



# **SUMMARY**

# **FALMOUTH CRUISE PORT EXPANSION**

**Maintenance & Capital Dredging**

# PROJECT SUMMARY

## MAINTENANCE & CAPITAL DREDGING FALMOUTH CRUISE PORT (South Berth)

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### Background

The Historic Falmouth Cruise Port is located in the town of Falmouth, Trelawny on the north coast of Jamaica and consists of a cruise ship pier constructed in late 2009 with the capability of accommodating two megaliner cruise vessels. The port started operations in 2011 and to date has received the most cruise ships of all Jamaica's cruise ports.

The Port Authority of Jamaica (PAJ) is seeking to undertake dredging of the east side of the Historic Falmouth Cruise Port (South Berth) to widen the berth pocket and a section of the access channel. Capital and Maintenance Dredging works will be carried out to allow the largest cruise vessels to dock at both the east and west berths/sides of the port simultaneously. Previous dredge works saw the basin having a depth of 12m with the berth pockets being 11.6m to the west (North Berth) and 10.6m to the east (South Berth).

Due to the presence of valuable natural resources in the area, the PAJ engaged the services of environmental consultant company Smith Warner International Limited (SWIL) to analyze the impacts from dredging at the Falmouth Cruise Port. Analyses included bathymetric (depth) and underwater surveys as well as data collection of parameters such as water quality and sediments.

It is important to note **that the proposed dredge footprint is situated in an area previously altered and impacted by dredging works**. Recommendations were proposed for minor realignment of the ship channel widening to permit important marine resources, such as hard corals found in the northern section (Exhibit 1) to remain undisturbed.

### Methodology and Equipment Type to be Used

The dredging works will be carried out by a Trailing Hopper Suction Dredger with an expected hopper capacity of approximately 11,000 m<sup>3</sup>. Additional dredging equipment may be employed as determined by the contractor.

The dredger will operate 24 hours per day and seven (7) days per week including all local and other holidays. Dredging operations will be conducted in repeated cycles with the following activities comprising one cycle: dredging; sailing loaded; discharging; sailing empty.

- Dredging – dredged material will be placed into the hopper using a sectional dredging arm.
- Sailing loaded – once hopper is full, vessel will sail to disposal site
- Discharging – unloading of dredged material at the disposal site by opening hopper

- Sailing empty – vessel will return empty to dredge area to commence dredging again.

## Volume Estimates

An estimated **one hundred and forty thousand cubic metres** (140,000 m<sup>3</sup>) of material will be removed from the seafloor at the location shown on the attached Exhibit 2 which illustrates the proposed dredge slope represented by purple hatched markings.

The breakdown of estimated volume is as follows:

<u>LOCATION</u>	<u>VOLUME</u>
East Berth	140,000 m <sup>3</sup> (maintenance & capital) dredge to 11.6m

## Location of Disposal Site

The proposed disposal site for the dredge spoil is the area approved by NEPA in previous capital dredging works located at least 2.5 nautical miles offshore at the 1000 m contour and not closer than the coordinates 18° 31'58.04"N and 77° 38'46.22"W (see attached Exhibit 3).

## Type of Material

Material composition of the dredge spoil is expected to be a mixture of high sand and significant silt and clay content. The presence of solid waste and other land-based source material is also expected.

## Benthos

A benthic survey was conducted by SWIL to identify species which could face potential negative impacts from dredging works and results indicate low ecological value of the proposed dredge footprint. Limited living significant marine resources - such as corals and fish - are located in the proposed dredge area presumably due to modification from previous activities as evidenced by the SWIL Impact Analysis October 2016 Report.

In general, dredging in a coral reef environment is likely to have some negative impact, however **the proposed dredge footprint is located in an area previously altered and impacted by dredge work**. The subsequent dredge impacts will be dependent on duration of the dredging operations, the equipment and proposed technique to be used.

A total of eleven (11) hard corals will need to be relocated along with any invertebrates present. Minor realignment of the proposed ship channel will exclude the hard coral heads identified in the northern shallow section of the dredge footprint – colonies will remain in their existing locations (Exhibit 1).

