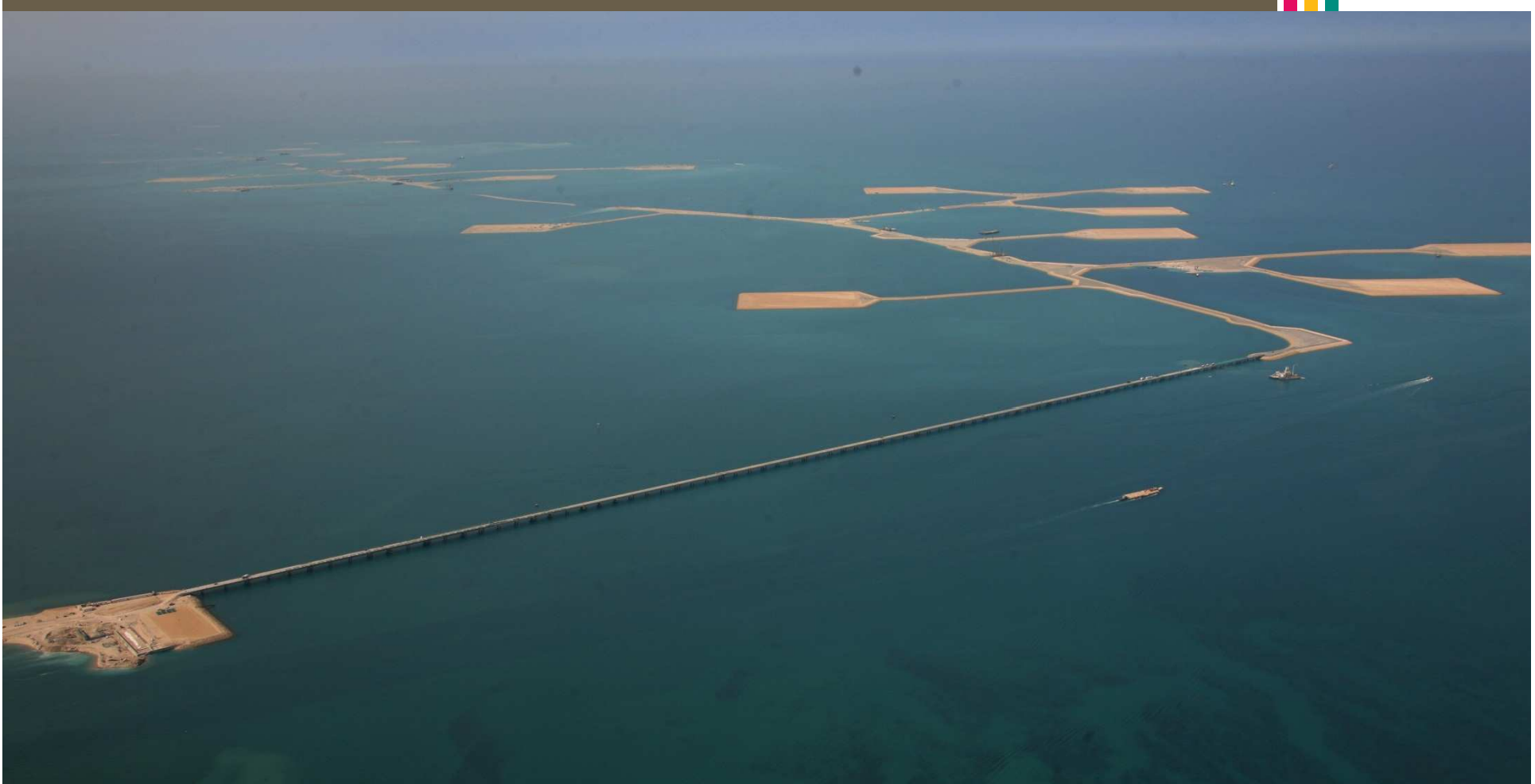


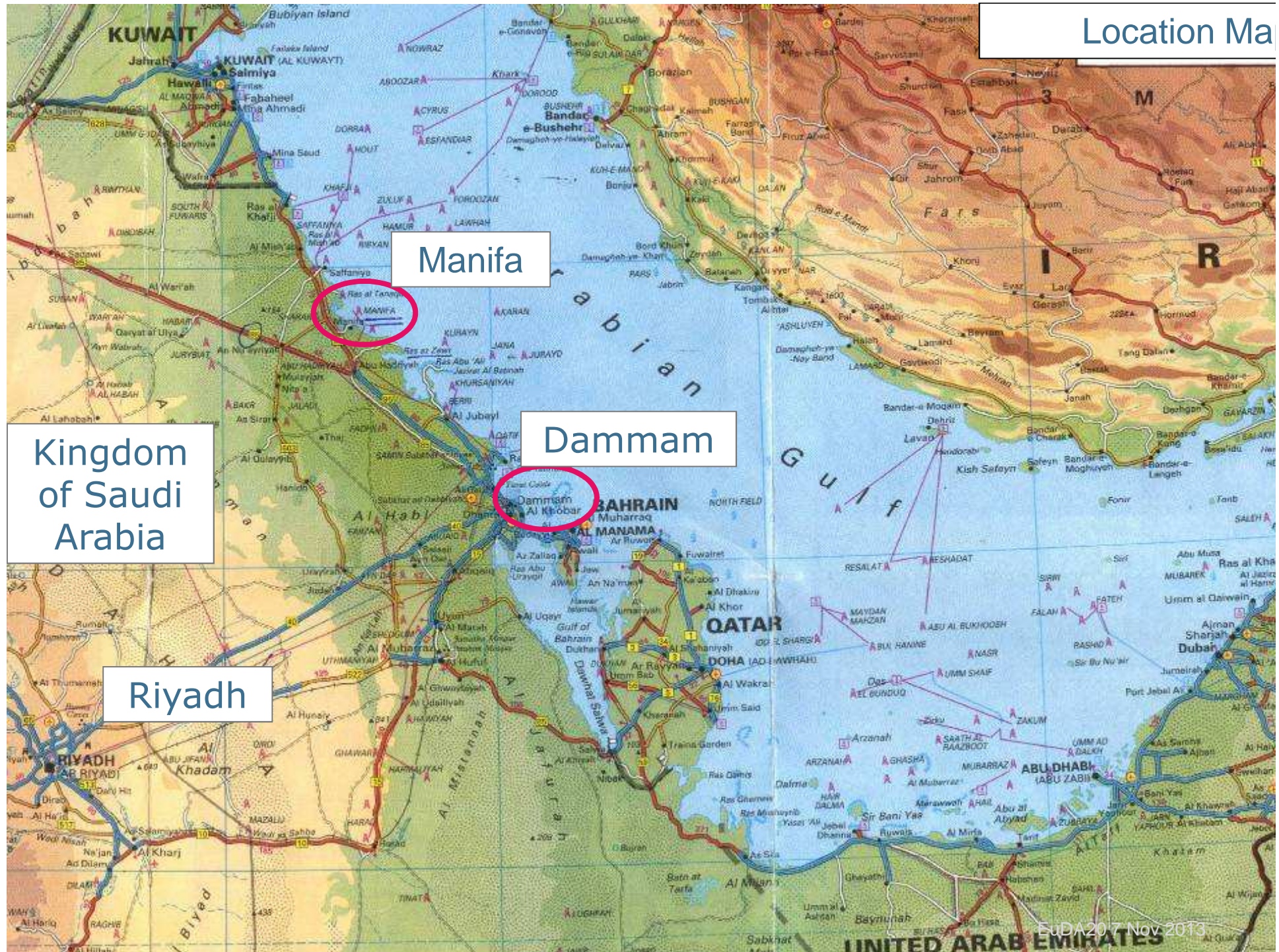


## Manifa Oil Field Causeway and Island