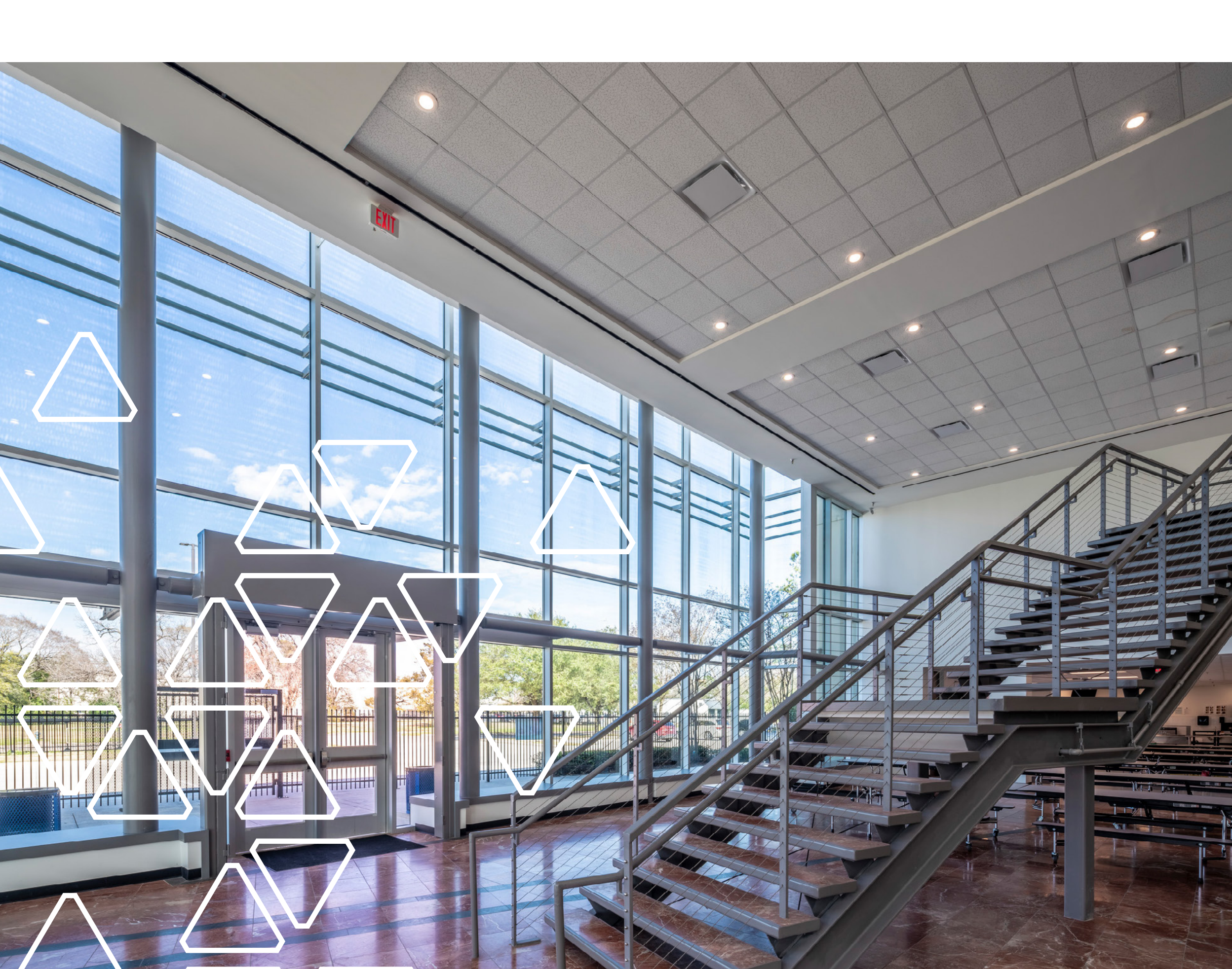
Flood Protection



Can you find the flood protection elements in this picture?

The Walter P Moore Advantage

Walter P Moore's pre- and post-disaster flood mitigation study and design services date back to Tropical Storm Allison in 2001. Walter P Moore was in the midst of flood protection efforts for several hospitals in Houston's Texas Medical Center, studying the flooding potential of Harris Gully. The flood protection efforts were timely and saved Texas Children's Hospital from damage. This flood event spurred a push within Water P Moore to design flood protection protocols to ensure the Texas Medical Center and other similar facilities in Houston would be protected against flood events.

