## APPENDIX - 4-1

General Description of Various Tunnel Construction Methodologies

### **Construction Methodologies Considered**

### 1. Cut-&-Cover Tunnelling

Cut-&-cover construction is a proven and common method of excavation and construction for stations, concourses and tunnels in built-up areas. This construction methodology has a long history in Hong Kong and the techniques are well established locally.

Cut-&-cover typically requires several overlapping stages of work to be carried out in sequence. Most of these stages are similar to other engineering works for road construction except that the level of excavation could be deeper and it would involve the construction of tunnel structures.

A summary of the key stages and the associated construction plant items is given below:

Key Stages	Typical Plant Items	Remarks
Remove obstruction, expose and divert any existing utilities	Handheld breaker / Mini excavator / crane lorry	Work sites are typically 40-50m long to minimise the impacts on local traffic. Plant items are at ground level.
Install pipe pile wall or D-wall	Pilepile wall: Pipe pile rig / air compressor / generator	Plant items are at ground level.
	D-wall: Hydraulic extractor mobile crane / concrete pump truck / bentonite filtering and mixing plant	
Grouting	Drill hole machine / grout pump, grout mixer / generator	Plant items are at ground level.
Install decking (If required to maintain any traffic arrangement)	Crane lorry / welding machine	Plant items are at ground level.
Soil excavation and install shoring	Excavator / generator / ventilation fan / lorry / mobile crane / welding machine	Except lorry and mobile crane, other items can be placed under the deck (if decking is installed). Spoil will be removed from the mucking out positions.
Construction	Generator / ventilation fan / mobile crane / air compressor / concrete pump / concrete lorry mixer / poker / mini excavator	Ditto
Water proofing, backfilling and reinstatement	Excavator / generator / roller / lorry	Plant items are at ground level.

 Table 1: Typical key stages of work and plant items for cut-&-cover method

### 2. Bored Tunnelling

Similar to the cut-&-cover method, bored tunnelling also requires several stages of work to be carried out in sequence. However, most of the work will be carried out underground and along the route alignment. There would be relatively limited amount of work at the TBM launching and retrieval shafts.

A summary of the key stages and the associated construction plant items is given below:

Table 2: Typical key stages of work and plant items in the launching and retrieval shafts

Key Stages	Typical Plant Items	Remarks
Remove obstruction, expose and divert any existing utilities	Handheld breakers / mini excavators / crane lorries	Plant items are at ground level.

Key Stages	Typical Plant Items	Remarks
Install diaphragm wall	Mobile cranes / circulation pumps / silos / desander / rock chisels / welding machines / generators / concrete pumps / concrete mixers / lorries	Plant items are inside the shaft
Soil & rock excavation and install shoring	Excavators / generators / ventilation fans / lorries / welding machines	Plant items are inside the shaft
Construction	Generators / ventilation fans / mobile cranes / air compressors / circular saws / concrete pumps / concrete mixers / pokers / excavators	Plant items are inside the shaft
Water proofing, backfilling and reinstatement	Excavators / generators / rollers / lorries	Plant items are inside the shaft except the final stage which is near the ground level.

## 3. Mined Tunnelling

Mined tunnelling is another approach to construct tunnels. Hydraulic breakers are often used to make way for the tunnel. Alternatively, drill & blast technique could be used instead of hydraulic breakers. In this case, drilling rigs with booms will be used for drilling an array of blast holes onto the tunnel face to a designated depth. The holes are then loaded with explosives and timed detonators, which will ensure the blasting occurs at the correct sequence. After the detonation, the spoil will be transported out of the tunnels.

Temporary support for the tunnels will be provided using rock dowels and shotcrete. Typical plant items required for drill-&-blast include crawler drills, excavators, lorries, generators, concreting plant and ventilation fans. All major excavation and construction activities would be conducted within the tunnel section except transportation of spoil out of the tunnel by mobile cranes and lorries.

