

## ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

### Head 704 - DRAINAGE

#### Civil Engineering – Drainage and erosion protection

#### 92CD – Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai drainage improvements, stage 1

Members are invited to recommend to Finance  
Committee -

- (a) the upgrading of part of **92CD**, entitled “Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai drainage improvements, stage 1, phase 1 – Yuen Long and Tin Shui Wai”, to Category A at an estimated cost of \$210.7 million in money-of-the-day prices; and
- (b) the retention of the remainder of **92CD**, re-titled “Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai drainage improvements, stage 1, phase 2 – Kam Tin and Ngau Tam Mei”, in Category B.

### PROBLEM

Many local areas in Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai are susceptible to flooding during heavy rainstorms due to the inadequacies of the existing streamcourses and drainage system.

**/PROPOSAL .....**

## PROPOSAL

2. The Director of Drainage Services, with the support of the Secretary for Works, proposes to upgrade part of **92CD** to Category A at an estimated cost of \$210.7 million in money-of-the-day (MOD) prices for the necessary drainage improvement works in parts of Yuen Long and Tin Shui Wai, including Yuen Long Town, Ping Shan and Hung Shui Kiu.

## PROJECT SCOPE AND NATURE

3. The scope of works under **92CD** comprises drainage improvement works in Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai, as follows -

(a) Phase 1 (Yuen Long and Tin Shui Wai)

- (i) construction and rehabilitation of stormwater drains, about 7.8 kilometres in length and 300 to 1 800 millimetres in diameter, in Yuen Long Town, Ping Shan and Hung Shui Kiu by open-cut method;
- (ii) construction of stormwater drains, about 35 metres in length and 1 800 millimetres in diameter, underneath the Light Rail Transit near Hung Uk Tsuen in Ping Shan by trenchless method<sup>1</sup>;
- (iii) construction of a single cell box culvert of about 35 metres in length at Tan Kwai Tsuen in Hung Shui Kiu; and
- (iv) construction of concrete parapet walls of about 5 kilometres in length and 1 metre in height to replace existing metal handrails along the banks of the Hung Shui Kiu Channel and Ha Tsuen Channel in Tin Shui Wai;

(b) Phase 2 (Kam Tin and Ngau Tam Mei)

The construction of drainage channels, about 7.5 kilometres in length, in Kam Tin and Ngau Tam Mei areas.

/The .....

---

<sup>1</sup> The trenchless method involves the use of pipe-jacking or boring techniques.

-----  
The location plans for phase 1 and phase 2 of the drainage improvement works under **92CD** are at Enclosures 1 and 2 respectively.

4. The part of **92CD** we now propose to upgrade to Category A is the phase 1 works mentioned in paragraph 3(a) above. We have substantially completed the detailed design for the proposed works and plan to start the construction in December 2001 for completion in May 2005.

5. The remainder of **92CD**, comprising the phase 2 works mentioned in paragraph 3(b) above, will be retained in Category B.

### JUSTIFICATION

6. Owing to rapid development in the areas and the extensive changes in land use in Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai over the years, some natural ground has been paved over and has become impermeable. Rainwater which would previously dissipate naturally through ground filtration can no longer do so. This has led to a significant increase in surface run-off and the overloading of the existing drainage system and natural streamcourses. As such, many local areas in Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai are susceptible to frequent flooding during heavy rainstorms.

7. In December 1998, we completed the "Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai drainage master plan study" (the Study) which assessed the adequacy of the existing drainage systems and tributaries in the areas. The Study has identified that some of the existing drains in the areas of Yuen Long and Tin Shui Wai, including Yuen Long Town, Ping Shan and Hung Shui Kiu, and some of the existing streamcourses and channels in Kam Tin, Ngau Tam Mei and Tin Shui Wai are inadequate in capacity. To reduce the risks of flooding, we need to carry out drainage improvement works as detailed in paragraph 3 above.

8. We will carry out the drainage improvement works under **92CD** in two phases so that works which do not require acquisition of private land may be carried out under phase 1 to bring about early improvement.

9. Upon completion of the proposed improvement works, the flood protection level in the areas concerned will be brought up to the required standard and the risk of flooding during heavy rainstorms will be substantially reduced.

/FINANCIAL .....

