

Background

With roots in Mobile, Alabama, McFadden Engineering brings nearly a century of combined experience in civil and environmental engineering to the Southeastern United States. Our team of professional engineers and professional geologists are licensed in Alabama, Florida, Georgia, Louisiana, Tennessee and Mississippi, and are ready to solve unique challenges through our integrative and innovative approach.

Our Philosophy

At McFadden Engineering, we succeed when our clients succeed. By prioritizing our client relationships, we can anticipate potential challenges and offer innovative engineering solutions to achieve their goals.



Flood Plain Modeling and Meeting No-Rise Criteria

By: Matt Pastorcich

The National Flood Insurance Program (NFIP) regulations require that local governments prohibit changes inside flood plains that would increase base flood levels during 100-year storms. Developers wishing to build on property below the base flood elevation must demonstrate that any proposed changes to the existing elevations inside the flood plain will not cause a rise in base flood elevation during a 100 year storm event. This is accomplished by obtaining a “No-Rise” Certification from a professional engineer who is competent in hydrologic investigation and flood modelling. Here along the Gulf Coast, development in low-lying areas near waterways can be done in a manner that is both sustainable and compliant with NFIP regulations. At McFadden Engineering (MEI), we have the expertise to help you navigate local regulations and obtain permits necessary to move forward with your project. By using software developed by the Army Corps of Engineers and data collected in the field, MEI can model potential impacts to flood levels based on your proposed development. In the process of developing a flood model, MEI uses software developed by the Army Corps of Engineers’ Hydrologic Engineering Center.

Preliminary data will be gathered in the field along the flood plain upstream and downstream of the proposed development. MEI will gather information on culverts, bridges, and other structures that affect stream flow during a storm event. By entering this data into the River Analysis System (HEC-RAS) software and data from channel cross-sections of streams and flow rates, a “current conditions” baseline model of the proposed area is created. The model is then calibrated against known flood elevations for a 100-year storm event. Once the existing conditions model is calibrated, cross-section elevation data in the area of the proposed development are changed to match proposed site modifications to create a “proposed conditions” model. Additionally, if changes to existing drainage features are proposed, these can be input into the proposed conditions model. The HEC-RAS software is versatile and can be used to model flood conditions along a single river reach or a network of channels. If there are lakes along the flood model reach, the software will take into account the storage capacity of the lakes during a storm event in determining the projected water level. When the proposed conditions model is analyzed, the output will show projected water levels during a 100-year storm after the development is complete. If no-rise in the 100-year flood elevation is shown by comparison of the two models, MEI will issue a “No-Rise” certification by way of a detailed flood model report submitted to the local municipal or county engineering office.



Background

With roots in Mobile, Alabama, McFadden Engineering brings nearly a century of combined experience in civil and environmental engineering to the Southeastern United States. Our team of professional engineers and professional geologists are licensed in Alabama, Florida, Georgia, Louisiana, Tennessee and Mississippi, and are ready to solve unique challenges through our integrative and innovative approach.

Our Philosophy

At McFadden Engineering, we succeed when our clients succeed. By prioritizing our client relationships, we can anticipate potential challenges and offer innovative engineering solutions to achieve their goals.

Two Case Studies

McFadden Engineering Inc. conducted a flood model to support proposed environmental corrective actions at a 7.9-acre brownfield site near downtown Mobile, Alabama. The site, which was once home to a manufactured gas plant, was located immediately adjacent to One Mile Creek and below the base flood elevation (FEMA flood zone AE). Remedial plans for the site included covering the site with clean fill soil after excavating contaminated soil from the subsurface. The City of Mobile required a No-Rise Certificate before the corrective actions could be implemented due to the elevation change caused by the fill and changes to the site drainage. MEI collected the required data along One Mile Creek including actual flow measurements during rain events. Once the required data was obtained and put into the HEC-RAS flood model, it was determined that the fill material at the site would not lead to a rise in flood water elevation during a 100-year storm. In the HEC-RAS flood model, it was determined that the fill material at the site would not lead to a rise in flood water elevation during a 100-year storm. The brownfield site has since been transformed into a community greenspace.

Additionally, McFadden Engineering was retained to determine if construction of a commercial carwash facility on a 1.5-acre site in West Mobile would impact flood levels. A portion of the site extended into the 100-year flood plain on the east side of the creek. Plans for the site involved raising the existing grade elevation in the flood zone from 165 ft msl to 169 ft msl.

MEI modeled the existing conditions for the 100-year flood levels. The flood model consisted of a 2-mile reach of Milkhouse Creek including a number of elevation cross-sections, culvert designs, and bridge crossings that were incorporated into the model. Using the Rational Method, estimated 100-year storm flow rates were calculated for the headwaters of Milkhouse Creek and at each stream cross-section. The model reach also included Optimist Lake, which provides storage capacity during a storm event and must be accounted for by the flood model in predicting the water levels. Using the HEC-RAS software, MEI constructed an existing conditions model that, once calibrated, accurately predicted water levels at various points along Milkhouse Creek during a 100-year storm event. The existing conditions model was then modified to match the proposed grading plan for the carwash facility. Comparison of the existing flood model and proposed site modifications demonstrated that there would be no rise in water levels after construction of the facility. MEI issued a No-Rise Certificate to the City of Mobile on behalf of the facility.

In addition to changes in site elevation for construction above the 100-year flood elevation, MEI can assist you in modeling and design of stormwater collection and detention systems for your development to mitigate a rise in flood levels. Intelligent management of stormwater adds value to your development, prevents erosion and damage to your property, saving costs in the long run. Let McFadden Engineering partner with you to address stormwater and design needs.