



PORT HOUSTON
THE INTERNATIONAL PORT OF TEXAS™

Port Houston: Looking Ahead

Rich Byrnes | Chief Infrastructure Officer | Port Houston

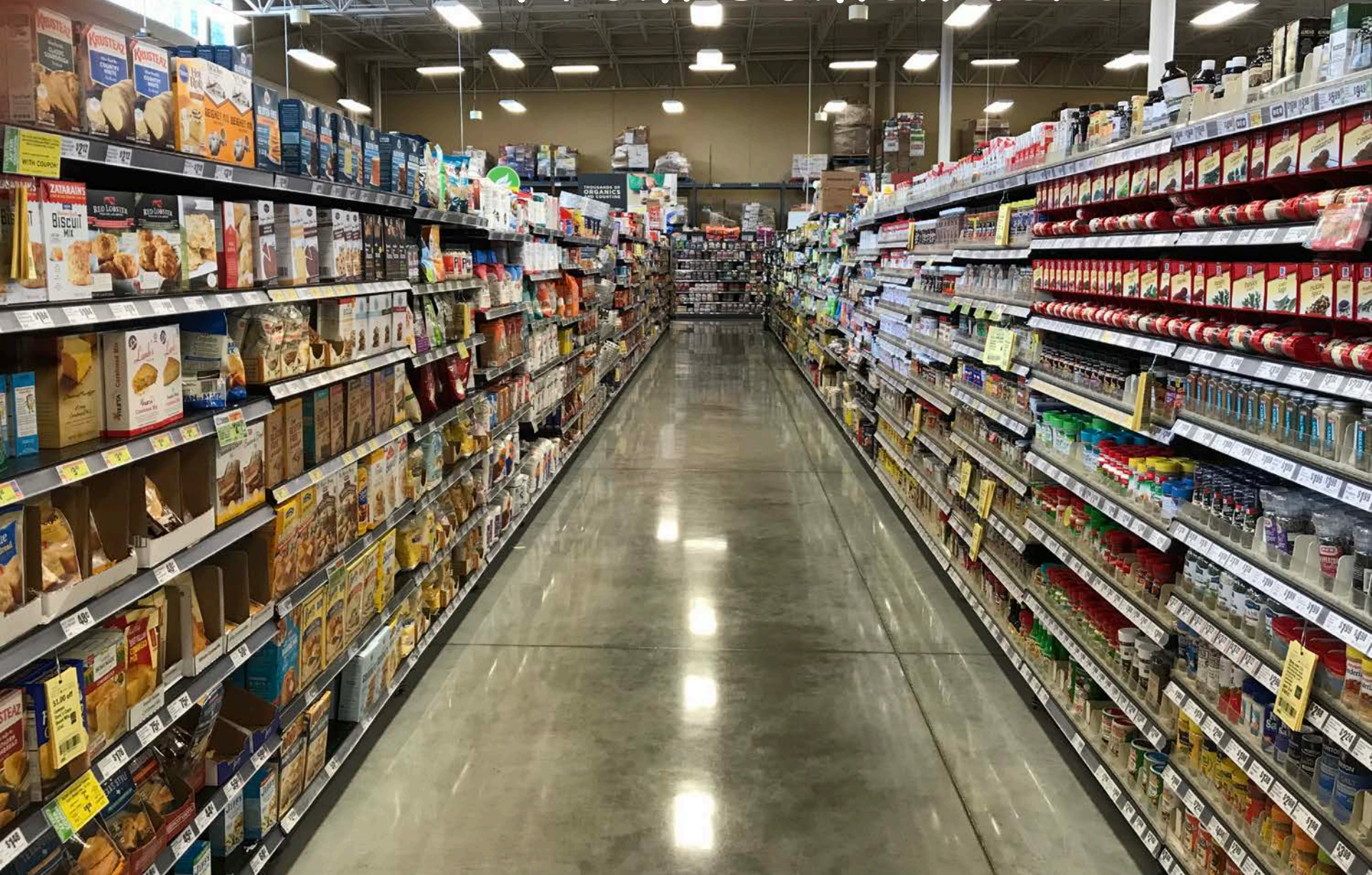
May 21, 2018



Family Dinner



Family Dinner...Food Comes From Somewhere



Family Dinner - The Food Takes Work



Lots of Work Behind the Scenes



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Our City



Economic Activity



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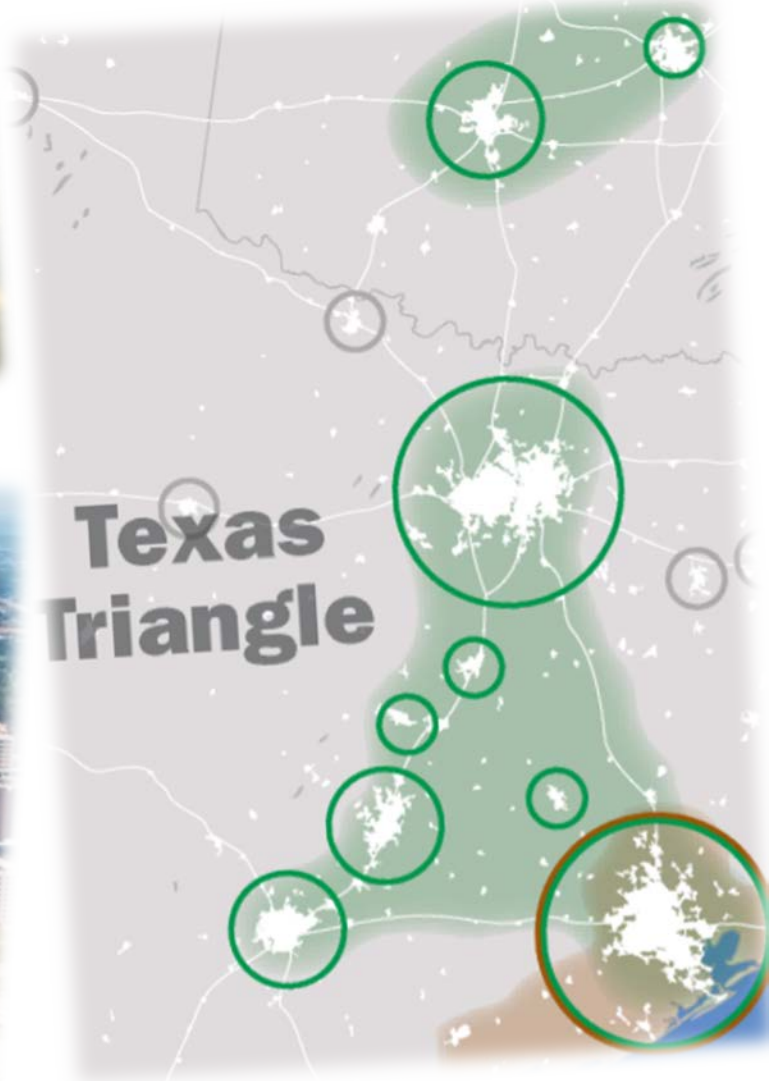


Energy Corridor...

Med Center...



Texas
Triangle



Port Houston... Behind the Scenes



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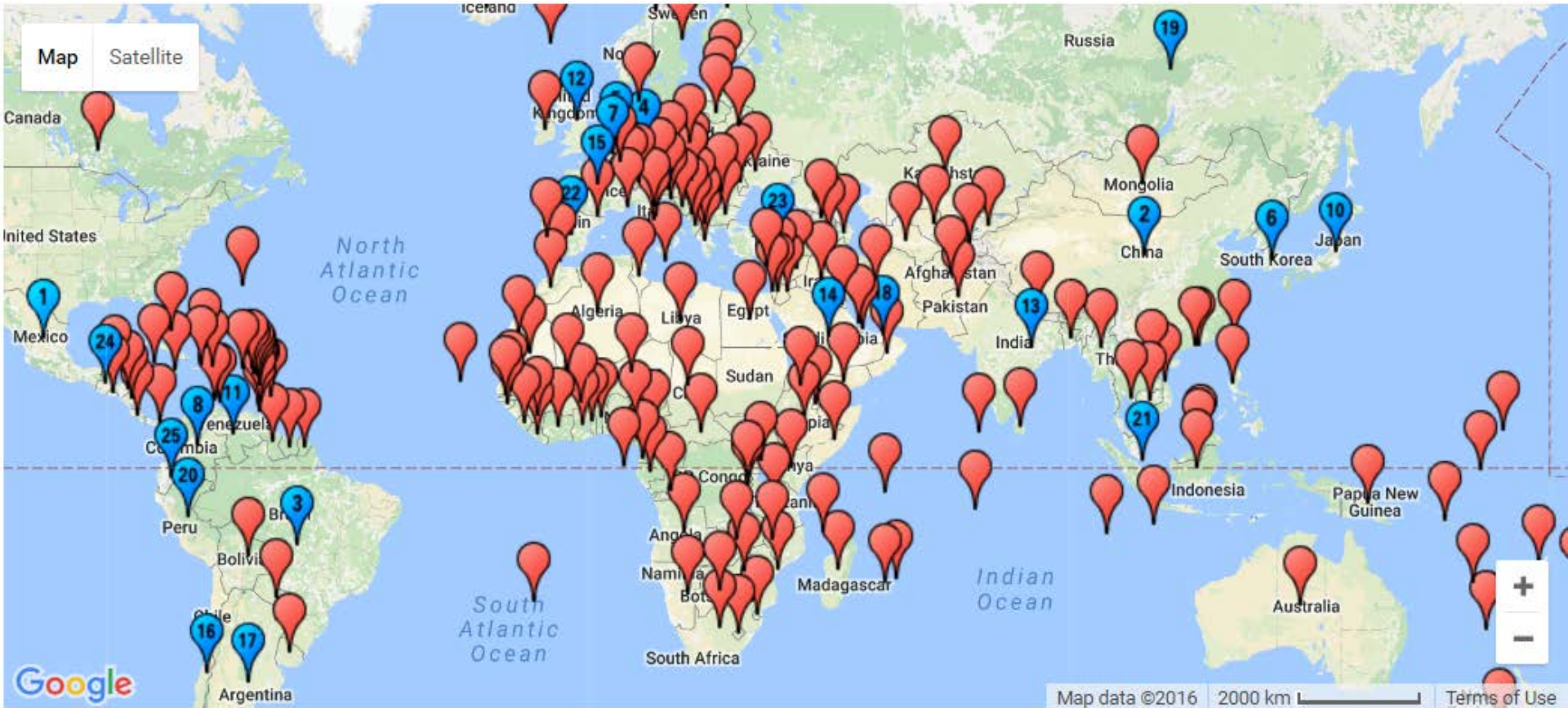


Port as a...Gateway



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Port of Houston's Global Reach



US Bureau of Census, ustradenumbers.com

PHA Trade Partners

- Top 25
- Others

Port as a...Facility for Cargo



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Port as a...Transportation Hub



