

**For discussion
on 29 March 2010**

**Legislative Council
Panel on Environmental Affairs**

- 230DS – Outlying Islands sewerage, stage 1 phase 1 part 2 –
Yung Shue Wan sewerage, sewage treatment works and
outfall**
- 234DS – Outlying Islands sewerage, stage 1 phase 2 –
Sok Kwu Wan sewage collection, treatment and disposal
facilities**

PURPOSE

This paper seeks Member's support for our proposals to increase the approved project estimates (APE) of –

- (a) **230DS** by \$59.2 million from \$288.3 million to \$347.5 million; and
- (b) **234DS** by \$97.3 million from \$256.4 million to \$353.7 million

in money-of-the-day (MOD) prices.

BACKGROUND

2. We need to collect and properly handle the sewage generated from Yung Shue Wan (YSW) and Sok Kwu Wan (SKW) on Lamma Island by providing the two areas with public sewerage and treatment facilities. In November 2007, the Finance Committee (FC) approved the upgrading of **230DS** and **234DS** to Category A at estimated costs of \$288.3 million and \$256.4 million in MOD prices respectively. The scopes of **230DS** and **234DS** comprise –

Sewage Collection Facilities

- (a) provision of about 3.3 kilometres (km) of sewers in six villages of YSW, namely Po Wah Yuen, Sha Po New

Village, Tai Yuen New Village, Kam Shan Terrace, Sha Po Old Village and Ko Long, together with the associated geotechnical works along the proposed sewer alignments;

- (b) provision of about 1.8 km of sewers in two villages of SKW, namely Chung Mei and Sok Kwu Wan, together with the associated geotechnical works along the proposed sewer alignments;

Sewage Treatment Facilities

- (c) provision of two secondary sewage treatment works (STWs) with treatment capacities of 2 850 and 1 430 cubic metres per day at YSW and SKW respectively, together with the associated sludge treatment and odour control facilities as well as the slope stabilisation works for the two STW sites;
- (d) provision of two submarine outfalls of lengths 500 metres (m) and 750 m at YSW and SKW respectively; and
- (e) provision of two pumping stations and two twin rising mains with a total length of about 1 km at SKW.

Site plans showing the works in YSW and SKW are at **Enclosure 1**.

3. We consulted the Panel on Environmental Affairs (EA Panel) in June 2007 on the upgrading of **230DS** and **234DS** to Category A prior to seeking FC's approval. Members did not raise objection to the proposals. Please refer to EA Panel paper CB(1)1928/06-07(04) for details.

4. The facilities above will be capable of handling the sewage from an estimated population of 5 300 at YSW and 2 100 at SKW, together with the flow arising from local commercial activities and visitors. Upon commissioning of the facilities, the sewage collected will undergo secondary treatment¹ and nutrient removal before disposal via submarine outfalls. This will significantly reduce the pollution to nearby watercourses and receiving waters of Lamma Island.

¹ Secondary treatment refers to treatment of sewage by means of biological treatment processes after the sewage has undergone primary treatment, which comprises screening, removal of grit, and a sedimentation process. The organic matter in the settled sewage will be decomposed by micro-organisms in the biological treatment process.

LATEST POSITION

5. The Drainage Services Department (DSD) is implementing **230DS** and **234DS** under two contracts. The first contract covers the construction of the sewage collection facilities (i.e. (a) and (b) in paragraph 2) whereas the second contract covers the construction of the sewage treatment facilities (i.e. (c), (d) and (e) in paragraph 2).

6. DSD awarded the works contract for the sewage collection facilities in January 2008 as scheduled and commenced construction subsequently. The progress has been satisfactory. About 72% of the works under this contract has been completed as at February 2010.

7. As regards construction of the sewage treatment facilities, our first tendering exercise for the sewage treatment facilities was however unsuccessful because no bid was received. We therefore have to review the tender arrangement and to re-tender the contract in the fourth quarter of 2009². Upon completing the tender evaluation and having reviewed the financial position of the projects, we propose to increase the APE of **230DS** and **234DS** before awarding the tender. The justifications for the proposed increases in APE are set out in paragraphs 8 to 14 below.

