

CLP Power Hong Kong Ltd

中華電力有限公司

**Decommissioning of Two Open
Cycle Gas Turbine Units and
Associated Facilities at Tsing Yi
Power Station**

青衣發電廠兩組燃氣渦輪發電機及
相關設施之清拆工程

September 2003

二零零三年九月

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For and on behalf of	
Environmental Resources Management	
Approved by:	<u>FREEMAN CHEUNG</u>
Signed:	<u></u>
Position:	<u>Executive Director</u>
Date:	<u>18 September 2003</u>

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This Project Profile is prepared in compliance with the requirements under Annex 2 of the *Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM)* for application for approval to apply directly for an Environmental Permit (EP) for ***Decommissioning of Gas Turbine Units Inside Tsing Yi Power Station*** which is a Designated Project under Schedule 2 Part II (4) of the *Environmental Impact Assessment Ordinance (EIAO)*.

Two 76MW open cycle gas turbines (OCGTs), namely TG1 and TG2, located at Tsing Yi Power Station were used for peak lopping and emergency electricity supplies in the past. With the operation of the Black Point Power Station in 1996, the utilization of the OCGT at Tsing Yi Power Station were very low and, the OCGTs have been disconnected from the system in 1997.

In early 2003, CLP Power Hong Kong Ltd decided that the OCGTs units and the associated facilities should be disposed of permanently. This Project Profile serves to address the potential environmental impacts arising from the dismantling and removal of these units for application for permission to apply directly for an EP.

2 BASIC INFORMATION

2.1 PROJECT TITLE

Decommissioning of Two Open Cycle Gas Turbines (OCGT) Units and Associated Facilities at Tsing Yi Power Station.

2.2 PURPOSE AND NATURE OF THE PROJECT

Demolish and remove all plant equipment and associated facilities of the two gas turbine units. Plant equipment to be removed included the two OCGT units, two chimney stacks, IDO tank, transformers, oil and water coolers, underground pipes and are indicated in *Figure 2.1*. A detailed list of plant equipment and associated facilities/structures to be dismantled are also presented in *Table 2.1a*. The existing building structures including the OCGT building and the control room will be retained by CLP Power as workshop.

Table 2.1a Plant Equipments to be Demolished

List of Equipment	Quantity	Reference Number as shown in Figure 2.1
Chimneys Stacks	2	1 & 1a
TG1 & TG2 Oil Coolers	2	3
Fuel Oil Storage (IDO) Tank	1	4
Unit Transformers	2	5
TG1 & TG2 Generator Transformers	2	6a & 6b
Fuel Oil Transmission Pump House	1	7
TG1 & TG2 Generator Cooling Water Coolers	2	8
TG1 & TG2 Turbine & Generator (within the OCGT building structure)	2	10a & 10b
TG1 & TG2 Fuel Oil Leakage Tank (within the OCGT building structure)	2	11a & 11b
TG1 & TG2 10.5kV Breaker Room (within the OCGT building structure)	2	12a & 12b
Underground Pipes (connecting the IDO tanks to the OCGT units)	N/A	-

The air filter unit located above the OCGT building will either be removed entirely or it will be blank off, with only the internal air filter element removed.

2.3 NAME OF PROJECT PROPONENT

CLP Power

2.4 LOCATION AND SCALE OF PROJECT

The Tsing Yi site is located on reclaimed land on the southern side of the Tsing Yi Island. The gas turbine unit is located to the north of the Esso Oil Depot, adjacent to Tsing Yi Road as shown in *Figure 2.2*.

