



**Capco** 青山發電有限公司  
Castle Peak Power Co. Ltd.

## ***Additional Gas-fired Generation Units Project***

Project Profile

22 April 2015

### **Environmental Resources Management**

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## Project Profile

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CLP Power Hong Kong Limited (CLP) is responsible for providing a safe, highly reliable and clean supply of electricity to over 80% of Hong Kong's population at reasonable cost. Within Hong Kong, CLP operates three power stations, namely Castle Peak Power Station (CPPS), Black Point Power Station (BPPS) and Penny's Bay Power Station (PBPS) owned by Castle Peak Power Company Limited (CAPCO), a joint venture between CLP and China Southern Power Grid Company Limited, of which CLP holds a 70% interest.

To support Hong Kong's major infrastructure development, new development and redevelopment areas, and consistent with CLP's 2014-2018 Development Plan approved by the HKSAR Government, a number of capital projects have been proposed to address the continuous growth in electricity demand. Preparation for the development of additional gas-fired generation capacity is one such project.

Ensuring sufficient generation capacity to meet load demand is vital to a reliable electricity supply, as well as maintaining appropriate reserve margins to cater for unplanned outages. In 2014 the peak demand for electricity in CLP's system reached 7,030 MW and this is forecast to rise in the next several years. The reserve capacity of CLP's supply system has already declined to 26%, against the range of 20-35% recommended by the International Energy Agency, and will reduce further if electricity demand continues to grow as forecast.

CLP and CAPCO support the HKSAR Government's objective of improving air quality and environmental performance in Hong Kong. Consistent with the HKSAR Government's medium-term strategy of increasing the use of natural gas for local power generation, and reducing carbon intensity of local electricity generation, provision for additional local gas-firing generation capacity is considered by CLP and CAPCO to be the preferred choice.

The purpose of CAPCO's current proposal is to consider the installation of up to two additional gas-fired generation units by CAPCO at Black Point Power Station (BPPS) (hereafter referred to as "the Project"). However, any formal decision by CLP/CAPCO to proceed with building any additional gas-fired generation capacity requires further analysis as such investment decision is dependent upon a host of factors including the rate of demand growth, environmental requirements, technical feasibility, the economic merits of the project and HKSAR Government approval. Accordingly, the submission of and content described in this Project Profile does not amount to a commitment by or on behalf of CLP and/or CAPCO to proceed with the Project.

## 1.2

### ***PURPOSE OF THIS PROJECT PROFILE***

This document, the Project Profile, is produced for the Project to obtain an EIA Study Brief under the *Environmental Impact Assessment Ordinance (EIAO) (Cap. 499)*. It includes a description of the potential environmental impacts associated with the construction and operation of the Project, should CLP/CAPCO decide and are able to obtain HKSAR Government's approval to proceed with the Project. The description presented herein has been based on best available information compiled by CLP/CAPCO describing relevant construction activities, operational details and baseline information describing the conditions at the Project site and its surrounding environment.

## 2 **BASIC INFORMATION**

### 2.1 **PROJECT TITLE**

Additional Gas-fired Generation Units Project

### 2.2 **NAME OF PROJECT PROPONENT**

Castle Peak Power Company Limited (CAPCO)

### 2.3 **PURPOSE & NATURE OF PROJECT**

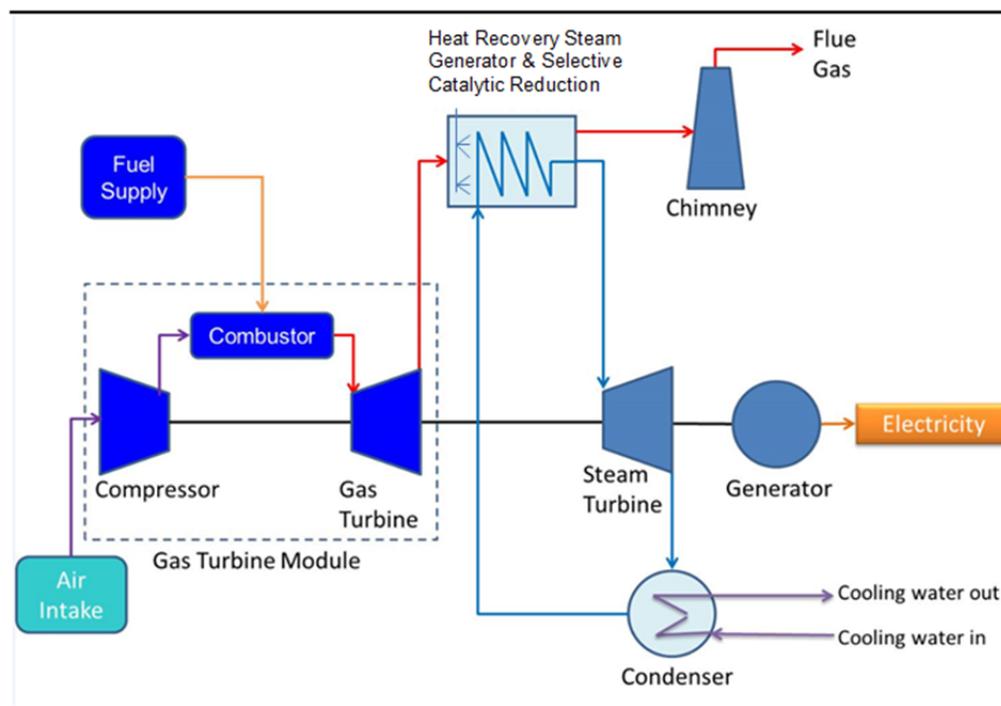
The scope of the Project involves the construction and operation of up to two 600 MW class additional gas-fired generation units at BPPS to both increase electricity generating capacity and accommodate continuous growth in electricity demand. Planning for such gas-fired generation units is also consistent with the HKSAR Government's strategy to increase the use of natural gas for power generation.

Technically, CAPCO's preference is to adopt two units of combined cycle gas turbine (CCGT) configuration using natural gas as the primary fuel. Such configuration is aimed at reducing emissions as compared with coal-fired generation and thereby providing a relatively clean source of electricity for Hong Kong.

#### 2.3.1 **Operation of a Combined Cycle Gas Turbine (CCGT)**

CCGT is a form of highly efficient power generation technology which combines a gas-fired gas turbine cycle with a steam turbine cycle. The combined cycle uses a gas turbine to generate electricity and then recover gas turbine exhaust waste heat in a boiler to produce steam, which in turn drives a steam turbine and increases significantly the system power output without using additional fuel in either the steam boiler or steam turbine cycle. This technology is currently being used at BPPS with an installed capacity of 8 units (each of 312.5 MW), using natural gas as the primary fuel. An indicative schematic diagram showing the CCGT process is depicted in *Figure 2.1*.

