

Water Quality of Victoria Harbour and its Typhoon Shelters

7 Jan 2013

Environmental Protection Department
Civil Engineering & Development Department
Drainage Services Department

Water Quality Objectives (WQO)

Parameter	WQO
Dissolved Oxygen (Bottom)	Not less than 2 mg/L for 90% of samples
Dissolved Oxygen (Depth-averaged)	Not less than 4 mg/L for 90% of samples
Nutrients (Total inorganic nitrogen, TIN)	Annual mean depth-averaged not to exceed 0.4 mg/L
Ammonia nitrogen (as unionised form, NH ₃ -N)	Annual mean depth-averaged not to exceed 0.021 mg/L

Note : There is no WQO for *E. coli* for Victoria Harbour Water Control Zone

Monitoring Stations

(Victoria Harbour and Typhoon Shelters)

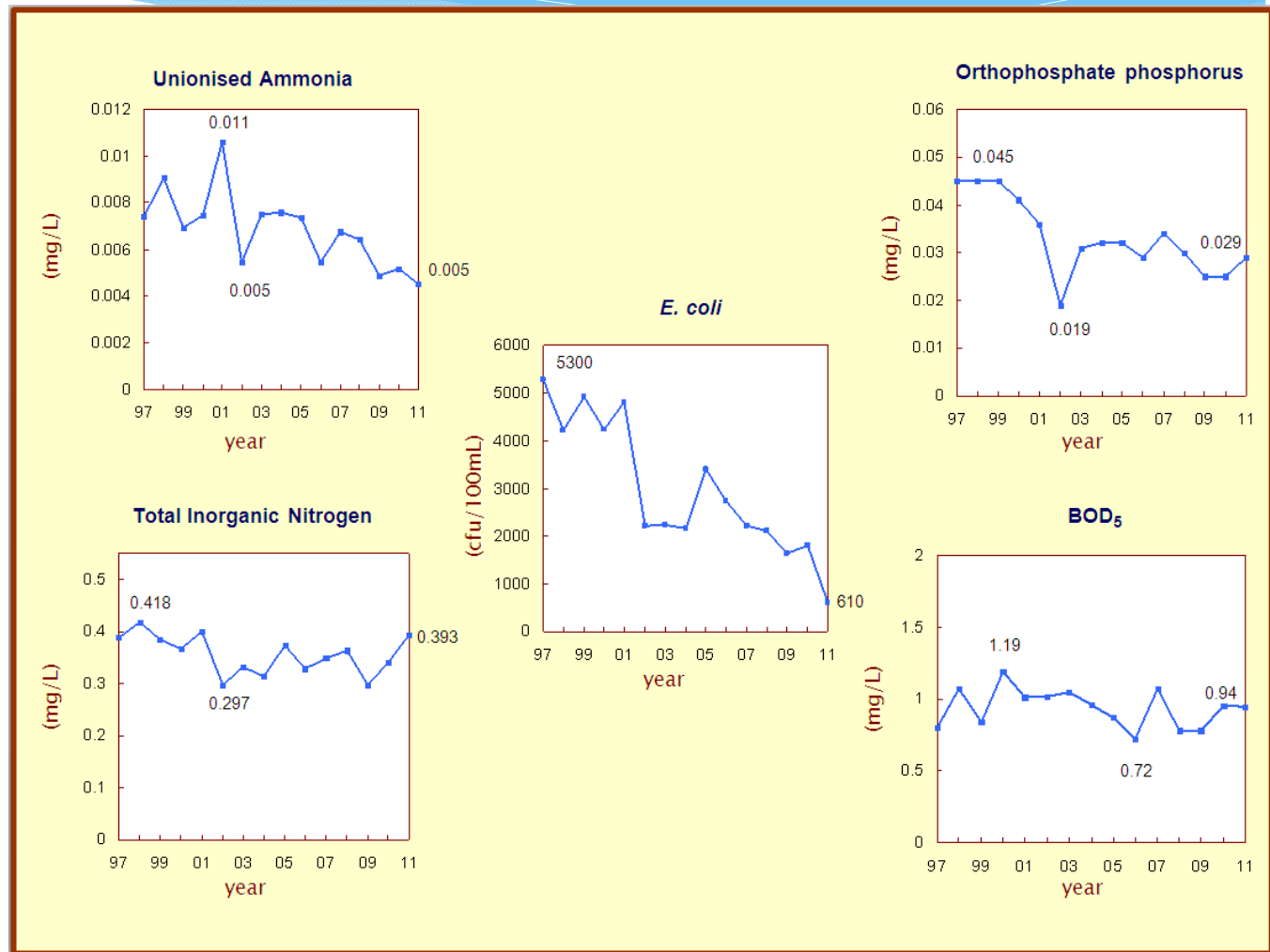
Locations of seven typhoon shelters, one cargo basin and ten marine monitoring stations in Victoria Harbour



Victoria Harbour Water Quality Trend 1997 - 2011

* Improving water quality since end 2001 (after HATS Stage I was implemented)