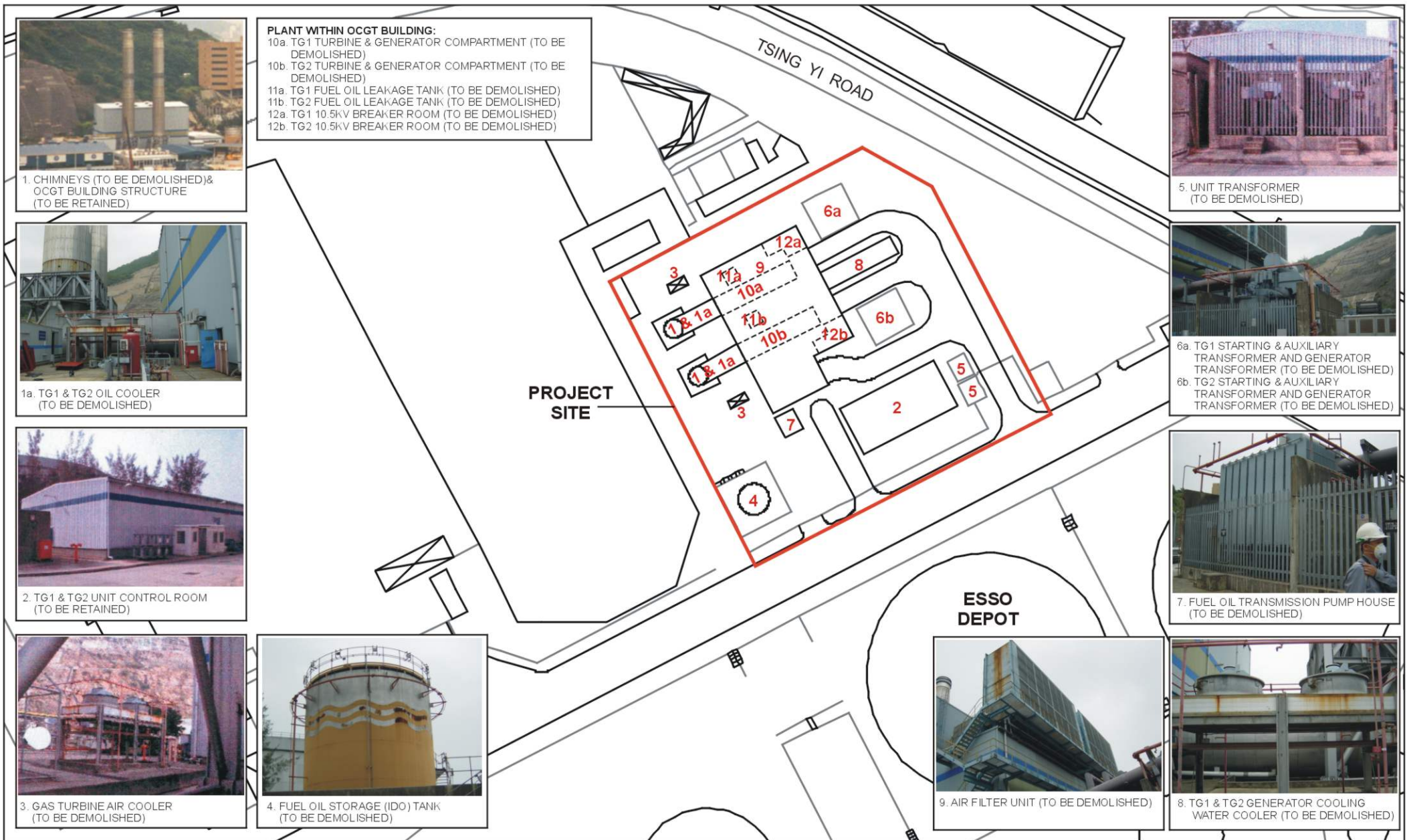


Figure 2.1

SITE LAYOUT PLAN

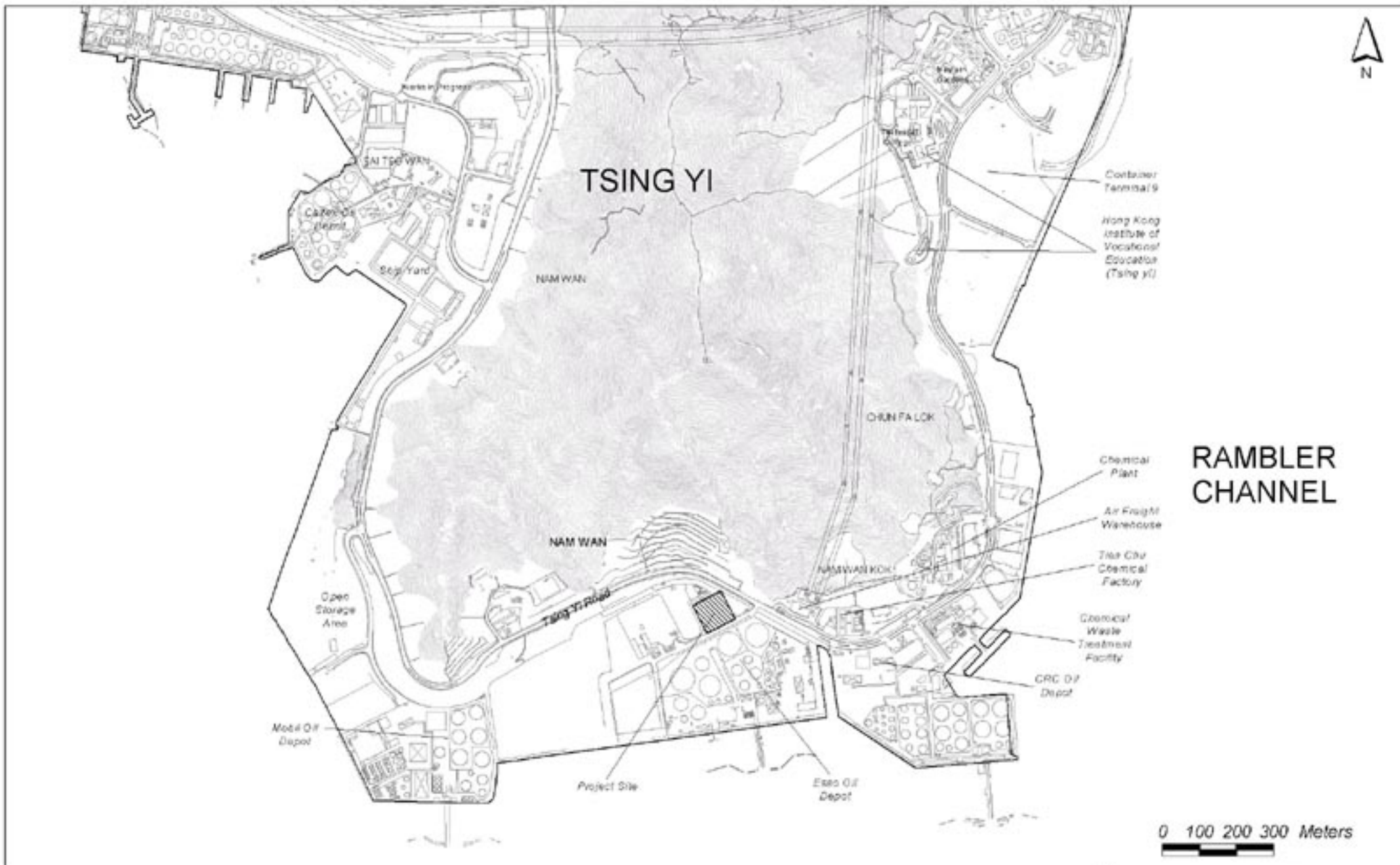


FIGURE 2.2

LOCATION OF PROJECT SITE
AND ITS SURROUNDING ENVIRON

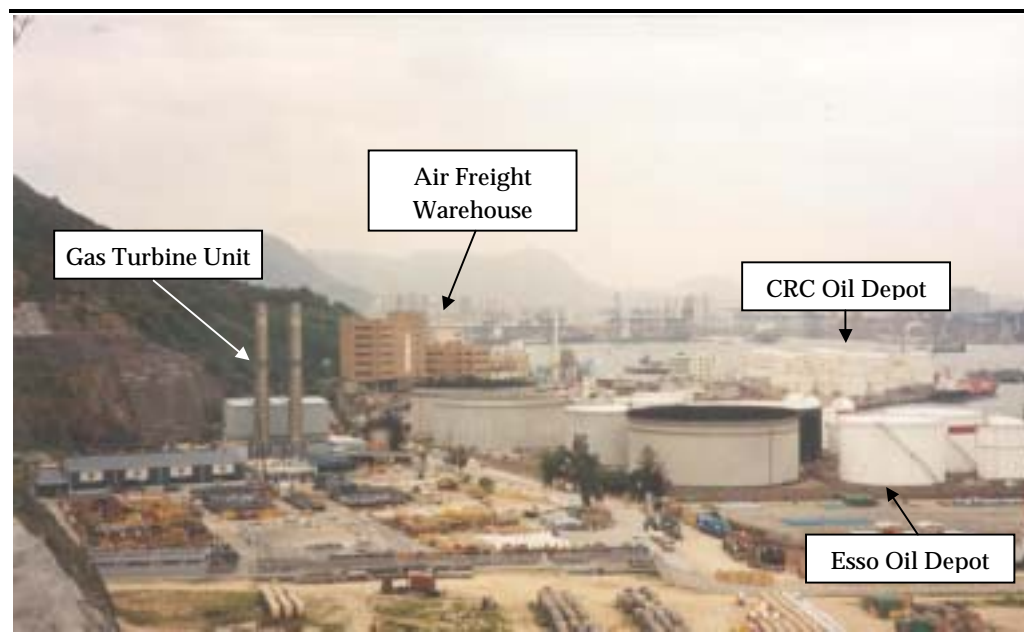
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Date: 9/06/2003

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To the east beyond the Esso Oil Depot is the CRC Depot followed by vacant land. There are several industrial operators further along the southern coast of Tsing Yi Island including the Chemical Waste Treatment Centre to the east. A photographic record of the gas turbine units together with the existing surrounding area is shown in *Figure 2.3*.

Figure 2.3 *Photographic Record of The Gas Turbine Unit*



2.5 *SITE HISTORY*

The two OCGT units occupy a site reclaimed from the sea during the construction of Tsing Yi Power Station. No previous land use was identified for this portion of the site prior to the reclamation operations.

The two OCGT units were originally installed in 1980 in Hok Un Power Station and then relocated to the Tsing Yi site in 1994.

2.6 *CONTACT PERSON*

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3 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

3.1 PURCHASER RESPONSIBILITIES AND METHOD STATEMENT

Since the gas turbines have a good maintenance record, instead of their disposal as scrap metal, CLP Power intends to sell them to a purchaser for re-use. However in view of the current economic situation in the Asia Pacific region, CLP Power may not be successful in engaging a buyer of the two OCGT sets in the immediate future.

The purchaser will perform all the necessary dismantling and removal work in accordance with a *Method Statement for the Work* issued by CLP Power. A method statement for dismantling and removal is presented in *Annex A*. The purchaser will also be required to conform to CLP's general *Specification for SHE & Site Requirement*, which is included in *Annex B* of this *Profile*.