**FINANCIAL IMPLICATIONS**

10. We estimate the cost of the proposed works to be \$210.7 million in MOD prices (see paragraph 11 below), made up as follows –

|  | <b>\$ million</b> |                            |
|--|-------------------|----------------------------|
| (a) Construction and rehabilitation of stormwater drains | 141.8             |                            |
| (i) by open-cut method                                   | 135.7             |                            |
| (ii) by trenchless method                                | 6.1               |                            |
| (b) Box culvert  | 1.8               |                            |
| (c) Concrete parapet wall                                | 23.5              |                            |
| (d) Environmental mitigation measures                    | 1.5               |                            |
| (e) Consultants' fees for construction stage             | 1.4               |                            |
| (f) Resident site staff cost                             | 27.6              |                            |
| (g) Contingencies  | 15.1              |                            |
| Sub-total  | 212.7             | (in September 2000 prices) |
| (h) Provision for price adjustment                       | (2.0)             |                            |
| Total  | 210.7             | (in MOD prices)            |

----- A breakdown by man-months of the estimate for consultants' fee is at Enclosure 3.

/11. ....

11. Subject to approval, we will phase the expenditure as follow –

| Year        | \$ million<br>(Sept 2000) | Price<br>adjustment<br>factor | \$ million<br>(MOD) |
|-------------|---------------------------|-------------------------------|---------------------|
| 2001 – 2002 | 4.0                       | 0.98000                       | 3.9                 |
| 2002 – 2003 | 45.0                      | 0.97976                       | 44.1                |
| 2003 – 2004 | 69.8                      | 0.98759                       | 68.9                |
| 2004 – 2005 | 58.2                      | 0.99549                       | 57.9                |
| 2005 – 2006 | 27.0                      | 1.00346                       | 27.1                |
| 2006 – 2007 | 8.7                       | 1.01149                       | 8.8                 |
|             | 212.7                     |                               | 210.7               |

12. We have derived the MOD estimate on the basis of the Government's latest forecasts of trend labour and construction prices for the period 2001 to 2007. We will tender the works under a standard re-measurement contract because of the uncertainties of the existence and location of underground utilities such as electric cables, telephone cables, sewers and water pipes. To reduce the uncertainty arising from obstructive utilities, we have carried out a comprehensive review of utility record drawings. In addition, we have conducted extensive utility surveys including investigation pits/trenches and non-destructive utility surveys to identify possible conflicting utilities and to determine the most practical alignment of the proposed drains. We will require the contractor to carry out trial pits/trenches to confirm the actual locations of utilities prior to the commencement of the works. The contract will allow for price adjustment as the contract period will exceed 21 months.

13. We estimate the annually recurrent expenditure arising from this project to be \$130,000.

## **PUBLIC CONSULTATION**

14. We consulted the Ping Shan Rural Committee and Ha Tsuen Rural Committee on 5 December 2000 and the Town Planning and Development Subcommittee of the Yuen Long District Council on 17 January 2001. All supported the implementation of the proposed works.

/15. ....

15. We consulted the LegCo Panel on Planning, Lands and Works on **92CD** on 23 April 2001. Members generally supported the proposed drainage improvement works. Nevertheless, some Members requested the Administration to provide an overview of the flood control and prevention strategy for tackling the flooding problem in the territory and to provide more details about the project. We have already submitted a supplementary paper to the Panel, as set out in Enclosure 4.

## LAND ACQUISITION

16. The proposed works do not require land resumption.

## ENVIRONMENTAL IMPLICATIONS

17. The proposed drainage improvement works under phase 1 of **92CD** are not classified as a designated project under Environmental Impact Assessment Ordinance. We completed the Environmental Study (ES) for the phase 1 works in March 2001. The ES concluded that the works would have no long-term environmental impacts. We will control noise, dust and site run-off during construction through the implementation of mitigation measures in the works contract. These will include frequent watering of the site and the provision of wheel-washing facilities to reduce emission of fugitive dust, the use of silenced construction plant to reduce noise generation and other procedures as recommended in the Environmental Study. The cost of implementing these measures is estimated to be \$1.5 million (in September 2000 prices) and the necessary provision has been made in the project estimate for the phase 1 works under **92CD**.

18. We have considered in the planning and design stage ways of reducing the generation of C&D materials as far as possible. We estimate that some 154 000 cubic metres (m<sup>3</sup>) of construction and demolition (C&D) materials will be generated by the phase 1 works. Of these, about 123 200 m<sup>3</sup> (80.0%) will be reused on site, 29 260 m<sup>3</sup> (19.0%) will be reused as fill in public filling areas and 1 540 m<sup>3</sup> (1.0%) will be disposed of at landfills. We will encourage the contractor to use steel instead of timber in formwork and temporary works to reduce the generation of waste. We shall require the contractor to submit for approval a waste management plan, with appropriate mitigation measures, including the allocation of an area for waste segregation. We shall ensure that the day-to-day operations on site comply with the approved plan. During construction, we shall require the contractor to implement necessary measures to minimize the generation of C&D materials and to reuse C&D materials as fill material as far as possible. We will control disposal of C&D materials and waste to public filling areas and landfills respectively through a trip-ticket system and will record the disposal and reuse of C&D materials for monitoring purposes.

