

## **West New Territories (WENT) Landfill Extensions**

### **PROJECT PROFILE**

## **1. PURPOSE OF PROJECT PROFILE**

- 1.1 This project profile sets out the scope of the environmental issues associated with the proposed A and B extensions of the existing West New Territories (**WENT**) Landfill at two identified sites at Nim Wan for the application of an Environmental Impact Assessment (**EIA**) study brief. The WENT A and B Landfill Extensions are to be implemented jointly and the project is regarded as a designated project under G.1, G.4 and G.6 of the EIA Ordinance.

## **2. BASIC INFORMATION**

### **2.1 Project Title**

‘West New Territories (**WENT**) Landfill Extensions’ at Nim Wan, Tuen Mun.

### **2.2 Purpose and Nature of the Project**

In order to maintain the continuity of landfill capacity for the cost-effective and environmentally satisfactory disposal of wastes, the Director of Environmental Protection commissioned in February 2000 a study on “Extension of Existing Landfills and Identification of Potential New Waste Disposal Sites”. Completed in the early 2003, the Study proposed a Strategic Plan for the development of landfill extensions and new sites for the disposal of solid wastes in the next 50 years. The WENT Landfill Extensions form an integral part in the Strategic Plan in maintaining the continuity of landfill capacity in the West New Territories. The project is to develop the WENT Landfill Extensions on 2 sites (Site A and Site B of about 240 hectares) lying between the existing WENT Landfill at Nim Wan, and the China Light and Power (**CLP**) power Station at Black Point. The WENT A and B Landfill Extensions are planned to commence in two phases with the first phase (WENT A) in operation around end 2009, and have a total estimated capacity of 71 million cum.

### **2.3 Name of Project Proponent**

Waste Facilities Business Unit (**WFBU**) of the Environmental Protection Department (**EPD**)

## 2.4 Location and Scale of Project

Both Site A and Site B are located in the West New Territories (WENT) some 5 km north-west of Tuen Mun, overlooking the Deep Bay. A location plan is attached in **Figure 1**. The sites are some 240 ha overall. The WENT A Landfill Extension is located in Tsang Kok valley, immediately to the west of the existing WENT Landfill. The Castle Peak Firing Range lies to the south of the existing WENT Landfill and the WENT A Extension. The WENT A Extension is a small extension, with a net void capacity of 6 Mcum assuming balanced earthworks.

The WENT B Extension will be a significantly larger scheme than WENT A, with a net void capacity of 65 Mcum, assuming balanced earthworks. The WENT B Extension locates further west to the WENT A Extension and the existing WENT Landfill. On the northern shore of the site, there are three pulverized fuel ash (PFA) lagoons of CLP. The southern part of the site encroaches into the Castle Peak Firing Range. The WENT A and WENT B Extensions are together referred to as the ‘**WENT Landfill Extensions**’, since they are located adjacent to each other and would be investigated together.

## 2.5 Name and Telephone Number of Contact Person(s)

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## 3. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

### 3.1 Scope of Works

The project ‘WENT Landfill Extensions’ is a Designated Project. The EIA study for this project will be carried out by consultants to be employed by WFBU.

As part of the study under Agreement No. CE 45/99 – “Extension of Existing Landfills and Identification of Potential New Waste Disposal Sites” undertaken by consultants in February 2000, a preliminary investigation to identify and assess the environmental issues associated with the WENT A and B Landfill Extensions was undertaken and reported in the Final Strategic Environmental Assessment (SEA) Report of January 2003.

Development of the WENT Landfill Extensions will basically comprise the following:

- (i) site formation, drainage diversion and preparation
- (ii) installation of liner system
- (iii) provision of leachate collection, treatment and disposal system
- (iv) provision of landfill gas collection and management system
- (v) measures to mitigate environmental impacts, environmental monitoring and auditing
- (vi) restoration and aftercare
- (vii) provision of utilities
- (viii) diversion of a section of Nim Wan Road
- (ix) provision of marine access ( to be assessed )

### **3.2 Project Programme**

The project programme is scheduled as follows:

- |  |                       |
|--|-----------------------|
| (i) Commencement/Completion of the feasibility/EIA Study | Nov 2004/<br>Dec 2006 |
| (ii) CPLD approval on Outline Development Plan           | Mar 2006              |
| (iii) Complete land resumption clearance                 | Apr 2008              |
| (iv) Award contract                                      | Jan 2009              |
| (v) Start operation                                      | Dec 2009              |

## **4. POSSIBLE IMPACTS ON THE ENVIRONMENT**

Possible impacts on the environment during the construction, operation and aftercare phases of the WENT Landfill Extensions are outlined below. From this paragraph onwards, the proposed Site A and Site B of the WENT Landfill Extensions are collectively referred as “WENT Landfill Extensions Sites (WLES)”.