Project

Peter De Pooter



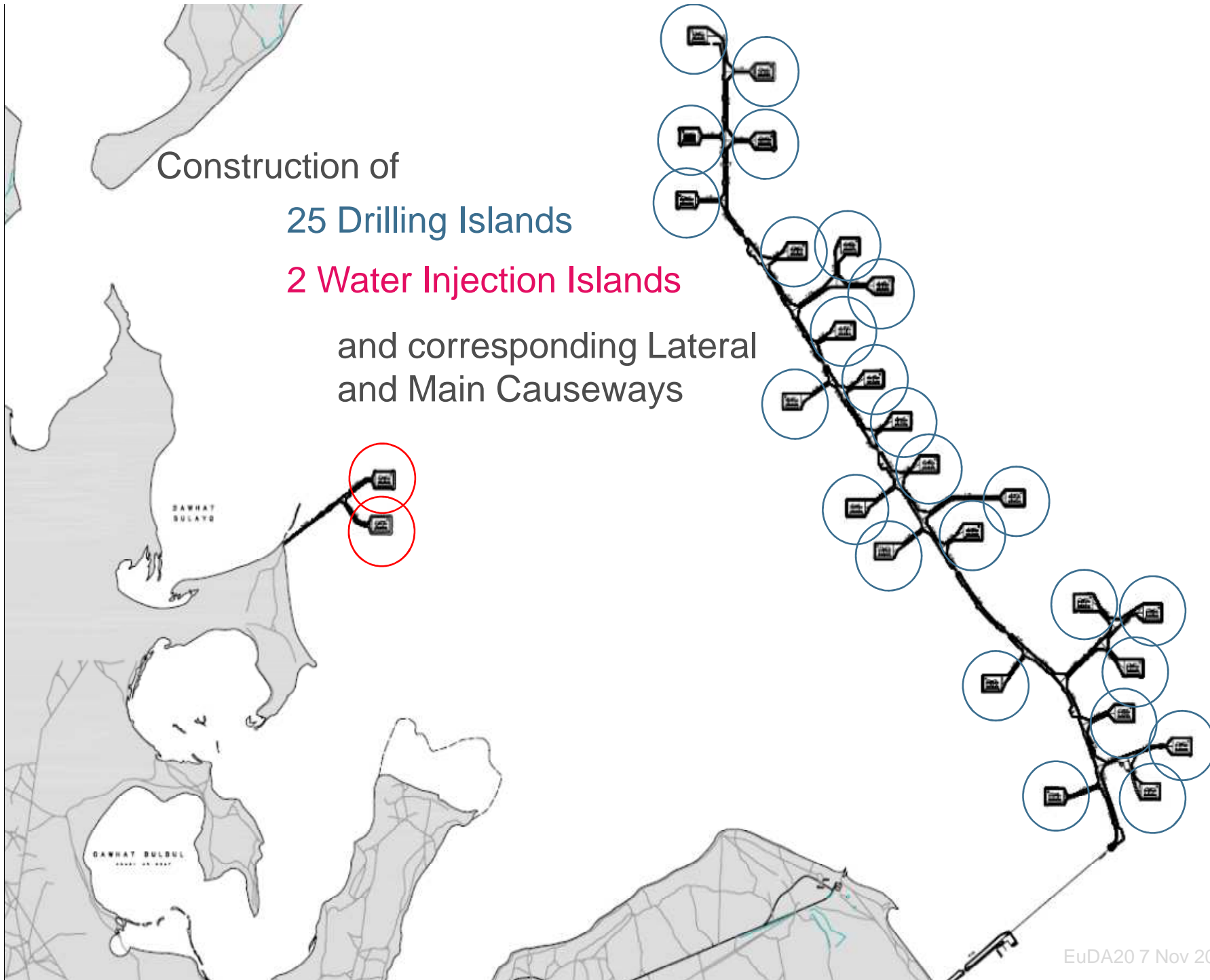
# Location Ma



Construction of  
25 Drilling Islands

