For discussion **PWSC(2005-06)46**
on 15 February 2006

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 705 – CIVIL ENGINEERING
Environmental Protection – Refuse Disposal
169DR – Restoration of Northwest New Territories landfills and Gin Drinkers Bay landfill – aftercare work

Members are invited to recommend to the Finance Committee the upgrading of **169DR** to Category A at an estimated cost of $95.7 million in money-of-the-day prices for the continuation of the aftercare work at the three Northwest New Territories landfills and the Gin Drinkers Bay landfill for a further period of seven years.

PROBLEM

We need to continue with aftercare work for the three closed Northwest New Territories landfills (NWNTL) and the Gin Drinkers Bay landfill (GDBL) to monitor landfill gas and leachate pollution.

PROPOSAL

2. The Director of Environmental Protection, with the support of the Secretary for the Environment, Transport and Works, proposes to upgrade **169DR** to Category A at an estimated cost of $95.7 million in money-of-the-day (MOD) prices for the continuation of the aftercare work at the NWNTL and GDBL for a further period of seven years from June 2007 to May 2014.

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PROJECT SCOPE AND NATURE

3. The scope of the proposed aftercare work comprises –

(a) operation and maintenance of the landfill gas (LFG) management systems to control gas emission and to prevent off-site gas migration;

(b) operation and maintenance of the leachate management systems to control surface and groundwater infiltration into the landfills and to extract, collect, treat and dispose of the leachate;

(c) environmental monitoring and auditing; and

(d) maintenance of landscape and site infrastructures.

—— The site plans of the NWNTL and GDBL are at Enclosure 1.

JUSTIFICATION

4. Landfills, whether operating or closed, produce LFG and leachate[1] as products of refuse decomposition. LFG is malodorous and potentially asphyxiating, flammable and explosive. Leachate is highly polluting and, if not properly controlled, may seriously contaminate water bodies due to its infiltration or direct discharge.

5. Municipal solid waste, when disposed of at landfills, does not exhibit homogeneous geotechnical properties, as it is subject to a continuing biological degradation process. This results in differential settlement of the landfill surface which may lead to slope instability problems. We therefore need to monitor and improve slope stability at landfills. For some landfills, we also need to stabilise the natural slopes adjacent to the top platform of landfills to prevent possible boulder falls or soil debris flows.

6. The three NWNTL, (namely, the Siu Lang Shui landfill (SLSL), Ma Tso Lung landfill (MTLL), and Ngau Tam Mei landfill (NTML)) were closed between 1975 and 1983, and the GDBL was closed in 1979. They did not have proper LFG and leachate management systems at the time. To minimise the adverse environmental impacts of NWNTL and GDBL and to put the land to productive use, we sought funding approvals from the Finance Committee (FC) in

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1 "Leachate" is the water which has permeated through the waste mass.

1995 and 1998 under PWP Items **157DR** and **158DR** respectively for the design and construction of the restoration facilities and a period of seven years' aftercare work to operate and maintain the facilities and monitor the LFG migration and leachate pollution. The restoration facilities comprise LFG and leachate management systems, a low permeability final cover and surface water drainage system to reduce infiltration of water into the waste mass so as to minimise leachate generation and other ancillary works. The produced LFG is utilised on-site for operation of the leachate management system. The aftercare work involved LFG and leachate management, site maintenance work as well as about 12 700 annual measurements of LFG, 1 800 annual measurements on leachate quality, and 3 100 annual measurements on groundwater and surface water quality. The monitoring programme is at Enclosure 2.

7. The construction of the restoration facilities and the subsequent aftercare work for the NWNTL and GDBL were tendered and awarded under the same design-build-and-operate contract in 1999. The first seven-year aftercare work for NWNTL and GDBL commenced thereafter in June 2000 and October 2000 respectively, the capital cost for the construction of the restoration facilities at NWNTL and GDBL is $332 million and the respective cost for the first seven years' aftercare work is about $33.2 million and $68.6 million (in MOD prices).

8. In seeking funding for **157DR** and **158DR**, we undertook to carry out an environmental review five years from the commencement of the aftercare work to determine if the landfill sites had been completely restored and if further aftercare work would be needed. In early 2005, the Environmental Protection Department (EPD) commissioned an environmental review of the NWNTL and GDBL as required by the FC. The review was completed in mid 2005 and revealed that while the amount of LFG[2] and the pollution level of leachate[3] collected for treatment had decreased since 2000, both the LFG and leachate were still of significant quantities and should be subject to continuous control and treatment. Landfill settlement was expected to continue and regular maintenance work would be required to maintain the surface drainage, slopes and internal

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2 For example, the LFG generation rates of the NWNTL and GDBL have been reduced from 320 cubic metres per hour (m^3/hr) and 300 m^3/hr in 2001 to 220 m^3/hr and 90 m^3/hr in 2004 respectively. The methane content in the LFG remains fairly constant at NWNTL (28%-35%) and GDBL (44%-55%) between 2001 and 2004. Such LFG quantity and methane content levels still require control and monitoring as the landfills could only be considered as fully restored from the perspective of LFG safety when the methane content is reduced to 1% or below.

3 The total nitrogen concentration of leachate from NWNTL and GDBL has been reduced from 4 850 milligrams per litre (mg/l) in 2001 to around 3 750 mg/l in 2004. It still exceeds the acceptable discharge standard on total nitrogen of 200 mg/l which is stipulated in the Technical Memorandum of the Water Pollution Control Ordinance for discharge to Government sewers.

access roads. The review confirmed that the aftercare work at the NWNTL and GDBL should continue to ensure that the sites would pose no threat to the safety of the public and have minimal adverse environmental impacts so as to provide a safe environment for future afteruses.

9. The two projects were tendered and awarded under one 30-year design-build-and-operate contract. Subject to approval of the Finance Committee, we would realign the commencement date of the second seven-year aftercare work to 1 June 2007 for both NWNTL and GDBL.

