


Challenges of the Panama Canal Expansion Dredging Plan

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Dredging/Dry Excavation

20 May 2008



A Unique Program

Cutting a new channel through hills to a new set of Locks

Dredging through the Continental Divide



Expansion Program Dredging Scope

➤ Entrance Channels

- ◆ Pacific

- ◆ Atlantic

➤ Freshwater Dredging

- ◆ Gatun Lake

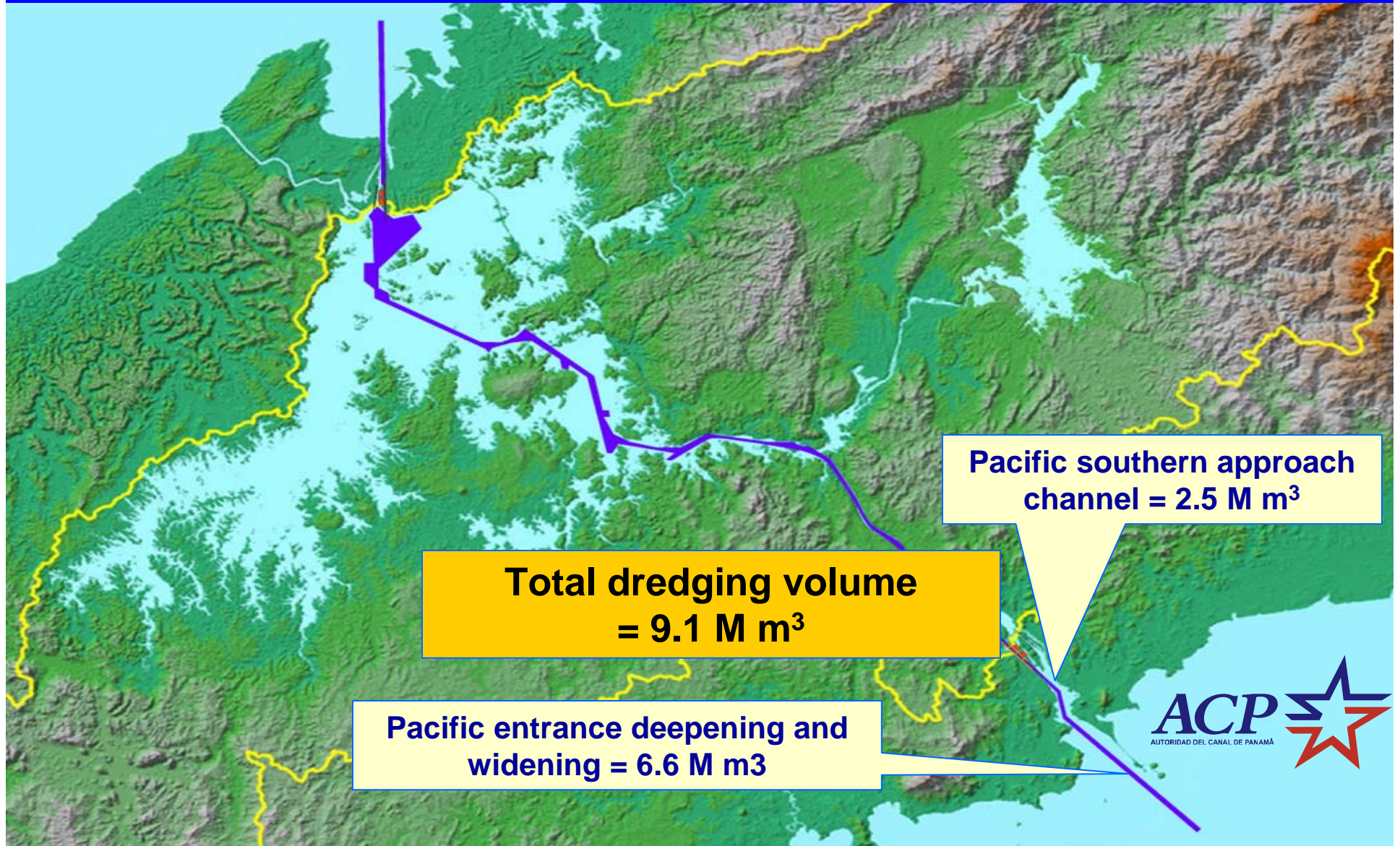
- ◆ Pacific Access Channel/Dry Excavation

