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**SUSTAINABLE COASTAL CITIES –  
DISASTER RECOVERY & PLANNING –  
CASE STUDIES**

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## Topics to be covered today

- Overview of the impact of implementing HUD funding of NEPA following a coastal disaster
  - Where we've been (a look back);
  - What we've learned (what we're doing now);
  - What we're facing (the bigger issues that are missing from the NEPA process)
- Case Studies - real world examples of HUD-funded coastal resiliency and “liveable cities”, featuring the Isle de Jean Charles Resettlement Project.

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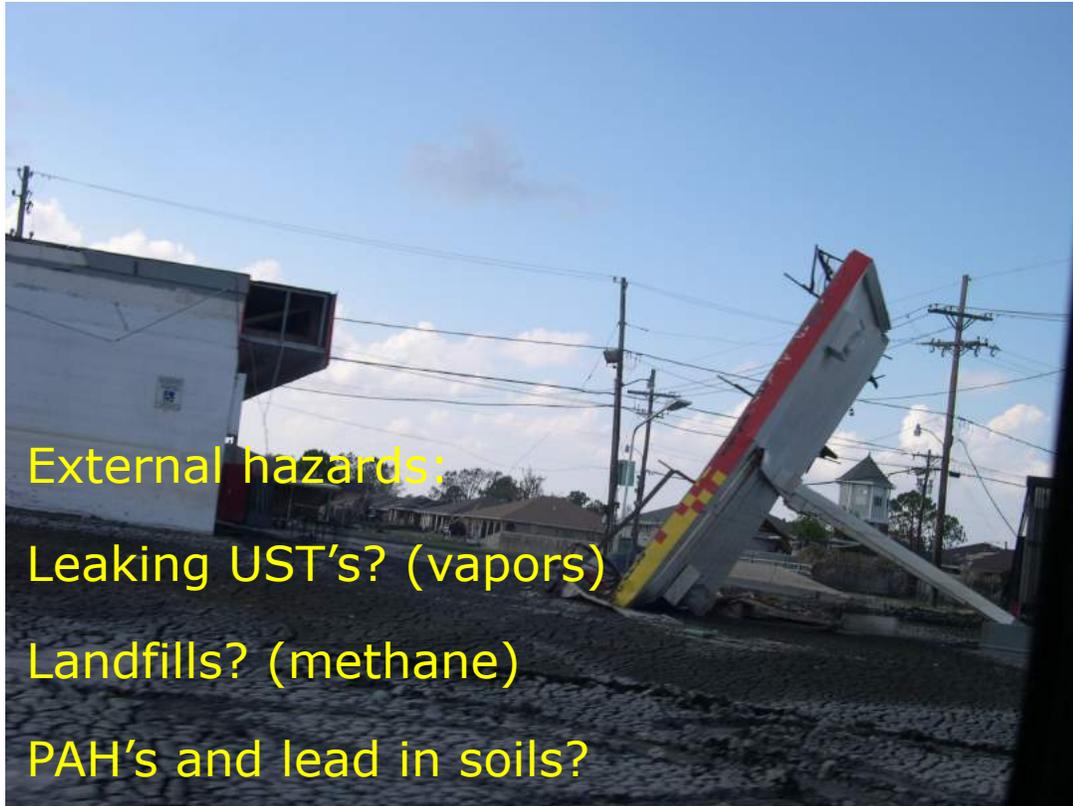
## HUD's Mission for Disaster Recovery is only a "seed" ....

HUD provides flexible grants to help cities, counties, and States recover from Presidentially declared disasters, **especially in low-income areas**, subject to availability of supplemental appropriations. In response to Presidentially declared disasters, Congress may appropriate additional funding for the Community Development Block Grant (CDBG) Program as Disaster Recovery grants **to rebuild the affected areas and provide crucial seed money to start the recovery process**. Since CDBG Disaster Recovery (CDBG-DR) assistance may fund a broad range of recovery activities, HUD can help **communities and neighborhoods that otherwise might not recover due to limited resources**.

# Looking back...

## Hurricane Katrina was a regulatory game-changer

>50,000 homes, hundreds of projects  
A coordinated centralized approach was needed



The former CDBG funding branched into “Disaster Recovery CDBG” funding. What’s the diff?

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HUD'S CDBG-DISASTER RECOVERY NEPA PROCESS CAN LEAD TO SUSTAINABLE COASTAL COMMUNITIES THROUGH ITS REVIEW OF ENVIRONMENTAL AND SOCIAL FACTORS INCLUDING:

- **FLOODPLAIN PROTECTION AND MITIGATION PLANNING**
- **ENVIRONMENTAL QUALITY IMPACTS (AIR, WATER, WASTE)**
- **HAZARDS MITIGATION (LEAD, ASBESTOS, CONTAMINATION)**
- **ALTERNATIVE SITES & PROJECTS - ANALYSES AND MITIGATION**
- **HISTORICAL AND CULTURAL SITES PRESERVATION**
- **SENSITIVE ENVIRONMENTS PROTECTION**
- **IMPACTS AND STRAINS TO LOCAL INFRASTRUCTURE**
- **QUALITY OF LIFE (NOISE, ACCESS TO SOCIAL SERVICES)**
- **URBAN DENSITY AND MASTER LAND USE PLANNING**
- **ENVIRONMENTAL JUSTICE AND DISPROPORTIONATE IMPACTS**
- **COMPLIANCE WITH ENVIRONMENTAL, HEALTH AND SAFETY LAWS**
- **CUMULATIVE AND INDIRECT EFFECTS ASSESSMENT**
- **PROTECTION OF PUBLIC INVESTMENT FOR "THE NEXT STORM"**

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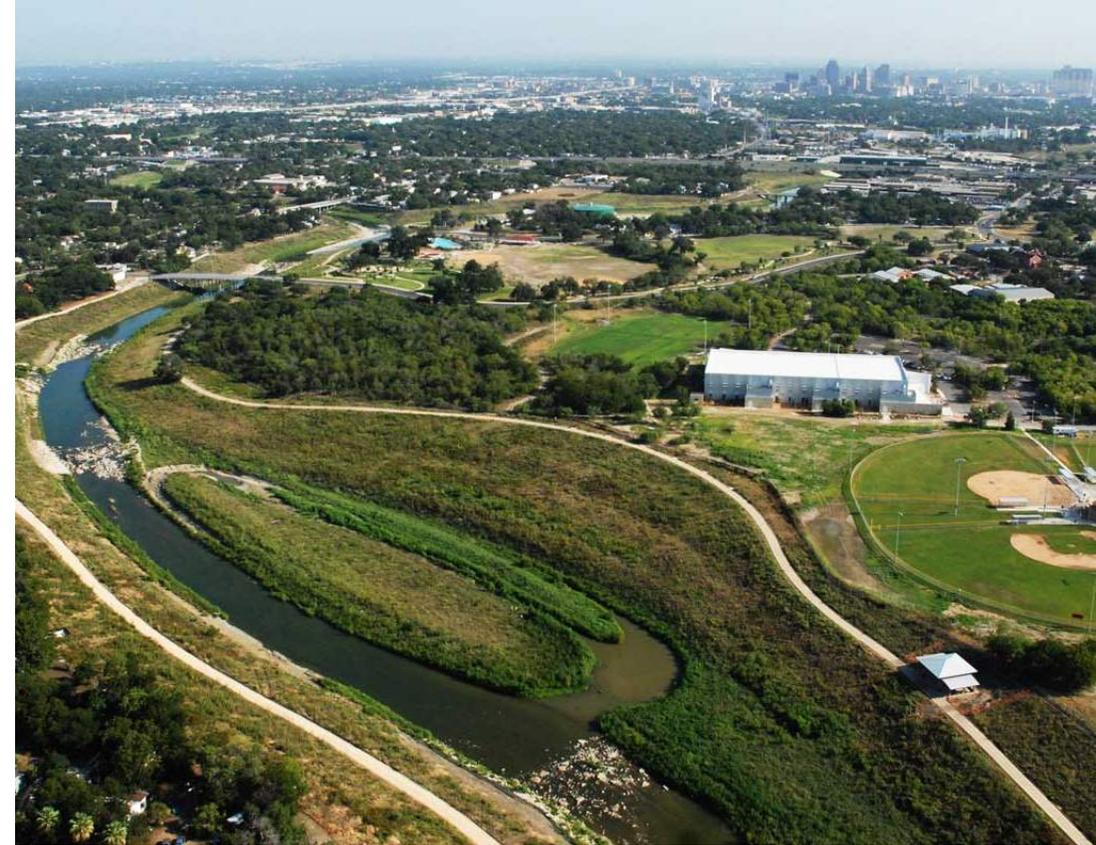
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## HUD Disaster recovery under NEPA has two competing aspects:

- THE NATURAL ENVIRONMENT  
AND
- THE HUMAN ENVIRONMENT

THIS IS BALANCED THROUGH A ROBUST  
IMPACTS, ALTERNATIVES AND MITIGATION  
ANALYSIS

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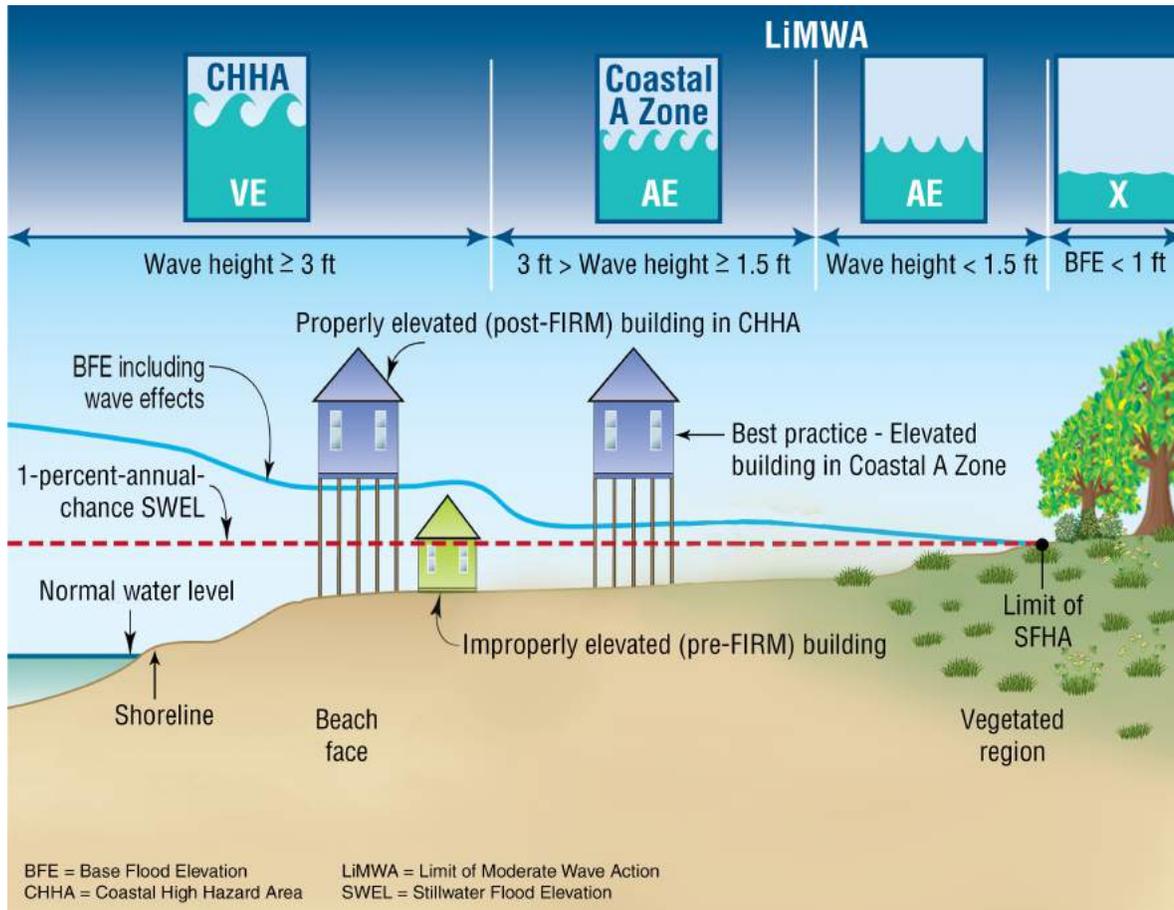
While most hazards or impacts can be mitigated  
It's a balance of alternatives vs objectives