Figure 2.1 Combined Cycle Gas Turbine Process (arrangement for illustration only)



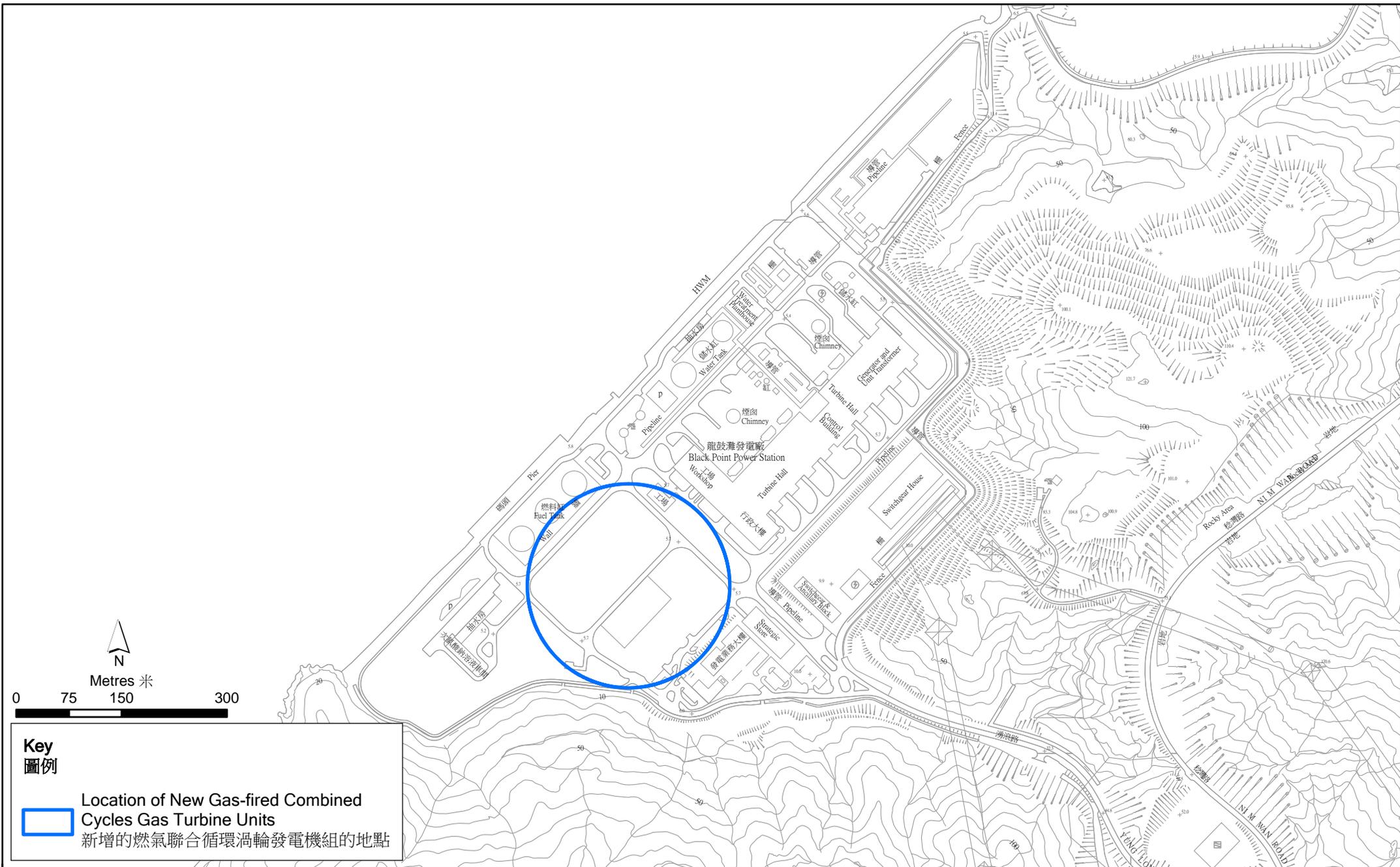
#### 2.4 LOCATION & SCALE OF THE PROJECT & HISTORY OF SITE

The proposed location for the Project is within the existing boundaries of the BPPS site. Based on the preliminary project design information available at the time of preparing this *Project Profile*, the proposed location for each of the additional gas-fired generation units comprising the Project are illustrated in *Figure 2.2*. Notably, the proposed Project location is intended to minimize interfaces to avoid disruption to BPPS operations, including throughout the construction phase.

Black Point (and the BPPS) is located in the western-most part of the New Territories. It comprises a headland extending from the east (land) to the west (sea) with granitic soil underneath, typical of the Tuen Mun and Castle Peak areas. The major development at Black Point is the BPPS (the first natural gas-fired power plant in Hong Kong), which is located to the north of the headland on reclaimed land. To the west of Black Point lies the route of the Urmston Road shipping channel, which has a water depth of > -15 mPD at present.

#### 2.5 OVERVIEW OF PROJECT ACTIVITIES

This section provides a generic description of the currently envisaged construction and operational activities associated with the Project based on current information. As the Project is at a preliminary development phase, the design and planned implementation programme described in this Project Profile may be subject to further change.



**Key**  
**圖例**

Location of New Gas-fired Combined Cycles Gas Turbine Units  
新增的燃氣聯合循環渦輪發電機組的地點

Figure 2.2  
圖 2.2  
Indicative Location of New Gas-fired Combined Cycle Gas Turbine Units at Black Point Power Station  
龍鼓灘發電廠內新增的燃氣聯合循環渦輪發電機組的擬定地點

## 2.5.1

### *Construction Phase*

To provide space for the installation of the additional gas-fired generation units, the construction of the Project will first involve site clearance and preparation. Depending upon the final layout selection, some buildings and structures may need to be demolished or relocated. At this stage it is anticipated that the covered store area currently occupying the proposed Project site at BPPS would be demolished and relocated. In addition some underground services (pipes, cabling etc.) may require re-routing or diversion to install the additional gas-fired generation units.

New facilities to be installed for the Project will include the gas turbines, steam turbines, generators, HRSG, generator step-up (GSU) transformers, unit auxiliary transformers, exhaust stacks, selective catalytic reduction (SCR) facilities, and all associated equipment and facilities for fuel, power, service water, cooling water uptake and discharge, etc. No additional submarine gas pipeline, or gas receiving/storage facilities will be installed as existing facilities will be used. No decommissioning of existing electricity generation facilities will be required.

