



Trends in Facilities Engineering

Presented by:

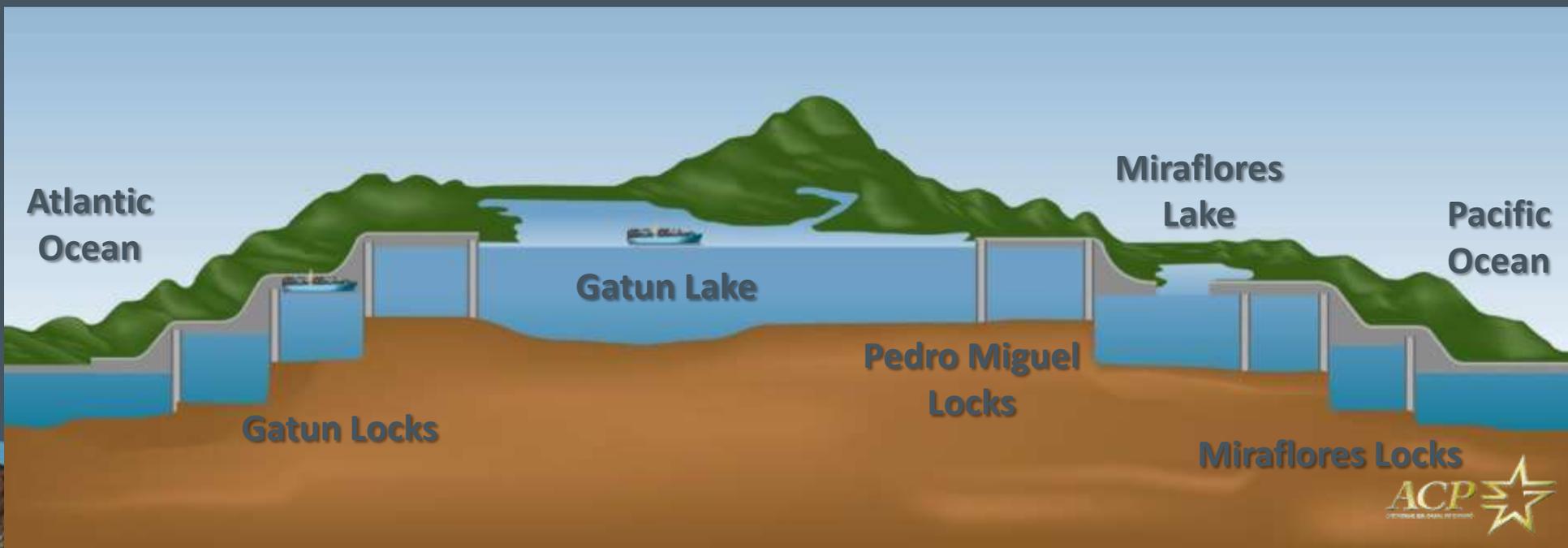
AAPA Executive Management Conference
May 2012

Driving Forces

- ❖ Trends in shipping (Larger Container Vessels, Channel Depth, Air Draft)
- ❖ Container Cargo Growth (delayed)
- ❖ Roadway/Rail Traffic Congestion
- ❖ Security
- ❖ Environmental Concerns
- ❖ Mitigation and Other Factors

