City Of Sugar Land ISWMM

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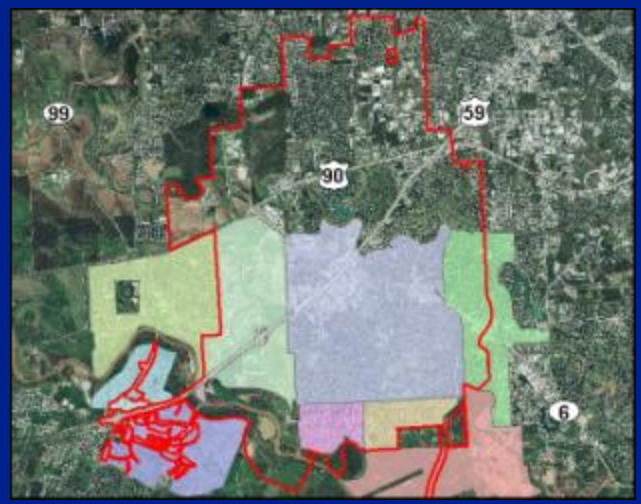
City Background

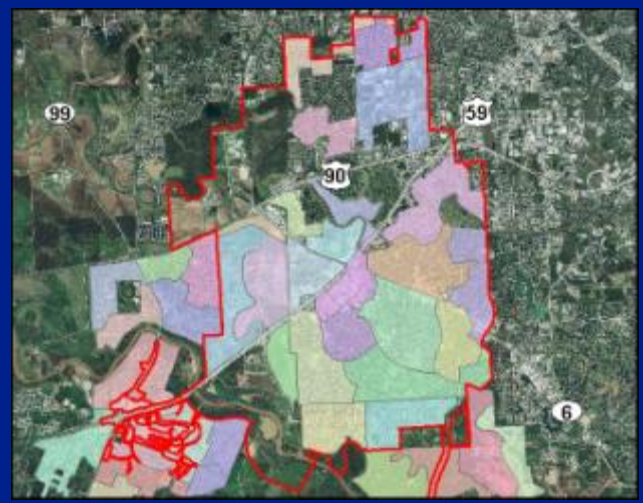
- Located 20 miles SW of Houston in Fort Bend County
- Original Home of Imperial Sugar
- Incorporated in 1959
- Census 2010 Population – 78,817

City Background

- Incorporated Area – 35 square miles
- ETJ – 22 square miles
- 9 Levee Improvement Districts
- 22 Active Municipal Utility Districts

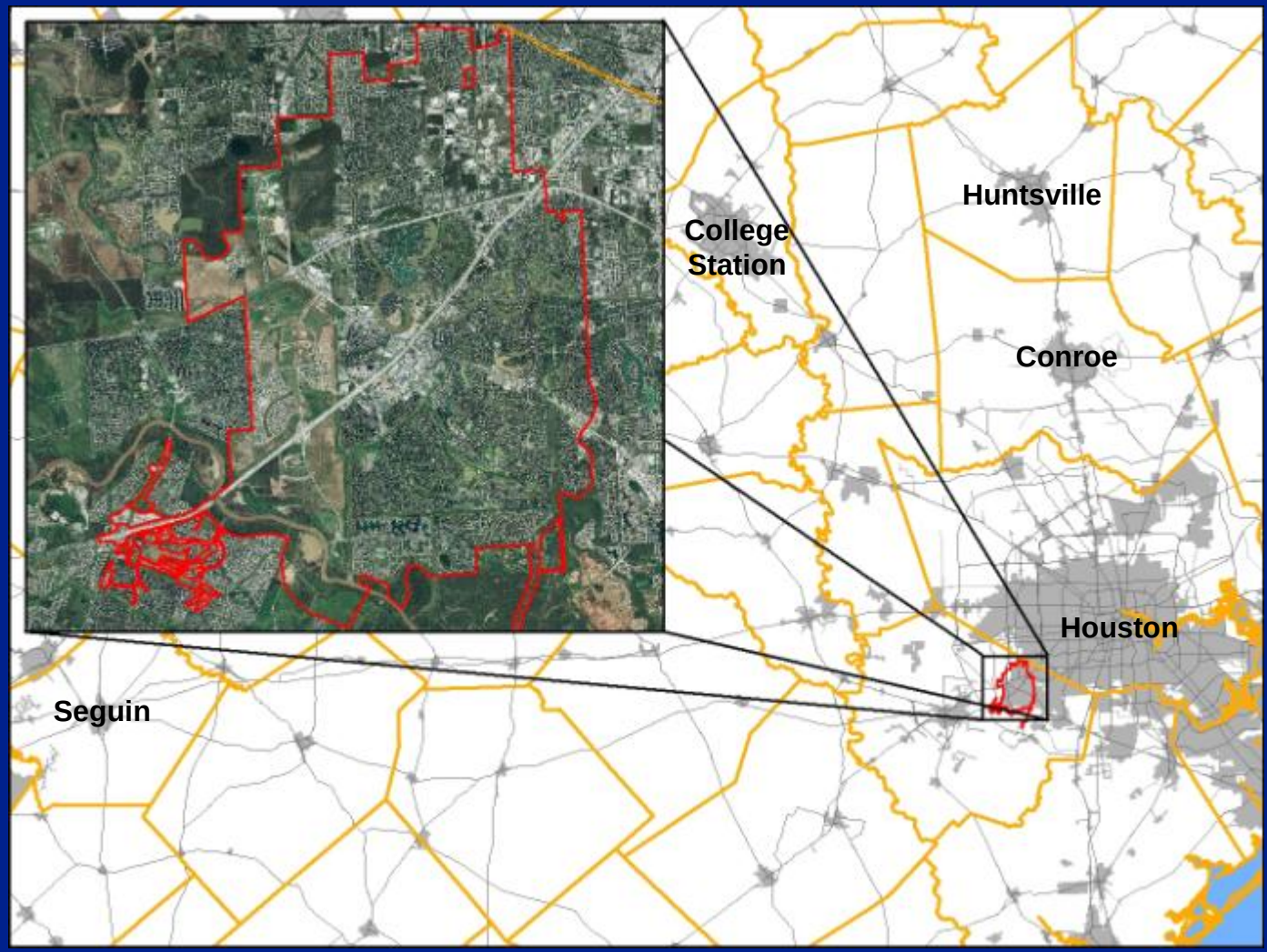


LIDs



MUDs

Project Background



Project Goals

- Regional Drainage Repository
- Geo-Reference data
- Create a user-friendly Database
- Setup for future applications
  - Radar Based Flood Alert System
  - Aid Emergency Response
  - Situational Analysis