3.2 FUTURE SITE UTILISATION

After completion of this decommissioning project, the site will be retained by CLP Power. The retained building structures (including the OCGT building structure and the control room) will be used by CLP Power as workshop and storage use.

3.3 PROJECT TIMETABLE

Upon agreement of sale with the purchaser, the works on the two OCGT sets would be undertaken within a six-month period.

No interactions with any other projects are envisaged.

4.1 INTRODUCTION

Table 4.1a identifies the potential environmental impacts that may arise from the decommission of the gas turbine and associated facilities.

Table 4.1a *Potential Sources of Environmental Impacts*

Source	Potential Impact
Gaseous Emissions	x
Dust	✓
Odour	x
Noise	✓
Night-time Operations	x
Traffic (Land & Marine)	✓
Liquid Effluents, Discharges or Contaminated Runoff	✓
Generation of Waste or By-products	✓
Manufacturing, Storage, Use, Handling, Transport, or Disposal of Dangerous Goods, Hazardous Materials or Wastes	x
Hazard to Life in case of Spillage	x
Landfill Gas Hazard	x
Disposal of Spoil Material, including potentially Contaminated Materials	✓
Disruption of Water Movement or Bottom Sediment	x
Unightly Visual Appearance	x
Cultural & Heritage	x
Terrestrial Ecology	x
Marine Ecology	x
Cumulative Impacts	x

Notes:
 ✓ = Possible x = Not Expected

The key potential impacts are asbestos containing material (ACM), land contamination, air quality, water quality and waste management. These issues are addressed in the following sub-sections. Additionally, the potential noise impacts are also discussed below. No other environmental impacts are expected for this project.