Major installation works will include civil, mechanical and electrical works, such as construction of gas headers (above-ground pipework) and seawater systems (underground pipework) and other general land-based construction works common to a power plant.

Marine dredging works would not be required for the construction of a single CCGT unit. However, if a second CCGT unit is installed, minor marine dredging works close to the existing cooling water system are anticipated to be required to enhance the cooling water system to support the construction of the second additional CCGT unit.

## 2.5.2

### *Operation Phase*

During operation of the additional gas-fired generation units, emissions (e.g. stack emissions, cooling water and heat discharge) from the BPPS will comply with the relevant licence requirements in accordance with statutory requirements, including the *Air Pollution Control Ordinance*, *Water Pollution Control Ordinance*, etc.

Land-based maintenance works common to a power plant will be undertaken as necessary over the lifespan of the additional gas-fired generating units. No marine-based maintenance works will be required.

## 2.6

### *NUMBER AND TYPE OF DESIGNATED PROJECT TO BE COVERED BY THE PROJECT PROFILE*

The following elements of the Project addressed in this Project Profile are classified as Designated Projects under the *EIAO (Cap. 499)*:

- Installation of additional gas-fired generation units at BPPS (Schedule 2, Part I, Item D.1 Public utility electricity power plant).
- If a second unit is to be installed, a dredging operation less than 100 m from the BPPS seawater intake location would be required (Schedule 2, Part I, Item C.12(b) A dredging operation which is less than 100 m from a seawater intake point).

## 2.7

### *NAME AND TELEPHONE NUMBERS OF CONTACT PERSON*

<b>Name, Position &amp; Title</b>	<b>Telephone Number</b>
Chris K C Cheung <i>Deputy Director – Generation Engineering CLP Power Hong Kong Limited</i>	2678-5201

### 3 *OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME*

#### 3.1 *PROJECT PLANNING & IMPLEMENTATION*

The Project Proponent is CAPCO with overall responsibility for the planning, design, construction and operation of the Project. The Project Proponent has engaged an Environmental Consultant to carry out an Environmental Impact Assessment (EIA) Study and Engineering Consultants to undertake preliminary engineering design works. It is envisaged that the Project will be constructed by Contractor(s) to be appointed at a subsequent stage. CLP is the operator of the BPPS and will remain as operator of the additional gas-fired generation units.

#### 3.2 *INDICATIVE PROJECT PROGRAMME*

The planning stage of the Project, including the EIA, engineering design and statutory permitting, is anticipated to be completed during mid-2016. Subject to obtaining HKSAR Government approval of the Project and a final investment decision on the Project being taken by CLP/CAPCO, it is anticipated that the construction of the Project would be implemented in stages commencing from the second half of 2016, with commercial operation of the first unit anticipated by the end of 2019.

#### 3.3 *INTERACTIONS WITH OTHER SURROUNDING PROJECTS*

The Project will be located within the existing BPPS site. The following committed or planned projects in the surrounding areas may potentially interface with the construction and operation of this Project:

- *Engineering Feasibility Study for Industrial Estate at Tuen Mun Area 38* (EPD Study Brief ESB-277/2014): this project includes the development of an Industrial Estate with temporary loading and storage of petrochemical feedstock site and other road modification works in Tuen Mun Area 38 and is currently under EIA stage. This potential concurrent project is more than 3 km away from the BPPS, and its construction period is tentatively scheduled from 2019 to 2023;
- *West New Territories (WENT) Landfill Extensions* (Register No.: AEIAR-147/2009): this landfill extension is approximately 2 km away from the BPPS, and is likely to commence in the near future, but the programme remains uncertain;
- *Pyrolysis Plant at EcoPark* (EPD Study Brief ESB-259/2013): this project consists of four 5-tonne pyrolysis furnace systems, with each system having a handling capacity of 5 tonnes of waste plastics per day. It is currently under the EIA stage and construction is expected to commence in 2015. It is located approximately 4.5 km away from BPPS;

- *Potential Reclamation Site at Lung Kwu Tan*: this site is located along the coastal waters of Lung Kwu Tan and Lung Kwu Sheung Tan. With an area of about 200 – 300 ha, this proposed site would potentially be used for residential development <sup>(1)</sup>. Details of its implementation programme are uncertain at this stage;
- *Enhanced Ash Utilisation and Water Management Facilities at Castle Peak Power Station (CPPS) (EP-441/2012)*: This project involves the reconstruction of the two existing water lagoons at CPPS by lowering their base slabs and the construction of a new one to increase the storage capacities of the water lagoons at CPPS. The water lagoons are used for temporary storage of storm water runoff collected from the coal stockyard and process water from the operation of the CPPS which in turn can be reused for the operation of the CPPS. The project is expected to be constructed between 2016 and 2019. It is more than 3 km away from the BPPS site;
- *Decommissioning of West Portion of the Middle Ash Lagoon at Tsang Tsui, Tuen Mun (Register No.: AEIAR-186/2015)*: This project involves the decommissioning of the pulverized fuel ash (PFA) lagoon at the west portion of the Middle Ash Lagoon at Tsang Tsui, Tuen Mun, which was operated by CAPCO for the placement of water and PFA. The decommissioning will provide buildable land for future developments by the HKSAR Government. A columbarium has been proposed to be built at the site. The tentative decommissioning period would be from September 2015 to March 2016. The project site is about 1 km away from the BPPS site;

In addition, the following existing operations in the Black Point and Castle Peak areas may also interact with the construction and operation of this Project:

- *Sludge Treatment Facilities (STF) (Register No. AEIAR-129/2009)*: the STF is located 1.5 km away from BPPS. It serves to treat dewatered sewage sludge from the public sewage treatment works by high temperature incineration and reduce the volume of sludge requiring final disposal at landfill by up to 90% through the thermal process <sup>(2)</sup>;
- *Permanent Aviation Fuel Facility (PAFF) for Hong Kong International Airport (Register No.: AEIAR-107/2007)*: the PAFF is located about 4.5 km away from BPPS. It consists of a tank farm providing jet fuel to the Hong Kong International Airport via submarine fuel pipelines;

(1) [https://www.fccihk.com/files/dpt\\_image/5\\_committees/Infrastructure/ELSS%20-%20Briefing%20French%20Chamber%20\(140120\).pdf](https://www.fccihk.com/files/dpt_image/5_committees/Infrastructure/ELSS%20-%20Briefing%20French%20Chamber%20(140120).pdf)

(2) [http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob\\_solutions/WFdev\\_TMSTF.html](http://www.epd.gov.hk/epd/english/environmentinhk/waste/prob_solutions/WFdev_TMSTF.html)

- *Castle Peak Power Station (CPPS)*: CPPS is a coal-fired power plant located in Tap Shek Kok in Tuen Mun, approximately 4 km away from BPPS. The operation of CPPS is regulated under a Specified Process licence;
- *Green Island Cement Plant*: this site produces cement and is operating under a Specified Process licence. It is more than 4 km away from the BPPS site; and
- *Shiu Wing Steel Mill*: this site manufactures steel bars is operating under a Specified Process licence. It is more than 4 km away from the BPPS site.

