

Exercise Great Yarmouth

Course year 2006-2007

A group of investors has a concession from the British Government to build and exploit a new port in Great Yarmouth.



The new port will be constructed just north of the river mouth, on the spit. It will be a classical port with two symmetric breakwaters reaching into the sea. The near shore parts of the breakwater are designed as a “revetment”, i.e. there will be a harbour area. The outer sections of the breakwater are real breakwaters (water on both sides). The tender documents are at this moment sent out to contractors to make a bid. The design foresees in a core of geocontainers and a cover of either X-blocs or natural rock. However, is it unclear if a core with geocontainers is feasible, and therefore we will investigate in this exercise a number of alternatives.

The breakwater has to be designed for a 1/50 (or 1/100) survival condition; for the revetment sections a 1/10 operation condition should be used.

Boundary conditions

For an overview of internet sources of information is referred to the Knowledge Centre Water: http://www.library.tudelft.nl/civiel/a/information_resources/water/index.htm Under the heading “data” information on data sources is available

For detailed information regarding the bed topography is referred to the digital nautical map, available in the citg-library. Also you may use the printed nautical charts available in the TU map-room (opposite to the faculty library in the building for architecture).

Tidal information is available from various sources, for example the admiralty tide tables (library) or the website of the UK hydrographic office. Realise that also the storm surges may play a role in the determination of your design water level. The design water level has also an impact on the wave information.

The following information is available:

exceedance per year	1/50	1/20	1/10	1	5	10	50
water level (m) above CD	4.65	4.45	4.30	3.80	3.50	3.00	2.80

For waves you should use three sources:

- The Global Wave Statistics (available in the city library)
- The Argoss database (www.waveclimate.com)
- The Alkyon database (www.hydrobase.net)

For the last two databases a password is required. The password will be given during the instruction session.

For the transformation of waves from deep to shallow water you may use Cress (old version, CressWin).

For the calculation of the armour units you may use Breakwat. In Cress you will also find a routine for application of the Goda method for vertical wall breakwaters.

On Friday (morning or afternoon) every group will :

1. Give an oral presentation, explaining the cross sectional profile of the both sections of the breakwater, including the choices made. The total duration of the presentation should be 10 minutes.
2. All groups present will comment on the presentations of other groups.
3. You have to hand in a drawing with a design of two cross-sectional profiles of the breakwater.

On the drawing the contractor has to be able to find sufficient information regarding:

- weight of armour units
- slopes
- crest height
- toe
- sub-layers

4. Additional information plus explanation of the choices has to be presented in a short report. The total size of the report should be less than 5 pages.

group	Morning group		Afternoon group	
1	NS	50	NS	100
2	C1	100	C1	50
3	C2	50	C2	100
4	T	100	T	50
5	CL	50	CL	100
6	D	100	D	50
7	X	50	X	100
8	BB	100	BB	50
9	M	50	M	100
10	LDN	100	LDN	50

Armour Units:

NS Natural Stone

C1 Single layer of cubes

C2 Double layer of cubes

T Tetrapods

CL Core Loc

D Dolos

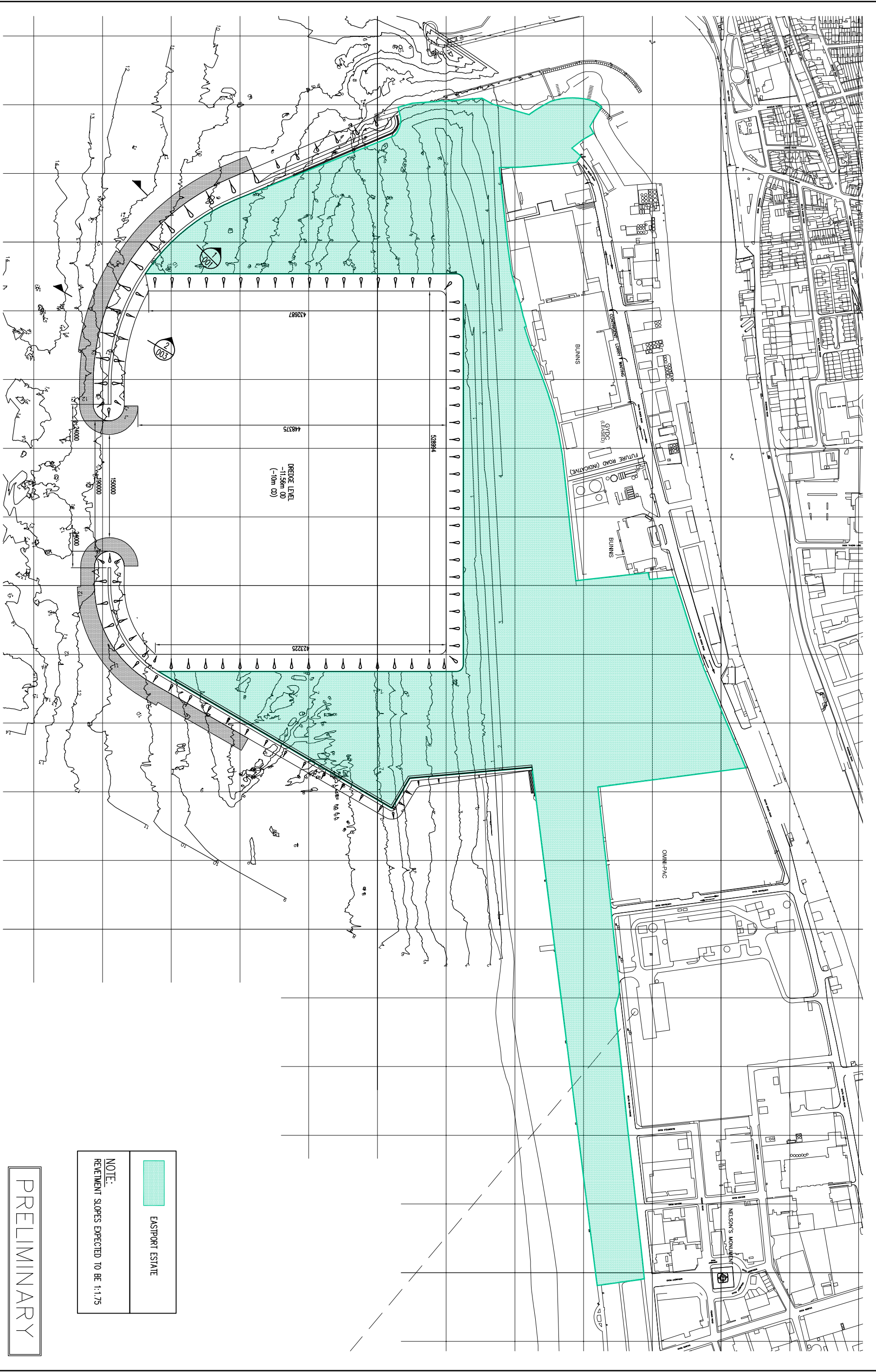
X X-bloc

BB Berm breakwater

M Monolithic caisson breakwater

LDN Low dam (natural stone) with beach

Make calculations with a classical approach, see if you can use PIANC guidelines, and see if it is possible (and useful) to make a full probabilistic approach.



EASTPORT ESTATE
NOTE:
 REVENMENT SLOPES EXPECTED TO BE 1:1.75

PRELIMINARY

GENERAL NOTES

- BATHYMETRIC SURVEY AUGUST 2006 TO ORDNANCE DATUM.
- ORDNANCE DATUM IS 1.56m ABOVE CHART DATUM.

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Rev'n	Description	Date	Designed	Approved	Scale
1	PRELIMINARY	06.09.06	LL	06.09.06	1:2500

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EASTPORT HARBOUR GEOMETRY FOR MODELING
 Drawing number: **IPH-002-005**
 Sheet: **A1**
 Revision: **1**