

Global Dredging: Best Practices Enhance Beneficial Re-Use, Productivity & Reduced Cost

Jamie Lescinski

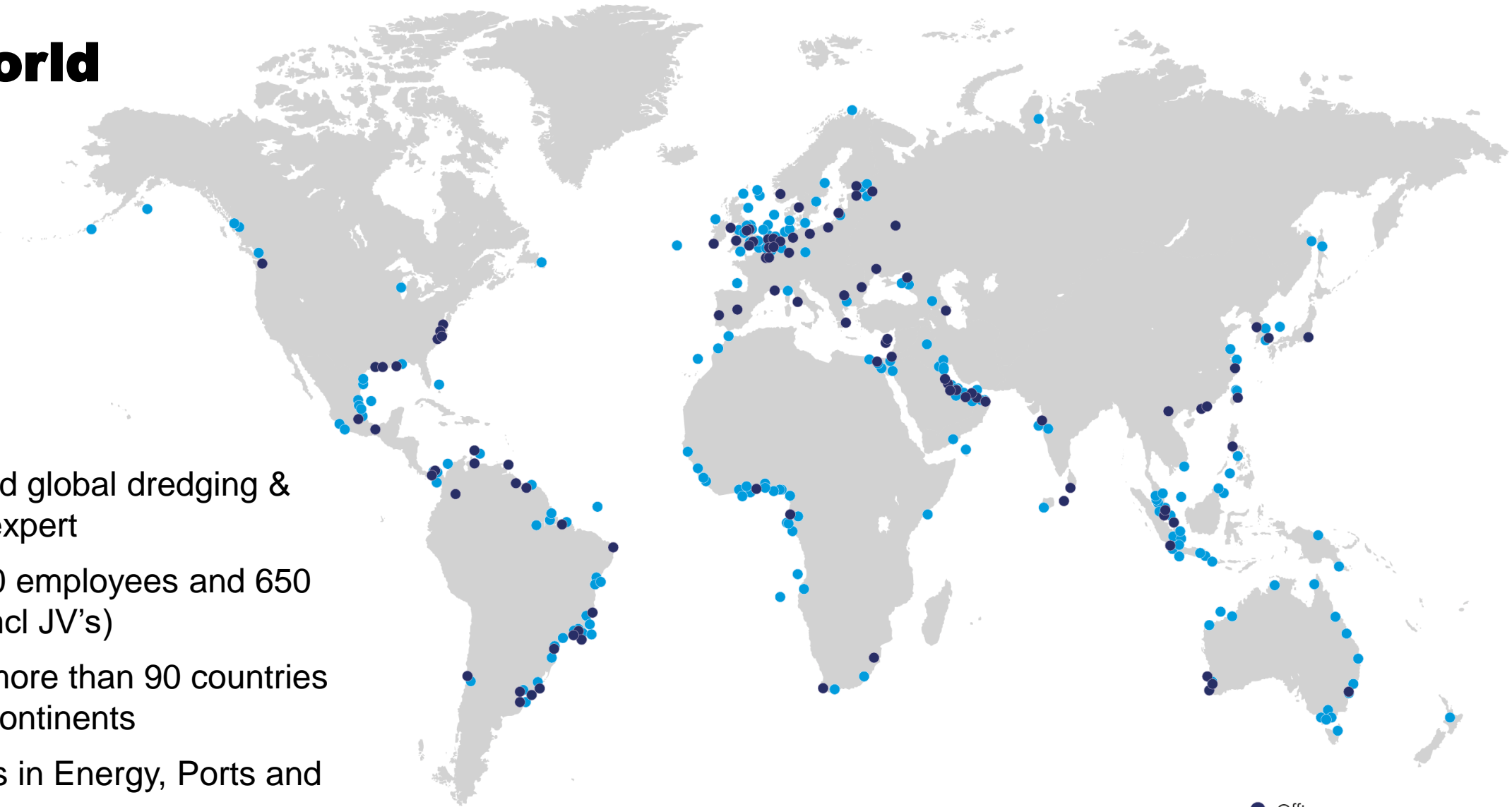
SFSLD Conference - Digital

3 November 2021



Our world

- Stock listed global dredging & maritime expert
- With 9,900 employees and 650 vessels (incl JV's)
- Active in more than 90 countries across 6 continents
- Customers in Energy, Ports and Infra



● Offices
● Projects and operations

Three business segments

1. DREDGING & INLAND INFRA

- Construction & maintenance of ports & waterways, land reclamation and coastal defense
- Earthmoving, roads, civil structures, soil remediation & improvement

2. OFFSHORE ENERGY

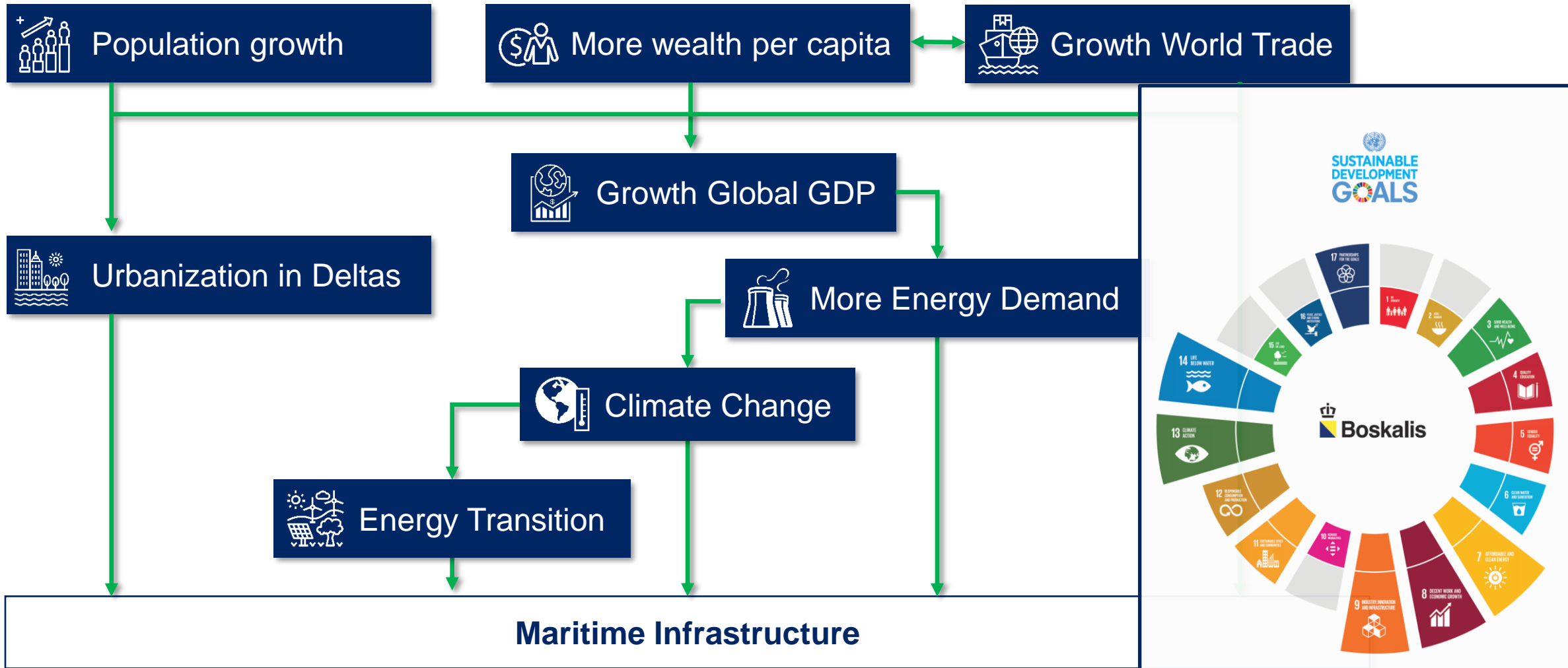
- Key markets: renewables and O&G
- Activities (market agnostic): Marine Survey, Subsea Services, Marine Transport & Services, Seabed Intervention, Heavy Lifting and Subsea Cables