The above working assumptions will be re-examined and confirmed during the EIA stage of the Project.

Major environmental elements surrounding the Project are summarized below and presented in *Figure 4.1*. Potential impacts of the Project on these elements and sensitive receivers will be studied in detail in the EIA study.

#### 4.1 PLANNING & DEVELOPMENT CONTEXT

The Project will be implemented within the boundary of the existing BPPS. The BPPS site is not covered by the *Outline Zoning Plan (OZP)*.

#### 4.2 INDUSTRIAL, COMMERCIAL & RESIDENTIAL DEVELOPMENTS

Existing, committed and planned industrial, commercial and residential developments are regarded as potential environmentally sensitive receivers for air quality, noise impacts and hazards to life. These sensitive receivers are presented in *Table 4.1*.

**Table 4.1** *Potential Existing and Planned Environmental Sensitive Receivers in the Vicinity of the Project*

Sensitive Receivers	Type of Use	Approximate Separation Distance from the BPPS (m)
Residents at Ha Pak Nai	Residential	2,900
Residents at Sheung Pak Nai	Residential	6,100
Residents at Lung Kwu Sheung Tan	Residential	1,000
Residents at Sha Po Kong	Residential	2,700
Proposed development in Lung Kwu Tan reclamation area (planned)	Residential	800
Site offices of Industrial/commercial plants (e.g. Green Island Cement, Eco Park, Shiu Wing Steel Mill)	Industrial/ Commercial	4,300
Site office of BPPS	Industrial	0
Site office of CPPS	Industrial	4,000
Site office of WENT landfill	Industrial	1,400
Site office of Sludge Treatment Facility	Industrial	1,450
Residents at Lau Fau Shan	Residential	8,800
Residents at Tin Shui Wai	Residential	10,000
Residents at Hung Shui Kiu	Residential	7,500
Residents at Lam Tei	Residential	6,500
Residents at Tuen Mun Sun Hui	Residential	6,500
Residents at Tuen Mun Town Centre	Residential	6,600
Residents at Butterfly Beach	Residential	6,100

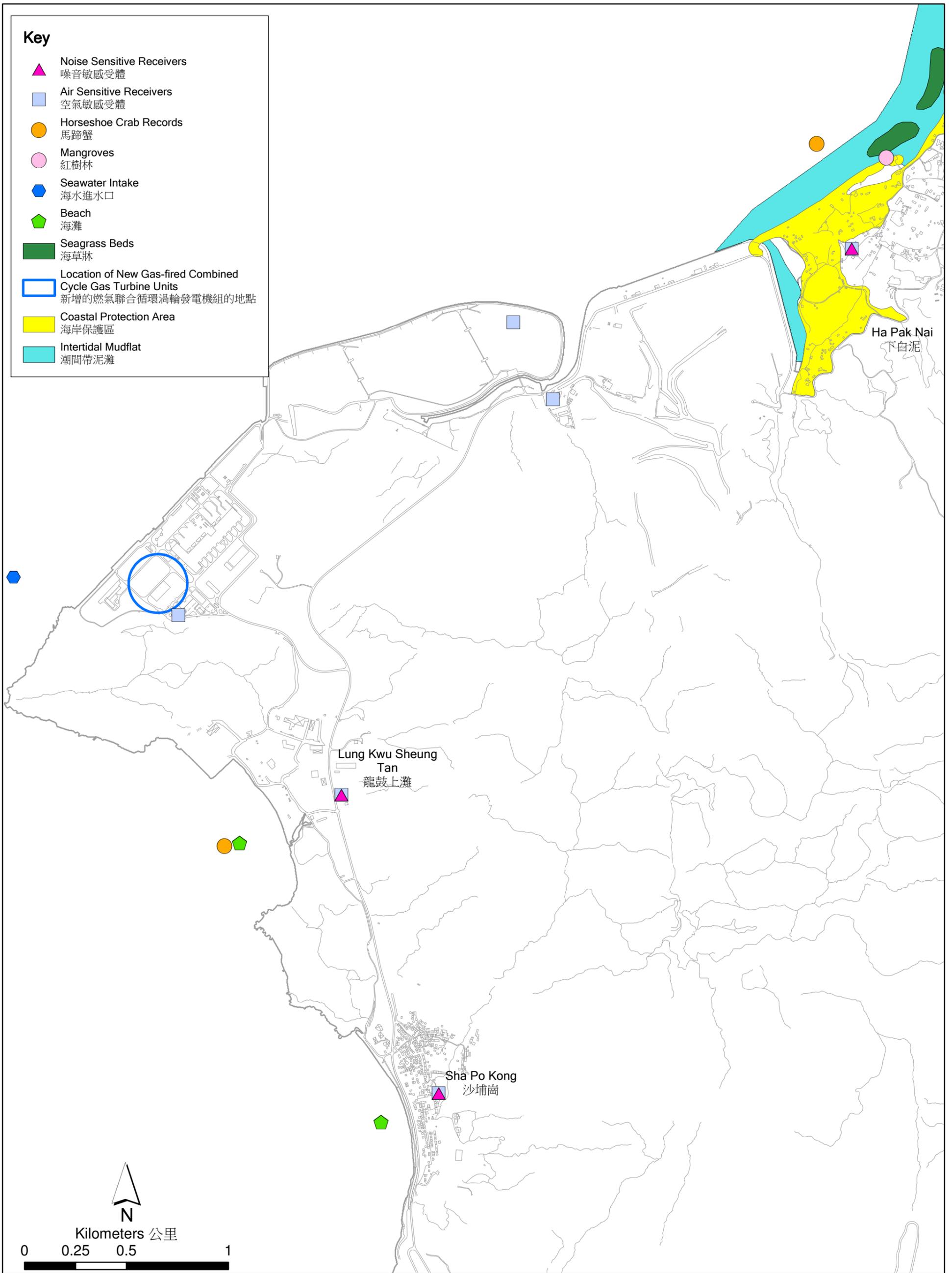


Figure 4.1  
圖 4.1

Locations of Environmentally Sensitive Receivers in  
the Vicinity of the Project  
項目附近的環境敏感受體位置

#### 4.3 *SHIPPING FAIRWAYS*

The Urmston Road to the south of BPPS is a major vessel fairway that connects the Pearl River Estuary, the west and northwestern Hong Kong waters and the waters between Chek Lap Kok and Tuen Mun. The marine works associated with the second CCGT unit for the Project are expected to maintain sufficient separation distances from the Urmston Road shipping channel.