- ◆ Gaillard/Culebra Cut

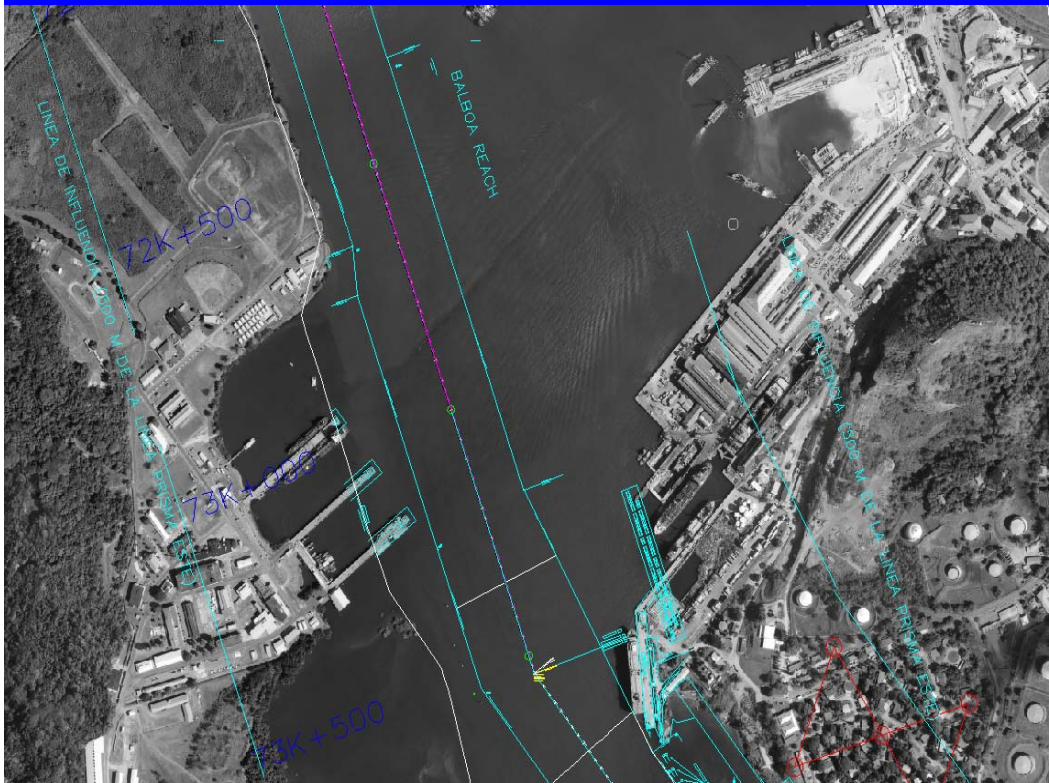
Lessons



PACIFIC ENTRANCE CHANNEL

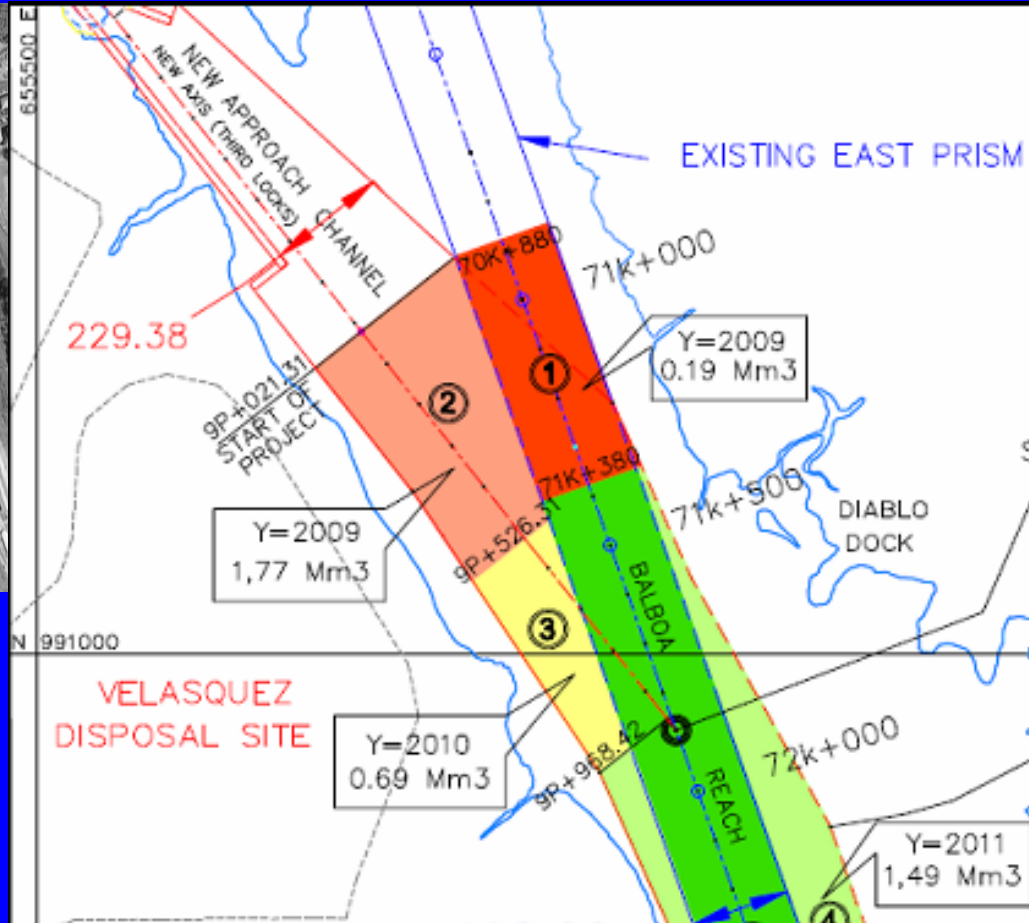
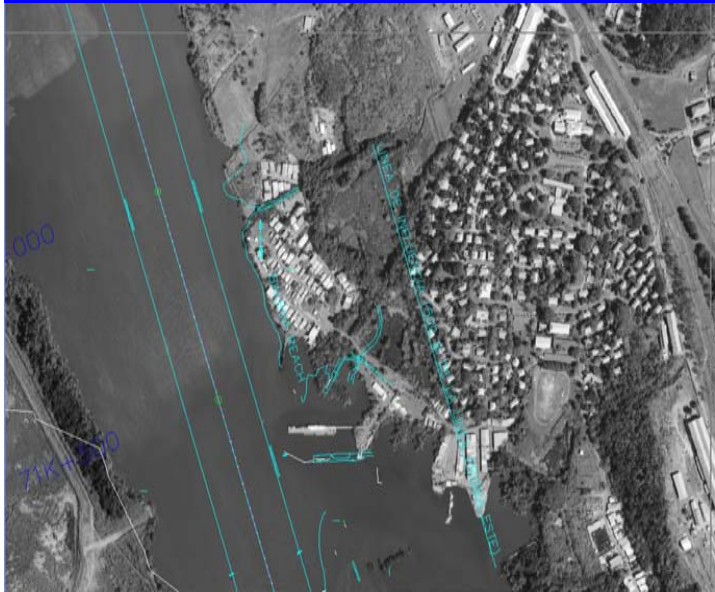