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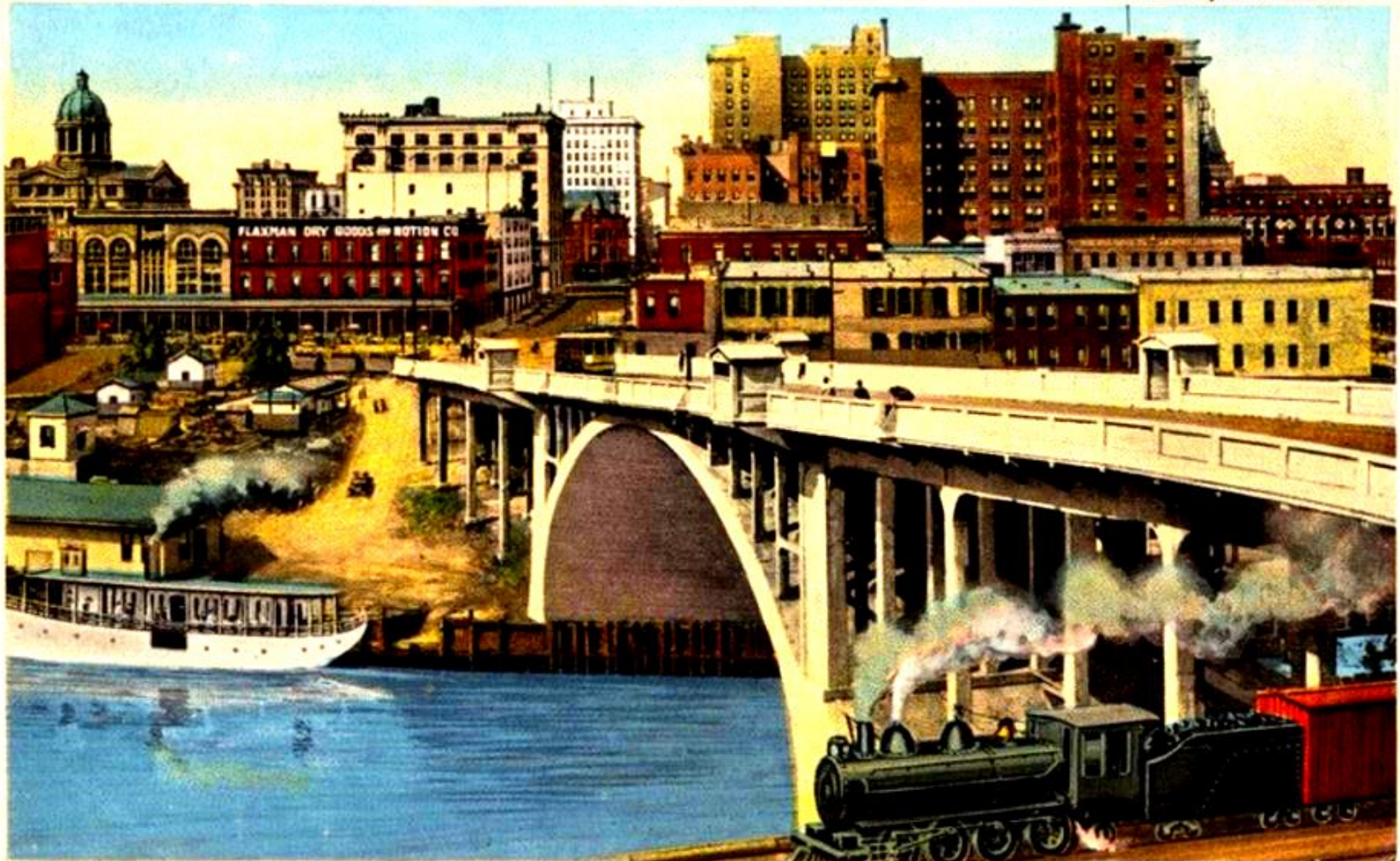


Port as a...Heart of a City



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Photo by Geo. Beach.



MAIN STREET VIADUCT AND SHIP CHANNEL, HOUSTON, TEXAS.

Port as... Economic Engine



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	U.S.	TEXAS
ECONOMIC ACTIVITY	\$618 Billion	\$265 Billion
JOBS	2.7 Million	1.2 Million
TAX REVENUE	\$35 Billion	\$5 Billion
PERSONAL INCOME	\$126 Billion	\$67 Billion



MAIN STREET VIADUCT AND SHIP CHANNEL, HOUSTON, TEXAS.

International Port and Community Asset



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Port Houston Video (removed due to file size)



1899



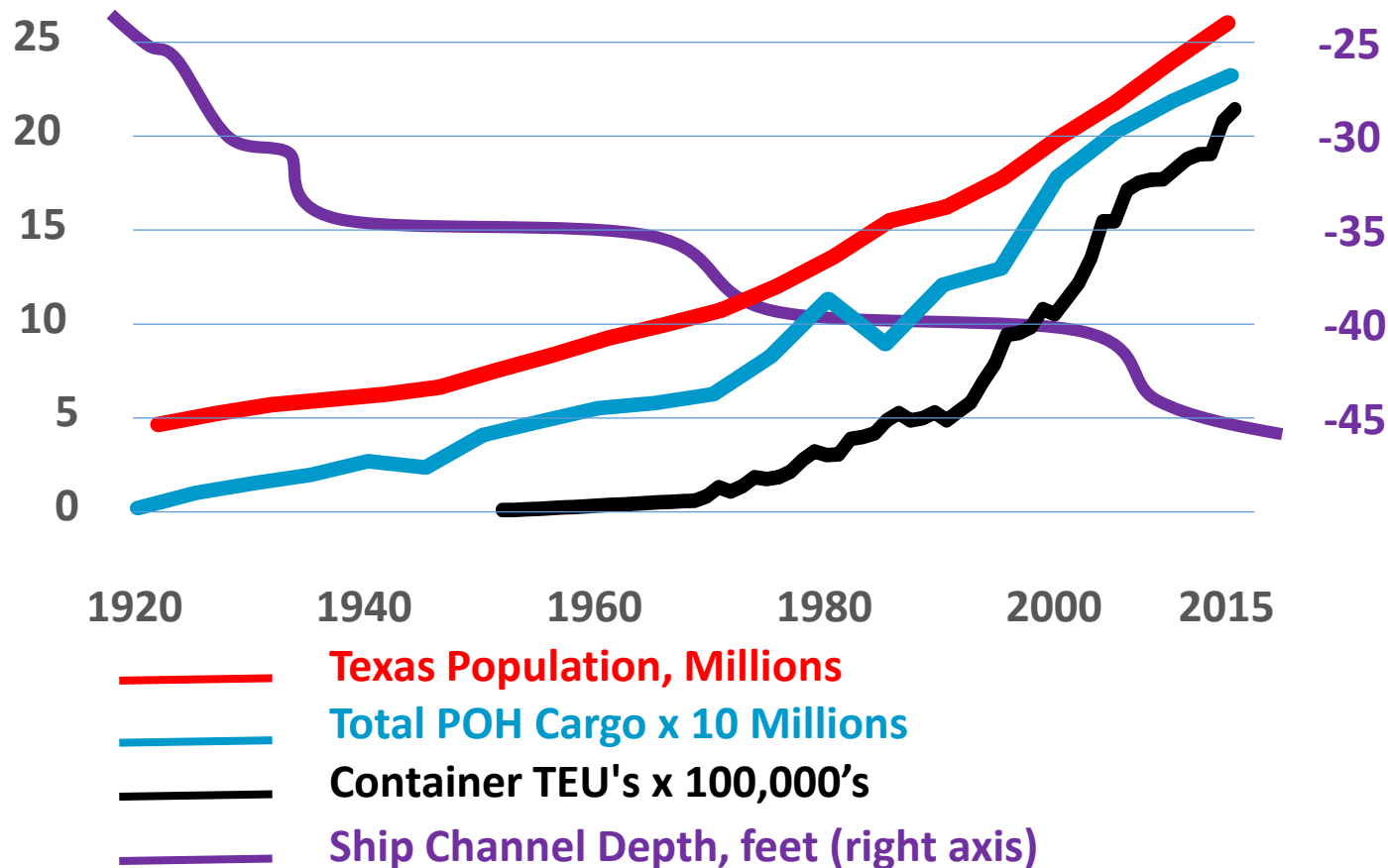
Largest Cargo.

This is a scene on Buffalo Bayou. The barge was loaded October 30, 1899, from Houston Converting Plant, with 5,300 Lowery bales of cotton, weighing 1,285,861 pounds. Loaded on Steamship Catania, in Bolliver Roads, for Boston, and not touching Galveston wharves. Capacity of barge, 650 tons.

This is the largest cargo of cotton ever loaded on Buffalo Bayou. See steamship, page 11.



Port Houston's Success: Growth supported by Innovation



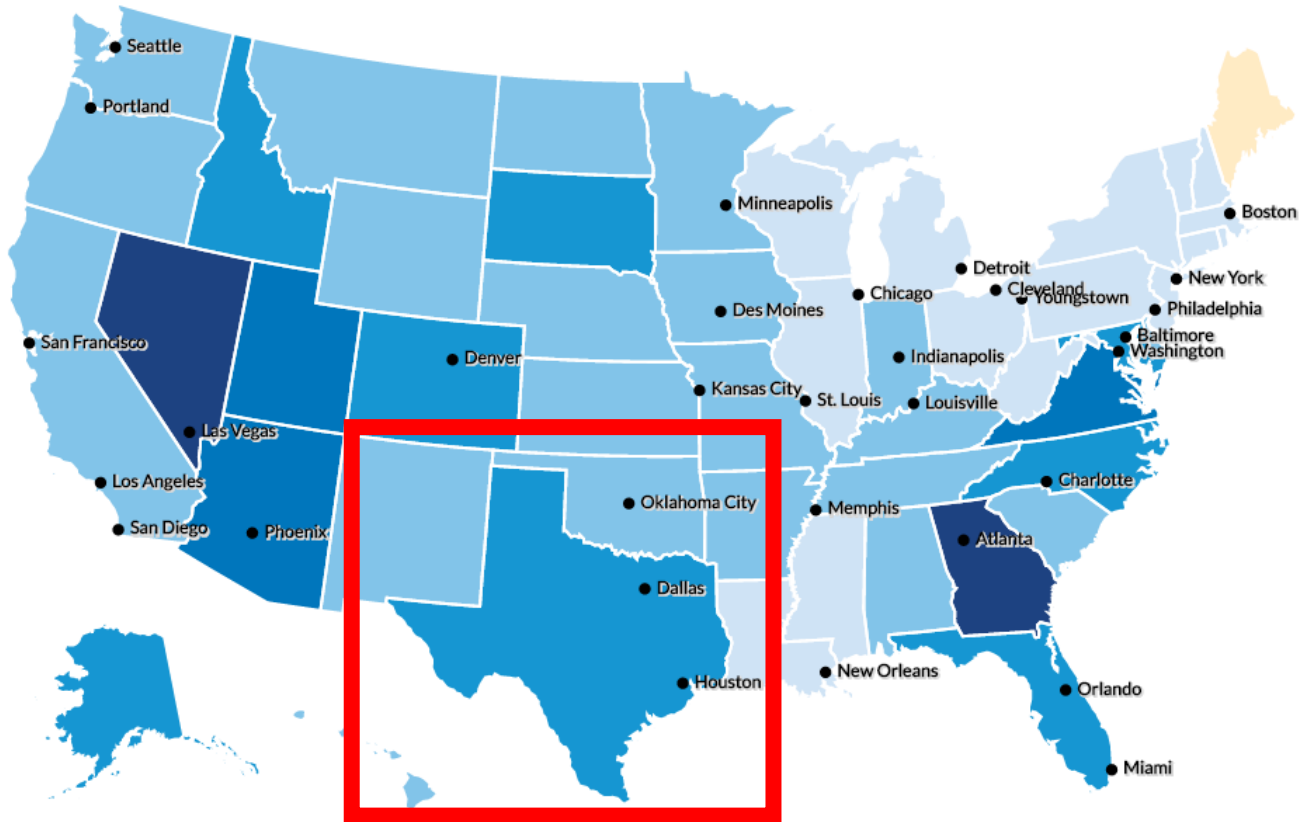
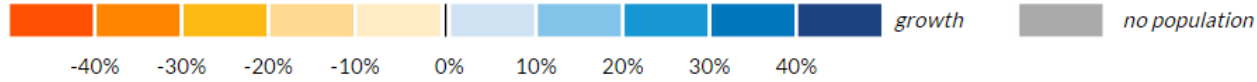
2018



