

Exploration Green: Clear Lake's 200-Acre Multi-Purpose Green Space

AIAA Houston Section Technical Symposium 2017

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Exploration Green Conservancy



Clear Lake Area Floods



Clear Lake area has had seven 100 year floods
and three 500 year floods since 1979

Clear Lake Area Flooding

Clear Lake City Water Authority Role



- Over 30 years, flooding has become major issue for Clear Lake City area.
- “100 Year” peak flow in Horsepen Bayou watershed increased by 20% in 1980s alone.
- CLCWA objectives include:
 1. Prevent increased rainwater runoff due to new development
 2. Reduce current flooding through proven methods such as detention

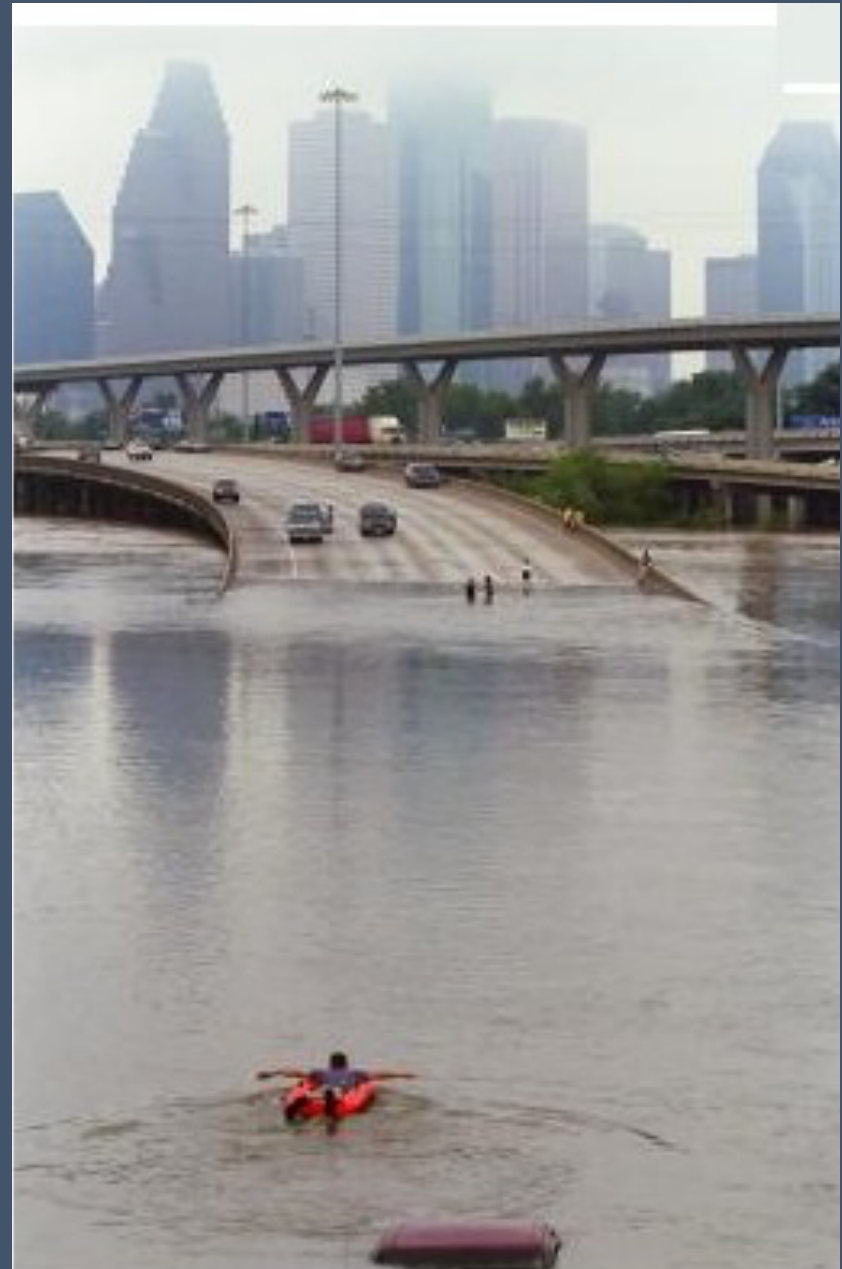


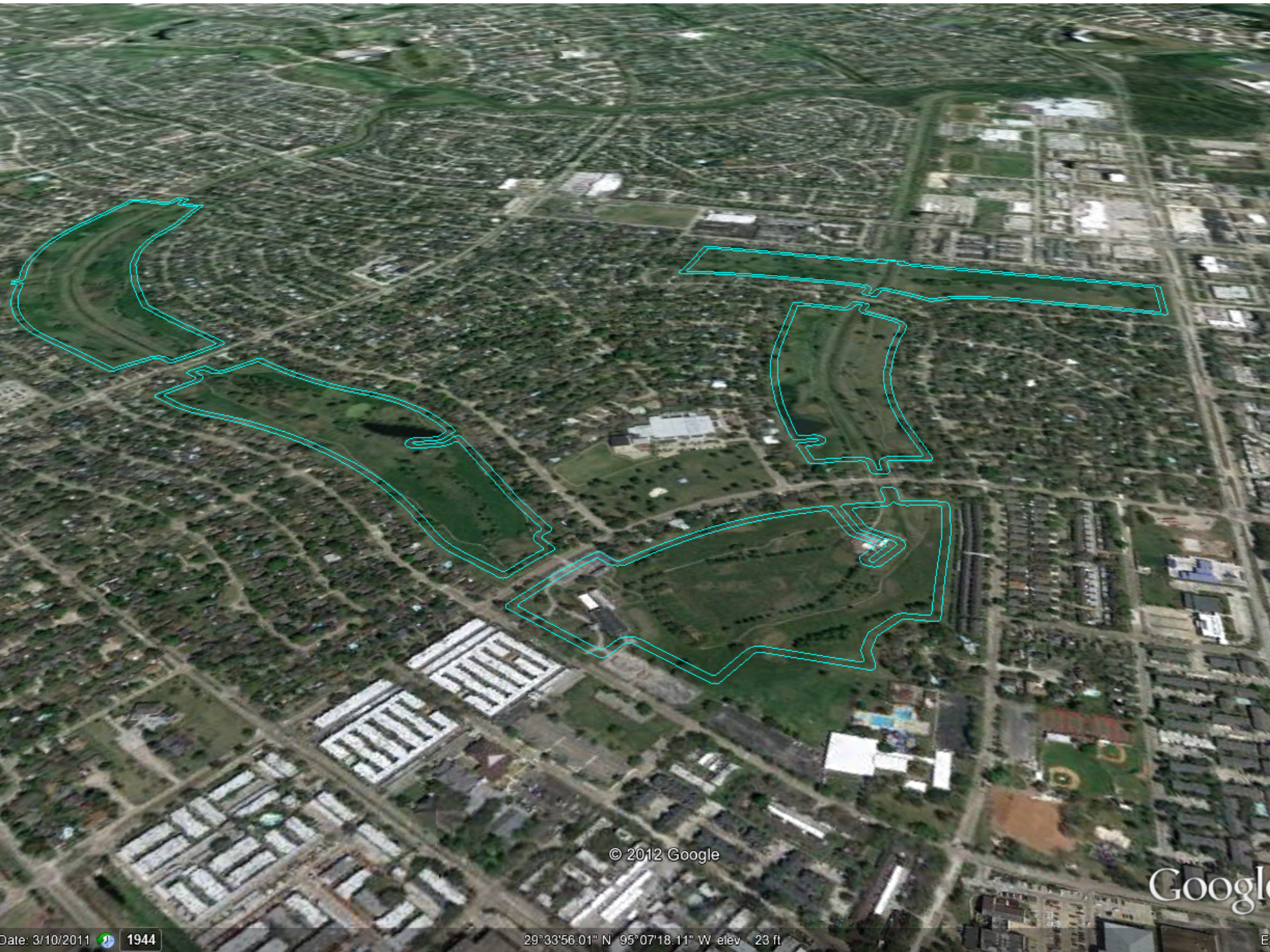
Extreme Weather Events

**A Key Texas Message:
As the climate warms,
increases in hurricane
rainfall rates, storm surge
height due to sea level rise,
and the intensity of the
strongest hurricanes are
projected.**

And in May 2015 a statewide monthly average rainfall total of 9.05 inches, broke the previous all-time monthly record by well over two inches.

