

DRAFT August 2013

Upper Des Plaines River and Tributaries Integrated Feasibility Report and Environmental Assessment

Appendix B – Flood Risk Management (FRM) Plan Formulation

August 2013 (DRAFT)

Study Partnership

Illinois Department of Natural Resources (IDNR)
Southeastern Wisconsin Regional Planning Commission (SEWRPC)
Lake County Stormwater Management Commission (LCSMC)
Lake County Forest Preserve District (LCFPD)
Metropolitan Water Reclamation District of Greater Chicago (MWRDGC)
Cook County Highway Department (CCHD)
Forest Preserve District of Cook County (FPDCC)
U.S. Fish and Wildlife Service (USFWS)
U.S. Army Corps of Engineers (USACE)



US Army Corps
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Chicago District

DRAFT August 2013

**Upper Des Plaines River and Tributaries
Illinois & Wisconsin
Integrated Feasibility Report and Environmental Assessment**

Appendix B – Flood Risk Management (FRM) Plan Formulation

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List of Attachments

- Attachment 1: Groveland Avenue Limited Strategic Study, IDNR-OWR, October 2009.
- Attachment 2: Farmers/Prairie Creek Strategic Planning Study, IDNR-OWR, September 2009.
- Attachment 3: Mitigation Planning

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SECTION 1 – IDENTIFICATION OF FLOOD RISK MANAGEMENT SITES

Potential sites for implementation of flood risk management measures were identified collaboratively by the Chicago District and study partners. Using the hydraulic models developed for the watershed, the Chicago District created GIS maps of potential areas of concentrated damage (included in Appendix E). The maps show the location of potential damages, the annual chance of exceedance of the modeled flood which caused the damages, and the relative magnitude of the damages. Areas of clustered damages on these maps, stakeholder knowledge of areas affected by previous events, records of reported damages from previous events, and the results of investigations conducted during the Phase I Study were used to identify areas to be considered as sites for both structural and non-structural measures.

Due to the large footprint required and limited available open land for floodwater storage, a broader approach was used for identifying sites for potential reservoirs. From land use data provided by NIPC and SEWRPC, all sites close to the river and its tributaries coded as “open or undeveloped” were included in the preliminary screening process.

To aid in tracking the large number of sites identified, a coding system was developed to give each site a unique identifier. Six digit identification codes for each site beginning with a two letter watershed code are designated below, in **Table 1**. The watershed designation is followed by a two letter code for the type of measure and a two digit number. The measure codes are presented in **Table 2**.

Table 1 – Watershed Codes Used in Site Identification System

Watershed	Code	County
Brighton Creek	BR	Kenosha/Racine
Center Creek	CC	Kenosha
Kilbourn Road Ditch	KR	Kenosha/Racine
Jerome Creek	JC	Kenosha
Newport Ditch	ND	Lake
North Mill Creek	NM	Lake/Kenosha
Mill Creek	ML	Lake
Suburban County Club Tributary	CT	Lake
Delaney Road Tributary	DR	Lake
Gurnee Tributary	GT	Lake
Bull Creek	BC	Lake
Indian Creek	IN	Lake
Aptakisic Creek	AC	Cook/Lake
Buffalo-Wheeling Creek	BW	Cook/Lake
McDonald Creek	MD	Cook
Feehanville Ditch	FD	Cook
Weller Creek	WL	Cook
Farmer-Prairie Creek	FP	Cook
Willow-Higgins Creek	WH	Cook/DuPage
Crystal Creek	CR	Cook
Silver Creek	SC	Cook/DuPage
Des Plaines River Mainstem	DP	Cook/Lake/Kenosha

Table 2 – Measure Codes Used in Site Identification System

Measure	Code
Floodwater Storage / Reservoir	RS
Floodwater Protection / Levee / Floodwall	LV
Other Structural – Bridge Modification	BM
Other Structural – Road Raise	RR
Other Structural – Modify Existing Structure	ME
Other Structural – Drain / Channel Improvement	CI
Other Structural – General	OT
Non-Structural	NS

As required by the study authorization, sites were not excluded from consideration and evaluation “based on restrictive policies regarding the frequency of flooding, the drainage area, and the amount of runoff.” Sites throughout the watershed were considered and benefits in all locations were considered during the screening and evaluation process. An assessment of the flows in channels where individually justified projects are identified was conducted after this process as discussed in Volume 2 (NED Plan Formulation) Section 3.7.

1.1 – Floodwater Storage Site Identification

As discussed above, sites along the Upper Des Plaines River and its tributaries coded as “open or undeveloped” were identified as potential floodwater storage sites. A total of 200 potential floodwater storage sites were identified throughout the entire Upper Des Plaines River watershed study area.

A preliminary site screening was conducted for the 200 sites, to narrow the list of analyzed sites to sites with a higher likelihood of being available for use as reservoirs. A set of four screening criteria was developed in order to identify potential floodwater storage sites with compatibility issues and those with the greatest likelihood of being implementable. At this step in the plan formulation process, the study team decided to exclude existing real estate ownership as a factor in screening sites. The study team reached a consensus decision for each identified site to either keep it for further evaluation or eliminate it from consideration based on the following criteria:

- A. *Field Verification* – Sites were initially identified using GIS-based landuse data provided by the Northern Illinois Planning Commission (NIPC), now the Chicago Metropolitan Agency for Planning (CMAP), and SEWRPC from 2001. These sites that were coded as “open or undeveloped” in the landuse data may not actually be available for site implementation due to either coding errors or new development within the basin since the dataset was compiled. Using aerial photography and field verification, each site was checked to determine whether or not the site was undeveloped. Developed sites were immediately eliminated from further consideration.
- B. *Existing Compatibility* – Some sites that were identified during the site selection process based on “open or undeveloped” land use may actually serve a critical hydrologic, recreational, cultural, social or other purpose; making significant alterations for

floodwater storage impractical. Examples of existing compatibility constraints include: important established recreational lands, unique culturally significant lands, historic properties, waste disposal areas, etc.

- C. *Neighboring Compatibility* – Adding potential floodwater storage at a given site needs to be compatible with adjacent lands in order for it to be supported by local interests. Adjacent properties were checked to ensure adding floodwater storage would not be detrimental. Examples of neighboring compatibility constraints include: safety concerns (schools, playgrounds, and airports), aesthetics, property values, etc.
- D. *Environmental Compatibility* – It is impractical to propose a floodwater storage site on lands that currently possess significant ecological habitats. In addition to protected areas and those possessing threatened and endangered species, the high cost of mitigation and the inability to replace significant ecosystems makes this practice undesirable. Examples of environmental compatibility constraints include: natural areas, protected tracts, conservancy set-aside lands, etc.

Table 3 through **Table 21** detail the sites investigated and the results of application of each of the screening criteria to the site. Sites are grouped according to watershed. **Table 22** presents a summary of sites considered, sites eliminated, and sites kept for further consideration by watershed.

Table 3 – Reservoir Site Preliminary Site Screening Results: Brighton Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
BR01	Near Bristol	Kenosha	Agriculture	415	Yes	Yes	Yes	Yes	Keep	A portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided.
BR02	Near Bristol	Kenosha	Forested & Grassland / Agriculture	1063	Yes	Yes	Yes	Yes	Keep	A small portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided.
BR03	Near Bristol	Kenosha	Forested & Grassland / Agriculture	995	Yes	Yes	Yes	Yes	Keep	A portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as designated within the 100-year floodplain for planned landuse and existing channel conditions.
BR04	Near Paris	Kenosha	Mainly Agriculture / Some Forested & Grassland	824	Yes	No	NA	NA	Eliminate	A small portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
BR05	Near Paris	Kenosha	Agriculture	1588	Yes	No	NA	NA	Eliminate	Site was not identified in the SEWRPC Comprehensive Plan, March 2003, Map 65. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
BR06	Near Paris	Kenosha	Forested & Grassland / Agriculture	515	Yes	No	NA	NA	Eliminate	Site was not identified in the SEWRPC Comprehensive Plan, March 2003, Map 65. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
BR07	Near Paris	Kenosha and Racine	Agriculture	2147	Yes	No	NA	NA	Eliminate	An extremely small portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
Total 7 Sites				7,547	7 Yes 0 No 0 NA	3 Yes 4 No 0 NA	3 Yes 0 No 4 NA	3 Yes 0 No 4 NA	3 Keep 4 Eliminate	

Table 4 – Reservoir Site Preliminary Site Screening Results: Center Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
CC01	Near Woodworth	Kenosha	Agriculture / Small amount of Residential / Small amount of Forested & Grassland	145	Yes	No	NA	NA	Eliminate	The entire site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided, a small portion of the site was designated within the 100-year floodplain for planned landuse and existing channel conditions. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
CC02	Near Woodworth	Kenosha	Agriculture	204	Yes	No	NA	NA	Eliminate	The entire site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided, a small portion of the site was designated within the 100-year floodplain for planned landuse and existing channel conditions. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
CC03	Near Woodworth	Kenosha	Agriculture / Small amount of Forested & Grassland	431	Yes	No	NA	NA	Eliminate	Site was not identified in the SEWRPC Comprehensive Plan, March 2003, Map 65. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
CC04	Near Woodworth	Kenosha	Agriculture	1054	Yes	No	NA	NA	Eliminate	Site was not identified in the SEWRPC Comprehensive Plan, March 2003, Map 65. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
CC05	Near Paris	Kenosha	Agriculture	1328	Yes	No	NA	NA	Eliminate	Site was not identified in the SEWRPC Comprehensive Plan, March 2003, Map 65. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
CC06	Near Paris	Kenosha	Agriculture	690	Yes	No	NA	NA	Eliminate	Site was not identified in the SEWRPC Comprehensive Plan, March 2003, Map 65. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
CC07	Near Paris	Kenosha	Agricultural	584	Yes	No	NA	NA	Eliminate	Site was not identified in the SEWRPC Comprehensive Plan, March 2003, Map 65. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
Total 7 Sites				3,852	7 Yes 0 No 0 NA	0 Yes 7 No 0 NA	0 Yes 0 No 7 NA	0 Yes 0 No 7 NA	0 Keep 7 Eliminate	

Table 5 – Reservoir Site Preliminary Site Screening Results: Kilbourn Road Ditch

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
KR01	Near Kenosha	Kenosha	Primarily wetland surrounded by residential	176	Yes	Yes	Yes	Yes	Keep	A portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided.
KR02	Near Kenosha	Kenosha	Wetland, Residential, Agriculture, and Forest & Grassland	303	Yes	Yes	Yes	Yes	Keep	Majority of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided.
KR03	Near Kenosha	Kenosha	Agriculture	368	Yes	No	NA	NA	Eliminate	Majority of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
KR04	Near Somers	Kenosha	Agriculture	982	Yes	Yes	Yes	Yes	Keep	A small portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided, a larger portion of the site was designated within the 100-year floodplain for planned landuse and existing channel conditions.
KR05	Near Somers	Kenosha	Agriculture	604	Yes	Yes	Yes	Yes	Keep	Majority of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as designated within the 100-year floodplain for planned landuse and existing channel conditions.
KR06	Near Somers	Kenosha	Agriculture	628	Yes	Yes	Yes	Yes	Keep	Majority of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as designated within the 100-year floodplain for planned landuse and existing channel conditions.
KR07	Near Sturtevant	Kenosha	Agriculture / Small portion of Forest & Grassland	723	Yes	No	NA	NA	Eliminate	A portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as designated within the 100-year floodplain for planned landuse and existing channel conditions. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
Total 7 Sites				3,784	7 Yes 0 No 0 NA	5 Yes 2 No 0 NA	5 Yes 0 No 2 NA	5 Yes 0 No 2 NA	5 Keep 2 Eliminate	

Table 6 – Reservoir Site Preliminary Site Screening Results: Newport Ditch

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
ND01	Unincorporated	Lake	agricultural	254	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site would be configured to take both flow from mainstem and Newport.
ND02	Unincorporated	Lake	agricultural / residential / grassland	147	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site would be configured to take both flow from mainstem and Newport by linking with ND01
ND03	Zion / Wadsworth	Lake	wetland / agricultural / residential	189	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Potential for ecosystem compatibility problem.
ND04	Wadsworth	Lake	agricultural	29	Yes	No	Yes	No	Eliminate	Eliminated from further analysis because the site contains the headwaters of the stream which is serving important ecological functions for the watershed.
ND05	Unincorporated	Lake	wetland / utilities	17	Yes	No	Yes	No	Eliminate	Eliminated from further analysis because the site contains the headwaters of the stream which is serving important ecological functions for the watershed.
ND06	Wadsworth / Beach Park	Lake	forested & grassland / wetland / water / residential	336	No	NA	NA	NA	Eliminate	Eliminated from further analysis due to field verification showing site is being developed.
ND07	Wadsworth	Lake	wetland / agricultural	85	Yes	No	Yes	No	Eliminate	Eliminated from further analysis because the site contains the headwaters of the stream which is serving important ecological functions for the watershed.
Total 7 Sites				1,057	6 Yes 1 No	3 Yes 2 No 1 NA	5 Yes 0 No 1 NA	3 Yes 2 No 1 NA	3 Keep 4 Eliminate	

Table 7 – Reservoir Site Preliminary Site Screening Results: North Mill Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
NM01	Old Mill Creek	Lake	agricultural / wetland	601	Yes	Yes	Yes	TBD	Keep	Keep for further analysis. Potential for ecosystem compatibility problem.
NM02	Old Mill Creek	Lake	agricultural / wetland / residential	989	Yes	No	No	No	Eliminate	Site is Ethel's Woods Forest Preserve. Eliminated from further analysis because site is planned for ecosystem restoration, serves important ecological functions and contains significant constraints including T&E species and property deed restrictions. Eliminated by LCFPD per 23-Mar-09 letter.
NM03	Antioch	Lake	agricultural / grassland / residential	546	Yes	Yes	Yes	Yes	Keep	Keep for further analysis.
NM04	Unincorporated	Lake	agricultural / grassland / residential / cemetery	673	Yes	Yes	Yes	TBD	Keep	Keep for further analysis. Potential for ecosystem compatibility problem as there may be a mitigation bank at this site.
NM05	Unincorporated	Kenosha	agricultural / wetland / industrial	689	Yes	Yes	Yes	TBD	Keep	Keep for further analysis. Potential for ecosystem compatibility problem.
NM06	Unincorporated	Kenosha	agricultural / forest / wetland / residential	1,183	Yes	No	Yes	No	Eliminate	Eliminated from further analysis because site contains the headwaters of the stream which are serving important ecological functions as a high quality natural area. Eliminated by SEWPRC per 26-Mar-09 Mtg.
NM07	Unincorporated	Kenosha	agricultural / forest / wetland / industrial / water / residential	1,619	Yes	No	Yes	TBD	Keep	Keep for further analysis. Potential for ecosystem compatibility problem.
NM08	Unincorporated	Kenosha	agricultural / forest / wetland / industrial / water / residential	522	Yes	No	Yes	No	Eliminate	Eliminated from further analysis because the site contains the headwaters of the stream which are serving important ecological functions as a high quality natural area. Site eliminated by SEWPRC per 26-Mar-09 Mtg.
Total 8 Sites				6,822	8 Yes 0 No	5 Yes 3 No	8 Yes 0 No	2 Yes 3 No 3 TBD	5 Keep 3 Eliminate	

Table 8 – Reservoir Site Preliminary Site Screening Results: Mill Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
ML01	Wadsworth	Lake	forested & grassland / wetland / agriculture / residential	212.8	Yes	No	No	Yes	Eliminate	Eliminated from further analysis because the site is bisected by the creek and bounded by roads. Due to these constraints the site is not conducive to efficient alterations.
ML02	Wadsworth	Lake	forested & grassland	22	Yes	No	No	Yes	Eliminate	Eliminated from further analysis because the site is bisected by the creek and bounded by roads. Due to these constraints the site is not conducive to efficient alterations.
ML03	Old Mill Creek	Lake	forested & grassland / wetland / agriculture / residential	950.9	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site has been identified as a potential area for ecological restoration
ML04	Old Mill Creek	Lake	forested & grassland / wetland / agriculture / residential	1481.4	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site has been identified as a potential area for ecological restoration
ML05	Old Mill Creek / Grandwood Park	Lake	agriculture / wetland / residential	50.8	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis because the site is the riparian corridor of the creek and is serving important ecological functions in this capacity.
ML06	Grandwood Park	Lake	agriculture / wetland / residential	46.4	Yes	Yes	Yes	Yes	Keep	Keep for further analysis.
ML07	Unincorporated	Lake	residential / wetland	16.8	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis because the site is the riparian corridor of the creek and is serving important ecological functions in this capacity.
ML08	Unincorporated	Lake	residential / grassland / vacant / commercial	33.5	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis because the site is disconnected from the stream by a road.

Table 8 (cont) – Reservoir Site Preliminary Site Screening Results: Mill Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
ML09	Grayslake / Third Lake	Lake	agriculture / residential	1063.7	Yes	No	Yes	No	Eliminate	This is Rollins Savanna Forest Preserve where significant ecosystem restoration has taken place. Site eliminated by LCFPD per 23-Mar-09 letter.
ML10	Third Lake / Venetian Village / Lindhurst	Lake	agriculture / wetland / residential	730.1	Yes	No	Yes	No	Eliminate	This is Fourth Lake Forest Preserve and is a state-dedicated Illinois Nature Preserve. Site eliminated by LCFPD per 23-Mar-09 letter.
ML11	Third Lake / Grayslake	Lake	agriculture / wetland / residential	53.5	Yes	No	Yes	Yes	Eliminate	This is part of Rollins Savanna Forest Preserve where wetland restoration has already taken place. Site eliminated by LCFPD per 23-Mar-09 letter.
ML12	Grayslake	Lake	agriculture / wetland / residential	49.8	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis because the site is the riparian corridor of the creek and is serving important ecological functions in this capacity.
ML13	Grayslake	Lake	agriculture / wetland / residential	16.2	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis due to size of site and location within the watershed separate from the creek,
ML14	Grayslake / Round Lake Park	Lake	agriculture / wetland / residential	1210.4	Yes	No	Yes	No	Eliminate	Eliminated from further analysis because the site contains the headwaters of the stream and its riparian corridor which are serving important ecological functions as a high quality natural area.
Total 14 Sites				5,938	14 Yes 0 No	3 Yes 11 No	12 Yes 2 No	11 Yes 3 No	3 Keep 11 Eliminate	

Table 9 – Reservoir Site Preliminary Site Screening Results: Gurnee Tributary

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
GT01	Gurnee	Lake	forested	15.5	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. This site was evaluated during the Phase I analysis. Potential during reevaluation.
Total 1 Sites				16	1 Yes 0 No	1 Yes 0 No	1 Yes 0 No	1 Yes 0 No	1 Keep 0 Eliminate	

Table 10 – Reservoir Site Preliminary Site Screening Results: Bull Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
BC01	Mundelein	Lake	forested & grassland / agricultural / residential	250.6	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis because the site contains the headwaters of the stream which is serving important ecological functions for the watershed.
BC02	Mundelein	Lake	golf course / wetland / grassland / residential	111.4	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Adjacent to a damage site and a good candidate for additional storage.
BC03	Libertyville	Lake	forested & grassland / agricultural / residential / utilities	337.2	Yes	No	Yes	No	Eliminate	Eliminated from further analysis due to site being a preserved high quality ecosystem. It should be noted that any proposed ecosystem restoration measures should consider enhancing the floodwater storage capabilities of this site.
BC04	Libertyville	Lake	forested & grassland / wetland	24.1	Yes	Yes	Yes	No	Eliminate	Eliminated from further analysis due to site being an important forested ecosystem.
Total 4 Sites				723	4 Yes 0 No	2 Yes 2 No	4 Yes 0 No	2 Yes 2 No	1 Keep 3 Eliminate	

Table 11 – Reservoir Site Preliminary Site Screening Results: Indian Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
IN01	Lincolnshire	Lake	forested & grassland / wetland / urban mix	37.4	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site has stream to the east of the site. There is a potential to connect adjacent area west of Milwaukee Ave to this area.
IN02	Lincolnshire	Lake	forested & grassland / urban mix / residential	12.9	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis because the site is primarily occupied by the creek and therefore the site would have a low storage efficiency.
IN03	Vernon Hills / Buffalo Grove	Lake	forested & grassland / industrial / residential	46.3	Yes	No	No	No	Eliminate	Eliminated from further analysis because the site is the riparian corridor of the river and is serving important ecological functions. In addition, there are compatibility constraints in regard to residential homes immediately adjacent to the site.
IN04	Vernon Hills / Buffalo Grove	Lake	forested & grassland / wetland / utilities / residential	62	Yes	No	No	No	Eliminate	Eliminated from further analysis due to having ecosystem significance as a high quality forested area. In addition there are compatibility constraints in regard to residential homes immediately adjacent to the site.
IN05	Vernon Hills / Buffalo Grove / Long Grove	Lake	forested & grassland / wetland / utilities / residential	160.4	Yes	No	No	No	Eliminate	Eliminated from further analysis because the site is the riparian corridor of the river and is serving important ecological functions as a high quality natural area. In addition, there are compatibility constraints in regard to residential homes immediately adjacent to the site.
IN06	Long Grove	Lake	forested & grassland / wetland / residential	44	Yes	No	No	No	Eliminate	Eliminated from further analysis because the site is the riparian corridor of the river and is serving important ecological functions as a high quality natural area. In addition, there are compatibility constraints in regard to residential homes immediately adjacent to the site.
IN07	Long Grove	Lake	forested & grassland / wetland / agriculture / utilities / residential	156	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site appears to be utilized as an existing nursery.

Table 11 (cont) – Reservoir Site Preliminary Site Screening Results: Indian Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
IN08	Long Grove / Hawthorn Woods	Lake	forested & grassland / wetland / agriculture / residential	223.8	Yes	No	No	Yes	Eliminate	Eliminated from further analysis due to an existing reservoir and road on the site. In addition, there are compatibility constraints in regard to residential homes immediately adjacent to the site.
IN09	Long Grove / Hawthorn Woods	Lake	forested & grassland / wetland / agriculture / residential	223.8	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Potential site with trimming of boundary
IN10	Long Grove / Hawthorn Woods	Lake	forested & grassland / wetland / agriculture	410.3	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Potential site with trimming of boundary
IN11	Mundelein	Lake	forested & grassland	108.4	Yes	No	No	No	Eliminate	Eliminated from further analysis because the site contains the headwaters of the stream and its riparian corridor which are serving important ecological functions as a high quality natural area.
Total 11 Sites				1,485	11 Yes 0 No	4 Yes 7 No	5 Yes 6 No	6 Yes 5 No	4 Keep 7 Eliminate	

Table 12 – Reservoir Site Preliminary Site Screening Results: Aptakasic Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
AC01	Unincorporated	Lake	forested & grassland / water / residential	12.7	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Western portion of the site is already a reservoir. Expansion to the east is a potential. Potential to link with AC02 as well.
AC02	Buffalo Grove	Lake	forested & grassland / industrial	18	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Area west of the site is open water. Potential expansion to the east. Potential to link with AC01 as well.
AC03	Buffalo Grove	Lake	forested & grassland / industrial / utilities	56.2	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. This site was looked at for DPI. Appears to be an existing landfill from the aerial and contours.
AC04	Buffalo Grove	Lake	wetland / industrial	17.8	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis due to the site's shape is a narrow strip of the river corridor and would not be conducive to efficient alterations.
AC05	Buffalo Grove	Lake	residential / recreation	10.7	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis because the majority of the site is currently occupied by the channel, an existing lake and ball fields. The remaining land area is too small for efficient alterations.
AC06	Buffalo Grove / Long Grove	Lake	forested & grassland / wetland / residential	31.2	Yes	No	Yes	No	Eliminate	Eliminated from further analysis due to the site already being a wetland and having ecosystem significance.
AC07	Long Grove	Lake	forested & grassland / water / residential	37.2	Yes	No	No	Yes	Eliminate	Eliminated from further analysis due to the site being adjacent to residential area and currently functions as a floodwater retention area for the sub-division.
AC08	Buffalo Grove	Lake	agricultural	94	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. This site is slightly farther away than 250-ft, but is a large open space. This site was added due to proximity to stream
AC09	Buffalo Grove	Lake	wetland / grassland	20	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. This triangular area is adjacent to the creek. Potential for storage.
Total 9 Sites				298	9 Yes 0 No	5 Yes 4 No	8 Yes 1 No	8 Yes 1 No	5 Keep 4 Eliminate	

Table 13 – Reservoir Site Preliminary Site Screening Results: Buffalo-Wheeling Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
BW00	Wheeling	Cook	forested & grassland / aircraft transportation	21	Yes	Yes	No	Yes	Eliminate	Eliminated from further analysis due to neighboring airport runway. FAA regulations prohibit constructing an open water area that would attract hazardous wildlife within 10,000-ft of an air operations area. (FAA Advisory Circular AC150/5200-33A)
BW01	Wheeling	Cook	forested & grassland / residential	9	Yes	Yes	Yes	Yes	Eliminate*	Keep for further analysis of other measures. Due to location neighboring airport, only non-open water measures should be considered. Potential measures include floodplain alterations such as stream bank and floodplain terracing.
BW02	Wheeling	Cook	forested & grassland / industrial / residential	11	Yes	No	No	Yes	Eliminate	Eliminated from further analysis due to existing low-lying area that currently serves as floodplain storage and neighboring compatibility constraints due to residential homes immediately adjacent to the site. In addition, the site is oddly shaped and not conducive to efficient alterations.
BW03	Wheeling	Cook	parks / residential / government	48	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Due to a small (possibly low quality?) wetland in the northern part of the site, mitigation may be necessary. Potential added costs for replacement and/or relocation of existing recreational facilities.
BW04	Wheeling	Cook	forested & grassland / business / residential / educational	6	Yes	Yes	Yes	Yes	Eliminate*	Keep for further analysis of other measures. Due to location adjacent to stream and small size of site, viable potential measures to be considered include floodplain alterations such as stream bank and floodplain terracing. Potential municipal owned piece of property that may have interest in parkland due to neighboring library.
BW05	Wheeling	Cook	residential / business	7	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis due to existing site being owned by multiple residential land owners that would require acquisition. It was determined that none of these structures were buy-out candidates by comparing the existing structure elevations to the 100-yr flood profiles.