* No obvious sign of increase in organic pollution

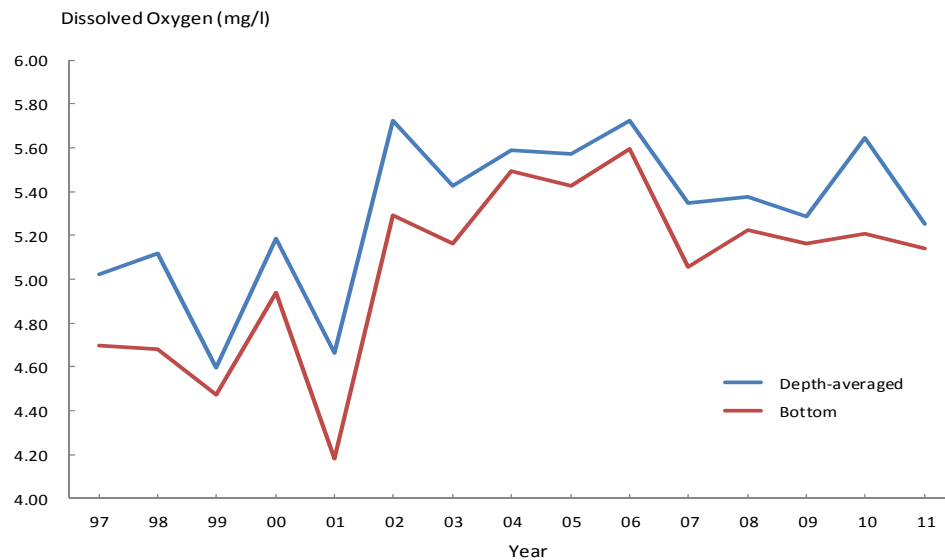


Victoria Harbour Water Quality Trend 1997 - 2011

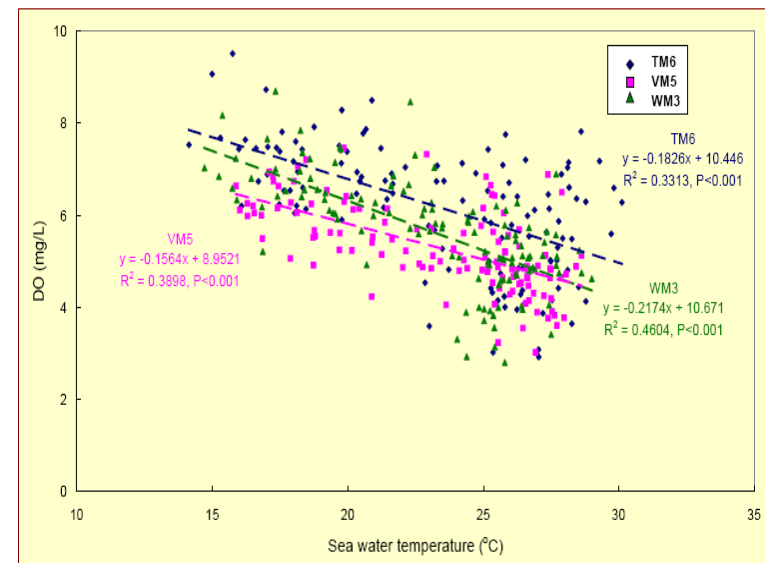
* In 2011, overall compliance rate with key WQOs was 50%, mainly due to the low compliance rates with the DO and TIN objectives

* Low DO levels likely related to the hot weather during the summer months

Annual Mean Dissolved Oxygen Levels



Correlation between DO level & Seawater Temperature



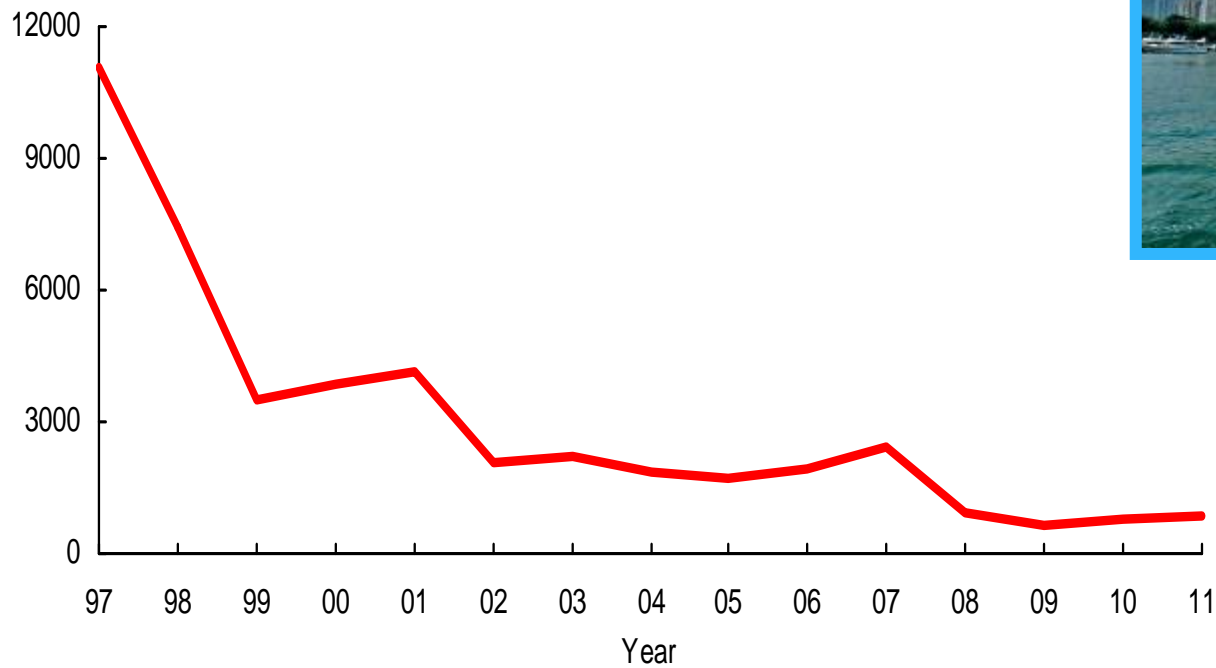
Typhoon Shelters Water Quality Trend

- * Long term improvement trends in terms of E. coli levels (a reduction of bacterial levels ranging from 60 to 95%)
- * Full compliance with ammoniacal nitrogen WQO
- * 7 typhoon shelters (excluding Chai Wan Cargo Basin) failed to meet DO objective, largely because of hot summer
- * 4 typhoon shelters (New Yau Ma Tei, Causeway Bay, Kwun Tong and Rambler Channel typhoon shelters) failed to comply with the TIN objective.