PACIFIC ENTRANCE CHANNEL DESCRIPTION

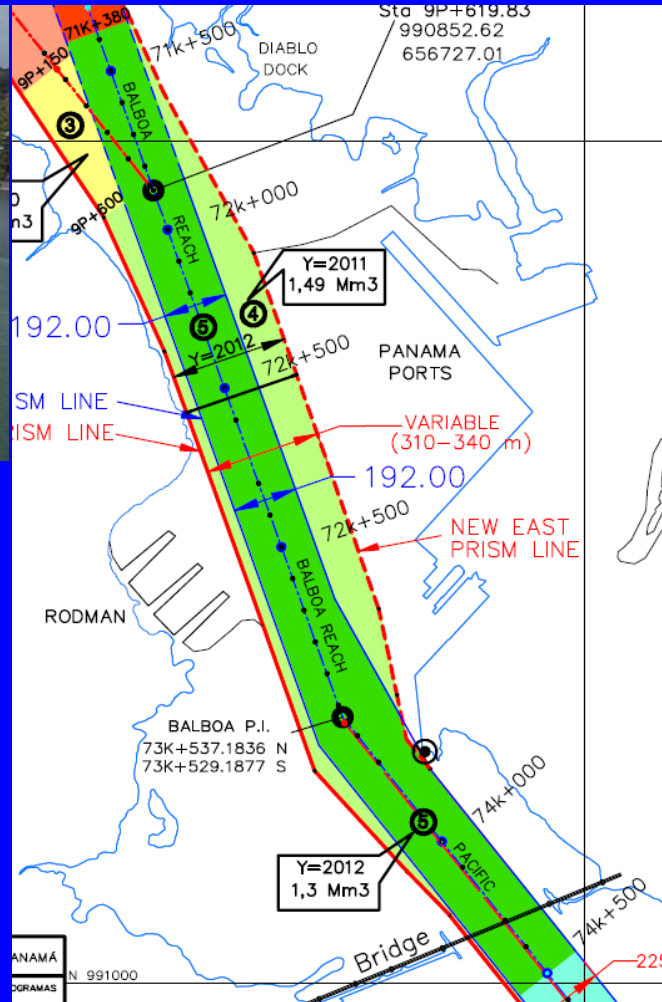


- Widening from 192 m to a minimum 225 m
- Deepening from -14.2 m to -15.5 m MLWS
- Total est. volume: 9.1 M m³
- Length 14.4 Km
- Award: 31 March 2008
- Estimated Start: July 2008
- Duration: 4 years

