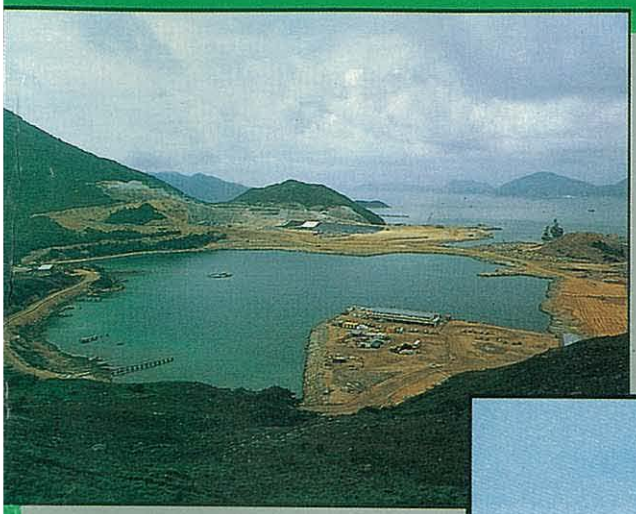
翠谷

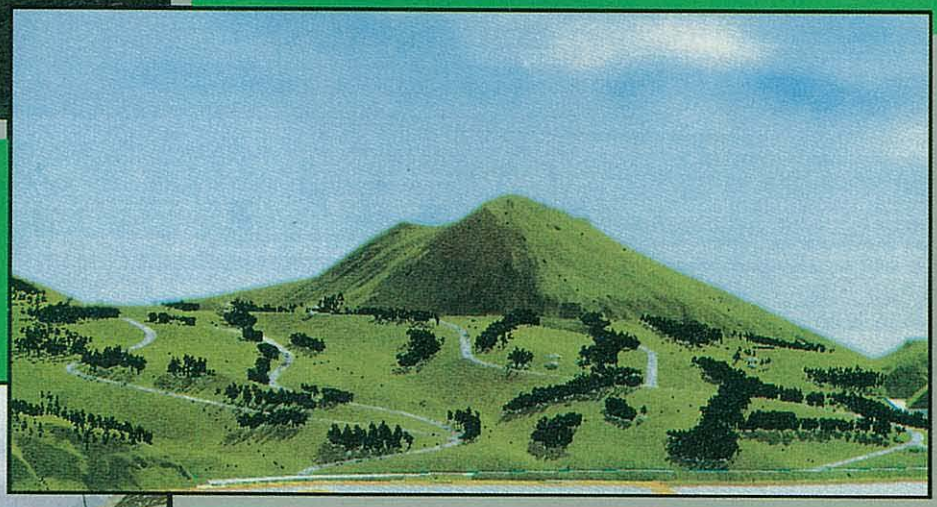
Green Valley Landfill, Ltd

South East New Territories (SENT) Landfill

Supplementary Environmental Impact Assessment (SEIA)

Executive Summary





March 1995

acer ENVIRONMENTAL

1. INTRODUCTION

SENT Landfill is one of the three strategic landfills being developed and operated to meet present and future solid waste disposal needs for Hong Kong for the next 20 to 30 years. The contract to develop and manage SENT Landfill was awarded to Green Valley Landfill, Ltd (GVL) in August 1993 and the site is due to receive waste within one year of this date.

A comprehensive and detailed Environmental Impact Assessment has already been prepared for SENT Landfill (the Conceptual Environmental Impact Assessment, or CEIA), based on a conceptual design developed for EPD. However there are a number of differences between the design produced by GVL and the conceptual design, with consequential differences in the potential environmental impacts of the project compared to those identified in the CEIA. An independent environmental review of the GVL design was undertaken as part of the Tender process. The review identified design changes between GVL design and the conceptual design and supplementary issues which required further study. The aim of this Supplementary Environmental Impact Assessment (SEIA) is to assess the impacts of these design changes and to complement the CEIA by addressing those issues arising since production of the CEIA.

1. 引言

新界東南堆填工程(SENT)爲香港三個正在發展或操作中的策略性堆填工程其中之一。其目的是爲了應付香港現在及未來20至30年內之固體廢料的棄置需求。發展及管理新界東南堆填工程的合約已於一九九三年八月批給翠谷工程有限公司(翠谷)，該地盤亦會於今後一年之內接收廢料。

一份對新界東南堆填工程而作的詳細及全面性的環境評估(概念環境評估，或簡稱"概念環評")已經準備完成。此概念環評是基於一個爲環保署而定下的概念設計，不過，翠谷的設計跟此概念設計有一些不同之處，所以，其可能產生的環境影響亦會異於與概念環評所指出的影響。因此，在合約投標過程中，已對翠谷的設計進行了一份獨立的初步環境評估。此初步環境評估書指出了翠谷的設計和概念設計中的不同之處與及那些項目需要作進一步的研究。此份補充環境評估(簡稱補充環評)的目的是要評估這些設計上的差異及針對那些概念評估完成後所發現的問題，替概念評估作出補充。

2. THE SENT LANDFILL SITE

SENT Landfill is located on the western edge of Clear Water Bay Peninsula in the south eastern corner of the New Territories, Figure 1. The site covers an area of about 100 hectares, half of which is being reclaimed from Shek Miu Wan (Junk Bay). At present part of the site has been reclaimed and the access road D6 is complete. To the north and east of the site lies Clear Water Bay Country Park; to the west, a reclamation started in 1991 for the Tseung Kwan O (TKO) Third Industrial Estate (TIE) and to the south a proposed reclamation for potentially hazardous installations and deep water-front industries (Tseung Kwan O Area 137).

