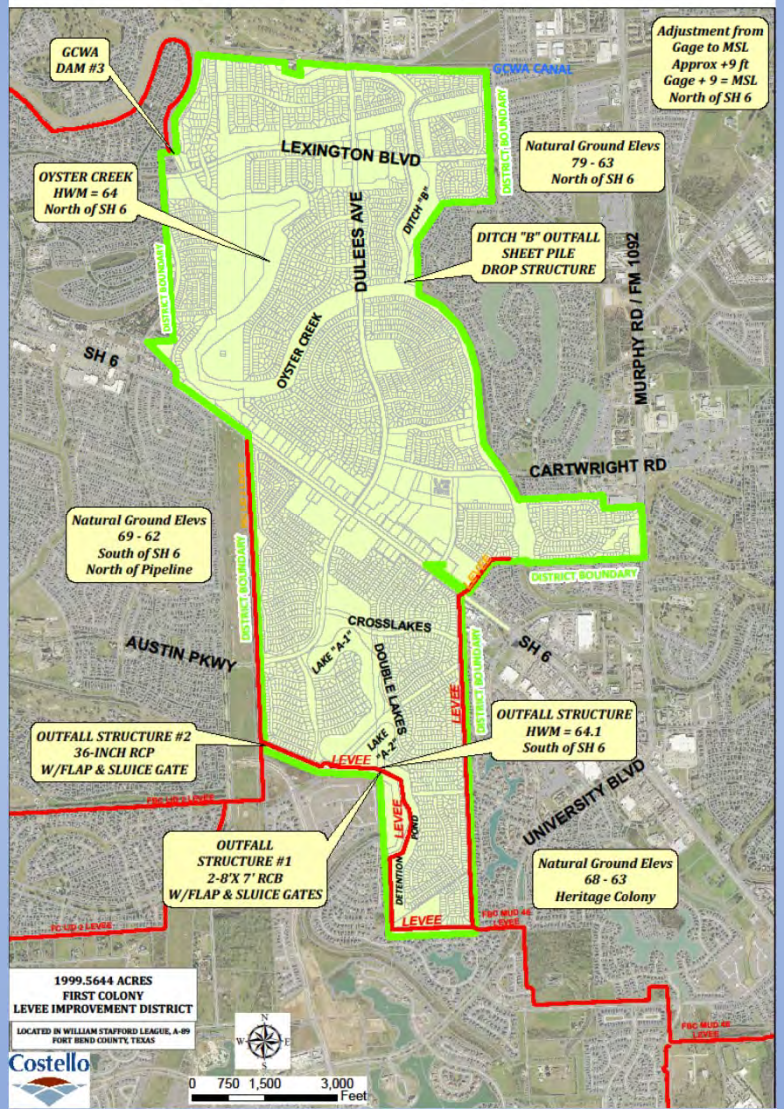
FIRST COLONY LEVEE IMPROVEMENT DISTRICT

DISTRICT BOUNDARY & FACILITIES MAP



FIRST COLONY LEVEE IMPROVEMENT DISTRICT

LEVEES 101

ENGINEERING AND TECHNICAL INFORMATION

Presented by:

Angela Lutz, Esq.

Gregory P. Frank, P.E., CFM

AGENDA

- Background & Purpose of Levees & LIDs
- Description of District and Overall Drainage Systems
  - Oyster Creek
  - Steepbank Creek
- How are the Systems Designed to Function?
  - Typical Street/Storm Sewer Design
  - Typical Levee System Design
  - Flap Gates – Sluice Gates
- Hurricane Harvey
- Drain Time – Sluice Gate Closure
- Moving Forward

Purposes of LIDs & Background of First Colony LID

Angie Lutz

What is a Levee Improvement District (LID)?

- A political subdivision of the State of Texas, similar to a county or school district
- Created over a limited area to provide flood protection, drainage improvements and reclaim lands from flood plains.

Creation of a LID

- The owners of a majority of the acreage in the proposed district shall petition the County Judge and County Commissioners to create the LID
- County Judge and Commissioners Court held a hearing to determine whether the LID should be created
- County Judge and Commissioners Court create the LID and determine the boundaries of the LID
- Engineering Studies Proving Engineering Feasibility

LID Directors

- Fort Bend County Commissioners appoint the 3 LID Board of Directors
- Must be a qualified property taxpaying elector of the county
- After the District is more than 50% developed, at least two of the directors must be residents of the District
- Continuing Education Requirements to ensure educated on Levees, Flood Fighting, and National issues

Purposes of the LID

- Construct and maintain levees and other improvements on, along, and contiguous to rivers, creeks and streams
- Reclaim lands from overflow
- Control and distribute the waters of rivers and streams by straightening and improving them; or
- Provide for the proper drainage and other improvement of the reclaimed land

What do LIDs do?

- Can issue bonds to reimburse the developers for the levee, detention ponds, drainage ditches, outfalls, pump stations and/or fill
- Maintain infrastructure the LID may own:
  - Levees
  - Pump Stations
  - Detention Ponds
  - Drainage Ditches
  - Gates/Closure Structures (flap gates, sluice gates)
- Protect from flooding and MANDATORY Flood Insurance

Examples of Fort Bend County LIDs

- Sienna Plantation (Sienna LID)
- Telfair (LID 17)
- Riverstone (LIDs 15 & 19)
- Kingdom Heights (LID 20)
- Del Webb Sweetgrass (LID 6)
- Greatwood (LID 11)
- RiverPark (LID 10)
- First Colony (FBC LID 2)
- Commonwealth (FC LID 2)

What laws govern the operation of the LID?

- MUDs/LIDs in Texas are one of the most heavily regulated types of political subdivisions
- Unlike Home Rule Cities which have all powers unless expressly taken away, MUDs/LIDs can **only** exercise those powers expressly granted in the Texas Water Code or other specific law
- LIDs derive their authority and power from the Texas Constitution
- Regulated by the TCEQ, the Texas Attorney General (Public Finance Division), Counties and Cities
- MUDs/LIDs are subject to the Open Meetings Act and Public Information Act
- Board members are subject to conflicts of interest, nepotism, penal code provisions, ethics guidelines, gift laws, etc.

How does a LID operate?

- The LID is governed by a three-member board that is appointed by the County Commissioners Court
- Like City Council, the Board of Directors is the “policy-making” and decision making body of the LID
- The LID employs a number of professional consultants to advise the board and make recommendations on action items, much like City staff.
- FBC LIDs have no permanent staff.
- Day-to-day Field Operations are conducted by an operating company.

What are the Roles of the Consultants?