Since 2001, the firm's skills, expertise, and learnings have grown such that Walter P Moore serves as the client's prime consultant directing architects, MEPs, and other consultants on high-profile projects and event responses. Additionally, we have helped various flood protection device manufacturers develop and improve existing products. Furthermore, we regularly vet equipment suppliers on behalf of clients.

Our project experience includes public, private, multi-family, institutional, educational, manufacturing, and medical clients. Flood project range include new projects, expansions, and retrofits. Typically, this includes commissioning testing to prove system integrity to the client and/or their insurance carrier.

Walter P Moore's Flood Protection Background

→ Flood mitigation planning and design experts, frequently assisting first responders after floods

→ Active principal level involvement throughout scope of project

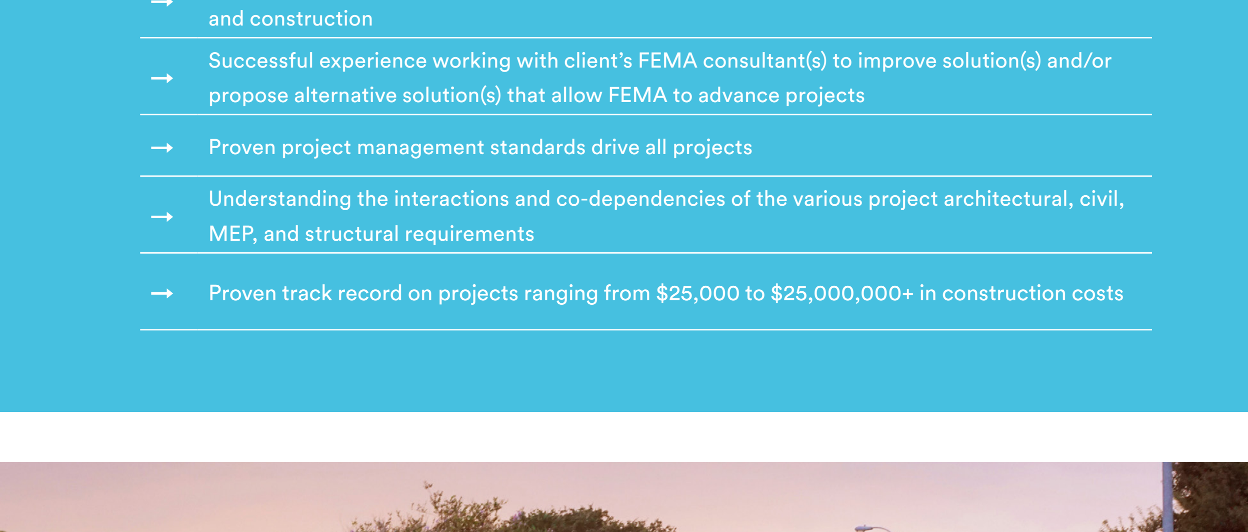
→ Thorough understanding of FEMA requirements for mitigation design, selection, and construction

→ Successful experience working with client's FEMA consultant(s) to improve solution(s) and/or propose alternative solution(s) that allow FEMA to advance projects

→ Proven project management standards drive all projects

→ Understanding the interactions and co-dependencies of the various project architectural, civil, MEP, and structural requirements

→ Proven track record on projects ranging from $25,000 to $25,000,000+ in construction costs



What is Flood Protection and Mitigation?

Flood protection is the effort to reduce loss of life and property by lessening the impact of disasters, according to FEMA. Effective mitigation requires understanding local and larger risks, addressing the hard choices, and investing in long-term community well-being. Without sound mitigation actions, safety, financial security, and self-reliance are jeopardized.

Goals of Flood Protection and Mitigation

→ Reduce future flooding disruptions

→ Affordable

→ Allow facility operation during most extreme events

→ Easily operated and maintained by the staff

→ Construction occurs without significantly impacting facility operations

CLICK HERE FOR A DEEPER DIVE INTO OUR PHILOSOPHY ON FLOOD MITIGATION/PROTECTION

What is the Approach?