2. 新界東南填土工程的地盤

新界東南堆填工程是位於新界東南角的清水灣半島西岸（圖一）。此地盤佔地100公頃，其中一半地方從石廟灣（將軍澳）向外填海而得，填海工程現正進行中。而D6交通便道亦已建成。地盤的東面及北面爲清水灣郊野公園，西面爲將軍澳第三工業村的填海地，其填海工程始於1991年，南面爲擬建填海地，此填海地將會用作貯存潛在有害物及深水駁岸工業用途（將軍澳第137區）。

3. PROJECT BACKGROUND

SENT Landfill will receive approximately 39 million tonnes of waste over a period of 15 to 17 years at current predicted waste generation rates. Municipal, commercial, industrial and chemical wastes will be accepted, together with the types of construction waste which cannot be recycled for use as fill material in reclamations. The site has been designed to incorporate extensive means to collect, contain, transfer and treat landfill by-products, including leachate and landfill gas. Unlike the other two strategic landfills (WENT and NENT), SENT Landfill is a direct replacement for an existing facility TKO Landfill Stages II/III, which is located to the north.

3. 工程背景

以現在的廢料生產預計速度估計，新界東南堆填工程將會在未來15至17年間接收大約三千九百萬噸重的廢料。這些廢料包括有：城市、商業、工業及化學廢料。而且，那些因建築工程而生但不能循環再用於填海工程的廢料亦可堆填於此。此地盤設計上包含有廣泛的方法去收集、貯存、轉運及處理填土的副產品，例如滲濾污水及堆填區沼氣體。跟另外兩個策略性堆填工程（新界西及新界東北）不同，新界東南堆填工程乃是一個直接的替換地，接替了位於北面的將軍澳堆填工程第二/三階段的現存設施。

A "conceptual" design was produced by consultants employed by EPD in 1990. Its development was an iterative process involving many inputs from the environmental assessment work being carried out simultaneously. The design incorporated extensive measures to protect ground water and marine waters from contamination during both preparation of the site, and filling with waste. Full containment of the deposited waste was stipulated, by low permeability liners over the base and sides, and a low permeability cap over the top of the site.

環保署於1990年僱用了顧問公司定出一個設計概念。此設計的發展是依據一個重複程序，輸入了多個從同步進行而得的環評數據而成的。此設計包括著大量的措施，以保護地下水及海水，避免它們在地盤準備及廢料堆填過程中受到污染。設計中，規定了棄置廢料要全面隱蔽：低透水性的隔墊設於底部側面及完成堆填工程後的頂部。

Since the CEIA was carried out, further environmental monitoring and assessment work including an Environmental Review has been undertaken; this has been reviewed as part of the SEIA, and incorporated where appropriate. A number of Site Investigations have been carried out with boreholes drilled to establish the depth, nature and characteristics of the geology of both land and marine areas. An Advance Works contract was carried out from June 1992 to August 1993, which included dredging muds and silts from the marine area, to give a stable base for the reclamation work; construction of seawalls and reclamation of parts of the site; construction of a temporary access road and surface water drainage system; and provision of advance landscape planting around the boundary of the site to screen the works from the Clear Water Bay Country Park, and particularly the High Junk Peak Hiking Trail. In addition environmental monitoring has been undertaken.

自概念環評進行之後，進一步的環境監察及評估工作已在進行中，包括有環境檢討；這些工作亦已被檢討，其合適的部份已融收於補充環評中。另外，已有一連串的"土地勘探"利用鑽孔方法測出了土地及海底的地質、特性及深度。"預先工程"合約於1992年6月至1993年8月執行，它包括了：挖掘海洋泥土及淤泥以提供一個穩定的地基作填海之用；築海堤及地盤的部份填海工程；建臨時道路及地面排水系統；與及於地盤界限週圍預早提供種植草木，美化環境，以遮蔽工程活動，減低對清水灣郊野公園，尤其是對釣魚灣遠足徑的視覺影響。並且環境監察的工作亦已經展開。

4. GVL Project Design

Prior to the start of landfilling, reclamation of the remainder of the marine parts of the site will be completed, using marine sands dredged from a licensed area (just south of Tung Lung Chau Island) and rock from on-site excavations. Preparation of the site for waste will also include blasting of rock slopes to provide a suitable base for the landfill, and installation of the site liner system. Four different liner systems will be used in different parts of the site, all of which are high technology "composite" systems using the latest synthetic impermeable materials to provide exceptionally high levels of integrity. Rigorous Construction Quality Assurance (CQA) checks will be adopted during installation of the liner.