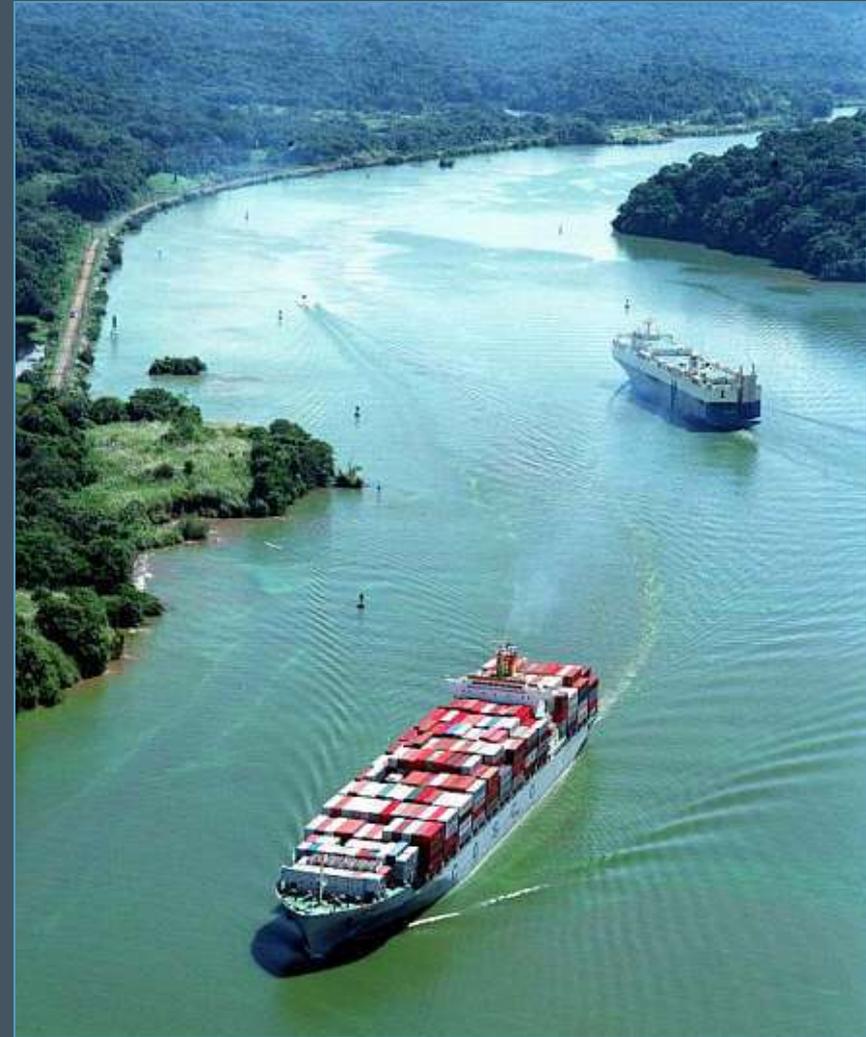
The Panama Canal

- Expanded by 400' long, 70' wide, 18' deep
- Complete by 2014
- Will grow U.S. containerized cargo trade by 5%



Panama Canal Expansion

- Complete 2014-2015
- Expanded by 400' long, 70' wide, 18' deep
- Ships holding up to 18,000 TEUs will be able to traverse the canal
 - Currently moves ships with 4,400 TEUs



Container Ship Evolution



2014
TRIPLE-E Maersk Class
18.000 TEU



2006
Emma Maersk Class
15.500 TEU



1997
Sovereign Maersk class
6.600 TEU



1996
Regina Maersk class
6.000 TEU

Container Ship Evolution

Current Panamax

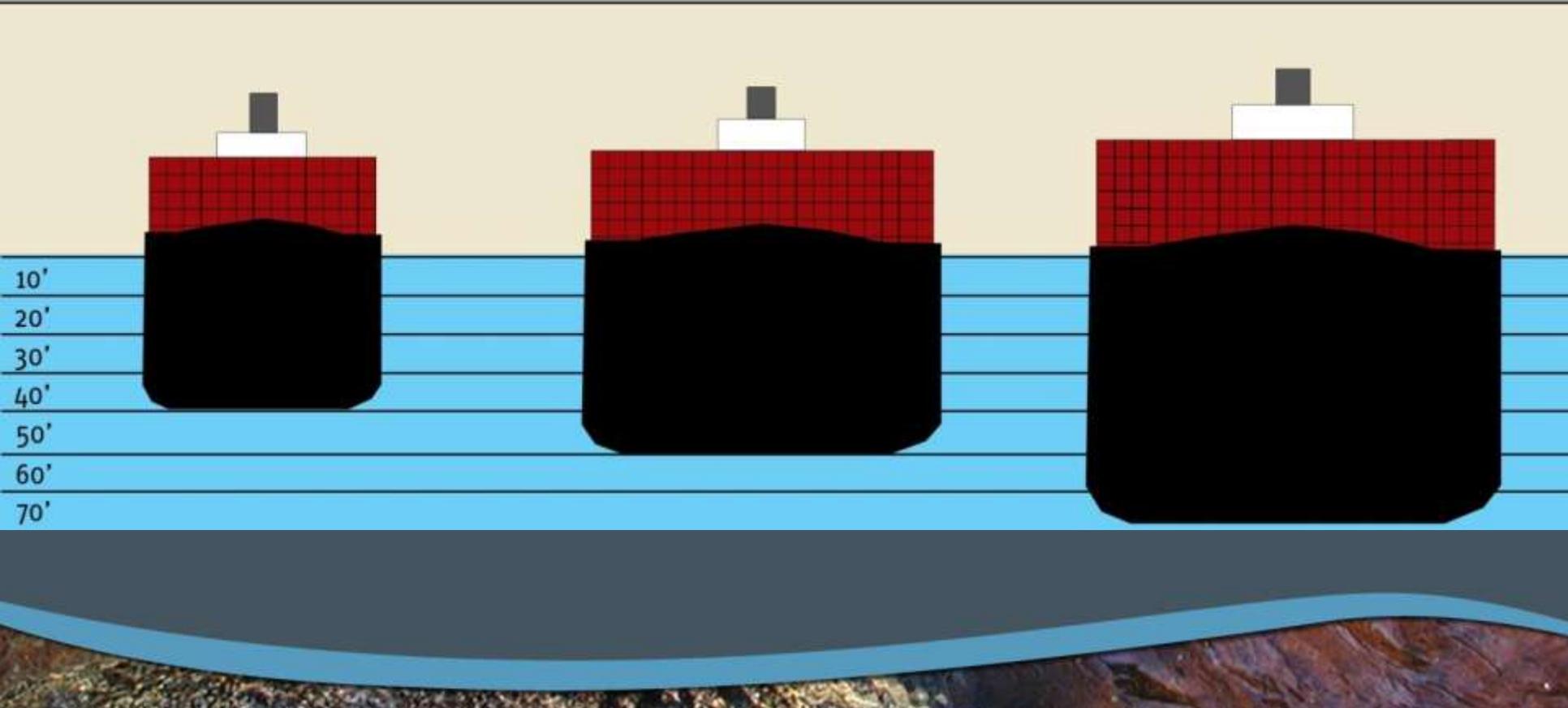
< 5,000 TEUs
13 Boxes Wide
40' Draft
965' Length

