

# TIRZ 17/Redevelopment Authority Regional Drainage Study



The goal of TIRZ 17 Regional Drainage Study is to identify individual drainage improvement projects that function collectively to benefit the region as well as independently to account for project sequencing. Recommended drainage improvement projects will be designed to cost effectively reduce structural and nuisance flooding. Improvement alternatives will be developed for various levels of protection, and a cost-benefit analysis will be provided to assist in determining the most cost-effective solution. Recommended improvement projects will be prioritized with an objective ranking matrix that will include a list of projects that may be constructed quickly to provide drainage relief to poorly drained areas in a timely manner.

The TIRZ 17 Regional Drainage Study will build on the Harris County Flood Control (HCFCD) W151-00-00 Implementation Study from Buffalo Bayou to IH-10 completed August 6, 2009. This study will not seek to duplicate the HCFCD model effort, but build upon it to create a more detailed and inclusive model of the W151 watershed including the area north of IH-10.

The HCFCD study documented extensive structural and street flooding in the W151 watershed south of IH-10, and identified the cause of the flooding to be the inability of the primary and secondary conveyance systems (roadway and storm sewer) to adequately transport runoff to the receiving channel W151. The inadequate conveyance condition is attributed to several factors including: (1) the lack of a dedicated overland sheet flow route to safely convey runoff, (2) undersized storm sewers, and (3) elevated water surface elevations in the receiving channel limiting the storm sewer discharge.

The effect of these combined conditions is that runoff is forced to slowly access the channel through under-sized storm sewer systems resulting in excessive ponding conditions and system overflow. The overflow of runoff from one over-burdened system to another over-burdened system compounds the issue for the receiving or downstream system. A primary goal of the TIRZ 17 Regional Drainage Study is to quantify the overflow to a receiving system.

The TIRZ 17 Regional Drainage Study will utilize recently released detailed topographic data in conjunction with a two-dimensional (2D) overland sheetflow analysis software (Wallingford Infoworks SD) to better define the extent of the overland sheetflow issues, and to document the benefit of various improvement alternatives. This study will comprehensively analyze the entire watershed, and will simultaneously account for the sub-surface storm sewer system and the above-ground overland flow.

The primary advantage of the 2D overland flow analysis is the ability to accurately account for system overflow into adjacent systems. One example of the benefit that this more detailed and refined analysis will provide can be found in the overflow of runoff from Gessner at Barryknoll south into the adjacent residential communities. The Upper Reaches of W151 Study will determine the frequency at which the capacity of Gessner storm sewer system is exceeded and the volume of overflow impacting the community to the south.

This study will also determine the impact of the overflow to the receiving community and the benefit of the various improvement alternatives to the receiving community. This study will also better enable the analysis of improvement alternatives for the area north of IH-10 including possible combinations of storm sewer improvements, detention, and channel improvements on Briar Branch. The fully dynamic 2D modeling performed as part of this study will allow for a more accurate representation of the interlinked W151 and Briar Branch drainage systems north of IH-10.

Study Item	HCFCD W151 Study	TIRZ 17 Regional Drainage Study
Develop Base Line Model	■	
Identify Primary Flooding Causes	■	+
Define Improvement Alternatives	■	+
Study Area South of IH-10	■	+
Study Area North of IH-10		■
Detailed Overland Flow Analysis		■
Identify Secondary Flooding Causes		■
Identify Detailed System Level of Service		■
Evaluate Benefit of CIP Projects		■
Prioritize Improvements - Schedule, Benefit, Cost		■