Figure 4.1 shows the locations of Air Sensitive Receivers (ASR) and Water Sensitive Receivers (WSR) closest to the works, that is the office of Chun Yu Warehouse and Esso Oil Depot (ASR) and Cooling Water Intake at Tsing Yi (WSR). Sensitive receivers have been selected in accordance with the *EIAO-TM*.

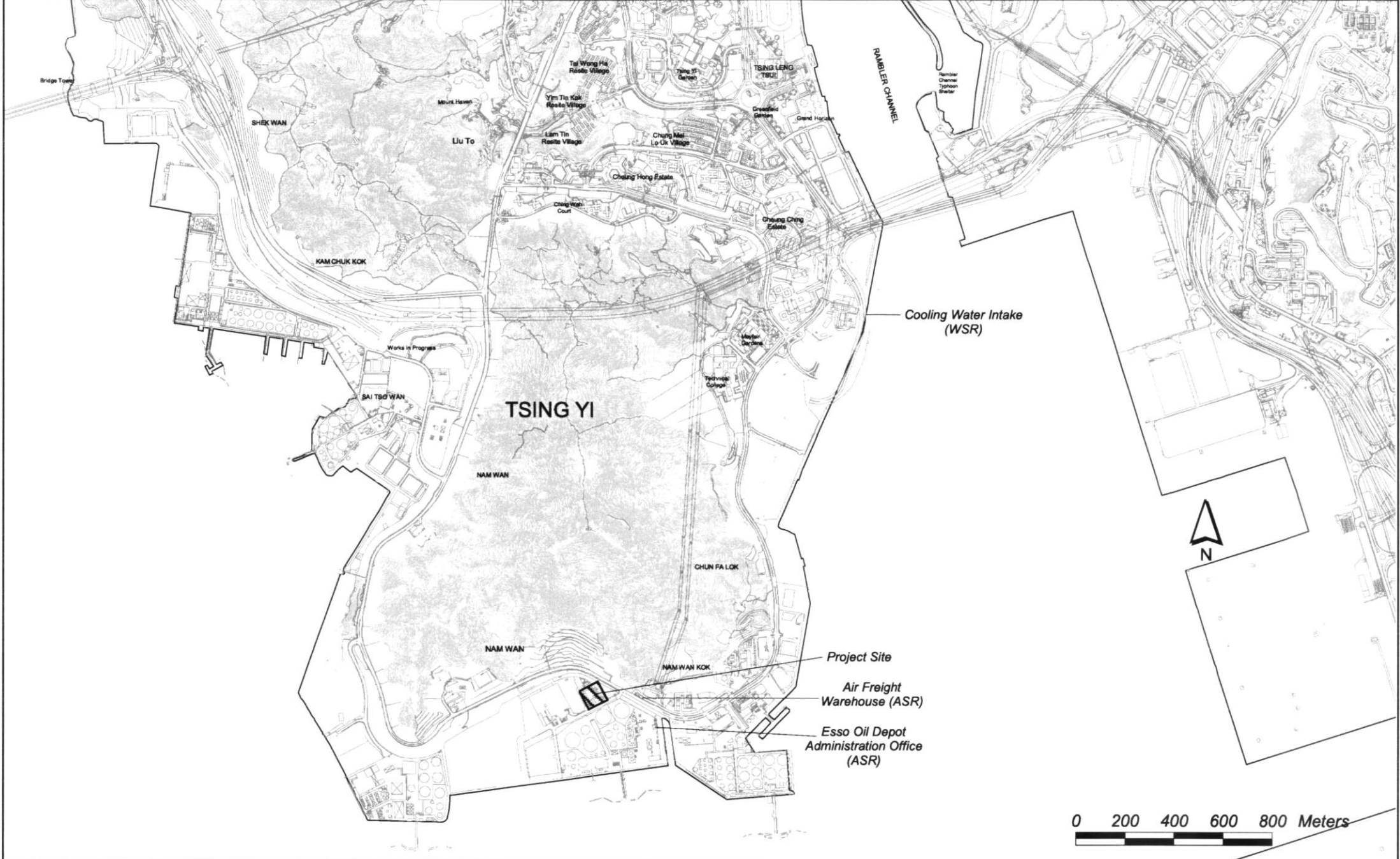


FIGURE 4.1

LOCATION OF SENSITIVE RECEIVER

4.2 ASBESTOS CONTAINING MATERIALS (ACM)

4.2.1 Introduction

CLP Power commissioned Atkins China Ltd (ACL) in 2003 to undertake an Asbestos Investigation Report (AIR) and Asbestos Abatement Plan (AAP) (see *Section 7*, items 3 and 4). The AIR and AAP reports were endorsed by EPD on 31 July 2003 in a letter (Ref: (13) in EP/AC/A/15/500/599 XIII) to CLP Power Hong Kong Ltd. Their conclusions are summarised below.