FINANCIAL IMPLICATIONS

10. Based on the rates in the existing contract, we estimate the cost of the proposed aftercare work for NWNTL and GDBL for the second seven-year period to be $95.7 million in MOD prices (see paragraph 11 below), made up as follows –

		$ million **NWNTL**	**$ million** **GDBL**	**$ million** **Total**	
(a)	Operation and maintenance of LFG management systems	10.7	20.7	31.4	
(b)	Operation and maintenance of leachate management systems	9.5	18.4	27.9	
(c)	Environmental monitoring and audit	2.9	5.8	8.7	
(d)	Maintenance of landscape	3.0	6.0	9.0	
(e)	Maintenance of site infrastructure	3.8	7.5	11.3	
(f)	Contingencies	1.6	2.9	4.5	
	Sub-total	31.5	61.3	92.8	(in September 2005 prices)
(g)	Provision for price adjustment	1.0	1.9	2.9	
	Total	32.5	63.2	95.7	(in MOD prices)

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

Year	$ million (Sept 2005)		Price adjustment factor	$ million (MOD)	
	NWNTL	**GDBL**		**NWNTL**	**GDBL**
2007 – 2008	2.9	5.5	1.00125	2.9	5.5
2008 – 2009	4.8	9.3	1.00125	4.8	9.3
2009 – 2010	4.8	9.3	1.00125	4.8	9.3
2010 – 2011	4.4	8.6	1.01627	4.5	8.7
2011 – 2012	4.3	8.4	1.03659	4.5	8.7
2012 – 2013	4.3	8.4	1.05733	4.5	8.9
2013 – 2014	4.3	8.4	1.07847	4.6	9.1
2014 – 2015	1.7	3.4	1.10004	1.9	3.7
	31.5	61.3		32.5	63.2

12. We have derived the MOD estimates on the basis of the Government's latest forecast of trend rate of change in prices of public sector building and construction output for the period 2007 to 2015. The cost of the aftercare work will be subject to price adjustment as the contract period will exceed 21 months.

13. We estimate that the annual recurrent expenditure will be about $1.94 million.

14. The aftercare work for closed landfills may last more than two decades (could be up to 30 years). We propose to carry out an environmental review five years after commencing the proposed second seven-year period to determine if the aftercare work should continue. We will continue with the existing contract to ensure that continuous liability is borne by the contractor. As specified in the contract, we have the right to terminate the contract or amend the coverage of the contract provided that we give the contractor sufficient advance notice.

PUBLIC CONSULTATION

15. We consulted the relevant District Councils in mid-2005 on the progress of the restoration of the NWNTL and GDBL. The Recreation and Culture Committee of the Kwai Tsing District Council supported EPD's funding proposal for the continuation of the aftercare work at the GDBL. The Tuen Mun District Council, North District Council and Yuen Long District Council did not express objection to EPD's funding proposal to continue the aftercare work for SLSL, MTLL and NTML respectively.

16. On 28 November 2005, we consulted the Legislative Council Panel on Environmental Affairs on the proposal to continue the aftercare work at NWNTL and GDBL for a further period of seven years. Members expressed no objection to the proposal, and requested more information on the management and maintenance costs of NWNTL and GDBL, and afteruse of restored landfills. We circulated an information paper to the Panel on 29 December 2005.

ENVIRONMENTAL IMPLICATIONS

17. We completed the initial environmental impact assessment, covering both the restoration and aftercare work, as part of the feasibility study for the restoration works of the NWNTL and GDBL in 1995 and 1992 respectively. The studies indicated that the restoration and aftercare work would ensure proper control of the emission and off-site migration of LFG and leachate. This would ameliorate the environmental impacts of the landfills and enable the landfill sites to be put to beneficial use.

18. During the contract period, we will withhold payment to the contractor if there is any non-compliance with the required environmental standards.

19. We have considered to reduce the generation of construction and demolition (C&D) materials where possible. C&D materials mainly arise from maintenance of drainage, access roads, capping layer, landscape, treatment plant and other site infrastructure. We will encourage the contractor to use non-timber formwork and recyclable materials for temporary works. We will require the contractor to reuse the excavated material as filling material on site or on other construction sites as far as possible, in order to minimise the disposal of public fill to public fill reception facilities. We will require the contractor to separate public fill from C&D waste for disposal at appropriate facilities. We will control the disposal of public fill materials and C&D waste to designated public fill reception facilities and landfills respectively through a trip ticket system. We will record the disposal, reuse and recycling of C&D materials for monitoring purposes.

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20. We estimate that the project will generate about 500 tonnes of C&D materials. Of these, we will reuse about 350 tonnes (70%) on site, and deliver 100 tonnes (20%) to public fill reception facilities[4] for subsequent reuse. In addition, we will dispose of 50 tonnes (10%) at landfills. The total cost for accommodating C&D materials at public fill reception facilities and landfill sites is estimated to be $8,950 for this project (based on a unit cost of $27/tonne for disposal at public fill reception facilities and $125/tonne[5] at landfills).

LAND ACQUISITION

21. The project does not require any land acquisition.

BACKGROUND INFORMATION

22. There are 16 landfills in Hong Kong of which three are operating[6] and serving the public for final waste disposal. The remaining 13 landfills[7] were closed between 1975 and 1996. A plan showing the location of the 16 landfills is at Enclosure 3.

23. Landfills produce LFG and leachate which would, if unmonitored and uncontrolled, seriously pollute the environment. In view of the problems envisaged, the "White Paper: Pollution in Hong Kong – A Time to Act" issued in June 1989 set out the policy objective of formulating a programme for the comprehensive restoration of closed landfill sites. The landfill restoration programme initiative and target were promulgated in 1995. The restoration includes mitigating measures to control the leachate and LFG problems, which aims to minimise the potential impacts on the environment and to enable the restored landfills to be safe for future beneficial use. The current status on the

/afteruse .....

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4 Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation. Disposal of public fill in public fill reception facilities requires a licence issued by the Director of Civil Engineering and Development.