Population Driving Imports



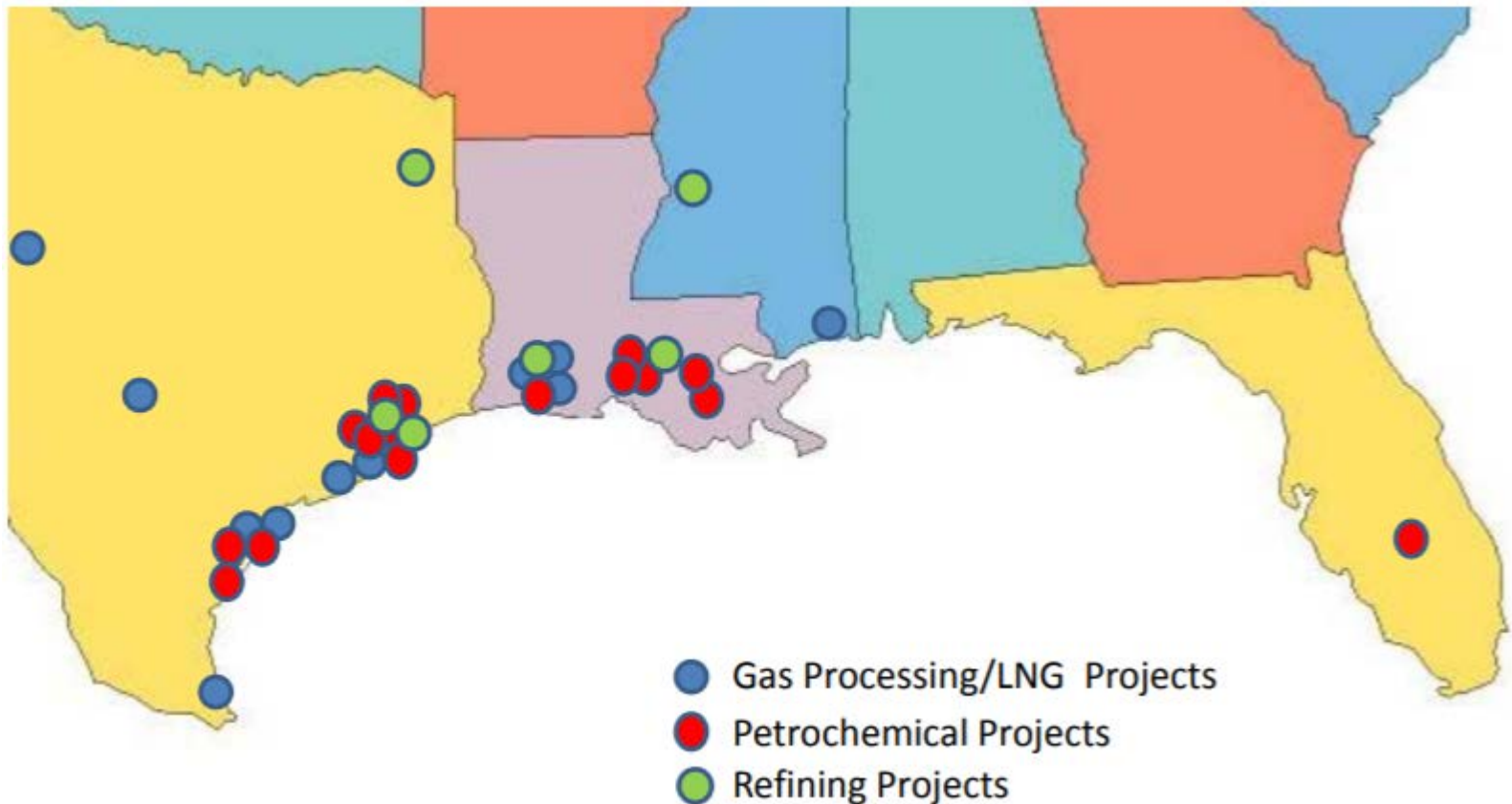
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Map Source: Urban Institute Mapping America's Futures

Manufacturing Driving Exports

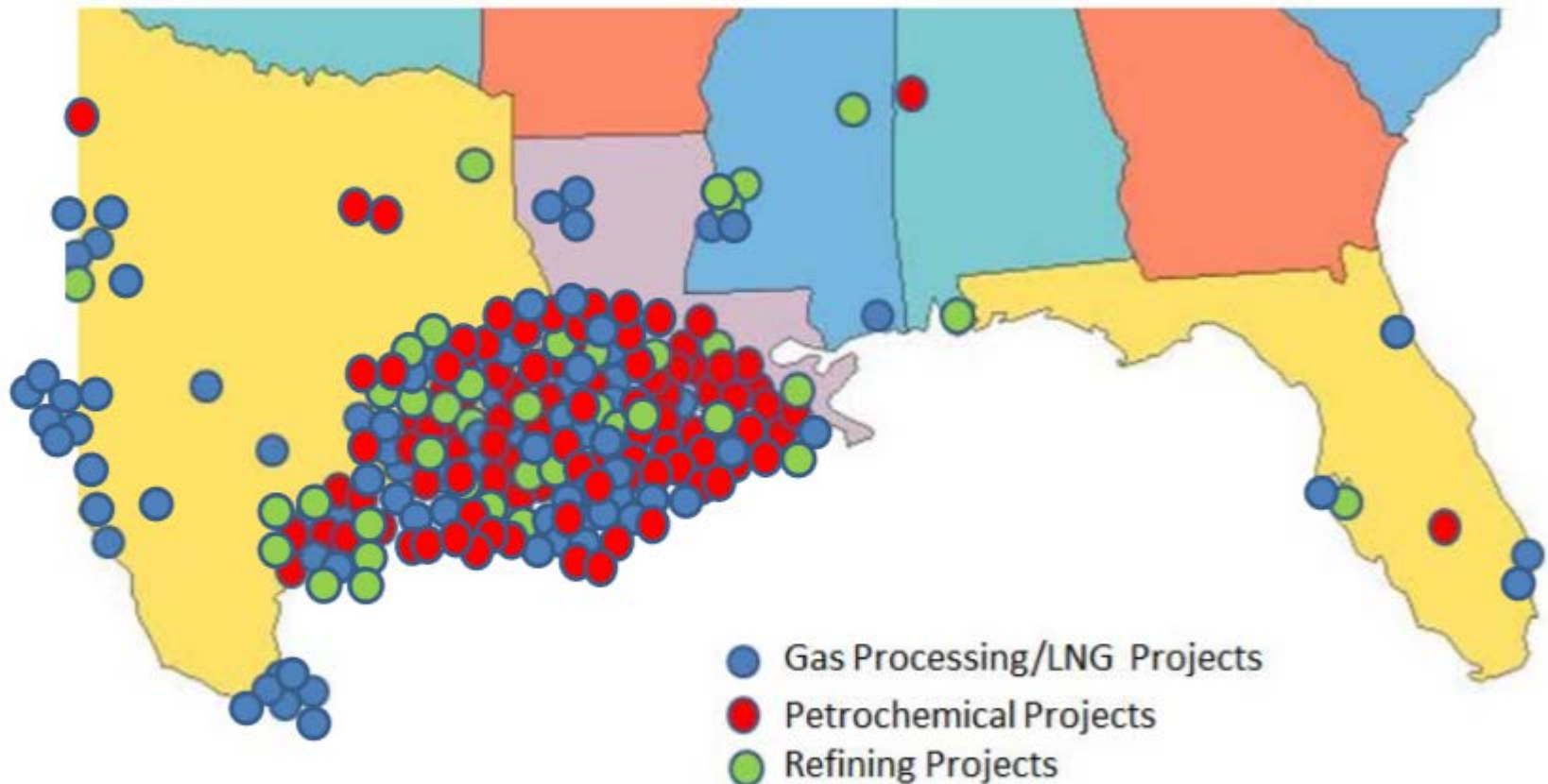
New Petrochemical Project Announcements – USGC 2012



Source: Lee Nichols, Hydrocarbon Processing Magazine, Energy Construction Form 3/16

Manufacturing Driving Exports

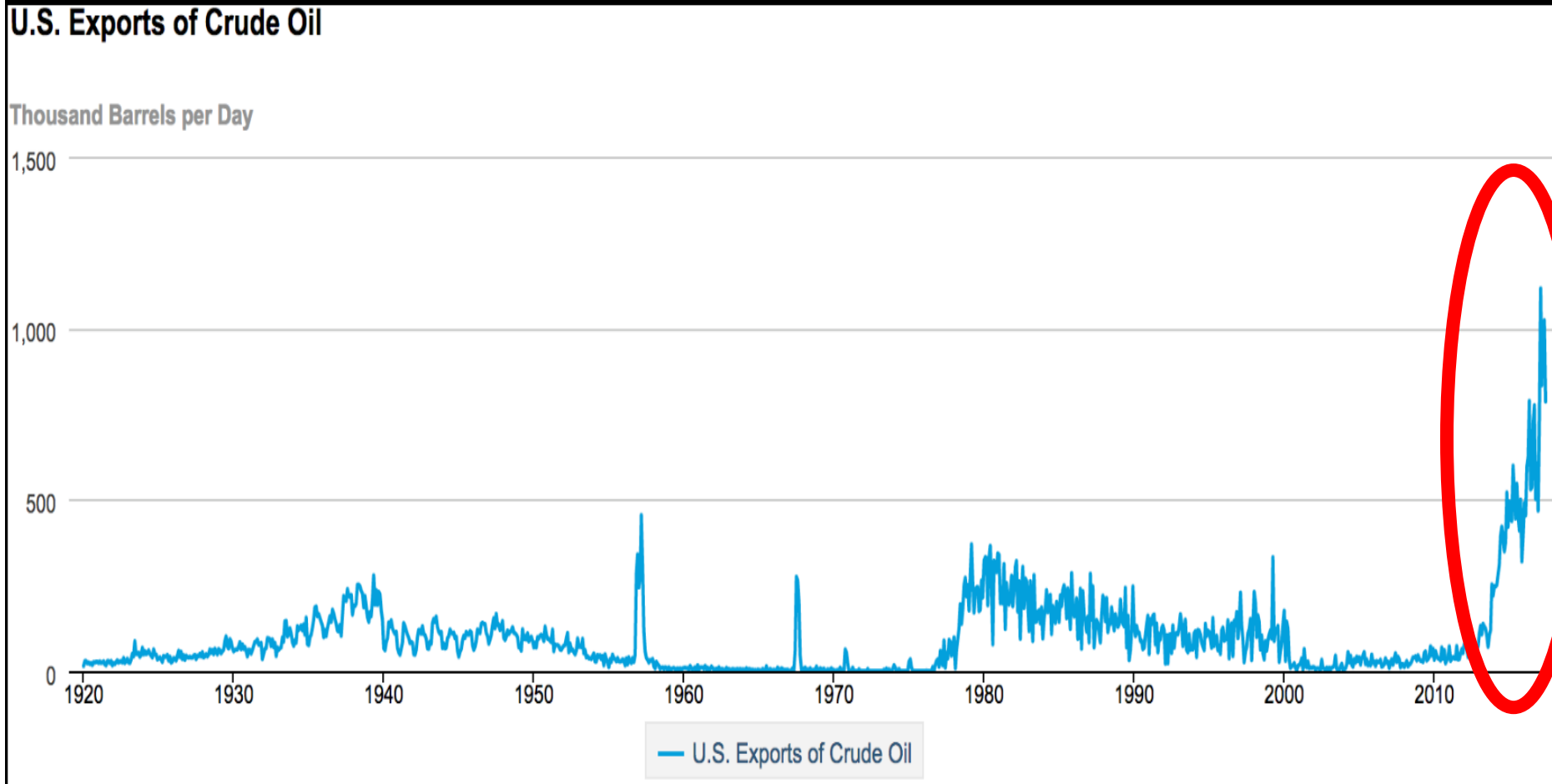
New Project Announcements – Through Q1-2016



Source: Lee Nichols, Hydrocarbon Processing Magazine, Energy Construction Form 3/16

Energy Sea Change

US Crude Oil Exports 1920 to 2017



Panama Canal = Greater Shipping Efficiency



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“If the rate of change on the outside exceeds the rate of change on the inside, the end is near”

