

# The Port of Astoria



# Presented to Lower Columbia Solutions Group 7/8/2011

- **The Location**
- **The Problem**
- **Possible Contributing Factors**
- **Solutions?**

# The Location



**PIERS 1, 2 & 3**





# Central Waterfront Activity

- **Oregon's Blue- Water Port**
- **Deep Draft Capable Piers**
- **Cargo Handling**
- **Cruise Ships**







# Central Waterfront Activity

- Dredges
- Research Vessels
- Military Vessels



## PORT OF ASTORIA

### SHIP CALLS 1999-2010

#### CALENDAR YEAR

#### TOTAL SHIP CALLS

1999	91
2000	102
2001	83
2002	57
2003	47
2004	40
2005	48
2006	46
2007	43
2008	42
2009	39
2010	40
2011	60 estimated

1989

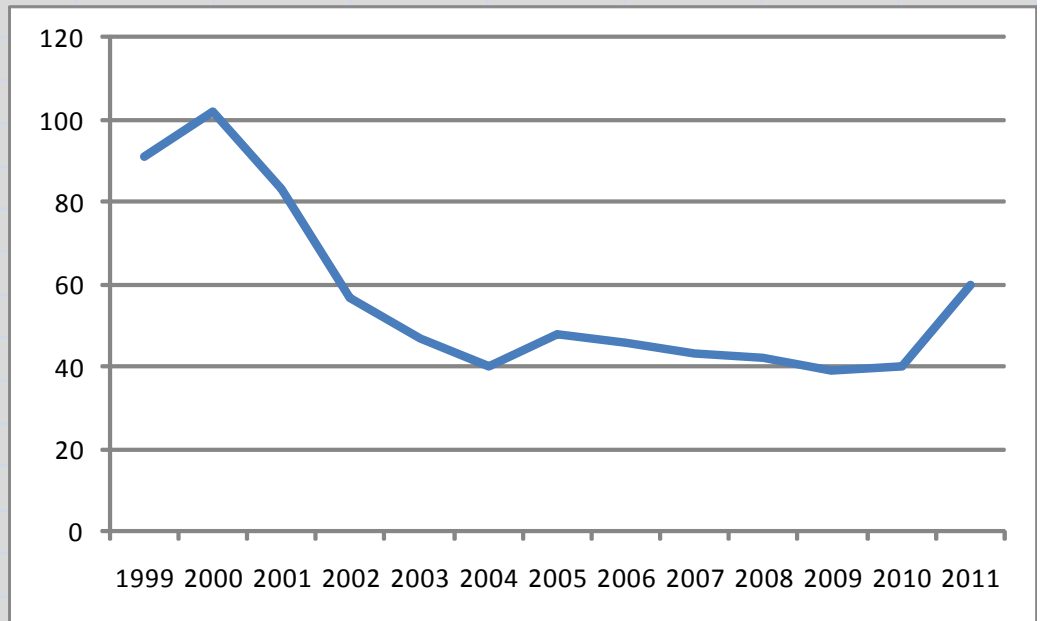
52 (LOG SHIPS ONLY)

1990

42 (LOG SHIPS ONLY)

1991

24 (LOG SHIPS ONLY)