NOAA National Centers for Environmental Information
| State Summaries 149-TX





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CLCWA DETENTION FACILITIES AND ASSOCIATED OPEN SPACE & PARK PLAN

Storm water
detention
Water polishing
Conservation
Recreation



Exploration Green



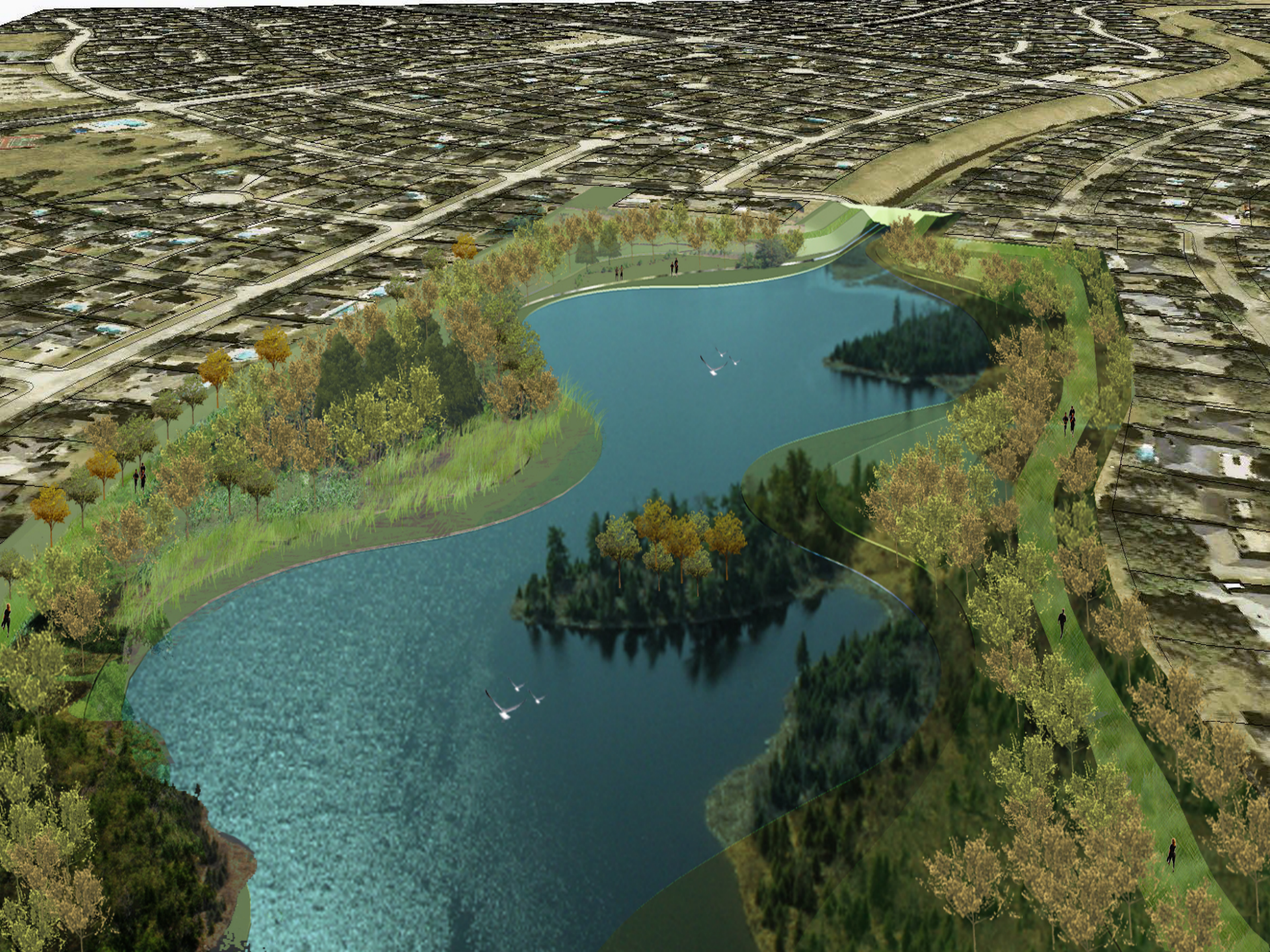
- Located in very heart of Clear Lake community
- Green space for recreation, conservation and flood detention
- City recognizes as key park space of district
- At center of Houston Bike Plan and H-GAC CL Study
- Honors exploration heritage in space and energy