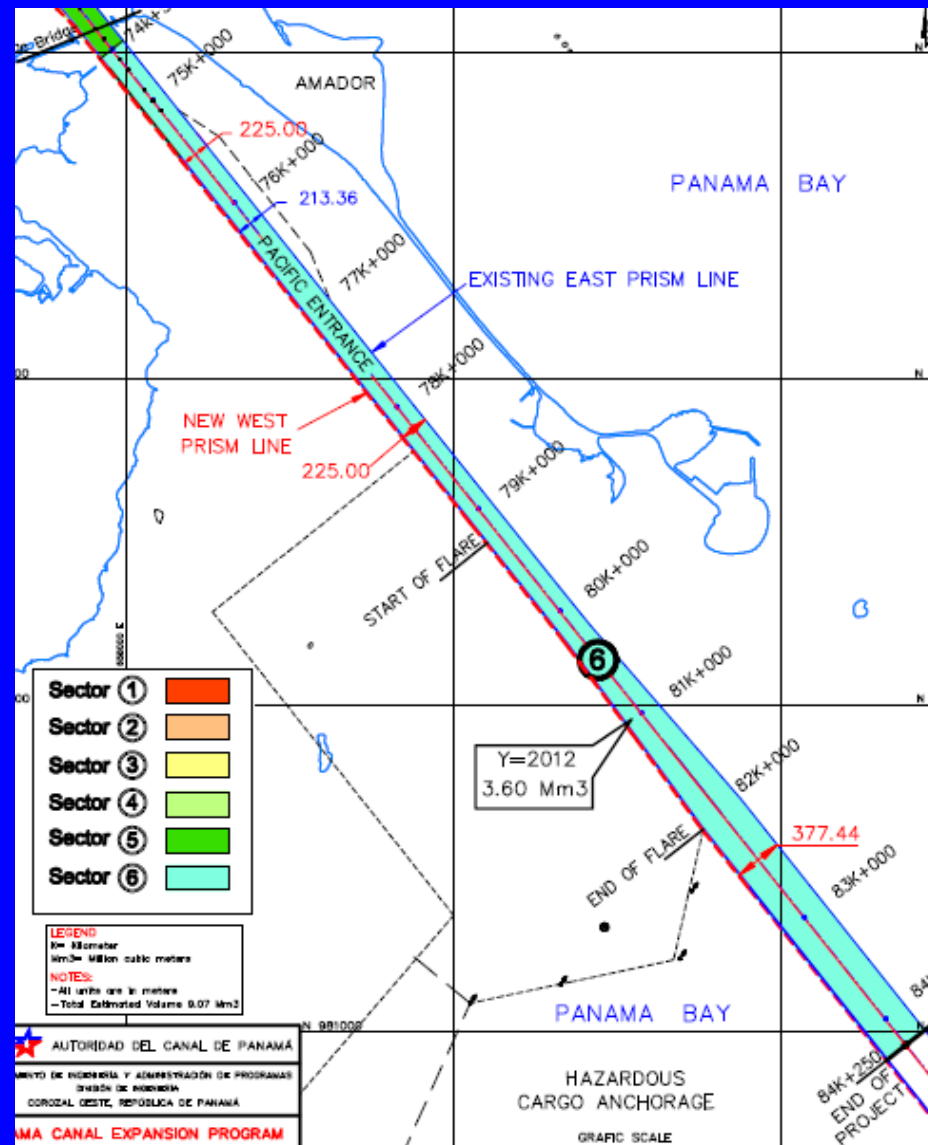
PACIFIC SOUTH APPROACH CHANNEL



PACIFIC ENTRANCE DREDGING NORTHERN SECTOR

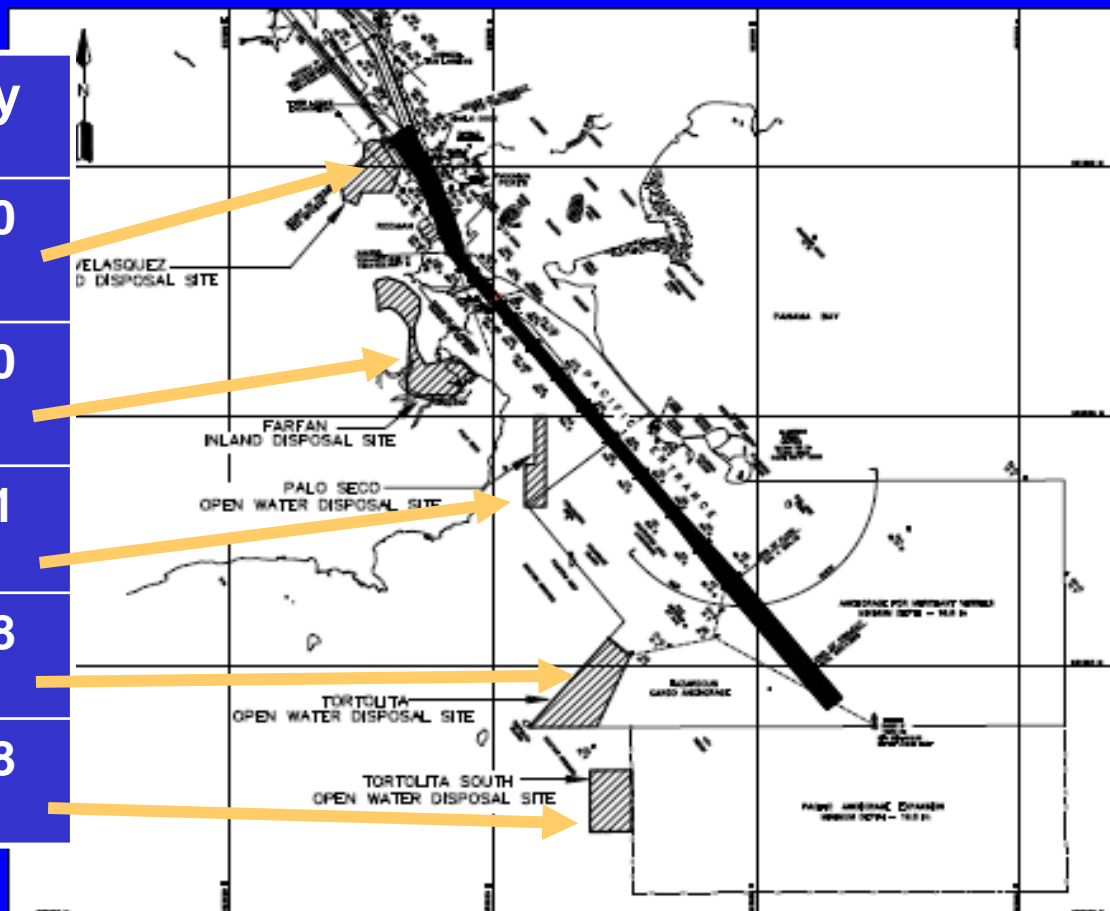


PACIFIC ENTRANCE DREDGING SOUTHERN SECTOR

