Citywide Master Drainage Plan

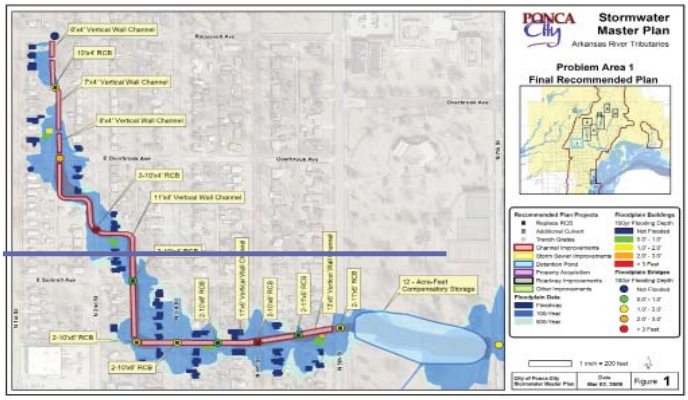
City of Ponca City, OK
Jim Fairbanks, City Engineer/ 580.767.0333

Completed in May 2009

Meshek & Associates, PLC, was selected to prepare a citywide Stormwater Master Plan for the City of Ponca City, Oklahoma. This three-phase project spanned over 4-1/2 years at a total cost of approximately $550,000, including $115,000 for detailed surveys, which will become part of the City's GIS database.

Phase I included floodplain mapping for the Bois D' Arc Creek tributaries located in the western portions of the City. Phase II of the study included floodplain mapping for the Arkansas River tributaries located in the eastern half of the city. Phase III evaluated and provided recommended improvements from the findings of the storm sewer hydraulic reports and floodplain studies.

Two separate survey companies were contracted to survey independently the open channels and closed storm sewer systems. Using an in-house developed attribute schema, surveyors captured information on storm sewer utility systems. The attribute schema allowed for survey information to transfer directly from data collector information into the GIS with minor post-processing to connect system features. Survey information was checked for quality in-house using the generated GIS datasets. Crews were directed as needed to verify, update or correct information identified during the QA/QC process. Storm sewer hydraulic evaluations were performed from the generated survey datasets on select systems using StormCADD. Flood problem areas were identified and evaluated with multiple alternatives of flood hazard mitigation projects.



In 2008, the three-phase, 4-1/2-year program culminated with a comprehensive Stormwater Master Plan for the City of Ponca City. The report summarized flood problem areas and provided a roadmap for the implementation of mitigating measures.

A notable technique utilized in the hydrologic portions of the study involved impervious surface datasets developed in-house using GIS from planimetric data supplied from the City. The data was processed in GIS to form two surface types of the existing land use: pervious and impervious. The resulting information was used along with digital soils and drainage basins to develop hydrologic input parameters. Conversely, GeoRAS was used for hydraulic input parameters including Manning's "n" values for channels and floodplains. Digital data submittals to the City included GIS formats of floodplains for both regulatory and FIS extents, a geodatabase of the storm sewer system from survey information, floodplain properties and depths of flooding on structures, bridges and their flood elevations from all frequency storms, custom form tool for reporting survey information in an organized manner and various other flood study information.

All floodplain mapping datasets and profiles, compiled into a DFIRM geodatabase format, were submitted and accepted by FEMA for incorporation into the Kay County Map Modernization Study.

Project Fee and Special Features

Project Fee: $550,000

Notable aspects of this study include the development of a GIS stormwater utility system from survey collection techniques and the integration of the floodplain data into the FEMA defined DFIRM geodatabase submitted for incorporation into the Kay County Map Modernization study.

MESHEK & ASSOCIATES, PLC
CIVIL & WATER RESOURCE ENGINEERING
GEOGRAPHIC INFORMATION SYSTEMS
Tulsa: Ph 918.392.5620
OKC: Ph 405.254.5544
Online: www.meshekengr.com