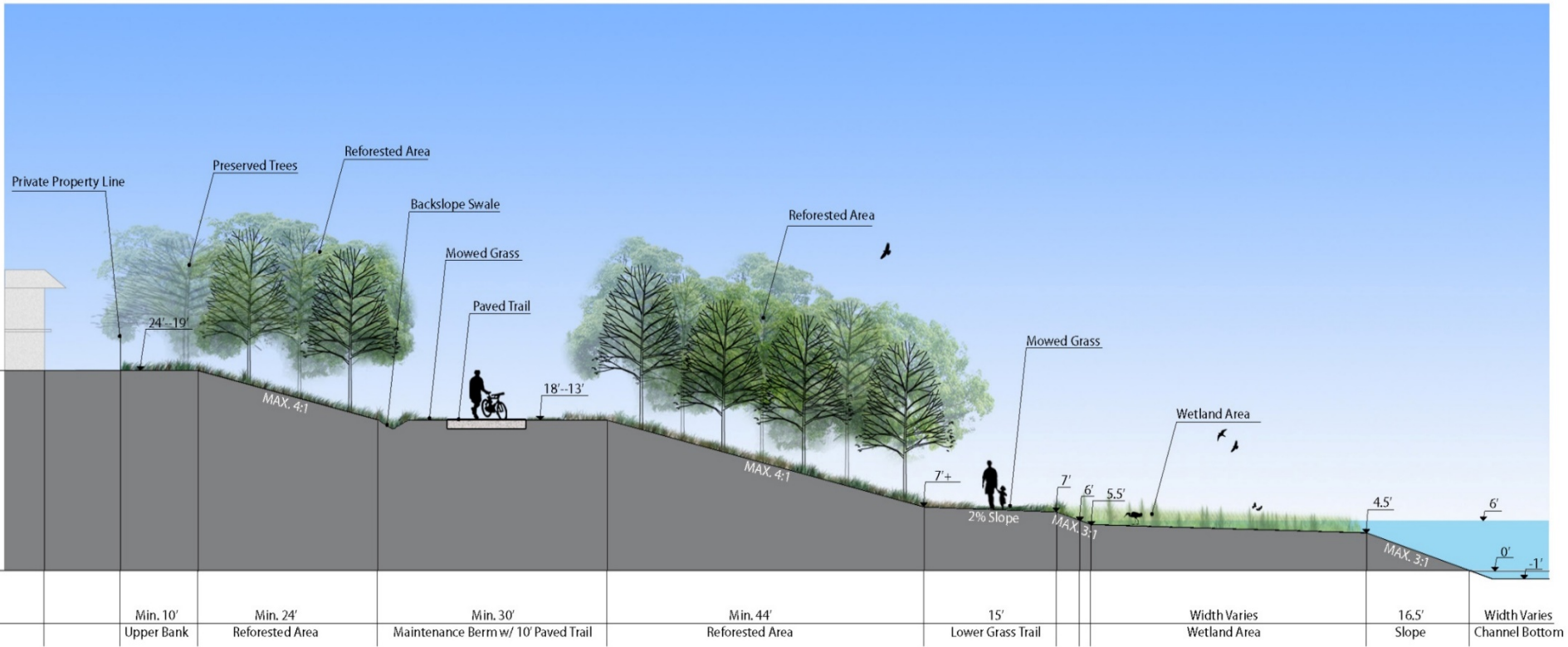
Master Plan Metrics

- 200 acres overall
- 1,680-acre ft storm water storage
- Excavation - 3 M cubic yards
- Water storage depth – 13 ft
- Permanent water depth – 6 ft
- Permanent surface water area – 38 ac
- Water Quality Wetlands – 39 ac
- 5 Habitat islands
- Upland / island areas – 101 acres





proposed typical section in detail







Exploration Green Benefits



- Reduces storm water flooding
- Green space park very accessible to Clear Lake neighborhoods
- Creates and conserves environmental area of natural habitats
- Recognizes Bay Area Houston as “home of human space exploration”
- Adds to walkable area of old Clear Lake City commercial district
- Increases real estate values of local homes



Short History & Milestones



2013. Master plan finalized

2014. Conservancy formed

2014. Conservation easement

2015. EGC awarded non-profit status

2015. Tree & Wetland Nurseries established

2016. Phase 1 excavation begins

2017. Major landscaping begins

Six Town Hall meetings in 2012, 2013, 2014, 2017

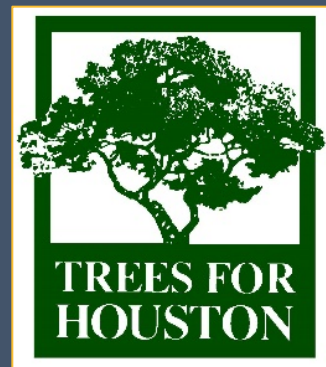


Exploration Green Conservancy

- All volunteer group organized to support conservation, recreation, education
- Define alternatives for Master Plan
 - Landscape and natural plantings
 - Park amenities, e.g. trails
- Benchmarked park conservancies and conservation non-profits
- Formed 501(c)(3) non-profit organization
- Develop and maintain all green space amenities
- Raise funds and obtain grants to develop the Green



Exploration Green – A Partnership



Awards and Recognition



2!