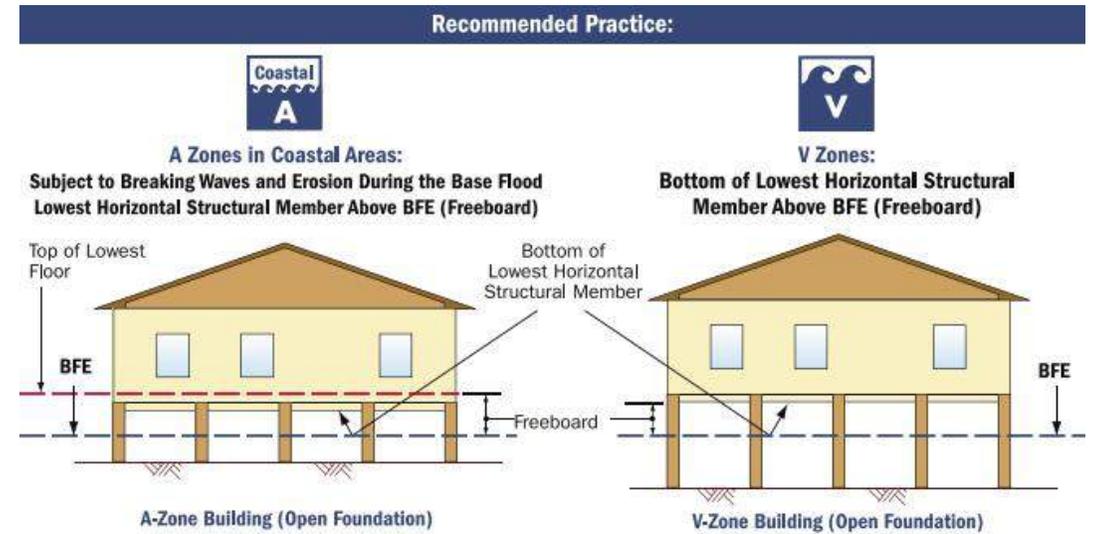
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## Tougher standards for coastal "V" and "A" zones



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- **Case studies**  
“Beyond rebuilding”



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**RECONSTRUCTION IN THE FLOODPLAIN  
(WE *DID* BUILD IT BETTER)**



New “green” elevated centralized high school in coastal Louisiana

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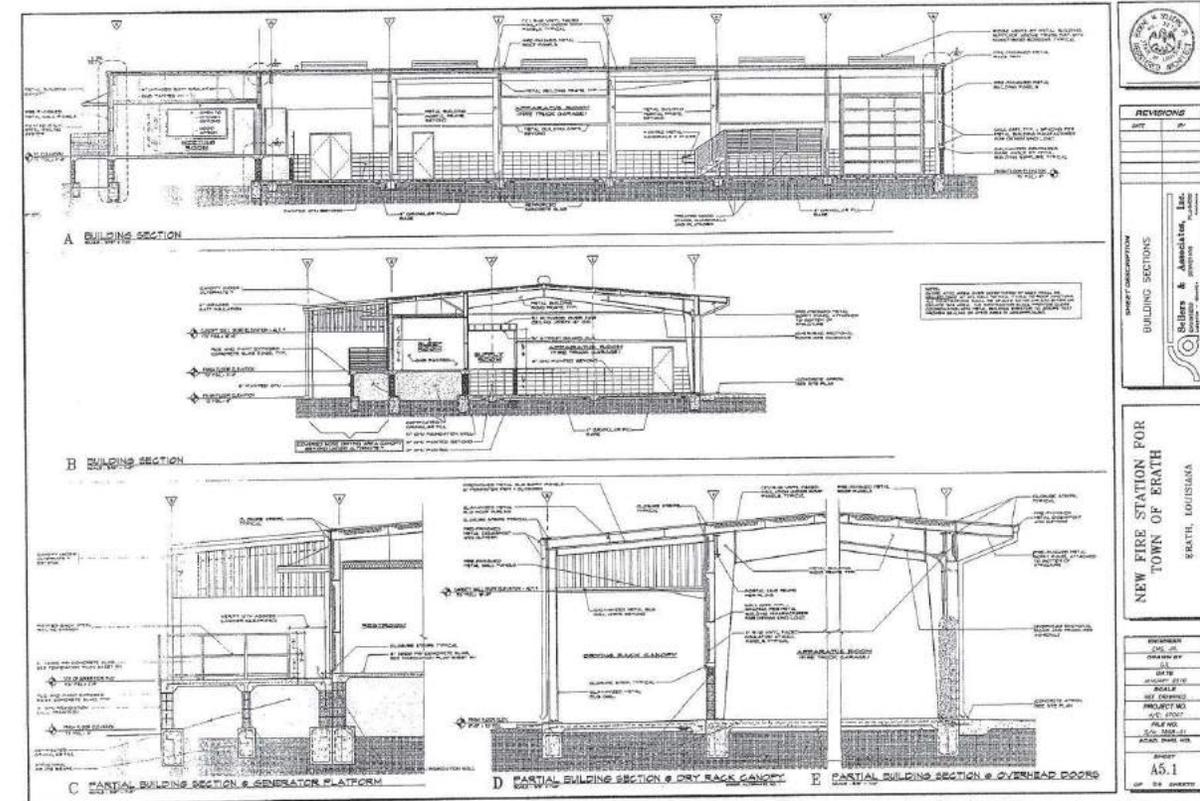
## Planning for Critical services

Erath Fire station case study

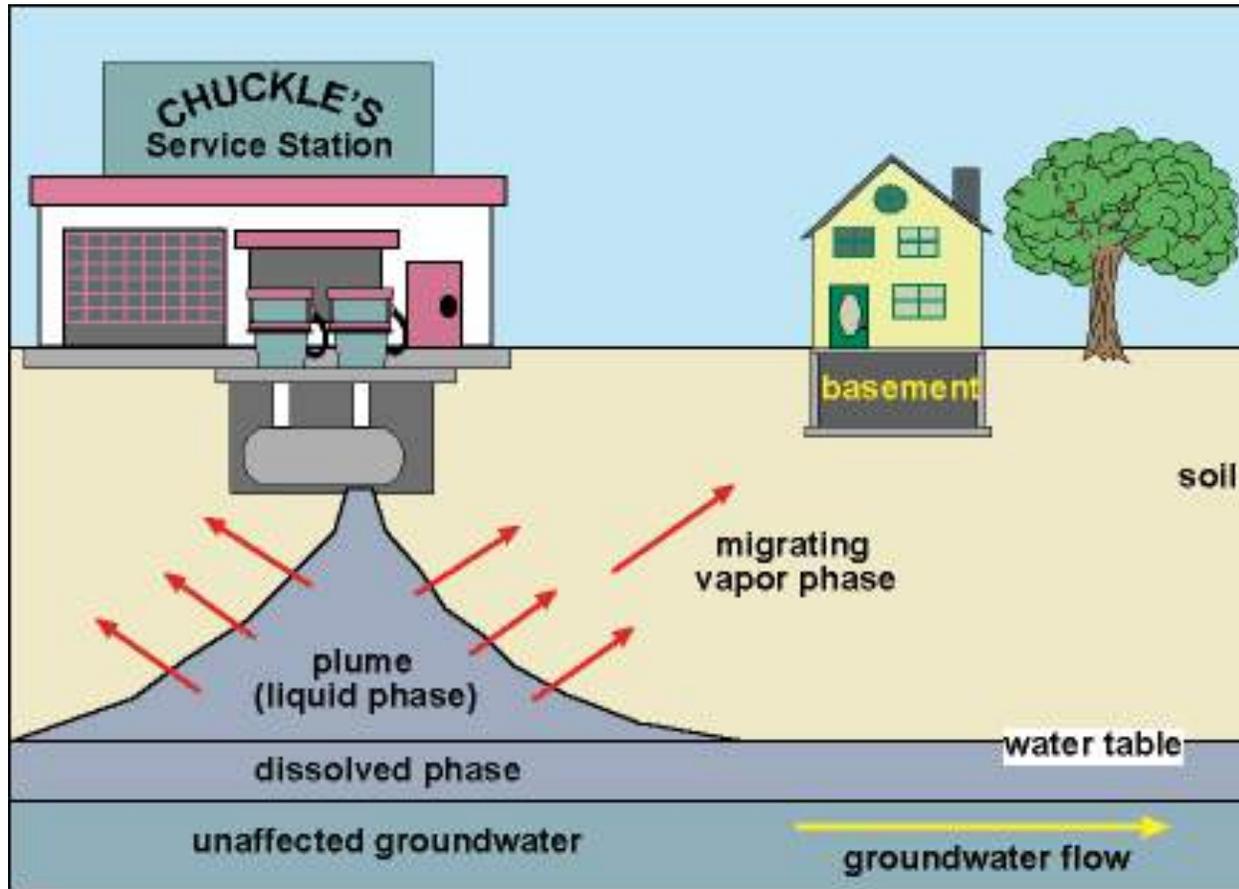
Located in "V" Zone but prohibition would leave rescue services too distant

**SOLUTION?**

CRITICAL UNITS ELEVATED ABOVE 500-yr BFE  
BREAKAWAY LOWER FLOOR PANELS



# THE HUD “TOXICS” POLICY



REQUIRES REVIEW OF  
POTENTIAL HEALTH AND  
SAFETY ISSUES FOR CERTAIN  
SITES; USING BEST  
PROFESSIONAL JUDGEMENT





***“BUILD IT AND THEY WILL COME”***  
**CRESCENT PARK**  
**CITY OF NEW ORLEANS**



**“CONTAMINATED” LANDS REQUIRE A HUMAN  
HEALTH RISK-BASED APPROACH**

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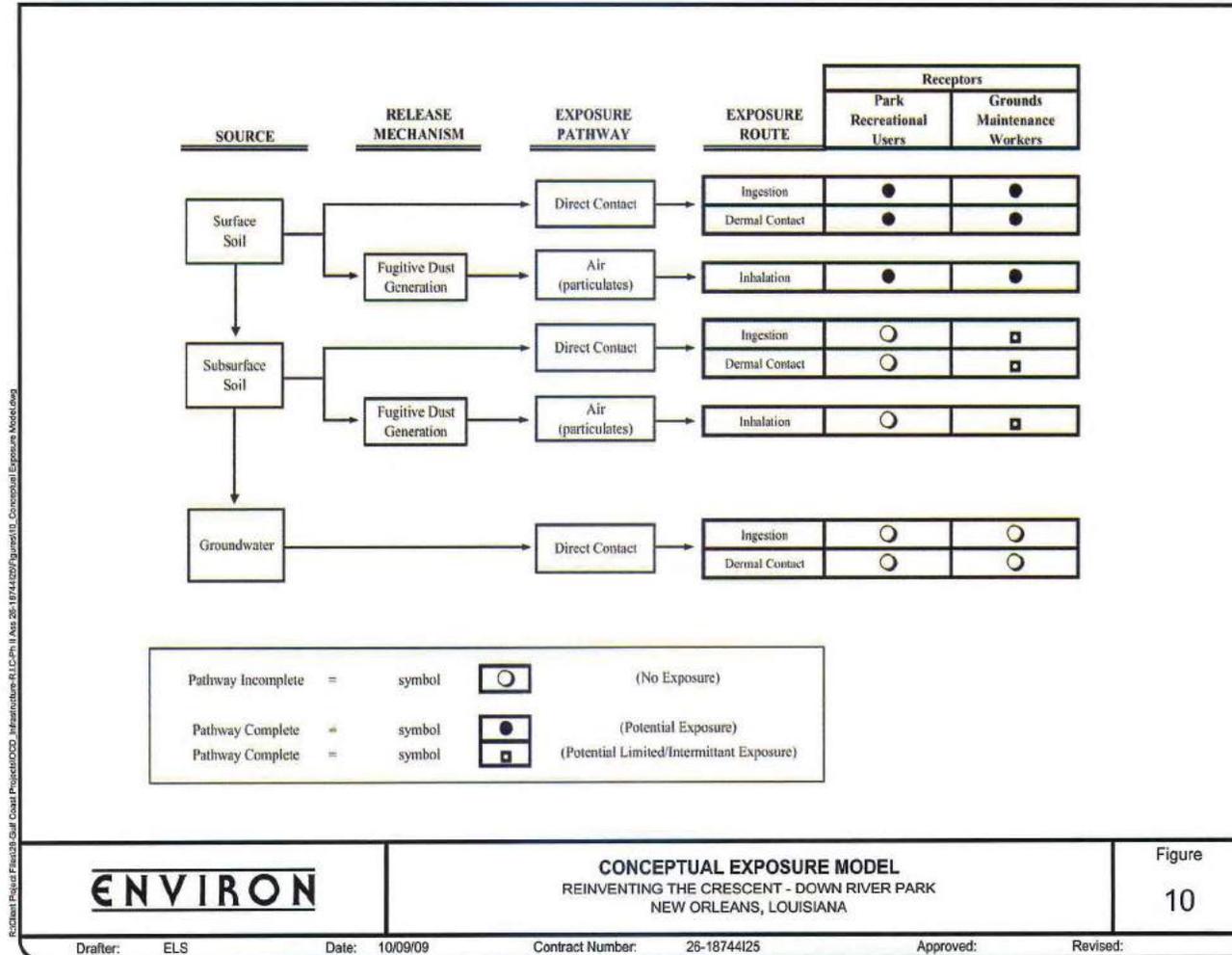
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## CONDITIONS AFTER THE STORM PAH'S AND METALS ABOVE RECAP SCREENING STANDARDS