– Jack Welch

2040

PLANNING AREAS

HSC
 CONTAINER OPERATIONS
 GENERAL CARGO
 STEEL
 AUTO
 OTHER
 REAL ESTATE
 FREIGHT MOBILITY

*Draft Frame
 For Illustrative
 Purposes Only*

2040
 2025

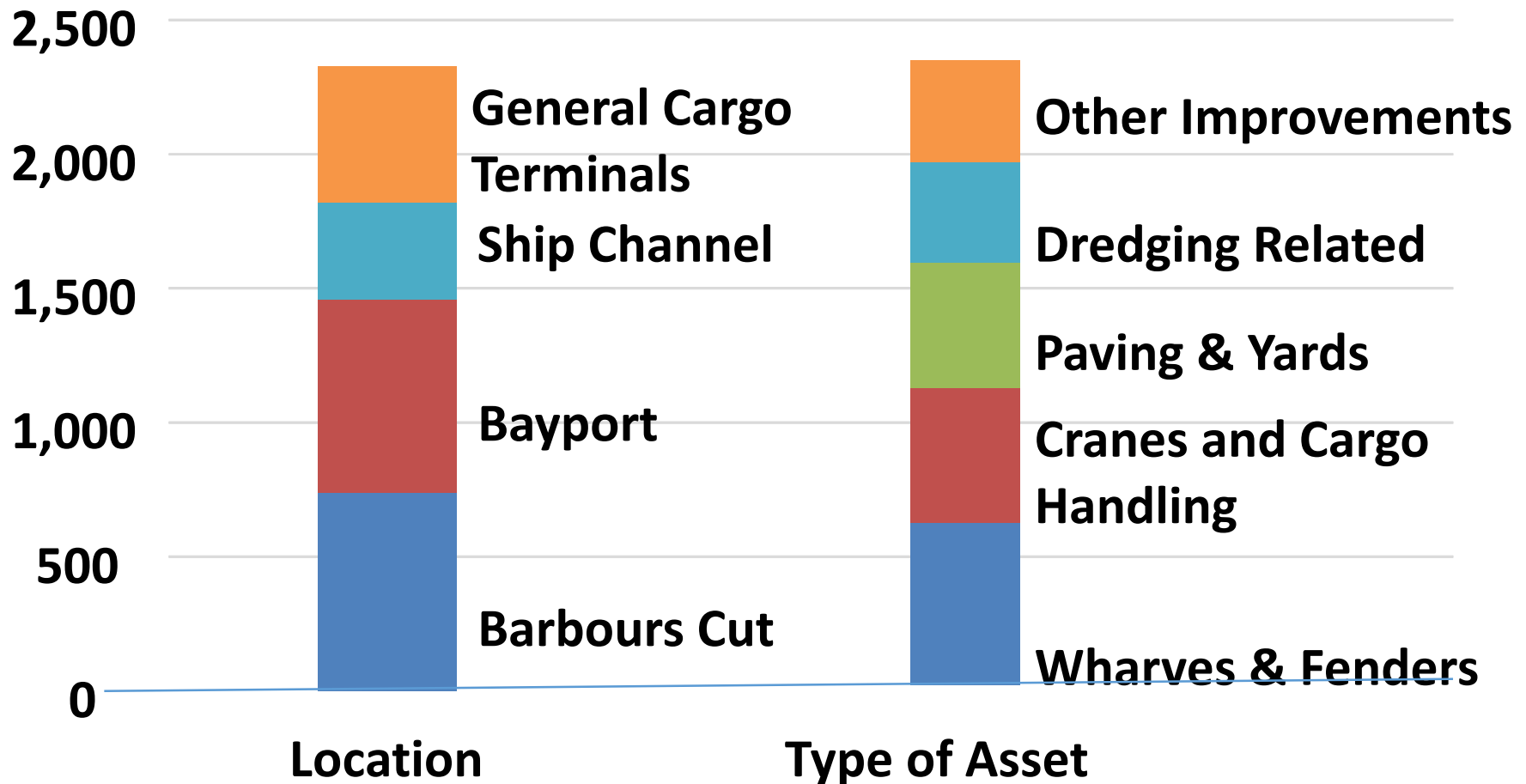
2019

-  LIQUID BULK
-  GENERAL CARGO
-  DRY BULK
-  CONTAINER
-  DREDGE DEPOSITION
-  REAL ESTATE
-  SHIP CHANNEL
-  MOBILITY INFRASTRUCTURE





2017-2026 Capital Plan: 2.2 Billion



Upcoming Work Program



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- Container Truck Gates
- Wharf Rehab
- New Yards
- Energy Sustainability
- Utilities Improvements
- Security Systems
- Crane Demo
- Dock Demo
- Concrete Structures
- Drainage Systems
- Rail Extensions
- Road Expansions
- Cargo Handling

1. Containers



Port Houston: 95% of Texas Container Traffic \$900MM Investments over 5 Years



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Barbours Cut



Bayport

Barbours Cut Redevelopment



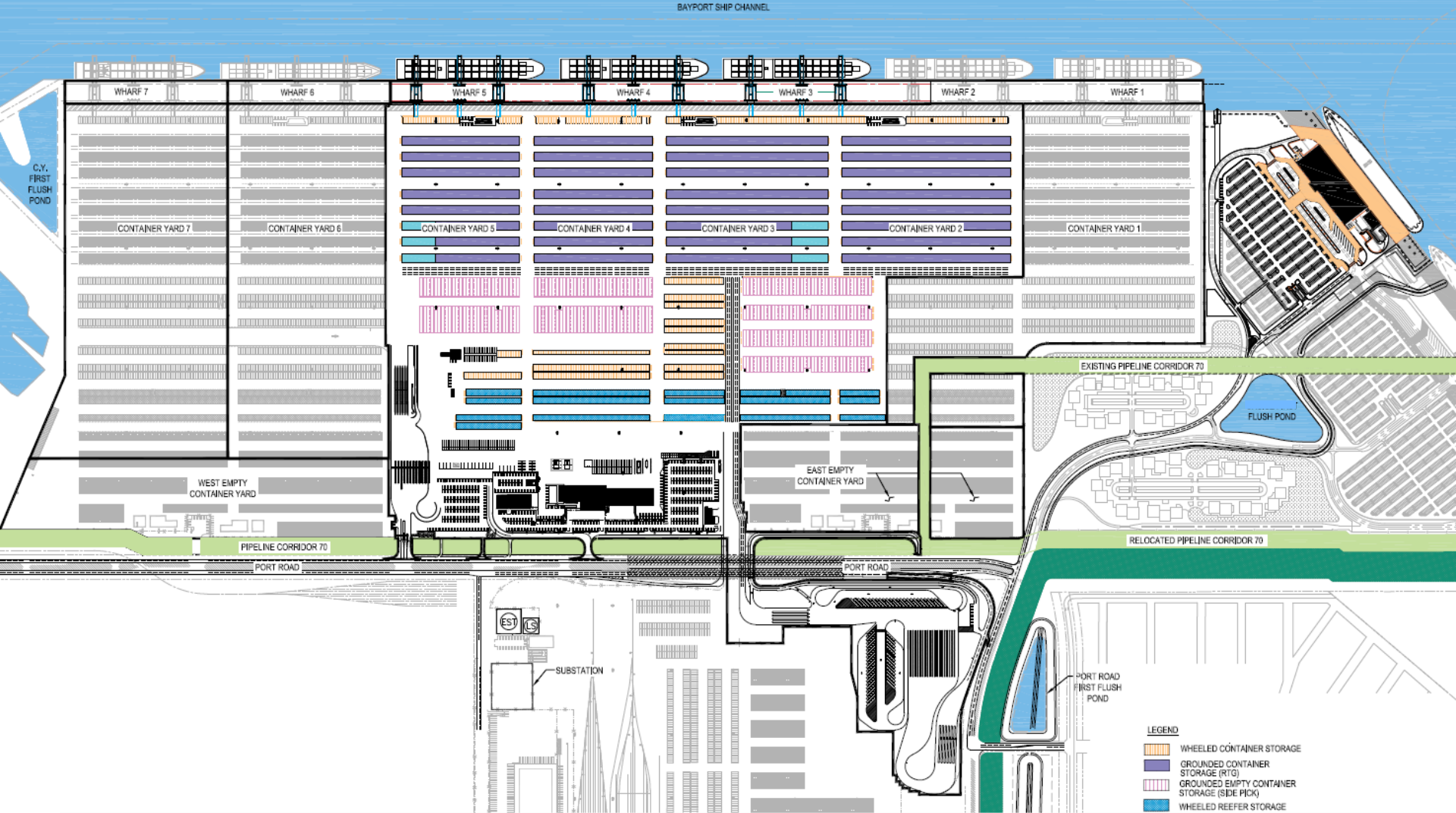
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Bayport Terminal Build-Out



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2. General Cargo / Breakbulk



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Rehabilitating Old City Docks



USTON
UNIT OF TEXAS





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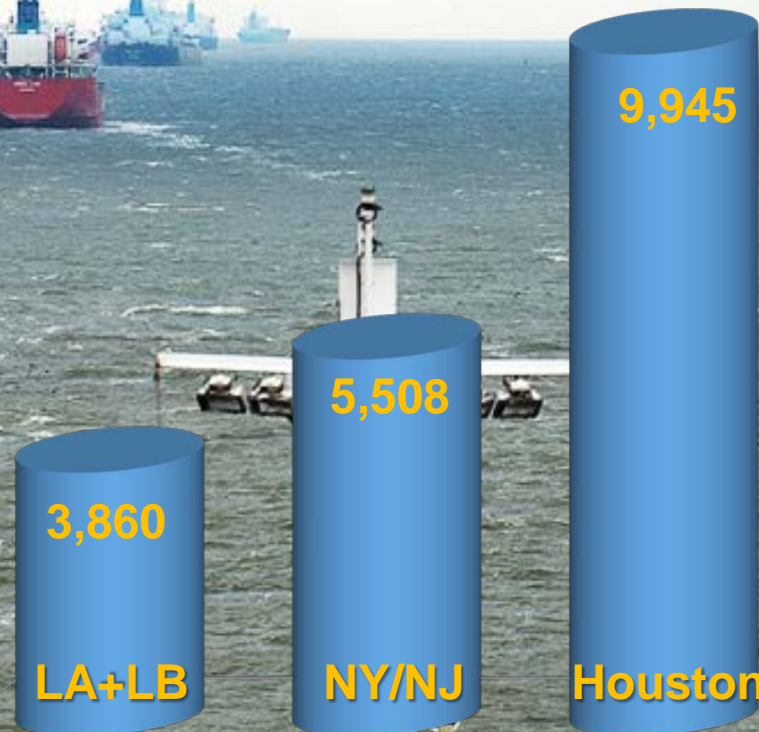
3. Houston Ship Channel



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Houston—USA's Busiest Channel

Houston:
22,000 ship moves
200,000 barge moves



Deep Draft Ship Calls

USACE "Megastudy" Current Plan



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DREDGING AND CHANNEL IMPROVEMENTS



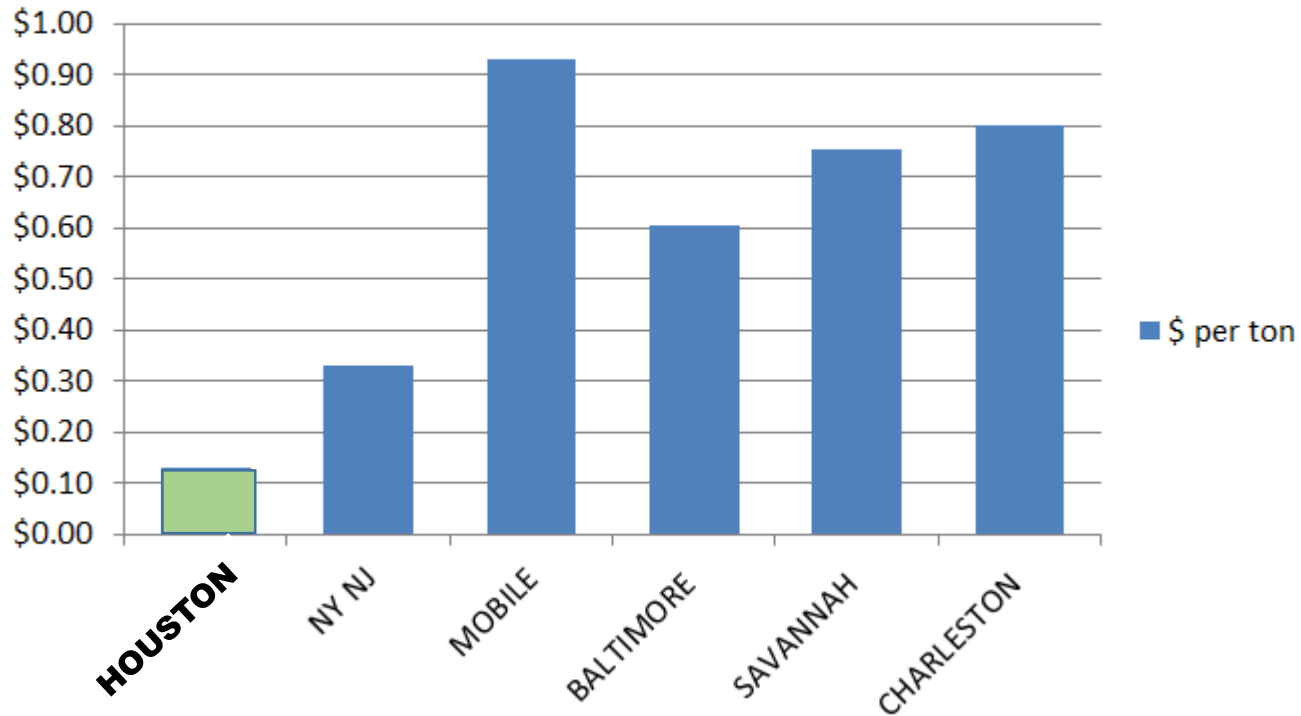
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- Improve Channels for Bigger Ships
- Harbor Maintenance Trust
- Preparing for the Future