3. TOWAGE & SALVAGE

- Harbor Towage, Terminal Services, Salvage



Forces driving our business



Towards a Zero-Waste Nation

[Sustainable Singapore Blueprint]

Singapore aims to move towards becoming a zero waste nation by reducing its consumption of materials, and reusing and recycling them to give them a second

lease of life. It keeps Singapore clean and healthy, conserves precious resources, and frees up land that would have otherwise been used for landfills.



TUAS TERMINAL PHASE 2 (FINGER PIER 3) - Base Offer

- Design & Construction Contract → **108 MONTH D&C PROGRAMME**

OPTION A : EMPLOYERS DIRECT SAND SOURCE

- ~12M m3 sand

OPTION B : REHANDLING SAND – DESIGNATED STOCKPILE

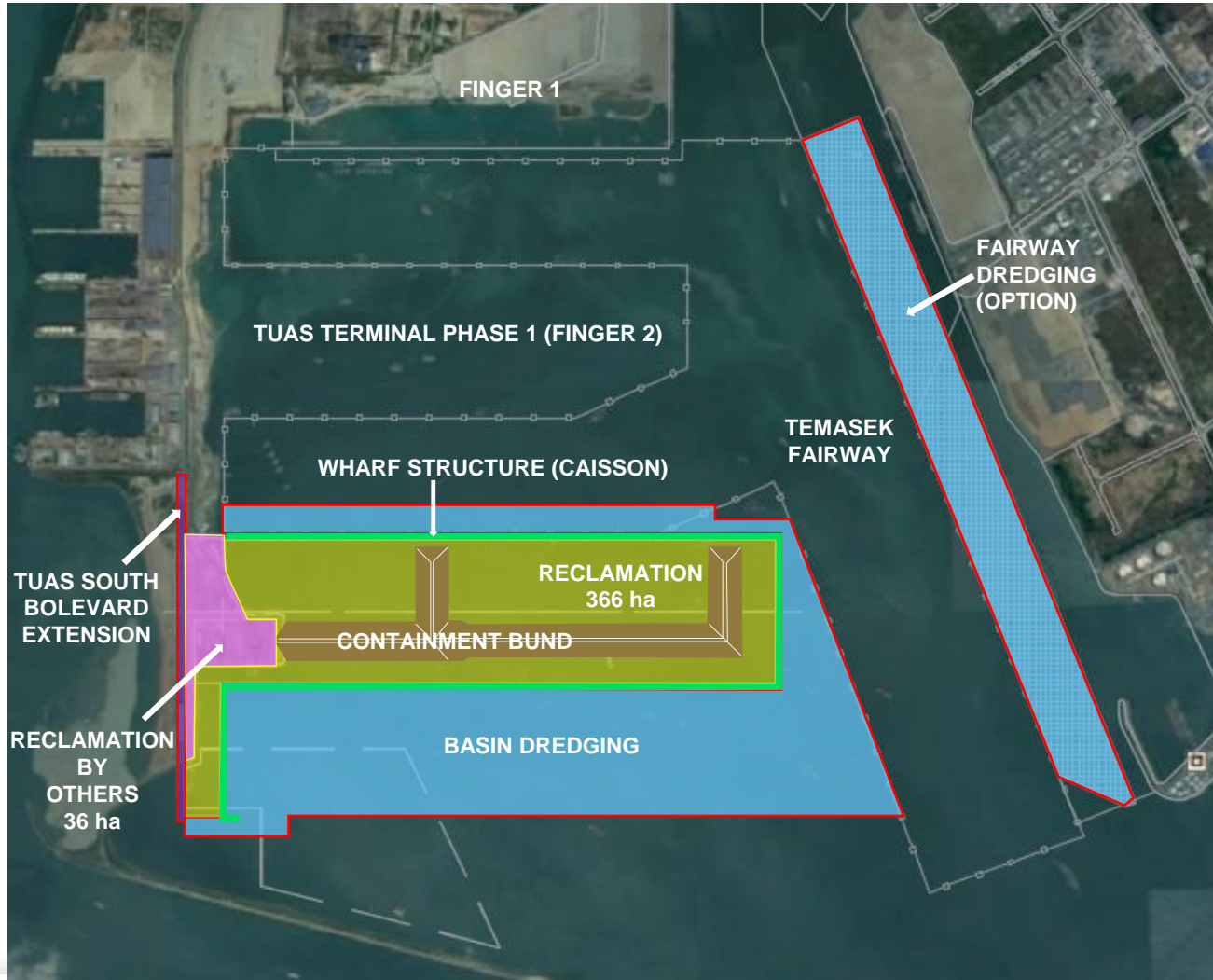
- ~40M m3 sand

OPTION C : DREDGING OF TEMASEK FAIRWAY

Project Value: S\$1.5 Billion



PROJECT OVERVIEW

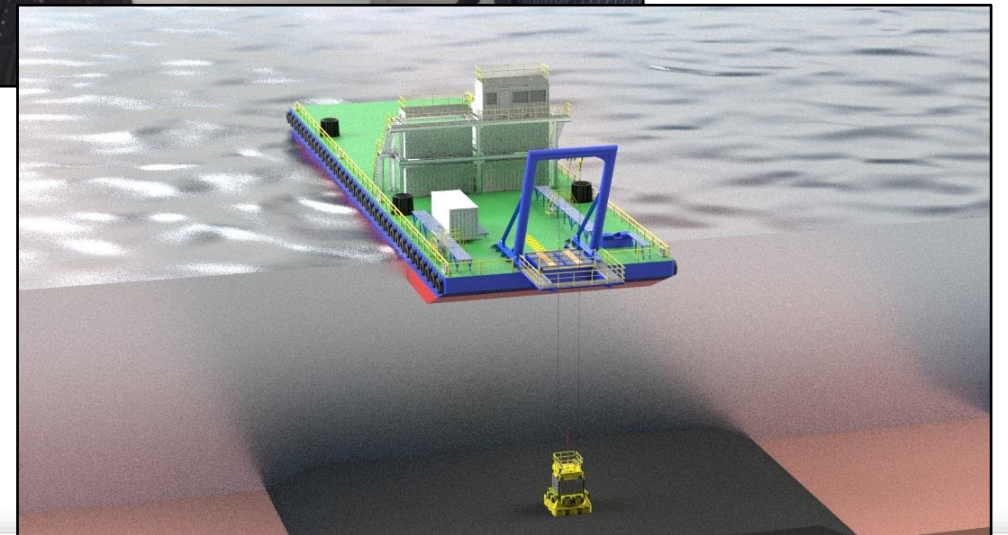
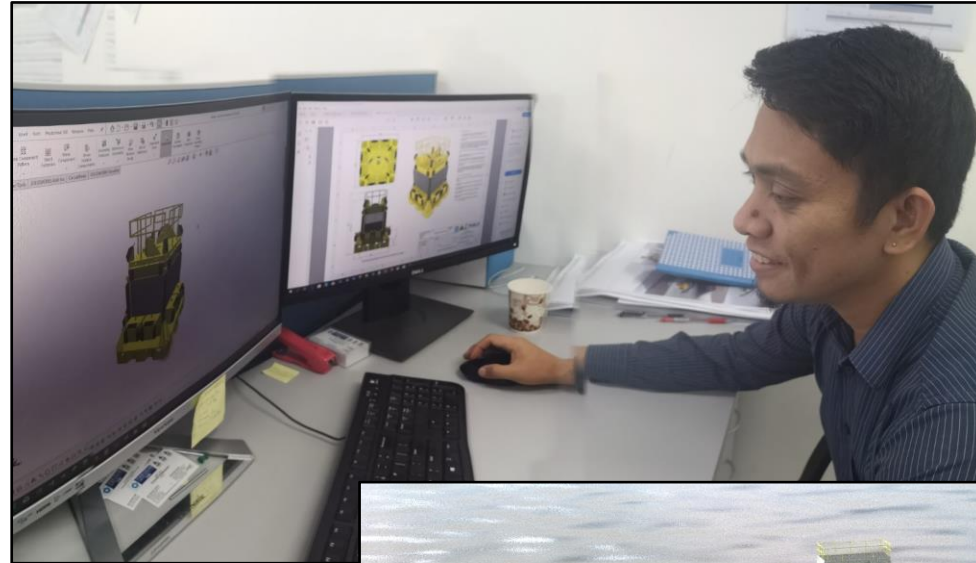


Description	Unit	Package 3
Delivery of Reclamation Material	m ³	~125M
Reclamation Area	ha	366
Soil Improvement Area	ha	403
Caisson Fabrication / Installation	nos	227
Tuas South Boulevard Extension Road (TSBE) Width 45.4m	km	2,2

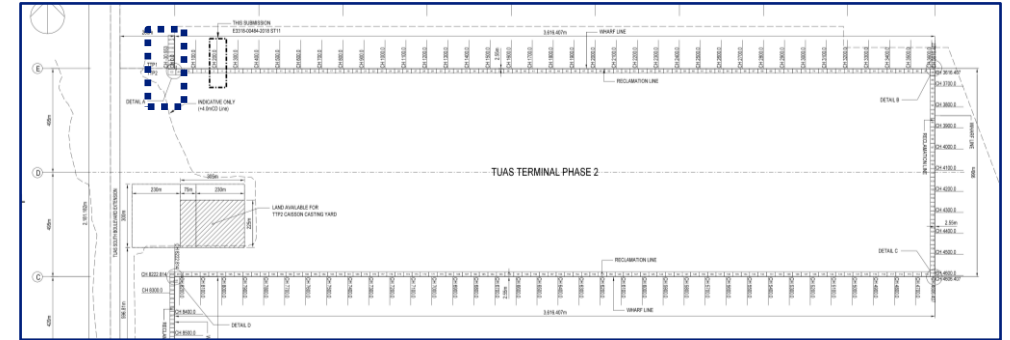
Design Scopes

Permanent Works Detail Design Scopes:

