Texas Department of Transportation
Form ProjStat
(Rev. 6/2005)
(GSD-EPC)

RTI
Research Project Statement

Fiscal Year: 2008

Project Statement Date: July 13, 2006

Revision Date: January 9, 2007

Project Number: 0-6070

RMC Number: 3

Title: Use of the Rational and Modified Rational Methods for TxDOT Hydraulic Design

Developed By: George "Rudy" Herrmann

TxDOT Project Personnel	Name	Office	Area Code/ Phone Number	Email	Fax Number
Program Coordinator (PC)	Amy Ronnfeldt, P.E.	DES	(512) 416-2328	ARONNFEL@dot.state.tx.us	(512) 416-3098
Project Director (PD)	Chuck Steed, P.E.	CHS	(940) 937-7191	CSTEED@dot.state.tx.us	(940) 937-7229
Project Advisors (PAs) – Optional	Kathy Dyer, P.E.	PAR	(903) 737-0237	KDYER@dot.state.tx.us	(903) 737-0385
	Elie Alkhoury, P.E.	HOU	(713) 802-5508	EALKHOU@dot.state.tx.us	(713) 802-5640
	Mark Mikulenka, P.E.	AUS	(512) 292-2408	MMIKULE@dot.state.tx.us	(512) 292-2362

Project Description:

The rational method is one of the tools hydraulic designers use to estimate design discharge for sizing a variety of structures. The rational method is a relatively simple hydrologic approach that relates watershed drainage area, a runoff coefficient, and average rainfall intensity for the time of concentration of the watershed. The modified rational method is sued for design of small detention structures when a runoff hydrograph is required but more sophisticated technology is not needed. The modified rational method uses the estimate of peak discharge produced by the rational method as a basis for estimating the triangular (normally) hydrograph. The peak discharge is placed at the time of concentration of the watershed and the time base of runoff that is twice the time of concentration.

Use of either method depends on the analyst's estimate of the time of concentration and the runoff coefficient. Both of these estimates can vary substantially depending on watershed conditions. Therefore, research to document appropriate values is needed.

The project objectives are to evaluate the appropriateness of using both rational and modified rational methods for small watershed design, evaluate the tabulated values of the runoff coefficient, and construct guidelines for TxDOT analysts for selection of appropriate parameter values for Texas watershed conditions.

Previous research results related to the rational method were presented in research project reports for Project 0-4405. In those reports, runoff coeffiecients for about 20 Texas watersheds were reported. One of the conclusions from that work suggested there is dependence of the runoff coefficient on the depth of precipitation (or runoff) for the event of interest. Guidance is needed to develop this observation into a useable tool or determine that refinement is not justified.

Deliverable Products And Reports: (Minimum Requirements)

Reports

- Report that documents completely the work performed, methods used, and results achieved. This report shall include guidance for the use of the rational and modified rational methods.

- Project Summary Report

Implementation:	Implementation of project results would be achieved through future updates to the TxDOT Hydraulics Manual.
Pre-proposal Meeting:	☒ **Yes** ☐ **No** **The Pre-Proposal Meeting will be held:** **Tuesday, February 27, 2007, 1:00 p.m., 4000 Jackson Avenue, Bldg. 1, Camp Hubbard, Austin, Texas, San Jacinto Conference Room, 3rd Floor.** **Teleconferencing is available.**
Proposal Submission:	Proposals are required to be submitted in PDF format, 1 PDF file per proposal. Please name this file with the project number and university acronym. The "Background and Significance" portion of the proposal should be limited to 10 pages. All proposals from researchers should be sent directly to your university's Research Liaison for submission to RTI. The Research Liaison is TxDOT's official contact with the university.
Deadlines:	1. All individuals interested in proposing are encouraged to contact the PC or PD **by February 9, 2007**, in case additional project information needs to be distributed by TxDOT.. 2. Proposals are due to RTI by **4:00 p.m. Central Time (Austin Time)**, **on March 22, 2007.**