5 This estimate has taken into account the cost for developing, operating and restoring the landfills after they are filled and the aftercare required. It does not include the land opportunity cost for existing landfill sites (which is estimated at $90/m^3$), nor the cost to provide new landfills, (which is likely to be more expensive) when the existing ones are filled.

6 The three operating strategic landfills are South East New Territories (SENT) landfill, North East New Territories (NENT) landfill and West New Territories (WENT) landfill.

7 The 13 closed landfills are Shuen Wan landfill, urban landfills (Sai Tso Wan, Ma Yau Tong West, Ma Yau Tong Central, Jordan Valley and Ngau Chi Wan landfills), Northwest New Territories landfills (Siu Lang Shui, Ma Tso Lung and Ngau Tam Mei landfills), Gin Drinkers Bay landfill, Tseung Kwan O stage I landfill, Tseung Kwan O stage II/III landfill and Pillar Point Valley landfill.

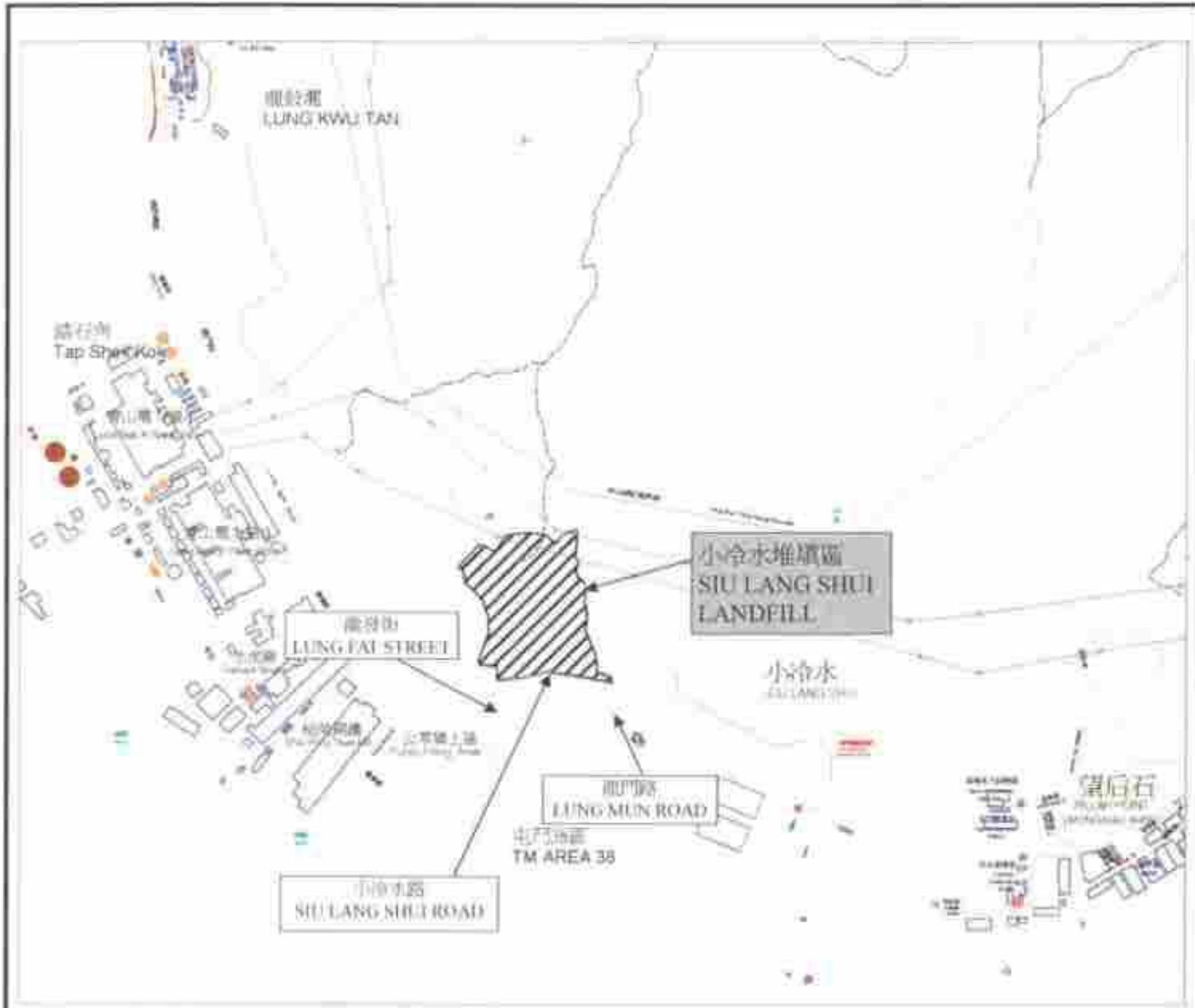
afteruse of the closed landfills is provided at Enclosure 4. The costs for the restoration and the estimated costs for aftercare work of all the closed landfills are provided at Enclosure 5.

24. We included **45DR** "Restoration of landfill sites" in Category B in August 1990. In July 1995, we upgraded part of **45DR** entitled "Restoration of Northwest New Territories landfills Part 1 – works" to Category A as **157DR** at an estimated cost of $288.6 million for the design and construction of the restoration facilities and the first seven years' aftercare work in NWNTL. Also in January 1998, we upgraded part of **45DR** entitled "Restoration of Gin Drinkers Bay landfill – works" to Category A as **158DR** at an estimated cost of $273.5 million for the design and construction of the restoration facilities and the first seven years' aftercare work in GDBL. In 1999, the construction of the restoration facilities and the aftercare work of NWNTL and GDBL were tendered and subsequently awarded under one contract.

25. The proposed works will not involve any tree removal and/or planting proposals.

26. We estimate that the proposed project will continue to provide 19 existing jobs (9 professional/technical staff and 10 labourers), totalling 1 596 man-months.