- ACM has been identified in the thermo-couples to the gas turbines located inside Tsing Yi Power Station and the ACM is in the form of a cloth type insulation material on the thermocouple wires.
- Due to the good physical condition, the low likelihood of fibre release if left undisturbed and the restricted accessibility to the ACM, the overall hazard is low.
- Although only seven thermo-couples are identified to have contain ACM, all thermo-couples will be removed as ACM. This presents no significant increase in the volume of waste produced (<0.5m³). The overall asbestos waste generated by the works is estimated at below 1 m³ of Type 2 asbestos waste that may get contaminated with asbestos during the works.
- The ACM identified does not present a significant hazard and is programmed for removal prior to the decommissioning of the OCGT units.
- Agreement for the supervision of the works and the appointment of Registered Asbestos Contractors will be made at a later stage in line with statutory requirements of the Air Pollution Control Ordinance. The ACM will be removed using methods in line with the Code of Practice (COP) for *Asbestos using Full or Mini Containment* and will be under the supervision of a Registered Asbestos Consultant. There will be one containment per turbine covering all the thermo-couples.
- With regard to inaccessible areas including the chimney stack and internal components of the turbines, a supplementary report prepared by a registered asbestos consultant will be undertaken once these areas are accessible.

4.3 LAND CONTAMINATION

4.3.1 Potential Sources of Land Contamination

The dismantling of some OCGT facilities may cause spillage of fuel oil or lube oil, if not properly managed. However, the whole site is concrete paved, and therefore the only cause for contamination is during the dismantling of fuel oil or lube oil. Special care will be exercised during the dismantling work in order to identify and record any contamination detected for possible assessment and sampling related to any future developments on the site.

4.3.2 Purchaser Obligations

It should be noted that, as required by the *Method Statement* (see *Annex A*), the Purchaser will be responsible to drain off all oil including but not limited to the fuel oil, lubrication oil, jacking oil and insulation oil before cutting of the pipes, tank, oil filled cables and dismantling of the component or equipment of the gas turbines. The Purchaser will also be responsible for the disposal of waste oil and the associated contaminant in accordance with the Hong Kong ordinances and regulations and CLP's SHE and General Site Work Requirements.

4.3.3 Facilities to Remain in Place

The building structure of the OCGTs will be retained for future workshop use. The existing control room located next to the OCGTs building will remain in place for future storage use.

Oil Pipes Trenches

All oil piping is located within concrete trenches. Owing to the containment within trench, it is unlikely they will have caused any land contamination. After disconnecting, emptying and removal of the oil pipes, the trenches can be filled and remain in place covered by concrete slab on top.

Equipment Plinths

All plinths will be levelled and made smooth.

4.3.4 Conclusions

In order to avoid the potential for land contamination during OCGT dismantling, the Purchaser will be required to submit the detailed dismantling methodology for CLP approval and establish appropriate adequate control and routine checking during the works.

The Purchaser is also required to produce a contingency plan to deal with any accidental spillage and leakage.

All chemical waste arising during the cleanup and dismantling activities should be handled and disposed of under the *Waste Disposal (Chemical Waste) (General) Regulation*.

4.4 AIR QUALITY

4.4.1 Potential Impacts

The project is likely to generate limited dust emissions during dismantling of plant structures, material transfer, filling activities and chimney demolition. No other air quality impacts are expected.

Since the nearest ASR in the vicinity of the site is located about 80 m away and the buildings and structures to be demolished are prefabricated metal, with the only concrete structures being floors and low bund wall, no adverse air quality impacts are expected, provided that the dust suppression measures stipulated under the *Air Pollution Control (Construction Dust) Regulation* as well as those listed in the *Method Statement* (see *Annex A*) are adhered to where applicable.

4.5 NOISE

4.5.1 Potential Impacts

The demolition process will involve the use of Powered Mechanical Equipment (PME) which have the potential to cause elevated noise levels in the close vicinity of the works. However, adverse noise impact is not envisaged based on the following considerations:

- **Distant Noise Sensitive Receivers (NSR):** The premises beside the OCGT units are industrial in nature. There are no NSRs within a 1 km radius.
- **Small number of PME:** The expected plant inventory and their noise levels are presented in *Table 4.5a* below:

Table 4.5a Proposed Plant Inventory

Plant	TM Ref. No	Unit	SWL/unit	Sub-SWL
Mobile Crane	CNP 048	2	112	115
Lorry	CNP 141	2	112	115
Breaker, excavator mounted	CNP 027	1	122	122
			Total SWL	123

Based on the above plant inventory, the predicted noise levels at 1.1 km from the works would be $L_{eq, 30 \text{ min}}$ 57dB(A), i.e. well within the daytime construction noise criteria of 75dB(A). Therefore, no adverse construction noise impact is expected during the decommissioning of the OCGTs.

4.6 WATER QUALITY

4.6.1 Water Sensitive Receivers

The OCGT unit falls within the Western Buffer Water Control Zone (WCZ) and effluents would be discharged into the nullah leading to the Rambler Channel as part of Western Buffer WCZ. Nearby water sensitive receivers include the cooling water intake point of the sewage treatment works along Tsing Yi Road, located about 2 km from the main discharge points of the Power Station.

4.6.2 Potential Sources of Impact

The demolition of OCGT units may result in the following:

- demolition run-off and erosion from site surfaces, drainage channels, etc.;
- spillage and leakage of fuel and lubricating oil during emergency conditions; and,
- sewage generated by the workforce.

4.6.3 *Evaluation of Impacts*

Demolition Site Run-off and Surface Water Drainage

Run-off and drainage from the site may contain increased loads of suspended solids (SS) and contaminants. Potential sources of water pollution from site run-off include:

- run-off and erosion from site surfaces, drainage channels, earth working area and demolition stockpiles; and
- wash water from dust suppression sprays and wheel washing facilities.

Since most equipment is to be sold and removed from the site and due to the generally small scale of project, the demolition run-off is expected to be small (except under heavy storm conditions), and no significant water quality impacts are envisaged.