# Central Waterfront Activity

- Warehousing
- Fishing Industry
- Marina
- Hotels
- Restaurants
- Tourism







# Fishing Industry







# Moorage

WEST BASIN





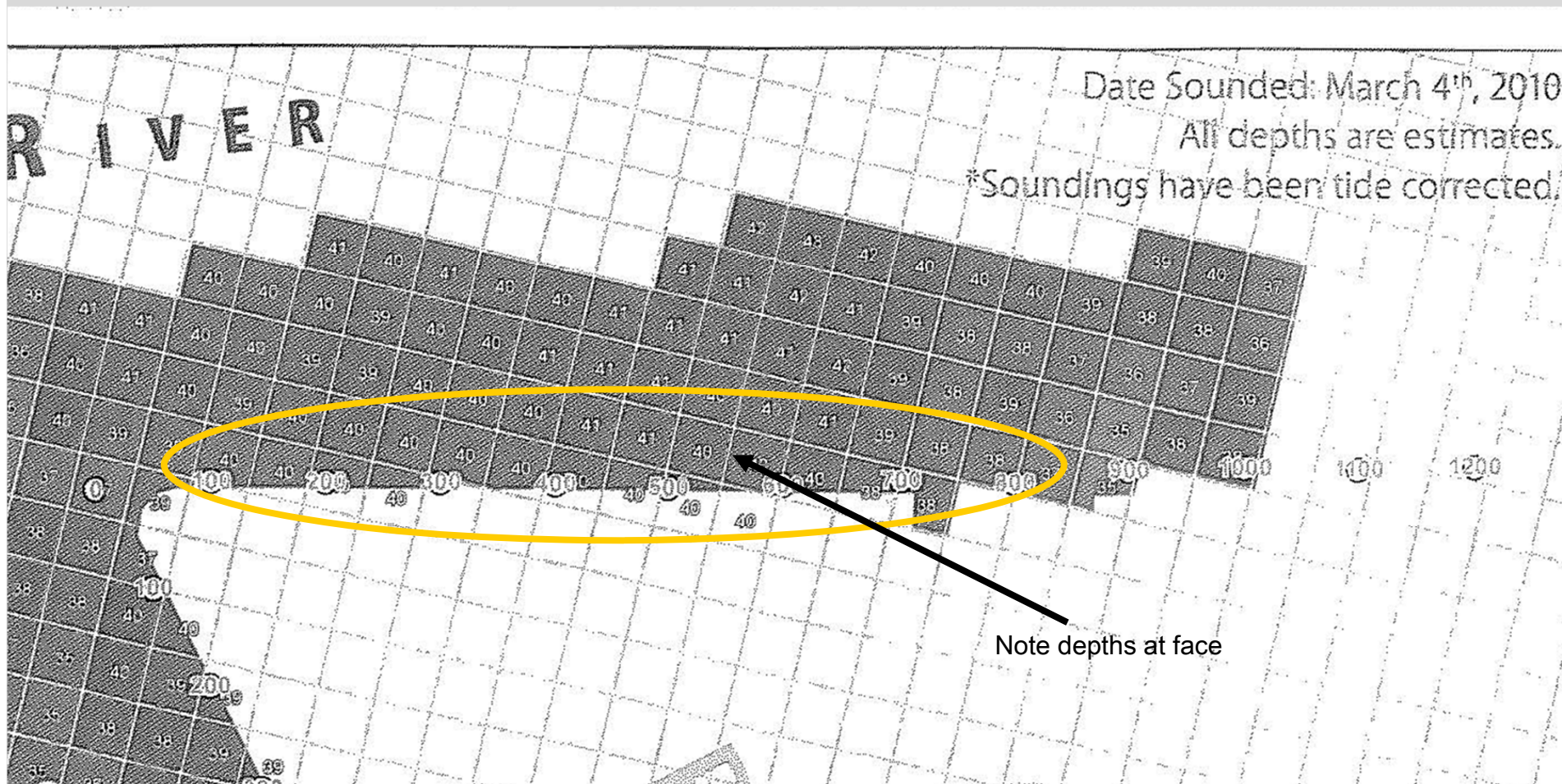
## The Problem: Sedimentation



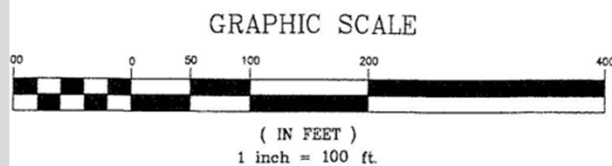
