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Land and Hydrologic Analysis for Stormwater Detention and Volume Control Trading Exchange in Cook County, Illinois

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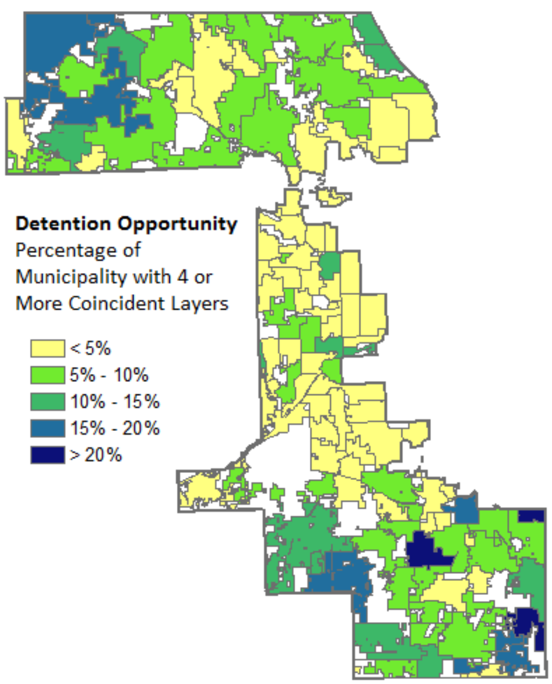

Illinois State Water Survey
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METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

Executive Summary

The Cook County Watershed Management Ordinance (WMO) allows detention trading as an option for providing off-site stormwater management for a given project as an alternative to on-site detention as part of an individual site development. Volume control (also referred to as retention) trading is proposed in the WMO Draft Amendment. As part of the effort to evaluate a potential stormwater detention and volume control trading exchange, the Illinois State Water Survey (ISWS) was contracted to assess potential opportunity areas for developing stormwater management facilities (detention and/or volume control) in suburban Cook County, excluding the City of Chicago. The ISWS land and hydrologic analyses compose one of three coordinated projects that explore the feasibility of stormwater trading in the study area. The ISWS was contracted by the Metropolitan Water Reclamation District of Greater Chicago, which led the land and hydrologic analyses team. A real estate demand analysis was performed by a team composed of Teska Associates, Inc.; Hey & Associates, Inc.; and Orion Planning and Design. The Nature Conservancy and the Metropolitan Planning Council led the policy analyses team. Studies and analyses were coordinated, and each team prepared a report. This report describes the analyses performed by the ISWS.

The primary objective of the land and hydrologic analysis component of the feasibility study is to identify and quantify opportunity areas with favorable characteristics for stormwater detention or volume control. The analyses were performed on a geospatial platform, building on Geographic Information System (GIS) tools. Opportunity areas could be used to provide trading credit when a development cannot meet the requirements on-site. The analyses used to identify opportunity areas are based on existing and available geospatial data that determined the precision of the results. Desirable characteristics differ for detention and volume control facilities; thus, two sets of data compilations were prepared, one showing opportunity areas for detention and one for volume control. This feasibility assessment study showed there are ample opportunity areas for trading. Supply of opportunity area is clearly not a limiting factor in a potential market. However, these areas have not been developed before and incentivizing creation of stormwater detention and/or volume control sites for trading will be important to avoid supply constraints. The GIS tools developed as part of this study will help to identify potential sites to assist with catalyzing this trading initiative.

Site development that uses off-site stormwater detention or volume control will meet the basic precepts of the WMO. Off-site storage upstream of the development site could reduce peak flows upstream, providing additional benefits to the area. Likewise, off-site volume control holds great promise in spurring the creation of the natural, multifunctional sites that enhance the study area and provide ecological and economic benefits.

Stormwater landscapes, sometimes called “landscape as infrastructure” become highly important public and environmental spaces in municipalities. Recent research has revealed that stormwater landscapes create multiple benefits to communities visually, educationally, socially, and environmentally. Therefore, the relative “value” of given sites and their characteristics may differ among different subwatersheds and communities depending on issues and priorities. The methodology for site selection can be adapted for use by watershed or community planners to locate sites with the greatest potential to serve their development priorities and achieve the desired ecosystem benefits.

Contents Acknowledgements

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Any opinions, findings, conclusions, or recommendations expressed in this report are those of the authors and do not necessarily reflect those of the Metropolitan Water Reclamation District of Greater Chicago, the Illinois State Water Survey, the Prairie Research Institute, or the University of Illinois.

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Introduction

Background

The Cook County Watershed Management Ordinance (WMO) was approved on October 3, 2013 and became effective on May 1, 2014. The purposes of the Ordinance are listed in Section 103 and include (but are not limited to) reducing the potential for loss of property from flood damage, managing and mitigating the effects of urbanization on stormwater (as defined in the WMO) drainage throughout Cook County, and protecting existing and new development (as defined in the WMO) by minimizing stormwater runoff volume increases beyond that experienced under existing conditions and by reducing peak stormwater flows.

Section 504.14 of the WMO allows detention trading as an option to provide off-site stormwater management for a given project as an alternative to on-site detention as part of an individual site development. Volume control trading is proposed in the WMO Draft Amendment, which is anticipated to be voted on by the MWRDGC Board of Commissioners in the final quarter of 2017. The Illinois State Water Survey (ISWS) was contracted to assess the extent of areas having potentially suitable characteristics for stormwater management facilities (detention and/or volume control) in suburban Cook County, excluding the City of Chicago. Figure 1 shows the boundary of Cook County, the boundary of the City of Chicago and the six watersheds identified by Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). The boundaries of the watersheds extend beyond the political boundaries and jurisdiction of the WMO.

Important knowledge needed in establishing a trading exchange for detention and volume control is to identify whether and where future stormwater management facilities can be located to serve and balance new development while helping meet the goals of the WMO. The suitability of any location for stormwater detention or volume control facilities depends on numerous physical, hydrologic, ecological, and anthropogenic factors. A review of the spatial distribution of these characteristics indicated the potential for detention and/or volume control facilities that meet multiple objectives. The resolution and completeness of available data are a central consideration in formulating the approach to identify opportune areas.

The land and hydrologic analyses performed by the ISWS composed one of three coordinated projects to explore the feasibility of stormwater trading in the study area. The ISWS was contracted by the MWRDGC, which led the land and hydrologic analysis team. A real estate demand analysis was performed by a team composed of Teska Associates, Inc., Hey & Associates, Inc., and Orion Planning and Design. The Nature Conservancy and the Metropolitan Planning Council led the policy analyses team. Studies and analyses were coordinated, and each team prepared a report of their research and findings. This report describes the analyses and findings of the land and hydrologic analysis by the ISWS.

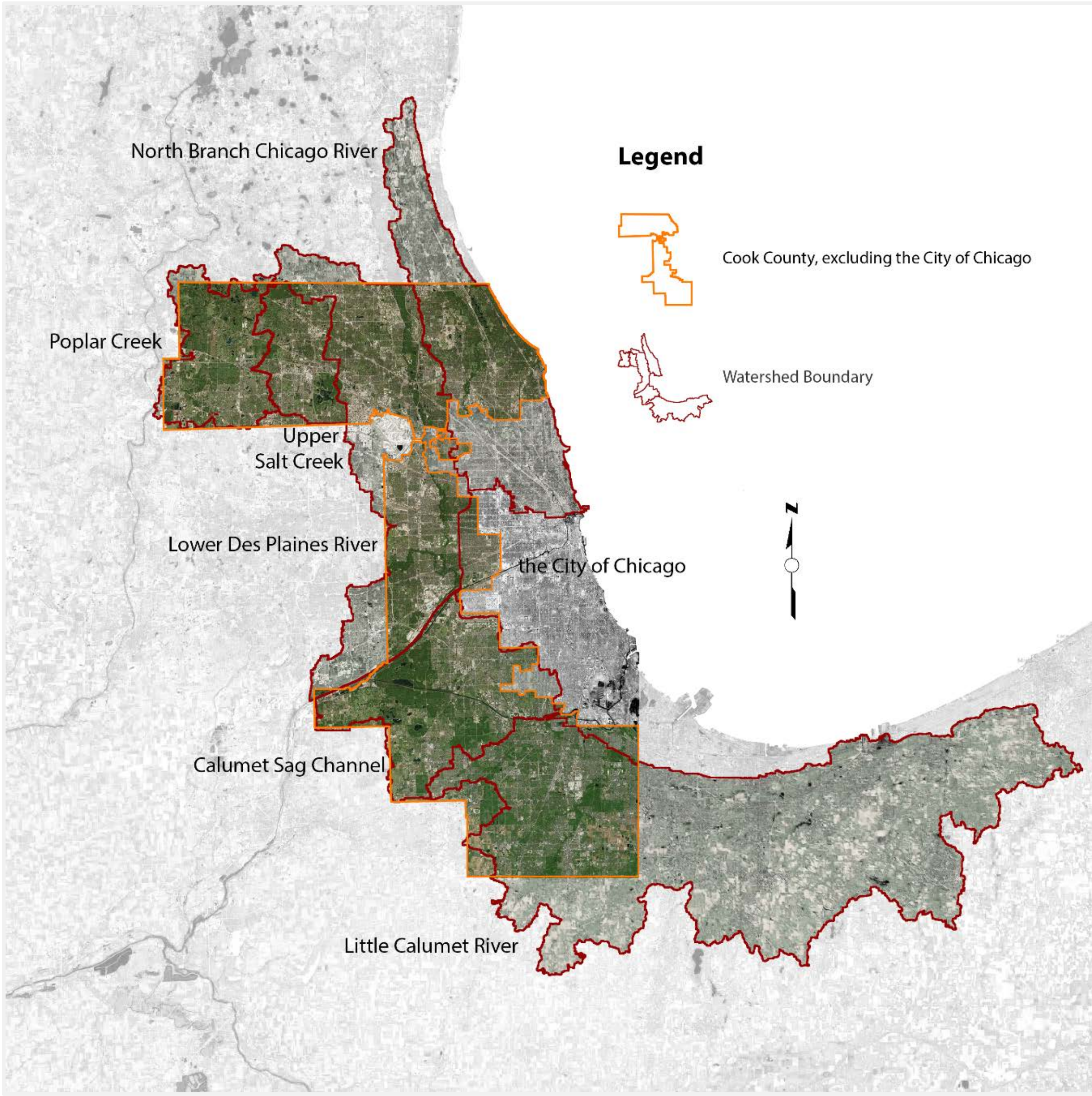

Figure 1. Study Area

Goals and Objectives

The primary goal of the land and hydrologic analysis component of the feasibility study was to identify and quantify opportunity areas having favorable characteristics for stormwater detention or volume control and to determine the geographic distribution of opportunity areas. The inventory and analysis were performed on a geospatial platform, building on Geographic Information System (GIS) tools. The opportunity areas have favorable characteristics for construction of off-site stormwater detention or volume control facilities that could be used to provide trading credit when a development cannot meet the requirements on-site. The analysis is based on existing and available geospatial data, which determined the precision of the results.

The off-site supply areas were identified based on an inventory and analysis of locational and functional potential:

1. **Geographic Location**: Potential supply sites must be located in the watershed, and ideally in the sub-watershed of the development site. There was also discussion about the spatial proximity of a supply site to the development site, but the proximity availability would become part of a follow-up study at the local level. "As close to the development site as possible" seems to be the recommendation; however, there is also a recognized need for stormwater design in areas that may not be directly adjacent to a development site.

2. **WMO Regulation**: Potential supply sites must follow the WMO regulations. The WMO established a hierarchy for meeting detention and volume control requirements; through this process the proposed development must demonstrate there are no adverse impacts of the development or by creating off-site management.

3. **Stormwater Functionality**: Potential supply sites must meet primary criteria for functionality as a stormwater control site, such as land use feasible for conversion to stormwater management, site extent, and soil type. Other factors considered included configuration and orientation of land type, areas of potential existing flooding, and prime areas for providing potential future green infrastructure to the region. The team also considered issues such as contamination.

The team also considered the following important aspects of stormwater design development in the region:

4. **Cross-Benefits**: Although the study principally focused on stormwater functionality, potential cross-benefits and added value of certain supply sites were strongly considered. The ecosystem services provided by stormwater design provide multiple benefits across ecological, social, educational, and economic categories that vary by land type and community context. The supply of stormwater design, particularly of green infrastructure, is seen as a strong potential outcome for the region by the trading exchange, given the need to alleviate flooding around the region.

5. **Supply Scenarios and Municipal Involvement**: The research team also considered the likelihood of certain land types as desired candidates for supply sites, such as public spaces and community use sites. Although this did not affect the final results, the team is aware that, in partnership with municipal involvement, the selection of sites could potentially develop unique configurations of stormwater supply that might solve the site-specific needs of neighborhoods and communities within various municipalities. An example is the development of public school sites for green infrastructure, the provision of supply by an organized community through residential lots, or a municipal-led green streets stormwater infrastructure project.

Costs to acquire land, construct sites, transact exchanges, and maintain and operate various land types across the watersheds will be influenced by development patterns, land costs, the climate for exchange, and involvement of municipalities or other parties. These influences are currently unknown for Cook County. Therefore, this feasibility-level analysis is the initial study to assess the available land for stormwater supply by watershed and evaluate the distribution of that availability across watersheds.

It is important to reiterate that a key concern of the WMO is to avoid and reduce flood damages from runoff. Stormwater management under the WMO is designed to ensure that site development will not exacerbate flood damages and will serve to improve water quality and volume control. Permitting off-site stormwater storage provides relief where site constraints preclude meeting the required stormwater management on-site. Creation of off-site stormwater storage facilities can provide economic opportunities, rehabilitate vacant areas subject to flooding, and stimulate green infrastructure solutions that provide multiple community benefits.

Identifying areas that have a potential for stormwater detention or volume control extends beyond the simple functionality of the site. An objective of the analyses was to identify areas where stormwater detention or volume control facility development would serve multiple purposes and enhance the study area. Opportunities to provide relief from flooding, develop underutilized sites, improve connectivity of the stormwater landscape, and stimulate use of green infrastructure were considered favorable for off-site stormwater management.

The components of this report include:

- Data Inventory and Evaluation;
- Assessment of Land Use Attributes;
- Methodology;
- Results; and
- Discussion and Conclusion.

Project Overview

The goals of the analysis were to 1) assess the areal extent of opportunity areas in Cook County to provide a stormwater supply as part of a stormwater trading system, and 2) evaluate the distribution of that land area among the watersheds.

For the study purposes, feasibility is defined as having characteristics that suggest an opportunity for off-site stormwater management (either for detention, volume control, or both) given the suitability of environmental conditions of the land itself and of the surrounding context. Other factors included in the evaluation were adverse conditions (such as landfills, cemeteries, and floodway) that were deleted from the inventory. Likewise, the potential co-benefits of certain land types were considered to positively affect opportunity area inventory.

The study was based on an inventory of existing GIS data for Cook County, in which the physical and functional attributes of land were evaluated for their potential for stormwater detention or volume control.

The general physical, functional, and typological categories included:

- **Land use** (e.g., roads, public space, parks, residential lots, commercial areas, utility rights-of-way, and publicly owned vacant land);
- **Environmental conditions** (e.g., soil type, topographic depressions, proximity to greenways); and
- **Special conditions** (e.g., potential contamination and floodway).

Data layers were assigned either

1 = positively suitable;

0 = neutral; suitable but not null; and

null = not qualified.

From a preliminary evaluation of the suitability of these layers, the team quantified (by sub-watershed and by municipality) the acreage of land area that has characteristics indicating it is an opportunity for stormwater management. The team broke this information down by detention versus volume control. The team also evaluated the distribution of the opportunity areas among the watersheds, as equity of opportunity is seen as an important principle of a Cook County-wide stormwater trading exchange system.

Certain baseline assumptions informed the study approach:

- The research team remains unbiased as to which types of land may be the most or least likely to be developed as part of a future stormwater trading system.
- The team foresees the prospect of developing a stormwater management supply system in a positive way as it may solve multiple issues in a given watershed. As a result, they were open to including as many available land types as feasible.
- Stormwater management sites in urban areas are typically designed and engineered (not natural), and therefore, the team did not limit any land type based on its potential complexity of retrofit construction.
- The study evaluated numerous geospatial GIS-based data layers and a few raster-based data layers. Every effort was made to obtain the most recent data for the study. Any redundant information layers across the datasets were excluded.
- The resolution scale varies across the datasets. These were reconciled to a standard cell size of 10 feet x 10 feet resolution. It should be kept in mind that a small grid size does not imply greater precision or accuracy of the data set.
- The study provides a feasibility-scale analysis, from which planning, and site selection and evaluation can be developed for future site-level analyses.

Using the Data

During the study, many questions arose regarding the use of the database to generate knowledge for site selection at a finer scale. The assembled database will be available for use by municipalities and potential suppliers to generate further site-level evaluation. Layers can be ranked or weighted, depending on the needs and priorities of a particular municipality or watershed. While there are more than adequate opportunity areas for development of offsite stormwater storage, the assembled data provide the starting point to geographically locate areas that meet the priorities of communities as well as multiple objectives of stakeholders. The methodology provides a process to follow to generate more site-specific analyses.

Data Inventory and Evaluation

This section provides a brief description of the data sets reviewed for the project. The data attributes are discussed in the context of their positive or negative character with respect to detention or volume control. The geographic scale, accuracy, precision, and date of development vary from data set to data set. Some data sets provide overlapping attributes, particularly with respect to land use. The most current and accurate data were used. Some data sets had sufficient coverage and attributes that could be considered as positive or neutral to providing an opportunity for detention or volume control. Some data sets did not have sufficient geospatial coverage or attribute information to be fully integrated with other data layers. These data layers are included in the geodatabase for information purposes as part of the deliverables.

Data Layer 1: Topographic Wetness Index

The topographic wetness index (TWI) is a physical index based on the concept that a terrain profile controls the distribution of water and the areas subject to water accumulation. TWI computation is achieved by evaluating the flow direction, accumulation, slope, and various geometric functions that are derived by coupling GIS and Python, a programming language used to enhance GIS computing capabilities. The indices help identify rainfall runoff patterns, areas of potential increased soil moisture, and ponding areas.

Figure 2. UFAA / An example of the TWI and its correlation to urban flooding.

The TWI is presented in the Urban Flood Awareness Act report (State of Illinois, 2015) for selected areas of Cook and DuPage counties in Illinois and shows a significant correlation between areas having a relatively high TWI and a high density of flood claims. Figure 2 shows an example of the correlation between TWI and its link to flood insurance. In this figure, the TWI has been overlaid with the total number of claims per census block.

The TWI lends unique information to the land and hydrologic analyses as it identifies areas in urban and rural watershed networks susceptible to localized flooding. Therefore, these areas are also capable of providing detention or volume control.

Data Layer 2: Chicago Wilderness Green Infrastructure Vision (GIV)

The least costly and most effective means of flood control relies on the support of the natural systems and green spaces. In an effort to preserve these natural areas and build on their effectiveness, the Northeastern Planning Commission completed the Green Infrastructure Vision (GIV) for the Chicago Wilderness alliance. This GIV serves as a "visual representation of large resource protection areas and recommended approaches for each area, including additional land preservation and ecological restoration" (CMAP, 2014). Since the publication of this dataset in 2004, Chicago Wilderness and the Chicago Metropolitan Agency of Planning (CMAP) have maintained and refined this dataset to include ecological and human connectivity to provide enhanced information to support conservation and development decisions.

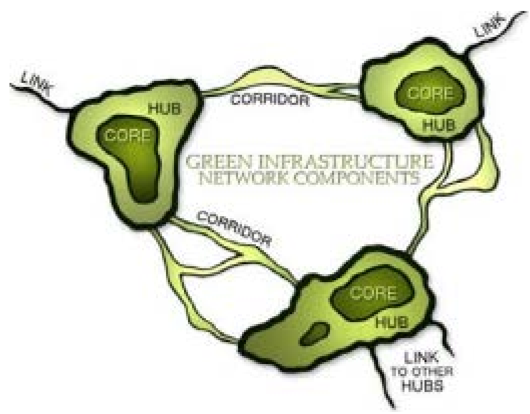

Figure 3. Green Infrastructure Network Components (CMAP).

The addition of the GIV to the land and hydrologic analyses allows the identification of areas where expansion of the regional green infrastructure network will provide multiple benefits. These expanded networks provide essential services such as recreation, water quality, wildlife migration corridors, water retention, education, and neighborhood beautification. Figure 3 shows a conceptual green infrastructure network. These natural systems provide some of the most efficient flood control, and tend to be the least costly in flood mitigation practices.

Data Layer 3: Public and Private Conservation Areas
This layer is composed of data provided by the Prairie State Conservation Coalition containing private and public conservation lands in Cook County, and municipal parks extracted from the CMAP Landuse database. These conservation areas and parks were included in our analyses as these areas potentially could alleviate the burden of excess stormwater

Figure 4. Floodplains and Floodways

Data Layer 4: Floodplains
The National Flood Insurance Program (NFIP) is managed by the Federal Emergency Management Agency (FEMA), which includes flood insurance, development of digital flood hazard maps, and standards in floodplain management. The floodplain boundaries shown on FEMA Flood Insurance Rate Maps (FIRMs) are used for regulatory and insurance purposes. Digital floodplains in Cook County are shown in Figure 4 and can be viewed through the National Flood Hazard Layer (NFHL). The NFHL can be accessed and downloaded through the FEMA Map Service Center. The area occupied by floodways were excluded from the analyses.

Data Layer 5: Flooding Claims
The NFIP insurance claims data represent flooding due to overland flow from primarily riverine flooding. The NFIP data included location, date of loss, and the final payment amount on claims from 1976 through October 2014. These represent sites where flooding has occurred.

Figure 5. Right-of-Way Area

Data Layer 6: Road Right-of-Way
The Road Right-of-Way layer, developed using the Illinois Department of Transportations (IDOT) GIS road inventory, identifies the easement area between a road's edge and private property. An example of this can be seen in Figure 5 This area was identified for the purpose discovering areas feasible for green infrastructure projects.

Data Layer 7: Soil Survey Data
The U.S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS) Soil Survey has developed a nationwide survey of the soils. The survey provides soil descriptions based on their unique properties. Survey information has been incorporated into a Soil Survey Geographic database (SSURGO), which can be used to analyze various soil attributes through maps and tables.

The SSURGO database contains the natural soil drainage classes that were used to identify areas best suited for detention or volume control projects. The drainage class represents the moisture condition of the soil throughout a given year. Natural soil drainage is assessed through soil surveys based on color patterns in the soil, the presence or absence of a high-water table, and soil texture. The Natural Drainage Classes are identified and described in Table 1 below.

Table 1. SSURGO Soil Drainage Classes

Excessively Drained	Includes excessively drained and somewhat excessively drained soils. These soils are very porous and rapidly permeable. They have a low available water capacity and no Redoximorphic Features (RMFs).
Well Drained	Includes well drained and moderately well drained soils. Color is normally uniform and free of RMFs. Small amounts of RMFs may occur in the C horizon. The texture is normally loamy.
Poorly Drained	Includes poorly, somewhat poorly, and very poorly drained soil. These soils are wet for significant periods of time. RMFs are common features and may appear anywhere throughout the profile.

Data Layer 8: Stack-Unit Map

A stack-unit map shows the distribution of geologic materials to a depth of 15 meters. These data were obtained from the Illinois State Geological Survey (ISGS) at a scale of 1:250,000. A stack-unit map shows the distribution of earth materials vertically from the surface to a specified depth and horizontally over a specified area. Maps also show a succession of geologic units in order of occurrence. In Cook County, there are 47 unique combinations of geologic materials classified in the stack-unit map.

The stack-unit database contains information on soil data at a greater depth than the SSURGO soils. The stack-unit map provides insight into the soil at a great depth, which allowed for the identification of the natural drainage based on soil types. These data, coupled with the SSURGO soil information, create a unique insight on soil porosity to great depths.

Data Layer 9: Greenways and Trails Plan

The Northern Illinois Greenways and Trails Plan (RGTP) is a multi-jurisdictional plan that envisions a network of continuous greenway and trail corridors. The goals of these corridors include the linking of multiple jurisdictions, scenic beauty, natural habitat, recreation, and the mitigation of flooding. The inclusion of this dataset leads to an identification of areas that would benefit from a green bike trails plan.

Data Layer 10: Land Use Inventory

The CMAP land use inventory is a GIS dataset that classifies several land use types divided into 60 categories. These specific categories are identified and described within CMAPs report on the 2013 Land Use Inventory. The GIS land use dataset was developed using county parcel GIS boundaries and assessors' information, along with aerial photography captured in the spring of 2013 (CMAP, 2016). An example of this dataset can be seen within Figure 6. Different land uses were identified as being more likely for detention or volume control, while some were categorized as neutral. See the discussion in the section Assessment of Land Use Attributes.

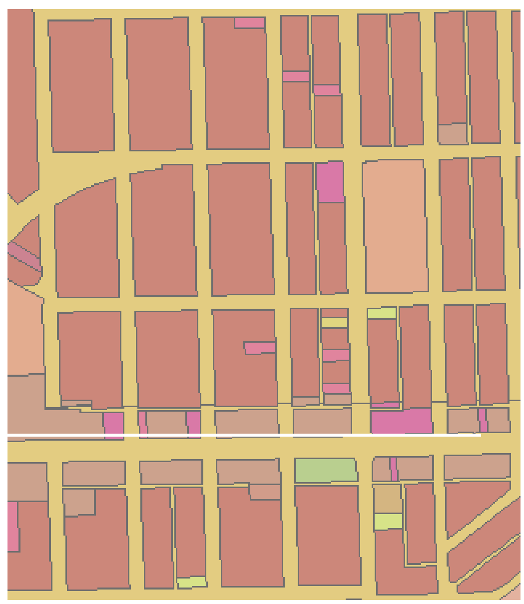

Figure 6. CMAP Land Use Inventory

Data Layer 11: Problem Areas

The MWRDGC problem areas data were compiled by MWRDGC for their Detailed Watershed Plans in the six established watersheds in Cook County. The purpose of the data was to identify stormwater related problems in a watershed and evaluate alternatives to address overall watershed needs. The data includes identified problems up to the year 2011. Regional capital improvement projects have been completed or are underway that may affect these identified problem areas.

Overlay Layers

The following layers listed below were not included in the land and hydrologic analysis although have been identified as overlay layers. These layers are provided for municipalities and potential suppliers to generate further site-level evaluation by superimposing the layers below with the coincident layer analyses. These data layers are included in the geodatabase as part of the deliverables.

Combined Sewer Location

Combined sewer networks carry both stormwater and sanitary flows. When there are large storm events, the combined sewer systems become overwhelmed and untreated waste and stormwater are discharged directly into water bodies. Urban areas may occasionally experience this excess stormwater as local streets and basements flood.

Identifying these existing combined storm sewer networks in GIS is a good tool for countywide stormwater management. Layering the combined sewer networks with stormwater supply analysis identifies areas where investments into volume control or detention projects provide an added benefit.

National Wetland Indicator

The U.S. Fish and Wildlife Service (FWS) provides information to the public on the status and trends of our nation's wetlands. The U.S. FWS' National Wetlands Inventory (NWI), a publicly available resource, provides detailed information and an inventory of U.S. wetlands.

Illinois Environmental Protection Agency (IEPA)

For the land and hydrologic analyses, the Illinois Environmental Protection Agency (IEPA) presented their capability in identifying areas of contaminated landscapes where extra work may be needed before being used as areas open for trading. Some example datasets provided by the IEPA include the Leaking Underground Storage Tank Incident Tracking (LIT), which identifies areas contaminated by leaking storage containers.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA, commonly known as the Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. This dataset presents the areas that have been directly affected by the release of hazardous substances.

MWRD Buyouts

The MWRD is consistently working with several communities to acquire flood-prone properties. The MWRD buyout layer identifies sites that have been purchase and structures removed, these are preserved as open space.

Forest Preserve District of Cook County

With over 69,000 acres of land, the Cook County Forest Preserve District is one of the largest forest preserve districts in the United States (FPCC). FPCC routinely faces stormwater and water quality problems contributed by adjacent community runoff. Visualizing these areas in GIS allows municipalities to identify where stormwater projects can mutually benefit the local and FPCC ecosystems.