Typhoon Shelters

Water Quality Trend 1997 - 2011

Annual Geometric Mean *E. coli* Levels
(cfu/100ml)



Breakwater



Storm water culvert



Kai Tak Approach Channel (KTAC) & Kwun Tong Typhoon Shelter (KTTS)

- * Embayed with poor water circulation and flushing capacity
- * Pollution from land based sources such as illegal discharge, and non-point sources
- * Pollutants cannot be effectively dispersed or assimilated after discharge into the KTAC



Kai Tak Approach Channel (KTAC) & Kwun Tong Typhoon Shelter (KTTS)

CEDD's monitoring programme



Water samples collected quarterly since December 2009 for the Kai Tak Development



Multi-pronged approach to abate pollution

- * Source control through legislative enforcement
 - joint enforcement by Environmental Protection Department and Buildings Department to stop illegal discharge from building drains
 - enforcement by Food & Environmental Hygiene Department to stop dish washing at rear lanes
- * Regular surveillance of the sewerage system to replace broken sewers and to rectify wrong connection between public sewers and storm drains
- * Removal of organic sediments and deposit from storm drains and culvert outlets as first aid measure.
- * Engineering measures to improve the sewerage system and to upgrade or install new dry weather flow interceptors

Drainage Services Department's Sewerage improvement works in East Kowloon

* Upgrading of Central & East Kowloon Sewerage

- Phase 1 substantially completed in July 2012.
- Phase 2 commenced in Jun 2011 for completion in Dec 2015.
- Phase 3 planned for commencement in mid 2014 and completion in mid 2019, subject to funding approval

* Sewage Interception Scheme in Kowloon City

- completed in July 2012.

* Jordan Valley Dry Weather Flow Interceptor

- commenced in Dec 2010 for commissioning in mid 2013.



Civil Engineering & Development Department

- * Conduct dredging and bioremediation treatment of the contaminated sediments over an area of about 90 ha of seabed at KTAC and KTTS to abate odour
- * Construct two desilting compounds to enable periodic removal of sediment accumulated along the drainage channel and box culverts of Kai Tak River.



- * Review the justifications for a proposed opening at the former runway to improve water circulation

Progress of Bioremediation Treatment



Legend

— Site Boundary

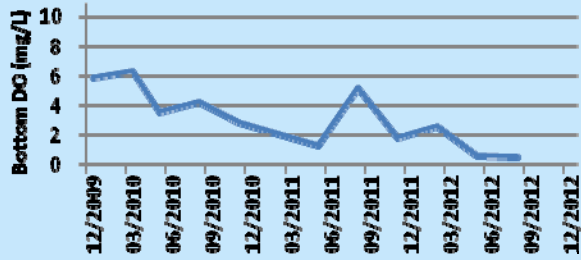
Bioremediation Works in progress

Start date: 31 Aug 2012

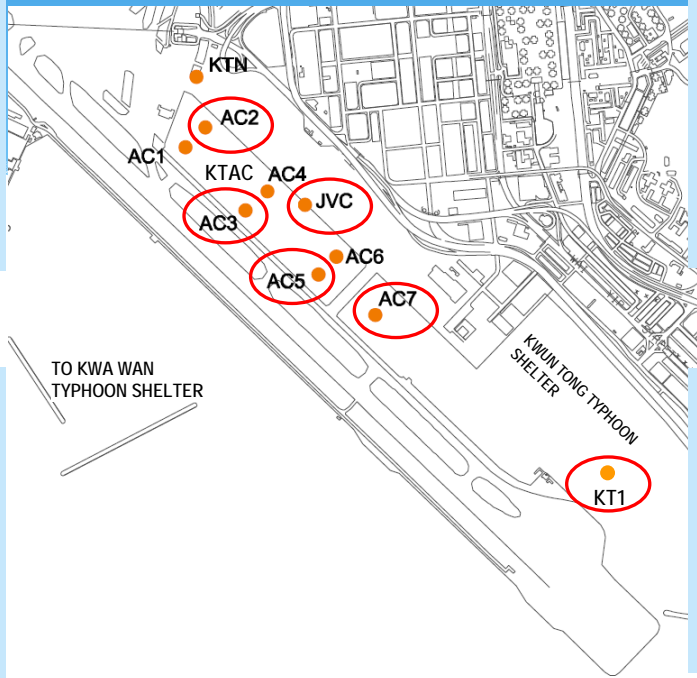
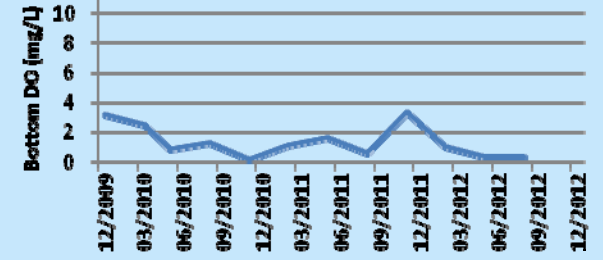
Target completion date: end 2013

Bottom DO Level

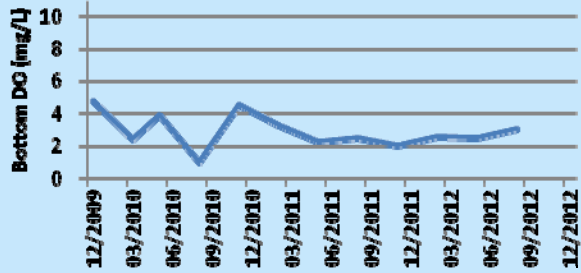
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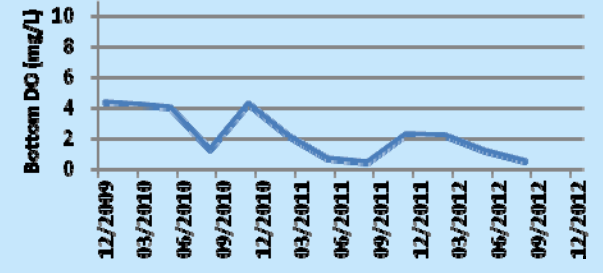
AC2



