

**CONTENTS**

<b>16</b>	<b>ENVIRONMENTAL PERFORMANCE COMPARISON</b>	<b>1</b>
<b>16.1</b>	<b>INTRODUCTION</b>	<b>1</b>
<b>16.2</b>	<b>SUMMARY</b>	<b>10</b>

## 16 ENVIRONMENTAL PERFORMANCE COMPARISON

### 16.1 INTRODUCTION

This section of the EIA report presents a summary of the environmental performance of the Black Point option and the South Soko option. A qualitative comparison of the environmental performance of the Black Point options against other options that were shortlisted but selected for the EIA is presented in *Part 1, Section 4*.

The information examined includes key engineering design parameters such as:

- Size of Project Area and project boundary;
- Size of reclamation
- Reclamation methods
- Dredging volumes
- Waste generation
- Pipeline details etc,

The environmental performance measures examined include:

- Compliance with the *EIAO TM*;
- Key sensitive receivers;
- Particulars of the environmental impacts.

The Study Brief in *Clause 3.4.12* has requested that this information is presented as a summary table.

Table 16.1 Summary of the Findings of the Environmental Performance Comparison – (site parameters are based on the preliminary indicative site design and are approximate)

ISSUE	BLACK POINT	SOUTH SOKO
<b>KEY DESIGN PARAMETERS</b>		
<b>Overall Project Area (ha)</b>	32 ha on the headland south of the Black Point Power Station. The land portion of the site is relatively undisturbed and because of this supports dense growth of mixed shrubland plants.	36.5 ha encompassing mainly the central part of South Soko Island where the former Detention Centre was located. The area mainly consists of disturbed land that was modified in the past for village developments and then the Detention Centre. Consequently, there are numerous cut slope and excavated areas along with access roads and paths.
<b>Land Based Works Areas (ha)</b>	5 ha	18.5 ha
<b>Reclamation Areas (ha)</b>	16 ha off the Black Point headland	Approximately 0.6 ha in Sai Wan
<b>Modified Seawall Areas (ha)</b>	0 ha	1.1 ha
<b>Site Development Areas (ha)</b>	21 ha	20.2 ha
<b>Dredging Volumes (Mm<sup>3</sup>)</b>	Approach Channel & Turning Circle = 2.49 Mm <sup>3</sup> Seawall = 0.63 Mm <sup>3</sup> Berthing Trench & Intake/Outfall = 0.03 Mm <sup>3</sup>  <b>TOTAL = 3.15 Mm<sup>3</sup></b>	Approach Channel & Turning Circle = 1.07 Mm <sup>3</sup> Seawall = 0.10 Mm <sup>3</sup> Berthing Trench = 0.12 Mm <sup>3</sup> Seawater Intake & Outfall = 0.03 Mm <sup>3</sup> Submarine Gas Pipeline = 2.06 Mm <sup>3</sup> Water & Power Supply Line = 0.22 Mm <sup>3</sup> Gas Receiving Station = 0.29 Mm <sup>3</sup>  <b>TOTAL = 3.89 Mm<sup>3</sup></b>
<b>Length of Natural Coastline Affected (m)</b>	600 m of rocky shore	300 m including 265 m of rocky shore and 35 m of sandy shore
<b>Volume of Excavated Construction &amp; Demolition Materials</b>	<u>Soil (Total = 220,000 m<sup>3</sup>)</u> Site Formation = 220,000 m <sup>3</sup>  <u>Rock (Total = 770,000 m<sup>3</sup>)</u> Site Formation = 770,000 m <sup>3</sup>	<u>Soil (Total = 560,000 m<sup>3</sup>)</u> Site Formation = 560,000 m <sup>3</sup>  <u>Rock (Total = 1,800,000 m<sup>3</sup>)</u> Site Formation = 1,800,000 m <sup>3</sup>