Assessment of Land Use Attributes

Stormwater landscapes are increasingly recognized as providing tangible and intangible benefits to surrounding environments and communities. The concept of cross-benefits is critical in considering the advantage of a stormwater credit trading program**.** Opportunities to create stormwater landscapes can benefit communities in many ways given the lack of open space throughout many urbanized areas and the frequency of flooding in the region exacerbated by anticipated climate-driven precipitation changes. "Landscapes as infrastructure" become highly important public and environmental spaces in municipalities.

Recent research has revealed that stormwater landscapes create multiple benefits to communities visually, educationally, socially, and environmentally Figure 7. Nature-based infrastructure design benefits human health and well-being (e.g., recreational trails that also manage stormwater), potentially spurring additional economic investment (e.g., popular public stormwater parks) and environmental benefits such as urban heat island reduction and lowered energy use (e.g., removal of excess parking lots in commercial areas). Through further analysis, and based on the specific needs of the community or potential supplier, a weighting scheme can be used to determine the highest and best value of potential site selections.

Figure 7. Potential benefits/ecosystem services by landscape-based stormwater management, also known as Green Stormwater Infrastructure (GSI).

Given the high potential for landscapes to perform ecosystem services, our assessment of the land use types for supply considered their potential to provide additional cross-benefits beyond stormwater quantity and quality. Although the benefits generally fall into the environment, economy, and equity categories, their strengths often cross these categories to reinforce the comprehensive benefits of nature-based approaches to stormwater design. We used these categories to evaluate the likely potential for each land use in the dataset to generate these benefits. By predicting the potential benefits associated with the various land types (Figure 8), the types were assigned a “1” (positive) rather than a “0” (neutral). Some land types are predicted to offer greater cross-benefits than others. Through further analysis, and based on the specific needs of a community, these land types can be weighted differently by a municipality or potential supplier when determining the highest and best value of potential site selections. Further discussion is provided in the Discussion and Next Steps section.

POTENTIAL CO- BENEFITS / Ecosystem Services provided through Green Stormwater Infrastructure (GSI)	**Environmental Benefit:** water quantity and quality value *(note: all projects expected to include these benefits)*	**Environmental Benefits:** such as habitat value, ecological connectivity, et cetera	**Social Benefits:** such as human health, educational and visual aesthetic value	**Social Benefit:** social equity value	**Economic Benefits (on-site):** such as low retrofit/ maintenance costs, reduced energy usage	**Economic Benefits (off-site):** such as increase property values to surrounding community
Selected examples of LAND-USE LAYERS						
Post-Secondary Educational Facilities	x	x	x		x	
Open Space, including Conservation	x	x	x	x	x	x
Vacant land	x	x	x	x	x	x
Agriculture	x	x	x		x	
Mineral Extraction	x	x	x	x	x	x
Other Utility/Waste	x	x	x	x	x	
Prison and Correctional Facilities	x		x	x		
Retail Centers and/or Shopping Malls	x		x	x		x
Religious Facilities	x		x			
Single Large-Site Retail	x		x		x	
Trail or Greenway	x	x	x	x	x	x
Urban Mix, including w/Residential Component	x	x	x			
Utility Right-of-Way	x	x	x	x		x
Warehousing/Distribution >= 100,000 sq. ft.	x			x	x	x

Figure 8. Potential benefits/ecosystem services by land use type. Land use type may be assigned an increased value in a specific stormwater site selection study to correlate site selection with desired ecosystem benefits.

Methodology

The detention opportunity layer was created by combining 11 prepared GIS layers together. These layers are open lands, land use, road right of ways, flood claims, flood areas, greenways, district problem areas, green infrastructure vision, wet areas, poorly drained soils, and poorly drained geology. The volume control opportunity layer was similarly created by combining these same 11 layers except that instead of poorly drained soils and geology, well drained soils and well drained geology were used. The resulting GIS layer of the 11 combined layers has been titled the opportunity layer and shows how many layers are coincident in every location of the study area (Figure 9).

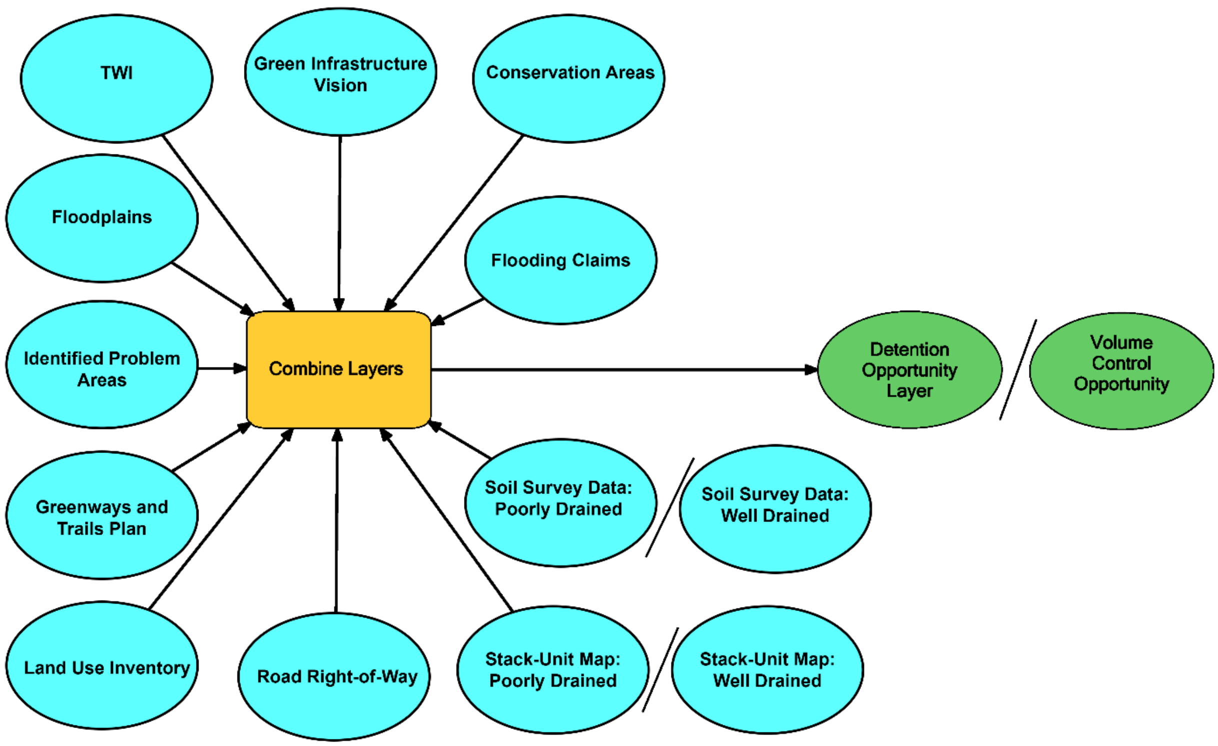

Figure 9. The detention opportunity and volume control opportunity layers (shown in green) are created by using a GIS process (shown in yellow) to combine 11 prepared GIS layers (shown in blue).

The opportunity layer uses a 10-foot cell size. Figure 10 shows an example of clicking within a GIS on a particular polygon within the detention opportunities polygon layer and having a listing of the attributes displayed. In this case, there are six coincident layers: green infrastructure vision (GIV), land use (LU), poorly drained soils (SO_P), wet areas (TWI), poorly drained geology (ST_P), and open lands (CONS). In this particular area, the number of coincident layers ranges from two to six. It is noteworthy that the number of coincident layers did not exceed eight in any area of the study. The methodology is discussed in full in Appendix 1.

The resulting opportunity layer can be displayed in the GIS with overlaying layers such as municipal boundaries and subwatersheds (Figure 11). Because of the predominance of poorly drained soils and poorly drained geology, the number of coincident layers for detention opportunities exceeds those of volume control. Using the GIS, the number of acres of coincident opportunity was calculated for each watershed, subwatershed, and municipality within the study area, and are presented in Appendix 2.

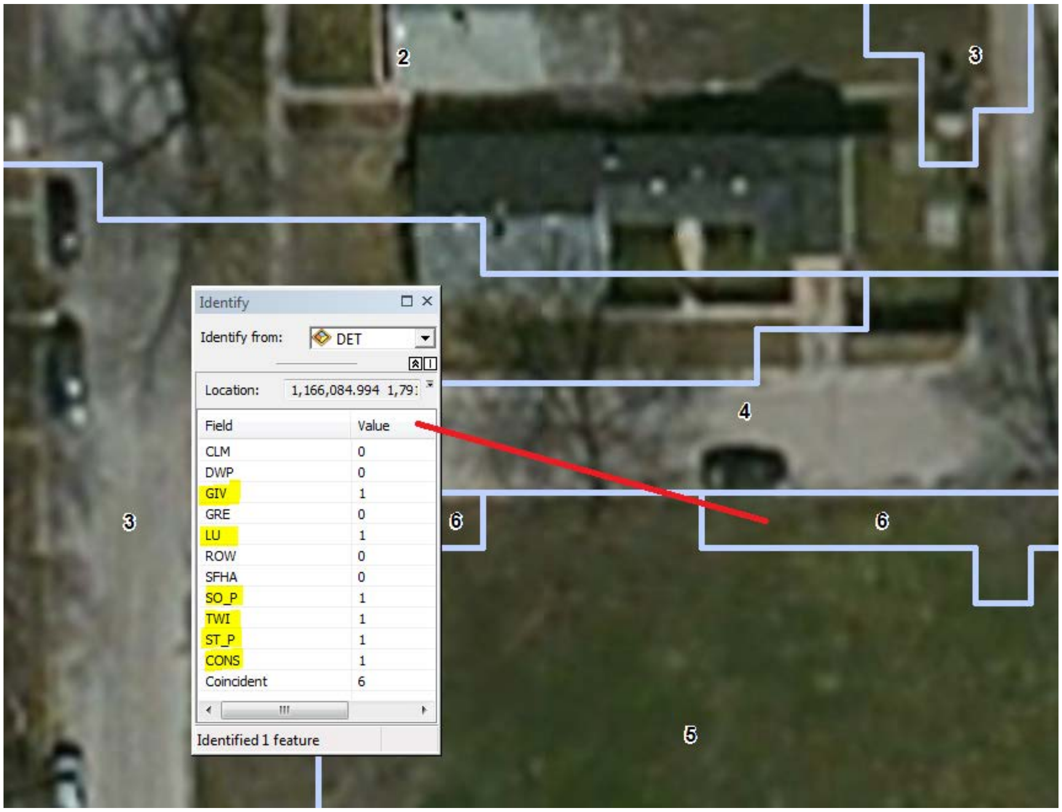

Figure 10. Detention opportunity layer polygons labeled with the number of coincident and favorable layers. A pop-up window identifies specifically which layers are considered favorable and denoted with a value of 1.

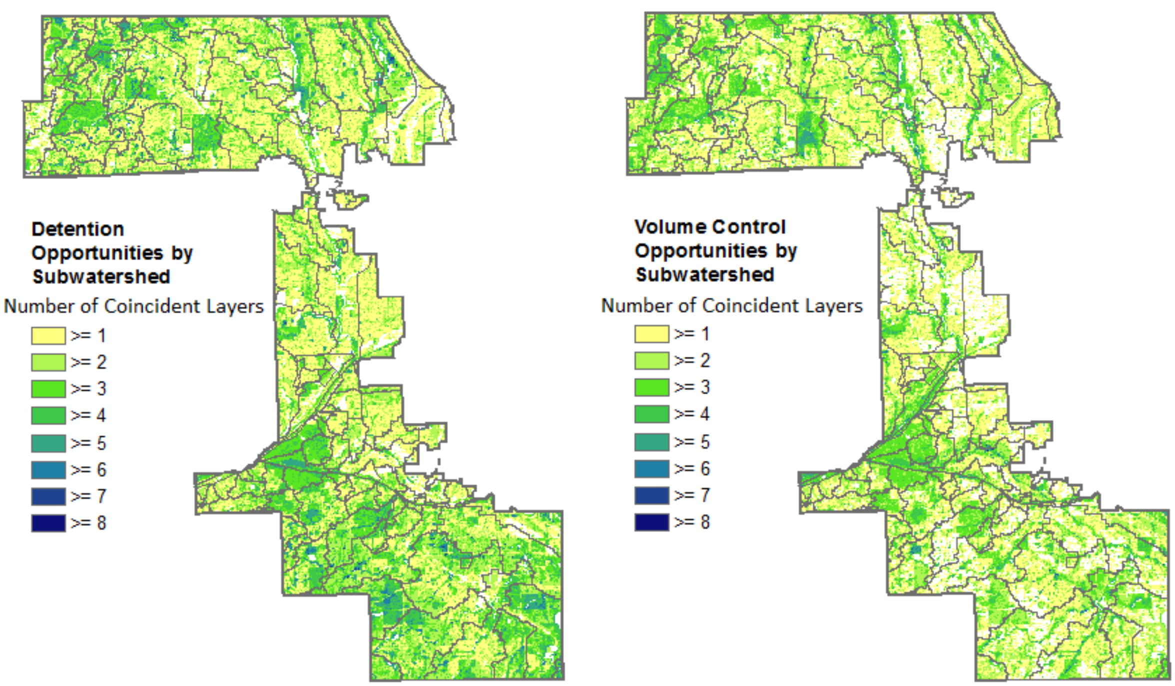

Figure 11. Opportunity layers color coded by the level of coincident layers by subwatershed. Darker areas have more coincident layers.

We did not judge the relative value of one of the base layers compared with another for this analysis. In the case of the opportunity layers, all base layers were treated equally; for example, soil drainage was equal to land use. Because of this equality, an area in the opportunity layer that shows six coincident layers might not necessarily be a better opportunity area than an area that shows two coincident layers. However, the area with six coincident layers has a higher probability of being a better opportunity. Assigning a higher value to a particular base layer, or set of base layers, is known as weighting, and will create an opportunity layer with a range in values that means more than just a count of the number of coincident layers. Instead, weighting will result in a layer with values in which higher numbers may equate a better opportunity. An example of this is presented in Appendix 3.

Results

This preliminary study quantifies the land area within Cook County (exclusive of the City of Chicago) that has characteristics suggesting it is suitable of being converted to a stormwater detention and/or volume control facility. The results will be used to determine if there is enough land area with favorable characteristics to warrant continued investigation of a future stormwater trading exchange in Cook County. As described in the methodology, the characteristics that make an area potentially suitable were evaluated. Favorable characteristics, represented in data layers were summed to provide a relative "score" of suitability. Land may be suitable based on one or more qualifying layers; however, the coincidence of layers yielding a higher score is seen as advantageous to that site, based on a coincidence of land use, soil type, beneficial context, and potential for co-benefits by land use type.

The visual results are presented here for Cook County as a color range associated with the level of opportunity. The detention and volume control opportunity layers displayed in Figure 11 of the Methodology section show the distribution across the study area by subwatershed. It is noteworthy that no areas within the study area had a number of coincident layers that exceeded eight.

Tables with quantified land area are also presented by watershed. A summary of opportunity areas by watershed within the study area was performed. Figure 12 shows the summary of those statistics consolidated by watershed for four or greater coincident layers. The summary by subwatershed for all levels of coincident layers are presented in the Appendix 2.

		Detention			Volume Control		
Watershed	total acres	acres	acre-feet	% watershed area	acres	acre-feet	% watershed area
Calumet Sag Channel	96135	12103	48412	13%	5788	23152	6%
Lower Des Plaines River	120847	7614	30456	6%	5748	22992	5%
Little Calumet River	91403	14015	56060	15%	3388	13552	4%
North Branch Chicago River	90526	3548	14192	4%	1856	7424	2%
Poplar Creek	51580	8075	32300	16%	5215	20860	10%
Upper Salt Creek	35387	4038	16152	11%	3269	13076	9%
Total	485877	49393	197572	10%	25264	101056	5%

Figure 12. Summary statistics showing area (acres) and volume (acre-feet) for a threshold of four or more coincident favorable layers. A red-white color scale was applied to the range of acres and acre-feet. Darker red indicates the watershed has a greater amount of opportunity compared to a watershed with acres and acre-feet shaded white. A green-white color scale was applied to the range of percentage. Percentage is calculated as opportunity acres divided by watershed total acres. The color indicates where each cell value falls within their respective range. Acre-feet calculated as: acres x depth of ponding, depth of ponding assumed to be 4 feet. Isolated areas less than 3 acres in size within each subwatershed have been removed in the creation of this table.

During the study, the Working Group and the Advisory Committee expressed interest in understanding the opportunity land distribution by municipality. This was prompted by two issues:

- recognition that optimization of site selection and stormwater permitting may take place in municipalities, which often cross subwatershed boundaries, and
- strong interest in ensuring that all municipalities throughout the county have opportunity areas that could support a stormwater trading exchange.

Therefore, summary results are also presented as a color coded, visual distribution of coincident layers by municipality in Figure 13. Data tables of quantified land area are also presented in Figure 14 and in Appendix 2.

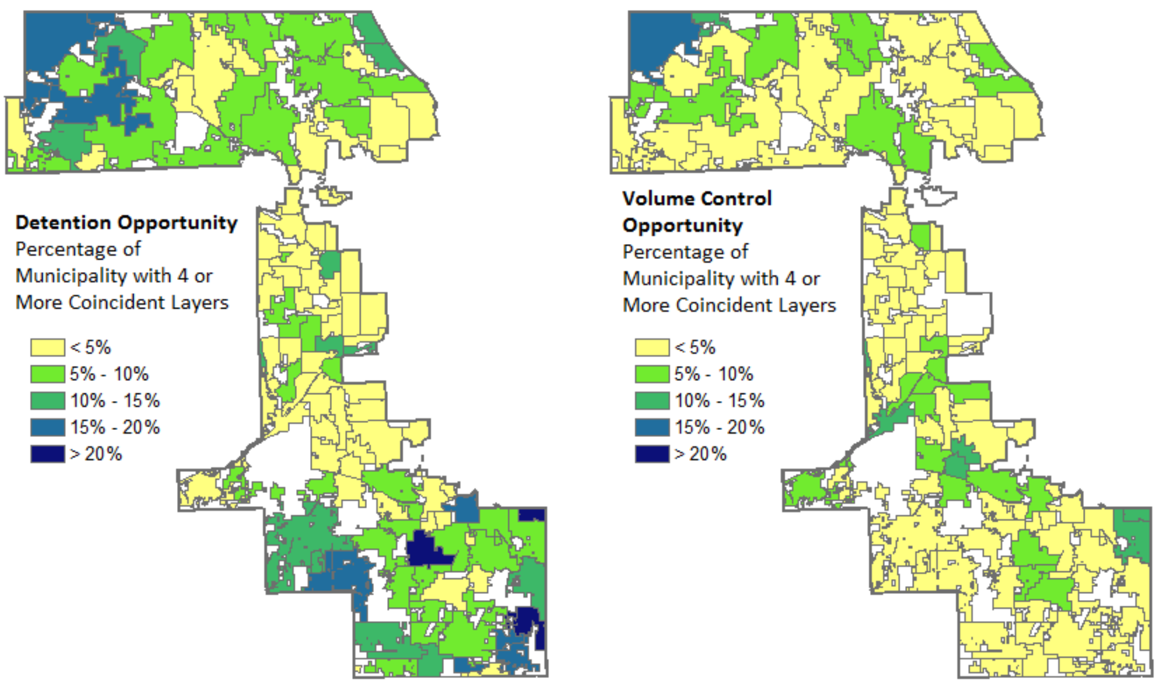

Figure 13. Opportunity layers color coded by the occurrence of coincident layers by municipality.

Opportunity	Detention		Volume Control	
Community	acre-feet	%	acre-feet	%
CITY OF DES PLAINES	2376	6%	2416	7%
CITY OF BERWYN	92	1%	0	0%
CITY OF BLUE ISLAND	156	1%	960	9%
CITY OF BURBANK	304	3%	224	2%
CITY OF CALUMET CITY	1380	7%	2188	12%
CITY OF CHICAGO HEIGHTS	2232	9%	1000	4%
CITY OF CICERO	64	0%	0	0%
CITY OF COUNTRY CLUB HILLS	1104	9%	296	2%
CITY OF COUNTRYSIDE	640	9%	44	1%
CITY OF ELGIN	504	3%	692	4%
CITY OF ELMHURST	0	0%	0	0%
CITY OF EVANSTON	588	3%	732	4%
CITY OF HARVEY	1332	8%	124	1%
CITY OF HICKORY HILLS	316	4%	128	2%
CITY OF HOMETOWN	0	0%	0	0%
CITY OF MARKHAM	3636	26%	972	7%
CITY OF NORTH LAKE	272	3%	144	2%
CITY OF OAK FOREST	1032	7%	364	2%
CITY OF PALOS HEIGHTS	456	5%	520	5%
CITY OF PALOS HILLS	504	5%	924	8%
CITY OF PARK RIDGE	740	4%	988	5%
CITY OF PROSPECT HEIGHTS	424	4%	676	6%
CITY OF ROLLING MEADOWS	248	2%	576	4%
VILLAGE OF FOREST PARK	76	1%	0	0%
VILLAGE OF JUSTICE	184	2%	424	6%
VILLAGE OF MELROSE PARK	188	2%	140	1%
VILLAGE OF MERRIONETTE PARK	40	4%	0	0%
VILLAGE OF MT PROSPECT	1608	6%	1060	4%
VILLAGE OF NILES	604	4%	244	2%
VILLAGE OF NORRIDGE	4	0%	0	0%
VILLAGE OF NORTH RIVERSIDE	204	5%	180	4%
VILLAGE OF NORTHBROOK	2164	6%	928	3%
VILLAGE OF NORTHFIELD	428	5%	72	1%
VILLAGE OF ALSIP	1148	7%	1400	8%
VILLAGE OF ARLINGTON HTS	2100	5%	1940	4%
VILLAGE OF BARRINGTON	1108	16%	688	10%
VILLAGE OF BARRINGTON HILLS	9136	20%	8556	19%
VILLAGE OF BARTLETT	1152	8%	544	4%
VILLAGE OF BEDFORD PARK	376	2%	1208	8%
VILLAGE OF BELLWOOD	128	2%	64	1%
VILLAGE OF BENSENVILLE	0	0%	0	0%
VILLAGE OF BERKELEY	24	1%	0	0%
VILLAGE OF BRIDGEVIEW	356	3%	264	2%
VILLAGE OF BROADVIEW	64	1%	32	1%
VILLAGE OF BROOKFIELD	664	8%	232	3%
VILLAGE OF BUFFALO GROVE	360	7%	148	3%
VILLAGE OF BURNHAM	1360	27%	708	14%
VILLAGE OF BURR RIDGE	80	1%	104	2%
VILLAGE OF CALUMET PARK	16	1%	88	3%
VILLAGE OF CHICAGO RIDGE	100	2%	768	13%
VILLAGE OF CRESTWOOD	328	4%	8	0%
VILLAGE OF DEER PARK	4	3%	0	0%
VILLAGE OF DEERFIELD	104	8%	68	5%
VILLAGE OF DIXMOOR	232	7%	36	1%
VILLAGE OF DOLTON	1072	9%	508	4%
VILLAGE OF EAST DUNDEE	0	0%	0	0%
VILLAGE OF EAST HAZELCREST	0	0%	40	2%
VILLAGE OF ELK GROVE VILLAGE	1632	6%	980	4%
VILLAGE OF ELMWOOD PARK	144	3%	0	0%
VILLAGE OF EVERGREEN PARK	108	1%	36	0%
VILLAGE OF FLOSSMOOR	892	10%	136	1%
VILLAGE OF FORD HEIGHTS	800	16%	48	1%
VILLAGE OF FORESTVIEW	396	12%	72	2%
VILLAGE OF FRANKFORT	4	1%	0	0%
VILLAGE OF FRANKLIN PARK	276	2%	164	1%
VILLAGE OF GLENCOE	1296	13%	368	4%
VILLAGE OF GLENVIEW	2888	8%	1216	3%
VILLAGE OF GLENWOOD	592	7%	412	5%
VILLAGE OF GOLF	68	6%	4	0%
VILLAGE OF HANOVER PARK	284	4%	200	3%
VILLAGE OF HARWOOD HTS	80	4%	0	0%
VILLAGE OF HAZELCREST	744	9%	532	6%
VILLAGE OF HILLSIDE	64	1%	40	0%
VILLAGE OF HINSDALE	296	12%	284	11%
VILLAGE OF HODGKINS	0	0%	468	7%
VILLAGE OF HOFFMAN ESTATES	8656	16%	4508	8%
VILLAGE OF HOMEWOOD	400	3%	780	6%
VILLAGE OF INDIAN HEAD PARK	28	1%	24	1%
VILLAGE OF INVERNESS	1764	10%	724	4%
VILLAGE OF KENILWORTH	0	0%	0	0%
VILLAGE OF LA GRANGE	228	4%	68	1%
VILLAGE OF LA GRANGE PARK	408	7%	104	2%
VILLAGE OF LANSING	2928	15%	220	1%
VILLAGE OF LEMONT	604	3%	1412	7%
VILLAGE OF LINCOLNWOOD	84	1%	304	4%
VILLAGE OF LYNWOOD	3180	25%	4	0%
VILLAGE OF LYONS	724	13%	532	10%
VILLAGE OF MATTESON	3360	14%	788	3%
VILLAGE OF MAYWOOD	68	1%	76	1%
VILLAGE OF MC COOK	40	1%	204	3%
VILLAGE OF MIDLOTHIAN	520	7%	88	1%
VILLAGE OF MORTON GROVE	1240	9%	648	5%
VILLAGE OF OAK BROOK	0	0%	4	1%
VILLAGE OF OAK LAWN	544	2%	1020	5%
VILLAGE OF OAK PARK	248	2%	56	0%
VILLAGE OF OLYMPIA FIELDS	756	10%	216	3%
VILLAGE OF ORLAND HILLS	396	13%	112	4%
VILLAGE OF ORLAND PARK	7140	13%	2460	4%
VILLAGE OF PALATINE	2212	6%	2076	6%
VILLAGE OF PALOS PARK	1320	8%	236	1%
VILLAGE OF PARK FOREST	1228	12%	444	4%
VILLAGE OF PHOENIX	0	0%	0	0%
VILLAGE OF POSEN	72	2%	44	1%
VILLAGE OF RICHTON PARK	1068	10%	108	1%
VILLAGE OF RIVER FOREST	644	10%	72	1%
VILLAGE OF RIVER GROVE	196	3%	456	7%
VILLAGE OF RIVERDALE	1584	17%	240	3%
VILLAGE OF RIVERSIDE	64	1%	144	3%
VILLAGE OF ROBBINS	232	6%	48	1%
VILLAGE OF ROSELLE	0	0%	0	0%
VILLAGE OF ROSEMONT	140	3%	96	2%
VILLAGE OF SAUK VILLAGE	1940	19%	100	1%
VILLAGE OF SCHAUMBURG	4096	8%	2436	5%
VILLAGE OF SCHILLER PARK	340	5%	276	4%
VILLAGE OF SKOKIE	888	3%	564	2%
VILLAGE OF SOUTH BARRINGTON	1976	10%	708	4%
VILLAGE OF SOUTH CHICAGO HTS	680	17%	188	5%
VILLAGE OF SOUTH HOLLAND	1372	7%	584	3%
VILLAGE OF STEGER	292	5%	8	0%
VILLAGE OF STICKNEY	120	2%	192	4%
VILLAGE OF STONE PARK	52	6%	20	2%
VILLAGE OF STREAMWOOD	2044	10%	640	3%
VILLAGE OF SUMMIT	480	8%	476	8%
VILLAGE OF THORNTON	76	1%	212	3%
VILLAGE OF TINLEY PARK	6172	19%	1072	3%
VILLAGE OF UNIVERSITY PARK	52	16%	0	0%
VILLAGE OF WESTCHESTER	644	8%	172	2%
VILLAGE OF WESTERN SPRINGS	284	4%	332	5%
VILLAGE OF WHEELING	1548	7%	2352	10%
VILLAGE OF WILLOW SPRINGS	252	2%	1796	17%
VILLAGE OF WILMETTE	1008	7%	932	7%
VILLAGE OF WINNETKA	1344	13%	844	8%
VILLAGE OF WORTH	232	4%	656	11%
Unincorporated Cook County	97112	30%	34412	11%

Figure 14. Summary statistics by municipality, based on areas with four of more favorable characteristics. Areas less than 3 acres in size within each municipality have been removed from the analysis. Acre-feet calculated as acres-feet = acres x 4.