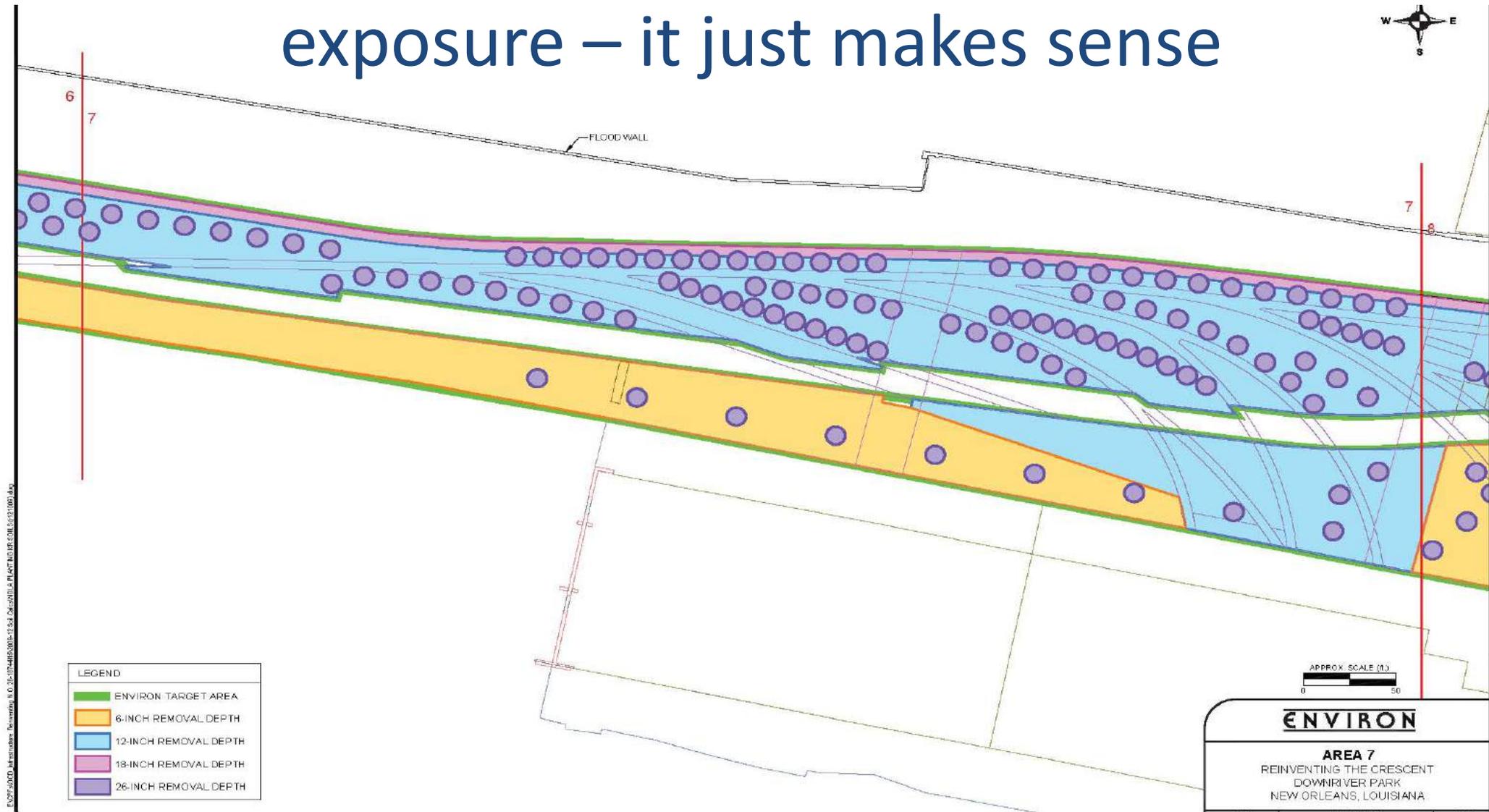


Site conceptual human health exposure models in returning sites to “Intended Use” under NEPA.

Eliminate or mitigate exposure to receptors



# Engineering and institutional controls to mitigate exposure – it just makes sense



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The park today -  
Sustainable,  
Resilient,  
Protective



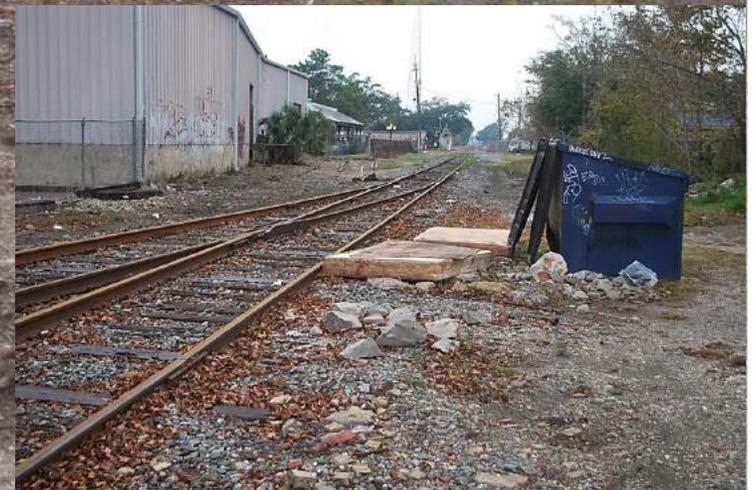
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# The Lafitte Greenway Project, New Orleans



The Lafitte Greenway, a 54-acre barren stretch of land once utilized as an industrial rail corridor, is poised to become a catalyst for change in the Crescent City.





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## A look back... Are we more resilient?



### Conclusion

“After 10 years, it is clear that Katrina-impacted areas are successfully rebuilding with flood- and wind-resistant design and construction in mind. Progress has been made in voluntary actions to elevate and repair existing buildings, and regulatory requirements for new construction. It may take several years to fully benefit from actions implemented following Hurricane Katrina, but we are headed in the right direction. Hurricane Katrina has shaped the national dialogue on building for flood resistance, and has not only led to improved resilience in the impacted area, but has led to greater resilience in national model codes and best practices for flood and wind mitigation.”

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John Ingargiola, EI, CFM, CBO, FEMA Building Science Branch

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That's how we got here (Past)  
and  
where we are today (Present)  
But...  
Where are we going?

What does the **future** look like “behind  
the walls”?





# WHAT ARE WE FACING?

## THE BIGGER QUESTIONS NOBODY WANTS TO ASK....

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Sources: CPRA Coastal Master Plan 2017 and USGS  
US Census TIGER/Line 2010, USGS National Hydrography Dataset, NOAA,  
Atlas: The Louisiana Statewide GIS, Esri, TomTom, Tele Atlas North America,  
DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,  
AeroGRID, IGN, and the GIS User Community

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**1960**



Sources: CPRA Coastal Master Plan 2017 and USGS  
US Census TIGERLine 2010, USGS National Hydrography Dataset, NOAA,  
Atlas: The Louisiana Statewide GIS, Esri, TomTom, Tele Atlas North America,  
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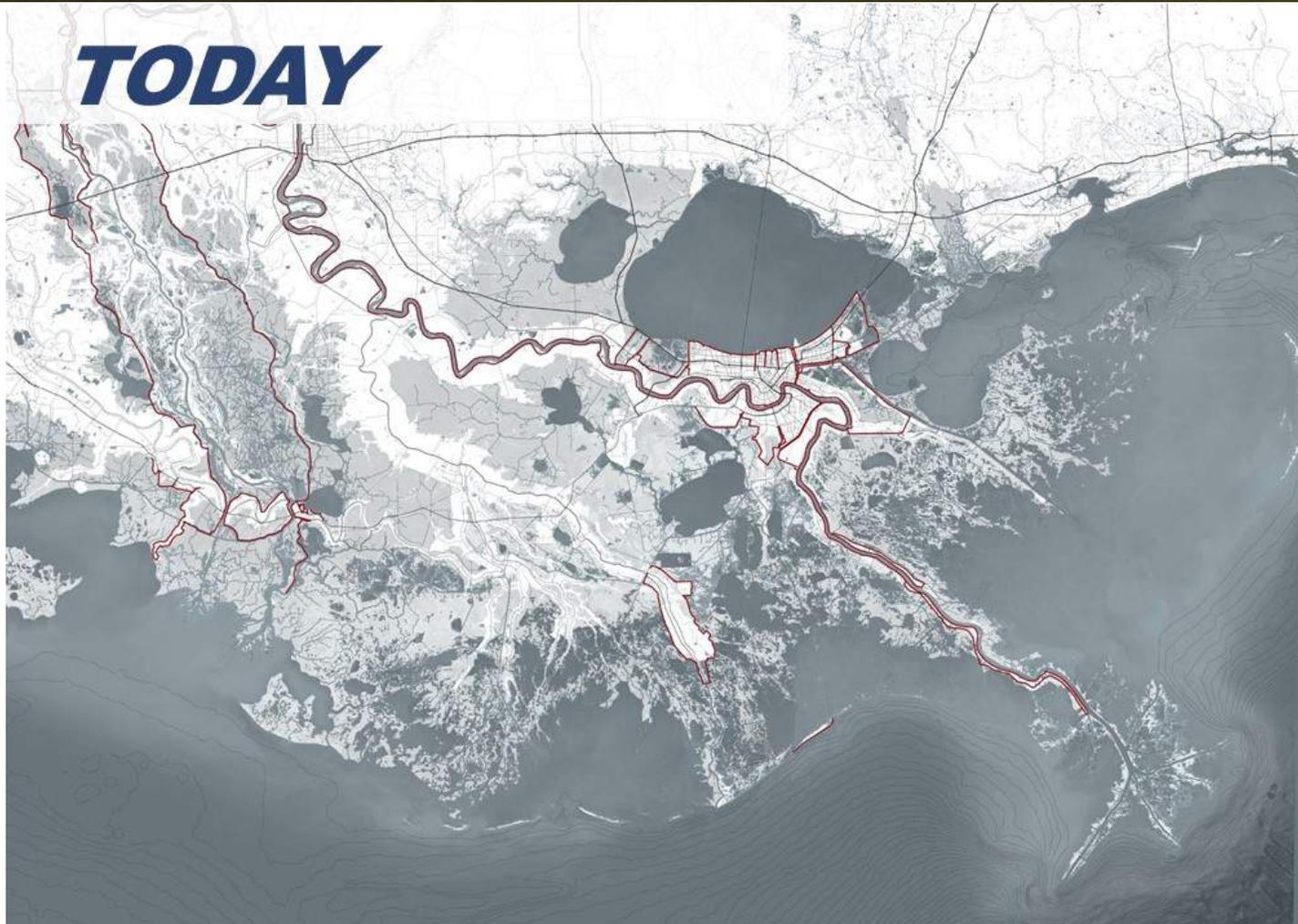
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**TODAY**



Sources: CPRA Coastal Master Plan 2017 and USGS  
US Census TIGERLine 2010, USGS National Hydrography Dataset, NOAA,  
Atlas: The Louisiana Statewide GIS, Esri, TomTom, Tele Atlas North America,  
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AeroGRID, IGN, and the GIS User Community

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**2067** (No Action)



***THIS IS  
IF WE DON'T  
PROTECT  
& RESTORE***

This data was provided by CPRA and were originally produced to inform the development of the 2017 Coastal Master Plan.