- Attorney
  - Acts as general counsel to the Board on public law, contract, and limited real estate matters and as bond counsel to the District on the issuance of tax-exempt debt
- Bookkeeper
  - Keeps the books and financial records of the District, pays invoices, advises the board on investment of public funds
- Financial Advisor
  - Advises the Board on the issuing of debt and setting the tax rate
- Tax Assessor/Collector
  - Sends tax bills and is responsible for collection of tax payments
- Auditor
  - Annually Audits the funds of the District pursuant to governmental accounting standards and TCEQ rules.
- Engineer
  - Designs and oversees construction of the District's facilities
- Operator
  - Operates, inspects and maintains the levee and drainage facilities

Background of FCLID

- Approximately 2000 acres
- Created in 1982
- Contains the Subdivisions South of SH 6:
  - Heritage Colony
  - Lakes of Austin Park
  - Lakefield
  - Lake Colony
- Contains the Subdivisions North of SH 6:
  - Oyster Creek Plantation
  - Plantation Trails at First Colony
  - Plantation Park
  - Magnolia Plantation
  - Plantation Creek
  - Plantation Colony
  - Plantation Bend
  - Lexington Colony
  - Riverbend South
  - Riverbend North
  - Sugar Crossing
  - Old Mill Park
  - Creekshire

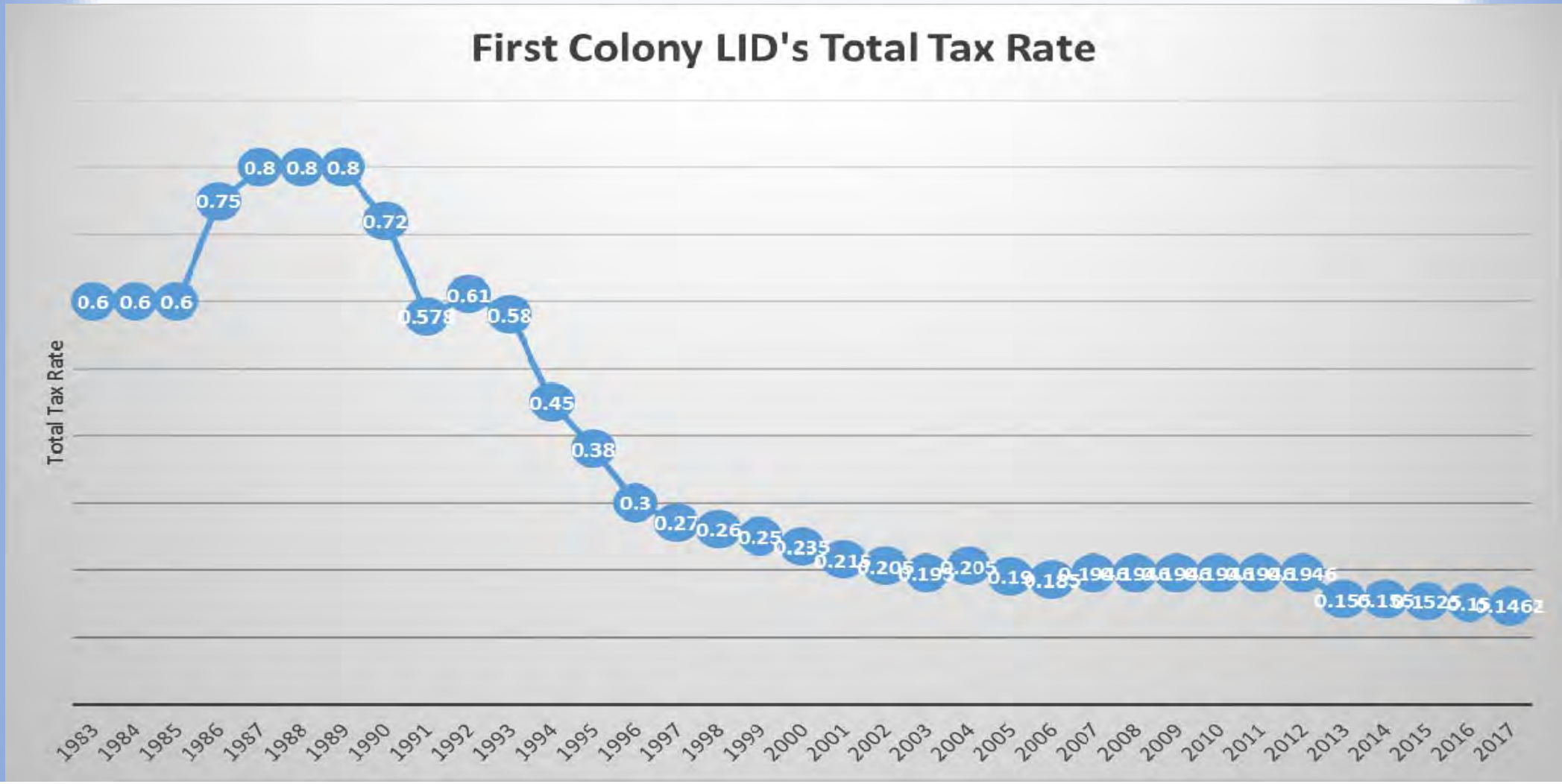
Taxation of the LID

- A LID in the beginning levies an Operation and Maintenance Tax against all of the property in the boundaries of the LID.
- After a LID has issued bonds payable in whole or in part from taxes, it has the authority to levy an ad valorem tax for each year that any of the bonds are outstanding in an amount sufficient to pay the interest and principal of the bonds.
- Total Tax Rate = Debt + O&M Components
- Only revenue of a LID is ad valorem taxes

FCLID Tax Rates

- 2016 Tax Rate
  - Debt Service $0.00
  - O&M $0.15
    Total $0.15 per $100 of Assessed Value
- 2017 Proposed Tax Rate
  - Debt Service $0.0000
  - O&M $0.1462
  - Total $0.1462 per $100 of Assessed Value

First Colony LID's Total Tax Rate History



Why Do We Have a Levee?

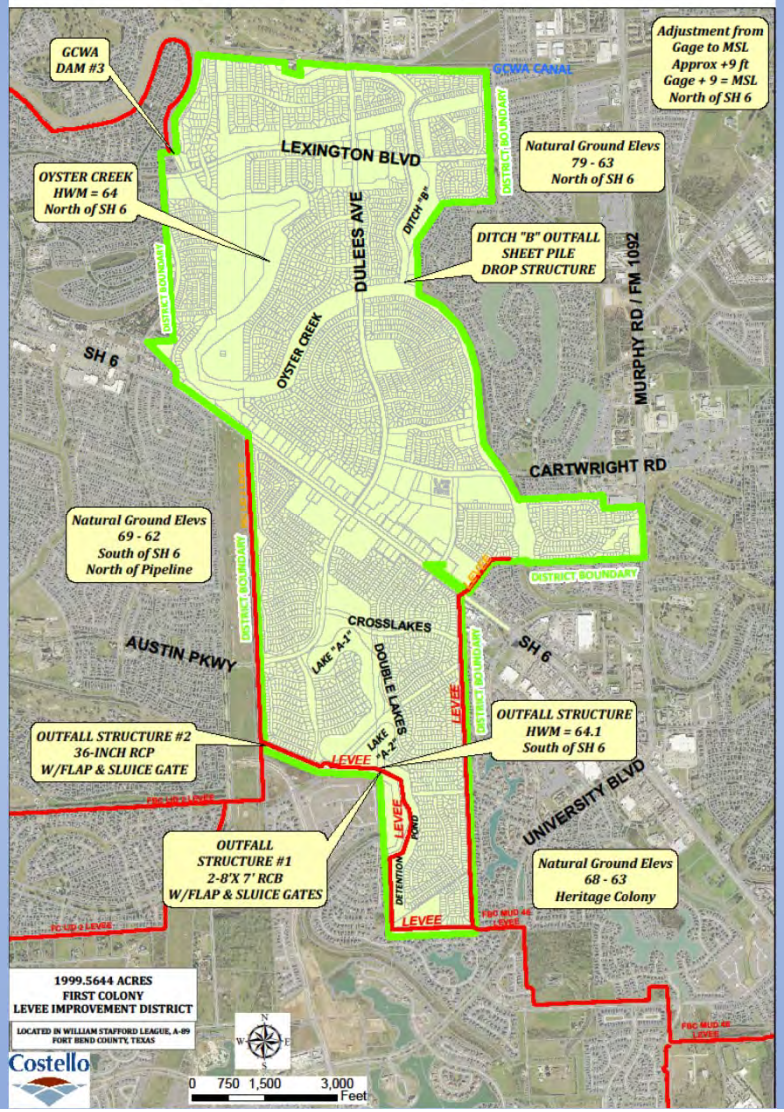
- Prior to the development of this area (1970s), a levee did not exist to protect this property from the Brazos River
- The levee was constructed to remove the property in the District from the floodplain, defined by FEMA **at that time**.
- As a result of the Brazos River floodplain re-mapping effort (2007-14), the District partnered with other perimeter levee districts to pay to raise the Perimeter Levees closest to the river and protect the partner districts from the Brazos River.
- The District continues to be shown as property protected from the **1% annual chance flood hazard by a levee** on the revised floodplain maps with an effective date of **April 2, 2014**

