



# TERREBONNE PARISH HAZARD MITIGATION PLAN UPDATE

HAZARD MITIGATION PLAN UPDATE  
COMMITTEE MEETING

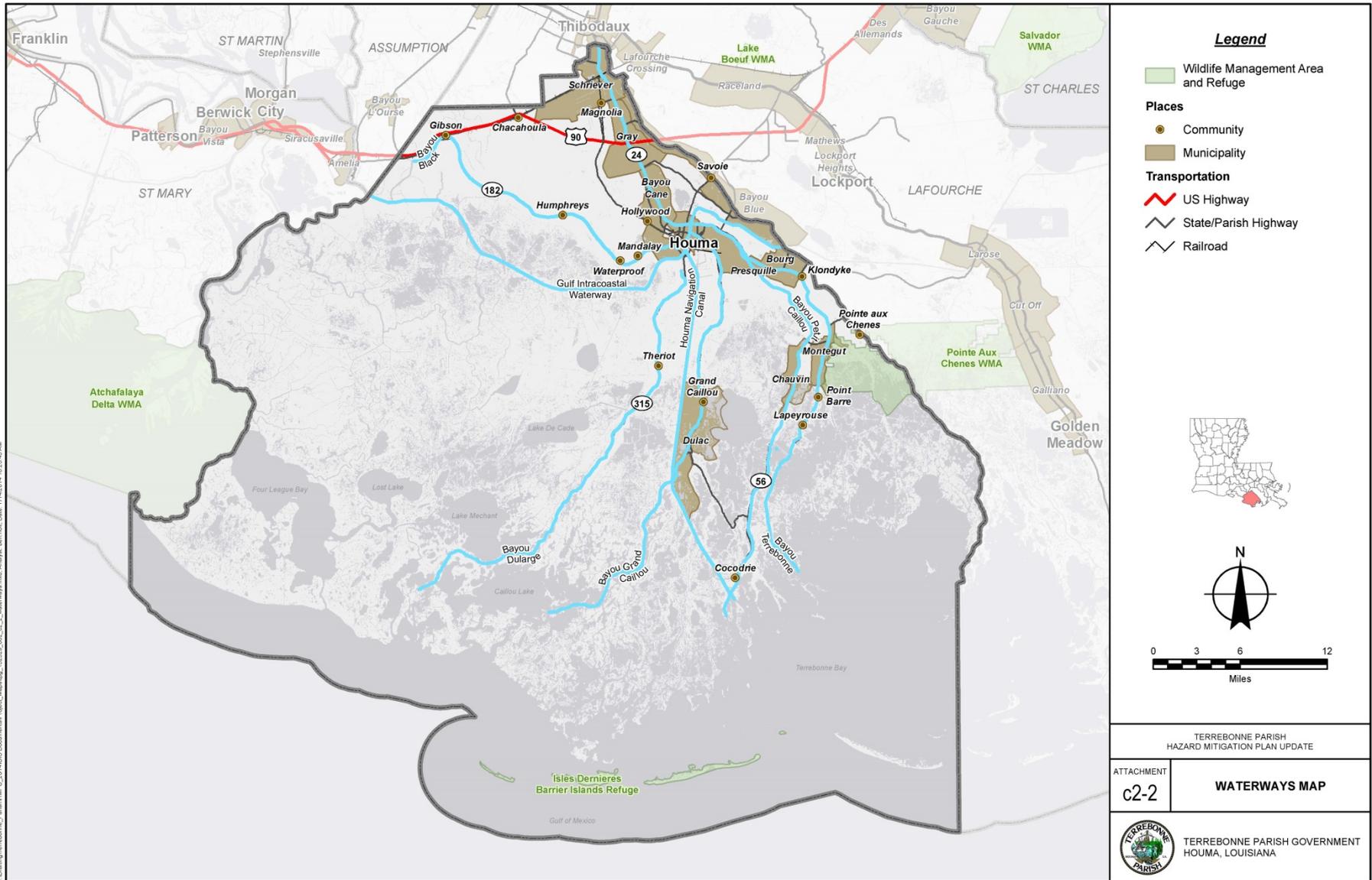
July 17, 2014

- ATTENDANCE
- INTRODUCTIONS
- HAZARD MITIGATION PLAN UPDATE COMMITTEE

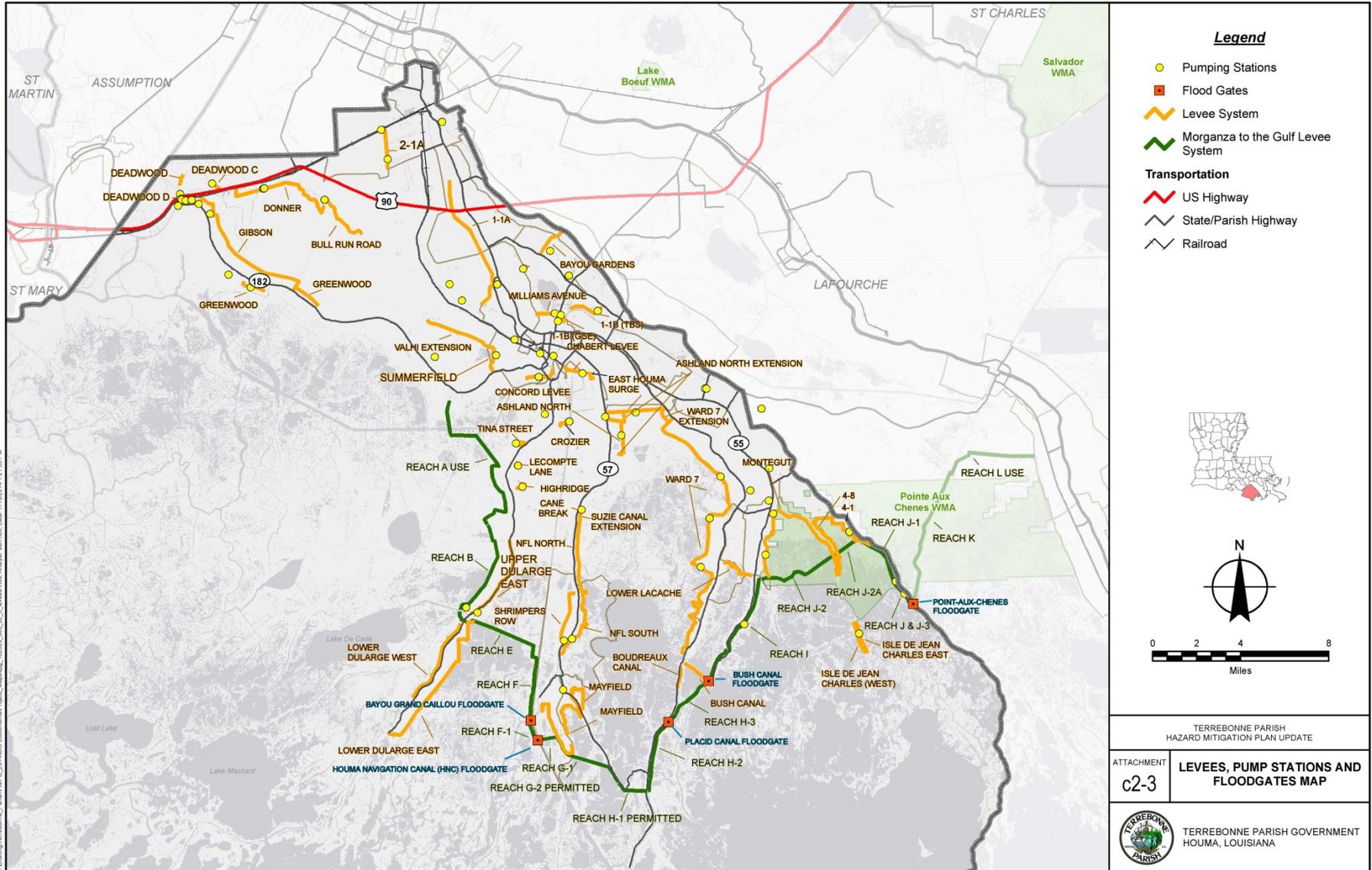
- I. Welcome & Introductions
- II. Summary of First Meeting
- III. Data Inventory and Maps Presentation
- IV. Risk Assessment
- V. Hazard Event Profiles
- VI. Determine Mitigation Strategies
- VII. Conclusion

- I. INTRODUCTIONS AND WELCOME
- II. PURPOSE, NEED, AND EXPECTATIONS
- III. PARTICIPATION STRATEGY
- IV. PLAN REVIEW
- V. CONCLUSION





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**Legend**

- Pumping Stations
- Flood Gates
- Levee System
- Morganza to the Gulf Levee System
- US Highway
- State/Parish Highway
- Railroad

