

# Hong Kong West Drainage Tunnel

## Newsletter Issue 4 January 2010

**Together We Build the Drainage Tunnel  
Together We Alleviate Flooding**

To alleviate the flooding problem of Northern Hong Kong Island, we are constructing a drainage tunnel of about 11km long and 34 intakes to intercept stormwater and discharge it directly to sea. For details, please visit the Project website [www.dsd.gov.hk/HKWDT](http://www.dsd.gov.hk/HKWDT).

## Progress Updates and Works Schedule



About 1700 metres of the main tunnel from Western Portal have been excavated and all facilities have been installed

### Eastern Portal at Tai Hang

Slope works at the Eastern Portal was completed in August 2009. Most of the river channel excavation works were completed in mid December 2009 with the remaining works scheduled to start by the end of 2010. Tunnelling works have been making good progress since commencing in early June 2009. Currently, about 31% of the tunnel has been excavated.

### Western Portal at Cyberport

Commenced in end March 2009, 26% of the tunnelling works from the Western Portal have been completed. Since mid July 2009, tunnel boring in the western end was put on round-the-clock schedule. The contractor will ensure full compliance with all legal requirements, and will implement necessary mitigation measures for all probable environmental impacts.

### Intake Construction

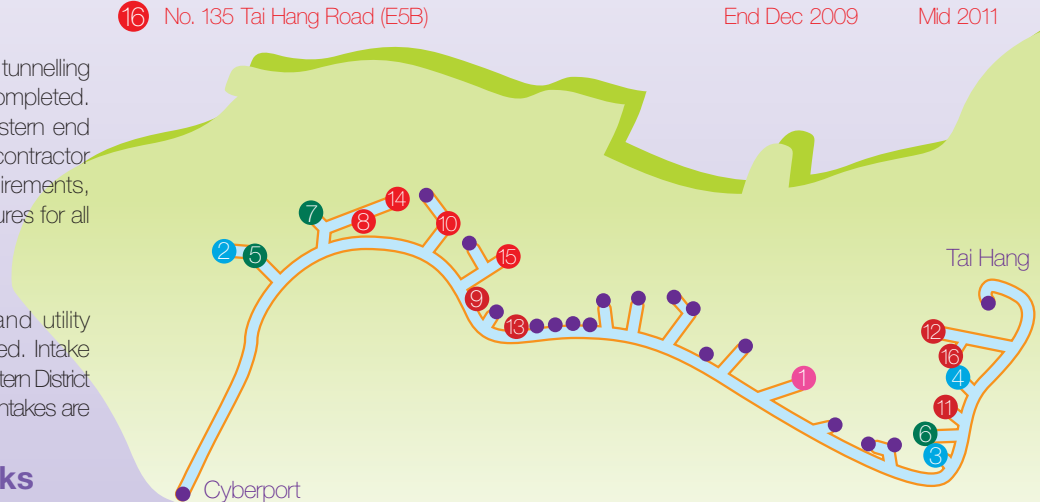
The second phase of ground investigation and utility identification works has almost been completed. Intake construction in Wan Chai District and Central & Western District started at the end of 2008. Currently, a total of 16 intakes are under construction.

### Adit Tunnels Excavation Works

The adit tunnels excavation works, carried out underground by using drill and blast method, will commence in phases from January 2010. We will keep stakeholders well informed of the works arrangement.

#### Intakes Under Construction

		Construction Commencement Date	Anticipated Completion Date
1	At Stubbs Road Garden (W0)	End Dec 2008	End 2011
2	Smithfield (SM1)	End May 2009	End 2010
3	Near Blue Pool Road (THR2)	Mid Jun 2009	Mid 2011
4	Junction of Mount Butler Road and Henderson Road (MB16)	End Jun 2009	Mid 2011
5	Within Pokfulam Road Playground (PFLR1)	Mid Jul 2009	Mid 2011
6	Junction of Blue Pool Road and Briar Avenue (E7)	End Aug 2009	Mid 2011
7	Between Graduate House and University Drive (HKU1)	Mid Sep 2009	Mid 2011
8	Junction of Kotewall Road and Conduit Road (W10)	Early Oct 2009	Mid 2011
9	Near Tregunter Tower at Tregunter Path (TP4)	End Oct 2009	End 2011
10	Junction of Robinson Road and Castle Road (RR1)	End Oct 2009	Mid 2011
11	Junction of Mount Butler Road and Price Road (MBD2)	Early Nov 2009	End 2011
12	Near No. 133 Tai Hang Road (E5A)	End Nov 2009	End 2011
13	Near Tavistock at Tregunter Path (TP789)	End Nov 2009	End 2011
14	Junction of Robinson Road and Oaklands Avenue (P5)	End Dec 2009	End 2011
15	Near Raimondi College (Primary) at Glenealy (W5)	Early Dec 2009	End 2011
16	No. 135 Tai Hang Road (E5B)	End Dec 2009	Mid 2011