### **4.1 Air Quality**

The potential air quality impact from the project would be:

- the dust and exhaust emissions from on-site plant during landfill construction

and operation

- gaseous emissions during landfill operation and aftercare
- odours arising during the operation of the landfill from waste decomposition and leachate treatment
- gaseous emissions from vehicles transporting waste during landfill operation

The only Air Sensitive Receivers (ASRs) found within a 500m radius from the site boundary is the CLP Black Point Power Station that is 400m west of the site boundary. There are other ASRs located further away in the village of Ha Pak Nai, which is situated over 1 km to the east, as well as Pak Long and Nam Long, which are 1.8km to the south.

The duration of parallel operation of existing WENT Landfill and the WLES would be minimal. However, the cumulative odour impacts to the residents at Ha Pak Nai for such period would be assessed and mitigation measures will be included in the design, operational procedures / monitoring of the WLES.

There were tentative proposals for regional roadworks and other environmental infrastructures near the WLES. However, all these proposals are subject to review and have not obtained any firm commitment for their implementation. Pending their future status and programmes, cumulative air quality impacts would be assessed as necessary during the EIA study.

The existing WENT Landfill has both marine frontage and road access for waste delivery. It is expected that the future WLES will utilize similar transportation arrangements. The emissions of air pollutants and hence regional air quality impacts from waste delivery will be similar to the present level.

## 4.2 Noise

The landfill development has the potential to generate the following noise sources:

- Excavation, site formation and general construction activities.
- Heavy mobile plant used during operation.
- Waste collection vehicles, etc. entering and leaving the site during operation.
- Fixed plant noise.

There is unlikely to be any significant noise implication associated with this site because there will be no NSRs within 300m of the site. One shrine / temple is found near Tsang Tsui, but it would be relocated in the event the WLES is pursued.

Based on previous studies, the major noise impacts at Ha Pak Nai were from the reclamation works for the existing WENT Landfill. Since the WLES does not include any reclamation works and is much further away from Ha Pak Nai, it is unlikely that this community would be affected by the construction or operation noise of the WLES at level exceeding the relevant planning standards. Potential off-site traffic noise impact to NSRs along Nim Wan Road will also be addressed in the EIA study.

### **4.3 Water Quality**

The landfill development has the potential to cause the following water quality impacts:

- Sediment-laden run-off escaping from the site during landfill construction and operation
- Effluent from the leachate treatment plant during operation and aftercare
- Accidental leachate breakout into surface water drainage during operation and aftercare

The site is located in a hilly area. While there is potential for sediment-laden and leachate-contaminated runoff during construction, the fact that the majority of construction works would be undertaken within a "bowl" should negate this potential. During operation and aftercare, surface water drainage channels would be constructed to prevent uncontrolled run off from the completed landfill surface area.

The assumption is made that for an operating landfill all discharges would be controlled, so that there would be no water quality impacts during operation. However, this assumption would be addressed in further detail, including a risk assessment (e.g. of a leachate breakout incident) during the detailed EIA stage of the project. The design of the landfill would have to incorporate environmental protection orientated designs to cater for such potential incidents.

### **4.4 Waste Management/Disposal Impacts**

Given the remote location of the site, the conceptual design provides for a material balance within the site, i.e., there is no significant import to site or export from site of materials. Lining, capping and leachate drainage would require about 3Mcum of

material for WENT A, and 5 Mcum for WENT B. These requirements would be provided for by excavation within the site. Existing PFA lagoons are included within the footprint of the WLES. It is anticipated that the PFA would remain in place during construction of the WLES, with no intention to excavate or relocate the PFA. Should the PFA be disturbed, an assessment on health impact will be made in the EIA study.

With regard to the transportation of waste to the site, waste would be delivered by both road and marine transports.