ISSUE	BLACK POINT	SOUTH SOKO
<p><b>Volume of Fill Requirements</b></p>	<p>Soil (Total = 2,100,000 m<sup>3</sup>)</p> <p>Reclamation = 2,100,000 m<sup>3</sup></p> <p>Rock (Total = 785,000 m<sup>3</sup>)</p> <p>Seawall = 785,000 m<sup>3</sup></p>	<p>Soil (Total = 381,000 m<sup>3</sup>)</p> <p>Site Formation = 270,000 m<sup>3</sup></p> <p>Reclamation at South Soko = 20,000 m<sup>3</sup></p> <p>Reclamation at Gas Receiving Station = 91,000 m<sup>3</sup></p> <p>Rock (Total = 1,940,000 m<sup>3</sup>)</p> <p>Seawall = 150,000 m<sup>3</sup></p> <p>Seawater Intake &amp; Outfall = 72,000 m<sup>3</sup></p> <p>Water &amp; Power Supply Line = 180,000 m<sup>3</sup></p> <p>Submarine Gas Pipeline = 1,310,000 m<sup>3</sup></p> <p>Gas Receiving Station = 228,000 m<sup>3</sup></p>
<p><b>Volume of Excavated Construction &amp; Demolition Materials for Disposal</b></p>	<p>Soil = 0 m<sup>3</sup></p> <p>Rock = 0 m<sup>3</sup></p>	<p>Soil = 179,000 m<sup>3</sup></p> <p>Rock = 0 m<sup>3</sup></p>
<p><b>Volume of Imported Fill</b></p>	<p>Soil = 1,880,000 m<sup>3</sup></p> <p>Rock = 15,000 m<sup>3</sup></p>	<p>Soil = 0 m<sup>3</sup></p> <p>Rock = 140,000 m<sup>3</sup></p>
<p><b>Length of Submarine Utilities</b></p>	<p>N/A</p>	<p>Submarine Gas Pipeline (30") = 38.0 km</p> <p>Submarine Water Supply Line (12") = 7.5 km</p> <p>Submarine Power Cable (3 circuits) = 8.0 km</p>
<p><b>KEY SENSITIVE RECEIVERS</b></p>		
<p><b>EIAO – TM COMPLIANCE:</b> For each of the components assessed in the <i>EIA Report</i>, the key sensitive receivers have been identified in accordance with the relevant standards/criteria of the <i>EIAO-TM Annexes</i>, in reference to the Study Brief and based on the findings of literature reviews and in some cases detailed field investigations (eg, terrestrial ecology, marine ecology, fisheries, archaeology).</p>		
<p><b>AIR QUALITY</b></p>	<ul style="list-style-type: none"> <li>No residential Air Sensitive Receivers (ASRs) were identified within 500 m of the Project boundary.</li> <li>The closest ASR is the Administration Building of Black Point Power Station (BPPS) located at approx. 600 m from the Project boundary. The closest residential ASR is at Lung Kwu Tan located at 2 km from the site.</li> </ul>	<ul style="list-style-type: none"> <li>No residential Air Sensitive Receivers (ASRs) were identified within 500 m of the Project boundary.</li> <li>The closest ASR is identified as the Staff Quarters of Shek Pik Prison located approximately 6.4 km away from the site boundary. The closest residential ASR is Shek Pik village located at approximately 7 km</li> <li>The closest ASR from the gas receiving Station is the Administration Building of Black Point Power Station (BPPS) located at approx. 360 m from the Project boundary.</li> </ul>
<p><b>NOISE</b></p>	<ul style="list-style-type: none"> <li>The nearest NSR is identified as is at Lung Kwu Tan located at 1.6 km from the site.</li> <li>There are planned uses within 2 km from the site at the Northern end of Lung Kwu Sheung Tan.</li> </ul>	<ul style="list-style-type: none"> <li>The nearest NSR is identified as the Staff Quarters of Shek Pik Prison located approximately 6.4 km away from the site boundary.</li> <li>There are no planned or committed uses within 7 km from the site.</li> </ul>