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**2067** (with Coastal Master Plan)



**THIS IS  
IF WE  
PROTECT  
& RESTORE**

SOURCE: CPRA  
MEDIUM SCENARIO

This data was provided by  
CPRA and were originally  
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Coastal Master Plan.

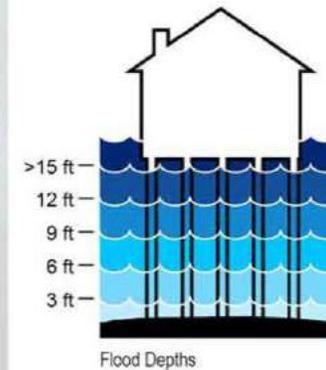
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SOURCE: CPRA  
100 YEAR FLOOD DEPTHS  
MEDIUM SCENARIO

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Coastal Master Plan.

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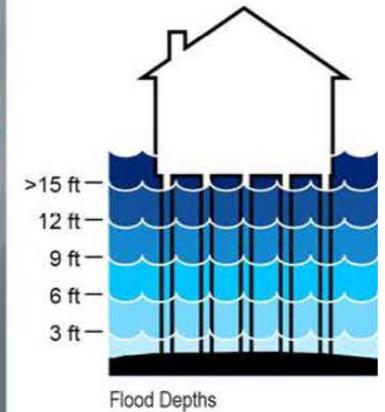
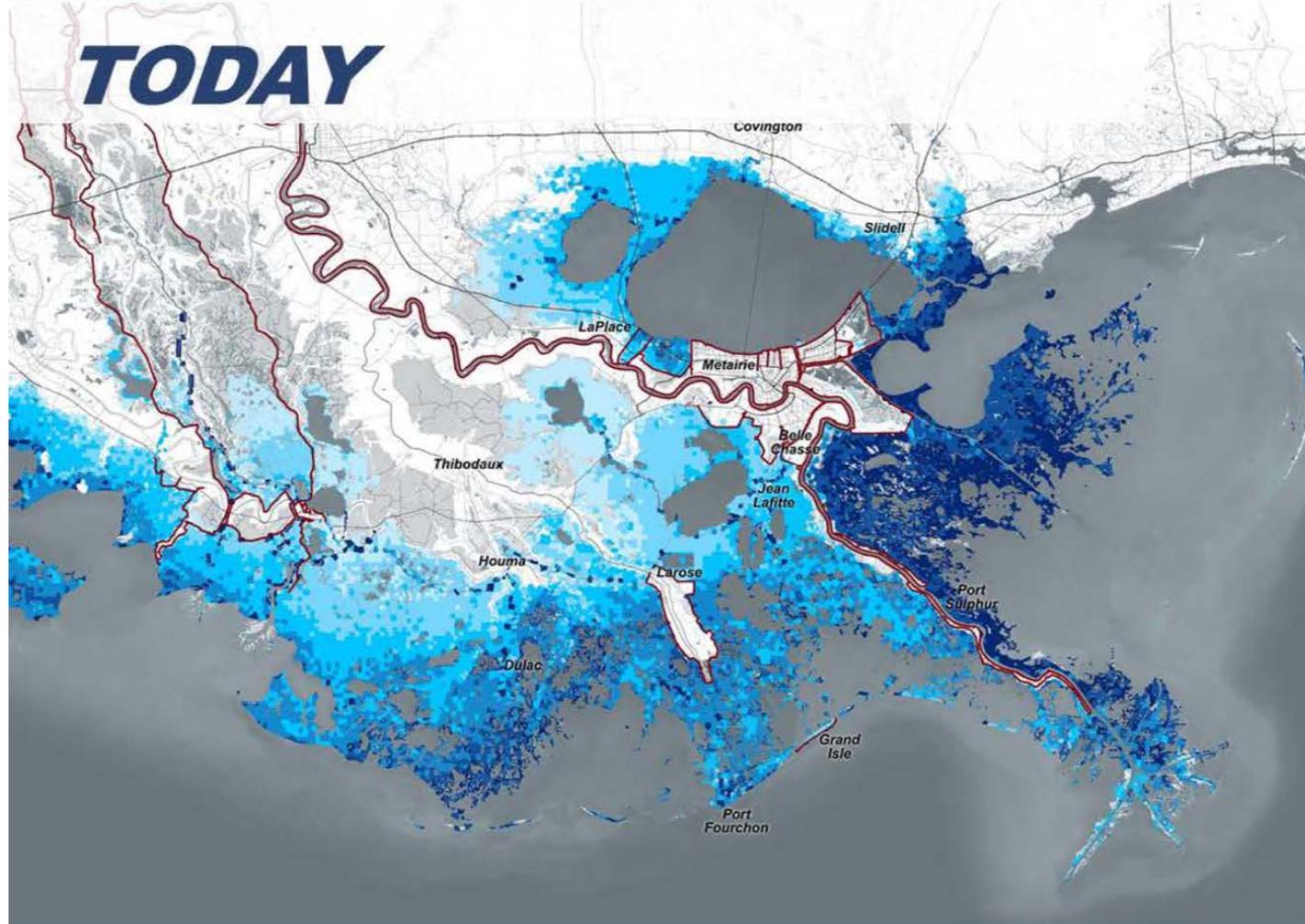
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**TODAY**



SOURCE: CPRA  
100 YEAR FLOOD DEPTHS  
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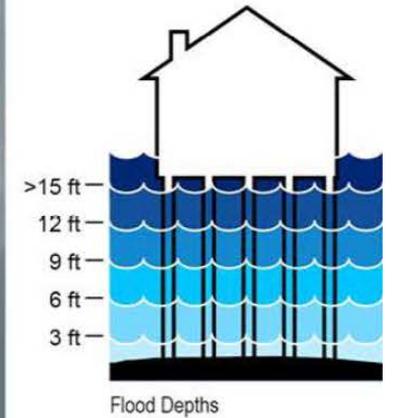
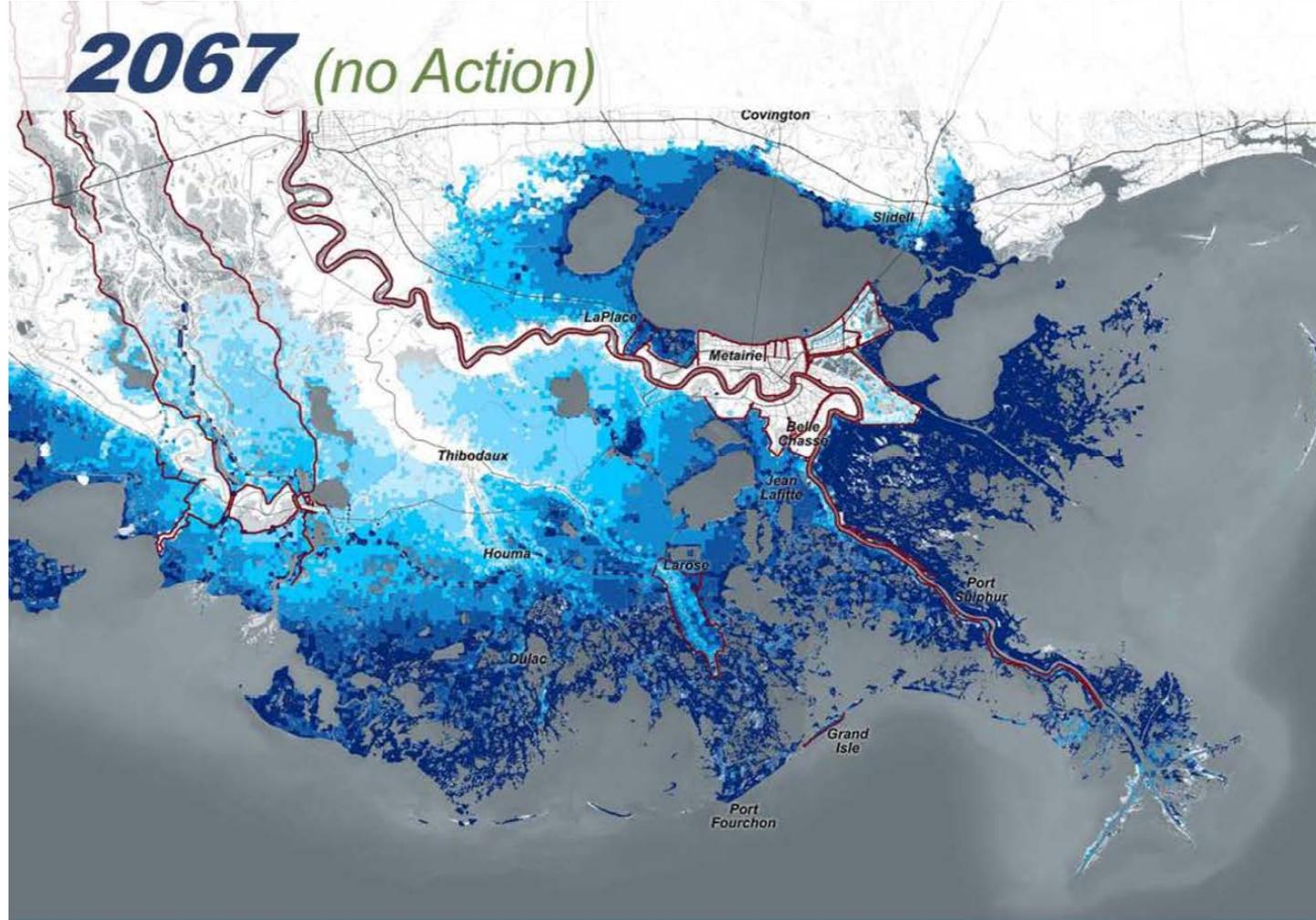
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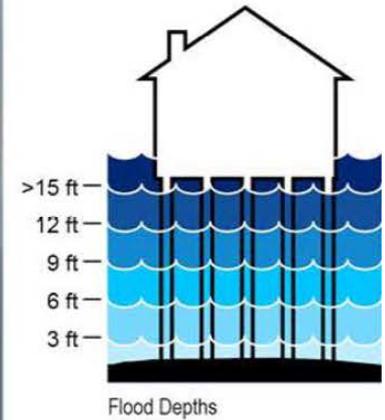
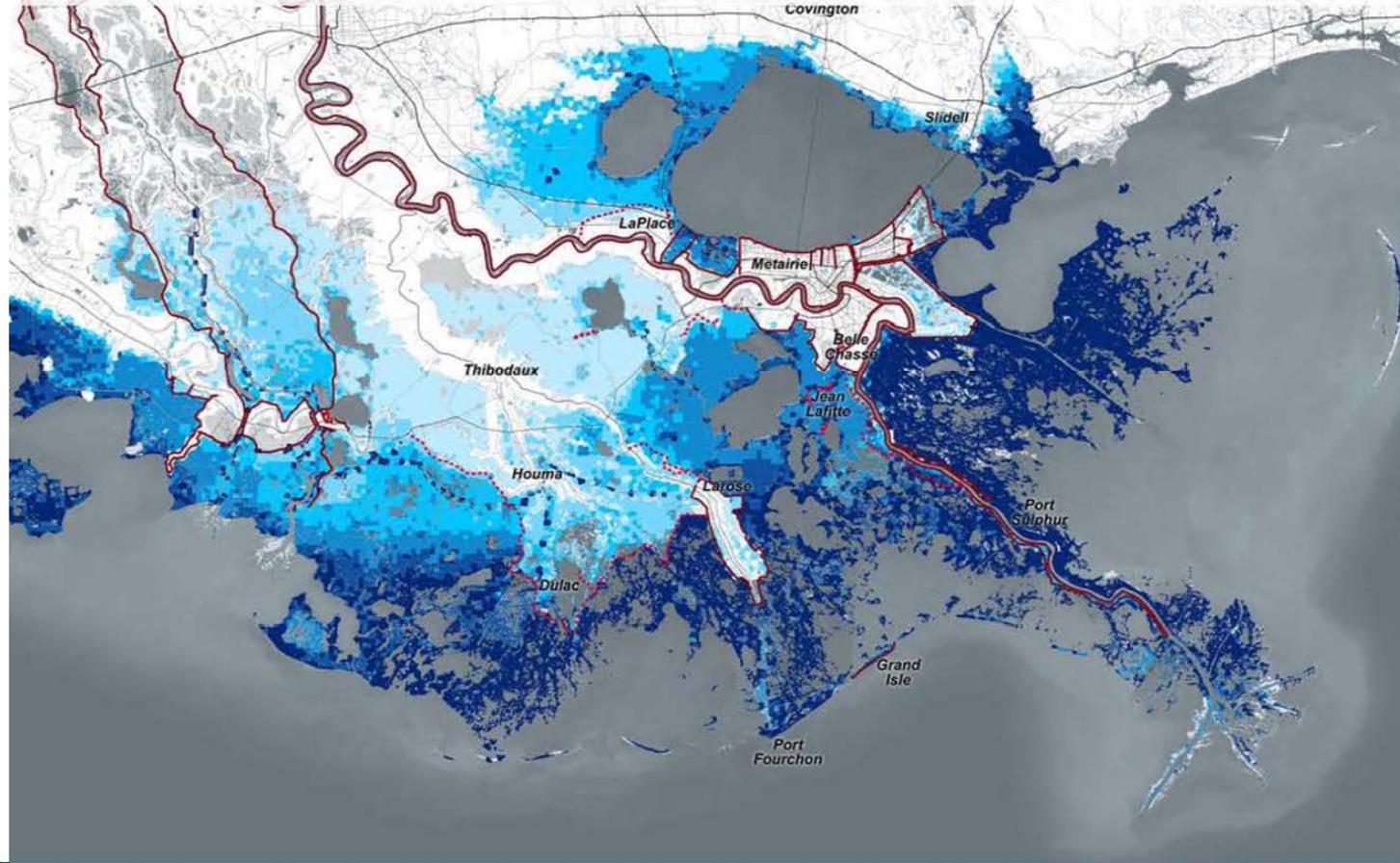
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**2067** (with Coastal Master Plan)