The proposed dredge slope and basin consisted mainly of non-living substrate, particularly silt with macroalgae being the dominant living substrate type. Fish diversity and abundance were low and no seagrass species were found in the proposed dredge area.

## **Mitigation Measures**

Given the proximity of the existing reef to the proposed dredge area, mitigation measures have been proposed including relocation of some corals and invertebrates.

Recommendations from the SWIL October 2016 report include the use of the coral relocation site from the previous capital dredge work of 2009 for any hard coral relocation provided that the site possesses complementary features (regarding space and species competition) and is exempt from potential harmful impacts such as ship groundings and sedimentation.

Minimization of sediment plume during dredging operations will be done using turbidity barriers to help protect the existing marine community. Dredging activities will be suspended in cases of adverse sea conditions and abnormal ocean parameters to further reduce the impact of sediment suspension on marine resources in close proximity to the dredging site.

## **Duration**

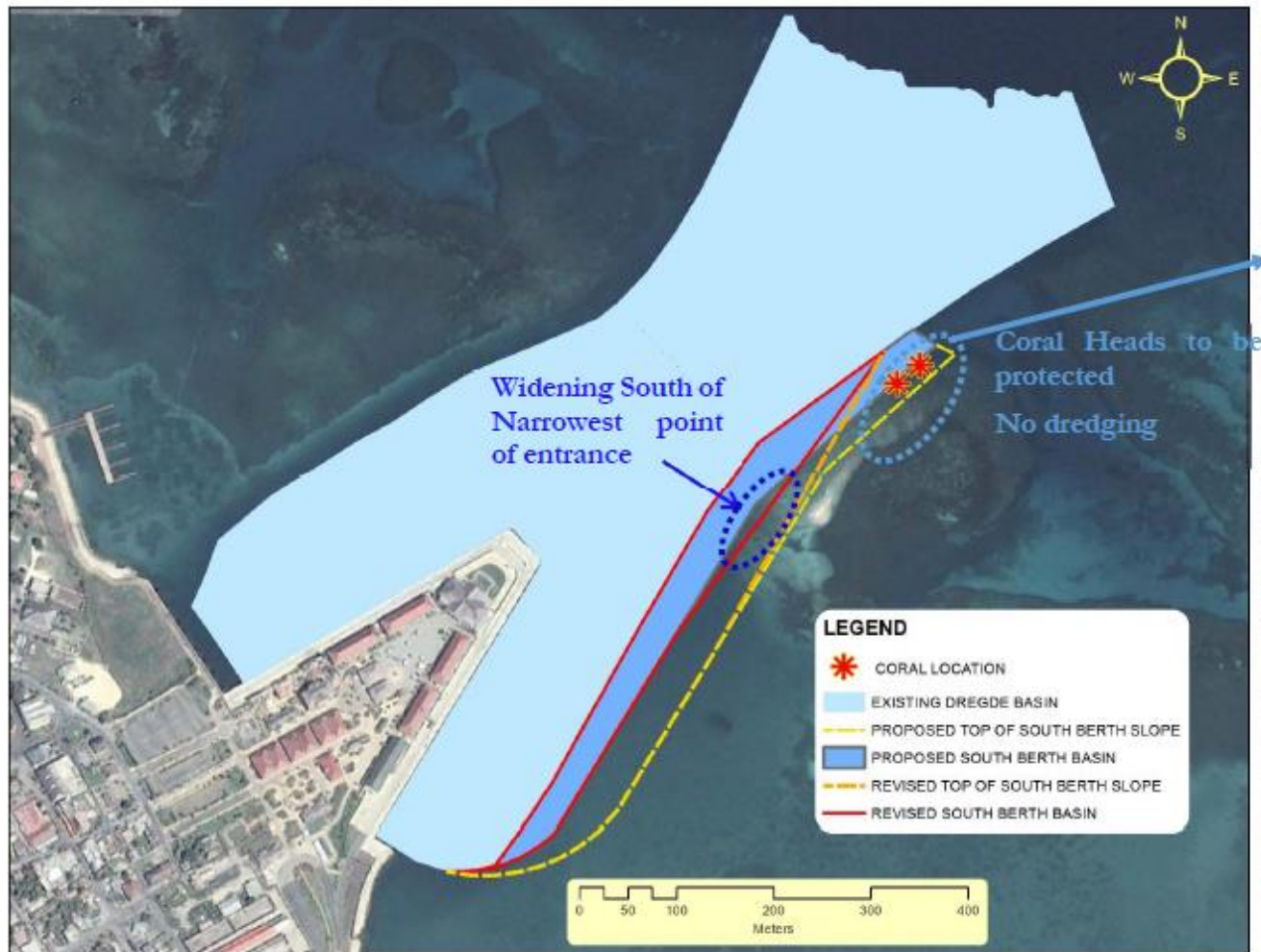
Work is projected to occur over a period of two (2) weeks.