Access to the site will be gained from the west via Road D6. A site infrastructure area at the extreme south of the site will house the landfill business office, the independent consultants, and offices for EPD. Weigh bridges, waste examination area, a waste examination, environmental and soils laboratory, a waste recycling area, a maintenance building, and plant to treat the landfill byproducts. Landfill gas and leachate will be carefully collected and removed from the waste mass. State-of-the-art Leachate treatment facility will be used on site, prior to discharge via a forcemain to TKOSTW for ultimate disposal as effluent discharge to inland waters. Stringent environmental controls will ensure impact on the environment is minimised. Each component of the site has been designed to accommodate the initial projected waste input rate of 3,000 tonnes per day, while allowing for a possible emergency waste intake of up to 30,000 tonnes per day.

4. 翠谷的工程設計

在堆填工程進行之前，地盤海洋部份剩下的填海工程，會利用從有牌照許可地點（東龍洲南面）挖得之海洋泥沙及原地掘取的石頭完全填妥。爲廢料而作的地盤準備工程包括有：炸爆石質斜坡以供適當的地基部作堆填之用，及裝置地盤隔墊系統。四個不同的隔墊系統會設於地盤上不同的部位，它們全都是高科技的混合物料系統，使用最新的混合不透水物質以提供異常高程度的效用。裝置隔墊物時會採用嚴格的"建築質素保証"（"建保"）去檢查工作。

從西面，可以經D6路到達地盤。地盤最南端的基建工程地點會設置堆填區辦工室，獨立顧問公司及環保署辦工室，地磅，廢料檢查地點，廢料檢查、環境監察及土壤分析實驗室，一個廢料循環再用地點，一座爲機器維修保養之建築物，與及處理堆填工程副產品之設施。堆填區沼氣及滲濾污水會被小心收集及從廢料堆中抽出。抽出的滲濾污水會首先在堆填區內的滲濾污水處理廠接受處理然後透過輸送管道泵到將軍澳污水處理廠再作最終排放，從而達到嚴格的環境管理，確保自然環境受到最少的影響。地盤上每一部份的設計都是預備可承受最初的每日3,000噸的廢料預計量，且留有能力可在發生緊急情況下，接受每日30,000噸的廢料量。

The site will be developed and operated in 23 areas, with phased construction, operation and restoration. Areas filled to final levels will be restored as soon as feasibly possible, with low permeability caps, a special drainage layer and at least 1.5m depth of soil. Areas will then be landscaped with a mixture of native trees, shrubs and grasses. Following completion of the site and restoration of all areas, the site will be closely managed for an "aftercare" period of about 30 years. Safe removal of landfill gas and leachate will continue over this period, as well as environmental monitoring. The site will be restored as an informal recreational area with footpaths, pavilions and sitting out areas. In both terms of topography and landscape it will integrate attractively with the Country Park.

堆填區會分於23個地區發展及操作，且會分期建設，操作及修復。當某地區達至最終水平後，會在可行情況下，盡快用低透水性合成物料頂蓋、特別排水層及至少1.5米深的泥沙復修，接著會於該地種植土生樹木、灌木及綠草，以美化風景。當地盤完工及所有修復工作完成後，此地盤會被密切管理，爲期約三十年，作爲"善後"期。此段時間內，會繼續環境監察及將堆填沼氣及滲濾污水安全地抽走。修復後，地盤會作爲非正式的休憩用地，設有小徑、涼亭及憩息處。以地形及風景兩方面來說此堆填區都可融入鄰近的郊野公園。

5. SEIA SUPPLEMENTARY ISSUES

Eleven specialist environmental studies of "Supplementary Issues" have been undertaken as part of the SEIA. These have evolved through an Environmental Review of the project, discussions with EPD and other Government Departments, and variations between the GVL design for SENT Landfill and the Conceptual Design. The conclusions of each of the Supplementary Issue studies are summarised in the following paragraphs.

5. 補充環評內的補充項目

補充項目內的十一份專門環境研究已分別完成，作爲補充環評的其中一個部份。這些研究的進化，是經過工程的"環境檢討"，與環保署及其他政府部門討論過，及考慮過翠谷新界東南堆填工程的設計與概念設計之不同處。"補充項目"各研究所得之結論已被撮寫於以下各段之中。

6. WASTE RECYCLING

Waste recycling at SENT Landfill has been proposed for both construction waste and combustible materials that can be used to make refuse derived fuel. Recycling is both environmentally preferred and in accordance with the Government's stated policies. Recycling proposals will be finalised following a waste characterisation study during the first year of waste disposal at the site, and following a review of the effects of the Government's plans for a number of centralised construction waste recycling centres, one of which may be located in the TKO area.