- ✓ 2013 Mayor's Proud Partner Award from Keep Houston Beautiful
- ✓ 2013 Houston-Galveston Area Council (H-GAC) "Planning Award for Parks and Natural Areas"
- ✓ 2015 Trees for Houston "Arbor Award"
- ✓ 2015 American Society of Landscape Architects Award to SWA
- ✓ 2016 H-GAC Our Great Region "Connections Award"



Construction Schedule Accelerates



- Phase 1 to be complete Fall 2017
- Phase 2 (Reseda to El Dorado) Fall 2017 to Fall 2018
- Phase 3 Fall 2018 to Fall 2019
- Phase 4 Fall 2019 to Fall 2020
- Phase 5 Fall 2020 to Fall 2021



Phase 1

1. Main entrance and plaza
2. Parking lot
3. Plaza w/ water features
4. Stream w/ boulders and bridges
5. Open area
6. Sports fields
7. Forested area
8. Wetland area
9. Habitat island
10. Preserved wells
11. Trees
12. Paved upper bank trail
13. Bridge crossing
14. Grass lower trail



WATER STORAGE (ACRE FT)	WATER AREA (ACRE)	WETLAND AREA (ACRE)	ISLAND AREA (ACRE)	TRAIL LENGTH (MILES)
345	8	6	0.5	1.1

NOTE: Uses and activities are preliminary and may expand to include other improvements







Stormwater Wetlands



- Urban and suburban stormwater carries pollution
- Wetland plants, soils and microbes reduce and remove contaminants
- Mosquitos reduced by flowing water, and ecosystems support frogs, tadpoles & mosquito fish
- Water flows from streets, yards, streams to wetlands cleansing to bayous to Galveston Bay



Stormwater Wetlands Planting



- Phase 1a pilot site
- Planted 5000 plants
- June 2016 community planting events
- 1450+ wetland volunteer hours since 2014



TEXAS COASTAL
WATERSHED
PROGRAM



TEXAS A&M
AGRILIFE
EXTENSION



Landscaping



Benefits for the Community

- Initial grant of 1,000 native trees, 2,000 more coming
- Islands w/ protected habitat
- Enhanced habitat for resident and migrating birds, butterflies, wildlife
- Diversity of native trees, shrubs, aquatic plants, grasses, wildflowers
- Bird and wildlife watching and education for area visitors

Habitat and Landscaping Plan

- 60 species of oaks, other large trees, understory trees, and shrubs
- Over 200 species of birds, butterflies, amphibians and mammals



Eco-tourism is popular
on the flyway



60 Species of Trees , Shrubs, Aquatic Plants

Oaks

Oak, Burr
Oak, Cherry Bark
Oak, Chinquapin
Oak, Coastal Live
Oak, Compton
Oak, Nuttal
Oak, Overcup
Oak, Swamp
Chestnut
Oak, Water
Oak, White
Oak, Willow

Other Trees

Black Gum
Black Cherry
Cypress (Bald)
Cypress (Montezuma)
Elm (American)
Elm (Cedar)
Elm (Winged)
Hackberry
Hornbeam
Loblolly Pine
Maple (Red)
Swamp Pecan
Sweet Gum
Sycamore (AmericaTup)
Water Hickory
Water Tupelo

Understory Trees

Carolina Buckthorn
Farkleberry
Fringe Tree (Mexican)
May Haw
Mexican Plum
Parsley Hawthorn
Persimmon, Common
Red Bud (Eastern)
Red Bay
Roughleaf Dogwood
Rusty Blackhaw
Virburnum
Sassafras
Sweet Bay Magnolia
Wild Crabapple



Tree Nursery

- 2,260 volunteers hours in 2015/16
- Lee College Early College High School students
- Texas Master Naturalists
- Eagle Boy Scout Projects