Project Statistics

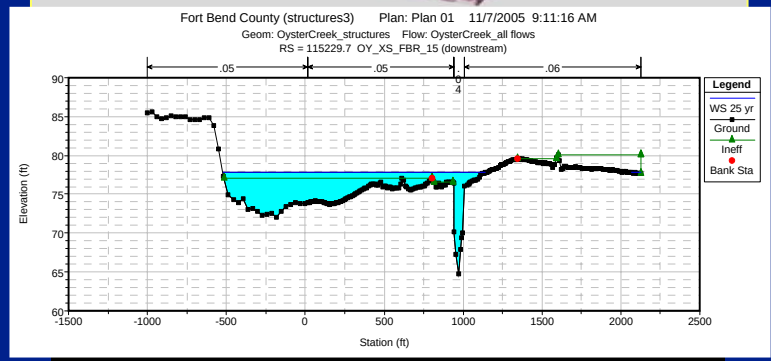
- 295 miles of Storm Sewer
- 6,290 Storm Inlets
- 194 Hydraulic Structures
- 60 miles of open channel
- 327 As-built documents
- 1,203 Model Cross Sections

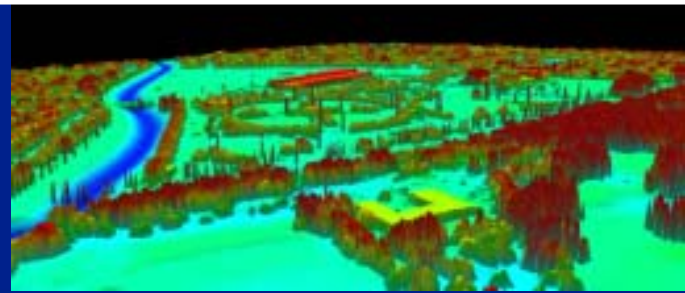
ISWMM – Phase I

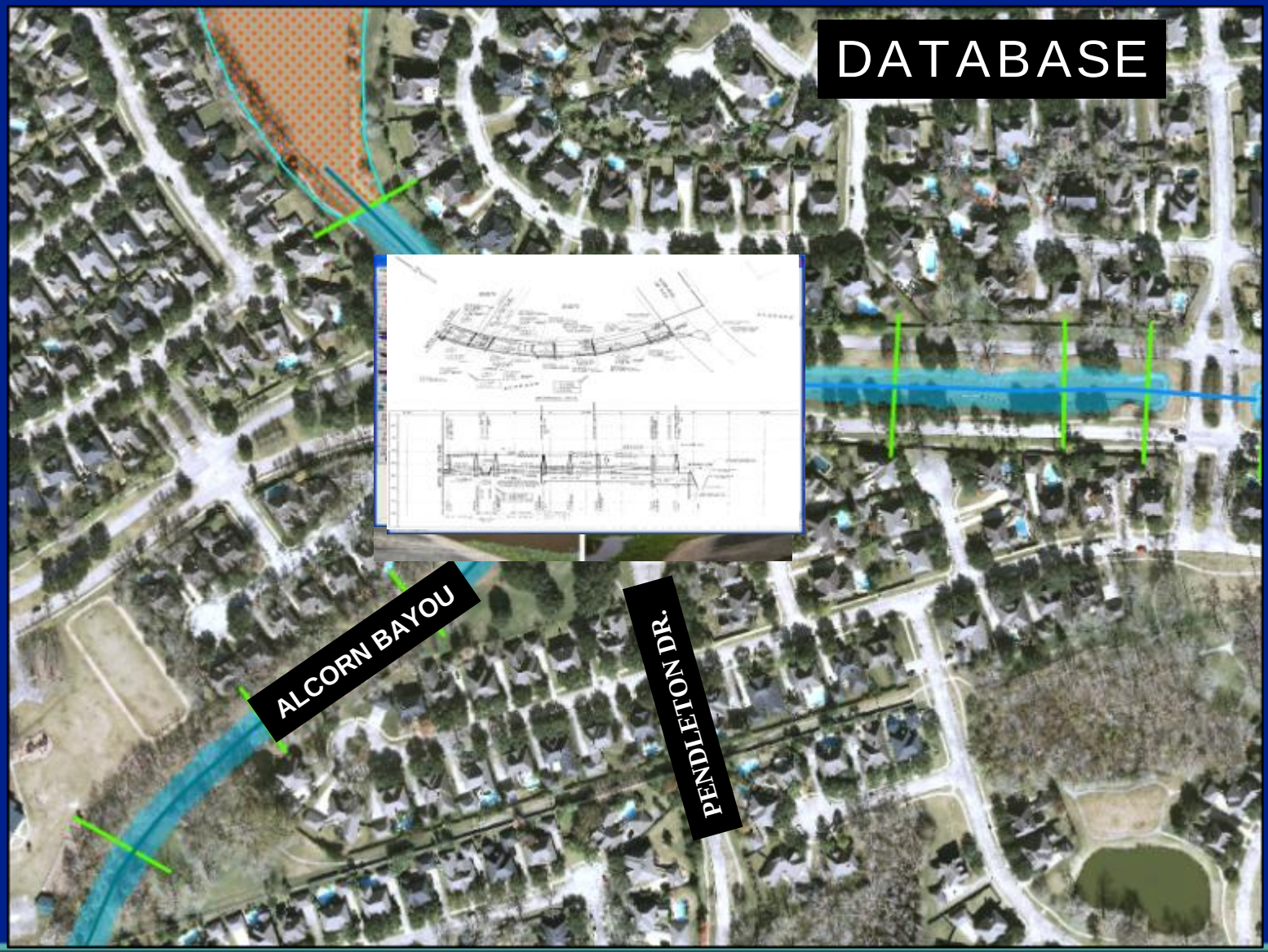
- Integrate distinct studies
- Ponding Map
- Delineation of floodplain limits
- Create database of stormwater features

Key Components of ISWMM

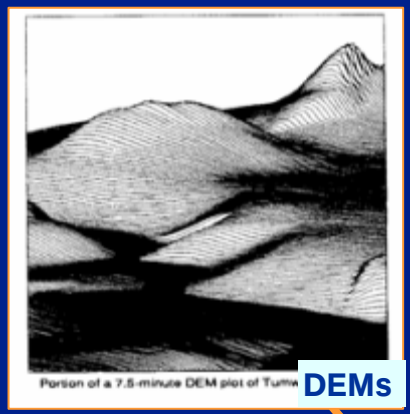
- Hydrologic Models
- Hydraulic Models
- LIDAR and GIS