2 Water Injection Islands

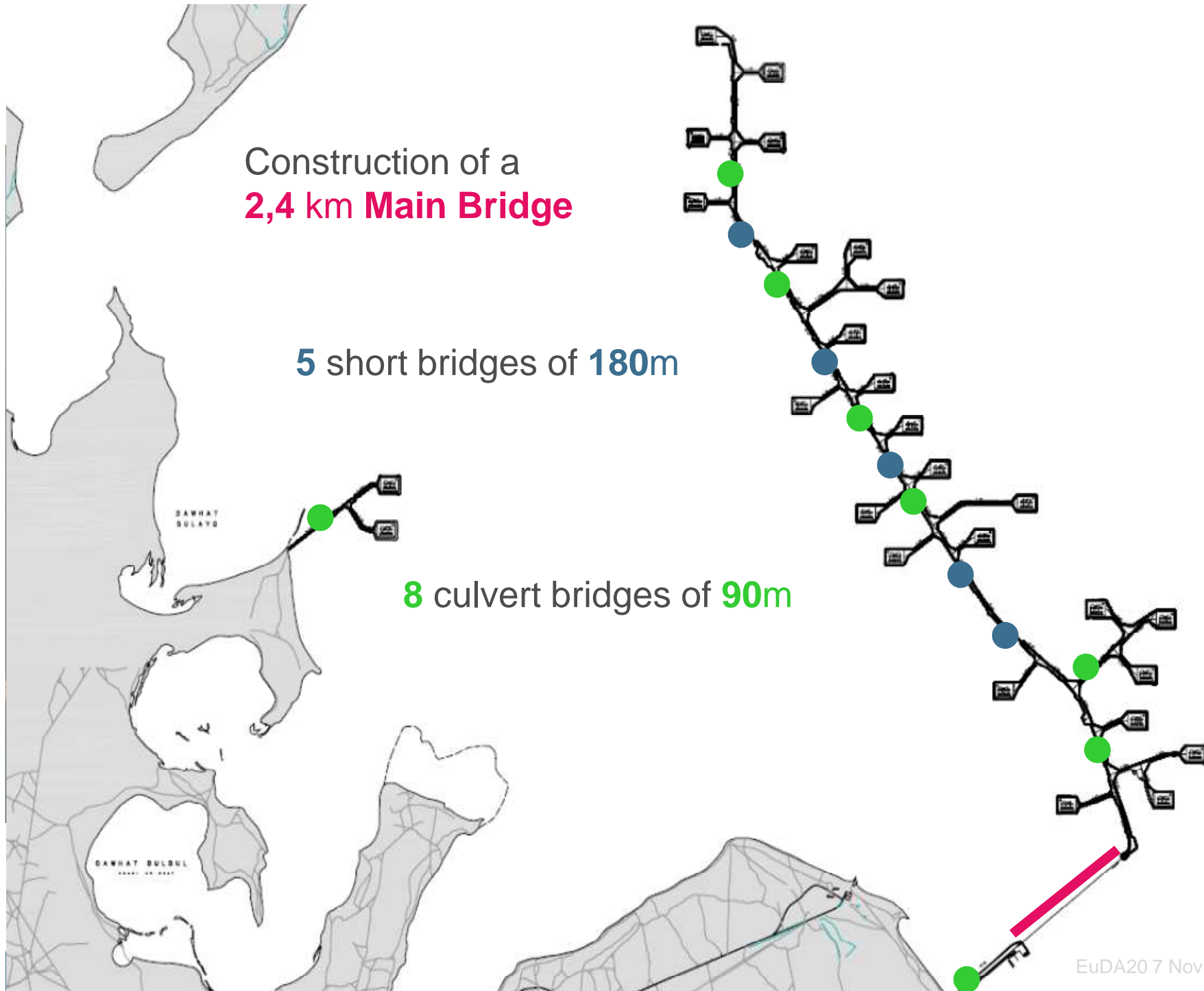
and corresponding Lateral  
and Main Causeways