Discussion

The development of a market supply of stormwater management sites represents a paradigm shift in infrastructure development. Potential suppliers likely include private investors, public entities, and public-private partnerships, and the development of stormwater supply sites may take many physical and transactional forms. Although studies from other markets reveal that site aggregation, for example, is advantageous for economy of scale, maintenance, and transaction costs, we do not yet know how a future exchange will develop in Cook County. However, from this study that looked at the feasibility and distribution of potential stormwater supply land, we learned the following:

Feasible supply meets anticipated demand. The study identifies potential stormwater supply areas in the county from geospatial data layers, and organizes the dataset by attributes assigned for stormwater feasibility. The study expresses the supply as areas of opportunity land, both in surface acres and as estimated acre-feet, by watershed, sub-watershed, and municipality. The general finding is that ample land is available for stormwater supply, since many land types and land conditions exist that can be retrofitted to provide stormwater management. Within this feasible land, however, there are certainly more optimal configurations of land to manage this supply, depending on the environmental and economic issues of a given municipality and of the market drivers that will lead to decision-making about where and how to invest and retrofit. A separate demand-side analysis revealed a preliminary estimate of off-site demand projected for the coming decade. In our study findings, the land area that was found feasible for stormwater supply in Cook County exceeded this demand estimate.

The supply dataset can be used for evaluation and weighting. Potential suppliers may use this stormwater exchange trading database to conduct a preliminary site investigation. In addition to quantifying the land area feasible for stormwater supply, the benefit of this study is that both municipalities and private and other public entities may use the "supply dataset" to evaluate land types and qualifying environmental attributes. Data layers may be selected, allowing for overlay analysis of desired land use types, scale, proximity, and other conditions sought for stormwater development. Of particular interest is the ability to assign weighted values to the data layers to identify more favorable characteristics and land types. This allows a data layer to move from "feasible" to "highly relevant or desired" in the analysis, according to other priorities of the municipality, district, or investor. For example, these higher weights might be assigned to highlight problem issue areas such as chronic flooding, to identify beneficial opportunities proximal to natural areas to enhance existing green infrastructure networks, or to isolate a particular land use type considered optimal for stormwater retrofit. The issues, opportunities, and priorities will vary across municipalities and watersheds as well as according to market drivers such as cost-benefit studies by investors.

Stormwater Supply Scenario Example

The following is a hypothetical scenario in which the supply dataset may be used to determine potential stormwater supply sites: A municipality, located in the Little Calumet watershed, has a chance to provide landscape stormwater infrastructure as a result of an off-site exchange due to a high-density commercial development. Approximately 10 acre-feet of detention and 10 acre-feet of volume control need to be provided according to the exchange agreement. The municipality contains disadvantaged communities that are experiencing disproportionate flooding. At the same time, open space development within the same community is lacking. The Municipality sees a design prospect to resolve some of these issues as part of the stormwater supply project.

The Municipality may consider working with the stormwater supplier candidate to identify sites that might synthesize these issues into a multi-beneficial project, by assigning higher weights (or values) to the stormwater data layers that can help to achieve stormwater design along with flooding and social needs. In doing so, they can identify layers to support the enhancement of an open space network, such as opportunities to convert vacant land to open park and garden space to enhance existing school grounds, which are increasingly seen as important community-wide use spaces, and to enhance broader recreational opportunities, by assigning higher weights to these sites in the municipality. In this example:

The Topographic Wetness Index (TWI) can be weighted higher, e.g. increase from 1 to 3.

The Vacant Land layer can be weighted higher, e.g. increase from 1 to 3.

The Greenways layer can be weighted higher, e.g. increase from 1 to 3.

The Schools layer can be weighted higher, e.g. increase from 1 to 3.

These layers would become more visible in the preliminary site inventory evaluation (Figure 15), reflective of the municipality weighing these areas higher. Other features would remain at 1 or neutral, receding visually in the analysis.

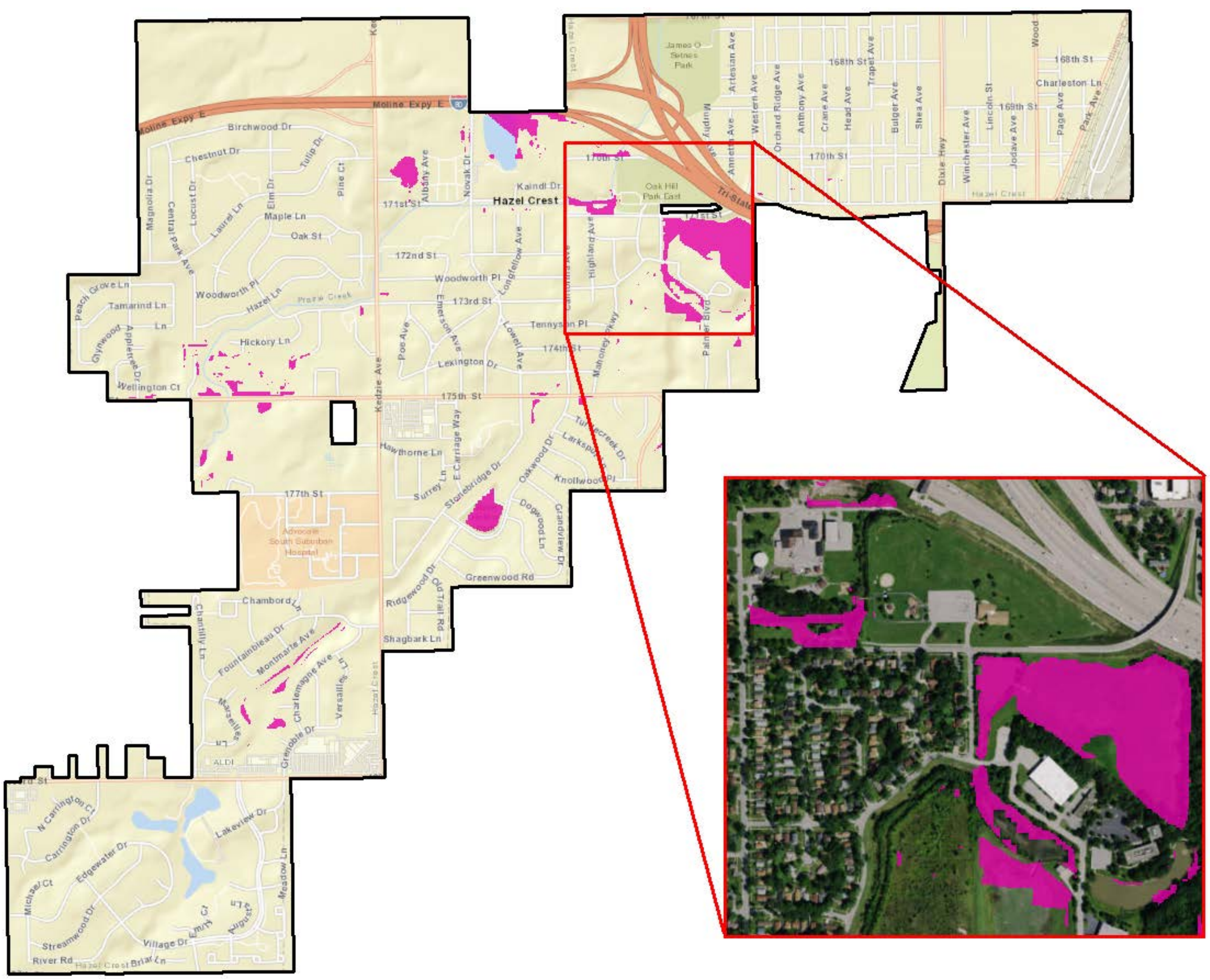

Figure 15. Results of weighted analysis in Calumet-Union Drainage Ditch (CUDD). Areas with values greater than 8 are shown in pink.

In this pre-design process, suppliers may also want to cross-evaluate this initial site selection with other planning needs identified in Community Development Plans, Comprehensive Plans, and Green Infrastructure Plans. Certainly, a municipality-led process will benefit by coordinating and guiding a site selection process, even for an external stormwater supply development application. For potential stormwater sites, a refinement of sites can be further made by performing on-site evaluation such as soil and geotechnical surveys. Stormwater and landscape conceptual plans, site engineering studies, and maintenance estimates for sites will provide useful cost comparison data for site acquisition decisions. Coordination and participation with neighborhoods will be important from the beginning to integrate community needs and understand the benefits of the project.

Other considerations to supply-side market development include:

Role of Municipalities. The role of the municipalities will likely influence the particular formation of stormwater supply given the regulatory management and oversight of the WMO by each municipality. Department managers may envision advantageous ways that a supply market can be developed that also addresses open space needs, urban flooding mitigation, or other community development issues for which stormwater sites will benefit the municipality. Demand could motivate municipalities to invest in detailed stormwater modelling and advanced planning. They may develop a fee-in-lieu system to manage this supply development potential, and to provide that infrastructure as public works. Municipalities may inform potential investors of the stormwater design investment potential. Likewise, private investors or non-governmental organizations may approach a municipality (or more than one) to propose sites, based on analysis of return-on-investment or other objectives.

Retrofit Costs. The costs (by square-foot) to retrofit sites will vary depending on existing conditions, cost of land, and scope and scale of planned design, construction, and maintenance. Suppliers with multiple objectives for developing sites, beyond stormwater control, can potentially increase their return by assessing the potential benefits of site development. By integrating other programmatic uses to the site, site developers may provide increased value to the site and surrounding community. Municipalities may develop incentives for such supply development to meet multiple objectives and create multiple benefits.

Cross-Benefits Analysis. The concept of cross-benefits is critical in considering the advantage of a stormwater credit trading program, as ecosystem services are increasingly considered marketable goods. Given the lack of open space through many urbanized areas and the frequency of flooding in the region, exacerbated by climate-driven precipitation changes, opportunities to create stormwater landscapes can benefit communities in many ways. “Landscapes as infrastructure” become highly important public and environmental spaces in municipalities. Recent research has revealed that stormwater landscapes create multiple benefits to communities visually, educationally, socially, and environmentally. Generally speaking, certain land-use types provide certain benefits, such as rain gardens in school playgrounds provide educational benefits to children in that they teach about the water cycle, biodiversity, and urban ecology. When these effects are scaled up, the benefits to urban areas and societies enhances the understanding of the value of these sites. Figure 8 in the Assessment section indicates potential benefits of site types.

Social Equity. A major concern for an off-site stormwater credit exchange is the issue of social justice. Given the unevenness of economic development in the region, and the uneven distribution of wealth and poverty, the issue of equity in stormwater infrastructure is pressing. There is a strong interest in finding ways to distribute the benefit of a stormwater exchange to assist with alleviation of flooding in disadvantaged communities and municipalities. As communities and regional entities further investigate the opportunities consideration should be given to: 1) the potential to provide a set-aside percent of purchase to be allocated to a general fund for green stormwater infrastructure, since the issue of geographic proximity may not be an issue if the development provides no adverse effects; and 2) the potential for certain municipalities or a consortium of municipalities, such as the South Suburban Mayors and Managers Association, to determine a fair and equitable trading scheme agreement across sub-watersheds. Although development and supply sites may not be within the same subwatershed, they may still be within the same watershed and the benefits of a supply site might outweigh the disadvantages. Again, there must be no adverse effect.

Conclusion

Stormwater landscapes, sometimes called “landscape as infrastructure” become highly important public and environmental spaces in municipalities. Recent research has revealed that stormwater landscapes create multiple benefits to communities visually, educationally, socially, and environmentally. The potential exists to integrate off site stormwater management facilities through stormwater trading that can serve multiple benefits. The results of this study demonstrate there are ample sites available to provide a supply of off-site facilities. Decision making at the watershed or municipal level can be guided by a systematic methodology to identify sites that serve priority goals and or multiple benefits.

Appendix 1: Technical Methodology

Methodology

The opportunity layer is created from a series of 11 prepared geospatial data layers combined using GIS procedures commonly called map algebra. As the name implies, mathematics is applied to data layers or, more specifically, math-like expressions containing operators and functions are applied to the numerical values that make up the data layers. Take for example the land use layer. Places in the study area where the current land use is deemed favorable to green infrastructure, such as a school campus, are given the numerical value of 1. Take as a second example the well-drained soils layer. Places in the study area where soils drain well are also given the numerical value of 1. When the math operator of "+" is used to add those two data layers together, the result is a layer that has a value of 2 (i.e., 1 + 1 = 2) in well-drained parts of a school campus. Places that are neither a school campus or well drained are given the value of 0 (i.e., 0 + 0 = 0). Finally, places that are either a school campus or are well drained (but not both) are given the value of 1 (0 + 1 = 1, or 1 + 0 = 1). Adding 11 similarly prepared GIS layers of various types using the "+" operator results in a layer that has possible values ranging between 0 and 11 for all parts of the study area. An area with a resulting value of 11 is interpreted as having a value of 1 in that same spot in every input layer. The resulting GIS layer of the 11 combined layers (a.k.a. the opportunity layer) shows how many layers are coincident in every location of the study area.

The terms location, spot, area, or places are translated to more specific terms within GIS such as polygon, point, zone, or cell. Each of these terms relates to a particular data model. A data model refers to how the information is conceptually stored with the GIS. The two main data models in GIS are the vector and the raster models. The vector model represents locations by points (for single locations), lines, and polygons that define the boundary of locations. The raster model represents locations as a series of adjacent, evenly spaced cells. Think of this model as being like tiny boxes within a page of graph paper. A linear area, such as a strip adjacent to a roadway, would be represented, using this analogy, as adjacent cells shaded to form the pattern on the roadway strip. Both raster and vector models were used for this project and converted because some procedures within GIS operate on the raster model, and others operate on the vector model.

The opportunity layer in the raster format is a 10-foot cell size. Figure 1 shows how this raster is represented as evenly spaced cells with values equal to the number of coincident layers overlaying a home, road, and vacant lot to give perspective to the cell resolution. This also demonstrates that it is not readily apparent which layers are coincident.

The raster format is more efficient for performing the analysis; however, it does not store as attributes which specific layers were coincident. A separate series of GIS processes were applied to generate a data layer in the vector/polygon format that allows a query within specific areas as to which layers were coincident. Figure 2 shows an example of clicking on a particular polygon within the detention opportunity polygon layer and having a list of the attributes display. In this case, the six coincident layers were green infrastructure (GIV), land use (LU), poorly drained soils (SO_P), wetness (TWI), poorly drained geology (ST_P), and open lands (CONS). Note that the specific land use category is not listed. To obtain that information, it would be necessary to go back to the original land use layer.

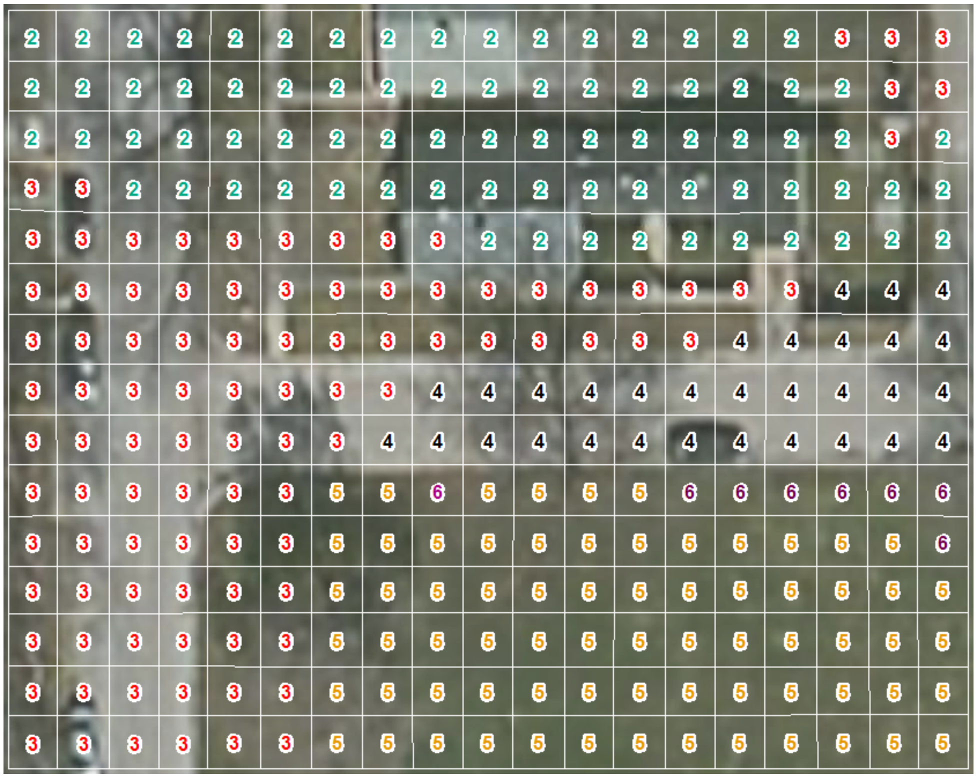

Figure 1. 10'X10' raster cells of opportunity layer overlaying the aerial photo labeled with the number of coincident layers.

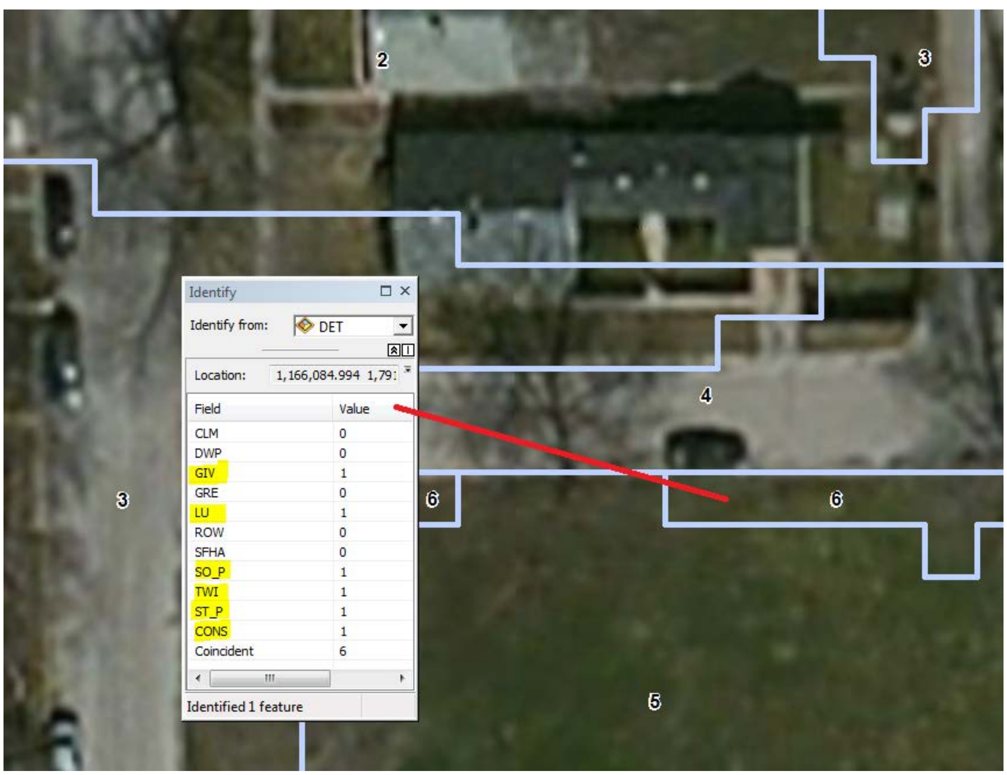

Figure 2. Opportunity layer polygons labeled with the number of coincident and favorable layers. A pop-up window identifies specifically which layers are considered favorable and thus are denoted with a value of 1.

A series of uniform procedures was applied to the resulting opportunity layer to count the number of coincident layers and calculate the extent of this count within each of the 108 subwatersheds of the study areas. Model Builder is an available function within ArcGIS for stringing together procedures and representing them in a diagram of varying shapes and colors. Figure 3 shows the view within GIS of the model used to count the coincident layers and calculate the percentage of the extent within each subwatershed. This figure is daunting, and perhaps gives an exaggerated impression of its complexity. Instead, the model is made up of a single workflow duplicated many times.

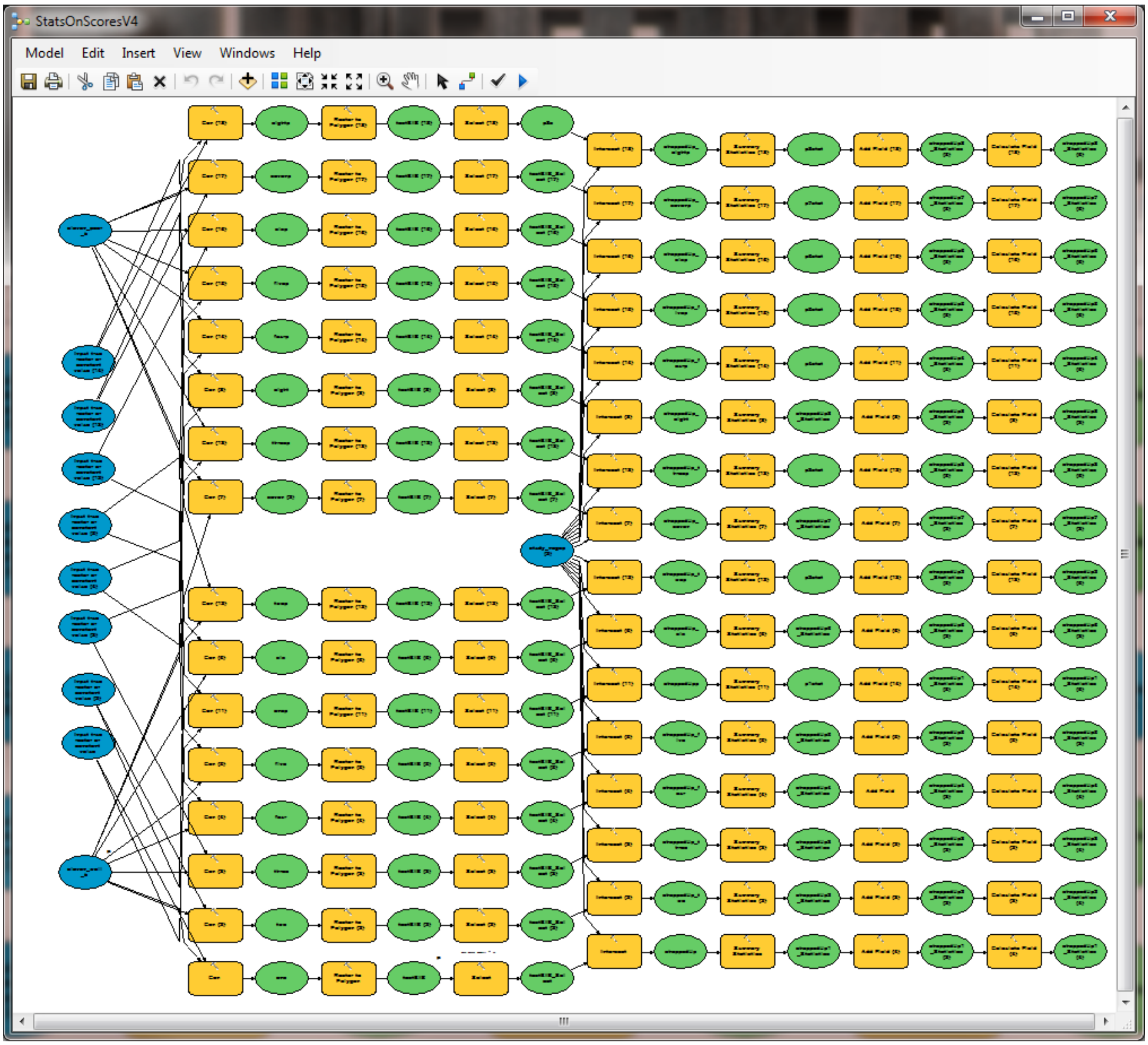

Figure 3. Processing model to create summary statistics of the opportunities layer.

The model diagram of that single workflow is represented in Figure 4 (file 4FigureOnly.png). In this diagram, the blue ovals represent inputs, the green ovals are outputs, and the yellow boxes are procedures that are also referred to as commands or tools. Arrows are used to show the flow of the model, which is important because the shapes can be rearranged, as they have been in this case, where what was a single row in Figure 3 (file StatsOnScoresV4Model.pdf) has been rearranged into two rows for improved readability.

Beginning at the upper left corner, the model shows the inputs as the opportunity layer ("opportunity raster") and the number 4. The tool for which these are inputs is called "con." In this case, the con command applies a conditional statement which, in effect, means if the cell within the opportunity layer has a value of 4 or greater (meaning there were 4 or more coincident layers), then those cells are saved as a new layer. The new layer, like the opportunity layer, is in a raster format and the effect of this command is to make a layer in which every cell meeting the criteria (values 4, 5, 6, 7, 8, 9, 10, and 11) becomes a value of 1, and everything else (0, 1, 2, and 3) is excluded. Keep in mind this workflow is repeated separately for the value of 1, the value of 2, the value of 3, and so on. The output of each were layers representing all areas with one or more coincident layers, two or more coincident layers, three or more coincident layers, and so on.

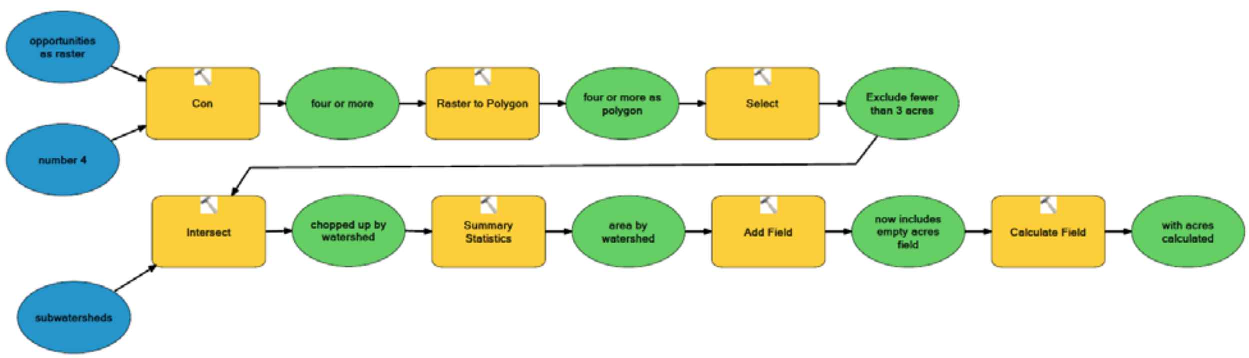

Figure 4. Processing model to summarize the areas with four or more coincident layers. This is a subset of the processing model depicted in Figure 3.

The output layer ("4") is then converted from the raster model to the vector model because some of the subsequent commands to be used are not available in the raster model, and the prior procedure was performed more efficiently in the raster model. The result is a layer of polygons enclosing all areas that had four or more coincident layers called "four or more as polygon."

The "select" command performed on that layer selects from the set of these polygons all the areas that are larger than 130,680 ft^2 (3 acres), and makes a new layer with those, excluding the smaller areas. The threshold of 3 acres was set to cooperate with MWRD and consider both the WMO and efficiencies in GIS processing.