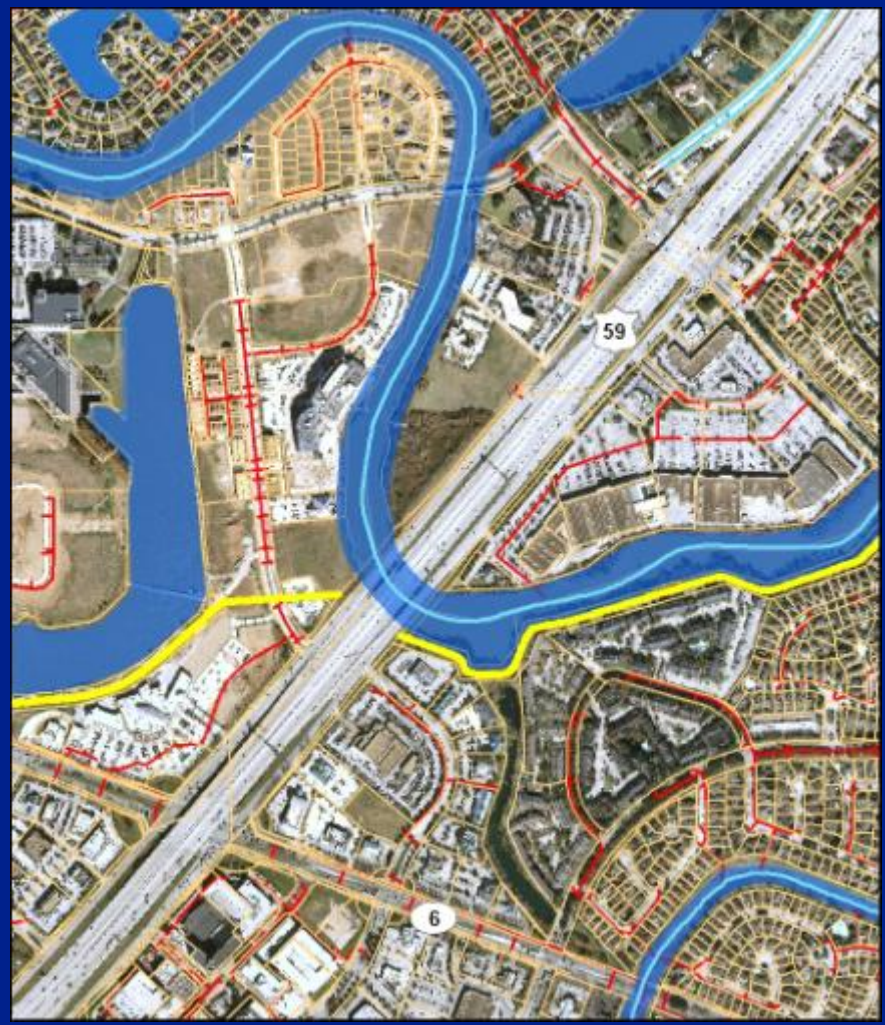

DATABASE
ALCORN BAYOU
PENDLETON DR.

Database Components

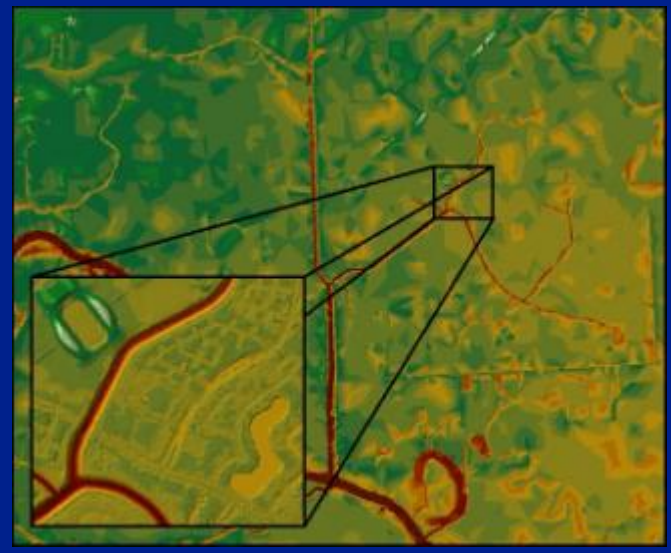


Basemap Data

- Aerial Photography
- DFIRM Data
- Parcel Data
- Transportation
- Stream Centerlines
- Storm Sewers
- Levees
- Political Boundaries
- Gauging Stations



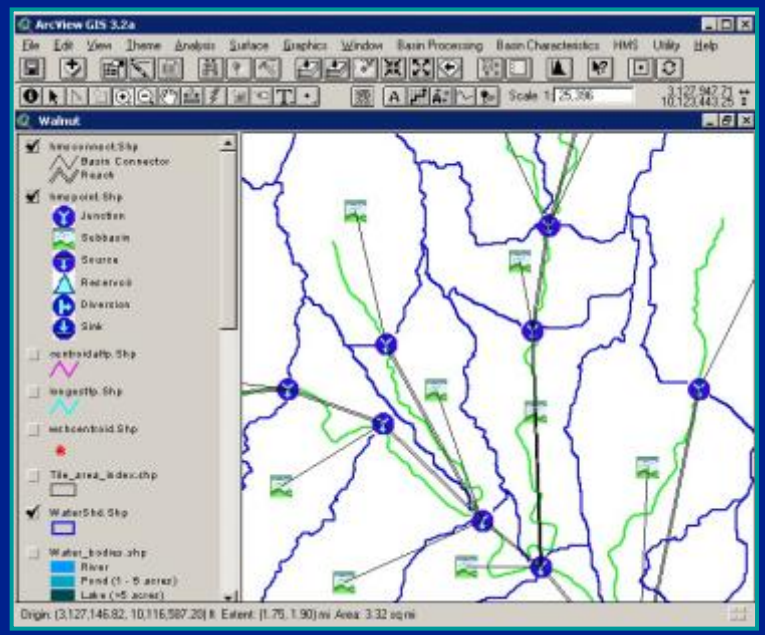
Digital Elevation Model

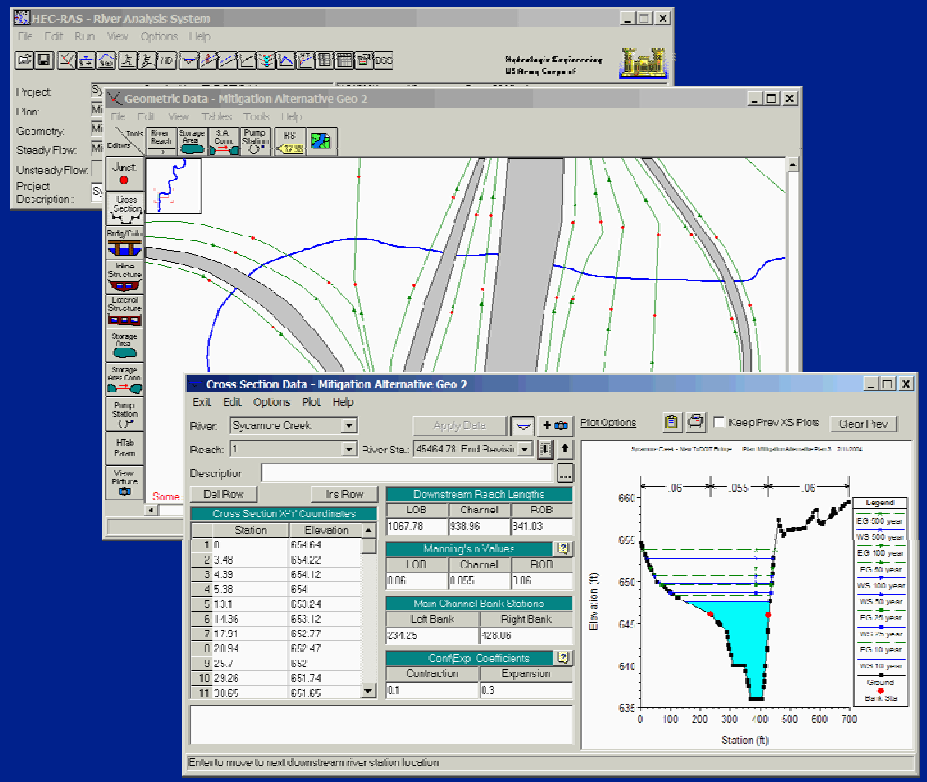


- Utilized LiDAR Data
- Develop Seamless TIN
- Developed Contour Map
- Obtained Field Survey
- Incorporated City's Benchmark Network
- Performed Model Datum Correction
- Accounted for Subsidence

