



# STONEBROOK ESTATES

## PROJECT OVERVIEW

**Local Permitting Entity:** Harris County / Harris County Water Control Improvement District No. 119

**Project Type:** Residential Community (Single Family, Multifamily) & Infrastructure (Street/Bridge, Wet Utility, Storm/Drainage)

**Sustainability Stars:**

★ Investment    ★ Integration

(Civil infrastructure and lots completed; homes under construction) (approx. 52% complete as of June 2017)

**Project Cost:** \$11.4 million **Site Size:** 51.4 acres

**Development Size:** 135 lots (2 lot sizes offered: one 70 ft. wide by 125 ft. deep and the other 80 ft. wide by 130 ft. deep)

**Project Owner:** Terra Visions, LLC, Randy Jones, Managing Member

**Project Engineer:** R. G. Miller Engineers, Inc., Angela Howes, P.E.

**Additional Engineer** (LID component): Aguirre & Fields, LP., Steve Albert, P.E.

**Sustainability Features:** LID/GI (Vegetated Bio-swales, Linear Detention, Biofiltration Systems, Natural Drainage System)



Photo provided by Terra Visions, LLC

Stonebrook Estates, a 51.4-acre single-family residential, low-impact development, is located near Tomball, Texas. The 135 lot development consists of 80 completed homes, with an average sales price over \$500,000. Stonebrook was developed with LID/GI amenities in mind and a hybrid stormwater management system, which uses natural drainage systems coupled with traditional storm sewers to adequately direct stormwater around and away from the homes. The hybrid drainage system received 12 inches of rain during the 2016 Tax Day Flood, equivalent to the 100-year event, and performed as designed with no flooded structures in the development.

**Figure 1:** Natural drainage systems alter site runoff and can reduce the amount of detention required to comply with local floodplain regulations.

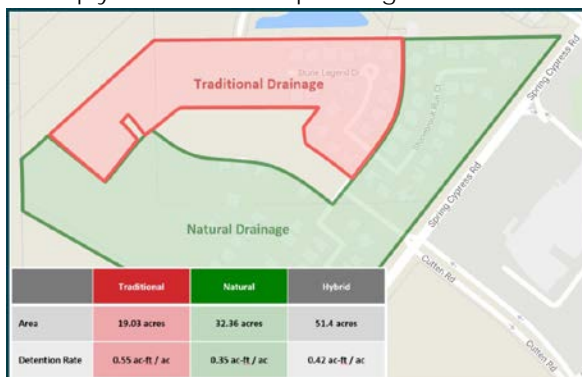


Image Credit: M. Bloom

**Low-Impact Development** (LID) is a term used to describe a land planning, and engineering design approach to manage stormwater runoff as part of green infrastructure. LID emphasizes conservation and use of on-site natural features to protect water quality.

**Green Infrastructure** (GI) is an approach to water management that protects, restores, or mimics the natural water cycle.

## NARRATIVE

Adopted in 2011, Harris County's Low Impact Development and Green Infrastructure (LID/GI) [Design Criteria](#) provides a detailed policy framework that allows developers to obtain development permits when using LID/GI in unincorporated areas of the county.

Stonebrook Estates was one of the first LID projects in Harris County. Terra Visions, LLC chose to employ the LID techniques as an integral part of the community's overall amenity, rather than using a detention pond alone, at the far side of the development approach. Using LID/GI, Terra Visions' engineers designed and had constructed the entire site's drainage system for nearly half of the typical cost of a traditional storm sewer system and preserved developable land.

"The idea was to be different. We chose to use the facility as landscaping and give it a look that's not a typical ditch." — RANDY JONES, PRINCIPAL, TERRA VISIONS, LLC.

Stonebrook Estates' entry is intended to serve as a gateway to the homes. A key feature of Stonebrook Estates' LID/GI approach is a bio-swale, creating the



welcoming green space at the entrance to the development.

The LID/GI amenities provide homeowners with increased green space, a trail system and a water feature that naturally guides stormwater to two 50-foot-wide detention channels that filter the flows to an interior detention basin. The basin then releases the water at a rate and quality that is safe for the surrounding environment.

## INNOVATIVE WATER-MANAGEMENT FEATURES

- **Natural Drainage System.** Stonebrook's natural drainage system mimics the natural flow of water across a green landscape. It directs stormwater into linear and lake-style detention basins. Then stormwater is slowly released to nearby watersheds.
- **Engineered Soils.** The first inch of stormwater runoff from the development is directed through engineered soil filters (biofiltration) that remove pollutants from the stormwater and ensures that the community complies with local post-construction stormwater quality management regulations.
- **Curb Cuts and False-back Inlets.** Stonebrook's roadways are cross-sloped and use "false-back inlets" along the curbs to drain stormwater into bio-swales, rather than traditional storm sewer pipes.

## ADDED VALUE

Terra Visions LLC describes the LID features as an essential part of the community's sense of place. The developer attributes the success to the community's complete blend: a private street—a gated community, and well landscaped with LID components right outside your front door.

R.G. Miller Engineers estimated that the natural drainage system reduced the site detention requirement by 24 percent. Stonebrook's natural drainage system was tested during the Tax Day Flood of April 2016, when the community received 12 inches of rainfall in a 24-hour period (an amount equal to the area's 100-year rainfall). Stonebrook's drainage system performed better than anticipated, with the stormwater staying in the system and not flowing into the streets or yards. The natural drainage system captured and directed the rainfall and runoff correctly, and the linear and lake-like detention basin successfully released the design flow to the nearby channels and bayous.



Photo provided by Terra Visions, LLC



Photo provided by Terra Visions, LLC

## BENEFITS

- **Low-impact development principles present the opportunity to fulfill market demand for communities that are environmentally friendly.** Natural drainage systems create linear green spaces that can anchor trails and water features that are desired by homeowners. Green Infrastructure is a key component of a well-rounded community desirable to homebuyers.
- **Natural drainage systems can cut drainage facilities costs.** By changing the site's runoff characteristics, natural drainage systems can reduce detention requirements, while reducing drainage costs because swales generally cost less than sewer pipes.
- **Green Infrastructure can mitigate risk and avoid losses.** Stonebrook Estates has already survived several floods. The Green Infrastructure in this community is effective and has protected its homeowners.