JUSTIFICATIONS

Higher-than-expected returned tender prices

8. The returned tender prices for the works under **230DS** and **234DS** are \$5.9 million and \$34.7 million higher than expected respectively, even though both are already the lowest bids among the returned tenders. We therefore propose to increase the APE for both projects accordingly.

Additional works for addressing local requests and on-site constraints

9. During construction of the sewage collection facilities, the

² Our original plan was to adopt the Design-Build-Operate (DBO) arrangement for this works contract. The first tendering exercise was closed in November 2008 without receiving any bids from the four pre-qualified contractors, possibly due to the uncertainty in market situation at that time. After a review on the tendering arrangement, DSD decided to switch over to the Consultant-Design-Contractor-Build approach in re-tendering the contract so as to attract tenders more effectively. The second attempt was successful in attracting multiple competitive bids.

contractor has to carry out a series of additional works for addressing the following local requests and on-site situations –

- (a) *On-site situations* : The on-site situations for some of the proposed branch sewers and manholes were more constrained than that envisaged during the project design stage. This was largely due to the presence of uncharted utilities (such as watermains and septic tanks) and archaeological remains³ buried underneath the village alleys.
- (b) *Local requests* : In the course of ongoing liaison with the community of YSW and SKW, the local residents have expressed concerns on the temporary closure of some access roads and emergency vehicular accesses for the sewer laying works.

10. In view of the above, DSD has applied trenchless construction instead of open excavation for about 90 m and 120 m of sewers and diverted about 680 m and 180 m of watermains in YSW and SKW respectively to enable the construction of these branch sewers and manholes. The alignment and design of some sections of sewers have also been revised. The expenditure (and hence the proposed increase in APE) related to these additional works was estimated to be \$3.9 million and \$3.4 million for **230DS** and **234DS** respectively.

Increase in site supervision cost

11. The project consultant has recruited resident site staff (RSS) directly from the market to conduct on-site supervision. Based on their actual employment terms and conditions, the remuneration for RSS employed under **230DS** and **234DS** will be higher than expected. Together with salary adjustments and projecting towards the end of the anticipated project completion date, we estimate that the additional cost will amount to \$2.3 million and \$6.4 million for **230DS** and **234DS** respectively.

³ Under the works contract for sewage collection facilities, the contractor is required to pay attention to the presence of any archaeological remains. Remains of four small pottery kilns were discovered in the course of sewerage works at Sha Po Old Village. DSD has followed the Antiquities and Monuments Office's advice to undertake appropriate preservation methods at a cost of around \$0.5M (which has already been included in paragraph 10).

Increase in provision for price adjustment

12. There are provisions for Contract Price Fluctuations (CPF)⁴ in both works contracts. When FC's approval for our funding proposal was sought in November 2007, we derived the MOD estimate on the basis of the forecast of trend rate of change in the prices of public sector building and construction output at that time. Both the actual increase and the forecast for price levels in subsequent years have been adjusted upwards since then⁵. The two projects will also incur larger CPF payments due to increases in their capital costs. Consequently, we estimate that their CPF payments will be higher than expected.

13. Based on the price adjustment factors adopted in March 2010, we propose to increase the provision for price adjustment of **230DS** and **234DS** by \$51.0 million and \$52.9 million respectively for meeting the actual and anticipated CPF payments. Please refer to **Enclosures 2 & 3** for detailed calculations on the proposed increases for **230DS** and **234DS** respectively.

Offset by project contingencies

14. The construction of the sewage treatment facilities will incur substantial risks relating to the stability of the massive rock slopes within the site area as well as other work uncertainties. Taking into account the above and the need to cater for possible instances incurring additional cost throughout remaining stages of the projects, such as further variations as necessary, possible claims and valuation of works during finalisation of the project account, we consider it necessary to retain \$19.9 million and \$21.0 million as contingencies for **230DS** and **234DS** respectively. The contingencies to be released (\$3.9 million and \$0.1 million for **230DS** and **234DS** respectively) will be applied for offsetting

⁴ The CPF system allows for both upward and downward adjustment to contract payments in accordance with movements in the cost of labour and materials in Government civil engineering and building contracts. The CPF payment is calculated based on the difference between the indices of costs of construction labour and materials at the time of tendering and the current values of these indices at the time of payment in accordance with a predetermined relative proportion of each cost index.