The intersect command divides up the remaining polygons by 108 subwatershed boundaries using the blue input circle of subwatersheds, and the subsequent summary statistics command tabulates the area by subwatershed where there were four or more coincident layers, excluding the smaller areas less than 130,680 ft^2. The remaining two commands add a field to the database and calculate that field in the unit of acres. The resulting statistics were then exported to a spreadsheet included as Appendix 2

(Appendix_2_Opportunity_Statistics.xlsx). The top portion of a single sheet of the spreadsheet is shown in Figure 5. Each subwatershed is listed as a separate row within a separate section for each watershed. Model results from the single workflow reviewed above were included in the column titled "matched 4 or more criteria." The duplicated workflow from the full model provided the information to populate the other columns. It is noteworthy that no watershed had an area greater than 3 acres in size in which eight or more layers were coincident.

The results for each subwatershed are reported in acres, percentage (as determined by dividing those acres by the total acreage of the subwatershed), and number of continuous polygons ("#") within a subwatershed.

			Number of Favorable Characteristics																							
Opportunities for Detention			1 or more				2 or more				3 or more				4 or more				5 or more				6 or more			
Watershed	Subwatershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
Calumet Sag Channel	CSARDT	157	1	157	628	100%	1	103	412	66%	3	52	208	33%	1	17	68	11%	0	0	0	0%	0	0	0	0%
	CSBRDT	1487	1	1470	5880	99%	4	1050	4200	71%	4	819	3276	55%	5	444	1776	30%	7	92	368	6%	0	0	0	0%
	CSCABL	1081	1	1048	4192	97%	4	423	1692	39%	8	77	308	7%	7	15	60	1%	1	3	12	0%	0	0	0	0%
	CSCRCR	2246	1	2244	8976	100%	4	2150	8600	96%	2	1926	7704	86%	32	649	2596	29%	10	108	432	5%	1	4	16	0%
	CSCRDD	810	1	803	3212	99%	1	643	2572	79%	8	356	1424	44%	5	213	852	26%	6	29	116	4%	0	0	0	0%
	CSCS1	799	1	793	3172	99%	1	644	2576	81%	7	247	988	31%	8	46	184	6%	0	0	0	0%	0	0	0	0%
	CSCS10	1693	1	1464	5856	86%	8	582	2328	34%	9	167	668	10%	3	47	188	3%	1	5	20	0%	0	0	0	0%
	CSCS2	2175	1	2161	8644	99%	3	2127	8508	98%	3	1959	7836	90%	14	961	3844	44%	9	441	1764	20%	0	0	0	0%
	CSCS3	2105	1	2105	8420	100%	2	2051	8204	97%	1	2015	8060	96%	12	531	2124	25%	4	67	268	3%	1	5	20	0%
	CSCS4	509	1	509	2036	100%	2	381	1524	75%	2	334	1336	66%	8	115	460	23%	3	11	44	2%	0	0	0	0%
	CSCS5	1210	1	1165	4660	96%	4	712	2848	59%	8	278	1112	23%	7	104	416	9%	1	3	12	0%	0	0	0	0%

Figure 5. Top portion of summary statistics showing area (acres) and volume (acre-feet) for specific number thresholds of the coincident favorable layer.

The spreadsheet contains six separate worksheets with calculations for detention opportunity by subwatershed (DetSubWS), detention opportunity summarized by watershed (DetWS), detention opportunity by municipality (DetMuni), volume control opportunity by subwatershed (VolSubWs), volume control opportunity summarized by watershed (VolWS), and volume control opportunity by municipality (VolMuni). The worksheet summarizing the information by watershed were derived using Excel functions and the worksheets by subwatershed as input. The sheets by subwatershed were populated using data from the model shown in Figure 3. Note that there are 16 rows in the model, and each row provided data for the seven columns in the volume control opportunity sheet, and seven columns in the detention opportunity sheet. Two rows produced results showing that no areas had eight or more coincident layers, so a footnote to that effect was included rather than data. Model rows producing output for detention opportunity by subwatershed used an opportunity layer as an input, which incorporated a layer for poorly drained soils and a layer for poorly drained geologic materials. Model rows producing output for volume control used a different opportunity layer to incorporate a well-drained soils layer and a layer for well-drained geologic materials.

A separate model was used for the worksheets by municipality that operated in an identical manner as that in the subwatershed model, except that the blue circle specifying subwatersheds was replaced by the input of municipal boundaries.

Appendix 2: Opportunity Statistics

Detention Opportunity by Subwatershed

Opportunity for Detention			Number of Favorable Characteristics																											
			1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Watershed	Subwatershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
Calumet Sag Channel	CSARDT	157	1	157	628	100%	1	103	412	66%	3	52	208	33%	1	17	68	11%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSBRDT	1487	1	1470	5880	99%	4	1050	4200	71%	4	819	3276	55%	5	444	1776	30%	7	92	368	6%	0	0	0	0%	0	0	0	0%
	CSCABL	1081	1	1048	4192	97%	4	423	1692	39%	8	77	308	7%	7	15	60	1%	1	3	12	0%	0	0	0	0%	0	0	0	0%
	CSCRCR	2246	1	2244	8976	100%	4	2150	8600	96%	2	1926	7704	86%	32	649	2596	29%	10	108	432	5%	1	4	16	0%	0	0	0	0%
	CSCRDD	810	1	803	3212	99%	1	643	2572	79%	8	356	1424	44%	5	213	852	26%	6	29	116	4%	0	0	0	0%	0	0	0	0%
	CSCS1	799	1	793	3172	99%	1	644	2576	81%	7	247	988	31%	8	46	184	6%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSCS10	1693	1	1464	5856	86%	8	582	2328	34%	9	167	668	10%	3	47	188	3%	1	5	20	0%	0	0	0	0%	0	0	0	0%
	CSCS2	2175	1	2161	8644	99%	3	2127	8508	98%	3	1959	7836	90%	14	961	3844	44%	9	441	1764	20%	0	0	0	0%	0	0	0	0%
	CSCS3	2105	1	2105	8420	100%	2	2051	8204	97%	1	2015	8060	96%	12	531	2124	25%	4	67	268	3%	1	5	20	0%	0	0	0	0%
	CSCS4	509	1	509	2036	100%	2	381	1524	75%	2	334	1336	66%	8	115	460	23%	3	11	44	2%	0	0	0	0%	0	0	0	0%
	CSCS5	1210	1	1165	4660	96%	4	712	2848	59%	8	278	1112	23%	7	104	416	9%	1	3	12	0%	0	0	0	0%	0	0	0	0%
	CSCS6	959	1	959	3836	100%	2	592	2368	62%	4	298	1192	31%	4	118	472	12%	2	28	112	3%	0	0	0	0%	0	0	0	0%
	CSCS7	1420	1	1070	4280	75%	5	776	3104	55%	14	280	1120	20%	4	36	144	3%	1	17	68	1%	0	0	0	0%	0	0	0	0%
	CSCS8	390	2	312	1248	80%	5	196	784	50%	4	117	468	30%	3	35	140	9%	1	6	24	2%	0	0	0	0%	0	0	0	0%
	CSCS9	479	1	443	1772	92%	3	309	1236	64%	5	128	512	27%	4	51	204	11%	1	8	32	2%	0	0	0	0%	0	0	0	0%
	CSCSTA	1894	1	1867	7468	99%	3	1381	5524	73%	10	985	3940	52%	12	461	1844	24%	4	130	520	7%	3	44	176	2%	0	0	0	0%
	CSCSTB	713	1	711	2844	100%	7	274	1096	38%	6	77	308	11%	3	17	68	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSCSTC	2143	1	2122	8488	99%	6	1511	6044	71%	17	656	2624	31%	13	256	1024	12%	2	16	64	1%	0	0	0	0%	0	0	0	0%
	CSIM1	352	1	302	1208	86%	1	207	828	59%	2	15	60	4%	2	5	20	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSIM2	511	1	500	2000	98%	1	377	1508	74%	8	101	404	20%	4	13	52	3%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSIM3	2558	1	2403	9612	94%	3	2177	8708	85%	5	2035	8140	80%	29	604	2416	24%	5	45	180	2%	0	0	0	0%	0	0	0	0%
	CSIM4	330	1	282	1128	86%	3	134	536	41%	2	76	304	23%	2	1	4	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSIM5	1473	1	1442	5768	98%	3	810	3240	55%	11	316	1264	21%	6	151	604	10%	3	58	232	4%	1	24	96	2%	0	0	0	0%
	CSIMBC	1620	1	1505	6020	93%	6	1154	4616	71%	12	532	2128	33%	12	167	668	10%	5	31	124	2%	0	0	0	0%	0	0	0	0%
	CSIMCA	1358	1	1309	5236	96%	2	1004	4016	74%	14	517	2068	38%	8	57	228	4%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSIMTA	612	1	589	2356	96%	2	265	1060	43%	8	76	304	12%	2	22	88	4%	1	5	20	1%	0	0	0	0%	0	0	0	0%
	CSIMTD	574	1	552	2208	96%	2	405	1620	71%	4	345	1380	60%	6	87	348	15%	1	3	12	1%	0	0	0	0%	0	0	0	0%
	CSJUDT	267	1	165	660	62%	5	58	232	22%	4	35	140	13%	1	16	64	6%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSKKDT	812	2	578	2312	71%	3	238	952	29%	4	102	408	13%	4	30	120	4%	2	4	16	0%	0	0	0	0%	0	0	0	0%
	CSLDDT	2190	3	1905	7620	87%	14	1007	4028	46%	18	295	1180	13%	8	69	276	3%	3	19	76	1%	0	0	0	0%	0	0	0	0%
	CSLRCR	1612	1	1566	6264	97%	4	1062	4248	66%	17	454	1816	28%	9	196	784	12%	12	77	308	5%	0	0	0	0%	0	0	0	0%
	CSLRTB	2774	2	2568	10272	93%	12	1612	6448	58%	26	602	2408	22%	15	93	372	3%	2	8	32	0%	0	0	0	0%	0	0	0	0%
	CSLUDT	1731	2	1540	6160	89%	8	907	3628	52%	17	327	1308	19%	6	56	224	3%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSMACR	5993	2	5560	22240	93%	12	4003	16012	67%	40	2324	9296	39%	40	1375	5500	23%	23	404	1616	7%	8	157	628	3%	0	0	0	0%
	CSMEDT	5417	1	5264	21056	97%	26	2239	8956	41%	43	713	2852	13%	12	160	640	3%	5	60	240	1%	0	0	0	0%	0	0	0	0%
	CSMICR	6817	1	6659	26636	98%	10	4912	19648	72%	33	3154	12616	46%	43	1529	6116	22%	37	583	2332	9%	10	75	300	1%	0	0	0	0%
	CSMPDT	2699	1	342	1368	13%	9	92	368	3%	6	32	128	1%	3	12	48	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSMQCR	581	1	387	1548	67%	6	226	904	39%	4	87	348	15%	3	26	104	4%	1	6	24	1%	0	0	0	0%	0	0	0	0%
	CSNVCR	1835	1	1800	7200	98%	2	1196	4784	65%	11	516	2064	28%	10	157	628	9%	2	26	104	1%	0	0	0	0%	0	0	0	0%
	CSOLCR	2345	4	2165	8660	92%	17	529	2116	23%	16	164	656	7%	8	40	160	2%	5	21	84	1%	0	0	0	0%	0	0	0	0%
	CSSFDT	2197	1	1771	7084	81%	8	710	2840	32%	17	236	944	11%	13	89	356	4%	3	14	56	1%	0	0	0	0%	0	0	0	0%
	CSSNDT	1325	1	1279	5116	97%	14	304	1216	23%	9	107	428	8%	5	49	196	4%	1	8	32	1%	0	0	0	0%	0	0	0	0%
	CSSPCR	1613	2	1540	6160	95%	2	1152	4608	71%	13	562	2248	35%	14	232	928	14%	17	102	408	6%	3	13	52	1%	0	0	0	0%
	CSSSCL	691	1	550	2200	80%	1	359	1436	52%	6	106	424	15%	3	18	72	3%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSSTCE	4434	6	2444	9776	55%	24	1040	4160	23%	24	410	1640	9%	8	137	548	3%	3	16	64	0%	0	0	0	0%	0	0	0	0%
	CSSTCR	7133	9	5098	20392	71%	48	1769	7076	25%	45	558	2232	8%	20	152	608	2%	6	42	168	1%	1	5	20	0%	0	0	0	0%
	CSTICR	6620	1	6559	26236	99%	2	6133	24532	93%	29	3762	15048	57%	47	1617	6468	24%	35	507	2028	8%	10	115	460	2%	3	27	108	0%
	CSTPSL	2242	1	2241	8964	100%	2	1933	7732	86%	6	1632	6528	73%	24	699	2796	31%	7	31	124	1%	0	0	0	0%	0	0	0	0%
	CSWCT1	692	1	631	2524	91%	4	287	1148	41%	5	57	228	8%	1	28	112	4%	1	4	16	1%	0	0	0	0%	0	0	0	0%
	CSWCT2	600	1	599	2396	100%	1	531	2124	89%	9	395	1580	66%	5	100	400	17%	1	4	16	1%	0	0	0	0%	0	0	0	0%

Opportunity for Detention			1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Watershed	Subwatershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
Lower Des Plaines River	DP67DT	165	1	163	652	99%	3	34	136	21%	1	14	56	8%	2	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPADCR	8678	2	7820	31280	90%	30	3903	15612	45%	59	1072	4288	12%	23	163	652	2%	4	32	128	0%	2	13	52	0%	0	0	0	0%
	DPBUCR	8016	4	7560	30240	94%	26	4483	17932	56%	69	1853	7412	23%	37	665	2660	8%	16	241	964	3%	4	79	316	1%	0	0	0	0%
	DPCYCR	3458	1	1298	5192	38%	11	663	2652	19%	15	266	1064	8%	7	52	208	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPDP	44697	16	31950	127800	71%	207	14961	59844	33%	215	7484	29936	17%	150	3693	14772	8%	49	931	3724	2%	6	28	112	0%	0	0	0	0%
	DPDPTA	257	1	251	1004	98%	2	125	500	49%	2	72	288	28%	1	5	20	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPEADT	1031	1	1031	4124	100%	17	254	1016	25%	9	38	152	4%	1	5	20	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPFGCR	5083	5	4417	17668	87%	45	1734	6936	34%	44	532	2128	10%	20	182	728	4%	6	32	128	1%	0	0	0	0%	0	0	0	0%
	DPFHDT	1732	1	1546	6184	89%	10	784	3136	45%	16	170	680	10%	7	59	236	3%	1	4	16	0%	0	0	0	0%	0	0	0	0%
	DPFRCR	2835	2	2424	9696	85%	16	1057	4228	37%	23	285	1140	10%	12	102	408	4%	1	2	8	0%	0	0	0	0%	0	0	0	0%
	DPGCTR	356	1	321	1284	90%	1	210	840	59%	2	114	456	32%	4	46	184	13%	1	13	52	4%	0	0	0	0%	0	0	0	0%
	DPMDCR	6464	2	5486	21944	85%	21	2623	10492	41%	49	941	3764	15%	34	425	1700	7%	12	150	600	2%	7	56	224	1%	1	4	16	0%
	DPSLCR	5304	1	4635	18540	87%	26	2089	8356	39%	54	599	2396	11%	15	106	424	2%	3	20	80	0%	1	4	16	0%	0	0	0	0%
	DPSTCR	8228	3	7377	29508	90%	38	3142	12568	38%	36	1861	7444	23%	43	978	3912	12%	32	263	1052	3%	8	41	164	0%	0	0	0	0%
	DPSUMT	2371	3	2007	8028	85%	25	892	3568	38%	21	430	1720	18%	6	56	224	2%	1	19	76	1%	0	0	0	0%	0	0	0	0%
	DPVLCQ	460	1	459	1836	100%	2	424	1696	92%	1	200	800	43%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPWECR	12009	3	11422	45688	95%	55	4787	19148	40%	86	1416	5664	12%	48	563	2252	5%	22	188	752	2%	3	28	112	0%	1	3	12	0%
	DPWICR	9702	1	6772	27088	70%	42	3610	14440	37%	55	1512	6048	16%	29	514	2056	5%	7	75	300	1%	1	6	24	0%	0	0	0	0%
Little Calumet River	LCBTCR	15474	1	14224	56896	92%	23	10422	41688	67%	94	5203	20812	34%	107	2317	9268	15%	56	685	2740	4%	11	61	244	0%	0	0	0	0%
	LCCUDD	15836	3	15097	60388	95%	41	10321	41284	65%	133	4669	18676	29%	87	1857	7428	12%	52	689	2756	4%	28	261	1044	2%	5	33	132	0%
	LCDRCR	6006	2	5497	21988	92%	11	4642	18568	77%	43	2983	11932	50%	48	1118	4472	19%	26	286	1144	5%	5	26	104	0%	0	0	0	0%
	LCLCRW	15978	8	14712	58848	92%	25	10866	43464	68%	118	4767	19068	30%	111	1526	6104	10%	41	293	1172	2%	9	44	176	0%	3	10	40	0%
	LCMTCR	11826	2	11295	45180	96%	14	8680	34720	73%	85	4115	16460	35%	64	1478	5912	12%	54	609	2436	5%	17	156	624	1%	5	68	272	1%
	LCNOCR	11836	1	10467	41868	88%	5	9153	36612	77%	45	6582	26328	56%	89	3587	14348	30%	48	1038	4152	9%	12	119	476	1%	1	4	16	0%
	LCTHCR	14448	7	12923	51692	89%	35	8773	35092	61%	78	4272	17088	30%	74	2132	8528	15%	39	454	1816	3%	8	118	472	1%	0	0	0	0%
North Branch Chicago River	NBLM	10247	12	3249	12996	32%	23	941	3764	9%	19	375	1500	4%	12	141	564	1%	5	31	124	0%	0	0	0	0%	0	0	0	0%
	NBMFNB	3206	2	2916	11664	91%	6	1546	6184	48%	17	865	3460	27%	18	277	1108	9%	6	60	240	2%	1	0	0	0%	0	0	0	0%
	NBNBDS	26155	2	734	2936	3%	7	225	900	1%	3	118	472	0%	1	10	40	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	NBNBUS	13745	11	6246	24984	45%	46	2543	10172	19%	50	1363	5452	10%	29	783	3132	6%	17	114	456	1%	2	15	60	0%	0	0	0	0%
	NBNSCH	16022	27	7501	30004	47%	49	2564	10256	16%	55	917	3668	6%	25	321	1284	2%	8	59	236	0%	0	0	0	0%	0	0	0	0%
	NBSKRV	8592	14	6995	27980	81%	18	4848	19392	56%	37	2563	10252	30%	40	1224	4896	14%	27	655	2620	8%	15	341	1364	4%	2	37	148	0%
	NBWFNB	12559	4	11926	47704	95%	53	5521	22084	44%	96	2107	8428	17%	48	792	3168	6%	22	325	1300	3%	4	39	156	0%	1	4	16	0%
Poplar Creek	PCBRCR	2368	3	2191	8764	93%	8	1538	6152	65%	20	683	2732	29%	7	285	1140	12%	4	97	388	4%	2	10	40	0%	0	0	0	0%
	PCFCRT	1162	1	1152	4608	99%	3	772	3088	66%	4	514	2056	44%	4	352	1408	30%	3	243	972	21%	3	53	212	5%	1	10	40	1%
	PCFLCR	3554	1	3526	14104	99%	2	2469	9876	69%	19	1638	6552	46%	11	957	3828	27%	19	273	1092	8%	4	71	284	2%	0	0	0	0%
	PCPCEB	3272	1	3036	12144	93%	6	1976	7904	60%	26	1369	5476	42%	27	645	2580	20%	13	254	1016	8%	4	80	320	2%	0	0	0	0%
	PCPCGB	2082	1	1921	7684	92%	11	854	3416	41%	25	368	1472	18%	23	200	800	10%	14	84	336	4%	6	32	128	2%	0	0	0	0%
	PCPCLP	2505	5	1887	7548	75%	22	795	3180	32%	17	281	1124	11%	8	53	212	2%	1	3	12	0%	0	0	0	0%	0	0	0	0%
	PCPCRT	1777	4	1425	5700	80%	7	812	3248	46%	7	412	1648	23%	10	146	584	8%	4	19	76	1%	0	0	0	0%	0	0	0	0%
	PCPCSB	3698	1	3624	14496	98%	17	1785	7140	48%	30	828	3312	22%	30	382	1528	10%	16	139	556	4%	5	58	232	2%	0	0	0	0%
	PCPCTA	833	1	744	2976	89%	3	547	2188	66%	16	238	952	29%	4	85	340	10%	1	17	68	2%	0	0	0	0%	0	0	0	0%
	PCPOCR	12985	7	11281	45124	87%	38	8187	32748	63%	77	5664	22656	44%	81	2389	9556	18%	46	507	2028	4%	11	139	556	1%	2	22	88	0%
	PCSCTA	1140	1	1140	4560	100%	4	799	3196	70%	15	416	1664	36%	8	197	788	17%	5	76	304	7%	2	17	68	1%	0	0	0	0%
	PCSCTB	1158	1	1090	4360	94%	4	889	3556	77%	8	383	1532	33%	6	64	256	6%	1	13	52	1%	0	0	0	0%	0	0	0	0%
	PCSCTC	744	1	744	2976	100%	1	499	1996	67%	10	202	808	27%	3	59	236	8%	1	6	24	1%	0	0	0	0%	0	0	0	0%
	PCSCTD	1579	1	1330	5320	84%	7	947	3788	60%	7	628	2512	40%	7	171	684	11%	3	14	56	1%	0	0	0	0%	0	0	0	0%
	PCSCTE	866	1	826	3304	95%	3	401	1604	46%	9	223	892	26%	3	128	512	15%	6	28	112	3%	0	0	0	0%	0	0	0	0%
	PCSCTF	415	1	414	1656	100%	2	206	824	50%	2	85	340	20%	1	41	164	10%	2	21	84	5%	0	0	0	0%	0	0	0	0%
	PCSPCR	5838	1	5759	23036	99%	14	4533	18132	78%	25	2755	11020	47%	26	1374	5496	24%	16	617	2468	11%	6	188	752	3%	0	0	0	0%
	PCWBDR	3708	1	3563	14252	96%	16	1774	7096	48%	22	820	3280	22%	28	421	1684	11%	22	220	880	6%	9	95	380	3%	2	20	80	1%
	PCWBTB	1411	1	1410	5640	100%	7	803	3212	57%	16	341	1364	24%	12	114	456	8%	2	12	48	1%	0	0	0	0%	0	0	0	0%
	PCWDRA	484	1	484	1936	100%	3	105	420	22%	3	15	60	3%	2	12	48	2%	2	9	36	2%	0	0	0	0%	0	0	0	0%
Upper Salt Creek	SCSCAH	8858	4	7992	31968	90%	29	4217	16868	48%	49	2267	9068	26%	38	985	3940	11%	20	363	1452	4%	6	31	124	0%	2	8	32	0%
	SCSCMS	18739	3	17244	68976	92%	52	10350	41400	55%	134	5665	22660	30%	96	2431	9724	13%	58	638	2552	3%	17	150	600	1%	0	0	0	0%
	SCSCWB	7790	2	7060	28240	91%	23	3369	13476	43%	62	1395	5580	18%	63	622	2488	8%	32	233	932	3%	10	56	224	1%	1	5	20	0%
Other		36233	15	32803	131212	90%	139	19429	77716	52%	192	10269	41076	27%	135	5376	21504	15%	103	1730	6920	5%	22	456	1824	1%	2	17	68	0%

Notes:

Acre-feet calculated as: acres-feet = acres x 4

Opportunity for Detention			1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Watershed	Subwatershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%

A Red - White Color Scale was applied to the range of acres and acre-feet. Darker red indicates the subwatershed has a greater amount of opportunity compared to a subwatershed with acres and acre-feet shaded white.

A Green - White Color Scale was applied to the range of %. Percentage is calculated as opportunity acres divided by subwatershed total acres. The color indicates where each cell value falls within their respective range.

Isolated areas less than 3 acres in size within each subwatershed have been removed in the creation of this table.

refers to the number of continuous area polygons within the subwatershed.

The Eleven Opportunity Criteria are:

- Chicago Wilderness Green Infrastructure Vision
- Greenways and Trails plan
- MWRDGC GIS data based on flooding/stormwater issues
- CMAP Land Use Inventory
- Public and Private Conservation Areas
- Floodplains
- Soil Survey (poorly drained)
- Stack-Unit Mapping of Geologic Materials (poorly drained)
- Topographic Wetness Index
- Flooding claims
- IDOT Road Right-of-ways

No areas matched greater than 7 of the 11 critera.

Detention Opportunity by Watershed

		Number of Favorable Characteristics																											
Opportunity for Detention		1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Watershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
Calumet Sag Channel	96135	74	83498	333992	91%	322	54737	218948	57%	583	31414	125656	32%	518	12103	48412	12%	234	3042	12168	3%	38	442	1768	0%	3	27	108	0%
Lower Des Plaines River	120847	49	96939	387756	87%	577	45775	183100	39%	757	18859	75436	16%	439	7614	30456	7%	155	1970	7880	2%	32	255	1020	0%	2	7	28	0%
Little Calumet River	91403	24	84215	336860	92%	154	62857	251428	67%	596	32591	130364	34%	580	14015	56060	15%	316	4054	16216	4%	90	785	3140	1%	14	115	460	0%
North Branch Chicago River	90526	72	39567	158268	79%	202	18188	72752	29%	277	8308	33232	12%	173	3548	14192	6%	85	1244	4976	2%	22	395	1580	0%	3	41	164	0%
Poplar Creek	51580	35	47547	190188	92%	178	30691	122764	59%	358	17863	71452	34%	301	8075	32300	15%	181	2652	10608	5%	52	743	2972	1%	5	52	208	0%
Upper Salt Creek	35387	9	32296	129184	91%	104	17936	71744	50%	245	9327	37308	26%	197	4038	16152	11%	110	1234	4936	3%	33	237	948	1%	3	13	52	0%

Notes:

Acre-feet calculated as: acres-feet = acres x 4

A Red - White Color Scale was applied to the range of acres and acre-feet. Darker red indicates the watershed has a greater amount of opportunity compared to a watershed with acres and acre-feet shaded white.

A Green - White Color Scale was applied to the range of %. Percentage is calculated as opportunity acres divided by watershed total acres. The color indicates where each cell value falls within their respective range.

Isolated areas less than 3 acres in size within each subwatershed have been removed in the creation of this table.

refers to the number of continuous area polygons within the subwatershed.

The Eleven Opportunity Criteria are:

- Chicago Wilderness Green Infrastructure Vision
- Greenways and Trails plan
- MWRDGC GIS data based on flooding/stormwater issues
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- Floodplains
- Soil Survey (poorly drained)
- Stack-Unit Mapping of Geologic Materials (poorly drained)
- Topographic Wetness Index
- Flooding claims
- IDOT Road Right-of-ways

No areas matched greater than 7 of the 11 critera.

