

## Abstract

Recent South Texas hazardous flooding events have affected communities along the Lower Rio Grande Valley (LRGV). Permeable Pavement (PP) designs will allow runoff filtration and will reduce pollutants from runoff through filtration and retention. The purpose of this study is to mitigate stormwater runoff by implementing a Low Impact Development (LID) project which will consist of a porous concrete design. The City of Mercedes is partnership with the LRGV stormwater taskforce and the University of Texas Rio Grande Valley (UTRGV) to develop the LID project which will be executed within the city limits. Following the construction of the project, UTRGV students will start monitoring the porous concrete pavement design for runoff volume and pollutant load reduction. The porous concrete will introduce the use of green infrastructures (GI) which are beneficial for areas with flooding. The implementation will benefit both the community and the environment and introduce the GI Master Plan in the region.

## Permeable Pavement Design

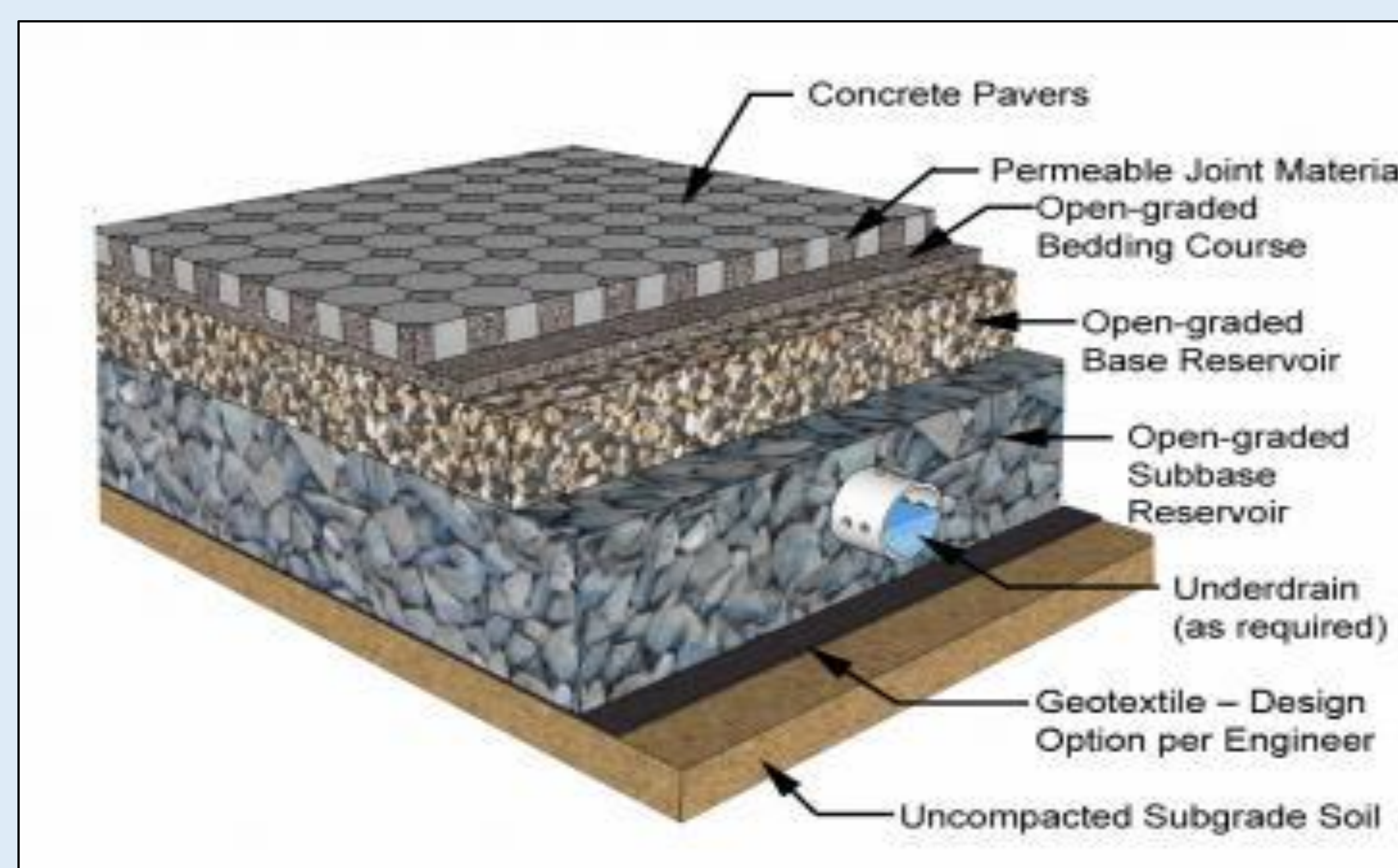


Figure 2: A typical Permeable Pavement design showing the different layers it consists of. Reference: <http://www.stormwater.allianceforthebay.org/take-action/installations/pervious-pavers>