Construction of a  
**2,4 km Main Bridge**

**5** short bridges of **180m**

**8** culvert bridges of **90m**







EuDA20 7 Nov 2013





















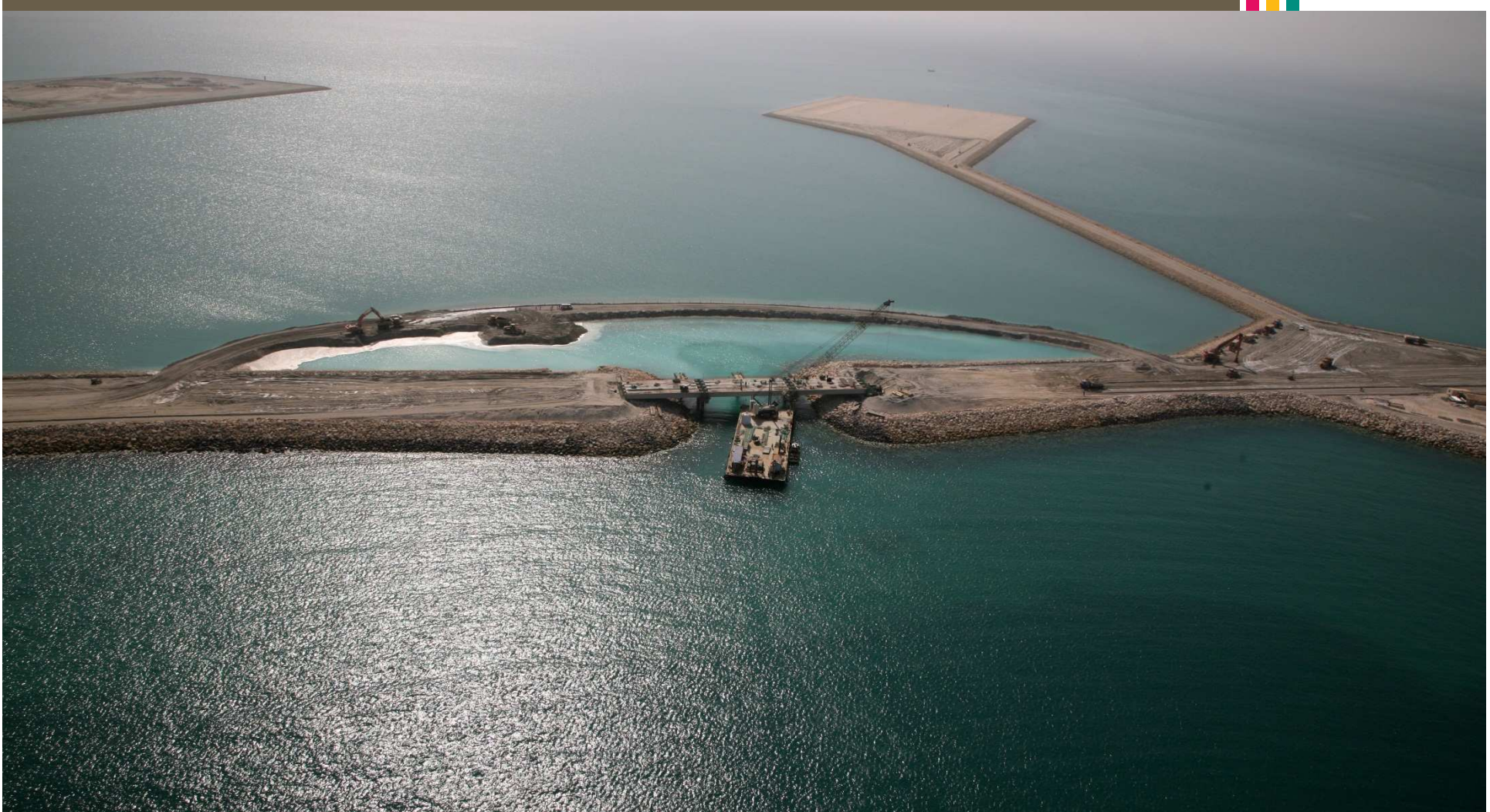




EuDA20 7 Nov 2013



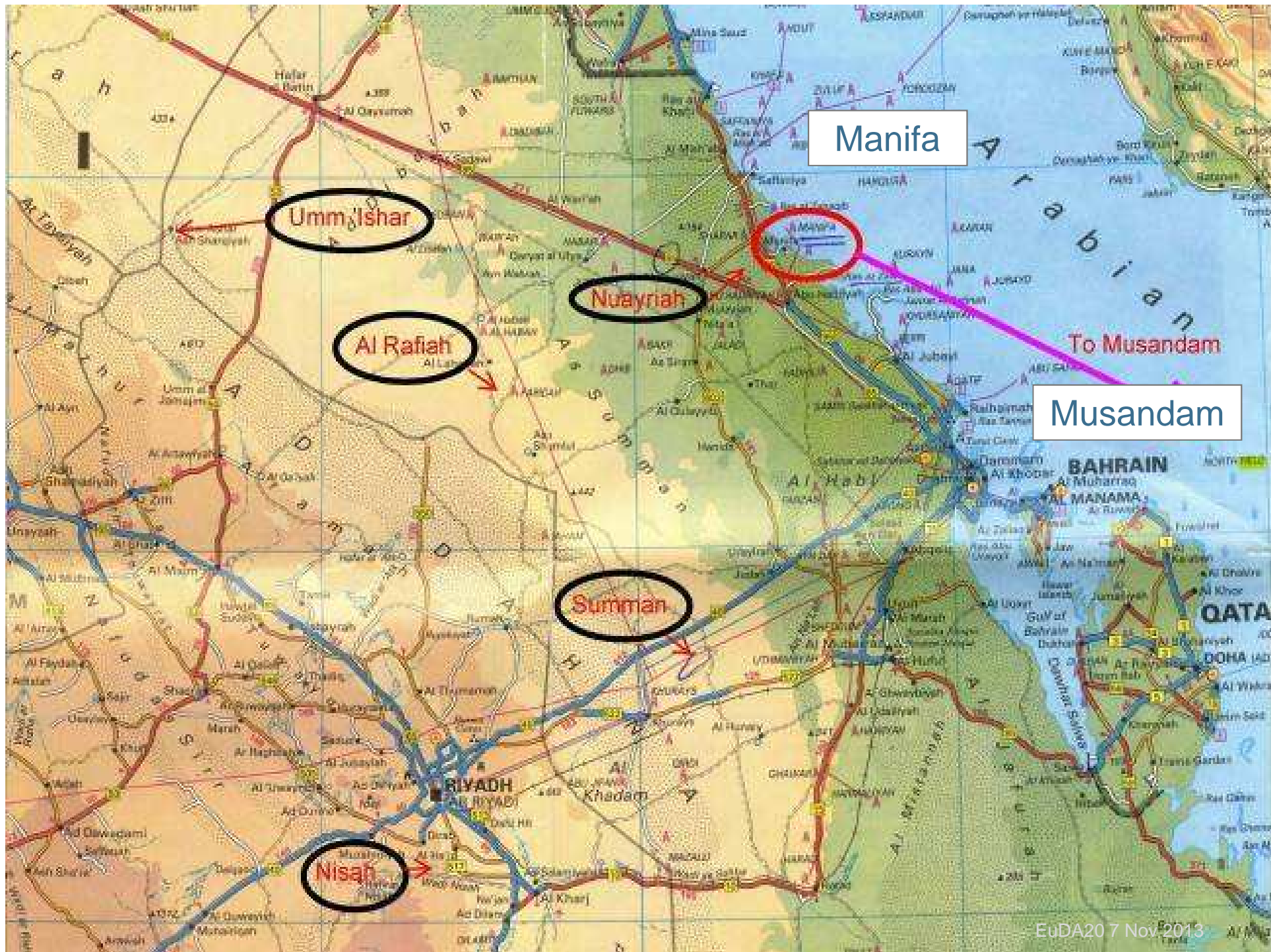






## Rock Production in different Quarries





Manifa

Umm al-Shar

Nuayriah

Al Rafiah