ISSUE	BLACK POINT	SOUTH SOKO
<p><b>WATER QUALITY</b></p>	<p>The following water quality sensitive receivers were identified. In brackets is the closest distance between the sensitive receiver and the marine works (site/pipeline/utilities):</p> <p><i>Fisheries Resources:</i></p> <ul style="list-style-type: none"> <li>• Fisheries spawning ground in North Lantau (~2.6 km);</li> <li>• Artificial reefs at Sha Chau and Lung Kwu Chau (~6 km).</li> <li>• Other fisheries resources sensitive receivers are located at &gt;10 km away from the site and are thus not considered key sensitive receivers.</li> </ul> <p><i>Marine Ecological Resources:</i></p> <ul style="list-style-type: none"> <li>• Sha Chau and Lung Kwu Chau Marine Park (~2.7 km);</li> <li>• Intertidal mudflats and mangroves at Pak Nai (~2.6 km);</li> <li>• Seagrass beds and horseshoe crab nursery grounds at Pak Nai (~2.6 km);</li> <li>• Marine mammal habitat in NW waters;</li> <li>• Other marine ecological sensitive receivers are located at &gt;10 km away from the site and are thus not considered key sensitive receivers.</li> </ul> <p><i>Water Quality:</i></p> <ul style="list-style-type: none"> <li>• Gazetted beaches: Butterfly Beach (~6.6 km), Tuen Mun Beaches (~9.4 km);</li> <li>• Non-gazetted beaches: Lung Kwu Sheung Tan (~1.5 km), Lung Kwu Tan (~2.7 km);</li> <li>• Seawater intakes: Black Point Power Station (~0 km), Castle Peak Power Station (~3.2 km), Tuen Mun Area 38 (~5.2 km), Airport (&gt;10 km).</li> </ul>	<p>The following water quality sensitive receivers were identified. In brackets is the closest distance between the sensitive receiver and the marine works (site/pipeline/utilities):</p> <p><i>Fisheries Resources:</i></p> <ul style="list-style-type: none"> <li>• Fisheries spawning ground in North Lantau (~2.7 km);</li> <li>• Artificial reefs: Sha Chau and Lung Kwu Chau (&lt;1 km), Airport (~7.7 km);</li> <li>• Fish fry habitat at Pak Tso Wan (&lt;1 km);</li> <li>• Other fisheries resources sensitive receivers are located at &gt;10 km away from the site/pipeline/utilities and are thus not considered key sensitive receivers.</li> </ul> <p><i>Marine Ecological Resources:</i></p> <ul style="list-style-type: none"> <li>• Sha Chau and Lung Kwu Chau Marine Park (&lt;1 km);</li> <li>• Seagrass beds at Pak Nai (~5.1 km);</li> <li>• Intertidal mudflats at Pak Nai (~5.1 km);</li> <li>• Mangroves at Pak Nai (~5.1 km);</li> <li>• Horseshoe crab nursery grounds: Pak Nai (~1.7 km), Sham Wat Wan (~2.3 km), Tai O (~1.9 km), Yi O (~1.6 km), Sha Lo Wan (~3.1 km), Tong Fuk Miu (~2.1 km) Wan, Tung Chung Bay (~6.6 km);</li> <li>• Protection zone for Chinese White Dolphin Protection Zone in mainland waters (~1.9 km).</li> <li>• Marine Mammal Habitat.</li> </ul> <p><i>Water Quality:</i></p> <ul style="list-style-type: none"> <li>• Gazetted beaches: Butterfly Beach (~8.1 km), Tong Fuk (~4.4 km), Upper Cheung Sha Beach (~5.9 km), Lower Cheung Sha Beach (~7.2 km), Pui O Wan (~9.8 km);</li> <li>• Non-gazetted beaches: Lung Kwu Sheung Tan (~4.0 km), Lung Kwu Tan (~4.7 km), Fan Lau Sai Wan (~1.4 km), Fan Lau Tung Wan (~1.8 km), Tsin Yue Wan (~1.6 km);</li> <li>• Seawater intakes: Black Point Power Station (&lt;1 km), Castle Peak Power Station (~4.1 km), Tuen Mun Area 38 (~5.8 km), Airport (~5.1 km), Pumping Station at Tai Kwai Wan (&gt;10 km).</li> </ul>
<p><b>WASTE MANAGEMENT</b></p>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• N/A</li> </ul>
<p><b>TERRESTRIAL ECOLOGY</b></p>	<ul style="list-style-type: none"> <li>• The Project Area is relatively undisturbed and its terrestrial habitats are dominated by shrubland.</li> <li>• The following floral and faunal species of conservation interest have been identified within the Study Area: <ul style="list-style-type: none"> <li>• Two protected plant species: Pitcher Plant (<i>Nepenthes mirabilis</i>) and Bamboo Orchid (<i>Arundina graminifolia</i>);</li> <li>• Two uncommon butterflies and two rare butterflies;</li> <li>• A protected amphibian: Lesser Spiny Frog (<i>Rana exilispinosa</i>);</li> <li>• A protected reptile: Burmese Python (<i>Python molurus</i>);</li> <li>• Three birds of conservation interest: Black Kite (<i>Milvus lineatus</i>), White-bellied Sea Eagle (<i>Haliaeetus leucogater</i>) and Greater Coucal (<i>Centropus sinensis</i>).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• The Project Area has largely been developed.</li> <li>• The following floral and faunal species of conservation interest have been identified within the Study Area: <p><u>South Soko:</u></p> <ul style="list-style-type: none"> <li>• A protected and rare orchid: Golden Eulophia (<i>Eulophia flava</i>);</li> <li>• Three uncommon dragonfly species, fifteen uncommon and two rare butterfly species;</li> <li>• An uncommon reptile: Plumbeous Water Snake (<i>Enhydryis plumbea</i>), and a protected reptile: Common Rat Snake (<i>Pytas mucosus</i>);</li> <li>• Eleven bird species of conservation interest</li> </ul> <p><u>Shek Pik:</u></p> <ul style="list-style-type: none"> <li>• One protected plant species Pavetta (<i>Pavetta hongkongensis</i>);</li> <li>• Four uncommon butterfly species;</li> <li>• An endemic and protected amphibian: Romer's Tree Frog (<i>Philautus romeri</i>);</li> <li>• One locally protected bat species Japanese Pipistrelle (<i>Pipistrellus abramus</i>);</li> <li>• Eight bird species of conservation interest.</li> </ul> </li> </ul>