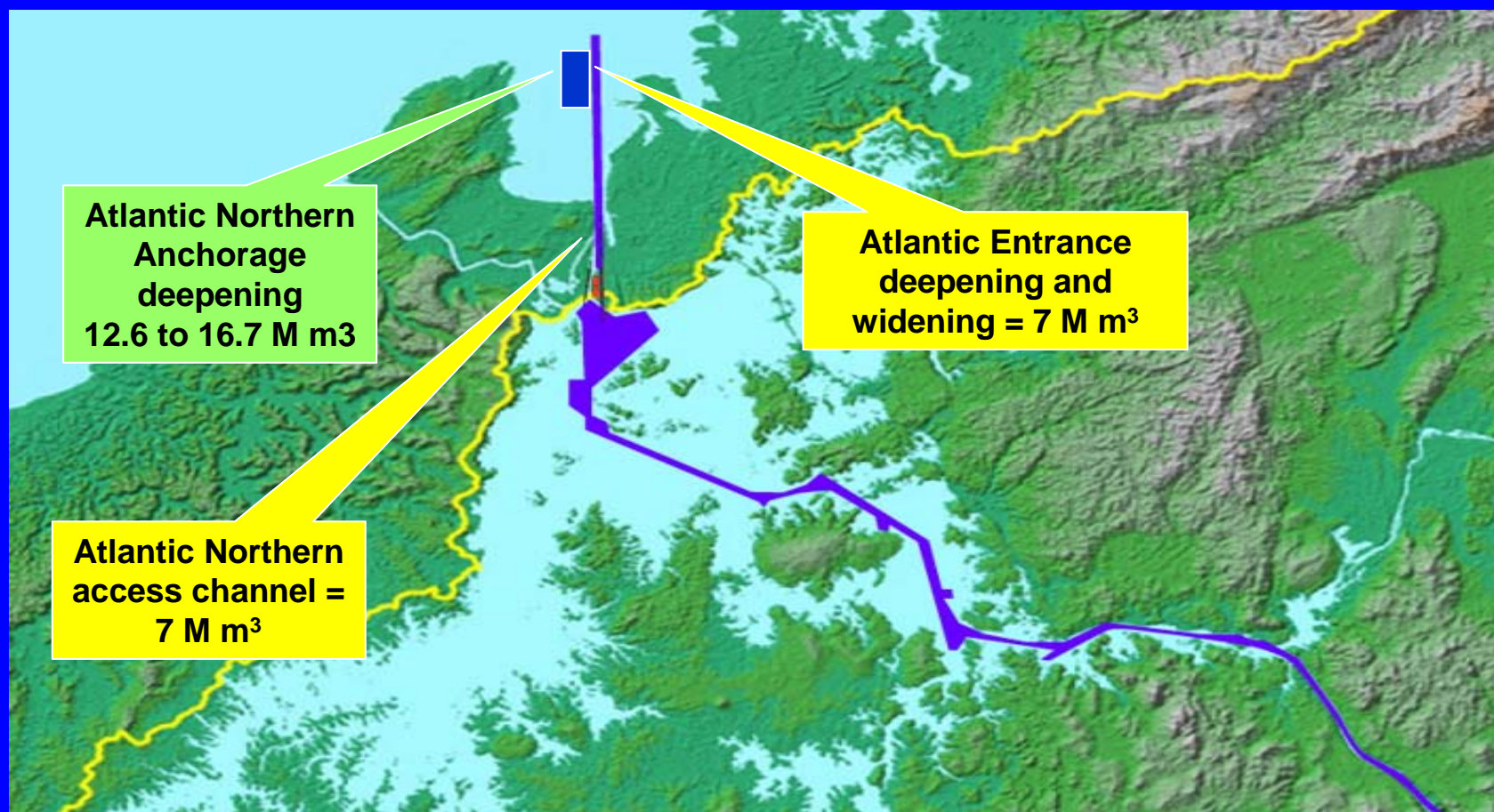


PACIFIC ENTRANCE CHANNEL DREDGED MATERIAL DISPOSAL

Area/Type	Capacity
VELASQUEZ (Upland)	2,294,000
FARFAN (Upland)	3,657,280
PALO SECO (Open Water)	1,492,811