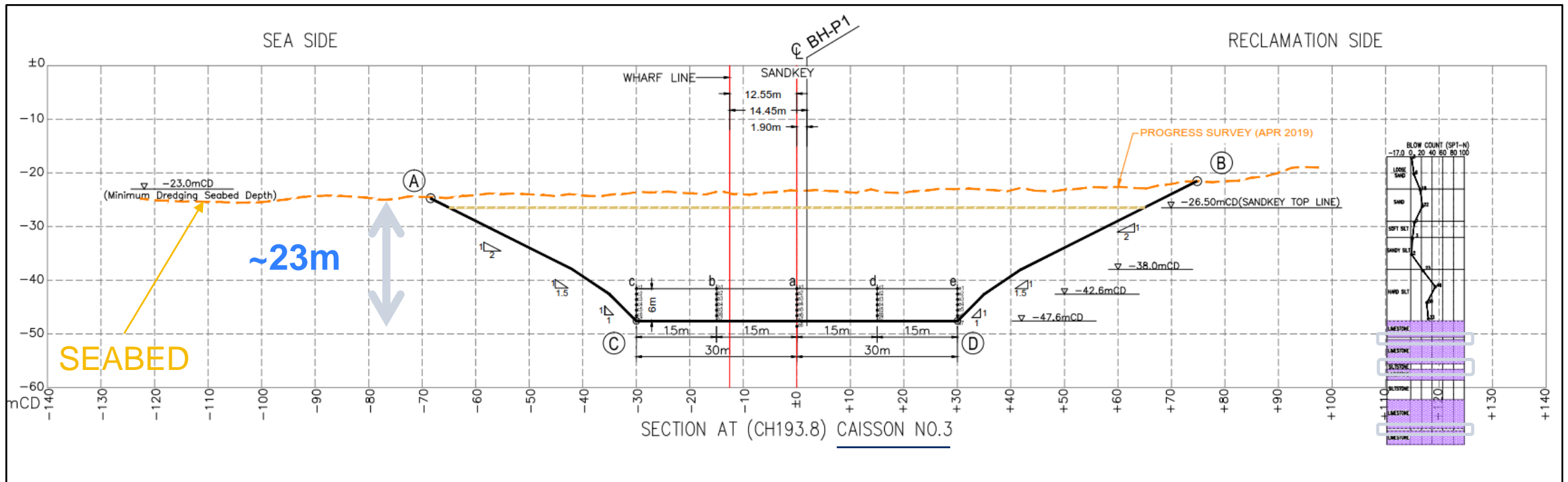
- TSBE Soil Improvement Works (SIW)
- TSBE Road and Drainage
- Wharfline Foundation
- Caissons
- Containment Bunds
- Port Land SIW
- Sand Bund 2
- Scour Protection