A preliminary assessment has been made of the impacts of a construction waste recycling plant. On the basis of current intentions and available information it is not anticipated that the plant will cause either noise or dust impacts. Recent information has shown that the proposed construction waste reception facility would be less substantial than that considered in the SEIA report, and that key environmental impacts due to the proposed facility have been sufficiently covered in the SEIA report. Thus, no further EIA studies are envisaged with respect to the construction waste reception facility.

6． 廢料循環再用

擬議中，在新界東南堆填區所接收的建築廢料及可燃物質會被循環再用，從廢料中提取燃料。廢料循環再用對環保來說是較合適而且按據政府訂下的政策而進行。地盤正式啓用作爲堆填廢料地盤的第一年，會有一份廢料特質研究。循環再用的建議，將會根據此份研究及對政府一系列中央建築廢料循環再用中心（其中之一個中心可能會置於將軍澳）的檢討而作出最終決定。

建築廢料循環再用機械裝置的影響之初步評估已經完成。基於現在的計劃及已有的資料，估計此機械裝置將不會引起噪音及塵埃影響。近期資料顯示，建議中的建築廢料收集設施之規模將會比在補充環評裏所考慮到的小很多，而主要的環境影響亦已在補充環評報告中詳述。所以，預料不會對建築廢料收集設施再作進一步的環境影響評估研究。

7. LANDFILL GAS UTILISATION

Landfill gas is produced by decomposing waste and will be collected and transferred to a treatment plant where it will be burnt off in enclosed flares, which have very low air and noise emissions. More than 98% of the harmful compounds in the gas will be destroyed. When the volumes of gas produced reach a level at which it is practical and economically viable, a gas utilisation plant will be installed. This will use the latest turbine technology to produce electricity to supply all the needs of the site, and possibly for sale to other users off-site.

Computer modelling of air and noise emissions from the plant has been carried out. The very low emissions, and comparatively large distances to Sensitive Receivers (SRs) result in very low concentrations at the SRs, well within the noise and air quality standards. No significant odour or visual impacts are predicted.

7、 堆填區沼氣的運用

堆填區沼氣是由廢料分解而產生的。它會被收集及轉運至處理機械裝置，在那裏沼氣會在密閉情況下被引點燃燒至貽盡，燃燒過程只會有很少量的氣體及噪音發出，而且沼氣中高於98%的有害物質會被毀滅。若果實際上及經濟上皆是可行的，當沼氣生產量達到一定水平時，便會裝置運用沼氣的機械。此裝置會使用最新的渦輪科技來生產電力，供給堆填區所有電力需求，且有可能會賣電力給堆填區以外之用戶。

機械裝置發出的噪音及空氣已用電腦模擬衡量過。由於敏感接收物（簡稱接收物）的位置距離較遠且機械發出的噪音及氣體非常之少，所以接收物所感受到的噪音及空氣污染濃度非常低，完全在噪音及空氣質素可接受標準之內。預計中沒有重要的嗅味及視覺影響。

8. SOURCES AND AVAILABILITY OF CONSTRUCTION MATERIALS

During preparation of the site, there is potential for environmental impact from the large quantities of soil and rock required, and from activities such as blasting, excavation, material handling, transport, processing and stockpiling. The impacts will be minimised by maximising the use of materials from the site excavation into the reclamation and site formation fill materials. Extensive mitigatory measures have been incorporated into the design and their effectiveness will be checked by the Environmental Monitoring Plan (EMP).

A number of alternative materials may be used to cover the waste at the end of each day to minimise odour, rodents, flies and litter. Soil is routinely used, but the utilisation of other materials can preserve soil supplies and reduce the use of valuable landfill air space. Materials under consideration include foams, geotextile, tyre chips and foundry slag. All of these materials have been used at landfills in the USA, without adverse results. It is recommended that trials should be carried out, however, of the intended materials, including testing of the likelihood for them leaching toxic chemicals. In addition, monitoring should be undertaken on-site to assess the effectiveness of the performance of the alternative cover materials.

8. 建築物料的來源及存在情況

在準備地盤過程中，由於需要大量沙泥及石塊，須要進行一些工程例如：爆石、掘挖、物料控制、運輸、處理及堆積，這些可能會帶來環境影響。只要盡量採用掘挖而得的物料來作填海及土地填料之上，便可盡量減低環境影響。設計中已經包括有大量緩減措施，這些措施的有效性會用"環境監察計劃"來檢查。

有多種的代替物料可在每天運作完結時用來遮蓋廢物，以盡量減少臭味、老鼠、蒼蠅、及防止垃圾飛揚。常用的是泥土，不過，可利用其他物料以保存泥土供應及減少使用有價值的堆填區地方。考慮中的物料包括有：泡沫膠、土工織物、車胎膠碎、鑄模鎔渣。這些物質所有都已經在美國的堆填區使用過，且沒有發現任何不良後果。不過，現建議將計劃中所用的物料進行試驗，包括測試滲漏有毒化學物質的可能性。而且，在地盤上應執行監察以評估遮蓋代替物質之表現及其有效用。