Detention Opportunity by Municipality

		Number of Favorable Characteristics																											
Opportunity for Detention		1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Community	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
CITY OF DES PLAINES	9260	6	7741	30964	84%	47	3433	13732	37%	75	1268	5072	14%	55	594	2376	6%	13	128	512	1%	3	3	12	0%	0	0	0	0%
CITY OF BERWYN	2496	1	2496	9984	100%	21	315	1260	13%	9	54	216	2%	3	23	92	1%	2	16	64	1%	0	0	0	0%	0	0	0	0%
CITY OF BLUE ISLAND	2627	1	2273	9092	87%	9	1100	4400	42%	26	393	1572	15%	7	39	156	1%	1	5	20	0%	0	0	0	0%	0	0	0	0%
CITY OF BURBANK	2666	1	2666	10664	100%	15	575	2300	22%	18	181	724	7%	8	76	304	3%	2	13	52	0%	0	0	0	0%	0	0	0	0%
CITY OF CALUMET CITY	4710	5	3647	14588	77%	11	2339	9356	50%	25	1202	4808	26%	30	345	1380	7%	10	48	192	1%	1	3	12	0%	0	0	0	0%
CITY OF CHICAGO HEIGHTS	6410	2	6085	24340	95%	29	3015	12060	47%	43	1439	5756	22%	46	558	2232	9%	17	113	452	2%	3	18	72	0%	0	0	0	0%
CITY OF CICERO	3756	1	3593	14372	96%	30	1015	4060	27%	13	69	276	2%	4	16	64	0%	1	3	12	0%	0	0	0	0%	0	0	0	0%
CITY OF COUNTRY CLUB HILLS	3150	2	3104	12416	99%	7	2225	8900	71%	27	960	3840	30%	20	276	1104	9%	15	106	424	3%	3	21	84	1%	0	0	0	0%
CITY OF COUNTRYSIDE	1857	1	1781	7124	96%	18	674	2696	36%	10	440	1760	24%	9	160	640	9%	1	7	28	0%	0	0	0	0%	0	0	0	0%
CITY OF ELGIN	4129	6	2963	11852	72%	36	1419	5676	34%	31	495	1980	12%	12	126	504	3%	5	23	92	1%	0	0	0	0%	0	0	0	0%
CITY OF ELMHURST	32	1	30	120	94%	2	5	20	16%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
CITY OF EVANSTON	5004	20	2550	10200	51%	26	843	3372	17%	18	302	1208	6%	11	147	588	3%	3	11	44	0%	0	0	0	0%	0	0	0	0%
CITY OF HARVEY	3923	2	3831	15324	98%	10	3064	12256	78%	35	1085	4340	28%	31	333	1332	8%	15	90	360	2%	5	23	92	1%	3	11	44	0%
CITY OF HICKORY HILLS	1818	1	1789	7156	98%	12	766	3064	42%	16	212	848	12%	8	79	316	4%	3	18	72	1%	0	0	0	0%	0	0	0	0%
CITY OF HOMETOWN	310	1	309	1236	100%	2	64	256	21%	1	3	12	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
CITY OF MARKHAM	3509	2	3360	13440	96%	8	2722	10888	78%	33	1609	6436	46%	30	909	3636	26%	27	445	1780	13%	17	192	768	5%	5	32	128	1%
CITY OF NORTH LAKE	2054	7	1940	7760	94%	17	983	3932	48%	24	284	1136	14%	9	68	272	3%	1	7	28	0%	0	0	0	0%	0	0	0	0%
CITY OF OAK FOREST	3876	1	3644	14576	94%	12	1762	7048	45%	30	762	3048	20%	19	258	1032	7%	13	59	236	2%	0	0	0	0%	0	0	0	0%
CITY OF PALOS HEIGHTS	2481	1	2404	9616	97%	2	1556	6224	63%	14	433	1732	17%	13	114	456	5%	6	4	16	0%	0	0	0	0%	0	0	0	0%
CITY OF PALOS HILLS	2740	3	2228	8912	81%	19	1184	4736	43%	24	505	2020	18%	14	126	504	5%	3	10	40	0%	0	0	0	0%	0	0	0	0%
CITY OF PARK RIDGE	4572	3	3748	14992	82%	34	1021	4084	22%	27	578	2312	13%	22	185	740	4%	7	41	164	1%	0	0	0	0%	0	0	0	0%
CITY OF PROSPECT HEIGHTS	2740	2	2431	9724	89%	17	1023	4092	37%	33	334	1336	12%	17	106	424	4%	2	22	88	1%	1	4	16	0%	0	0	0	0%
CITY OF ROLLING MEADOWS	3620	5	2713	10852	75%	24	912	3648	25%	37	215	860	6%	12	62	248	2%	4	18	72	0%	1	4	16	0%	1	4	16	0%
VILLAGE OF FOREST PARK	1547	2	909	3636	59%	17	200	800	13%	8	45	180	3%	3	19	76	1%	1	5	20	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF JUSTICE	1848	1	1334	5336	72%	12	523	2092	28%	17	173	692	9%	7	46	184	2%	1	3	12	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MELROSE PARK	2702	4	2616	10464	97%	21	1456	5824	54%	29	440	1760	16%	11	47	188	2%	1	6	24	0%	1	4	16	0%	0	0	0	0%
VILLAGE OF MERRIONETTE PARK	248	1	211	844	85%	5	67	268	27%	3	24	96	10%	1	10	40	4%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MT PROSPECT	6817	4	5992	23968	88%	36	2617	10468	38%	58	887	3548	13%	29	402	1608	6%	16	140	560	2%	5	39	156	1%	1	3	12	0%
VILLAGE OF NILES	3778	2	3283	13132	87%	39	1132	4528	30%	33	322	1288	9%	11	151	604	4%	4	8	32	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF NORRIDGE	1147	3	958	3832	84%	10	71	284	6%	1	2	8	0%	1	1	4	0%	1	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF NORTH RIVERSIDE	1046	2	894	3576	85%	7	384	1536	37%	8	168	672	16%	8	51	204	5%	2	1	4	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF NORTHBROOK	8516	6	8105	32420	95%	34	4441	17764	52%	60	1668	6672	20%	41	541	2164	6%	12	140	560	2%	2	21	84	0%	1	4	16	0%
VILLAGE OF NORTHFIELD	2083	3	1855	7420	89%	6	1068	4272	51%	13	512	2048	25%	11	107	428	5%	9	33	132	2%	1	0	0	0%	0	0	0	0%
VILLAGE OF ALSIP	4248	5	3173	12692	75%	24	1983	7932	47%	32	843	3372	20%	15	287	1148	7%	6	63	252	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF ARLINGTON HEIGHTS	10784	2	10166	40664	94%	37	4907	19628	46%	88	1397	5588	13%	49	525	2100	5%	21	190	760	2%	6	40	160	0%	0	0	0	0%
VILLAGE OF BARRINGTON	1693	1	1642	6568	97%	4	900	3600	53%	11	471	1884	28%	9	277	1108	16%	5	160	640	9%	4	48	192	3%	1	10	40	1%
VILLAGE OF BARRINGTON HILLS	11458	1	10952	43808	96%	22	7771	31084	68%	56	4716	18864	41%	33	2284	9136	20%	39	825	3300	7%	11	255	1020	2%	0	0	0	0%
VILLAGE OF BARTLETT	3494	2	3139	12556	90%	15	2057	8228	59%	37	883	3532	25%	25	288	1152	8%	5	82	328	2%	2	10	40	0%	0	0	0	0%
VILLAGE OF BEDFORD PARK	3906	1	3850	15400	99%	6	2905	11620	74%	47	1018	4072	26%	11	94	376	2%	2	4	16	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BELLWOOD	1544	2	1492	5968	97%	6	743	2972	48%	13	247	988	16%	6	32	128	2%	1	10	40	1%	1	4	16	0%	0	0	0	0%
VILLAGE OF BENSENVILLE	74	1	74	296	100%	1	25	100	34%	1	9	36	12%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BERKELEY	891	2	886	3544	99%	6	301	1204	34%	6	34	136	4%	1	6	24	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BRIDGEVIEW	2647	3	2480	9920	94%	15	1081	4324	41%	27	358	1432	14%	13	89	356	3%	4	21	84	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF BROADVIEW	1152	2	1092	4368	95%	7	431	1724	37%	14	88	352	8%	6	16	64	1%	2	3	12	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BROOKFIELD	1962	2	1728	6912	88%	14	456	1824	23%	6	261	1044	13%	11	166	664	8%	10	67	268	3%	2	19	76	1%	0	0	0	0%
VILLAGE OF BUFFALO GROVE	1365	3	1330	5320	97%	9	523	2092	38%	16	209	836	15%	14	90	360	7%	5	19	76	1%	1	5	20	0%	1	4	16	0%
VILLAGE OF BURNHAM	1248	1	1183	4732	95%	3	862	3448	69%	3	666	2664	53%	6	340	1360	27%	8	116	464	9%	1	31	124	2%	0	0	0	0%
VILLAGE OF BURR RIDGE	1715	5	1477	5908	86%	25	708	2832	41%	24	174	696	10%	7	20	80	1%	2	1	4	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF CALUMET PARK	738	1	677	2708	92%	7	216	864	29%	5	42	168	6%	2	4	16	1%	1	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF CHICAGO RIDGE	1452	2	1094	4376	75%	18	357	1428	25%	9	150	600	10%	3	25	100	2%	2	12	48	1%	1	5	20	0%	0	0	0	0%
VILLAGE OF CRESTWOOD	1960	1	1924	7696	98%	5	1415	5660	72%	22	444	1776	23%	15	82	328	4%	5	10	40	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF DEER PARK	31	2	17	68	55%	3	14	56	45%	4	3	12	10%	1	1	4	3%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF DEERFIELD	334	2	324	1296	97%	2	239	956	72%	6	68	272	20%	3	26	104	8%	2	20	80	6%	0	0	0	0%	0	0	0	0%
VILLAGE OF DIXMOOR	814	1	797	3188	98%	3	521	2084	64%	11	175	700	21%	4	58	232	7%	3	21	84	3%	0	0	0	0%	0	0	0	0%
VILLAGE OF DOLTON	3000	8	2272	9088	76%	10	1308	5232	44%	19	540	2160	18%	15	268	1072	9%	6	79	316	3%	1	24	96	1%	0	0	0	0%

Opportunity for Detention		1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Community	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
VILLAGE OF EAST DUNDEE	84	1	80	320	96%	3	40	160	48%	2	0	0	0%	1	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF EAST HAZELCREST	507	1	428	1712	84%	3	142	568	28%	6	22	88	4%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF ELK GROVE VILLAGE	6918	1	6545	26180	95%	42	2911	11644	42%	64	1011	4044	15%	47	408	1632	6%	24	159	636	2%	5	28	112	0%	2	17	68	0%
VILLAGE OF ELMWOOD PARK	1221	1	1126	4504	92%	5	225	900	18%	3	81	324	7%	4	36	144	3%	1	13	52	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF EVERGREEN PARK	2034	1	1740	6960	86%	14	626	2504	31%	14	121	484	6%	4	27	108	1%	2	14	56	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF FLOSSMOOR	2337	1	2196	8784	94%	4	1406	5624	60%	32	512	2048	22%	15	223	892	10%	6	29	116	1%	1	3	12	0%	0	0	0	0%
VILLAGE OF FORD HEIGHTS	1226	2	1198	4792	98%	6	992	3968	81%	19	639	2556	52%	17	200	800	16%	2	9	36	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF FORESTVIEW	831	2	794	3176	96%	2	606	2424	73%	7	290	1160	35%	2	99	396	12%	2	5	20	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF FRANKFORT	143	1	139	556	97%	1	137	548	96%	2	42	168	29%	2	1	4	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF FRANKLIN PARK	3025	1	2871	11484	95%	9	1558	6232	52%	45	417	1668	14%	8	69	276	2%	2	13	52	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF GLENCOE	2434	2	2332	9328	96%	6	1271	5084	52%	7	699	2796	29%	8	324	1296	13%	8	126	504	5%	4	41	164	2%	0	0	0	0%
VILLAGE OF GLENVIEW	8978	4	8487	33948	95%	37	4086	16344	46%	84	1643	6572	18%	49	722	2888	8%	21	340	1360	4%	5	25	100	0%	0	0	0	0%
VILLAGE OF GLENWOOD	2114	5	1591	6364	75%	6	1181	4724	56%	19	642	2568	30%	18	148	592	7%	7	8	32	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF GOLF	292	2	224	896	77%	2	137	548	47%	6	62	248	21%	4	17	68	6%	1	3	12	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF HANOVER PARK	1706	1	1590	6360	93%	10	585	2340	34%	11	213	852	12%	10	71	284	4%	7	16	64	1%	4	7	28	0%	0	0	0	0%
VILLAGE OF HARWOOD HEIGHTS	520	1	514	2056	99%	8	80	320	15%	4	29	116	6%	2	20	80	4%	1	13	52	3%	0	0	0	0%	0	0	0	0%
VILLAGE OF HAZELCREST	2164	1	2066	8264	95%	9	1261	5044	58%	22	530	2120	24%	15	186	744	9%	9	86	344	4%	5	41	164	2%	0	0	0	0%
VILLAGE OF HILLSIDE	2088	1	1457	5828	70%	13	513	2052	25%	11	187	748	9%	2	16	64	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF HINSDALE	628	1	566	2264	90%	11	160	640	25%	5	93	372	15%	5	74	296	12%	3	18	72	3%	0	0	0	0%	0	0	0	0%
VILLAGE OF HODGKINS	1645	1	1379	5516	84%	23	725	2900	44%	10	255	1020	16%	1	0	0	0%	1	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF HOFFMAN ESTATES	13420	4	12305	49220	92%	46	7550	30200	56%	96	5081	20324	38%	113	2164	8656	16%	63	641	2564	5%	19	193	772	1%	0	0	0	0%
VILLAGE OF HOMEWOOD	3387	3	2933	11732	87%	20	1099	4396	32%	37	392	1568	12%	16	100	400	3%	4	16	64	0%	1	3	12	0%	0	0	0	0%
VILLAGE OF INDIAN HEAD PARK	605	3	540	2160	89%	6	210	840	35%	7	43	172	7%	3	7	28	1%	1	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF INVERNESS	4258	2	3978	15912	93%	5	2269	9076	53%	37	884	3536	21%	27	441	1764	10%	17	146	584	3%	5	22	88	1%	0	0	0	0%
VILLAGE OF KENILWORTH	389	1	280	1120	72%	4	51	204	13%	1	5	20	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF LA GRANGE	1619	1	1619	6476	100%	16	329	1316	20%	9	78	312	5%	6	57	228	4%	2	31	124	2%	1	3	12	0%	0	0	0	0%
VILLAGE OF LA GRANGE PARK	1436	1	1373	5492	96%	7	471	1884	33%	10	231	924	16%	15	102	408	7%	7	37	148	3%	1	0	0	0%	0	0	0	0%
VILLAGE OF LANSING	4819	1	4328	17312	90%	3	3649	14596	76%	24	1981	7924	41%	40	732	2928	15%	24	176	704	4%	7	25	100	1%	1	4	16	0%
VILLAGE OF LEMONT	4884	3	4622	18488	95%	18	2541	10164	52%	54	753	3012	15%	33	151	604	3%	4	16	64	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF LINCOLNWOOD	1719	2	1383	5532	80%	10	452	1808	26%	10	168	672	10%	3	21	84	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF LYNWOOD	3169	1	2849	11396	90%	3	2627	10508	83%	17	1662	6648	52%	41	795	3180	25%	11	108	432	3%	1	1	4	0%	0	0	0	0%
VILLAGE OF LYONS	1399	3	1200	4800	86%	4	551	2204	39%	8	382	1528	27%	10	181	724	13%	2	6	24	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MATTESON	6000	1	5580	22320	93%	6	4503	18012	75%	37	2364	9456	39%	54	840	3360	14%	30	332	1328	6%	6	38	152	1%	0	0	0	0%
VILLAGE OF MAYWOOD	1757	1	1584	6336	90%	12	263	1052	15%	11	62	248	4%	4	17	68	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MC COOK	1726	3	1414	5656	82%	12	1016	4064	59%	15	490	1960	28%	2	10	40	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MIDLOTHIAN	1818	1	1747	6988	96%	5	1015	4060	56%	18	417	1668	23%	19	130	520	7%	8	44	176	2%	1	10	40	1%	0	0	0	0%
VILLAGE OF MORTON GROVE	3264	8	2668	10672	82%	20	961	3844	29%	17	569	2276	17%	14	310	1240	9%	8	34	136	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF OAK BROOK	76	1	59	236	77%	2	11	44	14%	1	4	16	5%	2	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF OAK LAWN	5486	9	4300	17200	78%	33	963	3852	18%	30	347	1388	6%	17	136	544	2%	11	87	348	2%	0	0	0	0%	0	0	0	0%
VILLAGE OF OAK PARK	3007	1	2743	10972	91%	27	381	1524	13%	17	113	452	4%	10	62	248	2%	3	23	92	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF OLYMPIA FIELDS	1906	1	1837	7348	96%	2	1563	6252	82%	17	592	2368	31%	18	189	756	10%	8	48	192	3%	3	12	48	1%	0	0	0	0%
VILLAGE OF ORLAND HILLS	747	1	727	2908	97%	1	704	2816	94%	13	234	936	31%	11	99	396	13%	6	60	240	8%	1	22	88	3%	1	10	40	1%
VILLAGE OF ORLAND PARK	13667	4	13206	52824	97%	20	9744	38976	71%	99	4258	17032	31%	113	1785	7140	13%	85	789	3156	6%	23	237	948	2%	2	18	72	0%
VILLAGE OF PALATINE	8798	2	8121	32484	92%	30	4061	16244	46%	67	1361	5444	15%	44	553	2212	6%	26	195	780	2%	7	23	92	0%	1	4	16	0%
VILLAGE OF PALOS PARK	4243	3	4101	16404	97%	13	2638	10552	62%	29	1151	4604	27%	38	330	1320	8%	18	45	180	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF PARK FOREST	2470	3	2428	9712	98%	5	1638	6552	66%	17	630	2520	26%	15	307	1228	12%	11	205	820	8%	5	98	392	4%	0	0	0	0%
VILLAGE OF PHOENIX	298	1	298	1192	100%	1	296	1184	99%	5	62	248	21%	1	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF POSEN	745	2	745	2980	100%	4	300	1200	40%	11	71	284	10%	4	18	72	2%	2	11	44	1%	2	10	40	1%	0	0	0	0%
VILLAGE OF RICHTON PARK	2578	1	2348	9392	91%	2	1906	7624	74%	19	803	3212	31%	30	267	1068	10%	15	64	256	2%	3	8	32	0%	0	0	0	0%
VILLAGE OF RIVER FOREST	1587	1	1370	5480	86%	8	509	2036	32%	6	233	932	15%	5	161	644	10%	4	48	192	3%	0	0	0	0%	0	0	0	0%
VILLAGE OF RIVER GROVE	1537	4	773	3092	50%	6	486	1944	32%	11	198	792	13%	7	49	196	3%	1	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF RIVERDALE	2366	1	2348	9392	99%	3	1493	5972	63%	15	729	2916	31%	9	396	1584	17%	8	57	228	2%	2	14	56	1%	0	0	0	0%
VILLAGE OF RIVERSIDE	1296	2	1059	4236	82%	12	270	1080	21%	11	82	328	6%	5	16	64	1%	2	5	20	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF ROBBINS	927	2	860	3440	93%	4	589	2356	64%	16	210	840	23%	5	58	232	6%	1	5	20	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF ROSELLE	492	1	429	1716	87%	2	229	916	47%	6	35	140	7%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF ROSEMONT	1159	1	847	3388	73%	11	438	1752	38%	6	140	560	12%	2	35	140	3%	1	6	24	1%	1	6	24	1%	0	0	0	0%
VILLAGE OF SAUK VILLAGE	2488	2	2330	9320	94%	3	1688	6752	68%	18	1163	4652	47%	40	485	1940	19%	22	187	748	8%	4	19	76	1%	0	0	0	0%
VILLAGE OF SCHAUMBURG	12384	2	11843	47372	96%	39	6032	24128	49%	120	2303	9212	19%	98	1024	4096	8%	57	518	2072	4%	25	219	876	2%	5	47	188	0%

Opportunity for Detention		1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Community	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
VILLAGE OF SCHILLER PARK	1768	2	1429	5716	81%	16	624	2496	35%	11	286	1144	16%	9	85	340	5%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF SKOKIE	6438	18	3964	15856	62%	28	1627	6508	25%	39	662	2648	10%	17	222	888	3%	8	53	212	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF SOUTH BARRINGTON	4943	1	4621	18484	93%	9	3066	12264	62%	65	1342	5368	27%	39	494	1976	10%	17	102	408	2%	5	19	76	0%	0	0	0	0%
VILLAGE OF SOUTH CHICAGO HEIGHTS	1012	2	998	3992	99%	2	815	3260	81%	9	334	1336	33%	3	170	680	17%	4	30	120	3%	1	6	24	1%	0	0	0	0%
VILLAGE OF SOUTH HOLLAND	4627	2	4124	16496	89%	10	3514	14056	76%	55	1334	5336	29%	36	343	1372	7%	11	114	456	2%	3	15	60	0%	0	0	0	0%
VILLAGE OF STEGER	1480	2	1394	5576	94%	3	1039	4156	70%	13	384	1536	26%	13	73	292	5%	2	5	20	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF STICKNEY	1276	3	625	2500	49%	6	256	1024	20%	4	103	412	8%	2	30	120	2%	2	1	4	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF STONE PARK	216	3	205	820	95%	4	129	516	60%	3	47	188	22%	4	13	52	6%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF STREAMWOOD	4995	1	4927	19708	99%	20	2483	9932	50%	45	1128	4512	23%	43	511	2044	10%	22	172	688	3%	8	84	336	2%	0	0	0	0%
VILLAGE OF SUMMIT	1443	2	1332	5328	92%	5	719	2876	50%	7	280	1120	19%	4	120	480	8%	2	55	220	4%	1	24	96	2%	0	0	0	0%
VILLAGE OF THORNTON	1529	3	1366	5464	89%	13	853	3412	56%	7	110	440	7%	3	19	76	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF TINLEY PARK	8114	1	7851	31404	97%	7	7118	28472	88%	28	3444	13776	42%	55	1543	6172	19%	61	715	2860	9%	21	217	868	3%	5	45	180	1%
VILLAGE OF UNIVERSITY PARK	82	1	80	320	98%	1	80	320	98%	1	61	244	74%	2	13	52	16%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF WESTCHESTER	2088	3	1881	7524	90%	12	833	3332	40%	18	365	1460	17%	13	161	644	8%	7	69	276	3%	4	19	76	1%	0	0	0	0%
VILLAGE OF WESTERN SPRINGS	1782	1	1702	6808	95%	18	432	1728	24%	17	143	572	8%	14	71	284	4%	4	13	52	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF WHEELING	5602	4	4864	19456	87%	31	3226	12904	58%	47	1230	4920	22%	27	387	1548	7%	9	63	252	1%	3	4	16	0%	0	0	0	0%
VILLAGE OF WILLOW SPRINGS	2716	4	2058	8232	76%	13	1119	4476	41%	22	483	1932	18%	15	63	252	2%	1	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF WILMETTE	3462	5	2763	11052	80%	13	1522	6088	44%	15	535	2140	15%	17	252	1008	7%	13	171	684	5%	5	113	452	3%	0	0	0	0%
VILLAGE OF WINNETKA	2496	3	2248	8992	90%	7	1021	4084	41%	10	564	2256	23%	15	336	1344	13%	9	223	892	9%	5	140	560	6%	2	37	148	1%
VILLAGE OF WORTH	1524	2	1209	4836	79%	9	554	2216	36%	9	230	920	15%	7	58	232	4%	2	4	16	0%	0	0	0	0%	0	0	0	0%
Unincorporated Cook County	80287	44	72147	288588	90%	200	61338	245352	76%	542	48224	192896	60%	640	24278	97112	30%	381	6129	24516	8%	75	795	3180	1%	2	23	92	0%

Notes:

Acre-feet calculated as: acres-feet = acres x 4

A Red - White Color Scale was applied to the range of acres and acre-feet. Darker red indicates the municipality has a greater amount of opportunity compared to a municipality with acres and acre-feet shaded white.

A Green - White Color Scale was applied to the range of %. Percentage is calculated as opportunity acres divided by municipality total acres. The color indicates where each cell value falls within their respective range.

Isolated areas less than 3 acres in size within each subwatershed have been removed in the creation of this table.

refers to the number of continuous area polygons within the subwatershed.

The Eleven Opportunity Criteria are:

- Chicago Wilderness Green Infrastructure Vision
- Greenways and Trails plan
- MWRDGC GIS data based on flooding/stormwater issues
- CMAP Land Use Inventory
- Public and Private Conservation Areas
- Floodplains
- Soil Survey (poorly drained)
- Stack-Unit Mapping of Geologic Materials (poorly drained)
- Topographic Wetness Index
- Flooding claims
- IDOT Road Right-of-ways

No areas matched greater than 7 of the 11 critera.