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The problem  
with models has  
direct bearing on  
Coastal Louisiana

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A car is seen stranded at a car park area as rising sea water hits Muara Baru fishing port during high tide in Jakarta, Indonesia, December 6, 2017. Credit: \ BEAWIHARTA/ REUTERS

## Risk of Coastal Flooding Badly Underestimated Because Models Forgot Sinking Cities

Land subsidence plus rising sea levels equals big problem for 2 billion people living on or near the coast, especially those in megacities such as San Francisco, Shanghai and Tokyo

By Ruth Schuster | Mar 07, 2018

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## Case in Point – Leeville LA; 1897 to 2004



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"FRANCOIS GUILBEAU -- Decedee 24 Janvier 1901 -- age de 99 ans."  
"Just one more name to add to the list of the forgotten corpses of  
Leeville." (NOLA.COM March 24, 2018)

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## The Isle De Jean Charles tribal relocation project

*“The world’s first  
climate change  
Refugees”*



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# Tribes Losing Ground to Rising Waters



NEW ORLEANS

HOUMA

Grand Caillou/Dulac

Pointe-au-Chien

Grand Bayou Village

Isle de Jean Charles

Bayou Lafourche

# RETREATING COAST, RETREATING POPULATION

The small community of Isle de Jean Charles used to be surrounded by marsh and coastal forest, but Louisiana's coastal land loss has left it increasingly exposed to the water. Concerns for community's future resulted in a January announcement of \$48 million from the U.S. Housing and Urban Development to the state for a first of its kind relocation of residents to a safer area.



Source: Terrebonne Levee and Conservation District, Google maps

Advocate graphic

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**From 22,000 acres.....to this...300 acre**

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### BARRY COMES ASHORE

## Coast Guard rescues people stranded on Isle de Jean Charles

Staff and wire reports

The Coast Guard says it rescued more than a dozen people stranded on a remote Louisiana island by flooding from Hurricane Barry.

Petty Officer Lexie Preston said some of the people were on rooftops Saturday on the Isle

de Jean Charles, about 45 miles south of New Orleans.

Preston told The Associated Press that four people and a cat have been taken from the island on a helicopter. She said a boat is also heading to the area to help get the rest of the people off the island.

Preston said she does not

know the condition of the people rescued.

Terrebonne Parish placed the island under a voluntary evacuation, and the only two-lane road to it was cut off by floodwaters.

The island is the home of the Isle de Jean Charles Band of Biloxi-Chitimacha-Choctaw

Tribe and is part of the southern Louisiana bayous threatened by rising sea levels. Since 1955, the island has lost approximately 98% of its land, the state said, and some estimates predict that it will be fully underwater in five to 25 years.

Hurricane Gustav damaged

approximately half of its 50 homes in 2008, and it took another wallop from Isaac in 2012. About 100 residents remain, spread among some three dozen homes.

The residents of the island have been called the nation's first climate refugees.

In January, the state closed

on an \$11.7 million purchase of a 515-acre tract of land near Thibodaux that will be the new home of the current Isle de Jean Charles residents.

The state has begun construction on the site, which is about 20 minutes from Houma by car and 40 miles from Isle de Jean Charles.

## AND THEN THERE'S THE STORMS



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## Using leverage:

### The NEPA Environmental Review Process for IDJC will consider:

Alternatives Analysis (alternative sites → resources → layouts)

8-Step floodplain evaluation (Outside Floodplain → mitigation)

Wetlands and floodplains resources and permitting

Section 106 cultural and historical resources and approvals

Sensitive species reviews and consultations

Impacts to local infrastructure and social services

Environmental justice concerns

Siting and consistency assessment

Toxics including contaminated lands

Air and water quality

Safety and other hazards

Traffic, noise, open spaces, aesthetics, infrastructure

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Future phases and dependencies – cumulative, direct and indirect consequences of this action

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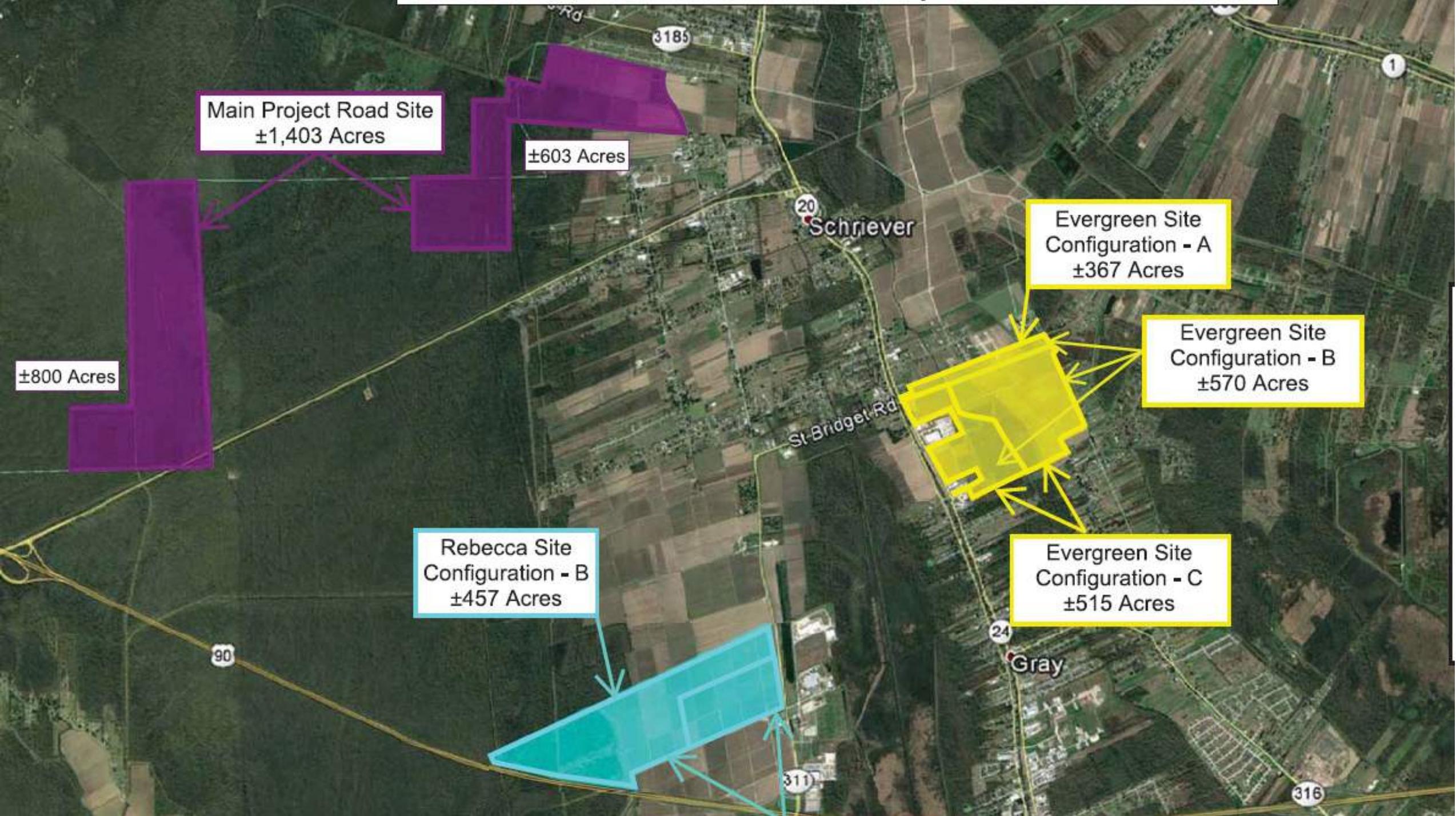
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## Resettlement alternatives analysis under NEPA

1. Initial screening factors established;
2. 20 sites → 9 sites → 3 sites;
3. Multiple workshops with the island residents on the potential sites;
4. Appraisals and Owner Contacts conducted;
5. Additional factors and weighting on potential sites;
6. No site perfect, out of floodplain or other hazards;
7. Additional Meetings with residents on final site selection.