9. LEACHATE PRODUCTION AND MANAGEMENT

"Leachate" is the term used to describe the highly polluting liquid formed within waste by the seepage of water through it, and the chemical and biological reactions taking place as the waste decomposes, together with any liquids already present in the waste when landfilled. The leachate will be collected at the base of the landfill, extracted and treated at the leachate treatment facility (LTF). The LTF will use chemical and biological processes to reduce the amounts of organic chemicals, ammonia and metals in the raw leachate to specified concentrations prior to discharge to a sewer leading to TKO sewage treatment works (TKO STW). From 1998, it is planned that TKO STW will be connected into Hong Kong's Strategic Sewage Disposal Scheme (SSDS). Prior to this, treated effluent from TKO STW is discharged to the Tathong Channel through a long sea outfall. During this interim period, significant impacts on water quality are not expected due to the advanced processes which will be provided at the LTF (including almost total ammonia removal) and the good tidal flushing characteristics in the Tathong Channel which will disperse any residual contaminants along with sewage from TKO.

The LTF uses a series of air-strippers to remove ammonia. The ammonia gas removed will be passed over a hot catalyst material prior to discharge, to convert it to harmless nitrogen gas and water vapour. Computer modelling of ammonia emissions from the LTF indicate very low ambient concentrations, and no adverse impact. It is recommended however that the performance of the catalyst is closely monitored; an additional ammonia monitoring location in the close vicinity of the LTF equalisation tank is included in the EMP; and an Emergency Procedures Plan is produced. Construction and operation of the LTF is not predicted to have any significant adverse impacts.

9. 滲濾污水之產生及管理

"滲濾污水"此詞匯是用來形容那些高度受污染的液體 - 當水份從廢料中滲濾過時，廢料因分解作用產生化學及生物反應，再加上在堆填時廢料本身亦帶有各種液體，這些液體跟滲過廢料的水份混合一起，就成爲滲濾污水了。滲濾污水將會由堆填區的底部收集，然後抽至滲濾污水處理裝置（滲理裝置）進行處理。滲理裝置會採用化學及生物過程去減低未經處理的滲濾污水內所含的有機化學物、氨及金屬含量到達指定的濃度，然後才排進污水管，再由污水管引往將軍澳污水處理廠。規劃中，從1998年起，將軍澳污水處理廠會與香港的策略性污水排放計劃連接起來。在此之前經處理後的污水會從將軍澳污水處理廠經一條長長的海口排往藍塘海峽。預料在這過渡時期水質不會受到嚴重的影響，因爲滲理裝置採用先進的程序（包括把氨完全清除），而且藍塘海峽的良好潮汐沖擊特性亦會沖淡將軍澳流出來的污水及任何殘餘污染物。

滲理裝置會採用一系列的氣體清除器去清除氨。被清除出來的氨氣，先經過熾熱的催化劑物料，使之變爲無害的氮氣及水蒸氣，然後才排走。電腦模擬顯示，滲理裝置所發出的氨，其週圍濃度十分之低，並且沒有不良影響，不過現建議要密切監察催化劑的表現。在環境監察計劃內，加多一個氨氣監察地點，此地點要很接近濾理裝置的平衡箱；並且定出一個緊急計劃。滲理裝置的建設和操作，預料不會帶來任何嚴重的不良影響。

10. SURFACE WATER RUN-OFF AND OPERATIONAL EFFLUENT DISCHARGES

The surface water management system at SENT Landfill has been designed such that clean surface water is segregated from leachate producing parts of the landfill and does not come into contact with waste. Run-off from slopes surrounding the site is intercepted and discharged at controlled, monitored locations to Junk Bay and Clear Water Bay. The design and operational procedures of the surface water management system are such that no significant adverse impacts on water quality are expected to occur. The EMP will show if contamination of surface water is occurring, and subsequent investigations will identify the source to establish where remediation measures are required.

10. 地面水徑流及操作產生之污水排放

"新界東南堆填工程"之地面水管理系統的設計，是可以令潔淨的地面水與生產滲濾污水的那些堆填區部份分隔開來，不會與廢料有接觸。地盤週圍斜坡上的水徑流會被攔截及排往那些受控制及監察的地點，流至將軍澳及清水灣。地面水管理系統的設計及操作步驟，是使到水質不會受到嚴重影響。若果有地面水污染情況出現的話，"環境監察計劃"會將之顯示出來，然後會偵查污染來源，指出那些地方需要採取補救措施。

11. GROUNDWATER

Monitoring data show that the groundwaters within the SENT Landfill catchment are uncontaminated. The higher standards of the GVL liner system above the conceptual design will result in higher levels of protection to the groundwater. However, some seepage of leachate through the liner system is inevitable, and calculations indicate a theoretical maximum leakage rate of 1.05 litres per hectare per day. Leachate which escapes through the landward basal part of the liner system will enter the grondwater collection blanket and contaminated groundwater will be intercepted and treated. Leachate which escapes through the liner system in the reclaimed area will be identified in the downgradient monitoring wells. Monitoring of groundwater quality in the downgradient monitoring wells will allow an assessment to be made of the possible degradation of groundwater quality. Any action taken in response to degradation of groundwater