* These sites retained for analysis of other options, see "Modifications to Existing Structures."

Table 13 (cont) – Reservoir Site Preliminary Site Screening Results: Buffalo-Wheeling Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
BW06	Wheeling	Cook	forested & grassland	11	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site is within 100-yr floodplain, but with depths less than 2-ft. Neighboring parcels are roads and businesses. Unclear why this site has not been developed; possible municipal owner.
BW07	Wheeling	Cook	water / utilities / urban mix / residential	12	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis due to existing utilities (water tower, high tension power lines, waste facilities, etc.) and the high costs of relocation.
BW08	Wheeling	Cook	forested & grassland / residential / agricultural	19	Yes	No	Yes	No	Eliminate	Eliminated from further analysis due to existing site being primarily inundated by the 100-yr floodplain with limited areas for additional storage and possible environmental significance and the high costs of mitigation.
BW09	Wheeling	Cook	agricultural / urban mix	78	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Existing site has agricultural landuse, large size, and is near damage areas. One of the last large open tracts in watershed adjacent to the stream.
BW10	Buffalo Grove	Cook	parks / cemeteries / urban mix / residential	16	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site location in the watershed near damage areas. This site is not in the 100-yr floodplain and has potential for additional storage. Site is bisected by Lake-Cook Road.
BW11	Long Grove / unincorporated	Lake	agricultural / parks / wetlands / residential	129	Yes	No	Yes	Yes	Eliminate	Existing site has undeveloped landuse, large size, and located adjacent to Buffalo Creek Reservoir Site 29. This site was previously investigated for Levee 37 mitigation. Site eliminated by LCFPD per 23-Mar-09 letter
BW12	Long Grove / unincorporated	Lake	agricultural	54	Yes	Yes	Yes	Yes	Eliminate	Eliminated from further analysis due to dependence on Site 11 as link to the stream. Existing site has undeveloped landuse, large size, and location near Buffalo Creek Reservoir Site 29. Potential conflict of compatibility with IDOT plans to expand Route 53.
BW13	Wheeling / unincorporated	Cook	forested & grassland / residential	5	Yes	No	No	Yes	Eliminate	Eliminated from further analysis due to existing floodplain inundation depths for the 100-yr event and neighboring airport.

Table 13 (cont) – Reservoir Site Preliminary Site Screening Results: Buffalo-Wheeling Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
BW14	Wheeling	Cook	educational	9	Yes	No	No	Yes	Eliminate	Eliminated from further analysis due to existing floodplain inundation with deep depths for the 100-yr event and neighboring school currently uses the site for recreation, may be a safety hazard if altered.
BW15	Wheeling	Cook	parks / business	9	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site is adjacent to Site 03 and could be combined. Potential compensatory storage site for IDOT road improvements on Dundee Road. Also, may be opportunity to increase opening of Dundee Rd bridge over Buffalo Creek.
BW16	Wheeling	Cook	business	2	No	NA	NA	NA	Eliminate	Eliminated from further analysis due to field verification showing site already developed.
BW17	Wheeling / Buffalo Grove	Lake	business	6	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Potential dependence with Site 40 as a link to the stream. Potential measures include relief of road drainage along Weiland Avenue, field verification is needed.
BW18	Buffalo Grove	Lake	golf course / business / residential / parks	125	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site is large and near damage areas. Potential conflict with existing recreational landuse. Site was not eliminated as measures could be configured with smaller storage volumes to minimize impacts to existing landuse.
BW19	Buffalo Grove	Lake	parks / residential	15	Yes	Yes	Yes	No	Eliminate	Eliminated from further analysis due to existing floodplain inundation with deep depths for 100-yr event and a high quality conservation area. It should be noted that any proposed ecosystem restoration measures should consider enhancing the floodwater storage capabilities of this site.
BW20	Buffalo Grove	Cook	forested & grassland / residential	6	Yes	No	No	Yes	Eliminate	Eliminated from further analysis due to size, location within the watershed separate from the Buffalo Creek, and adjacent neighboring residential landuse.
BW21	Long Grove	Lake	residential / golf course	20	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site has areas not within 100-yr floodplain. Investigate ownership for possible use adjacent to Site 29.

Table 13 (cont) – Reservoir Site Preliminary Site Screening Results: Buffalo-Wheeling Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
BW22	Long Grove	Lake	forested & grassland / residential	14	Yes	Yes	Yes	No	Eliminate	Eliminated from further analysis due to having ecosystem significance.
BW23	Long Grove	Lake	residential / wetlands	23	Yes	Yes	Yes	No	Eliminate	Eliminated from further analysis due to having ecosystem significance.
BW24	Wheeling	Cook	forested & grassland / aircraft transportation	9	Yes	Yes	No	Yes	Eliminate	Eliminated from further analysis due to location adjacent to neighboring airport runway.
BW25	unincorporated	Cook	parks / forested & grassland / residential / business	529	Yes	Yes	Yes	No	Eliminate	Eliminated from further analysis due to site being a high quality conservation area. It should be noted that any proposed ecosystem restoration measures should consider enhancing the floodwater storage capabilities of this site.
BW26	Deer Park / unincorporated	Lake	forested & grassland	21	No	NA	NA	NA	Eliminate	Eliminated from further analysis due to field verification showing site already developed.
BW27	Kildeer / unincorporated	Lake	forested & grassland / residential / lakes / business	70	Yes	Yes	Yes	Yes	Keep	Keep for further analysis with reduced footprint area to avoid existing trees. Questionable hydrologic effectiveness due to location in watershed. Potential high land value due to intersection of two major streets to the south.
BW28	Buffalo Grove	Lake	parks / residential	46	Yes	Yes	Yes	Yes	Keep	Keep for further analysis with increased footprint area encompassing additional open space in the center. Potential high land value due to location in the basin.
BW29	Long Grove / unincorporated	Lake	parks / water / residential	186	Yes	Yes	Yes	Yes	Eliminate	Eliminated from further analysis because site was selected and recommended for expansion in the Upper Des Plaines River Phase I Feasibility Study.
BW30	Long Grove	Lake	residential / forested & grassland / agricultural / wetlands	142	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site is large and undeveloped. Possible hydrologic effectiveness issues due to location within the watershed.
BW31	Kildeer	Lake	agricultural / residential	87	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site is large and undeveloped. Possible hydrologic effectiveness issues due to location within watershed.

Table 13 (cont) – Reservoir Site Preliminary Site Screening Results: Buffalo-Wheeling Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
BW32	Buffalo Grove	Lake	agricultural / forested & grassland / wetlands / business	75	No	NA	NA	NA	Eliminate	Eliminated from further analysis due to field verification showing site already developed.
BW33	Wheeling	Cook	water / parks / industrial / residential	19	Yes	Yes	Yes	Yes	Eliminate*	Keep for further analysis of other measures. Site currently has flood retention capability. Potential measures include alterations to pump operation, modification to inlet/outlet structures, berming, deepening of the lake.
BW34	Wheeling	Cook	unidentified / industrial / utilities	46	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis due to location within the watershed separate from the Buffalo Creek
BW35	Long Grove / unincorporated	Lake	agricultural / lakes / residential / wetlands	196	Yes	Yes	Yes	No	Eliminate	Eliminated from further analysis due to having ecosystem significance.
BW36	Long Grove / unincorporated	Lake	agricultural / wetlands / residential / industrial / utilities	147	Yes	Yes	Yes	Yes	Eliminate	Eliminated from further analysis due to dependence on sites 11 and 12 or site 37 for link to stream. Potential conflict of compatibility with IDOT plans to expand Route 53. Possible hydrologic effectiveness issues due to location within the watershed.
BW37	Long Grove / Kildeer	Lake	wetlands / lakes / agricultural / residential	124	Yes	Yes	Yes	No	Eliminate	Eliminated from further analysis due to having ecosystem significance.
BW38	Long Grove	Lake	agricultural	15	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis due to size, location within the watershed separate from Buffalo Creek. This site straddles the watershed divide / boundary.
BW39	Lake Zurich / Kildeer	Lake	forested & grassland / residential	48	Yes	No	Yes	No	Eliminate	Eliminated from further analysis due to size, location within watershed separate from Buffalo Creek. Potential ecosystem significance.
BW40	Wheeling	Cook	agricultural	6	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Potential link between Site 09 or Site 17.
Total 41 Sites				2,421	38 Yes 3 No	27 Yes 9 No 3 NA	32 Yes 6 No 3 NA	30 Yes 8 No 3 NA	13 Keep 28 Eliminate	

* These sites retained for analysis of other options, see "Modifications to Existing Structures."

Table 14 – Reservoir Site Preliminary Site Screening Results: McDonald Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
MD01	Mount Prospect	Cook	forested & grassland / utilities / residential	10.6	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis due to existing utilities (high tension power lines) and long, narrow shape of site is not conducive to efficient alterations.
MD02	Mount Prospect / Prospect Heights	Cook	forested / recreation	20	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Existing park district land. Area to the east is forested and the west appears to be a driving range.
MD03	Wheeling / Prospect Heights	Cook	forested & grassland / industrial / residential	13.5	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis due to existing floodplain with limited areas for additional storage and environmental significance.
MD04	Wheeling / Prospect Heights	Cook	forested & grassland / utilities / recreation	28	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Northwest portion of the site appears to be unusable but eastern portion appears to be usable. Area may be floodplain making efficiency of storage lacking.
MD05	Prospect Heights	Cook	wetland / recreation	14.3	Yes	No	No	Yes	Eliminate	Eliminated from further analysis due to compatibility constraints in regard to residential homes immediately adjacent to site. Also, site is oddly shaped, bisected by a creek and therefore not conducive to efficient alterations.
MD06	Prospect Heights	Cook	residential / recreation / utilities	10	Yes	No	No	Yes	Eliminate	Eliminated from further analysis due to compatibility constraints in regard to residential homes immediately adjacent to site. Also, site is oddly shaped, bisected by a creek and therefore not conducive to efficient alterations.
MD07	Arlington Heights / Prospect Heights	Cook	forested & grassland / residential / utilities / wetland / water	66	Yes	Yes	Yes	Yes	Eliminate*	Keep for further analysis of other structural measures. Site is adjacent to Lake Arlington. Potential to expand the lake to the north. A lot of design analysis was done for the initial expansion.
Total 7 Sites				162	7 Yes 0 No	3 Yes 4 No	5 Yes 2 No	7 Yes 0 No	2 Keep 5 Eliminate	

* This site retained for analysis of modifications to existing structure, see "Modifications to Existing Structures."

Table 15 – Reservoir Site Preliminary Site Screening Results: Feehanville Ditch

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
FD01	Des Plaines	Cook	religious	18.5	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Existing Maryville property owned by the archdiocese. Potential storage site in area adjacent to Feehanville Ditch. The ditch originally ran through this site, but was relocated in the 1970s.
FD02	Des Plaines / Mount Prospect	Cook	grassland	17	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Existing open space north of Feehanville Ditch. Potentially difficult layout.
FD03	Unincorporated Wheeling Township	Cook	residential	5	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. About 7 frequently flooded structures exist on the site. Two have been acquired. Foreclosure properties and willing sellers are likely. Site could be converted to storage.
Total 3 Sites				41	3 Yes 0 No	3 Yes 0 No	3 Yes 0 No	3 Yes 0 No	3 Keep 0 Eliminate	

Table 16 – Reservoir Site Preliminary Site Screening Results: Weller Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
WL01	Mount Prospect	Cook	recreation	13.9	Yes	No	No	Yes	Eliminate	Eliminated from further analysis due to compatibility constraints in regard to residential homes immediately adjacent to the site. In addition, site is a narrow strip of land along creek and would not be conducive to efficient alterations.
WL02	Mount Prospect / Arlington Heights	Cook	recreation / government / industrial / transportation	61.8	Yes	Yes	Yes	Yes	Eliminate*	Keep for further analysis of other measures. There is an existing reservoir in northeast portion of this site. There is a spoil pile just south of the existing reservoir site. Potential to expand the reservoir to the western portion of this site where there are existing ball fields. However the ball fields are being relocated to the spoil area. This site is owned by MWRD and portions are leased to Mt. Prospect Park District.
WL03	Mount Prospect	Cook	golf course	109	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. This is an existing golf course; therefore acquisition costs may be high. Additional site information needed before proceeding.
Total 3 Sites				185	3 Yes 0 No	2 Yes 1 No	2 Yes 1 No	3 Yes 0 No	1 Keep 2 Eliminate	

* This site retained for analysis of modifications to existing structure, see "Modifications to Existing Structures."

Table 17 – Reservoir Site Preliminary Site Screening Results: Farmer-Prairie Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
FP01	Des Plaines / Park Ridge	Cook	forested & grassland / water / interstate tollway	46.3	Yes	Yes	Yes	Yes	Eliminate*	Keep for further analysis of other measures. This is Belleau Lake. IDNR looked at deepening this lake in their analysis. Land is owned by the Cook County Forest Preserve.
Total 1 Site				46	1 Yes 0 No	1 Yes 0 No	1 Yes 0 No	1 Yes 0 No	0 Keep 1 Eliminate	

* This site retained for analysis of modifications to existing structure, see "Modifications to Existing Structures."

Table 18 – Reservoir Site Preliminary Site Screening Results: Willow-Higgins Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
WH01	Chicago / Rosemont	Cook	grassland / residential	56.6	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. This site needs further evaluation because the contours show a 50-ft hill at this site. It may be a landfill or spoil pile.
WH02	Chicago / Rosemont	Cook	golf course / air transportation / interstate tollway	39.4	Yes	Yes	No	Yes	Eliminate	Eliminated from further analysis due to neighboring airport runway. FAA regulations prohibit constructing an open water area that would attract hazardous wildlife within 10,000-ft of an air operations area. (FAA Advisory Circular AC150/5200-33A)
WH03	Chicago	Cook	air transportation	30.3	No	NA	NA	NA	Eliminate	Eliminated from further analysis due to this site being developed for the O'Hare expansion and is currently being constructed as a future runway.
WH04	Chicago / Rosemont	Cook	air transportation	49.8	No	NA	NA	NA	Eliminate	Eliminated from further analysis due to this site being developed for the O'Hare expansion and is currently being constructed as a future runway.
WH05	Des Plaines	Cook	grassland / warehouse district	28.4	Yes	Yes	Yes	Yes	Eliminate*	Keep for further analysis of other measures. Site is an existing reservoir. Potential to interconnect with adjacent site WH06. This is the Touhy Avenue Reservoir that was recently expanded by the City of Chicago.
WH06	Des Plaines	Cook	grassland / warehouse district / government / residential	42.2	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site partially contains the west cell of the Touhy Avenue reservoir. Potential to expand the existing reservoir to the south. This site is currently owned by the O'Hare Airport
WH07	Des Plaines	Cook	grassland / wetland / interstate tollway	21.2	No	NA	NA	NA	Eliminate	Eliminated from further analysis due to field verification showing site already developed.

Table 18 (cont) – Reservoir Site Preliminary Site Screening Results: Willow-Higgins Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
WH08	Des Plaines	Cook	recreation	28	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. The eastern portion of this site is an existing reservoir. The rest of the site is occupied by Majewski Metro Park. The land is owned by MWRD and leased to the Mt. Prospect Park District. MWRD is evaluating long term plans for the site since it is adjacent to the Kirie Water Reclamation Plant. There is a potential to expand the existing reservoir to the west.
WH09	Des Plaines	Cook	grassland / wetland	52	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. The existing spoil for CUP O'Hare Reservoir is here. The cost of removing the material may outweigh real estate acquisition. MWRDGC owns the site and may have future plans to utilize existing wetland for sewage treatment operations of Kirie Water Reclamation Plant. Connection to Willow-Higgins would involve boring under the Tollway.
Total 9 Sites				348	6 Yes 3 No	6Yes 0 No 3 NA	5Yes 1 No 3 NA	6Yes 0 No 3 NA	4 Keep 5 Eliminate	

* This site retained for analysis of modifications to existing structure, see "Modifications to Existing Structures."

Table 19 – Reservoir Site Preliminary Site Screening Results: Crystal Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
CR01	Schiller Park / Chicago	Cook	forested & grassland / interstate tollway	27.4	Yes	No	Yes	Yes	Eliminate	Eliminated from further analysis due to location in watershed. Eliminated because upstream drainage at O'Hare is captured on site. Damage areas are downstream of site and floodwaters come from area south of Irving Park Rd. This site would not alleviate flooding to damage area.
Total 1 Site				27	1 Yes 0 No	0 Yes 1 No	1 Yes 0 No	1 Yes 0 No	0 Keep 1 Eliminate	

Table 20 – Reservoir Site Preliminary Site Screening Results: Silver Creek

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
SC01	Franklin Park	Cook	business / grassland / residential	11.5	Yes	Yes	Yes	Yes	Eliminate*	Keep for further analysis of other measures. Currently structure 106 reservoir that was optimized with the right of way available at the time. There are a set of ball diamonds about 800-ft southeast of the site that could be interconnected. This reservoir is currently pumped dry. Options include: operational changes, deepening/expanding existing reservoir, and interconnecting with nearby open space.
SC02	Franklin Park	Cook	grassland / vacant	28.8	Yes	Yes	Yes	Yes	Eliminate*	Keep for further analysis of other measures. Currently structure 102 reservoir that was optimized with the right of way available at the time. There is a small triangular area northeast of the site and an area just west that could be interconnected. This reservoir is currently pumped dry. Options include: operational changes, deepening/expanding existing reservoir, and interconnecting with nearby open space.
SC03	Chicago	Cook	transportation	162.7	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. This site is currently spoil pile from existing reservoir on site SC02. Site is owned by the O'Hare Airport, but is currently not planned for development during the expansion project.
Total 3 Sites				40	3 Yes 0 No	3 Yes 0 No	3 Yes 0 No	3 Yes 0 No	1 Keep 2 Eliminate	

* These sites retained for analysis of other options, see "Modifications to Existing Structures."

Table 21 – Reservoir Site Preliminary Site Screening Results: Des Plaines River

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
DP01	River Forest	Cook	conservation / education / river	125	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable. Site was identified as CC8 in DPI Final Feasibility Report, June 1999.
DP02	Maywood / River Forest / Melrose Park	Cook	conservation / river residential / religious / education	328	Yes	No	NA	No	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable. Site was identified as CC7 in DPI Final Feasibility Report, June 1999. The area was much smaller in the DPI study; at the time it was estimated to have an approximate max storage volume of 410 acre ft.
DP03	River Grove / Elmwood Park	Cook	golf course / conservation / river / residential / education	205	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable. Site was identified as CC5 in DPI Final Feasibility Report, June 1999.
DP04	River Grove	Cook	education / mineral extraction / residential	45	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable. Site was identified as CC11 in DPI Final Feasibility Report, June 1999. The site was estimated to have an approximate max storage volume of 280 acre ft.
DP05	River Grove	Cook	conservation / river / education	78	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable. Site was identified as CC5 in DPI Final Feasibility Report, June 1999.
DP06	River Grove	Cook	conservation / river	33	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP07	Chicago / Franklin Park / Schiller Park	Cook	conservation / river / golf course	401	Yes	Yes	Yes	Yes	Keep	Site is currently FPDCC Chevalier Woods. Evaluate use of portion of site (1,000 ac.ft.) for detention storage.
DP08	Chicago / Schiller Park	Cook	lake / river / open space	555	Yes	No	NA	No	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP09	Chicago / Rosemont / Schiller Park	Cook	river / open / industrial / tollway / residential / commercial	536	Yes	No	NA	No	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP10	Chicago / Rosemont	Cook	river / open / cemetery / commercial	21	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.

Table 21 (cont) – Reservoir Site Preliminary Site Screening Results: Des Plaines River

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
DP11	Chicago / Rosemont / Park Ridge	Cook	river / open	136	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP12	Des Plaines / Park Ridge	Cook	lake / river / open space / tollway / residential / commercial	272	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP13	Park Ridge	Cook	river / open / tollway	94	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP14	Des Plaines / Park Ridge	Cook	river / open / tollway residential	202	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable. This site was identified as CC4 in DPI Final Feasibility Report, June 1999. The area was smaller in DPI study and was estimated to have an approximate max storage volume of 570 acre ft.
DP15	Des Plaines	Cook	river / open / tollway	107	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP16	Des Plaines	Cook	river / open	29	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP17	Des Plaines	Cook	river / wetland / open	15	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP18	Des Plaines	Cook	river / lake / open / tollway	173	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable. This site was identified as CC3 in DPI Final Feasibility Report, June 1999. Site is described as Big Bend Lake.
DP19	Des Plaines	Cook	river / commercial / industrial	42	Yes	No	NA	Yes	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP20	Des Plaines	Cook	river / wetland / open / residential	234	Yes	No	NA	No	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP21	Mount Prospect / Prospect Heights	Cook	river / open / church / cemetery / hotel	366	Yes	No	NA	No	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.

Table 21 (cont) – Reservoir Site Preliminary Site Screening Results: Des Plaines River

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
DP22	Prospect Heights	Cook	river / open / commercial / toll way	161	Yes	No	NA	No	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP23	Glenview / Northbrook	Cook	river / open / commercial / tollway	816	Yes	Yes	Yes	Yes (portions No)	Keep	Keep for further analysis. This site was identified as CC1 in DPI Final Feasibility Report, June 1999. The area was much smaller in DPI study and was estimated to have an approximate max storage volume of 330 acre ft. Evaluate 330 acre feet storage volume to avoid conflict with existing site features.
DP24	Northbrook / Wheeling	Cook	river / open / commercial / tollway / residential	512	Yes	Yes	Yes	Yes (portions No)	Keep	Keep for further analysis. Site is currently FPDCC Potawatomi Woods.
DP25	Wheeling	Cook	river / open / commercial / tollway	33	Yes	No	NA	No	Eliminate	Eliminated due to FPDCC determination that stormwater storage on this site is not acceptable.
DP26	Buffalo Grove / Riverwoods	Lake	river / wetland / open / residential / roadway	219	Yes	No	Yes	No	Eliminate	This is part of Ryerson Woods Conservation Area. Eliminated from further analysis because the site serves important ecological functions and supports several T&E species. Site eliminated by LCFPD per 23-Mar-09 letter.
DP27	Lincolnshire / Riverwoods	Lake	river / open / church / grassland / residential	531	Yes	No	Yes	No	Eliminate	This is part of Ryerson Woods Conservation Area. Eliminated from further analysis because site serves important ecological functions, supports several T&E species, significant resources were used to restore area and a permanent conservation easement exists over most of site. Eliminated by LCFPD per 23-Mar-09 letter.
DP28	Lincolnshire / Mettawa / Vernon Hills	Lake	river / open / grassland / wetland / residential	860	Yes	No	Yes	No	Eliminate	This site contains Wright Woods Forest Preserve, Half Day Forest Preserve, Adlai E. Stevenson Historic Home, and Lloyd's Woods Nature Preserve. Eliminated from further analysis because the site serves multiple important ecological functions, supports several T&E species. Site eliminated by LCFPD per 23-Mar-09 letter.
DP29	Libertyville / Mettawa / Mundelein / Vernon Hills	Lake	river / open / agricultural / commercial / utilities	552	Yes	No	Yes	No	Eliminate	This is MacArthur Woods Forest Preserve. Eliminated from further analysis because the site serves important ecological functions, supports several T&E species and significant resources were used to restore the area. Site eliminated by LCFPD per 23-Mar-09 letter.