#### 4.5 Ecology

There are no 'Protected Areas' within 500m of the WLES. The nearest 'Protected Areas' are the Sha Chau and Lung Kwu Chau Marine Park (over 4km to the south west), and an SSSI at Sheung Pak Nai (3.5km to the north east).

The majority of this site is grassland and man made ash lagoons of CLP. There are a few small areas of mixed shrub-land and approximately 4,000sq.m of semi-mature native woodland that are of conservation value, whilst Tsang Kok Stream is largely natural.

A previous study in year 2001 has identified four bird species with significant populations in CLP's ash lagoons. They are Little Grebe, Chinese Pond Heron, Little Egret and Little Ringed Plover. Of them, two species are considered as having conservation importance that will be exposed to direct adverse impacts if their habitats in the lagoons are to be destroyed. The ecological value of these lagoons will be examined in the detailed EIA study.

The EIA Report for the existing WENT Landfill refers to a population of the Pitcher Plant *Nepenthes mirabilis* that was found in the Tsang Kok valley, the proposed site of WENT A. *Nepenthes mirabilis* is protected in the HKSAR under the Forestry Regulations (Cap. 96), primarily due to the past over-exploitation for use in Chinese medicine., *Nepenthes mirabilis* is now quite widespread, being found on hillsides across the New Territories. Thus, *Nepenthes mirabilis* is not considered threatened. Further investigation would be required as part of the detailed EIA study for the project.

#### **4.6 Fisheries**

As the site is totally land based, there will be no impacts to marine fisheries. In addition, there is no freshwater fish farming in the vicinity that would be disturbed by the project.

#### **4.7 Cultural Heritage**

Commissioned by the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department, Field Archaeology Consultants conducted an archaeological survey and assessment in the WLES site during August and September 2001.

Tsang Tsui Archaeological Site (TTAS) was identified by AMO under the study 'Preliminary Project Feasibility Study for Sludge Treatment Facilities' in October 2000. Archaeological relics dated to late Neolithic period (c. 2500 - 1500 BC) were unearthed at the site. Furthermore, TTAS is a recorded item of, and should be protected by, the Antiquities and Monuments Ordinance, Cap.53.

The result of the archaeological survey concluded that Nim Wan was a suitable area for human settlement well before the 1970s. However, with the construction of former BBC station, the existing WENT Landfill and the PFA lagoons, part of the area with significant archaeological deposits were very much disturbed. The result of this survey further revealed that with the exception of the existing TTAS, it is unlikely that any further archaeological remains would be found within the site.

The TTAS lies in the centre of the boundary of the proposed WLES. Construction of the WLES in a manner that avoids encroachment upon the TTAS was assessed but considered not feasible. As the TTAS would be totally buried by significant depths of waste, preservation in-situ is not considered a feasible option. A heritage impact assessment would be conducted to establish appropriate mitigation measures. Opportunities to maximize the preservation/ relocation of archaeological features of the TTAS would be considered in the detailed EIA study.

#### **4.8 Landscape and Visual**

*Landscape Planning Designations* - Under the Territorial Development



Strategy Review (TDSR) 1995 Landscape Strategy, the northern part of the site is zoned "Development Area High Landscape Value". The zoning allows "selected but constrained urban/suburban land use". The southern part of the site is zoned "Conservation Area" under the TDSR. There is no OZP covering the site.

The landfill will, amongst other things, affect areas of low scrub, grass, tall scrub, small areas of woodland, stream courses and degraded upland terrain. However, given the extensive disturbance already caused to the site by industrial development, roadworks and landslides, impacts on landscape resources during construction/ operation and during after-use, will be slight.

***Landscape Character*** - The WLES will introduce a new feature into a landscape, which is already somewhat degraded by the existing WENT Landfill and by features such as power stations and ash lagoons on the coast. This will result in moderate impacts on landscape character during the construction / operation phase and slight impacts during afteruse.

Because of the location of the site, there are no large areas of population within the primary visual envelope, although areas of Shenzhen (Shekou) have a line of sight to the WLES from some 7km. Generally, visual impacts are offset by the indifferent visual quality of this area of the coast and in particular the presence of the existing WENT Landfill, Black Point Power Station and ash lagoons.