### 4. Benefits and Disbenefits of Construction Approaches

A comparison of the benefits and disbenefits on the above construction approaches for tunnels is given below:

Approaches	Benefits	Disbenefits
Cut-&-cover tunnelling	<ul> <li>Well proven and commonly used in other infrastructure projects.</li> <li>Flexible and not constraint by geological conditions</li> </ul>	<ul> <li>Larger amount of spoil needs to be excavated and disposed.</li> <li>More underground utilities need to be diverted prior to construction.</li> <li>More construction plant on ground level. This would generate more noise and dust impacts.</li> <li>More interruption to receivers along the alignment but the use of temporary decks could minimize the associated impacts.</li> <li>More carefully planned temporary traffic management would be required.</li> <li>Bentonite (e.g. for D-wall) would need to be recycled.</li> </ul>
Bored tunnelling	<ul> <li>No need to open up extensive amount of road surface and public areas and hence</li> </ul>	<ul> <li>Water would need to be used as lubricant during tunnel boring. Bentonite would need to be recycled.</li> </ul>

 Table 4-4 : Benefits and disbenefits of construction approaches for tunnels

Approaches	Benefits	Disbenefits
	<ul> <li>less disturbance (in noise, air quality and visual impacts) to sensitive receivers along the alignment. Only receivers near to the launching and retrieval shafts would be affected. This can be mitigated by installing temporary decks over the shaft openings.</li> <li>Fewer disturbances to local traffic conditions. This offers particular advantages in urban built-up areas with severe traffic constraints.</li> <li>The amount of excavated materials would be much less than the cut-&amp;-cover approach.</li> <li>Less impact to commercial activities in the vicinity of the alignment</li> </ul>	<ul> <li>Constraint by geological conditions</li> <li>Requires sufficient soil cover</li> </ul>
Mined tunnelling	<ul> <li>No need to open up extensive amount of road surface and public areas and hence less disturbance (in noise, air quality and visual impacts) to sensitive receivers along the alignment. Only receivers near to the portal would be affected. This can be mitigated by installing temporary decks over the portal.</li> <li>Fewer disturbances to local traffic conditions. This offers particular advantages in urban built-up areas with severe traffic constraints.</li> <li>The amount of excavated material would be much less than the cut-&amp;-cover approach.</li> </ul>	<ul> <li>Timed detonation (if blasting is required) would result in vibration and groundborne noise for receivers very close to the blasting point. This could be alleviated by optimizing the charge amount and coordinating with the operators of the neighbouring sensitive uses.</li> <li>Constraint by geological conditions</li> </ul>

## APPENDIX - 4-2

**Construction Plant Inventory** 

#### **Ove Arup & Partners** ARUP Hong Kong

#### Job Title : KCRC KSL 100 EIA Heading : **Plant Inventory** C&C Tunnel from Salisbury Road to FMPHQ Section :

Description	Period	PME	Unit
Remove obstruction, expose and divert existing utilities	Mar 05 - Jul 05	Breaker handheld	4
		Mini excavator	4
		Crane lorry	2
Install pipe pile wall	Jun 05 - Mar 06	Pipe pile rig	4
		Air compressor	7
		Generator, silenced	3
		Water pump	5
		Filtering plant / desander	2
		Crawler Crane	2
Grouting	Jun 05 - Mar 06	Drill hole machine (electric)	2
5		Electric grout pump	2
		Grout mixer (electric)	2
		Generator, silenced	2
Install decking	Jun 05 - Mar 06	Crane lorry	1
		Welding machine	2
		Mobile crane	2
Soil excavation for tunnels	Apr 06 - Oct 06	*Hydraulic excavator	5
		*Hydraulic breaker	2
		*Generator, silenced	3
		*Ventilation fan	2
		+Mobile crane	1
		+Dump Truck	1
		*Welding machine	6
Construction & waterproofing of tunnels	Nov 06 - Jul 07	*Generator, silenced	3
		*Ventilation fan	2
		+Crane lorry	1
		+Mobile crane	1
		*Air compressor	2
		*Circular saw	4
		+Concrete pump truck	1
		+Concrete lorry mixer	1
		*Pokers	4
		*Mini excavator	1
Backfilling & reinstatement works	Aug 07 - Nov 07	Excavator	2
	-	Lorry	1
		Generator, silenced	1
		Roller	2
		Asphalt paver	1

