2017 STORMWATER MASTER PLAN

PW-FY17-05

FOR THE
CITY OF PARK RIDGE

SUBMITTED BY
Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

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www.heyassoc.com

June 7, 2016
June 7, 2016

Mr. Joe Gilmore
Interim City Manager
City of Park Ridge
505 Butler Place
Park Ridge, IL 60068

Re: 2017 Stormwater Master Plan, PW-FY17-05

Dear Mr. Gilmore:

Hey and Associates, Inc. (Hey) is pleased to submit this proposal for the 2017 Stormwater Master Plan issued on April 28, 2016 and amended on June 2, 2016 (we acknowledge receiving and reviewing Amendment 1). Our proposal was completed in accordance with the Invitation to Bid.

Over the last 40 years, Hey has provided state-of-the-art as well as practical civil and stormwater management services. Our key staff proposed for this project have directly applicable experience, having previously:

- Drafted Stormwater Master Plans and Watershed Master Plans for multiple municipal clients including the Village of Niles, the Village of Barrington, DuPage County the Metropolitan Water Reclamation District of Greater Chicago, and the Milwaukee Metropolitan Sewerage District.
- Designed major stormwater management facilities and flood control projects.
- Authored regulations for development and stormwater management and technical manuals (i.e. - Chicago, Niles, McHenry County) as well as having served on technical advisory committees for stormwater regulations.
- Designed and implemented of numerous storm water BMPs and green infrastructure facilities targeted at water quality improvement and runoff volume reduction.
- Evaluated the need to implement climate change and resiliency into stormwater management design.

We sincerely look forward to an opportunity to work with the City to efficiently and effectively perform the services outlined in the Invitation to Bid. Please do not hesitate to contact me if you require any additional information (jwickenkamp@heyassoc.com; 773-693-9200x11).

Sincerely,

Jeffrey A. Wickenkamp, PE, CFM, D.WRE
Vice President
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**Attachment A:** Team Member Resumes

**Attachment B:** Village of Niles Stormwater Relief Program
Hey and Associates, Inc.
Engineering, Ecology and Landscape Architecture

LOCATIONS
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8755 W. Higgins Road, Suite 835
Chicago, Illinois 60631
773.693.9200

Volo
26575 W. Commerce Drive, Suite 601
Volo, Illinois 60073
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9401 W. Beloit Road, Suite 210
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SERVICE AREAS
Civil Engineering and Design
Stormwater and Floodplain Management
Ecological Restoration and Management
Landscape Architecture
Sustainability Planning and Design
Watershed and Water Quality Studies
Erosion and Sediment Control Compliance
Construction Management
Wetland Delineation
Wetland Mitigation
Lake Management
Drain Tile Services
Urban Forestry
Survey

www.heyassoc.com

ABOUT HEY AND ASSOCIATES, INC.
Hey and Associates, Inc. is a professional engineering, ecological consulting, and landscape architecture firm founded in 1976 to deliver comprehensive solutions to complex water resources and natural resources challenges. Over the last 40 years, the firm has grown to offer a full range of professional services with a special focus on green and sustainable infrastructure.

Hey has a multi-disciplinary staff of 29 engineers, scientists, landscape architects and support staff that collaborate to identify opportunities, design creative solutions, and implement projects that are grounded in the fundamental principles of water resources, environmental science, and sustainability. For all projects, we carefully consider the regulatory requirements, constructability, cost effectiveness, and long-term management requirements to ensure we meet our clients’ expectations and needs. Nearly all of our work involves some form of green infrastructure.

ENGINEERING
Our experienced engineers are trained in traditional civil engineering, environmental and water resources engineering. Hey provides civil engineering services for both the public and private sectors. We have experience in designing stormwater management and flood control projects, green infrastructure, streambank and shoreline projects, conveyance improvements, sanitary sewers, potable water, paving and grading improvements.

ECOLOGY
Our wetland scientists have an excellent working knowledge of the wetland and water quality regulations of the federal, state and local governments and are some of the most experienced practitioners in the Midwest. Staff ecologists and environmental scientists continually strive to be at the forefront of ecological restoration principles in order to deliver superior results. We work closely with our clients to identify restoration goals, and then tailor restoration plans to meet specific site opportunities, constraints, budgets and schedules.

LANDSCAPE ARCHITECTURE
Our landscape architects and design professionals specialize in the planning and design of park and recreation facilities, trails, open spaces, habitat restoration and green infrastructure. We address our clients’ diverse needs throughout the analysis, planning, design, implementation, and maintenance stages of each project to create unique and consistently successful design solutions that are comprehensive, cost effective, and environmentally sound.

SPECIALTY AND SUPPORT SERVICES
In addition to our Engineering, Ecology and Landscape Architecture personnel, we have additional specialty staff that rounds out our team. Our Survey Department provides us with accurate and timely information which allows us to keep projects on schedule.

FIRM CAPACITY TO PERFORM THE PROJECT

The scope of work requested by the City of Park Ridge requires skills and experience in the following areas:

- Civil Engineering
- Sewer Capacity Analysis
- Surface Water Hydrology and Hydraulics
- Drainage and Flooding Remediation
- Water Quality Enhancement and Protection
- Best Management Practices to Reduce Runoff Volume including Stormwater Infiltration
- Green Infrastructure
- Water Resource Regulations and Permitting
- Federal, State, and Local Permits
- Funding Sources
- Stormwater Regulations
- Sanitary Infiltration and Inflow
- Financing
- Programming for Public Works Capital Improvements, Maintenance and Implementation

Hey and Associates, Inc. will provide the City of Park Ridge with the experience and talent required to develop a comprehensive stormwater master plan. Our engineers and water resources professionals are experts at planning and implementing water resources, stormwater and flood control projects. We have a high degree of expertise in hydrologic and hydraulic modeling, including extensive experience with the XP SWMM model. We also have extensive experience and a successful track record for the preparation of engineering cost estimates. Our water resources planner and landscape architects are experts in the design and implementation of water quality and green infrastructure projects. The Hey team members have extensive experience throughout the region creating successful and unique projects that reduce runoff volumes and improve runoff quality while providing stimulating user experiences. Hey has prepared Stormwater Master Plans multiple municipal clients including the Village of Niles, the Village of Barrington, DuPage County and the Metropolitan Water Reclamation District of Greater Chicago. It is expected that no sub-consultants will be necessary for the completion of the project.

QUALITY ASSURANCE AND CONTROL PROGRAM

Our project team takes pride in its work and understands the importance of the successful implementation of a Quality Assurance / Quality Control (QA/QC) Plan. The intent of a QA/QC plan is to ensure, to the extent practical, the reduction of errors and omissions in deliverables. Tom Polzin, President of Hey and Associates, will serve as the QA/QC manager. Mr. Polzin will not have any direct participation in the preparation of the design. In performing his QA/QC reviews he will provide an expert and independent review of all significant deliverables. He has overseen and performed reviews on a variety of stormwater and civil engineering design projects.

PERSONNEL

Our multi-disciplinary staff credentials include:

- Diplomate, Water Resources Engineer 2
- Illinois Professional Engineers 7
- Engineers in Training 2
- Illinois Registered Landscape Architect 2
- Registered Land Surveyor 1
- Certified Wetland Scientist 5
- Certified Flood Plain Managers 5
- Certified Professional Soil Erosion Sediment Control 8
- Certified Lake Professional 1
- GIS Proficient Staff 8
DISTINCTIVE COMPETENCE

The key challenge for this project will be the delivery of a comprehensive document that is useful, flexible and easily understandable. The plan will be prepared by a consultant that has not performed all of the supporting work. While this will allow that consultant to bring a fresh view to the comprehensive plan, it will also require that the consultant be well versed in the full range of water resources issues including technical, policy, regulatory, financial, and emerging issues. The Hey and Associates’ team has dedicated our careers to becoming experts in all aspects of water resources including stormwater and floodplain management and planning. This knowledge and experience will be instrumental in our ability to assimilate and compile the extensive existing information along with our new analyses into a comprehensive Stormwater Master Plan. It will also enhance our ability to extract, simplify and communicate the strategic and key points of the plan to staff, elected officials and the public.

LITIGATION/LEGAL INFORMATION

In the last five (5) years, Hey and Associates, Inc. has been named in one (1) litigation case. Hey has been named as third party defendant in Helen Miller V Waukegan Illinois Hosp. Hey provided a tree survey as a sub-consultant for another engineering firm. In March of 2013 Hey was added as a third party defendant in a case that had been pending for some time. There is no causal connection between the limited services provided by Hey and the alleged damages. Counsel on behalf of Hey prepared a motion for summary judgment which was granted.

CONTRACT DEFAULTS/TERMINATION

Hey has not defaulted on and/or was not terminated on any previous contracts.

WORKLOAD ANALYSIS

The workload associated with existing projects currently underway with the proposed staff does not present a conflict with the ability to complete the services over the Schedule included in Section 4: Project Understanding and Approach. The Project Manager will be responsible for assigning and coordinating tasks in a timely manner to meet the deadlines required by this project. It is our anticipation that our proposed staff will have the ability to commence on the project immediately upon Notice to Proceed.

Projected availability during the duration of this project for each staff member is provided below:

- Project Principal: Jeff Wickenkamp – 25% available
- Project Manager: Patrick Lach – 40% available
- Water Quality: Deanna Doohaluk – 50% available
- Green Infrastructure: Tim Pollowy – 40% available
- Modeling: Dave Kraft – 30% available
- Quality Assurance/Quality Control: Tom Polzin – 15% available
- Other Support Staff (Engineers, Ecologists, Survey, CAD) – 50% available (appropriate staff to be assigned)

Brief overview of the Hey key personnel assigned to the project are included in Section 3: Key Qualification and full resumes can be found in Attachment A.
Hey and Associates, Inc. (Hey) has built our company’s suite of services and staff specifically to address the unique challenges and opportunities presented by projects like the City of Park Ridge Stormwater Master Plan.

The Hey team will provide the City of Park Ridge with a highly qualified and experienced project team. Our engineers, landscape architects and environmental scientists are experts at planning and implementing civil engineering, water resources, stormwater, flood control, and green infrastructure projects. We have a high degree of expertise in best management practice (BMP) design, hydrologic and hydraulic modeling, and extensive storm sewer modeling. In addition, we have proposed a project team that has successful and recent experience in preparing stormwater master plans for Cook County municipalities.

Our specifically proposed staff members have been directly working together for many years on a variety of projects ranging from water resources planning to design and through construction including water resources engineering, surface water hydrology and hydraulics, stormwater regulations, and water quality enhancement and protection. Our team’s experience matches the requirements of this project and we are excited for this opportunity to provide our services to create a multi-benefit solution that can improve the community and the environment.

A brief overview of the Hey key personnel assigned to the project and their roles follows with additional detailed resumes in Attachment A. The Hey key personnel listed will be fully supported by various Hey support staff and specialists as needed.

**PROJECT PRINCIPAL**

Jeff Wickenkamp, P.E., CFM, CPESC, is a Vice-President of Hey and Associates, Inc. and will serve as the Principal-in-Charge. Mr. Wickenkamp has over 20 years of water resources engineering experience (15 years with Hey and Associates, Inc.), is a registered professional engineer, a certified floodplain manager, a Diplomate, Water Resources Engineer and served on the executive board of the Illinois Association for Floodplain and Stormwater Management for seven years. His experience includes:

- Successfully managed watershed plans, stormwater management plans, preparation of regulations and technical reference manuals, preliminary engineering designs, and preparation of construction plans and specifications for numerous water resources projects.
- Served as the project manager for a number of sewer-based watershed studies. (Village of Niles, Norwood Park Chicago, Beverly Chicago, West Highlands Naperville, Central Business District Naperville, and General Mitchell International Airport).
- Served as the primary author of for stormwater management regulations and guidance manuals for the City of Chicago, the Village of Niles and McHenry County.
- Served as NIPC’s project manager for over 15 BMP projects being installed by local partners with Section 319 funding from the IEPA. Also responsible for engineering reviews of preliminary and final plans and site inspections during construction.

Jeff has most recently led the following projects:
### Project Manager

**Patrick Lach, PE, CFM** will act as project manager and be the City’s primary contact. He has over 13 years of water resources engineering experience (9 years with Hey and Associates, Inc.), is a registered professional engineer, a certified floodplain manager and serves on the Executive Board of the Illinois Section of the American Society of Civil Engineers. Based on his experience, he is an ideal fit for leading this project because he is well versed in planning and evaluating services for urban stormwater issues. Patrick has relevant project experience including completing stormwater management plans/drainage studies/watershed plans, advanced hydrologic and hydraulic modeling, site design, grading plans, underground utility design, designing drainage and detention systems, BMP design, completing construction plans and specifications, assessing flood damages, performing design for flood control projects, and performing on-site management for construction activities. Mr. Lach has completed many urban watershed studies involving hydraulic modeling of separate and combined sewer systems using SWMM and XP-SWMM, calibration to flow meters, alternative analysis, capital improvement planning and cost estimates. Patrick has most recently served Project Manager or Senior Water Resources Engineer on the following projects:

<table>
<thead>
<tr>
<th>Project</th>
<th>Client</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village of Niles Stormwater Master Plan and Tier 1 Design</td>
<td>Village of Niles</td>
</tr>
<tr>
<td>Poplar Creek Detailed Watershed Plan</td>
<td>Metropolitan Water Reclamation District of Greater Chicago</td>
</tr>
<tr>
<td>City of Chicago Stormwater Management Ordinance and Guidance Manual</td>
<td>City of Chicago Department of Environment</td>
</tr>
<tr>
<td>City of Chicago Woodlawn Green Infrastructure Plan</td>
<td>City of Chicago Department Housing and Economic Development</td>
</tr>
<tr>
<td>Kinnickinnic River Channel Rehabilitation Project and Watershed Plan Update</td>
<td>Milwaukee Metropolitan Sewerage District and GRAEF</td>
</tr>
</tbody>
</table>

### Water Quality

**Deanna Doohaluk, CPESC, CLP** will serve as the Water Resources Planner for the project and is Hey’s Senior Water Resources Planner. Ms. Doohaluk has 15 years of experience specializing in watershed management and water quality issues (9 years with Hey and Associates, Inc). She has served Project Manager/Technical Advisor for the development of four watershed-based plans for watersheds located in DuPage, DeKalb, Kane, and Winnebago Counties and she was responsible for facilitating educational outreach, watershed assessment, nutrient loading modeling, and BMPs selection and prioritization. She has also written and obtained various grant funding for a variety of projects related to water quality and stormwater issues.

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<tr>
<td>Village of Niles Stormwater Master Plan and Tier 1 Design</td>
<td>Village of Niles</td>
</tr>
<tr>
<td>Spring Brook Tributary to Salt Creek Watershed Plan Addendum</td>
<td>DuPage County Stormwater Management Division</td>
</tr>
<tr>
<td>Glencrest Creek and Bronswood Creek FEQ Modeling and Floodplain Mapping</td>
<td>DuPage County Stormwater Management Division</td>
</tr>
<tr>
<td>Various Hydraulic Reports, Location Drainage Studies, and Drainage Investigations</td>
<td>Illinois Department of Transportation</td>
</tr>
<tr>
<td>Poplar Creek Detailed Watershed Plan</td>
<td>Metropolitan Water Reclamation District of Greater Chicago</td>
</tr>
</tbody>
</table>
**KEY QUALIFICATIONS**

**GREEN INFRASTRUCTURE**

Tim Pollowy, ASLA RLA will serve as the Landscape Architect for the project and is Hey’s Senior Landscape Architect. Mr. Pollowy has over 20 years of environmental planning and design experience, is a registered landscape architect in Illinois and Wisconsin, and is a full member of the American Society of Landscape Architects. He has worked with Hey for more than 13 years. Having previously worked for a native areas landscape contractor, he also has a thorough hands-on understanding of construction, and has overseen the successful implementation of a wide variety of projects. Tim is widely recognized as an expert in the design and implementation of green infrastructure projects. He has assisted the City of Aurora in the design and implementation of numerous storm water BMPs including parkway bioinfiltration facilities serving a combined sewer area. These bioinfiltration facilities were designed to account for a difficult urban environment subject to road salt application. Additional consideration was given to planting specifications in order to maintain traffic sight lines, neighborhood awareness, and related public health, safety, and welfare issues. Tim also served as the landscape architect on the Chicago Green Alleys program and worked extensively on the Design Manual that established the basis for how, when and where green alleys should be implemented.

**MODELING**

Dave Kraft, P.E., CFM will serve as the Project Engineer. He has over 12 years of experience working on projects with similar scope items in Northeastern Illinois and is a Senior Civil Engineer at Hey. Dave has experience spanning the full breadth of water resources engineering including advanced hydrologic and hydraulic modeling, site design, grading plans, underground utility design, designing drainage and detention systems, BMP design, and preparing construction plans and specifications.