/BACKGROUND .....

## BACKGROUND INFORMATION

19. We commissioned **83CD** "Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai drainage master plan study" in January 1996 and completed the final study in December 1998. The study identified a series of drainage improvement works and recommended a two-stage implementation programme.

20. In September 1998, we included **92CD** "Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai drainage improvements, stage 1" in Category B. The project is estimated to cost about \$517 million in September 2000 prices.

### Stage 1, phases 1 and 2

21. In March 1999, we upgraded part of **92CD** to Category A as **96CD** "Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai drainage improvements, stage 1 – consultants' fees and site investigations" at an estimated cost of \$20.6 million in MOD prices for engaging consultants to carry out impact assessments, site investigations and detailed design for the stage 1 drainage improvement works.

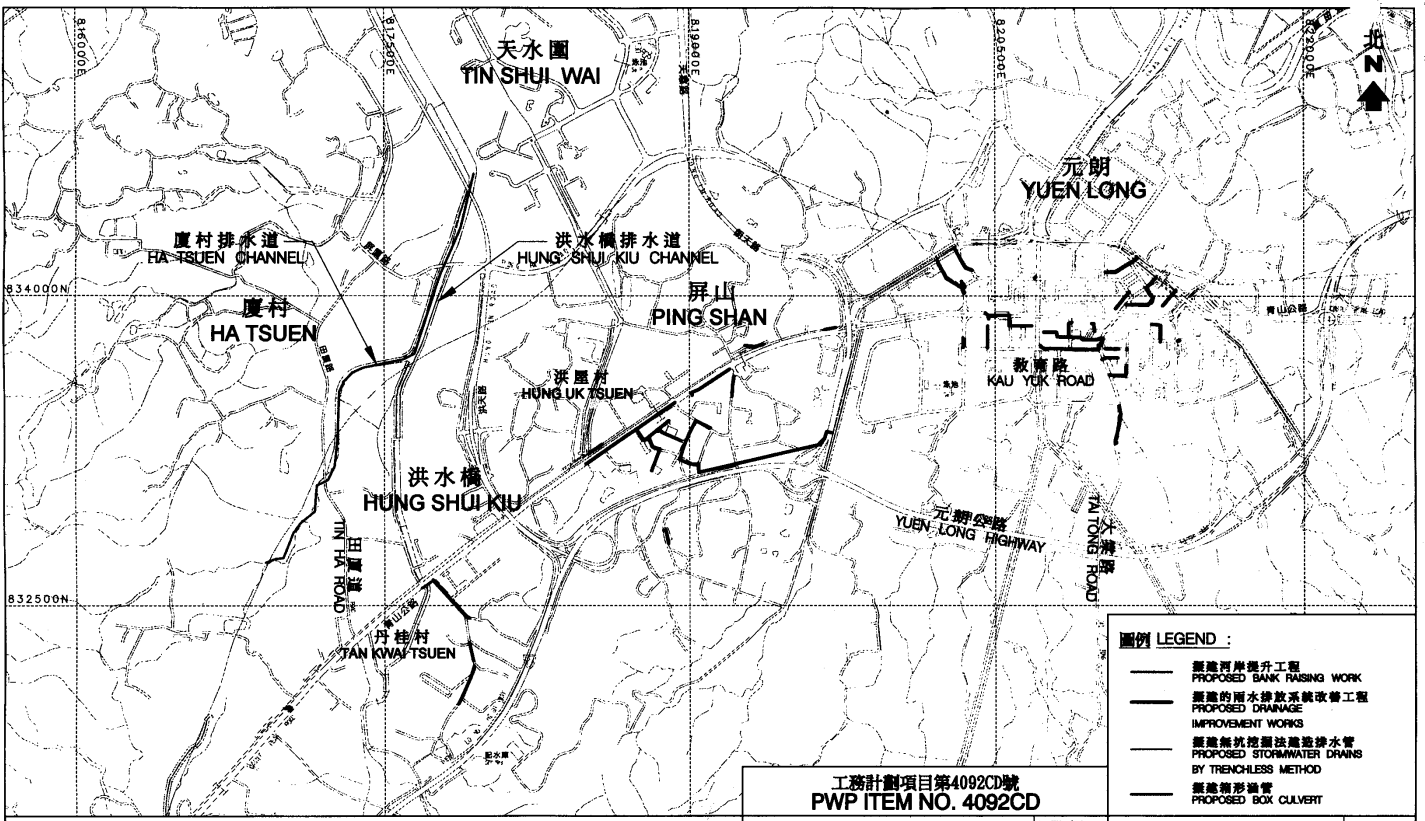
22. To complete the stage 1 works, we plan to commence the phase 2 construction, as described in paragraph 3(b) above, in early 2004.