ISSUE	BLACK POINT	SOUTH SOKO
<p><b>MARINE ECOLOGY</b></p>	<ul style="list-style-type: none"> <li>The following ecological sensitive receivers were identified. In brackets is the closest distance between the sensitive receiver and the marine works (site/pipeline/utilities)::                             <ul style="list-style-type: none"> <li>Habitats of the Indo-pacific Humpback Dolphin (<i>Sousa chinensis</i>) (&lt; 1 km);</li> <li>Designated Sha Chau and Lung Kwu Chau marine park (~2.7 km);</li> <li>Intertidal mudflats and mangroves at Pak Nai (~2.6 km);</li> <li>Seagrass beds and horseshoe crab nursery grounds at Pak Nai (~2.6 km);</li> <li>Other marine ecological sensitive receivers are located at &gt;10 km away from the site and are thus not considered key sensitive receivers.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The following ecological sensitive receivers were identified. In brackets is the closest distance between the sensitive receiver and the marine works (site/pipeline/utilities):                             <ul style="list-style-type: none"> <li>Habitats of the Indo-pacific Humpback Dolphin and Finless Porpoise (&lt;1 km).</li> <li>Designated Sha Chau and Lung Kwu Chau (&lt;1 km);</li> <li>Seagrass beds at Pak Nai (~5.4 km);</li> <li>Intertidal mudflats at Pak Nai (~5.4 km); Tai O, Yi O, Shui Hau Wan</li> <li>Mangroves at Pak Nai (~5.4 km);</li> <li>Horseshoe crab nursery grounds: Pak Nai (~1.8 km), Sham Wat Wan (~1.7 km), Tai O (&lt;1 km), Yi O (~1.7 km), Sha Lo Wan (~3.3 km), Tong Fuk Miu (~2.1 km) Wan, Tung Chung Bay (~7.1 km);</li> <li>Protection zone for Chinese White Dolphins in mainland waters (~2.1 km).</li> </ul> </li> </ul>
<p><b>FISHERIES</b></p>	<ul style="list-style-type: none"> <li>Fisheries spawning ground in North Lantau (~2.6 km);</li> <li>Artificial reefs at Sha Chau and Lung Kwu Chau (~6 km).</li> <li>Other fisheries resources sensitive receivers are located at &gt;10 km away from the site and are thus not considered key sensitive receivers.</li> </ul>	<ul style="list-style-type: none"> <li>Nursery areas of commercial fisheries resources in south Lantau (&lt;1 km);</li> <li>Fisheries spawning ground in North and South Lantau (&lt;1 km);</li> <li>Artificial reefs: Sha Chau and Lung Kwu Chau (&lt;1 km km), Airport (~8.3 km);</li> <li>Fish fry habitat at Pak Tso Wan (&lt;1 km);</li> <li>Other fisheries resources sensitive receivers are located at &gt;10 km away from the site/pipeline/utilities and are thus not considered key sensitive receivers.</li> </ul>
<p><b>LANDSCAPE &amp; VISUAL</b></p>	<ul style="list-style-type: none"> <li>The site is remote and not visible from densely populated areas. There are no views from villages.</li> <li>Visually Sensitive Receivers:                             <ul style="list-style-type: none"> <li>Public Areas (VSR1 and VSR6);</li> <li>Road Network; (VSR3, 4 and 5);</li> <li>Ocean viewpoints (VSR 2).</li> </ul> </li> <li>The site is close to Black Point Power Station</li> <li>Landscape Resources:                             <ul style="list-style-type: none"> <li>Plantation (LR1), shrubland (LR2), shrubby grassland (LR3), stream / channel (LR4), developed area (LR5), rocky shoreline (LR6), power station edge (LR7)</li> </ul> </li> <li>Landscape Character Areas:                             <ul style="list-style-type: none"> <li>Black Point coastal uplands (LCA1), Black Point industrial urban landscape (LCA2), offshore waters landscape (LCA3), inshore waters landscape (LCA4).</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The site is remote and not visible from densely populated areas.</li> <li>Visually Sensitive Receivers:                             <ul style="list-style-type: none"> <li>Villages (VSR 1, 5, 13 and 14); views from Tai Long Wan Tsuen, Pui O, the Chi Ma Wan Peninsula and Shek Kwu Chau.</li> <li>Country Parks and Scenic lookouts (VSR 3, 4, 6, 7, 12 and 15);</li> <li>Road Network (VSR 2 and 8);</li> <li>Ocean viewpoints (VSR 9, 10 and 11).</li> </ul> </li> <li>The site has been disturbed in the past.</li> <li>Landscape Resources:                             <ul style="list-style-type: none"> <li>Secondary woodland (LR1), plantation (LR2), shrubland (LR3), backshore shrubland (LR4), grassland (LR5), abandoned wet and dry agricultural land (LR6), disturbed area (LR7), abandoned reservoir (LR8), rocky shoreline (LR9), sandy beaches (LR10), Artificial shore (LR11) and Tin Hau Temple (LR12)</li> </ul> </li> <li>Landscape Character Areas:                             <ul style="list-style-type: none"> <li>Island landscape (LCA1), abandoned institutional landscape (LCA2), offshore waters landscape (LCA3), inshore waters landscape (LCA4)</li> </ul> </li> </ul>