**Transportation**

- US Highway
- State/Parish Highway
- Railroad



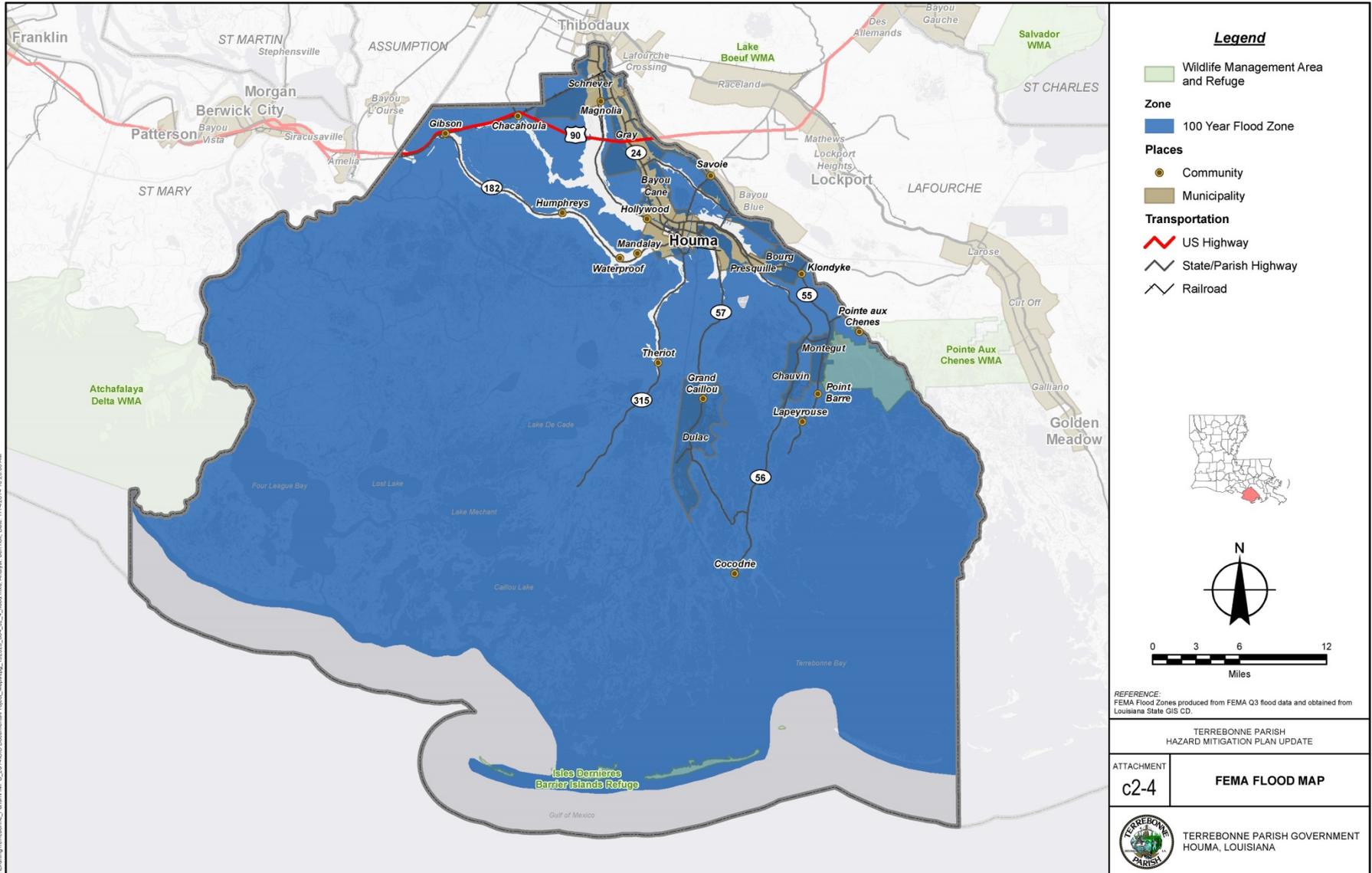
TERREBONNE PARISH  
HAZARD MITIGATION PLAN UPDATE

ATTACHMENT **c2-3** **LEVEES, PUMP STATIONS AND FLOODGATES MAP**

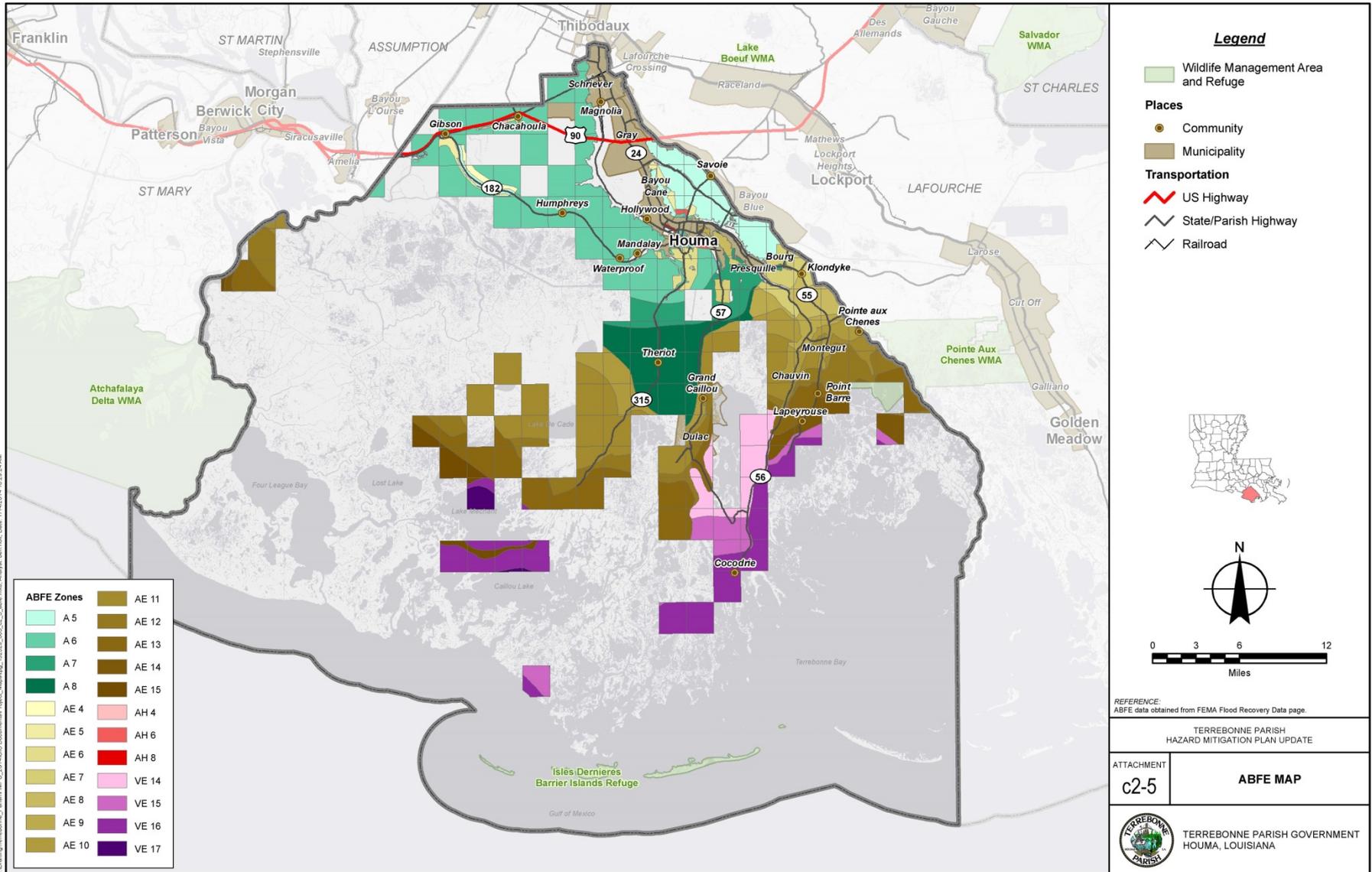


TERREBONNE PARISH GOVERNMENT  
HOUMA, LOUISIANA

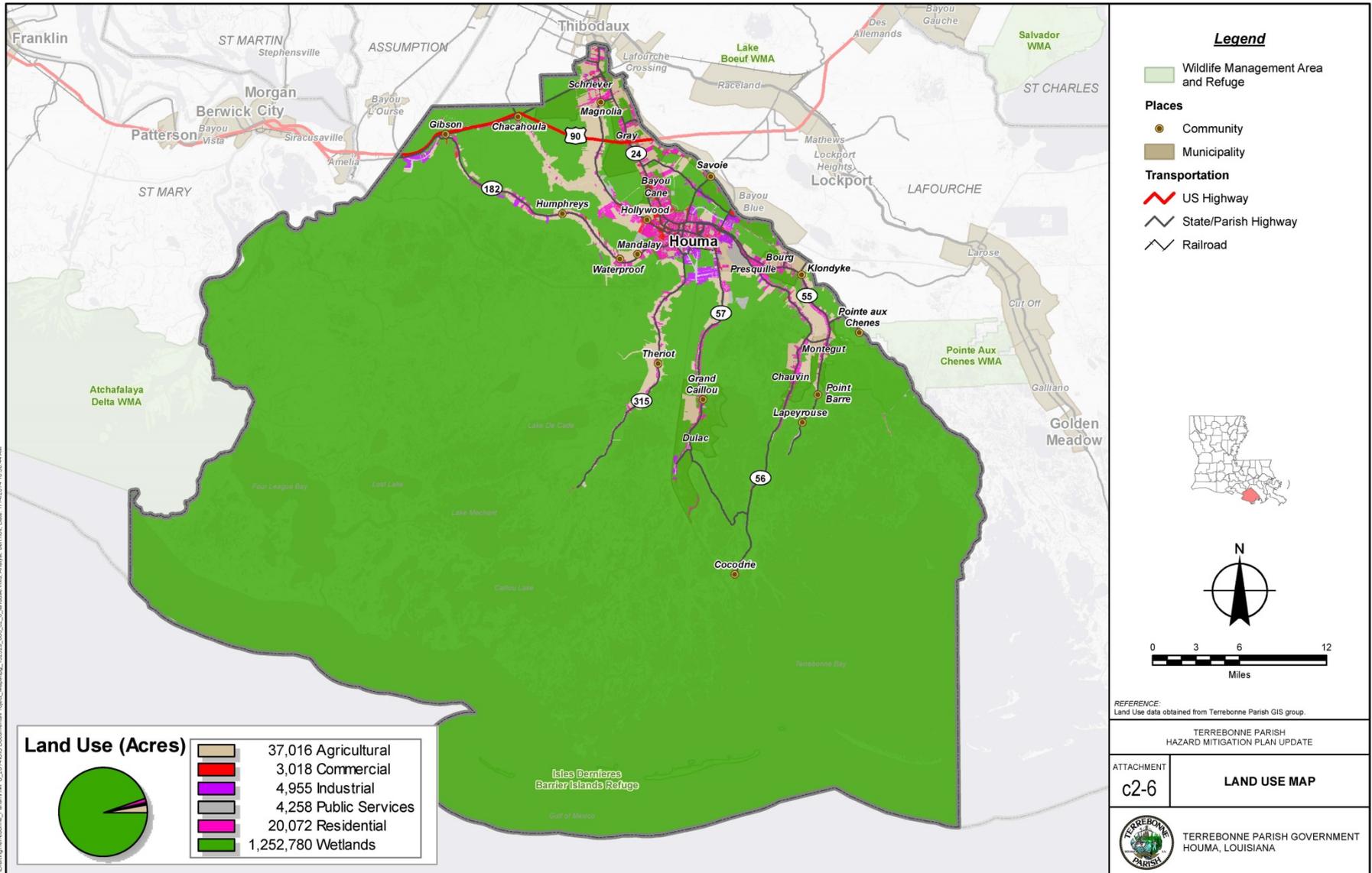
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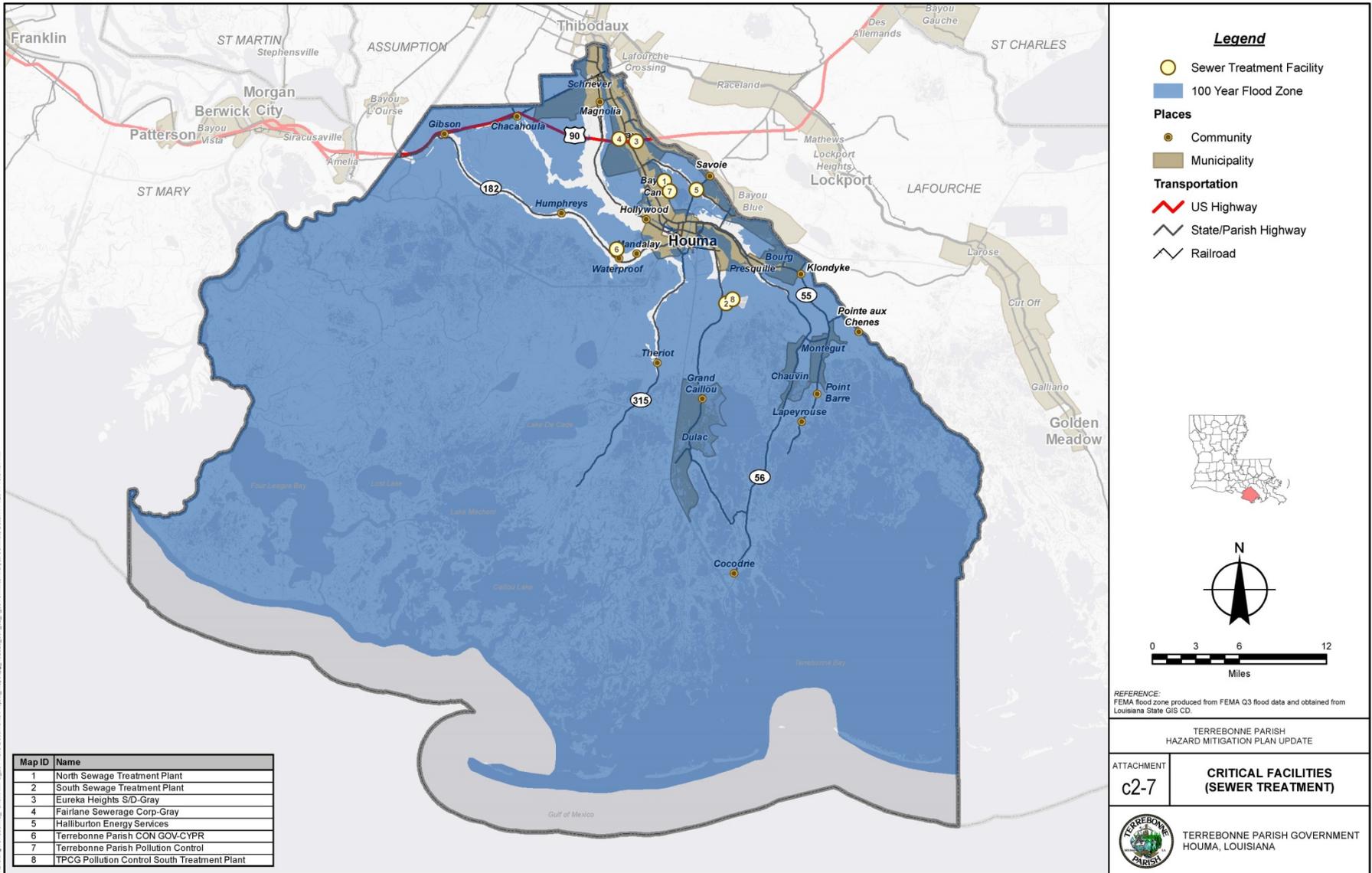
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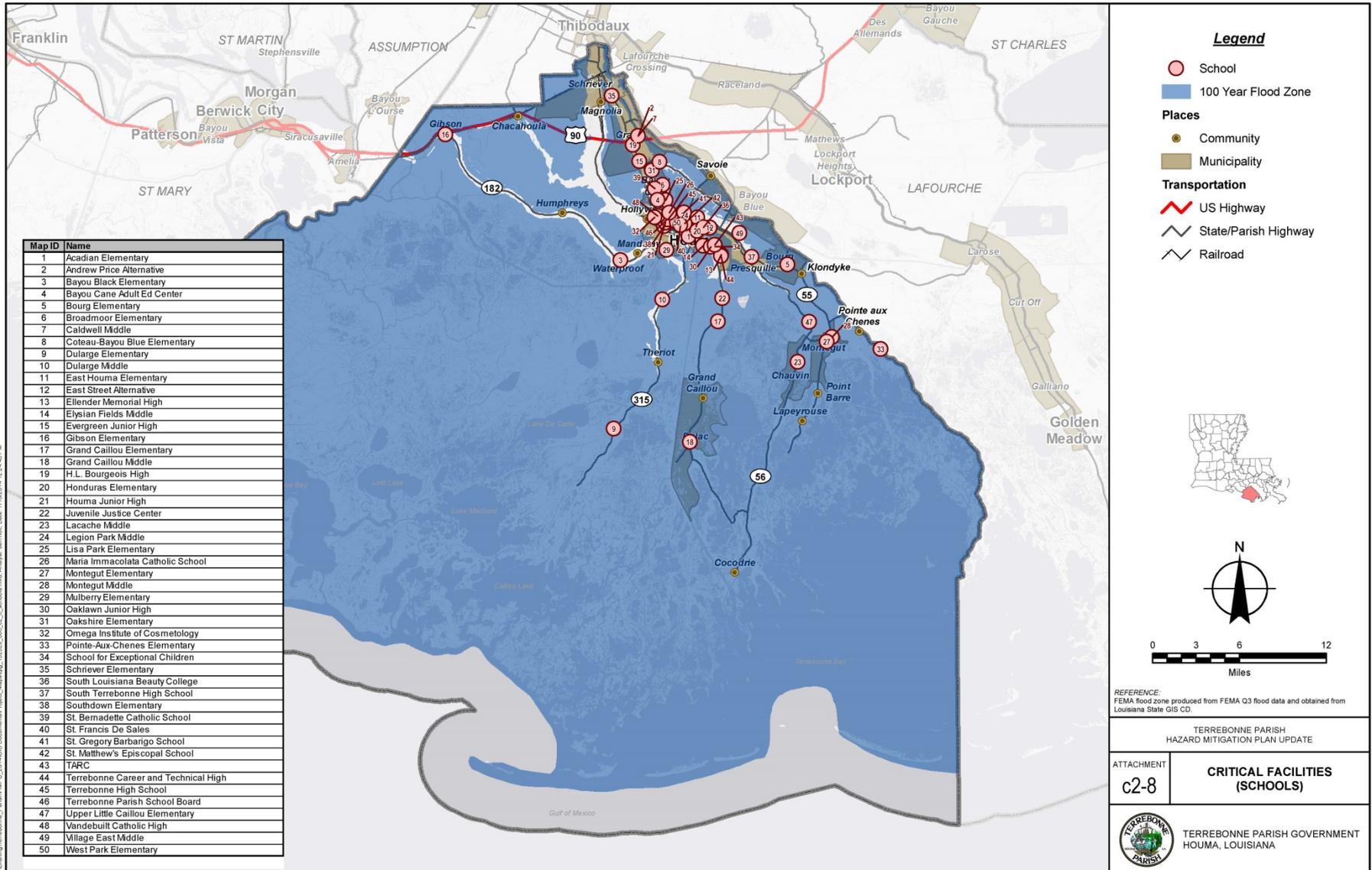