**QA/QC**

Tom Polzin, PE, CLM is the President of Hey and Associates, Inc. and will serve as Quality Assurance/Quality Control officer for the project. Mr. Polzin’s professional experience includes stormwater infrastructure design, hydrologic and hydraulic analyses of stormwater systems, and water quality best management practice design. His experience also includes the analysis and design of urban flood reduction projects as well as the design and implementation of restoration projects in urban stream corridors. He has more than 23 years of experience solving civil and water resources problems (17 years with Hey and Associates, Inc.) and is a magna cum laude graduate of Northern Illinois University. He is a registered Professional Engineer in Illinois, Wisconsin and Oregon, a Certified Floodplain Manager in Illinois, a Qualified Engineering Review Specialist in Kane County, Illinois, a Lake County Certified Enforcement Officer, a Certified Professional in Erosion and Sediment Control and serves on the Lake County Stormwater Management Commission’s Technical Advisory Committee as Vice Chairman.
Project Understanding

Over the last ten years, the frequency and intensity of storm events have increased in northeastern Illinois, impacting the health and well-being of residents throughout our communities. In 2008, Hurricane Ike caused urban flood damages throughout the whole region. Ever since and in the wake of a string of additional damaging storms, stormwater and drainage engineers have expended tremendous energy identifying, diagnosing and solving the damaging effects of urban flooding. While the role of the drainage engineer has existed for decades, the demands placed on these engineers have never been more complex. The analytical models have become more sophisticated, simulating both flows within the sewer as well as complex flowpaths that occur overland during flooding events. Potential solutions have also expanded from the traditional installation of larger sewers (which may still be a valid solution in many cases) to also include multi-purpose flood control basins, underground storage, green infrastructure, buyouts, and lastly, floodproofing and modification of the structures on private properties.

All communities endeavor to seek affordable, fair, balanced and appropriate solutions to their flooding problems. When successful solutions are implemented, they create and enhance the value of the community itself.

Addressing today’s urban flooding challenges requires professional engineers with not only outstanding technical skills, but also the ability to communicate and explain their work to the public. It also is the engineer’s job to anticipate the questions that will be asked, which is highly dependent on the unique situation and circumstances of the project and the community.

The two most challenging issues facing water resources engineers and the communities they serve are:

- Traditional public works projects that achieve a uniform flood protection level-of-service (i.e. - the 1% probability or 100-year event) across an entire community are rarely feasible or affordable.
- The “highest value” projects typically require cooperation between multiple governing bodies with different primary “charges” such as provision of public services, open space, recreation, or education.
For many civil engineering projects, communities look to engineers to be prescriptive, asking:

“Please evaluate this issue and tell us the best way to fix the problem.”

These assignments are then completed in three fairly straightforward steps:

1. Identify or confirm the problem
2. Develop several alternatives
3. Recommend the most cost effective solution

However, this approach has been ineffective for the engineering of urban flood control projects; let’s examine why. The most cost effective urban flooding solution almost always drives toward one of two solutions: 1) putting in larger sewers to convey stormwater runoff away from problem areas, or 2) installation of stormwater storage basins on property controlled by entities other than the municipality itself. In developing a solution, there are many other factors to consider such as regulatory requirements, likelihood of receiving cooperation from other governmental bodies, environmental impacts, sustainability and time required for implementation. Historically, engineers have diligently addressed these issues, arriving at a “recommended” solution, which in fact may be a perfectly valid solution. However, it is nearly impossible the engineers to make these decisions on their own and then expect the community to share the same opinion.

Solving complex urban flooding problems and identifying the best solutions for a community is a collaborative process. If solutions are not arrived at through collaborative process, then they will often be misunderstood and unsupported.

The flow chart below presents the systems analysis approach that we will use to complete this stormwater master plan. Flooding problems can be classified as local sewer capacity related, outlet capacity related or lack of major drainage system related. All solutions must identify and incorporate opportunities to control the volume of runoff wherever possible.
APPRAOCH TO STORMWATER MASTER PLANNING IN PARK RIDGE

Investigation and Review

- Previously Completed Studies
- Historical High Water Marks
- Sewers
  - Size
  - Capacity
  - Connectivity
- Special Hydraulic Structures
  - Size
  - Capacity
- Parcels
  - Location
  - Lowest adjacent grades
  - Estimated low water entry

Diagnosis and System Understanding

- Review XP SWMM Model
- Verify Model Results
- Confirm Existing System Performance
  - Downstream outlet capacity
  - Outlet basin capacities
  - Level of service
  - System deficiencies
- Evaluate future level of service goals and recommendations

Evaluate and Discuss Solutions

- Increase local sewer capacity
- Evaluate downstream capacity
- Trunk sewer improvements
- Downspout disconnections
- BMPs
- Regulatory

Recommend Solutions
Project Approach
Our project approach to developing the Stormwater Mater Plan has been divided into nine major tasks as described below.

**Task 1 – Project Initialization**
We will conduct a kickoff meeting at the start of this project as described below.

*Kickoff Meeting* – We will schedule and conduct a project kickoff meeting within 7 days of Notice to Proceed. The purpose of the kickoff meeting will be to establish schedules, roles, responsibilities, milestones, communication plans, and other baseline elements needed to successfully manage the project. Hey and Associates’ staff has viewed the videos of recent stormwater meetings. We will use this initial understanding of Park Ridge’s recent stormwater planning history along with our own experience with the stormwater master planning process to facilitate successful completion of the project.

**Task 2 – Background Data Collection**
We will collect and review available data including previous drainage studies and reports, GIS and utility data, previously compiled flood damage survey, and stormwater utility files. Hey will review existing reports and data available from the City on reported problems and historical flooding. Hey will ensure that we acquire additional data from other agencies or sources necessary to conduct the engineering analyses including:
- Fully updated GIS data
- Cook County LiDAR data
- Future projects planned by adjacent or downstream communities or other entities like MWRD

Hey and Associates staff has already reviewed the publicly available data for this project. In fact, due to our comparable work in nearby Niles, our staff has reviewed and tracked Park Ridge stormwater programs (as well as programs in other communities such as Glenview, Lincolnwood, Des Plaines, LaGrange, Elmhurst, Downers Grove, River Forest, etc.) since 2010. We regularly review these programs for any innovative ideas and approaches that could enhance the programs that we’re working on.

**Task 3 – Review and Update Existing Hydrologic and Hydraulic Modeling**
We will evaluate, review, update, and verify the existing modeling and the modeling for previously proposed improvements as listed in Addendum 1 to assure that it is useable and accurate as base modeling for determining existing conditions and developing proposed improvements. If necessary, we will adapt the existing hydrologic/hydraulic modeling to verify modeled flood depths for various storms for the existing storm sewer network.

*Identify Existing Level of Service and System Deficiencies* - Hey will review the previously determined system deficiencies, flood impacts and damages. We will work directly with City staff to define the criteria that will be used to evaluate the performance of the system. Typical criteria would include the following, but we will work with the City to adjust these as may be appropriate:

- a. Capacity to convey the flow generated in the 10-, 25-, 50-, and 100-year storms without flood damage.
- b. Flood depths on streets that exceed 6 inches.
- c. Location of any buildings subject to overland flow damage.

This information will be used to inform decisions about the minimum level of service for different types of flooding.
**Task 4 – Review Previously Proposed Improvements**

We will review the previously developed improvements for feasibility, including re-visiting discussions with public agencies or other entities owning the land on which detention would need to be constructed. We are experienced in facilitating these types of meetings. For instance, we assisted the City of Niles in negotiating with the Catholic Archdiocese of Chicago for the installation of two detention basins on their property. We also have a strong working relationship with the FPDCC, having completed civil engineering designs for them and also through negotiation work on Niles’ behalf to obtain a license agreement for a new proposed outfall.

Finally, we will review and update the preliminary cost estimates previously prepared. We will check these estimates both for the items and quantities, as well as the unit costs used in these estimates. Have just completed a bidding process in May 2015 for an $8.5 million relief sewer project which attracted six bidders, we have access to recent and applicable unit cost data reflective of current conditions in this area. We will meet with staff at the conclusion of this task to discuss interim results and conclusions and to prepare for the development of new alternatives.

**Task 5 – Develop Alternatives**

Hey will conduct an alternatives analysis to identify potential solutions and recommend improvements for the identified problems in the City and to achieve the desired level of service. A starting point will be the effectiveness of the previously proposed solutions reviewed under Task 4. We will consider a variety of approaches including traditional gray infrastructure, green infrastructure, and other approaches. Control of runoff from open space volume control BMPs will be considered along with sewer capacity increases. Alternatives will be evaluated based on construction cost, construction disruption, operating/maintenance costs, water quality considerations, sustainability, land use goals, and technical feasibility. Time-to-implementation will also be considered, with the possibility of quick implementation of partial improvements or phased implementation to provide relief to affected neighborhoods quickly.

**Identify and evaluate potential solutions** – Potential solutions will be outlined for City review for acceptability as the first step in the process of seeking solutions. We will provide a brief description of potential solutions, their advantages and. Major capital improvements will be modeled using the XP SWMM model to quantify benefits of the improvements. Itemized or estimated cost estimates will be prepared for feasible alternatives to be used in the development of recommended improvements. The following table presents alternatives which will be evaluated as appropriate.

<table>
<thead>
<tr>
<th>Alternative Solution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of Runoff</td>
<td>• Green infrastructure projects and recommendations</td>
</tr>
<tr>
<td></td>
<td>• Recommended BMPs to improve performance above limitations of downstream sewer capacities</td>
</tr>
<tr>
<td></td>
<td>• Regulatory program and policy recommendations</td>
</tr>
<tr>
<td>Conveyance improvements</td>
<td>• Address locations with limited capacity</td>
</tr>
<tr>
<td></td>
<td>• Local and trunk sewer improvements to match downstream outlet capacities</td>
</tr>
<tr>
<td>Downstream Limitations</td>
<td>• Identify any opportunities to increase downstream capacity</td>
</tr>
<tr>
<td>Protection of Property</td>
<td>• Identify opportunities to implement floodproofing of structures or property</td>
</tr>
</tbody>
</table>
**Development of benefits and costs associated with recommended improvements** – Hey will identify the benefits of each alternative. Avoided flood damages will be documented as well using historical flood damage data so that the City has a complete picture of the benefits associated each solution. Using expected benefits, costs, ease of implementation, feasibility and other criteria to be developed with input from the City, Hey will prepare recommendations for implementation of the improvements. This information will be prepared for presentation under Task 6.

**Task 6 – Public Participation**
We propose to hold an open house meeting. This meeting will be conducted when alternatives have been drafted and developed, but before these alternatives have been finalized. We have found that an open house session lasting from 4:00 pm to 7:00 pm are particularly successful as they accommodate a variety of schedules.

**Task 7 – Prepare Stormwater Master Plan**
Hey and Associates’ staff will use the products and outcomes of the previous tasks to to prepare a Stormwater Master Plan (SMP). The SMP will identify the minimum level of flood protection that can feasibly be provided throughout the entire City. As identified in the Project Understanding, it may be necessary to establish varying protection standards for different types of flood problems.

**Capital Improvement Plan:** A major objective of the SMP is to establish a capital improvement plan for future projects. Previous studies analyzed the existing sewer system comprehensively throughout the City limits. The constructed improvement projects and remaining proposed improvements have targeted specific locations. Additional projects recommended in the the SMP will be to achieve a standard level of protection throughout the City.

Capital improvements will be grouped according to projects that can completed within the next five years (Tier 1 projects) based on the recommended stormwater utility funding level and other anticipated funding sources (grants or debt issuance), and projects that will be implemented after the initial five year implementation period (Tier 2). While some prioritization of Tier 2 projects will be conducted, it is generally advisable to revisit Tier 2 project prioritization after Tier 1 projects are implemented to reassess new information and developments within the City.

**Water Quality:** The SMP will identify opportunities to protect and enhance water quality. These opportunities will primarily be identified through the continued implementation of the City’s MS4 permit.

**Green Infrastructure:** The SMP will include a strategy for encouraging the use of green infrastructure in both private and public improvements. Identifying a green infrastructure implementation plan for future projects may enhance the ability to secure grants for projects.

**Development Stormwater Polices and Regulations:** As part of the SMP, we will prepare recommendations for updating development regulations to ensure that they express the state of the art in stormwater management. With the Cook County WMO in place, many of these protections are now in place, but Park Ridge may wish to consider further lowering the development threshold limits of the WMO. There are also ways to implement supporting regulations that are effective for smaller sites. Hey and Associates wrote the City of Chicago’s stormwater management ordinance which governs site development down to 7,500 square feet. We later assisted the Village of Niles in modifying Chicago’s
ordinance to apply to sites 15,000 square feet and larger (an appropriate cutoff for development in Niles). We will assist Park Ridge in considering similar opportunities.

**Operations and Maintenance:** The Stormwater Master Plan should provide a strategy for scheduling and funding maintenance activities associated with the storm sewer system. These activities will include inflow and infiltration monitoring, reporting and I&I program development as required by the MWRD, catchbasin cleaning, and sewer defect detection.

**Staffing Level Analysis:** Using the SMP program elements, we will estimate number of full time equivalents needed to implement the program. The analysis shall determine the Stormwater Operations, Engineering and Administration staffing level necessary to adequately maintain and manage the recommended stormwater program.

**Stormwater Commission:** We will assess and recommend whether or not the City should create a Stormwater Commission. The analysis shall include the expected duties and functions of the Stormwater Commission. If the formation of Stormwater Commission is not recommended, we will identify the process by which stormwater management decisions in the City will be made and how the SMP will be implemented.

**Fee in Lieu of Construction Program:** We will assist the City in preparing standards for how and when a fee-in-lieu of construction of stormwater facilities can be implemented.

**Stormwater Utility Rate Setting:** Based on the previously completed work to implement a stormwater utility, we will assist the City in selecting a final service charges rate to support the SMP recommendations.

**Public Education and Involvement:** The SMP will provide a strategy for educating and working with property owners on strategies and measures they as individuals can take to protect their properties. Our staff are very experienced in property protection measures. We have assisted the Village of Niles in implementing their overland flow flood protection program and we are currently working with the Center for Neighborhood Technology to lead private property flood risk assessments and prepare detailed property improvement recommendations for up to 70 properties in the City of Chicago.

**Timeline:** The SMP will include recommended timeframes for implementation of the recommendations. These timeframes will be compatible with the expected funding to be generated by the stormwater utility as well as other sources.

**Task 8 – Presentation to City Council**
We will present the SMP to the City Council at a public meeting. The presentation will include the improvements, benefits, protection levels, and costs, so that the City Council and the community can effectively move toward adoption of the SMP.

**Task 9 – Project Management and Progress Reporting**
We will provide monthly written progress updates for City staff. These reports will include a summary of weekly reports, plus a summary of contract billings to date, a schedule review/update, and a report of any budget or schedule variances. We will also conduct monthly project management meetings with staff.
# Project Schedule

The project will be completed over a 10-month period. Based on the time needed to review data, present interim results, allow for adequate review time and make the necessary adjustments, we believe this is an appropriate time frame for the nature of this project. A project schedule is included below.

<table>
<thead>
<tr>
<th>Task Description</th>
<th>Month</th>
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<tbody>
<tr>
<td>Project Initialization</td>
<td>Aug-16</td>
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<tr>
<td>Kick Off Meeting</td>
<td>Oct-16</td>
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<tr>
<td>Background Data Collection</td>
<td>Nov-16</td>
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<tr>
<td>Data Collection &amp; Review</td>
<td>Dec-16</td>
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<tr>
<td>Review and Update Existing H&amp;H Modeling</td>
<td>Jan-17</td>
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<tr>
<td>Review H&amp;H Models</td>
<td>Feb-17</td>
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<tr>
<td>Identify Existing Level of Service and System Deficiencies</td>
<td>Mar-17</td>
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<tr>
<td>Review Prior and Proposed Improvements</td>
<td>Apr-17</td>
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<tr>
<td>Agency Coordination</td>
<td>May-17</td>
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<tr>
<td>Review/Update Cost Estimates</td>
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<tr>
<td>Develop Alternatives</td>
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<td>Alternative Development</td>
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<td>Evaluation of Design Standards</td>
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<tr>
<td>Benefits / Costs</td>
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<tr>
<td>Public Participation</td>
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<td>Public Open House</td>
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<td>Develop Stormwater Master Plan</td>
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<td>Prepare Draft Plan</td>
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<td>Prepare Final Plan</td>
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<td>Presentation to City Council</td>
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<tr>
<td>Preparation and Presentation</td>
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<tr>
<td>Project Management and Progress Reporting</td>
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<td>Management</td>
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<tr>
<td>Progress Reports</td>
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</table>

▲ Meetings and Deliverables
Hey and Associates’ experience with water resources projects is extensive. The table below lists only Hey and Associates projects that have been completed within the last 5 years as requested by the RFP. Expanded summaries for six key projects are provided on the pages following the table.