## Design Model

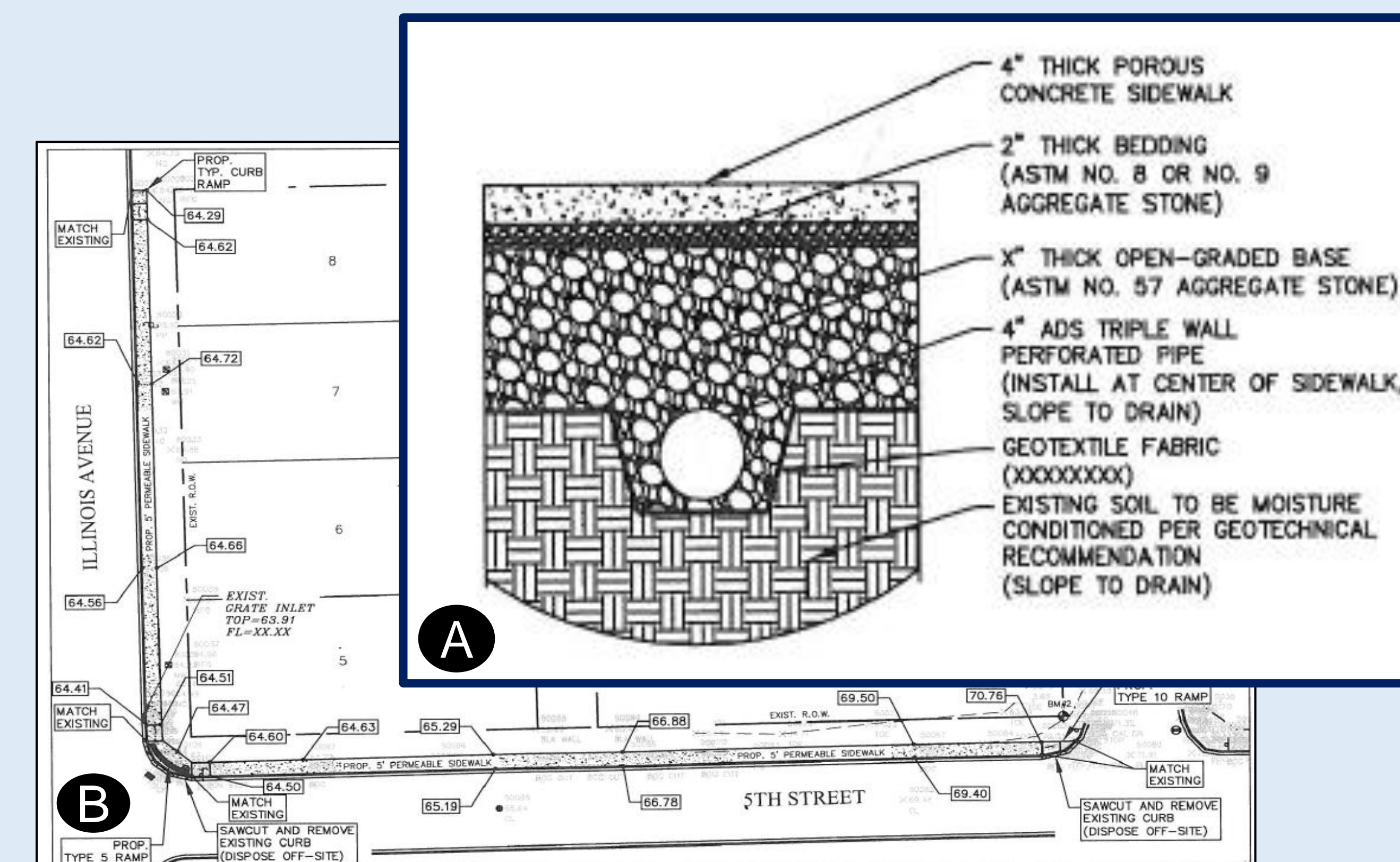


Figure 4: Figure A shows the cross-section of the porous concrete design model. Figure B shows the civil engineering drawing of the design in the project site.

## Scope of Work

Permeable pavements (PP) are effective in reducing water volume, improving water quality, removing pollutants, and filtration of water into a reservoir until water runoff is collected by an under drain pipe. There are four main kinds of PPs these include porous concrete, permeable asphalt, concrete grid pavers, and permeable interlocking grid pavers. Among the different types of PPs, porous concrete was chosen due to its proved effectiveness based on previous studies. One of the studies was conducted in the City of Brownsville and showed expected results of porous concrete in reduction of water quantity and improved quality.