#### 4.4 *SUBMARINE UTILITIES, INCLUDING CABLES, PIPELINES & OUTFALLS*

The Black Point to Shekou Submarine Cable System lands approximately 50 m to the north of the BPPS site. The closest outfall is the outfall for BPPS itself. There are also two submarine gas pipelines connecting two gas export facilities in the PRC to BPPS at the northern end of the site.

#### 4.5 *GAZETTED BATHING BEACHES*

There are no gazette beaches within 5 km of the BPPS site. For non-gazetted beaches, the Lung Kwu Sheung Tan (Upper and Lower) is at least 2 km from the BPPS.

#### 4.6 *SEAWATER INTAKE*

Nearby seawater (cooling water) intake includes that of the BPPS. Other seawater intakes include the CPPS intake, Permanent Aviation Fuel Facility (PAFF) intake, Shiu Wing Steel Mill intake and Tuen Mun Flushing Water intake located more than 4 km away from the BPPS.

#### 4.7 *AREAS OF CONSERVATION VALUE*

To the north of the BPPS site is the Pak Nai Site of Special Scientific Interest (SSSI), which is an intertidal mudflat/mangrove habitat about 5 km away from the proposed location of the Project. The Siu Lang Shui SSSI, which is known as a butterfly overwintering site, is over 5 kms away from the BPPS.

The Sha Chau and Lung Kwu Chau Marine Park is located approximately 3 km from the BPPS.

#### 4.8 *COASTAL PROTECTION AREA*

Ha Pak Nai, Pak Nai and Sheung Pak Nai are designated Coastal Protection Areas (CPA) by the *Town Planning Ordinance, Hong Kong Town Planning Board* in the *Sheung Pak Nai and Ha Pak Nai Outline Zoning Plan No. S/YL-PN/9*. The closest of these CPAs is more than 3 km from this Project.

## 4.9

### *ECOLOGICAL SENSITIVE RECEIVERS*

Black Point and Deep Bay waters form part of the habitat of the Chinese White Dolphin (*Sousa chinensis*). Based on the latest data reported by the AFCD <sup>(1)</sup>, marine waters immediately adjacent to the BPPS where minor marine works are proposed for this Project represents only marginal habitat and appears to be of low importance to the species.

Intertidal, subtidal benthos and coral surveys were conducted in the vicinity of BPPS as part of the Black Point Gas Supply Project EIA <sup>(2)</sup>. Rocky shore species and infauna common and widespread in Hong Kong were recorded, and no species of conservation interest was found. Also no corals (hard, soft, gorgonians or whips) were recorded. Therefore only habitats and assemblages of low ecological value are anticipated within the Project site for minor dredging.

To the north of the BPPS lies the seagrass bed and horseshoe crab nursery ground at Ha Pak Nai. These habitats of ecological value are more than 3 km from BPPS.

## 4.10

### *FISHERIES SENSITIVE RECEIVERS*

There is no Fish Culture Zone (FCZ) located close to the BPPS. The closest AFCD designated FCZ is located at Ma Wan which is over 20 km from the project site. The oyster production area located along the shore from Tsim Bei Tsui to Pak Nai is more than 4 km from the BPPS.

A total of 5,580 m<sup>3</sup> of artificial reefs were deployed in the Sha Chau and Lung Kwu Chau Marine Park and are at least 7 km from the BPPS. The recognised northern Lantau fisheries spawning area is located more than 4 km to the south of the BPPS.

Results of the AFCD Port Survey 2006 <sup>(3)</sup> suggested that waters in outer Deep Bay and Black Point are not key fishing areas with very low fisheries production comparing to elsewhere in Hong Kong waters.

## 4.11

### *SITES OF CULTURAL HERITAGE*

No Declared/deemed monuments or graded/ recorded heritage resources are located in the vicinity of the BPPS. There are three archaeological sites in the areas of Sheung Pak Nai and Ha Pak Nai north of the BPPS, including:

- (1) Hung SKY (2014) Monitoring of Marine Mammals in Hong Kong Waters (2013-14). Final Report (1 April 2013 to 31 March 2014). Submitted to the Agriculture, Fisheries and Conservation Department
- (2) Black Point Gas Supply Project. EIAO website. Accessed on 31 March 2015  
<[http://www.epd.gov.hk/eia/english/alpha/aspd\\_581.html](http://www.epd.gov.hk/eia/english/alpha/aspd_581.html)>
- (3) AFCD (2015) Fisheries: Capture Fisheries Latest Status. Accessed on 31 March 2015  
<[http://www.afcd.gov.hk/english/fisheries/fish\\_cap/fish\\_cap\\_latest/fish\\_cap\\_latest.html](http://www.afcd.gov.hk/english/fisheries/fish_cap/fish_cap_latest/fish_cap_latest.html)>

- Sheung Pak Nai Archaeological Site, located north east of the SSSI at Sheung Pak Nai and ~5 km from the project;
- Long Jok Tsuen Archaeological Site, located along both sides of Nim Wan Road near the shoreline and ~4 km from the project; and
- Ha Pak Nai Archaeological Site, which covers partly the CPA at Ha Pak Nai and located ~3 km from the project.

To the south of BPPS are the terrestrial culture heritage resources including Build Heritage (comprising of two building structures, a World War II cave and a grave site) and the Lung Kwu Sheung Tan Archaeological Sites, which are located over 300 m away. The proposed location of the additional gas-fired generation units is located over the former Yung Long site which was reclaimed when the original BPPS was constructed.

## 5.1 OVERVIEW OF POTENTIAL ENVIRONMENTAL IMPACTS

The potential environmental impacts arising from the construction and operation of the Project have been investigated and discussed in this *Section*. An overview of the potential environmental impacts associated with the construction and operation phases of the Project have been identified and summarised in *Table 5.1*.