Description of District & Overall Drainage System for First Colony LID

Greg Frank

FIRST COLONY LEVEE IMPROVEMENT DISTRICT

DISTRICT BOUNDARY & FACILITIES MAP



General Design Criteria

- FEMA Requirements
  - Height – 100-year River Event + 3-feet of Freeboard
  - Internal Drainage – 100-year Local Event
  - Structural Integrity Using Sound Engineering Practices
- FBCDD Requirements
  - Local Event Design – 100-year with Brazos River Down
  - Coincident Event with Brazos River Up
  - Levee Height – FEMA Freeboard + 1-foot

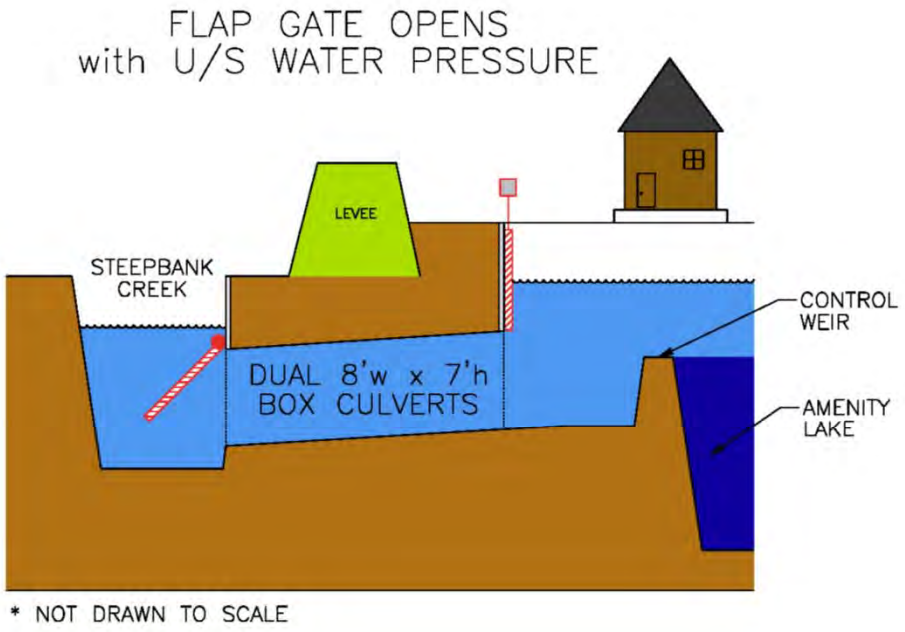
First Colony LID Earthen Levee

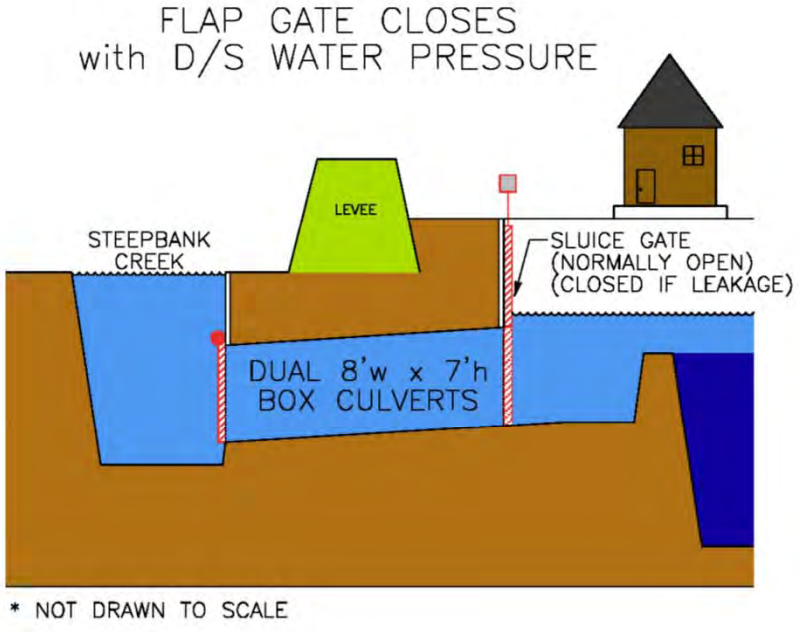
- Levee is an Earthen Embankment built with Highly Compacted Clay Soils, making permeability of embankment very low (not easily saturated)
- 10-foot Top Widths
- Generally 6 to 10 feet in Height above natural ground
- Trapezoidal Cross Section with 3:1 (Horizontal:Vertical) Side Slopes
- Clay core about 50-70 feet in width at base
- Grass Cover for Erosion Protection

FCLID Gates and Pumping

- FCLID does NOT have any pumps. Internal storage designed for multiple day event
- The outfall gates into Steepbank Creek allow GRAVITY driven flows out of the lakes/detention pond.
- The Outfall Structure on Lake A-2 has dual 8'x 6' Box Culverts with Flap and Sluice Gates
- Flap Gates open/close AUTOMATICALLY with difference in water levels inside and outside of levee
- Sluice Gates are used as backup to flap gates if gates leak, debris blocks gate open AND outside level is higher than inside level

FLAP GATES & SLUICE GATES
HOW THEY FUNCTION





FCLID FLAP & SLUICE GATES

Detention Storage Capacity
South of SH 6

- Two Lakes (A-1 & A-2) near Double Lakes Dr. are Amenity & Detention
- One Dry Detention Pond near Heritage Colony
- Approximately 275 acre-feet (11.9 Million cubic feet, 89 Million gallons) of storage volume
- Equates to approximately 9.5 inches of Rainfall (10-Day, 3-year event)

Detention & Drainage System
North of SH 6

- Subdivisions north of SH 6 drain into Oyster Creek
- Ditch “B” provides Detention for areas along and north of Lexington Blvd
- Oyster Creek is connected to Brazos River by Flat Bank Diversion Channel
- 100-year on Brazos River at Flat Bank (Richmond Gage 55.8) backs water into some streets, no structural flooding is shown to occur by topographic data