Figure 1: the different types Permeable Pavement

## Project Site



Figure 3: Aerial picture shows project site in City of Mercedes

The purpose of this project is to provide a sidewalk for Mercedes City Hall, Bridge and a School. The project will be implemented in S. Illinois Ave and W 5 street. The site location was selected to provide a path for the people and students which will serve as a stormwater control system for the urban runoff.

## Future Work

UTRGV stormwater faculty and students will be evaluating the performance of the porous concrete pavement in reducing stormwater runoff volume and enhancing water quality. Monitoring equipment will be installed (Figure 5) for measuring the outflow volume and pollutant concentration.

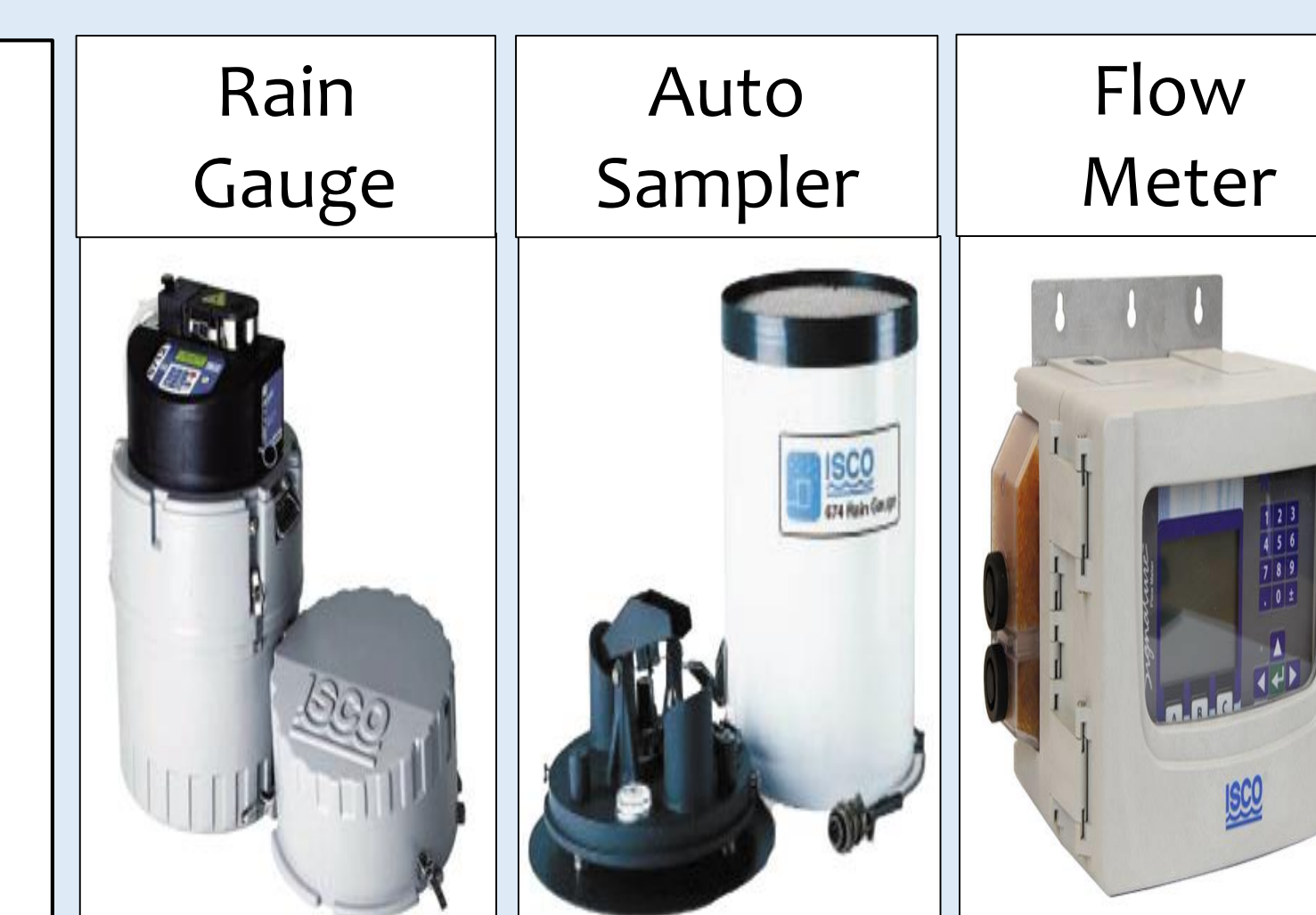


Figure 5: Monitoring equipment to measure rain stormwater runoff volume and collecting samples.

## Acknowledgements

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