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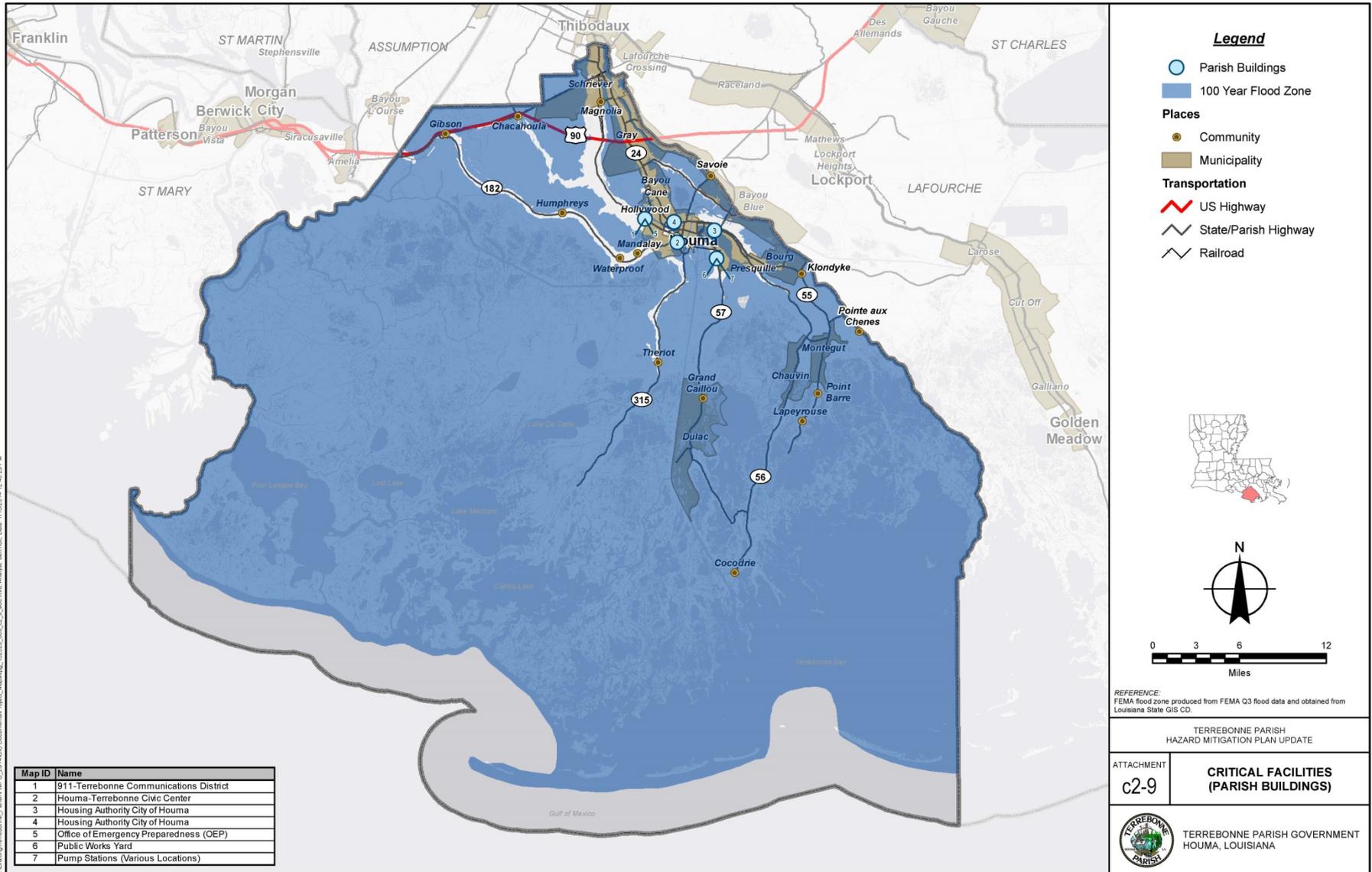
TERREBONNE PARISH  
 HAZARD MITIGATION PLAN UPDATE

ATTACHMENT  
**C2-8**

**CRITICAL FACILITIES  
 (SCHOOLS)**



TERREBONNE PARISH GOVERNMENT  
 HOUMA, LOUISIANA



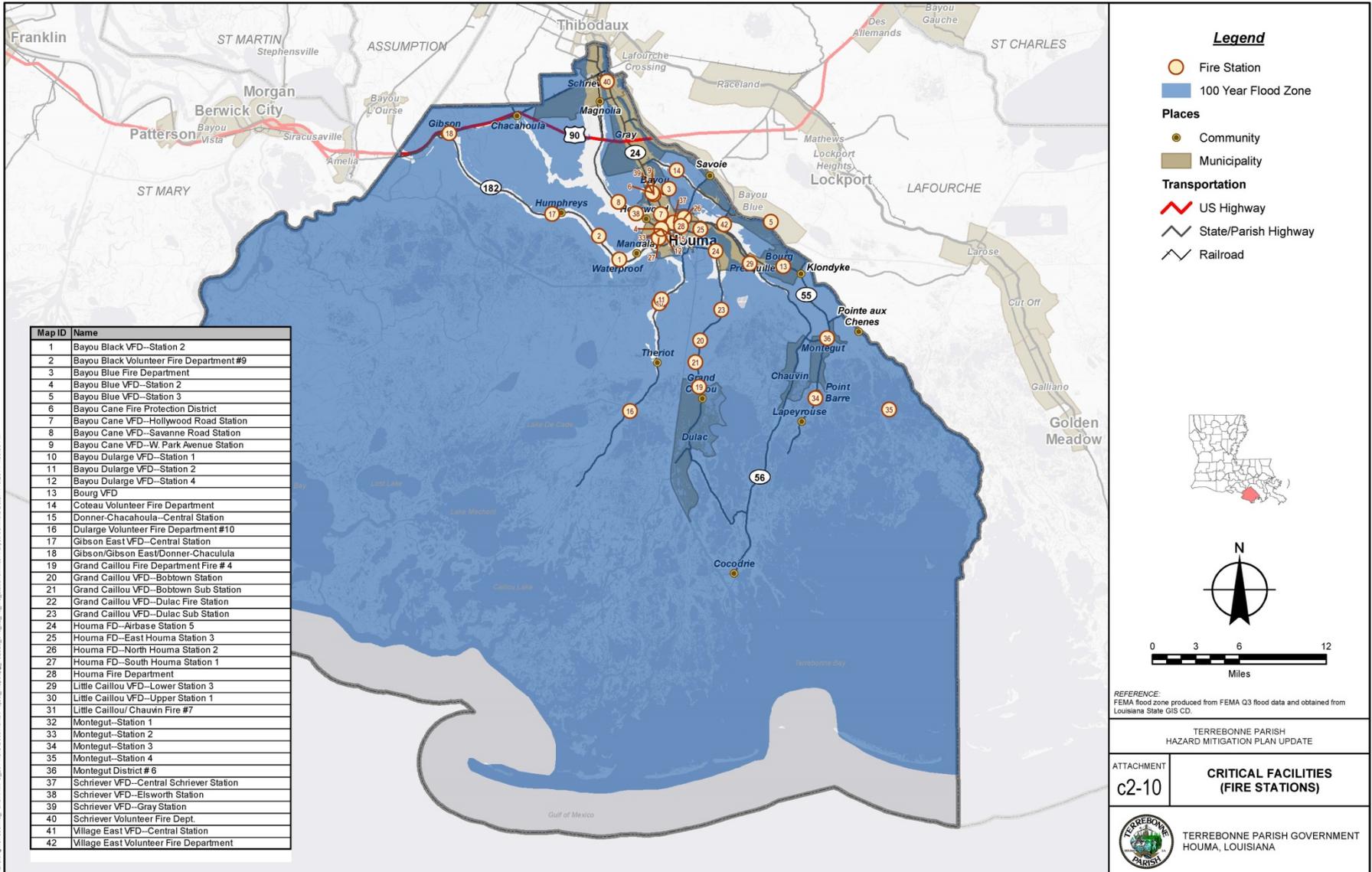
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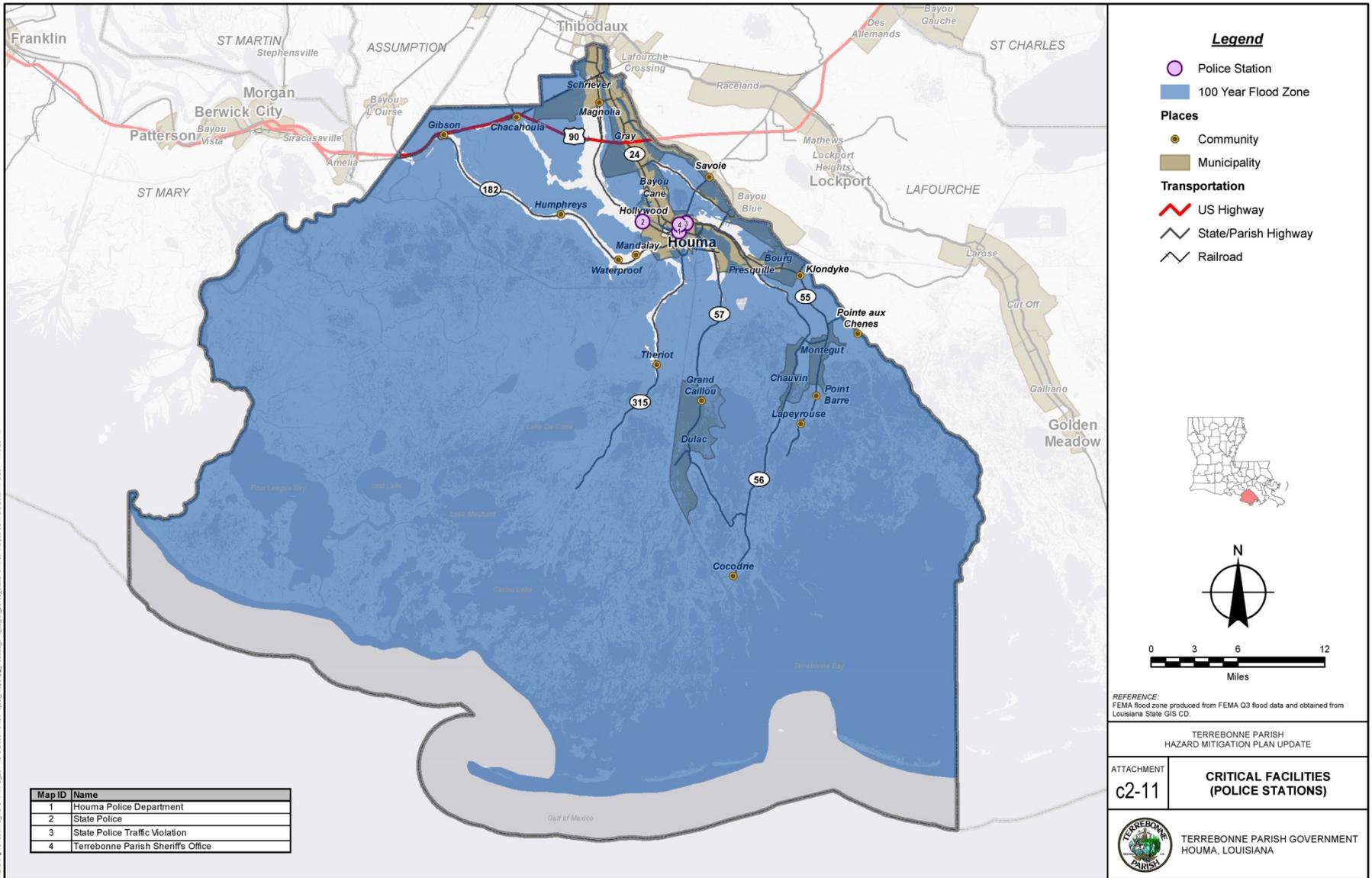
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TERREBONNE PARISH  
 HAZARD MITIGATION PLAN UPDATE