CAISSON FOUNDATION

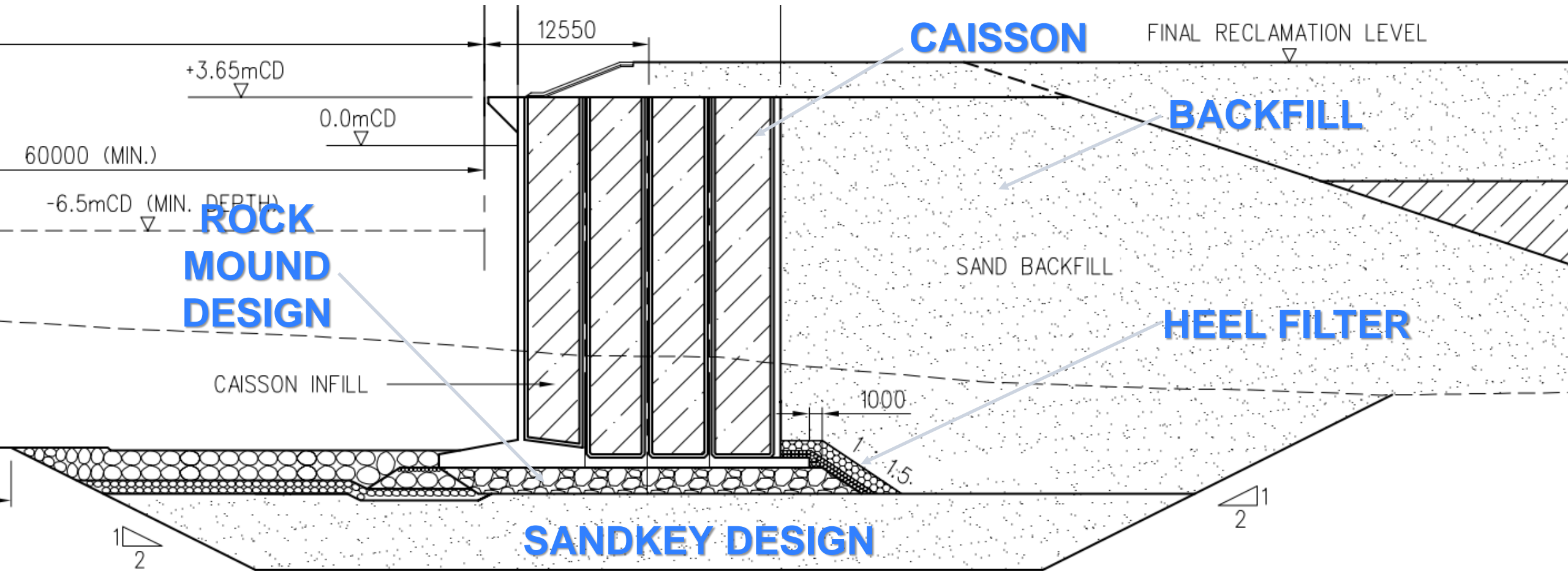


TYPICAL SANDKEY DESIGN



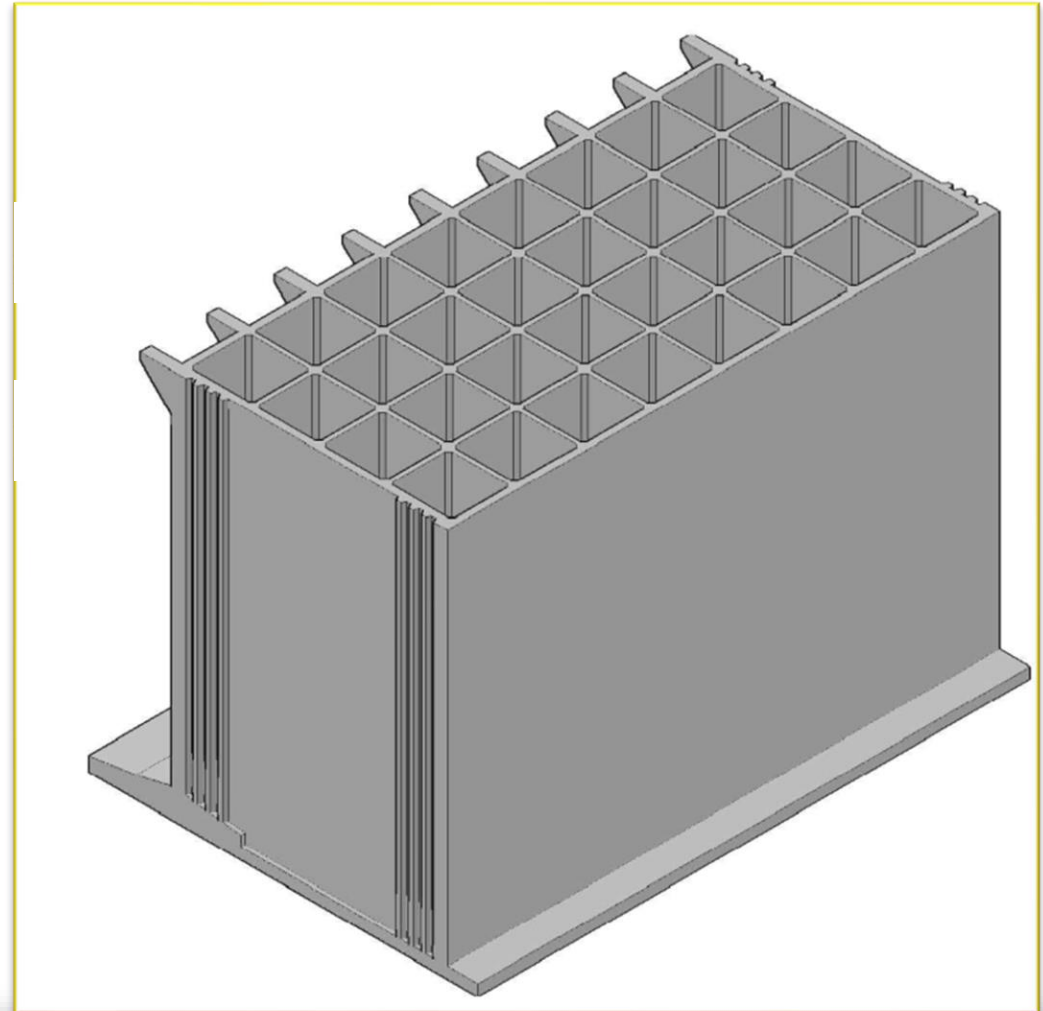
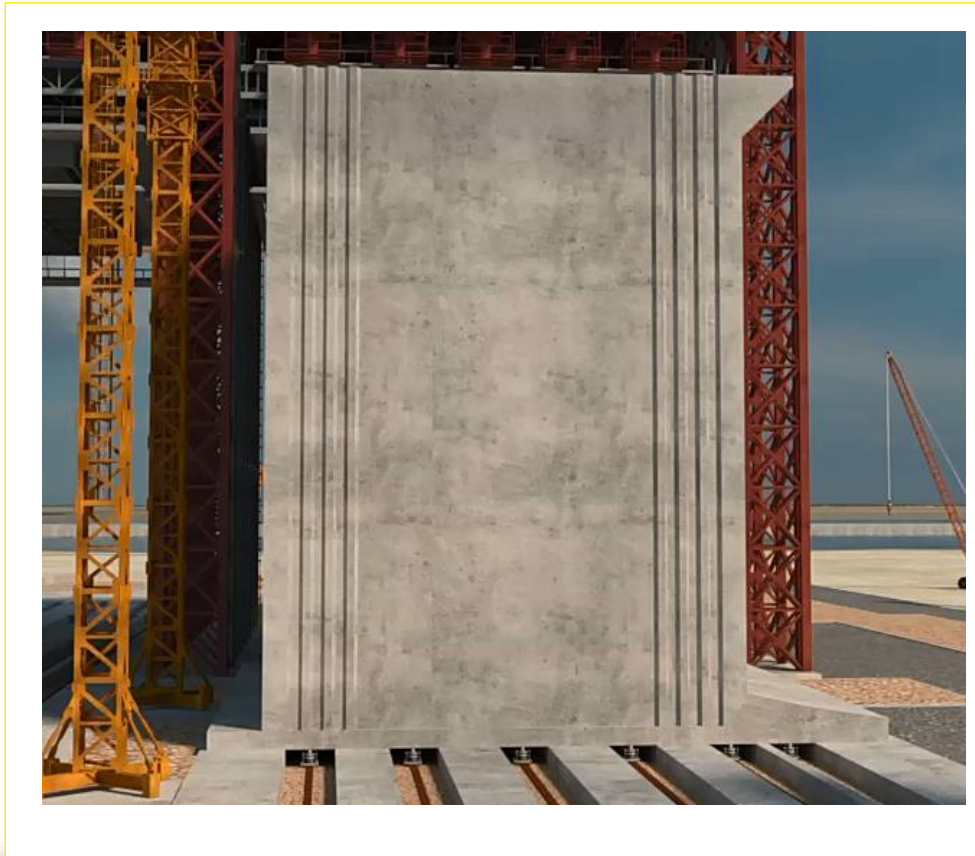