Tree Planting

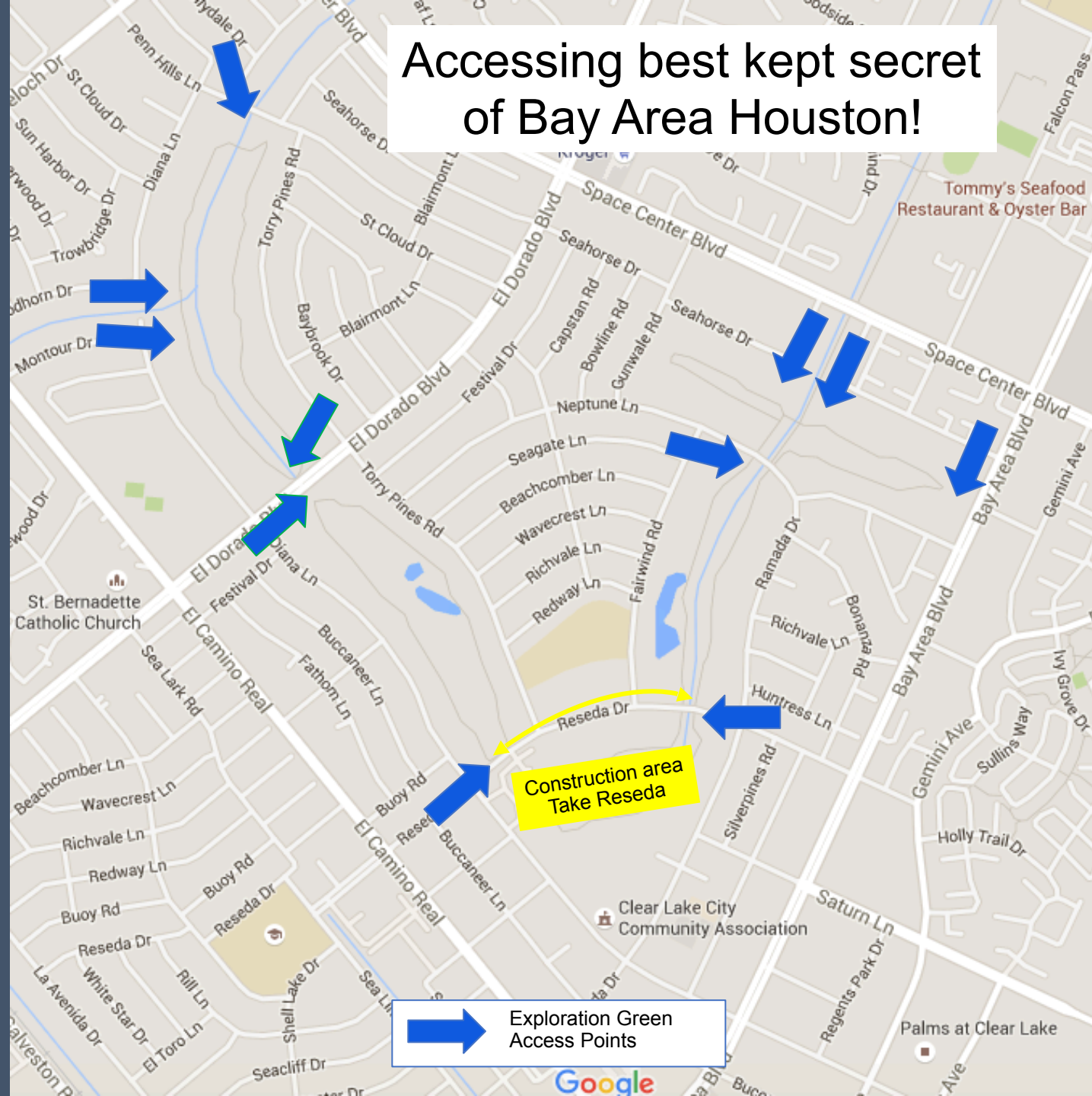
- 240 trees planted in 2017
- 160+ volunteers from Boeing, JSC, High School groups, Lee College, local Boy and Girl Scout troops







Accessing best kept secret of Bay Area Houston!



Questions?

Comments?

www.ExplorationGreen.org



Recreation Needs



1. Benches and tables
2. Signs and trash cans
3. Drinking fountains
4. Picnic area
5. Restrooms
6. Nature playground
7. Stream & pebble beach
8. Small amphitheater
9. Planning support





Hike & Bike Trails

1. Center of Clear Lake Bike/Ped Plan
2. Approx. 6-12 miles w/ double trails
3. 10 ft. concrete trail above & water edge grass trail
4. ADA compliant
5. Phase One 1.1 mile connects to sections
6. Connects to other trails in area
7. Off-road to schools, NASA, library, Courthouse Annex, Park and Ride