Stormwater Modeling

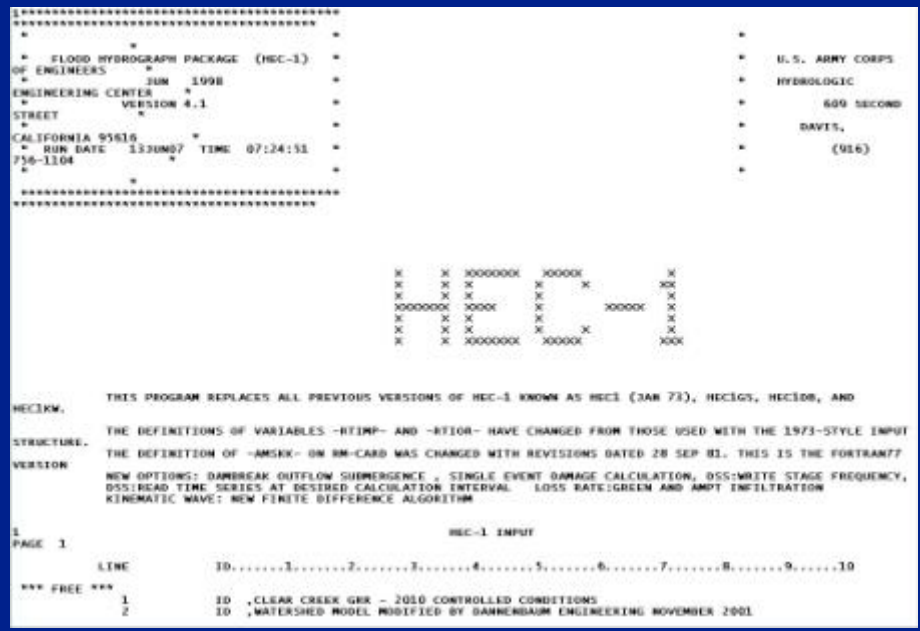
- FEMA Models
- City Models
- Developer Models





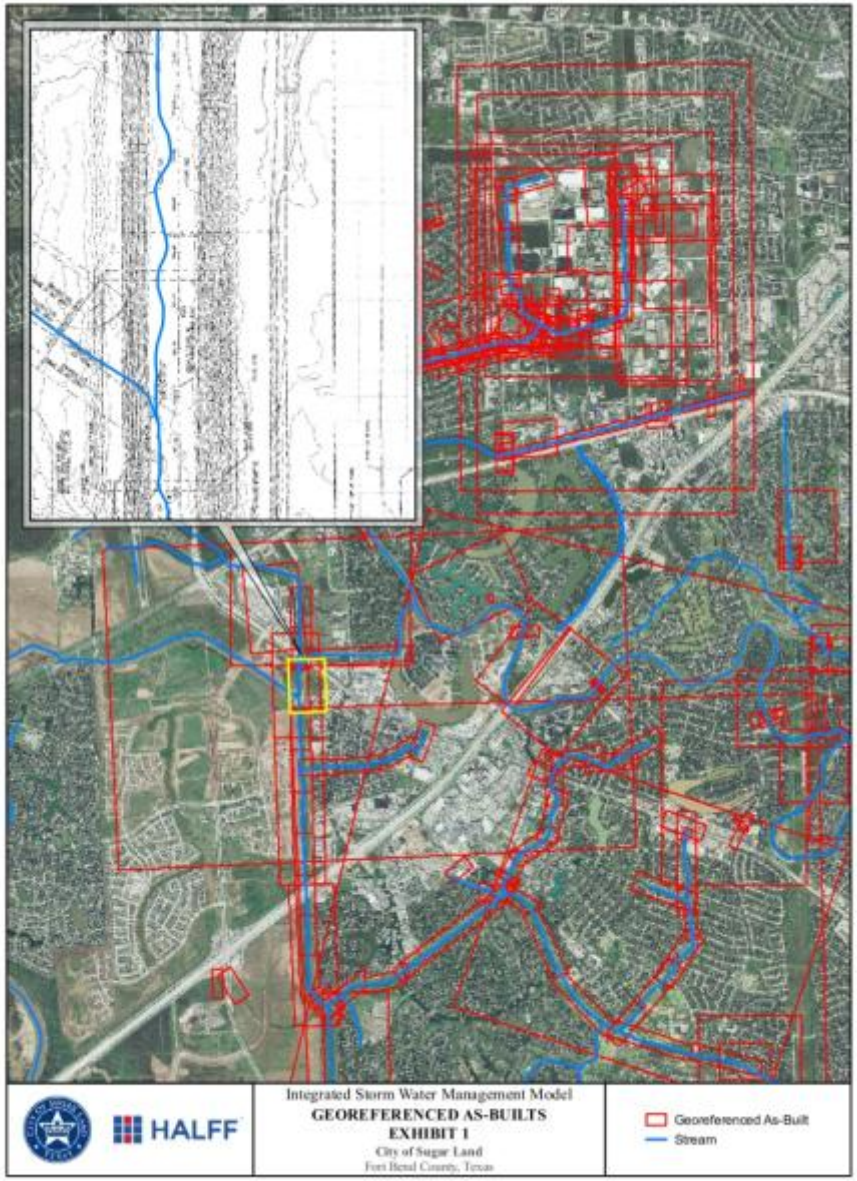
Incorporating Existing Models

- Set Criteria
- Various Software
- Datum adjustments
- Geo-Referencing
- Backwater effects