#### **4.9 Landfill Gas**

The WLES is within the 250m consultation zone of the existing WENT Landfill and so a Landfill Gas Hazard Assessment would be required during the EIA study.

It should be noted, however, that two geological fault lines run from the existing WENT Landfill, through the WLES and terminate below Black Point Power Station. This may provide a natural pathway for LFG migration. Although the WLES would generate significant amounts of LFG during the operation and aftercare phases, it has been assumed that the WLES would be designed as a containment landfill with an efficient LFG collection system that would eliminate off-site migration. During the EIA study, the need for setting up a LPG monitoring programme will be examined.

## **5. HISTORY OF SITE**

The existing WENT Landfill was commissioned in 1993 and receives publicly collected waste from the North West New Territories by road. Waste is received by marine vessel from a number of Refuse Transfer Stations comprising Island East, Island West, West Kowloon, Outlying Islands and North Lantau. Waste is also transferred by road from the NWNT Refuse Transfer Station near Yuen Long.

The existing landfill also receives containerised sludges from various Sewage Treatment Works, including the Stonecutters Island Sewage Works constructed under the Harbour Area Treatment Scheme.

The existing landfill is a coastal site and occupies an area of approximately 106ha. Approximately 20ha of the site was formed by reclamation from the sea, using the soil and rock excavated from the site formation for the landfill void as filling material.

## **6. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT**

Apart from the PFA lagoons and the Castle Peak Firing Range as discussed in Section 2.4, the nearest residential sensitive receivers to the WLES is the village community at Ha Pak Nai, located on the eastern boundary of the existing WENT Landfill.

Another sensitive receiver is the community of Lung Kwu Tan; waste delivery vehicles travelling to the existing landfill pass through this village about 1.5 km to the south west of the extension; waste delivery vehicles to the WLES would also pass through Lung Kwu Tan.

There were tentative proposals for regional roadworks and other environmental infrastructures near the WLES. However, all these proposals are subject to review and have not obtained any firm commitment for their implementation.

## **7. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS**

## 7.1 Air Quality

It is unlikely that the construction, operation or aftercare activities of the landfill extensions alone would have a significant impact on ASRs. However, the cumulative air quality impact with the existing WENT Landfill and other environmental infrastructures (if materialized) will be assessed as necessary in the EIA study.

Moreover, good site practice would include reduction of dust and odour by:

- paving and subsequent regular sweeping of long term haul roads within the site
- regular damping of unpaved roads
- vehicle washing before leaving site
- immediate cover to odorous waste (e.g. sludge) after disposal
- daily covering of the current tipping face with inert material (e.g. selected construction & demolition materials, tarpaulin covers, foam spray etc.)
- interim cover of any operational areas which are not currently in use
- proper operation and maintenance of leachate collection/management system
- proper operation and maintenance of landfill gas collection/combustion facilities

## 7.2 Noise

Noise generated during the construction stage is not expected to cause a significant increase to that generated by the operation of the existing WENT Landfill. During construction, the topography of the site provides natural acoustic shielding, nevertheless, good site practice is recommended. This would include using only powered mechanical equipment with built-in acoustic shielding and not using percussive piling. Where necessary, temporary noise barriers or earth bunds could be constructed.

During operation, it is likely that the most significant noise source would be from landfill-related vehicular traffic on the internal haul roads and the access road. Minor sources would be from on-site plant such as leachate treatment works, pumps, generators and the flare. To mitigate the most significant sources, the location of fixed plant should be carefully reviewed and mitigation measures would be provided alongside roads where necessary.

### 7.3 Water Quality

**Leachate** - Leachate from the existing WENT Landfill is subject to pretreatment, prior to its discharge via the North West New Territories Trunk long sea outfall into Urmston Road. The discharge point lies within the North Western Water Control Zone rather than Deep Bay, and hence less impact on the sensitive Deep Bay area is expected. The quality of treated leachate should be in compliance with the WPCO Technical Memorandum.

The estimated mean daily leachate production from the WLES is approximately 500cum/day. During wet season, the peak monthly leachate generation is calculated at approximately 36,000cum, equivalent to 1,200cum/day averaged over the month. It is expected that leachate treatment would be similar to that at the existing WENT Landfill.