Note:

\* Plants to be operated inside tunnel/decking
+ Plants to be located at the nearest worksite to the receivers

Welding machine is not a PME

#### **Ove Arup & Partners** ARUP Hong Kong

#### KCRC KSL 100 EIA Job Title : Heading : **Plant Inventory Tunnel under FMPHQ** Section :

Appendix No. 4-2b

Description	Period	PME	Unit
Mined tunnel, excavation	Apr 06 - Feb 07	**Crawler drill	2
		**Excavator	2
		+Dump Truck	1
		**Generator, silenced	2
		**Hydraulic breaker	2
		**Ventilation fan	2
		+Mobile crane	1
		**Air compressor	2
		**Circular saw	4
		+Concrete pump truck	1
		+Concrete lorry mixer	1
		**Pokers	4

Note:

The TBM recovery shaft is used as the access shaft for mined tunnelling \* Plants to be operated inside tunnel / decking \*\* Plants to be operated underground

+ Plants to be located at shaft area

# Job Title :KCRC KSL 100 EIAHeading :Plant InventorySection :Construction Access Shaft

Appendix No. 4-2c

Description	Period	PME	Unit
Remove obstruction, expose and divert existing utilites	Mar 05 - Jun 05	Breaker handheld	2
		Mini excavator	1
		Crane lorry	1
Install pipe pile walls	Jul 05 - Oct 05	Pipe pile rig	1
		Air compressor	1
		Generator, silenced	1
		Water pump	1
		Filtering plant / desander	1
		Crawler Crane	1
Install decking	Oct 05	Crane lorry	1
		Welding machine	2
		Mobile crane	1
Excavation	Nov 05 - Mar 06	*Hydraulic excavator	2
		*Generator, silenced	3
		*Ventilation fan	2
		+Mobile crane	1
		+Dump Truck	1
		*Welding machine	2
Deassambling TBM	Sep 06 - Oct 06	*Generator, silenced	4
(for one tube)		*Ventilation fan	2
		+Crane lorry	1
		+Lorry	1
		* Welding machine	4
Deassambling TBM	Feb 07 - Mar 07	*Generator, silenced	4
(for another tube)		*Ventilation fan	2
		+Crane lorry	1
		+Lorry	1
		* Welding machine	4
Shaft fitout	Mar 07 - Apr 07	+Crane lorry	2
		+Mobile crane	2
		*Air compressor	1
		*Circular saw	1
		+Concrete pump truck	2
		+Concrete lorry mixer	2
		*Pokers	1
		*Mini excavator	1
Backfilling and reinstatement	May 07 - Jun 07	Excavator	1
	-	Lorry	1
		Generator,silenced	1
		Roller	1
		Asphalt paver	1

Note:

\* Plants to be operated inside tunnel/decking

+ Plants to be located at access shaft area

Welding machine is not a PME

#### **Ove Arup & Partners** ARUP Hong Kong

#### Job Title : KCRC KSL 100 EIA Heading : **Plant Inventory Canton Road Plant Building** Section :

Appendix No. 4-2d

Description	Period	PME	Unit
Remove obstruction, expose and divert existing utilities	Mar 05 - Jun 05	Breaker handheld	1
(for the C&C shaft in front of China HK Centre)		Mini excavator	1
		Crane lorry	1
Install pipe pile walls	Jul 05 - Dec 05	Pipe pile rig	1
(for the C&C shaft in front of China HK Centre)		Air compressor	1
		Generator, silenced	1
		Water pump	1
		Filtering plant / desander	1
		Crawler Crane	1
Install decking	Dec 05	Crane lorry	1
(for the C&C shaft in front of China HK Centre)		Welding machine	1
х ,		Mobile crane	1
Excavation	Sep 06 - Nov 06	*Hydraulic excavator	2
(for the C&C shaft in front of China HK Centre)		*Generator, silenced	2
·		*Ventilation fan	2
		*Welding machine	6
		+Mobile crane	1
		+Dump Truck	1
Construction of plant building	Feb 07 - Jun 07	Generator, silenced	2
		Crane lorry	2
		Mobile crane	1
		Air compressor	1
		Circular saw	4
		Concrete pump truck	1
		Concrete lorry mixer	1
		Pokers	4
		Excavator	2
Backfilling and reinstatement	Jul 07 - Sep 07	Excavator	1
(for the C&C shaft in front of China HK Centre)		Lorry	1
		Generator, silenced	1
		Roller	1
		Asphalt paver	1