**Table 5.1** *Potential Environmental Impacts Arising from the Project during Construction and Operation Phases*

Potential Impact	Construction Phase <sup>(a)</sup>	Operation Phase <sup>(a)</sup>
• Air Quality		
- Dust	✓	–
- Gaseous emissions	✓	✓
- Odour	–	–
• Noise	✓	✓
• Liquid Effluents & Discharges	✓	✓
• Generation of Waste or By-products	✓	✓
• Manufacturing, Storage, Use, Handling, Transport, or Disposal of Dangerous Goods	✓	✓
• Hazard to Life	–	✓
• Disposal of Spoil Material, including Potentially Contaminated Materials	✓	✓
• Disruption of Water Movement or Bottom Sediment	✓	✓
• Change in Visual Appearance	–	✓
• Cultural & Heritage	–	–
• Terrestrial Ecology	–	–
• Marine Ecology & Fisheries	✓	✓
• Cumulative Impacts	✓	✓
<b>Notes:</b>		
(a) ✓ = Possible      '–' = Not Expected		

## 5.2 AIR QUALITY

## 5.2.1 Construction Phase

The construction and installation of the additional gas-fired generation units will be carried out within the existing BPPS site and do not require any major site formation. Any structures to be cleared or built will mostly be of general construction. With the implementation of good construction site practices in accordance with the *Air Pollution Control (Construction Dust) Regulation*, dust and gaseous emissions arising from the construction works are anticipated to be minor and no unacceptable air quality impact is expected.

## 5.2.2 *Operation Phase*

The additional gas-fired generation units will be of advanced technology being adopted in the world-wide power industry and with the installation of emission control facilities SCR, air emissions are expected to be even lower than other gas-fired CCGT units currently in operation at BPPS. Industrial distillate oil (i.e., ultra low sulphur diesel (ULSD)) is intended to be used as back-up fuel. NO<sub>x</sub>, SO<sub>2</sub> and particular matter (PM<sub>10</sub> and PM<sub>2.5</sub>) are the key air pollutants of concern when industrial distillate oil is used. The emission control facilities installed will be effective in controlling air emissions when natural gas or back-up fuel is used, and the air emissions are expected to be even lower than other gas-fired CCGT units currently in operation at BPPS.

All operations at BPPS are required to comply with the Environmental Protection Department's (EPD) Guidance note on the best practicable means for electricity works 2014, and the Specified Process Licence conditions, which include compliance with both instantaneous emission limits as well as an overall total emission cap.

## 5.3 *NOISE*

### 5.3.1 *Construction Phase*

The site clearance and construction works for the Project will involve the use of Powered Mechanical Equipment (PME), which have the potential to cause elevated noise levels. The works are expected to be relatively small-scale and do not require extensive concrete breaking activities which are the noisier activities. The closest Noise Sensitive Receivers (NSRs) are villages such as Lung Tsai, Tuk Mei Chung and Sha Po Kong in the Lung Kwu Tan area, which is located more than 1 km away from the BPPS.

Construction works carried out by contractors during restricted hours, i.e. 1900 - 0700 hrs of the next day on any day, and anytime on Sundays or general holidays, will be required to obtain Construction Noise Permits in accordance with the requirements of the *Noise Control Ordinance (NCO)*.

### 5.3.2 *Operation Phase*

Fixed plants with excessive noise will be enclosed in building structures from which noise emissions would be minimised. The closest NSRs are Lung Tsai, Tuk Mei Chung and Sha Po Kong villages in the Lung Kwu Tan area, which is located more than 1 km away from the BPPS. With large separation distances from nearby NSRs, unacceptable noise impact from fixed plant noise sources due to the operation of the Project is not expected.

## 5.4 WATER QUALITY

### 5.4.1 Construction Phase

No major site formation works are anticipated for the Project. Minor water quality impact, including construction site runoff and discharges, and sewage from the construction workforce, may arise from land-based construction works. With implementation of good construction site practice, including the *Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN1/94)* and other relevant guidelines and statutory requirements, no unacceptable water quality impacts from the construction works are anticipated.

Marine dredging works would not be required for the construction of a single CCGT unit. However, if a second CCGT unit is installed, minor marine dredging works would be required to enhance the cooling water system to support the construction of the second additional CCGT unit. It is anticipated that there may be potential water quality impacts in localised areas which are distant from water quality sensitive receivers (WSRs), e.g. gazetted bathing beaches, public seawater intakes, etc.

### 5.4.2 Operation Phase

It is likely that there will be increased cooling water discharges to the existing seawater outfall at BPPS as a result of increased generation capacity for any additional CCGT unit(s) installed. This marginal increase in cooling water discharges, both in terms of volume and heat load, may alter water current patterns in localised areas. Since potential impact on water current patterns occur in localised areas surrounding the seawater outfall and that WSRs are relatively distant from the Project, no unacceptable water quality impacts associated with the operation of the Project are expected.

Operational discharges from the Project will be managed in the same way as the effluent streams currently permitted for the BPPS and will be required to comply with relevant standards stipulated under the *Water Pollution Control Ordinance (WPCO)*.

## 5.5 TERRESTRIAL ECOLOGY

As the Project will be located within the existing boundaries of the BPPS site, no disturbance to terrestrial ecological resources (e.g. recognized sites of conservation importance, habitats, vegetation and wildlife) is anticipated. No impacts to terrestrial ecology are thus expected to arise from the construction and operation of this Project.

## 5.6 *MARINE ECOLOGY & FISHERIES*

### 5.6.1 *Construction Phase*

Marine dredging works would not be required if one additional CCGT unit is being built. However, if a second CCGT unit is installed, minor marine dredging works for enhancing the cooling water system would be required. Potential impacts to marine ecological and fisheries resources include direct impacts on assemblages within the marine works areas. Temporary disturbance to fishing operations, if present, may occur within the marine works area. Also, indirect impacts to marine ecological resources and fisheries around the marine works areas may have the potential to occur as a result of perturbations to water quality due to dredging works at the seabed.

### 5.6.2 *Operation Phase*

As discussed in *Section 5.4.2*, operation of additional CCGT units may result in an increase of cooling water discharges and heat rejection to seawater via the cooling water outfall. These have the potential to cause indirect impacts on marine ecological resources and fisheries within the zone of influence of such discharges. Compliance with the relevant discharge licence requirements is expected to mitigate potential impacts to within acceptable levels. No unacceptable impact on fishing operations is anticipated.