Environment, Transport and Works Bureau
February 2006



圖例:
LEGEND:

堆填區
LANDFILL

工務計劃項目編號 5169 DR –
新界西北堆填區及酒館灣堆填區
修復計劃 – 修復工程 (小冷水)

PWP Item No. 5169 DR –
Northwest New Territories Landfills and Gin Drinkers Bay Landfill Restoration – aftercare work (Siu Lang Shui)

圖則名稱 Drawing Title
修復工程工地範圍
SITE LOCATION PLAN

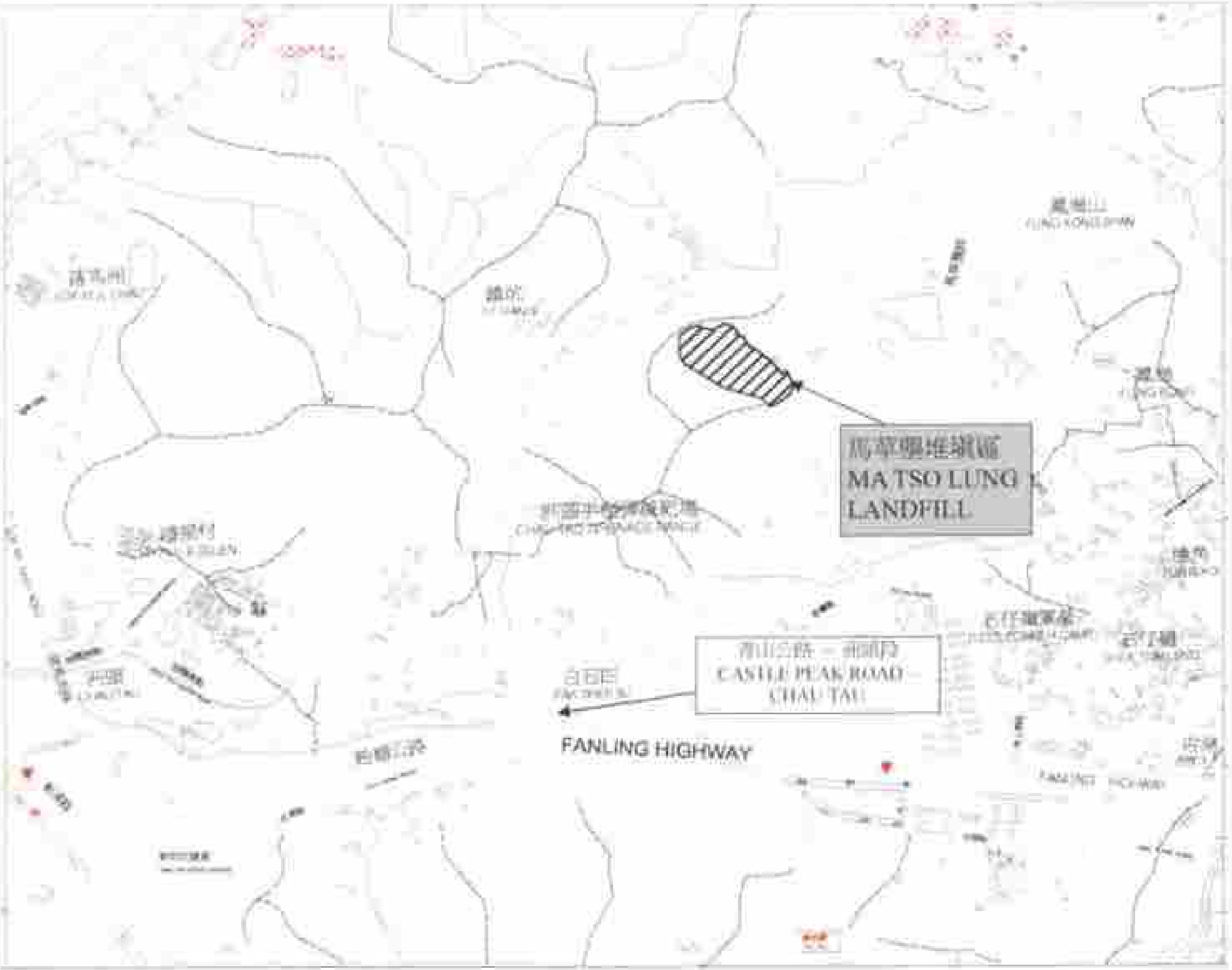
圖則編號 Drawing No.
NWNT Landfills Location Plan.doc

ENVIRONMENTAL PROTECTION DEPARTMENT
環境保護署

日期 Date 03-2005

不按比例 NTS

Enclosure 1-a to PWSC(2005-06)46 附件 1-a



圖例
LEGEND:

堆填區
LANDFILL

工務計劃項目編號 5169 DR –
新界西北堆填區及醉酒灣堆填區
修復計劃 – 修護工程 (馬草壟)

PWP Item No. 5169 DR –
Northwest New Territories Landfills and Gin Drinkers Bay Landfill Restoration – aftercare work (Ma Tso Lung)