As-Builts

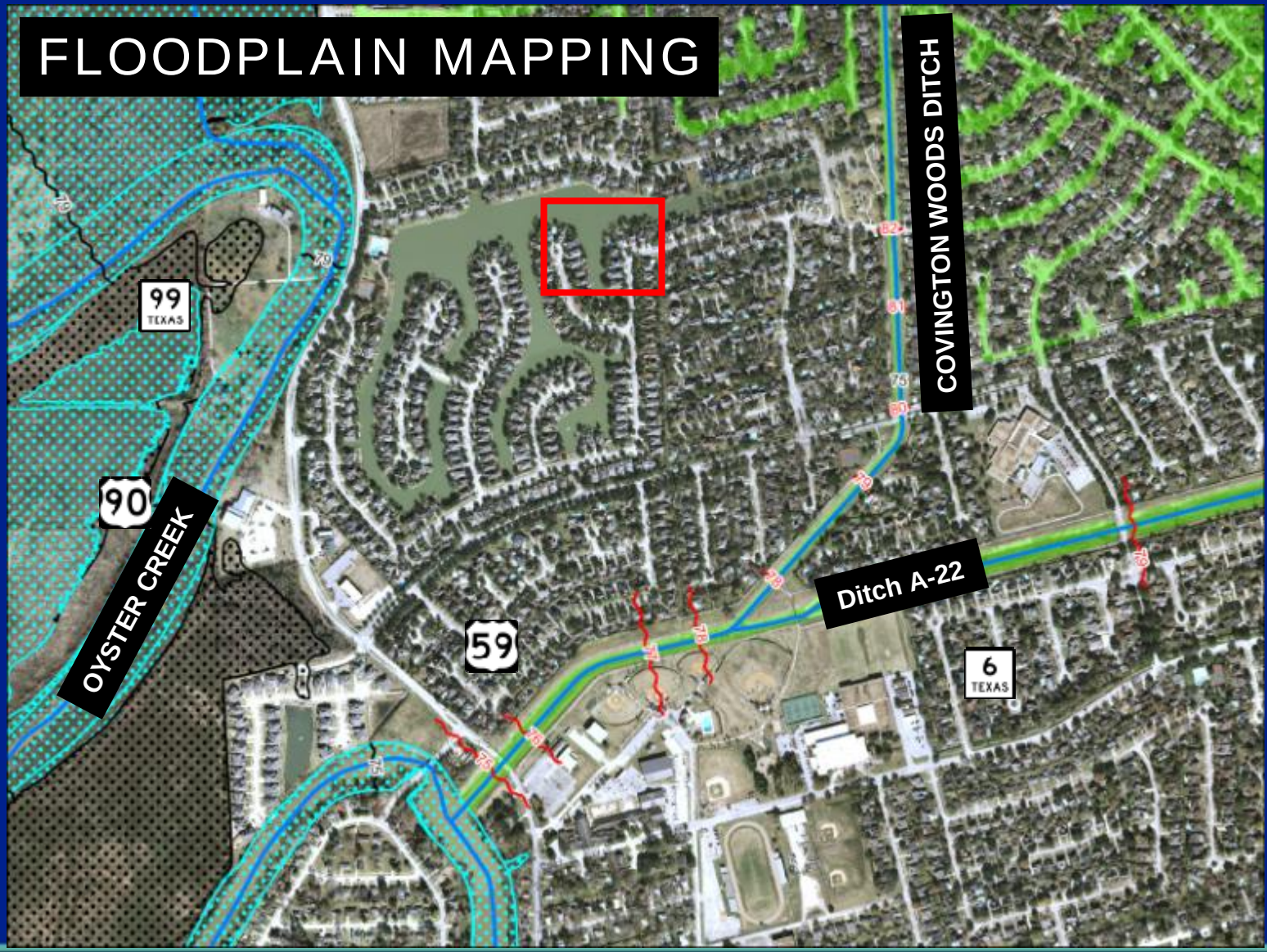
- As-built data
  - Paper maps selected by bounding polygon for easy viewing, emailing, and printing
  - Eliminates the search for paper documents
  - Eliminates overlapping data on the cities server
  - Accuracy in identifying correct documents


HALFF
Integrated Storm Water Management Model
GEOREFERENCED AS-BUILTS
EXHIBIT 1
City of Sugar Land
Fort Bend County, Texas
Georeferenced As-Built
Stream

Mapping

- FEMA Flood Hazard Boundaries
- Water Surface Elevations from latest studies
- Mapped floodplain delineations
- Created Ponding Map