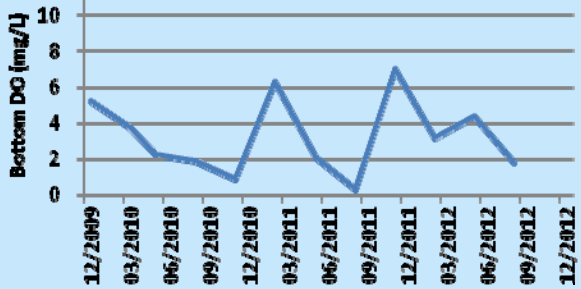
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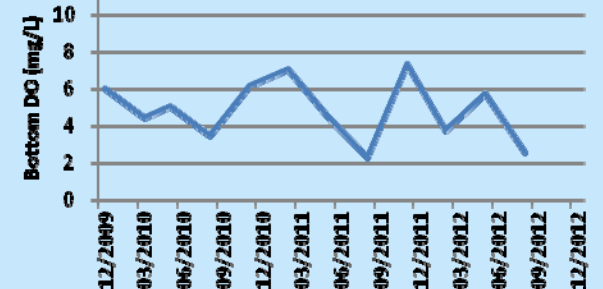
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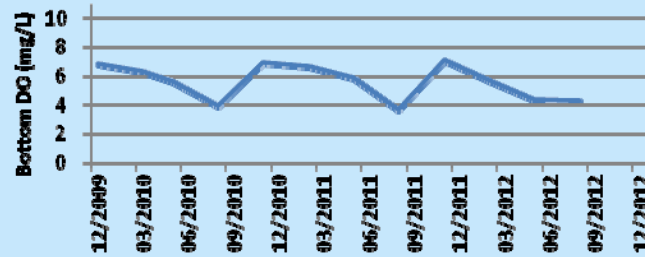
AC7



KT1



VH2

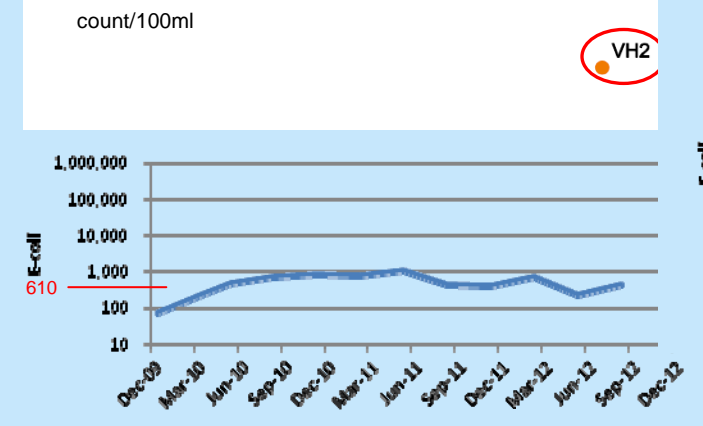