Table 21 (cont) – Reservoir Site Preliminary Site Screening Results: Des Plaines River

Site #	Community	County	NIPC Existing Landuse	Area (acres)	a	b	c	d	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
DP30	Libertyville / Mettawa / Mundelein / Vernon Hills	Lake	river / lake / open / golf course	290	Yes	No	NA	NA	Eliminate	Eliminated from further analysis due to its odd shape making the site not conducive to efficient alterations.
DP31	Libertyville	Lake	river / open / residential	25	Yes	No	NA	NA	Eliminate	Eliminated from further analysis due to its odd shape making the site not conducive to efficient alterations.
DP32	Libertyville	Lake	river / grassland / open	29	Yes	No	NA	NA	Eliminate	Eliminated from further analysis due to the site's small size making it not conducive to efficient alterations.
DP33	Libertyville	Lake	lake / open / residential	381	Yes	Yes (portions No)	Yes	Yes (portions No)	Keep	This site was identified as site 14c in the DPI Final Feasibility Report, June 1999. This site contains Lake Minear. Potential to expand this lake. The northeast portion of this site contains Wilmot Woods Forest Preserve. This portion should be eliminated because it serves an important ecological function as per the LCFPD letter dated 23-Mar-09. The remaining portions of the site should be reevaluated under DPII.
DP34	Waukegan	Lake	river / lake / church / agriculture / residential / utilities	847	Yes	No	Yes	No	Keep	Keep for further analysis. This site was identified as sites 13A, 13B, and LS6 in the DPI Final Feasibility Report, June 1999. The majority of the site contains Independence Grove Forest Preserve. Significant resources were used to restore this site for recreational uses. A portion of the site identified by LCFPD will be used for analysis.
DP35	Gurnee	Lake	river / lake / open / utilities / grassland / wetland	273	Yes	Yes	Yes	Yes	Keep	Majority of the site is owned by the LCFPD. This site contains Riverhill and Lake Carina Forest Preserves. Alterations could be supported by LCFPD as per letter dated 23-Mar-09 given existing recreational facilities are accommodated. This site was identified as sites 12A, and LS5 in the DPI Final Feasibility Report, June 1999. Keep for further analysis. Reevaluate under DPII.
DP36	Gurnee	Lake	river / lake / open/tollway / agricultural / residential / utilities	206	Yes	No	Yes	No	Eliminate	Eliminated from further analysis due to its odd shape, making this site not conducive to efficient alterations, and environmental significance.

Table 21 (cont) – Reservoir Site Preliminary Site Screening Results: Des Plaines River

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
DP37	Gurnee	Lake	river / lake / open / residential / grassland / utilities	113	Yes	No	Yes	No	Eliminate	The site should be eliminated because it serves an important ecological function as per the LCFPD letter dated 23-Mar-09.
DP38	Gurnee	Lake	river / lake / wetland / open / education	72	Yes	No	Yes	No	Keep	Keep for further analysis. Site identified for use by LCFPD in combination with Site 40. Potential conflict with existing utility crossing the site. In addition, there is the potential a berm will be constructed along the utility corridor to protect the nearby grade school.
DP39	Gurnee	Lake	river / open / residential / utilities	22	Yes	No	NA	NA	Eliminate	Eliminated from further analysis due to its odd shape making the site not conducive to efficient alterations.
DP40	Wadsworth / Waukegan	Lake	river / lake / wetland / open / utilities / residential	908	Yes	No	Yes	No	Keep	Keep for further analysis. This site is Gurnee Woods Forest Preserve and recently constructed Wetlands Restoration Demonstration Project. LCFPD identified a portion of site that could be used for detention storage.
DP41	Wadsworth	Lake	river / lake / wetland / residential / commercial	839	Yes	No	Yes	No	Keep	Keep for further analysis. This is Wadsworth Savanna Forest Preserve. LCFPD identified portion of site for analysis to avoid conflicts. Site serves important ecological functions, supports several T&E species, significant resources were used to restore area and permanent conservation easement exists over most of site.
DP42	Unincorporated	Lake	grassland / residential	12	Yes	No	NA	NA	Eliminate	Eliminated from further analysis due to its small size making the site not conducive to efficient alterations.
DP43	Unincorporated	Lake	river / open / grassland / nursery / residential / commercial	842	Yes	No	NA	NA	Eliminate	This is Van Patten Woods Forest Preserve. Eliminated from further analysis as the site is an existing project authorized under DPI.
DP44	Pleasant Prairie	Kenosha	river / lake / wetland / agriculture / public / residential / grassland / tollway	779	Yes	Yes	Yes	TBD	Keep	Keep for further analysis. This site was identified as 1C in the DPI Final Feasibility Report, June 1999. The construction of an instream dam structure was evaluated; the results showed backwater impacts in Wisconsin. Eastern portion of the site contains Van Patten Woods Forest Preserve. Potential conflict with ecosystem plans. Reevaluate under DPII.

Table 21 (cont) – Reservoir Site Preliminary Site Screening Results: Des Plaines River

Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
DP45	Pleasant Prairie	Kenosha	wetland / forest / agriculture / residential	1,463	Yes	No	Yes	NA	Eliminate	The western half of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided, the eastern half was designated within the 100-year floodplain for planned landuse and existing channel conditions. Site eliminated by SEWPRC per 26-Mar-09 Mtg.
DP46	Pleasant Prairie	Kenosha	wetland / agriculture / commercial / residential / utilities	1,785	Yes	No	NA	NA	Eliminate	The western half of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided, the eastern half was designated within the 100-year floodplain for planned landuse and existing channel conditions. Site eliminated by SEWPRC per 26-Mar-09 Mtg.
DP47	Pleasant Prairie	Kenosha	wetland / agriculture / forest / residential	78	Yes	No	NA	NA	Eliminate	The western half of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided, the eastern half was designated within the 100-year floodplain for planned landuse and existing channel conditions. Site eliminated by SEWPRC per 26-Mar-09 Mtg.
DP48	Unincorporated	Kenosha	wetland / agriculture / forest / residential / industrial	2,364	Yes	Yes	Yes	Yes	Keep	A small portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided, another small portion was designated within the 100-year floodplain for planned landuse and existing channel conditions.
DP49	Unincorporated	Kenosha	wetland / agriculture / forest / industrial / public / residential	1,273	Yes	No	NA	NA	Eliminate	A small portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided, another small portion was designated within the 100-year floodplain for planned landuse and existing channel conditions. Site eliminated by SEWPRC per 26-Mar-09 Mtg.

Table 21 (cont) – Reservoir Site Preliminary Site Screening Results: Des Plaines River

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Site #	Community	County	NIPC Existing Landuse	Area (acres)	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	Screening Decision	Reason for Screening Decision
					Field Verification	Existing Compatibility	Neighboring Compatibility	Environmental Compatibility		
DP50	Unincorporated	Kenosha	wetland / agriculture / forest / residential	786	Yes	No	NA	NA	Eliminate	A portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as an area of planned urban development where detention storage would be provided, another smaller portion was designated within the 100-year floodplain for planned landuse and existing channel conditions. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
DP51	Unincorporated	Kenosha	wetland / agriculture / forest / residential	949	Yes	Yes	Yes	Yes	Keep	A portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as designated within the 100-year floodplain for planned landuse and existing channel conditions.
DP52	Unincorporated	Kenosha	wetland / agriculture / forest / residential	1,608	Yes	Yes	Yes	Yes	Keep	A portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as designated within the 100-year floodplain for planned landuse and existing channel conditions.
DP53	Unincorporated	Kenosha	wetland / agriculture / forest / residential / public	2,135	Yes	Yes	Yes	Yes	Keep	A portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as designated within the 100-year floodplain for planned landuse and existing channel conditions.
DP54	Unincorporated	Racine	wetland / agriculture / forest / residential	312	Yes	No	NA	NA	Eliminate	A portion of the site was identified in the SEWRPC Comprehensive Plan, March 2003, Map 65 as designated within the 100-year floodplain for planned landuse and existing channel conditions. Site eliminated by SEWRPC per 26-Mar-09 Mtg.
DP55	Libertyville	Lake		18	Yes	No	Yes	Yes	Eliminate	Site eliminated due to small size. Site is currently Red Top Pond Park.
DP56	Gurnee	Lake		200	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Use site for offline storage and compensatory storage for Gurnee Levee.
DP57	Maywood	Cook		158	Yes	Yes	Yes	Yes	Keep	Keep for further analysis. Site was identified as potential storage site in Phase I Study.
Total 57 Sites				26,072	57 Yes 0 No	12 Yes 45 No	24 Yes 0 No 33 NA	27 Yes 10 No 12 NA 1 TBD	16 Keep 41 Eliminate	

Table 22 – Summary of Preliminary Screening Results for Identified Floodwater Storage Sites

ID	Watershed	County	State	Identified	Eliminated	Kept
BR	Brighton Creek	Kenosha/Racine	WI	7	4	3
CC	Center Creek	Kenosha	WI	7	7	0
KR	Kilbourn Road Ditch	Kenosha/Racine	WI	7	2	5
JC	Jerome Creek	Kenosha	WI	0	-	-
ND	Newport Ditch	Lake	IL	7	4	3
NM	North Mill Creek	Lake/Kenosha	IL/WI	8	3	5
ML	Mill Creek	Lake	IL	14	11	3
CT	Sub. Country Club Trib.	Lake	IL	0	-	-
DR	Delaney Road Tributary	Lake	IL	0	-	-
GT	Gurnee Tributary	Lake	IL	1	0	1
BC	Bull Creek	Lake	IL	4	3	1
IN	Indian Creek	Lake	IL	11	7	4
AC	Aptakisic Creek	Cook/Lake	IL	9	4	5
BW	Buffalo-Wheeling Creek	Cook/Lake	IL	41	28	13
MD	McDonald Creek	Cook	IL	7	5	2
FD	Feehanville Ditch	Cook	IL	3	0	3
WL	Weller Creek	Cook	IL	3	2	1
FP	Farmer-Prairie Creek	Cook	IL	1	1	0
WH	Willow-Higgins Creek	Cook/Dupage	IL	9	5	4
CR	Crystal Creek	Cook	IL	1	1	0
SC	Silver Creek	Cook/Dupage	IL	3	2	1
DP	Des Plaines River	Cook/Lake/Kenosha	IL/WI	57	41	16
				200	130	70

1.2 – Flood Barrier Site Identification

Locations with high concentrations of flood damage were identified as potential flood barrier sites. Concentrated damage areas included groups of both residential and commercial, industrial, and public (CIP) structures. With input from the study partners and stakeholders, several sites were identified for screening including sites where levees or floodwalls had previously been constructed. **Table 23** shows all flood barrier sites considered, by watershed. **Table 24** provides a summary of the sites.

Table 23 – Identified Flood Barrier Sites

Site ID	Location	Municipality	County	River Miles	Bank (looking downstream)	Proposed Modification
<i>Buffalo-Wheeling Creek</i>						
BWLV01	Valley Stream Dr west of Elmhurst Rd	Wheeling	Cook	2.87 - 3.63	Right	Protect large area of residential structures (25-500 yr)
BWLV02	St. Mary's Pkwy	Buffalo Grove	Cook	5.12 - 5.55	Right	Protect damage pocket of residential structures (50-500 yr)
<i>Silver Creek</i>						
SCLV01	South of North Ave (near Frenzel Dr & 19th Ave)	Melrose Park	Cook	1.25 - 1.70	Right	Protect damage pocket of residential structures (25-100 yr)
SCLV02	Between Fullerton Ave & Armitage Ave	Franklin Park - Leyden	Cook	2.55 - 3.15	Both	Protect damage pocket of residential and CIP structures (25-500 yr)
SCLV03	Between Fullerton Ave & Scott Ave	Franklin Park - Leyden	Cook	3.15 - 3.64	Both	Protect damage pocket of residential and CIP structures (25-100 yr)
SCLV04	Between Mannheim Rd & Grand Ave	Franklin Park - Leyden	Cook	4.30 - 4.71	Left	Protect damage pocket of residential and CIP structures (25-100 yr)
<i>Des Plaines River</i>						
DPLV01	Groveland Ave	Riverside	Cook	45.76-46.09	Left	Tie- back and/or raise existing berm
DPLV02	near Central Ave & Lake St	River Forest	Cook	54.26-51.15	Left	Raise existing berm
DPLV03	Thatcher near Armitage - Golf Course Trib	River Grove	Cook	53.16-53.90	Left	Protect damage pocket of residential structures (25-500 yr)
DPLV04	Des Plaines River Rd between First Ave & Fullerton	River Grove	Cook	54.20-55.35	Right	Protect structures near intersection of River Rd and Fullerton (10 -500 yr) and lane closures on River Rd
DPLV05	Des Plaines River Rd between Irving & Belmont	Schiller Park	Cook	55.92-56.92	Right	Protect structures along river road and lane closures on River Road
DPLV06 ¹	River Rd between Fargo & Howard	Des Plaines	Cook	62.90-63.36	Right	Protect damage pocket of residential structures
DPLV07 ¹	River Rd between Everett & Oakton	Des Plaines	Cook	63.36-63.70	Right	Protect damage pocket of residential structures
DPLV08 ¹	River Rd between Van Buren & Oakwood	Des Plaines	Cook	64.22-64.62	Right	Protect damage pocket of residential structures
DPLV10 ¹	Des Plaines River Rd between Algonquin & Oakton (Shagbark Lake)	Des Plaines	Cook	63.70-64.22	Right	Protect residential structures (5-500 yr); interior drainage issues with Shagbark Lake
DPLV11	Big Bend Dr	Des Plaines	Cook	66.41 - 66.96	Right	Protect damage pocket of residential structures
DPLV12	Krause, Edgewood and Prairie View Lanes (east of Milwaukee)	Wheeling	Cook	74.71-74.91	Right	Protect damage pocket of residential structures (25-500 yr)
DPLV13	Pekara Rd (Aptakisc Creek)	Unincorporated Vernon Twnshp	Lake	77.60	Right (trib)	Protect damage pocket of residential structures (5-500 yr)
DPLV14	South of Lincolnshire Rd	Lincolnshire	Lake	79.45-80.05	Left	Protect damage pocket of residential structures
DPLV15	East of Libertyville Estates btwn Spruce and Idlewood	Libertyville	Lake	90.62-91.11	Left	Protect damage pocket of residential structures (25-50yr)
DPLV16	Libertyville Estates Levee	Libertyville	Lake	90.70-91.11	Left	Increase existing 40-yr level of protection
DPLV17	Gurnee Area	Gurnee	Lake	98.41	Left	Protect structures south of Route 132. A levee in this area was evaluated as Levee 5 in Phase I Study.
¹ During site screening DPLV06, DPLV07, DPLV08, DPLV10 were combined into DPLV09. See Section 2.2.						

Table 24 – Summary of Identified Flood Barrier Sites

ID	Watershed	County	State	Levees
BW	Buffalo-Wheeling Creek	Cook/Lake	IL	2
SC	Silver Creek	Cook/Dupage	IL	4
DP	Des Plaines River	Cook/Lake/Kenosha	IL/WI	16
TOTAL				22

1.3 – Road Raise and Bridge Modification Site Identification

From baseline transportation damage data provided by the Visual Interactive System for Transportation Algorithms (VISTA) study, the 25 sites with the highest transportation damages were identified as possible road raise sites to prevent flooding of the roadway. All of the identified sites were along the Des Plaines River mainstem. **Table 25** lists the identified sites.

Table 25 – Identified Potential Road Raise and Bridge Modification Sites

Site ID	Location	Municipality	County	River Mile	Structure Type	Proposed Modification
DPBM03	Chicago Ave	River Forest	Cook	51.62	Bridge Mod.	Raise Bridge - currently floods at 10 yr
DPBM04	First Ave	River Grove	Cook	54.20	Bridge Mod.	Raise bridge - currently floods at 2 yr
DPRR01	River Road	River Grove	Cook	54.78	Road Raise	Raise road - currently floods at 10 yr
DPBM05	Grand Ave	River Grove	Cook	55.10	Bridge Mod.	Raise bridge - currently floods at 25 yr
DPRR02	River Road	River Grove	Cook	55.27	Road Raise	Raise road - currently floods at 10 yr
DPRR03	River Road	Schiller Park	Cook	56.84	Road Raise	Raise road - currently floods at 5 yr
DPRR04	River Road	Des Plaines	Cook	63.04	Road Raise	Raise road - currently floods at 5 yr
DPRR05	River Road	Des Plaines	Cook	64.50	Road Raise	Raise road - currently floods at 5 yr
DPRR06	Miner Street	Des Plaines	Cook	65.03	Road Raise	Raise road - currently floods at 5 yr
DPBM06	Rand Road	Des Plaines	Cook	65.39	Bridge Mod.	Raise bridge - currently floods at 25 yr
DPBM07	Golf Road	Des Plaines	Cook	66.91	Bridge Mod.	Raise bridge - currently floods at 5 year
DPBM08	River Road	Glenview	Cook	69.52	Bridge Mod.	Raise bridge - currently floods at 5 yr
DPBM09	Milwaukee Ave	Prospect Heights	Cook	71.03	Bridge Mod.	Raise bridge - currently floods at 5 yr
DPRR07	River Road	Prospect Heights	Cook	71.03	Road Raise	Raise road - currently floods at 5 yr
DPBM10	Milwaukee Ave	Prospect Heights	Cook	72.86	Bridge Mod.	Raise Bridge - currently floods at 5 yr
DPRR08	River Road	Buffalo Grove	Lake	77.97	Road Raise	Raise road - currently floods at 10 yr
DPBM11	Milwaukee Ave	Long Grove	Lake	77.37	Bridge Mod.	Raise bridge - currently floods at 100 yr
DPRR09	River Road	Buffalo Grove	Lake	78.82	Road Raise	Raise road - currently floods at 25 yr
DPBM12	IL Route 60	Libertyville	Lake	83.66	Bridge Mod.	Raise bridge - currently floods at 25 yr
DPBM13	IL Route 120	Grayslake	Lake	94.51	Bridge Mod.	Raise bridge - currently floods at 25 yr
DPRR10	Old Grand Ave	Gurnee	Lake	97.02	Road Raise	Raise road - currently floods at 2 yr
DPRR11	IL Route 32	Gurnee	Lake	97.08	Road Raise	Raise road - currently floods at 5 yr
DPBM14	Grand Ave	Gurnee	Lake	97.12	Bridge Mod.	Raise bridge - currently floods at 10 yr
DPBM15	US Hwy 41	Gurnee	Lake	98.08	Bridge Mod.	Raise bridge - currently floods at 25 yr
DPRR12	US Hwy 41	Gurnee	Lake	98.59	Road Raise	Raise road - currently floods at 5 yr

1.4 – Modifications to Existing Structures Site Identification

From the results of GIS mapped flood damages and through collaboration with study partners and stakeholders, several sites where modifications to existing structures could reduce flood risk were identified. **Table 26** shows all sites considered by watershed. **Table 27** provides a summary of these sites.

Table 26 – Identified Potential Structure Modifications

Site ID	Location	Municipality	County	River Mile	Structure Type	Proposed Modification
<i>Buffalo-Wheeling Creek</i>						
BWC101	Wolf Rd & Hintz Rd	Wheeling	Cook	0.88	Channel Improvements	Due to location of airport, only non-open water measures should be considered including streambank and floodplain terracing.
BWC102	Wolf Rd & Dundee Rd	Wheeling	Cook	1.92	Channel Improvements	Due to size, streambank and floodplain terracing should be considered. Potential municipal owner.
BWME01	Wolf Rd & Dundee Rd	Wheeling	Cook	1.53	Modify Existing Structure	This site, Heritage Lake, has flood retention capability. Look at potential for expansion.
<i>Weller Creek</i>						
WLME01	Central Rd & Northwest Hwy	Mount Prospect / Arlington Heights	Cook	5.97	Modify Existing Structure	Mt Prospect Reservoir is in the northeast portion of this site and a spoil pile is just south of existing reservoir. Potential to expand reservoir to western portion of site where there are existing ball fields. Site is owned by MWRD and portions are leased to Mt. Prospect Park District.
<i>Farmer-Prairie Creek</i>						
FPCI01	Golf Road & I-294	Unincorporated	Cook	0.95	Drainage Improvement	Modify pump and provide a connection at Lake Mary Anne to Dude Ranch Pond, across Golf Road
FPME01	Busse Rd & I-294	Des Plaines and Park Ridge	Cook	0.59	Modify Existing Structure	This site, Belleau Lake, could be deepened and expanded to increase capacity.
<i>Willow-Higgins Creek</i>						
WHME01	Touhy Rd & Mt. Prospect Ave	Des Plaines	Cook	4.73	Modify Existing Structure	This site is Touhy Avenue Reservoir that was recently expanded by the City of Chicago. Potential to interconnect with adjacent site, WHRS06.
<i>Silver Creek</i>						
SCCI01	Underground Creek, Upstream of RR Culvert (N of North Ave)	Melrose Park	Cook	2.25	Drainage Improvements	Evaluate improvements to drainage including replacement of culverts
SCCI02	Between N. Wolf Rd & Lee St	Franklin Park - Leyden	Cook	5.27	Drainage Improvements	Evaluate improvements to drainage including replacement of culverts
SCME01	Grand & Mannheim	Franklin Park	Cook	4.30	Modify Existing Structure	Modify structure 106. Look at potential for expansion.
SCME02	Irving Park Rd & Mannheim Rd	Franklin Park	Cook	6.42	Modify Existing Structure	Modify structure 102. Look at potential for expansion.
SCOT01	Indian Boundary Dr	Melrose Park - Stone Park	Cook	2.42	Interbasin Flow Issue	Review topography and evaluate potential for interbasin flow associated with Addison Creek/Silver Creek.

Table 26 (cont.) – Identified Potential Structure Modifications

Site ID	Location	Municipality	County	River Mile	Structure Type	Proposed Modification
<i>Des Plaines River</i>						
DPBM01	BNSF RR Bridge	Riverside	Cook	46.56	Bridge Modification	Extend bridge piers to reduce head loss through skewed structure
DPBM02	Forest Ave	Riverside	Cook	46.69	Bridge Modification	Modify bridge channel section.
DPOT01	near Brookfield Zoo	Riverside	Cook	47.05	Salt Creek Diversion	Re-evaluate diversion of flow from Salt Creek.
DPOT02	Varies	Varies	Cook	Varies	Modified Riparian Greenway	Evaluate improvements to conveyance by removing snags and other existing vegetation along the riparian corridor to reduce channel roughness
DPOT03	Varies	Varies	Cook / Lake	Varies	Optimize Existing Structures	Optimize operations at existing reservoirs within watershed to ensure efficient use of structures.

Table 27 – Summary of Identified Structure Modification Sites

ID	Watershed	County	State	Modify Existing Struct.	Drain/Channel Improve	Bridge Mod.	Other
BW	Buffalo-Wheeling Creek	Cook/Lake	IL	1	2	0	0
WL	Weller Creek	Cook	IL	1	0	0	0
FP	Farmer-Prairie Creek	Cook	IL	1	1	0	0
WH	Willow-Higgins Creek	Cook/Dupage	IL	1	0	0	0
SC	Silver Creek	Cook/Dupage	IL	2	2	0	1
DP	Des Plaines River	Cook/Lake/Kenosha	IL/WI	0	0	2	3
TOTAL				6	5	2	3

1.5 – Non-Structural Measure Site Identification

A number of structures throughout the watershed were identified for potential non-structural flood risk management measures such as acquisition, flood proofing, or elevation. In addition to structures damaged during events up to and including the 1% annual change of exceedance flood, repetitive loss structures compiled from information collected by the Illinois Emergency Management Agency (IEMA) and the Federal Emergency Management Agency (FEMA) were identified for further evaluation. Repetitive loss structures not captured by the structure survey conducted for this study or that showed \$0 Equivalent Annual Damages in the HEC-FDA model were assumed to be incurring damages as a result of local drainage issues rather than overbank flooding and were removed from consideration.

A total of 1,527 structures were identified as potential candidates for non-structural FRM methods. Of these, 71% are in Cook County, 25% in Lake County, and 4% in Kenosha County. Residential structures make up the majority with 88% of the total. The non-residential portion contains largely commercial and industrial structures, with a few unique, large structures (hotels and a convention center). **Table 28** shows a summary of sites considered for non-structural measures.