<table>
<thead>
<tr>
<th>Project Experience</th>
<th>Project</th>
<th>Date</th>
<th>Client</th>
<th>H&amp;H</th>
<th>Flood Control Alternatives</th>
<th>Water Quality</th>
<th>Green Infrastructure</th>
<th>Policy and Regulation</th>
<th>O&amp;M Plan</th>
<th>Implementation Plan</th>
<th>Public Outreach</th>
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<tbody>
<tr>
<td>Niles Stormwater Relief Program</td>
<td>2012</td>
<td>Niles</td>
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<td>Kinnickinnic River Channel Preliminary Engineering</td>
<td>2016</td>
<td>MWRD</td>
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<td>East Branch DuPage River Resiliency Plan</td>
<td>2015</td>
<td>DuPage Co.</td>
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<td>Spring Brook Watershed Plan Addendum</td>
<td>2011</td>
<td>DuPage Co.</td>
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<td>Poplar Creek Detailed Watershed Plan</td>
<td>2010</td>
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<td>Barrington Flood Studies</td>
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<td>Tier 1 Stormwater Relief Projects Design</td>
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<td>Evanston</td>
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<td>Niles Bioinfiltration Facility</td>
<td>2013</td>
<td>Niles</td>
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<td>Downer Place &amp; Stolp Avenue Improvements</td>
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VILLAGE OF NILES STORMWATER RELIEF PROGRAM – Niles, Illinois

Client: Village of Niles
Steve Vinezeano
(847) 588-8007
scv@vniles.com

Services Provided:
- Stormwater & Floodplain Management
- Civil Engineering Design
- Landscape Architecture
- Water Quality Planning
- Sustainable Planning & Design
- Soil Erosion & Sediment Control

Project Highlights:
- Flood Risk Identification
- Urban flood relief
- Public Outreach
- XPSWMM 2D model

Completed: 2012

Construction Cost: N/A

Fee: $264,000

Hey and Associates, Inc. prepared a Stormwater Master Plan, adopted by the Village in June 2012. The preparation of the master plan involved advanced hydrologic and hydraulic modeling, evaluation and diagnosis of drainage problems, preparation of recommended solutions, and new cost share programs and stormwater management regulations. Hey modeled the village using XPSWMM 2D, which is a state-of-the-art sewer modeling program. Hey conducted an alternative analysis to develop potential solutions and identify the most effective solutions. A public open house, where residents could meet with engineers and review model results, was conducted to answer questions about the identified problem areas as well as the proposed solutions.

The proposed capital improvement program included over $30M of improvements in two priority tiers. Hey completed preliminary and final engineering for three high priority projects. The three high priority projects included:

- Cleveland Relief Sewer – extends a 72-inch relief storm sewer into several depressional flooding areas and began construction in June 2016.
- Maryhill and Our Lady of Ransom Storage Basins – a combination of stormwater detention and new storm sewers were used to relieve local flooding and drainage problems, completed in late 2014. The design and implementation of these two basins won a 2015 ACEC Special Achievement Award in Water Resources.

A copy of the final report for the Village of Niles Stormwater Relief Program is included in Attachment B.
Hey and Associates prepared a preliminary engineering report and plans for the Kinnickinnic Channel Rehabilitation Project. The proposed project involved rehabilitation of two miles of failing concrete-lined channel. The project reach included a large park as well as heavily urbanized and residential areas. During flood stage, high flow velocities created hazardous conditions. Over 200 structures were within the floodplain in this reach. The objectives of the proposed rehabilitation project included:

- Improve public safety by reducing flow velocity
- Manage long-term flood risk
- Provide in-stream aquatic habitat
- Improve aesthetics of channel
- Leverage additional community objectives

Alternative channel rehabilitation plans were developed and evaluated for the project area based on combinations of the following techniques.

- Develop upstream storage to reduce peak flood flows
- Divert high flows around reaches of limited conveyance
- Modify bridges to increase conveyance
- Remove drop structures
- Widen the channel and floodplain
- Widen and deepen the channel and floodplain

Each alternative or combination of alternatives was evaluated using an HSPF hydrologic model and a HEC-RAS hydraulic model. The recommended project included removing the concrete lining, reconstructing a rock-lined channel with aquatic habitat, modifying bridge structures, expanding the floodplain to increase storage, and developing a vegetated inset floodplain. The estimated cost for the recommended improvements is $60 million.

In 2014, an overall Watershed Management Plan Update was undertaken due to new meteorological data. Hey and Associates is preparing the Watershed Plan Update to remove 100-year flood risk from over 500 properties. The recommended improvements will have a value of over $200 million.
Hey and Associates, Inc. managed the project team for the fast-paced data collection, public outreach and report development efforts for the East Branch DuPage River Watershed & Resiliency Plan. The work included significant stakeholder coordination to develop a major plan that expanded the scope of potential watershed projects beyond the flood control focal point and into a broader watershed-wide plan for future resilience to extreme weather disasters. The goal was to identify unmet needs in the watershed and create recommendations and an implementation plan to improve the resiliency of the watershed and its stakeholders.

Data collection included a wide ranging analysis of existing codes and ordinances, comprehensive plans, green infrastructure plans, capital improvement plans, maintenance programs, flood damages, water quality impairments, unmet needs associated with disaster prevention and preparedness, natural resource inventories and other planning studies. Hey analyzed and aggregated various stormwater and water resources projects throughout the watershed including streambank stabilization and restoration activities.

Significant public and stakeholder outreach and collaboration was conducted to bring together the many different people and groups with an inherent link to the watershed. These included residents, businesses, municipalities, non-governmental organizations, watershed-based work groups, County departments, other agencies, and many more. This process included stakeholders beyond what is normally considered as part of a flood control plan.

A final report was prepared that detailed the data collection efforts, outreach efforts, and developed an implementation plan for wide-ranging recommendations to improve resiliency to disasters such as flooding. The recommendations range from watershed-wide programmatic plans to site-specific plans to non-point source pollution reduction plans. Implementation strategies will guide the County and the watershed stakeholders to further improve and develop their ability to prepare for, respond to, and recover from disaster events.
Hey and Associates, Inc. worked with the DuPage County Stormwater Management on providing an addendum to the Spring Brook Tributary to Salt Creek Watershed Plan. This addendum included existing conditions hydrologic and hydraulic analysis, estimate of historical flood damages, alternative evaluation, streambank stabilization and water quality alternatives, opinion of probable cost, and associated documentation and exhibits. The alternatives recommended in the plan were also required to comply with the DuPage County Stormwater and Floodplain Ordinance (DPCSFO). The analysis utilized the Spring Brook FEQ unsteady hydraulic model and the DuPage County Historical Storm Series rainfall.

As part of this project, Hey prepared Concept Design Reports for streambank stabilization for a 2,650-foot reach of Spring Brook in Bloomingdale and a 1,500-foot reach of Spring Brook in Roselle. These reports included an assessment of existing conditions including hydrology and geomorphology, proposed alternative development, cost opinions, administrative and regulatory considerations, and site exhibits and concept designs. These reaches were characterized by steep eroded banks constrained by private properties. Several small portions of the channel have been stabilized and DuPage County is planning on designing and implementing the Bloomingdale Stabilization in the next year.

In addition, Hey analyzed flood reduction alternatives including optimization of an existing labyrinth weir into a flood storage reservoir at the Meacham Grove Forest Preserve to divert flood waters into the reservoir for the greatest array of storm events and designing a retrofit to an existing detention pond that frequently overtops and floods adjacent commercial properties.

An addendum to the 2006 watershed plan was prepared which includes recommended improvements, damage estimates, alternative benefits and cost estimates. A public outreach meeting was held to inform stakeholders of the components and recommendations of the plan. This addendum is used to plan for future capital improvement projects. DuPage County has constructed several of the recommendations from the plan.
POPLAR CREEK DETAILED WATERSHED PLAN – Cook County, Illinois

Client: Metropolitan Water Reclamation District
Jonathan Grabowy
(312) 751-5600
Jonathan.Grabowy@mwrd.org

Services Provided:
- Stormwater & Floodplain Management
- Civil Engineering Design

Project Highlights:
- Unsteady HEC-RAS Modeling
- Inundation Mapping
- Flood reduction project development

Completed: 2010

Construction Cost: n/a

Fees: $1,169,000

Hey and Associates completed the Detailed Watershed Plan for the Poplar Creek Study Area for the Metropolitan Water Reclamation District of Greater Chicago. The Poplar Creek Study Area includes five watersheds (Poplar Creek, Spring Creek, Flint Creek, West Branch DuPage River, and Brewster Creek) in northwestern Cook County.

Phase A of the plan included a significant data collection, inventory, and assessment effort. Data assessment included technical reviews of existing hydrologic and hydraulic models, wetland and riparian information, water quality, land use, soils, existing watershed plans, stormwater problems, FEMA floodplain/floodway mapping, and other GIS data.

Phase B included the preparation of detailed hydrologic and hydraulic modeling and flood maps, as well as the development and analysis of flood control alternatives. Detailed hydraulic models were prepared for approximately 67 linear miles of waterways. Modeling was performed using HEC-HMS and HEC-RAS modeling software, including the ArcGIS extensions HEC-GeoHMS and HEC-GeoRAS. GIS data was used to facilitate development of hydrologic inputs and parameters including subbasin delineation, time of concentration, runoff curve numbers, impervious areas, and drainage patterns. As part of this project new survey data was collected throughout the study area to obtain stream channel profiles, channel cross sections, bridge and culvert crossings, dams, weirs, and significant detention basin outlets. Calibration was completed for historical storm events including the September 13, 2008 event. On September 14th, 2008 Hey and Associates staff obtained high water marks at over 40 structures throughout the watershed.

The models were also used to develop alternative solutions to address flood damages in accordance with the Cook County Stormwater Management Plan. The Poplar Creek Detailed Watershed Plan document was produced in December 2010.
Hey and Associates, Inc. was contracted by the Village of Barrington to perform a Village-wide stormwater management study. The impetus for the study was the flooding issues experienced within the Village during the August 2007 and September 2008 storm events. Major flooding issues occurred at a Metra commuter lot as well as several residential areas throughout the Village. In addition, the Flint Creek Tributary that flows through the Village experienced high water elevations, affecting several residences.

Hey completed an initial data gathering phase and coordinated an open house at the Village offices to document drainage complaints of Village residents. Following this data gathering phase, Hey performed detailed field reconnaissance of all noted drainage concerns as well as additional areas of concern.

Detailed modeling work consisted of an XP-SWMM hydrologic and hydraulic modeling representing a large portion of the Village storm sewer system to quantify flooding extents and begin to assess solutions to mitigate drainage issues.

The hydrologic and hydraulic modeling that was prepared for the study was used to quantify the existing observed flooding areas and highlight any areas prone to flooding for which no observations were available. Upon identification of these areas, alternatives were developed to decrease flooding at the problem areas and weigh the potential to minimize flooding in the Village as a whole. Alternatives examined included additional and modified storm sewer lines, additional storage, pumping solutions, modifications to existing impoundment outlets, opportunities for water quality improvements and overland conveyance routes. The information prepared for the study was delivered to the Village in a comprehensive report and presented to the Village Committee of the Whole for their consideration.
A complete table of itemized, not-to-exceed Total Project Cost including a breakdown of project hours, direct and indirect labor costs for each task, all reimbursable expenses and fixed fee is enclosed in a separate envelope as requested. A rate table for engineering and staff time by the hour, including rates for expenses is also included.
JEFFREY A. WICKENKAMP, P.E., CFM, D.WRE, Vice President

EDUCATION
M.S., Environmental Engineering in Civil Engineering, University of Illinois Urbana-Champaign, 1994
B.S., Civil Engineering, University of Illinois Urbana-Champaign, 1992

PREVIOUS EMPLOYMENT
Principal Water Resources Engineer, Northeastern Illinois Planning Commission, 2004-2005
Senior Project Manager, Camp Dresser & McKee, Inc., 1998-2004

MAJOR PROJECTS
Village of Niles Tier 1 Preliminary Engineering Design, Village of Niles, Illinois. Mr. Wickenkamp is serving as project manager for the development of preliminary engineering solutions to mitigate flood damages in separate and combined sewer areas in the Village of Niles. Two stormwater relief basins and a stormwater relief sewer were designed to reduce flood damages.

Village of Niles Stormwater Study, Niles, Illinois. Served as project manager of a two-phase project to prepare a stormwater master plan for the Village of Niles. Analyzed existing conditions and prepared proposed conditions alternatives. Recommended cost share program and $15M capital improvement plan that was adopted by the village in 2012. The recommended program was reviewed at Stormwater Commission meetings, a public open house and at two Village board meetings.

Kinnickinnic River Watershed Plan Update, Milwaukee Metropolitan Sewerage District, Milwaukee, Wisconsin; Led the modeling efforts using HSPF and HEC-RAS to prepare and analyze watershed alternatives. Presented draft alternatives at multiple technical stakeholder meetings and public meetings to receive input on the final recommended alternatives. The recommended alternatives including channel improvements, bridge replacements, and storage facilities will improve safety, improve environmental conditions and reduce flood risk. The recommended watershed-wide improvements are estimated to cost over $200M.

Kinnickinnic River Channel Rehabilitation Project, Milwaukee, Wisconsin; Completed HSPF and HEC-RAS modeling and prepared preliminary design for the rehabilitation of a two-mile reach of the Kinnickinnic River with aging and undesirable concrete lining. The plan interfaced with a local neighborhood plan and was presented to stakeholders and the public in a series of open meetings.

City of Chicago Green Alley Program. Worked with the Chicago Department of Transportation to prepare design guide and designs for green alley pilot projects. Also worked with the Department of Transportation to conduct a pavement performance monitoring program following installation.

Addison Creek Channel Improvement Preliminary Engineering, Metropolitan Water Reclamation District of Greater Chicago, Cook County, Illinois. Mr. Wickenkamp served as project manager for the preliminary design of $30M of channel improvements. Work included analysis of conveyance and storage alternatives, streambank stabilization improvements, and bridge/culvert removals and replacements. Additional work involved coordination meetings with six municipalities and regulatory agencies.

Orchard Valley Golf Course Stream Corridor Analysis, Aurora, Illinois. Prepared analysis of hydrology, topography, soils, vegetation, erosion, irrigation demand, and other factors to address water-resources-based problems on the golf course. Alternatives for addressing aesthetics of the one-mile East Run of Blackberry Creek corridor, enhancing of over ten acres of wetland mitigation, and improving surface water supply were prepared.

Big Marsh Hydrologic Master Plan Design, Chicago Park District, Illinois. Mr. Wickenkamp led this project to develop plans and specifications for an improved outlet control structure and channel improvements for Big Marsh. The project involved hydrologic and hydraulic model using XP-SWMM and XP-SWMM 2D.

City of Chicago Green Healthy Neighborhoods. Worked with the Department of Housing and Economic Development to prepare a Green Infrastructure Dashboard and completed a green infrastructure plan for the Woodlawn and Washington Park Neighborhoods. Projects to capture stormwater runoff before it enters the sewer system were identified. Presented the work at a public workshop for Green Healthy Neighborhoods. Also met with a neighborhood stakeholder group to review a site specific sewer daylighting project concept.
Newport Creek Watershed Plan, Lake County, Illinois. Served as project engineer for the preparation of the Newport Creek Watershed Based Plan. This plan used an updated floodplain study to prepare a flood damage assessment and recommendations for the watershed.

Boneyard Creek Improvement Plan, City of Champaign, Illinois; Prepared hydrologic and hydraulic models for selected alternatives for a series of online detention basins. Each alternative was evaluated for achieving the flood mitigation goals. Ultimate improvements include channel modifications, detention facilities and storm sewer improvements and will be implemented over a 25-year time frame.

Stormwater Management Plan Update, General Mitchell International Airport, Milwaukee, Wisconsin; Prepared a Stormwater Management Plan (SWMP) to address new regulations that affect proposed development at the airport. Preliminary designs and cost estimates were prepared and a recommended stormwater management policy was developed.

Lincoln Creek Watershed, Milwaukee, Wisconsin; Prepared the HEC-RAS analysis of the Lincoln Creek Watershed for the Milwaukee Metropolitan Sewerage District (MMSD) and covered approximately 10 square miles and 8 miles of stream channel. This comprehensive restoration involved the removal of concrete lining, followed by construction of detention facilities and naturalized river reaches to achieve both environmental restoration and flood control.

City of Chicago Flowpath Diagrams. Worked with the Department of Housing and Economic Development to prepare stormwater flowpath diagramming for all of the City of Chicago. This dataset was then used to plan and identify green infrastructure implementation opportunities.