⁵ Price adjustment factors adopted in March 2010 have assumed the movement of prices of public sector building and construction output to increase by 3.0% in 2010, and to increase by 4.0% per annum over the period from 2011 to 2020. The actual increases in 2007, 2008 and 2009 were 2.9%, 8.7% and 1.8% respectively. In comparison, when we formulated our funding proposal in 2007, the prices were assumed to remain unchanged in 2007; to increase by 1.0% per annum over the period from 2008 to 2011; and to increase by 1.5% per annum over the period from 2012 to 2017.

the increases in project estimates due to other factors as set out in paragraphs 8 to 13 above.

FINANCIAL IMPLICATIONS

15. Having reviewed the financial positions of both projects, we propose to increase the APE of –

- (a) **230DS** by \$59.2 million from \$288.3 million to \$347.5 million; and
- (b) **234DS** by \$97.3 million from \$256.4 million to \$353.7 million

in MOD prices for meeting the required expenditures. Cost breakdowns of the proposed increases are as follows –

Factors	Increase in estimates in MOD prices (\$ million)	
	230DS	234DS
<i>Increase due to –</i>		
(a) Higher-than-expected returned tender price	5.9	34.7
(b) Additional works for addressing local requests and on-site constraints	3.9	3.4
(c) Additional remuneration for RSS	2.3	6.4
(d) Additional provision for price adjustment	51.0	52.9
(e) Contingencies	(3.9)	(0.1)
Total	59.2	97.3

Comparisons of the cost breakdowns of the APE and the latest project estimates of **230DS** and **234DS** are at **Enclosures 4 & 5** respectively.