Panamax II (2015)

< 12,000 TEUs
20 Boxes Wide
50' Draft
1,200' Length

Suezmax

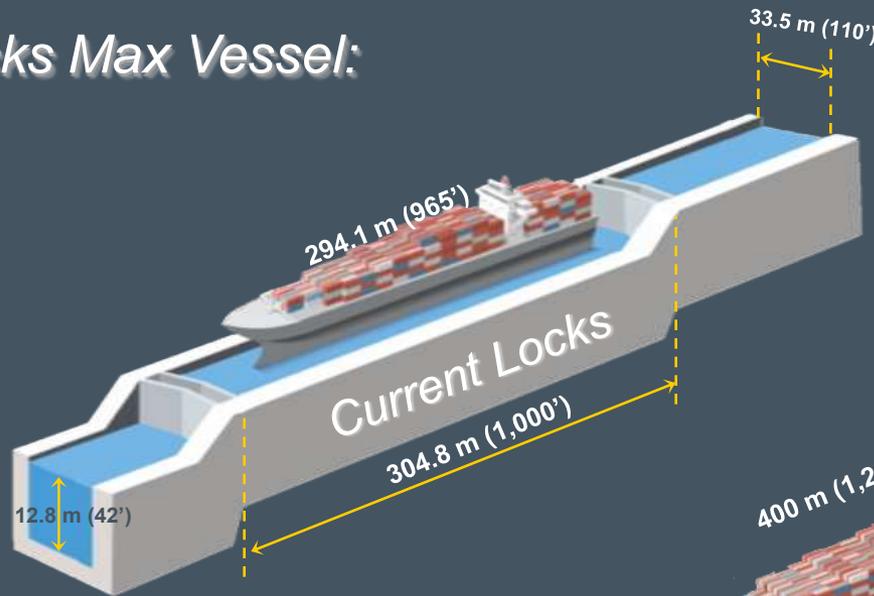
13,000+ TEUs
23 Boxes Wide
68' Draft
No Length Restriction



New Cargo Ships

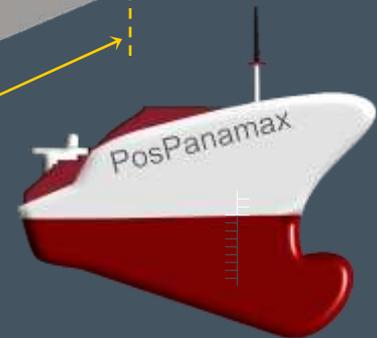
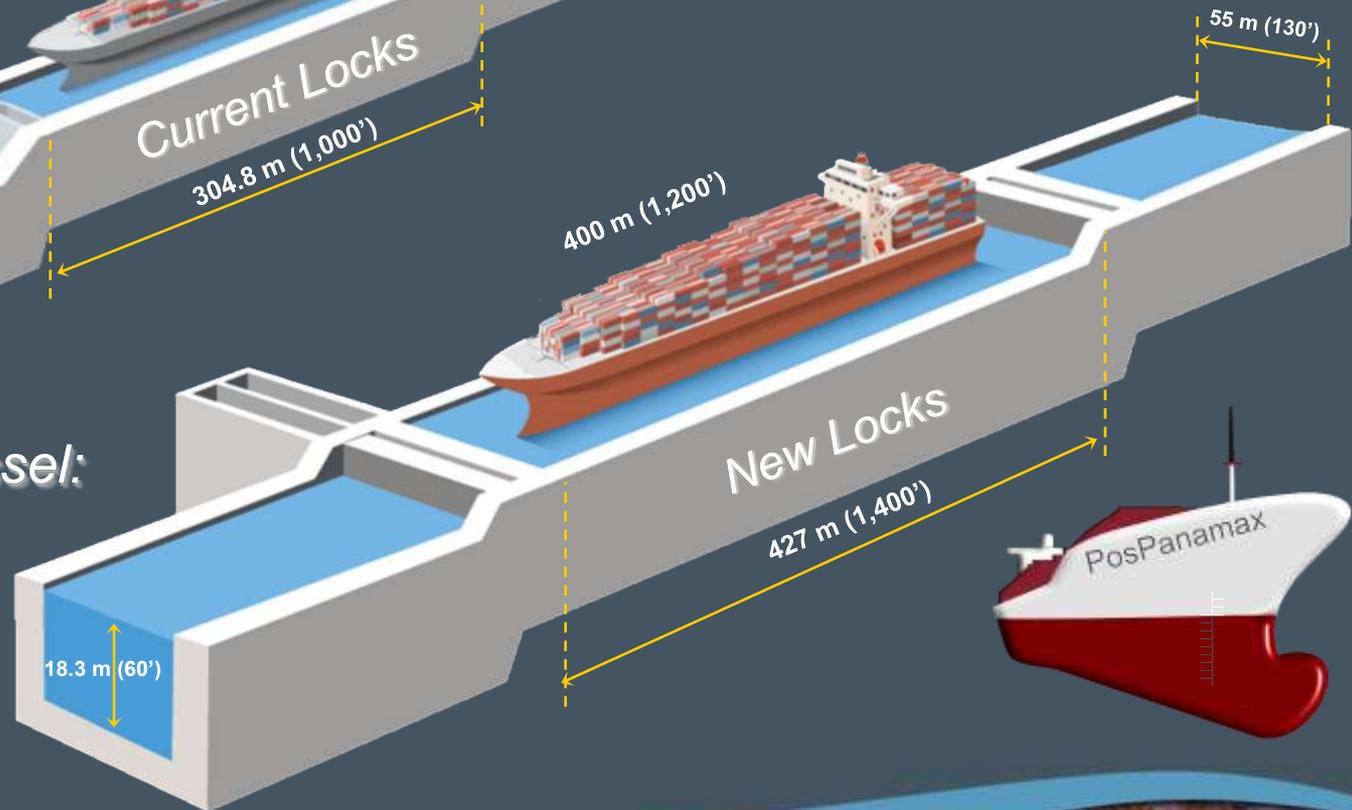
Existing Locks Max Vessel:

4,400 TEU

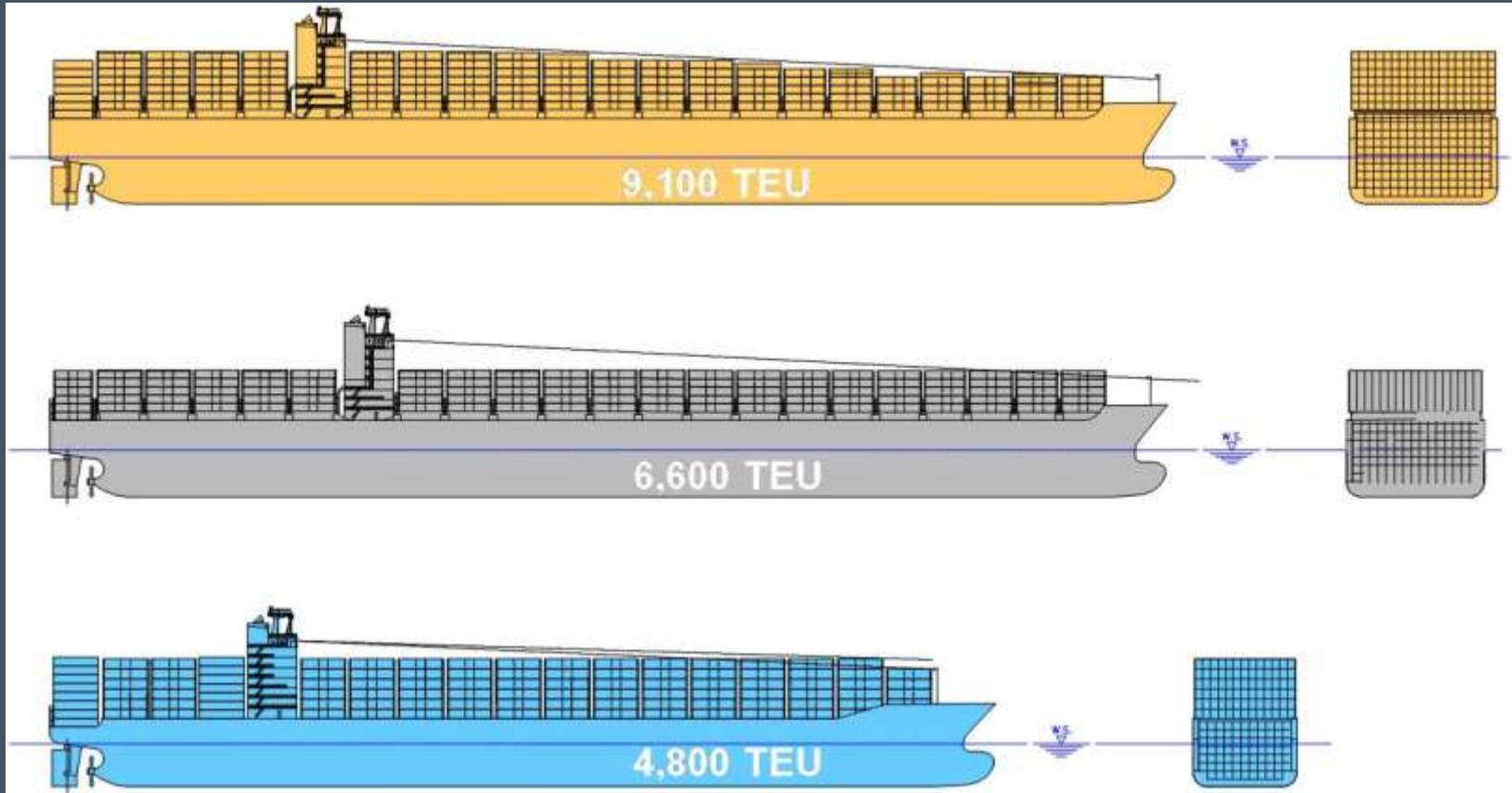


New Locks Max Vessel:

12,600 TEU



Trends in shipping (Larger Container Vessels)



Trends in shipping (Larger Container Vessels)