Summan

Nisah

Musandam



















## 13 Million tons of Rock

- Produced
- Tested
- Transported
- Stockpiled
- Placed











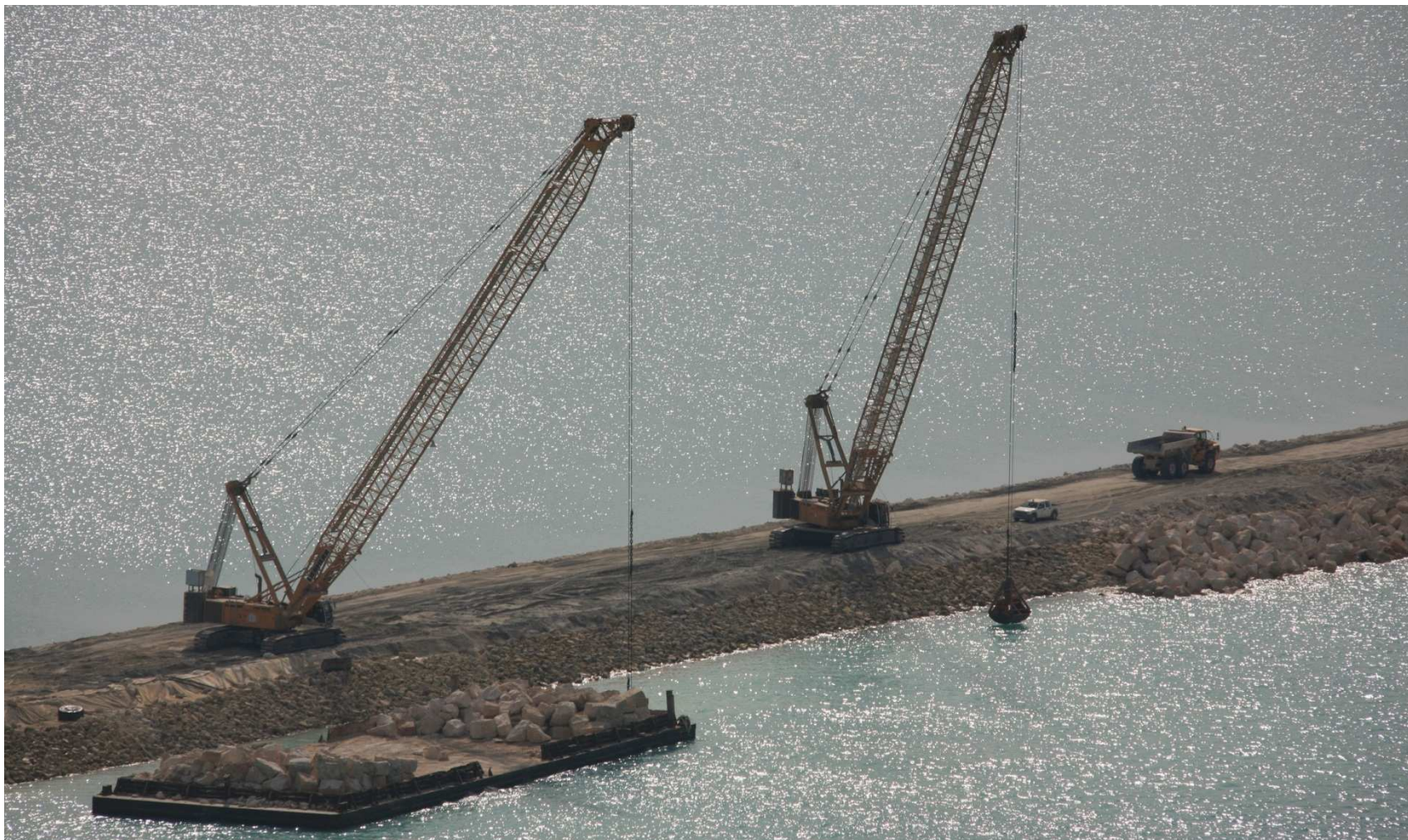




+/- 40,000 ton a day rock transport to the island with 16 barges



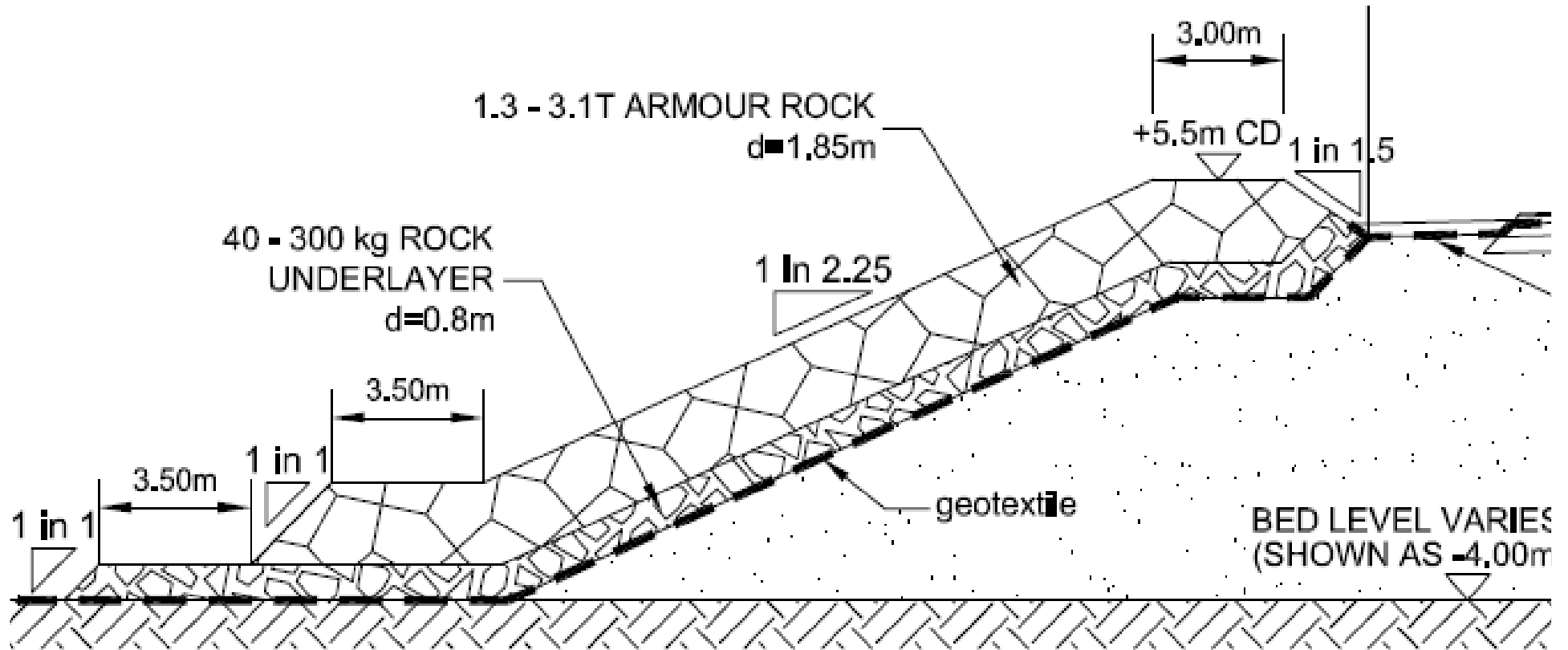
## 115 km of Rock Revetment installed





## Breakwaters Design & model tests

- University of Ghent @ Belgium