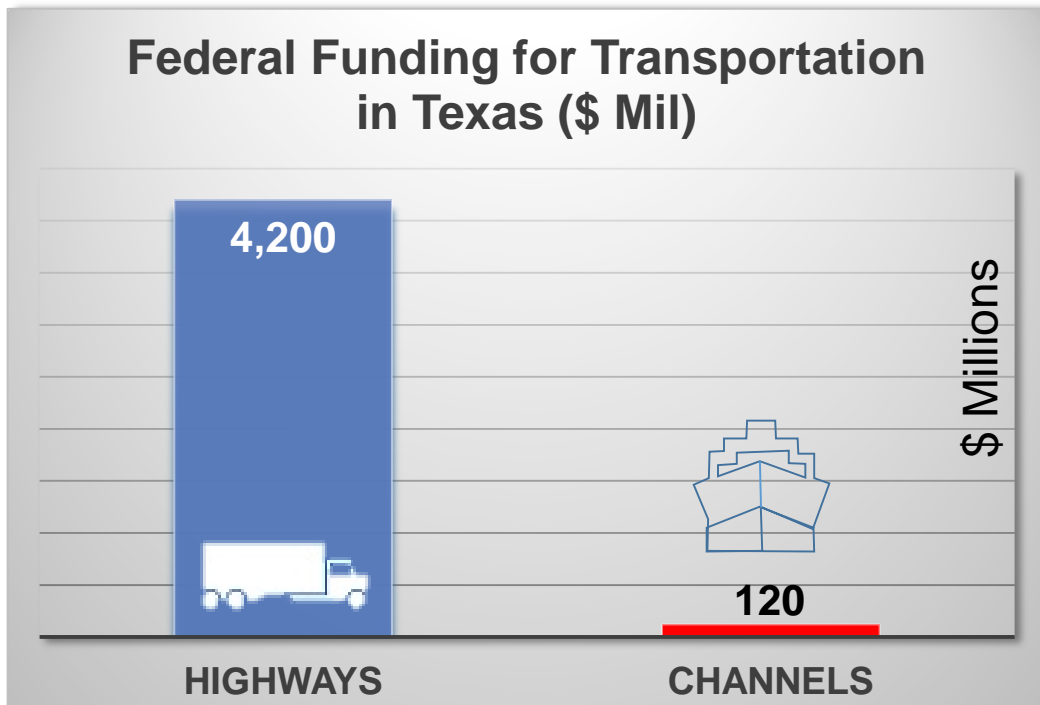
Houston Ship Channels: Biggest Bang for the O&M Buck

Dredging cost per ton of cargo moved



FY 14 Appropriation, CY 2013 total tonnage

Annual Federal Funding for “Highways”



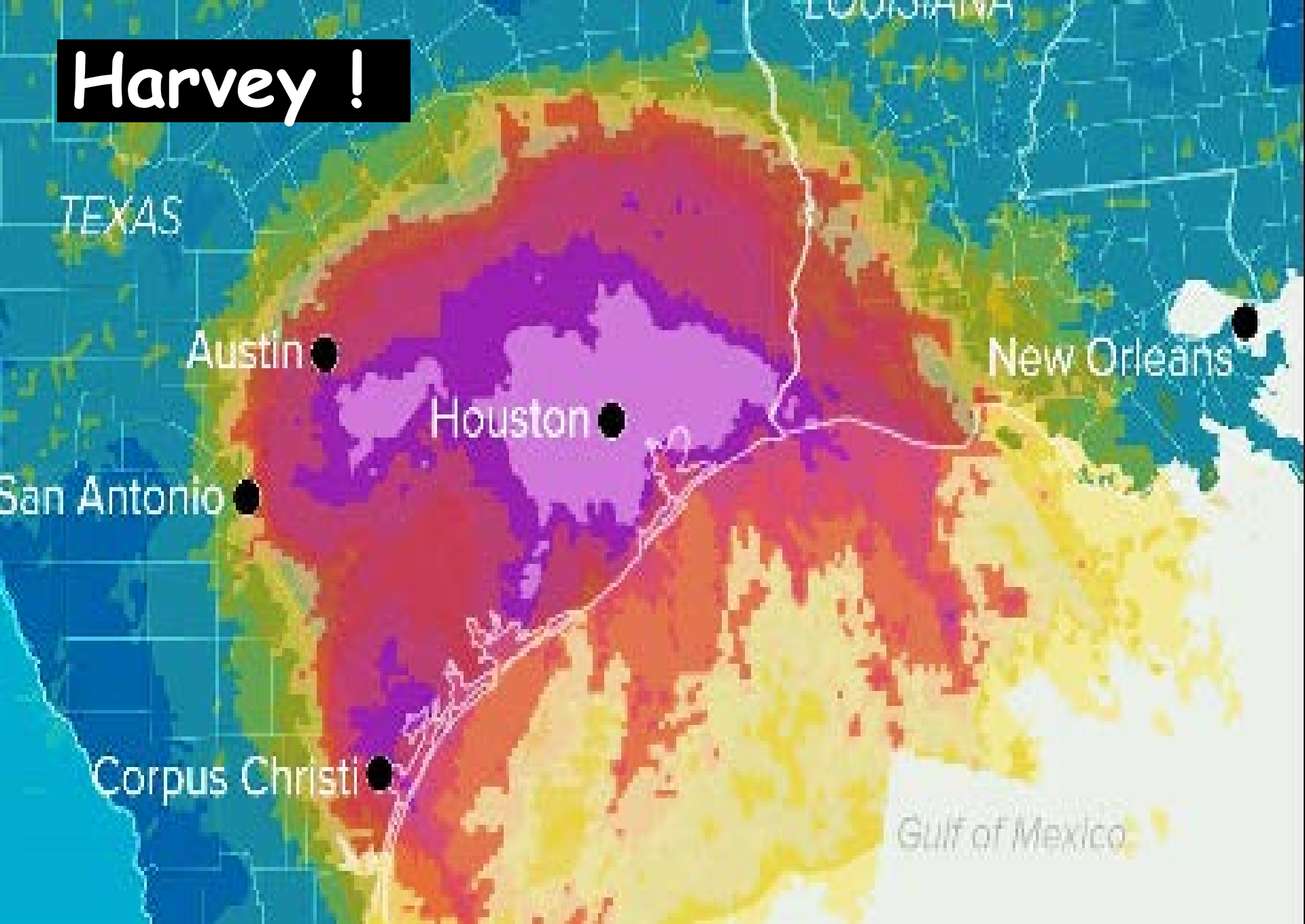
\$4.2 billion annually to keep cars and trucks moving

\$120 million for the “maritime highways” of 28 Texas ports and the GIWW

Marsh Habitat Creation



Harvey !



Before Harvey



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8/22/2017

After Harvey



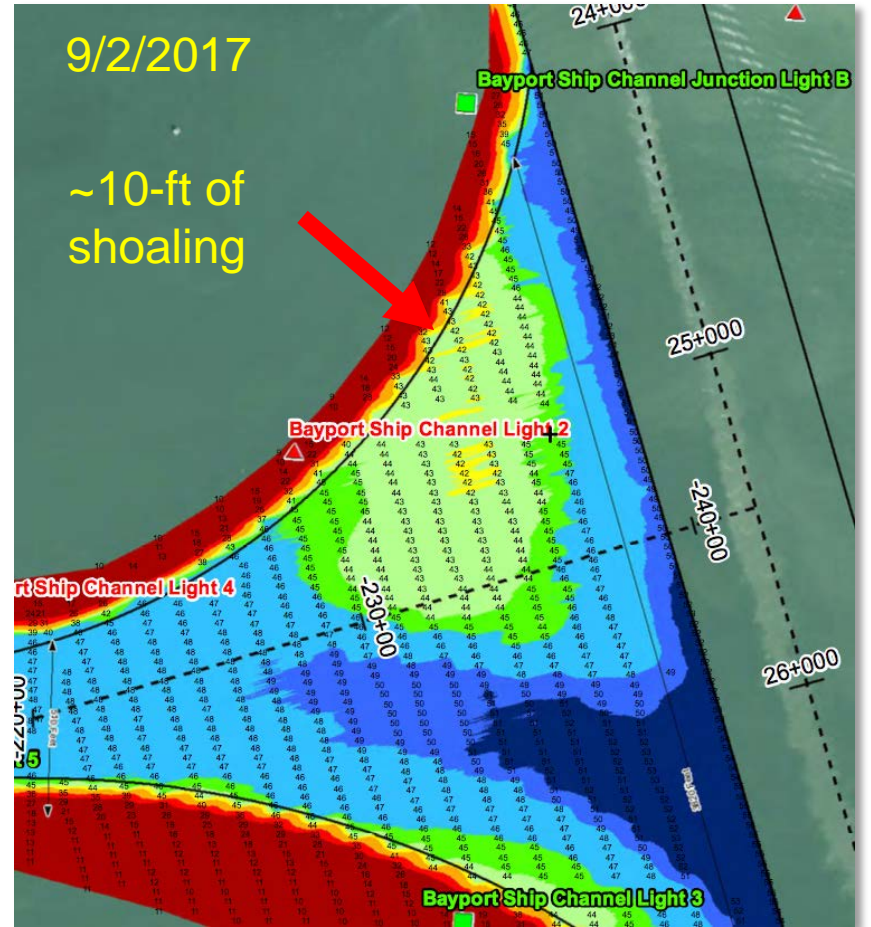
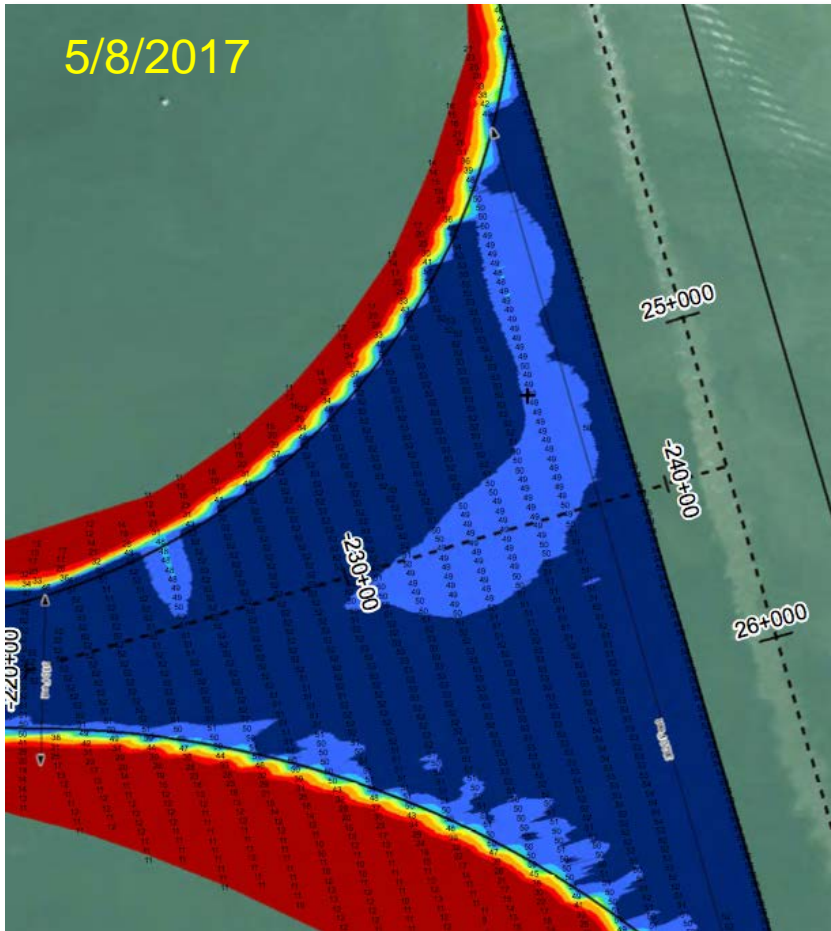
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Shoaling



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Placement Area Damage



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Key Q: How to include Sediment Capture and Control in Flood Control Projects?