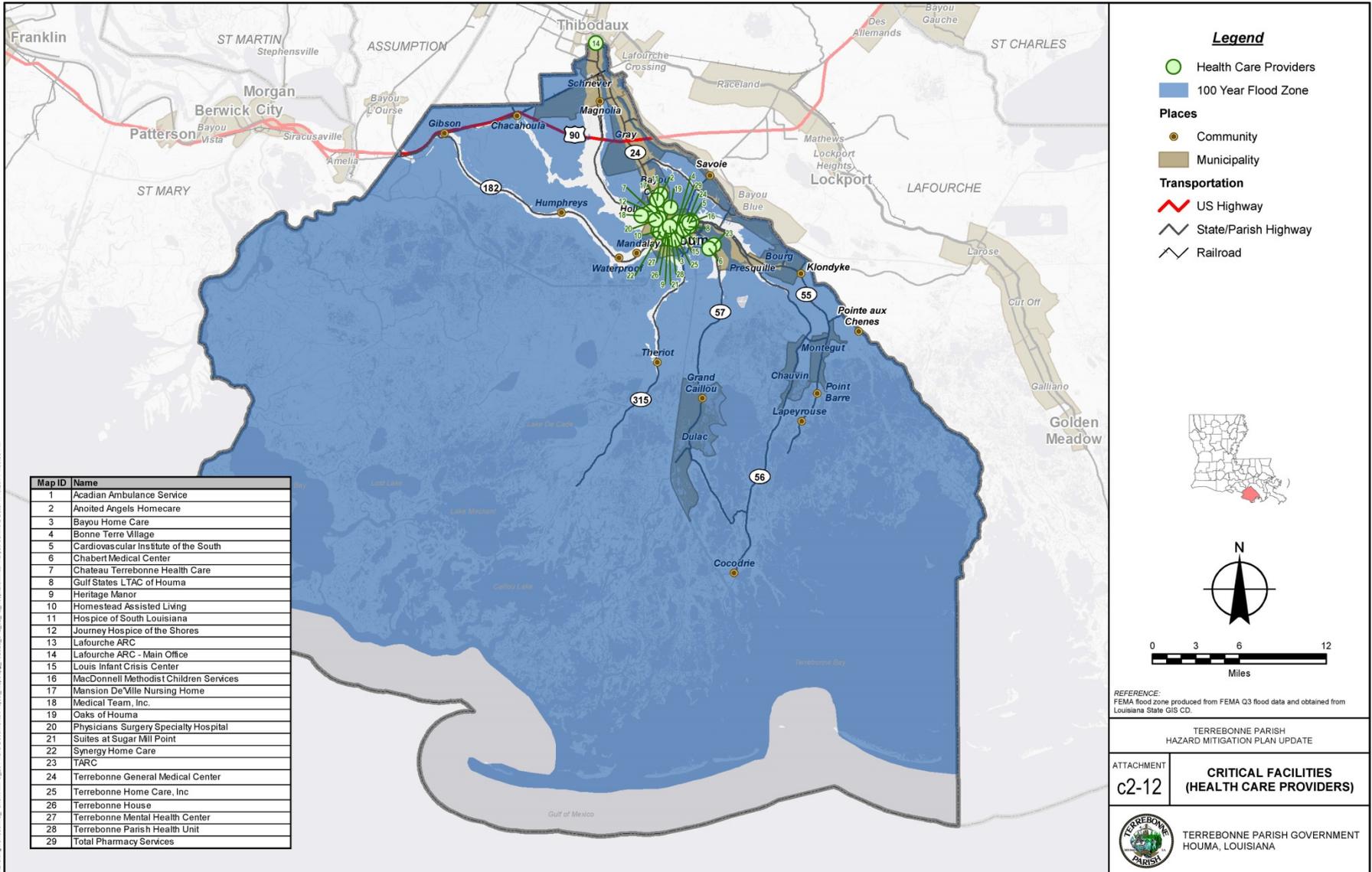
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**c2-9**      **CRITICAL FACILITIES  
 (PARISH BUILDINGS)**







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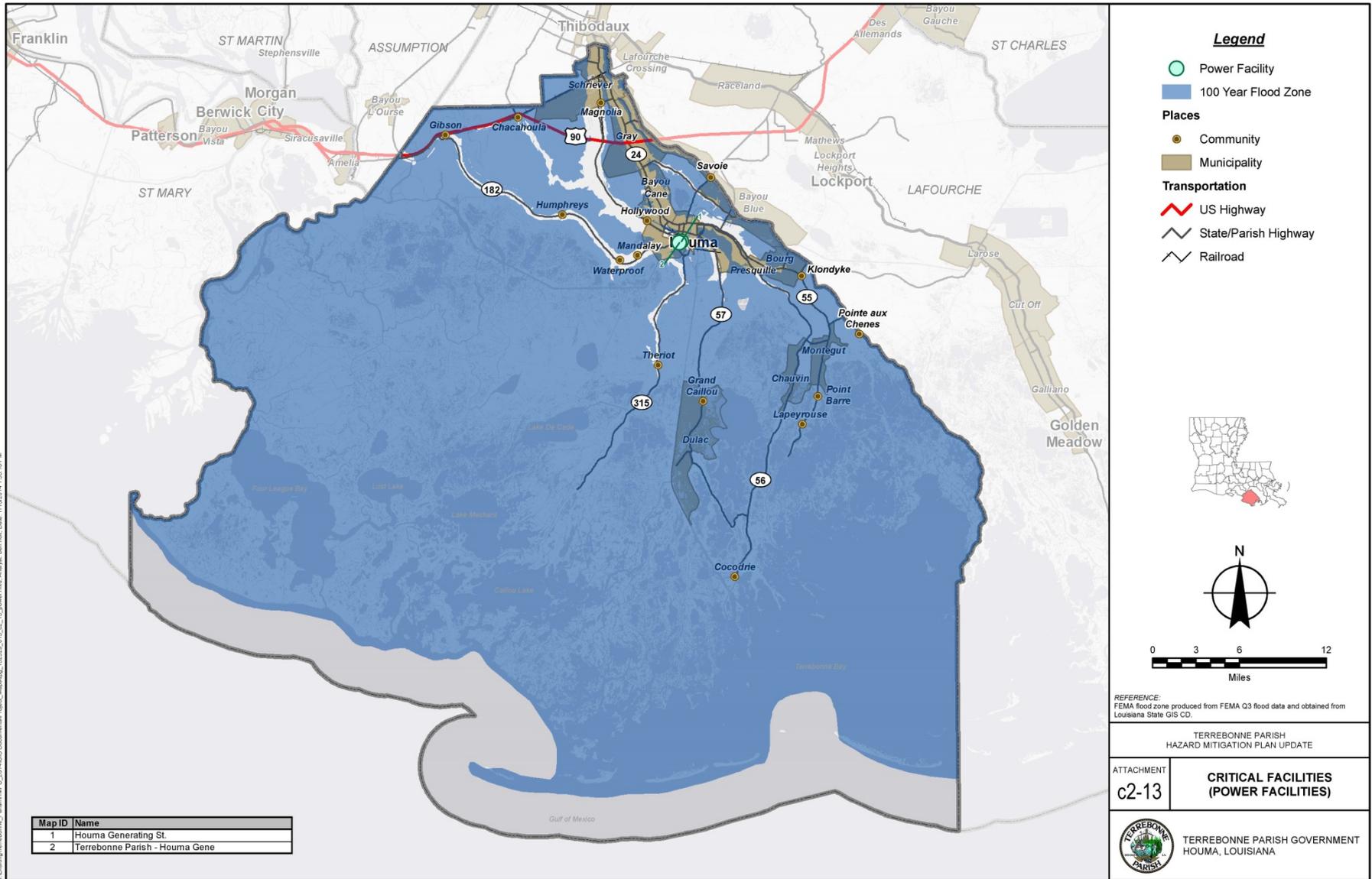
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TERREBONNE PARISH  
HAZARD MITIGATION PLAN UPDATE