11. 地下水

地下水監測結果顯示，現在堆填區一帶的集水區皆沒有受污染。而翠谷將採用的墊料系統的質素將高於概念環評所提到的，亦會令到地下水質加倍地受到保護。可是，滲濾污水亦有流出該墊料系統，這是無可避免的。計算顯示該地每日每頃漏出的污水量最高爲1.05升/頃/日。由靠山地區墊料系統滲漏出來的污水，會流進地下水收集層，受污染的地下水會被攔截及處理。而由填海地區墊料系統滲漏出來的污水，可被裝置在填海區下游的地下水監測井監測出來，根據監測水質的結果可以評估地下水是否受到污染。若果，發現地下水水質有受污染，會即時採取行動。在必要時可將受污染的地下水

quality in the downgradient monitoring wells will be detailed in a correction action programme, and if necessary the contaminated groundwater will be intercepted and treated. Given the small amounts of leachate that may escape from the site, and the provisions to deal with them, it is considered that there is very little risk of groundwater quality adversely affected by the project.

收集處理，而詳細程序會在"更正行動計劃"內列明。就這滲濾污水漏出墊料系統而言，其影響地下水水質的機會很微。

The groundwater levels will reduce, but as groundwater is not considered a resource in the area, this will have little noticeable impact, and the reduction in groundwater levels should have little effect on stream discharges in Clearwater Bay and Joss House Bay.

因爲地下水在該區並非用作水源，所以，雖然其水位將減低，亦不會有顯著的影響。而且，地下水水位降低，對在清水灣及大廟灣溪流之排放來說，只會有很少的影響。

It is recommended that an Action Plan for dealing with a major liner rupture be prepared by GVL within 12 months from commencement of landfilling operations.

建議在堆填施工後十二個月內，由翠谷工程有限公司提交一份「行動計劃」，內容爲如何應付破爛的墊料系統。

12. MARINE DISCHARGES

12. 海洋傾瀉

Prior to the finalisation of the specific methodology for the reclamation of the marine infill area, it is not possible to quantify the associated impacts. It is expected, however, that mitigation measures, including the use of sediment traps, will be required to prevent any adverse impacts on the receiving marine water quality in Junk Bay. The sediment traps will have to be designed so that sufficient settling time is allowed to ensure that the effluent water complies with Government standards.

在未確定於海洋堆填區的填海方法之前，是不可能預計它所會造成的影響。可是，預計中將採用沉沙坑之類的作舒緩措施，以防止對將軍澳灣水質的影響。那些沉沙坑的設計將是可以令到流出的物質得到充足的時間沉澱，令排出的污水符合政府所訂之指標。

The potential impact of leachate seepage on marine water quality is considered negligible.

滲濾污水的滲漏對海水水質的潛在影響相信是不顯著的。

13. LANDSCAPE AND ECOLOGY

The advance landscape planting which was carried out under the Advance Works Contract will be used as a guide in the preparation of the Landscape Masterplan. Experience gained from the restoration of other landfills in Hong Kong will be evaluated before the selection of a mixture of indigenous and introduced species with proven local adaptability for the restoration planting.

Landscaping will also be provided adjacent to the access road, along the western boundary of the site; in the site infrastructure area, to screen the LTF and landfill gas plant; and in adjacent areas of the Country Park. Planting trials will be undertaken during the first phase of the restoration, to determine the most appropriate seed and plant mixes and methods of implementation.

Monitoring of flora and fauna will be carried out six-monthly under the EMP. Additional surveys of rodents, burrowing animals and birds have been proposed and are now incorporated into the EMP.

13. 景觀及生態

預先工程合約裏所包括的預早景觀種植已經進行，並會被用作編制景觀主要計劃的指引。在挑選植物作修復之用時，將會憑著以往修復其他堆填區的經驗，揀採適合該地區的本地及新參之品種。

在沿著地盤範圍之西面的通道、郊野公園附近及地盆的基建工程範圍都會作景觀修茸（以作滲濾污水處理設施及填土區沼氣站的屏障），第一期的修復計劃將會進行一些種植試驗，以確定最合適的種子及植物比例，及進行之方法。

環境監察計劃所包括的動植物群監察將會每六個月進行一次，建議會觀察鼠類、鑽穴及鳥類動物，並載於環境監測計劃中。

14. VISUAL IMPACT

The key areas of potential visual impact as a result of the development and operation of SENT Landfill are residential properties across Junk Bay and users of the High Junk Peak Hiking Trail adjacent to the site. Extensive mitigatory measures have been incorporated by GVL into the design of the site, including the hydroseeding of soil slopes with grass; provision of landscaping around the periphery of the site; and the phasing of filling and restoration. These measures, combined with the screening effect of Junk Island, mean that visual intrusion to residential areas will be low.

