

# Stormwater Management and Flood Protection

The storm water management professionals at GAI Consultants protect ponds, wetlands, and water channels, keeping them operational as public and private clients advance their development projects. Professionals in multiple disciplines guide private and public clients through the issues of managing drainage and run-off in compliance with watershed rules for storm water systems. Our innovative solutions re-direct natural water flows, minimize flood concerns, and maintain wetland areas.

**Professionals committed to managing water drainage with the most cost-effective strategies means economical and practical solutions for communities.**

Understanding that land developers, highway builders, and utilities face new and changing Phase II storm water management criteria for construction and post construction activities, GAI's proven storm water management specialists follow a four-step

process that expedites the permitting process and identifies the most cost-effective, post-construction storm water pollution prevention technology.

**Jurisdiction Analysis**—GAI researches and identifies applicable codes, regulations, and requirements associated with jurisdictional agencies.

**Study and Design Development**—Our designs for bridge hydraulics, cross drains, and retention/detention and collection systems include pond, wetland, filtration, and open-channel water treatment designs following Best Management Practices (BMP). Our floodplain-floodway studies include floodplain compensation, no-rise certification, and FEMA floodplain map revision.

**Permitting**—GAI moves projects through permitting efficiently, following standardized application procedures and formats developed for efficiency. We know the process and the best path to follow in getting permit approvals. Our teams work with local and state authorities throughout the process to prevent any permitting delays.



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## Service Profile



**Certification**—After a stormwater management project has been successfully permitted and constructed, GAI follows up with a thorough review to check that all design elements are complete and operational.

Protection from rising floodwaters is a major concern. GAI's premier capabilities in flood control engineering include computer modeling, hydrologic and hydraulic analyses, and innovative design. Our stability analyses and foundation investigations for flood control systems keep waterways—from storm channels to levees and dams—flowing within their boundaries.

GAI develops plans and manuals, evaluates existing stormwater systems, designs retrofits to modernize older systems, guides clients through permitting processes, and finds the most cost-effective strategies for post-construction stormwater pollution prevention.

Flood protection begins with watershed infiltration and runoff control, continues with channel improvements, and ultimately relies on quality engineering solutions for flood control dams. GAI is a premier engineering partner for stormwater management and flood control.

### Stormwater Management and Flood Protection Services

- Flood protection and flood damage surveys
- Field reconnaissance
- Potential flood control measure identification
- Hydrologic and hydraulic analyses
- HEC-HMS/HEC-RAS computer program modeling
- Dredging and sediment removal design
- Floodwall restoration and crack/joint repair design
- Rip-rap and sheet pile restoration design
- Channel improvements design
- Access ramp remediation
- Levee design and construction monitoring
- Non-structural strategies for improvement
- Dam foundation and structural investigations
- Hydraulic and embankment design
- Stability and seepage analyses
- Spillway and outlet works design
- Pore water pressure monitoring
- Slope movement monitoring

### GAI Services Summary

- Airport Planning and Design
- Bridge and Structure Inspection and Design
- Coal Combustion Residuals Management
- Construction Inspection and Management
- Cultural Resources Management
- Economic Analyses and Strategies
- Electric Transmission Design and Siting
- Environmental Engineering
- Environmental Studies, Species Studies, Permitting
- Gas Pipeline Surveying and Mapping
- Geographic Information Systems (GIS)
- Geotechnical Engineering and Geology
- Impoundment and Landfill Permitting and Design
- Land Development Engineering
- Landscape Architecture and Design
- Master Planning and Urban Design
- Mechanical, Electrical, Structural Engineering
- Natural Gas FERC Certification and Permitting
- Nuclear Energy Engineering Support
- Right of Way and Appraisal Support
- Land Surveying and Mapping
- Transportation Planning and Design
- Utility Management Consulting
- Water, Stormwater, Wastewater Management

The scope of professional services that are provided by or offered out of each GAI office including, but not limited to, engineering and surveying services, is governed by the professional and business licensing requirements of each individual State or jurisdiction in which the GAI office is located and whether GAI has the requisite professional and business licenses for that State or jurisdiction. Nothing on GAI's Web Site or marketing materials is intended to be interpreted or construed as offering to perform professional licensed services where prohibited unless the licensing requirements have been met. Engineering services are not offered out of GAI's Northern Kentucky (Florence) office location. Surveying services are not offered out of GAI's Illinois location or by our New York subsidiary.

