

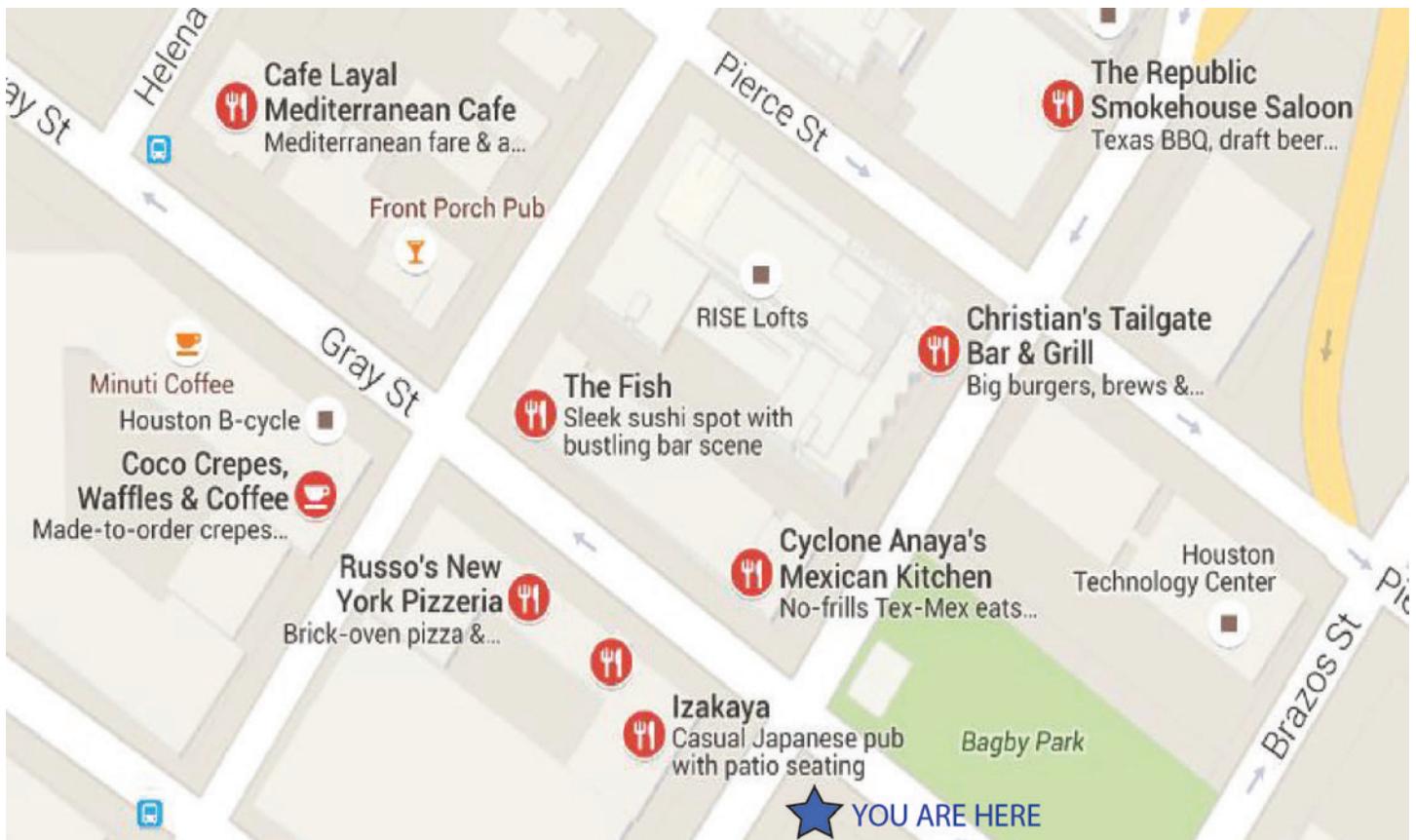
DESIGNING FOR IMPACT:
**LID Mobile
Workshop**