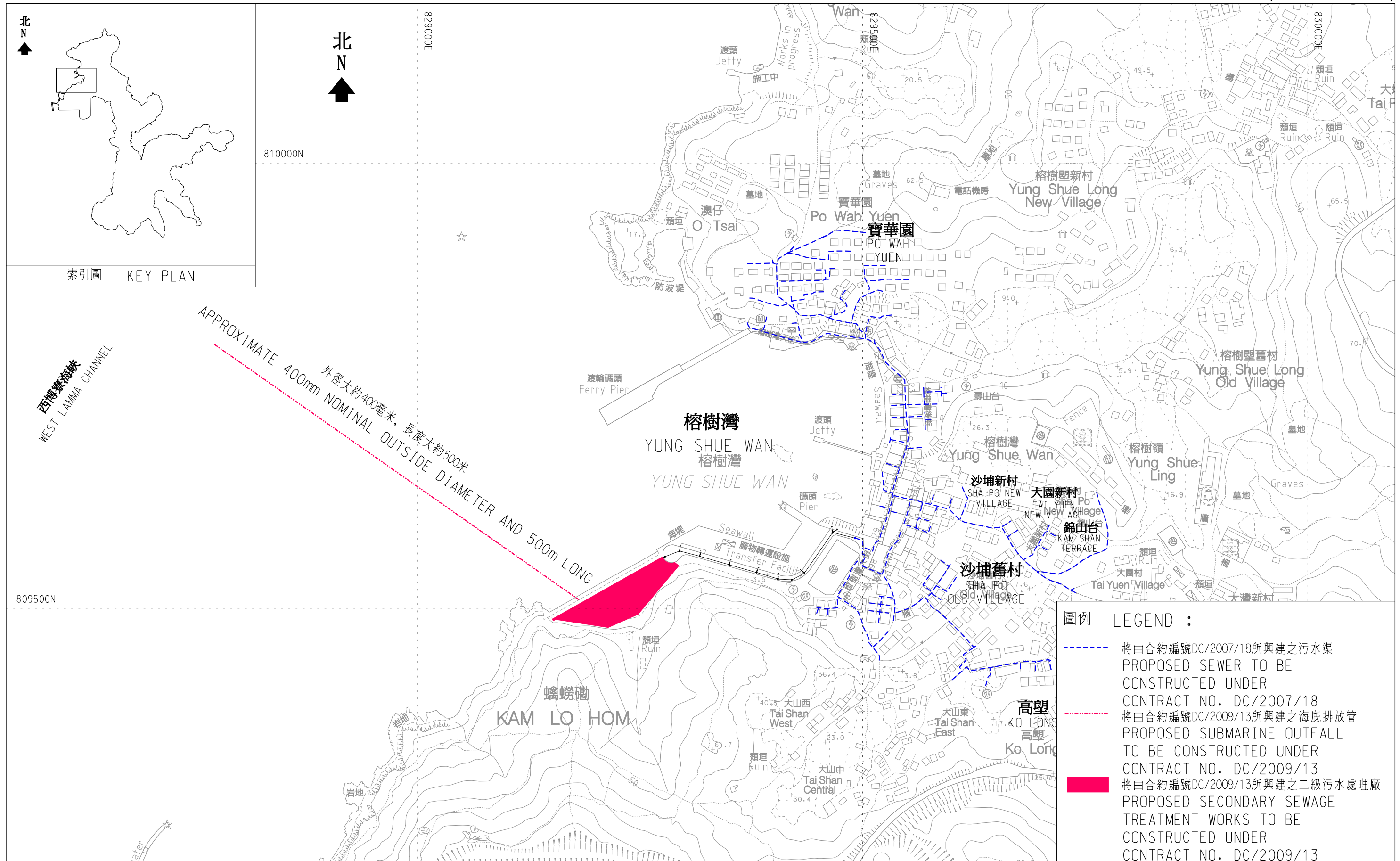
IMPLEMENTATION PLAN

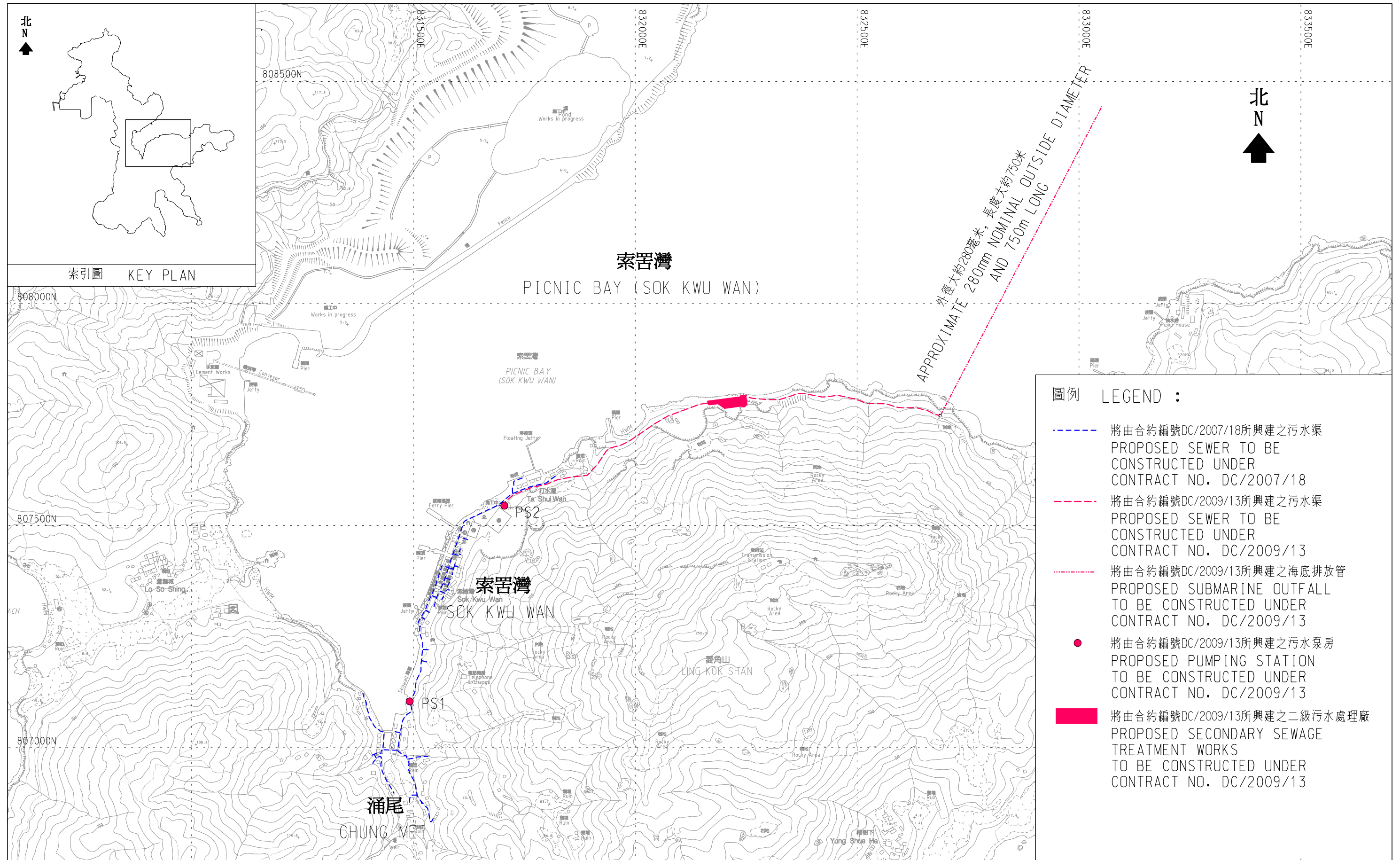
16. We expect to complete major parts of the sewage collection facilities by September 2010. Subject to funding approval by the FC, we aim to commence construction of the sewage treatment facilities by May 2010 for completion by mid 2013.