Routine Operations and Maintenance

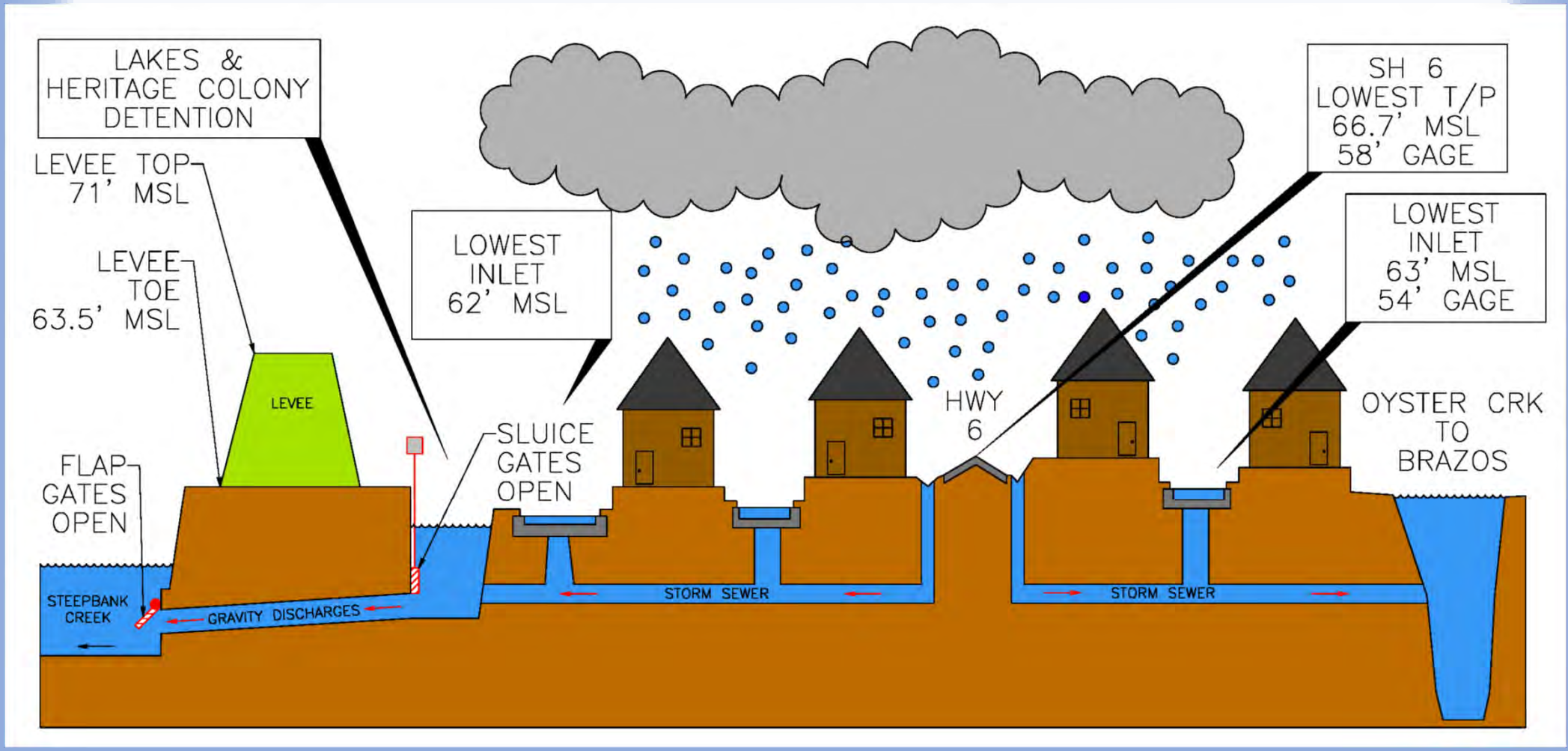
- Levee, Flap & Sluice Gates are visually inspected each week for general conditions, debris, hog damage, etc.
- Gates are inspected after each rainfall to check/clear debris
- Sluice Gates are operated monthly to ensure all electrical/mechanical parts are functional
- Mowing of the levees & ditches is performed monthly or more often during high growth periods

Emergency Operations

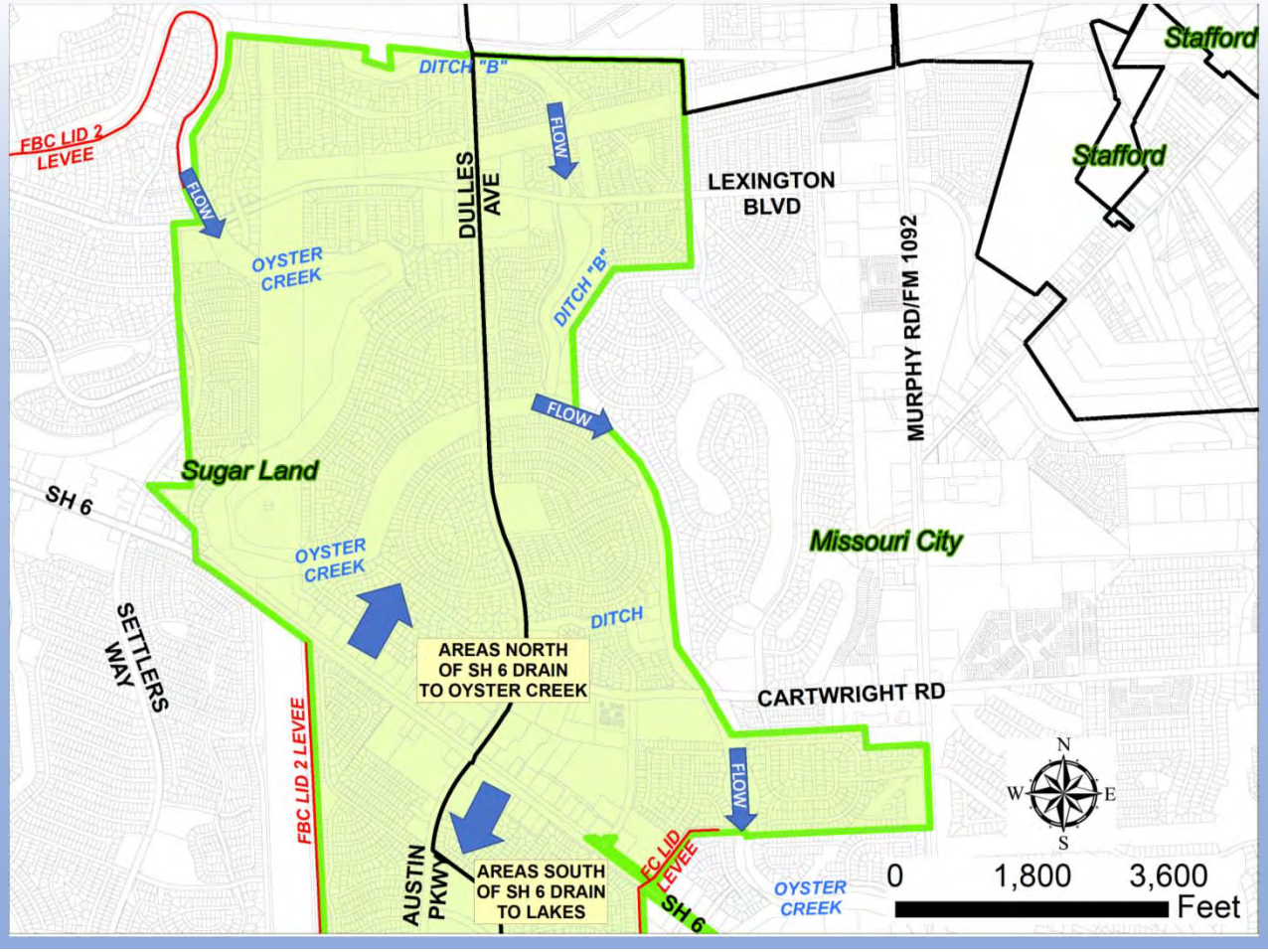
- Check Flap Gates for Closure. If debris found in gates, remove if able/safe for operator.
- If outside levels are higher than inside AND Flap Gate does not seal, Close Sluice Gate
- Inspect Levee regularly for Slides/Sloughs/Erosion and Embankment Seepage
- Monitor surrounding areas for sand boils/underseepage