TORTOLITA (Open Water)	7,313,678
TORTOLITA SOUTH (Open Water)	8,652,588



ATLANTIC ENTRANCE CHANNEL



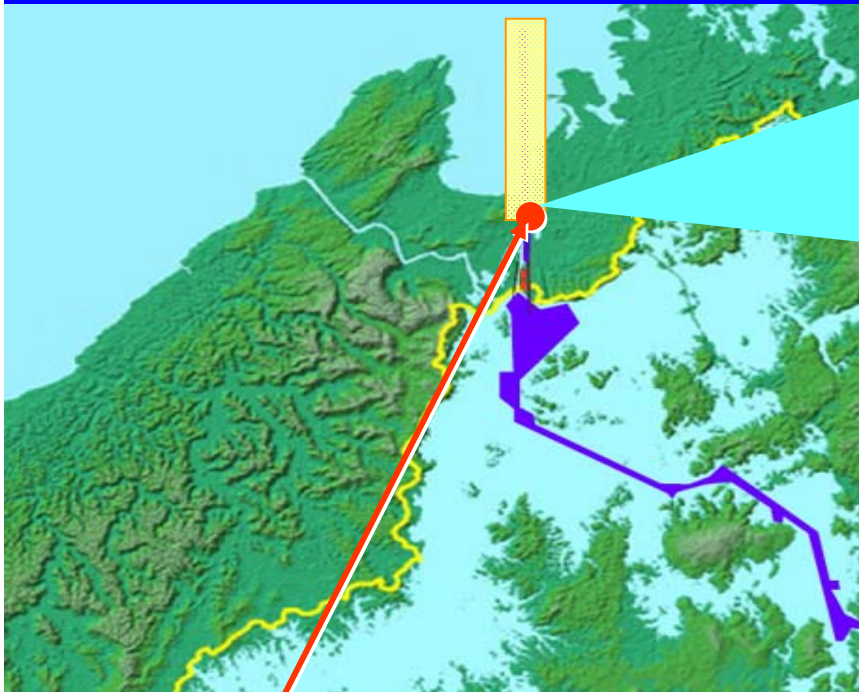
Total estimated Atlantic Dredging volume 26.6 to 30.7 M m³