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**C2-12** **CRITICAL FACILITIES  
(HEALTH CARE PROVIDERS)**





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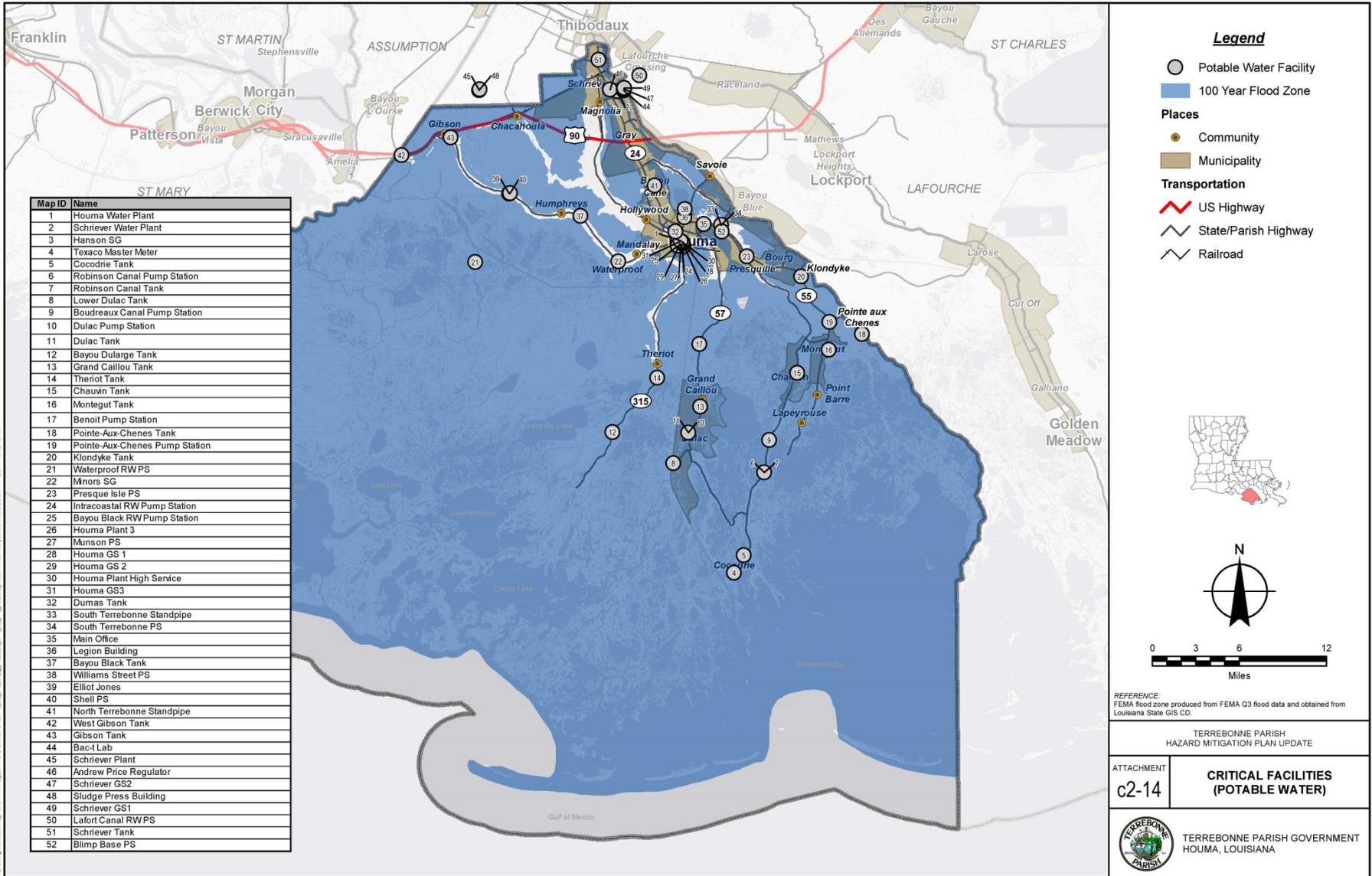
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TERREBONNE PARISH  
HAZARD MITIGATION PLAN UPDATE

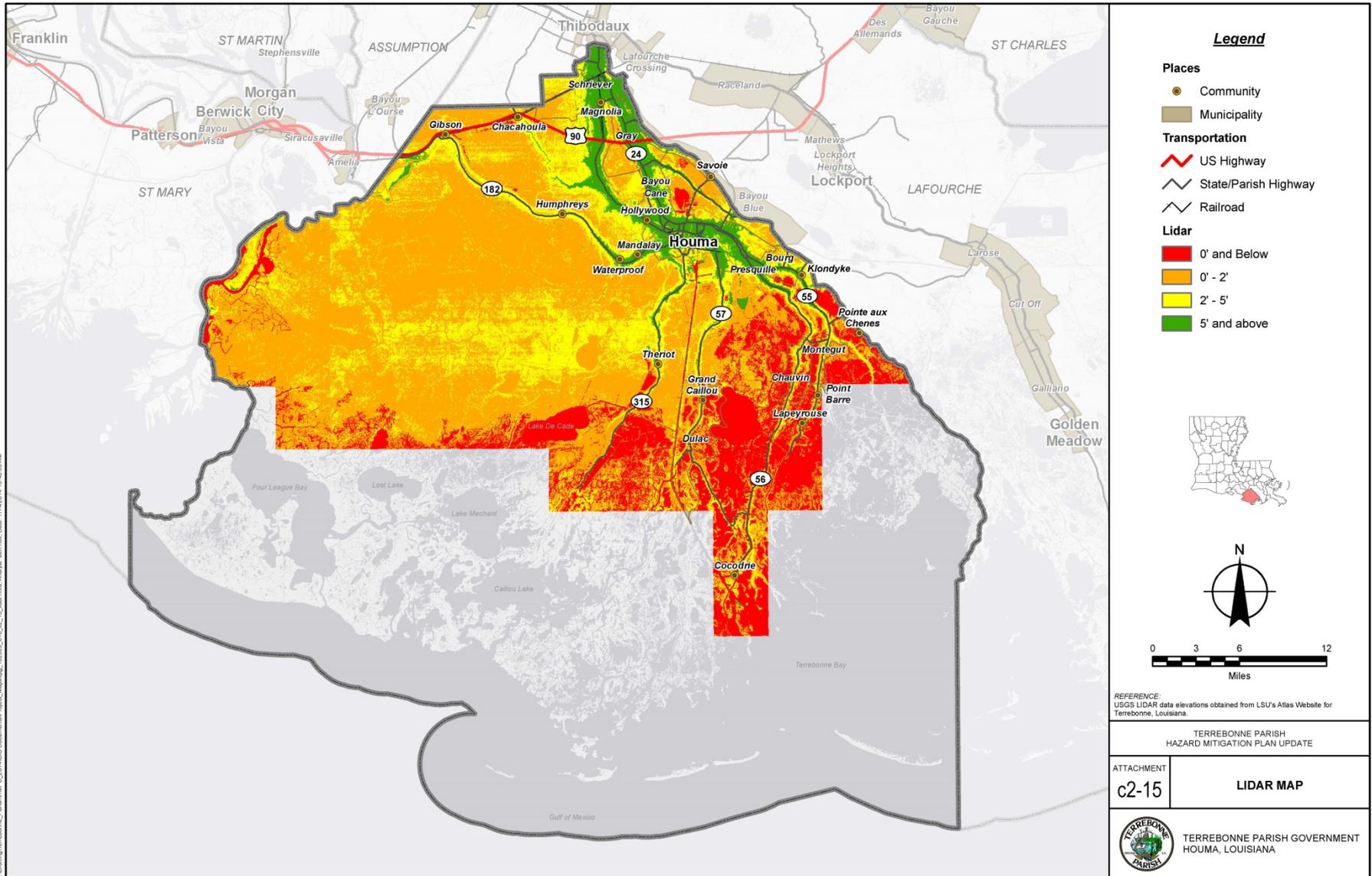
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**c2-13**  
**CRITICAL FACILITIES  
(POWER FACILITIES)**



TERREBONNE PARISH GOVERNMENT  
HOUMA, LOUISIANA



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USGS LIDAR data elevations obtained from LSU's Atlas Website for  
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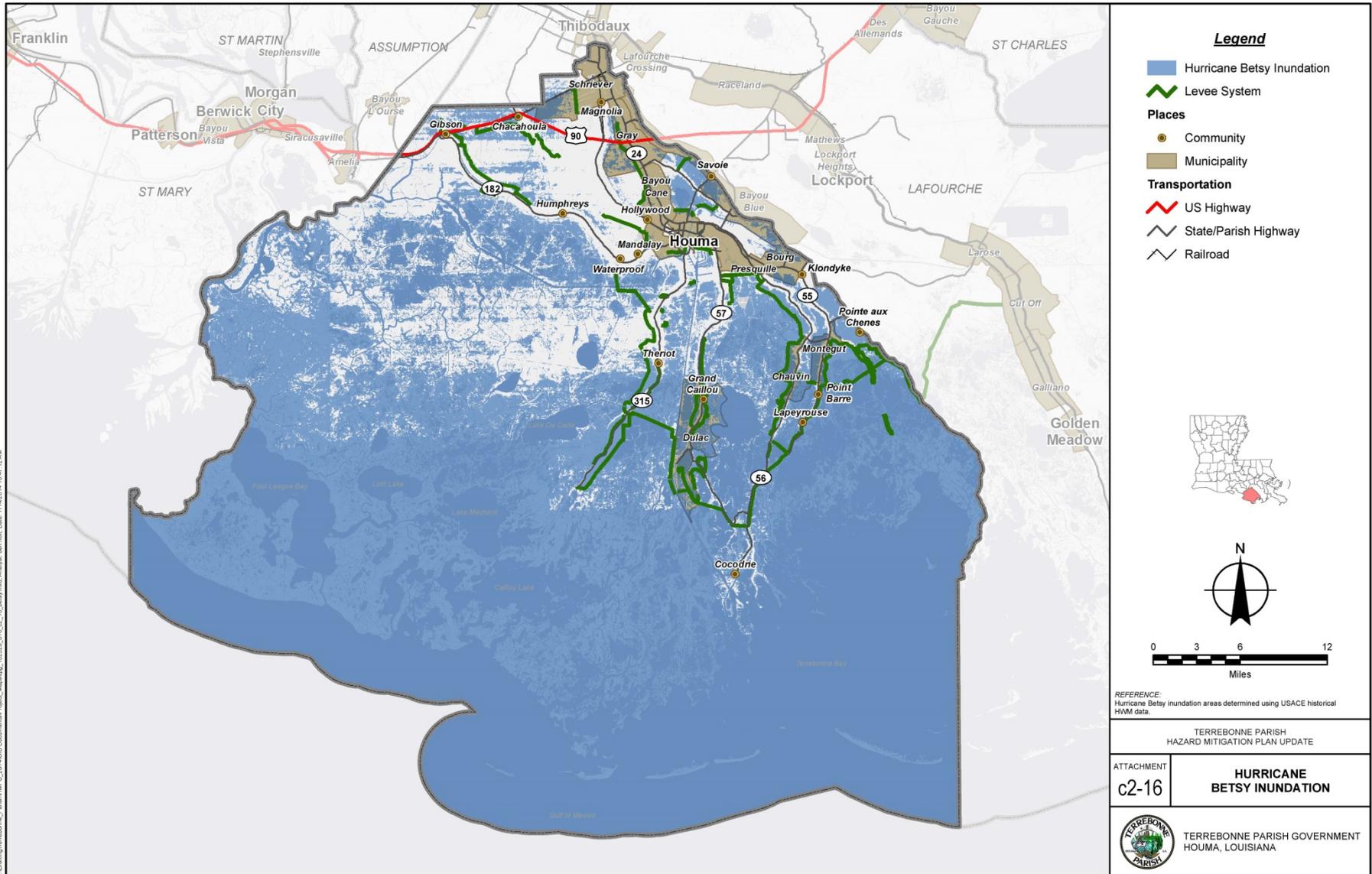
TERREBONNE PARISH  
HAZARD MITIGATION PLAN UPDATE