- SANDKEYS RANGE FROM 2 M TO 40 M BELOW SEABED

CAISSON FOUNDATION

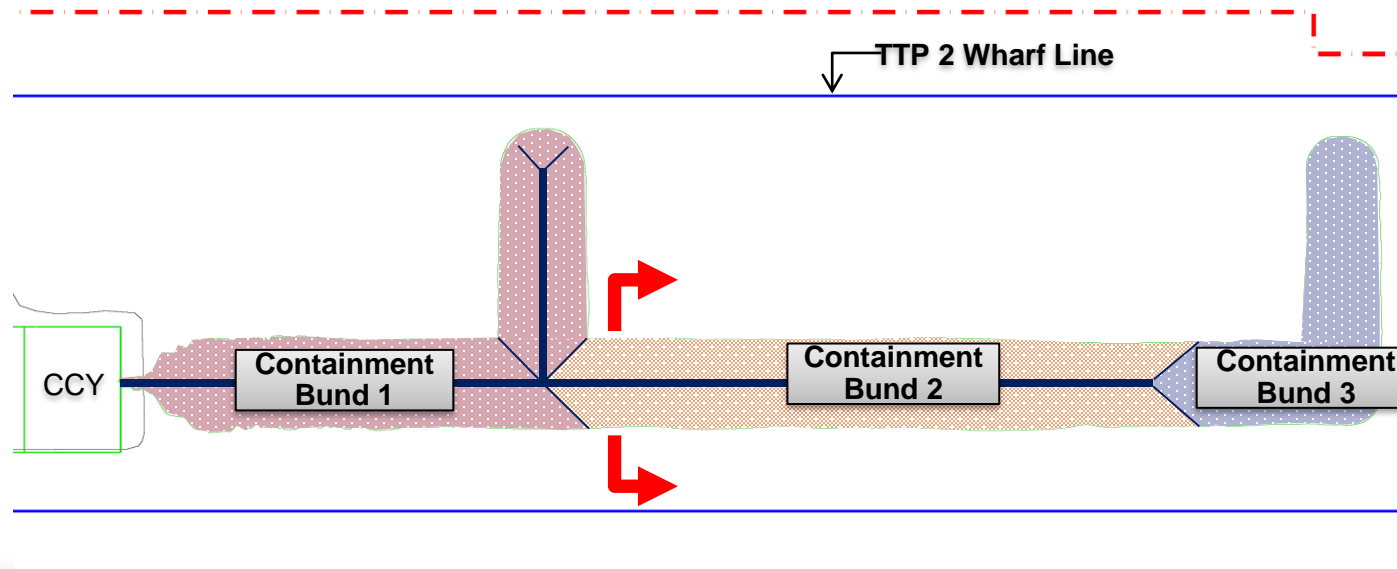
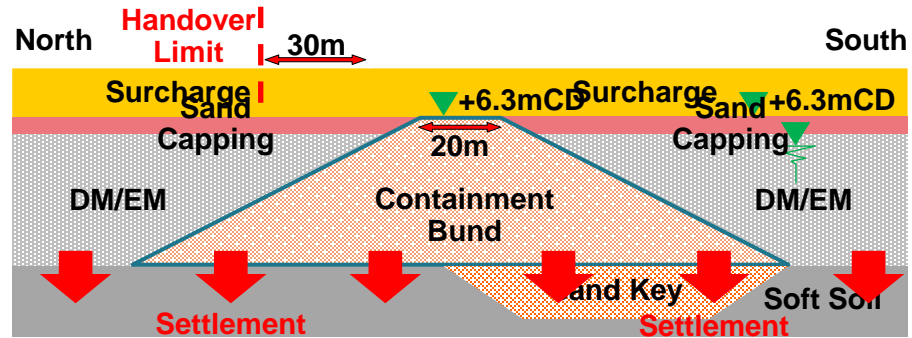