Volume Control Opportunity by Subwatershed

			Number of Favorable Characteristics																											
Opportunity for Volume Control			1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Watershed	Subwatershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
Calumet Sag Channel	CSARDT	157	1	118	472	75%	2	56	224	36%	3	32	128	20%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSBRDT	1487	1	1396	5584	94%	9	871	3484	59%	9	415	1660	28%	4	26	104	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSCABL	1081	1	1022	4088	95%	6	440	1760	41%	6	148	592	14%	3	40	160	4%	3	5	20	0%	0	0	0	0%	0	0	0	0%
	CSCRCR	2246	1	2230	8920	99%	3	2118	8472	94%	2	1671	6684	74%	7	221	884	10%	1	0	0	0%	0	0	0	0%	0	0	0	0%
	CSCRDD	810	4	566	2264	70%	5	313	1252	39%	6	90	360	11%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSCS1	799	1	765	3060	96%	4	538	2152	67%	4	164	656	21%	3	52	208	7%	2	7	28	1%	0	0	0	0%	0	0	0	0%
	CSCS10	1693	3	1067	4268	63%	10	377	1508	22%	4	176	704	10%	3	103	412	6%	3	7	28	0%	0	0	0	0%	0	0	0	0%
	CSCS2	2175	1	2175	8700	100%	1	2160	8640	99%	2	1833	7332	84%	10	643	2572	30%	4	28	112	1%	0	0	0	0%	0	0	0	0%
	CSCS3	2105	1	2094	8376	99%	1	2025	8100	96%	4	1618	6472	77%	4	64	256	3%	2	11	44	1%	0	0	0	0%	0	0	0	0%
	CSCS4	509	1	489	1956	96%	2	350	1400	69%	2	260	1040	51%	6	30	120	6%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSCS5	1210	2	949	3796	78%	4	490	1960	40%	5	345	1380	29%	2	226	904	19%	2	82	328	7%	0	0	0	0%	0	0	0	0%
	CSCS6	959	1	777	3108	81%	5	324	1296	34%	3	160	640	17%	1	38	152	4%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSCS7	1420	3	939	3756	66%	8	533	2132	38%	9	168	672	12%	3	28	112	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSCS8	390	1	390	1560	100%	2	297	1188	76%	5	177	708	45%	4	87	348	22%	1	4	16	1%	0	0	0	0%	0	0	0	0%
	CSCS9	479	2	411	1644	86%	1	227	908	47%	5	123	492	26%	2	56	224	12%	1	1	4	0%	0	0	0	0%	0	0	0	0%
	CSCSTA	1894	1	1711	6844	90%	7	1125	4500	59%	11	586	2344	31%	1	114	456	6%	1	17	68	1%	0	0	0	0%	0	0	0	0%
	CSCSTB	713	1	667	2668	94%	7	158	632	22%	2	1	4	0%	1	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSCSTC	2143	6	1288	5152	60%	23	453	1812	21%	11	70	280	3%	1	4	16	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSIM1	352	1	344	1376	98%	3	260	1040	74%	1	74	296	21%	1	21	84	6%	1	6	24	2%	0	0	0	0%	0	0	0	0%
	CSIM2	511	1	494	1976	97%	1	350	1400	68%	3	93	372	18%	3	38	152	7%	2	4	16	1%	0	0	0	0%	0	0	0	0%
	CSIM3	2558	1	2477	9908	97%	1	2316	9264	91%	5	1841	7364	72%	9	194	776	8%	2	33	132	1%	1	1	4	0%	0	0	0	0%
	CSIM4	330	1	265	1060	80%	1	142	568	43%	4	91	364	28%	1	10	40	3%	1	3	12	1%	0	0	0	0%	0	0	0	0%
	CSIM5	1473	3	870	3480	59%	8	439	1756	30%	3	242	968	16%	4	85	340	6%	2	34	136	2%	1	6	24	0%	0	0	0	0%
	CSIMBC	1620	1	1391	5564	86%	11	797	3188	49%	14	197	788	12%	2	0	0	0%	1	0	0	0%	0	0	0	0%	0	0	0	0%
	CSIMCA	1358	1	1356	5424	100%	1	1347	5388	99%	2	1242	4968	91%	15	642	2568	47%	5	100	400	7%	1	2	8	0%	0	0	0	0%
	CSIMTA	612	1	542	2168	89%	6	186	744	30%	5	45	180	7%	2	17	68	3%	1	0	0	0%	0	0	0	0%	0	0	0	0%
	CSIMTD	574	1	569	2276	99%	2	427	1708	74%	7	283	1132	49%	3	8	32	1%	1	0	0	0%	0	0	0	0%	0	0	0	0%
	CSJUDT	267	1	204	816	76%	2	144	576	54%	6	61	244	23%	1	1	4	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSKKDT	812	1	812	3248	100%	1	507	2028	62%	4	161	644	20%	3	85	340	10%	2	10	40	1%	0	0	0	0%	0	0	0	0%
	CSLDDT	2190	7	1421	5684	65%	11	669	2676	31%	11	291	1164	13%	10	88	352	4%	2	13	52	1%	0	0	0	0%	0	0	0	0%
	CSLRCR	1612	1	1315	5260	82%	11	580	2320	36%	16	165	660	10%	3	16	64	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSLRTB	2774	2	2372	9488	85%	34	1064	4256	38%	16	187	748	7%	4	29	116	1%	1	4	16	0%	0	0	0	0%	0	0	0	0%
	CSLUDT	1731	1	1646	6584	95%	3	1112	4448	64%	9	608	2432	35%	12	208	832	12%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSMACR	5993	7	4922	19688	82%	37	2757	11028	46%	40	982	3928	16%	20	386	1544	6%	2	180	720	3%	1	51	204	1%	0	0	0	0%
	CSMEDT	5417	7	3967	15868	73%	44	1157	4628	21%	20	377	1508	7%	10	115	460	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSMICR	6817	4	5890	23560	86%	25	3654	14616	54%	39	2112	8448	31%	22	591	2364	9%	2	22	88	0%	0	0	0	0%	0	0	0	0%
	CSMPDT	2699	3	203	812	8%	5	77	308	3%	6	31	124	1%	2	9	36	0%	1	2	8	0%	1	2	8	0%	0	0	0	0%
	CSMQCR	581	1	404	1616	69%	2	263	1052	45%	3	127	508	22%	5	49	196	8%	1	5	20	1%	0	0	0	0%	0	0	0	0%
	CSNVCR	1835	2	1383	5532	75%	10	626	2504	34%	7	282	1128	15%	3	8	32	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSOLCR	2345	4	1638	6552	70%	14	528	2112	23%	15	225	900	10%	4	107	428	5%	3	36	144	2%	1	10	40	0%	1	8	32	0%
	CSSFDT	2197	3	1339	5356	61%	16	538	2152	24%	8	156	624	7%	6	53	212	2%	1	4	16	0%	0	0	0	0%	0	0	0	0%
	CSSNDT	1325	1	1058	4232	80%	15	201	804	15%	8	61	244	5%	3	20	80	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSSPCR	1613	2	1415	5660	88%	15	750	3000	47%	15	184	736	11%	5	28	112	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSSSCL	691	1	610	2440	88%	1	609	2436	88%	1	530	2120	77%	4	208	832	30%	4	27	108	4%	0	0	0	0%	0	0	0	0%
	CSSTCE	4434	7	2732	10928	62%	6	1777	7108	40%	17	870	3480	20%	18	372	1488	8%	10	87	348	2%	2	8	32	0%	0	0	0	0%
	CSSTCR	7133	10	5169	20676	72%	30	2651	10604	37%	41	1124	4496	16%	25	371	1484	5%	13	143	572	2%	2	20	80	0%	1	11	44	0%
	CSTICR	6620	19	4434	17736	67%	41	3202	12808	48%	25	2038	8152	31%	18	214	856	3%	3	34	136	1%	0	0	0	0%	0	0	0	0%
	CSTPSL	2242	1	2108	8432	94%	5	1637	6548	73%	10	1186	4744	53%	6	53	212	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSWCT1	692	1	638	2552	92%	4	270	1080	39%	6	45	180	7%	2	25	100	4%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	CSWCT2	600	2	536	2144	89%	9	187	748	31%	3	25	100	4%	1	5	20	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
Lower Des Plaines River	DP67DT	165	1	132	528	80%	3	30	120	18%	1	12	48	7%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPADCR	8678	18	5077	20308	59%	63	1602	6408	18%	42	407	1628	5%	10	86	344	1%	1	6	24	0%	0	0	0	0%	0	0	0	0%
	DPBUCR	8016	4	6752	27008	84%	45	3306	13224	41%	58	1608	6432	20%	35	502	2008	6%	5	64	256	1%	1	9	36	0%	0	0	0	0%
	DPCYCR	3458	6	848	3392	25%	15	361	1444	10%	11	107	428	3%	3	10	40	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPDP	44697	93	24665	98660	55%	171	13784	55136	31%	170	7609	30436	17%	147	3097	12388	7%	75	554	2216	1%	3	18	72	0%	1	5	20	0%

Opportunity for Volume Control			1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Watershed	Subwatershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
	DPDPTA	257	1	217	868	85%	5	55	220	21%	1	5	20	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPEADT	1031	3	759	3036	74%	18	138	552	13%	4	15	60	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPFGCR	5083	5	4481	17924	88%	41	1868	7472	37%	30	712	2848	14%	18	216	864	4%	5	51	204	1%	2	19	76	0%	0	0	0	0%
	DPFHDT	1732	3	1471	5884	85%	14	747	2988	43%	21	227	908	13%	8	78	312	5%	1	3	12	0%	0	0	0	0%	0	0	0	0%
	DPFRCR	2835	9	1609	6436	57%	19	680	2720	24%	9	356	1424	13%	15	163	652	6%	9	43	172	2%	1	5	20	0%	0	0	0	0%
	DPGCTR	356	1	238	952	67%	1	160	640	45%	3	45	180	13%	1	14	56	4%	1	5	20	1%	0	0	0	0%	0	0	0	0%
	DPMDCR	6464	1	5460	21840	84%	37	2514	10056	39%	48	848	3392	13%	34	351	1404	5%	12	116	464	2%	3	15	60	0%	0	0	0	0%
	DPSLCR	5304	13	3071	12284	58%	53	854	3416	16%	19	202	808	4%	9	79	316	1%	2	10	40	0%	0	0	0	0%	0	0	0	0%
	DPSTCR	8228	7	6638	26552	81%	46	3059	12236	37%	39	1521	6084	18%	31	523	2092	6%	4	48	192	1%	0	0	0	0%	0	0	0	0%
	DPSUMT	2371	3	2137	8548	90%	31	930	3720	39%	15	211	844	9%	4	59	236	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPVLCQ	460	1	455	1820	99%	1	440	1760	96%	2	210	840	46%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	DPWECR	12009	6	11003	44012	92%	78	4043	16172	34%	82	1160	4640	10%	38	401	1604	3%	11	90	360	1%	1	14	56	0%	0	0	0	0%
	DPWICR	9702	13	5416	21664	56%	67	2210	8840	23%	38	846	3384	9%	15	169	676	2%	3	19	76	0%	1	4	16	0%	0	0	0	0%
Little Calumet River	LCBTCR	15474	16	11361	45444	73%	101	5354	21416	35%	106	1756	7024	11%	51	448	1792	3%	12	61	244	0%	0	0	0	0%	0	0	0	0%
	LCCUDD	15836	25	11984	47936	76%	87	5516	22064	35%	107	2283	9132	14%	56	675	2700	4%	19	131	524	1%	2	22	88	0%	1	4	16	0%
	LCDRCR	6006	6	4818	19272	80%	66	2309	9236	38%	42	630	2520	10%	17	137	548	2%	2	9	36	0%	0	0	0	0%	0	0	0	0%
	LCLCRW	15978	20	11511	46044	72%	104	5266	21064	33%	88	1977	7908	12%	49	604	2416	4%	13	79	316	0%	0	0	0	0%	0	0	0	0%
	LCMTCR	11826	20	8007	32028	68%	85	3769	15076	32%	79	1938	7752	16%	39	418	1672	4%	7	87	348	1%	0	0	0	0%	0	0	0	0%
	LCNOCR	11836	12	8901	35604	75%	94	5099	20396	43%	67	1865	7460	16%	22	338	1352	3%	2	16	64	0%	0	0	0	0%	0	0	0	0%
	LCTHCR	14448	21	11362	45448	79%	66	6701	26804	46%	71	3075	12300	21%	56	768	3072	5%	11	53	212	0%	0	0	0	0%	0	0	0	0%
North Branch Chicago River	NBLM	10247	1	4481	17924	44%	20	1390	5560	14%	30	353	1412	3%	14	139	556	1%	6	50	200	0%	0	0	0	0%	0	0	0	0%
	NBMFNB	3206	3	2618	10472	82%	18	1010	4040	32%	14	469	1876	15%	9	121	484	4%	1	7	28	0%	0	0	0	0%	0	0	0	0%
	NBNBDS	26155	6	239	956	1%	5	112	448	0%	2	42	168	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	NBNBUS	13745	33	4289	17156	31%	49	2217	8868	16%	34	838	3352	6%	21	336	1344	2%	11	38	152	0%	0	0	0	0%	0	0	0	0%
	NBNSCH	16022	6	9620	38480	60%	64	3525	14100	22%	55	757	3028	5%	25	318	1272	2%	11	63	252	0%	1	3	12	0%	0	0	0	0%
	NBSKRV	8592	9	6558	26232	76%	37	3779	15116	44%	51	1628	6512	19%	27	588	2352	7%	13	143	572	2%	1	5	20	0%	0	0	0	0%
	NBWFNB	12559	21	9560	38240	76%	95	3290	13160	26%	64	1238	4952	10%	29	354	1416	3%	4	28	112	0%	1	4	16	0%	0	0	0	0%
Poplar Creek	PCBRCR	2368	2	2114	8456	89%	16	1288	5152	54%	8	502	2008	21%	10	105	420	4%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	PCFCRT	1162	1	1080	4320	93%	9	624	2496	54%	3	411	1644	35%	1	241	964	21%	4	33	132	3%	0	0	0	0%	0	0	0	0%
	PCFLCR	3554	2	3175	12700	89%	21	1813	7252	51%	14	1009	4036	28%	11	161	644	5%	1	16	64	0%	0	0	0	0%	0	0	0	0%
	PCPCEB	3272	1	3015	12060	92%	16	1857	7428	57%	26	1158	4632	35%	21	322	1288	10%	6	25	100	1%	1	3	12	0%	0	0	0	0%
	PCPCGB	2082	1	1814	7256	87%	23	701	2804	34%	23	359	1436	17%	18	196	784	9%	7	60	240	3%	2	9	36	0%	0	0	0	0%
	PCPCLP	2505	2	2397	9588	96%	4	1549	6196	62%	32	471	1884	19%	8	87	348	3%	1	5	20	0%	0	0	0	0%	0	0	0	0%
	PCPCRT	1777	1	1646	6584	93%	6	1073	4292	60%	20	420	1680	24%	7	46	184	3%	1	4	16	0%	0	0	0	0%	0	0	0	0%
	PCPCSB	3698	1	3206	12824	87%	29	1081	4324	29%	27	409	1636	11%	15	137	548	4%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	PCPCTA	833	1	714	2856	86%	8	445	1780	53%	5	150	600	18%	6	69	276	8%	1	0	0	0%	0	0	0	0%	0	0	0	0%
	PCPOCR	12985	4	11618	46472	89%	35	8730	34920	67%	89	5333	21332	41%	80	1251	5004	10%	14	144	576	1%	2	28	112	0%	0	0	0	0%
	PCSCTA	1140	1	999	3996	88%	15	507	2028	44%	7	216	864	19%	5	38	152	3%	1	2	8	0%	0	0	0	0%	0	0	0	0%
	PCSCTB	1158	1	1158	4632	100%	1	1121	4484	97%	6	929	3716	80%	4	452	1808	39%	3	37	148	3%	0	0	0	0%	0	0	0	0%
	PCSCTC	744	1	599	2396	80%	9	223	892	30%	4	42	168	6%	1	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	PCSCTD	1579	1	1550	6200	98%	5	1271	5084	81%	4	917	3668	58%	10	367	1468	23%	4	23	92	1%	0	0	0	0%	0	0	0	0%
	PCSCTE	866	1	785	3140	91%	15	284	1136	33%	3	137	548	16%	2	90	360	10%	2	12	48	1%	0	0	0	0%	0	0	0	0%
	PCSCTF	415	1	389	1556	94%	4	137	548	33%	3	31	124	7%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	PCSPCR	5838	3	5440	21760	93%	19	3846	15384	66%	15	2763	11052	47%	14	1498	5992	26%	7	152	608	3%	0	0	0	0%	0	0	0	0%
	PCWBDR	3708	1	3228	12912	87%	25	1170	4680	32%	21	483	1932	13%	20	232	928	6%	8	49	196	1%	0	0	0	0%	0	0	0	0%
	PCWBTB	1411	1	1305	5220	92%	23	511	2044	36%	10	58	232	4%	3	14	56	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
	PCWDRA	484	1	433	1732	89%	6	36	144	7%	2	12	48	2%	2	9	36	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
Upper Salt Creek	SCSCAH	8858	1	8069	32276	91%	46	4296	17184	48%	33	2215	8860	25%	34	612	2448	7%	20	167	668	2%	8	60	240	1%	2	14	56	0%
	SCSCMS	18739	4	16452	65808	88%	86	9122	36488	49%	104	5347	21388	29%	68	2289	9156	12%	29	915	3660	5%	4	16	64	0%	0	0	0	0%
	SCSCWB	7790	1	6595	26380	85%	50	2470	9880	32%	59	930	3720	12%	36	368	1472	5%	13	96	384	1%	1	4	16	0%	0	0	0	0%
Other		36233	80	24392	97568	67%	227	13289	53156	37%	173	4664	18656	13%	90	1290	5160	4%	14	150	600	0%	2	7	28	0%	0	0	0	0%

Notes:

Acre-feet calculated as: acres-feet = acres x 4

A Red - White Color Scale was applied to the range of acres and acre-feet. Darker red indicates the subwatershed has a greater amount of opportunity compared to a subwatershed with acres and acre-feet shaded white.

A Green - White Color Scale was applied to the range of %. Percentage is calculated as opportunity acres divided by subwatershed total acres. The color indicates where each cell value falls within their respective range.

Areas less than 3 acres in size within each subwatershed have been removed from the analysis.

refers to the number of continuous area polygons within the subwatershed.

The Eleven Opportunity Criteria are:

Opportunity for Volume Control			1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Watershed	Subwatershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%

Chicago Wilderness Green Infrastructure Vision
Greenways and Trails plan
MWRDGC GIS data based on flooding/stormwater issues
CMAP Land Use Inventory
Public and Private Conservation Areas
Floodplains
Soil Survey (well drained)
Stack-Unit Mapping of Geologic Materials (well drained)
Topographic Wetness Index
Flooding claims
IDOT Road Right-of-ways

No areas matched greater than 7 of the 11 critera.

Volume Control Opportunity by Watershed

Opportunity for Volume Control		1 or more				2 or more				3 or more				4 or more			
Watershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
Calumet Sag Channel	96135	131	73578	294312	77%	475	44079	176316	46%	463	23973	95892	25%	282	5788	23152	6%
Lower Des Plaines River	120847	188	80429	321716	67%	708	36781	147124	32%	593	16101	64404	14%	368	5748	22992	5%
Little Calumet River	91403	120	67944	271776	74%	603	34014	136056	36%	560	13524	54096	14%	290	3388	13552	4%
North Branch Chicago River	90526	79	37365	149460	41%	288	15323	61292	22%	250	5325	21300	9%	125	1856	7424	4%
Poplar Creek	51580	28	46665	186660	90%	289	28267	113068	54%	322	15810	63240	30%	231	5215	20860	10%
Upper Salt Creek	35387	6	31116	124464	88%	182	15888	63552	45%	196	8492	33968	24%	138	3269	13076	9%

Opportunity for Volume Control		5 or more				6 or more				7 or more			
Watershed	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
Calumet Sag Channel	96135	81	909	3636	1%	10	100	400	0%	2	19	76	0%
Lower Des Plaines River	120847	129	1009	4036	1%	12	84	336	0%	1	5	20	0%
Little Calumet River	91403	66	436	1744	0%	2	22	88	0%	1	4	16	0%
North Branch Chicago River	90526	46	329	1316	1%	3	12	48	0%	0	0	0	0%
Poplar Creek	51580	55	542	2168	1%	5	40	160	0%	0	0	0	0%
Upper Salt Creek	35387	62	1178	4712	3%	13	80	320	0%	2	14	56	0%

Notes:

Acre-feet calculated as: acres-feet = acres x 4

A Red - White Color Scale was applied to the range of acres and acre-feet. Darker red indicates the watershed has a greater amount of opportunity compared to a watershed with acres and acre-feet shaded white.

A Green - White Color Scale was applied to the range of %. Percentage is calculated as opportunity acres divided by watershed total acres. The color indicates where each cell value falls within their respective range.

Areas less than 3 acres in size within each subwatershed have been removed from the analysis.

refers to the number of continuous area polygons within the subwatershed.

The Eleven Opportunity Criteria are:

- Chicago Wilderness Green Infrastructure Vision
- Greenways and Trails plan
- MWRDGC GIS data based on flooding/stormwater issues
- CMAP Land Use Inventory
- Public and Private Conservation Areas
- Floodplains
- Soil Survey (well drained)
- Stack-Unit Mapping of Geologic Materials (well drained)
- Topographic Wetness Index
- Flooding claims
- IDOT Road Right-of-ways

No areas matched greater than 7 of the 11 critera.

Volume Control Opportunity by Municipality

Opportunity for Volume Control		1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Community	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
CITY OF DES PLAINES	9260	13	6628	26512	72%	55	2929	11716	32%	63	1394	5576	15%	50	604	2416	7%	26	118	472	1%	2	8	32	0%	0	0	0	0%
CITY OF BERWYN	2496	18	547	2188	22%	9	88	352	4%	5	26	104	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
CITY OF BLUE ISLAND	2627	4	1727	6908	66%	12	878	3512	33%	12	499	1996	19%	12	240	960	9%	4	31	124	1%	0	0	0	0%	0	0	0	0%
CITY OF BURBANK	2666	5	1728	6912	65%	16	373	1492	14%	11	137	548	5%	6	56	224	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
CITY OF CALUMET CITY	4710	2	3968	15872	84%	21	2287	9148	49%	26	1092	4368	23%	29	547	2188	12%	8	42	168	1%	0	0	0	0%	0	0	0	0%
CITY OF CHICAGO HEIGHTS	6410	4	5829	23316	91%	61	2141	8564	33%	34	643	2572	10%	23	250	1000	4%	4	12	48	0%	0	0	0	0%	0	0	0	0%
CITY OF CICERO	3756	27	1311	5244	35%	19	221	884	6%	8	35	140	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
CITY OF COUNTRY CLUB HILLS	3150	2	2188	8752	69%	21	694	2776	22%	25	211	844	7%	8	74	296	2%	2	11	44	0%	0	0	0	0%	0	0	0	0%
CITY OF COUNTRYSIDE	1857	3	1463	5852	79%	18	650	2600	35%	8	275	1100	15%	3	11	44	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
CITY OF ELGIN	4129	2	3812	15248	92%	7	2706	10824	66%	41	1089	4356	26%	25	173	692	4%	1	5	20	0%	0	0	0	0%	0	0	0	0%
CITY OF ELMHURST	32	2	18	72	56%	1	3	12	9%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
CITY OF EVANSTON	5004	3	4262	17048	85%	34	1367	5468	27%	20	348	1392	7%	17	183	732	4%	7	46	184	1%	1	5	20	0%	0	0	0	0%
CITY OF HARVEY	3923	10	2708	10832	69%	31	1377	5508	35%	29	358	1432	9%	7	31	124	1%	3	12	48	0%	0	0	0	0%	0	0	0	0%
CITY OF HICKORY HILLS	1818	2	1497	5988	82%	11	412	1648	23%	12	136	544	7%	3	32	128	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
CITY OF HOMETOWN	310	2	64	256	21%	1	3	12	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
CITY OF MARKHAM	3509	7	2718	10872	77%	22	1508	6032	43%	40	637	2548	18%	19	243	972	7%	9	48	192	1%	0	0	0	0%	0	0	0	0%
CITY OF NORTH LAKE	2054	8	1553	6212	76%	26	437	1748	21%	16	158	632	8%	4	36	144	2%	1	6	24	0%	0	0	0	0%	0	0	0	0%
CITY OF OAK FOREST	3876	1	3283	13132	85%	40	1109	4436	29%	22	411	1644	11%	10	91	364	2%	1	8	32	0%	0	0	0	0%	0	0	0	0%
CITY OF PALOS HEIGHTS	2481	2	1699	6796	68%	11	662	2648	27%	11	253	1012	10%	5	130	520	5%	2	64	256	3%	0	0	0	0%	0	0	0	0%
CITY OF PALOS HILLS	2740	1	2564	10256	94%	4	1794	7176	65%	18	930	3720	34%	26	231	924	8%	1	1	4	0%	0	0	0	0%	0	0	0	0%
CITY OF PARK RIDGE	4572	22	2031	8124	44%	20	870	3480	19%	19	584	2336	13%	18	247	988	5%	9	53	212	1%	1	9	36	0%	1	5	20	0%
CITY OF PROSPECT HEIGHTS	2740	2	2362	9448	86%	20	1000	4000	36%	26	459	1836	17%	22	169	676	6%	4	13	52	0%	1	5	20	0%	0	0	0	0%
CITY OF ROLLING MEADOWS	3620	1	3322	13288	92%	24	1716	6864	47%	16	498	1992	14%	17	144	576	4%	11	68	272	2%	3	17	68	0%	0	0	0	0%
VILLAGE OF FOREST PARK	1547	15	308	1232	20%	13	90	360	6%	5	24	96	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF JUSTICE	1848	1	1044	4176	56%	11	473	1892	26%	10	288	1152	16%	9	106	424	6%	2	7	28	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MELROSE PARK	2702	17	1548	6192	57%	25	483	1932	18%	16	93	372	3%	5	35	140	1%	2	9	36	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MERRIONETTE PARK	248	2	114	456	46%	4	44	176	18%	2	13	52	5%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MT PROSPECT	6817	7	6240	24960	92%	48	2887	11548	42%	63	862	3448	13%	29	265	1060	4%	11	79	316	1%	2	12	48	0%	0	0	0	0%
VILLAGE OF NILES	3778	28	1562	6248	41%	36	473	1892	13%	12	126	504	3%	10	61	244	2%	4	11	44	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF NORRIDGE	1147	8	541	2164	47%	8	78	312	7%	1	1	4	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF NORTH RIVERSIDE	1046	6	556	2224	53%	5	249	996	24%	7	105	420	10%	6	45	180	4%	1	7	28	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF NORTHBROOK	8516	25	6040	24160	71%	65	2159	8636	25%	42	933	3732	11%	15	232	928	3%	1	5	20	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF NORTHFIELD	2083	3	1545	6180	74%	18	494	1976	24%	13	118	472	6%	3	18	72	1%	1	7	28	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF ALSIP	4248	5	3557	14228	84%	13	2318	9272	55%	26	1022	4088	24%	22	350	1400	8%	7	65	260	2%	2	10	40	0%	0	0	0	0%
VILLAGE OF ARLINGTON HEIGHTS	10784	3	9431	37724	87%	73	3878	15512	36%	70	1265	5060	12%	36	485	1940	4%	11	122	488	1%	2	17	68	0%	0	0	0	0%
VILLAGE OF BARRINGTON	1693	1	1555	6220	92%	18	681	2724	40%	9	273	1092	16%	3	172	688	10%	4	31	124	2%	0	0	0	0%	0	0	0	0%
VILLAGE OF BARRINGTON HILLS	11458	2	10711	42844	93%	50	7070	28280	62%	34	4598	18392	40%	36	2139	8556	19%	15	200	800	2%	1	0	0	0%	0	0	0	0%
VILLAGE OF BARTLETT	3494	2	3178	12712	91%	32	1819	7276	52%	20	488	1952	14%	19	136	544	4%	4	5	20	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BEDFORD PARK	3906	6	3083	12332	79%	41	1386	5544	35%	4	597	2388	15%	13	302	1208	8%	2	7	28	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BELLWOOD	1544	6	756	3024	49%	11	306	1224	20%	14	71	284	5%	2	16	64	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BENSENVILLE	74	1	27	108	37%	2	9	36	12%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BERKELEY	891	3	470	1880	53%	12	65	260	7%	2	12	48	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BRIDGEVIEW	2647	8	1760	7040	67%	23	666	2664	25%	16	242	968	9%	7	66	264	2%	2	13	52	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BROADVIEW	1152	3	840	3360	73%	15	175	700	15%	6	26	104	2%	5	8	32	1%	1	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BROOKFIELD	1962	7	1353	5412	69%	9	551	2204	28%	12	217	868	11%	9	58	232	3%	1	2	8	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF BUFFALO GROVE	1365	3	1152	4608	84%	21	247	988	18%	17	118	472	9%	7	37	148	3%	2	7	28	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF BURNHAM	1248	1	1193	4772	96%	1	988	3952	79%	9	565	2260	45%	8	177	708	14%	2	91	364	7%	1	3	12	0%	0	0	0	0%
VILLAGE OF BURR RIDGE	1715	5	1359	5436	79%	24	492	1968	29%	16	122	488	7%	9	26	104	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF CALUMET PARK	738	1	458	1832	62%	6	107	428	15%	2	54	216	7%	2	22	88	3%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF CHICAGO RIDGE	1452	1	1393	5572	96%	6	845	3380	58%	11	446	1784	31%	11	192	768	13%	7	105	420	7%	2	6	24	0%	1	0	0	0%
VILLAGE OF CRESTWOOD	1960	9	1044	4176	53%	16	302	1208	15%	9	93	372	5%	3	2	8	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF DEER PARK	31	3	7	28	22%	2	1	4	3%	3	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF DEERFIELD	334	6	138	552	41%	4	55	220	16%	2	21	84	6%	1	17	68	5%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF DIXMOOR	814	1	651	2604	80%	11	292	1168	36%	6	93	372	11%	3	9	36	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF DOLTON	3000	2	2654	10616	88%	18	1371	5484	46%	21	332	1328	11%	11	127	508	4%	2	8	32	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF EAST DUNDEE	84	1	84	336	100%	1	78	312	93%	2	37	148	44%	1	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF EAST HAZELCREST	507	1	459	1836	91%	3	246	984	49%	5	114	456	22%	3	10	40	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF ELK GROVE VILLAGE	6918	11	5640	22560	82%	65	1960	7840	28%	51	730	2920	11%	24	245	980	4%	11	89	356	1%	1	0	0	0%	0	0	0	0%
VILLAGE OF ELMWOOD PARK	1221	3	337	1348	28%	5	68	272	6%	4	17	68	1%	1	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%