Poplar Creek Detailed Watershed Study, Cook County, Illinois. Served as project manager for Phases A and B of the Metropolitan Water Reclamation District’s Detailed Watershed Plan of Poplar Creek and adjacent watersheds of Flint Creek, Spring Creek, Brewster Creek, and West Branch DuPage River. Led presentations of technical work to stakeholders at local municipal working sessions.


Thorn Creek Watershed Based Plan, Cook County, Illinois. Served as project engineer for the preparation of the Thorn Creek Watershed Based Plan. This plan became the first official watershed based plan funded by the IEPA.

Poplar Creek Watershed Plan, Cook County, Illinois. Served as the regional planning agency’s coordinator for the Poplar Creek watershed stakeholders group. Completed phase 1 planning effort that focused on water quality and environmental restoration opportunities and prepared successful grant application for a second phase.

City of Evanston Feasibility Study of Alternative Stormwater Management Techniques, City of Evanston, Illinois. Served as project manager for the development of standard green infrastructure details that could be used in municipal projects. Project deliverables included standard details for green infrastructure techniques, overland flow path analysis, memorandums/summary of underground storage options and permeable pavement options.


Winnebago County Watershed Planning – Welworth/Wentworth Watershed, Winnebago County, Illinois. Provided technical oversight for the Welworth/Wentworth Watershed Plan for Winnebago County. Utilizing the BASINS (Better Assessment Science Integrating Point & Non-Point Sources) modeling platform to perform a PLOAD (Pollutant Load Estimator) analysis within the Welworth/Wentworth watershed.

Thorn Creek Watershed Based Plan, Cook County, Illinois. Served as project engineer for the preparation of the Thorn Creek Watershed Based Plan. This plan became the first official watershed based plan funded by the IEPA.
PATRICK M. LACH, P.E., CFM, Senior Civil Engineer

EDUCATION

B.S., Civil Engineering, University of Notre Dame, Notre Dame, Indiana, 2001

PREVIOUS EMPLOYMENT

Civil Engineer, Camp, Dresser & McKee, Inc. (CDM), Chicago, Illinois, June 2001-September 2005

EXPERIENCE

Mr. Lach has 15 years of water resources and civil engineering experience, is a registered professional engineer, a certified floodplain manager, and recently served as Past-President of the Illinois Section of the American Society of Civil Engineers. He currently serves as a Senior Civil Engineer for Hey and Associates and has managed both public and private sector planning and design projects involving civil engineering, water resources, environmental engineering, wetlands/ecology, and landscape architecture. His experience includes planning and design of transportation drainage and stormwater projects for IDOT, Tollway, Cook County Department of Transportation and Highways, Kane County Division of Transportation, and local municipalities. Expertise includes hydrologic and hydraulic modeling practices, stormwater infrastructure design, watershed planning and studies, and water resources design. He has extensive experience in developing design plans, specifications, cost estimates, permitting and construction observation for civil engineering, transportation, and water resources projects. He received his Bachelor of Science in Civil Engineering from the University of Notre Dame and is a licensed engineer in Illinois, Indiana, Wisconsin, and Michigan.

MAJOR PROJECTS

Hydraulic and Wetlands Services, Cook County Department of Transportation and Highways: Served as project manager for various/Various contract with Cook County to develop hydraulic reports, location drainage studies, wetland delineation reports, and other permitting issues. Projects include Happ Road at the Skokie River, 108th Avenue in Orland Park, 156th Street in Harvey, and sewer cleaning and televising.

Hassell Road Culvert Replacement Project, Village of Hoffman Estates: Mr. Lach was the lead engineer working on and overseeing the design of culvert improvements for three separate culverts for the Poplar Creek East Branch under Hassell Road. The project includes the hydraulic analysis of existing and proposed culverts, development of preliminary and final engineering plans for each culvert, development of specifications, permitting, and coordination with IDOT. In addition, Mr. Lach performed construction observation and soil erosion and sediment control inspections during the construction phase.

Various-Various Hydraulics Projects, Illinois Department of Transportation: Served as lead project engineer for multiple work orders under two Various-Various contracts for hydraulics and drainage for IDOT District 1. Work included completion of Location Drainage Studies, Hydraulic Reports, Sewer Cleaning / Televising / Assessments, Drainage Investigations, and remedial drainage designs. He completed and directed staff on projects for successful and timely completion of project deliverables. Projects included hydraulic reports for IL 53 South of Elwood, IL 83 at 63rd St, IL 113 at River Road, Touhy Ave at North Branch Chicago River; drainage studies for Dempster Ave in Morton Grove / Niles, US 30, Willow Rd and Pfingsten, Halsted and Vincennes; and various storm sewer cleaning and televising locations.

Illinois Route 68 (Dundee Road), Shermer Road at the North Branch Chicago River, Illinois Department of Transportation: Mr. Lach was the lead engineer performing and overseeing data collection and analysis of existing and proposed conditions of the culvert under IL 68 and Lee Road as well as the Shermer Road Bridge over the North Branch Chicago River. The existing and proposed (2 alternatives) analyses also included analyzing floodway fill and the necessary compensatory storage while designing the improvements to fit within IDOT right-of-way. A summary report and corresponding exhibits were prepared to meet IDOT requirements for Phase II design.

Stearns Road Corridor Stage 5, Civitech Engineering and Kane County Division of Transportation: Mr. Lach was the lead drainage engineer coordinating various water resources related design services included designing wetland
bottom detention basins, coordinating a drain tile survey, and providing necessary BMP design parameters for detention basins, drainage swales, outfalls and other pertinent drainage features in order to meet permitting requirements. Mr. Lach also performed the analysis and design for a drainage diversion structure to divert flows exceeding design capacities away from a critical detention basin.

Addison Creek Channel Improvements, MWRDGC: Mr. Lach oversaw and worked with a project team designing stream channel improvements to mitigate overbank flood damages along Addison Creek. Work includes analysis of conveyance and storage alternatives, streambank stabilization improvements, and bridge/culvert removals and replacements. Additional work involved initial coordination with regulatory agencies regarding necessary permits and their associated requirements. The project deliverables include preliminary engineering plans, specifications, cost estimates and reporting.

Tier 1 Engineering Design, Village of Niles: Mr. Lach is the lead project engineer for the development of engineering solutions to mitigate flood damages in separate and combined sewer areas in the Village of Niles. He is performing conceptual design verification and refinement of conveyance and storage alternatives utilizing XP-SWMM and XP-SWMM 2D. Improvements include new storm sewer improvements, detention basins and combined sewer improvements. Design plans, specifications and cost estimates were prepared for two projects constructed in 2014 and another to be constructed in 2016.

Buffalo Creek Reservoir Expansion, MWRDGC: Lead stormwater engineer on a multi-disciplinary team tasked with preparing plans for an approximately 170-acre-foot expansion of an existing MWRDGC flood control reservoir located on Lake County Forest Preserves’ property. Responsibilities included conducting hydrologic and hydraulic analyses for existing conditions and evaluating alternative options, assisting with detailed grading for the site, designing hydraulic structures and erosion control measures, and completing permit applications.

East Branch DuPage River Watershed & Resiliency Plan, DuPage County Stormwater Management. Mr. Lach served as the project manager for the team for the fast-paced data collection, public outreach and report development efforts for the East Branch DuPage River Watershed & Resiliency Plan. He worked on GIS analysis of existing watershed features related to the ability to respond to disaster including flood areas, census data, riparian corridors, wetlands, damaged properties, and other data. His work included significant stakeholder coordination to develop a major plan that expanded the scope of potential watershed projects beyond the flood control focal point and into a broader watershed-wide plan for future resilience to disasters.

Ronald Reagan Memorial Tollway Reconstruction and Add Lane, M.P. 137.2 (Route 83) to M.P. 140.5 (I-290), Illinois Tollway. Mr. Lach was the Drainage Design Lead for the design of two miles of I-88 which includes reconstruction of the conventional toll collection lanes for westbound Plaza 51 and reconstruction and widening along mainline I-88 from IL Route 83 to York Road. The design included hydrologic and hydraulic modeling and design of bridges, culverts, storm sewers, ditches, and detention basins. Mr. Lach was responsible for managing the drainage design team and coordinating standards and issues.

I-90 Open Road Tolling at Plazas 1, 5, & 7, Illinois Tollway: Mr. Lach was a drainage engineer working on the design of three new independent roadway segments and other major features for three toll plazas on the Northwest Tollway (I-90) which included roadway work, toll plaza design, toll facilities, bridge and culvert replacement, drainage and other associated work. Drainage structures and facilities were designed to avoid negative impacts on the surrounding creeks, rivers, floodways and floodplains.

FA 309 (US Route 30) Corridor Study, Illinois Department of Transportation: Mr. Lach worked on the corridor study of U.S. Route 30 in northwestern Illinois, which included the evaluation of several corridors based on social, economic, environmental, and engineering issues. He was responsible for determining the various drainage requirements for streams and rivers along the multiple corridors. Mr. Lach was also the GIS analyst for the corridor study including analyzing and mapping impacts to various natural, historical and manmade resources.

REGISTRATIONS

Illinois Professional Engineer, 062-058745
Wisconsin Professional Engineer, 39017-006
Michigan Professional Engineer, 6201053889
Indiana Professional Engineer, PE10809287

CERTIFICATIONS

Illinois Certified Floodplain Manager, IL-10-00569
DEANNA A. DOOHALUK, CLP, CPESC, DECI, Senior Water Resources Planner

EDUCATION

M.P.H. in Environmental Health Sciences, Focus: Environmental Quality - Environmental Management and Planning University of South Carolina, Columbia, SC, 2000
B.S. Environmental Science, Minor in Chemistry, Mercer University, Macon, GA, 1997

EXPERIENCE

Ms. Doohaluk has over 15 years of experience specializing in watershed management and water quality issues. She is an expert in developing Quality Assurance Project Plans for water quality monitoring projects. She has developed numerous watershed-based plans throughout northeastern Illinois. In this role, she was responsible for facilitating the Watershed Plan Steering Committees through all phases of plan development including educational outreach, watershed assessment, nutrient loading modeling, and BMP selection and prioritization. Additionally, as a CPESC, Ms. Doohaluk also has experience in the design and inspection of soil erosion and sediment control measures for transportation, residential, and commercial projects. She also has experience as a documentation manager/office engineer for the Illinois Department of Transportation, Illinois Tollway, and Kane County Department of Transportation.

MAJOR PROJECTS

Elgin-O’Hare Western Access Wetland Mitigation at Pine Dunes, Illinois Tollway: Served as Office Engineer for the Elgin O’Hare Eastern Access Pine Dunes Forest Preserve Wetland Mitigation Project. Responsible for documentation of contract quantities using FieldSys, materials inspections, change orders/extra work order preparation and all related project documentation in E-builder.
Roadside Maintenance, Illinois Department of Transportation: Served as Documentation Manager for twelve IDOT landscape maintenance contracts including mowing, spraying, and dead tree removal. Responsible for documentation of contract quantities using ICORs and material inspection documentation using MISTIC.
Stearns Road Landscape, Kane County Division of Transportation: Served as Documentation Manager for the Sterns Road Corridor Permanent Landscaping contract. Responsible for documentation of contract quantities using ICORs and material inspection documentation using MISTIC. Conducted weekly and post-rain SESC inspection for NPDES compliance.
NPDES Compliance, Illinois Department of Transportation. Reviewed Storm Water Pollution Prevention Plans (SWPPPs) prior to contract letting and assisted the Bureau of Design with the development of best management practices for stormwater discharge. Field services for compliance with Clean Water Act, Phase II NPDES, USACE 404, county and local stormwater regulations. Site observation and reporting for transportation projects. Development of instream work plans. In field development of best management practices for stormwater discharge, direct contact with Resident Engineers.
Sediment and Vactor Waste Characterization, Illinois Department of Transportation: Conducted alternatives analysis to identify appropriate disposal and/or reuse of sediment and Vactor wastes. Prepared paperwork for the disposal of Vactor wastes at an Illinois registered landfill.
Soil Erosion and Sediment Control Services, numerous private clients: Provided compliance with Clean Water Act, Phase II NPDES, county and local stormwater regulations. Prepared Storm Water Pollution Prevention Plans (SWPPPs) for homebuilders and commercial developers. Completed site observation and reporting for homebuilders and commercial development sites. Development of best management practices for stormwater discharge, direct contact at site superintendent level.
East Branch DuPage River Watershed and Resiliency Plan, DuPage County: Served as Senior Water Resources Planner responsible for data collection and the preparation of plan sections related to the development of a watershed-based plan for the East Branch DuPage River Watershed.
Waubonsie Lake Dredge Feasibility Study, Fox Valley Park District: Prepared a physical and chemical characterization of potential dredge material. Assisted with the preparation of an alternatives analysis for dredge material disposal.
DEANNA A. DOOHALUK, CLP, CPESC, DECI, Senior Water Resources Planner (continued)

East Branch of the South Branch of the Kishwaukee River Watershed-Based Plan, DeKalb and Kane Counties: Served as Project Manager during the development of a watershed-based plan in the East Branch of the South Branch of the Kishwaukee River. Responsible for facilitating the DeKalb County Watershed Planning Steering Committee through all phases of plan development.

Buckbee Creek Watershed-Based Plan, Winnebago County: Served as Project Manager for the development of a watershed-based plan in the Buckbee Watershed. Conducted habitat assessments of the entire creek using the EPA Rapid Bioassessment Protocol. Responsible for facilitating the Winnebago County Watershed Planning Steering Committee through all phases of plan development.

Madigan Creek Watershed-Based Plan, Winnebago County: Served as Project Manager for the development of a watershed-based plan Madigan Creek watershed. Responsible for facilitating the Winnebago County Watershed Planning Steering Committee through all phases of plan development.

Upper Kishwaukee River Water Quality Monitoring Project, Winnebago County: Served as Project Manager during the development of a comprehensive water quality sampling project in the Upper Kishwaukee River watershed. Conducted field sampling of various monitoring sites including instream sites, surface runoff sites, drain tiles, and groundwater monitoring wells. Developed the Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOPs) for the project.

Rain Garden Monitoring in Northeastern Illinois, Center for Neighborhood Technology and the Fox River Ecosystem Partnership: Project Manager who developed the Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOPs) for this water quality monitoring project. Responsible for conducting infiltration testing and synthetic drawdown testing in rain gardens across northeastern Illinois and the analysis of data.

Poplar Creek Detailed Watershed Study, MWREDC. Served as Water Resources Planner for Phase A of the Detailed Watershed Plan of Poplar Creek and adjacent watersheds of Flint Creek, Spring Creek, Brewster Creek, and West Branch DuPage River. Phase A involved data collection and preliminary analyses. Assessed water quality opportunities within the study area and conducted property and damage assessment calculations. Phase B involved detailed hydrologic and hydraulic studies for approximately 60 miles of waterways.

Fox River Dissolved Oxygen Monitoring Project, Fox River Study Group. Served as Water Resources Planner for a large scale water quality monitoring project in the Fox River Watershed. Developed the Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOPs) for the project. Served as project Quality Assurance Manager.

Sediment Core Sampling on the Fox River Upstream of the Carpentersville Dam, confidential client: Served as Project Manager during the collection of sediment samples on the Fox River.

Best Management Practices Monitoring, Center for Neighborhood Technology: Served as Water Resources Planner. BMP monitoring systems were designed and installed for rain gardens and bioswales at four locations to obtain data on BMP effectiveness. Responsible for the installation and maintenance of monitoring equipment and the collection and analysis of data.

Chicago Best Management Practices Monitoring, Chicago Center for Green Technology and Household Computer and Electronics Recycling Facility: Served as Water Resources Planner for a BMP monitoring project. BMP monitoring systems were designed and installed at the sites which included BMPs such as green roofs, bioswales, gravel infiltration trenches, permeable pavement and cisterns. Responsible for the installation and maintenance of monitoring equipment, and the collection and analysis of data.

Fort Sheridan Remediation and Restorations, Lake County Forest Preserves: Served as Water Resources Planner responsible for overseeing the sorting, removal of deleterious materials, and onsite reuse of clean materials from over 200,000 cubic yards of construction and demolition debris dumped on the project site.

Chicago Stormwater Management, City of Chicago: Contributed to the development of the city’s stormwater management ordinance and accompanying technical reference manual. Conducted research, identified issues and prepared technical guidance.