CAISSON QUAY WALL

- 227 CAISSONS 13,000 TONS
- Typical dimensions 29M X 40M X 20M

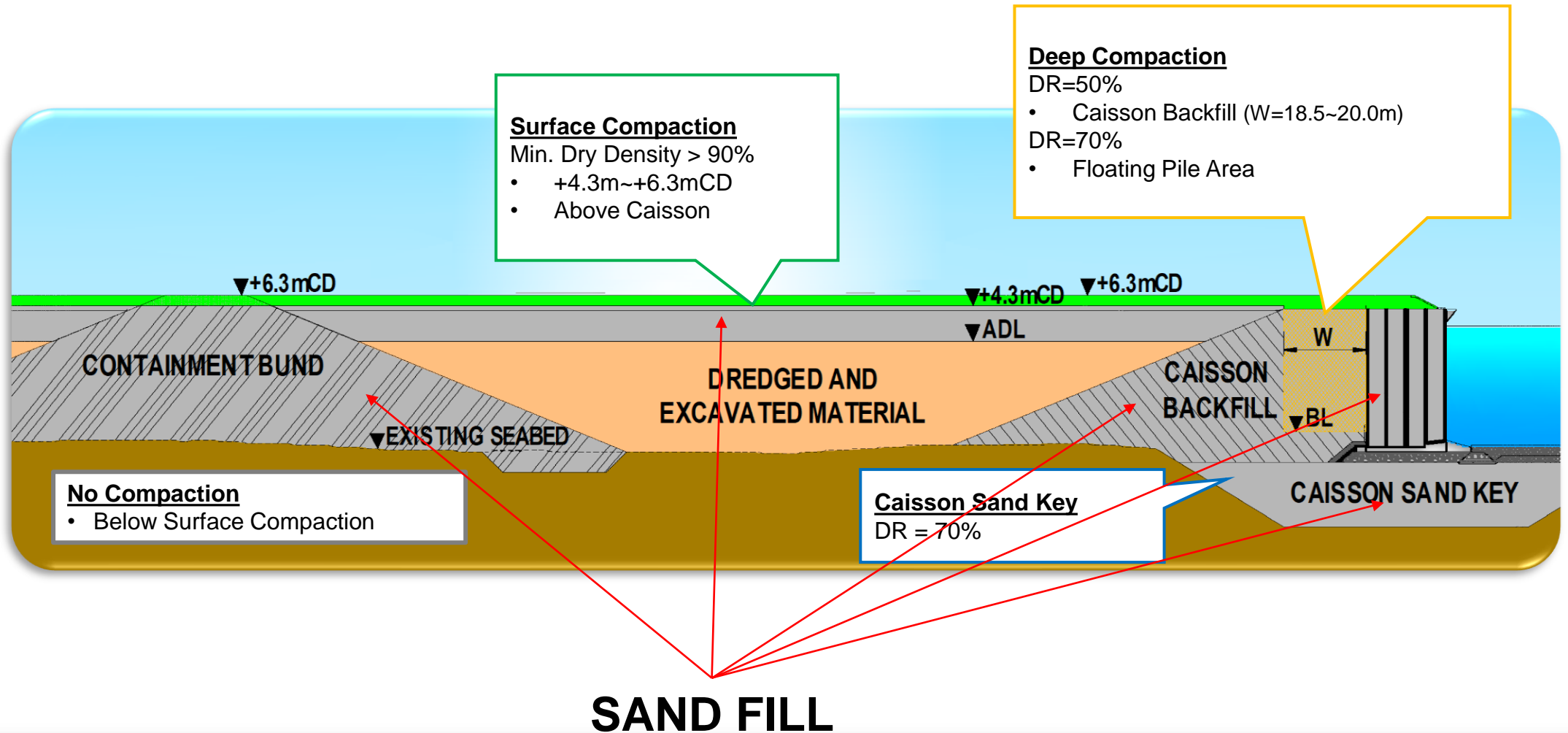


CONTAINMENT BUNDS



- RECLAMATION BACKBONE
- ENVIRONMENTAL MEASURE

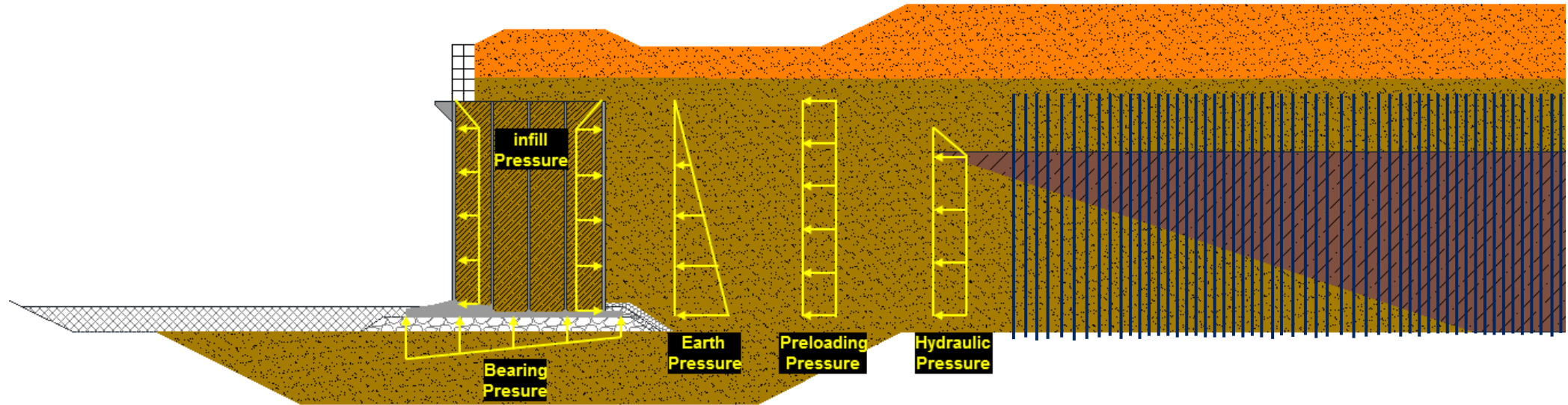
SOIL IMPROVEMENT – Sand



SOIL IMPROVEMENT – Clay

PORT LAND SOIL IMPROVEMENT WORKS:

- SURCHARGE LOADS 10+ M HIGH
- ~45,000 KM OF VERTICAL DRAINS (PVDs)



HOW DOES THIS WORK IN THE REAL WORLD?