First Colony LID System Layout, Design and Functionality

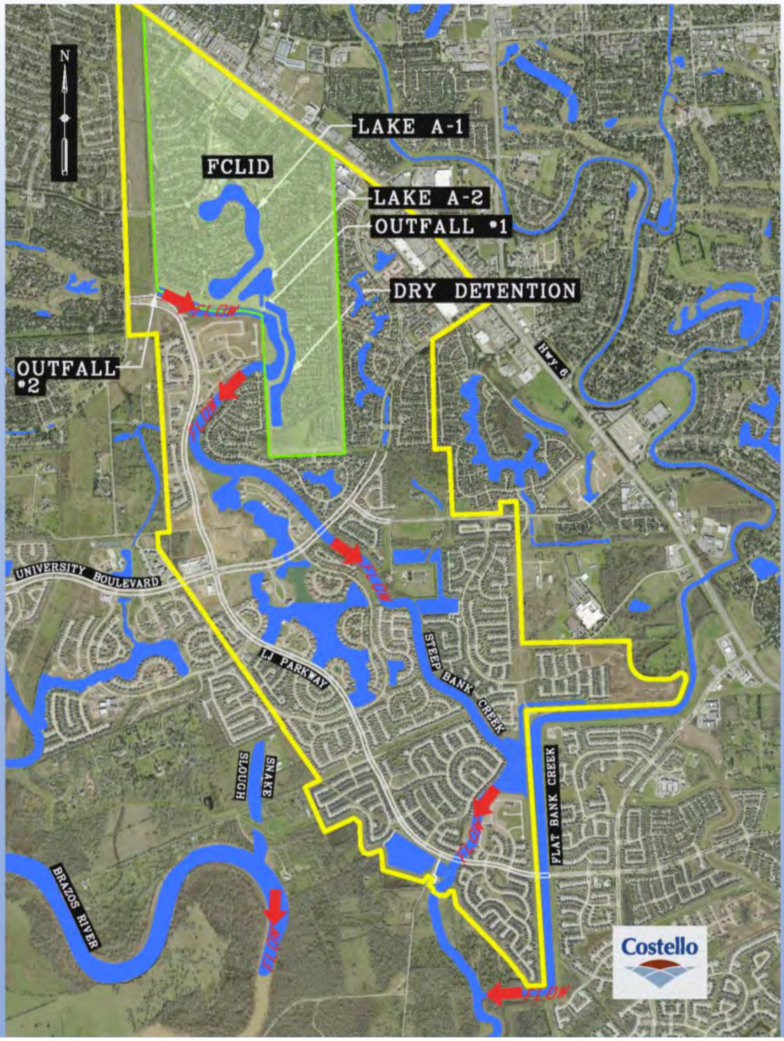
FIRST COLONY LID SCHEMATIC



OVERALL SYSTEM MAP (NORTH of SH 6)



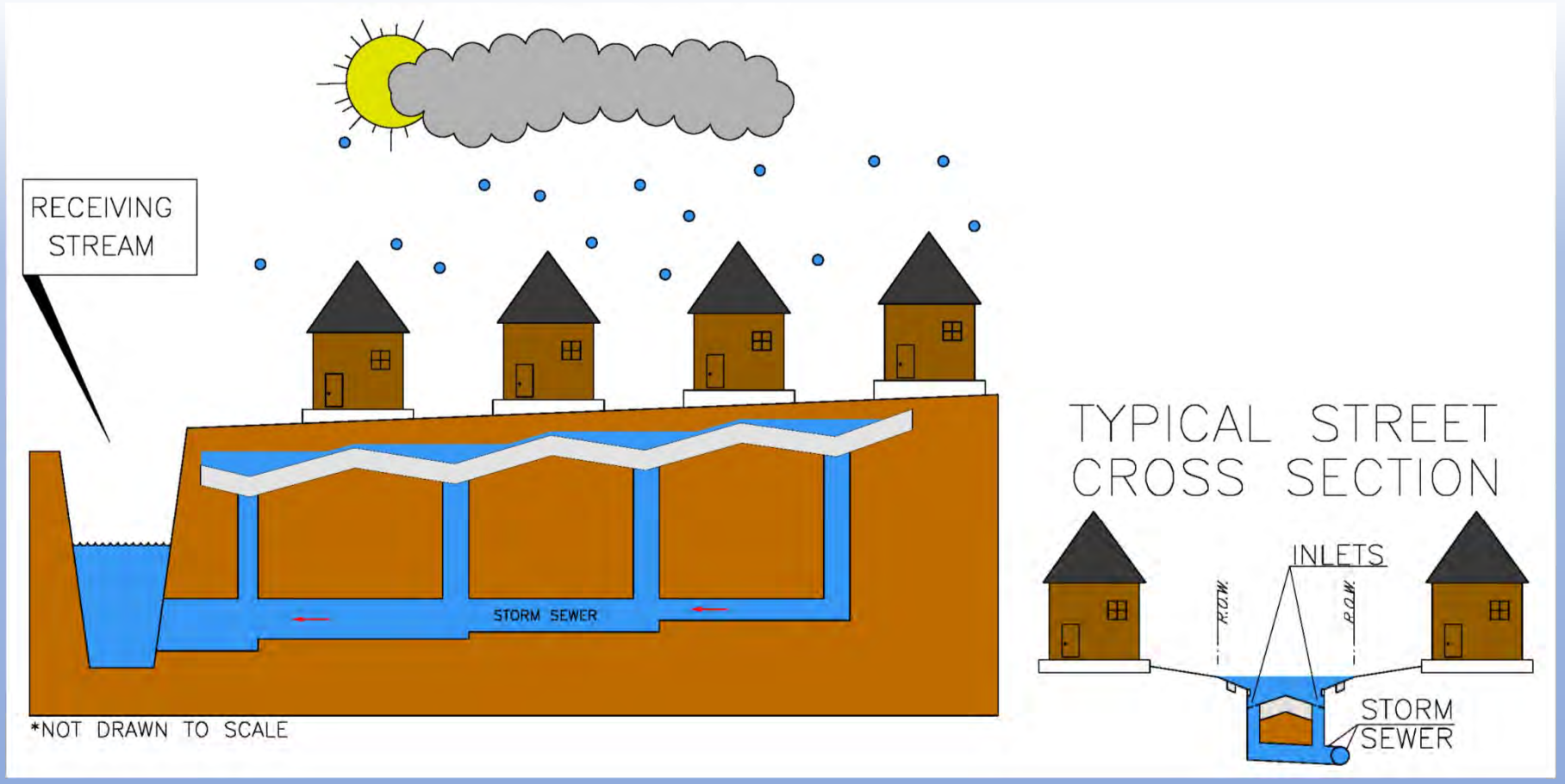
OVERALL SYSTEM MAP (SOUTH of SH 6)