Opportunity for Volume Control		1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Community	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
VILLAGE OF EVERGREEN PARK	2034	5	1249	4996	61%	17	200	800	10%	7	66	264	3%	1	9	36	0%	1	4	16	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF FLOSSMOOR	2337	11	1604	6416	69%	17	568	2272	24%	21	124	496	5%	8	34	136	1%	1	3	12	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF FORD HEIGHTS	1226	5	1023	4092	83%	28	375	1500	31%	6	35	140	3%	2	12	48	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF FORESTVIEW	831	2	743	2972	89%	8	487	1948	59%	2	168	672	20%	6	18	72	2%	1	4	16	0%	1	4	16	0%	0	0	0	0%
VILLAGE OF FRANKFORT	143	1	135	540	95%	2	95	380	67%	1	4	16	3%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF FRANKLIN PARK	3025	5	1753	7012	58%	39	574	2296	19%	16	120	480	4%	5	41	164	1%	1	4	16	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF GLENCOE	2434	2	2045	8180	84%	11	786	3144	32%	13	312	1248	13%	5	92	368	4%	4	15	60	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF GLENVIEW	8978	19	6824	27296	76%	70	2505	10020	28%	54	944	3776	11%	32	304	1216	3%	5	30	120	0%	1	4	16	0%	0	0	0	0%
VILLAGE OF GLENWOOD	2114	4	1609	6436	76%	22	922	3688	44%	17	293	1172	14%	15	103	412	5%	5	17	68	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF GOLF	292	2	268	1072	92%	2	196	784	67%	3	77	308	26%	1	1	4	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF HANOVER PARK	1706	1	1511	6044	89%	17	420	1680	25%	8	137	548	8%	9	50	200	3%	1	3	12	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF HARWOOD HEIGHTS	520	7	93	372	18%	5	39	156	8%	3	21	84	4%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF HAZELCREST	2164	3	1747	6988	81%	16	755	3020	35%	16	310	1240	14%	10	133	532	6%	5	57	228	3%	2	22	88	1%	1	4	16	0%
VILLAGE OF HILLSIDE	2088	11	699	2796	33%	16	154	616	7%	2	22	88	1%	1	10	40	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF HINSDALE	628	1	601	2404	96%	5	287	1148	46%	5	167	668	27%	6	71	284	11%	2	17	68	3%	1	5	20	1%	0	0	0	0%
VILLAGE OF HODGKINS	1645	2	1513	6052	92%	1	1290	5160	78%	13	806	3224	49%	15	117	468	7%	1	9	36	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF HOFFMAN ESTATES	13420	2	12547	50188	93%	55	7836	31344	58%	125	4624	18496	34%	88	1127	4508	8%	30	200	800	1%	3	13	52	0%	0	0	0	0%
VILLAGE OF HOMEWOOD	3387	3	3110	12440	92%	22	1398	5592	41%	24	584	2336	17%	22	195	780	6%	7	35	140	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF INDIAN HEAD PARK	605	2	506	2024	84%	5	160	640	26%	10	39	156	6%	3	6	24	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF INVERNESS	4258	1	3363	13452	79%	22	1344	5376	32%	40	523	2092	12%	16	181	724	4%	3	62	248	1%	2	28	112	1%	0	0	0	0%
VILLAGE OF KENILWORTH	389	2	377	1508	97%	5	83	332	21%	1	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF LA GRANGE	1619	1	1442	5768	89%	27	227	908	14%	7	67	268	4%	3	17	68	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF LA GRANGE PARK	1436	1	1241	4964	86%	15	398	1592	28%	12	191	764	13%	5	26	104	2%	1	1	4	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF LANSING	4819	8	2983	11932	62%	45	1208	4832	25%	36	373	1492	8%	10	55	220	1%	2	16	64	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF LEMONT	4884	3	4395	17580	90%	39	2222	8888	45%	32	918	3672	19%	17	353	1412	7%	6	48	192	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF LINCOLNWOOD	1719	3	1086	4344	63%	9	482	1928	28%	8	113	452	7%	3	76	304	4%	2	18	72	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF LYNWOOD	3169	6	2166	8664	68%	43	1124	4496	35%	18	155	620	5%	1	1	4	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF LYONS	1399	4	746	2984	53%	7	538	2152	38%	9	313	1252	22%	9	133	532	10%	2	9	36	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF MATTESON	6000	5	4404	17616	73%	46	2031	8124	34%	46	676	2704	11%	17	197	788	3%	4	20	80	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MAYWOOD	1757	5	838	3352	48%	7	193	772	11%	9	55	220	3%	3	19	76	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MC COOK	1726	1	1595	6380	92%	13	1025	4100	59%	14	244	976	14%	3	51	204	3%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MIDLOTHIAN	1818	1	1408	5632	77%	24	519	2076	29%	13	118	472	6%	3	22	88	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF MORTON GROVE	3264	14	1759	7036	54%	20	945	3780	29%	15	406	1624	12%	7	162	648	5%	4	20	80	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF OAK BROOK	76	3	17	68	22%	1	8	32	10%	1	5	20	7%	1	1	4	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF OAK LAWN	5486	9	3756	15024	68%	23	1680	6720	31%	30	655	2620	12%	10	255	1020	5%	12	79	316	1%	2	25	100	0%	2	19	76	0%
VILLAGE OF OAK PARK	3007	20	1073	4292	36%	17	426	1704	14%	13	84	336	3%	4	14	56	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF OLYMPIA FIELDS	1906	6	980	3920	51%	20	319	1276	17%	19	135	540	7%	6	54	216	3%	2	9	36	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF ORLAND HILLS	747	10	266	1064	36%	10	108	432	14%	8	65	260	9%	1	28	112	4%	1	10	40	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF ORLAND PARK	13667	22	10092	40368	74%	110	4548	18192	33%	99	1618	6472	12%	44	615	2460	4%	5	216	864	2%	1	51	204	0%	0	0	0	0%
VILLAGE OF PALATINE	8798	5	7519	30076	85%	56	3269	13076	37%	49	1317	5268	15%	30	519	2076	6%	13	124	496	1%	6	47	188	1%	2	14	56	0%
VILLAGE OF PALOS PARK	4243	3	3876	15504	91%	20	2000	8000	47%	34	591	2364	14%	12	59	236	1%	2	8	32	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF PARK FOREST	2470	11	1622	6488	66%	17	584	2336	24%	15	288	1152	12%	10	111	444	4%	2	4	16	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF PHOENIX	298	3	95	380	32%	2	6	24	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF POSEN	745	4	615	2460	83%	11	144	576	19%	2	16	64	2%	2	11	44	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF RICHTON PARK	2578	4	1693	6772	66%	28	757	3028	29%	23	164	656	6%	6	27	108	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF RIVER FOREST	1587	1	1268	5072	80%	15	409	1636	26%	5	123	492	8%	2	18	72	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF RIVER GROVE	1537	2	970	3880	63%	6	513	2052	33%	8	233	932	15%	5	114	456	7%	6	35	140	2%	0	0	0	0%	0	0	0	0%
VILLAGE OF RIVERDALE	2366	1	2008	8032	85%	17	949	3796	40%	9	359	1436	15%	9	60	240	3%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF RIVERSIDE	1296	3	1020	4080	79%	13	329	1316	25%	9	121	484	9%	8	36	144	3%	2	8	32	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF ROBBINS	927	4	680	2720	73%	4	354	1416	38%	16	131	524	14%	3	12	48	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF ROSELLE	492	1	365	1460	74%	8	141	564	29%	2	19	76	4%	1	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF ROSEMONT	1159	2	912	3648	79%	8	491	1964	42%	13	142	568	12%	5	24	96	2%	1	6	24	1%	1	4	16	0%	0	0	0	0%
VILLAGE OF SAUK VILLAGE	2488	3	2065	8260	83%	39	824	3296	33%	29	272	1088	11%	5	25	100	1%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF SCHAUMBURG	12384	1	10758	43032	87%	96	3982	15928	32%	108	1403	5612	11%	67	609	2436	5%	20	163	652	1%	2	7	28	0%	0	0	0	0%
VILLAGE OF SCHILLER PARK	1768	10	941	3764	53%	12	410	1640	23%	11	227	908	13%	7	69	276	4%	3	9	36	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF SKOKIE	6438	3	5682	22728	88%	38	2291	9164	36%	47	463	1852	7%	16	141	564	2%	8	43	172	1%	1	3	12	0%	0	0	0	0%
VILLAGE OF SOUTH BARRINGTON	4943	4	3980	15920	81%	33	1885	7540	38%	33	779	3116	16%	27	177	708	4%	4	11	44	0%	1	0	0	0%	0	0	0	0%
VILLAGE OF SOUTH CHICAGO HEIGHTS	1012	6	622	2488	61%	4	296	1184	29%	6	108	432	11%	5	47	188	5%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF SOUTH HOLLAND	4627	15	2644	10576	57%	24	1268	5072	27%	29	514	2056	11%	19	146	584	3%	4	28	112	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF STEGER	1480	5	949	3796	64%	19	284	1136	19%	8	37	148	3%	2	2	8	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF STICKNEY	1276	4	616	2464	48%	7	322	1288	25%	6	166	664	13%	3	48	192	4%	1	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF STONE PARK	216	4	132	528	61%	3	65	260	30%	4	22	88	10%	1	5	20	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%

Opportunity for Volume Control		1 or more				2 or more				3 or more				4 or more				5 or more				6 or more				7 or more			
Community	Acres	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%	#	Acres	acre-feet	%
VILLAGE OF STREAMWOOD	4995	1	4334	17336	87%	49	1481	5924	30%	40	526	2104	11%	17	160	640	3%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF SUMMIT	1443	3	905	3620	63%	7	490	1960	34%	4	301	1204	21%	7	119	476	8%	2	36	144	2%	1	6	24	0%	0	0	0	0%
VILLAGE OF THORNTON	1529	3	1442	5768	94%	3	1258	5032	82%	11	838	3352	55%	7	53	212	3%	1	2	8	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF TINLEY PARK	8114	15	4561	18244	56%	68	1941	7764	24%	64	796	3184	10%	31	268	1072	3%	6	56	224	1%	0	0	0	0%	0	0	0	0%
VILLAGE OF UNIVERSITY PARK	82	1	61	244	74%	2	13	52	16%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF WESTCHESTER	2088	2	1825	7300	87%	14	880	3520	42%	20	243	972	12%	10	43	172	2%	0	0	0	0%	0	0	0	0%	0	0	0	0%
VILLAGE OF WESTERN SPRINGS	1782	1	1722	6888	97%	18	474	1896	27%	13	213	852	12%	8	83	332	5%	4	32	128	2%	2	14	56	1%	0	0	0	0%
VILLAGE OF WHEELING	5602	3	4826	19304	86%	19	3345	13380	60%	44	1583	6332	28%	33	588	2352	10%	13	151	604	3%	1	9	36	0%	0	0	0	0%
VILLAGE OF WILLOW SPRINGS	2716	3	2409	9636	89%	5	2008	8032	74%	13	1366	5464	50%	12	449	1796	17%	7	83	332	3%	1	2	8	0%	0	0	0	0%
VILLAGE OF WILMETTE	3462	3	3242	12968	94%	14	1665	6660	48%	25	547	2188	16%	15	233	932	7%	7	57	228	2%	0	0	0	0%	0	0	0	0%
VILLAGE OF WINNETKA	2496	2	2233	8932	89%	4	984	3936	39%	12	464	1856	19%	14	211	844	8%	4	57	228	2%	0	0	0	0%	0	0	0	0%
VILLAGE OF WORTH	1524	1	1378	5512	90%	4	734	2936	48%	9	296	1184	19%	4	164	656	11%	4	22	88	1%	0	0	0	0%	0	0	0	0%
Unincorporated Cook County	80287	72	68330	273320	85%	443	53903	215612	67%	543	33438	133752	42%	382	8603	34412	11%	98	1323	5292	2%	6	10	40	0%			0	0%

Notes:

Acre-feet calculated as: acres-feet = acres x 4

A Red - White Color Scale was applied to the range of acres and acre-feet. Darker red indicates the municipality has a greater amount of opportunity compared to a municipality with acres and acre-feet shaded white.

A Green - White Color Scale was applied to the range of %. Percentage is calculated as opportunity acres divided by municipality total acres. The color indicates where each cell value falls within their respective range.

Areas less than 3 acres in size within each subwatershed have been removed from the analysis.

refers to the number of continuous area polygons within the subwatershed.

The Eleven Opportunity Criteria are:

- Chicago Wilderness Green Infrastructure Vision
- Greenways and Trails plan
- MWRDGC GIS data based on flooding/stormwater issues
- CMAP Land Use Inventory
- Public and Private Conservation Areas
- Floodplains
- Soil Survey (well drained)
- Stack-Unit Mapping of Geologic Materials (well drained)
- Topographic Wetness Index
- Flooding claims
- IDOT Road Right-of-ways

No areas matched greater than 7 of the 11 critera.

Appendix 3: Customizing Opportunities

Customizing Using Weighting

The two opportunity layers, one for volume control and one for detention, are each a composite of 11 different base layers. Judgement regarding the relative value of one of the base layers compared with another was not performed for this analysis. In the case of the opportunity layers, all base layers were treated equally; for example, soil drainage was equal to land use. Because of this equality, an area in the opportunity layer, which shows six coincident layers, may not necessarily be a better opportunity area than an area that shows two coincident layers. However, the area with six coincident layers has a higher likelihood of being a better opportunity. Assigning a higher value to a particular base layer, or set of base layers, is known as weighting and will create an opportunity layer with a range in values that mean more than just a count of the number of coincident layers. Instead, it will result in a layer with values in which higher numbers may indicate a better opportunity.

A weighted opportunity layer is created in two steps. First, determine the weights for each layer. This is arguably the more difficult step. Second, use GIS processing to create weighted opportunity layers.

Example One

As a hypothetical example, a planner in the Calumet-Union Drainage Ditch subwatershed believes schools, vacant lands, and greenways may be the easiest places for volume control supply projects. Additionally, areas prone to ponding/wetness seem to be natural locations for supply projects. In other words, wetness, schools, vacant land, and greenways are determined to have a greater impact in determining the opportunity for areas within this subwatershed. The planner assumes that wetness and greenways layers are each three times more important than soil drainage, flood zones, open lands, geology drainage, strips along roadways, flood damage claims, district-identified problem areas, and green infrastructure layers. He/she also assumes that vacant lands (of varying types) and schools (K-12 and post-secondary) are three times more important than other land use categories. The value of 1 currently assigned to each greater impact area should therefore be increased to a 3.

The model in Figure 1 shows the simplified steps that may be used to create an opportunity layer for detention. The Raster Calculator command in ArcGIS performs the step of adding the values from all the layers together (see the yellow box surrounded by blue circles). In the unweighted model, the maximum possible value of any area of the resulting layer can be 11 because there are 11 layers used in the analysis. As noted previously, no areas in this study had more than seven coincident layers. In a weighted model, the maximum value exceeds this because some input layers will be increased in value to 3. With greenways and Topographic Wetness Index (TWI) set to 3, and schools and vacant land within the land use layer (referred to as LU in the figure) set to 3, the maximum possible value is 17.

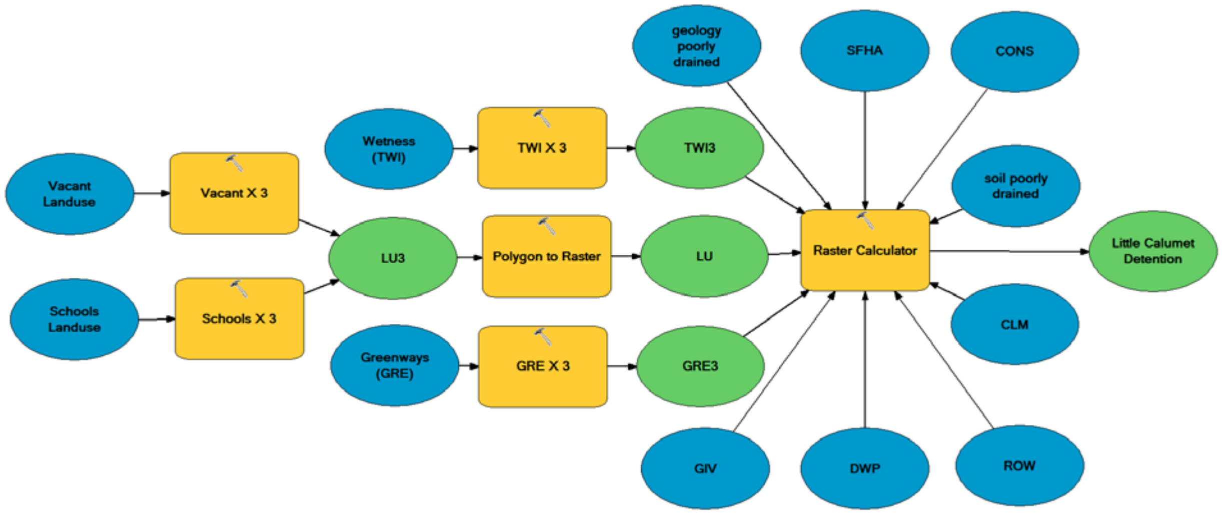

Figure 1. Processing model to create a weighted opportunities layer for a specific subwatershed.

Note that the simplified model figure omits steps that convert numerical data formats. The model also omits the reselection and subsequent field calculation of the multiple categories of vacant land and multiple categories of schools within the land use layer. It also does not display the environmental parameters that include the cell size and processing extent, which in this case is the Little Calumet area.

The results for this newly weighted analysis in the Calumet-Union Drainage Ditch (CUDD), a subwatershed in the Little Calumet watershed, is shown in Figure 2. The pink areas are those with a value/score of greater than 8. Figures for four of the areas overlaying the aerial imagery follow in numerical order.

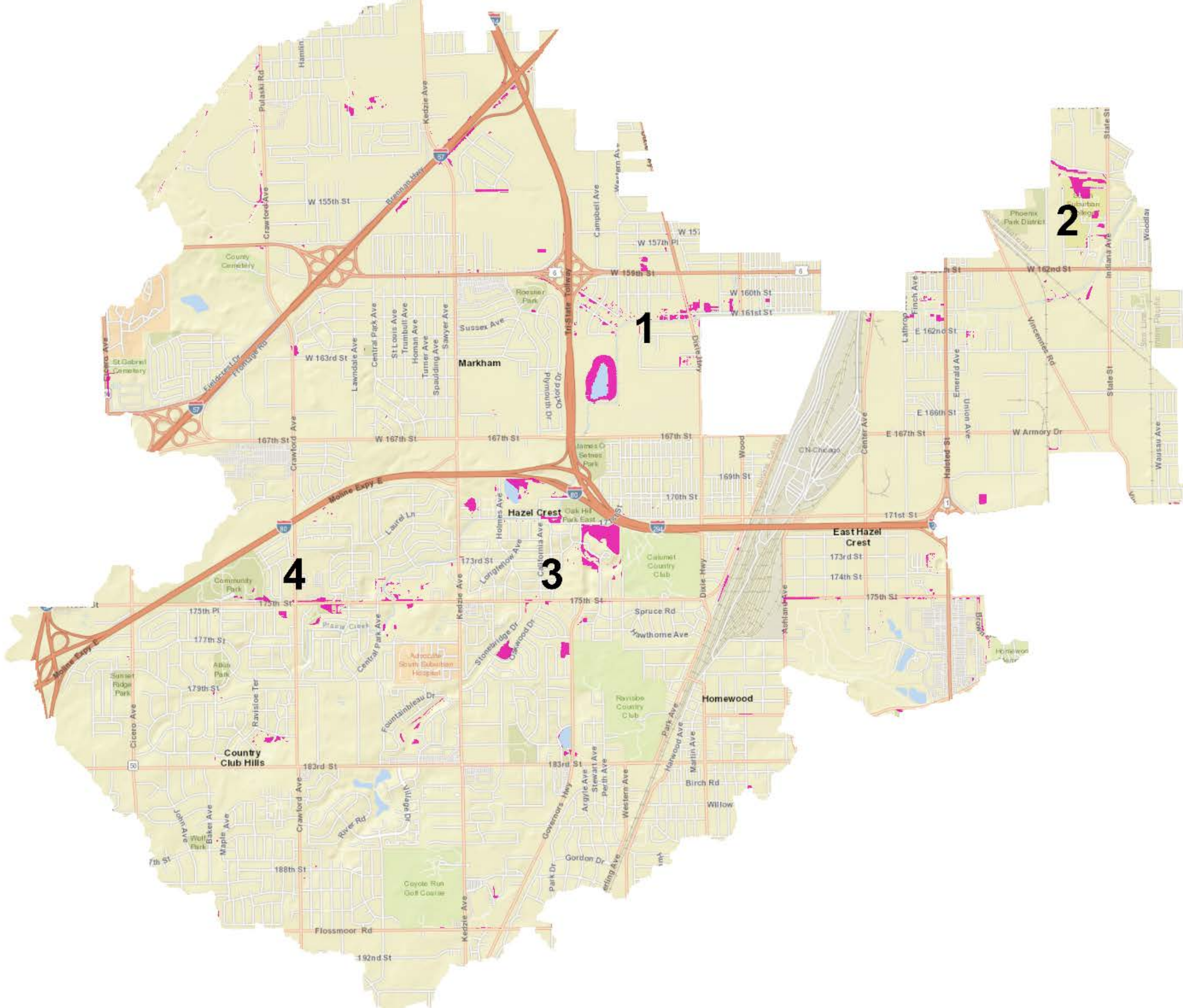

Figure 2. Results of weighted analysis in the Calumet-Union Drainage Ditch (CUDD). Areas with values greater than 8 are shown in pink.

Figure 3. Zoomed view of Area #1 of Figure 2 showing areas in pink with weighted values greater than 8.

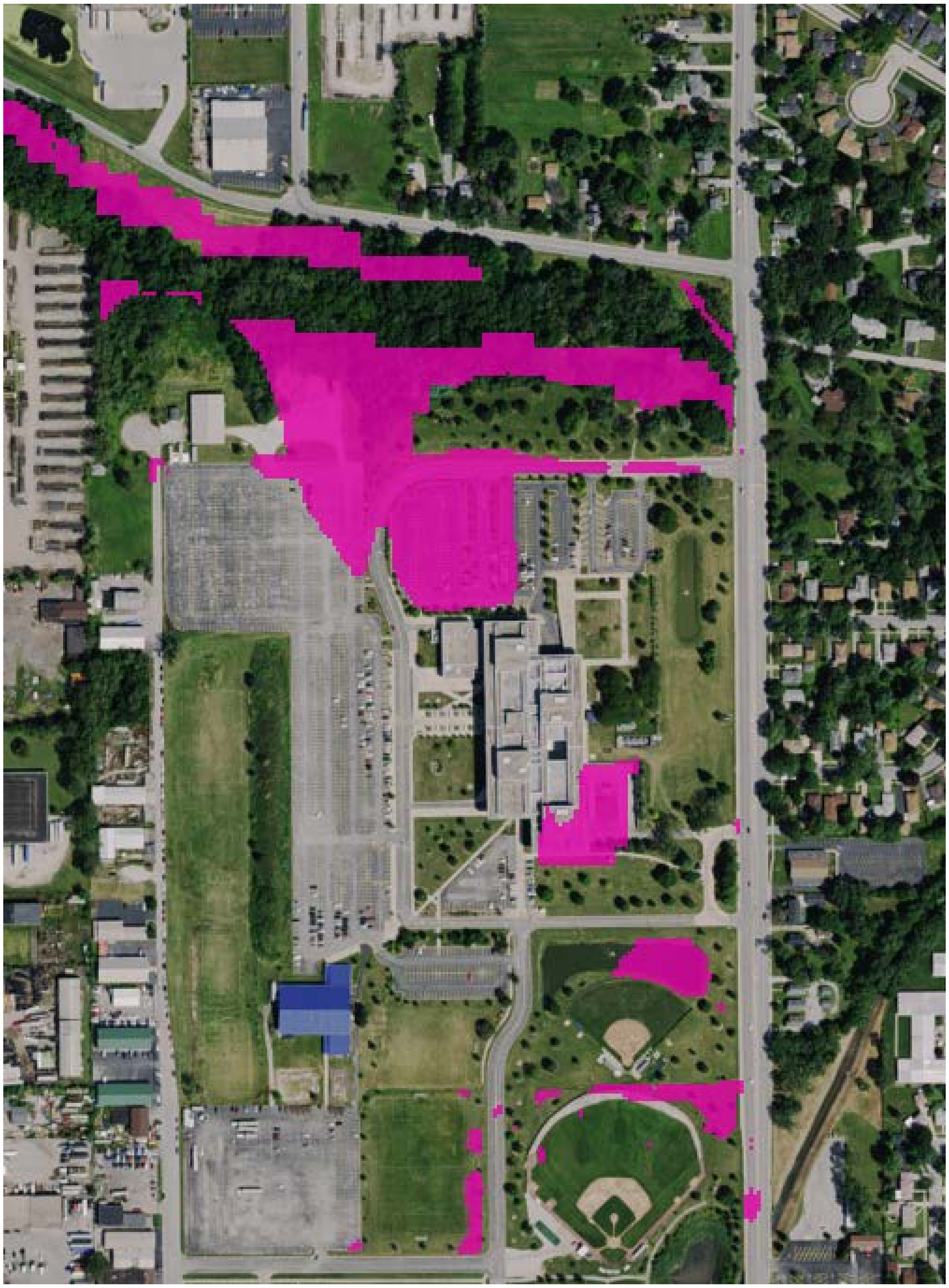

Figure 4. Zoomed view of Area #2 of Figure 2 showing areas in pink with weighted values greater than 8.

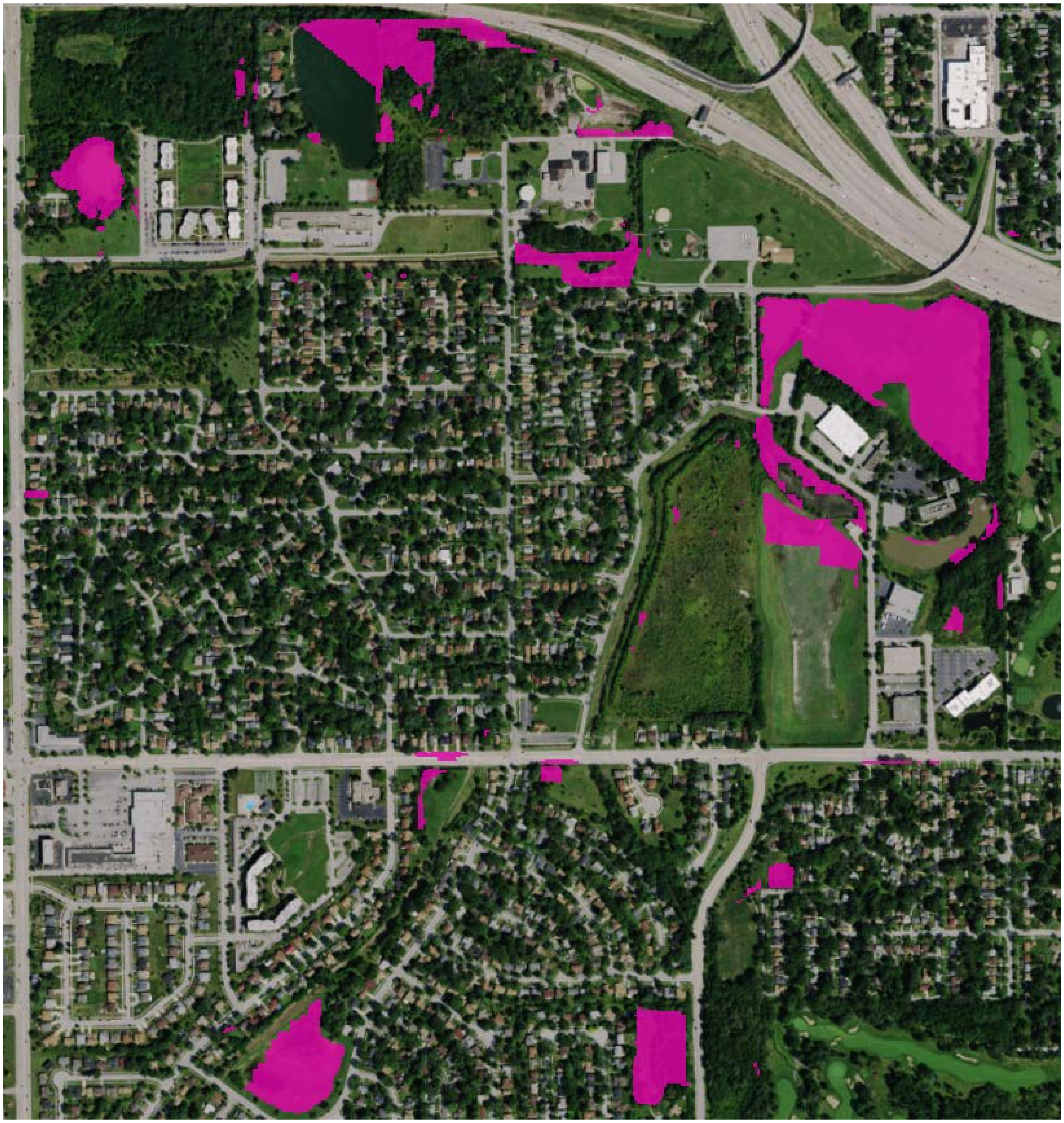

Figure 5. Zoomed view of Area #3 of Figure 2 showing areas in pink with weighted values greater than 8.