Containment Bund Sand Filling

QotN - TRAILER SUCTION HOPPER DREDGER



Caisson SK Dredging
GRAB DREDGERS



Caisson SK Rock Mound
PETRA 1 - ROCK WORK BARGE

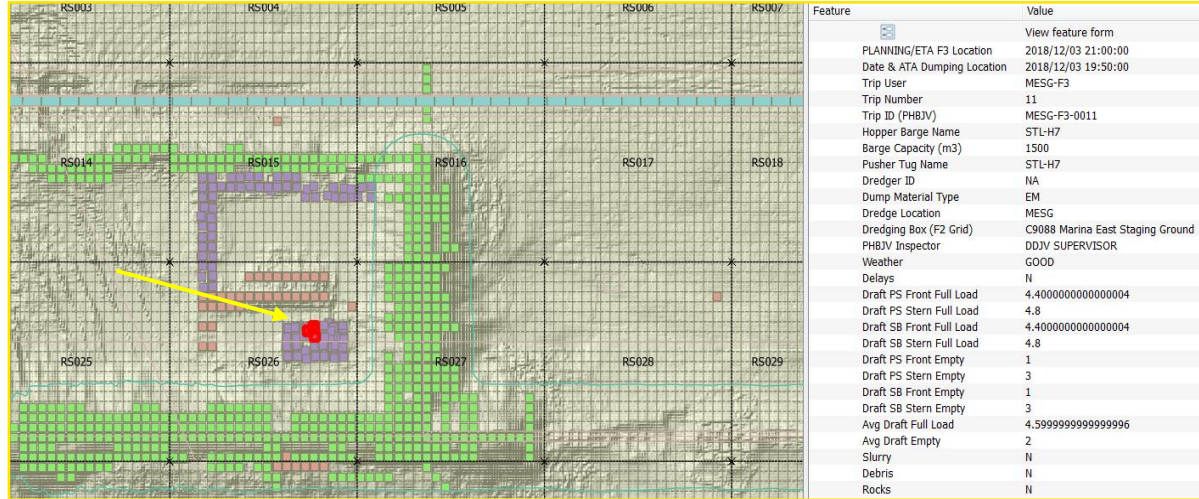


Caisson Fabrication
CAISSON CASTING YARD

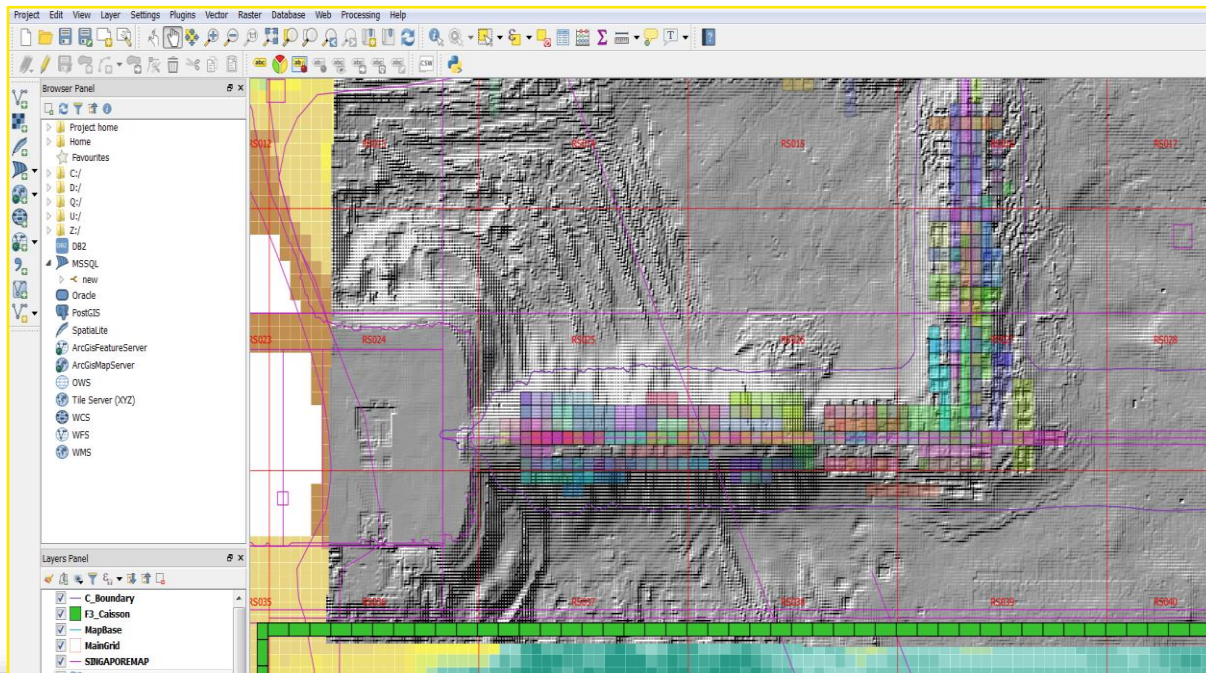