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CULTURAL HERITAGE	No terrestrial or marine sites of cultural heritage were identified.	<ul style="list-style-type: none"> <li>The following terrestrial cultural heritage resources have been identified:</li> </ul> <p><u>Shek Pik:</u></p> <ul style="list-style-type: none"> <li>The Shek Pik Rock Carving Declared Monument;</li> <li>An abandoned Hung Shing Temple; and</li> <li>The Shek Pik archaeological site.</li> </ul> <p><u>South Soko:</u></p> <ul style="list-style-type: none"> <li>Tin Hau Temple;</li> <li>Graves and an associated tablet;</li> <li>Earth shrines; and</li> <li>The Tai A Chau archaeological site with six distinct archaeological deposit areas (namely Sites A to E, and G - Site F being at Shek Pik).</li> </ul> <ul style="list-style-type: none"> <li>No marine archaeological resources were identified.</li> </ul>
QUANTITATIVE RISK ASSESSMENT	<ul style="list-style-type: none"> <li>The Terminal site, although remote is closer to populated areas than South Soko (~ 2km).</li> <li>The proposed route utilises the busy vessel fairways of central Hong Kong waters and passes in close proximity to densely populated areas:                             <ul style="list-style-type: none"> <li>Western Hong Kong Island: Ap Lei Chau, Cyberport;</li> <li>Ma Wan Island and Tsing Ma Bridge;</li> <li>New Territories: Sham Tseng, Tsing Lung Tau, Gold Coast, Tuen Mun</li> </ul> </li> <li>With respect to the route to Black Point, a higher number of land and marine based sensitive receivers will be exposed to the LNG carrier’s transit route than for the South Soko option.</li> </ul>	<ul style="list-style-type: none"> <li>No sensitive receivers have been highlighted. The Terminal site is remote from densely populated areas.</li> <li>The LNG carrier’s route to South Soko avoids the busy vessel fairways of central Hong Kong Waters and thereby avoids densely populated areas.</li> </ul>
<b>KEY ENVIRONMENTAL IMPACTS</b>		
<p><b>EIAO – TM COMPLIANCE:</b> For each of the components assessed in the <i>EIA Report</i>, the assessments and the residual impacts have all been shown, for both sites, to be acceptable and in compliance with the relevant assessment standards/criteria of the <i>EIAO-TM Annexes</i>. The information below focuses on some of the key findings of the Environmental and Risk Assessments performed for this EIA on the two options.</p>		
AIR QUALITY	<ul style="list-style-type: none"> <li>Although no adverse residual construction or operational air quality impact have been predicted, it is noted that there are other significant emissions in the vicinity of the site from the existing Black Point and Castle Peak Power Stations.</li> </ul>	<ul style="list-style-type: none"> <li>No adverse residual construction or operational air quality impact is anticipated due to the remoteness of the site from ASRs.</li> </ul>
NOISE	<ul style="list-style-type: none"> <li>No adverse residual construction or operational noise impact is anticipated</li> </ul>	<ul style="list-style-type: none"> <li>No adverse residual construction or operational noise impact is anticipated.</li> </ul>