## **Schedule/ Timeline**

Dredging operations are expected to commence during the third quarter of 2017.

**The Port Authority of Jamaica - May 2017**

Exhibit 1 – Proposed Realignment of ship channel in Falmouth showing hard coral locations.



Proposed realignment

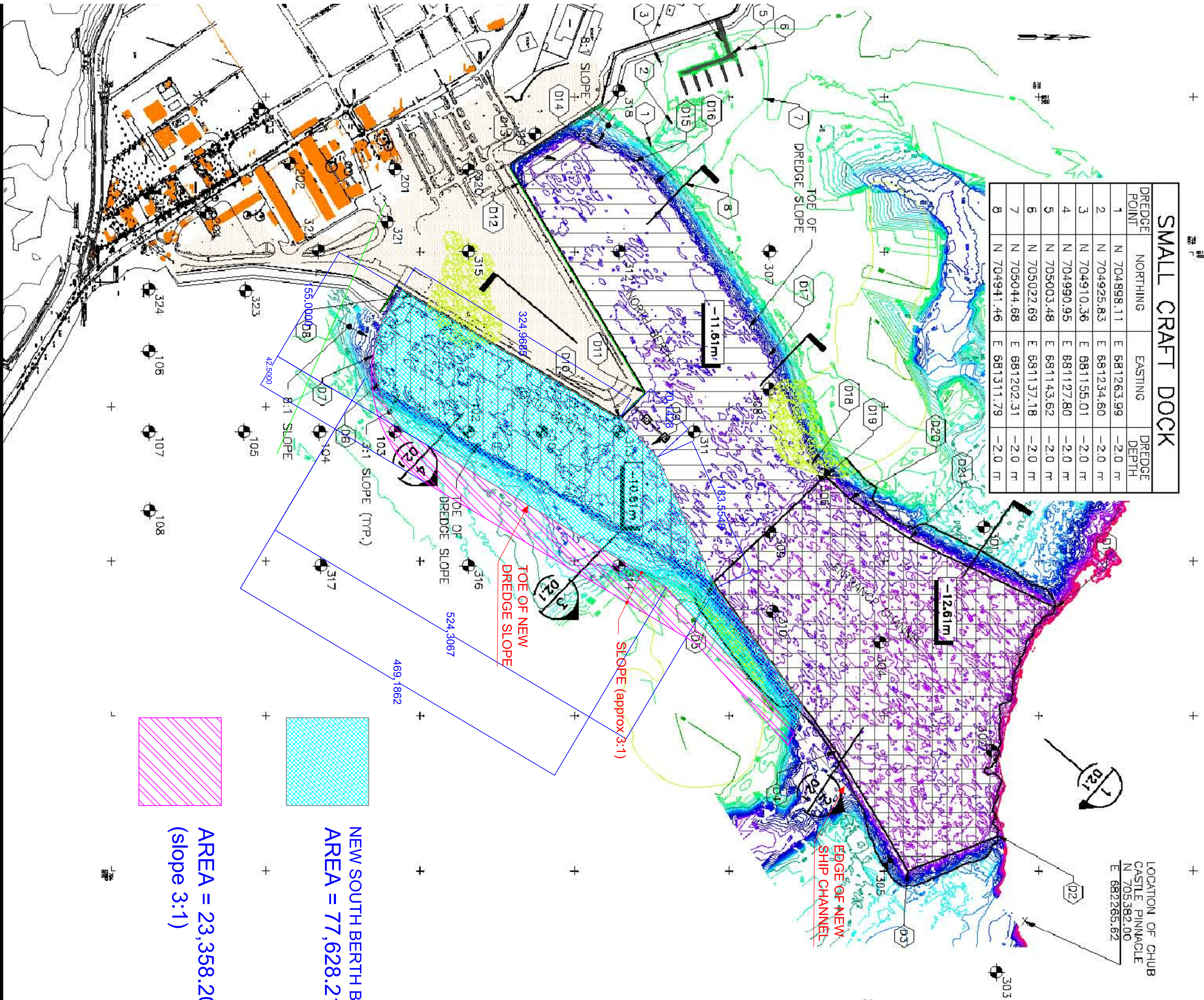




SMALL CRAFT DOCK

DREDGE POINT	NORTHING	EASTING	DREDGE DEPTH
1	N 704898.11	E 681263.99	-2.0 m
2	N 704925.83	E 681234.60	-2.0 m
3	N 704910.36	E 681155.01	-2.0 m
4	N 704990.95	E 681127.80	-2.0 m
5	N 705003.48	E 681143.62	-2.0 m
6	N 705022.69	E 681137.18	-2.0 m
7	N 705044.68	E 681202.31	-2.0 m
8	N 704941.46	E 681311.78	-2.0 m