General Demolition Activities

Spillages of liquids, such as oil and diesel from demolition equipment, could in sufficient quantity result in water quality impacts if they enter the soil or nearby water bodies. However, due to the small scale of the works and that all oils and lubricants will be drained off prior to dismantling, no adverse impact is expected. Details of the proposed handling of demolition wastes are prescribed in *Section 5.3*.

Sewage Effluents

While no kitchen effluents will be generated on site, sewage arising from sanitary facilities provided for the on-site workforce (estimated at about 20 persons or less) have the potential to cause water pollution. Sewage is characterized by high levels of biological oxygen demand (BOD), ammonia and *E. coli* counts.

However, the sewage discharges from the site facilities are connected to the existing sewer and sewage treatment facilities, so no adverse impacts are expected.

4.6.4 *Conclusions*

No significant adverse water quality impacts are likely to result from the decommissioning of the OCGTs provided that:

- all the recommended mitigation measures including appropriate drainage and silty run-off collection facilities are incorporated in accordance with the recommendations of *ProPECC PN 1/94*;

- all demolition workforce sewage is discharged to the foul sewer leading to Tsing Yi Sewage Treatment Plant;
- all temporary drainage diversions will be reinstated to the original condition after the demolition works are completed and implemented properly, in accordance with the recommendations of *ProPECC PN 1/94*; and
- all demolition works area discharges comply with the TM standards of the WPCO. It is considered that controls on discharges from land based demolition activities and proper site management procedures, as referenced above, will minimise residual water quality impacts to the acceptable levels stipulated in the WPCO criteria.

4.7 WASTE MANAGEMENT

Since most of the OCGT plant and equipment will be sold to the purchaser, it is expected that only small amounts of solid waste will be generated.

4.7.1 Potential Sources of Impact

General

The demolition activities will result in generation of a variety of wastes which can be divided into distinct categories based on their constituents, as follows:

- construction and demolition (C&D) waste;
- chemical waste; and
- general refuse.

Construction and Demolition Waste

Construction and demolition waste comprises materials torn down during demolition works, including concrete and structural steels. The bulk of the C&D waste will be generated from the demolition of the OCGTs associated equipment and the bund wall around these equipment. The C&D waste will comprise different types of materials, as shown in *Table 4.7a*:

Table 4.7a Solid Waste Categories from Demolition Works

Category	To be disposed of at public filling facilities	For recycling	To be disposed of at landfills
Mass concrete	Y		
Reinforced concrete	Y		
Plaster (from drywall)	Y		
Steel		Y	
Other metal (eg aluminium frame)		Y	
Sheet plastics (eg protective covers)			Y
Other plastics (eg pipes, stair handles, scaffolding ties)			Y
Glass (eg window, doors)			Y

Category	To be disposed of at public filling facilities	For recycling	To be disposed of at landfills
Wiring		Y	
Fixtures (various material types)			Y
Fibre (from insulation)			Y
Chemical waste (eg oil contaminated pipes or oil stained concrete) ^(a)			

Note (a): To be disposed of at the Chemical Waste Treatment Facility at Tsing Yi

As discussed in Section 3.3, the demolition works will complete within a six-month period, involving demolition of two OCGT units. The amounts of major C&D waste categories generated from this project can be estimated as follows:

Concrete: The main source of concrete waste will be from the removal of bund walls of the oil farm, generator transformer and unit transformer; concrete plinth of the oil farm, generator and unit transformer; revamp of the chimney and turbine house floor. The total concrete waste to be disposed of at public filling facilities is estimated at approximately 350 m³ in total, requiring approximately 47 lorry trips to the public filling area, that is 8 trips for each month of the demolition works.

Scrap Metal: The prefabricated-metal walls and roofs of the OCGT house will remain in place. The steel to be disposed includes two chimneys, IDO tank, chimney supports, reinforced steel of the bund walls and concrete plinths and pipes. The total amount of scrap metal to be recycled should be about 10 m³ in total. That would result in only 2 lorry trips to the scrap yard.

Other C&D Waste: Detailed estimation of other C&D waste would be difficult, but the volume of waste requiring disposal to landfill will be minimised by material recovery practices, such as waste metals being segregated and sold for scrap, inert waste being directed to public filling facilities etc. It is believed that due to the small scale of the project and prefabricated metal construction of the buildings, the total amount of C&D waste to be disposed of at landfills will not exceed 5 m³ per unit, 10 m³ in total, resulting in a total of about 2 lorry trips to the landfill.

Large equipment items will be removed by barge using the heavy loading berth at Tsing Yi. In view of the small volume of material to be demolished, it is anticipated that the frequency of barge trip would be very low.

Chemical Waste

Chemical Waste, as defined under the *Waste Disposal (Chemical Waste)(General) Regulation*, includes any substance being scrap material, or unwanted substances specified under *Schedule 1* of the *Regulation*.

Chemical waste expected from these demolition works include lead-acid batteries used for turbine start-up (a total of about 4 m³ for two units), oil drained from the plant piping (about 10 m³), and piping containing residual quantity of oil (about 300 m in length). Minor quantities of hydraulic and

lubricating oils from machines involved in the demolition may also be generated. The fuel oil shall be collected by CLP Power and return to other site for use.

It should be noted that the transformers contained in each of OCGT units are part of the equipment intended for re-use and, being part of the sale, will be drained on-site and then removed by the purchaser. The drained oil from the unit transformers and generator transformers, about 80 m³ for two units, will be disposed by the purchaser as chemical waste in local licensed treatment facilities for recycling, reprocessing or treatment.