Table 28 – Summary of Identified Non-Structural Flood Risk Management Sites

County	Municipality	Structures in Municipality	Structures in County
Cook	Riverside	6	1,084
	River Forest	22	
	Elmwood Park	54	
	River Grove	132	
	Franklin Park	130	
	Schiller Park	20	
	Rosemont	2	
	Des Plaines	243	
	Prospect Heights	9	
	Wheeling	239	
	Park Ridge	47	
	Melrose Park	16	
	Franklin Park	130	
	Buffalo Grove	34	
Lake	Riverwoods	55	385
	Buffalo Grove	30	
	Lincolnshire	50	
	Mettawa	2	
	Libertyville	198	
	Gurnee	50	
Kenosha	Pleasant Prairie	16	58
	Salem	6	
	Bristol	12	
	Somers	1	
	Paddock Lake	23	

SECTION 2 – FLOOD RISK MANAGEMENT SITE SCREENING

Identified flood risk management sites were screened based on the development of benefit to cost ratios (BCRs) at each site. Benefits were estimated based on conceptual hydrologic and hydraulic modeling results and associated reductions in flood damages using the Hydrologic Engineering Center – Flood Damage Analysis (HEC-FDA) model. Costs were estimated using idealized designs that could be factored to all measures independent of specific site conditions and escalated operations and maintenance costs from similar studies. General estimates of real estate costs were developed based on county-wide averages of tax assessed market values for sites in private ownership and escalated real estate values of sites in public ownership.

2.1 – Floodwater Storage Site Screening

See Appendix A (Hydrology and Hydraulics) for discussion and details on the conceptual Hydrologic and Hydraulic analysis performed at this stage.

See Appendix D (Civil Design) for discussion and details on development of site design and cost estimates used in site screening.

Table 29 through **Table 44** presents the damage reduction calculations for the identified potential floodwater storage sites. APT, VEH, COM, IND, PUB, RES and TRAFFIC are damage categories as discussed in Appendix E (Economics).

Table 29 – Reservoir Screening Damage Reduction Calculation: Brighton Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
BRRS01	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
BRRS02	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
BRRS03	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								

Table 30 – Reservoir Screening Damage Reduction Calculation: Kilbourn Road Ditch

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
KRRS01	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
KRRS02	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
KRRS04	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
KRRS05	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
KRRS06	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								

Table 31 – Reservoir Screening Damage Reduction Calculation: Newport Ditch

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
NDRS01	565	\$0	\$0	\$5,000	\$1,000	\$3,000	\$3,000	\$26,000	\$38,000
NDRS02	309	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
NDRS03	574	\$1,000	\$1,000	\$30,000	\$11,000	\$30,000	\$30,000	\$325,000	\$427,000

(FY 2010 Price Level, FDR 4.125%)

Table 32 – Reservoir Screening Damage Reduction Calculation: North Mill Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
NMRS01	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
NMRS03	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
NMRS04	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
NMRS05	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
NMRS07	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								

(FY 2010 Price Level, FDR 4.125%)

Table 33 – Reservoir Screening Damage Reduction Calculation: Mill Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
MLRS03	4195	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MLRS04	6535	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MLRS06	205	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<i>Tributary</i>									
MLRS03	4195	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MLRS04	6535	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MLRS06	205	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<i>Total</i>									
MLRS03	4195	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MLRS04	6535	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MLRS06	205	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

(FY 2010 Price Level, FDR 4.125%)

Table 34 – Reservoir Screening Damage Reduction Calculation: Gurnee Tributary

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
GTRS01	67	\$0	\$0	\$1,000	\$0	\$0	\$0	\$0	\$1,000

*Gurnee Tributary was not modeled, thus tributary damage reductions are not included for this reservoir.

(FY 2010 Price Level, FDR 4.125%)

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Table 35 – Reservoir Screening Damage Reduction Calculation: Bull Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
BCRS02	177	\$35,000	\$1,000	\$528,000	\$57,000	\$9,000	\$163,000	\$1,708,000	\$2,500,000
<i>Tributary</i>									
BCRS02	177	\$0	\$0	\$0	\$0	\$0	\$1,000	\$17,000	\$18,000
<i>Total</i>									
BCRS02	177	\$35,000	\$1,000	\$528,000	\$57,000	\$9,000	\$164,000	\$1,725,000	\$2,518,000

(FY 2010 Price Level, FDR 4.125%)

Table 36 – Reservoir Screening Damage Reduction Calculation: Indian Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
INRS01	165	\$0	\$0	\$4,000	\$0	\$0	\$1,000	\$0	\$5,000
INRS07	441	\$2,000	\$0	\$30,000	\$4,000	\$1,000	\$7,000	\$66,000	\$110,000
INRS09	499	\$3,000	\$0	\$55,000	\$6,000	\$2,000	\$12,000	\$151,000	\$229,000
INRS10	549	\$7,000	\$0	\$122,000	\$15,000	\$4,000	\$34,000	\$380,000	\$561,000
<i>Tributary</i>									
INRS01	165	\$0	\$0	\$0	\$0	\$0	\$0	\$51,000	\$51,000
INRS07	441	\$0	\$0	\$0	\$0	\$0	\$11,000	\$51,000	\$62,000
INRS09	499	\$0	\$0	\$0	\$0	\$0	\$13,000	\$51,000	\$64,000
INRS10	549	\$0	\$0	\$0	\$0	\$0	\$5,000	\$51,000	\$55,000
<i>Total</i>									
INRS01	165	\$0	\$0	\$4,000	\$0	\$0	\$0	\$51,000	\$56,000
INRS07	441	\$2,000	\$0	\$30,000	\$4,000	\$1,000	\$18,000	\$117,000	\$172,000
INRS09	499	\$3,000	\$0	\$55,000	\$6,000	\$2,000	\$25,000	\$201,000	\$293,000
INRS10	549	\$7,000	\$0	\$122,000	\$15,000	\$4,000	\$39,000	\$430,000	\$617,000

(FY 2010 Price Level, FDR 4.125%)

Table 37 – Reservoir Screening Damage Reduction Calculation: Aptakasic Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem*</i>									
ACRS01	56	\$2,000	\$0	\$33,000	\$5,000	\$0	\$9,000	\$84,000	\$133,000
ACRS02	79	\$3,000	\$0	\$46,000	\$8,000	\$1,000	\$13,000	\$133,000	\$204,000
ACRS03	248	\$23,000	\$1,000	\$395,000	\$45,000	\$5,000	\$101,000	\$990,000	\$1,559,000
ACRS08	418	\$51,000	\$1,000	\$810,000	\$85,000	\$17,000	\$225,000	\$2,122,000	\$3,312,000
ACRS09	93	\$4,000	\$0	\$65,000	\$11,000	\$1,000	\$18,000	\$194,000	\$293,000

*Aptakasic Creek Tributary was not modeled, thus tributary damage reductions are not included for these reservoirs.
(FY 2010 Price Level, FDR 4.125%)

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Table 38 – Reservoir Screening Damage Reduction Calculation: Buffalo-Wheeling Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
BWRS03	165	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BWRS06	49	\$0	\$0	\$3,000	\$0	\$0	\$0	\$0	\$3,000
BWRS09	345	\$5,000	\$0	\$68,000	\$9,000	\$3,000	\$18,000	\$144,000	\$247,000
BWRS10	72	\$0	\$0	\$3,000	\$0	\$0	\$0	\$1,000	\$4,000
BWRS15	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
BWRS17	26	\$5,000	\$0	\$68,000	\$9,000	\$3,000	\$18,000	\$144,000	\$247,000
BWRS18	552	\$12,000	\$0	\$187,000	\$21,000	\$6,000	\$43,000	\$479,000	\$748,000
BWRS21	86	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
BWRS27	308	\$0	\$0	\$8,000	\$1,000	\$0	\$2,000	\$17,000	\$27,000
BWRS28	204	\$1,000	\$0	\$12,000	\$2,000	\$0	\$4,000	\$25,000	\$44,000
BWRS30	628	\$7,000	\$0	\$105,000	\$13,000	\$3,000	\$23,000	\$320,000	\$472,000
BWRS31	383	\$14,000	\$0	\$259,000	\$36,000	\$5,000	\$58,000	\$873,000	\$1,245,000
BWRS40*	25	\$5,000	\$0	\$63,000	\$8,000	\$3,000	\$17,000	\$141,000	\$237,000
<i>Tributary</i>									
BWRS03	165	\$7,000	\$2,000	\$11,000	\$4,000	\$0	\$86,000	\$8,000	\$118,000
BWRS06	49	\$6,000	\$2,000	\$11,000	\$4,000	\$0	\$82,000	\$8,000	\$112,000
BWRS09	345	\$11,000	\$2,000	\$14,000	\$5,000	\$0	\$115,000	\$8,000	\$155,000
BWRS10	72	\$8,000	\$2,000	\$11,000	\$4,000	\$0	\$89,000	\$8,000	\$122,000
BWRS15	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
BWRS17	26	\$11,000	\$2,000	\$14,000	\$5,000	\$0	\$115,000	\$8,000	\$155,000
BWRS18	552	\$11,000	\$2,000	\$13,000	\$4,000	\$0	\$110,000	\$8,000	\$148,000
BWRS21	86	\$7,000	\$2,000	\$12,000	\$4,000	\$0	\$93,000	\$8,000	\$126,000
BWRS27	308	\$8,000	\$2,000	\$12,000	\$4,000	\$0	\$95,000	\$8,000	\$129,000
BWRS28	204	\$9,000	\$2,000	\$15,000	\$4,000	\$0	\$101,000	\$8,000	\$140,000
BWRS30	628	\$9,000	\$3,000	\$16,000	\$5,000	\$0	\$132,000	\$8,000	\$173,000
BWRS31	383	\$8,000	\$2,000	\$13,000	\$4,000	\$0	\$102,000	\$8,000	\$137,000
BWRS40*	25	\$11,000	\$2,000	\$14,000	\$5,000	\$0	\$113,000	\$8,000	\$153,000
<i>Total</i>									
BWRS03	165	\$7,000	\$2,000	\$11,000	\$4,000	\$0	\$86,000	\$8,000	\$118,000
BWRS06	49	\$7,000	\$2,000	\$13,000	\$4,000	\$0	\$82,000	\$8,000	\$115,000
BWRS09	345	\$16,000	\$2,000	\$82,000	\$14,000	\$3,000	\$133,000	\$152,000	\$402,000
BWRS10	72	\$8,000	\$2,000	\$14,000	\$4,000	\$0	\$90,000	\$9,000	\$126,000
BWRS15	H&H analysis did not show a significant effect on the water surface profile, site eliminated from further analysis.								
BWRS17	26	\$16,000	\$2,000	\$82,000	\$14,000	\$3,000	\$133,000	\$152,000	\$402,000
BWRS18	552	\$22,000	\$3,000	\$200,000	\$25,000	\$6,000	\$153,000	\$487,000	\$896,000
BWRS21	86	\$7,000	\$2,000	\$12,000	\$4,000	\$0	\$93,000	\$8,000	\$126,000
BWRS27	308	\$8,000	\$2,000	\$20,000	\$4,000	\$0	\$96,000	\$25,000	\$156,000
BWRS28	204	\$10,000	\$2,000	\$27,000	\$6,000	\$0	\$105,000	\$33,000	\$184,000
BWRS30	628	\$16,000	\$3,000	\$121,000	\$19,000	\$3,000	\$155,000	\$328,000	\$644,000
BWRS31	383	\$23,000	\$2,000	\$271,000	\$40,000	\$5,000	\$160,000	\$881,000	\$1,381,000
BWRS40*	25	\$16,000	\$2,000	\$77,000	\$13,000	\$3,000	\$131,000	\$149,000	\$390,000

*BWRS40 was run as a combination of sites BWRS09 and BWRS40. BWRS17 was run as a combination of sites BWRS09, BWRS40 and BWRS 17.

(FY 2010 Price Level, FDR 4.125%)

Table 39 – Reservoir Screening Damage Reduction Calculation: McDonald Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
MDRS02	44	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MDRS04	119	\$1,000	\$0	\$11,000	\$2,000	\$0	\$3,000	\$19,000	\$36,000
<i>Tributary</i>									
MDRS02	44	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MDRS04	119	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<i>Total</i>									
MDRS02	44	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
MDRS04	119	\$1,000	\$0	\$11,000	\$2,000	\$0	\$3,000	\$19,000	\$36,000

(FY 2010 Price Level, FDR 4.125%)

Table 40 – Reservoir Screening Damage Reduction Calculation: Feehanville Ditch

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem*</i>									
FDRS01	4,400	\$214,000	\$13,000	\$2,971,000	\$372,000	\$234,000	\$1,225,000	\$11,565,000	\$16,595,000
FDRS02	243	\$1,000	\$0	\$7,000	\$2,000	\$0	\$3,000	\$26,000	\$39,000
FDRS03	24	\$24,000	\$0	\$256,000	\$37,000	\$20,000	\$73,000	\$804,000	\$1,214,000

*Feehanville Ditch Tributary was not modeled, thus tributary damage reductions are not included for these reservoirs.
(FY 2010 Price Level, FDR 4.125%)

Table 41 – Reservoir Screening Damage Reduction Calculation: Weller Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
WLRS03	322	\$3,000	\$0	\$30,000	\$8,000	\$1,000	\$10,000	\$48,000	\$99,000
<i>Tributary</i>									
WLRS03	322	\$0	\$1,000	\$0	\$0	\$0	\$51,000	\$3,000	\$54,000
<i>Total</i>									
WLRS03	322	\$3,000	\$1,000	\$30,000	\$8,000	\$1,000	\$61,000	\$51,000	\$153,000

(FY 2010 Price Level, FDR 4.125%)

Table 42 – Reservoir Screening Damage Reduction Calculation: Willow-Higgins Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
WHRS01	250	\$5,000	\$0	\$52,000	\$9,000	\$6,000	\$13,000	\$164,000	\$248,000
WHRS06	586	\$740,000	\$14,000	\$7,822,000	\$849,000	\$1,024,000	\$1,963,000	\$23,327,000	\$35,739,000
WHRS08	93	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WHRS09	246	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<i>Tributary</i>									
WHRS01	250	\$0	\$0	\$14,000	\$0	\$0	\$1,000	\$21,000	\$36,000
WHRS06	586	\$0	\$0	\$14,000	\$0	\$0	\$1,000	\$21,000	\$36,000
WHRS08	93	\$0	\$0	\$14,000	\$0	\$0	\$1,000	\$21,000	\$36,000
WHRS09	246	\$0	\$0	\$14,000	\$0	\$0	\$1,000	\$21,000	\$36,000
<i>Total</i>									
WHRS01	250	\$5,000	\$0	\$65,000	\$9,000	\$6,000	\$14,000	\$185,000	\$284,000
WHRS06	586	\$740,000	\$14,000	\$7,836,000	\$849,000	\$1,024,000	\$1,964,000	\$23,348,000	\$35,775,000
WHRS08	93	\$0	\$0	\$14,000	\$0	\$0	\$1,000	\$21,000	\$36,000
WHRS09	246	\$0	\$0	\$14,000	\$0	\$0	\$1,000	\$21,000	\$36,000

(FY 2010 Price Level, FDR 4.125%)

Table 43 – Reservoir Screening Damage Reduction Calculation: Silver Creek

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
SCRS03	718	\$3,000	\$0	\$20,000	\$12,000	\$1,000	\$12,000	\$104,000	\$151,000
<i>Tributary</i>									
SCRS03	718	\$2,000	\$3,000	\$193,000	\$148,000	\$0	\$223,000	\$245,000	\$813,000
<i>Total</i>									
SCRS03	718	\$4,000	\$3,000	\$213,000	\$160,000	\$2,000	\$234,000	\$349,000	\$964,000

(FY 2010 Price Level, FDR 4.125%)

Table 44 – Reservoir Screening Damage Reduction Calculation: Des Plaines River Mainstem

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
DPRS07	1000	\$35,000	\$1,000	\$290,000	\$158,000	\$8,000	\$108,000	\$1,924,000	\$2,524,000
DPRS23	330	\$24,000	\$1,000	\$356,000	\$32,000	\$5,000	\$81,000	\$890,000	\$1,388,000
DPRS24	1000	\$24,000	\$1,000	\$372,000	\$30,000	\$8,000	\$74,000	\$751,000	\$1,261,000
DPRS33	1678	\$0	\$0	\$17,000	\$10,000	\$28,000	\$25,000	\$172,000	\$252,000
DPRS34	500	\$0	\$0	\$23,000	\$12,000	\$33,000	\$25,000	\$296,000	\$391,000
DPRS35	1200	\$1,000	\$1,000	\$43,000	\$20,000	\$60,000	\$50,000	\$728,000	\$902,000
DPRS38	200	\$0	\$0	\$15,000	\$6,000	\$20,000	\$14,000	\$248,000	\$304,000
DPRS40	1000	\$2,000	\$1,000	\$54,000	\$25,000	\$84,000	\$63,000	\$1,329,000	\$1,560,000
DPRS41	1200	\$3,000	\$1,000	\$58,000	\$20,000	\$50,000	\$47,000	\$557,000	\$737,000
DPRS44	3436	\$3,000	\$1,000	\$71,000	\$22,000	\$57,000	\$57,000	\$538,000	\$748,000
DPRS48	1220	\$1,000	\$0	\$26,000	\$6,000	\$15,000	\$19,000	\$120,000	\$187,000
DPRS51	697	\$1,000	\$0	\$13,000	\$3,000	\$7,000	\$9,000	\$48,000	\$80,000
DPRS52	489	\$1,000	\$0	\$14,000	\$4,000	\$12,000	\$12,000	\$61,000	\$102,000
DPRS53	1004	\$1,000	\$0	\$19,000	\$5,000	\$16,000	\$19,000	\$115,000	\$175,000
DPRS56	1230	\$3,000	\$2,000	\$65,000	\$31,000	\$97,000	\$79,000	\$1,384,000	\$1,661,000
DPRS57	698	\$6,000	\$0	\$9,000	\$5,000	\$4,000	\$14,000	\$95,000	\$132,000

(FY 2010 Price Level, FDR 4.125%)

Screening cost estimates used several assumptions. To estimate first cost of construction, cost estimates were developed for several sites covering a range of sizes, capacities, and site conditions, as discussed in Appendix F (Cost Engineering). These estimates were used to create a linear relationship between the reservoir size and the first cost of construction. Estimated Lands and Damages were calculated based on an area-wide cost per acre of \$[REDACTED]. This value was determined using the average value of land per acre in Cook County, as discussed in Appendix E (Economics). Supervision and administration (S&A) costs were estimated as 25% of the first costs, and Operation & Maintenance (O&M) costs were estimated as \$[REDACTED] per acre-foot of storage up to 444 acre-feet. The cost at 444 acre-feet, \$[REDACTED], was considered an upper limit for the O&M cost estimate. **Table 45** presents the screening cost calculations used in the benefit to cost ratio screening.

Table 45 – Reservoir Screening Cost Calculations

ID	Storage Volume (acre-ft)	Footprint Area (acres)	Estimated First Costs	Estimated Lands and Damages	Estimated S&A Costs	Total Implementation Costs	Estimated O&M Costs	Equivalent Annual Total Costs
<i>Newport Ditch</i>								
NDRS01	565	128						\$1,312,000
NDRS02	309	70						\$901,000
NDRS03	574	130						\$1,325,000
<i>Mill Creek</i>								
MLRS03	4,195	951						\$6,710,000
MLRS04	6,535	1,481						\$10,189,000
MLRS06	205	46						\$722,000
<i>Gurnee Tributary</i>								
GTRS01	67	15						\$486,000
<i>Bull Creek</i>								
BCRS02	177	55						\$788,000
<i>Indian Creek</i>								
INRS01	165	37						\$653,000
INRS07	441	100						\$1,127,000
INRS09	499	113						\$1,214,000
INRS10	549	124						\$1,287,000
<i>Aptakisic Creek</i>								
ACRS01	56	13						\$469,000
ACRS02	79	18						\$507,000
ACRS03	248	56						\$796,000
ACRS08	418	95						\$1,088,000
ACRS09	93	21						\$531,000
<i>Buffalo-Wheeling Creek</i>								
BWRS03	165	37						\$653,000
BWRS06	49	11						\$455,000
BWRS09	345	78						\$962,000
BWRS10	90	90						\$708,000
BWRS17	552	125						\$1,292,000
BWRS18	86	20						\$520,000
BWRS21	308	70						\$900,000
BWRS27	204	46						\$720,000
BWRS28	628	142						\$1,405,000
BWRS30	383	87						\$1,028,000
BWRS31	84	84						\$686,000
<i>McDonald Creek</i>								
MDRS02	44	10						\$447,000
MDRS04	119	27						\$576,000

(FY 2010 Price Level, FDR 4.125%)

Table 45 (cont.) – Reservoir Screening Cost Calculations

ID	Storage Volume (acre-ft)	Footprint Area (acres)	Estimated First Costs	Estimated Lands and Damages	Estimated S&A Costs	Total Implementation Costs	Estimated O&M Costs	Equivalent Annual Total Costs
<i>Feehanville Ditch</i>								
FDRS01	2,000	1,007						\$4,896,000
FDRS02	243	55						\$788,000
FDRS03	24	5						\$412,000
<i>Weller Creek</i>								
MLRS03	4,195	951						\$923,000
<i>Willow-Higgins Creek</i>								
WHRS01	250	57						\$801,000
WHRS06	586	21						\$1,050,000
WHRS08	93	21						\$531,000
WHRS09	246	56						\$794,000
<i>Silver Creek</i>								
SCRS03	718	163						\$1,540,000
<i>Des Plaines River</i>								
DPRS07	1,000	200						\$1,889,000
DPRS23	330	66						\$914,000
DPRS24	1,000	200						\$1,889,000
DPRS33	1,678	380						\$2,966,000
DPRS34	500	100						\$1,180,000
DPRS35	1,200	272						\$2,256,000
DPRS38	200	40						\$700,000
DPRS40	1,000	200						\$1,889,000
DPRS41	1,200	240						\$2,172,000
DPRS44	3,436	779						\$5,582,000
DPRS48	1,220	276						\$2,285,000
DPRS51	697	158						\$1,508,000
DPRS52	489	111						\$1,199,000
DPRS53	1,004	228						\$1,966,000
DPRS56	1,230	200						\$2,094,000
DPRS57	698	140						\$1,462,000

(FY 2010 Price Level, FDR 4.125%)

The costs and benefits presented in the above tables were used to calculate a BCR for each site, presented in

Table 46. Sites with BCRs greater than 1.0 were kept for further analysis. **Table 47** presents a summary of these results by watershed.