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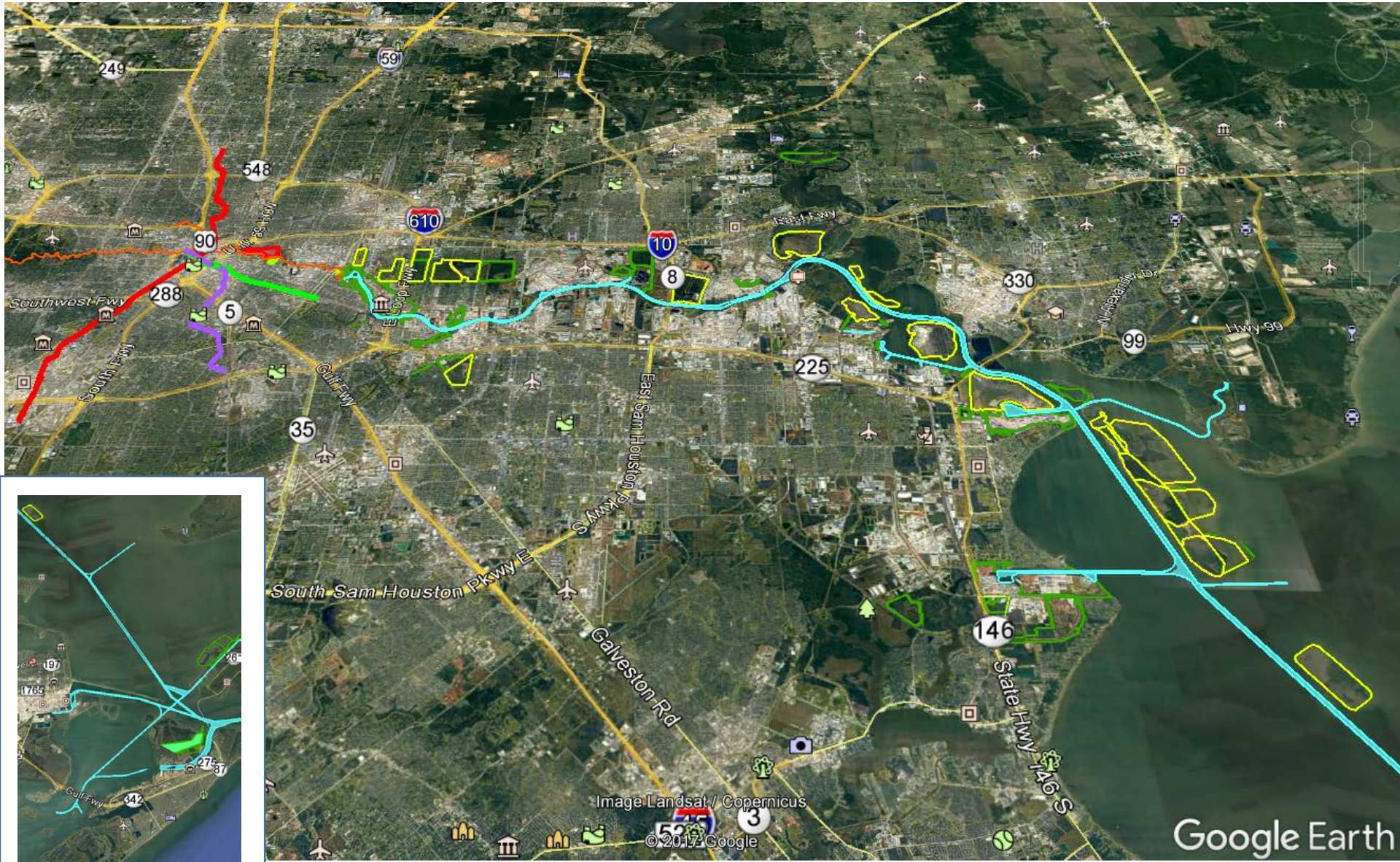
4. Connection to Community



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Core Assets Linking to Community Trends



Houston, Buffalo Bayou and East End...



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Source: SWA Group



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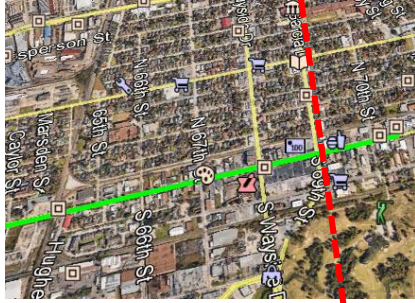


Southside Wharves





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Harbor Street Property

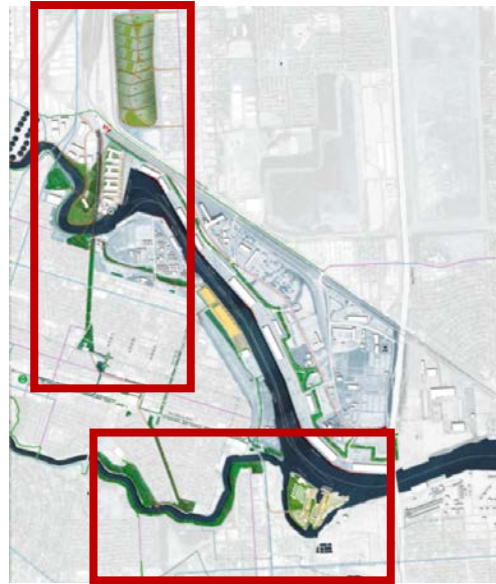


What If... Turning Basin Innovation Complex



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Houston East End / Port West End



Conceptual For
Illustrative
Purposes Only

Source: SWA Group



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Conceptual For
Illustrative
Purposes Only



Source: SWA Group

Atkinson Island Marsh





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Conceptual For
Illustrative
Purposes Only



Source: SWA Group

5. Invest in Technology and Operations



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- Mobile Application
- Lynx CAP
- Truck/Equipment Registration
- Pre-advise Transactions
- GOS Replacement

NEW EXTENDED GATE HOURS!

Longer Term – Anticipate Trends



From...

- Physical Gateway
- Waterside Cargo
- Diesel
- Capital Infrastructure
- Customer Service
- Digital processing
- Public *OR* Private
- Community Support
- Operator / Landlord

Plus...

- Digital Value Creation
- Inland Delivery
- Electric
- Capacity Innovation
- Integrated Operations
- Big data analytics
- *And: P3*
- Cluster & Jobs Incubation
- Integrated Enterprise



Evaluating New Tech

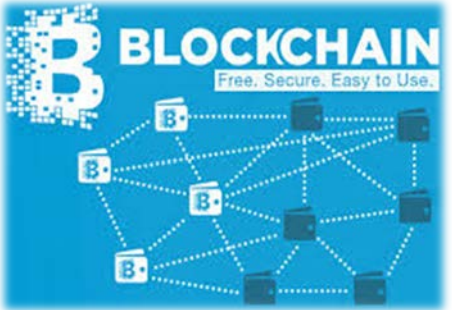
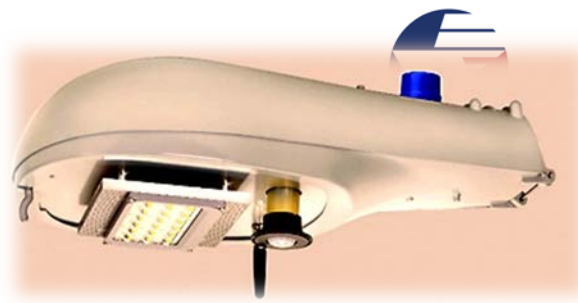
Deployed



Emerging



Conceptual



???

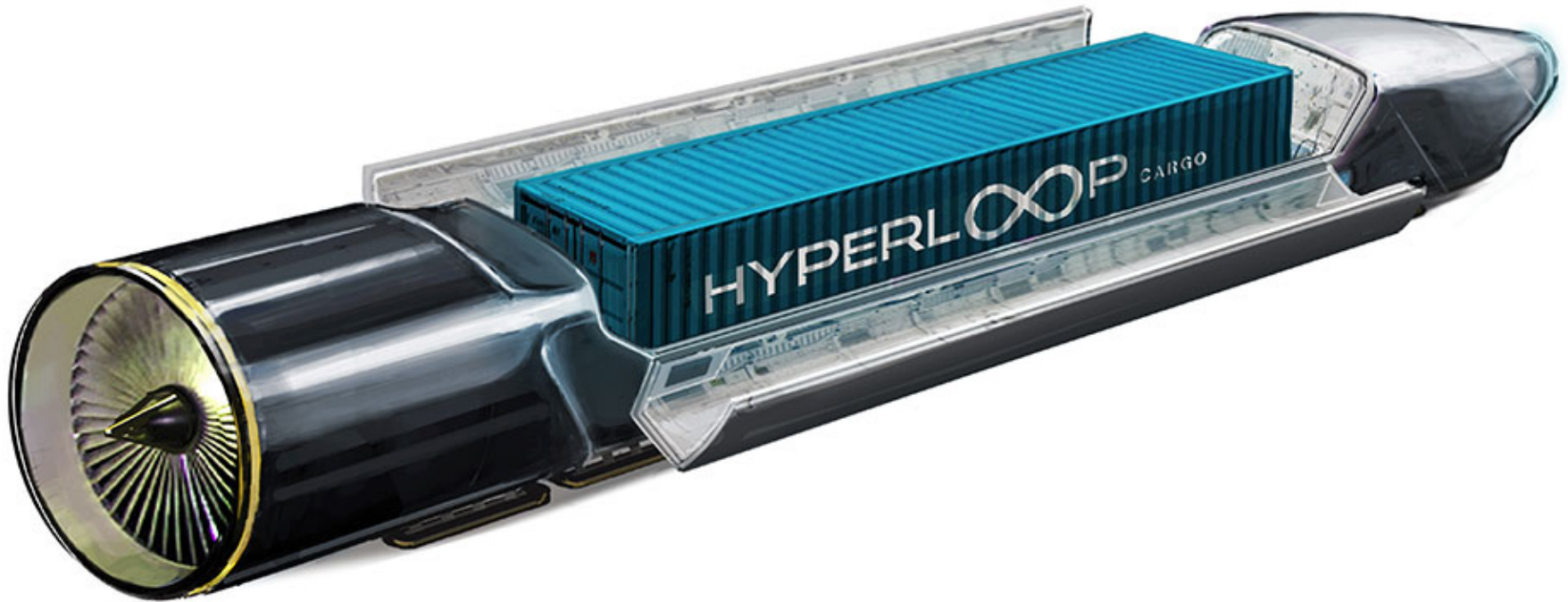


Many ideas – which will be economic and practical?



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???



Hyperloop's primary initial target will be passengers

HYPERLOOP



rebecca @curiousworlds

20 Jul

Replying to @elonmusk

Can Texas haz hyper loop too? Dallas - Houston - San Antonio - Austin (a girl can dream...)



Elon Musk

@elonmusk

Follow

For sure. First set of tunnels are to alleviate greater LA urban congestion. Will start NY-DC in parallel. Then prob LA-SF and a TX loop.

10:36 AM - Jul 20, 2017

342 724 3,685



...target is high speed, high density passenger travel

Whether tubes or tracks – separated from road traffic





OCT 12, 2017

SQUAWK EXCLUSIVE BOX
VIRGIN GROUP ANNOUNCES INVESTMENT IN HYPERLOOP

CNBC

SQUAWK EXCLUSIVE BOX

RICHARD BRANSON JOINS BOARD OF HYPERLOOP ONE

hyperloop ONE CNBC

Once a science contest, now attracting more investment

Hyperloop for Cargo?