DM / EM - from approved user
LTA - SPLIT BARGES

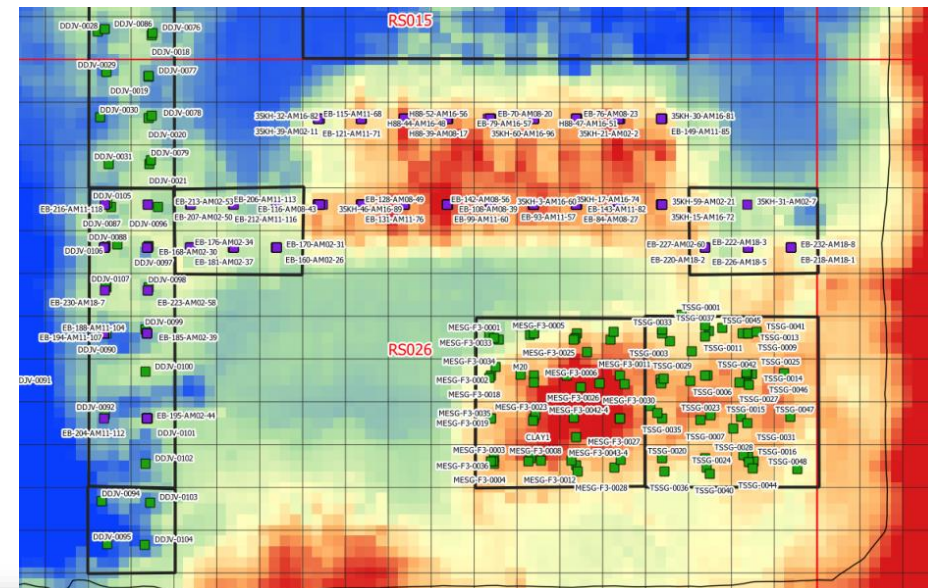
Reclamation



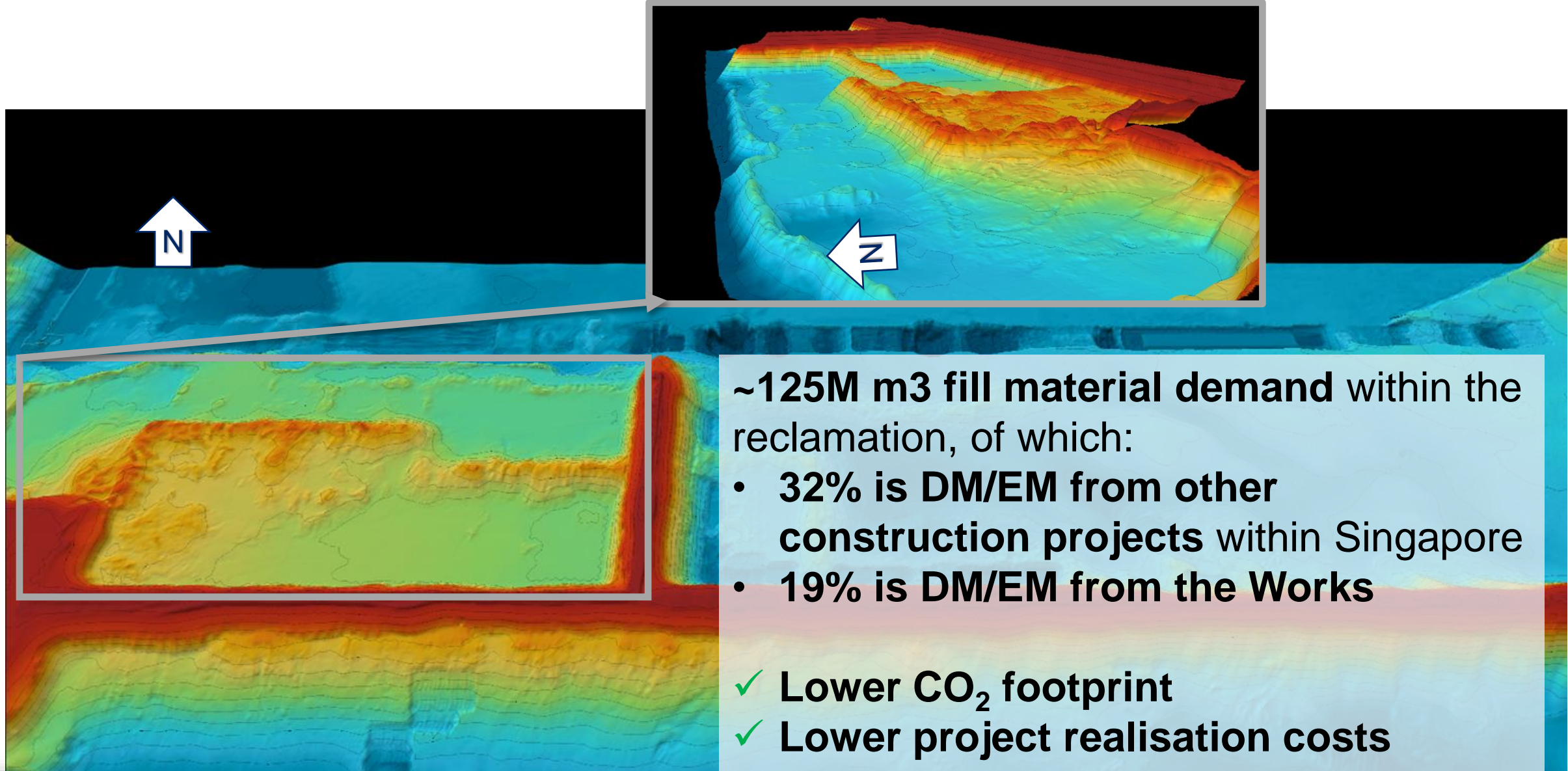
**TIGHT
CONTROLS ON
MATERIAL
VOLUMES!**



COMBINED SURVEY & SOILS DATABASE



Reclamation – Beneficial Re-USE



Future: 100% Circular!