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**C2-15**

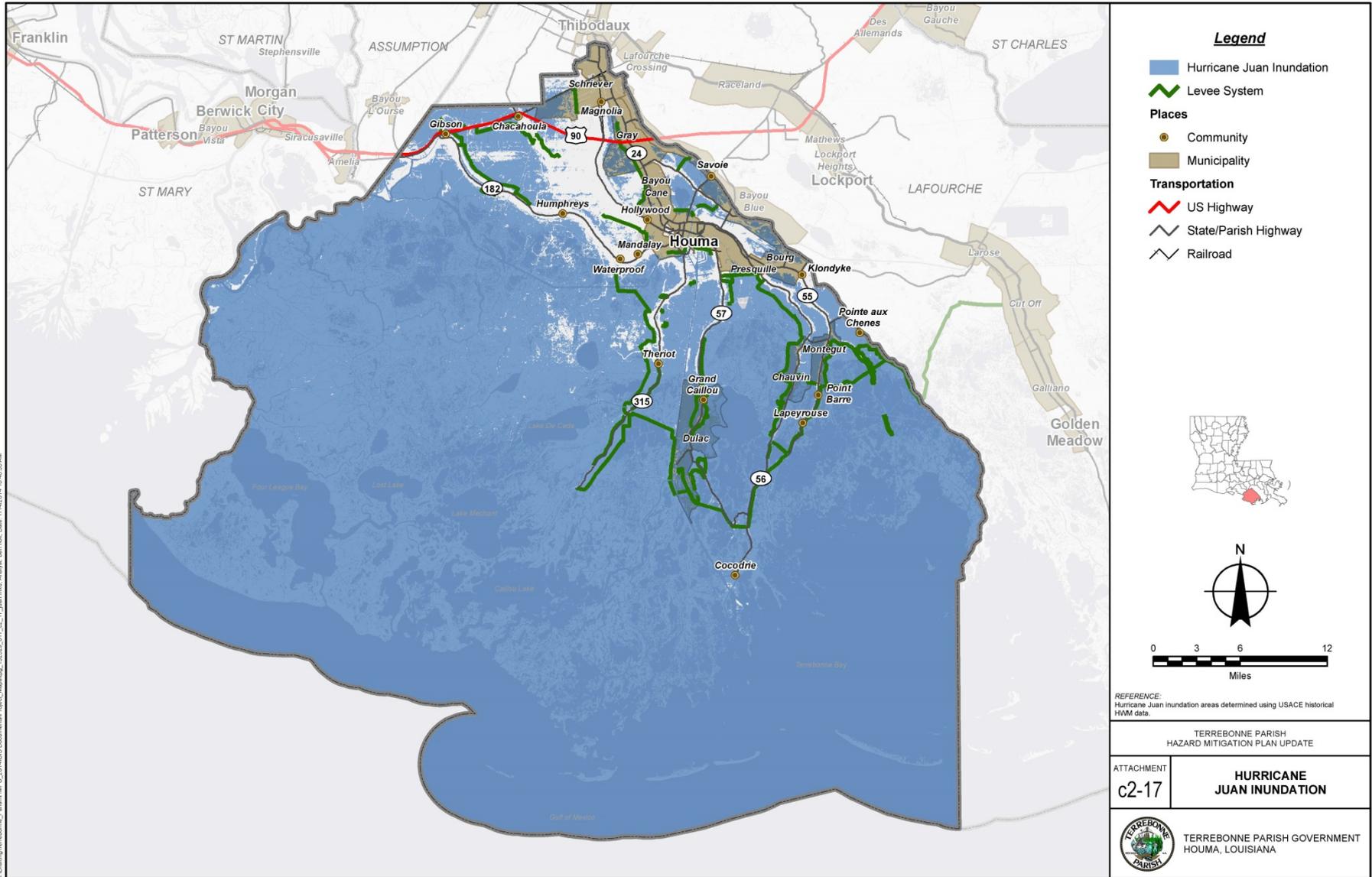
**LIDAR MAP**



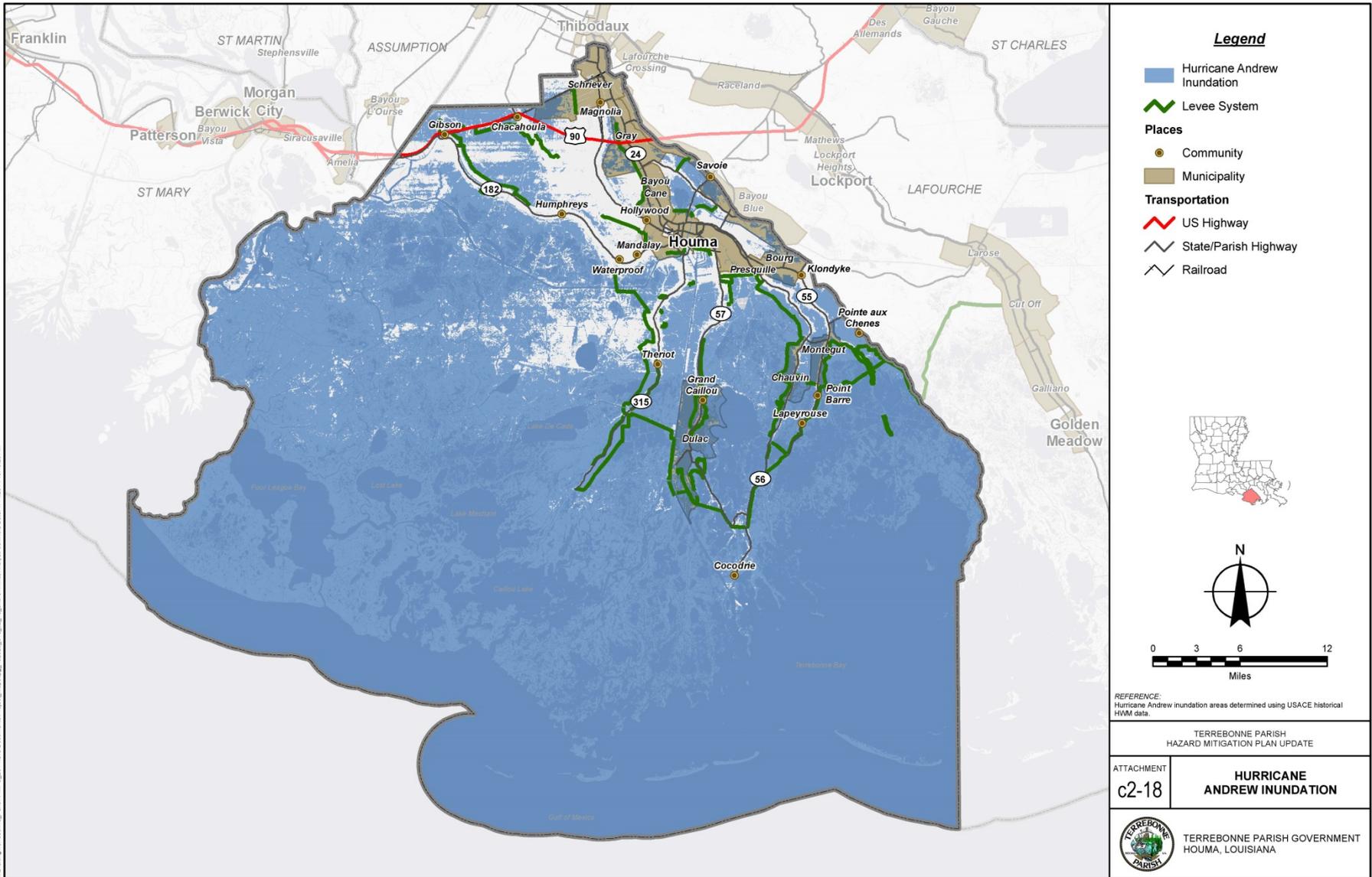
TERREBONNE PARISH GOVERNMENT  
HOUMA, LOUISIANA



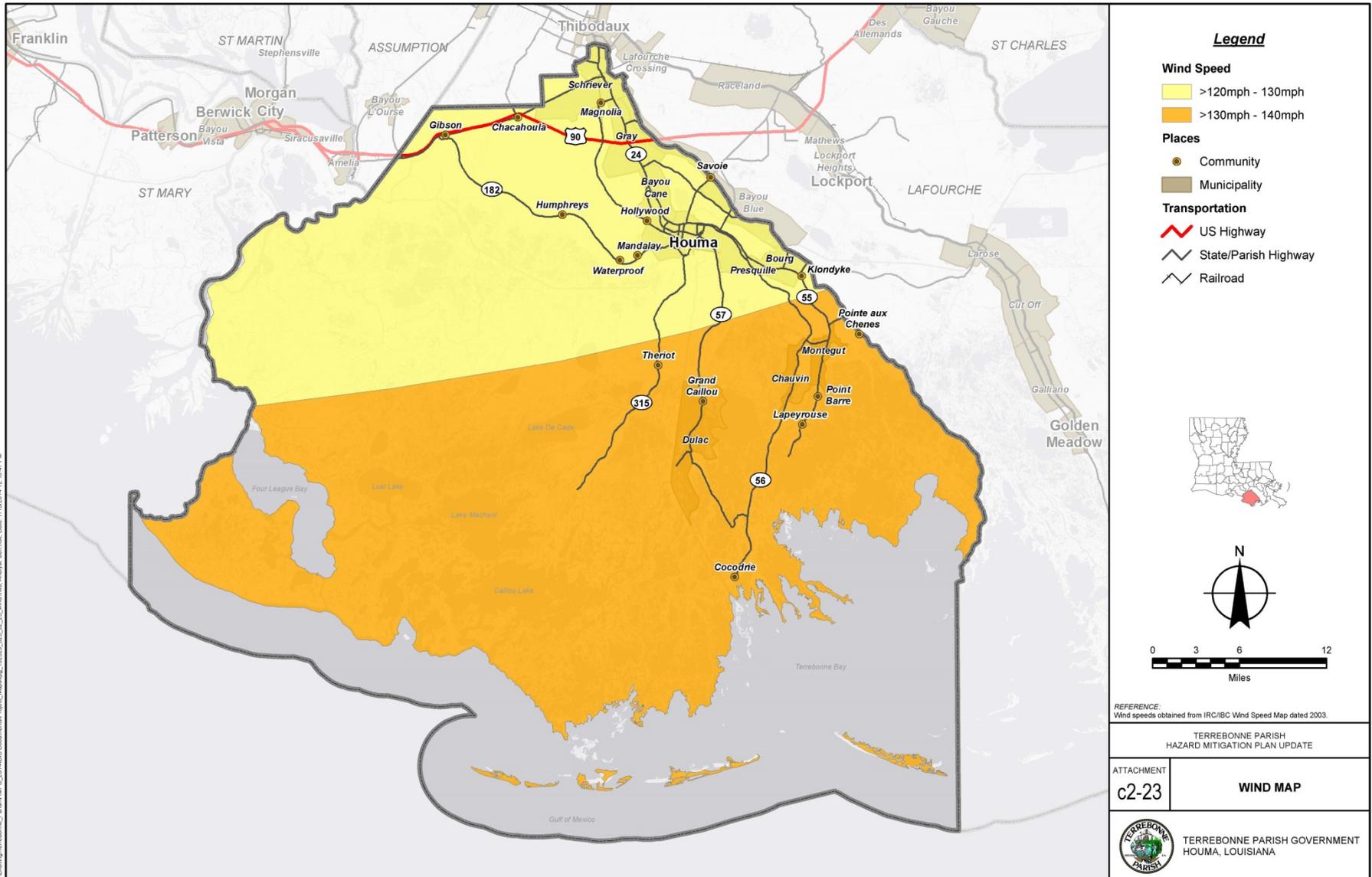
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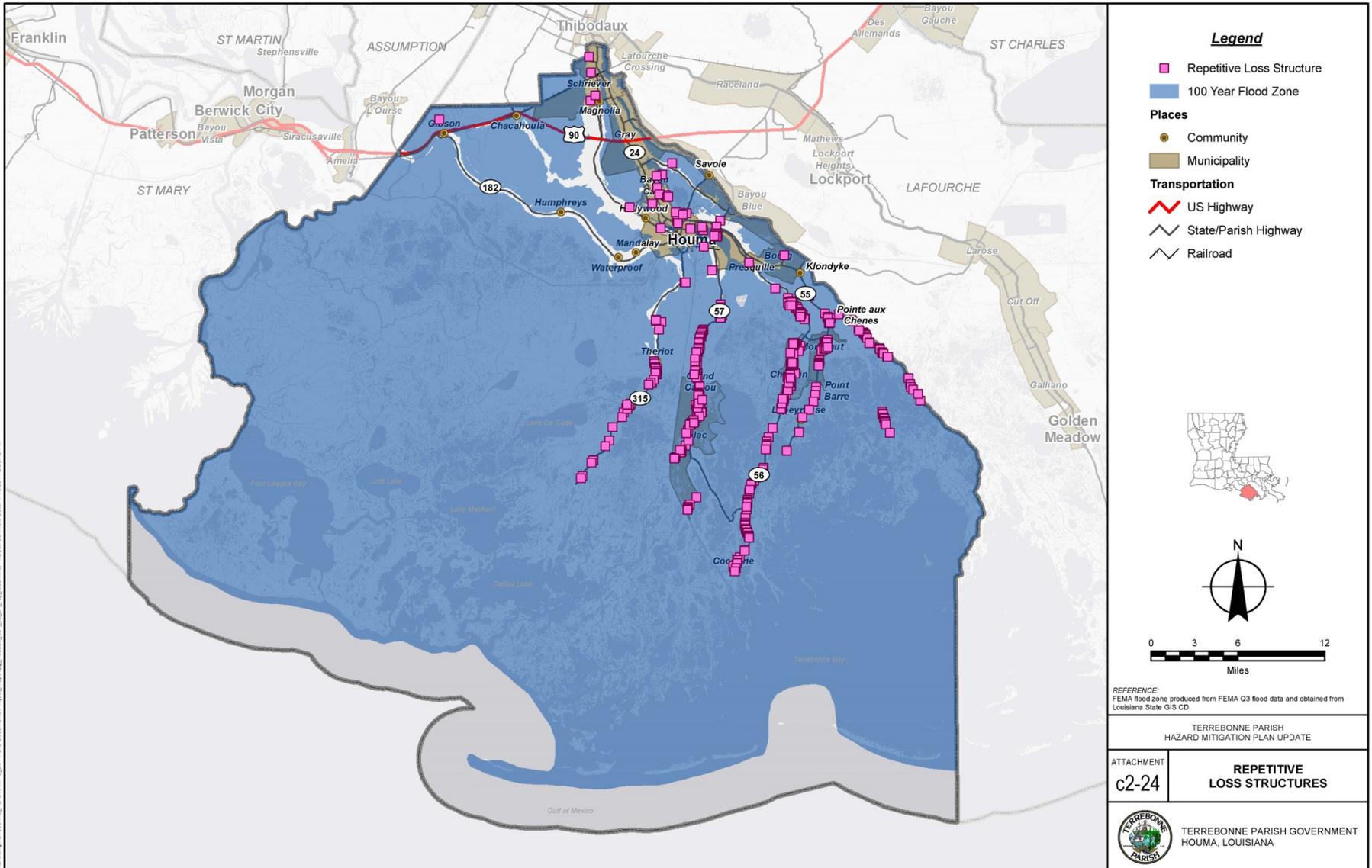
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- **Hurricane Gustav**
- Mandatory Evacuation of 2,300 residents
- 100% of Parish experienced loss of electrical service
- Drinking water system damaged and required a boil water advisory, affected the opening of two major hospital systems within Terrebonne Parish
- Parish experienced Category 2 hurricane force winds
- Major structural damage widespread throughout Terrebonne Parish
- Jail flooded
- Hospital parking lot flooded (couldn't get to Chabert)