Larger Cranes/ Higher Wharf Loads



Trends in shipping (Larger Container Vessels)

Larger Cranes/ Higher Wharf Loads



Trends in shipping (Larger **Cruise** Vessels)



- Deeper Draft
- Higher Air Draft
- Wharf Loads
- Parking Requirements
- Traffic Control

Container Cargo Growth Higher Throughput Velocities



Double-Stacked Rail



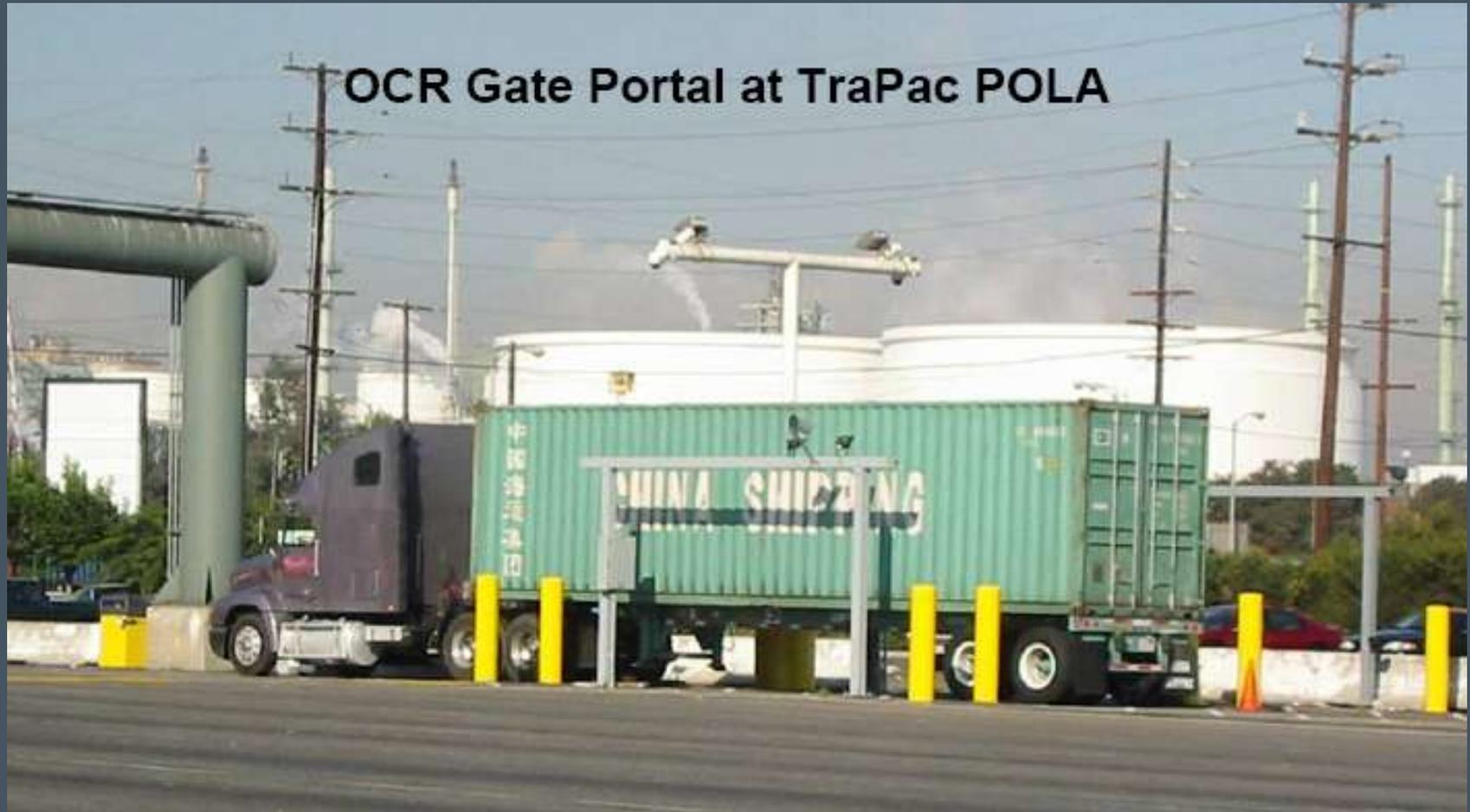
Median Rail Corridor



Alameda Corridor



Container Cargo Growth Higher Throughput Velocities



Container Cargo Growth Higher Throughput Velocities



Container Cargo Growth Higher Throughput Velocities



Roadway/Rail Traffic Congestion



APM Terminals



APM Terminal
237 Acres
1.125 Million TEUs

On-Dock Rail
to Double-Stacked