**Houston-Galveston Area Council
June 16, 2016**

Agenda

- 9:00 a.m. **Depart from H-GAC**
- 9:40 - 10:20 a.m. **Tour Queenston Manor Apartments**
Speakers from EHRA Engineering, Camillo Properties, Construction Eco Services
- 10:40 - 11:20 a.m. **Tour City of Houston Fire Station 90**
Speakers from Asakura Robinson, City of Houston Fire Department, English + Associates Architects, Inc.
- Noon - 1:15 p.m. **Lunch**
See map below for choices in the area
- 1:15 - 1:55 p.m. **Tour Bagby Street**
Speakers from Walter P Moore, Midtown Management, Design Workshop
- 2:10 - 2:50 p.m. **Tour Mandell Park**
Speakers from Asakura Robinson, Friends of Mandell Park, City of Houston
- 3:00 p.m. **Return to H-GAC**

Lunch Locations



Mary Martha Gaiennie: 318-423-7325

Queenston Manor

Using LID features to create additional development opportunities

LOCATION	Houston, TX
LAND USE	Multi-Family Residential
COST	\$799,483 (LID Systems)
PRACTICES USED	Bioswales Rain Gardens Permeable Paving Underground Cisterns
CONSULTANT	EHRA



When the site plan for Queenston Manor was initially prepared, a detention pond was proposed to manage the site's runoff. This feature consumed a large area, making multi-family development financially infeasible. Redesigning the site with LID practices increased the amount of land available for buildings, allowing the developer to construct 48 additional units within the multi-family residential project. While the installation of LID systems did not result in cost savings, the 48 extra units generate an additional \$642,812 in revenue each year.

Different LID practices were distributed throughout the site.

- **RAIN GARDENS AND BIOSWALES:** A system of rain gardens and bioswales are located between buildings. Native species are planted in engineered soils, creating a functional and attractive landscape for residents. This system was designed to allow water to drain within 24 hours. The use of engineered soils and other strategies ensures water does not stand for long periods, preventing these features from becoming breeding areas for mosquitoes.
- **PERMEABLE PAVING:** Parking spaces are surfaced with permeable pavers. Stormwater seeps directly through the pavers into the underground storage system.
- **UNDERGROUND CISTERNS:** After flowing through permeable pavers, rain gardens, and bioswales, stormwater percolates through engineered soils into an underground system of rain tanks.

Speakers

Chris Browne

EHRA Engineering

Jeanette Dearen

Camillo Properties

David Batts

Construction Eco Services

Houston Fire Station 90

Using LID practices to reduce water use

LOCATION	Houston, TX
LAND USE	Institutional
COST	\$5,400,000 (Total Cost of Development)
PRACTICES USED	Permeable Paving Rainwater Harvesting Native Plants
CONSULTANT	Asakura Robinson, English + Associates Architects, Inc.



Irrigating urban landscapes requires a significant amount of water. In Texas, almost half of water consumed in urban areas is used to irrigate lawns and other landscapes. To reduce the expense and environmental impacts of excessive irrigation, the City of Houston: Fire Station 90 used a variety of LID practices and other techniques to reduce the amount of potable water used for irrigation by over 80%.

- **NATIVE PLANTS:** Large expanses of native, drought-tolerant plants surround the building.
- **RAINWATER HARVESTING:** Six 1,000-gallon cisterns collect rainwater that runs off the building's roof. This water is used in a low-flow drip irrigation system.
- **PERMEABLE PAVEMENT:** To manage stormwater on-site, parking stalls are surfaced with permeable concrete. Pores allow water to seep through the pavement into the underlying soil instead of ponding and running into nearby storm sewers.

These water conservation and stormwater management techniques helped the building earn LEED Gold Certification from the U.S. Green Building Council, which recognizes projects that incorporate environmentally-friendly materials and practices into their design.

Speakers

Keiji Asakura

Asakura Robinson

Chief Mark Donovan

City of Houston: Fire Station 90

Kathleen English

English + Associates Architects, Inc.

Bagby Street

Rethinking traditional roadway design to incorporate LID

LOCATION	Houston, TX
LAND USE	Roadway
COST	\$9,600,000 (Total Cost of Construction)
PRACTICES USED	Rain Gardens Native Plants
CONSULTANT	Walter P Moore, Asakura Robinson, Design Workshop



Bagby Street is a major collector road that connects downtown Houston with Midtown and US 59. Inception of the Bagby Street Reconstruction project began with a local drainage study that determined Bagby Street as the most logical route for a regional stormwater system. The original project scope included the installation of a sub-street 60-inch stormwater pipe and standard improvements along the roadway corridor and the expansion of the roadway to a four lane, 80-foot right-of-way commuter thoroughfare. However, the project owner, Midtown Management, had another vision for Bagby Street – to use LID to create a vibrant, sustainable pedestrian-friendly street.