Main Project Road Site  
±1,403 Acres

±603 Acres

±800 Acres

Rebecca Site  
Configuration - B  
±457 Acres

Evergreen Site  
Configuration - A  
±367 Acres

Evergreen Site  
Configuration - B  
±570 Acres

Evergreen Site  
Configuration - C  
±515 Acres

20  
Schriever

St. Bridget Rd

24  
Gray

311

316

90

3185

1

# HAZARD MITIGATION NO. 1

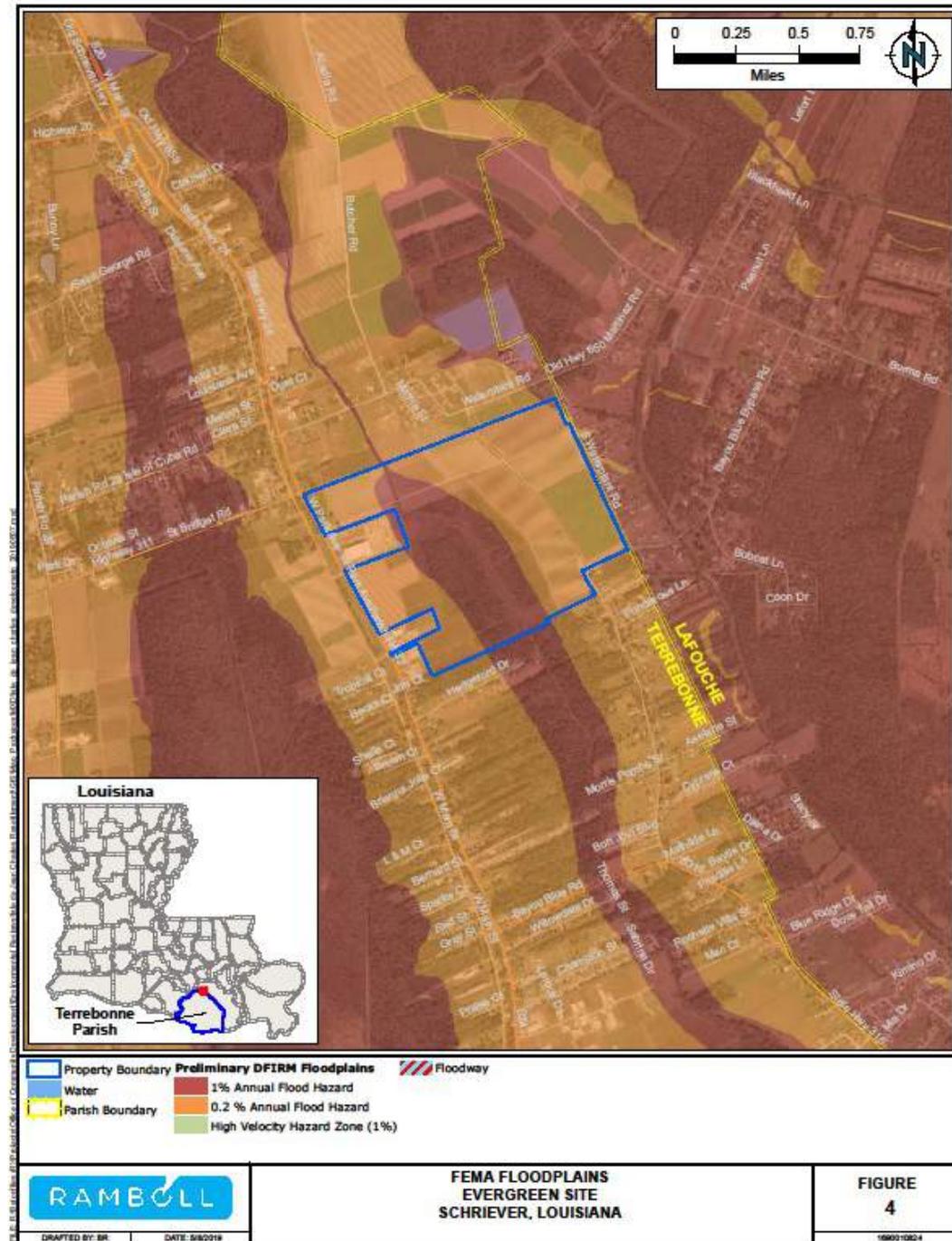
## FLOODPLAINS

HEC-1 Model with UNET model used for existing conditions.

**Solution:** Added weirs, overflow channels, deepening of bayous, bio-swales and pond - modeled until the two bayou flood elevations showed no increase.

*"The results show that 4% AEP flood elevations do not increase as a result of the development."*

Dec 2018 Drainage Study Report, FTN Associates



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## Floodplain mitigation turned into an asset



Isle De Jean Charles  
Resettlement  
ON INFRASTRUCTURE  
RE-ANCHORING

**DRAFT PRINT**  
FOR REVIEW ONLY  
10/10/2018

PRELIMINARY PLAN ONLY  
NOT TO BE USED  
FOR CONSTRUCTION, BIDDING,  
PERMITTING, CONTRACTING,  
SALES, OR AS A BASIS FOR  
THE ISSUANCE OF A PERMIT.

No.	Date	Description

Sheet Title: Perspective Rendering

Scale: 1/8" = 1'-0"  
Project Name: ISLE DE JEAN CHARLES  
Client: USACE  
Created By: [Name]

CS.5

WETLANDS DETERMINATION MAP - ±87 ACRES

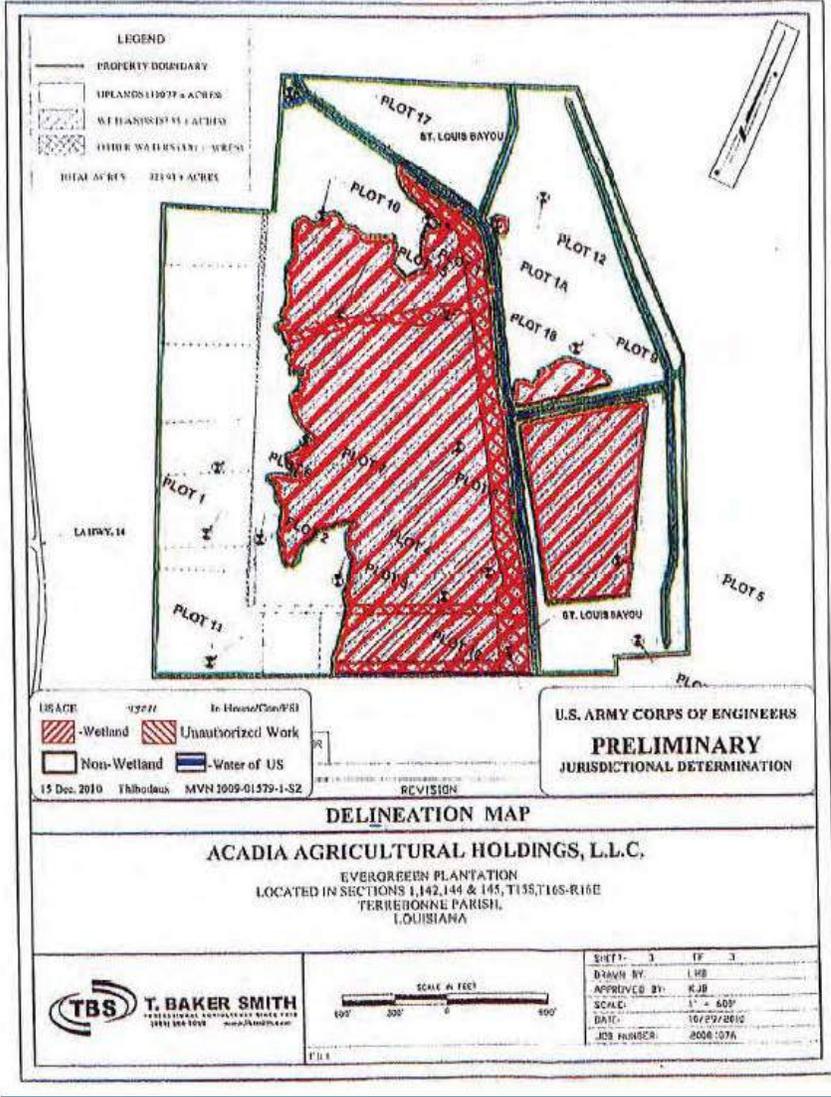
# HAZARD MITIGATION ISSUE NO. 2

## WETLANDS

Wetland Delineation and USACE Jurisdictional Determination that most of the 515 acres are wetlands and would require mitigation if developed. (Cost prohibitive)

Current Owner under Consent Order to restore illegally filled wetlands. Monitoring plan not completed per Corps. (Liabilities would transfer to new Owner; high risk).

**Solution: Hazard avoided, turned into a trail system.  
Owner notified they must achieve closure of issue with Corps prior to sale (completed)**



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## WETLAND Trail System



Client:



Project:

Isle De Jean Charles  
Resettlement  
35% INFRASTRUCTURE  
65% ARCHITECTURAL

**DRAFT PRINT**  
FOR REVIEW ONLY  
12/27/18

Professional of Record:

**PRELIMINARY PLAN ONLY**  
NOT TO BE USED  
FOR CONSTRUCTION, PERMITS,  
RECORDING, COMPANIES,  
SUA FE, OR AS A BASIS FOR  
THE ISSUANCE OF A PERMIT.

Reference:

No.	Date	Description

App Title:

See Owner information: 04/16/18

See Update Date: November 8, 2018

This Drawing is Approved For Construction:

This Drawing is Not Approved For Construction:

Sheet Title:

Perspective Rendering

Scale: 1/8" = 1'-0"

Project Number: 21185-11-00

Client: GE

Contract No.:

Sheet Number:

CS.9

## Hazard Mitigation Issue #3

# Non-native cultural and archaeological relics



Currently  
proposed  
entrance to the  
village

Possible slave grave  
site(s)

? Costs for Phase II/III  
Archaeological Surveys vs  
avoidance ?