CERTIFICATION
Certified Lake Professional
Certified Professional in Erosion and Sediment Control
Designated Erosion Control Inspector (DECI) Lake County IL
40 hour Hazardous Materials Activities (HAZWOPER) Certification
TIMOTHY R. POLLOWY, RLA, ASLA, Senior Landscape Architect

EDUCATION

Master of Landscape Architecture, University of Illinois, 1992
Bachelor of Landscape Architecture, University of Illinois, 1990

PREVIOUS EMPLOYMENT

Consulting and Design Manager, Landscape Resources, Inc., Montgomery, IL, 1999-2003
Associate Staff, Otis Associates, Inc., Schaumburg, IL, 1994-1996
Landscape Planner, Village of Schaumburg, Schaumburg, IL, 1993-1994
Associate Staff, Johnson Johnson & Roy, Chicago, IL, 1992

EXPERIENCE

Built upon an education in landscape architecture and natural resources from the University of Illinois, Mr. Pollowy has 24 years of experience in environmental planning and landscape architecture. Areas of expertise include best management practices for stormwater management, wetland mitigation, urban forestry, landscape architectural issues related to transportation projects, and the restoration and management of natural areas. He is also an experienced project manager, using his organizational and communication skills to keep projects on track and within budget. Tim has a thorough hands-on understanding of construction, and has overseen the successful implementation of a wide variety of projects. Mr. Pollowy has successfully completed IDOT/FHWA Context Sensitive Solutions (CSS) training for public consensus building, and is a Registered Landscape Architect in Illinois and Wisconsin.

MAJOR PROJECTS

Green Healthy Neighborhoods, City of Chicago: Served as lead landscape architect on a multi-disciplinary team planning green infrastructure improvements throughout the City of Chicago. Work included stormwater management to reduce CSOs, complete streets, pedestrian linkages, and similar enhancements in different neighborhoods.

Green Infrastructure for CSO Control, City of Aurora: Landscape architect on a project to reduce CSOs by diverting stormwater runoff into BMPs to infiltrate runoff at dozens of locations in the public ROW throughout the city. Work included public meetings, design, urban forestry, preparation of plans and specifications, and construction phase services. Project was funded in part by an Illinois Green Infrastructure Grant (IGIG) from the Illinois EPA.

North Aurora Towne Centre, private developer: Lead wetland consultant/designer on multidisciplinary team for commercial development in North Aurora, Illinois. Included design of over 100 acres of wetland mitigation, and an additional 10 acres of BMPs to protect water quality.

Prairie Ridge, private developer: Landscape architect responsible for wetland mitigation, naturalized stormwater basin, and naturalized open space design for a 1,300-acre development. Work included preparation of grading and planting plans for over 250 acres of naturalized open space.

Reach 1 Habitat Restoration, Village of Glenview: Prepared design documents for stream meandering, riffle-pool structures, and stream-side wetland restoration for an over one-half mile reach of the West Fork of the North Branch Chicago River. This project was funded by ARRA (stimulus) funds administered by the Illinois EPA, and received an award from Friends of the Chicago River.

CBD River Corridor Restoration, Village of Northbrook: Led design team and oversaw construction of $1.8 million urban stream stabilization and water quality enhancement project on the West Fork North Branch Chicago River through the Central Business District of Northbrook, Illinois. Also prepared conceptual design plans for the development of a riverwalk adjacent to the restored channel.
TIMOTHY R. POLLOWY, RLA, Senior Landscape Architect (continued)

Willoway Brook, The Morton Arboretum: Designed several BMPS and streambank stabilization projects. Improvements included a level spreader connected to an existing drain tile originating off-site and vegetated swale to emulate a natural groundwater seep along Willoway Brook; floodplain wetland restoration and stream remanering along Willoway Brook near the Prairie Visitor’s Center; and stabilization of a severely eroded tributary conveying off-site drainage to Willoway Brook.

Elgin-O’Hare Western Access Wetland Mitigation at Pine Dunes, Illinois Tollway: Served as the Phase III Quality Representative (QR) on the Construction Manager (CM) team during implementation of wetland mitigation project at Lake County Forest Preserve’s Pine Dunes Preserve. The project included wetland, prairie, and woodland restoration; trails and boardwalks; a new parking lot; and related improvements.

Downer-Stolp Streetscape, City of Aurora: Designed streetscape improvements including numerous BMPS. Project was funded in part by an Illinois Green Infrastructure Grant (IGIG) from the IL EPA.

BMP Design, Illinois Department of Transportation: Prepared plans and specifications for numerous expressway and primary route stormwater BMPS including naturalized detention areas, comp storage basins, bioswales, and channel improvements/stabilization for IDOT District 1. BMP work was incorporated into plans and specifications prepared by other consultants.

Natural Areas Management, Illinois Department of Transportation: Identified, assessed, and prepared plans for managing roadside natural areas such as remnant or planted prairies and wetlands. Phase III consultant project manager overseeing contracted management activities at these sites.

Landscape Maintenance Program, Illinois Department of Transportation: Led new “green” roadside maintenance program for IDOT District 1. Responsibilities included preparation of guidelines for sustainable landscape development and management, providing Phase III construction engineering services for contracted roadside landscape maintenance, and development of GIS mapping and relational databases for IDOT expressway and primary route roadsides in District 1.

Expressway Roadside Enhancements, Illinois Department of Transportation: Helped develop plans and special provisions, and provided Phase III support IDOT District 1’s Roadside Development Unit for over $10 million in roadside landscape improvements associated with major expressway projects. Work was completed between 2010 and 2015 in association with the Eisenhower/I-290 resurfacing, I-80 add lanes/resurfacing, I-55 improvements south of I-80, and Bishop Ford reconstruction.

Stearns Road Landscape, Kane County Division of Transportation: Served as consultant project manager on Phase III project. Provided full QA/QC construction engineering services for roadside landscape improvements throughout the approximately six-mile long Stearns Road corridor including new bridge over the Fox River.

Emerald Ash Borer Response Plan, Illinois Department of Transportation: Assessed damages to roadside urban forest from the Emerald Ash Borer (EAB) within IDOT District 1. Work involved directing inventories of EAB affected trees along expressways and primary routes, and preparation of budget position papers to obtain additional funding for emergency tree removals. Also acted as Phase III consultant project manager overseeing contracted tree removal work.

Ft. Sheridan Forest Preserve Remediation and Restoration, Lake County Forest Preserves: Managed environmental clean-up and ecological restoration, including sorting and disposal or re-use of over 200,000 cubic yards of construction and demolition debris. This former U.S. Army base turned forest preserve overlooks Lake Michigan and includes several unique ecosystems and numerous threatened/endangered species.

Buffalo Creek Reservoir Expansion, Metropolitan Water Reclamation District of Greater Chicago: Lead landscape architect during $20 million expansion of existing regional flood control reservoir located within Lake County Forest Preserve’s Buffalo Creek Preserve. Work included preparation of grading plans for reservoir expansion, coordination with engineers, wetland design, stream mitigation design, prairie restoration, tree and shrub plantings, erosion control, specification writing, and cost estimating.

REGISTRATION

Illinois Registered Landscape Architect 157001200

CERTIFICATION

IDOT Documentation of Contract Quantities (S-14) FHWA/IDOT Context Sensitive Solutions (CSS)
DAVID A. KRAFT, P.E., CFM, CPESC, Senior Civil Engineer

EDUCATION

B.S., Civil/Environmental Engineering, University of Wisconsin, Madison, December 2002

PREVIOUS EMPLOYMENT

Water Resources Engineer, Kabbes Engineering, Inc. 2003-2005
Dam Safety and Floodplain Management Engineering Specialist LTE, Wisconsin Department of Natural Resources, 2002-2003
Waste Management Specialist LTE, Wisconsin Department of Natural Resources, 2003

EXPERIENCE

Mr. Kraft has over 13 years of professional experience in civil and water resources engineering design, permitting, construction observation, contract administration, project management, and review. These projects include natural areas restoration, streambank stabilization, access improvements, trail design, stormwater management, roadway and parking design, urban flooding improvements, and general site development. Dave currently serves as a project manager and engineer, engaging all aspects of civil engineering from project kick-off through construction. His work on projects with sensitive features including flooding areas and several Illinois Nature Preserves often requires substantial public interaction and coordination with a wide array of interest groups. Mr. Kraft is a registered Professional Engineer in Illinois and Wisconsin, a Certified Floodplain Manager, a Qualified Engineering Review Specialist in Kane County, Illinois and a Certified Professional in Erosion and Sediment Control.

MAJOR PROJECTS

Poplar Creek Watershed Study Area Detailed Watershed Plan, MWRDGC: Provided review of GIS analysis, hydrologic modeling using HEC-HMS software, and unsteady HEC-RAS hydraulic modeling for the Spring Creek and Flint Creek Tributary portions of the study area.

Crystal Creek Flood Study, City of Crystal Lake: Prepared detailed XP-SWMM hydrologic and hydraulic modeling representing the Crystal Lake watershed and Crystal Creek downstream from the Lake. The modeling was used to develop numerous alternatives to address flooding at the lake and downstream along the creek.

Stormwater Study, Village of Barrington: Performed village-wide assessment of drainage issues. Prepared XP-SWMM hydrologic and hydraulic modeling representing much of the downtown area of the Village and three known major flooding areas. The modeling was used to develop several alternatives to resolve severe street and structural flooding. Also prepared HEC-HMS and HEC-RAS modeling of the Flint Creek Tributary to document flooding and explore alternatives.

Vernon Township Drainage Design, Civiltech Engineering, Inc.: Prepared design and supporting modeling and calculations to resolve drainage concerns along Raleigh Drive. The project including modeling of an existing undersized storm sewer system in XP-SWMM and preparation of alternatives to relieve drainage issues.

Indian Creek Watershed Model (previous employer): Completed hydrologic and hydraulic model for the 36 square mile Indian Creek watershed. Assessment of provided data, basin delineation, model setup, parameter calculation, calibration and field assessment.

LCDOT Facility Detention Basin Retrofit, Lake County DOT: Prepared design and construction documents for the retrofit of an existing detention facility to enhance water quality and reduce downstream discharges. The design included two new BMP cells configured to allow for water quality sampling. XP-SWMM modeling of the existing and proposed conditions was prepared to document beneficial impacts. As part of this project, ten additional LCDOT basins were assessed and documented for potential improvements.

LCDOT Detention Basin Retrofits, Lake County DOT: Prepared design and construction documents for the retrofit of five detention basins to enhance function, specifically related to water quality. Design components included grading, native plantings, and erosion control measures.
Hey and Associates, Inc.

DAVID A. KRAFT, P.E., CFM, CPESC, Senior Civil Engineer (continued)

Ray Lake Forest Preserve Access Improvements, Lake County Forest Preserves: Tasks included detailed hydraulic modeling utilizing HEC-RAS for culvert crossings for proposed trails, compensatory storage documentation and documentation of detention requirements.

Three Oaks, City of Crystal Lake: Prepared designs and supporting modeling and calculations for shoreline stabilization, water level control, and water quality best management practices for this 487-acre park site.

Riverwoods Road Improvements, Village of Riverwoods: Provided drainage calculations and design assistance consistent with IDOT requirements for proposed roadway improvements.

Fairfield and Gilmer Road Grade Separation, Lake County DOT: Prepared hydrologic and hydraulic calculations in PondPack software to document detention design for stormwater facilities, including proposed connection to local roadway drainage and detention at the intersection of Fairfield and Gilmer Roads.

Buffalo Creek Wetland Mitigation, Lake County DOT: Performed hydrologic and hydraulic modeling utilizing XPSWMM to assess ability to meet hydrologic requirements and evaluate potential impacts to off-site property. Prepared concept design incorporating revised grading, tile disablement, and new drainage infrastructure to meet wetland mitigation requirements.

Sterne’s Fen Restoration, Illinois Nature Preserve Commission: Acted as project engineer for design of fen restoration at existing Illinois Nature Preserve site. Proposed improvements include restoration of degraded on-site channels, and reestablishment of historic groundwater elevations consistent with fen ecosystem.

Braidwood Dunes and Sand Ridge Preserves Hydrologic Restoration, Forest Preserve District of Will County: Acted as project manager and engineer for the design of hydrologic restoration efforts and the Braidwood Dunes and Sand Ridge preserves, both Illinois Nature Preserve sites. Restoration measures consisted of filling existing agricultural ditches, disabling drain-tiles, addressing existing erosion issues and modifying drainage patterns to support native prairie communities.

Maple Square Springs, McHenry County Conservation District: Prepared design plans and hydrologic and hydraulic modeling for the proposed restoration of approximately 45 acres of existing agricultural area to wetland.

Prairie Bluff Infiltration Basin, Forest Preserve District of Will County: Provided design and calculations for the implementation of a water quality infiltration basin for the Forest Preserve District of Will County on the Prairie Bluff property. Design included field infiltration testing and detailed hydrologic analysis.

Pleasant Valley Wetland Restoration, McHenry County Conservation District: Provided engineering support to McHenry County Conservation District for wetland restoration design at Pleasant Valley Park. Tasks included existing and proposed conditions hydrologic and hydraulic analyses and design input for restoration efforts.

Gladstone Fen Restoration, Illinois Department of Natural Resources: Provided hydraulic design and BMP practices for the restoration of a degraded unique fen ecosystem. Design measures included stabilization of a groundwater fed stream area, modification of an on-site pond outlet and stabilization of stream channel banks all done in a unique and fragile system with concentrated groundwater inputs and erodable peat soils.

Fort Sheridan Janes and Hutchinson Ravine Restoration Projects, Lake County Forest Preserves: Prepared design for ravine stabilization and restoration. Tasks included stabilization design, hydrologic and hydraulic calculations, specification preparation and coordination and permitting with regulatory bodies.

Upper Turkey Creek Project, U.S. Army Corps of Engineers: Assisted in the design of several stream restoration improvements. Project designs included grade control structures, hydraulically stable fish passage riffles, channel/floodplain connections and stormwater basins.

REGISTRATION

Illinois Professional Engineer, No. 062-060860
Wisconsin Professional Engineer, No. 40397-006

CERTIFICATION

Illinois Certified Floodplain Manager, IL-06-00236
Certified Professional in Erosion and Sediment Control, 5865
THOMAS L. POLZIN, P.E., CFM, CPESC, President

EDUCATION

B.S., Geography, Northern Illinois University, DeKalb, Illinois, 1989

PREVIOUS EMPLOYMENT


EXPERIENCE

Mr. Polzin has been solving complex civil and water resource problems for more than 26 years. His experience ranges from small-scale private residential projects to large-scale teams for clients such as the Illinois Department of Transportation (IDOT), the Illinois Tollway (ISTHA), and the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC). His professional experience includes water quality best management practice design, stormwater infrastructure design, and hydrologic and hydraulic analyses of stormwater systems. He is experienced with site development design such as grading, paving, water and sewer improvements, and has been responsible for management and design of numerous public and private sector projects. His experience also includes the analysis and design of urban flood reduction projects as well as the design and implementation of restoration projects in urban stream corridors. He is a registered Professional Engineer in Illinois, Wisconsin and Oregon, a Certified Floodplain Manager in Illinois, a Qualified Engineering Review Specialist in Kane County, Illinois, a Lake County Certified Enforcement Officer, a Certified Professional in Erosion and Sediment Control, and serves on the Lake County Stormwater Management Commission’s Technical Advisory Committee as Vice Chairman and Subject Matter Expert.

MAJOR PROJECTS

Northern Illinois University – Outdoor Intramural and Recreation Complex; Project manager and design for civil program for project. Work included design of grading, drainage, field underdrains, potable water and sanitary sewer. Comprehensive stormwater management plan was prepared. Permits were obtained from City and IEPA. Project includes construction inspection and other typical construction phase services.

Pine Dunes Forest Preserve, Wetland Mitigation, Illinois State Toll Highway Authority. Provide construction management services for the construction of wetland mitigation, streambank stabilization and public access improvements on a 300 acre Lake County Forest Preserve site. Project includes constructability review of plans and specifications, Resident Engineer Services and oversight of future monitoring and management for the wetland.

Buffalo Creek Flood Reduction Analysis, Village of Palatine, Illinois; Responsible for conceiving and analyzing Flood Reduction alternatives along several stream reaches, analysis includes hydrologic and hydraulic analysis using XP-SWMM.

IDOT – Bureau of Programming; Project principal and manager responsible for QA/QC and preparation of drainage investigations, hydraulic reports, drainage design and sewer cleaning and televising under PTB 146-010 and PTB 152-018 for IDOT District 1. Example projects include: Route 83 and 63rd Street to evaluate effect on floodplain for hydraulic structure replacement and to properly size replacement structures. Project included preparation of hydraulic report, Route 68 and Lee Road: to evaluate effect on floodplain for hydraulic structure replacement and to properly size replacement structures. Project included preparation of hydraulic report. Route 30 – Drainage Investigations determined that development had interrupted the subsurface drainage system. Alternatives were developed for consideration by IDOT. Cost opinions were developed. A drainage investigation report was prepared in accordance with IDOT requirements.

IDOT – Bureau of Maintenance; Project principal for Phase III project including vegetation mapping, mow/spray oversight and coordination, forestry, NPDES permitting and field monitoring, Corps 404 permitting and field oversight.