FLOODPLAIN MAPPING



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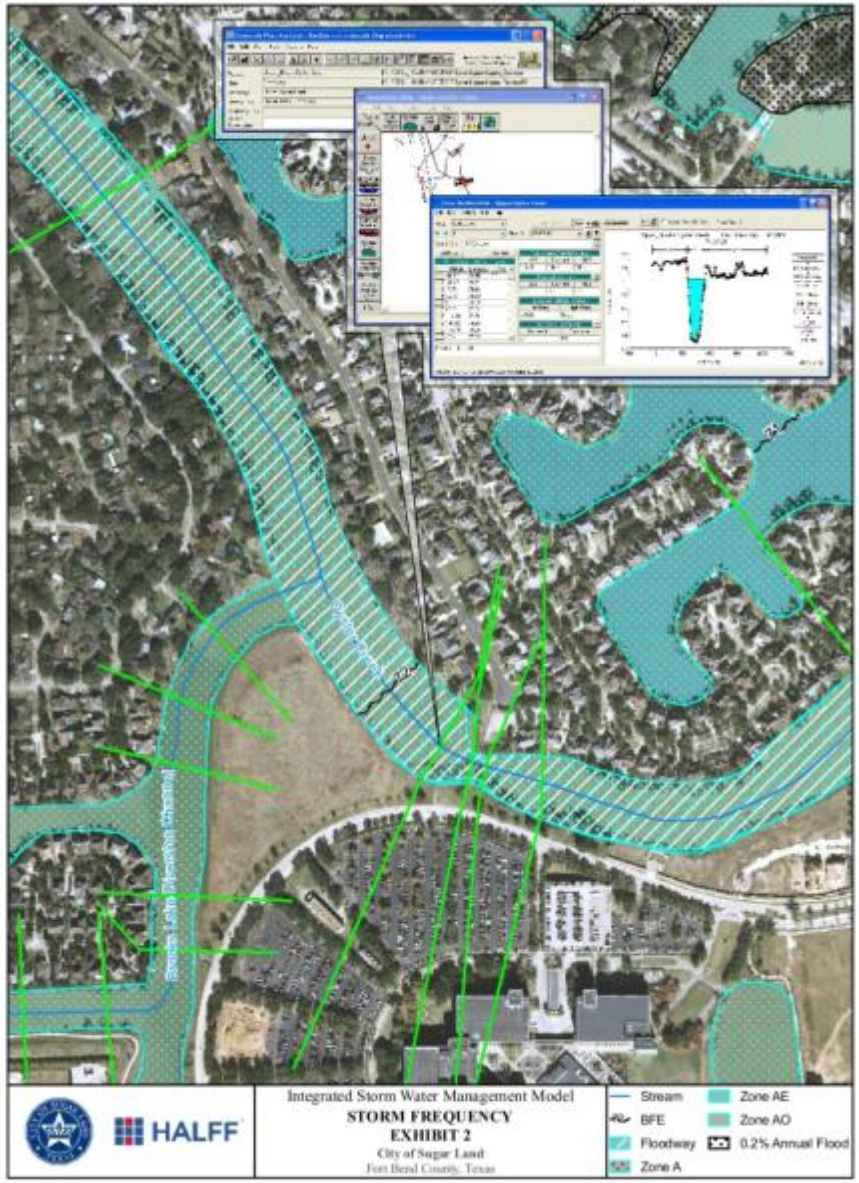
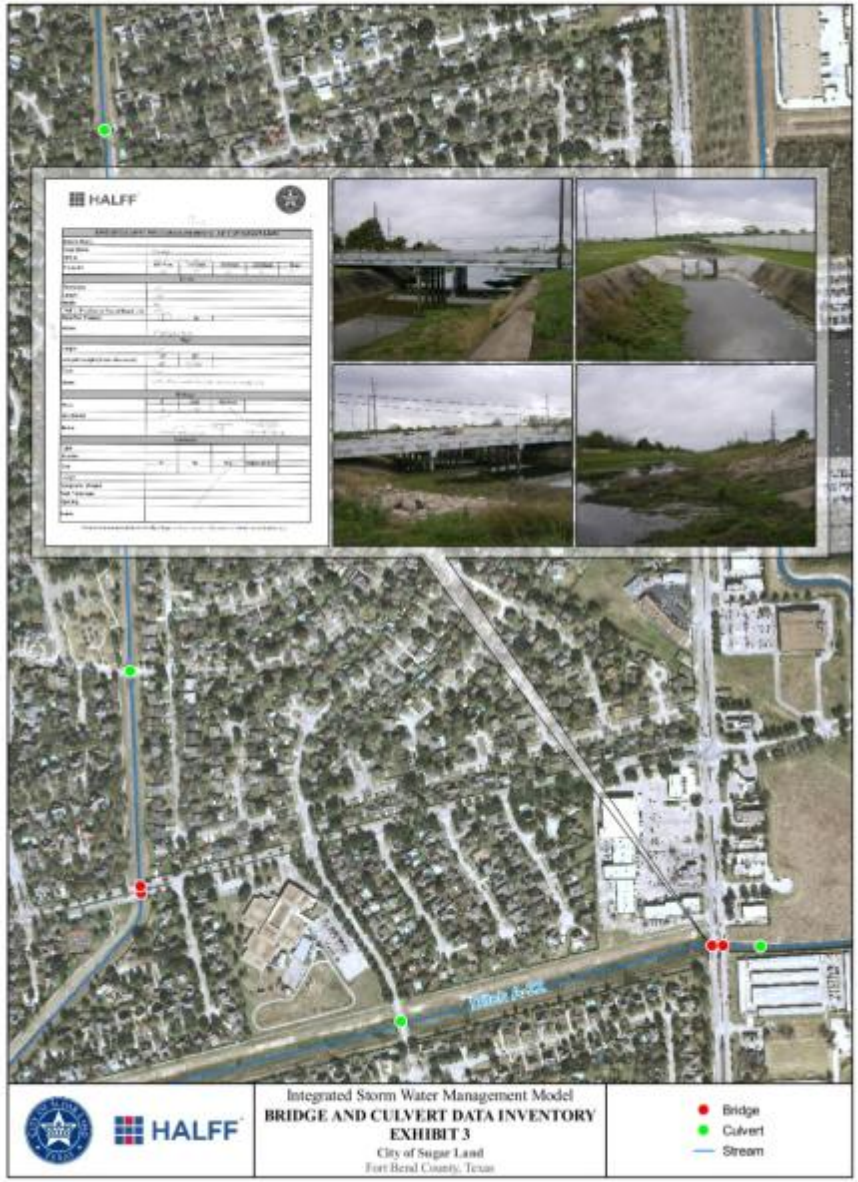


Integrated Stormwater Management Model

HALFF

Bridge and Culvert Inventory

- Each structure assigned a point
- Field data collected
  - Deck measurements
  - Channel flow heights
  - Roadway rail measurements
  - Bridge/culvert measurements
  - Photographs


HALFF
Integrated Storm Water Management Model
BRIDGE AND CULVERT DATA INVENTORY
EXHIBIT 3
City of Sugar Land
Fort Bend County, Texas
HALFF
Bridge
Culvert
Stream

Strom Drain Network

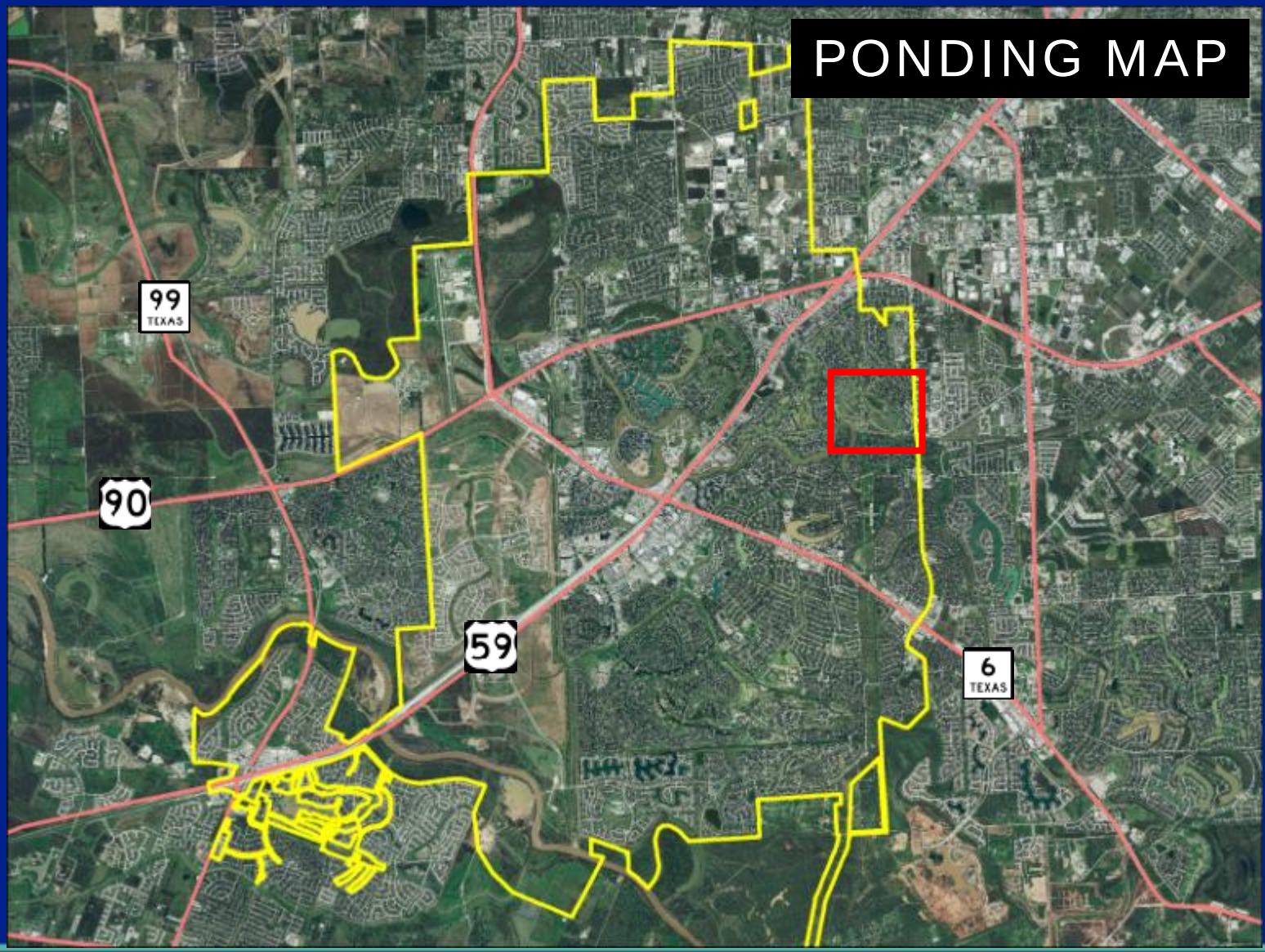
- Network added in GIS format
  - Administrative area
  - Installation date
  - Status
  - Water type
  - Material
  - Exterior Coating
  - Joint types
  - Class
  - Lining
  - Shape
  - Invert Elevations
  - Slope