Intake Location Map for the Hong Kong West Drainage Tunnel

Note : Works commenced in the same quarter are highlighted with the same colour

# Quality and Safety Come First

## Together We Build A Quality Project

To provide world-class stormwater drainage services, quality assurance is of paramount importance. As such, the Project team of the Hong Kong West Drainage Tunnel meticulously strives for perfection, ranging from tunnelling, manufacturing and installation of precast segments, etc., to assure the quality as well as safety.

## Quest for Quality

To ensure the drainage tunnel excels in both form and function, precast concrete segments play a crucial part. The segments not only form an even and smooth tunnel surface allowing expeditious discharge of stormwater, but also provide immediate support for the tunnel upon installation during the tunnel excavation. In addition, to facilitate future tunnel maintenance, the segments were specially designed such that maintenance vehicle can be driven along the tunnel.

The precast segments are produced in the workshop equipped with advanced technology. To ensure quality standard, the production process is under stringent control and monitoring. The mould can be re-used which is in line with the principle of environmental protection.



The mould for precast segments



A worker carefully pours concrete into the mould



The temperature of concrete for making precast segments is kept below 32°C



Precast segments



To ensure the concrete strength of the precast segments is up to standard, the concrete is tested in a laboratory



A technical officer tests precast segments

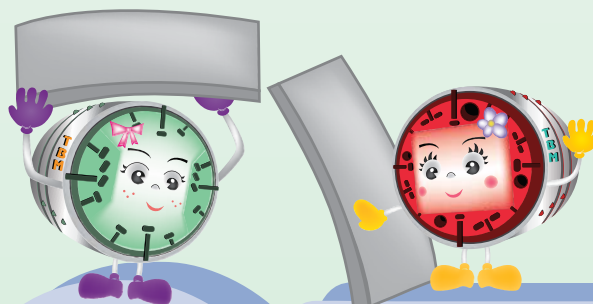
## Quality Control to Assure Perfection

The manufacture of precast segments must strictly comply with the required standard. Hence, quality control is of great importance. Some of the quality control measures are:

- The size error of each mould cannot be over 0.3mm.
- Before pouring the concrete, it is necessary to measure its temperature to make sure it is below 32°C.
- While pouring the concrete, the shaking function of the mould should be started to free air trapped in the concrete. The momentum must coincide with the concrete pouring speed.
- To ensure the concrete strength reaches the specified standard, cubes of the concrete are sent to a accredited laboratory for testing.
- Precast segments with defects or big air pockets will be discarded.

## Step By Step

Precast segments are to be installed using the segment erector of the tunnel boring machine. The segment forming the tunnel invert will be installed first, and to be followed by the segments forming the side walls. A complete ring of segments will be formed after the soffit segments are installed. Segments are securely interlocked with each other.



## Do You Know???

How thick is each precast segment?

What is the weight of each precast segment?