Lake County Department of Transportation LCDOT – Detention Basin Retrofit Projects – Project Manager and engineer-in-charge for the design of retrofits to fix existing detention basins to improve water quality.
Lake County Department of Transportation LCDOT / Lake County Stormwater Management Commission LCSMC – Route 120 to Wilson Road Drainage Improvements – Project Manager and engineer-in-charge for the design of approximately 1,800 lineal feet of storm sewer to address the flooding of a County road due to a failing drain tile. Responsible for coordination with four public agencies and two major public utilities.

Fort Sheridan Rehabilitation and Remediation, Lake County Forest Preserves, Lake County, Illinois: Responsible for oversight of enhancement and remediation plan preparation for upland grading, ravine restoration and stormwater management of urban runoff. Led construction inspection team for redistribution of 200,000 cy of potentially impacted construction debris in accordance with IEPA Remedial Action Plan and Lake County Health Department requirements. Led construction inspection for ravine restoration.

Development Review, Kane County Development Department; Responsible for all plan review from preliminary engineering through final plat acceptance. Review plans and specification, review hydrologic and hydraulic analysis and stormwater reports, review Corps and NPDES submittals, coordinate with County and Township Highway Departments. Perform construction inspection including grading, paving and NPDES requirements through punchlist inspections and final acceptance.

East Run Tributary to Blackberry Creek, Village of North Aurora, Illinois; Responsible for hydrologic and hydraulic analysis of two streams and prepared a stormwater and floodplain management plan to accommodate a major development adjacent to the East-West Tollway. Engineer in charge for wetland mitigation grading plan development and dam safety permitting.

Roosevelt and Washington Parks, Waukegan Park District, Waukegan, Illinois; Develop alternative restoration concepts and final design for urban park in ravine setting. Project includes hydrologic and hydraulic analysis for the Waukegan River, evaluation of water quality effects of the project, bank stabilization, dam evaluation and public access and education components, construction inspection.

Hammel Woods North, Forest Preserve District of Will County: Responsible for design of 2 miles of trail improvements including bridge underpass along DuPage River. Project included floodway analysis and permitting. Oversaw construction inspection.

Wetland Research, Incorporated: Responsible for design and permitting of six (6) off-site wetland mitigation site. Plans included hydrologic analysis, grading for wetland creation, planting plans and permitting for LCSMC, Corps and IDNR.

Big Sag Wetland Bank – Squaw Creek, Lake County, Illinois: Developed wetland design for mitigation bank along Squaw Creek. Design included manipulation of existing sub-surface drainage system.

Village of Downers Grove – Project Manager and engineer-in-charge for evaluation of alternatives to reduce intersection flooding and surface overflow. Analyses of four alternatives was performed using XPSWMM. Project included calibration to historic rainfall data. Cost opinions for the various alternatives were prepared for consideration by the Village.

Global Flood Reduction Analysis, Village of Barrington, Barrington, Illinois: Responsible for village wide flood reduction analysis including storm sewered village center and Flint Creek tributary overbank flooding.

REGISTRATIONS

Illinois Professional Engineer, 062-052619
Wisconsin Professional Engineer, 33557-006
Oregon Professional Engineer, 19280PE

CERTIFICATIONS

Illinois Certified Floodplain Manager, IL-00-00024
Kane County Qualified Review Specialist, E-004
Lake County Certified Enforcement Officer
Certified Professional in Erosion and Sediment Control, 5867

PROFESSIONAL MEMBERSHIPS

American Society of Civil Engineers - Member
Association of State Floodplain Managers
Illinois
Association for Floodplain and Stormwater Management

COMMITTEE MEMBERSHIPS

Subject Matter Expert, Technical Reference Manual, Lake County Stormwater Management Commission, April 2006 through present
Member, Chairman Delegate and Vice Chairman, Technical Advisory Committee, Lake County Stormwater Management Commission, 1999 through present
Technical Representative and Chair, Technical Sub-Committee for Ad Hoc Water Quality Committee, City of DeKalb, Illinois
Village of Niles
Stormwater Relief Program

Prepared for:
Village of Niles Stormwater Commission

Prepared by:
Hey and Associates, Inc.
8755 W. Higgins Rd.
Suite 835
Chicago, IL 60631

June 15, 2012
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Acknowledgements

This page acknowledges those who made significant contributions to the development of the Stormwater Relief Program and the preparation of this report.

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**Trustees:** Chris Hanusiak, James T. Hynes, Joe LoVerde, Rosemary R. Palicki, Louella Blaine Preston, Andrew Przybylo

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Steven Vineziano  
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Section 1 Introduction

1.1. Background

In response to the disastrous flooding event of September 2008, the Village of Niles established a formal stormwater commission to review this and past events, evaluate existing conditions in Niles and to develop and present a detailed improvement program to the Village Board for review and consideration for approval. The Stormwater Commission Report was published in September 2009 (available under the Stormwater Commission Report heading at http://www.vniles.com/Content/templates/?a=2605). The goal of the Commission’s study was to identify, evaluate, and report on “persistent” stormwater related issues. The report included:

- Summary of magnitude and damages resulting from the September 2008 flood event.
- Description of the local and regional stormwater systems that serve Niles.
- Survey results regarding historical problems and common causes of flooding.
- Potential stormwater management and flood risk reduction strategies.
- Recommended actions for immediate solutions and comprehensive planning focusing on a four part program involving: regulatory changes, improvements in sewer maintenance and monitoring, recommended appropriate capital improvements for the system, and a flood control assistance program for homeowners.
- Recommendation to perform detailed engineering studies of selected areas.

1.2. Village Activities Since 2009 Commission Report

Upon publishing its first report, the Stormwater Commission continued working on number of initiatives related to stormwater. Twelve ordinance amendments were developed and approved related to drainage and sewers. These amendments worked to improve the operation and maintenance of the sewer system in Niles.
A homeowner education program was developed that included providing stormwater information in a quarterly newsletter, on the village website, at a public information table in Village Hall, and on Niles TV.

The Commission also coordinated with the owners of eight large properties to implement local drainage improvements. These projects provided some immediate benefits for properties neighboring the large parcels, but did not address shortcomings with the overall sewer system. Projects were implemented at

Kirk Lane Park – Niles Park District installed 200 feet of 6-inch perforated storm sewer and four catch basins to reduce rear yard flooding from stormwater runoff from park.

Nico Park – Niles Park District constructed an 8-foot wide swale along rear yards and installed two catch basins in low areas and 125 feet of 6-inch perforated storm sewer.

Greenwood Park – Niles Park District constructed an 8-foot wide swale and installed 250 feet of 6 inch storm sewer and two catch basins.

Grennan Heights Park – Niles Park District/Village installed 800 feet of sidewalk to cause site retention and divert stormwater runoff to a detention pond.

North Park – Park Ridge Park District installed a swale along Western Avenue.

Maryhill Cemetery – Catholic Cemeteries installed drainage tiles parallel to Monroe and a more substantial sewer project is under construction. Additional work is planned to install a backwater valve to protect homes at the south property and additional stormwater retention and management work is planned for the area near Cumberland. This work would benefit Roseview, Betty, Crian and Carol.

St. Adalbert Cemetery – Catholic Cemeteries repaired a berm and added a check valve to the sewer.

Our Lady of Ransom – The church created a shallow depression to increase the on-site storage of stormwater runoff.
The system maintenance program was enhanced through the preparation of modernized mapping, tracking and record keeping. GIS atlases of all major municipal utilities have been completed and are used by Village staff to maintain and service these systems. A maintenance management system was also put into place to track and plan sewer maintenance activities. GIS for the sewer systems was used extensively for completion of the engineering study.

1.3. Stormwater Management Study

In 2010, funding was approved for professional engineering analysis and assistance, and Hey and Associates, Inc. was selected to perform additional detailed study. The Commission began work on this study in June 2010 with technical assistance from Hey and Associates. The following major tasks were completed and are explained in detail in the following sections of this report:

- A detailed two phase study of technical analysis of stormwater flow and drainage in Niles was conducted. Details concerning the Niles’ sewer system, local topography, and drainage systems and interconnections with adjoining communities were included covering virtually all of the residential areas of the village.

- The model was used to identify flood risks and diagnosed stormwater problems resulting in the following:
  - Established sewer performance and identified areas subject to basement backups.
  - Identified areas of overland flooding and properties subject to overland flood risk.
  - Developed and evaluated alternative drainage improvements.

- Prepared and recommended a capital improvement program.

- Prepared and recommended a flood control assistance program.

- A Village of Niles Stormwater Management Ordinance was developed to meet the future needs of the village. The ordinance was adopted on March 22, 2011.
Section 2 Drainage System Analysis

2.1. Niles Watersheds and Drainage System

The Village straddles two major watersheds. The west side of the village is in the Des Plaines River Watershed, while the east side is in the North Branch Chicago River watershed. To analyze the system, the boundary between the two major watersheds was defined and then four study areas were defined (north, south, east, west). The system was further divided into subsystems served by the major sewer outfalls or discharge points into adjacent municipalities. Figure 1 shows the watershed divide and the four study areas. Subwatersheds that flow to the Des Plaines River are outlined in red, while North Branch of the Chicago River subwatersheds are outlined in green.

![Figure 1. Village of Niles, subwatershed boundaries, and Study Areas.](image-url)
The Village of Niles has 150 miles of combined sewer mains, 75 miles of sanitary sewer mains, and 35 miles of storm sewer mains. The areas that discharge to the Des Plaines River watershed are served by separate sewers. In these areas, there is one sewer system to carry stormwater flows and a second, separate system to carry sanitary sewage. Almost all of the residential areas in the North Branch Chicago River watershed are served by combined sewers. The combined sewer system conveys both sanitary and storm water to the MWRDGC treatment plant in Skokie located on Howard Street. The sewage and waste water is generated from inside homes and businesses through sinks, toilets, dishwashers, washing machines, etc. The stormwater enters the combined sewer system from yards, fields, streets, parking lots, and exterior drains. Inflow and infiltration from leaking pipes and directly connected foundation drains are also sources of water in combined sewers. Because of this dual duty, combined sewers are easily overwhelmed in wet weather conditions and cause basement flooding. The combined sewer and sanitary systems discharge into MWRDGC sewer lines which are much larger and commonly referred to as interceptors. In Niles there are seven interceptors and eight Deep Tunnel overflow points as part of the Tunnel and Reservoir Plan (TARP)

2.2. Modeling Tool

Modeling of the sewers was completed for the areas where the most significant, frequent, or persistent flooding has occurred as determined through data collected by the Stormwater Commission. This section summarizes the overall approach to preparation and development of the models, while Section 3 discusses results for each of the four study areas.

The XPSWMM 2D model was used to model and understand the interaction of the surface (overland) and subsurface (sewer) drainage performance. XPSWMM is a comprehensive software package for dynamic modeling of stormwater, sanitary or combined systems, and river systems. XPSWMM has been in use by engineers around the world for over 25 years has been tested by the United States Environmental Protection Agency (USEPA) and approved for use by the Federal Emergency Management Agency (FEMA).
This model performs both hydrologic (rainfall and runoff) and hydraulic (flow overland and through sewers) computations. It fully couples the one-dimensional sewer flow with two-dimensional overland flow to accurately model interaction between flood waters and drainage systems, including underground pipes and overland channels. It was used to analyze existing system performance as well as to evaluate improvement options.

2.3. Modeling Data

The Niles GIS database for the storm and combined sewer systems and Cook County topographic maps were used as a starting point for the modeling effort. This data included the following information:

- Village utility mapping and GIS datasets
- Available engineering plans for public and private projects from Village records
- Cook County topographic data
- As-built plans from the Metropolitan Water Reclamation District (MWRD) for connecting structures to the MWRD’s sewers and tunnels
- City of Chicago sewer atlases
- Village of Glenview sewer mapping and sewer invert survey data
- City of Park Ridge Citywide Sewer Study Summary Report
- Rainfall data from Village records
- Rainfall data from the Illinois State Water Survey’s Cook County Precipitation Network (Stations 3 and 4)
- Hydrologic and hydraulic modeling performed for the North Branch Chicago River Detailed Watershed Plan MWRD
- Village drainage complaint records
The above listed data was utilized to construct the initial framework of the models. Existing sewer data was expanded through extensive field measurements of key sewer inverts and field verification of drainage connections. After the hydrologic and hydraulic model parameters were developed and used to construct working models, efforts proceeded to conduct model verification using historical storms, and finally to execute a suite of design storm model runs.

2.4. Historical Rainfall Events

The XPSWMM model was used to analyze historical rainfall events to test and verify the model. Model results were correlated with known events to ensure that it provided reliable information for quantifying sewer performance and flood risk. The September 2008 rain event was used as the primary model verification event.

On September 12 through 14, 2008 a record rainfall of approximately 9.5 inches of rain fell on the Village of Niles and surrounding communities over a 15-hour period. Preceding this rain event was a 3-inch rain on September 4th and a 1-inch rain on September 8th, leaving the ground nearly saturated and the rivers swelled. Figure 2 shows just one of the many areas in Niles that experienced flooding during this multi-day event.

The model was run for the September 2008 event. No surveyed high water marks existed for this event, but an extensive collection of photographs and survey results were available. Model results were compared to reported and observed flooding. Model parameters were adjusted until model results were consistent with recorded observations.
Further analysis was conducted with the July 23, 2011 event when five inches of rain fell in two hours. This event occurred between 12 a.m. and 2 a.m. which limited the photographic data. However, a Cook County flooding survey elicited a large response and was used to prepare a map of over 700 properties with reported flooding. Model results for this historical event were consistent with the flood survey results.

2.5. Design Rainfall Events

Design rainfall events were modeled in order to determine the rainfall conditions, amount and time frame, that pose the most severe risk for flooding in Niles. Design events are assumed conditions based on statistical analysis of historic rainfall data. They can be best understood as events with various annual probabilities of occurrence. The 2-year (50% annual probability), 5-year (20% prob.), 10-year (10% prob.), 25-year (4% prob.), 50-year (2% prob.) and 100-year (1% prob.) events were run for a series of durations. Each probability storm has a range of rainfall depths associated with various storm durations as shown in Table 1.

The storm duration that produces the highest peak flow and the highest peak stages is referred to as the critical duration. In general, the Village of Niles sewer system has a 2-hour critical duration under existing conditions. This means that for a given probability a storm and its associated rainfall over 2 hours is likely to cause the highest stages of flooding either in the sewer or on the ground surface.

| Table 1: ISWS Bulletin 70 Design Event Rainfall Depths. |
|-----------------------------------|----------|---------|---------|---------|---------|---------|
| Duration  | 2-yr    | 5-yr    | 10-yr   | 25-yr   | 50-yr   | 100-yr  |
| 1-hr      | 1.43    | 1.79    | 2.1     | 2.59    | 3.04    | 3.56    |
| 2-hr      | 1.79    | 2.24    | 2.64    | 3.25    | 3.82    | 4.47    |
| 3-hr      | 1.94    | 2.43    | 2.86    | 3.53    | 4.14    | 4.85    |
| 6-hr      | 2.28    | 2.85    | 3.35    | 4.13    | 4.85    | 5.68    |
| 12-hr     | 2.64    | 3.31    | 3.89    | 4.79    | 5.62    | 6.59    |
| 24-hr     | 3.04    | 3.8     | 4.47    | 5.51    | 6.46    | 7.58    |
Section 3 Problem Identification and Alternatives Development

Using the model, the sewer system was studied in detail for deficiencies. Specific causes and the extent of flooding were identified for each study area. The model was also used to evaluate potential drainage and flood control projects.

3.1. Types of Sewer System Deficiencies

Drainage problems can be generally classified in five separate categories: sewer capacity, overland flow route capacity, overbank flooding, high groundwater and maintenance-related drainage issues.

3.1.1 Storm Sewer Capacity (Minor Conveyance System)

Storm sewers or combined sewers are typically referred to as the minor drainage system. They are typically designed to safely drain away runoff from events that have a 10 to 20 percent chance of occurring in any year (10-year to 5-year event). When these systems are undersized, in need of repair, or when larger rainfall events occur that won’t fit in the sewer, water ponds and will attempt to find other routes of flow. While modern design convention typically requires a sewer to be designed for the 10-year storm, this was not the case when the sewer system in Niles was constructed.

3.1.2 Overland Flow Route Capacity (Major Conveyance System)

Storm sewers are not designed to fully convey larger rainfall events. Larger events that cannot fit into the sewer system must be conveyed through developed areas in overland flow routes. In Niles the overland flow route is typically provided by the streets, but in many places flow is not confined to the street and inundates homes mid-block. These routes are called the major drainage system and are intended for events that have a less than 10 percent chance of occurring in any year (greater than 10-year event). Many of the areas with the worst overland flooding in Niles result from the lack of a safe overland flow.
3.1.3 Overbank Flooding

Overbank flooding is a result of a ditch or waterway overflowing its banks. These are typically associated with FEMA floodplain. While there are few properties within the floodplain of the North Branch of the Chicago River, overbank flooding is not a significant source of flooding in Niles.