General Refuse

Demolition works with even a moderate number of workers will result in the generation of a variety of general refuse materials that will require disposal. General refuse may include food wastes and packaging as well as waste paper.

Since it is expected that no more than 20 workers will be employed at any time, assuming a waste generation of 0.65 kg per worker, the general refuse generated during this project will be in the order of 13 kg per day.

4.7.2 Evaluation of Impacts

Construction and Demolition Waste

To conserve void space at landfill sites, C&D waste containing more than 30% of inert material should not be disposed of at landfills. As wastes will be segregate scrap metals recovered for recycling, the amount of waste to be disposed of at landfills will be minimised.

Due to the small scale of the project, sell-off of the equipment and a large proportion of the inert and recyclable waste in the total waste to be generated, no adverse waste impact is expected.

Chemical Waste

In general, chemical wastes may pose serious environmental and health and safety hazards if not stored and disposed of in an appropriate manner as outlined in the *Waste Disposal (Chemical Waste) (General) Regulation, Code of Practice on the Handling, Transportation and Disposal of Asbestos Waste, A Guide to the Chemical Waste Control Scheme* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. These hazards include:

- toxic effects to workers;
- adverse effects on air, water and land from spills;
- fire hazards; and,
- disruption to sewage treatment works where waste enters the sewage system through damage to the sewage biological treatment systems.

The chemical waste generated during the demolition of OCGT units will include lead-acid batteries, oil drained from plant piping and some oil-contaminated piping. However, due to the small scale of the project, the amount of chemical wastes is unlikely to generate adverse impact on the existing treatment facilities. It should be noted that BTM (halon) materials from the fire-fighting equipment, do not constitute chemical waste, as they will be retained by CLP Power for future use.

General Refuse

The general refuse arising from the workforce (20 workers or less) will be collected daily and disposed together with the refuse generated with the Tsing Yi site via the existing means of refuse collection. No adverse impacts are therefore expected.

Summary

The environmental impacts from the various waste types are summarised in *Table 4.7b*.

Table 4.7b *Summary of Waste Management Impacts*

Waste Type	General Evaluation
C&D Waste	The total quantities of C&D wastes generated will be small, of which major parts comprising inert materials will be diverted to public filling areas (inert materials, about 350 m ³ in total) or recycled (scrap metal, about 10 m ³). The C&D waste disposed of at landfills will not exceed 10 m ³ . Due to the inert nature of most C&D waste, its disposal is not likely to raise long-term environmental concerns. The C&D Waste disposal would result in a total of about 47 lorry trips to the public filling area, 2 lorry trips to the scrap yard and 2 lorry trips to the landfill over the six month work period. The small amount of large items will be removed by barge.
Chemical Waste	As discussed in <i>Section 4.2</i> , Asbestos Containing Materials contained within the thermo couple of the two OCGT units must be handled according to <i>Asbestos Abatement Plan</i> , which has been submitted to EPD. Other chemical waste, including lead-acid batteries (4 m ³), oil drained from piping (approximately 10 m ³) and oil contaminated piping (approximately 300 m) will be handled and disposed of according to pertinent Government regulations. The oil of the unit transformers and generator transformers (approximately 80 m ³) shall be disposed of as chemical waste by the purchaser. Due to the small scale of the project, the amount of chemical wastes that may be generated would not be sufficient to cause adverse impact on the existing treatment facilities
General Refuse	As the workforce will not exceed 20 persons and good practice will be adhered to, no adverse impacts are expected.

Although adverse environmental impact is not envisaged during the decommission of the OCGTs, the following mitigation measures are still recommended to further minimise any potential environmental impact on the nearby sensitive receivers.

5.1 AIR QUALITY

The following mitigation measures stipulated in *the Air Pollution Control (Construction Dust) Regulation* should be incorporated in the Contract Specifications and implemented to minimise dust nuisance.

General Requirement

- where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4 m high from ground level shall be provided along the entire length of that portion of the site boundary except for a site entrance or exit;
- the portion of any road leading only to a construction site that is within 30 m of a discernible or designated vehicle entrance or exit shall be kept clear of dusty materials;
- any stockpile of dusty material shall be covered entirely by impervious sheeting or sprayed with water or a dust suppression chemical so as to maintain the entire surface wet;
- all dusty materials shall be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet;
- where a vehicle leaving the works site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; and
- the working area of any excavation or earth moving operation shall be sprayed with water or a dust suppression chemical immediately after the operation so as to maintain the entire surface wet.

5.2 NOISE

Good site practice and noise management can further reduce the noise impact on the identified NSRs. To reduce noise impacts, the following measures should be followed during the demolition works:

- only well-maintained plant should be operated on-site and plant should be serviced regularly during the demolition works;

- machines and plant that are in intermittent use should be shut down between work periods or should be throttled down to a minimum; and
- silencers or mufflers on demolition equipment should be utilised and should be properly maintained during the demolition.

5.3

WATER QUALITY

Despite the small scale of this project, it is important that appropriate measures are implemented to control run-off and drainage and, thereby, prevent high loadings of SS from entering the Western Buffer WCZ and causing impacts on the identified WSR. Proper site management is proposed to minimise surface water run-off, soil erosion and the impacts of sewage effluents.

Site run-off and drainage impacts will be prevented in accordance with the guidelines stipulated in the EPD's *Practice Note for Professional Persons, Construction Site Drainage* (ProPECC PN 1/94). The implementation of good housekeeping and stormwater best management practices will ensure that WPCO standards are met and that no unacceptable impacts on the WSRs arise due to the demolition works.

