ YD	6000	$5.00	$30,000.00
STABILIZED CONSTRUCTION ENTRANCE	EACH	1	$3,500.00	$3,500.00
STONE RIPRAP, CLASS A4	SQ YD	40	$30.00	$1,200.00
TRENCH BACKFILL, SPECIAL	CU YD	40	$45.00	$1,800.00
STORM SEWER, RCP 12"	FOOT	60	$75.00	$4,500.00
PROPOSED MANHOLE, 4' DIA	EACH	2	$4,000.00	$8,000.00
PROPOSED RESTRICTOR MH, 5' DIA	EACH	1	$4,500.00	$4,500.00
PRECAST REINFORCED CONCRETE FLARED END SECTIONS 12"	EACH	2	$500.00	$1,000.00
TRAFFIC CONTROL	LSUM	1	$5,000.00	$5,000.00
CONSTRUCTION LAYOUT	LSUM	1	$15,000.00	$15,000.00

SUB TOTAL =	$268,500.00
CONTINGENCY (30%) =	$80,550.00
CONSTRUCTION TOTAL =	$349,050.00
DESIGN ENGINEERING (10%) =	$26,178.75
CONSTRUCTION OBSERVATION (10%) =	$26,178.75
PERMITTING (5.0%) =	$13,425.00
TOTAL PROJECT COST INCLUDING ENGINEERING =	$414,832.50

NOTE: THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISTION, TEMPORARY OR CONSTRUCTION EASEMENTS, RELOCATING ANY UTILITIES, OR RELOCATING ANY PRIVATE PROPERTY.

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Prospect Heights, Proposed Drainage Improvements
EASTSIDE TIF DISTRICT FLOODING PROBLEM AREA - ALTERNATE 5

ITEMS	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
TREE REMOVAL	ACRE	0.2	$15,000.00	$3,000.00
TREE ROOT PRUNING	EACH	5	$200.00	$1,000.00
EARTH EXCAVATION	CU YD	10370	$40.00	$414,800.00
TOPSOIL FURNISH AND PLACE, 4"	SQ YD	4440	$5.00	$22,200.00
SEEDING WITH EROSION CONTROL BLANKET	SQ YD	4440	$5.00	$22,200.00
STABILIZED CONSTRUCTION ENTRANCE	EACH	1	$3,500.00	$3,500.00
STONE RIPRAP, CLASS A4	SQ YD	40	$30.00	$1,200.00
TRENCH BACKFILL, SPECIAL	CU YD	200	$45.00	$9,000.00
STORM SEWER, RCP 12"	FOOT	2000	$75.00	$150,000.00
PROPOSED MANHOLE, 4' DIA	EACH	8	$4,000.00	$32,000.00
PROPOSED RESTRICTOR MH, 5' DIA	EACH	1	$4,500.00	$4,500.00
CLASS D PATCHES, 12 INCHES	SQ YD	200	$75.00	$15,000.00
CURB AND GUTTER REMOVAL AND REPLACEMENT	FOOT	50	$40.00	$2,000.00
RETAINING WALLS	SQ FT	12000	$40.00	$480,000.00
TRAFFIC CONTROL	LSUM	1	$15,000.00	$15,000.00
CONSTRUCTION LAYOUT	LSUM	1	$25,000.00	$25,000.00
FORCE MAIN	FOOT	50	$50.00	$2,500.00
PUMP STATION	LSUM	1	$200,000.00	$200,000.00

SUB TOTAL =	$1,402,900.00
CONTINGENCY (30%) =	$420,870.00
CONSTRUCTION TOTAL =	$1,823,770.00
DESIGN ENGINEERING (10%) =	$136,782.75
CONSTRUCTION OBSERVATION (10%) =	$136,782.75
PERMITTING (5.0%) =	$70,145.00
TOTAL PROJECT COST INCLUDING ENGINEERING =	$2,167,480.50

NOTE: THIS ESTIMATE DOES NOT INCLUDE ROW ACQUISTION, TEMPORARY OR CONSTRUCTION EASEMENTS, RELOCATING ANY UTILITIES, OR RELOCATING ANY PRIVATE PROPERTY.