THE ATLANTIC ENTRANCE AND NORTH APPROACH CHANNEL

Atlantic Entrance

1 Contract

- Widening from 192 m to a minimum 225 m
- Deepen: -14.2 m MLW. to -15.5 m MLW.
- Dredging = 14 M m³
- Dry excavation = 1 M m³
- Total: 15 Mm³ (Million cubic meters)
- Material: mud, silt, clay and sand
 - Approach Channel: Hardness <15 Mpa.



ATLANTIC ENTRANCE

SECTION	LENGTH (km)	CHANNEL WIDTH (m)	DESIGN DEPTH (m)
ATLANTIC ENTRANCE	9.80	225 / 260	15.5
NORTH APPROACH CHANNEL	4	218	15.5

Freshwater Dredging

- **Gatun Lake**
- **Pacific Access Channel Dredging**
- **Gaillard/Culebra Cut**



FRESHWATER DREDGING VOLUMES

ACP RESOURCES	M m ³
Gatún Lake	10.7
Gaillard Cut	3.3
Subtotal	14 M
CONTRACTS	
Gatún Lake North (FFP contract)	5.1
Charter Option (Equipment Rental)	3.8
Pacific Access Channel (FFP contract)	3.2
North Plug (Pacific Locks)	0.5
Intermediate Plug (Pacific Locks)	0.4
Subtotal	13 M

Grand Total Freshwater Dredging

27 M m³



Gatún Lake



Gatún Lake

Fixed Price Contract:

- 5 M m³, from Gatún to Buena Vista Reach.
- Option: 2.5M m³ Mechanical Dredging in other reaches
- Includes island removal, drilling & blasting, dry excavation