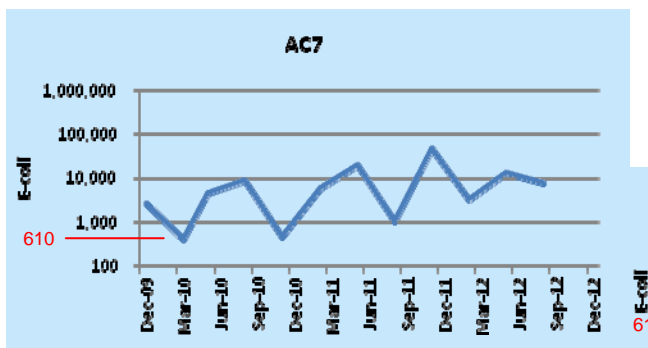
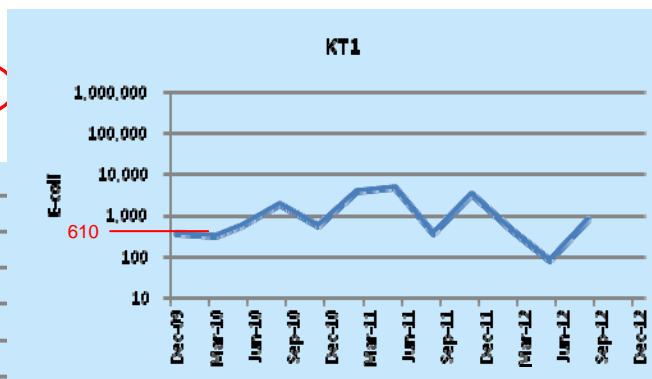
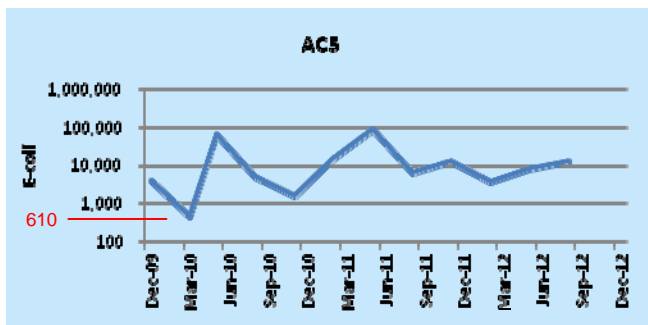
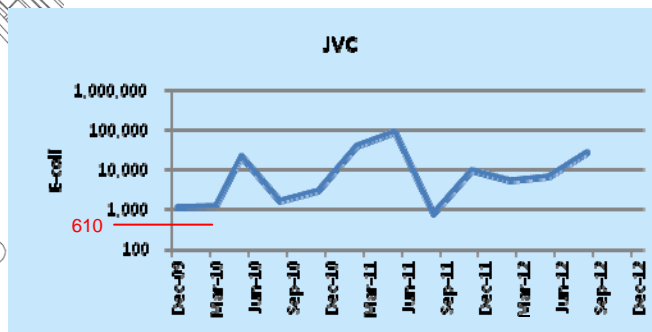
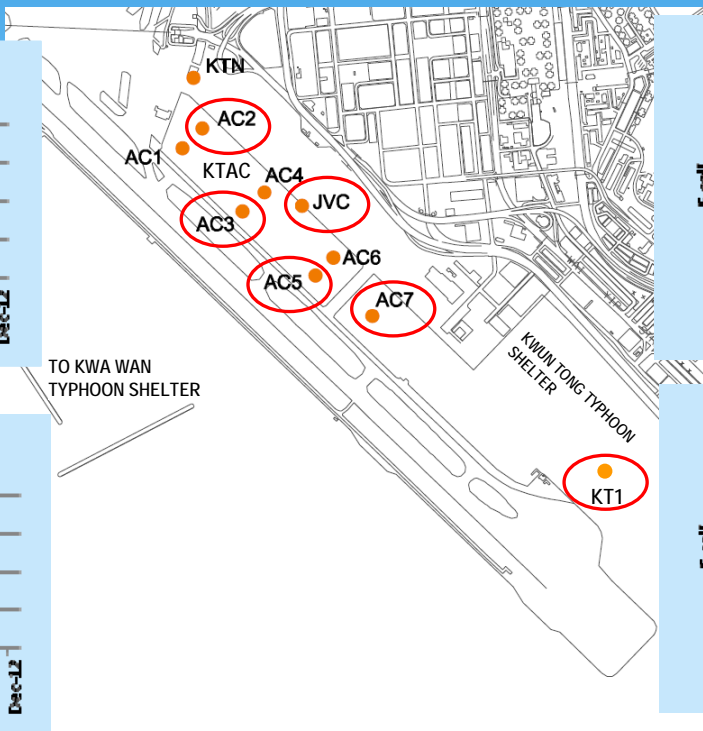
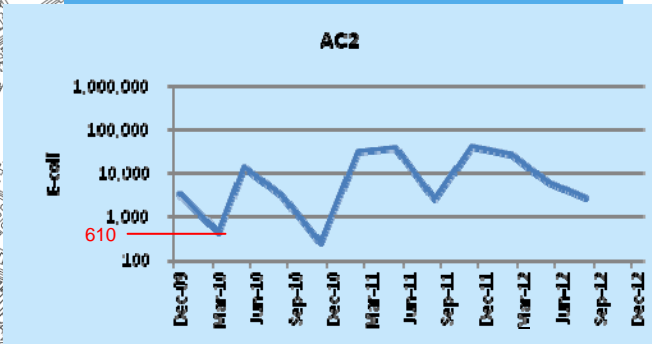
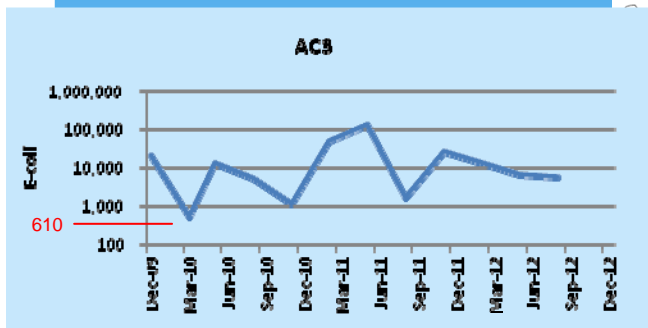