### Stage 2

23. The stage 2 works comprise drainage improvements to streamcourses in the rural or undeveloped areas in Kam Tin, Ngau Tam Mei and Tin Shui Wai. At present, these areas are not susceptible to flooding. With future development of the areas, we anticipate that flood protection measures will be required. We will closely monitor the pace of development in the areas concerned and will carry out the necessary improvements as and when required.

### Job Opportunities

24. We estimate that the proposed works will create about 65 new jobs during the construction stage. These will comprise 25 professional and technical staff and 40 labourers, totaling 2 730 man-months.



**圖例 LEGEND :**

- 擬建河岸提升工程  
PROPOSED BANK RAISING WORK
- 擬建的雨水排放系統改善工程  
PROPOSED DRAINAGE IMPROVEMENT WORKS
- 擬建無坑位埋地建造排水管  
BY TRENCHLESS METHOD  
PROPOSED STORMWATER DRAINS
- 擬建箱形涵管  
PROPOSED BOX CULVERT

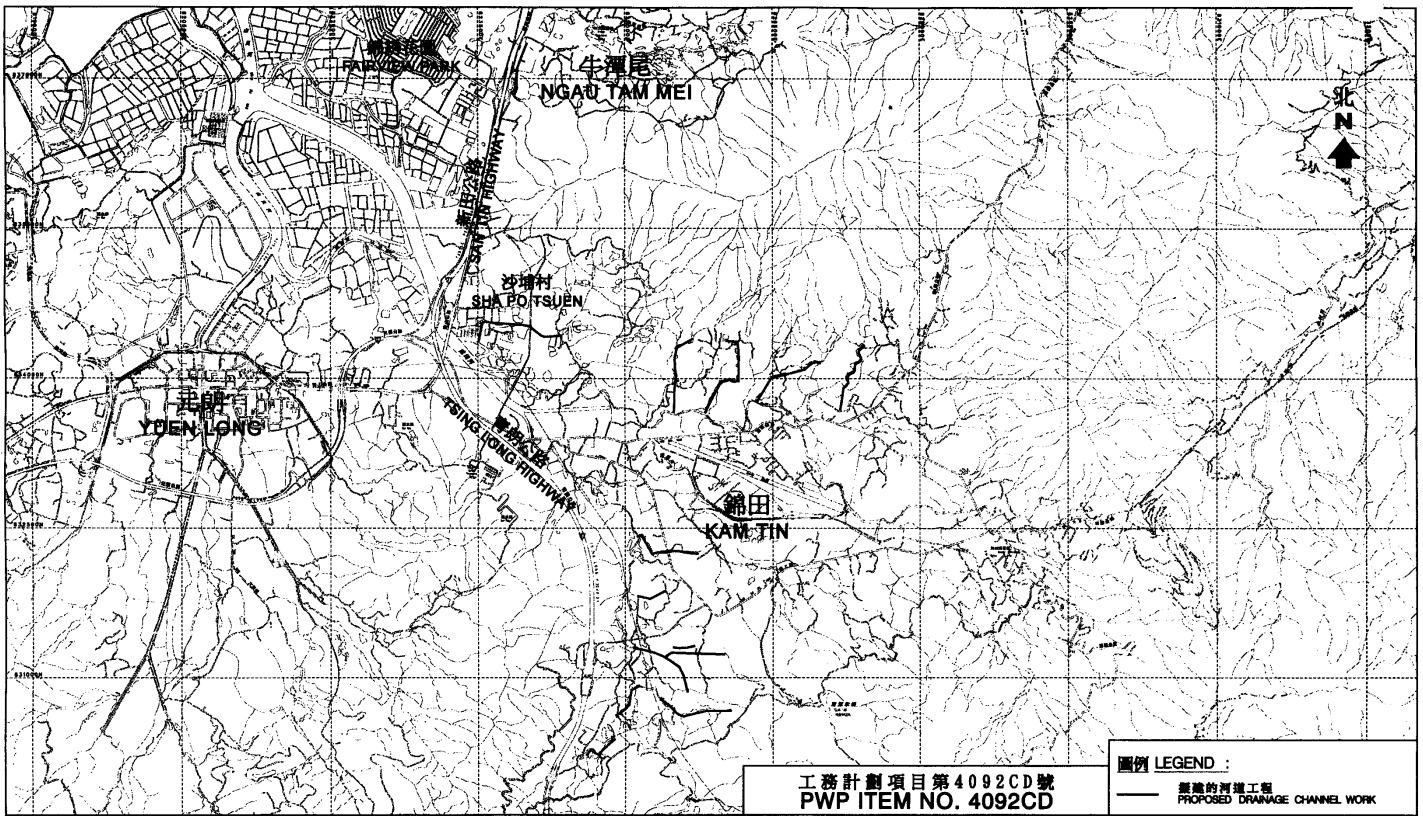
|   |                   |                       |
|---|-------------------|-----------------------|
| <b>工務計劃項目第4092CD號<br/>PWP ITEM NO. 4092CD</b>     |                   |                       |
| 繪圖 drawn  | SIGNED C.W. CHAN  | 日期 date<br>11-04-2001 |
| 核對 checked  | SIGNED C.S. CHENG | 日期 date<br>11-04-2001 |
| 批核 approved                                       | SIGNED C.M. CHUNG | 日期 date<br>11-04-2001 |
| 部門 office<br>工程管理部<br>PROJECT MANAGEMENT DIVISION |                   |                       |