- **Hurricane Ike**
- Major storm surge flooding throughout Terrebonne Parish, mostly south of the Intracoastal Waterway. Storm surge flooding also noted in western end of Parish.
- Storm surge was approximately 7 to 8 feet.
- Levee breached and overtopped from storm surges
- Damage to drainage pump stations.
- Shelters opened to house residents affected by storm surge flooding.

- **Flood of May 2011 (Atchafalaya High Water Event)**
  - No flooding
- Prepped pumps
- Levees built in time to prevent damages
- Tiger Tubes, Sheetpile, Hesco baskets Placed
- If barge in Bayou Chene hadn't been successful, new levees wouldn't have held

- **Flood of July 18, 2011**
- Street flooding
- Catch basin clogging
- Debris blocking drains
- Clearing culverts & trash screens

- **Tropical Storm Lee**
- North shore of Lake Boudreaux Lost material /Rock Dike  
\$1.2MM
- Bellaire Lift Station Flooded
- Not as severe as other listed storms

- **Hurricane Isaac**
- Debris due to wind damage
- Signs/ bridges/ traffic lights needed repair
- Island Road shoulder damage
- Damage to the South treatment plant oxidation pond

- **October Flooding (2013)/May Flooding (2014)**
  - REMOVE?

# Discussion of FEMA Worksheet #3A—Inventory Assets

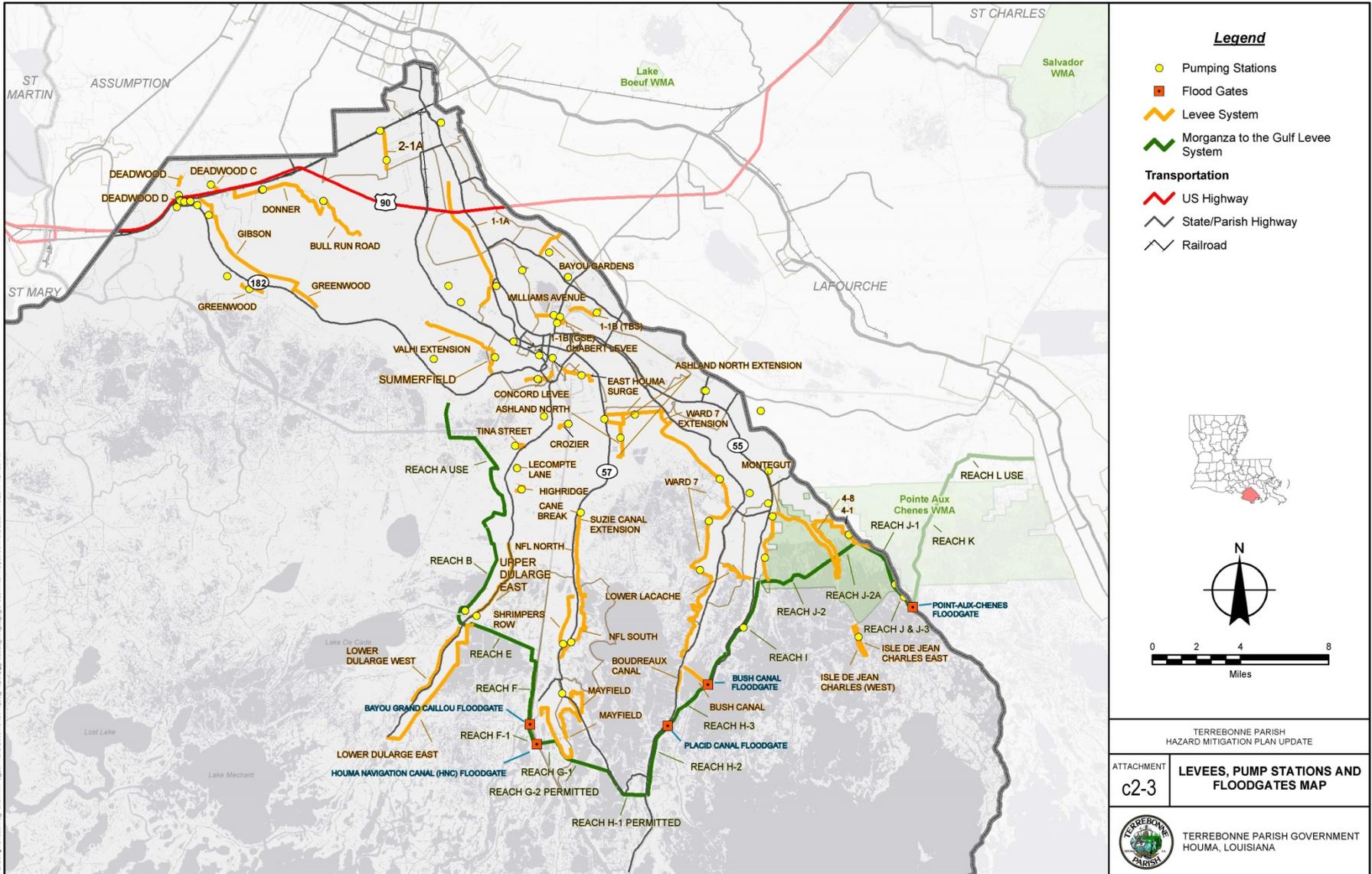
	Number of Structures			Value of Structures			Number of People		
	# in Community	# in Hazard Area	% in Hazard Area	\$ in Community	\$ in Hazard Area	% in Hazard Area	#in Community	# in Hazard Area	% in Hazard Area
<b>Total</b>	<b>50,185</b>	<b>31,778</b>	<b>63%</b>	<b>\$610,603,788</b>	<b>\$275,653,193</b>	<b>45%</b>	<b>104,503</b>	<b>57,036</b>	<b>55%</b>

## Repetitive Loss Structures

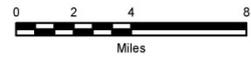
- 514 structures identified
- Total amount of claims by these structures = \$50 Million
- Average claim amount = \$36,500

## Levee Failure

- Review and discuss responsibilities (federal, parish, city, etc.)



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TERREBONNE PARISH  
HAZARD MITIGATION PLAN UPDATE

ATTACHMENT  
**c2-3** LEVEES, PUMP STATIONS AND  
FLOODGATES MAP



TERREBONNE PARISH GOVERNMENT  
HOUMA, LOUISIANA

## Flooding

- Atchafalaya Flooding of 2011
- July 18, 2011 Flooding

## Hurricanes and Coastal Storms

- Hurricane Gustav
- Hurricane Ike
- Tropical Storm Lee
- Hurricane Isaac

- Drought
  - Can adversely effect every jurisdiction in Louisiana
  - No fatalities, no injuries, no property damage in last 25 years
  - 6 occurrences in last 56 years (1957-2013) with damages totaling \$4.4 million
  
- Hailstorm
  - 20 major hail storm instances reported by NCDC in last 56 years
  - \$0 losses according to NCDC
  
- Tornadoes
  - 30 tornadoes reported by NCDC
  - Losses total \$13 million
  
- Winter Storms
  - 7 cold/winter storm events reported by NCDC in last 56 years
  - \$100,000 total damages

- Non-NCDC Reported Hazard Events:
  - Land Subsidence
    - Worsened by Levee Construction and Pumping Stations that inhibit alluvial sedimentary deposits along ridges and wetlands in a deltaic region
  - Sea Level Rise
    - Combined with subsidence, sea level rise will cause the Louisiana Coastline to disappear into the gulf
    - USGS ranks Terrebonne Parish at a “very high” risk to land loss due to sea level rise
  - Coastal Erosion
    - Worsened by Hurricane Events
    - Terrebonne Parish and the State of Louisiana has comprehensive list of coastal restoration and protection projects