圖則名稱 Drawing Title
修護工程工地範圍
SITE LOCATION PLAN

圖則編號 Drawing No.
NWNT Landfills Location Plan.doc

ENVIRONMENTAL PROTECTION DEPARTMENT
環境保護署

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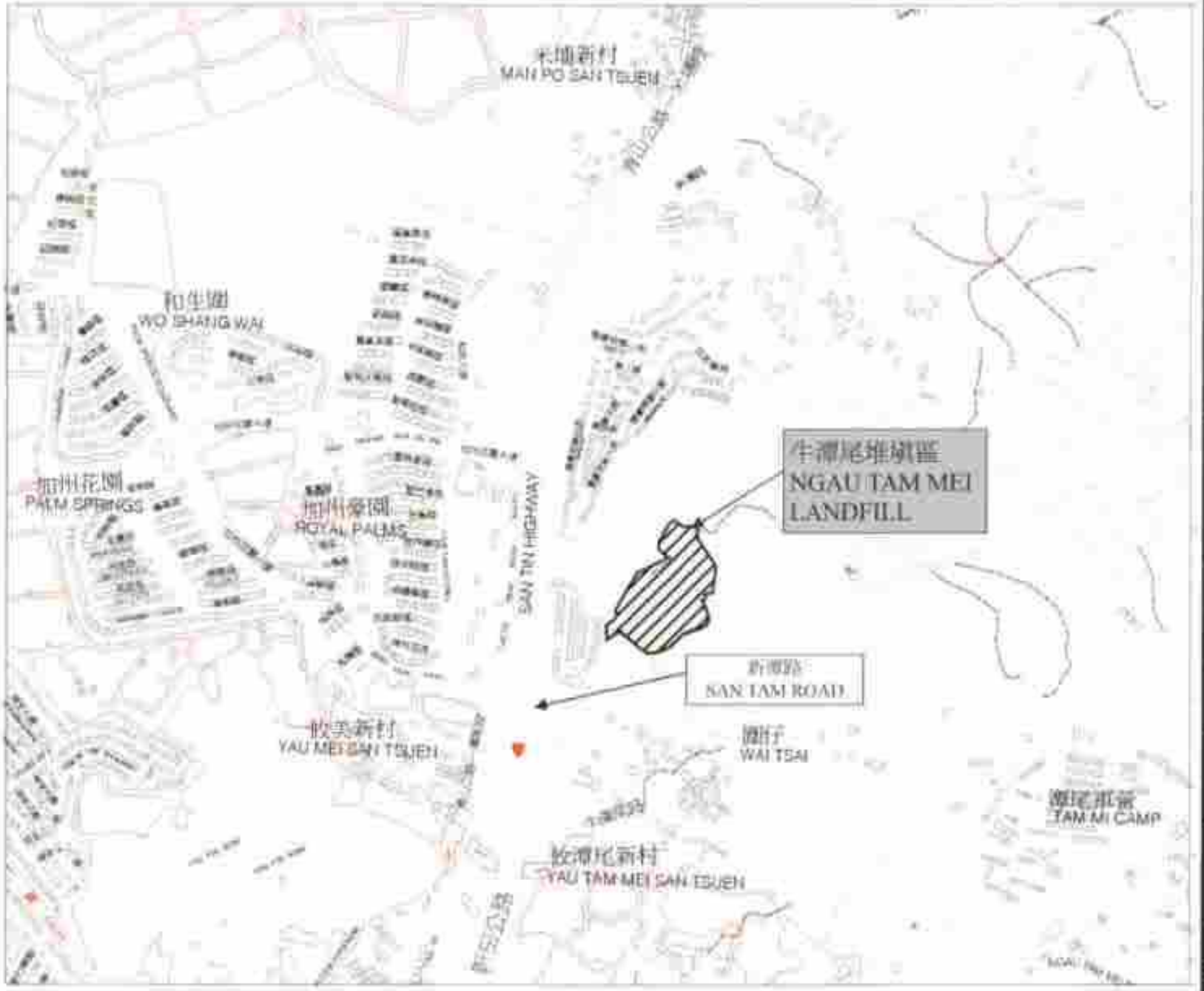
Enclosure 1-b to PWSC(2005-06)46 附件1-b



圖例:
LEGEND:

堆填區
LANDFILL

工務計劃項目編號 5169 DR –
新界西北堆填區及酸洗灣堆填區
修復計劃 – 修護工程 (生潭尾)

PWP Item No. 5169 DR –
Northwest New Territories Landfills and
Gin Drinkers Bay Landfill Restoration –
aftercare work (Ngau Tam Mei)

圖則名稱 Drawing Title
修復工程工地範圍
SITE LOCATION PLAN

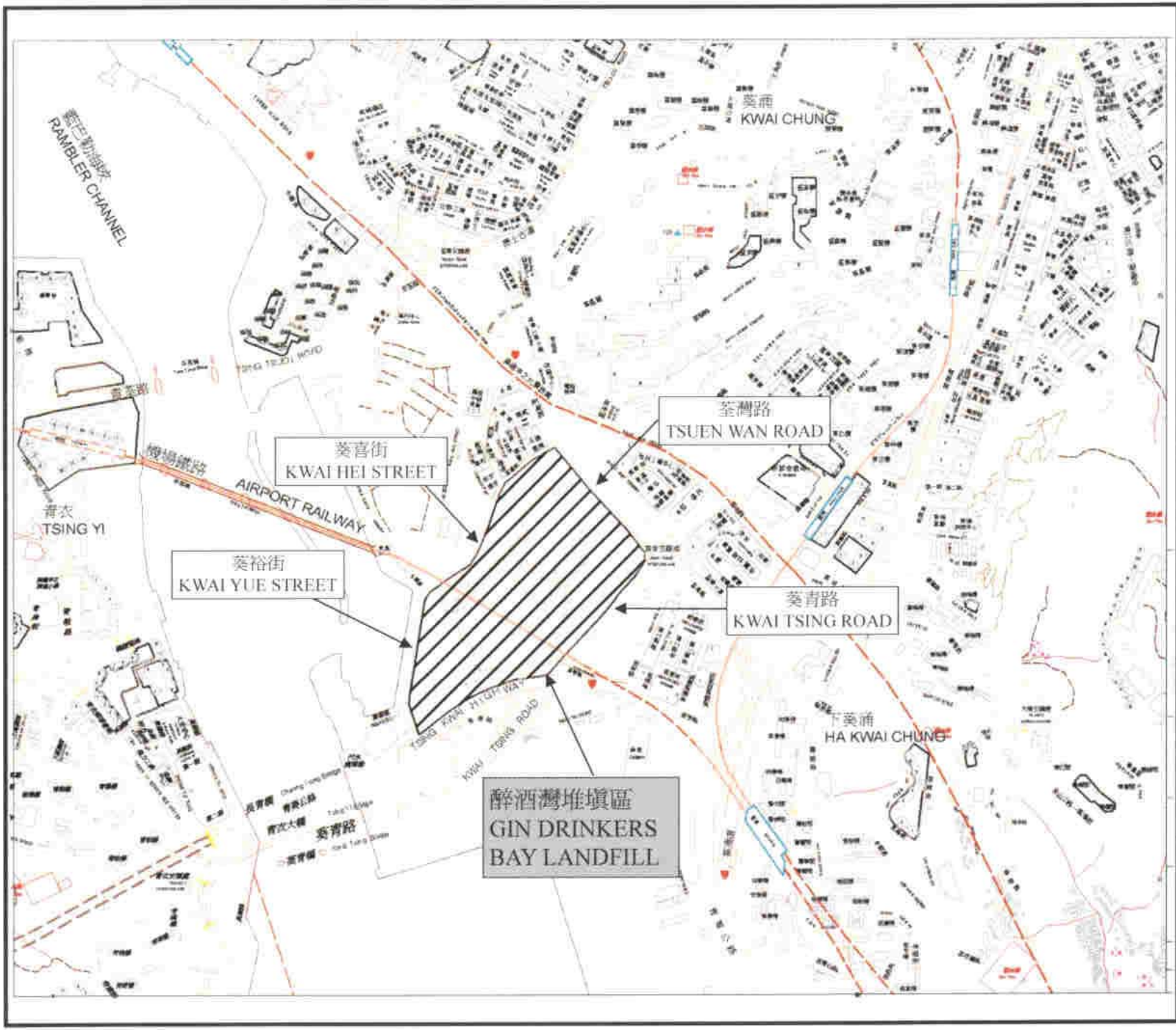
圖則編號 Drawing No.
NWNT Landfills Location Plan.doc