Table 46 – Reservoir Screening Benefit to Cost Ratio Results

Site ID	Storage Volume (acre-ft)	Equivalent Annual Damages Reduced	Equivalent Annual Costs	BCR	Screening Result
<i>Newport Ditch</i>					
NDRS01	565	\$38,000	\$1,312,000	0	Eliminated: BCR<1
NDRS02	309	\$0	\$901,000	0	Eliminated: BCR<1
NDRS03	574	\$427,000	\$1,325,000	0.3	Eliminated: BCR<1
<i>Mill Creek</i>					
MLRS03	4,195	\$0	\$6,710,000	0	Eliminated: BCR<1
MLRS04	6,535	\$0	\$10,189,000	0	Eliminated: BCR<1
MLRS06	205	\$0	\$722,000	0	Eliminated: BCR<1
<i>Gurnee Tributary</i>					
GTRS01	67	\$1,000	\$486,000	0	Eliminated: BCR<1
<i>Bull Creek</i>					
BCRS02	177	\$2,518,000	\$788,000	3.2	Kept for further analysis
<i>Indian Creek</i>					
INRS01	165	\$56,000	\$653,000	0.1	Eliminated: BCR<1
INRS07	441	\$172,000	\$1,127,000	0.2	Eliminated: BCR<1
INRS09	498	\$293,000	\$1,214,000	0.2	Eliminated: BCR<1
INRS10	549	\$617,000	\$1,287,000	0.5	Eliminated: BCR<1
<i>Aptakisic Creek</i>					
ACRS01	56	\$133,000	\$469,000	0.3	Eliminated: BCR<1
ACRS02	79	\$204,000	\$507,000	0.4	Eliminated: BCR<1
ACRS03	248	\$1,559,000	\$796,000	2	Kept for further analysis
ACRS08	418	\$3,312,000	\$1,088,000	3	Kept for further analysis
ACRS09	93	\$293,000	\$531,000	0.6	Eliminated: BCR<1
<i>Buffalo-Wheeling Creek</i>					
BWRS03	165	\$118,000	\$653,000	0.2	Eliminated: BCR<1
BWRS06	49	\$115,000	\$455,000	0.3	Eliminated: BCR<1
BWRS09	345	\$402,000	\$962,000	0.4	Eliminated: BCR<1
BWRS10	72	\$126,000	\$494,000	0.3	Eliminated: BCR<1
BWRS17	396	\$402,000	\$708,000	0.6	Eliminated: BCR<1
BWRS18	552	\$896,000	\$1,292,000	0.7	Eliminated: BCR<1
BWRS21	86	\$126,000	\$520,000	0.2	Eliminated: BCR<1
BWRS27	308	\$156,000	\$900,000	0.2	Eliminated: BCR<1
BWRS28	204	\$184,000	\$720,000	0.3	Eliminated: BCR<1
BWRS30	628	\$644,000	\$1,405,000	0.5	Eliminated: BCR<1
BWRS31	383	\$1,381,000	\$1,028,000	1.3	Kept for further analysis
BWRS40	370	\$390,000	\$686,000	0.6	Eliminated: BCR<1

(FY 2010 Price Level, FDR 4.125%)

Table 46 (cont.) – Reservoir Screening Benefit to Cost Ratio Results

Site ID	Storage Volume (acre-ft)	Equivalent Annual Damages Reduced	Equivalent Annual Costs	BCR	Screening Result
<i>McDonald Creek</i>					
MDRS02	44	\$0	\$447,000	0	Eliminated: BCR<1
MDRS04	119	\$36,000	\$576,000	0.1	Eliminated: BCR<1
<i>Feehanville Ditch</i>					
FDRS01	2,000	\$16,595,000	\$4,896,000	3.4	Kept for further analysis
FDRS02	243	\$39,000	\$788,000	0	Eliminated: BCR<1
FDRS03	24	\$1,214,000	\$412,000	2.9	Kept for further analysis
<i>Weller Creek</i>					
WLRS03	322	\$153,000	\$923,000	0.2	Eliminated: BCR<1
<i>Willow-Higgins Creek</i>					
WHRS01	250	\$284,000	\$801,000	0.4	Eliminated: BCR<1
WHRS06	586	\$35,775,000	\$1,050,000	34.1	Kept for further analysis
WHRS08	93	\$36,000	\$531,000	0.1	Eliminated: BCR<1
WHRS09	246	\$36,000	\$794,000	0	Eliminated: BCR<1
<i>Silver Creek</i>					
SCRS03	718	\$964,000	\$1,540,000	0.6	Eliminated: BCR<1
<i>Des Plaines River</i>					
DPRS07	1,000	\$2,524,000	\$1,889,000	1.3	Kept for further analysis
DPRS23	330	\$1,388,000	\$914,000	1.5	Kept for further analysis
DPRS24	1,000	\$1,261,000	\$1,889,000	0.7	Eliminated: BCR<1
DPRS33	1,678	\$252,000	\$2,966,000	0.1	Eliminated: BCR<1
DPRS34	500	\$391,000	\$1,180,000	0.3	Eliminated: BCR<1
DPRS35	1,200	\$902,000	\$2,256,000	0.4	Eliminated: BCR<1
DPRS38	200	\$304,000	\$700,000	0.4	Eliminated: BCR<1
DPRS40	1,000	\$1,560,000	\$1,889,000	0.8	Eliminated: BCR<1
DPRS41	1,200	\$737,000	\$2,172,000	0.3	Eliminated: BCR<1
DPRS44	3,436	\$748,000	\$5,582,000	0.1	Eliminated: BCR<1
DPRS48	1,220	\$187,000	\$2,285,000	0.1	Eliminated: BCR<1
DPRS51	697	\$80,000	\$1,508,000	0.1	Eliminated: BCR<1
DPRS52	489	\$102,000	\$1,199,000	0.1	Eliminated: BCR<1
DPRS53	1,004	\$175,000	\$1,966,000	0.1	Eliminated: BCR<1
DPRS56	1,230	\$1,661,000	\$2,094,000	0.8	Eliminated: BCR<1
DPRS57	698	\$132,000	\$1,462,000	0.1	Eliminated: BCR<1

(FY 2010 Price Level, FDR 4.125%)

Table 47 – Summary of Reservoir Site Screening Results

ID	Watershed	County	State	Identified	Eliminated	Kept
BR	Brighton Creek	Kenosha/Racine	WI	3	3	0
KR	Kilbourn Road Ditch	Kenosha/Racine	WI	5	5	0
ND	Newport Ditch	Lake	IL	3	3	0
NM	North Mill Creek	Lake/Kenosha	IL/WI	5	5	0
ML	Mill Creek	Lake	IL	3	3	0
GT	Gurnee Tributary	Lake	IL	1	1	0
BC	Bull Creek	Lake	IL	1	0	1
IN	Indian Creek	Lake	IL	4	4	0
AC	Aptakisic Creek	Cook/Lake	IL	5	3	2
BW	Buffalo-Wheeling Creek	Cook/Lake	IL	13	12	1
MD	McDonald Creek	Cook	IL	2	2	0
FD	Feehanville Ditch	Cook	IL	3	1	2
WL	Weller Creek	Cook	IL	1	1	0
WH	Willow-Higgins Creek	Cook/Dupage	IL	4	3	1
SC	Silver Creek	Cook/Dupage	IL	1	1	0
DP	Des Plaines River	Cook/Lake/Kenosha	IL/WI	16	14	2
				70	61	9

2.2 – Flood Barrier Site Screening

As a preliminary step, the potential flood barrier sites were evaluated with respect to practical site considerations. Several sites were eliminated or modified:

- DPLV02 was eliminated because no high ground tie-in spot was available in the area.
- No high ground tie-in spots for DPLV06, 07, 10, and 08 as individual structures were available. As these sites are adjacent and tie back is feasible at the north and south ends, the sites were combined into a single levee system. The revised site was named DPLV09.
- DPLV11 was eliminated because no high ground tie-in spot was available in the area.
- DPLV12 was eliminated because no high ground tie-in spot was available in the area.
- DPLV13 was eliminated due to the large amount of floodplain removed by the structure, making floodplain mitigation impractical.
- DPLV14 was eliminated because no high ground tie-in spot was available in the area.
- DPLV16 was eliminated because the existing structure had been tied in to the highest available elevation.
- DPLV17 was eliminated due to the large amount of floodplain removed by the structure, making floodplain mitigation impractical.

For the remaining sites, preliminary reductions in damages were calculated in HEC-FDA using baseline water surface profiles created as described in Appendix A (Hydrology & Hydraulics). Reductions in damages are shown in **Table 49**. In order to find the optimal levee height at each location, reductions in damages were calculated for levees heights at flood stages for 10%, 2%, 1%, 0.02% annual chance of exceedance flood events. These flood stages are shown in **Table 48**. An additional crest elevation of two feet above the 1% chance flood stage was modeled as a maximum elevation. The length of the levee was determined as discussed in

Appendix D (Civil Design). Initial calculations were performed assuming that the structure would not impact the water surface profile and no floodplain mitigation would be required.

Table 48 – Flood Barrier Site Water Surface Profile Elevations

Site ID	Grade Elev. (ft NGVD 29)	Flood Elevation by Flood Event (% chance of exceedance)				
		10%	2%	1%	0.02%	1% + 2 ft
<i>Buffalo-Wheeling Creek</i>						
BWLV01	652	653.11	654.61	655.27	656.61	657.27
BWLV02	674	674.54	676.46	677.62	680.33	679.62
<i>Silver Creek</i>						
SCLV01	626	626.56	627.98	628.31	628.97	630.31
SCLV02	632	633.67	634.69	635.02	635.40	637.02
SCLV03	633	634.46	635.70	635.96	636.42	637.96
SCLV04	639	641.73	641.99	642.27	642.85	644.27
<i>Des Plaines River</i>						
DPLV01	610	614.8	616.0	616.3	617.2	618.3
DPLV03	622	622.6	624.7	625.4	627.0	627.4
DPLV04	618	623.1	625.2	625.9	627.4	627.9
DPLV05	621	624.4	626.6	627.4	629.0	629.4
DPLV09 ¹	621	629.1-630.7	630.9-632.5	631.6-633.1	633.0-634.5	633.6-635.1
DPLV15	650	655.1	657.6	658.6	660.7	660.6

¹Since DPLV09 is significantly longer than other levee sites, flood elevations at DPLV09 were determined for four reaches of the levee to optimize costs.
(FY 2010 Price Level, FDR 4.125%)

Table 49 – Flood Barrier Site Screening Calculation of Reduction in Damages

Site ID	Length (ft)	Total Equivalent Annual Damages Reduced at Crest Elevation (Annual Chance of Exceedance) Flood Stage				
		10%	2%	1%	0.02%	1% + 2 feet
<i>Buffalo-Wheeling Creek</i>						
BWLV01	4,010	\$25,000	\$25,000	\$25,000	\$25,000	\$25,000
BWLV02	2,082	\$3,000	\$3,000	\$11,000	\$35,000	\$35,000
<i>Silver Creek</i>						
SCLV01	2,392	\$0	\$9,000	\$13,000	\$17,000	\$17,000
SCLV02	6,247	\$240,000	\$367,000	\$393,000	\$423,000	\$430,000
SCLV03	5,145	\$3,000	\$44,000	\$60,000	\$85,000	\$91,000
SCLV04	2,098	\$96,000	\$124,000	\$140,000	\$184,000	\$189,000
<i>Des Plaines River</i>						
DPLV01	2,098	\$185,600	\$342,300	\$365,700	\$409,200	\$422,700
DPLV03	1,360	\$1,200	\$35,600	\$58,900	\$104,200	\$117,700
DPLV04	6,072	\$145,000	\$826,000	\$1,207,000	\$1,960,000	\$2,344,000
DPLV05	6,050	\$438,000	\$992,000	\$1,277,000	\$1,575,000	\$1,781,000
DPLV09	9,081	\$435,000	\$1,400,300	\$1,775,000	\$2,401,900	\$2,576,000
DPLV15	1,417	\$3,300	\$37,100	\$55,600	no tie-in	no tie-in

(FY 2010 Price Level, FDR 4.125%)

Although some sites would require construction of floodwalls rather than levees because of space constraints, levee construction costs were used in this preliminary screening. Since levees are cheaper to construct than floodwalls, this assumption provides conservative results.

Using the approximate grade at the site, the baseline flood elevation, and an approximate levee length, screening costs were calculated using a cost per linear foot based on the levee height, shown in **Table 50**. The cost per linear foot was estimated as described in Appendix F (Cost Engineering). The baseline flood elevation at each site for each event is shown in **Table 48**. The calculated levee height is the difference between the crest elevation and the approximate grade.

Table 50 – Cost of Levee Construction per Linear Foot

Height (ft)	1	2	3	4	5	6	7	8	9
Cost/LF									
Height (ft)	10	11	12	13	14	15	16	17	
Cost/LF									

(FY 2010 Price Level)

To estimate the levee costs during this screening step, only first costs of construction were used. Estimated construction costs were annualized over the 50 year period of analysis at 4.375%. The construction costs calculated based on these parameters are shown in **Table 51**. These costs were then compared with the equivalent annual damages reduced for each levee height at each location to determine the net benefits (equivalent annual damages reduced minus annualized construction costs), shown in **Table 52**.

Table 51 – Flood Barrier Annualized Screening Costs

Site ID	Length (ft)	Grade Elev. (ft)	Cost of Flood Barrier at Annual Chance of Exceedance Flood Stage				
			10%	2%	1%	0.02%	1%+2 feet
<i>Buffalo-Wheeling Creek</i>							
BWLV01	4,010	652	\$344,000	\$382,000	\$382,000	\$430,000	\$430,000
BWLV02	2,082	674	\$179,000	\$186,000	\$210,000	\$237,000	\$237,000
<i>Silver Creek</i>							
SCLV01	2,392	626	\$188,000	\$196,000	\$196,000	\$205,000	\$214,000
SCLV02	6,247	632	\$512,000	\$536,000	\$536,000	\$536,000	\$595,000
SCLV03	5,145	633	\$405,000	\$441,000	\$441,000	\$441,000	\$490,000
SCLV04	2,098	639	\$180,000	\$180,000	\$180,000	\$188,000	\$200,000
<i>Des Plaines River</i>							
DPLV01 ¹	2,098	616	\$83,000	\$88,000	\$88,000	\$93,000	\$99,000
DPLV03	1,360	622	\$107,000	\$117,000	\$117,000	\$129,000	\$129,000
DPLV04	6,072	618	\$578,000	\$650,000	\$692,000	\$710,000	\$740,000
DPLV05	6,050	621	\$519,000	\$610,000	\$610,000	\$690,000	\$690,000
DPLV09	9,081	621	\$1,016,000	\$1,104,000	\$1,128,000	\$1,191,000	\$1,219,000
DPLV15	1,417	650	\$63,000	\$75,000	\$77,000	no tie-in	no tie-in

¹A previously constructed levee at 616 covers approximately 940 feet of this alignment. Grade over this portion of the site is assumed to be at 616 to account for possible savings incurred by incorporation of the existing structure into the design. (FY 2010 Price Level, FDR 4.125%)

Table 52 – Flood Barrier Site Net Benefits

Site ID	Net Benefits at Flood Stage (% Chance of Exceedance)				
	10%	2%	1%	0.02%	1%+2 ft
<i>Buffalo-Wheeling Creek</i>					
BWLV01	(\$319,000)	(\$357,000)	(\$357,000)	(\$405,000)	(\$405,000)
BWLV02	(\$176,000)	(\$183,000)	(\$199,000)	(\$202,000)	(\$202,000)
<i>Silver Creek</i>					
SCLV01	(\$188,000)	(\$187,000)	(\$183,000)	(\$188,000)	(\$197,000)
SCLV02	(\$272,000)	(\$169,000)	(\$143,000)	(\$113,000)	(\$165,000)
SCLV03	(\$402,000)	(\$397,000)	(\$381,000)	(\$356,000)	(\$399,000)
SCLV04	(\$84,000)	(\$56,000)	(\$40,000)	(\$4,000)	(\$11,000)
<i>Des Plaines River</i>					
DPLV01	\$103,000	\$254,000	\$278,000	\$316,000	\$324,000
DPLV03	(\$106,000)	(\$81,000)	(\$58,000)	(\$25,000)	(\$11,000)
DPLV04	(\$433,000)	\$176,000	\$515,000	\$1,250,000	\$1,604,000
DPLV05	(\$252,000)	\$224,000	\$509,000	\$746,000	\$952,000
DPLV09	(\$581,000)	\$296,000	\$647,000	\$1,211,000	\$1,357,000
DPLV15	(\$60,000)	(\$38,000)	(\$21,000)	no tie-in	no tie-in

(FY 2010 Price Level, FDR 4.125%)

Two levees had positive net benefits at various elevations when considering levee construction costs alone, as shown in **Table 52**. The crest elevation maximizing net benefits was selected for further investigation. A summary of the screening net benefits is presented in **Table 53**. As shown the table, the screening resulting in positive net benefits at two feasible sites: DPLV01 and DPLV09. The table shows the elevation and corresponding flood frequency at which the highest net benefits occurred. **Table 54** presents a summary of the screening results by watershed.

Table 53 – Flood Barrier Site Screening Results

Site ID	Max. Net Benefits	Screening Decision	Optimized Levee		
			Length (ft)	Appx. Grade (ft)	Crest Elev. (ft)
<i>Buffalo-Wheeling Creek</i>					
BWLV01	(\$221,976)	Eliminate: Net Benefits<0	--	--	--
BWLV02	(\$164,700)	Eliminate: Net Benefits<0	--	--	--
<i>Silver Creek</i>					
SCLV01	(\$183,000)	Eliminate: Net Benefits<0	--	--	--
SCLV02	(\$113,000)	Eliminate: Net Benefits<0	--	--	--
SCLV03	(\$381,000)	Eliminate: Net Benefits<0	--	--	--
SCLV04	(\$4,000)	Eliminate: Net Benefits<0	--	--	--
<i>Des Plaines River</i>					
DPLV01	\$307,000	Keep	2,098	610	618.0
DPLV03	(\$11,000)	Eliminate: Net Benefits<0	--	--	--
DPLV04	\$1,604,000	Keep	6,072	618	627.8
DPLV05	\$1,091,000	Keep	6,050	616	629.4
DPLV09	\$1,357,000	Keep	9,081	621	633.6-635.1
DPLV15	(\$21,000)	Eliminate: Net Benefits<0	--	--	--

(FY 2010 Price Level, FDR 4.125%)

Table 54 – Summary of Flood Barrier Site Screening Results

ID	Watershed	County	State	Total	Eliminated	Kept
BW	Buffalo-Wheeling Creek	Cook/Lake	IL	0	2	0
SC	Silver Creek	Cook/Dupage	IL	4	4	0
DP	Des Plaines River	Cook/Lake/Kenosha	IL/WI	16	12	4
TOTAL				22	20	2

2.3 – Road Raise and Bridge Modification Site Screening

Before conducting economic and cost analyses for each site, a preliminary screening was conducted to determine which sites would be likely to undergo major rehabilitation within the study period of analysis. To minimize impacts to roadways users and optimize use of Federal and state funds, implementation of road raises and bridge modifications would only occur in conjunction with planned major rehabilitation of the road or bridge.

Each site was also reviewed to determine its location with respect to other identified sites. Nearby sites, where the road raise and/or bridge modification would be conducted concurrently, were combined. In coordination with the Illinois Department of Transportation (IDOT), the age and remaining design life of each structure was determined as well as whether the site is currently included in the IDOT multi-year plan for major rehabilitation. The design life used by IDOT is 50 years for bridges and 90 years for box culverts. Parallel roads are not assigned a design life, but instead undergo major rehabilitation when required for safety or capacity improvements.

The road segments were first evaluated against three criteria:

1. Planned major rehabilitation
2. At or near end of design life
3. Contribute more than 10% of total delays

Sites that meet at least one of the criteria were further evaluated to determine whether any physical limitations at the site (e.g. existing underpasses) would prevent raising the road. **Table 55** presents a summary this initial screening evaluation for each site.

Three of the identified sites are included in the IDOT multi-year plan: DPRR04/DPRR05 (River Road in Des Plaines), DPBM06 (Rand Road Bridge in Des Plaines), and DPRR11/DPBM14 (Grand Avenue in Gurnee). DPRR04/DPRR05, however, is scheduled for construction in 2012, making coordination infeasible. Site DPRR11/DPBM14 is near a railroad bridge crossing and a road raise would reduce clearance at the bridge, limiting capacity of the roadway. DPBM06, however, was retained for further analysis.

One additional IDOT road, although not on IDOT's priority list, is at the end of its design life: DPBM13 (Route 120 in Grayslake). The age of the structure suggests that major rehabilitation is likely to occur within the 50 year period of analysis for this study. Based on these considerations DPBM13 was retained for further analysis.

DPBM04 (First Avenue Bridge in River Grove), was responsible for approximately 15% of all delays in the VISTA model. This site is also at the top of the flood priority list maintained by IDOT (roadways are ranked according to the frequency of pavement flooding as reported to IDOT). While the site has 20 years of remaining design life, the significance of flooding at this location suggests that major rehabilitation may be prioritized prior to that time.

One of the identified roads, DPRR10 (Old Grand Avenue in Gurnee) is not owned by IDOT. Review of this site, however, showed that the numerous access points along the roadway would make elevation of the road infeasible and the site was eliminated from further consideration.

Screening level cost estimates for raising the roads were developed by IDNR-OWR. To generate the estimates, LIDAR topography was used to establish the extent of roadway that would need to be raised and the average height of raise required. The range of elevations used in the analysis corresponds to the flood elevations used in the VISTA model. Fill and paving costs were based on approximate prices provided by IDOT. The approximate length and height of the road raise was used to calculate a volume of fill required using an estimated price of \$25 per cubic yard of fill. Repaving costs were calculated using a price of \$■ million per lane per mile of roadway. **Table 56** shows the data used to estimate screening costs. **Table 57** shows the approximate cost estimated for raising the roadway to each evaluated elevation.

Benefits for the retained sites were calculated for each evaluated elevation using depth-damage relationships developed for use in HEC-FDA. The benefits, annualized costs, and net benefits for each site are shown in **Table 58**. Each site had positive net benefits. The elevation with the highest net benefits was retained for further evaluation. A summary of the screening results is shown in **Table 59**.

Table 55 – Road Raise and Bridge Modification Structure Preliminary Screening

ID	Name	Municipality	Structure Type	Percent of Total Delays	Planned Work	Last Major Work	Age as of 2010	Remainig Design Life	Screening Decision ¹
DPBM03	Chicago Ave	River Forest	Bridge	1.32%	N	1989	21	29	Eliminate: does not meet criteria
DPBM04	First Ave	River Grove	Bridge	14.98%	N	1980	30	20	<i>Retain: contributes over 10% of delays</i>
DPRR01	River Road	River Grove	Parallel	2.40%	N	2003	7	--	Eliminate: does not meet criteria
DPRR02				1.19%					
DPBM05	Grand Ave	River Grove	Bridge	2.26%	N	1985	25	25	Eliminate: does not meet criteria
DPRR03	River Road	Schiller Park	Parallel	4.87%	N	1928	82	--	Eliminate: does not meet criteria
DPRR04	River Road	Des Plaines	Parallel	6.64%	Y	1990	20	--	Eliminate: planned work will be completed in 2012
DPRR05									
DPRR06	Miner Street	Des Plaines	Parallel	2.00%	N	1986	24	--	Eliminate: does not meet criteria
DPBM06	Rand Road	Des Plaines	Bridge	2.91%	Y				<i>Retain: IDOT planned work in future years</i>
DPBM07	Golf Road	Des Plaines	Bridge	4.66%	N	2004	6	44	Eliminate: does not meet criteria
DPBM08	River Road	Glenview	Box Culvert	2.78%	N	1984	26	64	Eliminate: does not meet criteria
DPBM09	Milwaukee Ave	Prospect Hgts	Bridge	1.67%	N	1990	20	30	Eliminate: does not meet criteria
DPRR07	River Road	Prospect Hgts	Parallel	4.03%	N	2009	1	--	Eliminate: does not meet criteria
DPBM10	Milwaukee Ave	Prospect Hgts	Box Culvert	7.74%	N	1990	20	70	Eliminate: does not meet criteria
DPBM11	Milwaukee Ave/ River Road	Buffalo Grove	Box Culvert	6.45%	N	2000	10	80	Eliminate: does not meet criteria
DPRR08			Parallel						
DPRR09			Parallel						
DPBM12	IL Route 60	Libertyville	Bridge	1.33%	N	1987	23	27	Eliminate: does not meet criteria
DPBM13	IL Route 120	Grayslake	Bridge	1.49%	N	1959	51	-1	<i>Retain: structure age is at design life</i>
DPRR10	Old Grand Ave	Gurnee	Parallel	8.45%	N	NOT IDOT			Eliminate: site limitations
DPRR11	IL Route 132/ Grand Ave	Gurnee	Parallel	5.19%	Y	1995	15	35	Eliminate: site limitations
DPBM14			Bridge						
DPBM15	US Hwy 41	Gurnee	Bridge	6.81%	N	1981	29	21	Eliminate: does not meet criteria
DPRR12			Parallel						

¹Sites were retained if they met one of three criteria: work is planned by IDOT at the site; the site construbites over 10% of total delays; or the structure age is at or near its design life. Sites that met these criteria were further screened for site specific limitations that would prevent construction of a higher road surface elevation.