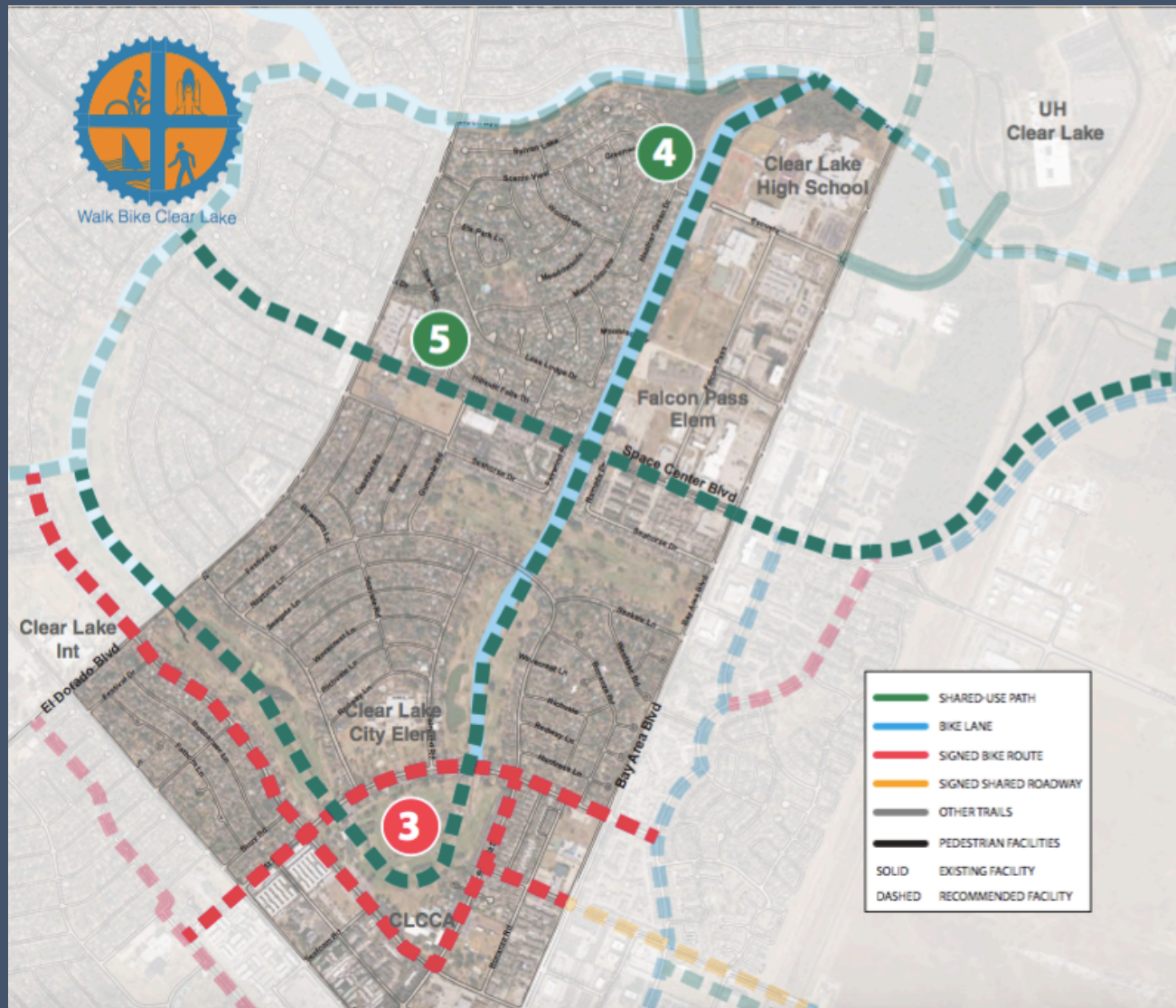


Kingwood





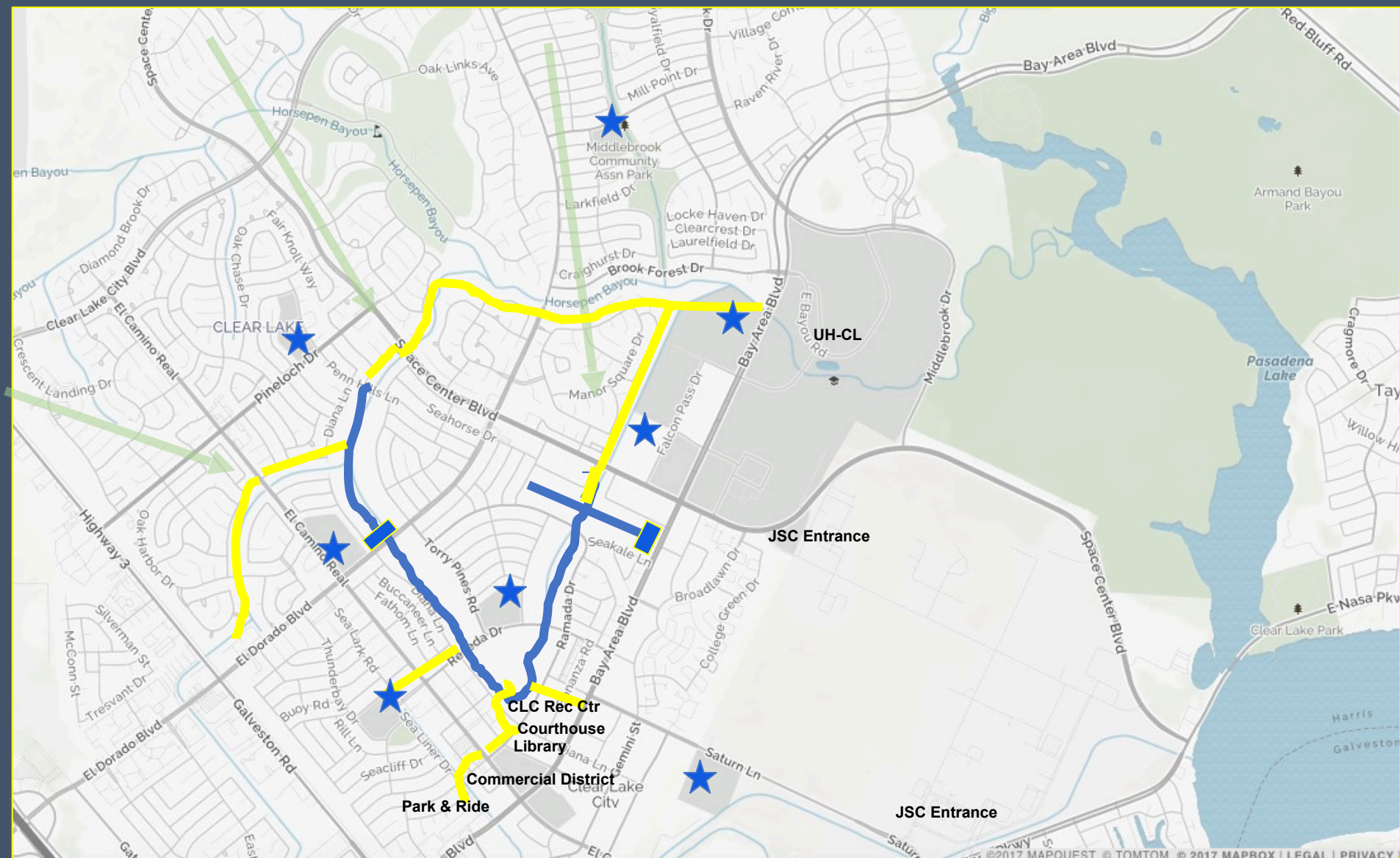
Clear Lake Bike/Pedestrian Study



District 2: Schools & Residential Recommended Projects

- 3 CLCCA / Golf Course**
- Signed route along Reseda Dr. between Gemini Ave. and Sea Liner Dr.
 - Signed route along Ramada Dr. between Reseda Dr. and Diana Ln.
 - Signed route along Diana Ln. between Ramada Dr. and drainage ditch.
 - Shared-use path on one side of drainage ditch from Space Center Blvd. to west of El Dorado Blvd.
- 4 CCISD Drainage Easement Shared-Use Path**
- Shared-use path between Space Center Blvd. & Bay Area Blvd. behind Clear Lake High School
- 5 Space Center Blvd Shared-Use Path and Intersection Improvements**
- Shared-use path on north side of the road between El Dorado Blvd. and Middlebrook Dr.
 - Improvements at intersections to increase ease and safety of crossings.

Primary EG Trail Connections



EG Trails - future

Connecting trails - future

School - CCISD

Parking Pull-out

TEXAS PARKS & WILDLIFE

Fundraising

1. Federal, state, city and local grants
2. Corporate and foundation donations
3. Individual donations
4. Matching donations

Volunteers for grant writing and administration, event planning and other fundraising activities.



Events

- EG-hosted events
 - Earth Day – April 22
 - Banquet – September
- Tabling at events
- Speakers Bureau



Volunteers help with media relations, events, design, copywriting, data entry and other communications roles.