LOCATION OF CHUB CASTLE PINNACLE  
N 705382.00  
E 682285.62

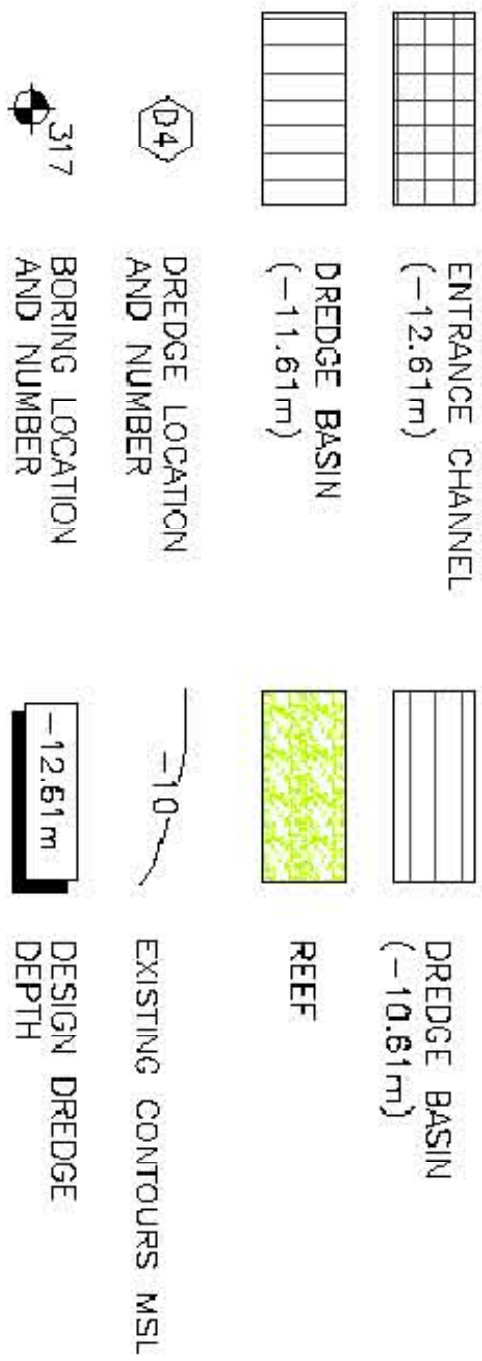


DREDGING COORDINATES

DREDGE POINT	NORTHING	EASTING	DREDGE DEPTH	DREDGE POINT	NORTHING	EASTING	DREDGE DEPTH
D1	N 705421.90	E 681860.46	-12.61 m	D11	N 704890.77	E 681582.54	-11.61 m
D2	N 705346.78	E 682194.73	-12.61 m	D12	N 704729.15	E 681310.74	-11.61 m
D3	N 705230.92	E 682199.76	-12.61 m	D13	N 704775.68	E 681280.13	-11.61 m
D4	N 705138.60	E 682045.85	-12.61 m	D14	N 704831.45	E 681255.30	-11.61 m
D5	N 704979.33	E 681827.83	-12.61 m	D15	N 704875.68	E 681283.38	-11.61 m
D6	N 704547.88	E 681568.92	-10.61 m	D16	N 704903.86	E 681311.83	-11.61 m
D7	N 704539.75	E 681534.57	-10.61 m	D17	N 705050.24	E 681535.71	-11.61 m
D8	N 704589.36	E 681456.40	-10.61 m	D18	N 705106.95	E 681672.54	-11.61 m
D9	N 704898.68	E 681649.27	-11.61 m	D19	N 705124.44	E 681689.55	-12.61 m
D10	N 704858.75	E 681615.85	-11.61 m	D20	N 705155.18	E 681719.44	-12.61 m
				D21	N 705232.63	E 681770.93	-12.61 m

\* APPROXIMATE LOCATIONS, THESE POINTS MAY VARY DEPENDING ON ACTUAL DEPTH.

LEGEND



NOTES:

- HYDROGRAPHIC AND SHORELINE SURVEY PROVIDED BY GEORGE F. YOUNG, INC.  
FIELD DATE, 2/18/2008, JOB NO. 0913030700
- GEOLOGICAL REPORT ENTITLED FALMOUTH CRUISE SHIP TERMINAL BY HILL-BETTY ENGINEERS LTD., DECEMBER, 2007.
- GRID SYSTEM IS IN METERS RELATIVE TO JAD 2001
- CHART DATUM (CD) RELATIVE TO MSL  
CD 0.0  
-0.11 (AS DEFINED BY THE PORT AUTHORITY)