Heartland Corridor

RTG
Operations

APMT II
42 Acres

RMG
Operations

Security



Security – Radiation Portals

Port Hueneme version



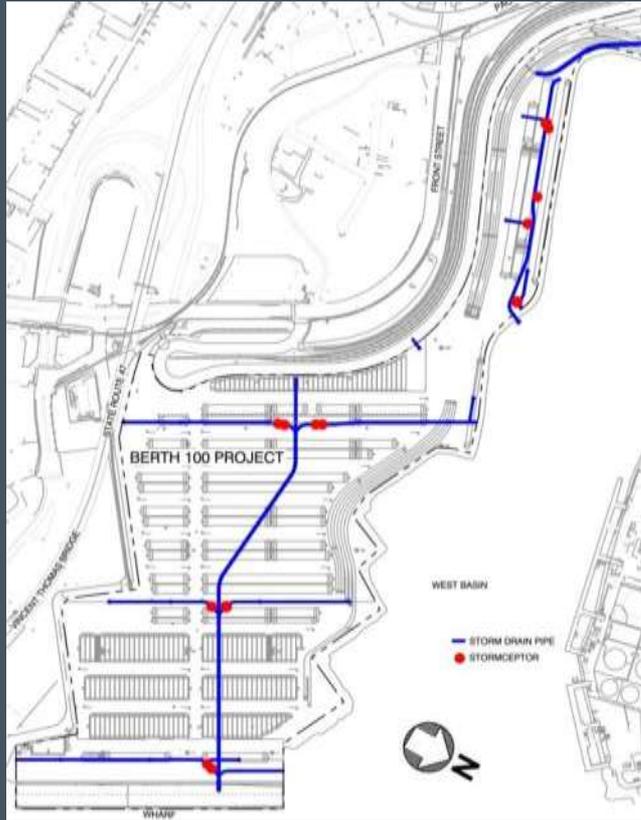
Security

Vacis X-ray Inspection in Hong Kong for Automated Inspection of Empties

Radiation is beamed
between these two panels



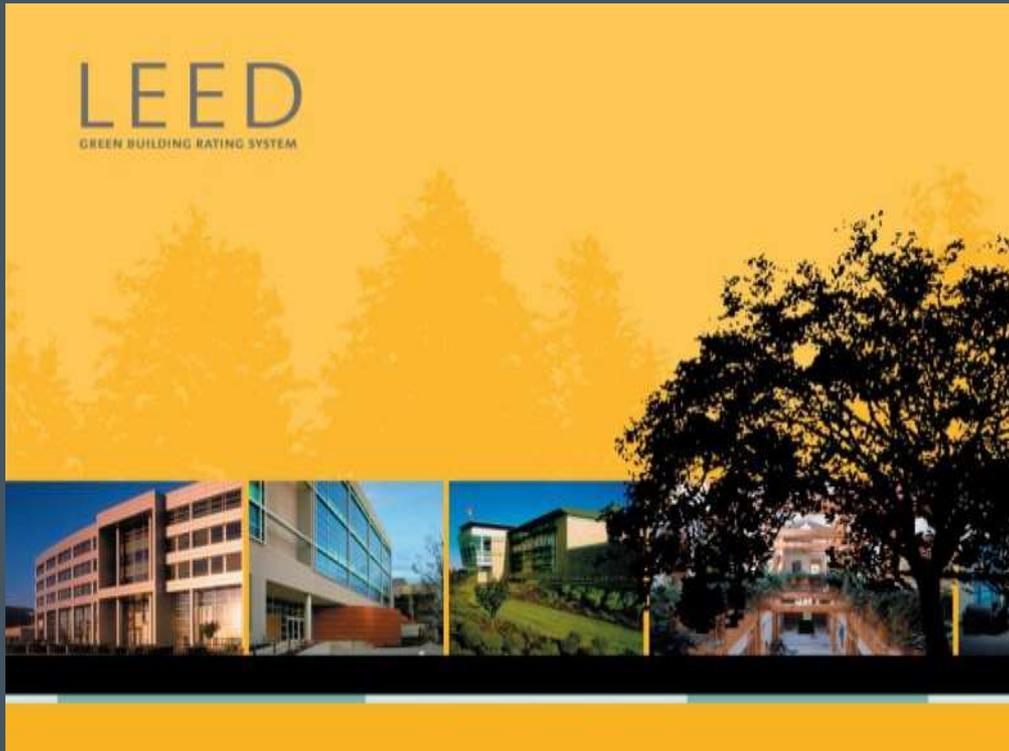
Environmental Concerns



Environmental Concerns

Leadership in Energy & Environmental Design®

Low Impact Development



Environmental Concerns

Vessels Generate a Large Fraction of Total Port Pollution



Diesel Yard Cranes Are Also Significant Emitters



Alternative Maritime Power (AMP) Wharf-to-Vessel Cable Connections



Alternative Maritime Power (AMP)