ADVICE SOUGHT

17. Members are invited to support our proposal for increasing the APE of **230DS** and **234DS** as set out in paragraph 15 above. Subject to Members' advice, we plan to submit our proposal for consideration by the Public Works Subcommittee (PWSC) and seek FC's approval in April 2010.

Environmental Protection Department
Drainage Services Department
March 2010





**230DS – Outlying Islands sewerage, stage 1 phase 1 part 2 –
Yung Shue Wan sewerage, sewage treatment works and
outfall**

Table 1 – Cash flow and provisions for price adjustment in PWSC(2007-08)49

Year	Original project estimate (\$ million, in September 2007 prices)	Original price adjustment factor (September 2007)[#]	Approved project estimate (\$ million, in MOD prices)	Provision for price adjustment (\$ million)
	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>A = Z – X</i>
2007 – 2008	0.3	1.00000	0.3	0.0
2008 – 2009	44.1	1.00750	44.4	0.3
2009 – 2010	96.8	1.01758	98.5	1.7
2010 – 2011	80.9	1.02775	83.1	2.2
2011 – 2012	25.8	1.03803	26.8	1.0
2012 – 2013	19.0	1.05619	20.1	1.1
2013 – 2014	14.0	1.07732	15.1	1.1
Total	280.9	–	288.3	7.4

[#] Price adjustment factors adopted in October 2007 are based on the projected movement of prices for public sector building and construction output at that time, which are assumed no change in 2007; to increase by 1.0% per annum over the period from 2008 to 2011; and to increase by 1.5% per annum over the period from 2012 to 2014.

Table 2 – Latest cash flow and provision for price adjustment due to latest project estimate and latest adjustment factors

Year	Latest project estimate (\$ million, in September 2007 prices) <i>a</i>	Latest project estimate (\$ million, in September 2009 prices) [@] <i>b</i>	Latest price adjustment factor (March 2010) ^{##} <i>c</i>	Latest project estimate (\$ million, in MOD prices) <i>d</i>	Latest provision for price adjustment (\$ million) <i>e</i>	Net increase in provision for price adjustment (\$ million) <i>f</i>
2007 – 2008	0.0	0.0 [^]	–	0.0	<i>e = d – a</i>	<i>f = e – A</i>
2008 – 2009	19.2	20.7 [^]	–	20.7		
2009 – 2010	22.9	24.5 ^{^^}	1.00000	24.5		
2010 – 2011	36.0	40.0	1.02700	41.1		
2011 – 2012	72.0	79.9	1.06551	85.1		
2012 – 2013	80.9	89.8	1.10813	99.5		
2013 – 2014	27.0	30.0	1.15246	34.6		
2014 – 2015	19.0	21.1	1.19856	25.3		
2015 – 2016	12.1	13.4	1.24650	16.7		
Total	289.1	319.4	–	347.5	58.4	51.0

[@] The latest project estimate (in September 2007 prices) is multiplied by 1.11031 for conversion to September 2009 prices. The figure of 1.11031 represents the changes in price movement for public sector building and construction output between September 2007 and September 2009.

^{##} Price adjustment factors adopted in March 2010 are based on the latest movement of prices for public sector building and construction output, which are assumed to increase by 3.0% in 2010 and by 4.0% per annum over the period from 2011 to 2016.