Table 56 – Bridge Modification Site Screening Quantity Estimates

Site (Existing Low Point ft NGVD29)	New Road Elevation (ft NGVD29)	Elev. Length (ft)	Avg. Elev. Height (ft)	Avg. Fill Area (sq. ft.)	Fill Volume (cu. ft.)
DPBM04 (620.0)	621.9	20	0.4	24.6	18
	622.8	839	0.8	47.8	1,485
	623.8	1,019	1.6	109.5	4,130
	624.9	1,608	2.0	136.3	8,120
	625.5	1,928	2.3	158.9	11,347
	627.1	3,927	2.1	140.8	20,471
DPBM06 (632.0)	632.7	3,281	1.3	70.6	8,575
	633.6	5,178	1.6	89.1	17,086
	634.2	6,325	1.9	106.0	24,834
	635.7	6,405	3.3	203.0	48,161
DPBM13 (661.5)	661.6	459	0.8	63.9	1,087
	662.9	779	1.6	122.1	3,523
	663.8	928	2.2	176.0	6,052
	664.7	998	2.9	240.5	8,894
	666.8	1,587	3.6	308.1	18,115

Table 57 – Bridge Modification Site Screening Estimated Costs

Site	Fill Cost (\$1,000)	Pvmt. Cost (\$1,000)	Conveyance (\$1,000)	Total Cost (\$1,000)	Annual Costs (\$1,000)
DPBM04					\$1
					\$70
					\$108
					\$184
					\$235
					\$456
DPBM06					\$275
					\$472
					\$618
DPBM13					\$847
					\$46
					\$92
					\$124
					\$151
				\$270	

(FY 2010 Price Level, FDR 4.125%)

Table 58 – Road Raise Site Screening Benefit-Cost Summary

Site (Existing Low Point ft NGVD29)	New Elevation (ft NGVD29)	Added Height (ft)	Approx Extent (ft)	Annual Benefits (\$1,000)	Annual Costs (\$1,000)	Net Benefits (\$1,000)
DPBM04 (620.0)	621.9	1.9	20	\$3,803	\$1	\$3,802
	622.8	2.8	839	\$4,615	\$70	\$4,545
	623.8	3.8	1,019	\$4,979	\$108	\$4,872
	624.9	4.9	1,608	\$5,127	\$184	\$4,943
	625.5	5.5	1,928	\$5,188	\$235	\$4,953
	627.1	7.1	3,927	\$5,215	\$456	\$4,760
DPBM06 (632.0)	632.7	0.7	3,281	\$552	\$275	\$277
	633.6	1.6	5,178	\$1,013	\$472	\$541
	634.2	2.2	6,325	\$1,171	\$618	\$553
	635.7	3.7	6,405	\$1,257	\$847	\$410
DPBM13 (661.5)	661.6	0.1	459	\$92	\$46	\$46
	662.9	1.4	779	\$383	\$92	\$291
	663.8	2.3	928	\$486	\$124	\$362
	664.7	3.2	998	\$575	\$151	\$423
	666.8	5.3	1,587	\$606	\$270	\$336

(FY 2010 Price Level, FDR 4.125%)

Table 59 – Road Raise Site Screening Results

Site ID	Annual Benefits (\$1,000)	Annual Costs (\$1,000)	Max Net Benefits (\$1,000)	1% Annual Chance Flood Elevation (ft NGVD29)	Lowest Existing Pavement Elevation (ft NGVD29)	Optimized Pavement Elevation (ft NGVD29)	Approximate Extent (ft)
DPBM04	\$5,188	\$235	\$4,953	626.0	620.0	625.5	1,900
DPBM06	\$1,171	\$618	\$553	634.5	632.0	634.2	6,300
DPBM13	\$575	\$151	\$423	665.1	661.5	664.7	1,000

(FY 2010 Price Level, FDR 4.125%)

2.4 – Modifications to Existing Structures Site Screening

Due to the uniqueness of each site in this category, no parameters for screening were available. Instead, site specific evaluations as discussed in Section 3.4 were conducted for each site.

2.5 – Non-Structural Measure Site Screening

Each of the potential non-structural sites was evaluated for all non-structural flood risk management measures applicable to that structure. The evaluated measures for individual structures were: elevation, dry floodproofing, wet floodproofing, and construction of a ring levee. While implementation costs were evaluated for individual structures to determine the optimal floodproofing method, the screening looked at net benefits for groups of homes within a community to avoid implementing a plan that would benefit individual homeowners rather than the community as a whole. Therefore, only clusters with positive total net benefits for implementation at all feasible structures were considered for further evaluation.

Benefits for implementation of measures at individual structures are equal to the equivalent annual damages for the site as modeled by HEC-FDA, since these are the damages foregone with implementation of the measure. Details of flood elevations and equivalent annual damages were derived from the "FDA_StrucDetail.out" file generated by HEC-FDA when computing reach stage-damage functions with uncertainty.

Costs for non-structural measures were estimated as discussed in Appendix D (Cost Engineering). Supervision and Administration Costs were estimated as 25% of construction costs. Only structure elevation would require temporary relocation of the residents. Costs associated with this relocation were estimated using the Federal reimbursement rate for lodging in the study area, meals and incidental reimbursement for the average size family, and a 5% contingency. Reimbursement rates are those reported by the General Services Administration. The average family size was determined according to American Community Survey statistics.

Applicability of each measure to a structure was determined as discussed below. The estimated implementation costs calculated for each measure were amortized over the 50 year period of analysis using a discount rate of 4.375%.

Elevation

Elevation was considered for residential structures only. USACE practice dictates a maximum elevation of 12 feet, although the majority of the structures fell within the range of two to five feet. Elevations were calculated based on raising the structure at least one foot above the 1% chance flood elevation.

Wet Floodproofing

Wet floodproofing was considered for both residential and non-residential structures. In order to use this measure, the 1% chance flood elevation must be below the first floor elevation of the structure. In addition, the structure must contain an unfinished basement area to be waterproofed and remain unused. Detailed information was not available as to whether structure basements are finished. Most structures with basements in this area have finished basements, therefore structures that were not coded as having basements but showed damages at the 1% chance flood elevation below the first floor were assumed to have an unfinished basement or crawlspace area and therefore eligible for this method.

Dry Floodproofing

Dry floodproofing was considered for both residential and non-residential structures. Dry floodproofing can be utilized up to three feet above the first floor elevation. To implement the measure at least 1 foot above the 1% chance flood elevation, the 1% chance flood must be no more than two feet above the first floor elevation. The structure must also be constructed of masonry or masonry veneer with no basement.

Fill Basement/Dry Floodproofing

For residential structures with finished basements, the dry floodproofing measure was combined with filling the basement and removing it from use. Any utilities located in the basement would be relocated to a new addition installed above the first floor elevation and the basement would be filled and prepared to allow floodwaters to flow through safely as for wet floodproofing.

Ring Levee

A levee encircling the structure was considered for non-residential structures where other options were not feasible, especially large high damage structures such as hospitals. The maximum feasible height for these ring levees was four feet, although a few exceptions were considered for large urban structures.

Buyouts

Because of the high cost and potential community disruption caused by buyouts, this measure was evaluated only for structures where no other measure was feasible and where flood damages at the 1% annual chance of exceedance flood event are estimated to be at least 1 foot above the first floor elevation..

Costs considered include demolition and debris removal, the value of the home and land, and relocation costs provided to cover the costs of finding and moving to a new home. Demolition and debris removal costs were estimated as discussed in Appendix F (Cost Engineering). Relocation costs were estimated as \$ [REDACTED] for owners and \$ [REDACTED] for renters, as coordinated with the Detroit District Real Estate Section. These costs were allocated within groups according to county-wide home ownership rates as reported by the American Community Survey in Lake and Kenosha Counties. For Cook County, the suburban rate was used as reported by the Chicago Metropolitan Agency for Planning.

Based on input from the Real Estate section, current land and improvement values reported by the assessor were used to estimate the cost of purchasing the property. For residential clusters, improvement and land values per square foot were determined for a random sample of homes in the cluster. These values were then generalized to the group of properties based on the average size of each home and the total land that would be acquired. For commercial and industrial structures, the total assessed value for all properties in the cluster was used.

Table 61 presents a summary of the analysis of floodproofing measures by county, showing the net benefits for implementation of non-structural measures within each cluster and the number of structures where each type of measure would be implemented. Details of the analysis for individual structures are not shown here to protect the privacy of property owners. Where benefits are shown as \$0 and no measures are listed for potential implementation, none of the measures were feasible for structures in that cluster.

Table 60 shows a summary of screening results for non-structural measures by County. As shown in the table, approximately 600 were retained for further evaluation with the majority in the more urbanized southern portion of the watershed.

Table 60 –Non- Structural Screening Results Summary by County

County	Elevation	Dry Floodproof	Wet Floodproof	Fill Bsmt	Ring Levee	Buyout	Total Structures	Benefits (\$1,000)	Project Costs (\$1,000)	Annual Costs (\$1,000)	Net Benefits (\$1,000)
Cook	135	51	27	61	14	124	412	\$1,960	[REDACTED]	\$875	\$1,085
Lake	60	9	11	6	19	12	117	\$1,138	[REDACTED]	\$324	\$814
Kenosha	3	0	13	1	2	19	38	\$231	[REDACTED]	\$55	\$175
Total	198	60	51	68	35	155	567	\$3,328	[REDACTED]	\$1,255	\$2,073

(FY2013 Price Level, FDR 3.75%)

Table 61 –Non-Structural Measure Site Screening

County	Municipality	Structures in Municipality	WOP Damages (\$1,000)	Optimized Floodproofing Measures (Structures)						Total Structures	% of Structures	Benefits (\$1,000)	Project Costs (\$1,000)	Annual Costs (\$1,000)	Net Benefits (\$1,000)
				Elevation	Dry Fldproof	Wet Fldproof	Fill Bsmt	Ring Levee	Buyout						
Cook	Riverside	4	\$22.8	0	0	0	1	0	1	2	50%	\$21.5		\$7.2	\$14.3
	River Forest	22	\$54.5	1	0	0	9	0	10	20	91%	\$51.7		\$61.7	(\$10.0)
	Elmwood Park	54	\$101.9	7	2	0	30	0	9	48	89%	\$97.3		\$210.2	(\$112.9)
	River Grove	2	\$102.0	0	0	0	0	1	1	2	100%	\$102.0		\$15.3	\$86.8
	Franklin Park	119	\$168.0	11	2	1	34	2	4	54	45%	\$104.9		\$156.2	(\$51.3)
	Rosemont	2	\$278.5	0	0	0	0	2	0	2	100%	\$278.5		\$25.7	\$252.8
	Des Plaines	273	\$1,254.9	3	32	3	47	7	118	210	77%	\$1,187.7		\$476.9	\$710.8
	Prospect Heights	9	\$24.6	0	4	4	0	0	0	8	89%	\$22.9		\$43.2	(\$20.3)
	Wheeling	239	\$351.6	132	15	24	10	4	0	185	77%	\$329.0		\$328.9	\$0.1
	Park Ridge	47	\$120.2	0	4	0	3	0	4	11	23%	\$41.0		\$21.1	\$19.9
	Melrose Park	16	\$7.3	3	8	1	3	0	0	15	94%	\$7.0		\$22.4	(\$15.4)
	Franklin Park	130	\$193.0	11	8	3	35	4	4	65	50%	\$129.8		\$183.7	(\$53.8)
Buffalo Grove	34	\$23.9	31	0	0	0	0	0	31	91%	\$22.1		\$34.1	(\$12.0)	
Lake	Riverwoods	55	\$215.3	28	5	9	1	2	4	49	89%	\$209.5		\$105.3	\$104.2
	Buffalo Grove	30	\$95.2	22	3	2	0	1	0	28	93%	\$93.9		\$49.4	\$44.5
	Lincolnshire	50	\$69.8	21	9	10	4	2	0	46	92%	\$68.7		\$98.3	(\$29.6)
	Mettawa	2	\$2.9	1	0	0	0	0	1	2	100%	\$2.9		\$3.6	(\$0.7)
	Libertyville	198	\$344.7	117	5	3	6	3	39	173	87%	\$260.5		\$301.3	(\$40.8)
	Gurnee	50	\$990.0	10	1	0	5	16	8	40	80%	\$834.2		\$169.3	\$664.9
Kenosha	Pleasant Prairie	16	\$81.3	0	0	8	0	1	1	10	63%	\$14.7		\$17.8	(\$3.0)
	Salem	6	\$52.1	1	0	3	0	0	2	6	100%	\$52.1		\$4.5	\$47.6
	Bristol	12	\$44.9	0	0	5	1	1	1	8	67%	\$34.0		\$20.0	\$14.0
	Somers	1	\$59.3	0	0	0	0	1	0	1	100%	\$59.3		\$6.5	\$52.8
	Paddock Lake	23	\$85.1	2	0	5	0	0	16	23	100%	\$85.1		\$24.4	\$60.7

(FY2013 Price Level, FDR 3.75%)

SECTION 3 –FLOOD RISK MANAGEMENT SITE EVALUATION

3.1 – Floodwater Storage Site Evaluation

Hydrology and Hydraulics and Civil Design performed initial site specific analysis of floodwater storage sites retained after the screening, as discussed in Appendix A (Hydrology and Hydraulics) and Appendix D (Civil Design). In addition, a site along the mainstem in Cook County, which had been eliminated during the identification step, was reintroduced for analysis. This site, DPRS04, was previously shown as incompatible, but discussion with the site owner, the Forest Preserve District of Cook County, indicated that the site is available. The results of the initial assessment are presented in **Table 62**, below:

Table 62 – Floodwater Storage Site H&H and Civil Design Site Evaluation

Site ID	Evaluation Result
BCRS02	Kept for further analysis
ACRS03	Eliminated due to site configuration (H&H)
ACRS08	Kept for further analysis
BWRS31	Eliminated due to development on site (H&H)
FDRS01	Kept for further analysis
FDRS03	Eliminated due to site configuration (H&H)
WHRS06	Eliminated due to detailed analysis of H&H profile (H&H)
DPRS07	Eliminated due to poor soil conditions (Civil Design)
DPRS23	Kept for further analysis
DPRS04	Added due to new information about availability

For the five retained sites, design and hydraulic analyses were performed in greater detail, refining the costs and benefits associated with each site. Details of these analyses are presented in Appendix A (Hydrology and Hydraulics) and Appendix D (Civil Design). Estimates of the first cost of construction and Operation & Maintenance were developed as discussed in Appendix F (Cost Engineering). Interest During Construction (IDC) was also added to the costs, as discussed in Appendix E (Economic Analysis). **Table 63** shows the revised calculation of reduction in damages and **Table 64** shows the revised cost estimates.

Table 63 – Reservoir Site Evaluation Damage Reduction Calculation

Site ID	Volume (acre-ft)	Equivalent Annual Damages Reduced by Category							Total EAD Reduced
		APT	VEH	COM	IND	PUB	RES	TRAFFIC	
<i>Mainstem</i>									
BCRS02	177	\$25,535	\$335	\$65,500	\$42,696	\$14,090	\$103,000	\$1,232,400	\$1,483,500
ACRS08	418	\$18,289	\$404	\$48,440	\$19,149	\$5,610	\$83,380	\$752,200	\$927,500
FDRS01	1,000	\$41,000	\$1,000	\$663,000	\$41,000	\$8,000	\$147,000	\$1,161,000	\$2,063,000
DPRS23	330	\$23,000	\$1,000	\$347,000	\$30,000	\$4,000	\$89,000	\$920,000	\$1,413,000
DPRS04	200	\$14,707	\$143	\$16,730	\$4,754	\$11,090	\$31,640	\$439,800	\$518,900
<i>Tributary</i>									
BCRS02	177	\$0	\$0	\$0	\$0	\$0	\$1,000	\$17,000	\$18,000
<i>Total</i>									
BCRS02	177	\$25,535	\$335	\$65,500	\$42,696	\$14,090	\$104,000	\$1,249,400	\$1,502,000
ACRS08	418	\$18,000	\$0	\$48,000	\$19,000	\$6,000	\$83,000	\$753,000	\$929,000
FDRS01	1,000	\$41,000	\$1,000	\$663,000	\$41,000	\$8,000	\$147,000	\$1,161,000	\$2,063,000
DPRS23	330	\$23,000	\$1,000	\$347,000	\$30,000	\$4,000	\$89,000	\$920,000	\$1,413,000
DPRS04	200	\$14,707	\$143	\$16,730	\$4,754	\$11,090	\$31,640	\$439,800	\$518,900

*Aptakasic Creek and Feehanville Ditch were not modeled, thus ACRS08 and FDRS01 tributary damage reductions are not included. (FY 2010 Price Level, FDR 4.125%)

Table 64 – Reservoir Site Evaluation Cost Estimates

Site ID	Area (acres)	Constr. Duration (months)	First Cost	Lands and Damages	S&A	IDC	Total Cost	Annual O&M	Equivalent Annual Cost
ACRS08	49	93							\$820,000
FDRS01	1,007	72							\$7,264,000
DPRS23	352	30							\$2,475,000
DPRS04	20	12							\$2,385,000

(FY 2010 Price Level, FDR 4.125%)

An existing wetland complex at site BCRS02 would require mitigation. An appropriate mitigation site and mitigation measures were formulated according to mitigation planning guidance. The mitigation planning is included as Attachment 3 to this Appendix. The costs for implementation of BCRS02, including mitigation, are presented in **Table 65**, below.

Table 65 – BCRS02 Total Implementation Costs

	Footprint Area (acres)	Constr. Duration (months)	First Cost	Lands and Damages	S&A	IDC	Total Cost	Annual O&M	Equivalent Annual Cost
Reservoir	111	12							\$971,000
Mitigation	112	6							\$455,000
Total									\$1,426,000

(FY 2010 Price Level, FDR 4.125%)

Sites with net benefits close to or greater than zero were retained for further evaluation. **Table 66** shows the results of this evaluation. A summary of the site evaluation results is shown in **Table 67**.

Table 66 – Reservoir Site Evaluation Results

Site ID	Total Equivalent Annual Damages Reduced	Equivalent Annual Costs	Net Benefits	BCR	Evaluation Result
BCRS02	\$1,502,000	\$1,426,000	\$76,000	1.1	Keep
ACRS08	\$928,000	\$930,000	(\$2,000)	1.0	Keep
FDRS01	\$2,063,000	\$7,026,000	(\$4,963,000)	0.3	Eliminate: Net Benefits<0
DPRS23	\$1,413,000	\$2,294,000	(\$881,000)	0.6	Eliminate: Net Benefits<0
DPRS04	\$518,900	\$2,385,000	(\$1,866,100)	0.2	Eliminate: Net Benefits<0

*BCRS02 is modeled as an inline reservoir and the weir elevation was set based on the topography rather than a design storm. (FY 2010 Price Level, FDR 4.125%)

Table 67 – Summary of Reservoir Site Evaluation Results

ID	Watershed	County	State	Total	Eliminated	Kept
BC	Bull Creek	Lake	IL	1	0	1
AC	Aptakistic Creek	Cook/Lake	IL	2	1	1
BW	Buffalo-Wheeling Creek	Cook/Lake	IL	1	1	0
FD	Feehanville Ditch	Cook	IL	2	2	0
WH	Willow-Higgins Creek	Cook/Dupage	IL	1	1	0
DP	Des Plaines River	Cook/Lake/Kenosha	IL/WI	2	2	0
				9	7	2

3.2 – Flood Barrier Site Evaluation

The optimized flood barrier sites selected during the screening step were examined in greater detail. Along with detailed site designs, hydraulic modeling was conducted to determine whether the proposed features would cause stage impacts outside of the leveed reaches. In Illinois any structure causing an increase of more than 0.0 feet the water surface profile for any storm up to and including the 1% annual chance of exceedance flood event requires floodplain mitigation.

Impacts to the water surface profile caused by DPLV01 were investigated by IDNR, as documented in Appendix A (Hydrology & Hydraulics). The investigation concluded that the maximum increase in stage caused by the levee was 0.03 feet. The investigation included levee heights up to elevation 618. As discussed in Appendix D (Civil Design), it was determined that this was the maximum practical height for tying back the levee to high ground.

Sites DPLV04, DPLV05, and DPLV09 did, however, impact the water surface elevation beyond this regulatory threshold. Although the maximum stage increase was less than 0.2 feet for each levee individually, the impacts typically extend over a large area, impacting over hundreds of properties. A real estate takings analysis determined that, due to the small increment of flooding at infrequent events, the stage impacts would not result in any takings. The takings analysis is documented in Appendix I (Real Estate).

Table 68 shows the modeled reduction in damages as well as the induced damages that would result from implementation at each of the proposed levee sites. The goal of the screening and evaluation steps is to identify economically justified features that can be combined to form alternative plans. Because the flood barrier sites would likely be combined with other features such as reservoirs, it was determined that mitigation requirements would be determined based on the tentatively selected plan.

Table 68 – Flood Barrier Sites: Damage Reductions

Site ID	Equivalent Annual Damages Reduced by Category (\$1,000)							
	APT	VEH	COM	IND	PUB	RES	TRAFFIC	TOTAL
DPLV01	\$331	\$0	\$0	\$0	\$0	\$87	\$0	\$418
DPLV04 (Benefits)	\$42	\$0	\$96	\$1	\$0	\$157	\$2,054	\$2,350
DPLV04 (Induced Damages)	(\$8)	(\$0)	(\$15)	(\$7)	(\$5)	(\$17)	(\$155)	(\$206)
DPLV04 Total	\$35	(\$0)	\$81	(\$6)	(\$5)	\$140	\$1,899	\$2,144
DPLV05 (Benefits)	\$47	\$0	\$5	\$130	\$0	\$4	\$1,619	\$1,805
DPLV05 (Induced Damages)	(\$5)	(\$0)	(\$17)	(\$3)	(\$2)	(\$22)	(\$166)	(\$214)
DPLV05 Total	\$42	(\$0)	(\$12)	\$127	(\$2)	(\$17)	\$1,453	\$1,591
DPLV09 (Benefits)	\$323	\$47	\$202	\$2	\$13	\$732	\$1,241	\$2,560
DPLV09 (Induced Damages)	(\$8)	(\$0)	(\$25)	(\$8)	(\$1)	(\$38)	(\$412)	(\$492)
DPLV09 Total	\$315	\$46	\$176	(\$5)	\$12	\$694	\$829	\$2,068

(FY 2010 Price Level, FDR 3.75%)

Site specific design and cost estimates for the flood barriers were developed as discussed in Appendix D (Civil Design) and Appendix F (Cost Engineering). **Table 69** presents the cost estimate for each levee or floodwall. The site specific cost estimate is shown as first cost of construction. The total cost also includes estimated lands and damages, supervision and administration (S&A) costs, and operation & maintenance (O&M) costs. Lands and damages were estimated, as for reservoirs, at \$ [REDACTED] per acre. This value was determined using the average value of land per acre in Cook County, as discussed in Appendix E (Economics). S&A costs were estimated as 25% of the first costs. O&M costs were estimated as discussed in Appendix F (Cost Engineering).

Table 69 – Flood Barrier Site Evaluation Cost Estimates

Site ID	Project Area (ac)	Constr. Duration (months)	First Cost (\$1,000)	Land & Damages (1,000)	S&A (\$1,000)	IDC (\$1,000)	Total Cost (\$1,000)	Annual O&M (\$1,000)	Eq. Annual Cost (\$1,000)
<i>Levee</i>									
DPLV01	3	12	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$282
DPLV04	7	24	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$547
DPLV05	8	24	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$499
DPLV09	8	29	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$1,056

(FY 2010 Price Level, FDR 4.125%)

Using the revised costs and reductions in damages, net benefits and a benefit to cost ratio were calculated for each site, as shown in **Table 70**. Both sites were retained as individually justified for consideration in the last added analysis.

Table 70 – Flood Barrier Site Evaluation Results

Site ID	DPLV01	DPLV04	DPLV05	DPLV09
Approximate Grade (ft NGVD 29)	610	618	618	621
Crest Elevation (ft NGVD 29)	618.3 ¹	628.7	629.6	633.6-635.1 ²
Approximate Height (ft)	8.30	10.7	11.6	12.5-14.0
1% Chance Flood Elevation (ft NGVD 29)	616.5	626.7	627.6	631.6-633.1
Approximate Length (ft)	2,500	6,400	6,000	11,000
Equivalent Annual Damages Reduced	\$397,000	\$2,350,000	\$1,805,000	\$2,560,000
Equivalent Annual Damages Induced	NA ³	(\$206,000)	(\$214,000)	(\$492,000)
Equivalent Annual Costs	\$282,000	\$547,000	\$499,000	\$1,056,000
Net Benefits	\$136,000	\$1,597,000	\$1,092,000	\$1,504,000
BCR (\$/\$)	1.5	3.9	3.2	2.4

¹ Maximum elevation limited by available tie-back elevations.

² Due to the length of DPLV09, the structure was evaluated along four reaches with the structure at varying heights for each reach.

³ Hydraulic modeling showed that this flood barrier did not have an effect on the water surface profile or induce damages.

(FY 2010 Price Level, FDR 3.75%)

3.3 – Road Raise and Bridge Modification Site Evaluation

Site specific investigations were conducted for the three retained Road Raise and Bridge Modification Sites, as discussed in Appendix D (Civil Design). At DPBM06, the length of road required to tie into high elevations made the design impractical. For DPBM04 and DPBM13, a hydraulic analysis was conducted to determine design requirements to prevent adverse stage impacts resulting from the changed bridge alignment. For each site, the length of the bridge was extended onto land to allow flood waters to flow unimpeded through the surrounding forest preserve district lands during a flood event. Additional discussion of the design requirements can be found in Appendix D (Civil Design) and Appendix A (Hydrology and Hydraulics).

Using the estimated land requirements identified in Appendix D, land acquisition costs were estimated at \$██████ per acre, as with other sites. Supervision and administration (S&A) costs were estimated as 25% of implementation costs and Operation & Maintenance (O&M) costs were estimated as discussed in Appendix F (Cost Engineering). **Table 71** presents a summary of estimated annual costs for each site. Benefits for each site are the transportation damages avoided with implementation of the of the road raise. **Table 72** presents these benefits as well as the annual costs and the resulting benefit to cost ratio and net benefits for each site. As shown in **Table 72**, site DPBM04 had positive net benefits and was retained for further analysis but costs for implementation of DPBM13 exceeded the benefits and the site was eliminated from further consideration.