<https://youtu.be/dQlihCOvZY>



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Introducing DP World Cargospeed



***...so many ideas – need to be thought through
(e.g., how would ships pass?)***



Freight Shuttle



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Key Success Factor: Freight Density and Scale Volume



Source: Freight Shuttle International

Key Success Factors:

Implementation Ease, Public benefits, Proven Technologies

Vehicle Interlocks with Guideway to Ensure Transport Safety

Precast Segmental Design Allows Construction from the Guideway Itself

Power and Communications Gear Housed Inside Structure

Eliminates Drainage Issues

High-Capacity/
Bi-directional Guideway

Reduces Maintenance, Emissions, and Noise; Improves Safety; Adds Capacity; Helps Separate Freight from Passenger Traffic with Ample Clearance for Highway Vehicles

Structural Stability Built to Last

Small Footprint (6 feet)
Fits within Highway Median



Source: Freight Shuttle International

Key Success Factor: Pilot Systems Developed



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Key Success Factor: Public Support



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Houston port shuttle hailed as potential freight-handling breakthrough

in Port News 12/09/2016

Write a Letter to the Editor

A futuristic freight-handling

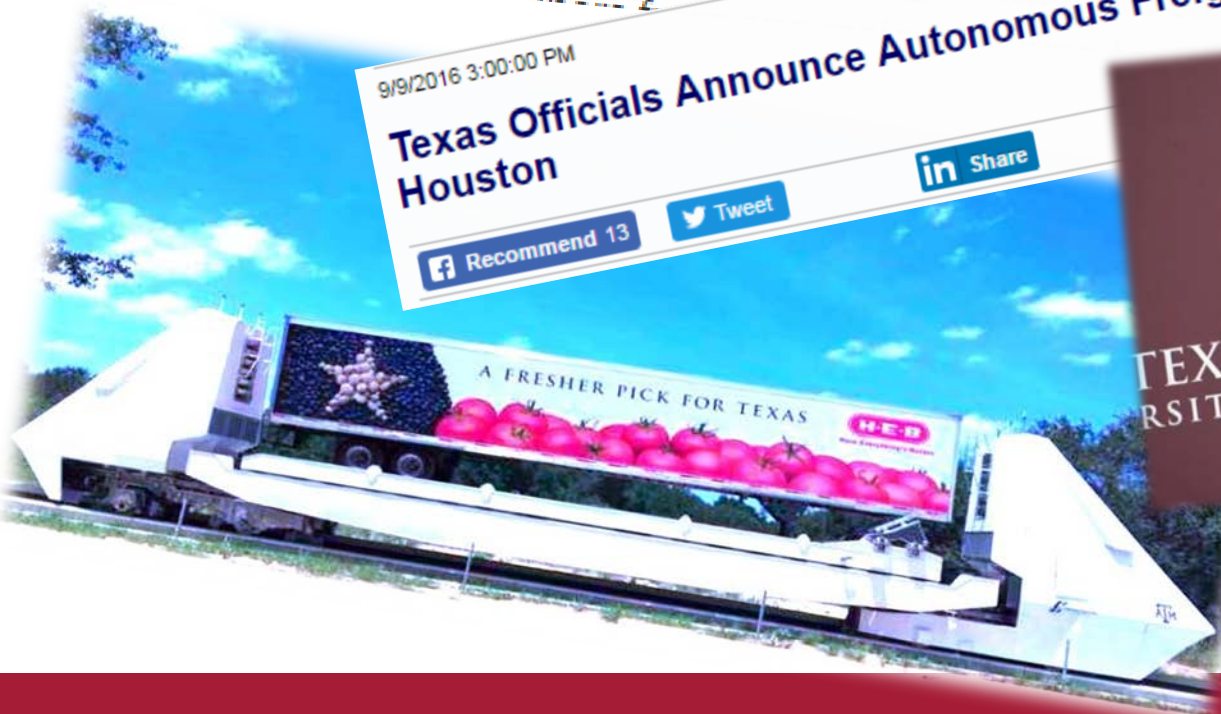
Texas Officials Announce Autonomous Freight Shuttle at Port of Houston

9/9/2016 3:00:00 PM

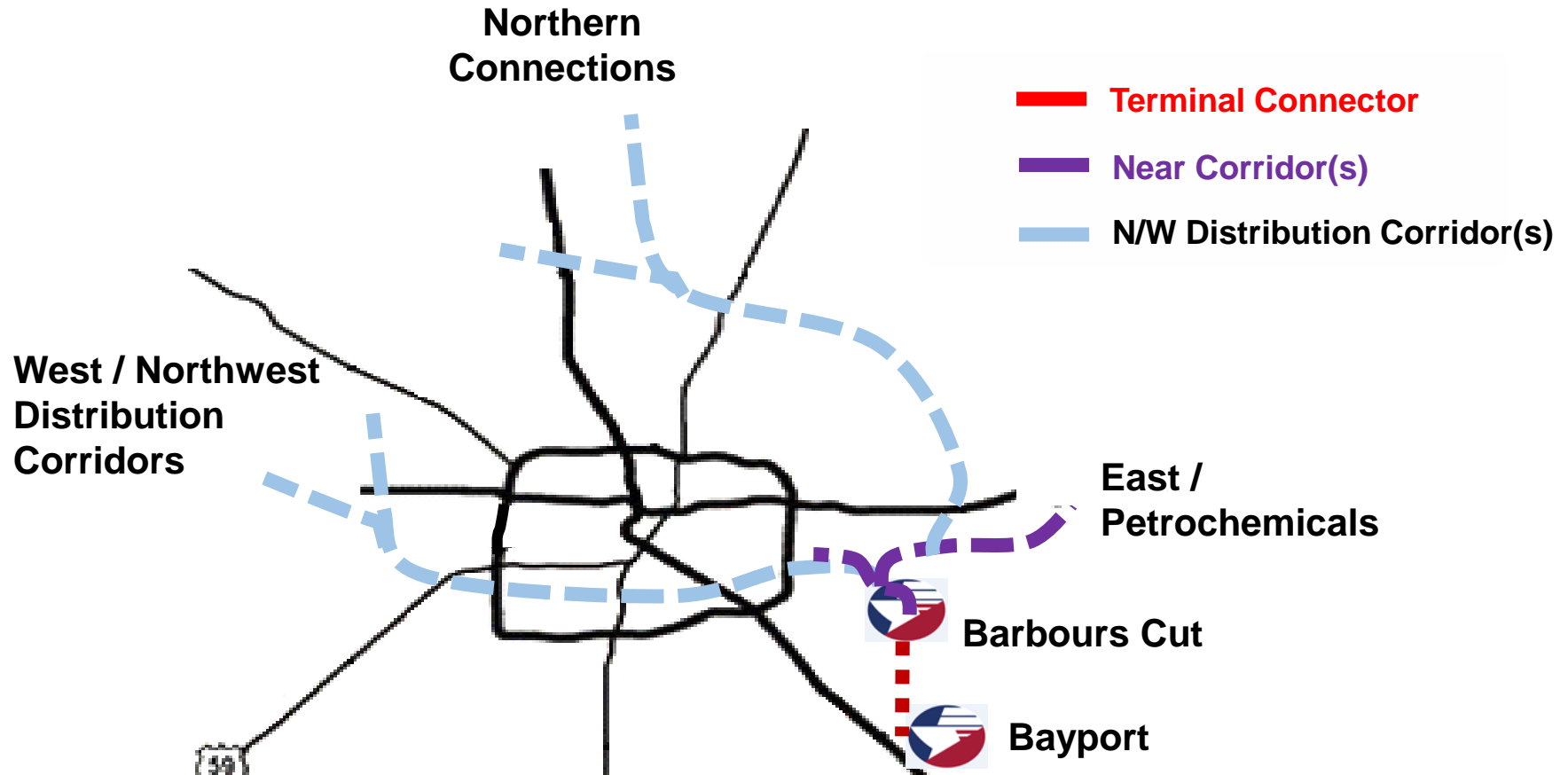
Recommend 13

Tweet

Share



Key Success Factor: Phased, Market Driven Deployment



*Map not to scale; Routes Illustrative Only;
No decisions or commitments expressed or implied*

Early Days: More Steps Ahead Required

- Confirm game changer potential
- Partnership innovation
- Whole chain economics
- High volumes / commitments
- Very large investments
- Pragmatic technologies
- ROW
- Channel crossings
- Details: markets, routes, economics
- Operating model proof of concept



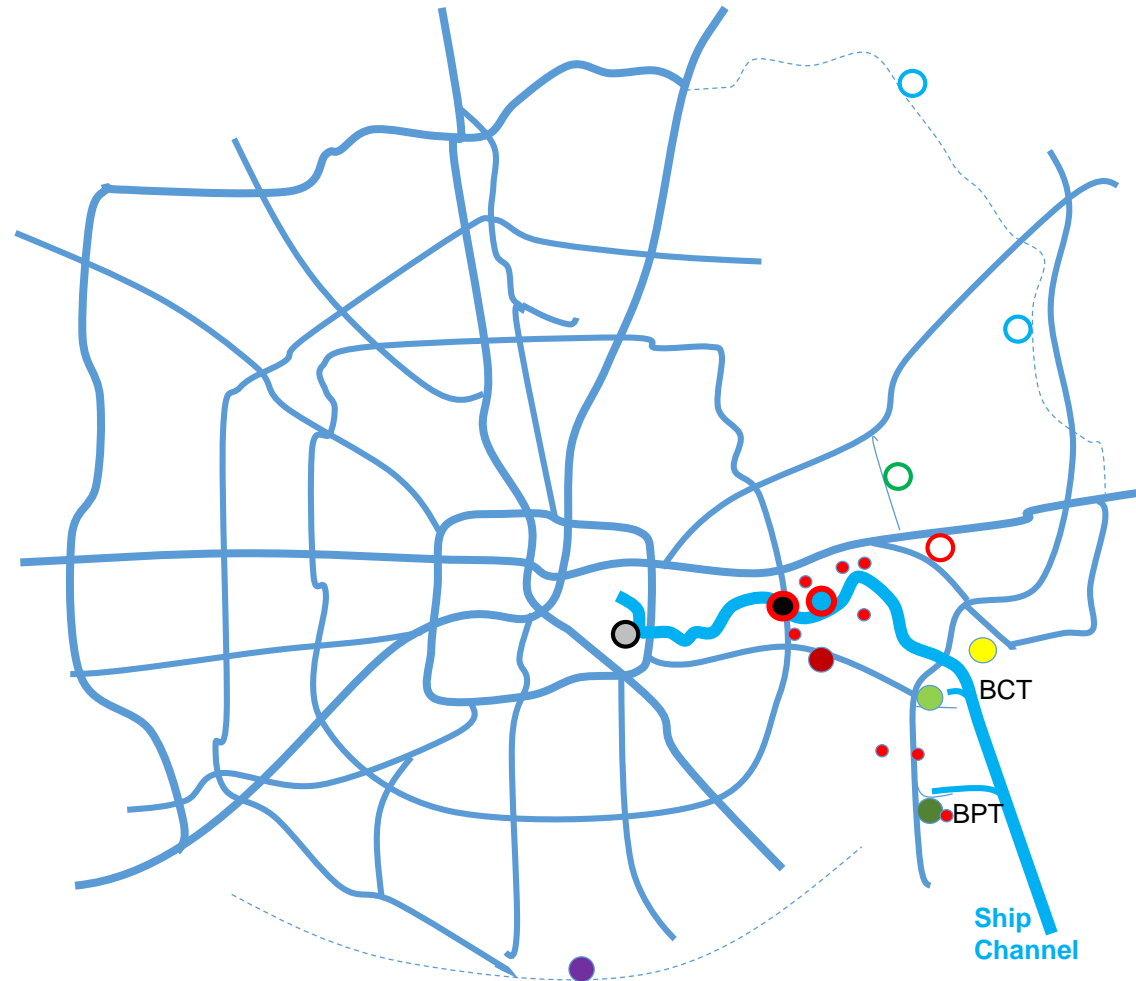
Focus on Freight Mobility



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Example Current & Potential Area Projects

- 99 Sections H & I
- Crosby-Lynchburg Improvements
- SH 330 Connectivity
- Peninsula Road Expansion
- RR Double-track at Broadway
- BW-8 Bridge Expansion
- SH 225 Expansion & Connectors
- Container Barges
- BCT Blvd to 146 connectors
- Bayport Port Road and RR Spur
- I-69 / 99S bypass
- Other road and rail improvements
- ⊗ Inland distribution (not shown)