In the early years of the project, medium to high levels of visual impact will be experienced by the users of the Hiking Trail and parts of Clear Water Bay Country Park which is adjacent to the site. These will be mitigated over time by trees planted around the site boundary. The presence of the TIE and Area 137 industrial developments will detract from the quality of mid to long range views, but the restored landfill will partly hide these developments, Figure 2. Following restoration the visual impact of SENT Landfill will be slight, providing an attractively landscaped area of recreational open space between the Country Park and adjacent developments.

14. 視覺影響

堆填區的發展及運作將令兩個主要地區受到視覺上影響，該兩處地區分別爲釣魚翁步行徑及將軍澳住宅區。翠谷已經在設計地盆時加入了詳盡舒緩措施，包括了於斜土上作噴草工程，在工地的周邊提供景觀修茸及堆填與修復的分期進行。這些舒緩措施，加上佛堂洲作屏障，預計住宅區的視覺影響將會很低。

工程進行早期的首幾年時將會對使用附近步行徑及清水灣郊野公園的遊人造成中度到高度的視覺影響。這些影響都會隨著週圍樹木的生長而減少。第三工業村及137區工業發展將成爲該區之中至遠距離之視覺影響，但修復中所種的樹木可把部份遮蓋（圖二）。修復之後堆填區所帶來的視覺影響將不會顯著，更可成爲郊野公園及發展區中間美化了的康樂用地。

15. EXCEPTIONAL TRAFFIC IMPACTS

If a situation should occur when one (or even both) of the other strategic landfills (NENT and WENT) were unable to accept waste, significant additional waste inputs to SENT Landfill would be necessary. This has been termed an exceptional waste situation (EWS). Although an EWS is a possibility, it would be expected to be of a maximum of about two weeks duration. It would lead to a maximum predicted road traffic flow of 454 lorry arrivals at the peak hour of 17:00-18:00. Although some traffic congestion would be experienced, following completion of the Western Coast Road to TKO, minimal traffic disruption is anticipated. Where possible, waste would be transferred by barge, to reduce road congestion.

Mitigation measures have been identified which would deal with an EWS. These include the development of extra tipping faces, which would speed up the input and output rate of the lorries. A major aim is to avoid fly tipping causing disturbance to the neighbouring sensitive receivers. It is recommended, however, that a Management Plan be drawn up for handling containers at both the SENT Landfill and TKO(I) Landfill marine access points, based on the marine traffic arrival patterns predicted under the EWS.

15. 特多交通影響

若其他兩個堆填區（新界西和新界東北）其中一個或兩個不能接受廢料，此堆填區便要增加其收集廢料量，此情況被稱爲"特多廢料情況"。雖然此情況只是可能發生，但預計這情況可最多維持兩星期，這會令到繁忙時間（17:00-18:00）到達該堆填區的交通流量高達454輛貨車。預計可能會有塞車情況出現，但若新的西堤路完成之後，交通影響將會很低。如有需要，亦可將廢料用駁船運送到堆填區，以避免交通擠塞。

對付多廢料情況的舒緩措施已被定出。包括發展更多個傾倒點，令貨車的流量更快捷，防止貨車隨處傾倒廢料，造成對鄰近居民的滋擾。建議根據特多廢料情況預計海上交通到達狀況，擬定一管理計劃以處理新界東南及將軍澳（第一期）堆填區海上通道點的貨櫃。

16. ADJACENT DEVELOPMENTS

Of the planned adjacent developments to the SENT Landfill site, none have been identified as potentially incompatible. Any future development should be planned taking due cognisance of the presence of the SENT Landfill and its permitted threshold emissions.

16. 附近發展

從現時來看，所有堆填區鄰近發展區都將會可以與其共存。將來的發展該考慮到堆填區的存在，及其許可的污染物散播水平。

17. ENVIRONMENTAL MONITORING

An Environmental Monitoring Plan (EMP) has been developed for SENT Landfill. This is designed not only to detect any adverse environmental impacts and help to ensure compliance with the required standards, but to gauge the effectiveness of the mitigation measures adopted in the GVL design and to provide data for on-going environmental audit of the project. The range of environmental and operational variables and parameters to be monitored includes:

- Leachate;
- Landfill gas;
- Groundwater;
- Surface water;
- Marine water;
- Noise;
- Dust;
- Organic emissions and odour;
- Volatile organic carbons (VOCs) and ammonia;
- Settlement;
- Waste type; and
- Flora and Fauna.

17. 環境監測

堆填計劃包括了一環境監察計劃，這不只是爲了測度對環境之不良影響及確定環境質量於標準內，而是去量度翠谷設計所採用之舒援措施的有效性，及不斷提供資料以作該工程之環境審核。

監察的環境及運作變數包括：

- 滲濾污水；
- 堆填區沼氣；
- 地下水；
- 地面水；
- 海水；
- 噪音；
- 空氣中懸浮塵；
- 有機散播物及臭味；
- 發揮性有機碳化物及氨氮；
- 氣象資料；
- 廢料的體積及密度；
- 地層沉降；
- 廢料種類；及
- 動植物群。

18. CONTINUOUS ASSESSMENT PROGRAMME

Since there are environmental issues to be addressed during the early life of the landfill which cannot be undertaken during the limited period of time available for the preparation of the SEIA, a Continuous Assessment Programme (CAP) is planned and will include the following studies:

- EIA of refuse derived fuel recycling plant;
- dust assessment of construction waste recycling;
- alternative cover materials trials;
- on-going groundwater assessment; and
- input advice to EPD in the production of a Management Plan for handling marine traffic and containers during an EWS.