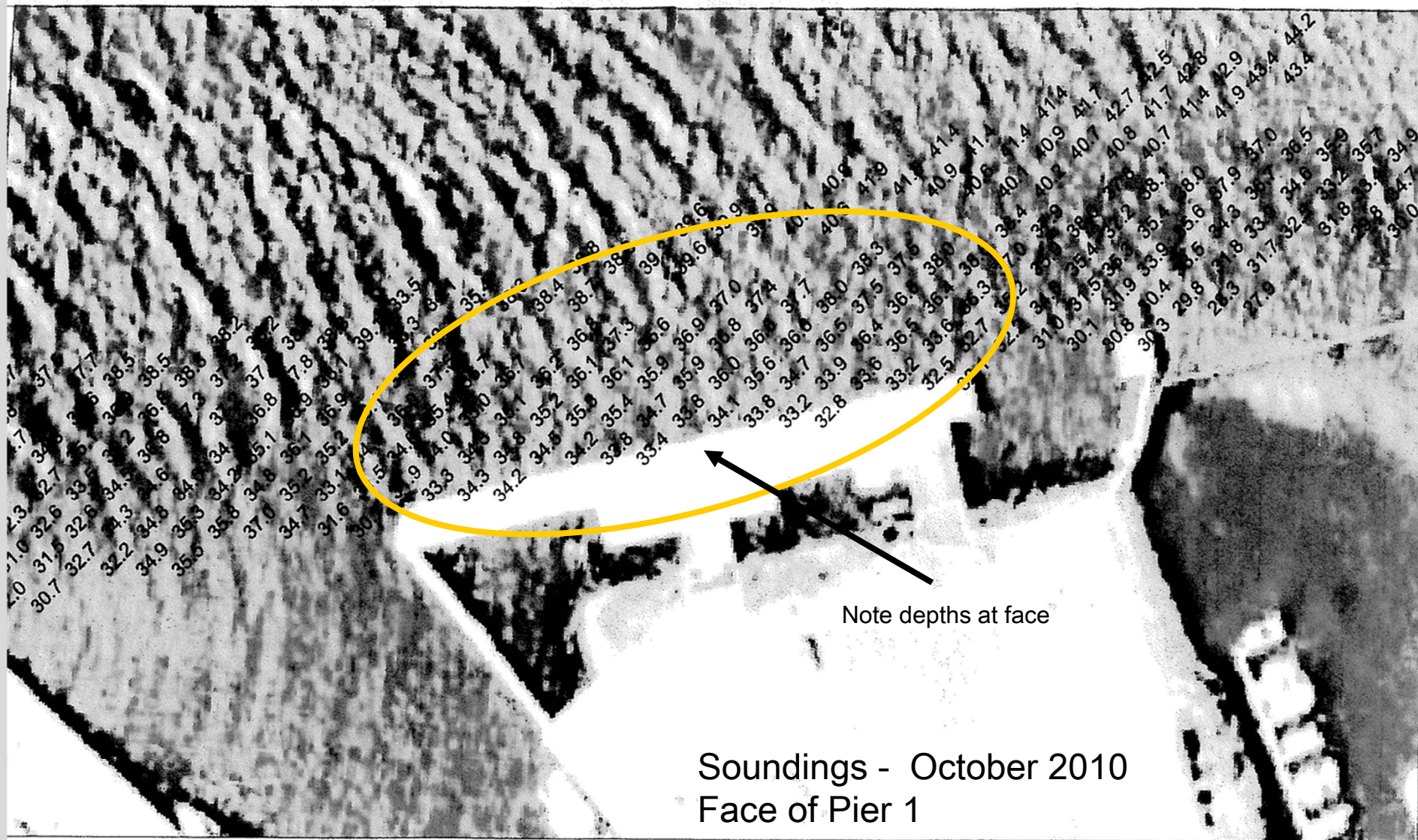
- “At least the Port is going to lower the moorage rates”



## Soundings - March 2010 Face of Pier 1







## Port of Astoria Pier 1 Astoria, OR

Survey date: October 19, 2010  
Vertical Datum: MLLW  
Surveyor not liable for depths