Table 71 – Road Raise Site Evaluation Cost Estimates

Site ID	Site Area (ac)	Constr. Duration (months)	First Cost	Lands & Damages	S&A	IDC	Total Cost	Annual O&M	Total Annual Cost
DPBM04	8.7	18							\$863,000
DPBM13	5.7	18							\$1,919,000

(FY 2010 Price Level, FDR 4.125%)

Table 72 – Road Raise Site Evaluation Results

Site ID	Total Equivalent Annual Damages Reduced	Annualized Cost	Net Benefits	BCR	Evaluation Decision
DPBM04	\$5,339,000	\$863,000	\$4,476,000	6.2	Keep
DPBM13	\$736,000	\$1,919,000	(\$1,183,000)	0.4	Eliminate: Net Benefits<0

(FY 2010 Price Level, FDR 4.125%)

3.4 – Modification to Existing Structure Site Evaluation

For measures involving modifications to existing reservoirs, channel improvements, or other modifications to existing structures, site specific evaluations of benefits and costs are detailed below.

Buffalo-Wheeling Creek Watershed

BWCI01: Channel Improvements at Wolf Road & Hintz Road

This measure would involve excavation of open space in this area above the normal water elevation to add to the amount of available storage in the floodplain. A reservoir would not be acceptable in this area due to the proximity of runways at O'Hare airport. According to Federal Aviation Administration (FAA) rules, open water structures are not allowed in such areas. As an approximation of the benefits that could be gained by adding to the undeveloped floodplain area, a 70 acre-ft reservoir was modeled for a nearby site, as discussed in Appendix A (Hydrology & Hydraulics). **Table 73** shows the resulting reduction in damages as calculated by HEC-FDA.

Table 73 – Channel Improvement at Wolf Road & Hintz Road Damage Reduction

Equivalent Annual Damages Reduced by Category							Total Equivalent Annual Damages Reduced
APT	VEH	COM	IND	PUB	RES	TRAFFIC	
\$2,000	\$0	\$33,000	\$2,000	\$0	\$6,000	\$48,000	\$92,000

(FY 2010 Price Level, FDR 4.125%)

Using GIS, an approximation of the additional floodplain volume available from excavation was calculated as 20 acre-feet, less than one third of the modeled reservoir's volume. Due to the minimal benefits that would be gained from such a project, this site was eliminated from further evaluation.

Evaluation Decision: Eliminate

BWCI02: Channel Improvements at Wolf Road & Dundee Road

This site has been designated for use as compensatory storage for Levee 37, a Phase I project, and is not available for further modification.

Evaluation Decision: Eliminate

BWME01: Modification of Heritage Lake Reservoir

This site has been designated for use as compensatory storage for Levee 37, a Phase I project, and is not available for further modification.

Evaluation Decision: Eliminate

Weller Creek Watershed

WLME01: Modification of Mt. Prospect Reservoir

The existing reservoir was modeled with a 151 acre-foot expansion, based on available area, as discussed in Appendix A (Hydrology & Hydraulics). Using the new profiles, damage reductions were calculated by HEC-FDA as shown in **Table 74**. A design and cost estimate were developed for the site as discussed in Appendix D (Civil Design) and Appendix F (Cost Engineering) and resulted in the calculated equivalent annual costs shown in **Table 75**. Lands and damages were calculated as for other sites, at \$ [REDACTED] per acre. Supervision and administration were calculated as 25% of the first cost. The resulting benefit to cost ratio is 0.8, therefore this site was eliminated from further analysis.

Table 74 – Mt. Prospect Reservoir Modification Damage Reduction

Reach	Equivalent Annual Damages Reduced by Category							Total Equivalent Annual Damages Reduced
	APT	VEH	COM	IND	PUB	RES	TRAFFIC	
Mainstem	\$6,000	\$0	\$90,000	\$8,000	\$2,000	\$24,000	\$178,000	\$308,000
Tributary	\$0	\$0	\$0	\$0	\$0	\$22,000	\$3,000	\$25,000
Total	\$6,000	\$1,000	\$90,000	\$8,000	\$2,000	\$46,000	\$181,000	\$333,000

(FY 2010 Price Level, FDR 4.125%)

Table 75 – Mt. Prospect Reservoir Modification Cost Estimate

Easement Area (ac)	Constr. Duration (months)	First Cost	Lands & Damages	S&A	IDC	Total Costs	Annual O&M	Eq. Annual Costs
46.3	8	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$437,000

(FY 2010 Price Level, FDR 4.125%)

Evaluation Decision: Eliminate

Farmer-Prairie Creek Watershed

IDNR conducted a detailed analysis of a number of sites in this watershed (see Attachment 2: Farmers/Prairie Creek Strategic Planning Study, September 2009). The hydraulic modeling and

preliminary cost estimates developed by IDNR were used to identify the two sites below for further analysis.

FPCI01: Golf Road Connector at Lake Mary Anne

To maintain lower flood stages on Lake Mary Anne, at Golf Road and Interstate 294, the outlet of the lake would be supplemented by a 10 cubic foot per second pump station. This pump station would discharge into an 18 inch diameter discharge pipe that would be routed under Golf road and over a 96 inch diameter Golf Road interceptor pipe to the Dude Ranch Pond. The existing routing of tollway runoff to Lake Mary Anne would be eliminated by gating the existing 12 and 18 inch outlet pipes. Discharge from two-5 cubic foot per second pumps would be directed to Dude Ranch pond through a 12 inch outlet pipe in the existing right overbank between the pond and Farmer-Prairie Creek.

Expected damage reductions resulting from implementation of this alternative were calculated in HEC-FDA using modeling developed by IDNR. **Table 76** shows the calculated reduction in damages resulting from implementation of this project. Costs developed in the IDNR analysis were used as preliminary project costs, with adjustments made to reflect the FY10 depreciation rate. **Table 77** shows the costs estimated by IDNR.

Table 76 – Golf Road Connector at Lake Mary Anne Damage Reduction

Equivalent Annual Damages Reduced by Category							Total Equivalent Annual Damages Reduced
APT	VEH	COM	IND	PUB	RES	TRAFFIC	
\$200	\$0	\$0	\$0	\$0	\$107,000	\$0	\$107,000

(FY 2010 Price Level, FDR 4.125%)

Table 77 – Golf Road Connector at Lake Mary Anne Costs: Preliminary IDNR Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
Elevate existing pipe by 36 inches	48	ft		
36" Reinforced Concrete Pipe	352	ft		
Pumps	1	set of 3		
Pump House and Accessories	1	ea		
Total Implementation Costs				
LERRD (estimated permanent flood easement cost)	24,4474	sq.ft.		
Contingency (15%)				
Engineering and Design (20%)				
Supervision and Administration (7.5%)				
Mobilization (6%)				
O&M (1%)				
Total Project Cost				
Equivalent Annual Project Cost				

(FY 2010 Price Level, FDR 4.125%)

The preliminary benefit to cost ratio, based on this cost estimate is 3.7, therefore a more detailed analysis of the design requirements for implementation of this project and the resulting costs were developed as discussed in Appendix D (Civil Design) and Appendix F (Cost Engineering). The estimated costs resulting from this analysis are shown in **Table 78**, below. The resulting benefit to cost ratio is 1.3, therefore the measure was kept for further analysis.

Table 78 – Golf Road Connector at Lake Mary Anne Site Evaluation Costs

Easement Area (ac)	Constr. Duration (months)	First Cost	Lands & Damages	S&A	IDC	Total Costs	Annual O&M	Eq. Annual Costs
2.8	6							\$81,000

(FY 2010 Price Level, FDR 4.125%)

Evaluation Decision: Keep

FPME01: Belleau Lake Expansion

This measure was also analyzed by IDNR in their September 2009 Study. Belleau Lake, south of Rand Road and west of Interstate 294, currently retains flood flows during a 10% annual chance of exceedance flood event. In this measure, the lake would be expanded by lowering the bottom contours and expanding the footprint. The resulting in-line lake elevation would be lowered from 626.2 feet to 622.0 feet, the downstream channel invert. Outflow from the lake would be controlled by the conveyance capacity of the creek downstream of the lake. Steep side slopes, exposed along the western edge of the lake by the decrease in water elevation, would be graded at 3:1 for safety and stability. The newly configured lake would be capable of providing up to 75 acre-feet of additional flood storage capacity at the 1% annual chance of exceedance flood event. **Table 79** presents the calculated reduction in damages resulting from implementation of this project. **Table 80** shows the estimated costs. The resulting benefit to cost ratio is 0.1, therefore the site eliminated from further analysis.

Table 79 – Belleau Lake Expansion Damage Reduction

Equivalent Annual Damages Reduced by Category							Total Equivalent Annual Damages Reduced
APT	VEH	COM	IND	PUB	RES	TRAFFIC	
\$0	\$0	\$0	\$0	\$2,000	\$1000	\$0	\$3,000

(FY 2010 Price Level, FDR 4.125%)

Table 80 – Belleau Lake Expansion Cost Estimate

Item	Quantity	Unit	Unit Cost	Total Cost
24" Reinforced Concrete Pipe	10	ft		
Seeding/Mulching/Fertilizing	3	acres		
Excavation	50683	cy		
Total Implementation Costs				
LERRD (estimated right-of-way cost)	207094	sq. ft.		
Contingency (15%)				
Engineering and Design (20%)				
Supervision and Administration (7.5%)				
Mobilization (6%)				
O&M (1%)				
Total Project Cost				
Equivalent Annual Project Cost				

(FY 2010 Price Level, FDR 4.125%)

Evaluation Decision: Eliminate

Willow-Higgins Creek

WHME01: Modification of Touhy Avenue Reservoir

As discussed in Appendix A (Hydrology & Hydraulics), the reservoir was modeled with expanded capacity. The model resulted in an insignificant change in water surface profile and therefore no further analysis was conducted.

Evaluation Decision: Eliminate

Silver Creek

SCCI01: Channel Improvements North of North Avenue

Silver Creek is underground in this section of the channel. To improve flow, installation of an additional culvert section was investigated. The improved channel was modeled as discussed in Appendix A (Hydrology & Hydraulics). Reductions in damages calculated by HEC-FDA with the modeled improvements are shown in **Table 81**. A cost estimate was developed for the site as discussed in Appendix F (Cost Engineering) and resulted in the calculated equivalent annual costs shown in **Table 82**. Lands and damages were calculated as for other sites, at \$ [REDACTED] per acre. Supervision and administration were calculated as 25% of the first cost.

Table 81 – Silver Creek Channel Improvement North of North Avenue Damage Reduction

Equivalent Annual Damages Reduced by Category							Total Equivalent Annual Damages Reduced
APT	VEH	COM	IND	PUB	RES	TRAFFIC	
\$1000	\$7,000	\$196,000	\$213,000	\$1000	\$770,000	\$439,000	\$1,628,000

(FY 2010 Price Level, FDR 4.125%)

Table 82 – Channel Improvement North of North Avenue Cost Estimate

Easement Area (ac)	Constr. Duration (months)	First Cost	Lands & Damages	S&A	IDC	Total Costs	Annual O&M	Eq. Annual Costs
0	5	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$149,000

(FY 2010 Price Level, FDR 4.125%)

The benefit to cost ratio from this initial analysis is 10.5. However, after this initial evaluation, an analysis of routing changes resulting from the additional culvert was conducted as described in Appendix A (Hydrology & Hydraulics). The increased flow resulted in increased flood elevations downstream of the culvert and no feasible mitigation measures were identified. This measure was therefore eliminated from further consideration.

Evaluation Decision: Eliminate

SCCI02: Channel Improvements between North Wolf Road & Lee Street

This portion of the channel extends for over 1,000 feet underneath railroad tracks. Based on the length of the channel under the tracks, it was determined that this measure would not be implementable.

Evaluation Decision: Eliminate

SCME01: Modification of Structure 106

Examination of the existing reservoir using aerials indicated that expansion of the reservoir by further excavation while maintaining the existing side slopes would only result in 10 acre feet of additional storage. An alternative expansion scenario was also identified in which the reservoir would be expanded by installing vertical sheet pile walls and eliminating the need for sloped sides, although it was determined that due to the use of sheet pile, the costs would be too high to warrant further investigation.

Evaluation Decision: Eliminate

SCME02: Modification of Structure 102

The existing reservoir was modeled with a 119 acre foot expansion, based on available area, as discussed in Appendix A (Hydrology & Hydraulics). Using the new profiles, damage reductions were calculated by HEC-FDA as shown in **Table 83**. A design and cost estimate were developed for the site as discussed in Appendix D (Civil Design) and Appendix F (Cost Engineering) and resulted in the calculated equivalent annual costs shown in **Table 84**. Lands and damages were calculated as for other sites, at \$[REDACTED] per acre. Supervision and administration were calculated as 25% of the first cost. The resulting benefit to cost ratio is 0.2. Therefore, the expansion was eliminated from further consideration.

Table 83 – Structure 102 Modification Damage Reduction

Equivalent Annual Damages Reduced by Category							Total Equivalent Annual Damages Reduced
APT	VEH	COM	IND	PUB	RES	TRAFFIC	
\$1,025	\$437	\$5,369	\$1,994	\$0	\$93,548	\$34,469	\$136,840

(FY 2010 Price Level, FDR 4.125%)

Table 84 – Structure 102 Expansion Cost Estimate

Easement Area (ac)	Constr. Duration (months)	First Cost	Lands & Damages	S&A	IDC	Total Costs	Annual O&M	Eq. Annual Costs
12.1	16	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$661,000

(FY 2010 Price Level, FDR 4.125%)

Evaluation Decision: Eliminate

SCOT01: Addison Creek/Silver Creek Interbasin Flow

Urbanization in the Silver Creek and Addison Creek watersheds has led to the possibility of interbasin flow from the Addison Creek watershed to the Silver Creek watershed. Although this potentially increases flooding in Silver Creek, analysis of steps to alleviate the effects of the interbasin flow are beyond the scope of this study.

Evaluation Decision: Eliminate

Des Plaines River

DPOT01: Reevaluation of Salt Creek Diversion

Preliminary analysis of this option by MWRDGC indicated that any changes to the Salt Creek Diversion would have impacts along Salt Creek in Brookfield. Based on this assessment, the measure was eliminated from further analysis.

Evaluation Decision: Eliminate

DPOT02: Modification of Des Plaines River Riparian Greenway

To improve flow conditions in the mainstem, modification of the riparian greenway was investigated. An initial evaluation of this measure consisted of modifying the hydraulic model of the river, as discussed in Appendix A (Hydrology & Hydraulics). The modifications to the model represented tree trimming along 30 miles of the channel. **Table 85** presents the resulting reduction in damages.

Table 85 – Modification of Greenway Damage Reduction

Equivalent Annual Damages Reduced by Category							Total Equivalent Annual Damages Reduced
APT	VEH	COM	IND	PUB	RES	TRAFFIC	
\$86,000	\$2,000	\$1,239,000	\$112,000	\$61,000	\$343,000	\$3,391,000	\$5,233,000

(FY 2010 Price Level, FDR 4.125%)

As discussed in Appendix F (Cost Engineering), the estimated cost for trimming trees along the channel and chipping and disposing of the debris is \$[REDACTED]. The trimming would be repeated every five years to maintain the cleared conditions. Maintenance trimming is estimated to cost \$[REDACTED]. These costs, annualized over the 50 year period of analysis, result in an equivalent annual cost of \$[REDACTED]. The resulting BCR for this measure is 13.8.

While these initial results were very positive, concerns about whether the project would be implementable were raised. The measure was reformulated to look in more detail at potential for flow improvements and available land. In this iteration, lands in the two-year floodplain owned by either LCFPD or FPDC were evaluated. Implementation would consist of clearing the two-year floodplain of trees and planting grasses and shrubs in their place.

Reaches of the greenway downstream of large damage areas were identified as presented in **Table 86** below. The tree clearing was modeled as discussed in Appendix A (Hydrology & Hydraulics). The reduction in damages resulting from each reach is presented in **Table 87**. The hydraulic modeling for this refined analysis was performed in the revised model used in the last added analysis as discussed in Section 3.5 of Volume 2 as the reformulation of this measure was conducted after the need to update the without project conditions was identified.

Preliminary cost estimates for each reach were developed as discussed in Appendix F (Cost Engineering). Lands and damages were calculated, as for other sites, at \$[REDACTED] per acre. Supervision and Administration costs were calculated as 25% of the first cost. O&M costs were calculated assuming that invasive species control and periodic prescribed burns would be required. Invasive species control was assumed to occur monthly during the growing season for the first five years and subsequently twice per year. Prescribed burns would be conducted every

five years. The total implementation costs and O&M costs were annualized of the 50 year period of analysis. **Table 88** presents the estimated equivalent annual costs for each reach.

Table 86 – Riparian Greenway Modification Reaches

Reach ID	River Miles	Area (ac)	Municipalities	County
DPOT02-A	50.21-52.91	209	River Forest, Melrose Park, Maywood	Cook
DPOT02-B	51.04-56.88	250	River Grove, Chicago	Cook
DPOT02-C	69.70-76.4	419	Mt. Prospect, Glenview, Wheeling, Prospect Heights	Cook/Lake
DPOT02-D	76.40-78.82	181	River Woods, Buffalo Grove, Lincolnshire	Lake
DPOT02-E	91.67-97.11	379	Waukegan, Gurnee	Lake

Table 87 – Riparian Greenway Modification Screening Reduction in Damages

Reach ID	APT	AUTO	COM	IND	PUB	RES	TRAFFIC	Total Equiv. Annual Damages Reduced
DPOT02-A	\$43,000	\$1,000	\$444,000	\$122,000	\$0	\$148,000	\$1,629,000	\$2,385,000
DPOT02-B	\$85,000	\$1,000	\$1,723,000	\$347,000	\$4,000	\$276,000	\$4,056,000	\$6,493,000
DPOT02-C	\$52,000	\$1,000	\$603,000	\$262,000	\$40,000	\$206,000	\$4,423,000	\$5,587,000
DPOT02-D	\$0	\$1,000	\$20,000	\$7,000	\$35,000	\$120,000	\$467,000	\$650,000
DPOT02-E	\$1,000	\$1,000	\$84,000	\$0	\$135,000	\$23,000	\$1,910,000	\$2,154,000

(FY 2010 Price Level, FDR 4.125%)

Table 88 – Riparian Greenway Modification Screening Cost Estimates

Reach ID	Constr. Duration (mos)	First Cost	Lands & Damges	S&A	IDC	Total Costs	Annual O&M	Eq. Annual Costs
DPOT02-A	6							\$1,295,000
DPOT02-B	6							\$1,549,000
DPOT02-C	6							\$1,571,000
DPOT02-D	6							\$1,121,000
DPOT02-E	6							\$2,348,000

(FY 2010 Price Level, FDR 4.125%)

Table 89 presents the evaluation results for each reach. As shown in the table, reaches D and E had negative net benefits and were eliminated from further consideration. Reaches A, B and C, however, had positive net benefits. Further analysis of these reaches, however, showed that, as formulated, the modifications would increase stages downstream.

Table 89 – Riparian Greenway Modification Screening Results

Reach	Total Equivalent Annual Damages Reduced	Equivalent Annual Costs	Net Benefits	BCR
DPOT02-A	\$2,385,000	\$1,295,000	\$1,090,000	1.8
DPOT02-B	\$6,493,000	\$1,549,000	\$4,944,000	4.2
DPOT02-C	\$5,587,000	\$1,571,000	\$4,016,000	3.6
DPOT02-D	\$650,000	\$1,121,000	(\$471,000)	0.6
DPOT02-E	\$2,154,000	\$2,348,000	(\$194,000)	0.9

(FY 2010 Price Level, FDR 4.125%)

The conditions of the greenway were assessed in the fall of 2010. The assessment results indicate that much of the area is a high functioning floodplain forest with mature canopy trees and lush herbaceous understory. The very rare and significant flatwoods community type was also present in small areas. In areas that had undergone recent human activities (e.g., mowing or clearing of canopy), the current conditions were degraded with thick stands of invasive shrub species such as European Buckthorn. Overall, the greenway included natural resources that are considered to be significant and important to the local and regional ecosystems.

A brief look at the species composition of the area revealed high native plant species richness and coverage. In degraded areas, the plant species composition was less rich and included many non-native and invasive species. However, the structure of the community is ideal floodplain forest with large tall canopy trees, a small amount of shrub layer coverage, and a lush and diverse herbaceous layer. The shrub and herbaceous layers were negatively impacted and of lower structural integrity only in degraded areas. Since most of the assessment area is considered to be a significant natural resource, removal of the structural components (e.g., all woody species) of the system would result in significant negative impacts. These impacts, if not avoided, have to be minimized and/or mitigated for.

As a multi-purpose study, measures evaluated for flood risk management potential must meet not only objectives and constraints related to this purpose, but also overall study objectives and constraints. One overall objective is to preserve existing natural resources and a constraint is that measures must avoid adverse impacts to existing ecosystem integrity. Implementation of this measure would result in direct impacts to the structural integrity of a significant natural resource and impact the function of this riparian corridor as a conduit for species movement and connectivity of the riparian zone to the surrounding uplands. Therefore, this measure was eliminated from further consideration.

Evaluation Decision: Eliminate

DPOT03: Optimize Reservoir Operations

This measure would involve watershed-wide coordination of operations at floodwater storage sites to ensure efficient operations of the existing sites. Existing major reservoirs in the watershed are listed below in **Table 90**.

Table 90 – Structures Included in Reservoir Optimization Screening Analysis

Reservoir	Watershed	Location	Maintained by
Jack B. Williams Reservoir (Structure 106)	Silver Creek	Grand & Mannheim	Franklin Park
Silver Creek Reservoir (Structure 102)	Silver Creek	Irving Park & Mannheim	MWRDGC
Willow-Higgins Reservoir (Structure 140)	Willow-Higgins Creek	Touhy & Mount Prospect	MWRDGC
White Pine Ditch Reservoir	Buffalo-Wheeling Creek	Dundee & Buffalo Grove Rd	Buffalo Grove
Heritage Park Reservoir	Buffalo-Wheeling Creek	Wolf & Dundee	Wheeling Park District & Wheeling
Wilke-Kirchoff Reservoir	Weller Creek	Arlington Heights	Arlington Heights
Mt. Prospect Reservoir	Weller Creek	Central & Northwest Hwy	Mt. Prospect & Arlington Heights
Buffalo Creek Reservoir	Buffalo-Wheeling Creek	Lake-Cook Road	LCPFD, Buffalo Grove, MWRDGC
Lake Arlington Reservoir	McDonald Creek	Palatine & Windsor	Arlington Heights

Implementation of this measure would not require a significant Federal investment. Instead, the municipalities and local agencies operating the reservoirs would create a plan for communication and coordination during flood events that require operation of the facilities. This measure, therefore was not kept for further analysis in this study, but will instead be recommended for implementation by the operators of the listed reservoirs.

Evaluation Decision: Recommend for implementation by local agencies

DPBM01: BNSF Railroad Bridge Pier Extension

IDNR investigated several flood risk management alternatives in this area (see Attachment 1: Groveland Avenue Limited Strategic Study, October 2009). Of the alternatives involving the BNSF Railroad Bridge crossing the Des Plaines River in this area, extension of the piers was shown to have the greatest impact on the water surface profile. In this measure, the piers on the railroad bridge would be extended and curved both upstream and downstream to provide a flow transition across the bridge piers. The extensions change the effective width of the piers from 33 feet to 6.5 feet and the effective width of the bridge from 219 feet to 265 feet. Additionally, earth excavation would be required both upstream and downstream of the extension to allow for effective conveyance of flows through the bridge. Using the water surface profile developed by IDNR, HEC-FDA calculated the reduction in damages shown in **Table 91**. A site design and cost estimate were developed for the site as discussed in Appendix D (Civil Design) and Appendix F (Cost Engineering) and resulted in the calculated equivalent annual costs shown in **Table 92**. Lands and damages were calculated as for other sites, at \$ [REDACTED] per acre. Supervision and Administration costs were calculated as 25% of the first cost.

Although this measure has positive net benefits, several considerations led to the conclusion that this measure would not be implementable. The hydraulic investigation did not include reaches outside of the immediate Riverside area. Stage impacts are likely, requiring extensive mitigation. Additionally, the owner of the bridge, Burlington Northern Railroad, indicated that they were not interested in participating in any projects that require modifications to the existing bridge structure. This measure was therefore eliminated from further analysis.