18. 連續評估計劃

因時間關係，此堆填區早期的環境要素並未載於此補充環評之內，所以計劃有一個連續評估計劃，其中內容包括：

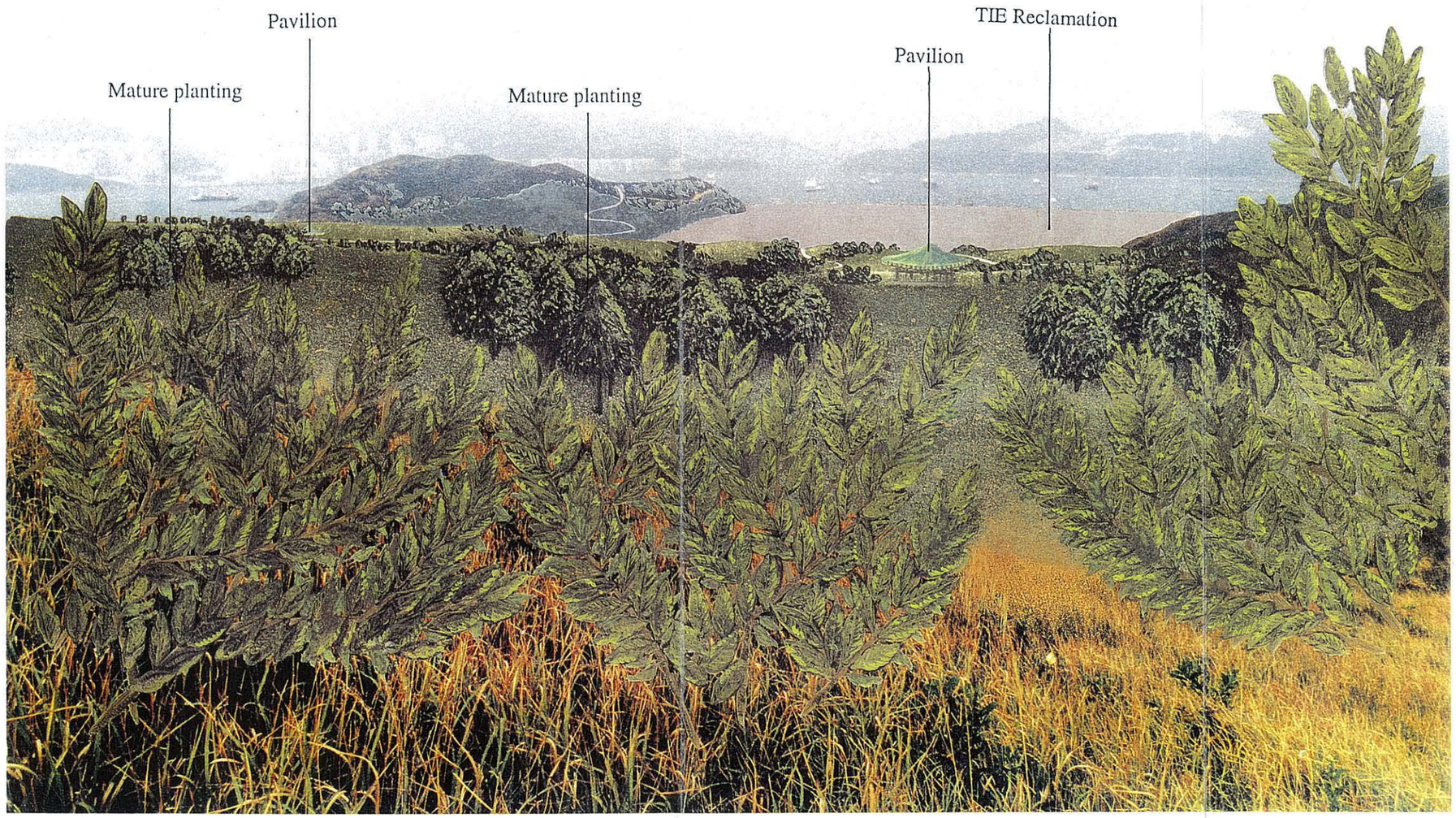
- 由廢物作燃料的循環再造廠的環評；
- 建築廢物再造的塵埃評估；
- 其他履蓋物料試驗；
- 連續地下水評估；及
- 於特多交通情況時就處理海上交通及貨櫃管理計劃作出提議于環保署。

acer ENVIRONMENTAL

FIGURE 1

LOCATION PLAN

Fully restored SENT landfill site



AXIS Environmental

Viewpoint 5: Final Restoration

FIGURE 2