|   |          |
|---|----------|
| 圖則編號 drawing no.  | 比例 scale |
| <b>DPM/0013</b>   | N.T.S.   |
| 保留版權 COPYRIGHT RESERVED   |          |
|  香港特別行政區政府渠務署<br>DRAINAGE SERVICES DEPARTMENT<br>GOVERNMENT OF THE HONG KONG<br>SPECIAL ADMINISTRATIVE REGION |          |

圖則名稱 drawing title

元朗、錦田、牛潭尾及天水圍雨水排放系統改善計劃第1階段第1期工程 - 元朗及天水圍  
 YUEN LONG, KAM TIN, NGAU TAM MEI AND TIN SHUI WAI DRAINAGE IMPROVEMENTS,  
 STAGE 1 PHASE 1 - YUEN LONG AND TIN SHUI WAI





圖則名稱 drawing title

元朗、錦田、牛潭尾及天水圍雨水排放系統改善計劃第1階段第2期工程 - 錦田及牛潭尾  
 YUEN LONG, KAM TIN, NGAU TAM MEI AND TIN SHUI WAI DRAINAGE IMPROVEMENTS,  
 STAGE 1 PHASE 2 - KAM TIN AND NGAU TAM MEI

工務計劃項目第4092CD號  
 PWP ITEM NO. 4092CD

|             |                                      |            |         |            |
|-------------|--------------------------------------|------------|---------|------------|
| 繪畫 drawn    | SIGNED                               | C.W. CHAN  | 日期 date | 11-04-2001 |
| 核對 checked  | SIGNED                               | C.S. CHENG | 日期 date | 11-04-2001 |
| 批核 approved | SIGNED                               | C.M. CHUNG | 日期 date | 11-04-2001 |
| 部門 office   | 工程管理部<br>PROJECT MANAGEMENT DIVISION |            |         |            |

圖例 LEGEND :

擬建的河道工程  
 PROPOSED DRAINAGE CHANNEL WORK

圖則編號 drawing no. **DPM/0014** 比例 scale N.T.S.

保留版權 COPYRIGHT RESERVED  
 香港特別行政區政府渠務署  
 DRAINAGE SERVICES DEPARTMENT  
 GOVERNMENT OF THE  
 HONG KONG  
 SPECIAL ADMINISTRATIVE REGION