Note:

\* Plants to be operated inside tunnel / decking
+ Plants to be located at C&C shaft in front of China HK Centre Welding machine is not a PME

Description

#### Job Title : KCRC KSL 100 EIA **Heading**: **Plant Inventory** Section : Bored tunnelling & Launching shaft

Ground treatment along Canton Road including recovery shaft

(working from north to south on 2 fronts down the Canton Rd,

one from WKN to Canton Rd. Plant Building and		Crane lorry	1
•			1
one from Canton Rd. Plant Building to recovery shaft,		Air compressor	2
50m long each 2 months)			
Diaphragm wall at launching shaft	Jun 05 - Jul 05	Mobile crane	1
		Lorry	1
		Concrete lorry mixer	1
		Concrete pump truck	1
		Excavator	1
		Chisel	1
Excavation at launching shaft	Aug 05 - Feb 06	Excavator	1
-	-	Mobile Crane	1
		Dump Truck	1
		Welding Machine	1
		Mini excavator	1
Assembling of TBM in launching shaft (for one tube)	Mar 06 - May 06	*Generator, silenced	4
		*Ventilation fan	2
		Crane lorry	1
		Lorry	1
		*Welding machine	4
Assembling of TBM in launching shaft (for another tube)	Sep 06 - Oct 06	*Generator, silenced	4
<b>o o (</b> <i>, )</i>		*Ventilation fan	2
		Crane lorry	1
		Lorry	1
		*Welding machine	4

Mini excavator

Welding Machine

PME

Drill Hole Machine (Electric)

Electric Grout Pump

		Mobile Crane	
		Dump Truck	
		Welding Machine	
		Mini excavator	
Assembling of TBM in launching shaft (for one tube)	Mar 06 - May 06	*Generator, silenced	
Assembling of TEM in lationing shart (for one tabe)		*Ventilation fan	
		Crane lorry	
		Lorry	
		*Welding machine	
Assembling of TBM in launching shaft (for another tube)	Sep 06 - Oct 06	*Generator, silenced	
Assembling of TBM inflautioning shart (for another tube)	Sep 00 - Oct 00	*Ventilation fan	
		Crane lorry	
		Lorry	
		*Welding machine	
Operation in launching shaft	Jun 06 - Aug 06	Gantry	
(for one tube)		+Generator	
		+Air compressor	
		Conveyor belt	
		Ventilation fan	
		Mortar plant	
		Mortar pump	
		+Water pump (S.M)	
		Water pump (for WWTP)	
		+Diesel Train	
		+Mortar Car	
		+TBM	
Foundation	Jun 06 - Jan 07	+ Piling, large diameter bored, oscillator	
Operation in launching shaft	Nov 06 - Jan 07	Gantry	
(for another tube)		+Generator	
		+Air compressor	
		Conveyor belt	
		Ventilation fan	
		Mortar plant	
		Mortar pump	
		+Water pump (S.M)	
		Water pump (for WWTP)	
		+Diesel Train	
		+Mortar Car	
		+TBM	
Construction and Waterproofing	Feb 07 - Mar 07	Generator, silenced	
oblish delion and Waterprooning		Crane Lorry	
		Mobile Crane	
		Air Compressor	
		Circular Saw	
		Concrete pump truck	
		Lorry	
		Pokers	

Period

Jul 05 -Mar 06

Note:

\* Plants to be operated inside tunnel/decking

+ Plants to be operated on the bottom of launching shaft

Welding machine is not a PME

#### Appendix No. 4-2e

2 2

1

1

1

Unit

# Job Title :KCRC KSL 100 EIAHeading :Plant InventorySection :WKN Northern Tunnels

Appendix No. 4-2f

Description	Period	PME	Unit
Remove Obstructions, Expose and Divert Existing Utilities	Mar 05 - Jul 06	Breaker handheld	4
(for each 100m sub-section)		Mini Excavator	4
		Crane Lorry	2
Diaphragm wall	Jul 05 - Nov 06	Hydraulic extractor	1
(for each 100m sub-section)		Mobile crane	1
		Lorry	4
		Concrete lorry mixer	3
		Concrete pump truck	1
Bentonite Filtering & Mixing for D-wall only	Jul 05 - Nov 06	Bentonite filtering and mixing plant	1
(for each 100m sub-section)		Excavator	1
,		Lorry	1
Temporary Decking (where required,	Jul 05 - Nov 06	Mobile crane	1
(between Lin Cheung Rd and Lai Cheung Rd)		Welding Machine	1
· · · · · · · · · · · · · · · · · · ·		Lorry	1
Excavation	Oct 05 - Feb 07	*Hydraulic Excavator	3
(for each 100m sub-section)		*Generator, silenced	3
,		Mobile Crane	3
		Dump Truck	4
		*Welding Machine	3
Construction and Waterproofing	Jan 06 - Mar 07	*Generator, silenced	2
(for each 100m sub-section)		Crane Lorry	1
		Mobile Crane	1
		*Air Compressor	2
		*Circular Saw	1
		Concrete Pump Truck	1
		Concrete Lorry Mixer	1
		*Pokers	2
		*Mini excavator	1
Backfilling and Reinstatement Works	Mar 06 - May 07	Excavator	1
(for each 100m sub-section)		Generator, silenced	1
		Roller	1
		Asphalt Paver	1
		Lorry	3

Note:

\* Plants to be operated inside tunnel/decking for section between Lin Cheung Road & Lai Cheung Road

Schedule of construction period should be referred to the detailed construction programme Welding machine is not a PME

#### Job Title : KCRC KSL 100 EIA Heading : **Plant Inventory** Section : WKN Northern Tunnels

Description	Period	PME	Unit
Demolition of Footbridge 14	Jan 05 - Mar 05	Breaker handheld	1
5		Excavator	1
		Circular saw	1
		Lorry	2
Box Culvert Diversions	Apr 05 - Apr 05	Excavator	1
ind Underpass, Jordan Rd (JR) - Breaking	Jul 06 - Jul 06	Hydraulic Breaker	1
······································		Lorry	1
Box Culvert Diversions	May 05 - May 05	Generator, silenced	1
nd Underpass, Jordan Rd (JR) - Prepare for concreting	Aug 06 - Aug 06	Mobile crane	1
Box Culvert Diversions	Jun 05 - Jun 05	Concrete Pump Truck	1
and Underpass, Jordan Rd (JR) - Concreting	Sep 06 - Sep 06	Concrete lorry mixer	1
		Pokers	1
		Circular saw	2
		Lorry	1
Box Culvert Diversions	Mar 06 - Feb 07 (PS)	Excavator	1
and Underpass, Jordan Rd (PS, WR, DS)	Jun 06 - Apr 07	Hydraulic Breaker	1
ind Onderpass, Jordan Ru (FS, WR, DS)	(WR & DS)	Concrete Pump Truck	
	(WR & DS)	Concrete lorry mixer	
		Pokers	2
		Generator, silenced	2
		Mobile crane	
			1
		Circular saw	2
		Lorry	1
Reinstatement Footbridge 14	Aug 05 - Nov 05	Concrete Pump Truck	1
		Concrete Lorry Mixer	1
		Pokers	2
		Mobile Crane	1
		Mini Excavator	1
Construction of YMT Ventilation building	Jun 06 - Feb 07	Generator, silenced	2
		Crane Lorry	1
		Mobile Crane	1
		Air Compressor	2
		Circular Saw	1
		Concrete Pump Truck	1
		Concrete Lorry Mixer	3
		Pokers	3
		Mini excavator	1
ox Culvert Diversions under Cherry Street	Nov 05 - Jan 07	Excavator	1
······, ·····	(Nov 05 - May 06 for box		1
	culverts 1 & 3; Jun 06 -	Concrete Pump Truck	1
	Jan 07 for box culverts 2		1
	& 4)	Pokers	2
	( <sup>4</sup> <sup>1</sup> )	Generator, silenced	1
		Mobile crane	
			1
		Circular saw	2