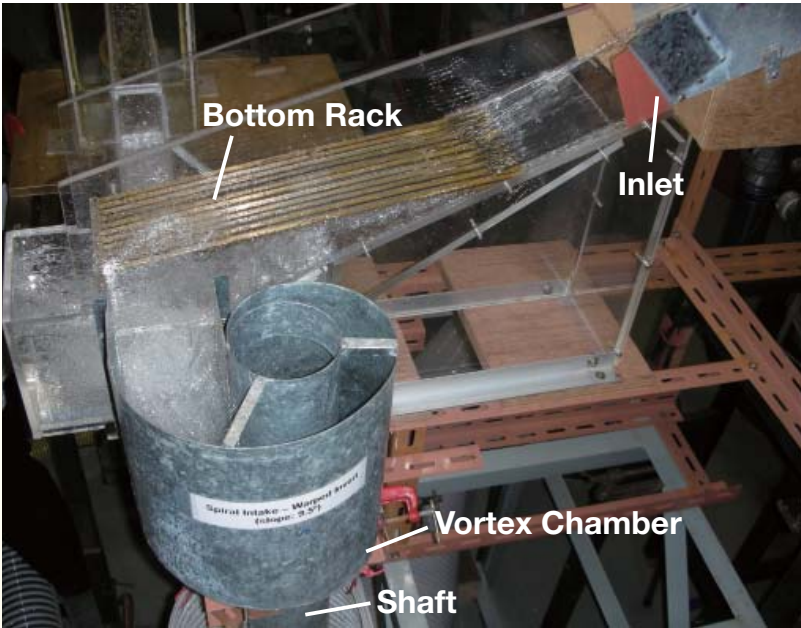
How many precast segments will be used for the Hong Kong West Drainage Tunnel?

How long will it take to make a precast segment?

1. The thickness of each precast segment is between 285mm and 310mm, like the length of a piece of A4 paper.
2. Each precast segment weighs about 2 to 7 tonnes, equivalent to a limousine and a coach with 61 seats respectively.
3. The 11km Hong Kong West Drainage Tunnel requires about 41,000 pieces of precast segments, which would cover approximately 63 standard football fields.
4. It takes 24 hours to finish the whole manufacturing process.

H

Highlights of Our Technology – Raise Boring Method



A model of an intake

We often mention about intakes in the Project Newsletter. What are they? Intakes constitute an essential part of this drainage tunnel system. They are built to collect and convey stormwater via dropshafts, adits and the main tunnel to the sea.

In this Project, 34 intakes will be built in Wan Chai District and Central & Western District. The construction method of dropshaft is determined by the intake location, topography and geology. The following three methods are adopted to construct the dropshafts:

1. Raise Boring Method
2. Reverse Circulation Drilling
3. Mechanical Excavation

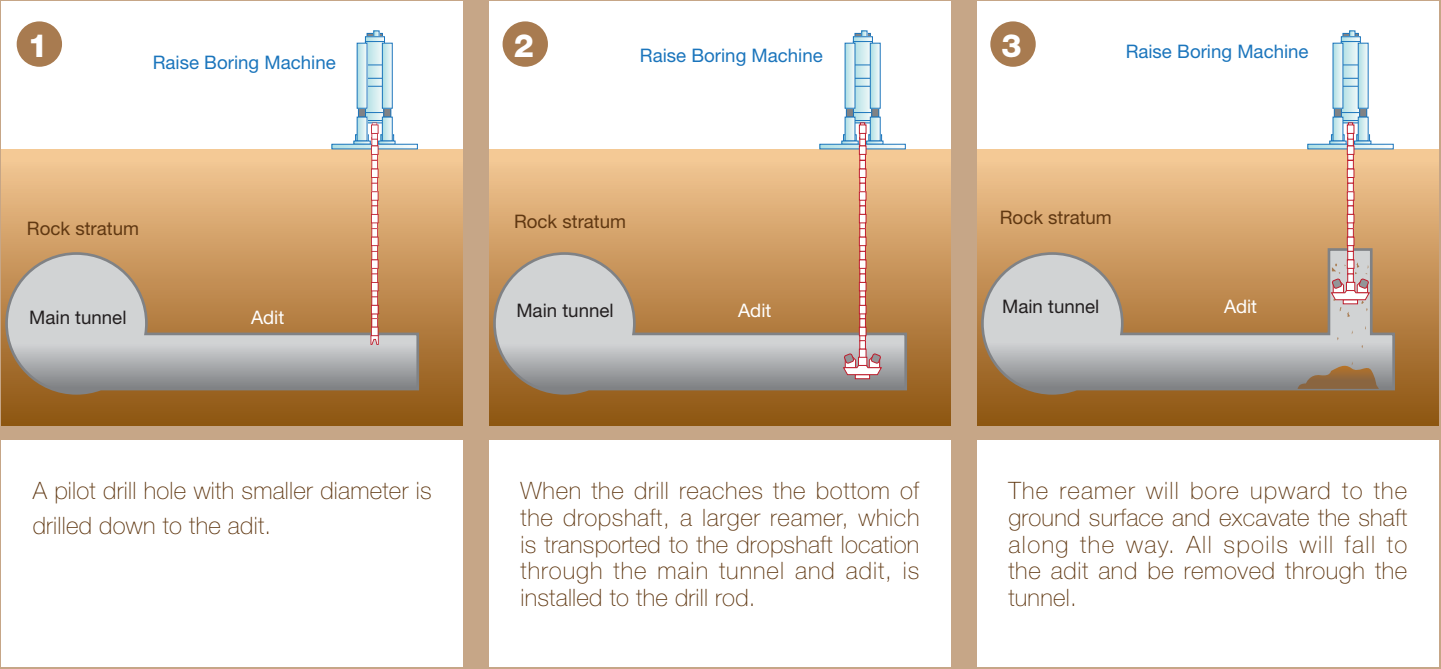
To minimize the impacts on residents nearby, Raise Boring Method will be adopted to construct most of the intake shafts.