- ALL ELEVATIONS ARE IN METERS AND REFER TO MEAN SEA LEVEL, UNLESS NOTED OTHERWISE.
- DREDGING COORDINATES REPRESENT TOE OF SLOPE.
- AVERAGE SIDE SLOPE 3 HORIZONTAL TO 1 VERTICAL TO BE ACHIEVED BY STEPPED CUTS, AS SPECIFIED.
- DREDGING TOLERANCES:  
VERTICAL TOLERANCE, 0.00m ABOVE DESIGN DREDGE DEPTH, 0.30m BELOW DESIGN DREDGE DEPTH HORIZONTAL TOLERANCE, +3.0m TO -1.0m FROM THEORETICAL DREDGE BOUNDARY
- UPLAND SURVEY PROVIDED BY LLEWELYN ALLEN & ASSOCIATES, Commissioned Land Surveyors  
DATE OF SURVEY.....Bet. 19th and 30th Nov., 2007  
JOB NUMBER.....LA/10-23/07  
FIELD BOOK NUMBER.....LA/167



AS - BUILT SET

DRAWING NO. <b>D1.1</b>	Mark	Description	Date	By	FALMOUTH CRUISE TERMINAL FOR E. Pihl & Son A.S.  DREDGING SITE PLAN	PREPARED BY: <b>Halcrow</b> Halcrow Inc. 1101 Channelside Drive, Suite 400 N Tampa, FL 33602 (813) 886-1990 Certificate of Authorization Number: 28480	PREPARED FOR: <b>The Port Authority</b>	Designed <b>G. SCHNEIDER</b> Drawn <b>R. AMLIN</b> Checked <b>C. CURTIS</b> Approved <b>G. SCHNEIDER</b>	PE NAME <b>G. SCHNEIDER</b> ID. 33287

No.	Revision/Issue	Date



Project Name and Address  
PAL FOST SOUTH BERTH PROPOSED DREDGING  
Falmouth Cruise Ship Terminal  
Treloveny, Jamaica

Project PAL_FLMTH_SB_DREDGE_01	Sheet 1
Date 2015-01-07	Scale NTS



Exhibit 3. Approach to Falmouth Harbour showing proposed dredge disposal site (red outline) located 2.5 nautical miles offshore in 1000m contour