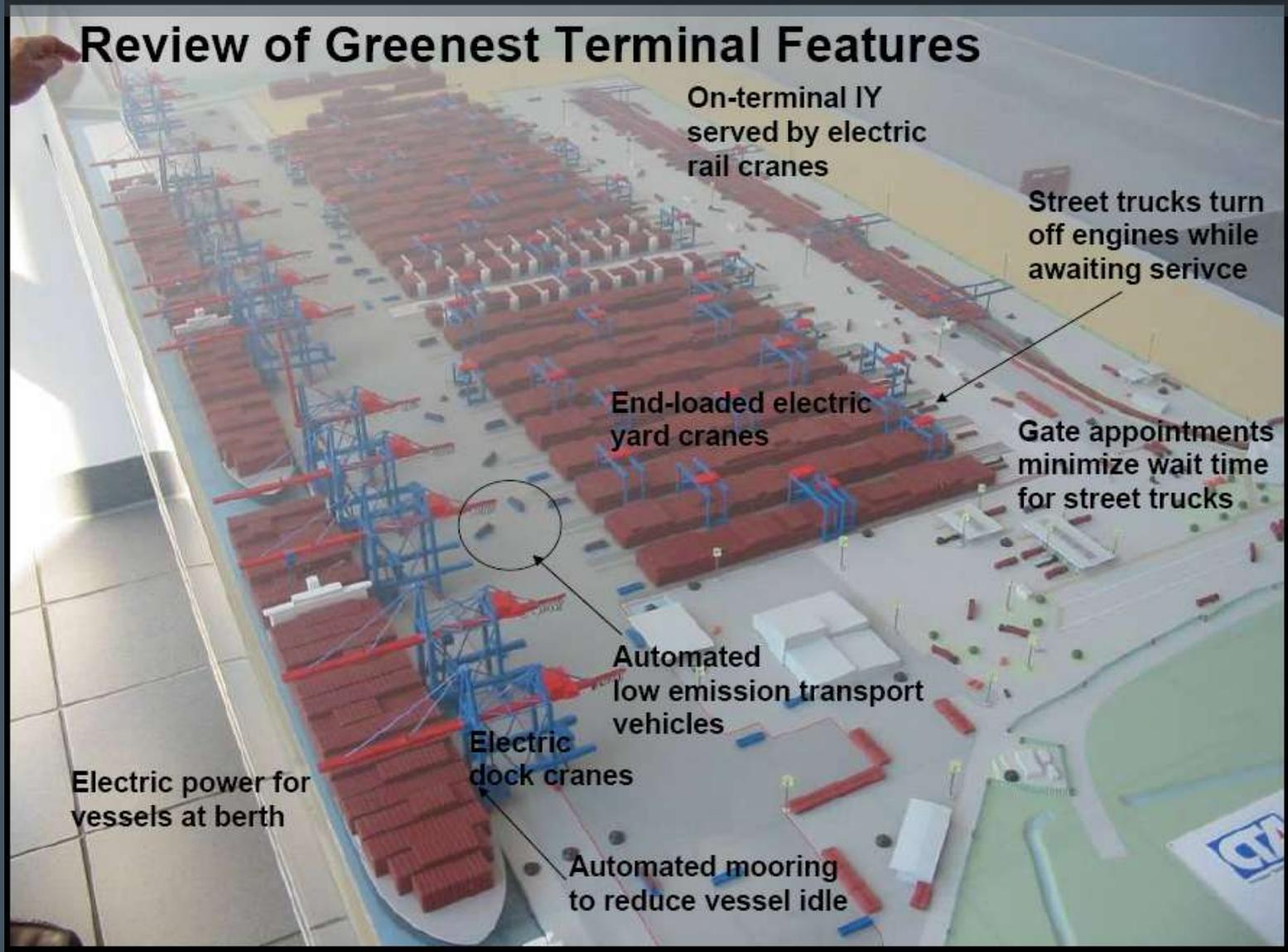


Alternative Maritime Power



Environmental Solutions

Review of Greenest Terminal Features



On-terminal IY served by electric rail cranes

Street trucks turn off engines while awaiting service

End-loaded electric yard cranes

Gate appointments minimize wait time for street trucks

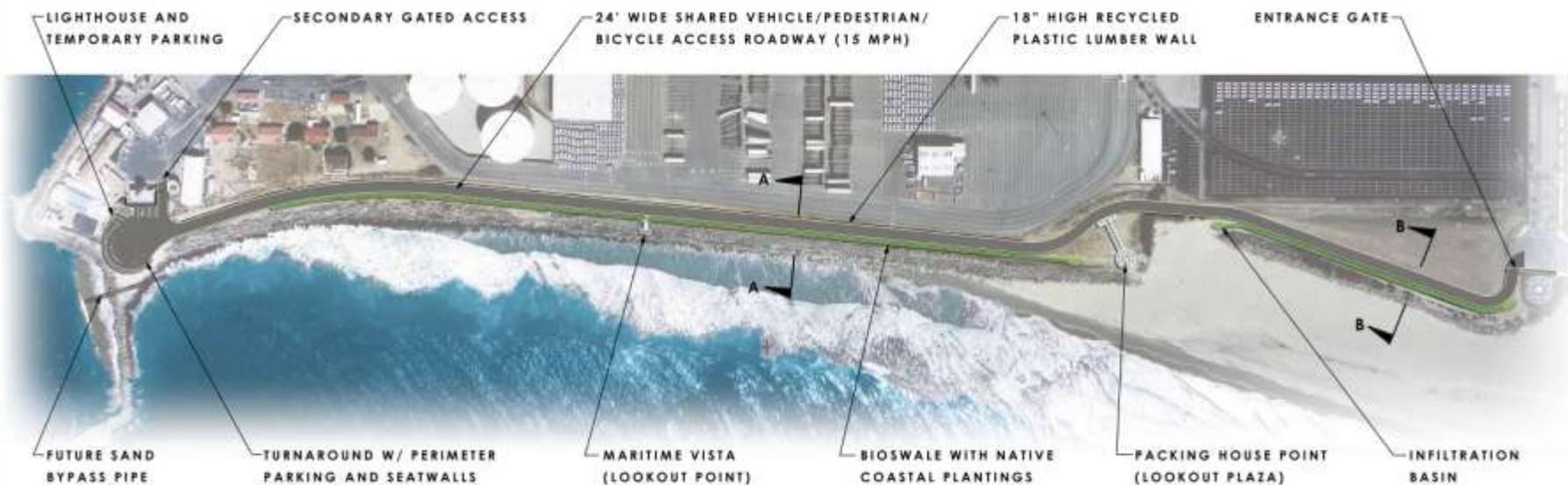
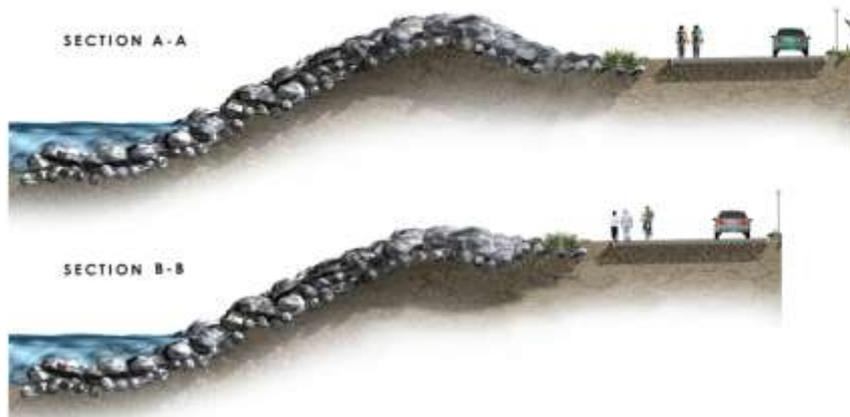
Automated low emission transport vehicles