**92CD - Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai  
drainage improvements, stage 1**

**Breakdown of estimate for consultants' fee**

| Consultants' staff cost              |  |              | Estimated<br>man-<br>months | Average<br>MPS*<br>salary<br>point | Multiplier<br>factor | Estimated<br>fee<br>(\$million) |
|--------------------------------------|--|--------------|-----------------------------|------------------------------------|----------------------|---------------------------------|
| (a)                                  | Consultants' fees for<br>construction stage                                  | Professional | 6                           | 38                                 | 2.4                  | 0.8                             |
|                                      |  | Technical    | 13                          | 14                                 | 2.4                  | 0.6                             |
| (b)                                  | Site supervision by<br>resident site staff<br>employed by the<br>consultants | Professional | 90                          | 38                                 | 1.7                  | 8.8                             |
|                                      |  | Technical    | 580                         | 14                                 | 1.7                  | 18.8                            |
| <b>Total consultants' staff cost</b> |  |              |                             |                                    |                      | 29.0                            |

\* MPS = Master Pay Scale

**Notes**

1. A multiplier of 2.4 is applied to the average MPS point to arrive at the full staff costs including the consultants' overheads and profit, as the staff will be employed in the consultants' offices. (At 1.4.2000, MPS pt. 38 = \$57,525 per month and MPS pt. 14 = \$19,055 per month). A multiplier of 1.7 is applied in the case of site staff supplier by the consultants.
2. The consultants' fees for construction stage are based on the lump sum fees calculated in accordance with the consultancy agreement the Director of Drainage Services has with the consultants undertaking the design and investigation of the project. The costs of resident site staff are based on estimates prepared by the Director of Drainage Services. We will only know the actual man-months and actual costs when the construction works have completed.

**Information Paper for Legislative Council  
Panel on Planning, Lands and Works**

**Supplementary Notes on**

- 92CD - Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai drainage improvements, stage 1**
- 109CD - Drainage improvement in Sha Tin and Tai Po**
- 112CD - Drainage improvement in Northern New Territories – Package A**

**INTRODUCTION**

At the meeting on 23 April 2001, Panel Members requested the Administration to provide an overview of the flood control and prevention strategy for tackling the flooding problem in the territory and to provide further details about the proposed drainage improvement works under **92CD**, **109CD** and **112CD**.

**AN OVERVIEW OF THE FLOOD CONTROL AND PREVENTION STRATEGY**

**Development of the Strategy**

2. In 1990, the Government completed the phase I of the Territorial Land Drainage and Flood Control Strategy Study. Based on the recommendation of the Study, the Government endorsed a set of flood protection standards such that all new stormwater facilities have to be designed to withstand a severe flood event as described below:

|  | <b><u>Return Period</u></b> <sup>1</sup> |
|--|--|
| • Urban drainage trunk systems           | 200                                      |
| • Urban drainage branch systems          | 50                                       |
| • Main river and rural drainage channels | 50                                       |
| • Village flood protection scheme        | 50                                       |

---

<sup>1</sup> "Return Period" means the average number of years within which a certain severity of a flood event will occur once statistically. It indicates the probability of occurrence of a certain flood severity. A larger return period represents a more severe event and a rarer occurrence, but there is always the chance that it will occur in any one year.

3. The definition of a flood event is based on the combination of rainfall intensity and tide levels. For a drainage basin, the downstream of the catchment is under influence of the sea. The capacity of the drainage network will be reduced if the tide level is high, as the high tide prevents the free discharge of flood water to the sea. This is a natural phenomenon and occurs to every drainage network within the tidal zone. We have always taken this into account and a high tide level is used in all our designs.

4. For urban areas, a 200 years protection standard is specified for the trunk drain such that adequate protection is provided against extensive regional flooding in the urban area. For the branch networks, a protection level of 1 in 50 years is provided for cost-effectiveness consideration, bearing in mind that the catchment area served by a branch drain is relatively small.

5. Regarding the design of main river and rural drainage channels as well as village flood protection schemes, a protection level of 50 years return period is provided to achieve cost-effectiveness based on considerations such as land requirement, social and economic impacts of flooding.

6. The above strategy serves to provide general guidelines for desired flood protection standards for new stormwater drainage infrastructure. They are subject to appropriate adjustment with regard to site constraints and characteristics of individual catchments.

7. The Government also completed in 1993 the phase II of the Territorial Land Drainage and Flood Control Strategy Study. The Study provided Government with concrete plans and tools needed to make the strategy more effective in the five most flood prone basins, namely the Yuen Long, Tin Shui Wai, San Tin, Ganges and Indus Basins in the New Territories. The principal output from the Study provided a rational framework for managing the drainage systems in each basin, implementing structural and non-structural flood mitigation measures and responding to requests for development.