## Soundings - March 2011 Face of Pier 1 (Post-Dredge)

Port of Astoria

Port Docks Maintenance Dredging Project

Time/Date: 10:00 - 12:00a.m. 29 March 2011

Depths adjusted for MLLW = 0 Tide

EBB

Columbia River



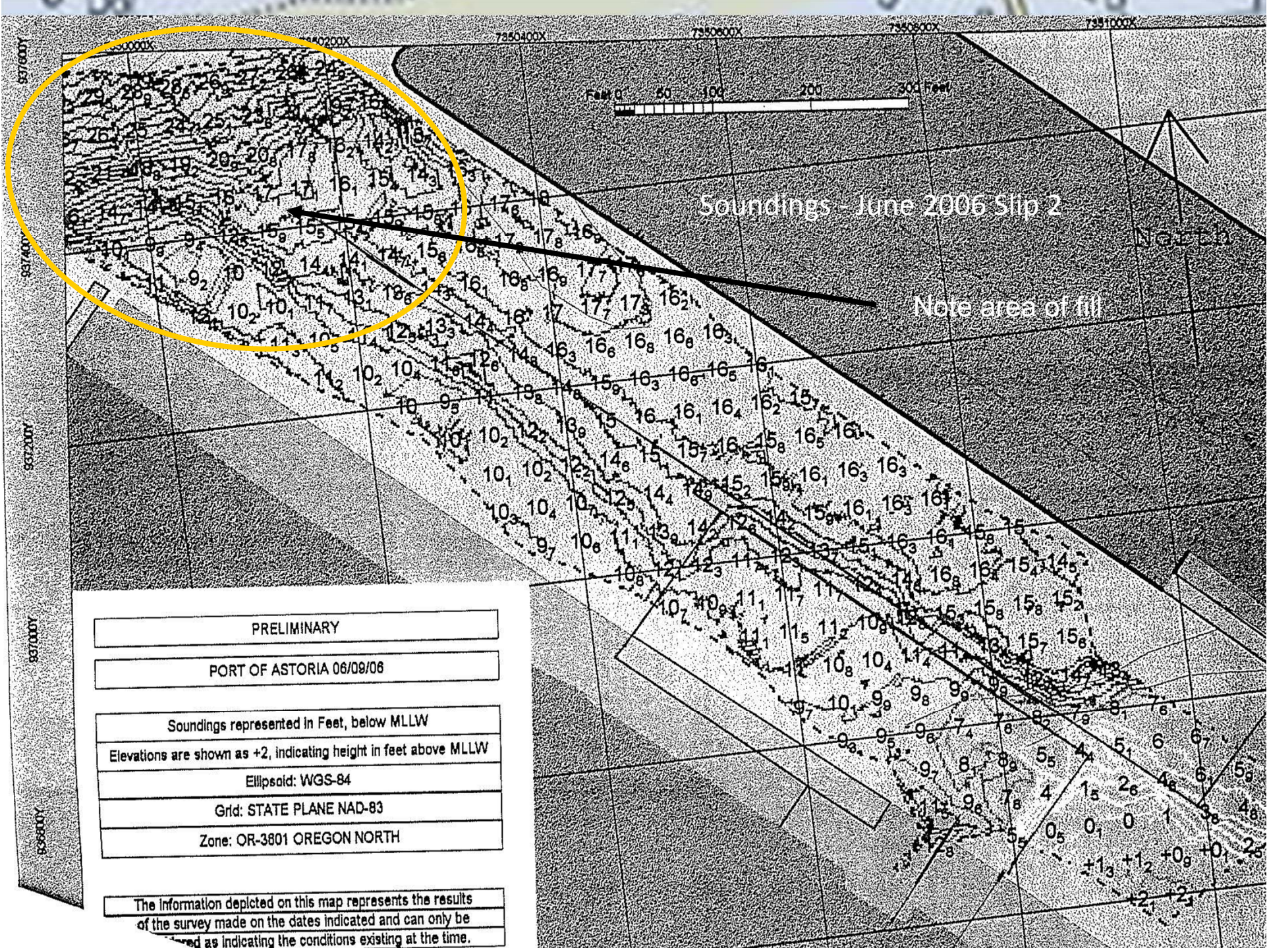
FLOW

Note area of  
still questionable depths

Note depths at face







PRELIMINARY

PORT OF ASTORIA 06/09/06

Soundings represented in Feet, below MLLW

Elevations are shown as +2, indicating height in feet above MLLW

Ellipsoid: WGS-84

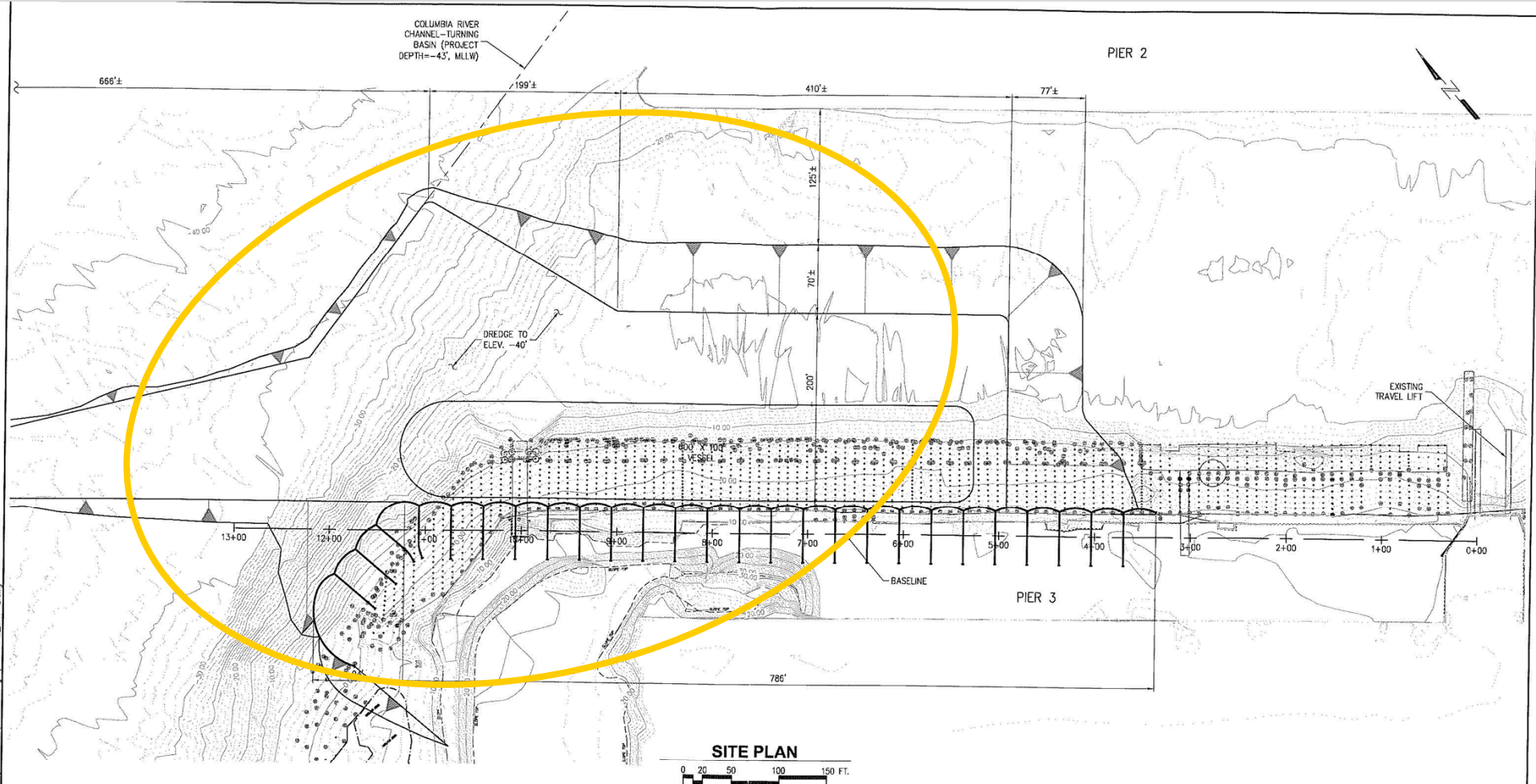
Grid: STATE PLANE NAD-83

Zone: OR-3801 OREGON NORTH

The information depicted on this map represents the results of the survey made on the dates indicated and can only be used as indicating the conditions existing at the time.



# Soundings - 2011 Slip 2



OPEN CELL® and OPEN CELL SHEET PILE® are registered trademarks of PND Engineers, Inc. The OPEN CELL system is patented. PATENT - US 5,715,964 B2 PATENT - US 7,018,141 B2 PATENT - US 7,488,140 B2

**PND**  
ENGINEERS, INC.

811 First Avenue, Suite 570  
Seattle, Washington 98104  
Phone: 206-624-1387  
Fax: 206-624-1388  
mail@pndengineers.com

This drawing, including the principle of design, is the intellectual property of PND Engineers, Inc. and is submitted with the agreement that it is not to be reproduced, copied, or used in any manner other than its intended use on this project, and further, shall not be used in any manner that would be detrimental to PND. Use of this drawing and the associated design principles is construed as acceptance to this agreement and provisions.