ENVIRONMENTAL PROTECTION DEPARTMENT
環境保護署

日期 Date: 10-2005

不按比例 NTS

Enclosure 1-c to PWSC(2005-06)46 附件 1-c



圖例:
LEGEND:

堆填區
LANDFILL

工務計劃項目編號 5169 DR –
新界西北堆填區及醉酒灣堆填區
修復計劃 – 修護工程 (醉酒灣)

PWP Item No. 5169 DR –
Northwest New Territories Landfills and
Gin Drinkers Bay Landfill Restoration –
aftercare work (Gin Drinkers Bay)

圖則名稱 Drawing Title
修復工程工地範圍
SITE LOCATION PLAN

圖則編號 Drawing No.
GDB Landfills Location Plan.doc

ENVIRONMENTAL PROTECTION
DEPARTMENT
環境保護署

日期 Date : 03-2005

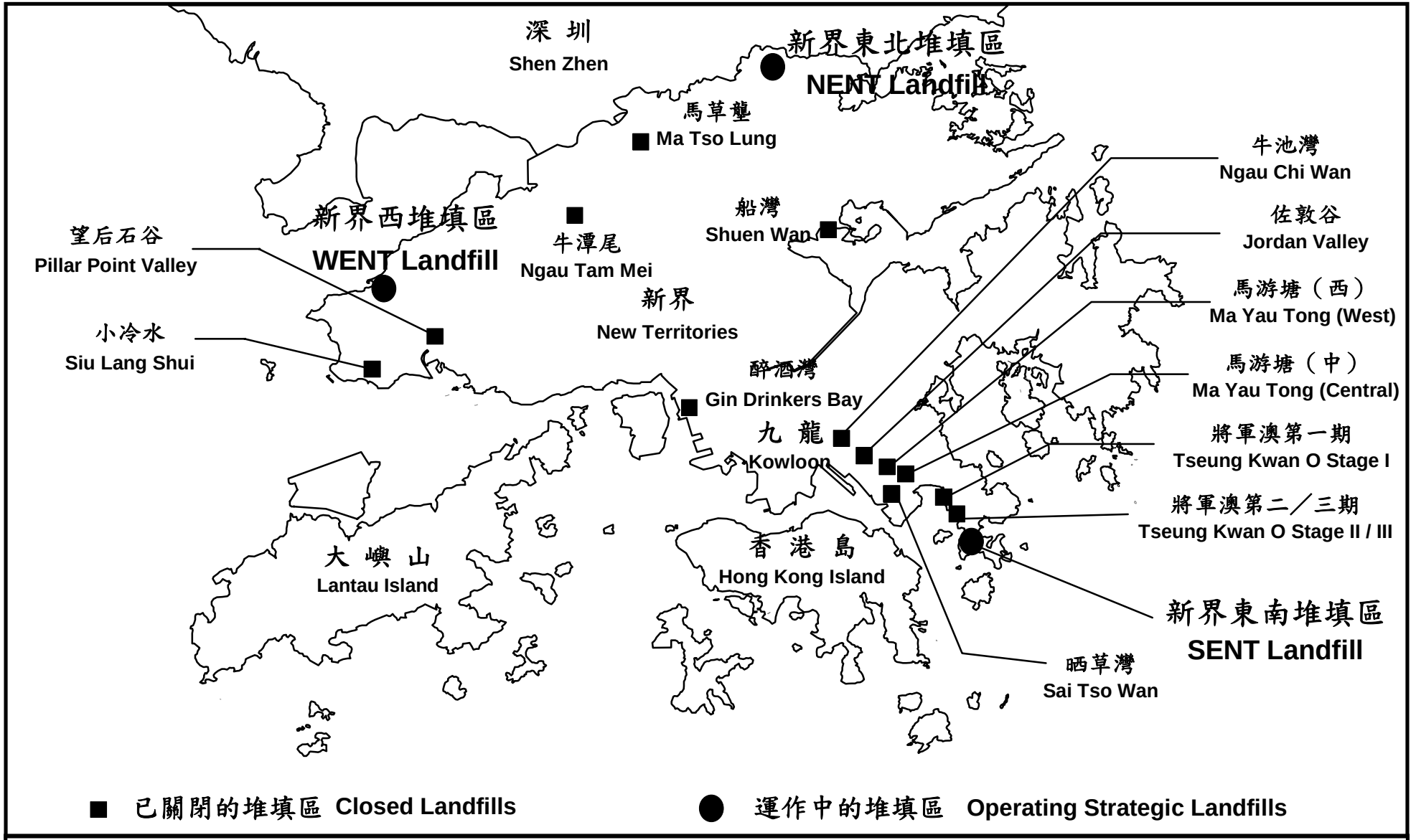
不依比例 NTS

Enclosure 1-d to PWSC(2005-06)46 附件 1-d

The environmental monitoring programme for the Northwest New Territories landfills and Gin Drinkers Bay landfill