TYPICAL STREET/STORM SEWER DESIGN

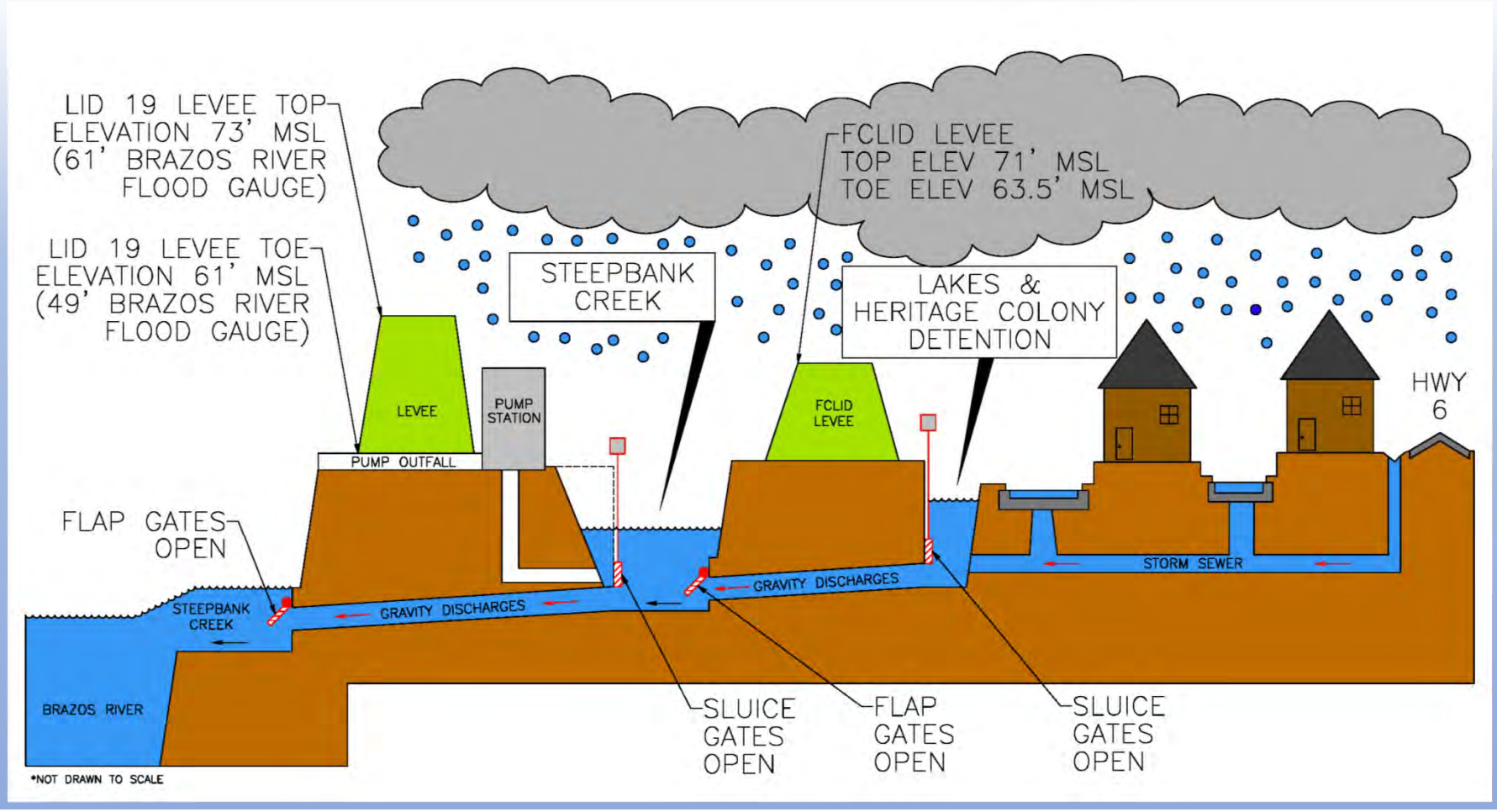
SHORT DURATION – HIGH INTENSITY RAINFALL