PND ENGINEERS, INC. IS NOT RESPONSIBLE FOR SAFETY PROGRAMS, METHODS OR PROCEDURES OF OPERATION, OR THE CONSTRUCTION OF THE DESIGN SHOWN ON THESE DRAWINGS. WHERE SPECIFICATIONS ARE GENERAL OR NOT CALLED OUT, THE SPECIFICATIONS SHALL CONFORM TO STANDARDS OF INDUSTRY. DRAWINGS ARE FOR USE ON THIS PROJECT ONLY AND ARE NOT INTENDED FOR REUSE WITHOUT WRITTEN APPROVAL FROM PND. DRAWINGS ARE ALSO NOT TO BE USED IN ANY MANNER THAT WOULD CONSTITUTE A DETRIMENT DIRECTLY OR INDIRECTLY TO PND.

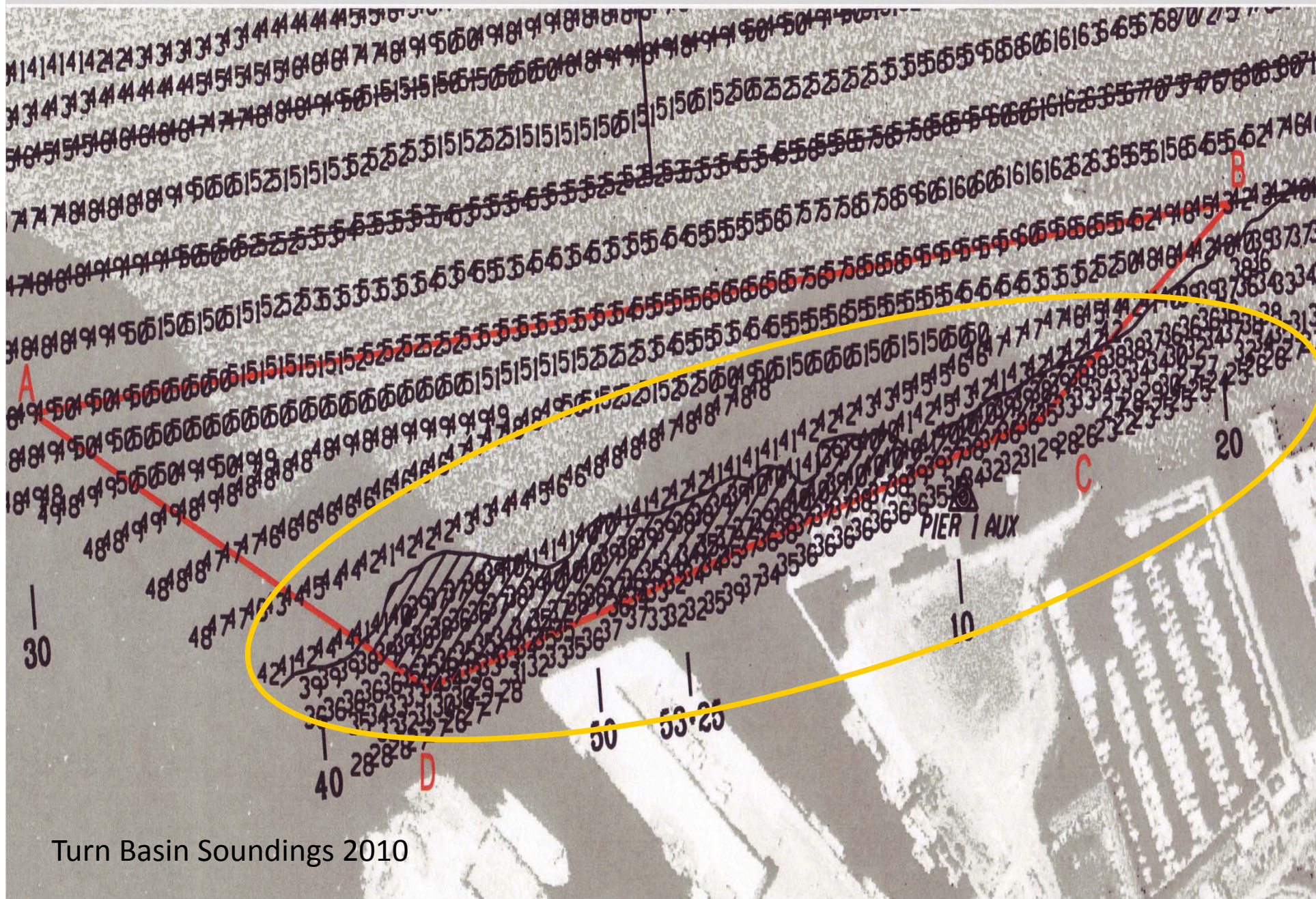
REVISIONS		
REV	DATE	DESCRIPTION

PROJECT:			
ASTORIA - PIER 3			
MATERIAL HANDLING BULKHEAD			
TITLE:			
OPTION 2			
PHASE I SITE PLAN			
DESIGNED BY:	TWO	PROJECT NO:	114043.01
DRAWN BY:	GRO	DATE:	JUNE 2011
CHECKED BY:		SCALE:	NOTED
SHEET NO:			2 OF 4



## Impact on Turn Basin Area

- **Cross Hatched area less than 40 ‘**
- **Cost to Corps of Engineers**
- **Hazard to navigation in vicinity of Piers**



Turn Basin Soundings 2010



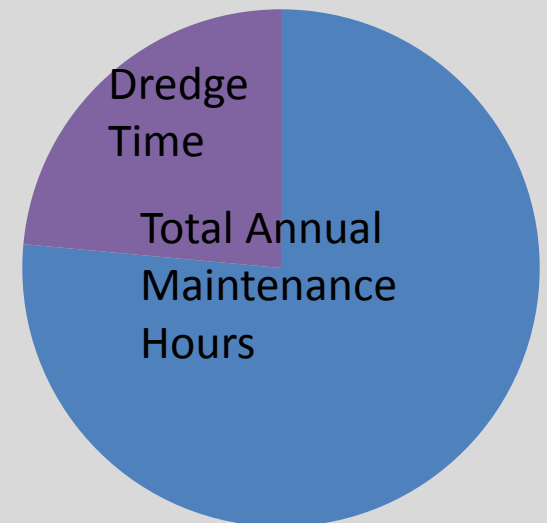
# Port of Astoria Dredging Costs

- Average labor per year –  
last three years = \$128,345.00
- Parts & Supplies –  
average per year = \$19,245.00
- Fuel / Oil –  
average per year = \$44,255.00
- Repairs / Maintenance  
average per year = \$65,982.00
- **TOTAL** average per year = **\$257,825.00**  
*Direct Costs Only*



# Maintenance Impact

- 2007 through 2011 Port has Maintenance crew of 7 to 8 personnel
- During dredge season two crews of three each run two shifts – 5 days per week
- Approximately 30 % of Maintenance man hours per year spent on dredging
- Maintenance deferred