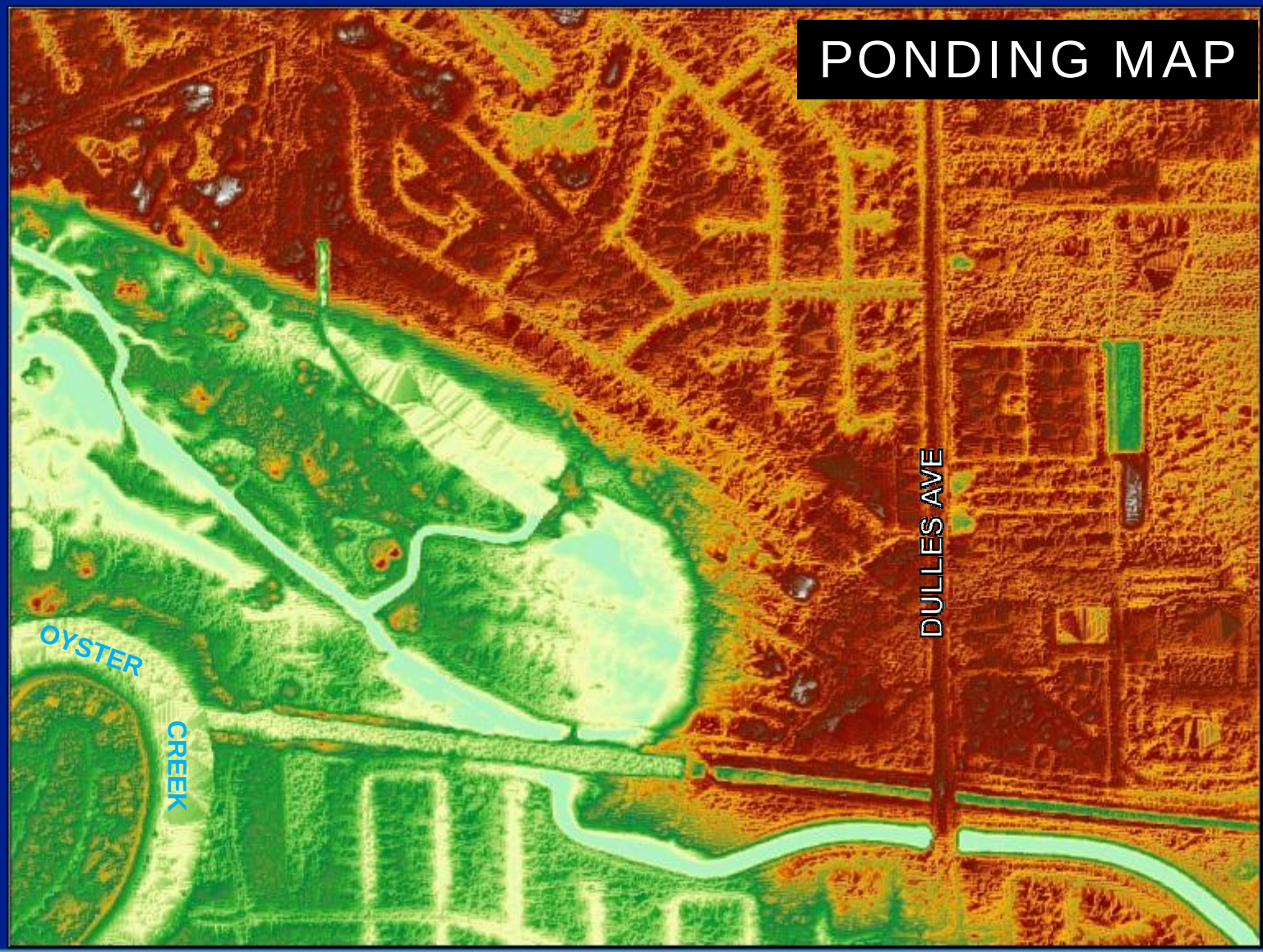

HALFF
Integrated Stormwater Management Model
STORM DRAIN NETWORK
City of Sugar Land
Fort Bend County, Texas
Inlet
Discharge Point
Storm Sewer


HALFF
Integrated Storm Water Management Model
PONDING ANALYSIS - STORM DRAIN NETWORK
EXHIBIT 4
City of Sugar Land
Fort Bend County, Texas
Ponding Depth (feet)
Inlet
Discharge Point
Storm Sewer
0.5 - 1
1 - 2
2 - 3
3 - 4
4 - 5
>5