VH2

E. Coli Level along KTAC & KTTS

count/100ml

count/100ml



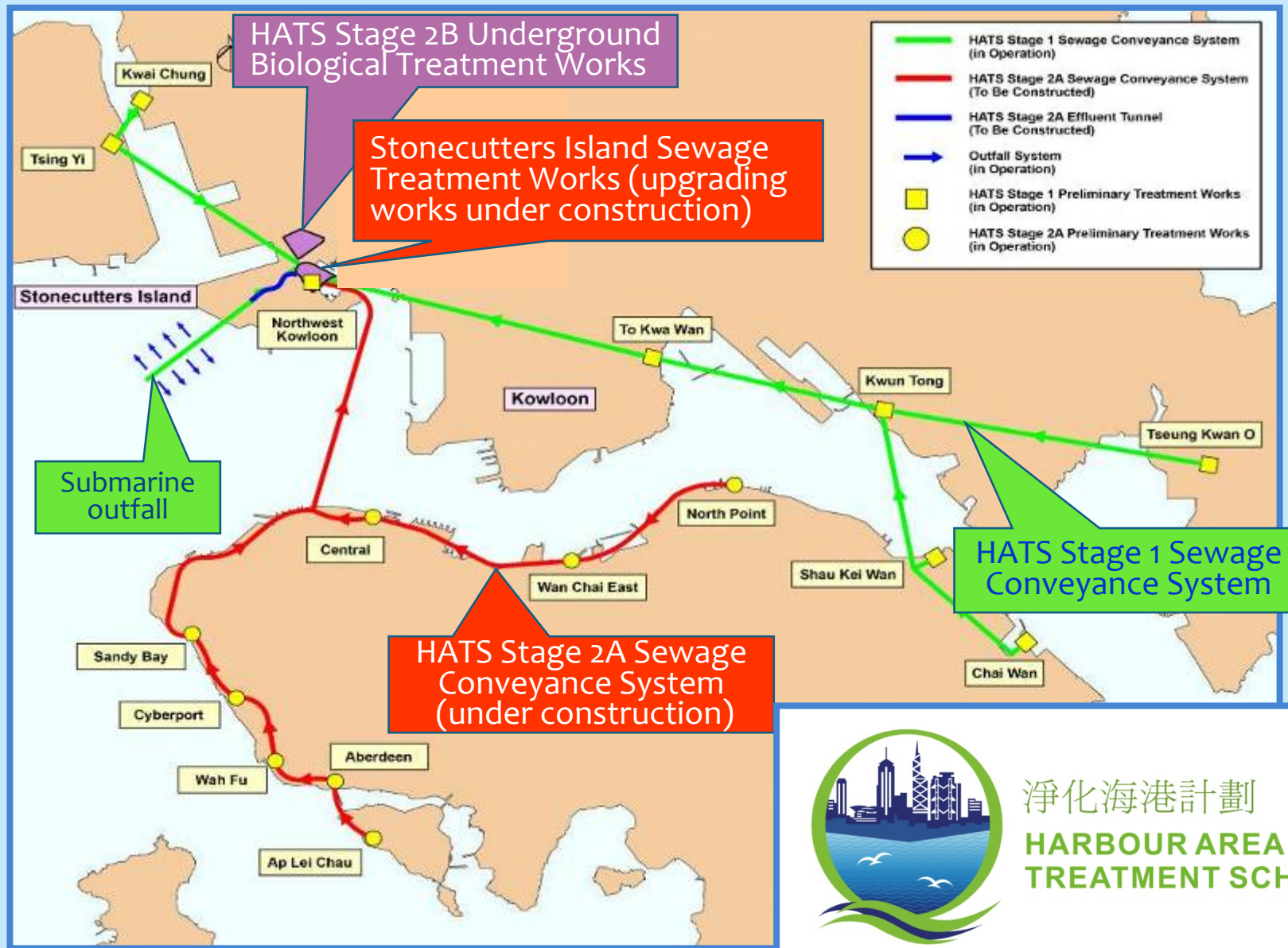


淨化海港計劃
**HARBOUR AREA
 TREATMENT SCHEME**

HATS Stage 2A: Progress Update



HATS - A major initiative to provide a clean Victoria Harbour by conveying and treating all sewage from both sides of the harbour



淨化海港計劃
HARBOUR AREA
TREATMENT SCHEME

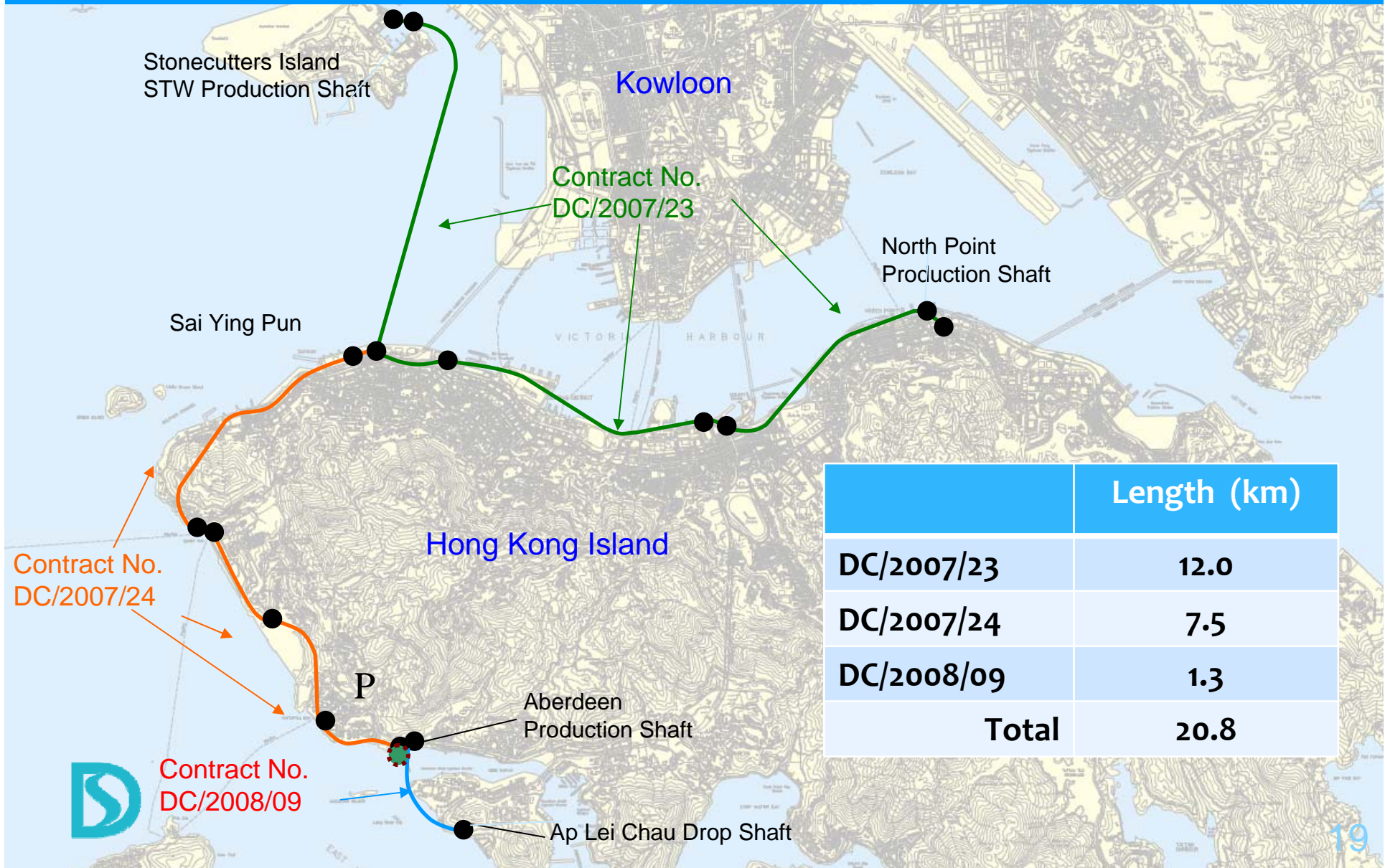
Scope of HATS Stage 2A

Construction works include :

- ◆ 21 km long sewage conveyance system
- ◆ Upgrading of Stonecutters Island Sewage Treatment Works
- ◆ Disinfection facilities at SCISTW to disinfect CEPT effluent
- ◆ Improvement of 8 preliminary treatment works



HATS Stage 2A Sewage Conveyance System (3 Contracts)



HATS Stage 2A

Upgrading of Stonecutters Island Sewage Treatment Works (SCISTW) and Preliminary Treatment Works (PTW)