## 5.7 *WASTE MANAGEMENT*

### 5.7.1 *Construction Phase*

The site clearance and construction activities associated with the Project will result in the following broad categories of waste:

- Inert Construction and demolition (C&D) materials and excavated materials, mainly from the clearance of existing facilities and excavation works, comprising concrete, steel and soil;
- Non-inert construction waste including packaging waste and timber;
- Chemical waste, such as batteries and lubricating oils from the maintenance of construction vehicles and equipment;
- General refuse, including food waste from the on-site work force and the packaging from the construction materials; and
- Marine sediments from marine dredging works (applicable only if the second CCGT unit is installed).

C&D materials and excavated materials generated from the construction works will be properly segregated and scrap metals will be recovered for recycling as far as practicable. The amount of construction waste requiring disposal at landfills and the associated potential impacts will be minimised.

With respect to the small-scale demolition and excavation works, the anticipated quantities of C&D materials and excavated materials to be generated will be small. Also, the construction activities of the Project are not expected to generate significant quantities of chemical waste. With proper housekeeping measures and collection and disposal of C&D materials and excavated materials in place, no unacceptable waste management implication is expected to arise from the construction phase of the Project.

Very small quantities of marine sediments are expected to arise from minor marine dredging works if a second additional gas-fired generation unit is to be installed. Procedures and requirements specified in *PNAP ADV-21 – Management Framework for Disposal of Dredged/ Excavated Sediment* will be followed for the management and disposal of the dredged material.

### 5.7.2 *Operation Phase*

Waste generated from the Project will be minimal and will be similar to that currently produced at the BPPS during normal gas-firing operation. The waste consists mainly of chemical waste as well as very small amount of debris and grit arising from cleaning of the cooling water system which will not represent any new waste stream compared to the existing situation. Chemical waste will be stored, handled, collected and disposed of according to the *Waste Disposal (Chemical Waste) (General) Regulation* and the conditions and requirements of Chemical Waste Producer Registration in BPPS. Debris and grit generated will be dewatered and disposal of in accordance with relevant requirements and guidelines of the *Waste Disposal Ordinance (WDO)* and the EPD.

The storage and handling of small quantities of dangerous goods anticipated for the Project, e.g. hydrogen, carbon dioxide, urea and ammonia, will follow the standard operating procedures currently adopted in BPPS and comply with the requirements of the *Dangerous Goods Ordinance (DGO)* and its subsidiary legislation.

## 5.8 *LAND CONTAMINATION*

Considering the current land use at the proposed Project site at BPPS, there appears to be a low potential for soil contamination. Historical records will be reviewed in detail as part of the EIA study to confirm this. The need for environmental site investigations at the concerned area(s), if any, will be determined.

Limited amount of chemicals may be used during the construction and operation of the Project. With the implementation of proper site management practices and precautionary measures, no land contamination concern is expected.

## 5.9 *LANDSCAPE AND VISUAL*

### 5.9.1 *Operation Phase*

It is proposed that the additional gas-fired generation units will be situated adjacent to the existing CCGT units within the existing BPPS site as depicted in *Figure 2.2*. The visual context of the proposed additional gas-fired generation units is considered compatible with the existing industrial setting at the BPPS site and no change to the overall visual quality is envisaged with the implementation of the Project. The Project is not anticipated to be visually intrusive in the overall setting of the BPPS.

## 5.10 *CULTURAL HERITAGE*

As the Project will be located within the existing boundaries of the BPPS site, cultural heritage/archaeological resources, such as Building Heritage and Archaeological Sites, are unlikely to be affected by this Project considering their distance from the proposed work areas (> 300 m). No impacts to these resources are thus expected to arise from the construction and operation of this Project.

## 5.11 *HAZARD TO LIFE*

### 5.11.1 *Operation Phase*

Existing facilities at BPPS will be used as far as practicable for storing hazardous materials required for the Project. New gas headers, piping, pressure and valve systems are required for the operation of the additional gas-fired generation units. These facilities will be carefully designed taking into account potential hazard to life considerations during operation. Similar to the current operation at BPPS, proper inspection and maintenance of these facilities as well as other components of the CCGT units by qualified personnel will be conducted on a regular basis. With proper plant design, maintenance and operation management, adverse issues related to hazard to life are not envisaged with respect to the operation of the Project.

## 5.12 *CUMULATIVE IMPACTS*

Cumulative impacts due to other existing, planned or committed concurrent projects would need to be considered during the EIA stage. The assessment will be based on best publicly available information at the time of reporting.

## 6 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN & FURTHER ENVIRONMENTAL IMPLICATIONS

### 6.1 AIR QUALITY

#### 6.1.1 Construction Phase

The following mitigation measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* are recommended to be implemented to minimise dust nuisance:

##### *Measures for General Construction Activities*

- Every main haul road shall be sprayed with water or a dust suppression chemical so as to maintain the entire road surface wet;
- All areas involving site clearance and excavations works will be sprayed with water before, during and after the operations to maintain the entire surface wet;
- The portion of any road leading only to a construction site that is within 30m of a discernible or designated vehicle entrance or exit shall be kept clear of dusty materials;
- Any stockpile of dusty materials on-site will be covered entirely by impervious sheeting; and/or placed in an area sheltered on the top and 3-sides. They should also be sprayed with water immediately prior to any loading, unloading or transfer operation to dampen the dusty materials; and
- 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.

##### *Measures for Demolition of Buildings*

- The area at which demolition work takes place should be sprayed with water immediately prior to, during and immediately after the demolition activities so as to keep the entire surface wet;
- Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads or streets; and
- All demolished items that may dislodge dust particles should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition.

#### 6.1.2 Operation Phase

The Project involves the operation of up to two additional gas-fired generation units with technology that produces comparatively higher efficiency and

better emission performance than the existing coal/gas generation units at CPPS and BPPS. Maintenance of the additional gas-fired generation units will be carried out on a regular basis to ensure compliance with emissions requirements.

## 6.2 NOISE

### 6.2.1 Construction Phase

The following construction noise management measures are proposed for the construction and demolition works:

- Only well-maintained equipment should be operated on-site and equipment should be serviced regularly during the demolition works;
- Machines and equipment that are in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- Silencers or mufflers on demolition equipment should be utilised and should be properly maintained during the demolition; and
- Where necessary, mobile noise barriers should be positioned within a few metres of noisy plant items.

### 6.2.2 Operation Phase

Adequate noise mitigating measures will be adopted to ensure that the noise level both during day and night time will comply with requirements in the NCO. Noise mitigation measures should be addressed during design stage to meet the relevant NCO requirements.