Appendix No. 4-2g

Job Title :KCRC KSL 100 EIAHeading :Plant InventorySection :Underpinning Bridge A & A1

Appendix No. 4-2h

Description	Period	PME	Unit
Underpin Bridge A & A1	May 05 - Nov 05	Mini Excavator	2
		Generator, silenced	2
		Crane Lorry	1
		Down the Hole Rig (Electric)	2
		Air Compressor	2
		Pipe Pile Rigs	1
		Concrete Pump Truck	1
		Concrete Lorry Mixer	4
		Pokers	3

# Job Title :KCRC KSL 100 EIAHeading :Plant InventorySection :Stockpiling & Barging facility

Description Barging point at WKCD Period PME Unit Jan 05 - Dec 07 Derrick barge 2 Excavator 1 Dump Truck 1 Stockpile Jan 05 - Dec 07 Excavator 1 Lorry 1

Appendix No. 4-1i

# Job Title :KCRC KSL 100 EIAHeading :Plant InventorySection :WKN Station

Appendix No. 4-2j

Description	Period	PME	Unit
Remove Obstructions, Expose and Divert Existing Utilities	Apr 05 - Jul 05	Breaker handheld	4
		Mini Excavator	2
		Crane Lorry	2
		Excavator	2
		Concrete pump truck	2
		Concrete lorry mixer	4
		Lorry	2
Diaphragm wall	Aug 05 - May 06	Mobile crane	3
		Lorry	4
		Concrete lorry mixer	8
		Concrete pump truck	1
		Excavator	1
		Chisel	1
Bentonite Filtering & Mixing for D-wall only	Aug 05 - May 06	Bentonite filtering and mixing plant	1
		(for both southern & northern stations)	
Bored piling	Aug 05 - May 06	Pilling, Crawler crane/ chisel/oscillator/RCD	2
		lorry	3
		Concrete pump truck	1
		Concrete lorry mixer	3
		Auger	8
Soil & Rock Excavation and shoring	Nov 05 - Sep 06	Excavator	5
		Mobile Crane	1
		Dump Truck	4
		Welding Machine	3
		Mini excavator	3
Construction and Waterproofing	Mar 06 - Sep 07	Generator, silenced	5
		Crane Lorry	2
		Mobile Crane	2
		Air Compressor	5
		Circular Saw	3
		Concrete pump truck	2
		Lorry	8
		Pokers	5
		Mini excavator	3
		Welding Machine	2

Note: Welding machine is not a PME

## Job Title : KCRC KSL 100 EIA Heading : Plant Inventory

Section : Operation of Launching shaft at Restricted Hour

Appendix	No.	4-2k
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Description	Period	PME	Unit
Operation in launching shaft	Jun 06 - Aug 06	+Generator	1
(for one tube)		+Air compressor	1
		Conveyor belt	1
		Ventilation fan	1
		Mortar plant	1
		Mortar pump	1
		+Water pump (S.M)	1
		Water pump (for WWTP)	1
nundation		+Diesel Train	1
		+Mortar Car	1
		+TBM	1
Foundation	Jun 06 - Jan 07	+ Piling, large diameter bored, oscillator	1
Operation in launching shaft	Nov 06 - Jan 07	+Generator	1
(for another tube)		+Air compressor	1
		Conveyor belt	1
		Ventilation fan	1
		Mortar plant	1
		Mortar pump	1
		+Water pump (S.M)	1
		Water pump (for WWTP)	1
		+Diesel Train	1
		+Mortar Car	1
		+TBM	1