淨化海港計劃
HARBOUR AREA
TREATMENT SCHEME

HATS Stage 2A – Upgrading of SCISTW (5 Contracts)

- | | | |
|---|------------|--|
| 1 | DE/2009/02 | Covers & Deodorization Facilities |
| 2 | DC/2009/05 | Interconnection Tunnel & Diaphragm Wall for Main Pumping Station |
| 3 | DC/2009/10 | Main Pumping Station, Sedimentation Tanks and Ancillary Facilities |
| 4 | DC/2009/17 | Sludge Dewatering Facilities |
| 5 | DC/2009/18 | Effluent Tunnel & Disinfection Facilities |



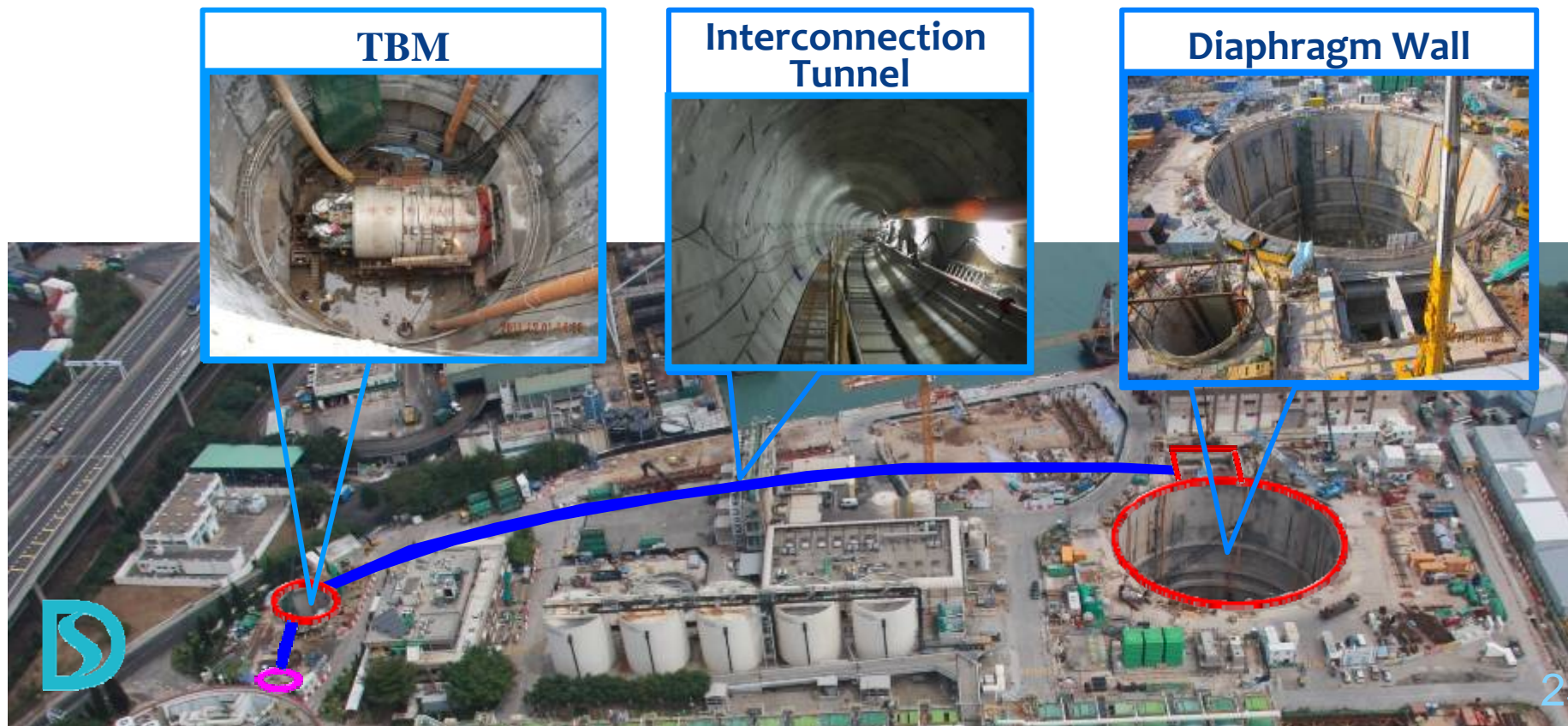
Contract 1 : Odour Control Enhancement (DE/2009/02 - contract completed)

- ◆ All 46 CEPT tanks provided with FRP covers since end Jun 2012
- ◆ 2 deodorization units (DOU) for the CEPT tanks put into operation
- ◆ Contract substantially completed in Sept 2012



Contract 2 : Interconnection Tunnel and Diaphragm Wall (DC/2009/05 - contract completed)

- ◆ Diaphragm wall completed in Jan 2012
- ◆ Tunnel Boring Machine (TBM) tunnel and hand-mined tunnel completed in May & Sept 2012
- ◆ Contract substantially completed on 6 July 2012



Contract 3 : Main Pumping Station and CEPT Tanks (DC/2009/10 - in progress)

Piling works for
CEPT tanks and other
facilities in progress



- ◆ Wet-well in progress
- ◆ Sewage pumps being manufactured in Japan



Contract 4 : Sludge Dewatering Facilities (DC/2009/17 - in progress)

- ◆ Eight cake silos erected
- ◆ Superstructure works for sludge dewatering building, cake silos and sludge storage tanks in progress