ISSUE	BLACK POINT	SOUTH SOKO
<p><b>WATER QUALITY</b></p>	<ul style="list-style-type: none"> <li>No unacceptable residual impacts have been predicted to occur during the construction phase as impacts are predicted to remain close to the works areas.</li> <li>The result of the construction of the terminal at Black Point will be the reduction in sea area by approximately 16 ha.</li> <li>Maintenance dredging at the site will be relatively frequent (1 in 4 to 5 years).</li> <li>Given the immediate dilution of the cooled water discharges from the terminal outfall and that the limited volume of sewage generated would be treated on site before being discharged in accordance with the EPD's required standards, residual water quality impacts during the operation phase are not expected.</li> </ul>	<ul style="list-style-type: none"> <li>No unacceptable residual impacts have been predicted to occur during the construction phase as impacts are predicted to remain close to the works areas.</li> <li>The result of the construction of the terminal at South Soko will be the reduction in sea area by approximately 0.6 ha.</li> <li>Maintenance dredging at the site will be very infrequent (1 in more than 10 years).</li> <li>Given the immediate dilution of the cooled water discharges from the terminal outfall and that the limited volume of sewage generated would be treated on site before being discharged in accordance with the EPD's required standards, residual water quality impacts during the operation phase are not expected.</li> </ul>
<p><b>WASTE MANAGEMENT</b></p>	<ul style="list-style-type: none"> <li>The result of the construction works is the need to dispose of 3.15 Mm<sup>3</sup> of marine sediment off site.</li> </ul>	<ul style="list-style-type: none"> <li>The result of the construction works is the need to dispose of 3.89 Mm<sup>3</sup> of marine sediment and 0.179 Mm<sup>3</sup> of soil offsite.</li> </ul>
<p><b>TERRESTRIAL ECOLOGY</b></p>	<p><u>Black Point</u></p> <ul style="list-style-type: none"> <li>The Project will involve the permanent loss of approximately 4.2 ha of shrubland, 1.0 ha of developed area and 135m drainage channel. The affected habitats are considered to be of moderate to negligible ecological value.</li> <li>No adverse residual impact due to the construction and operation of the LNG terminal is expected after the implementation of the proposed mitigation measures including provision of 0.7 ha of compensatory and 6 ha of enhancement planting of shrubland, reinstatement of the temporary haul road and transplantation of Pitcher Plants and Bamboo Orchids.</li> <li>Although the terrestrial ecology at Black Point is mainly dominated by moderate-low shrubland/grass habitat typical of Hong Kong, it must be noted that the Project Area is relatively undisturbed with no significant human alterations.</li> </ul>	<p><u>South Soko:</u></p> <ul style="list-style-type: none"> <li>Approximately 0.2 ha of secondary woodland, 2.8 ha of plantation, 8.3 ha of shrubland, 0.5 ha of abandoned wet agricultural land, 1.8 ha of grassland and 5.6 ha of disturbed area will be lost permanently or temporarily. Overall the affected areas are considered to be of low/negligible to moderate quality habitats.</li> <li>No adverse residual impact due to the construction and operation of the LNG terminal is expected at South Soko after the implementation of the proposed mitigation measures including provision of compensatory planting of approximately 0.2 ha of secondary woodland, 1.9 ha of shrubland and 1.3 ha of grassland and transplantation of individuals of the Golden Eulophia.</li> <li>It must be noted that many of the habitats on South Soko Island were observed to be highly modified and disturbed as a result of village developments up to the 1960s, the construction of a Detention Centre in 1980s and its subsequent demolition in the 1990s. The construction and operation of the LNG terminal will have no significant detrimental impact on the islands terrestrial ecology.</li> </ul> <p><u>Shek Pik:</u></p> <ul style="list-style-type: none"> <li>Approximately 0.004 ha of plantation and 0.02 ha of developed area will be lost permanently and 0.12 ha of developed area will be lost temporarily. The affected areas are considered to be low/negligible quality habitat.</li> </ul>