[^] \$0.0 million and \$20.7 million for 2007-08 and 2008-09 respectively are actual expenditures.

^{^^} Latest project estimate of \$24.5 million in 2009-10 comprises actual expenditure of \$23.5 million for the period from April 2009 to February 2010, and latest project estimate of \$1.0 million for March 2010 in September 2009 prices, which is derived by multiplying the latest project estimate of \$0.9 million in September 2007 prices by 1.11031 for conversion to September 2009 prices.

**234DS – Outlying Islands sewerage, stage 1 phase 2 –
Sok Kwu Wan sewage collection, treatment and disposal
facilities**

Table 1 – Cash flow and provisions for price adjustment in PWSC(2007-08)49

Year	Original project estimate (\$ million, in September 2007 prices)	Original price adjustment factor (September 2007)[#]	Approved project estimate (\$ million, in MOD prices)	Provision for price adjustment (\$ million)
	<i>X</i>	<i>Y</i>	<i>Z</i>	<i>A = Z – X</i>
2007 – 2008	0.3	1.00000	0.3	0.0
2008 – 2009	39.0	1.00750	39.3	0.3
2009 – 2010	79.9	1.01758	81.3	1.4
2010 – 2011	78.0	1.02775	80.2	2.2
2011 – 2012	23.5	1.03803	24.4	0.9
2012 – 2013	18.0	1.05619	19.0	1.0
2013 – 2014	11.0	1.07732	11.9	0.9
Total	249.7	–	256.4	6.7

[#] Price adjustment factors adopted in October 2007 are based on the projected movement of prices for public sector building and construction output at that time, which are assumed no change in 2007; to increase by 1.0% per annum over the period from 2008 to 2011; and to increase by 1.5% per annum over the period from 2012 to 2014.

Table 2 – Latest cash flow and provision for price adjustment due to latest project estimate and latest adjustment factors

Year	Latest project estimate (\$ million, in September 2007 prices) <i>a</i>	Latest project estimate (\$ million, in September 2009 prices) [@] <i>b</i>	Latest price adjustment factor (March 2010) ^{##} <i>c</i>	Latest project estimate (\$ million, in MOD prices) <i>d</i>	Latest provision for price adjustment (\$ million) <i>e</i>	Net increase in provision for price adjustment (\$ million) <i>f</i>
2007 – 2008	0.0	0.0 [^]	–	0.0	<i>e = d – a</i>	<i>f = e – A</i>
2008 – 2009	19.4	20.7 [^]	–	20.7		
2009 – 2010	21.2	22.6 ^{^^}	1.00000	22.6		
2010 – 2011	36.0	40.0	1.02700	41.1		
2011 – 2012	72.0	79.9	1.06551	85.1		
2012 – 2013	80.9	89.8	1.10813	99.5		
2013 – 2014	36.0	40.0	1.15246	46.1		
2014 – 2015	19.8	22.0	1.19856	26.4		
2015 – 2016	8.8	9.8	1.24650	12.2		
Total	294.1	324.8	–	353.7	59.6	52.9

[@] The latest project estimate (in September 2007 prices) is multiplied by 1.11031 for conversion to September 2009 prices. The figure of 1.11031 represents the changes in price movement for public sector building and construction output between September 2007 and September 2009.

^{##} Price adjustment factors adopted in March 2010 are based on the latest movement of prices for public sector building and construction output, which are assumed to increase by 3.0% per annum in 2010 and by 4.0% per annum over the period from 2011 to 2016.

[^] \$0.0 million and \$20.7 million for 2007-08 and 2008-09 respectively are actual expenditures

^{^^} Latest project estimate of \$22.6 million in 2009-10 comprises actual expenditure of \$22.0 million for the period from April 2009 to February 2010, and latest project estimate of \$0.6 million for March 2010 in September 2009 prices, which is derived by multiplying the latest project estimate of \$0.5 million in September 2007 prices by 1.11031 for conversion to September 2009 prices.