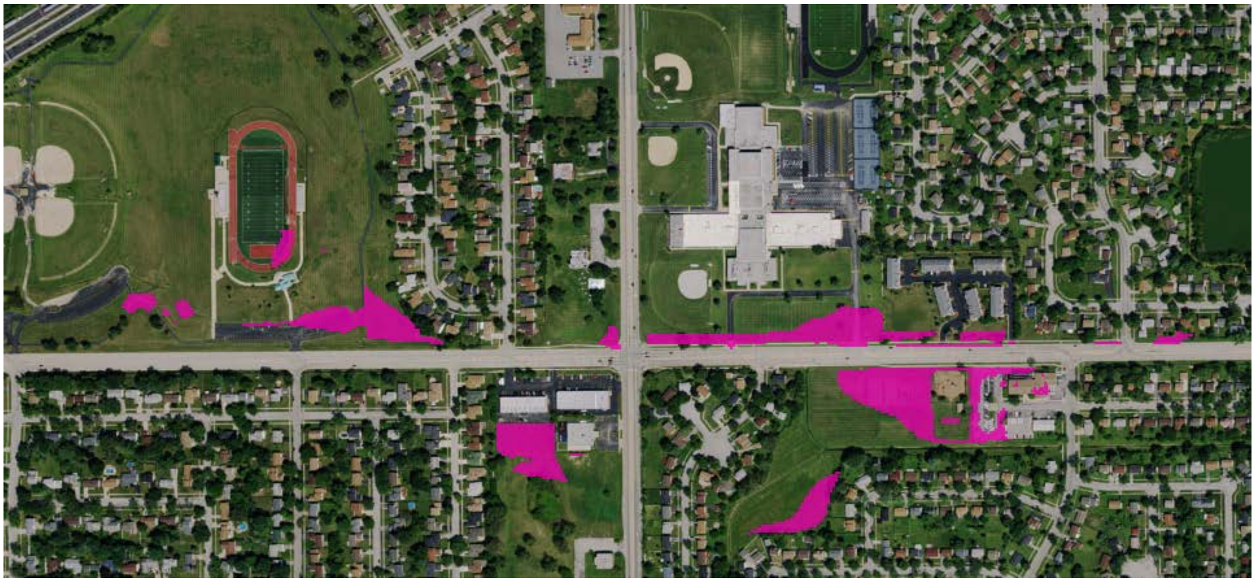

Figure 6. Zoomed view of Area #4 of Figure 2 showing areas in pink with weighted values greater than 8.

Comparing to Information Layers

Extending this hypothetical example further, the same planner within the Calumet-Union Drainage Ditch subwatershed is most interested in the first of the four areas and decides to compare the area with other GIS datasets available to his agency. These informational layers consist of a national wetlands inventory, historical buildings, and combined sewer areas. Additionally, the planner could include a data layer of MWRDGC acquired properties to determine if any are in the vicinity. The resulting Figure 7 shows there are no historical buildings or MWRDGC acquired properties in the area, but there is a national wetlands inventory polygon coincident with the top center opportunity area. Also, the combined sewer area is coincident with the opportunity areas in the center right of the image.

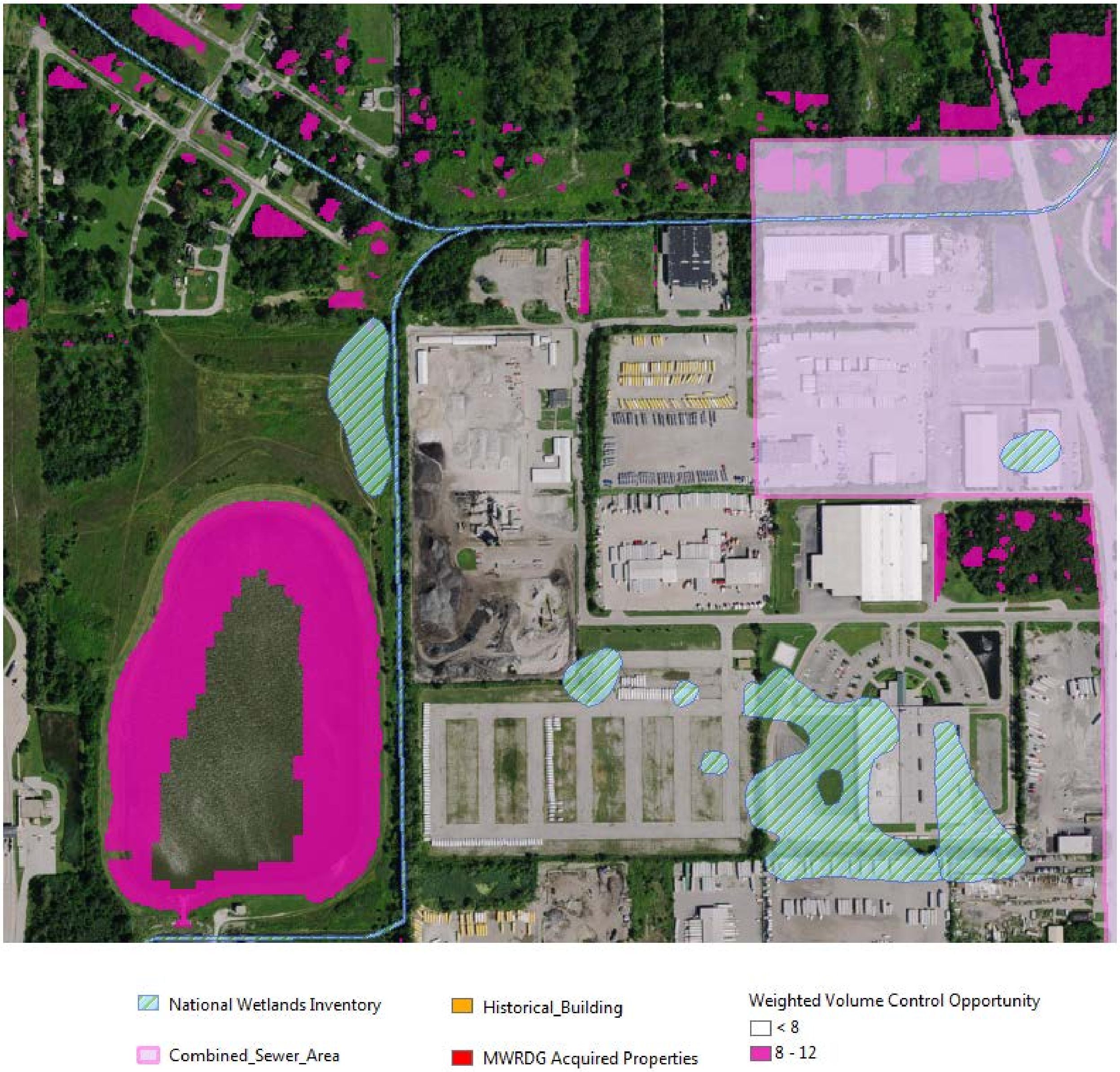

Figure 7. Zoomed view of Area #1 of Figure 2 showing areas with weighted values greater than 8, national wetlands inventory, and combined sewer areas.

Example Two

In a second hypothetical example, a fellow planner of the same subwatershed believes churches, schools, and vacant lands may be the likely places for volume control supply projects. In addition, areas that are prone to ponding/wetness, have flooding claims, are within the floodplain, or were identified by MWRDG as flooding problem areas are of heightened importance and should be weighted for greater impact. In this example, wetness (TWI), flood claims (CLM), floodplain (SFHA), and District problem area (DWP) layers are each three times more important than soil drainage, greenways, open lands, geology drainage, strips along roadways, and green infrastructure layers. Also, religious facilities, vacant lands (of varying types), and schools (K-12 and post-secondary) are considered three times more important than other land use categories. The value of 1 currently assigned to each greater impact area should therefore be increased to 3. The revised model is shown below.

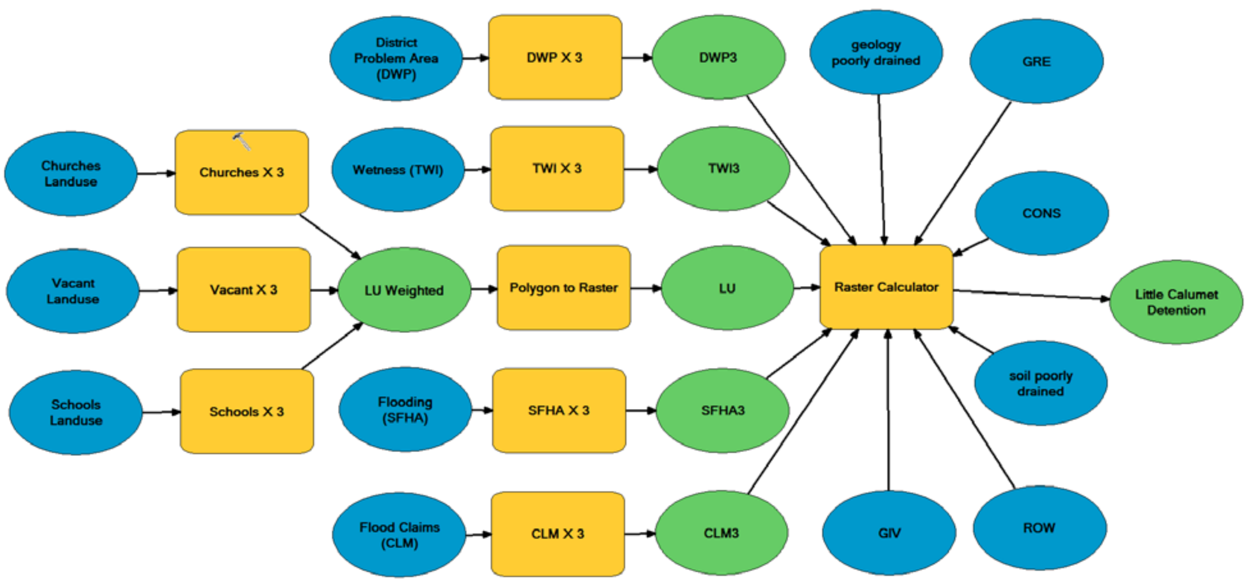

Figure 8. Processing model to create a weighted opportunities layer for a specific subwatershed. Churches, vacant land, schools, areas prone to ponding/wetness, have flooding claims, are within the floodplain, or were identified by MWRDG as flooding problem areas are assigned the weight of 3.

The result, as compared with the first scenario, is an expansion and densifying of existing areas 1 to 4, and four new areas of concentration (5 to 8).

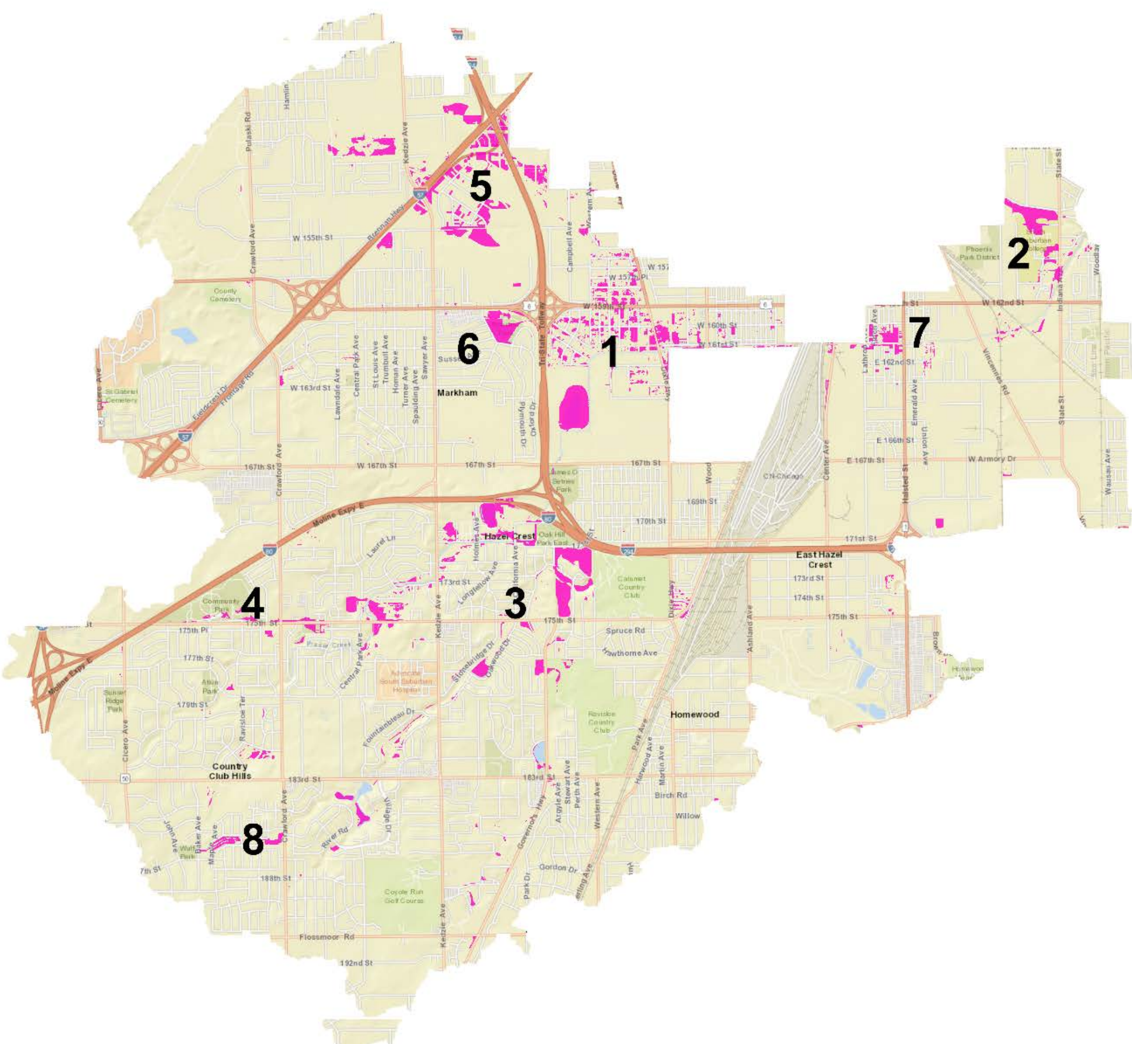

Figure 9. Results of the second scenario weighted analysis in Calumet-Union Drainage Ditch (CUDD). Areas with values greater than 8 are shown in pink.

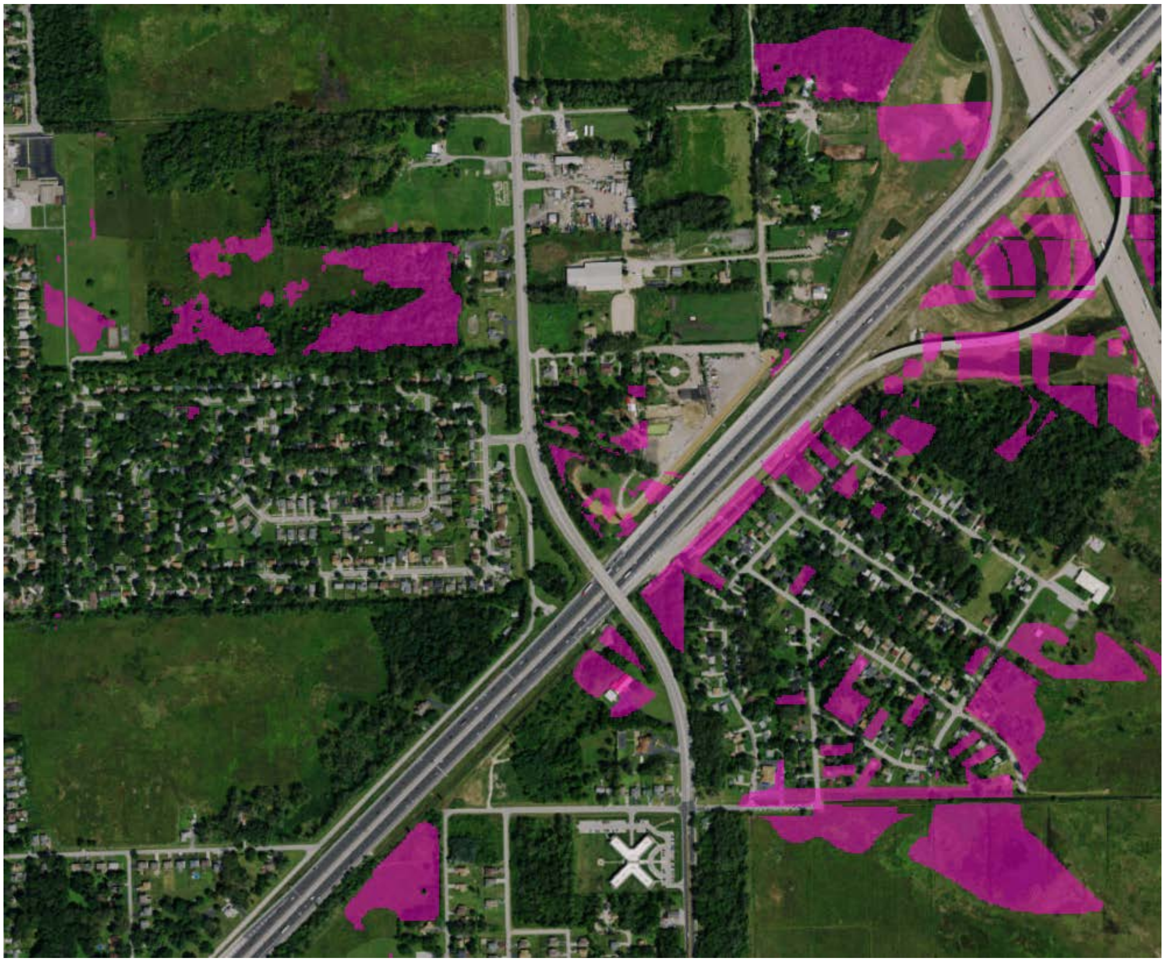

Figure 10. Zoomed view of Area #5 of Figure 9 showing areas in pink with weighted values greater than 8.

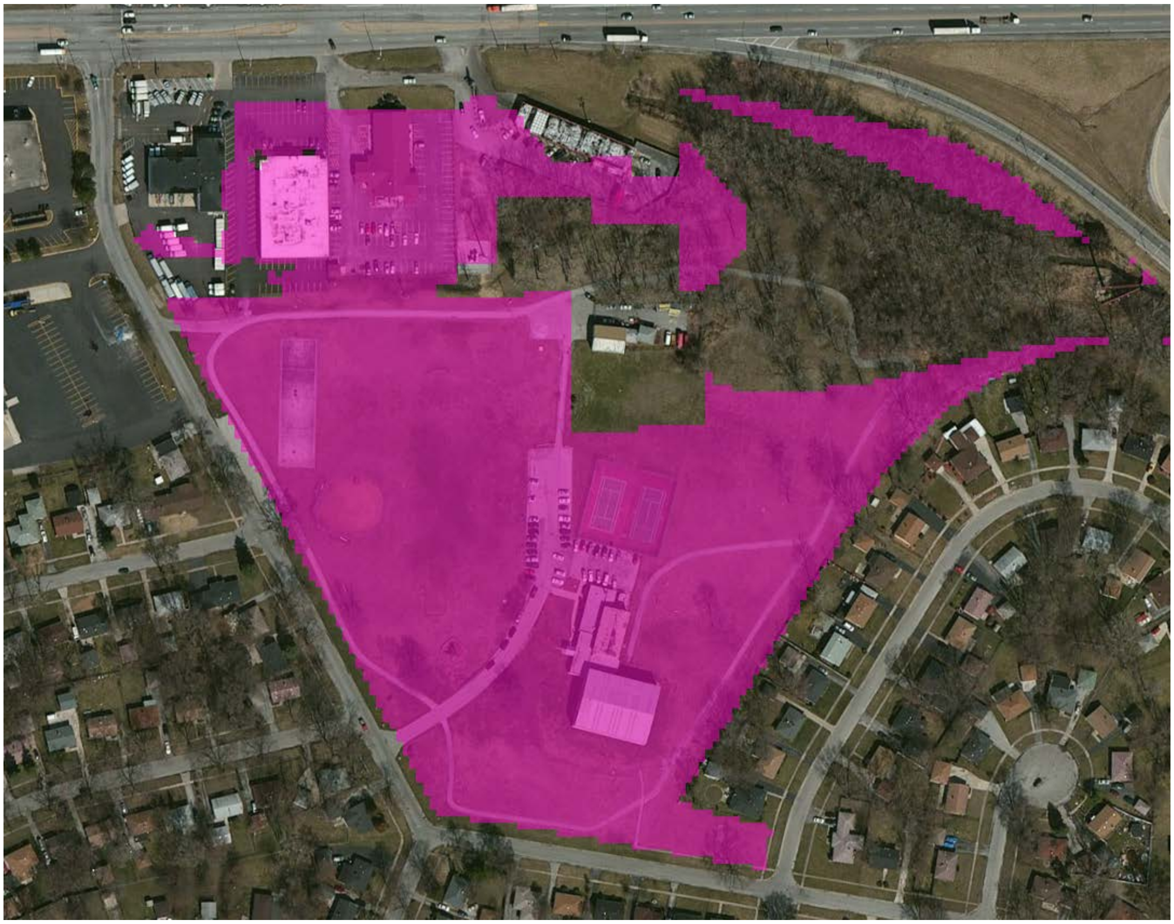

Figure 11. Zoomed view of Area #6 of Figure 9 showing areas in pink with weighted values greater than 8.

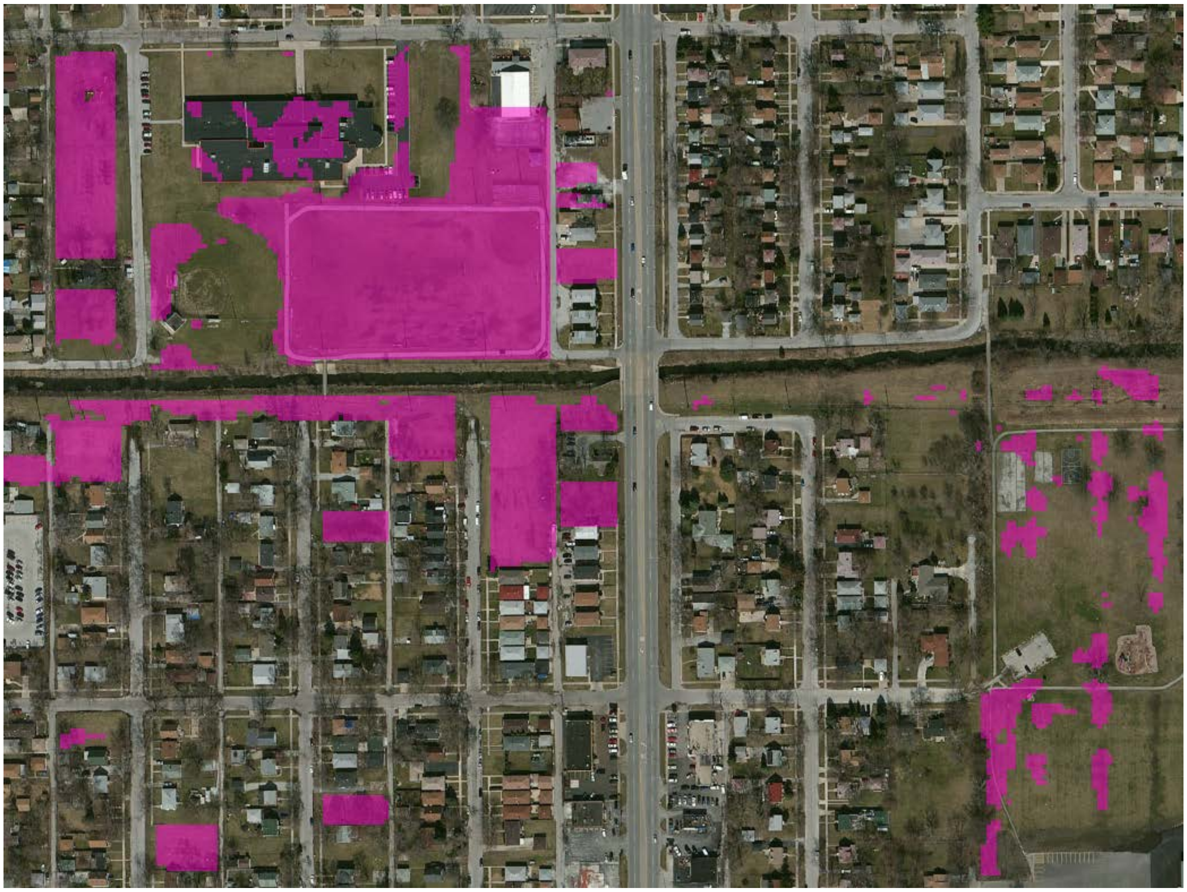

Figure 12. Zoomed view of Area #7 of Figure 9 showing areas in pink with weighted values greater than 8.

Figure 13. Zoomed view of Area #8 of Figure 9 showing areas in pink with weighted values greater than 8.

Appendix 4: Data Catalog

During the study, many GIS layers were integrated in the development of the stormwater detention or volume control opportunity analyses. The GIS processes used to prepare the source data for the final combining of layers was customized to the source data, which may have included selecting a subset of features, deriving buffers, clipping to the study boundary, conversion from vector to raster format, conversion of values to integers, and standardizing of cell size. The source data is referenced in the metadata, but it and the many iterations of derivative data are not included.

An assembled geodatabase of raster layers used for the final combined layers of volume control and detention opportunity is available for use by municipalities and potential suppliers to generate further site-level evaluation. The Geodatabase contains the analyses layers generated and attributed with the opportunity indicator values. These layers can be ranked or weighted, depending on the needs and priorities of a particular municipality or watershed. Within the table below is a crosswalk between the geodatabase layers names and the data's original source. The number corresponds to that in the report.

Layer Name	Data Inventory
TWI_10	Data Layer 1: Topographic Wetness Index
GIV_10	Data Layer 2: Chicago Wilderness Green Infrastructure Vision (GIV)
CONS_10	Data Layer 3: Public and Private Conservation Areas
SFHA_10	Data Layer 4: Floodplains
CLM_10	Data Layer 5: Flooding Claims
ROW_10	Data Layer 6: Road Right-of-Way
soil_poor	Data Layer 7: Soil Survey Data, poorly drained
soil_well	Data Layer 7: Soil Survey Data, well drained
stack_poorly_drained	Data Layer 8: Stack-Unit Map, poorly drained
stack_well_drained	Data Layer 8: Stack-Unit Map, well drained
Greenway_10_1	Data Layer 9: Greenways and Trails Plan
landuse_10	Data Layer 10: Land Use Inventory
DWP_10	Data Layer 11: Problem Areas

In addition the following information layers are included in the geodatabase.

Layer Name	Data Inventory
Combined_Sewer_Area	Combined Sewer Location
NWI	National Wetland Inventory
IEPA	Illinois Environmental Protection Agency (IEPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
MWRD_Buyouts	MWRD Buyouts
FPCC	Forest Preserve District of Cook County

The subbasin boundaries and municipal boundaries within the study area are included as layers in the geodatabase.

Layer Name	Data Inventory
Municipality_Study_Area	Detention Opportunity Raster Layer
Subbasin_Study_Area	Volume Control Opportunity Raster Layer

The Detention Opportunity and Volume Control Opportunity layers are included in the geodatabase in both raster format and vector format. Each cell and polygon of these is attributed with the count of coincident inventory layers. The polygons are also attributed to identify which particular index layers were coincident.

Layer Name	Data Inventory
DET-RAS	Detention Opportunity Raster Layer
VOL-RAS	Volume Control Opportunity Raster Layer
DET	Detention Opportunity Polygon Layer
VOL	Volume Control Opportunity Polygon Layer