3-yr STORM SEWER DESIGN – 100-yr EXCESS SHEET FLOW DESIGN



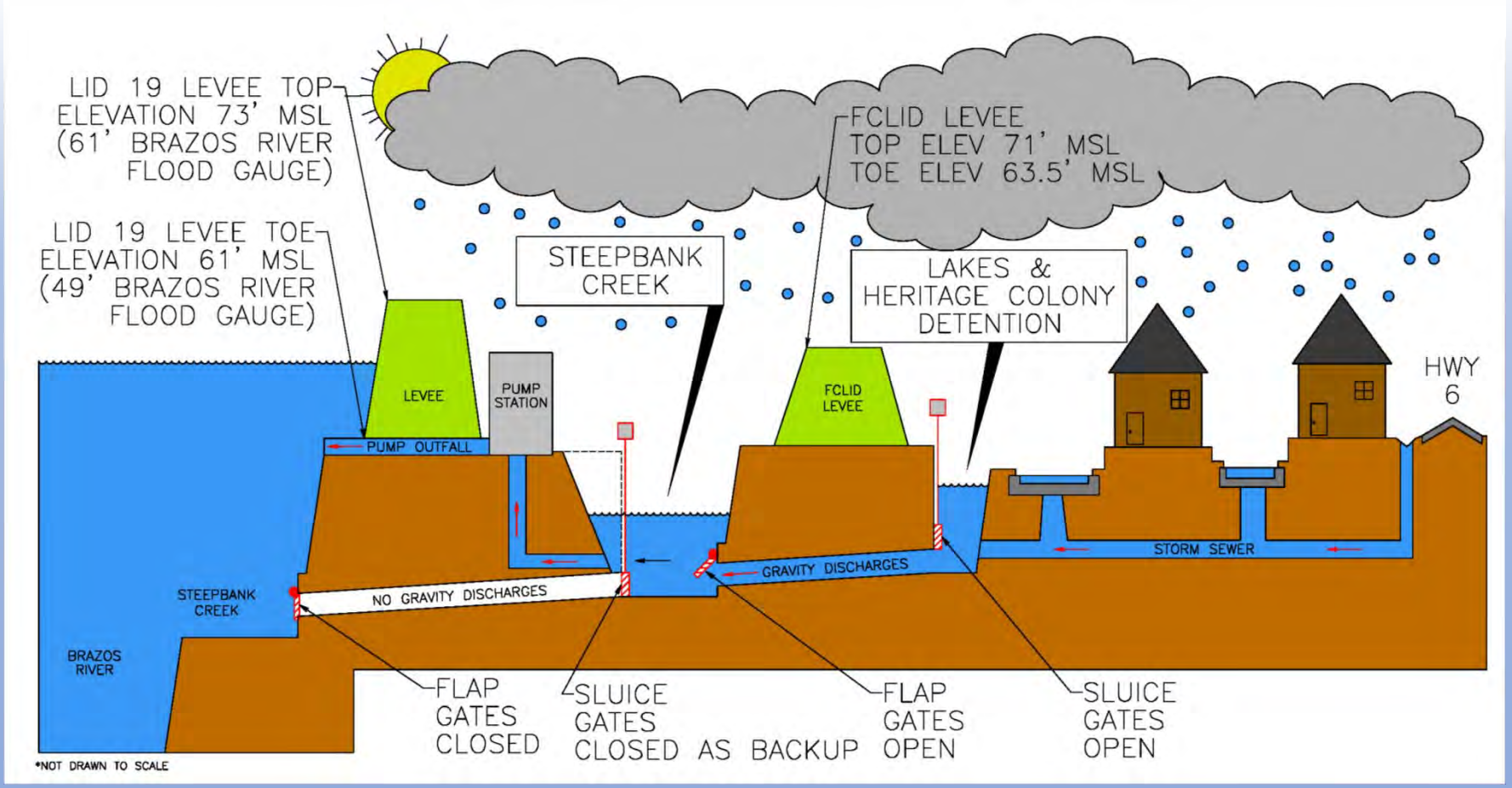
NORMAL OPERATIONS

100-yr LOCAL RAINFALL, 12.5” in 24-hrs
RIVER DOWN, FULL GRAVITY DISCHARGES AVAILABLE



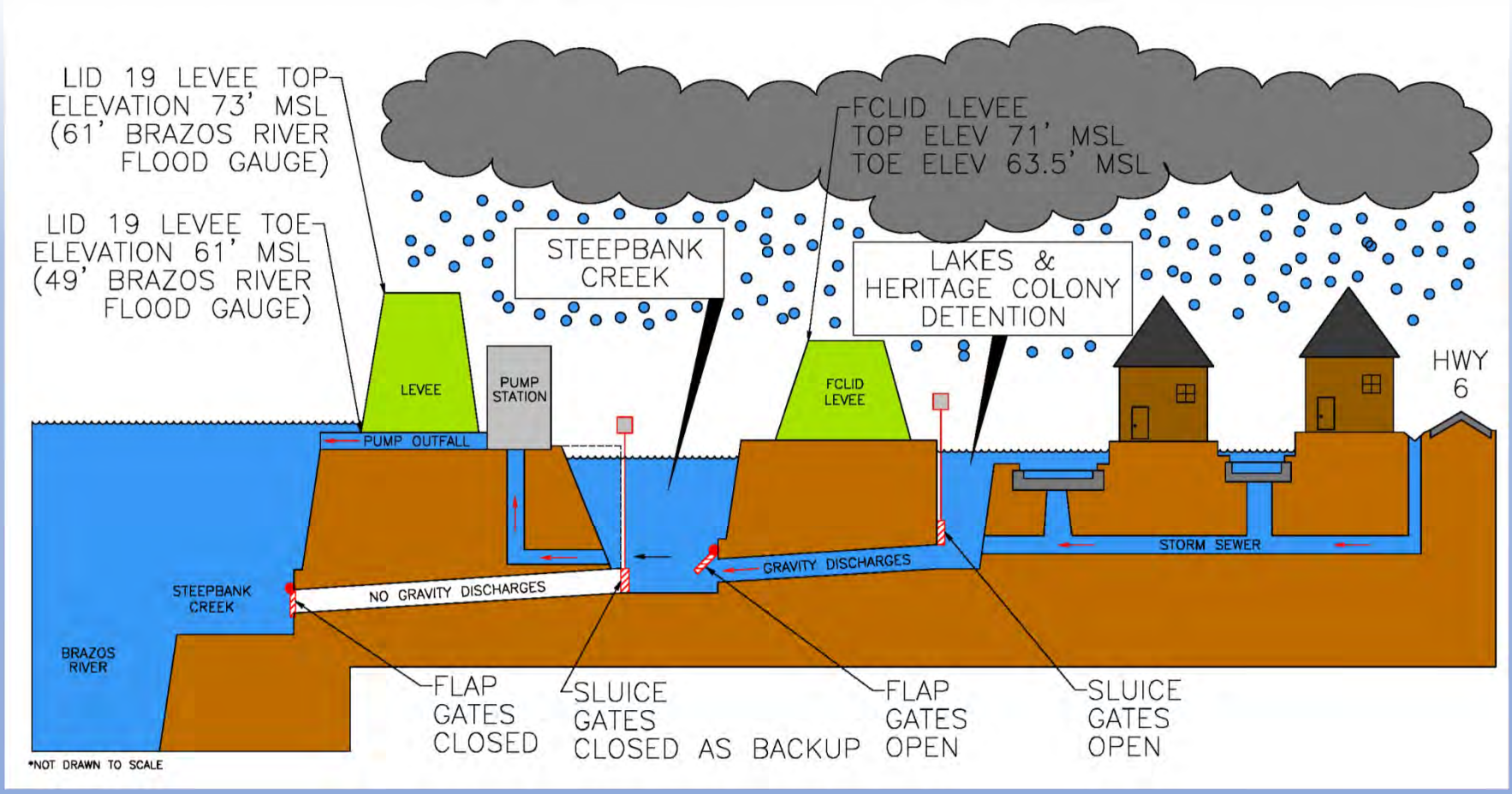
RIVER EVENT OPERATIONS

BRAZOS RIVER AT FLOOD LEVELS – NO GRAVITY DISCHARGES
6-inches in 24-hr DESIGN RAINFALL



HURRICANE HARVEY

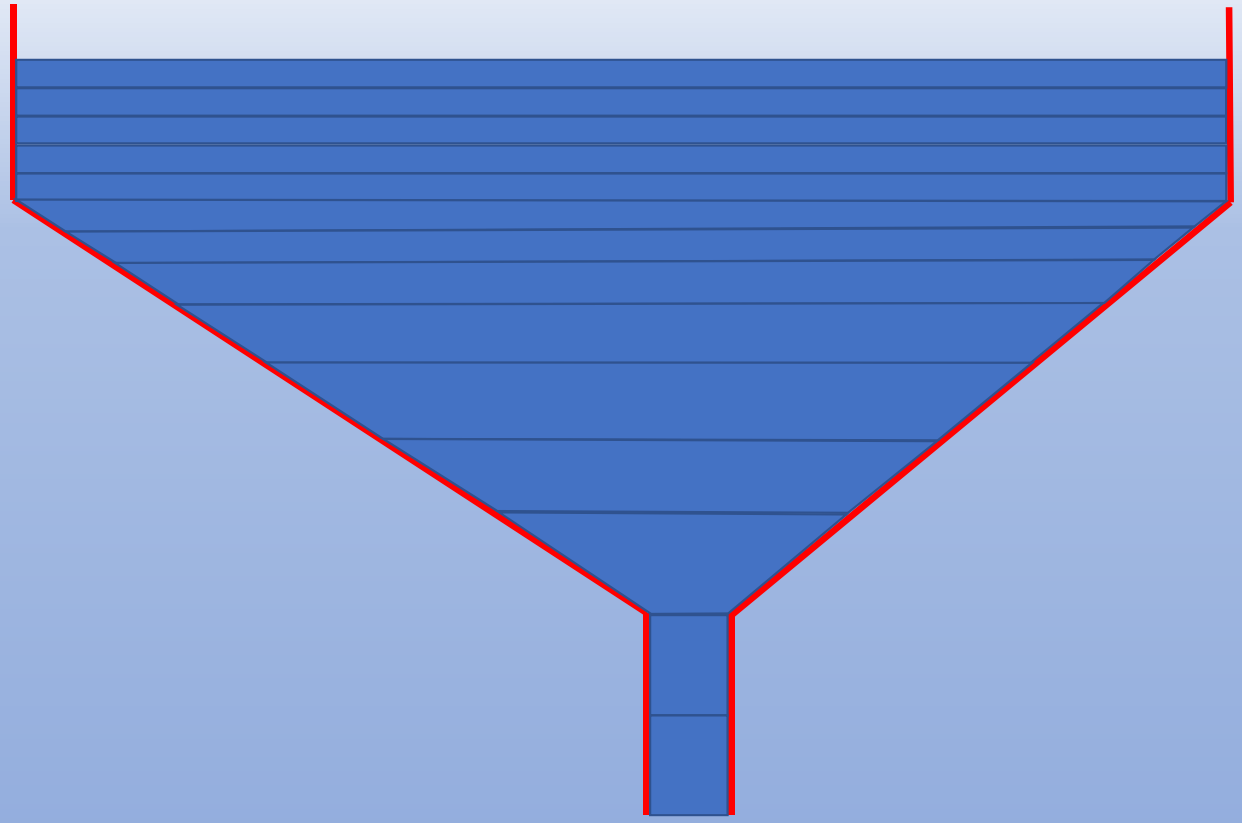
BRAZOS RISES TO FLOOD LEVELS – GRAVITY DISCHARGES CUT OFF AFTER 2 DAYS OF RAIN
+/- 34 inches OF TOTAL RAINFALL OVER 4 ½ DAYS



DRAIN TIME & GATE CLOSURE

- The drain time of the streets and the lakes was a direct result of the amount of rainfall that fell AFTER the river completely cut off gravity discharges from Steepbank Creek.
  - FCLID was designed with more storage due to NOT having pumps
- The Sluice Gates (inside gates) at Lake A-2 were closed ONLY AFTER there was no more water ponding in the streets in FCLID

LENGTH OF TIME TO DRAIN STREETS AND LAKES



RECENT RAINFALL HISTORY

Houston's Ten Wettest Days on Record

National Weather Service Houston/Galveston

Two of the 5 wettest days on record in Houston occurred with Harvey (16.07" and 8.37").