ISSUE	BLACK POINT	SOUTH SOKO
<p><b>MARINE ECOLOGY</b></p>	<ul style="list-style-type: none"> <li>The loss of approximately 600 m of natural rocky shore/intertidal habitat and approximately 120 m of artificial shoreline which are of low ecological value. The residual impact is considered to be acceptable, as the loss will be compensated by the provision of approx. 1.1 km of sloping rubble mound/rock or concrete armour seawalls that have been demonstrated to become recolonised by assemblages of a similar nature after construction.</li> <li>The loss of approximately 16 ha of subtidal soft bottom assemblages within the reclamation sites. The residual impact is considered to be acceptable as even though the size of habitat lost is relatively large it is of relatively low ecological concern.</li> <li>The loss of approximately 16 ha of marine waters within the reclamation sites. The residual impact is considered to be acceptable as the habitat forms only a small portion of the extensive home range of affected animals (typically over 100km<sup>2</sup>) and is not expected to result in long term biologically significant impacts on the population of marine mammals in Hong Kong.</li> <li>Maintenance dredging of specific areas of the approach channel and turning is expected to be required once every 4 to 5 years. Although impact to water quality is expected to be compliant with current WQO standards, the works will result in relatively regular disturbance to the low ecological value habitat within the dredged areas.</li> <li>Based on the above no adverse residual ecological impacts have been identified. It must also be noted that the marine environment around the Black Point has been subject to disturbance in the past as a result of the reclamation at BPPS and sand dredging.</li> </ul>	<ul style="list-style-type: none"> <li>The loss of approximately 560 m of artificial shoreline/intertidal habitat, approximately 265 m of natural rocky shore/natural subtidal habitat and approximately 35 m of sandy shore which are of low to medium ecological value. The residual impact is considered to be acceptable, as the loss of these habitats will be compensated by the provision of 0.6 km of sloping rubble mound/rock or concrete armour seawalls that have been demonstrated to become recolonised by assemblages of a similar nature after construction.</li> <li>The loss of approximately 0.6 ha of subtidal soft bottom assemblages within the reclamation site. The residual impact is considered to be acceptable as the habitat is of low ecological concern as a result of previous reclamation works and small size.</li> <li>The loss of approximately 0.6 ha of marine waters within the reclamation site. The residual impact is considered to be acceptable as the habitat supports comparatively low sightings of marine mammals and the size of habitat loss is small.</li> <li>Water quality mitigation measures have been proposed to ensure compliance with relevant standards that will prevent impacts from occurring to ecological sensitive receivers during the construction works for the terminal and submarine utilities.</li> <li>Maintenance dredging of specific areas of the approach channel and turning circle is expected to be required very infrequently (once every 10 years). Since impact to water quality is expected to be compliant with current WQO standards, the residual impact associated with maintenance dredging is considered to be acceptable.</li> <li>Based on the above, no unacceptable residual ecological impacts have been identified. It must also be noted that the marine environment around the South Soko Island has been subject to disturbance in the past as a result of the reclamations in Sai Wan and Tung Wan. To the East of the South Soko island lies the active South Cheung Chau Mid Disposal Ground and to the West the now inactive but gazetted Sand Dredging and Mud Disposal Area.</li> </ul>
<p><b>FISHERIES</b></p>	<ul style="list-style-type: none"> <li>The identified residual impact occurring during the construction phase is the permanent loss of approximately 16 ha of fishing grounds required for the LNG terminal reclamation.</li> <li>The residual impact is considered to be acceptable as even though the size of fishing ground lost is relatively large, the fisheries production values are relatively low.</li> </ul>	<ul style="list-style-type: none"> <li>The identified residual impact occurring during the construction phase is the permanent loss of approximately 0.6 ha of seabed associated with the LNG terminal reclamation.</li> <li>The limited habitat loss, the small-scale nature of fishing operations and the potential environmental benefits of the seawall combine to reduce the magnitude of this residual impact to within acceptable levels.</li> </ul>