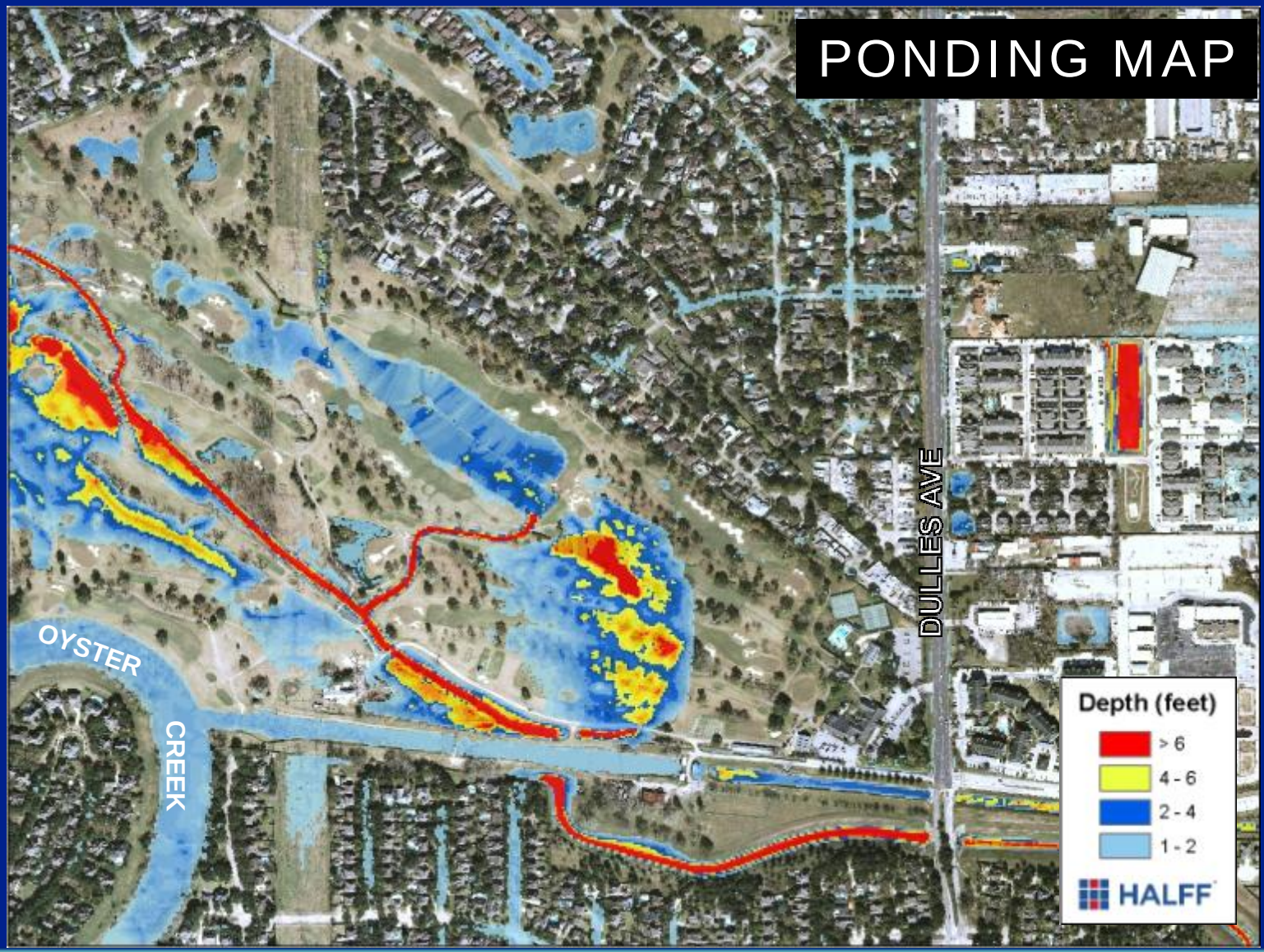
Ponding Analysis

- Trapped water unable to flow out freely
- Ponds, lakes, and rivers were removed
- Aids hurricane preparedness


PONDING MAP
99
TEXAS
90
59
6
TEXAS

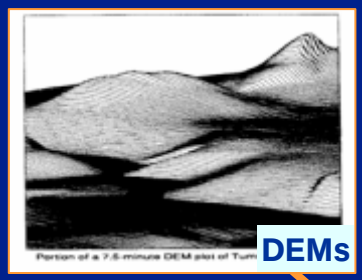

PONDING MAP
DULLES AVE
OYSTER
CREEK

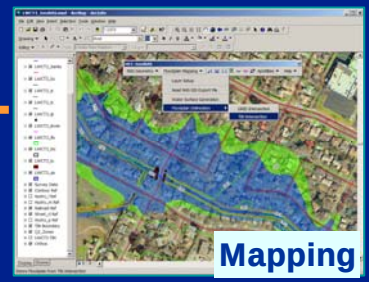
PONDING MAP




City of Sugar Land
ISWMM
NOT TO SCALE
Key to Features
Sugar Land City Limit
Flooding Depth (feet)
0.5 - 1
1 - 2
2 - 3
3 - 4
4 - 5
>5
THE PONDING ANALYSIS IS INTENDED FOR INFORMATIONAL AND PLANNING PURPOSES ONLY AND SHOULD NOT BE USED FOR PERMIT, BIDDING, OR CONSTRUCTION PURPOSES. RESULTS ARE NOT BASED UPON HYDROLOGIC OR HYDRAULIC DATA. THIS ANALYSIS WAS BASED UPON A 10' CELL SIZE DEM PROVIDED BY THE CITY OF SUGAR LAND. THE DEM WAS GENERATED FROM GROUND POINTS IN CLASSIFIED LIDAR DATA FORMAT AND WAS FLOWN BY MERRICK & COMPANY IN 2005. NATURAL AND ARTIFICIAL PONDS, LAKES, AND RIVERS WERE REMOVED FROM THE ANALYSIS.
0
300
600
1,200
Feet
1 inch = 600 feet

Database Applications





GIS Applications Interface

Capital Improvement Projects

Flood Alert System

Stormwater Quality Management

Ponding Map

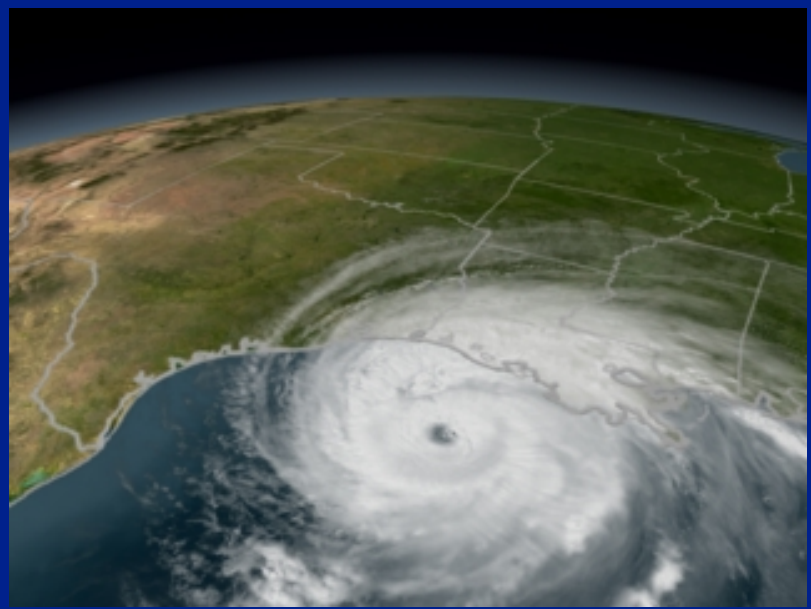
Floodplain Management

Capital Improvement Projects

- Utilize New Base Flood Mapping
- Verify Known Damages
- Assess Potential Damages
- Develop and Prioritize Projects
- Develop Alternatives

Flood Alert System

- Assist in Managing Flood “Alert System”
- Base Models for future development of real-time early flood warning system.



Future Phases

- Storm Sewer Modeling
- “What if” Scenarios
- Integrate with Radar Based FAS
- Update software
- Additional data development

Questions?