3.1.4 High Groundwater

Due to some low lying areas with very low surface grades, there are areas where high groundwater elevations may be affecting residences. The primary symptoms of these issues are sump pumps that run frequently, or are unable to keep up with the groundwater seepage rate.

3.1.5 Maintenance

Some of the reported drainage concerns are the result of maintenance issues on private or public property. These issues varied from occasional blockage of inlet grates (leaves and debris), improperly discharging sump pumps, blocked lateral lines, or inoperable flood control systems.

3.2. East Study Area

The East Study area is bounded by Dempster St. on the north, the North Branch Chicago River on the east, Howard St. on the south and Washington Ave. on the west. This area represents one of the oldest areas of the village. It is primarily served by combined sewers, but several storm sewers are also present. This area has three major combined sewer outfalls (connections to interceptor sewers or combined sewer overflows) at Main St., Cleveland St., and Dobson St. and two major storm sewer outfalls at Oakton St. and Howard St.

The East Study Area has historically exhibited widespread problems with both basement backups and overland flooding. As the oldest area of town, the majority of the housing in this area was constructed before overhead plumbing was required by code, after 1970. As a result, this area has the largest clusters of reported sewer backups. Sewer design practices in place at the time of construction, but now outdated, are also related to the problem.
In current standards, storm sewers are typically designed to convey the flow resulting from a 10-year storm event. When storms in excess of the 10-year event occur, flow must pass overland on roads or dedicated flowpaths to safely convey runoff away from development. The combined sewers in this area have less than a 10-year flow capacity and in many cases, even less than a 2-year flow capacity. This area is also affected by topography. There are several historical/natural major overland flow paths in this study area. Unfortunately, the grid pattern of urban development interrupted those overland flow paths creating a number of depressional areas that are subject to frequent flooding. *Exhibit 1 Existing Conditions: Modeled Flood Extents, 100-year Storm Event, East Side* can be found in the Exhibits section. This exhibit shows that up to 615 homes in this area are potentially at risk of having stormwater adjacent to the foundation during the 100-year event. The actual occurrence of structure flooding of this type is dependent on the height of the building pad, foundation elevation and elevation of the lowest water entry point. A subset of these at-risk homes has experienced overland flooding damage during events as small as the 10-year event.

Alternative solutions were developed and analyzed using the modeling tool. Several solutions were developed for this area including the Main/Lee sewer improvements and Cleveland Avenue improvements that are recommended as Tier 1 capital improvement projects. Several other projects including the Oakton Ct. and Seward St. improvements and the Dobson St. improvements are recommended as Tier 2 projects. For reference, the two tiers are based on flooding severity and allocated funding. Tier 1 represents capabilities with existing approved funding. The Tier 2 program requires additional future funding.

### 3.3. West Study Area

The West Study area is bounded by Dempster St. on the north, Washington Ave. on the east, Howard St. on the south and Western Ave. on the west. This area is served by both storm sewers and sanitary sewers. Stormwater runoff flows from east to west, starting in the vicinity of Maryhill Cemetery and continuing into Park Ridge. There are two storm sewer discharge locations where the Niles sewers discharge to sewers that serve Park Ridge. These are directed west into the Dempster sewer and south into the Western Ave. sewer. However, overland
flow that exceeds the capacity of these connections is directed above ground west onto Manor Lane.

The residential areas of the West study area were also developed without any provision for stormwater detention. This results in significant levels of overland flow when storms exceed the 5- or 10-year sewer capacities in this area. This overland flow concentrates and collects in the lowest areas west of Greenwood Ave on Sunset, Bruce and Western near the Manor Lane overland flow route. Exhibit 2 Existing Conditions: Modeled Flood Extents, 100-year Storm Event, West Side can be found in the Exhibits section. This exhibit shows that up to 144 homes in this area are at risk of having stormwater pond next to the foundation during the 100-year event. A subset of these at-risk homes has experienced overland flooding damage during events larger than the 25-year event.

Alternative solutions were developed and analyzed for this area using the model. Because the adjacent communities also experience flooding, there is no opportunity to implement conveyance based alternatives by increasing the size of sewers in these areas. A comprehensive solution was developed for the area that includes two storage basins and associated connecting sewers. This project is recommended as a Tier 1 capital improvement project. In addition, a “small project,” one with minimal design and implementation time and cost, was identified for Greenwood Ave. and Sunset Rd. This project involves the installation of a backflow prevention valve to protect a residential structure from a poorly located catch basin that overflows. Future stormwater management improvements at Maryhill Cemetery area also included in the proposed program. As these are implemented, runoff from the northwest corner of the cemetery will be captured and routed to the existing detention basin on its west side. This will reduce the flow passing onto Greenwood Ave. just south of Dempster St. that then flows overland toward Carol Ave.

3.4. North Study Area

The North Study area is bounded by Harrison St. on the north, Washington Ave. on the east, Dempster St. on the south and Greenwood Ave. on the west. This area is primarily served by separate sewers, but includes one area east of Milwaukee and north of Dempster that is served...
by combined sewers. Stormwater runoff flows generally east to west and discharges into unincorporated Cook County or Park Ridge (with the exception of the combined sewer area which connects to an interceptor sewer). There are two main storm sewer discharge locations. The areas north of Golf Rd. eventually discharge to a sewer running west under Golf Road. Areas south of Golf Rd. and north of Dempster St. discharge to the headwaters of Prairie Farmers Creek near Ballard Rd. and Greenwood Ave.

The North Study Area is characterized by pockets of very flat topography with shallow sewers. Overland flow discharging to these areas ponds on the surface due to the limited sewer capacity and the pockets of lower ground that do not connect with a designated overland flow path. Again, due to flooding in adjacent communities, storage must be a central component of any potential solution. Exhibit 3 Existing Conditions: Modeled Flood Extents, 100-year Storm Event, North Side can be found in the Exhibits section. This exhibit shows that up to 191 homes in this area are at risk of stormwater ponding adjacent to the structure foundation during the 100-year event.

Alternative solutions were developed and analyzed for this area using the modeling tool. Several solutions were identified and are recommended as part of the Tier 2 capital improvement projects. These include the Maynard Rd. and Glendale Ln. sewer improvements and storage in the ComEd right-of-way, the Maryland/Milwaukee storage (storage on ComEd right-of-way and under a parking area) and conveyance project, and the Courtland/Milwaukee storage (underground parking lot) project. The Village of Glenview would benefit from the Maynard/Glendale project and is a potential funding partner. In addition, a “small project” was identified for implementation at Callero Dr. and Lyons St. This involves the installation of backflow prevention valve to prevent backflow from the downstream commercial property. The Metropolitan Water Reclamation District (MWRD) is initiating preliminary design on a flood control project on Prairie Farmers Creek in 2012. It is likely that this project will provide some benefits to the properties in the vicinity of Ballard Rd. and Greenwood Ave.
3.5. South Study Area

The South Study area is bounded by Howard St. on the north, the North Branch Chicago River on the west, Albion Ave. on the south and Harlem Ave. on the west. This area is primarily served by combined sewers, but includes some areas of separate sewers that eventually discharge to combined sewers. Stormwater runoff flows generally west to east and discharges to MWRD connecting structures or as combined sewer overflow to the North Branch of the Chicago River.

The South Study Area has generally adequate sewer capacity and overland flowpaths. As with the East Study Area, development has been located over a historically well-defined overland flowpath that runs from Harlem and Jarvis St, south on Neva across Touhy Ave. and then southeast to cross Milwaukee Ave. near Newark Ave. This flowpath was also obstructed by the Niles aboveground water tank at the south end of Neva Ave. A subsequent sewer relief project partially restored this flowpath between the south end of Neva and Touhy. Exhibit 4 Existing Conditions: Modeled Flood Extents, 100-year Storm Event, South Side can be found in the Exhibits section. This exhibit shows that up to 82 homes in this area are at risk of stormwater ponding adjacent to the structure foundation during the 100-year event.

Alternative solutions were developed and analyzed for this area using the modeling tool. The Illinois Green Infrastructure Grant (IGIG) bioinfiltration facility (design and construction being funded by an Illinois Environmental Protection Agency grant) was included as part of the proposed conditions model. A Tier 2 capital improvement project was identified that involves the reconstruction of an underground diversion weir at the corner of Touhy Ave. and Milwaukee Ave. The City of Chicago, who would also benefit and has independently identified this potential project, is a possible cooperating partner for this project.
Section 4 Recommended Stormwater Relief Program

4.1. Stormwater Relief Program Overview

Overall the recommended Stormwater Relief Program is described by four categories as shown in Figure 3. All of these categories work together to reduce the risk of basement backups and overland flooding throughout all of Niles.

![Figure 3. Village of Niles Stormwater Relief Program categories.]

4.2. Regulatory Program

A main goal for the regulatory program was to ensure that future development does not negatively impact stormwater management for existing homes and businesses. Existing Niles ordinances were reviewed to determine what provisions for stormwater management were in place. The review discovered that to some degree, drainage and stormwater management requirements were spread out among a number of different regulations. In addition, current and future county ordinances were reviewed to determine how a new ordinance would interface with regulations that apply or will apply countywide. A proposed stormwater ordinance was
drafted and reviewed by the Stormwater Commission. This ordinance was adopted by the Board of Trustees on March 22, 2011. The ordinance requires that any new developments creating 7,500 square feet or more of new impervious area must obtain a stormwater management permit. Sites between 7,500 and 15,000 square feet are reviewed to ensure that proposed drainage patterns will not impact neighboring properties and that proper connections to the sewer system are made. When developments exceed 15,000 square feet of disturbed area, they are required to provide stormwater detention storage. This storage allows the rate of discharge from the development to be regulated to protect the existing sewer system’s capacity. As properties subject to the ordinance are redeveloped, the peak discharge to the sewer system will be reduced from current levels and lead to better sewer performance over time. All proposed developments subject to the stormwater ordinance undergo a detailed engineering review to ensure the provisions of the ordinance are met.

4.3. Maintenance and Monitoring

The Public Works Department implements the sewer maintenance and monitoring programs. When problems arise and are reported, sewers are inspected on an as-needed basis. Debris is removed and damaged pipes are repaired. The pipe lining program is in place to repair sanitary sewers that have been found to be in poor condition and susceptible to high rates of inflow and infiltration. A future program element may include additional detailed sewer monitoring or smoke testing to identify areas responsible for unusually high wet weather flow. This activity and slip lining are important aspects in reducing inflow and infiltration into the sanitary sewer system. The sewer infrastructure mapping system is continuously enhanced as field checks are made by village staff and this information is returned to the office for incorporation into the GIS system.

4.4. Capital Improvements

The capital improvements have been proposed in two tiers, as noted. In addition, there is a small allocation for “small projects,” previously described, that can be implemented without significant engineering or construction costs. Exhibit 5 Village of Niles Capital Improvement Projects can be found in the Exhibits section.
4.4.1 Tier 1 Capital Improvements

These projects were selected because they target the areas of most frequent and concentrated flooding, thereby also benefitting the greatest number of properties. Implementation of the Tier 1 projects reduces the overall number of properties at risk of overland flooding by approximately 50 percent. It also greatly improves the performance of the combined sewer system which will reduce sewage backups into basements. Table 2 summarizes the Tier 1 projects. Expanded descriptions of each project follow.

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<td>Cleveland Relief Sewer</td>
<td>Cleveland Relief Sewer with connections into Grennan Heights, Keeney and Monroe</td>
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<td>Lee Street Relief Sewer and Storage</td>
<td>Provide storage facility and storm sewer improvements near Milwaukee / Main. Provide storage facility and sewer improvements along Lee St. combined sewer.</td>
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<td>West Side Storage Basins</td>
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<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>$ 14,560,000</strong></td>
</tr>
</tbody>
</table>

4.4.1.1. Cleveland Relief Sewer

The Cleveland Relief Sewer project is a new sewer line to capture stormwater runoff and convey it to a new outfall to the North Branch Chicago River. This is a relief storm sewer installation in an area typically served by combined sewers. The relief sewer begins near the intersection of Main Street and Oketo Avenue and flows south to Monroe Street. The relief sewer continues east along Monroe Street where it crosses Harlem Avenue onto Cleveland Street. The sewer continues to flow east along Cleveland and crosses Caldwell Avenue into Cook County Forest Preserve property and ultimately into the North Branch Chicago River. Additional relief storm
sewers connecting into the new sewer on Monroe are provided on Odell Avenue, Octavia Avenue, and Oconto Avenue. In addition, the Harlem Avenue storm sewer flowing south would also connect into the new relief sewer at Cleveland Street. This project also provides new storm sewers on Monroe Street and Keeney Street between Harlem Avenue and Waukegan Road. These new storm sewers connect into the relief sewer at Waukegan Road and Cleveland Street. This project consists of approximately 11,200 feet of new storm sewer at the locations described above.

This relief sewer project mainly serves to provide relief from surface water flooding for the area generally bounded by Main Street to the north, Harlem Avenue to the east, Monroe Street to the south and Oketo Avenue to the west in addition to both Monroe Street and Keeney Street between Harlem Avenue and Waukegan Road. The new relief sewer provides capacity to convey surface water away from these areas into the North Branch Chicago River in order to minimize surface water flood damages and reduce the amount of surface water discharging to the existing combined sewer system in this area. This project will reduce the volume of water entering into the combined sewer system which will reduce peak flows through these sewers which in turn can reduce the risk of basement backups for residences in the project area. Exhibit 6 depicts the benefits of this project in the 25- and 100-year flood events.

The Cleveland Relief Sewer project will require coordination with the Forest Preserve District of Cook County in order to construct the new outfall to the river. Permits and coordination will be need with various agencies for the new outfall to the North Branch Chicago River. The project will also require coordination with IDOT for storm sewer connections on Harlem Avenue.

4.4.1.2. Lee Street Relief Sewer and Storage

The Lee Street Relief Sewer and Storage project is an upgrade of existing sewer lines to increase capacity during larger storm events. This project serves a combined sewer area along Lee Street east of Milwaukee Avenue and a separate storm sewer system located west of Milwaukee Avenue along Main Street. In addition, several detention facilities are to be constructed to store water during storm events. The Lee Street Relief Sewer portion of the project involves replacing the existing combined sewer on Lee Street from Oriole Avenue to Harlem Avenue and Main Street with a larger pipe. In addition, a storage basin to collect stormwater runoff will be constructed in

Hey and Associates, Inc.

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Oak Park at the southwest corner of Lee Street and Ottawa Avenue. At the intersection of Milwaukee Avenue and Main Street, a detention basin will be constructed at the northwest corner on property currently owned by Mary Hill Cemetery. The storm sewers at the intersection of Milwaukee and Main will be improved to direct flow into this detention basin. This project consists of approximately 4,600 feet of sewer (combined and storm), a 9-foot deep and 5.8 acre-feet storage basin at Mary Hill Cemetery, and a 3-feet deep and 0.5 acre-feet storage basin at Oak Park.

The Lee Street sewer improvement serves to provide relief from surface water flooding for the area generally bounded by Dempster Street to the north, Harlem Avenue to the east, Main Street to the south and Ottawa Avenue to the west. The upgraded combined sewer pipe provides capacity to convey surface water away from these areas to minimize surface water flood damages and will also reduce the frequency of sewer backups. The storage basin at Oak Park will provide storage for surface water runoff to further minimize flooding on residential property. The storage basin at Mary Hill Cemetery will provide relief from surface water flood damages for the Milwaukee and Main intersection as well as reducing the frequency of water inundating the intersection during large storm events. This storage basin will detain water which will reduce peak flows downstream to the east through the Lee Street sewer system. Exhibit 7 depicts the benefits of this project in the 25- and 100-year flood events.

The Lee Street Relief Sewer and Storage project will require coordination with Mary Hill Cemetery in order to construct the storage basin. The Village of Niles has already commenced discussions with the Cemetery in order to facilitate the future coordination. Additional coordination with the Niles Park District is needed in order to construct the storage basin at Oak Park. The Village has also commenced discussions with the Park District.

4.4.1.3. West Side Storage Basins

The west side storage basins project involves installation of new sewers to collect and convey flow to two detention storage basins. Flooding throughout the west side study area results from an excess of stormwater runoff directed toward low-lying areas, or areas where historical overland flowpaths were not maintained (west end of Bruce). A total of approximately 2,700 feet of storm sewers ranging from 15 to 30 inches are proposed to collect this flow and direct it to the
proposed detention basins. A proposed detention basin on Greenwood Park will store approximately 2 acre-foot at a maximum depth of 6 feet during the 100-year event. A second detention basin is proposed on the Our Lady of Ransom property. This basin will provide approximately 11 acre-feet of storage at a depth of approximately 10 feet during the 100-year event. Runoff will be directed to the Our Lady of Ransom basin through the new sewers, as well as over a curb cut that is installed on the east side of Lincoln. Exhibit 8 depicts the benefits of the storage basins in the 25- and 100-year flood events.