Solution: Buffer agreement  
with SHPO Division of  
Archaeology

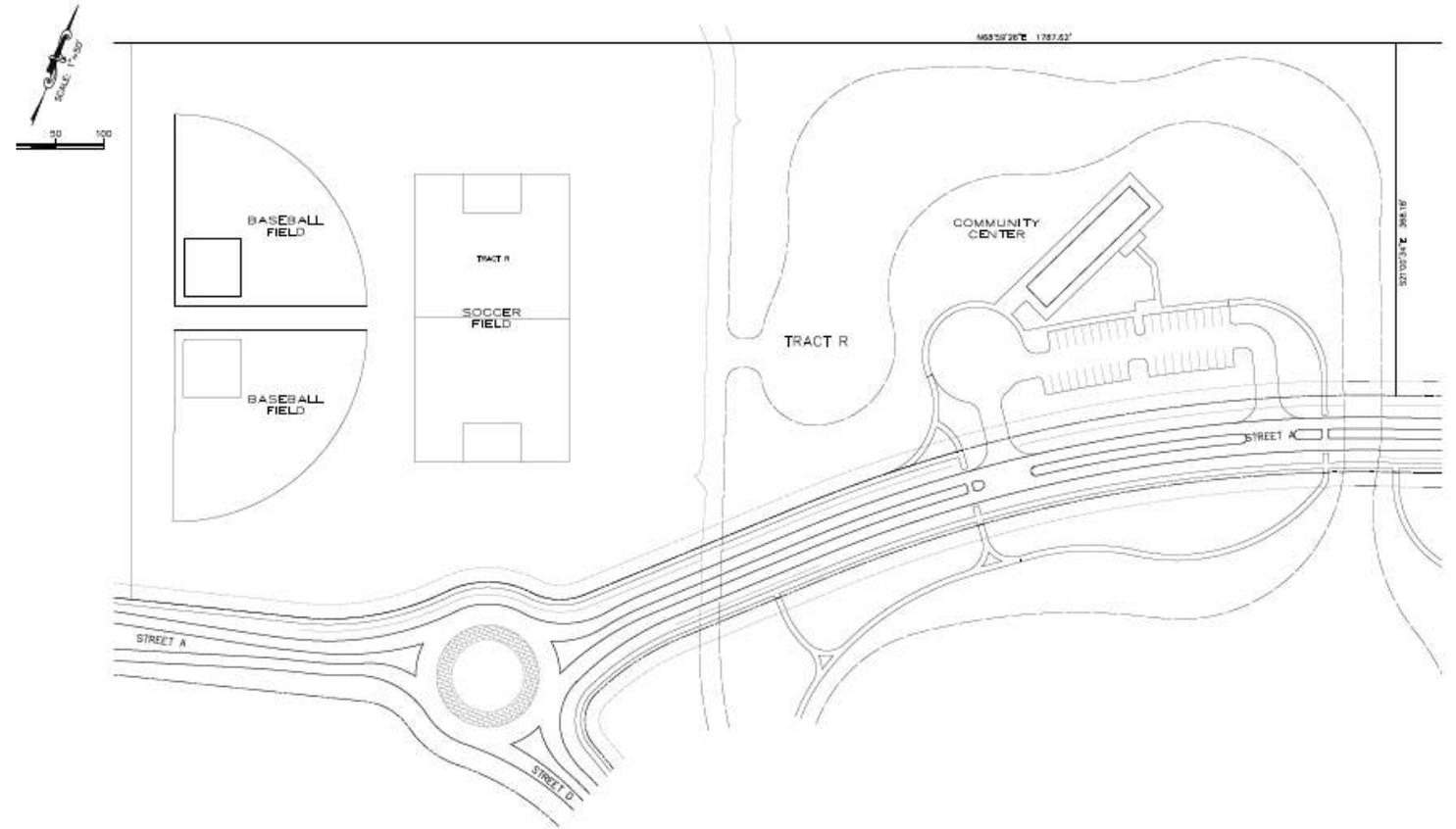
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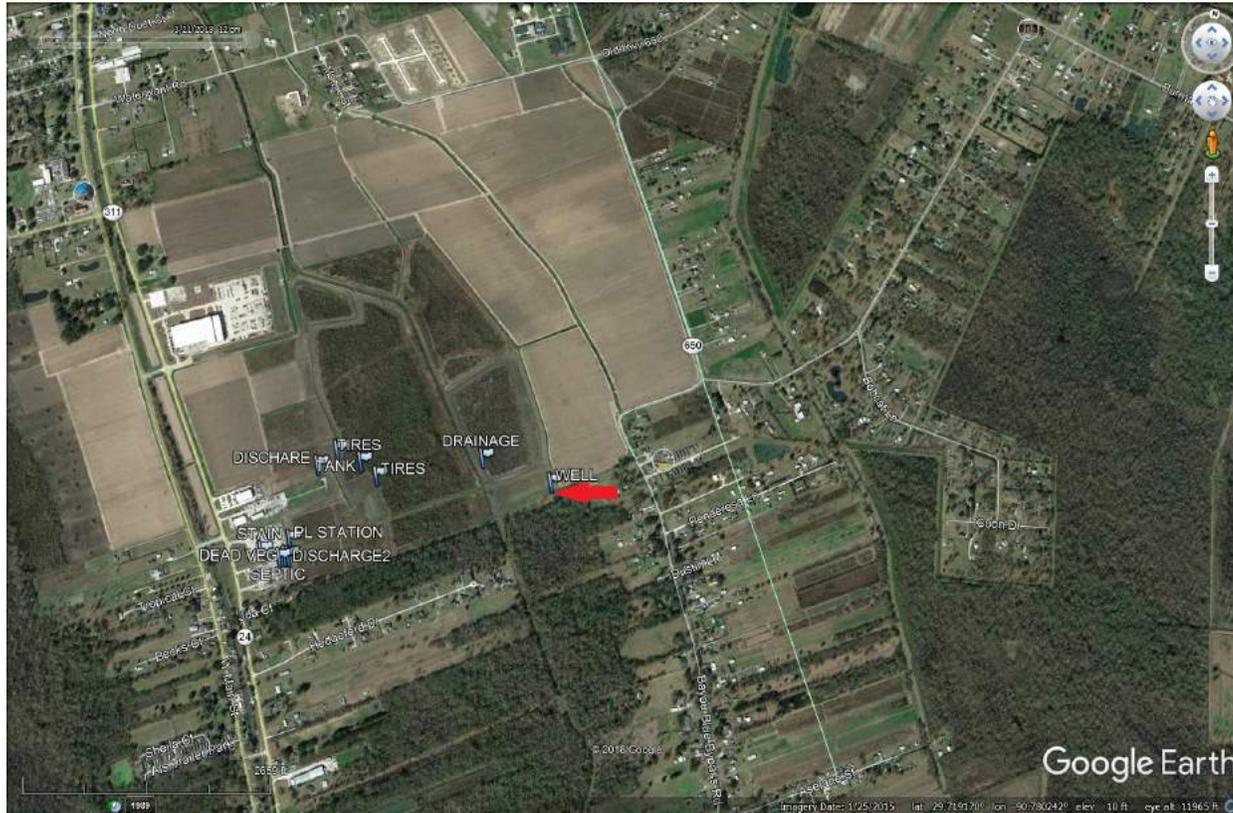
## Solution

Community tribal center  
and recreational areas  
built around  
archaeological areas with  
buffer zone, plaques



# HAZARD MITIGATION ISSUE # 4

## CONTAMINATION SIGNS FOLLOWING PHASE I ESA

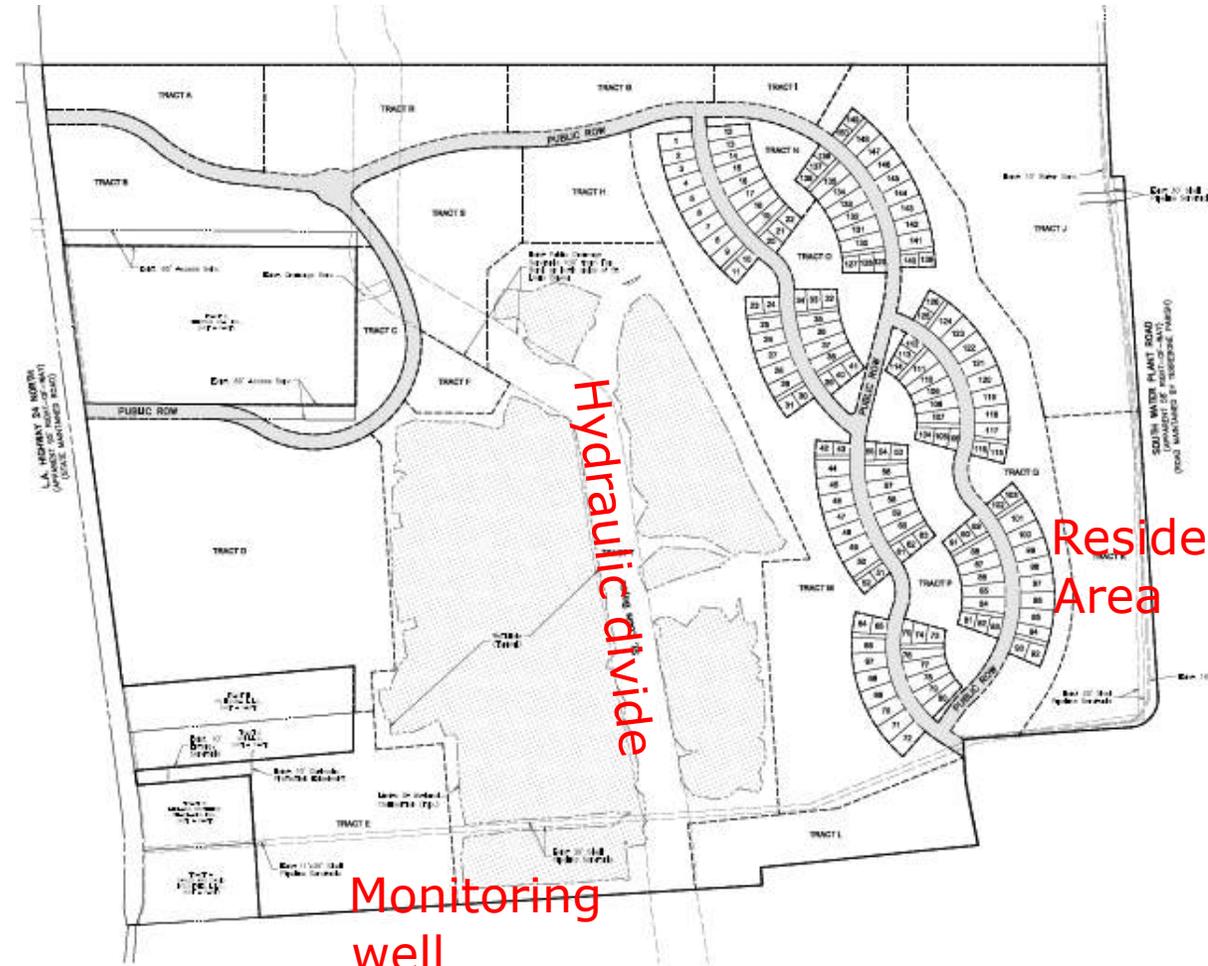


**Solution: Residential area upgradient and hydraulically separated from potential migration**

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- **Hazard mitigation issue #5 – Indirect and Direct effects**

- What happens to the Ancient homelands? Burials? Fishing and access rights?



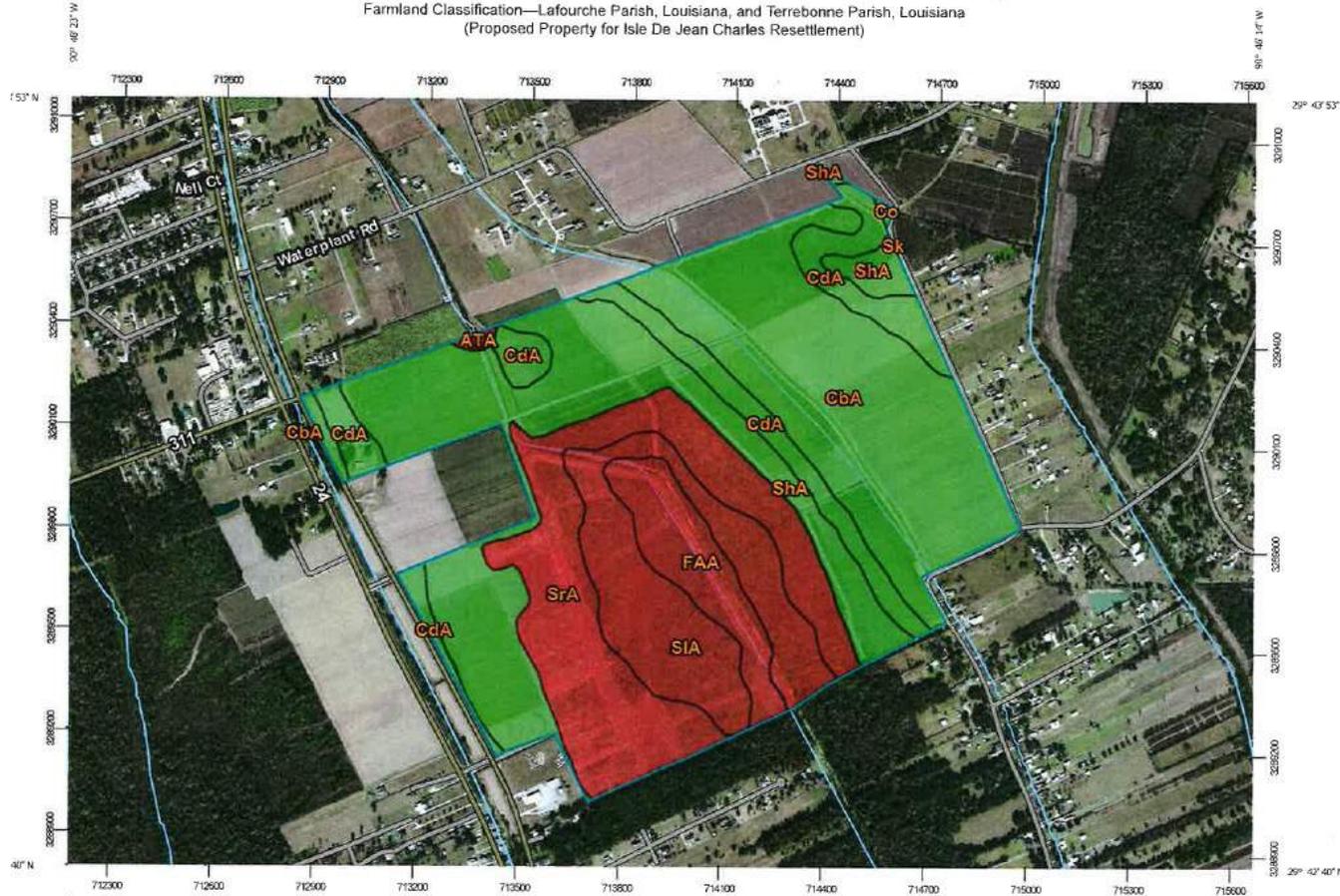
Solution: Residents can reach island via bayous on new site; moratorium on using funds for rebuilding on island but residents allowed to use land.

Issue: Is it fair this doesn't apply to non-participants?