Sludge Storage tanks

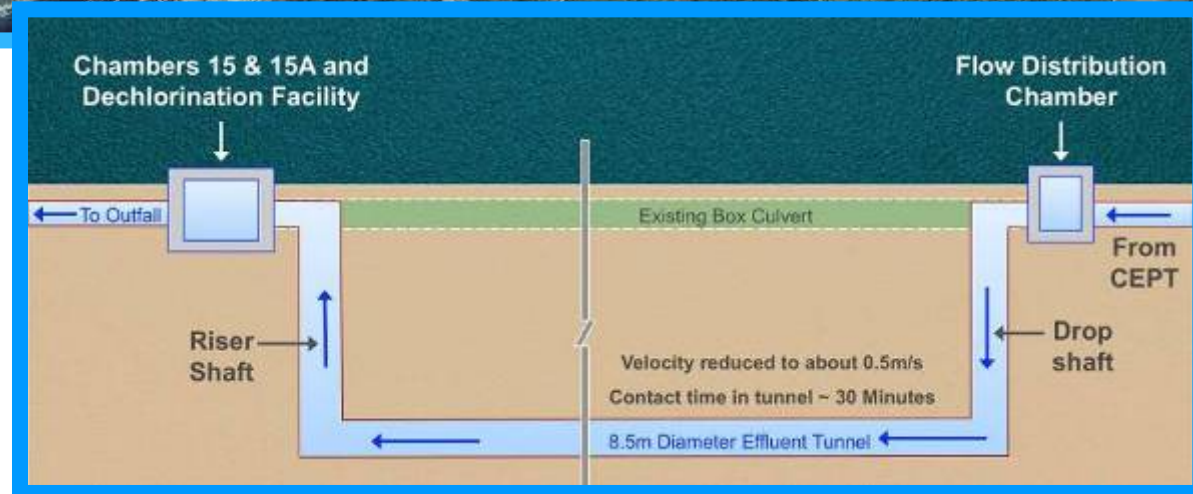
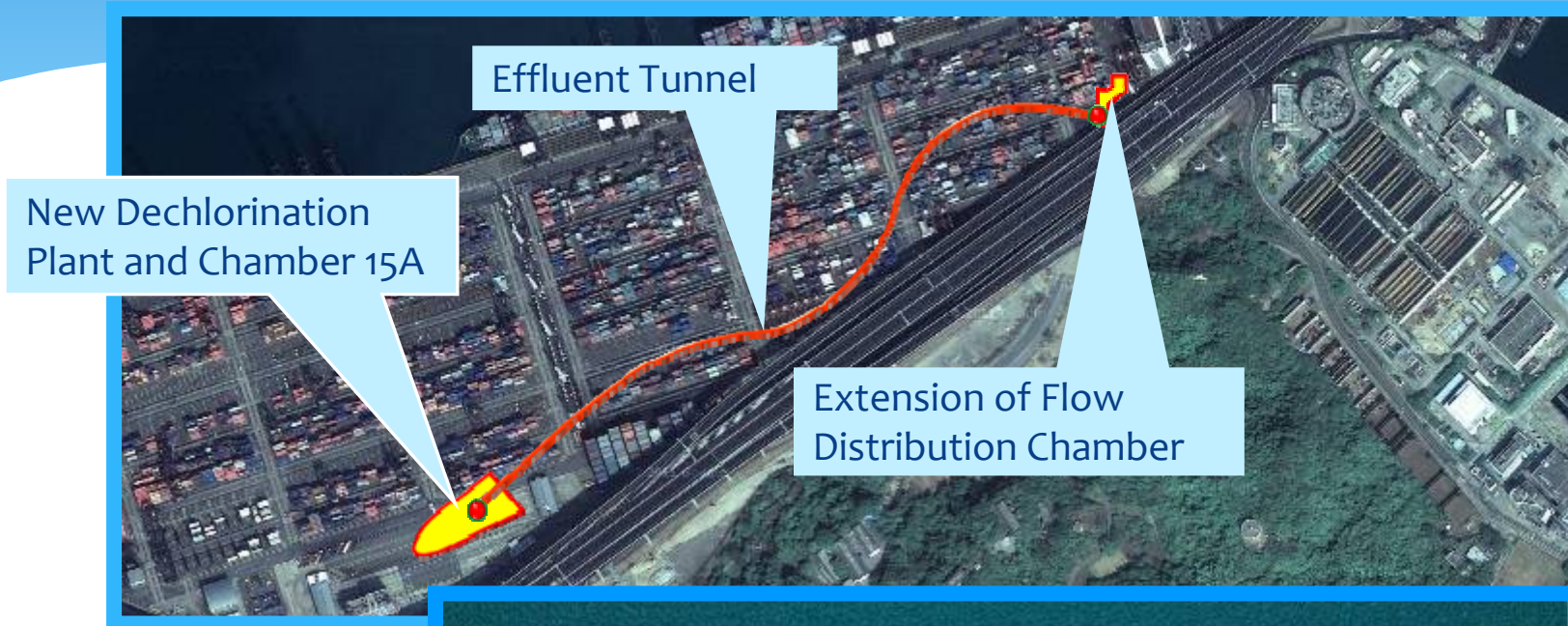


Sludge Dewatering Building

Cake Silos



Contract 5 : Effluent Tunnel and Disinfection Facilities (DC/2009/18 - in progress)



HATS Stage 2A – Upgrading of SCISTW



Photomontage for SCISTW
after Upgrading



淨化海港計劃
HARBOUR AREA
TREATMENT SCHEME

HATS Stage 2A – Upgrading Works at PTW

(DC/2009/23 & DC/2009/24 - in progress)

- ◆ Upgrading of 8 existing PTWs at northern and southwestern parts of Hong Kong Island
- ◆ To remove large solids and grits
- ◆ To protect downstream facilities from damage or blockage
- ◆ To enhance odour control
- ◆ To provide associated landscape works



Central PTW
(photomontage)



North Point PTW
(photomontage)



Wanchai East PTW
(photomontage)



HATS Stage 2A Upgrading Works at PTWs

Odour Abatement Measures at Central PTW during Construction

Screening and De-gritting Facilities housed in a Temporary Enclosure installed with Deodorization System



HATS Stage 2A Upgrading Works at PTWs Odour Abatement Measures during Construction



Enclosure for temporary Sewage Treatment Facilities at Wah Fu PTW



Temporary Deodorizer



Weekly Odour Monitoring



END
THANK YOU