- DHI @ Denmark
- Sogreah @ France

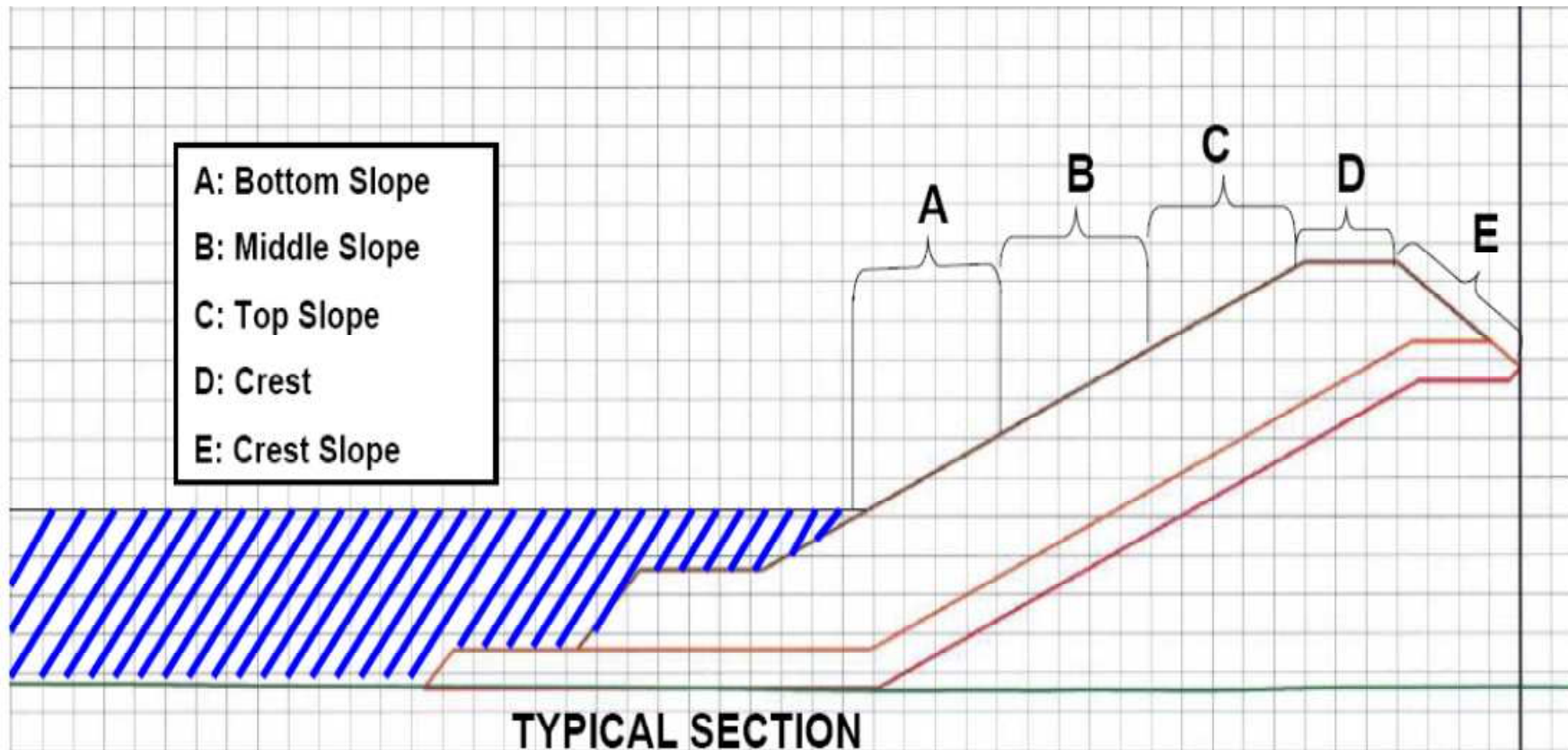
















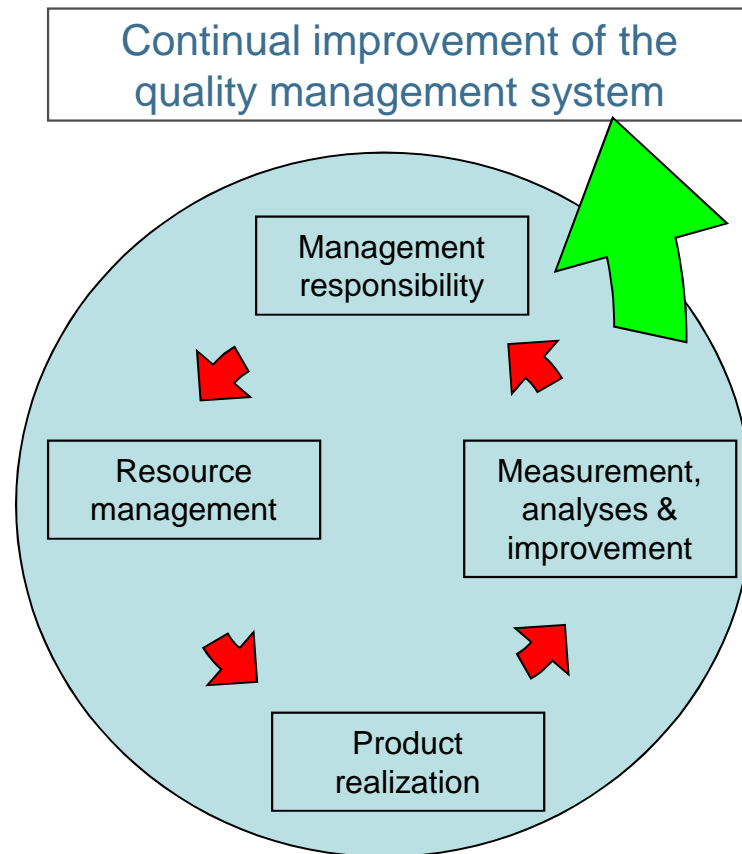
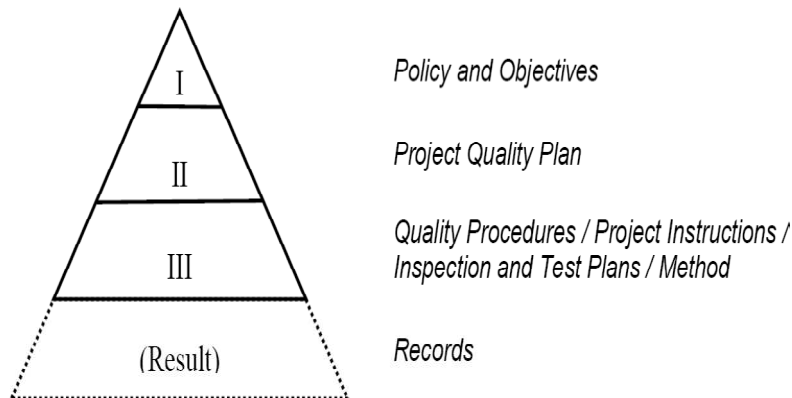
# Quality Management System

## General Requirements

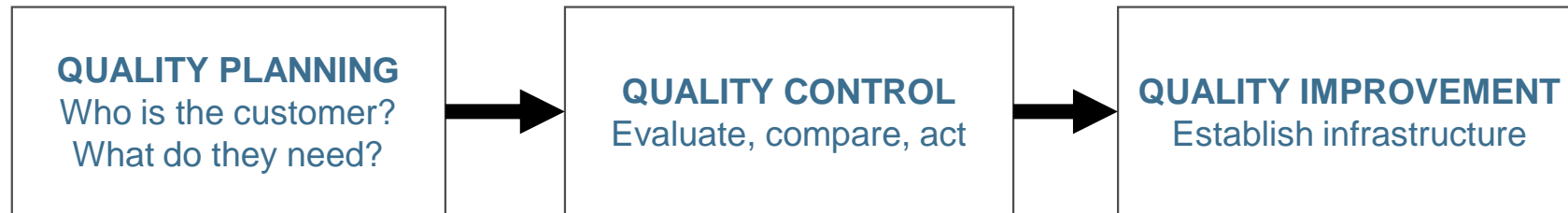
Maintained by the QAQC dep. and all other personnel through inspections and by a good quality awareness of all the involved personal.

## Documentation Requirements

PQM, QCP, PQF, MES, ITP,RFI,...



## Quality Process Control



### Documents for Inspections & Process Monitoring

- Survey data
- Test Reports
- Certificates
- Checklists
- Release notes
- Site observations
- Non-conformities