Note:

\* Plants to be operated inside tunnel/decking

+ Plants to be operated on the bottom of launching shaft

Activity	Activity Description	Orig Dur	Early Start	Early Finish	2004         2005         2007           SEP_OCT_INDV_DEC_JAN_FEB_MAR_APR_MAY_JUIN_JUIN_JUIN_SEP_OCT_INDV_DEC_JAN_FEB_MAR_APR_MAY_JUIN_JUIN_JUIN_JUIN_JUIN_JUIN_JUIN_JUIN
unnel	s from WKN Station - NAC Ove	rrun			
ut and	Cover Tunnels			108 E.100	
- Ch.5+400	- Ch.5+500	327	24.044.05	100 (10000)	
		32/	31,JAN05	17MAR06	
- Ch.5+500	- Ch.5+600	457	164PR05	17NON06	
JR Box C	luvert				
ontworte		452	31JAN05	29AUG06	
·Ch.5+600	- Ch.5+700		L		
		397	051,1105	1710006	
-Ch.5+700	- Ch.5+800	000		0000000	
		362	2055705	0506006	
PS Box C	Culvert	272	24DE005	05DEC06	Legend
WR Box (	Cebzort				Utility Diversions
- VALC BOX C		267	04MAR06	08FEB07	Diaphragm Walls
DS Box C	Livert				Pumping Test
an 1, <b>, , , , , , , , , , , , , , , , , ,</b>		267	04MARIOS	09FEB07	Excavation / Strutting
Ch.5+800	- Ch.5+900	010			Tunnel Structure / Mined Section
		342	01DEC05	08FEB07	Reinstatement
Ch.5+900	- Ch.6+000	297	15FEB06	26FEB07	Box Culvert Works
Ch 64000	- Ch.6+100				YMT Ventilation Building
CI3.01000		297	15FEB06	26FEB07	Underpinning Works
Ch.6+100	- Ch.6+200				Trackwork and ROS Fit Out
5		297	15FEB06	267-EB07	
Ch.6+200	- Ch.6+300				
		347	01DE005	14FEB07	
TKT Subw	vay	150	13JUN06	07DE005	
Ch 6+200	- Ch.6+400				
61.0+300		342	205EP05	2310/06	
Ch.6+400 -	- Ch.6+500				
		337	05JUL05	04SEF06	
YMT Vent	ilation Building				
-		315	01MAR06	02APR07	
Ch.6+500 -	- Ch.6+600	332	164PR05	12JUN06	
Ch 6+600	- Ch.6+700		1911100		
011.01000	1	332	31JAN05	23WAR06	
Ch.6+700 -	- Ch.6+800				
Circle Co.		373	01SEF05	13DE006	
Cherry Str	reet Box Culvert 1				
		435	29.01.05	26,141/07	
				R	
Date			27MAY03		
i Date Date			28SEP07 01OCT04	Deale	Contract No. KDC200
late			19SEP03 10:02	Desig	n Consultancy for Kowloon Southern Link (North Section) Tunnels from WKN Station - NAC Overrun
					n Consultancy for Kowloon Southern Link (North Section) Tunnels from WKN Station - NAC Overrun Summary Works Programme
U.	© Primavera Systems, Inc.				ounnaly avis Frogramme