Houston, Texas

Ten Wettest Calendar Days on Record (Inches), 1892-2017

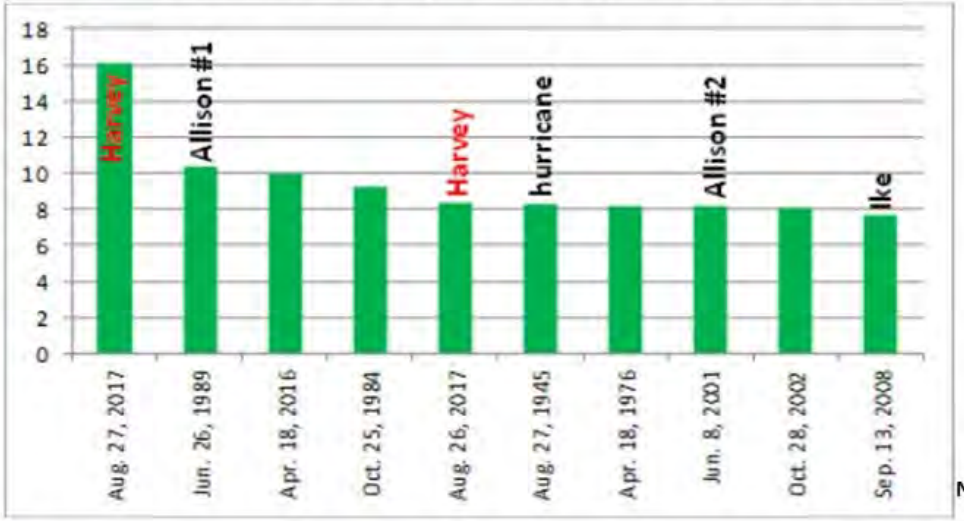


Image courtesy of NWS Southern Region

@NWSHouston
weather.gov/houston

Image Produced **8/31/2017 8:58 PM**

QUESTIONS PREVIOUSLY SUBMITTED

- *Did the levees breach/overtop?*
  - **No levees in FBC were breached or overtopped**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Is it time to reevaluate the entire system given the number of significant storms in the past several years?*
  - **The entire system is currently being re-evaluated, including the assumptions used to determine pumping requirements**
  - **ALL aspects of the system will be reviewed, including looking into more regionally based solutions**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Will the flood maps be changed due to Harvey?*
  - **Unlikely, FEMA does not typically re-study after every major event.**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Water was up to the sidewalks/up my driveway. WHY?!*
  - **The streets are designed to convey water once the storm sewers are full and rain continues**
  - **Streets will flood/convey before houses flood**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *What were the effects on the drainage of the recent CoSL 12-inch waterline project?*
  - **That project replaced water supply lines and had NO effect on drainage.**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Why doesn't FCLID have pumps?*
  - **FCLID was designed for a multiple day event, rather than the standard 24-hour event, instead of having pumps**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Should FCLID install pumps? Should we have spare pumps?*
  - **As part of the After Action Analysis adding pumps or pump capacity will be evaluated and considered**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Can we lower/empty the amenity lakes before a storm?*
  - **It is not advisable to lower/empty amenity lakes since it would likely cause damage to the hard edges and lake edges**
  - **If additional storage is desired/warranted, a permanent solution to adding storage should be evaluated**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Why did the water in my street not drain as fast as other streets in the District?*
  - **Not every street is at the same elevation as all others. The lower streets filled first and drained out last (Funnel Effect)**
  - **The streets north of SH 6 drained out to Oyster Creek, as long as the Brazos River was low enough to receive that runoff**
  - **The streets south of SH 6 drained to the lakes, then Steepbank Creek, which became dependent on pumping once the river cut off gravity discharges**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *I saw the District shut the gates! Why did you do that?*
  - **The flap gates (outside gates) did not close during Harvey. The water was flowing through the dual 8'x 6' box culverts throughout the event**
  - **The sluice gates (inside gates) on the box culverts were closed only after all FCLID streets were clear of water**
  - **The gates were closed to assist our neighboring district in de-watering more quickly**
  - **The operator monitored the rainfall predictions, with standing orders to re-open the gates if additional rain fell**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *What is the official name of our District? Who is First Colony LID #1?*
  - **Our official name is First Colony Levee Improvement District**
  - **There is no FCLID #1. That is an erroneous designation that is listed on several websites**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Why did we have to evacuate during Harvey? Why didn't you have a plan of where to go?*
  - **The County Judge looks at numerous factors to determine when to issue and lift evacuation orders**
    - **Brazos River Levels (projections of crest level, timing of crest, falling levels)**
    - **Water levels in streets that could affect evacuation routes**
    - **Additional Rainfall Predictions**
    - **Water/Wastewater Facilities (flooding of those facilities could affect your district)**
    - **Access Road into and out of Community**
  - **At the NWS prediction of Gage 59 AND 15 inches of additional rain, the County Judge issued a mandatory evacuation order for FCLID residents, as well as numerous other districts**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *If my house would have flooded due to rain, would FCLID pay for my damage?*
  - **No. The District cannot spend public funds for private use**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Do I need Flood Insurance?*
  - **YES**
  - **Due to the levee protection, which removes the District from the FEMA defined 100-year floodplain, MANDATORY flood insurance is not required by most mortgage companies**
  - **Even though no houses in FCLID reported being flooded, just a few more inches of rain could have raised levels high enough to flood homes**
  - **The District is in a Zone X (Shaded)**
  - **Properties within a Zone X are generally eligible for a Preferred Rate Policy, the premiums for which are currently less than $500 per year**

QUESTIONS PREVIOUSLY SUBMITTED Continued

- *Why doesn't FCLID have a website?*
  - **The District has sent out mailers directly to our residents describing the FCLID facilities and meeting/time/place**
  - **The Board of Directors voted to re-address communication efforts for the District**
  - **HOWEVER, DURING EMERGENCY SITUATIONS, the Fort Bend County Office of Emergency Management and/or your respective City OEM are the best sources of up-to-date and CORRECT information.**

www.firstcolonylid.org

Moving Forward – Future Considerations

- Review current system design (After Action Review)
- Consider Options for Improvements
- Strengthen current communications

Helpful Resources

- These entities are **trusted** resources for information during an emergency:
  - Fort Bend County Office of Emergency Management
    - http://fbcoem.org
  - City of Sugar Land Office of Emergency Management
    - https://www.sugarlandtx.gov/105/Emergency-Management
  - City of Missouri City Office of Emergency Management
    - http://www.missouricitytx.gov/index.aspx?NID=177
- These entities can be followed on Twitter, Facebook & Instagram for up-to-date information on emergencies
- FBCOEM also has a reverse 911 system for residents to sign up to receive text/phone messages

Questions?

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