Table 91 – BNSF Railroad Bridge Pier Extension Damage Reduction

Equivalent Annual Damages Reduced by Category							Total Equivalent Annual Damages Reduced
APT	VEH	COM	IND	PUB	RES	TRAFFIC	
\$199,397	\$1,059	\$18,700	\$11,300	\$114,990	\$141,060	\$776,400	\$1,262,900

(FY 2010 Price Level, FDR 4.125%)

Table 92 – BNSF Railroad Bridge Pier Extension Costs

Easement Area (ac)	Constr. Duration (months)	First Cost	Lands & Damages	S&A	IDC	Total Costs	Annual O&M	Eq. Annual Costs
0.6	6							\$183,000

(FY 2010 Price Level, FDR 4.125%)

Evaluation Decision: Eliminate

DPBM02: Forest Avenue Bridge Realignment

The effect of this measure on the water surface profile was analyzed by IDNR. Preliminary analysis showed that realignment of the bridge piers did not significantly affect the water surface profile, and IDNR did not include this measure in their Groveland Avenue Limited Strategic Study. Based on this analysis, this measure was eliminated from further analysis.

Evaluation Decision: Eliminate

Table 93 – Summary of Structure Modification Site Evaluation

ID	Watershed	County	State	Total	Eliminated	Kept
BW	Buffalo-Wheeling Creek	Cook/Lake	IL	3	3	0
WL	Weller Creek	Cook	IL	1	1	0
FP	Farmer-Prairie Creek	Cook	IL	2	1	1
WH	Willow-Higgins Creek	Cook/Dupage	IL	1	1	0
SC	Silver Creek	Cook/Dupage	IL	5	5	0
DP	Des Plaines River	Cook/Lake/Kenosha	IL/WI	5	5	0
TOTAL				17	16	1

3.5 – Non-Structural Site Evaluation

A large number of sites were identified for possible implementation of non-structural measures. Because this information can only be evaluated at a detailed level according to site specific information, site evaluations were not conducted for each of the structures retained in the screening. During the preconstruction engineering and design (PED) phase, a more detailed investigation will be conducted.

SECTION 4 –FLOOD RISK MANAGEMENT PLAN FORMULATION

4.1 Updates to Without Project Conditions and and Benefit Cost Analysis

Additional detailed evaluation for each of the retained sites was conducted to ensure that all relevant design and cost information was considered and net benefits had been maximized. At this stage, the without project conditions were reviewed to ensure that they present the most reasonable approximation of watershed baseline and expected future conditions. In addition, the discount rate used in the benefit and cost calculations was updated to 3.75% for the current fiscal year (FY13) and price levels were updated to October 2012 price levels.

Changes to the without project conditions included revised modeling for the Van Patten Woods lateral storage area and removal of the North Fork Mill Creek Dam Modification. The Van Patten Woods modeling was recently updated for the Phase I design analysis to reflect design modifications. The Lake County Forest Preserve District is in the process of permitting the notching for the North Fork Mill Creek Dam for ecosystem restoration. With implementation of this notching, there will no longer be an opportunity to increase floodwater storage by modifying the dam. The dam is modeled as in place for baseline conditions and notched in future conditions.

The sites retained for further evaluation include: BCRS02, ACRS08, DPLV01, DPLV09, DPBM04, and FPCI01. For all sites, estimated real estate costs were also updated to reflect site specific analyses conducted as discussed in Appendix I (Real Estate). Opportunities for optimizing the sites were investigated as discussed below:

ACRS08 and BCRS02: Previous hydrologic and hydraulic modeling for these reservoirs had focused on the tributaries. Because the majority of benefits for these features are on the mainstem, the modeling was revised to optimize the impacts of the structures on mainstem flooding. Benefits for ACRS08 increased, as shown in Table 94; however, benefits for BCRS02 decreased. The reduction in BCRS02 benefits resulted from updates to the hydrologic modeling that refined the sub-basin delineation for the site. As a result of the updated modeling, BCRS02 was eliminated from consideration.

DPLV01, DPLV04, and DPLV05: Benefits associated with reduced administration costs for the flood insurance program resulting from removal of structures from the floodplain were added to the project benefits.

DPLV09: Benefits associated with reduced administration costs for the flood insurance program resulting from removal of structures from the floodplain were added to the project benefits. In addition, an estimate of prevented emergency flood fighting costs was developed, as the high risk of flooding in this community has led to significant public investment in flood fighting, as discussed in Appendix E (Economic Analysis).

Opportunities to include recreation features at this site were also investigated, consisting of a trail along the floodwall alignment connecting to the existing Des Plaines River Trail system. This trail would provide access to the trail system for communities on the west bank of the river and a shorter trail "loop" for use by residents looking for a shorter hike, walk, or bike ride. A

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discussion of the analysis used to determine the recreation benefits, annualized costs, and net benefits can be found in Appendix E (Economic Analysis).

Updated benefits and costs for each individually justified site are presented in the tables below. The sites are arranged from highest net benefits to lowest. This ranking was used to begin the last added analysis, as discussed in the following section. Additionally, a "Plan" is designated for each site according to which flood risk management plan they may be included in, as discussed in the main report.

Table 94 – First Added Benefits (\$1,000)

Site	Flodd Damages Reduced by Category							Total Damage Reduced	FIA Savings	Flood Fighting	Recreation	Total Benefits
	APT	AUTO	COM	IND	PUB	RES	TRAFFIC					
DPBM04	\$0	\$0	\$0	\$0	\$0	\$0	\$4,287	\$4,287				\$4,287
DPLV09	\$290	\$47	\$166	-\$4	\$16	\$689	\$825	\$2,029	\$190	\$60	\$187	\$2,466
ACRS08	\$25	\$1	\$48	\$18	\$9	\$102	\$1,089	\$1,290				\$1,290
DPLV04	\$35	\$0	\$81	-\$6	-\$5	\$140	\$1,899	\$2,144	\$35			\$2,179
DPLV05	\$42	\$0	-\$12	\$127	-\$2	-\$17	\$1,453	\$1,591	\$38			\$1,629
DPLV01	\$331	\$0	\$0	\$0	\$0	\$87	\$0	\$418	\$23			\$441
FPCI01	\$0	\$0	\$0	\$0	\$0	\$107	\$0	\$107				\$107
BCRS02	\$6	\$0	\$12	\$7	\$1	\$32	\$374	\$433				\$433

(FY 2013 Price Level, FDR 3.75%)

Table 95 – First Added Costs (\$1,000)

Site	Constr. Duration (months)	Site area (acres)	All costs shown in \$1,000								
			First Cost	Lands and Damges	PED	S&A	IDC	Total Costs	Annual O&M	Eq. Annual Costs	
DPBM04	18	9									\$767
DPLV09	29	22									\$1,281
ACRS08	12	93									\$858
DPLV04	24	109									\$557
DPLV05	24	42									\$490
DPLV01	12	2									\$325
FPCI01	6	3									\$72
BCRS02	12	111									\$680
L22	6	112									\$215

(FY 2013 Price Level, FDR 3.75%)

Table 96 – First Added Benefit Cost Analysis (\$1,000)

Site	Description	Mitigation	Total Benefits ^{1,2}	Annual Costs ¹	Net Benefits	BCR
DPBM04	First Ave Bridge Modification		\$4,287	\$770	\$3,517	5.6
DPLV04	Belmont-Irving Levee		\$2,179	\$557	\$1,622	3.9
DPLV09	Ashland-Fargo Levee		\$2,470	\$1,044	\$1,426	2.4
DPLV05	Fifth-CN Railroad Levee		\$1,629	\$490	\$1,139	3.3
ACRS08	Aptakisic Creek Reservoir		\$1,290	\$819	\$471	1.6
DPLV01	Groveland Avenue Levee		\$441	\$275	\$166	1.6
FPCI01	Lake Mary Anne Pump Station		\$107	\$72	\$35	1.5
BCRS02	Bull Creek Reservoir	L22	\$433	\$895	-\$462	0.5

¹ Benefits and costs are annualized over a 50 year period of analysis, using a 3.75% discount rate.

² Additional benefit categories include Flood Insurance Administration Cost Savings for structures removed from the floodplain, reductions in flood fighting costs, and recreation benefits.

(FY 2013 Price Level, FDR 3.75%)

Screened non-structural sites were also separated according to policy compliance. Sites in portions of the watershed that do not meet the 800 cfs requirement would be part of the Full Plan, all remaining sites would be NED sites.

4.2 Mitigation for Levee Induced Damages

As discussed in Section 3.2, the hydraulic model showed that construction of DPLV04, DPLV05, and DPLV09 would result in increased stages outside of the proposed levee reaches. Each levee is individually justified even when accounting for the induced damages, however, additional analysis was conducted to identify and evaluate mitigation alternatives.

Because these levees are relatively close to each other along the mainstem, they were modeled together to ensure that the impacts were fully accounted for, as discussed in Appendix A (H&H Analysis). The combined levees resulted in compounded impacts resulting in more significant stage increases and induced damages, as shown in **Table 97**. The increased stages, while relatively small (they were never more than three inches and were typically less than an inch), spread over miles within the watershed, impacting hundreds of properties and structures. Because of the large extent of the impacts, purchasing flowage easements for all impacted properties was determined to be impractical.

Table 97 – Levee Induced Damages

	DPLV04	DPLV05	DPLV09	Combined Levees
Flood Protection Benefits	\$2,350	\$1,805	\$2,560	\$6,715
Induced Flood Damages	(\$206)	(\$214)	(\$492)	(\$2,855)
Total Economic Benefits	\$2,144	\$1,591	\$2,068	\$3,860

(FY 2013 Price Level, FDR 3.75%)

Two compensatory storage alternatives were evaluated for mitigating for the induced damages:

1. DPRS15 had previously been eliminated from consideration as a reservoir, but was evaluated for compensatory storage as it is located near the impacted area. The optimized storage at the site was determined to be 220 acre-ft. The estimated cost for this structure was annualized over the 50 year period of analysis at the FY13 federal discount rate of 3.75%. The total annualized estimated cost for the compensatory storage, including required fish and wildlife mitigation, was \$ [REDACTED]. Although the cost of this site is much less than the almost \$3 million in induced flood damages, the site was not able to mitigate for all of the induced stages. This alternative was therefore eliminated.

2. Site ACRS08 is individually justified as a floodwater storage reservoir, based on flood damage reduction benefits. Because this site had been shown to be effective for reducing flood stages, it was also evaluated as a compensatory storage site to address the levee induced damages. The annualized cost of constructing the reservoir, \$ [REDACTED], is less than the total induced damages. The levees were modeled in combination with this reservoir and the combination resulted in stage increases in a very limited area. The impacts of the increased stages at three cross-sections, located between the alignments of the existing Rand Park Levee and the proposed DPLV09, would be to a parcel along the river owned by the Forest Preserve District of Cook County. The stage increases, between 0.04 and 0.05 feet, would have minimal impact on this undeveloped land. A preliminary estimate of the value of the flowage easements was prepared as discussed in Appendix I (Real Estate Plan). The estimated value is \$ [REDACTED]. The net benefits of the levees when combined with ACRS08 are greater than for any of the sites individually. This mitigation alternative was therefore retained for incorporation in the flood risk management plans. The benefits, costs, and net benefits are presented in **Table 98**, below.

Table 98 – ACRS08 Compensatory Storage Evaluation

Site	Benefits (\$1,000)					Annual Costs (\$1,000)	Net Benefits (\$1,000)	BCR
	Total Flood Damage Reduced ¹	FIA Savings	Flood Fighting Prevented	Recreation	Total Benefits			
DPLV04	\$2,144	\$35			\$2,179	\$557	\$1,622	3.9
DPLV09	\$2,068	\$155	\$60	\$187	\$2,470	\$1,044	\$1,426	2.4
DPLV05	\$1,591	\$38			\$1,629	\$490	\$1,139	3.3
ACRS08	\$1,290				\$1,290	\$819	\$471	1.6
Levees & ACRS08	\$5,772	\$228	\$60	\$187	\$6,247	\$2,910	\$3,337	2.1

¹ For DPLV04, DPLV05, and DPLV09, total flood damages reduced incorporates induced damages which are subtracted from the total.

(FY 2013 Price Level, FDR 3.75%)

4.3 Last Added Analysis

The screened and evaluated sites shown to be individually justified were further evaluated using a “last added” analysis. Through the screening and evaluation process, each site has been individually justified and optimized with respect to without project conditions. The last added

analysis will evaluate measures in combination with each other ensuring that each site added to the plan is justified as an increment of the formulated plan.

Since the benefits of implementation of these measures are interdependent, this analysis will ensure that benefits are not claimed by two projects in the same plan. The site with the highest net benefits is the starting point, using the with-project hydraulic and economic models of that site as the formulated plan. The remaining projects are then each added to the plan, and benefit to cost ratios and net benefits are calculated for each combination. An increase in net benefits indicates that the new element is incrementally justified within the plan. The combination with the highest net benefits becomes the new baseline plan.

The remaining sites are then added to the hydraulic and economic model of the new formulated plan to determine the next site to be included in the plan. The analysis is repeated until either all sites have been added or there are no combinations of the remaining sites with the formulated plan that result in increased net benefits.

As detailed in the preceding sections, various sites are individually justified and retained for further analysis. Levees 04, 05, and 09 are dependant on implementation of ACRS08 for mitigation of induced damages; these sites were therefore included together in the formulation. The measures, ranked by net benefits (highest to lowest), are shown in Table 96. FPCI01 is included in the sites retained, however the modeled project showed no impacts on the mainstem: all benefits from this site are on the Farmer-Prairie Creek tributary. Since benefits for this site do not overlap with benefits from any other site, it was retained for inclusion in the Flood Risk Management Plans and not included in the last added analysis. Although sites ACRS08 and BCRS02 are also located on tributaries, the benefits for the project are accrued on the main stem of the Des Plaines River. These sites, therefore, are incorporated in the last added analysis.

Table 99 – Sites Considered in Last Added Analysis

Site	Description	Plan ¹	Total Benefits ^{2,3}	Annual Costs ²	Net Benefits	BCR
DPBM04	First Ave Bridge Modification	Full	\$4,287	\$770	\$3,517	5.6
DPLV04	Belmont-Irving Levee	NED	\$6,247	\$2,910	\$3,337	2.1
DPLV09	Ashland-Fargo Levee	NED				
DPLV05	Fifth-CN Railroad Levee	NED				
ACRS08	Aptakistic Creek Reservoir	NED				
DPLV01	Groveland Avenue Levee	CAP	\$441	\$275	\$166	1.6
FPCI01	Lake Mary Anne Pump Station	Full	\$107	\$72	\$35	1.5

¹ HQUSACE has directed the District to prepare a plan that includes all individually justified sites, a plan that includes all policy compliant plans that could not be implemented under the continuing authorities program (CAP), and sites for implementation under CAP. Full, NED, or CAP is shown to indicate which plan they would fall within.

² Benefits and costs are annualized over a 50 year period of analysis, using a 3.75% discount rate.

³ Additional benefit categories include Flood Insurance Administration Cost Savings for structures removed from the floodplain, reductions in flood fighting costs, and recreation benefits.

(FY 2013 Price Level, FDR 3.75%)

Non-structural measures are included in the plan formulation process by using the formulated Structural Flood Risk Management Plans as new without project conditions for performing a cost benefit analysis of the measures at each cluster retained in the screening process Clusters which continue to have positive net benefits are retained for inclusion in the Flood Risk Management Plans.

The highest ranking site is DPBM04. Implementation of this site in combination with the remaining sites was modeled to determine the combined project benefits. The resulting benefits were then compared to the costs of implementing each pair of projects. The benefits, costs, and net benefits are presented in **Table 100**. The retained non-structural measures were then evaluated in combination with these five structural sites. The retained sites are summarized in **Table 104**.

The last added analysis for the Full Plan was conducted as detailed above. As shown in the tables, all individually justified sites remained incrementally justified in the Full Plan. A similar procedure was conducted for policy compliant sites that would be included in the NED or CAP Plan.

Table 100 – Full Plan Last Added Round One (\$1,000)

DPBM04	Benefits			Annual Cost	Net Benefits		
	Flood Damages Reduced	Other	Total				
	\$4,280		\$4,280	\$736	\$3,545		
Added Site	Flood Damages Reduced	Other	Total	Annual Cost	Cumulative Net Benefits	Incremental Net Benefits	
+ DPLV09, DPLV05, DPLV04, ACRS08	\$9,925	\$475	\$10,400	\$3,646	\$6,754	\$9,925	
+ DPLV01	\$4,698	\$23	\$4,721	\$1,011	\$3,710	\$4,698	

(FY 2013 Price Level, FDR 3.75%)

Table 101 – Full Plan Last Added Round Two (\$1,000)

DPBM04, DPLV09, DPLV05, DPLV04, ACRS08	Benefits			Annual Cost	Net Benefits		
	Flood Damages Reduced	Other	Total				
	\$9,925	\$475	\$10,400	\$3,646	\$6,754		
Added Site	Flood Damages Reduced	Other	Total	Annual Cost	Cumulative Net Benefits	Incremental Net Benefits	
+ DPLV01	\$10,334	\$498	\$10,832	\$3,921	\$6,911	\$157	

(FY 2013 Price Level, FDR 3.75%)

Table 102 – Incremental Non-Structural Analysis – Full Plan

County	Municipality	Structures in Municipality	County	WOP Damages (\$1,000)	Total Structures	% Structures in Municipality	Benefits (\$1,000)	Project Costs (\$1,000)	Annual Costs (\$1,000)	Net Benefits (\$1,000)
Cook	Riverside	4	951	\$24.0	2	50%	\$22.6		\$7.2	\$15.4
	River Forest	22		\$56.2	20	91%	\$53.2		\$61.7	(\$8.5)
	Elmwood Park	54		\$104.8	48	89%	\$100.3		\$210.2	(\$109.9)
	River Grove	2		\$102.5	2	100%	\$102.5		\$15.3	\$87.2
	Franklin Park	119		\$168.0	54	45%	\$104.9		\$156.2	(\$51.3)
	Rosemont	2		\$307.6	2	100%	\$307.6		\$25.7	\$281.9
	Des Plaines	273		\$1,607.5	204	75%	\$1,531.8		\$457.5	\$1,074.3
	Prospect Heights	9		\$27.4	8	89%	\$25.4		\$45.8	(\$20.5)
	Wheeling	239		\$426.6	182	76%	\$388.8		\$298.7	\$90.1
	Park Ridge	47		\$134.3	11	23%	\$53.0		\$21.1	\$31.9
	Melrose Park	16		\$7.3	15	94%	\$7.0		\$22.4	(\$15.4)
	Franklin Park	130		\$195.4	65	50%	\$132.2		\$183.7	(\$51.5)
	Buffalo Grove	34		\$23.9	31	91%	\$22.1		\$34.1	(\$12.0)
Lake	Riverwoods	55	385	\$243.8	49	89%	\$237.9		\$107.8	\$130.1
	Buffalo Grove	30		\$105.1	28	93%	\$103.6		\$49.4	\$54.2
	Lincolnshire	50		\$78.6	46	92%	\$77.2		\$98.3	(\$21.1)
	Mettawa	2		\$3.2	2	100%	\$3.2		\$3.6	(\$0.3)
	Libertyville	198		\$431.3	175	88%	\$374.1		\$311.4	\$62.6
	Gurnee	50		\$1,090.5	40	80%	\$921.7		\$169.3	\$752.4
Kenosha	Pleasant Prairie	16	58	\$81.3	10	63%	\$14.7		\$17.8	(\$3.0)
	Salem	6		\$52.1	6	100%	\$52.1		\$4.5	\$47.6
	Bristol	12		\$44.9	8	67%	\$34.0		\$20.0	\$14.0
	Somers	1		\$59.3	1	100%	\$59.3		\$6.5	\$52.8
	Paddock Lake	23		\$85.1	23	100%	\$85.1		\$24.4	\$60.7

(FY 2013 Price Level, FDR 3.75%)

Table 103 – Summary of Incrementally Justified Non-Structural Measures (Full Plan)

County	Elevation	Dry Floodproof	Wet Floodproof	Fill Bsmt	Ring Levee	Buyout	Total Structures	Benefits (\$1,000)	Annual Costs (\$1,000)	Net Benefits (\$1,000)
Cook	135	49	24	56	15	124	403	\$2,406	\$57,638	\$826
Lake	178	15	13	12	23	51	292	\$1,637	\$16,336	\$638
Kenosha	3	0	13	1	2	19	38	\$231	\$1,527	\$55
Total	316	64	50	69	40	194	733	\$4,274	\$75,501	\$1,519

(FY 2013 Price Level, FDR 3.75%)

Table 104 – NED/CAP Plan Last Added (\$1,000)

DPLV09, DPLV05, DPLV04, ACRS08	Benefits			Annual Cost	Net Benefits	
	Flood Damages Reduced	Other	Total			
	\$5,772	\$475	\$6,209			\$2,910
Added Site	Flood Damages Reduced	Other	Total	Annual Cost	Cumulative Net Benefits	Incremental Net Benefits
+ DPLV01	\$6,181	\$498	\$6,641	\$3,185	\$3,456	\$157

(FY 2013 Price Level, FDR 3.75%)

Table 105 – Summary of NED Plan Incrementally Justified Non-Structural Measures

County	Elevation	Dry Floodproof	Wet Floodproof	Fill Bsmt	Ring Levee	Buyout	Total Structures	Benefits (\$1,000)	Project Costs (\$1,000)	Annual Costs (\$1,000)
Cook	81	45	24	52	15	120	337	\$2,294		\$729
Lake	178	15	13	12	23	51	292	\$1,637		\$638
Total	259	60	37	64	38	171	629	\$3,932		\$1,367

(FY 2013 Price Level, FDR 3.75%)

Table 106 – Incremental Non-Structural Analysis – NED Plan

County	Municipality	Structures in Municipality	County	WOP Damages (\$1,000)	Total Structures	% Structures in Municipality	Benefits (\$1,000)	Project Costs (\$1,000)	Annual Costs (\$1,000)	Net Benefits (\$1,000)
Cook	Riverside	4	833	\$24.0	2	50%	\$22.6		\$7.2	\$15.4
	River Forest	22		\$56.2	20	91%	\$53.2		\$61.7	(\$8.5)
	Elmwood Park	54		\$104.8	48	89%	\$100.3		\$210.2	(\$109.9)
	River Grove	2		\$102.5	2	100%	\$102.5		\$15.3	\$87.2
	Franklin Park	119		\$168.0	54	45%	\$104.9		\$156.2	(\$51.3)
	Rosemont	2		\$307.6	2	100%	\$307.6		\$25.7	\$281.9
	Des Plaines	273		\$1,607.5	204	75%	\$1,531.8		\$457.5	\$1,074.3
	Prospect Heights	9		\$27.4	8	89%	\$25.4		\$45.8	(\$20.5)
	Wheeling	168		\$358.1	127	76%	\$330.0		\$223.0	\$107.0
	Melrose Park	16		\$7.3	15	94%	\$7.0		\$22.4	(\$15.4)
	Franklin Park	130		\$195.4	65	50%	\$132.2		\$183.7	(\$51.5)
	Buffalo Grove	34		\$23.9	31	91%	\$22.1		\$34.1	(\$12.0)
Lake	Riverwoods	55	385	\$243.8	49	89%	\$237.9		\$107.8	\$130.1
	Buffalo Grove	30		\$105.1	28	93%	\$103.6		\$49.4	\$54.2
	Lincolnshire	50		\$78.6	46	92%	\$77.2		\$98.3	(\$21.1)
	Mettawa	2		\$3.2	2	100%	\$3.2		\$3.6	(\$0.3)
	Libertyville	198		\$431.3	175	88%	\$374.1		\$311.4	\$62.6
	Gurnee	50		\$1,090.5	40	80%	\$921.7		\$169.3	\$752.4

(FY 2013 Price Level, FDR 3.75%)

ACRONYMS AND ABBREVIATIONS

BCR	Benefit to Cost Ratio
CUP	Chicago Underflow Plan
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FPDCC	Forest Preserve District of Cook County
GIS	Geographic Information System
H&H	Hydrology & Hydraulics
HEC-FDA	Hydrologic Engineering Center – Flood Damage Analysis
IDNR	Illinois Department of Natural Resources
IDOT	Illinois Department of Transportation
IEMA	Illinois Emergency Management Agency
LCFPD	Lake County Forest Preserve District
LIDAR	Light Detection and Ranging
MWRDGC	Metropolitan Water Reclamation District of Greater Chicago
NED	National Economic Development
NIPC	Northern Illinois Planning Council
O&M	Operation & Maintenance
S&A	Supervision & Administration
SEWRPC	Southeastern Wisconsin Regional Planning Council
T&E	Threatened and Endangered
VISTA	Visual Interactive System for Transportation Algorithms