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## APPENDIX – 4-3

**Construction Programme** 

							200										006									20							800
ID	Description	Start	End	Jan	Feb Mar 2 3	Apr May	Jun	Jul	Aug S	ep O	Oct Nov	Dec 12	Jan	Feb Mar	Apr May 16 17	Jun	Jul	Aug S	Sep (	Oct	Nov Dec	Jan	Feb M	ar Ap	r May	Jun	Jul	Aug	Sep	Oct Nov	Dec 36	Jan	Fel 38
	Salisbury road to FMPHQ	Mar-05			2 3	4 0	0	7	0 3	9 1		12	13	14 15	10 17	10	19	20	21	22	23 24	20	20 2	.7 20	5 29	30	31	32	- 33	34 33		5 51	- 30
	Utilities diversion	Mar-05		-															-	-									-		<b>-</b>	=	-
	Temp wall & decking	Jun-05	-	-					_		_									_				_					=		+	=	=
102	Excavation works	Apr-06	Oct-06	1					_	_														_	_				=		+=	╪═	-
	Construction works	Nov-06		-								-																	=		+	=	-
	Backfilling & reinstatement	Aug-07		-								-								_				-					_		+	=	=
105	Dackning & rematatement	Aug-07	1404-07	-								-								_				_					-		<b>-</b>	=	-
200	Underneath FMPHQ to Retrieval Shaft	Apr-06	Feb-07																												+	+	-
203	Mined tunnel	Apr-06																													-		-
																															-		-
300	TBM Retrieval Shaft	Mar-05	Jun-07																														
301	Utilities diversion	Mar-05	Jun-05																														
302	Temp wall & decking	Jul-07	Oct-07																														
303	Excavation works	Nov-05	Mar-06																														
304	Deassembling TBM (for one tube)	Sep-06	Oct-06																														
305	Deassembling TBM (for another tube)	Feb-07	Mar-07																														
306	Shaft fitout	Mar-07	Apr-07																														
307	Backfilling & reinstatement	May-07	Jun-07	1																												1	
	Canton Road Plant Building (CRPB)	Mar-05																													<b> </b>	$\perp$	$\vdash$
	Utilities diversion	Mar-05																														_	
502	Temp wall & decking	Jul-05	Dec-05																												_		
	Excavation works	Sep-06	Nov-06																												_		
	Construction of CRPB	Feb-07	Jun-07																												_		
505	Backfilling & reinstatement (shaft near CHKC)	Jul-07	Sep-07																												_		
506	Fitout	Oct-07	Nov-07																														
600	Dered Turneling	Int OF	lan 07	-																					_						+	<u> </u>	_
	Bored Tunneling	Jul-05	Jan-07	-					_				_							_			_		_				=		+	+	_
	Ground treatment	Jul-05	May-06	-																				_	_				=		+	+	_
	Diaphragm wall in launching shaft	Jun-05		-							_		_	_										_	_				=		+	+	_
	Excavation in launching shaft	Aug-05		-										_					_	_				_	_				=		+	+	_
	Assembling TBM in launching shaft	Mar-06		-								-		_						_				_	_				=		+	+	_
605	Operation in launching shaft (for one tube) Operation in launching shaft (for another tube)	Jun-06 Nov-06	_	-																_				_	_				_		╪═	+	_
											_	-													_				-		+		-
	Foundation Construction of station box	Jun-06 Feb-07	Jan-07 Mar-07																										_		+	+	_
000		Feb-07	Ivial-07	+						_										_									-		+	+	+
700	WKN Station	Apr-05	Dec-07																													_	-
	Utilities diversion	Apr-05		1														-	-										-		=	1-	-
	Diaphragm wall	Aug-05		1																									-		+		-
703	Bored piling	Aug-05		1																									-		+		-
	Excavation works	Nov-05		1									_																-		+	+	-
705	Construction works	Mar-06		1							_																		-		+	+	-
	Fitout (E&M only)	Dec-06		1										_											-							-	-
-				1																									-		+	-	-
800	Tunnels from WKN station to NAC overrun	Apr-05	May-07	1																												1	
801	Utilities diversion	Apr-05	Jun-06																														
802	Diaphragm wall	Jul-05	Oct-06																												E		Ē
803	Excavation works	Oct-05	Jan-07																														
804	Construction works	Jan-06	Mar-07																														
805	Backfilling & reinstatement	Mar-06	May-07																												Ĺ	t.	
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	Construction Pro	ar	amı	m	2																			·	÷				·	<u> </u>	-		

## **Construction Programme**