LID elements are installed along Bagby Street.

- **RAIN GARDENS:** Rain gardens capture 33% of stormwater runoff and remove 75% of bacteria, 73% of phosphorous, 93% of oil, and 85% of total suspended solids.
- **NATIVE PLANTS:** The addition of these native plants includes 70% increase in tree canopy resulting in 12°F decrease in surface temperatures.

The Bagby Street project is a unique example of how LID techniques can be used in an urban streetscape to filter runoff and generate economic development. LID is interwoven into the new, pedestrian-friendly streetscape redesign which directly correlates to a 25% increase in rental market values and \$25 million increase in private development adjacent to the street since the announcement of the project.

Speakers

Charles Penland
Walter P Moore

Marlon Marshall
Midtown Management

Steven Spears
Design Workshop

Mandell Park

Transforming unused space into a public park with LID features

LOCATION	Houston, TX
LAND USE	Park
COST	\$1,010,000 (Total Cost of Construction)
PRACTICES USED	Green Roof Bioswales Native Plants
CONSULTANT	Asakura Robinson



Mandell Park is the result of a neighborhood effort to transform an abandoned lot into a beautiful park. The Friends of Mandell Park and the Houston Parks Board worked together to develop the 1.22-acre park master plan. The park underwent a transformation including upgrading the existing Meredith Gardens, an Urban Harvest Premier Garden, into an inviting space featuring meandering raised limestone planters for community use. The park includes a sustainable tool/potting shed with solar-powered ventilation and a green roof.

Several LID elements are incorporated throughout Mandell Park.

- **BIOSWALES:** Running along the periphery of the park and the outer edge of Meredith Gardens, bioswales contain native plantings and filter pollutants from runoff before it leaves the park. Each section of the bioswales contains educational signage about bio-infiltration and the use of LID techniques to improve water quality and reduce irrigation.
- **NATIVE PLANTS:** Native plants are used because they can tolerate long periods of inundation and drought, and they allow for low impact water retention and filtration.
- **GREEN ROOF:** A shipping container with solar-powered ventilation, green roof, and vine plantings serves as a sustainable tool and potting shed for community gardeners. The green roof system features native grasses that collect and filter greywater on the roof to be stored for irrigation.

Speakers

Keiji Asakura, Jessica Krug
Asakura Robinson

Skip Almoney
Friends of Mandell Park

Abel Gonzales
City of Houston

Regional Guide to LID

Designing for Impact:

A Regional Guide to Low Impact Development

The Houston-Galveston Area Council is pleased to announce the release of *Designing for Impact: A Regional Guide to Low Impact Development*. This guide explains LID functions, benefits, best management practices, and ways to overcome obstacles to implementation. The guide also looks at case studies showcasing successful LID projects from around the region and considers five hypothetical site plans comparing costs and environmental impacts of LID and conventional design.

This guide is part of H-GAC's Designing for Impact project, in cooperation with Environmental Protection Agency (EPA) Gulf of Mexico Program, to educate the public, designers, developers, and environmental stakeholders about the benefits of LID.

A digital copy of *Designing for Impact* can be found at www.h-gac.com/go/LID. To request a printed copy, contact Mary Martha Gaiennie at marymartha.gaiennie@h-gac.com.



Pick Up a Copy TODAY!

Interactive LID Mapping Tool

The Designing for Impact Interactive Map highlights LID practices across the 13-county H-GAC region. Users can simply click on a site on the map to learn more about the LID features and benefits and see photos from the specific project.

People using the map can also submit information about other LID projects not currently mapped.

Learn more at www.h-gac.com/go/LID.

Designing for Impact

Designing for Impact is a mapping application that highlights various Low Impact Development (LID) projects across H-GAC's 13 county region. Click the sites on the map to see a project's location, photos, features and benefits. Projects are grouped based on development type:

- Residential Development Projects (10 projects)
- Non-Residential Development Projects (24 projects)
- Mixed Use Development Projects (1 project)



Photos by Asakura Robinson, Design Workshop, EHRA Engineering, H-GAC, and Jones | Carter



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