## Other Adverse Impacts

- Increased dredging necessary for Turn Basin
- Potential grounding of loaded cargo vessel
- Double handling of silt as Port dredges then Corps of Engineers dredges
- Cost to Corps of Engineers



## Possible Contributing Factors

- Krone Report
- Dredging Upstream
- Hydrology
- Pier Design
- Young's Bay
- Other



# Investigation of Causes of Shoaling in Slips One and Two, Port of Astoria

By R. B. Krone

1971

## INVESTIGATION OF CAUSES OF SHOALING IN SLIPS ONE AND TWO,

PORT OF ASTORIA

### INVESTIGATION OF CAUSES OF SHOALING IN SLIPS ONE AND TWO, PORT OF ASTORIA

The research was conducted in the region of the Port of Astoria, the investigation of causes of shoaling of material in Slips One and Two, and the recommendations for modifications of the channels and harbor maintenance procedures in this report are based on information obtained during a visit to the port on February 28, including a review of dredging records and by the design of the dredging areas and examination of the facilities themselves, an analysis of samples of spoil material, an analysis of the region of the Port facilities as shown by measurements in a hydraulic model of the Columbia River estuary located at the Corps of Engineers, Dredging Experiment Station, and an knowledge of sediment transportation processes obtained from intensive studies of such processes in a number of estuaries. The following sections describe the sediment material, the general sediment transportable materials, apparent sediment accumulation in the port area, and recommendations.