**230DS – Outlying Islands sewerage, stage 1 phase 1 part 2 –
Yung Shue Wan sewerage, sewage treatment works and
outfall**

A comparison of the APE and the latest project estimate is as follows –

	(A)	(B)	(C)	(C) – (A)
	Approved Project Estimate	Revised Project Estimate¹	Latest Project Estimate	Difference
	\$ million	\$ million	\$ million	\$ million
(a) Construction of about 3.3 km of sewers	41.2	54.0	57.9	16.7
(b) Design and construction of	174.3	174.3	167.4	(6.9)
(i) sewage treatment works	101.6	101.6	95.5	(6.1)
(ii) submarine outfall	72.7	72.7	71.9	(0.8)
(c) Consultants' fees for	36.3	36.3	38.6	2.3
(i) contract administration	1.4	1.4	1.4	0.0
(ii) site supervision	34.2	34.2	36.5	2.3
(iii) environmental monitoring and audit	0.7	0.7	0.7	0.0
(d) Environmental mitigation measures	5.3	5.3	5.3	0.0
(e) Contingencies	23.8	11.0	19.9	(3.9)
(f) Provision for price adjustment	7.4	7.4	58.4	51.0
Total	288.3	288.3	347.5	59.2

¹ Revised estimate after the award of the contract for construction of the sewerage collection facilities in January 2008.

2. As regards **1(a) (Construction of about 3.3 km of sewers)**, the increase of \$16.7 million includes –

- (i) \$12.8 million due to the higher-than-expected price submitted by the contractor; and
- (ii) \$3.9 million due to additional works for addressing local requests and on-site constraints.

3. As regards **1(b) (Design and construction of sewage treatment facilities)**, the decrease of \$6.9 million is due to the competitive price submitted by the contractor.

4. As regards **1(c) (Consultants' fees)**, the increase of \$2.3 million is due to increase in the remuneration for RSS.

5. As regards **1(e) (Contingencies)**, we retain \$19.9 million as the contingencies to cater for further variations as necessary, claims and valuation of works during finalisation of the project account.

6. As regards **1(f) (Provision for price adjustment)**, the increase of \$51.0 million is mainly due to upsurge in CPF payment to the contractor during the construction period and the higher-than-expected capital cost for the project.

**234DS – Outlying Islands sewerage, stage 1 phase 2 –
Sok Kwu Wan sewage collection, treatment and disposal
facilities**

A comparison of the APE and the latest project estimate is as follows –

	(A)	(B)	(C)	(C) – (A)
	Approved Project Estimate	Revised Project Estimate¹	Latest Project Estimate	Difference
	\$ million	\$ million	\$ million	\$ million
(a) Construction of about 1.8 km of sewers	29.1	46.0	49.4	20.3
(b) Design and construction of	163.7	163.7	181.5	17.8
(i) sewage treatment works	68.9	68.9	91.6	22.7
(ii) submarine outfall	76.7	76.7	76.4	(0.3)
(iii) sewage pumping stations	18.1	18.1	13.5	(4.6)
(c) Consultants' fees for	30.9	30.9	37.3	6.4
(i) contract administration	1.2	1.2	1.2	0.0
(ii) site supervision	29.1	29.1	35.5	6.4
(iii) environmental monitoring and audit	0.6	0.6	0.6	0.0
(d) Environmental mitigation measures	4.9	4.9	4.9	0.0
(e) Contingencies	21.1	4.2	21.0	(0.1)
(f) Provision for price adjustment	6.7	6.7	59.6	52.9
Total	256.4	256.4	353.7	97.3

¹ Revised estimate after the award of the contract for construction of the sewerage collection facilities in January 2008.

2. As regards **1(a) (Construction of about 1.8 km of sewers)**, the increase of \$20.3 million includes –

- (i) \$16.9 million due to the higher-than-expected price submitted by the contractor; and
- (ii) \$3.4 million due to additional works for addressing local requests and on-site constraints.

3. As regards **1(b) (Design and construction of sewage treatment facilities)**, the increase of \$17.8 million is due to the higher-than-expected price submitted by the contractor.

4. As regards **1(c) (Consultants' fees)**, the increase of \$6.4 million is due to increase in the remuneration for RSS.

5. As regards **1(e) (Contingencies)**, we retain \$21.0 million as the contingencies to cater for further variations as necessary, claims and valuation of works during finalisation of the project account.

6. As regards **1(f) (Provision for price adjustment)**, the increase of \$52.9 million is mainly due to upsurge in CPF payment to the contractor during the construction period and the higher-than-expected capital cost for the project.