Category	Monitoring Details	Measurement	Purpose
Landfill Gas	Measure surface landfill gas emission	Methane	To ensure no safety risks to the personnel on site
	Detect landfill gas at perimeter monitoring boreholes, passive vents and utility manholes	Methane , Carbon Dioxide , Oxygen , Temperature	To monitor off site gas migration and safeguard the neighbourhood
	Analyse landfill gas collected from boreholes and extraction wells	Oxygen, Nitrogen, Carbon Monoxide , Carbon Dioxide , Hydrogen , Methane , Ethane , Propane , n-Butane	To monitor changes in the landfill gas quality over the years
	Detect landfill gas in buildings and confined space on site and off site	Methane , Carbon Dioxide , Oxygen	To ensure no safety risk to occupiers of these structures
	Measure landfill gas at the extraction system	Methane , Carbon Dioxide , Oxygen ,Temperature , Differential Pressure, Static Pressure , Flow	To monitor the landfill gas composition to ensure optimal operation of the landfill gas management system
	Analyse emissions of gas flaring facilities	Hydrogen Sulphide, Hydrogen Chloride, Hydrogen Fluoride, Hydrogen Bromide, Sulphur Dioxide, Nitrogen Dioxide, Carbon Monoxide, Total Non-methane Hydrocarbons	To monitor the performance of the landfill gas treatment plants
	Analyse volatile organic compound (VOC)	Trichloroethylene, Vinyl Chloride, Methylene Chloride, Chloroform, 1,2-Dichlorethane, 1,1,1-Trichloride, Carbon Tetrachloride, Tetrachloroethylene, 1,2-Dibromoethane, Toluene, Methane, Benzene	To ensure the VOC contents comply with international standards
Groundwater	Measure groundwater level and quality	Well Depth , Groundwater Level , Temperature, pH, Electrical Conductivity , Dissolved Oxygen , Alkalinity, COD , Chloride, Ammoniacal Nitrogen , Total Kjeldahl Nitrogen , Total Oxidized Nitrogen, Total Nitrogen, Sulphate, Sulphite, Phosphorous, Total Organic Carbon, Sodium, Potassium, Calcium, Magnesium, Iron, Manganese , Cadmium, Copper, Nickel, Lead, Zinc, Mercury, Chromium, Silver	To monitor groundwater quality

Category	Monitoring Details	Measurement	Purpose
Leachate	Measure level of leachate at monitoring wells	Well Depth, Leachate Level , Temperature , pH , Electrical Conductivity	To avoid excessive water pressure built up at the man-made slope which might affect the overall slope stability
	Measure leachate quality at leachate management system	Temperature, pH, Electrical Conductivity, Alkalinity, COD, BOD, Chloride, Ammoniacal Nitrogen, Total Kjeldahl Nitrogen, Total Oxidized Nitrogen, Total Nitrogen, Sulphate, Total Organic Carbon, Sodium, Potassium, Calcium, Magnesium , Iron , Manganese, Cadmium, Copper, Nickel, Lead, Zinc	To check the strength of leachate in relation to landfill aging
Surface Water	Analyse surface water quality	Appearance, Temperature, pH, Electrical Conductivity, Dissolved Oxygen, Alkalinity, COD, BOD, Chloride, Ammoniacal nitrogen, Total Kjeldahl Nitrogen, Total Oxidized Nitrogen, Total Nitrogen, Sulphate, Total Suspended Solids, Total Organic Carbon, Sodium, Potassium, Calcium, Magnesium, Iron, Manganese, Cadmium, Copper, Nickel, Lead, Zinc	To ensure no discharge of contaminated surface water off site
Nuisance	Dust	Total Suspended Particulates (TSP), Respirable Suspended Particulates (RSP)	To protect the general public, neighbouring residents as well as visitors from nuisance problems
	Noise	Noise Level	
	Odour	Odour	



堆填區位置圖

Location Plan of Landfills

Closed Landfills Afteruse - Current Status (November 2005)

Closed landfill Total surface area (flat area) (ha)	Zoned land use	Current status	Source of funding	Estimated cost of the project	Other consideration
Shuen Wan landfill					
Shuen Wan (Tai Po District) 50 (11.00)	Other Specified Use annotated Golf Course"	Currently it is used as a golf driving range which is a profit sharing self-financed project. EPD is discussing with a "National" Sports Association (NSA) the feasibility of replacing the driving range by a golf course on a self-financing basis.	NSA Self-financed project.	N.A.	N.A.
Urban landfills					
Ngau Chi Wan (Wong Tai Sin District) 7.63 (4.00)	Open space	The current plan is to develop the site as recreation ground with archery field, gateball courts, fitness corner, children's play area, 7-a-side soccer pitch, basketball courts, landscaped and sitting out areas and etc. The project has been identified as one of the 25 priority projects in the 2005 Policy Address. Leisure and Cultural Services Department (LCSD) is now carrying out planning work with relevant departments. Architectural Services Department (ArchSD) is currently designing the layout plans. The construction of the facility is scheduled to commence in early 2008 with a view to commissioning the facility by end 2010.	To be funded under CWRF.	$193M	N.A.
Sai Tso Wan (Kwun Tong District) 9.15 (2.00)	Open space/ green belt	The recreation facilities have been opened to the public since April 2004, which includes a multi-purpose grass pitch for football and baseball, one children's playing area, a jogging trail and 2 baseball batting cages.	Funded under CWRF[(1)].	$46.4M	N.A.
Ma Yau Tong West (Kwun Tong District) 5.53 (1.00)	Partly open space and partly green belt	LCSD planned to develop the site as a rest park. EPD will discuss with LCSD on suitable afteruse of the site.	N.A.	N.A.	Lack of basic utilities. Part of the site will be used as site office and storage area for the construction of the noise barriers along Tseung Kwan O Road between 2007 and 2009.
Ma Yau Tong Central (Kwun Tong District) 10.87 (0.80)	Partly open space and partly green belt	LCSD planned to develop the site as part of Lam Tin Park. EPD will discuss with LCSD on suitable afteruse of the site.	N.A.	N.A.	Lack of basic utilities.
Jordan Valley (Kwun Tong District) 10.72 (5.00)	Open space	The current plan is to develop the site as recreation ground with jogging track, outdoor fitness station, children's playground, landscaped features, radio- controlled motor car circuit and horticultural education centre etc. The project has been identified as one of the 25 priority projects in the 2005 Policy Address. LCSD is now carrying out planning work with relevant departments. ArchSD is designing the layout plans. The construction of the facility is scheduled to commence in early 2008 with a view to commissioning the facility by end 2010.	To be funded under CWRF.	$173M	N.A.