**Sewerage** - The amounts of sewage generated will be very small in comparison with quantities of leachate. It is proposed that sewage from the WLES would be disposed of by feeding into the leachate treatment plant, and then disposed of to the outfall in Urmston Road together with the treated leachate. The sewage volume is expected to be minimal in comparison with daily leachate generation, and is not expected to give rise to a measurable increase in pollutant loading.

**Surface Water Drainage** - During construction of the landfill bowl for the WLES, surface water drainage would be shed to the northern perimeter bund via drains cut into the perimeter haul roads to the west and utilising the existing WENT Landfill perimeter drainage to the east. The gradients of these drains would be 1(V) on 4(H); therefore intermediate and final flow attenuation measures would be required.

Following restoration, storm water runoff would flow from the landfill surface and be collected in perimeter drainage. The perimeter drainage would in turn discharge in the west into the main drainage line along the proposed Nim Wan Road diversion; and in the east into the drainage channels flowing through the existing WENT Landfill.

All water that has passed through areas containing waste should be classed as leachate, and will therefore be treated and discharged as described above. Storm water run-off generated during construction and operation of the WLES is not classed as leachate,

but may contain elevated concentrations of suspended solids, as well as oils and other contaminants from road surfaces. Treatment of run-off water may be carried out using settlement tanks to remove suspended solids, and oil interceptors to remove oil and grease.

The quality of all discharges would be regulated by means of a Discharge Consent issued in accordance with the WPCO.

#### **7.4 Waste Management**

Apart from good site practice, the need for specific waste management mitigation measures will be examined in the EIA study.

Certain potentially polluting materials may be stored, handled and transported to the site. These materials may include chemicals for wastewater/ leachate treatment, waste oils, fuel for plant working on the site, etc. These materials would be stored, handled and transported in an appropriate manner that complies with the Waste Disposal Ordinance (Cap 354) and regulations such as the Waste Disposal (Chemical Waste) (General) Regulation.

#### **7.5 Ecology**

As vegetation clearance would be necessary for development of the WLES, re-vegetation works should be undertaken at suitable locations and using suitable native species. The exact location of re-vegetation activities and the species to be used shall be determined at the detailed EIA Study stage of the project after detailed vegetation survey and habitat mapping has been conducted. The re-vegetation works would adopt a "landscape ecology" approach. Planting proposals would be co-developed by competent landscape architect with support from a botanist/ vegetation ecologist. Suitable mitigation measures would be proposed in the EIA study after ecological assessment of the habitats has been made.

#### **7.6 Fisheries**

As the site is totally land based, there will be no impacts to marine fisheries. Furthermore, there is no freshwater fish-farming in the area that would be disturbed by the project.

## **7.7 Cultural Heritage**

The SEA has investigated the opportunities to revise the boundary of the extension sites to avoid the TTAS, but they are not considered practicable. It has also explored the options of preservation in-situ by burial beneath the landfill and ex-situ preservation by removal to minimize the impacts on the TTAS. Opportunities to maximize the preservation of archaeological features of the TTAS would be pursued during the EIA stage.

The study concluded by Field Archaeology Consultants noted that as the two archaeological surveys in Nim Wan area were quite conclusive, no further archaeological survey is considered necessary within the study area covered by those surveys.

## **7.8 Landscape & Visual**

It is envisaged that the restored site would blend in with the restoration of the original WENT Landfill, and that both should blend in with the surrounding natural landscape. If the restored landfill is to be made available for low-intensity recreational use, hiking trails and panoramic lookout points with viewing pavilions could be provided.

## **8. PUBLIC CONSULTATION**

As mentioned in Para.2.2 above, the WENT Landfill Extensions form an integral part in the 'Strategic Plan' as recommended in the study "Extension of Existing Landfills and Identification of Potential New Waste Disposal Sites". The Advisory Council on the Environment (ACE) was consulted of the 'Strategic Plan' on 23rd December 2003. As regards the WENT Landfill Extensions, consultation to the Tuen Mun District Council has been started and will be maintained throughout the course and at the end of the EIA study.

## **9. HISTORY OF SIMILAR PROJECTS**

The project is similar to the development and management of the existing three strategic landfills in Hong Kong.