Source:  
*Faulting,  
 Subsidence,  
 and Land Loss  
 In Coastal  
 Louisiana*

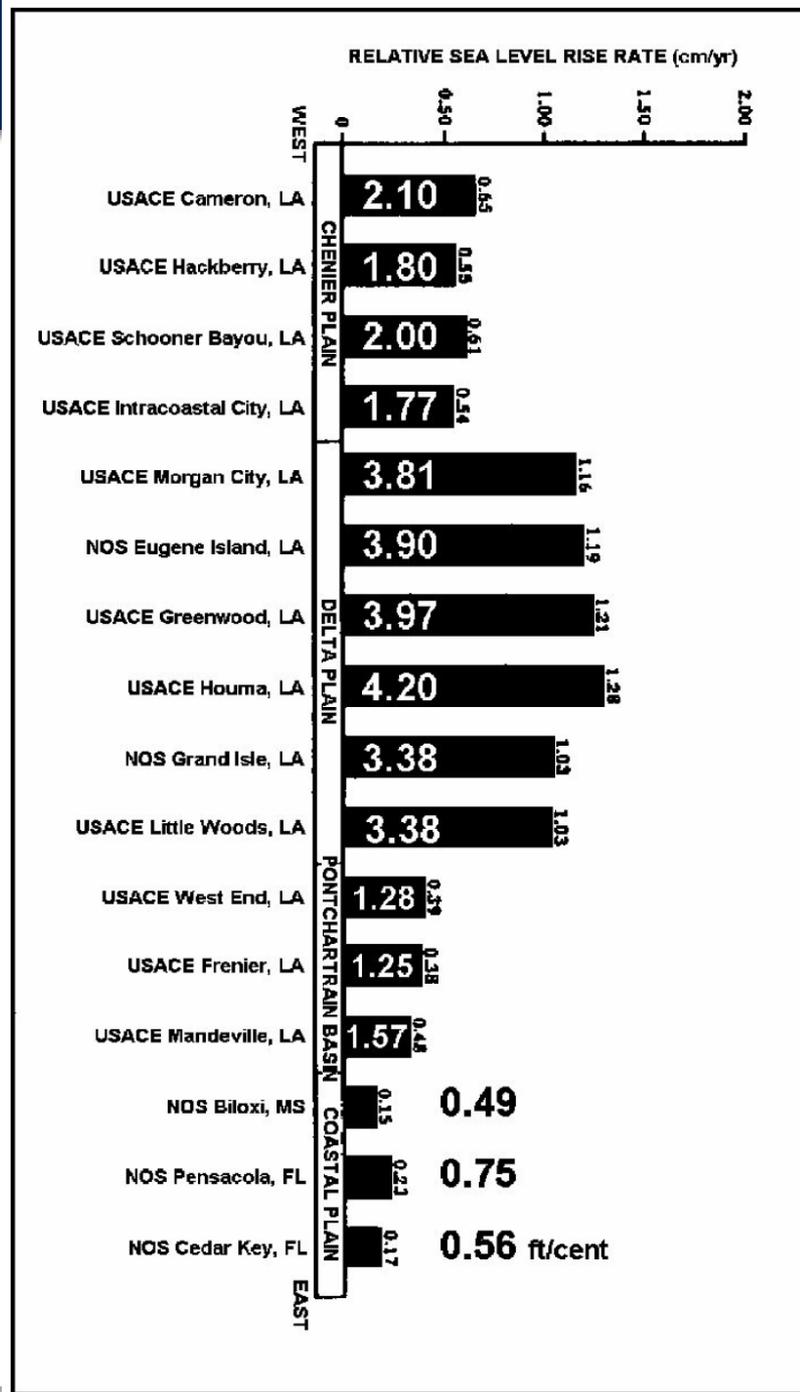
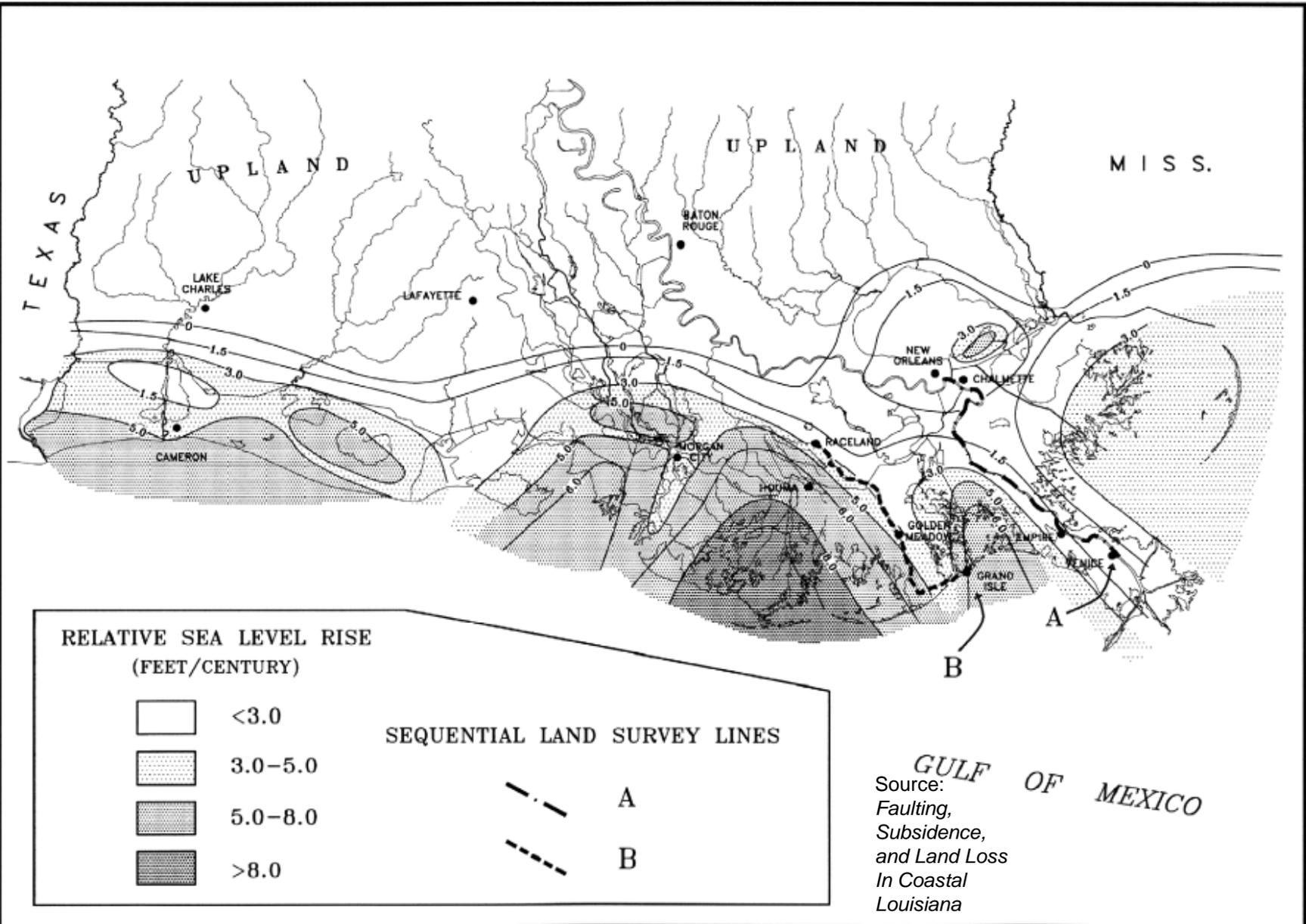
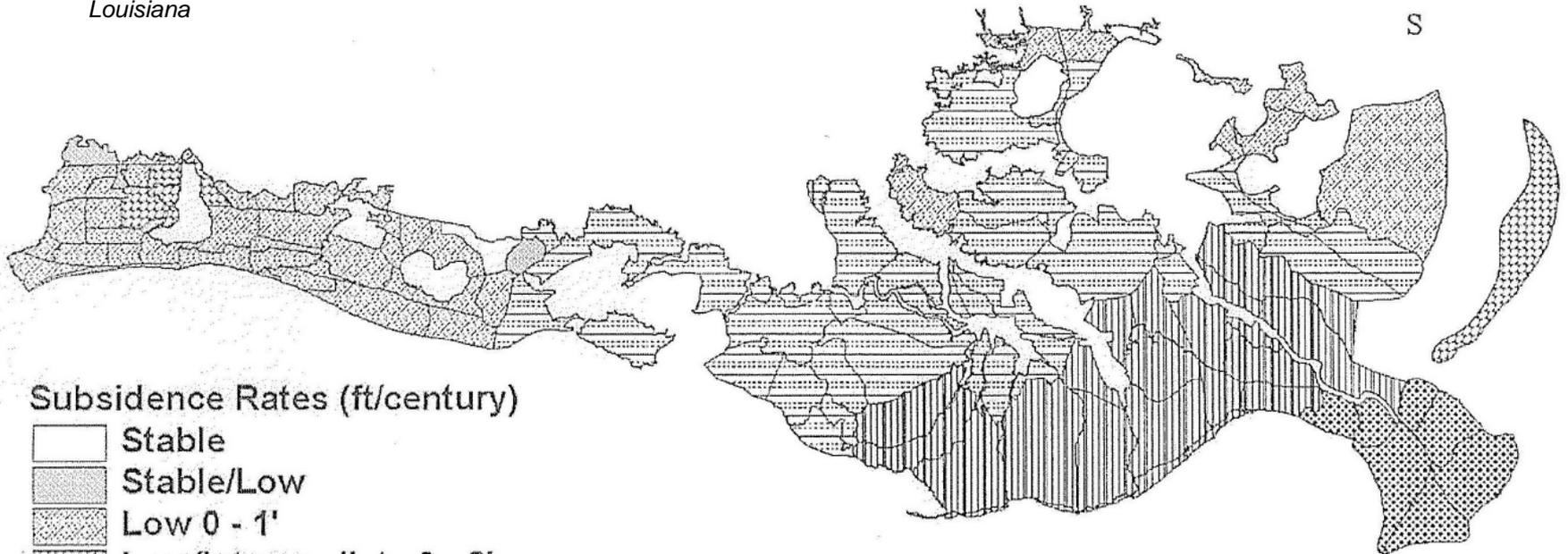
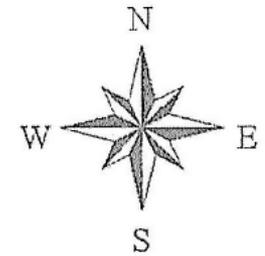


Figure 1-19. Rates of relative sea level rise across the northern Gulf of Mexico region from Cameron, LA to Cedar Key, FL based on records from the National Ocean Survey and U.S. Army Corps of Engineers tide gage stations. The Pensacola, FL gage land location is considered to be stable, and this gage provides a record of eustatic sea level rise in the Northern Gulf Region. The rates of rise of all stations in coastal Louisiana exceed the rate of eustatic rise. The differences are attributed to subsidence (after Penland et al. 1988).



Source:  
*Faulting,  
 Subsidence,  
 and Land Loss  
 In Coastal  
 Louisiana*



### Subsidence Rates (ft/century)

- Stable
- Stable/Low
- Low 0 - 1'
- Low/Intermediate 0 - 2'
- Intermediate 1.1' - 2'
- High 2.1' - 3.5'
- Very High >3.5'



- Non-NCDC Reported Hazard Events:
  - Saltwater Intrusion
    - Alternative backup water intakes
  - Sinkholes
    - The sinkhole in Bayou Corne, Assumption Parish brought to light the significance of this hazard.

## Mitigation Goals and Objectives

1. Identify and pursue preventative measures that will reduce future damages from hazards.
2. Enhance public awareness and understanding of disaster preparedness.
3. Reduce repetitive flood losses in the parish.
4. Facilitate sound development in the parish to reduce or eliminate the potential impact of hazards.

Preliminary Project List (**handout**)

Discussion of New or Additional Projects

## Current Plans

- Louisiana State Hazard Mitigation Plan
- Coastal Wetlands Planning Protection & Restoration Act
- Coastal Impact Assistance Program
- Louisiana Comprehensive Master Plan for a Sustainable Coast
- Coastal Protection and Restoration Authority
- ESF 14
- Terrebonne Parish Feasibility Study for Levee Embankment Projects
- Terrebonne Parish Comprehensive Master Plan

- Identify and Prioritize Mitigation Measures
  - Determine evaluation criteria
    - Social – Is the mitigation strategy socially acceptable?
    - Technical – Is the proposed action technically feasible and cost effective? Does it provide the appropriate level of protection?
    - Administrative – Does the parish have the capability to implement the action? Is the lead agency capable of carrying out oversight of the project?
    - Political – Is the mitigation action politically acceptable?
    - Legal – Does the parish have the authority to implement the proposed measure?
    - Economic – Does the economic base, protected growth and opportunity costs justify the mitigation project?
    - Environmental – Does the proposed action meet statutory considerations and public desire for sustainable and environmentally healthy communities?
  - Implementation Strategy
    - Identify who will implement the mitigation measures
    - Identify mitigation funding
    - Identify when the mitigation measures should be completed

- Capability Assessment
  - What plans reduce long-term vulnerability?
  - What capabilities could be used to implement mitigation and reduce vulnerability in the future?
  - Strengths/Opportunities for Improvement?
    - Planning and Regulatory
    - Administrative and Technical
    - Financial
    - Education and Outreach
- Discussion Questions:
  - What community capabilities can be identified?
  - What limits to community capabilities can be identified?
  - What improvements can be suggested?

### Next Phase.....

- Review Updated Maps
- Review Risk Assessment
- Prioritize Project List
- Next Meeting: August 7, 2014