

## RELATED EXPERIENCE

### FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE STUDIES

The Federal Emergency Management Agency (FEMA) contracted with Johnson & Anderson to update existing Flood Insurance Studies for Montrose Township in Genesee County and the City of Troy in Oakland County. The areas of detailed study within the City of Troy included portions of the Houghton Drain, the Sturgis Drain, the Gibson Drain, and the Rouge River. The Flint River and the Armstrong Creek were studied in Montrose Township.

<b>Location:</b>	City of Troy, Oakland County, MI And Montrose Township, Genesee County, MI
<b>Client:</b>	Federal Emergency Management Agency
<b>Contact:</b>	Mitigation Division Federal Emergency Management Agency (312) 408-5500

New hydrographs for the City of Troy drains were developed as a result of increased urbanization within the drainage basins. The hydrographs were developed based on the current population within the drainage districts using the Brater/Sherril Method, *Rainfall-Runoff Relations of Urban*

*and Rural Areas*. The new hydrographs were then routed using the Soil Conservation Service TR-20 routing program.

Resulting discharges were approved by the Land and Water Management Division of the MDEQ and then input into revised HEC-RAS river models. The HEC-RAS models for each drain were updated to include any new bridges, bridge modifications, new culverts, and fills and cuts within the floodplains based on issued MDEQ permits. New floodplain maps and hydraulic profiles for the 10, 50, 100, and 500-year storms for each drain were developed and forwarded to FEMA. A draft Flood Insurance Study was also submitted to FEMA.

Hydrographs for the Flint River and the Armstrong Creek were developed based on flooding that occurred in September of 1985. A Log Pearson Type III Analysis was used to determine the 10, 50, 100, and 500 year storm flows for the Flint River Gauging Stations. The Soil Conservation Service TR-20 program was utilized to determine the discharges for the 10, 50, 100, and 500 year storm events for Armstrong Creek.

Once discharges were approved by the MDEQ for the Montrose Township drains, HEC-2 models were developed to incorporate any changes that had occurred since the previous flood insurance study. New flood plain maps and hydraulic profiles for the 10, 50, 100, and 500-year storms for each stream were developed along with a Flood Insurance Study draft report.