## 6.3 WATER QUALITY

### 6.3.1 Construction Phase

Appropriate measures will be implemented in the construction and site clearance works to control run-off and drainage, thereby minimising suspended solids (SS) and potential impacts on water quality. 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 controlled in accordance with the guidelines stipulated in the *EPD's Professional Persons Environmental Consultative Committee 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 water sensitive receivers arise due to the site clearance and construction works.

If a second additional gas-fired generation unit is to be installed, silt curtains will need to be installed to limit the dispersion of SS during marine dredging works. The release of SS to the water column will be controlled by the maximum production rate (to be specified in the Contract for dredging works).

A detailed programme for sampling and testing the dredged marine sediment will be prepared and implemented to determine whether the material is contaminated in accordance with *PNAP ADV-21 on Management of Dredged/Excavated Sediment*.

### **6.3.2**      *Operation Phase*

Operational discharge (ie cooling water discharge) would be regulated by the relevant standards stipulated under the *WPCO*. Detailed design of the Project will confirm that the potential increase of cooling water discharges and heat rejection at the outfall is optimised as far as practicable to reduce potential water quality impacts.

## **6.4**      *MARINE ECOLOGY & FISHERIES*

### **6.4.1**      *Construction Phase*

Potential impacts on marine ecology and fisheries can be reduced by minimising the marine works areas. Mitigation measures implemented to control water quality impacts during construction phase as mentioned in *Section 6.3.1* will effectively minimise impacts to marine ecological and fisheries resources in the area.

### **6.4.2**      *Operation Phase*

As discussed in *Section 6.3.2*, detailed design of the Project will confirm that the potential increase of cooling water discharges and heat rejection at the outfall is optimised as far as practicable to reduce potential water quality impacts, thereby reducing potential marine ecological and fisheries impacts at the same time.

## **6.5**      *WASTE MANAGEMENT*

### **6.5.1**      *Construction Phase*

The contractors employed to undertake the Project's construction will be required to incorporate recommendations on waste recycling, storage, transportation and disposal measures 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.

In the waste management plan to be prepared, the hierarchy presented below will be used to evaluate waste management options, thus allowing maximum waste reduction and often reducing costs:

- Avoidance and minimisation, i.e. 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.

Only limited quantities of construction and demolition waste are expected to arise from the construction of the Project, of which only a small portion would require disposal at landfills. To further minimise waste arising and keep environmental impacts within acceptable levels, careful design, planning and good site management practice will be adopted to minimise waste generated and waste on-site will be properly segregated to increase the feasibility of recycling certain components of the waste streams, such as steel.

Chemical waste generated during the construction of the Project will be properly stored in accordance with EPD's *Code of Practice on the Packaging, Labelling and Storage of Chemical Waste* before collection for disposal by a licensed Chemical Waste Collector. General refuse generated on-site will be stored in enclosed bins and collected by waste collector on a daily basis.

Procedures and requirements specified in *PNAP ADV-21 – Management Framework for Disposal of Dredged/ Excavated Sediment* will be followed for the management and disposal of the dredged marine sediment (applicable only if the second CCGT unit is installed).

### 6.5.2 *Operation Phase*

As discussed in *Section 5.6.2*, chemical waste will be stored, handled, collected and disposed of according to the *Waste Disposal (Chemical Waste) (General) Regulation* and the conditions and requirements of Chemical Waste Producer Registration in BPPS.

Debris and grit from cleaning of the cooling water system will be dewatered, handled and disposed of under good management and in accordance with the requirements of the *Waste Disposal Ordinance*

The storage and handling of dangerous goods for the Project will comply with the requirements of the *DGO* and its subsidiary legislation. With compliance of all *DGO* requirements, no additional measures will be required to be implemented for the Project.

## 6.6 *LAND CONTAMINATION*

Precautionary measures will be implemented to prevent potential oil leak/spill and improper handling/use of chemicals and chemical wastes. Spill response plans for the event of any oil or chemical spillage shall be prepared.

## 6.7 *LANDSCAPE AND VISUAL*

Mitigation measures for landscape and visual impacts, such as building façade colour and heights, etc., will be considered as necessary to better integrate the Project into the existing landscape and visual character of the existing BPPS site.

## 6.8 *HAZARD TO LIFE*

Process design for the operation of the additional gas-fired generation units is required to be carefully examined. A safety case will be prepared showing that the process design is safe and that risks are kept 'as low as reasonably practicable' (ALARP). Proper inspection and maintenance of the gas header, piping, pressure and valve systems as well as other components of the CCGT units by qualified personnel will be undertaken on a regular basis during operation.

## 6.9 *POTENTIAL SEVERITY, DISTRIBUTION & DURATION OF ENVIRONMENTAL EFFECTS*

It is anticipated that environmental impacts associated with general construction activities are potential issues during the construction period. Air quality and water quality impacts (and secondary impacts on marine ecology and fisheries), as identified in Sections 5.2.2, 5.4.2 and 5.6.2, are potential issues during the operation of the Project.

With the implementation of appropriate mitigation measures, no unacceptable impacts are expected. This will be confirmed in the EIA study.

## 6.10 *FURTHER ENVIRONMENTAL IMPLICATIONS*

Natural gas is widely recognised as a comparatively clean burning fuel. Implementation of the Project will enable an increase in the use of natural gas for local power generation and reduction in carbon intensity, whilst maintaining reliable power supply and addressing the continuous growth in electricity demand.

The approved EIA reports of projects that are of relevance to the Project are listed in *Table 7.1*.

**Table 7.1** *Previously Approved EIA Reports Relevant to the Project*

Register No.	Project Title	Aspect of Relevance
AEIAR-163/2012	Integrated Waste Management Facilities	<ul style="list-style-type: none"> <li>Surrounding environment, sensitive receivers and air quality impact assessment</li> </ul>
AEIAR-150/2010	Black Point Gas Supply Project	<ul style="list-style-type: none"> <li>Surrounding environment, sensitive receivers and water quality impact assessment</li> <li>Marine dredging activities</li> </ul>
AEIAR-129/2009	Sludge Treatment Facilities	<ul style="list-style-type: none"> <li>Surrounding environment and sensitive receivers</li> </ul>
AEIAR-107/2007	Permanent Aviation Fuel Facility for Hong Kong International Airport	<ul style="list-style-type: none"> <li>Surrounding environment and sensitive receivers</li> </ul>

*The English version of this Project Profile shall prevail wherever there is a discrepancy between the English version and the Chinese version.*