Electric power for vessels at berth

Electric dock cranes

Automated mooring to reduce vessel idle

Mitigation Measures



SOUTH ACCESS ROAD AND REVETMENT RESTORATION

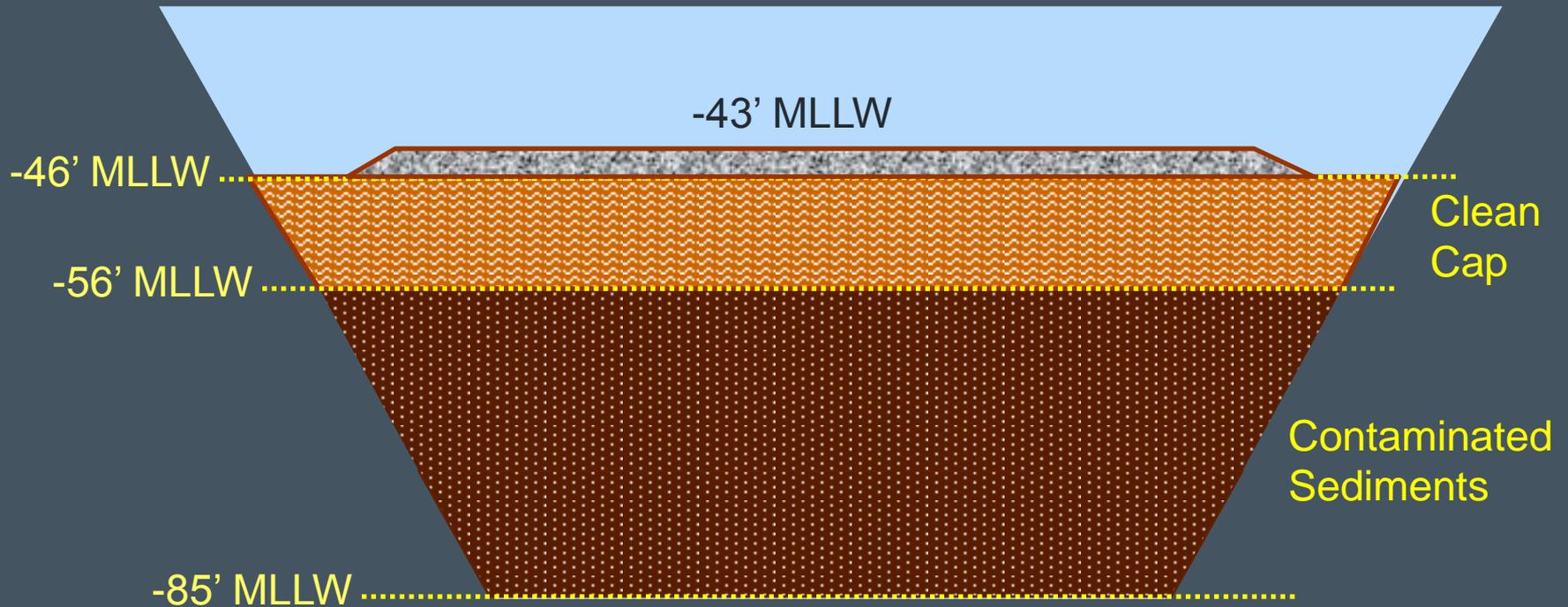
Other Factors

Contaminated Sediments



Other Factors

CAD Cross Section



Thank you