#### The Sediment Material

Core samples were obtained in the slips and at North Five in the location shown in Figure 1. The sediment particle size distributions of these samples were determined by ASTM methods modified as follows: The wet samples were treated with 3% hydrogen peroxide and bleach, to oxidize the organic matter, then were dispersed with sodium metaphosphate for the hydrometer analysis. The samples were not dried prior to dispersal to avoid difficultly dispersible particle agglomerations that form on drying. The total weight of the solids was determined after the hydrometer analysis, and in replicate sample portions.

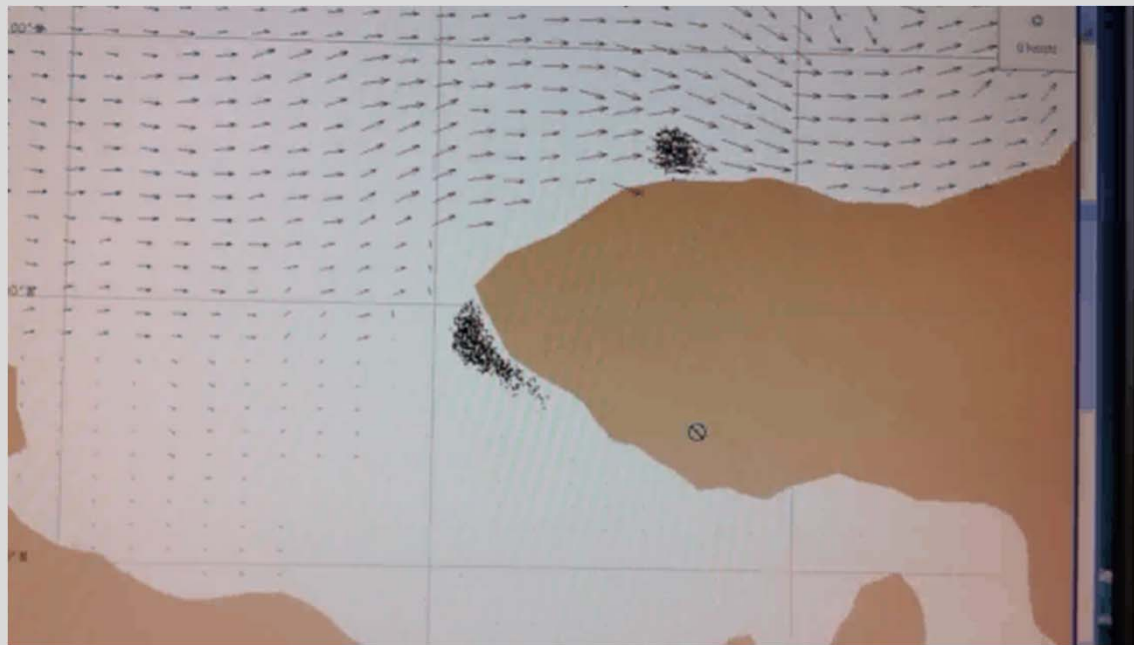
Data from particle size distribution analyses of these samples are presented in Figures 2 through 4. The size distribution plots for stations

Davis, California

May 22, 1971

- Fine sediment as land erosion particles carried by the Columbia, Young's, & Lewis and Clark Rivers
- Onshore breezes generate disturbance which suspend materials
- Suspended sediment can move downstream from the Bay during the ebb then upstream with bottom currents to the slips during the flood

# N.O.A.A. GNOME Simulation





- The shape of the 18 ft. contour in Slip Two supports the conclusion that most of the shoal deposits from water entering the slip during flood flows
- A barrier to flow...at the end of Pier Three is needed
- The proposed turning basin...should be dredged to be as deep or deeper than the slips



## Solutions ?

- Continue minimum maintenance dredging
- Corps of Engineers dredging Turn Basin
- Wing Dams
- Other ?

# Recommendations

- Study / Examination of benefits of Wing Dam installation to reduce infill of Port of Astoria Pier areas
- Financial assistance and support for Port request for Corps of Engineer funding
- Support 2013 request for Turn Basin dredge funding



# Benefits of Solutions

- Reduced Dredging Costs to Port and Corps of Engineers
- Employment for Clatsop County and Oregon