Benefits of Raise Boring Method

The main excavation works of shafts will be carried out underground by using the Raise Boring Method. Compared with the traditional approach for excavating dropshafts from the ground surface downwards, this effectively reduces dust and noise arising from the excavation, thus minimizing disturbance to the environment.

Moreover, during raise boring, spoils will fall to adits and then be removed through the tunnel. As such, the number of construction vehicles for spoil removal can be much reduced and therefore traffic impacts to the nearby road network can be minimized.

Diagram for Raise Boring Method



# E

## nvironmental Protection Measures

Students' drawings posted on the hoardings at Stubbs Road Garden (Intake No.WO) to publicize "environmental protection" and "anti-drug" themes



### Drawings Bring New Looks

Colourful and eye-catching drawings on hoardings at the intake construction site in Stubbs Road Garden (Intake No.WO) carry "environmental protection" and "anti-drug" themes.

### Environmental Protection Goes On

Our construction site at the Eastern Portal is surrounded by numerous high-rise buildings. To reduce the disturbance arising from our slope and river channel works to the neighbourhood, noise barriers were installed in September 2009.

### Commit to Tree Preservation

During the construction period, we endeavour to take every possible measure to preserve trees and to protect the environment adjacent to the work sites. Tree-felling will be avoided as far as possible and a certified horticulturist has been commissioned to monitor the condition of the affected tree. Landscaping will be carried out in the works area upon completion of the Project.



Trees within construction sites will be protected

# S

## taying in Touch

### Meeting Stakeholders

Regarding the construction progress, we continuously keep close contact with representatives from property management companies, incorporated owners, schools and residents in the vicinity of intake construction sites. We can therefore collect their opinions and better understand their concerns regarding the Project.

### Project Publicity

Following the commencement of intake construction, besides putting up banners near the sites, light-box posters are also displayed at bus shelters to provide information about the Project.



Project posters are put up at bus shelters in the vicinity of construction sites



Shatin Sewage Treatment Works open day



An exhibition at Stanley Plaza

### Roving Exhibition

To enhance public understanding of this flood prevention Project and its progress, roving exhibitions were held at Stanley Plaza and the Shatin Sewage Treatment Works in July and October 2009 respectively.



The Hong Kong Institution of Engineers (Civil Division) visits the Western Portal at Cyberport

### Site Visits

Being one of the largest flood control Projects of the Drainage Services Department, groups of local and overseas visitors have been drawn to the work sites of the Hong Kong West Drainage Tunnel Project to better understand the latest progress of the Project. Visitors include the International Academic Exchange Conference of Rock Mechanics "SinoRock 2009", the Open University of Hong Kong and the Hong Kong Institution of Engineers, etc.

## Key Facts

The Employer	: Drainage Services Department
Consultant	: Ove Arup & Partners Hong Kong Ltd.
Contractor	: Dragages Nishimatsu Joint Venture
Project Commencement Date	: November 2007
Anticipated Completion Date	: 2012

## Contact Us

We value your views on the Project.  
Please feel free to contact us.

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