Note: (1) 80% of the capital cost was donated by the Hong Kong Jockey Club.

Closed Landfills Afteruse - Current Status (November 2005)

Closed landfill Total surface area (flat area) (ha)	Zoned land use	Current status	Source of funding	Estimated cost of the project	Other consideration
Tseung Kwan O landfills					
Tseung Kwan O Stage I (Sai Kung District) 68.00 (9.60)	Open space	The proposed uses of the site include a Football Academy, open space including kite-flying area, jogging trail and cycle track and a golf driving range. The Football Academy will be located on the flat area of the site and be developed and operated by the Hong Kong Football Association (HKFA) on a self-financing basis. Hong Kong Jockey Club has agreed to provide capital funding. The construction of the Football Academy is expected to complete in end 2007.	HKFA self-financed project for the Football Academy.	N.A.	N.A.
Tseung Kwan O Stage II/III (Sai Kung District) 42.00 (2.80)	Open space	The HK Air Cadet Corps (HKACC) has been given permission since Aug 2004 to use the upper platform temporarily as a model aeroplane training field during Saturdays, Sundays and Public Holidays. Due to geotechnical constraint of the site, there is no long term committed use.	HKACC self-financed project.	N.A.	Lack of basic utilities. Geotechnical constraint affecting site access to the top platform.
Northwest New Territories landfills and Gin Drinker's Bay landfill					
Ngau Tam Mei (Yuen Long District) 2.00 (1.00)	Green belt	General landscaping provided. The whole site at Ngau Tam Mei is zoned "Green Belt". Given the small size of the site with limited access, the Administration is of the view that it should remain as local green scenery.	N.A.	N.A.	Vehicular access to the site is problematic as there is only one narrow, one-lane rural access road. No public utilities and sewerage available.
Ma Tso Lung (North District) 2.00 (0.90)	Government/ institution/ community	The site was returned to Tung Wah Group of Hospitals in August 2000 for recreational use.	N.A.	N.A.	N.A.
Siu Lang Shui (Tuen Mun District) 12.00 (0.60)	Mainly Green belt & small portion govt/institution/ community	It is part of the Green Belt of the area with the existing green landscaping. EPD is now considering suitable afteruse in consultation with relevant departments and interested parties.	To be financed by minor works vote.	Not more than $15M.	Lack of basic utilities. Flat area is divided into two separate parts. Vehicular access to the flat area problematic due to narrow site access road. Natural terrain hazard assessment required to confirm acceptability of any development.
Gin Drinkers Bay (Kwai Tsing District) 29.00 (2.70)	Open space	The site has been designated for Kwai Chung Park development. LCSD is reviewing the priority of the Kwai Chung Park development project. Currently, LCSD, ArchSD and related departments are conducting an investigation on the feasibility of opening part of the Kwai Chung Park under minor works project vote.	To be funded by minor works vote.	Not more than $15M.	Park design should avoid applying excessive loading to the site.
Pillar Point Valley landfill					
Pillar Point Valley (Tuen Mun District) 38.00 (14.00)	Mainly Green belt, a small part OU & Castle Peak Firing Range	Construction of landfill restoration facilities by EPD's restoration contractor is in progress and scheduled to be completed in mid 2006.	N.A.	N.A.	The Castle Peak Firing Range occupies about 26% (10ha) of the total area (38ha) and 57% (8ha) of the total flat area (14 ha) at the top platform.

The costs for the restoration and estimated costs for aftercare work of the closed landfills

Closed landfill (approximate site area in hectares (ha))	Actual cost for construction of restoration facilities ($ million) (in MOD prices)	Estimated cost for 30 years aftercare work[(1)] ($ million) (in MOD prices)
Shuen Wan landfill (50 ha)	160	119
Ngau Chi Wan landfill (8 ha) Sai Tso Wan landfill (9 ha) Ma Yau Tong West landfill (5 ha) Ma Yau Tong Central landfill (11 ha) Jordan Valley landfill (11 ha)	249	300
Tseung Kwan O landfill I (68 ha) Tseung Kwan O landfill II/III (42 ha)	369	422
Siu Lang Shui landfill (12 ha) Ma Tso Lung landfill (2 ha) Ngau Tam Mei landfill (2 ha) Gin Drinkers Bay landfill (29 ha)	332	433
Pillar Point Valley landfill (38 ha) [(2)]	221	342
Total	1,331	1,616

(1) Estimates based on 30 years aftercare work. Estimated costs for different landfills vary mainly due to the size of the landfills, the required restoration facilities and treatment, the number of sites under each restoration contract and geographical locations.

(2) The construction of restoration facilities is expected to complete in mid 2006 and the aftercare work will commence thereafter.