8. In 1994, the Government completed the West Kowloon Drainage Master Plan (DMP) study to investigate and resolve the drainage problems in the area. Since then, the Government has carried out seven more DMP studies to cover the following areas:

- a) Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai
- b) Northern Hong Kong Island
- c) Tsuen Wan, Kwai Chung and Tsing Yi

- d) Tuen Mun and Sham Tseng
- e) Northern New Territories
- f) Sha Tin and Tai Po
- g) Sai Kung, East Kowloon and Southern Lantau

9. The above studies comprehensively examined the adequacy of the drainage systems and developed drainage improvement measures to meet the required flood protection standards and future development needs. They have taken into consideration a number of constraints and factors including social and economic pressures, financial and legal constraints, geographical and environmental conditions, institutional and management constraints as well as known development plans when formulating the required drainage improvement measures.

### **Drainage Improvement Measures in the New Territories**

10. In the New Territories, the capacities of some existing rivers are inadequate and need to be improved to cope with the rapid development and changes in land use. River channels are the primary choice for drainage networks in the New Territories where the catchment areas to be drained are large and the river channel can more easily blend with the natural environment. Providing a box culvert in place of an open river channel will require a much larger land intake because of the need to compensate the corresponding reduction in the flow area for conveying the floodwater and to construct the supporting walls and deckings. Box culverts will be used when the drainage basin is small. Box culvert will also be used in urban areas when the decked area is required for other land use purpose.

11. Being constrained by the natural topography and existing development, existing villages in some low-lying areas are still susceptible to flooding even after the construction of river channels. Village flood protection schemes are therefore required. The scheme is to protect the low-lying village by constructing a perimeter bund to prevent the ingress of floodwater from outside and installing a floodwater pumping station to discharge the stormwater collected within the bunded area to the nearby river channel.

12. Based on the above strategy, we have completed improvement to about 10 km downstream sections of the major river channels in the Yuen Long and Kam Tin areas in the North-western New Territories. Construction works for about 9 km midstream sections of the river channels in Yuen Long, Kam Tin and Ngau Tam Mei areas have also been in progress since 1999. In the Northern New Territories, Stages I and II

works of the Shenzhen River Regulation Project have been completed. Corresponding improvement works for the River Beas and River Indus have also been in progress. In addition to the river training works, 19 village flood protection schemes have also been constructed and are now in operation.

13. Planning and design for further improvements to midstream and upstream sections of the river channels and tributaries and further village flood protection schemes in the New Territories are actively underway. Some are now ready for construction, subject to approval of funding, works could commence in end 2001/early 2002.

### **Drainage Improvement Measures in Urban Areas**

14. In urban areas like the West Kowloon, Northern Hong Kong Island, Tsuen Wan and Kwai Chung, the stormwater drainage systems were built many years ago. There is a need to upgrade the flood protection level to the current flood protection standard. However, conventional drainage improvement works involving road opening works for the installation of new drains of larger size are always subject to constraints due to the presence of congested underground utilities, traffic diversion problems and public concern over the nuisances and inconveniences resulting from the construction activities. In this regard, a combination of the following alternatives will be explored in order to minimise these impacts:

- (a) the application of no-dig technology to minimise road opening works;
- (b) the provision of underground storage tanks for floodwater to reduce peak flows and hence reduce the extent of conventional drainage improvement works in the urban areas;
- (c) the construction of tunnel systems to collect rain water from upland areas for discharge directly into the sea. By employing this method, less rain water would enter the old drainage systems within the urbanised districts and therefore, the flood protection level of the systems could be improved with much less requirement for the construction of conventional drainage works in busy streets, thus minimizing the disruption to the public.

15. In accordance with above strategy, we have already commenced Stage I and Stage II drainage improvement works in West Kowloon including constructing a flood storage tank of a capacity of 100,000 m<sup>3</sup>

underneath the Tai Hang Tung Recreation Ground and a 1.5 km stormwater transfer tunnel from Kowloon Tong to the Kai Tak Nullah.

16. To improve the existing drainage systems in other urban areas including Northern Hong Kong Island, Lai Chi Kok, Sham Shui Po, Tsuen Wan and Kwai Chung areas, construction of drainage tunnels of about 20 km in length to intercept and transfer stormwater from the upper catchments directly to the sea have been recommended. These tunnels aim to upgrade the flood protection standards of the lower urban areas while minimizing public disruption and avoiding practical difficulties/constraints associated with conventional drainage improvement works in heavily built-up areas. Preliminary feasibility studies for these drainage tunnels have been completed. Besides these tunnels which are under planning, we do not envisage the necessity for further drainage tunnels to meet the present planned development scenarios in Hong Kong.