ISSUE	BLACK POINT	SOUTH SOKO
<p>LANDSCAPE &amp; VISUAL</p>	<ul style="list-style-type: none"> <li>The proposed LNG terminal would be only visible from limited viewpoints, including the small number of visitors on the remote island of Lung Kwu Chau and the transient passengers on ferry routes. The residual level of visual impact is considered to be acceptable.</li> <li>Potential glare and lighting impacts will be low due to the distances between the site and VSRs and careful lighting selection and placement.</li> <li>There will be an overall slight residual impact on the landscape character of Black Point headland which is considered acceptable.</li> <li>Of the impacts on the Landscape Resources, most will be partially mitigated with additional plantings or through construction of the new terminal to blend as best as possible with the surrounding landscape</li> </ul>	<ul style="list-style-type: none"> <li>Due to its remoteness and layout, most land based viewing locations will be too far removed from the proposed LNG terminal to be aware of the change in landscape.</li> <li>The major visual change and impact on landscape character will be for those few viewers who visit the surrounding area and particularly the ocean between South and North Soko and south of South Soko.</li> <li>Potential glare and lighting impacts will be low due to the distances between the site and VSRs and careful lighting selection and placement.</li> <li>There will be a residual impact on the landscape character of South Soko, however the overall impact is assessed as moderate.</li> <li>Compensatory planting will mitigate the effects of the development on many of the landscape resources. The effects on the rocky shoreline can be partially mitigated by the use of natural rock in the reclamation areas and the sandy beach will be partially mitigated by the natural accretion of sand.</li> <li>The LNG terminal will not result in significant effects on the Landscape Resources;</li> </ul>
<p>CULTURAL HERITAGE</p>	<ul style="list-style-type: none"> <li>Loss of two building structures at Terrace 1, a WWII cave at Terrace 2 and a stone structure at Terrace 3 of low cultural resource value.</li> <li>The loss is considered acceptable provided that a photographic and cartographic recording is undertaken for the sites following AMO's requirements.</li> </ul>	<ul style="list-style-type: none"> <li>Potential direct impacts on archaeological deposits at Sites B to E within the Tai A Chau Archaeological Site are considered unavoidable. Preservation in situ of the archaeological deposit within the footprint of the development area is also considered not feasible, as underground utilities need to be installed.</li> <li>The rescue excavation for Sites B to E will be undertaken to preserve the archaeological deposits by record prior to the start of construction works.</li> <li>The excavation and preservation of the sites is considered to be a benefit to the cultural heritage of South Soko as the rescue excavation of the artefacts/resources into an appropriate display facility will protect them from inevitable weathering due to erosion, land slides/slips and will expose the island's cultural heritage to a wider audience.</li> </ul>
<p>QUANTITATIVE RISK ASSESSMENT</p>	<ul style="list-style-type: none"> <li>The results of the Marine Quantitative Risk Assessment of the transit of the LNG carrier to Black Point indicated that individual risk is acceptable and the societal risk is as low as reasonably practicable (ALARP) as set out in HKSARG risk guidelines presented in Annex 4 of the EIAO-TM.</li> <li>The results of the Terminal Quantitative Risk Assessments of the LNG terminal at Black Point indicated that individual and societal risk levels comply with the HKSARG risk guidelines presented in Annex 4 of the EIAO-TM.</li> <li>Access to the Black Point site today requires marine transit through busy harbour traffic, and along densely populated areas, of:                         <ul style="list-style-type: none"> <li>Western Hong Kong Island: Ap Lei Chau, Cyberport;</li> <li>Ma Wan Island and Tsing Ma Bridge;</li> <li>New Territories: Sham Tseng, Tsing Lung Tau, Gold Coast, Tuen Mun.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>The results of the Marine Quantitative Risk Assessment of the transit of the LNG carrier to South Soko indicated that individual and societal risk levels are acceptable as per the HKSARG risk guidelines presented in Annex 4 of the EIAO-TM.</li> <li>The results of the Terminal and Pipeline Quantitative Risk Assessments of the LNG terminal at South Soko indicated that individual and societal risk levels comply with the HKSARG risk guidelines presented in Annex 4 of the EIAO-TM.</li> <li>The remote location of the South Soko Island provides for very low numbers of surrounding land and marine-based populations for both the terminal site and the marine transit.</li> </ul>

## 16.2

## SUMMARY

The Study Brief for this EIA in Clause 2.1(xiv) requires a comparison of the environmental merits and demerits of the Black Point and South Soko options. Pursuant to this the table above has indicated that there are key differences between the findings of the environmental performance of the Black Point option with the South Soko option for a LNG terminal in Hong Kong.

For each of the components assessed in the South Soko *EIA Report*, the assessments and the residual impacts have all been shown to be acceptable within the relevant standards/criteria of the *EIAO-TM* and the associated *Annexes*.

The marine risk for the transit of LNG carriers to Black Point is in the As Low As reasonably Practicable (ALARP) <sup>(1)</sup> region for some areas of the marine transit of the LNG carrier but for all other aspects of the Black Point EIA Report, the assessments and the residual impact have all been shown to be acceptable within the relevant standards/criteria of the *EIAO-TM* and the associated *Annexes*.

(1) Under Hong Kong *EIAO-TM* guidelines, there are three regions of risk categorisation: "Acceptable" requires no further action; risk within "ALARP" should be mitigated to as low as reasonably practicable; and, "Unacceptable" cannot be permitted.