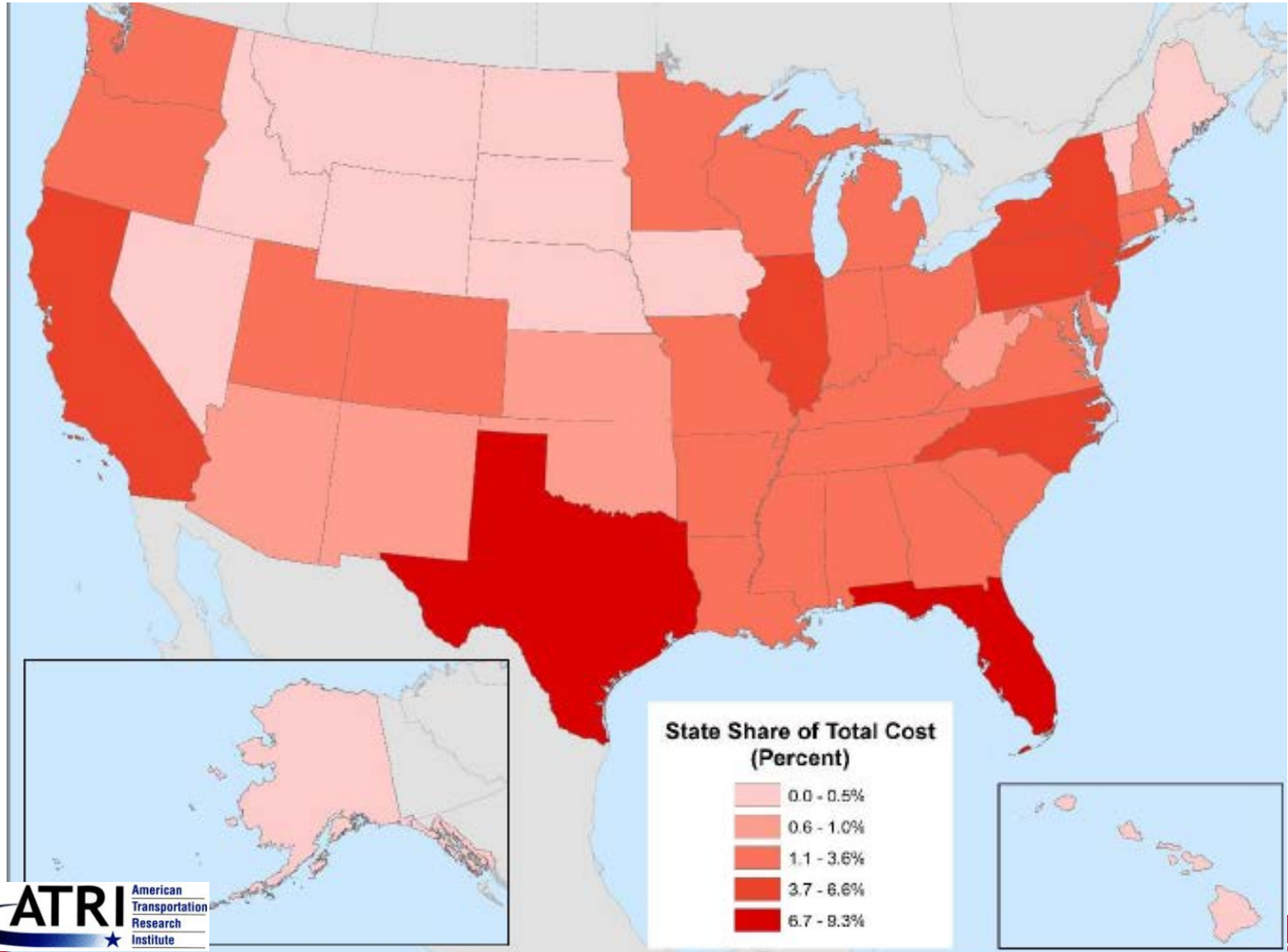


Complication: Busy Roads

Trucking Industry Cost of Traffic



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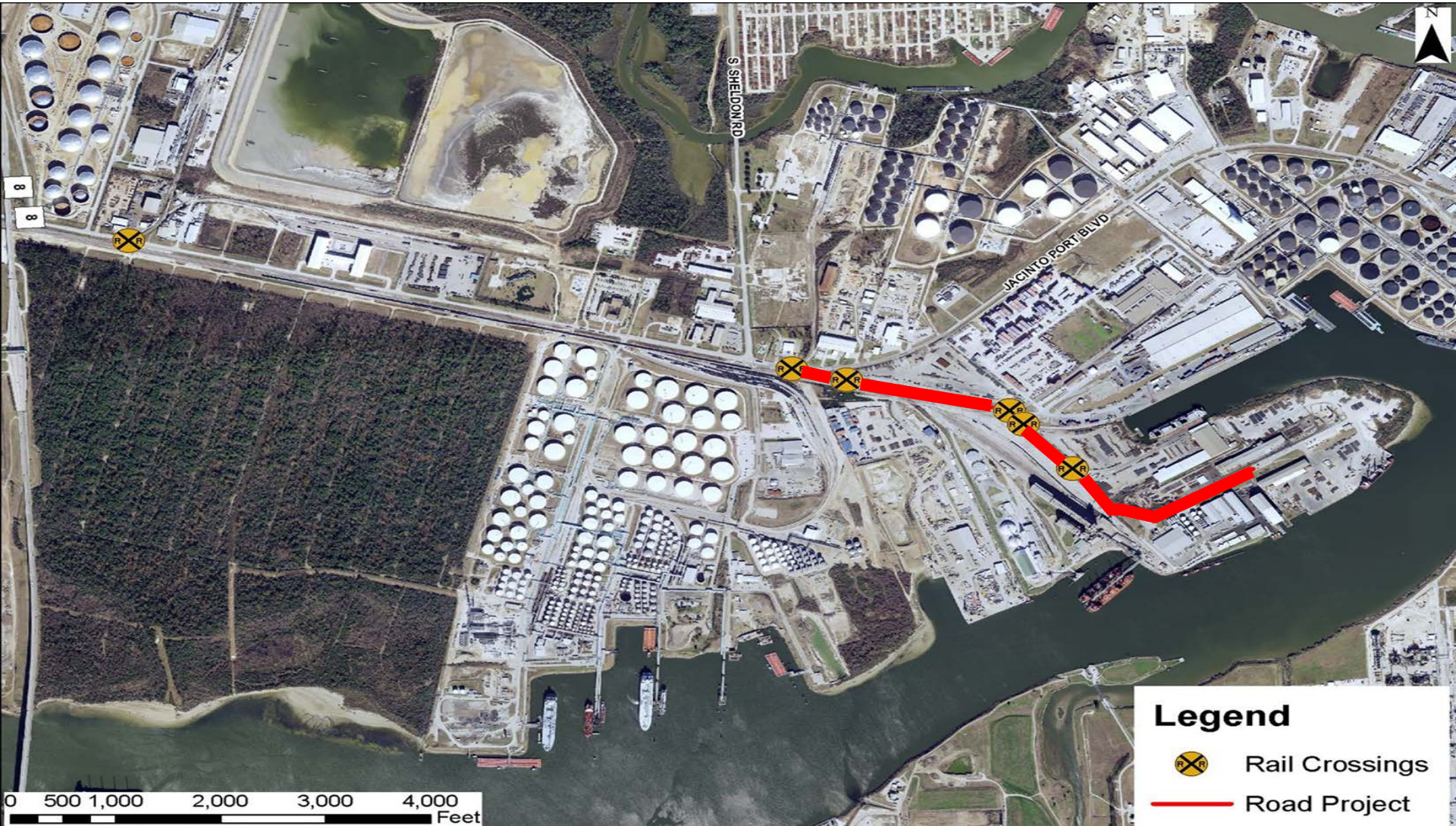


Source:



Peninsula Road improvement

Working with TxDOT and Harris County



Legend

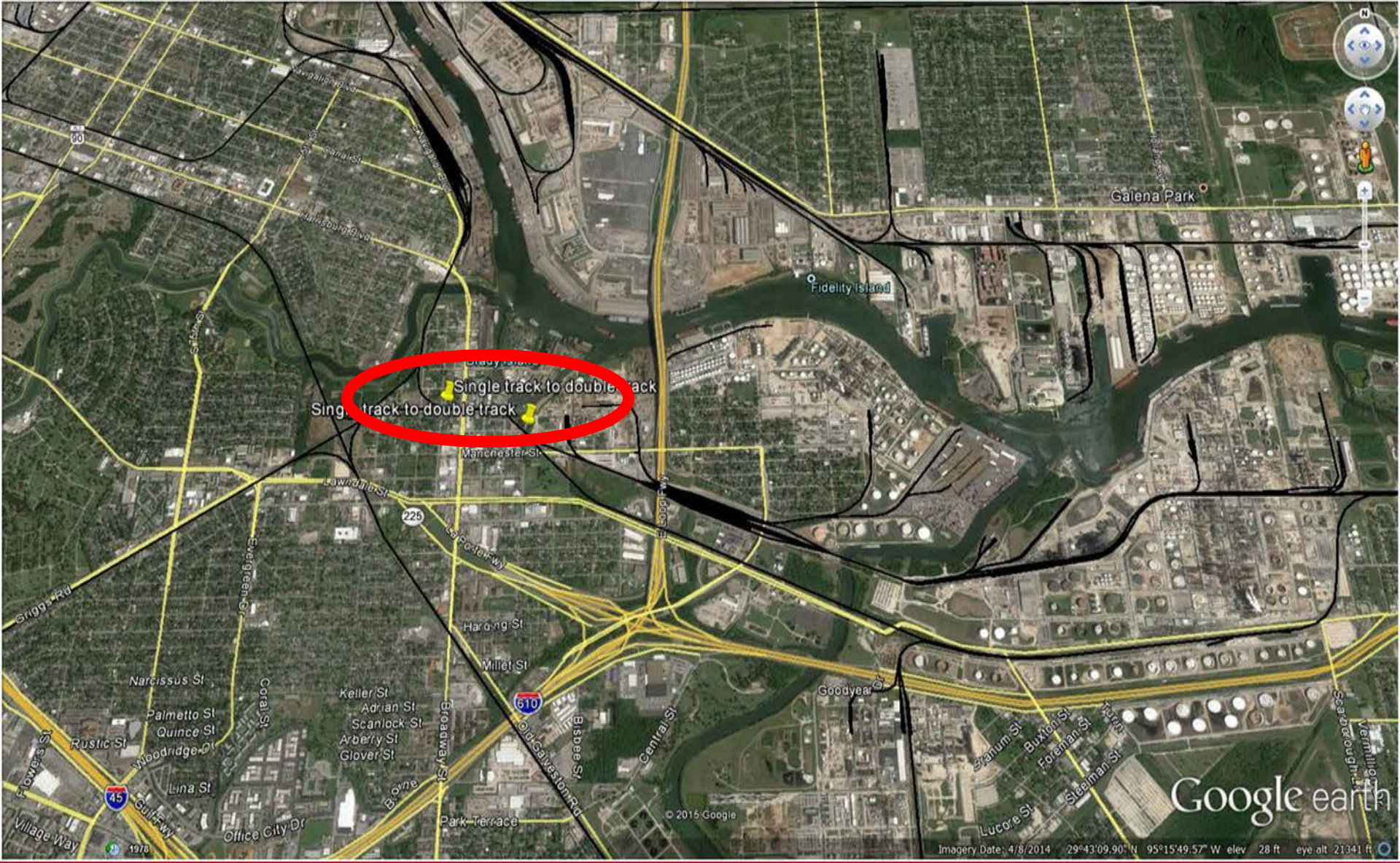
- Rail Crossings
- Road Project

0 500 1,000 2,000 3,000 4,000 Feet

Broadway Double Track



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Environmental Stewardship

Environmental Policy

“The Port of Houston is committed to conducting operations using a systematic approach to environmental management in order to preserve and protect the natural environment”

- **C**omply with laws and regs
- **C**reate business practices
- **C**ommunicate, engage and collaborate
- **C**ommit to industry leadership
- **C**ontinuously improve



**ISO 140001 Re-Certification for
Environmental Management Systems
*First Port Certified...since 2002***











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Aspects of Environmental Stewardship



- **Tenant Audit Review Board**
- **BUG (Beneficial Users Group)**
- **Air: \$1MM in DERA Grants**
- **LED Lighting**
- **Storm water: MS4 Program**
- **Dredge Material Testing**
- **Recycling: 84k Tons of Used Oil, E-Waste, Paper, Dunnage, Tires...**
- **Energy Sustainability Program**





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THANK YOU

Rich Byrnes

Chief Infrastructure Officer
Port Houston

Questions?

713.670.2400

rbyrnes@poha.com

www.PortHouston.com