EGC Budget

Project Budget (in \$1,000)	Section 1	Total
Trails	260	2,300
Trees, shrubs and irrigation	1,000	5,050
Entry Plaza	800	900
Sport field, Future Building	30	440
EGC Project Total	2,090	8,690

EGC Fundraising

- Success at Funding:

Trees for Houston	\$300,000+ (1000 trees)
Storm Water Wetlands Program	\$250,000 (Wetlands Plants)
Coastal Management Program	\$100,000 (Grant)
Space City Rotary	\$12,000 (Park Benches)
Clear Lake Civic League	\$18,000 (Irrigation)
Individual contributions	\$40,000+

- Seeking funds for Trails, Irrigation, Entry Plaza, and future needs.
- Pursuing more grants (Local, State & Federal) & corporate donations.

Additional Information

- Exploration Green Conservancy
www.ExplorationGreen.org
- Clear Lake City Water Authority
www.CLCWA.org
- Galveston Bay Foundation
www.galvbay.org
- Trees For Houston
www.treesforhouston.org
- Texas Coastal Watershed Program
www.tcwp.tamu.edu



Clear Lake Flooding & Green Space

1. CLCWA responsible for storm water drainage
2. Flooding continues to worsen
3. 2006 CLCWA defines greater need for water detention
4. Golf course closes, owners plan apartments & condos
5. Keep Green Space Green grassroots uprising!
6. CLCWA develops stormwater detention plan
7. CLCWA purchases site
8. Master Plan for stormwater lakes in shared use facility
9. Flood damage reduction features
 - 1,680-acre feet temporary stormwater storage
 - Water storage depth - 13'