The West Side Storage Basins project will require coordination with the Niles Park District, Cook County Highway Department, and Our Lady of Ransom. The Village of Niles has discussed the basin project concept on a preliminary basis with the church. Based on the positive interchange from discussion, it is warranted that this project be advanced to the preliminary engineering stage to develop more specific details that can be presented to the property owner. Additional coordination with the Niles Park District is needed in order to construct the storage basin at Oak Park.
4.4.2 Tier 2 Capital Improvements

This group of currently unfunded projects are recommended as future undertakings by the Village as funding becomes available from grants or funding partners. Compared to Tier 1, these projects generally have smaller or more geographically targeted benefits. In two cases, there are adjacent communities that would likely cooperate to help fund the projects. It is important to note that inter-jurisdictional benefits and cooperation, which these cases represent, can sometimes make a project a better candidate for potential grant opportunities. Table 3 summarizes the recommended Tier 2 projects. Expanded descriptions of each project follow.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Description</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maynard and Glendale Sewer Improvements</td>
<td>Improve sewer along Glendale and construct detention basin on ComEd right-of-way.</td>
<td>$ 4,350,000</td>
</tr>
<tr>
<td>Maryland/Milwaukee</td>
<td>Install storage under commercial parking lot and ComEd right-of-way.</td>
<td>$ 5,330,000</td>
</tr>
<tr>
<td>Milwaukee/Courtland</td>
<td>Install storage under commercial parking lot.</td>
<td>$ 3,440,000</td>
</tr>
<tr>
<td>Milwaukee and Touhy Diversion Structure</td>
<td>Reconstruct dry flow diversion structure at Milwaukee and Touhy.</td>
<td>$ 200,000</td>
</tr>
<tr>
<td>Oakton and Seward</td>
<td>Provide conveyance improvements for Seward and Oakton, east of New England. New storm sewer to outfall to the Chicago River through Forest Preserve Property.</td>
<td>$ 1,700,000</td>
</tr>
<tr>
<td>Dobson Outfall</td>
<td>Add a new storm outfall at the Chicago River off of Dobson. Add new storm along Dobson, Nordica and Jonquil to convey water away from this depression.</td>
<td>$ 1,390,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>$ 16,410,000</td>
</tr>
</tbody>
</table>
4.4.2.1. Maynard and Glendale Sewer Improvements

The Maynard and Glendale sewer improvements project involves installation of relief storm sewers with discharge to a new detention basin that will be constructed in the ComEd right-of-way property. Approximately 380 feet of 12- to 54-inch diameter sewers are proposed. In addition a pump station will be needed for the detention basin to function. The detention basin would provide 16 acre-feet of storage at an approximate depth of 10 feet. This alternative decreases flooding by providing increased drainage capacity away from the intersection of Maynard and Glendale. The increased sewer capacity leads flow to the detention basin where it is later pumped out and discharged west toward Milwaukee Ave. By improving the drainage away from Maynard and Glendale, this also enhances drainage in areas of Glenview to the north where inadequate sewer capacity is also a problem. Glenview supports this project concept and is a potential partner in this project. This project will require coordination with ComEd.

4.4.2.2. Maryland/Milwaukee Improvements

The Maryland and Milwaukee project includes the construction of two storage basins to detain stormwater runoff to reduce the peak flow through the storm sewer system at Maryland Street and Milwaukee Avenue. The first storage basin would be constructed on ComEd property north of Lyons Street and Catino Terrace. This basin would provide approximately 7.5 acre-feet of storage. The second storage basin would be constructed as an underground vault providing approximately 5.1 acre-feet of storage under commercial parking lots near the intersection of Maryland and Milwaukee and the associated connection sewers. Stormwater runoff from both Maryland Street and Courtland Drive would flow into this storage basin.

This project provides relief from surface water flooding for Maryland Street and Courtland Drive east of Milwaukee Avenue. In addition, the storage will reduce the frequency of flooding along Milwaukee Avenue near Maryland Street.

This project will require coordination with ComEd as well as the commercial property owners near the intersection of Maryland and Milwaukee.
4.4.2.3. Milwaukee/Courtland Improvements
The Milwaukee and Courtland project includes the construction of an underground storage basin near the intersection of Milwaukee Avenue and Courtland Drive. This basin would reduce surface water flooding along Courtland Drive north of Milwaukee Avenue and reduce the flooding along the commercial properties along Milwaukee and the residential properties on Joey Drive and Maryland Street north of Ballard Road. The underground vault would provide approximately 5.4 acre-feet of storage. This project will require coordination with the commercial property owners near the intersection of Milwaukee and Courtland.

4.4.2.4. Milwaukee and Touhy Diversion Structure
Portions of the village drain to a 60-inch combined sewer that runs under Touhy between Harlem Avenue and Milwaukee Avenue. This sewer is operated and maintained by the City of Chicago. Near the intersection of Milwaukee and Touhy, there is a diversion structure that diverts dry weather sewage flow into an intercepting sewer. This diversion structure also allows high flows during wet weather to pass in different direction toward a connection to the MWRD’s TARP system. The existing diversion structure is a weir fitted inside the 60-inch brick sewer. This configuration could be replaced with a more efficient structure to improve the rate of flow that is conveyed to TARP during wet weather events. This would improve drainage upstream of the structure in both Niles and Chicago. As both communities would benefit, there is a strong possibility of collaborating with Chicago to implement this project. Approvals would also be needed from MWRD to construct the project.

4.4.2.5. Oakton and Seward Improvements
The Oakton and Sewer project is a new storm sewer line to capture stormwater runoff and convey it to a new outfall to the North Branch Chicago River. This is a relief storm sewer installation in a flat depressional area served by storm sewers that are typically overwhelmed during storm events. This new storm sewer would collect stormwater runoff from Oakton Court and Seward Street east of New England Avenue and convey water to the east crossing Caldwell Avenue into Cook County Forest Preserve property and ultimately into the North Branch Chicago River. The project consists of approximately 2,500 feet of new storm sewer. This project will require coordination with the Forest Preserve District of Cook County in order to
construct the new outfall to the river. Permits and coordination will be need with various agencies for the new outfall to the North Branch Chicago River.

4.4.2.6. Dobson Outfall Improvements

The Oakton and Sewer project is a new storm sewer line to capture stormwater runoff and convey it to a new outfall to the North Branch Chicago River. This is a relief storm sewer installation in a flat depressional area served by both storm and combined sewers. This new storm sewer would collect stormwater runoff from Jonquil Terrace and Dobson Street from Nottingham Avenue to Nordica Avenue and convey water to the east into the North Branch Chicago River. The project consists of approximately 2,700 feet of new storm sewer which also includes some separation from existing combined sewers. This project will require coordination with the Niles Park District’s Tam O’Shanter Golf Course in order to construct the new outfall. Coordination with Morton Grove may also be necessary. Permits and coordination will be need with various agencies for the new outfall to the North Branch Chicago River.

4.4.3 Small Projects

Village staff continuously evaluates specific problems where local drainage conditions could be improved for minimal engineering and construction costs. In addition to the Tier 1 and Tier 2 projects, several small projects have been identified. These include the installation of backflow prevention valves at Greenwood and Sunset and also at Callero and Lyons. Another recommended project is the elevation of transformers in the vicinity of Bruce Dr., Lincoln Ave. north of Normal Ave. These transformers have been subject to flooding and should be raised to prevent future repeated failures. Niles will continue to work the ComEd to identify other transformers in the village that may also be subject to flooding and failure. It is recommended that $50,000 be allocated to fund these and other small projects in years 1 and 2 of the program.

4.4.4 Implementation of Capital Improvements

The Tier 1 capital improvement projects and small projects are planned to be implemented over a six-year period. Years 1 and 2 will heavily focus on preliminary engineering, as well as the implementation of several “small projects”. The preliminary engineering task will further refine the conceptual level engineering completed for this study. Preliminary engineering would include detailed surveys, identification of utilities, engaging owners of property needed to implement
projects, crafting preliminary land agreements, and coordination with regulatory agencies to confirm feasibility and permitting or regulatory requirements. Once preliminary engineering is successfully completed, a project would be advanced to the final engineering and construction stages. Figure 4 displays the planned expenditures by task over a six-year implementation period.

Figure 4. Tier 1 capital improvements implementation plan.

4.5. Flood Control Assistance

Unfortunately, system maintenance, a comprehensive regulatory program, and proposed capital improvements alone will not reduce all chronic flooding caused during intense rains. The capital improvement projects identified in Tier 1 are expected to take six or more years to complete and Tier 2 projects do not have an implementation plan at this time. In addition, due to financial realities, the proposed capital projects in Tier 1 and Tier 2 do not eliminate flooding risks in all areas of the village.
The Stormwater Commission identified sewage backup into basements and overland flooding through doors, windows and over foundations as the most common and damaging forms of flooding in the Village of Niles. During intense rains, the combined sewer system reaches capacity and is not adequate to carry the peak flow, resulting in pressurized sewers. When pressurized, sewage can backflow through house laterals into basements if there is no backflow prevention device. This is especially problematic for homes built before 1970 with gravity sewer systems. During these same intense rains, when sewers reach capacity, stormwater flows overland impacting structures by entering exterior basement stairs, window wells, and even front doors.

In an effort to provide immediate assistance to those households suffering from chronic sewer backup or overland flooding, the Flood Control Assistance Program was developed. This program category has two primary goals. The first is to significantly reduce the backup of sewage into basements. Sewage backups have a direct impact on public health and are a prime cause of dangerous molds in homes. The second is to significantly reduce overland flooding. Overland flooding is the direct result of a sewer system, described earlier in this report, that is unable to accommodate the stormwater runoff caused by intense 50- to 100-year storm events as experienced in the region three times in the past four years.

4.5.1 Program Qualifications

To qualify for the financial assistance, residents must meet the following qualifications:

1. Homeowner must complete a Flood Control Assistance Application. Applications will be prioritized based on past flooding data and engineering analysis.

2. Successful pre-applicants will have a property/basement inspection performed by a representative from the Village of Niles to determine if the home qualifies for the program.

3. At the time of inspection, the homeowner must also pass an Inflow and Infiltration Inspection. If a violation exists, such as an illegal sump pump or downspout connection, the resident must correct the sources of inflow and infiltration at their own expense prior to qualifying for this program.
4. The homeowner must submit three quotes from Illinois/Village licensed contractors showing the projected cost of the work to be performed. After the work is completed, the homeowner must notify and submit to the Village of Niles a detailed invoice of the work prior to scheduling the final inspection. A representative of the Village of Niles will perform a final inspection of the authorized project.

After a successful inspection, a check for the work, equal to 50% of the improvement costs up to a maximum of $4,000.00, will be issued by the Village of Niles to the homeowner. Payments will be made to homeowner applicants only. The Village of Niles assumes no responsibility for any defective work or other damage, injury or loss resulting from any act of negligence by the contractor or property owner while installing, operating, or maintaining the approved system.

4.5.2 Sewer Backflow Protection

A defining characteristic of sewage backups in Niles is that they occur in almost all areas of the Village. This relates, as previously described, to housing age and a combined sewer service, which represents approximately 70% of the Niles system. In addition, conditions can also vary on every block and in every house and rainfall is highly variable allowing for isolated sewer capacity overflows, which can happen in any storm event. These variables and uncontrollable factors are part of the rationale why overhead sewers have been required by the MWRD since 1970. For these reasons, protection of individual properties is an important component of the overall Flood Relief Program.

The most effective and least cost approach, which also has the shortest implementation time, involves the installation of flood control devices at individual homes. It is important to note, that improving the sewer system in Niles to a 10-year level of protection was estimated to be well in excess of $50 million. Even at that cost, a 10-year level of protection is far below that offered by an overhead or backflow prevention system. For the reasons cited, the Stormwater Commission recommends a cost assistance program to assist homeowners with installing flood control systems to prevent sewer backflow.

Homeowners applying for Sewer Backflow Protection may be eligible for a rebate of 50%, up to a maximum of $4,000.00, for the cost of installing an overhead sewer, backwater valve or check valve. The home must have no existing code violations on exterior plumbing. Construction of
an overhead sewer must include a sump pit system that removes all footing drains, driveway drains, outside stairwell drains, downspouts, and any other ground water sources from the sewer system. Project priority will be given to existing structures within combined sewer areas with a record of sewer backups.

4.5.3 Floodproofing
Floodproofing is a second component to the Flood Control Assistance program. Flood proofing at individual homes is the best method to protect against shallow overland flooding. In the proposal, this benefit will be eligible to homes that will not be assisted by Tier 1 capital improvement projects. Homeowners applying for Flood Proofing may be eligible for a rebate of 50%, up to a maximum of $4,000.00, for the cost of installing floodwater barriers or sealing the tops of foundation walls to ensure floodwaters cannot get inside. The home must have no existing code violations on exterior plumbing. Homeowners must be identified to be subject to overland flooding. Engineering analysis results must confirm risk of overland flooding. Project priority will be given to existing structures that are not expected to benefit from planned short-term capital improvements. All proposed work must not negatively impact neighboring properties.

4.5.4 Program Implementation
Homeowners who currently occupy single-family and multi-family homes are eligible to participate in this program. Eligibility is limited to one time only per address. This program is not available for commercial properties. Previous installations of flood protection do not qualify for reimbursement. The Stormwater Commission will conduct an open two month application period. The Commission will review and prioritize applications on a case-by-case basis. Applications will be prioritized based on past flooding data, engineering analysis, and an on-site inspection if necessary. If there are more qualified applications than funding can support, remaining applications will be considered for funding in the following fiscal year.

The program will have the following general requirements:

1. Homeowners must complete a Flood Control Assistance Application Form and establish they are the owner of the property and it is their primary residence.
2. The Homeowner must obtain three written detailed estimates from three Illinois/Village licensed contractors.

3. All building permits must be applied for prior to construction.

4. Village must verify the proposed improvement on-site.

5. If any time within a five year period following the date of reimbursement by the Village for its share of the funds a home is demolished or a major remodeling occurs requiring an overhead sewer upgrade, a refund by the property owner shall be required.

6. Ineligible costs for the program include, but not limited to: permit fees; architectural fees; sewer rodding and/or televising; sewer service line replacement; and any other incidental costs associated with maintaining a sewer system; and home “decorating restoration costs such as paint, wallpaper, carpet, tile, and other floor coverings and drywall or paneling; bushes, plants, trees and retaining walls that were required after the work was completed.

7. Homeowner must submit: verification of all required inspections and final approval of the completed improvements; a copy of the licensed plumber’s as-built, signed and dated; and proof of payment, in the form of waivers, that all the costs associated with the approved work are paid in full.

8. Reimbursement by the Village for properties that pre-qualified for the program will be processed only upon completion of all work.

9. Village shall make payments to homeowner applicants only.
Section 5 Final Summary

The Stormwater Relief Program identified in this document is the culmination of a nearly four-year long process that started after the disastrous flooding in September 2008. While various stormwater projects had been proposed over the last 30 years, none of them involved the level of analysis and detail that this study encompassed. This planning process was conducted under the guidance of the Niles Stormwater Commission. It began with collective fact finding, followed by detailed engineering analysis and common reviews, culminating after many joint discussions with careful consideration of a range of options in the proposed program.

The program elements presented herein truly reflect the best collective efforts of the Village of Niles staff, Hey and Associates, and the hundreds of residents who provided invaluable data, information, and input to the project. It is sincerely believed by all involved that this plan makes the best use of the available resources and will provide measurable and needed reductions in the severity of flood damages in Niles.
EXHIBITS
100-year Modeled Flood Extents - East Side
100-year Modeled Flood Extents - West Side
100-year Modeled Flood Extents - North Side
Exhibit 4

100-year Modeled Flood Extents - South Side
Recommended Capital Improvement Projects

Village of Niles
- Tier 1 Projects
- Tier 2 Projects
- Village of Niles Boundary

Improvements by others:
- MWRDGC Farmers Prairie Creek Improvements (Initiating Design 2012)
25-Year Flood Extents Comparisons
Existing Conditions vs. With Project Conditions

Cleveland Relief Sewer
Modeled Flood Extents
25- and 100-year Storms

100-Year Flood Extents Comparisons
Existing Conditions vs. With Project Conditions
Lee Street Relief Sewer and Storage Modeled Flood Extents 25- and 100-year Storms

25-Year Flood Extents Comparisons
Existing Conditions vs. With Project Conditions

100-Year Flood Extents Comparisons
Existing Conditions vs. With Project Conditions

Note:
This area is part of Cleveland Relief Sewer Tier 1 project. See the Cleveland Relief Sewer Board for more details.
25-Year Flood Extents Comparisons
Existing Conditions vs. With Project Conditions

West Side Storage Basins
Modeled Flood Extents
25- and 100-year Storms

100-Year Flood Extents Comparisons
Existing Conditions vs. With Project Conditions