Estimated Award : February 2009

Estimated Start: June 2009

Estimated Completion: October 2013



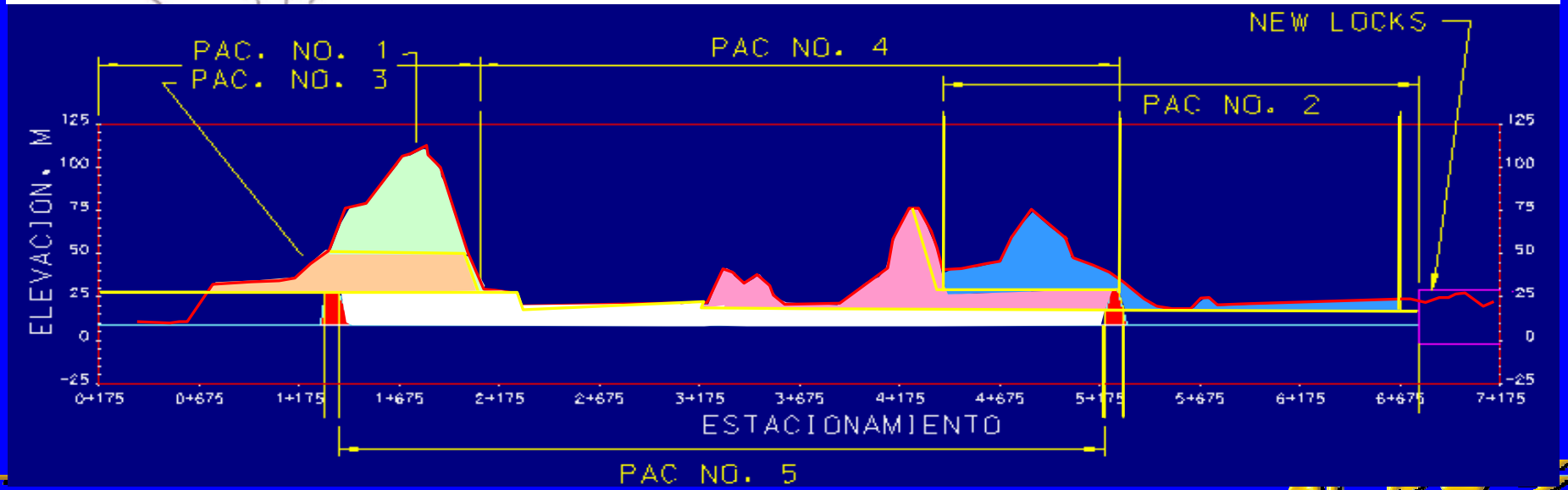
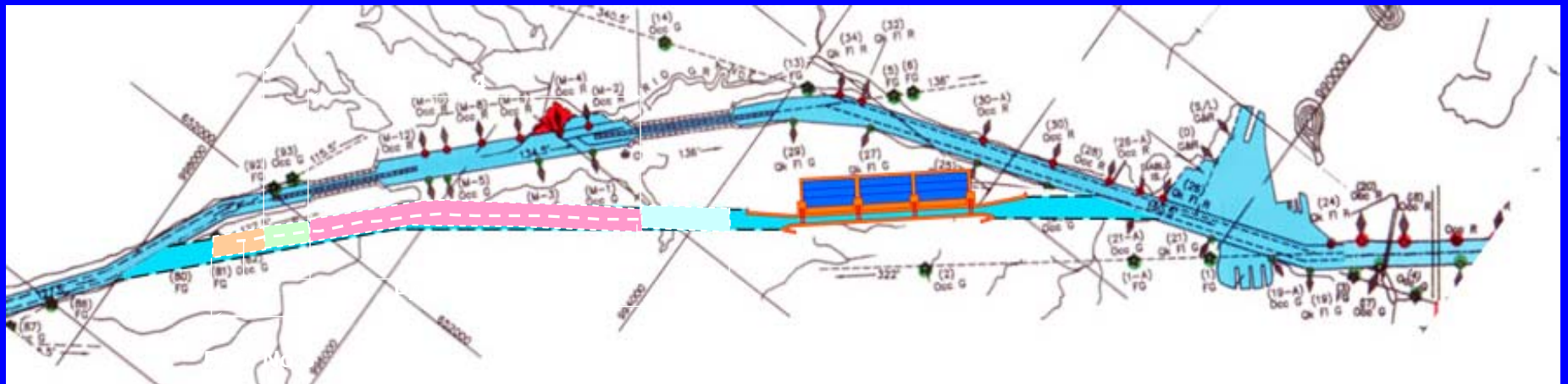
Pacific Access Channel



Dry Excavation



Pacific Access Channel Sequence of Excavation



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Pacific Access Channel Dredging

Fixed Price Contract:

- 3.2 M m³, north end of the Access Channel to the Pacific Locks
- Estimated Award : Feb 2009
- Est. Start: June 2009
- Est Completion: May 2011

The Gaillard/Culebra Cut



Dredging in the Cut

- Significant operating restrictions
- Limited disposal areas for hydraulic dredging: ACP's New Cutter Suction Dredge maximum operating range
- Disposal Elevation above water level ranges from 10 to 130 m.
- ANAM (Environmental Requirements)
- Cycle times for mechanical dredging range from 2 to 6 hours



Slides



Slides



Slides



Dredging Lessons

- **Programs must be viewed as Programs – Not a collection of independent Projects**
 - Master Program Schedule
- **Dredged Material Disposal Areas are not the sexiest part of an Authority's portfolio**

Nevertheless, a competent party must be assigned the responsibility to survey, permit, maintain, and manage these resources

Dredging Lessons

- **Marshalling the resources to execute a major program takes time. Start early acquiring:**
 - **Geophysical investigations/Surveys**
 - **Dredging Equipment**
 - **Support Equipment and Personnel (Pilots, tug captains)**
 - **Contract Scopes of Work, Bidding Time, Mobilization**
- **Partnering with Pilots, Port Interests, Environmental Agencies, Contractors can have significant beneficial impacts to a dredging program. **Interference = Risk****
- **Impacts of Fuel Prices, Foreign Exchange, and the world dredging market can pose significant risks**

CONCLUSION



QUESTIONS?