# Quality Process Control

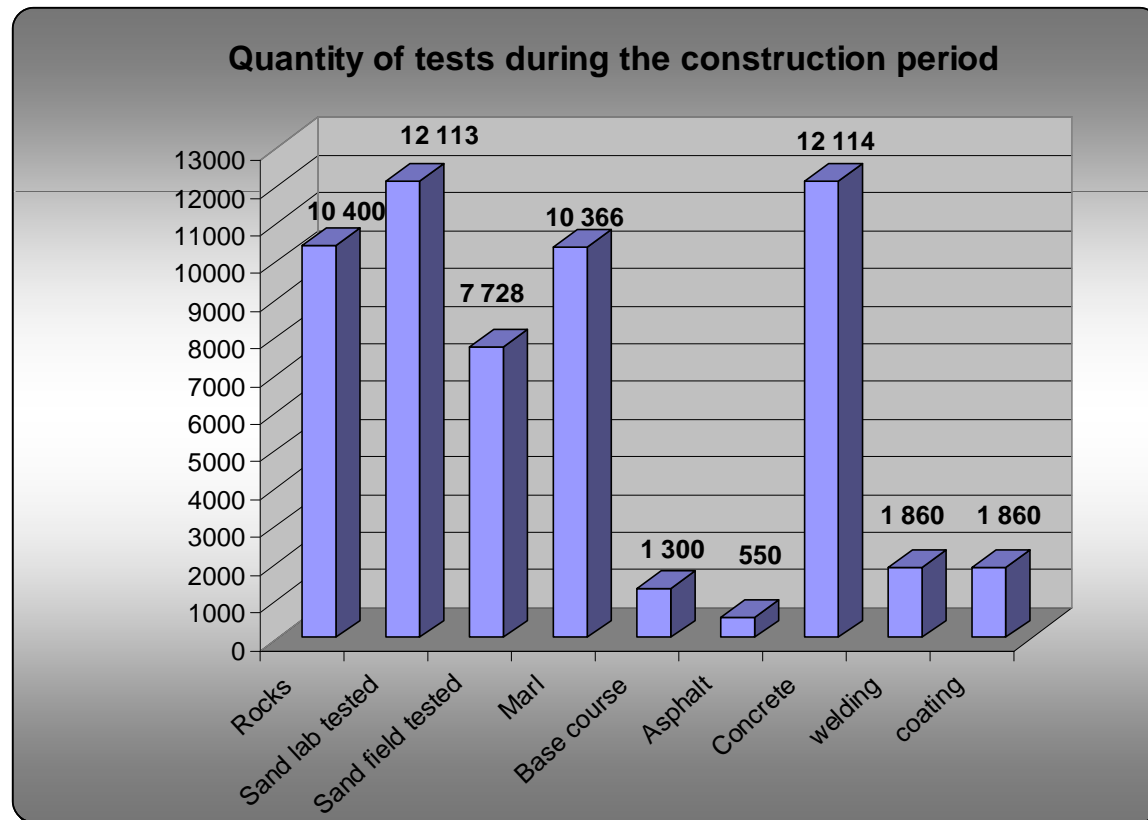
## Practical items

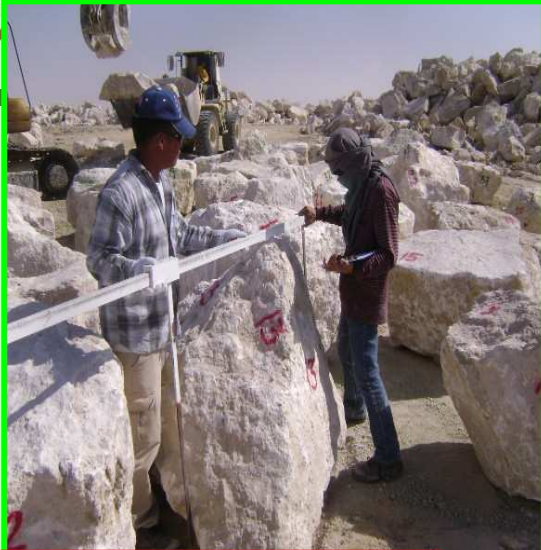
- Overview work activities / inspections
- Acceptance criteria and control reference mentioned on the Test Reports
- Clear coding for samples / test reports / checklists
- User-friendly and easy-reference databases with built-in alarm signals

No	Sample Location	Date Collected	Sent to Lab	Official Test Result Received	Lab Sample ID	Report No.	Laboratory Tests								
							1	2	3	4	6	7	8	9	
							Clay Lump & Friable Particles	Gradation & Material finer than # 200 Sieve	Raw 1 & 2 Combined	L.A. Abrasion	Water Absorption	Acid Soluble Chlorides as Cl <sup>-</sup>	Acid Soluble Sulphate as SO <sub>3</sub>	Soundness (MgSO <sub>4</sub> )	
≤ 6.0 %	≤ 6.0 %	≤ 6.0 %	≤ 40.0 %	≤ 2.5 %	≤ 0.03 %	≤ 0.4 %	≤ 25.0 %								
32	080421 AGG QAH 34 B6 LT						0.50	1.10	19	1.10	0.03	0.37	2		
33	080421 AGG QAH 38 B6 LT						0.70	2.10	27	1.80	0.03	0.37	3		
34	080529 AGG QAH 34 B7 LT						0.30	0.20	0.50	36.1	1.50	0.02	0.14	5	
35	080629 AGG QAH 38 B7 LT	28-May-08	AI Hoty	08-Jun-08	JBS08-0853-2A-2D	REJECTED	0.50	0.20	0.70	34.9	1.60	0.04	0.38	10	
36	080801 AGG QAH 34 B8 LT	1-Jun-08	AI Hoty	08-Jun-08	JBS08-0874-5A-5D	RELEASED	0.30	0.10	0.40	35.5	1.90	0.01	0.34	5	
37	080801 AGG QAH 38 B8 LT	1-Jun-08					0.40	0.90	34.3	2.00	0.01	0.37	11		
38	080801 AGG QAH 34 B9 LT	1-Jun-08					0.20	0.50	36	1.80	0.01	0.37	5		
39	080801 AGG QAH 38 B9 LT	1-Jun-08					0.30	0.50	34.3	2.00	0.01	0.35	9		
40	080604 AGG QAH 34 B10 LT	4-Jun-08					0.10	0.30	0.40	34.9	1.70	0.01	0.12	5	
41	080604 AGG QAH 38 B10 LT	4-Jun-08	AI Hoty	15-Jun-08	JBS08-0900-2A-2D	RELEASED	0.30	0.50	0.80	36.1	1.90	0.01	0.11	11	
42	080615 AGG QAH 34 B11 LT	15-Jun-08	AI Hoty	20-Jun-08	JBS08-0868-1A-1D	RELEASED	0.30	0.40	0.70	36.7	2.20	0.01	0.33	6	
43	080615 AGG QAH 38 B11 LT	15-Jun-08	AI Hoty	20-Jun-08	JBS08-0868-2A-2D	RELEASED	0.80	0.50	1.30	33.4	2.40	0.01	0.36	13	
44	080619 AGG QAH 34 B12 LT	19-Jun-08	AI Hoty	05-Jul-08	JBS08-1025-1A-1D	RELEASED	0.80	0.80	1.20	34.6	1.80	0.02	0.33	5	

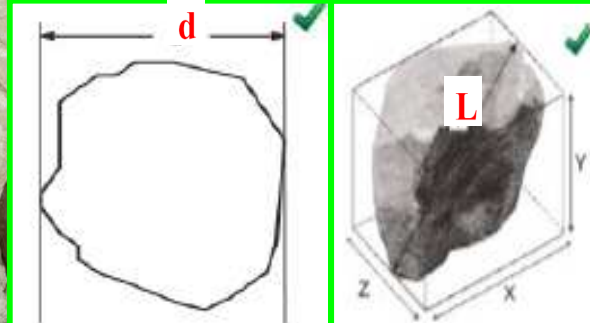
## During the construction periode

- 70 000 request for inspections were in place, 45 000 Bathymethrical and Topo Survey were executed





$$L/d \leq 3$$



## Quality Inspections

### Destructive

- Droptest
- Field Test Geotextile
- Field Density Test
- ...









# Quality never happens by accident!

It is always the result of intentional effort, intelligent guidance  
and skillful execution...

it represents the wise choice of many alternatives...