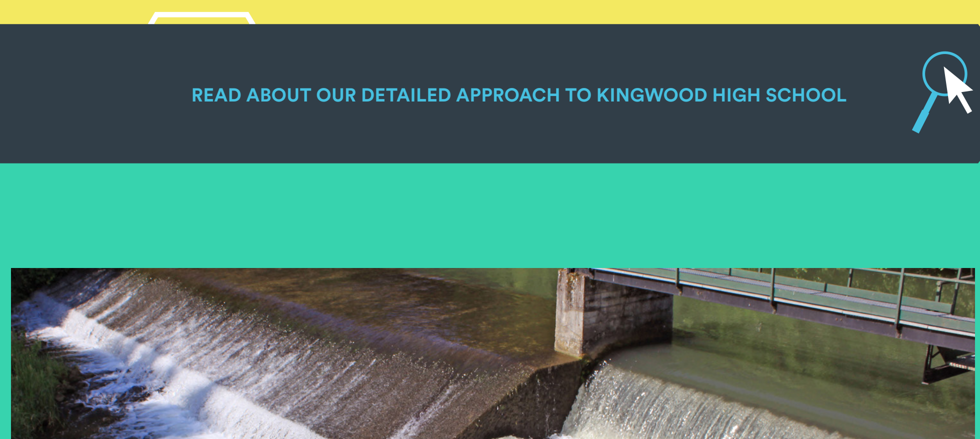
Flood mitigation projects start with developing site-specific risk definitions. We use our knowledge of hydrology, stream hydraulics, and site topography to define the potential flood elevations and the associated risk(s) to the improvements and operations of the facility. Furthermore, we use our structural and building enclosure knowledge to determine likely leak and collapse points that may impact the facility improvements and operations considering architectural and/or MEP features. This common understanding of risk forms the basis of the design decision-making. Then, based on the information and the client's direction on risk, cost, and reward, we establish the design parameters.

We educate the client on the various types of protection feasible for their situation. This can include active or passive flood protection approaches and education of the differences/costs.

We collaborate with the architect, the MEP engineer, the code consultant, and the client's personnel to define potential solutions for consideration that work for the defined limits of risk. Ultimately, Walter P Moore ensures that the proposed solution meets the client's operational requirements and complies with all local codes.

We collaborate with the vendors of flood protection products to find workable solutions, often working with them to create specific attributes for the unique conditions that exist at the property. We know the solution must meet specific parameters defined by FEMA and local Emergency Management Agencies. We also understand that a portion of the solutions may be provided by the client or their FEMA consultant and, at times, these are the limiting parameters that may guide our solutions.

READ ABOUT OUR DETAILED APPROACH TO KINGWOOD HIGH SCHOOL



Campus Level Flood Protection

Based on the extensive damage that Tropical Storm Allison caused to the Texas Medical Center in 2001, Walter P Moore developed early warning tools to predict flooding by looking at flood gauges and modifications upstream, flood gates, etc. The current generation of our Early Warning Flood Forecasting System reviews rain forecasts in real-time from the National Weather Service (NWS) to provide early warnings. It can be a simple weather alert tied to the NWS alerts or a more complex dynamic model that starts processing the forecast to predict the flooding potential. The model output can initiate a protocol of actions to take when certain predetermined thresholds are met. Our clients continue to use this system to avoid unexpected flood damages, warnings are issued and preventative actions are implemented.

Furthermore Walter P Moore's **Floodplain Elevation Tool** is an interactive tool designed to provide FEMA 10-year, 50-year, 100-year, and 500-year frequency floodplain elevations and stream flood profiles within the watersheds of Harris County and the City of Houston. Useful when planning urban development and evaluating flood risk, this tool incorporates the new Harris County and City of Houston floodplain regulations.

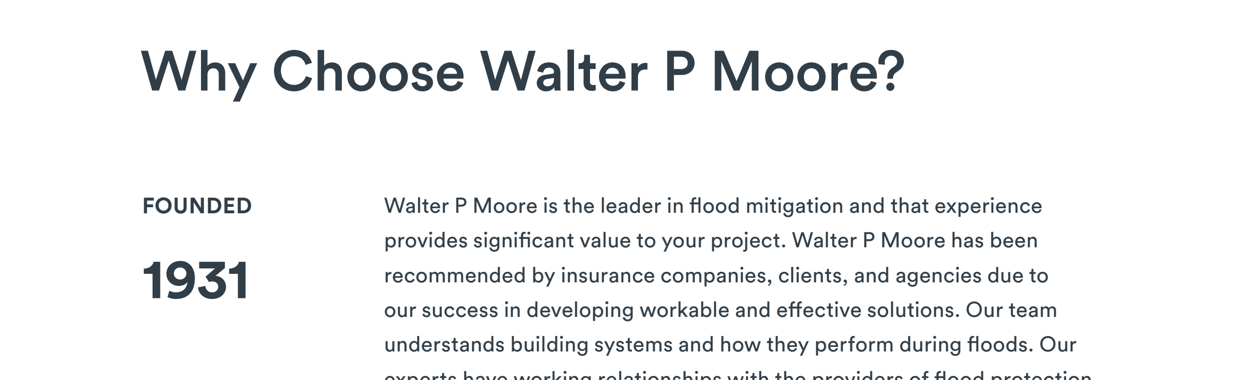
Features:

- Navigate a web-based map and see the FEMA Mapped floodplain limits.
- View stream cross sections from hydraulic models used to create the FEMA floodplain maps.
- Click on a cross section to show different flood elevations, including the 10% (10-year), 2% (50-year), 1% (100-year), and 0.2% (500-year).
- View the effective stream profile from the Flood Insurance Study.

Visit **flood.walterpmoore.com** for optimal viewing and complete the simple registration process.

Flood Protection Project Phases

For in-depth information on each phase, click the graphic to read our white paper.



Why Choose Walter P Moore?

FOUNDED

1931

STAFF COUNT

700+

FLOOD MITIGATION STUDIES

250+

FLOOD PROTECTION PROJECTS DESIGNED

200+

FLOOD PROTECTION PROJECTS CONSTRUCTED

150+

YEARS DESIGNING FLOOD PROTECTION

20+

Walter P Moore is the leader in flood mitigation and that experience provides significant value to your project. Walter P Moore has been recommended by insurance companies, clients, and agencies due to our success in developing workable and effective solutions. Our team understands building systems and how they perform during floods. Our experts have working relationships with the providers of flood protection systems and know which ones work for the specific project and client. We also understand local protection ordinances, codes, and flood control requirements and regional variations.

We have worked with government funding agencies such as FEMA and understand what it takes for them to fund the project along with how the funding cycle works. We recognize that the solutions are not all physical improvements; action-oriented protocols must be adopted, documented, trained, and followed in critical situations. We have developed special knowledge on the design of these systems and can help bring this understanding to support other disciplines. Our experience gives us a unique understanding where our design can address code issues, particularly around exiting and refuge. We also know how to listen and develop solutions that are based on the needs of the operators and administrators of the facility. Our team knows that each project is unique, and the physics that pertain to the solution are not. We can blend the unique needs with the design parameters to develop cost effective and functional solutions that can be operated and maintained by the client.

Technical Competence and Qualifications

Walter P Moore has developed and implemented flood protection systems that involve strengthening or modifying buildings, adding new protection elements around buildings in key areas, flood proofing building exterior enclosure elements — both above and below grade to keep water out, as well as identifying and sealing penetrations. Our experienced-based checklists and guides ensure that all vulnerabilities are considered.

Walter P Moore has designed flood protection for buildings with limited record drawings. We have successfully employed soil, concrete, steel, aluminum, and glass to resist hydrostatic loads at various facilities. Throughout the project planning and execution, we specify protection system components that are passively deployed or simple and quick to deploy to minimize cost and staff activation efforts before/during a flooding event. We prepare a deployment manual at the end of each project. A deployment manual describes when and how to deploy the system, as well as the required component maintenance and training intervals.

Walter P Moore works closely with contractors specializing in flood protection and installation of flood barriers. We provide special consulting and details to accommodate unforeseen site conditions to meet the project schedule and budget of our mutual client. The firm also works closely to find solutions to special site-specific issues that come about with existing facilities.

Walter P Moore works with many manufacturers of different pre-engineered flood protection components; critically reviews their work, tests their products, and provides technical and engineering assistance to protect our clients. Historically, Walter P Moore has identified design issues in pre-engineered components before they are manufactured saving the manufacturer money and the contractor precious time when the product arrives. These reviews can result in discussions on required corrective actions with the provider and the consequences of inaction, and in some cases physical testing of the barrier to design load to ensure capacity and requiring that the product be proved adequate prior to installation.

Additionally, Walter P Moore works for and with multiple insurance companies to provide engineering opinions and flood protection options for their insured assets. We have also served as the prime consultant on multiple FEMA and private entity projects in numerous regions.

Doug Coenen, PE
Principal / Infrastructure
713.630.7460
dcoenen@walterpmoore.com

Ray Drexler, PE
Principal / Diagnostics
713.630.7320
rdrexler@walterpmoore.com

Andres Salazar, PhD, PE, D.WRE
Principal / Infrastructure
713.630.7436
asalazar@walterpmoore.com