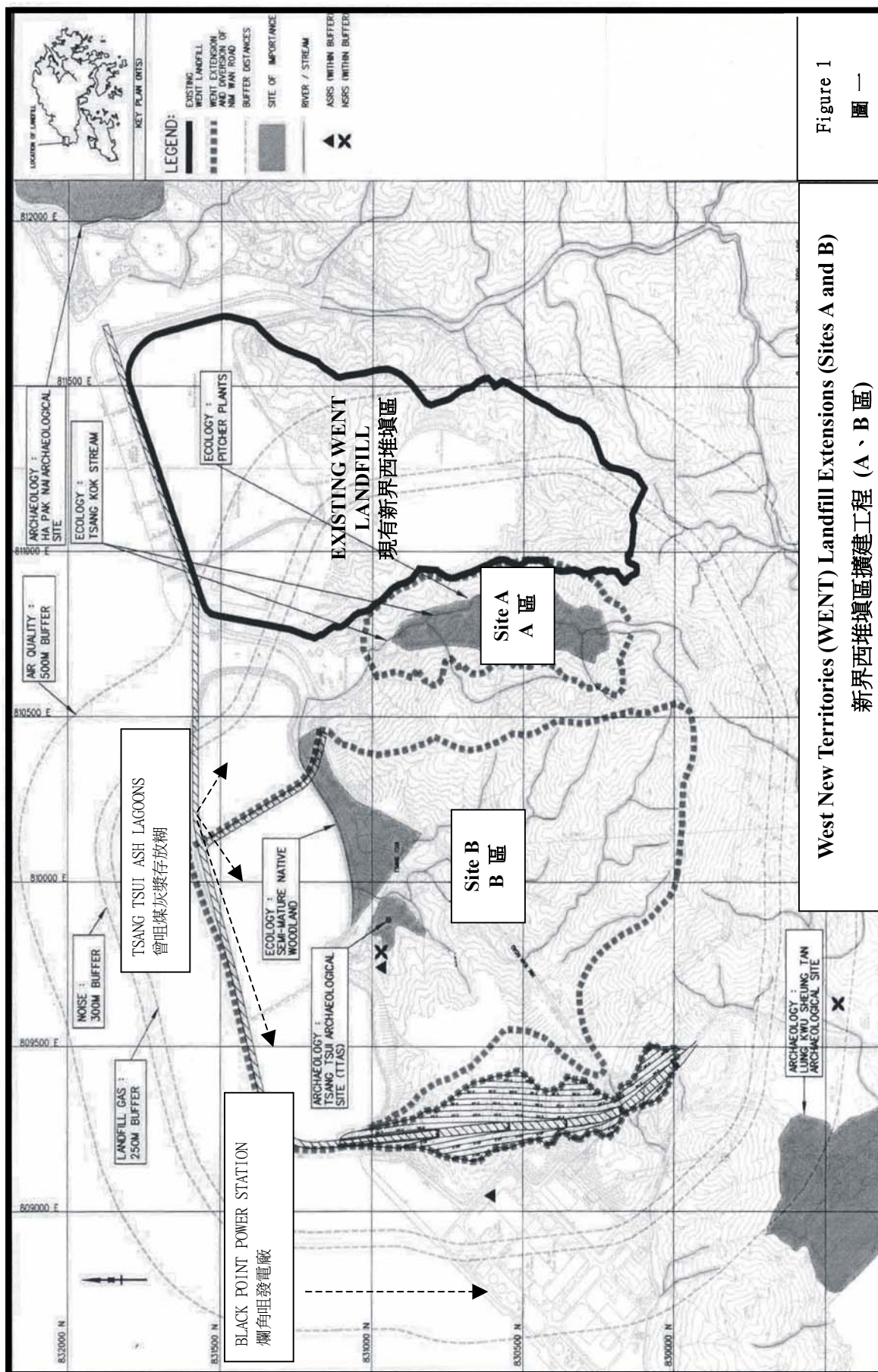
## **10. USE OF PREVIOUSLY APPROVED EIA REPORTS**

Agreement No. CE 45/99 –

“Extension of Existing Landfills and Identification of Potential New Waste Disposal Sites” – Final Strategic Environmental Assessment (SEA) Report (January 2003) by Scott Wilson Ltd. (available at EPD’s web site)

*Environmental Protection Department*

*April 2004*



West New Territories (WENT) Landfill Extensions (Sites A and B)  
新界西堆填區擴建工程 (A、B 區)

Figure 1  
圖一