Demolition Site Run-off and Surface Water Drainage

Exposed soil areas are expected to be minimal and with limited potential for siltation, contamination of run-off, and erosion. Run-off related impacts associated with demolition work and other general activities can be all readily controlled through the use of appropriate mitigation measures, which include:

- the use of sediment traps, where appropriate; and
- the adequate maintenance of the existing drainage system to prevent flooding and overflow.

All existing drainage pipes and culverts provided to facilitate run-off discharge from the Tsing Yi site have been adequately designed for the controlled release of storm flows. Sediment traps are regularly cleaned and maintained, and the oil interception facilities are regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages.

Provided the existing surface run-off and drainage are effectively managed and controlled, adverse water quality impacts can be avoided.

General Demolition Activities

Debris and rubbish on site will be collected, handled and disposed of properly to prevent such material from entering the water column and causing water quality impacts. The solid waste management requirements are discussed in *Section 4.7*.

The effects on water quality from these demolition activities are likely to be minimal, provided that works are well maintained and good site practice is observed to ensure that litter and fuels are managed, stored and handled properly.

Sewage Effluents

As the foul sewer will be utilized throughout the demolition works, no adverse water quality impacts should arise from the demolition workforce sewage.

5.4

WASTE MANAGEMENT

This section sets out recycling, storage, transportation and disposal measures which are recommended to avoid or minimise potential adverse impacts associated with waste arising from the decommissioning of OCGT units.

The Purchaser will be required to incorporate these recommendations into a comprehensive on-site waste management plan. Such a waste management plan should incorporate site-specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.

Waste Management Hierarchy

The various waste management options can be categorised in terms of preference from an environmental viewpoint. The options considered to be more preferable have the least impacts and are more sustainable in a long-term context. Hence, the hierarchy is as follows:

- avoidance and minimisation, ie not generating waste through changing practices;
- reuse of materials, thus avoiding disposal (generally with only limited reprocessing);
- recovery and recycling, thus avoiding disposal (although reprocessing may be required); and
- treatment and disposal, according to relevant laws, guidelines and good practice.

The Waste Disposal Authority should be consulted by the Purchaser on the final disposal of wastes.

This hierarchy should be used to evaluate waste management options, thus allowing maximum waste reduction and often reducing costs.

C&D Waste

Only small quantities of demolition waste will arise at the OCGT demolition site, of which only a small portion would require disposal at landfills. In order to minimise waste arising and keep environmental impacts within acceptable levels, the mitigation measures described below should be adopted. Small quantities of oil stained concrete may also be generated, these will be treated as chemical waste for disposal purposes.

Careful design, planning and good site management will minimise waste generated. Proper segregation of wastes on site will increase the feasibility of recycling certain components of the waste stream, such as the steel being sold as scrap for reuse by the steel mills.

In accordance with the *New Disposal Arrangements for Construction Waste, Environmental Protection Department and Civil Engineering Department, 1992*, most of the demolition waste will be disposed of as inert materials at a public filling area, with the remaining part going to a specified landfill.

Chemical Waste & ACM

Apart from ACM, only small amounts of chemical waste as defined by *Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation*, are likely to be produced. These will include lead-acid batteries and possibly minor amounts of other chemical wastes. These wastes will be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes* as follows:

The Purchaser will be required to ensure that containers used for the storage of chemical wastes should:

- be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;
- have a capacity of less than 450 l unless the specifications have been approved by the EPD; and
- display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations.

Chemical wastes will be stored and handled by the Purchaser.

General Refuse

General refuse generated on-site will be stored in enclosed bins and collected by existing waste collector on a daily basis.

The potential environmental impacts of the decommissioning works of gas turbine units have been discussed and appropriate and straightforward mitigation measures are proposed for the purchaser to adopt during the execution of the works to ensure the works will not cause adverse environmental impact.

As the Project Proponent will require the Purchaser to undertake the works in accordance with the Project Profile and in adherence to pertinent HK SAR Ordinances and Regulations as well as CLP's SHE Specifications, no adverse environmental impacts are expected.

Therefore, it is recommended that the nature of the project warrants an approval to apply directly for an Environmental Permit (EP).

REFERENCES TO PREVIOUSLY ENDORSED REPORTS

This Project Profile has made reference to the following environmental assessment report:

1. ERM Hong Kong Ltd: **Environmental Assessment Report on the Relocation of Two 76MW Open Cycle Gas Turbines From The Hok Un Power Station to the Tsing Yi Power Station.** July 1993. *Endorsed prior to 1 April 1998, listed under the Register:*
2. ERM Hong Kong Ltd: **Decommissioning of Gas Turbine Units (GT3-GT6) Inside Castle Peak Power Station.** November 2002. *EP Permission granted on 10 January 2003 under the EIA Ordinance.*
3. Atkins China Ltd: **Asbestos Investigation Report for Gas Turbines at Tsing Yi Compound.** July 2003. Ref. 3377-OR046-00. *Endorsed by EPD on 31 July 2003, (13) in EP/AC/A/15/500/599 XIII.*
4. Atkins China Ltd: **Tsing Yi Gas Turbines Asbestos Management Prior to Demolition, Asbestos Management Plan Including Asbestos Abatement Plan.** July 2003. Ref. 3377-OR045-00. *Endorsed by EPD on 31 July 2003, (13) in EP/AC/A/15/500/599 XIII.*