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- Hazard mitigation issue #6
- CONVERSION OF PRIME FARMLANDS (in green)

Solution: NRCS  
Farmland  
Conversion  
Rating Score was  
below  
significance  
level. Approval  
executed.



## Hazard Mitigation Issue #7 Environmental Justice



**Solution:** An overall improvement on both economic opportunities and social services versus existing remote island conditions; tribe members can travel via waterway to ancestral lands. If residents stay 5 years, mortgage is forgiven.



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## Hazard Mitigation Issue #8 Visual Cohesion

Solution: Architecture,  
layout, gathering centers  
and styles designed for  
community cohesion.



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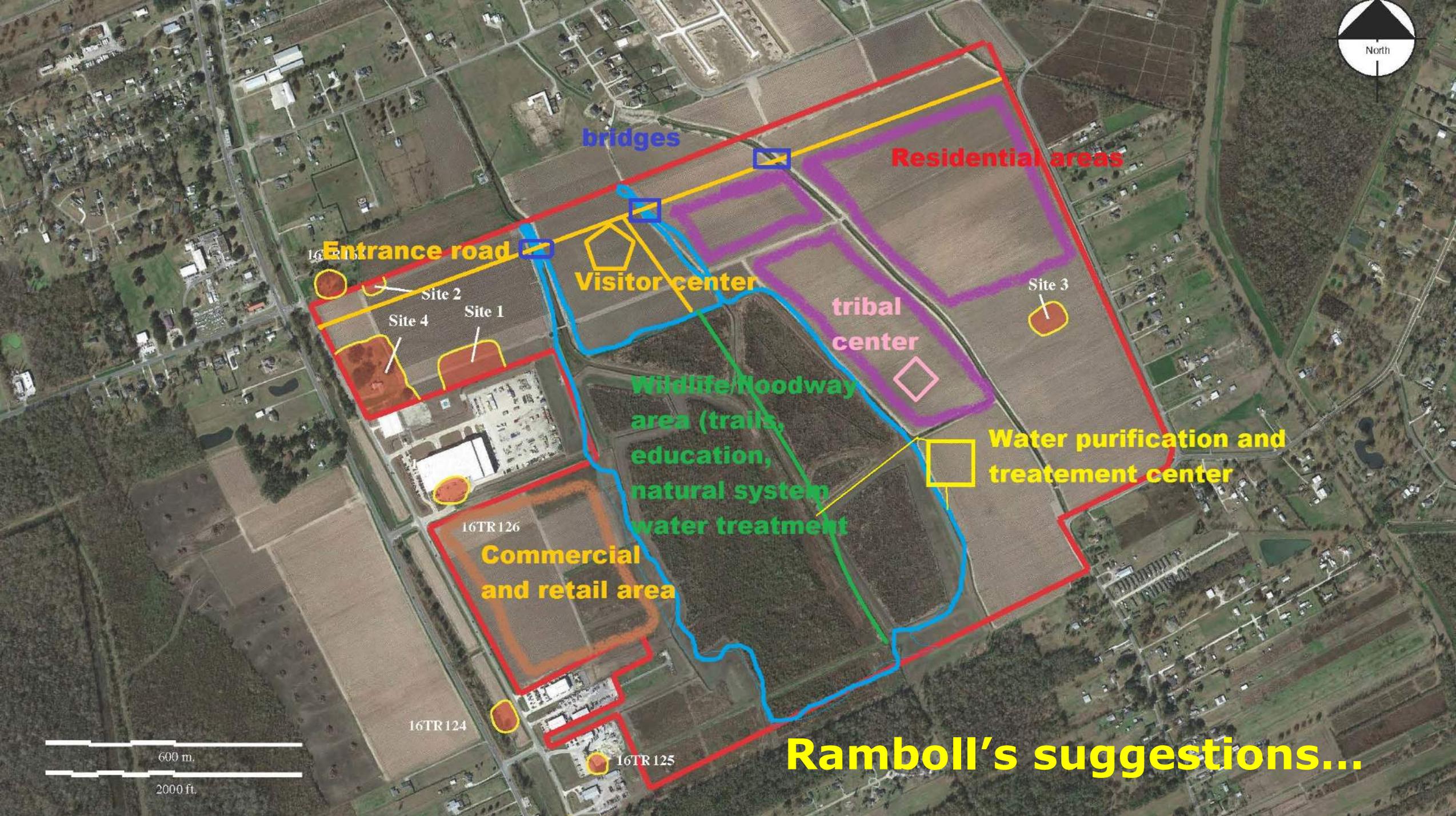
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## Open spaces as connectors?



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bridges

Residential areas

Entrance road

Visitor center

tribal center

Site 3

Site 2

Site 4

Site 1

Wildlife/hoodway area (trails, education, natural system, water treatment)

Water purification and treatment center

Commercial and retail area

16TR 126

16TR 124

16TR 125

Ramboll's suggestions...

600 m.

2000 ft.

## INITIAL LAYOUT

- AVOIDS WETLANDS AND MINIMIZES IMPACTS AT WATER CROSSINGS
- AVOIDS ARCHAEOLOGICAL AREAS AND ADVERSE EFFECT ON ST. BRIDGET'S C CHURCH
- AVOIDS STRUCTURES IN 100-YR FLOODPLAIN
- AVOIDS SOUTHERN BOUNDARY (PIPELINE AND M WELL)
- MAINTAINS CONSISTENCY WITH LA 24 LAND USE
- ADDS TRAILS AND GREEN SPACES TO COMMUNITY
- CONVERTS PRIME FARMLANDS



# 35% DESIGN LAYOUT

- REALIGNMENT OF DRAINAGES, POND TO REDUCE FLOODING
- ADDS SOLAR ARRAY
- MOVES RV PARK OUT OF PIPELINE HAZARD
- ADDRESSES HIGHWAY SAFETY (ENTRANCE) CONCERNS
- INCORPORATES TRIBAL CONCERNS



P:\317082\310 - Engineering\03\31 - General\01\03\31.dwg Dec 02, 2016 - 6:36am

Client:



Title:

**Isle De Jean Charles Resettlement**  
 20% INFRASTRUCTURE  
 15% ARCHITECTURAL

**DRAFT PRINT FOR REVIEW ONLY**  
 12/27/2018

Professional of Record:

PRELIMINARY PLAN ONLY  
 NOT TO BE USED  
 FOR CONSTRUCTION, RECORD,  
 RECONSTRUCTION, CONVEYANCE,  
 SALES, OR AS A BASIS FOR  
 THE ISSUANCE OF A PERMIT.

Revisions:

No.	Date	Description

Map No.:

Site Details Information: SHEET 1  
 Date/Issue Date: November 8, 2018  
 This Drawing is Approved for Construction:   
 This Drawing is Not Approved for Construction:

Issue Title:

**Illustrative Site Plan**

Date: November 2018  
 Project Number: 217082.11.020  
 Drawn By: \_\_\_\_\_  
 Checked By: \_\_\_\_\_

Sheet Number:

**CS.3**



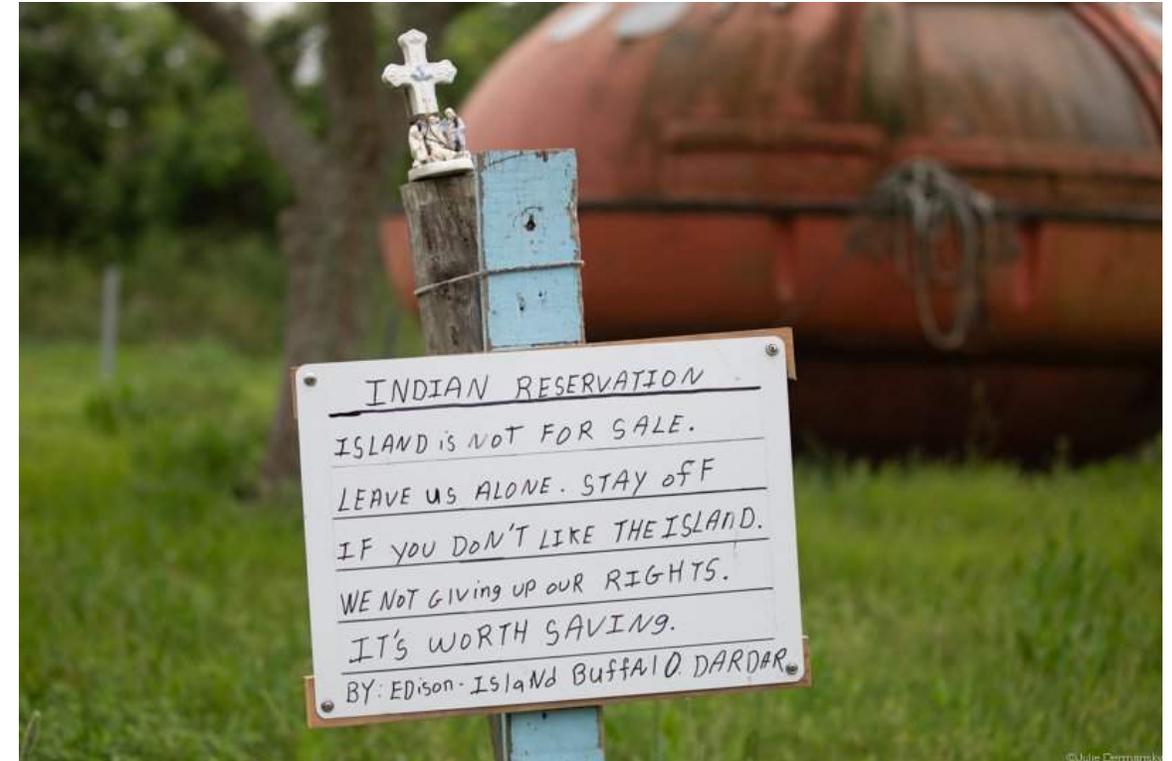
# ? What is a community? And what are we losing?

On a sinking Louisiana island,  
many aren't ready to leave

By Jenny Jarvie  
APR 23, 2019 | 5:00 AM  
| ISLE DE JEAN CHARLES, LA.



Edison Dardar has spent his whole life on Isle de Jean Charles, La., where he fishes daily: "I don't think the island's going nowhere." (Carolyn Cole / Los Angeles Times)



14<sup>th</sup>  
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## The Human Element

*"I'm not afraid to live here by myself... I ain't planning to go nowhere because I don't think the island's going nowhere." (resident)*

*"The state stole our plan to get the money and now they are running off with it. It wasn't for the white folks. We were supposed to have a tribal community...Now anybody can go...it's going to a Section 8 subdivision." (Chief)*

*"The State has no respect for our culture. You can't separate the Tribe from the island or the island from the Tribe." (Tribal Secretary)*

*"We don't know how to move people with deep roots. I mean that's the emotional, spiritual, social, and cultural level." (Tribal Secretary)*

*"We don't want anyone using the name Isle de Jean Charles..." (Chief)*

*"...it (the name of the Tribe) has been hijacked" (Chief of a brother tribe branch)*

*"We have been dealing with broken promises for hundreds of years – this is just one more promise." (Houma tribal Chief)*

*"Wow, a modern day Trail of Tears." (Chief)*

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# The following sustainability concepts are urgent

- **What is the time-frame upon which decisions are made for resiliency?**
  - Immediate? 5 years? 50 years? A 100-yr event or a 500-yr event?
  - What kinds of events are we missing? Focus here has been on flooding, but....
- **Are the effects of coastal change truly being considered and planned for? Such as...**
  - Sea level changes: if right, even a 3' rise/fall will have drastic coastal impacts.
  - Cloudbursts and flooding: How do we design for moving massive inundations of stormwater?
  - Water Supply and Saltwater Intrusion Issues: How do we stabilize these trends?
- **How do we evaluate costs versus value for the investment on these time frames?**
  - Monetized Added Value concepts being used internationally.
  - How do we decide which US coastal communities to invest and save vs others?
  - “Unit Prices” can be developed on national, regional and even state scales for decisions.
  - Better interconnection between agencies with overlapping missions is needed.
- **How do we balance the Human element into our decisions?**

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# Thank you

## **For more information:**

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