## **FURTHER DETAILS ABOUT PROPOSED DRAINAGE IMPROVEMENT WORKS UNDER 92CD, 109CD AND 112CD**

### **92CD – Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai Drainage Improvements, Stage 1, Phase 1**

17. In December 1998, we completed the Yuen Long, Kam Tin, Ngau Tam Mei and Tin Shui Wai Drainage Master Plan study and identified the following drainage improvement works to be carried out under **92CD** Phase 1:

- (a) To improve the drainage systems in Yuen Long town, Ping Shan and Hung Shui Kiu areas

The study revealed that the present capacities of some aged drains in the areas could only provide flood protection of 1 in 2 to 1 in 20 years. Flooding in these areas were recorded on 14 April last year. We propose to construct about 8 km of stormwater drains to bring the systems up to the required 1 in 50 years flood protection standard. Upon completion of the works in 2005, the risk of flooding in the areas concerned will be substantially reduced.

- (b) To upgrade the drainage capacities of Hung Shui Kiu Channel and Ha Tsuen Channel

The study also identified that the upstream section of these two channels (about 2.5 km) is inadequate in capacity to meet the future development, e.g. Hung Shui Kiu Strategic Growth Area. Therefore, we propose to construct solid parapets (about 5 km) to replace the existing metal handrails so as to achieve a flood protection level of 1 in 50 years.

## **109CD - Drainage Improvement Works in Sha Tin and Tai Po**

18. Sha Tin and Tai Po Drainage Master Plan study was completed in October 1999. The study reviewed comprehensively the entire catchments and drainage facilities in Sha Tin and Tai Po and proposed to carry out under **109CD** the following drainage improvement works for the drains and rivers in old towns and rural areas:

- (a) To improve the hydraulic capacities of Lam Tsuen River, She Shan River, Tai Po River and Kwun Hang River

These natural rivers at present have only a level of protection of 1 in 2 to 1 in 20 years. Floodings were recorded on 9 August 1998 in Kwun Hang area and on 25 August 1999 in Lam Tsuen area. Besides, some of the river banks are badly eroded and in need of protection.

We propose to carry out river channel upgrading works at these locations to improve land drainage as well as to cope with the planned development. Upon completion of the proposed river improvement, the flood protection level will be brought up to 1 in 50 years and hence the risk of flooding in the affected areas during heavy rainstorms will be substantially reduced. The river banks will at the same time be properly protected against erosion.

- (b) To tackle existing flooding spots

Recurrent flooding during heavy rainstorms occurs in low-lying Shuen Wan and Tai Po Kau Hui in Tai Po and Tin Liu to Pau Tau areas in Sha Tin. The level of protection in Shuen Wan, for example, is only 1 in 2 years, flooding was recorded on 12 August 1997. We propose to upgrade the concerned stormwater drains and construct floodwater pumping stations to bring the flood protection level of these areas up to 1 in 50 years.

## **112CD – Drainage improvement in Northern New Territories – package A**

19. In October 1999, we completed the Northern New Territories Drainage Master Plan study and identified the following drainage improvement works to be carried out under **112CD** package A:

- (a) To improve the hydraulic capacity of existing streamcourses in Ma Wat River (about 4 km) around Kau Lung Hang and Nam Wa Po in Fanling

These natural streamcourses at present have only a level of protection of less than 1 in 20 years. Upon completion of the proposed river improvement works, the flood protection level will be brought up to 1 in 50



years and the flooding risk in the areas will be substantially reduced.

(b) To tackle existing flooding spots

Flooding in low-lying Shek Wu Wai near San Tin Highway and in Ping Kong Tsuen due to the narrow streamcourses has long been problematic during heavy rainfall.

The proposed San Tin Western (about 2 km) and Ping Kong (about 1 km) drainage channels will provide a flooding protection level of 1 in 50 years in the areas concerned.

(c) To upgrade existing drains to meet the required flood protection standards

Some existing drains (about 8km) in the old town areas of Fanling and Sheung Shui are inadequate in capacity. In addition, the closed circuit television surveys have identified that the conditions of some of the drains (about 4.5 km) are deteriorating and in need of repair.

Upon completion of the proposed drainage improvement works, the Sheung Shui and Fanling towns will be provided with adequate flood protection standards. The improvement could also cope with the additional run-off generated from future developments in the areas, such as the Fanling North Strategic Growth Area.

**Works Bureau**  
**May 2001**