Highways Department

Tuen Mun-Chek Lap Kok Link

Project Profile
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DRAWING
HZMN05004-SP0013  Tuen Mun – Chek Lap Kok Link – Tentative Study Envelope
1. **BASIC INFORMATION**

1.1 **Project Title**
Tuen Mun – Chek Lap Kok Link

1.2 **Purpose and Nature of the Project**
According to the findings of the Northwest New Territories (NWNT) Traffic and Infrastructure Review conducted by the Transport Department, Tuen Mun Road, Ting Kau Bridge, Lantau Link and North Lantau Highway will be operating beyond capacity after 2016 due to increase in cross boundary traffic, developments in the NWNT, and possible developments in North Lantau, including the Airport developments, the Lantau Logistics Park and the Hong Kong – Zhuhai – Macao Bridge (HZMB). It is therefore necessary to provide new connection between NWNT with North Lantau to cope with the anticipated traffic demand.

The proposed Tuen Mun – Chek Lap Kok (TMCLKL) and Tuen Mun Western Bypass (TMWB) is one of the possible highway options identified under the NWNT Traffic and Infrastructure Review to meet the anticipated traffic demand of the NWNT and Lantau after 2016. The results of the studies concluded that it will provide the most direct route between the NWNT and Lantau, joining the Kong Sham Western Highway (formerly known as Deep Bay Link), the port back-up areas in the NWNT, the Tuen Mun River Trade Terminal, the proposed Ecopark, the Airport, the proposed Lantau Logistics Park, HZMB, North Lantau developments and possibly a new container terminal in Lantau. Upon completion, the new route will significantly reduce the journey time between the NWNT and Lantau. It will also release some capacity of the existing roads for urban bound traffic, offer strong support to the logistics industry in Lantau and reinforce the Airport as an international and regional aviation hub through providing an alternative land access for the Airport. Compared with the other highway options, it will provide better planning flexibility for possible future expansion of the road network from the NWNT to the urban areas in the “very long-term” (stands for year 2023 and beyond).

The TMCLKL, forming part of the proposed route between NWNT and North Lantau, is a dual two-lane highway of approximately 9 km in length connecting the proposed TMWB at the southern coast of Tuen Mun Area 40 in the north with the Hong Kong International Airport and Tung Chung in the south.

1.3 **Name of Project Proponent**
Highways Department, HKSAR Government

1.4 **Location and Scale of the Project**
The location of the project is shown on the attached drawing no. HZMN05004-SP0013. The tentative study envelope for the possible alignments covers part of Tuen Mun Area, North Western Water Control Zone, part of Northwest Lantau and the east of Airport Island, all within the HKSAR boundary.

The scope of the TMCLKL is to provide a highway and associated interchanges connecting TMWB / Lung Mun Road at Tuen Mun west and the Airport / North Lantau. It comprises the following:

(i) about 24ha reclamation near the Tuen Mun River Trade Terminal for the northern tunnel portal of TMCLKL;
(ii) about 1km elevated viaduct from TMWB to the northern tunnel portal on the new reclamation of (i) above and associated slip roads to connect with Lung Mun Road at Tuen Mun west;

(iii) about 4km long dual 2-lane immersed tube tunnel across the Urmston Road shipping channel towards western side of Tai Mo To / northeastern side of Airport Island;

(iv) about 12ha reclamation at Tai Mo To / northeastern side of Airport Island for the southern tunnel portal and a toll plaza; and

(v) about 4.6km long sea viaduct from the toll plaza at Tai Mo To / northeastern side of Airport Island to connect with the Airport Island and Tung Chung.

The above proposed structural forms are all tentative at this stage and subject to review. Other structural forms will be investigated if necessary.

There will be refinement of the highway alignment within the tentative study envelope. Selection of the alignment will be dependent on a variety of factors such as environmental impacts, construction programme and cost, planning and engineering considerations, traffic implications, land resumption requirements, the proposed alignment of the North Lantau Highway Connection and the proposed Hong Kong Boundary Crossing Facilities of the HZMB, etc.

1.5 Number and Types of Designated Projects to be covered by the Project Profile

The proposed TMCLKL involves the construction and operation of highways and the associated link roads, which is classified as Designated Projects under Schedule 2, Categories A.1, A.7, A.8, C.1, C.2 and Q.1 of the Environmental Impact Assessment Ordinance.

1.6 Contact Person

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2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Planning and Implementation

The TMCLKL will be implemented under a PWP item. Consultants will be appointed to undertake the investigation study of the project.

2.2 Project Programme

According to the current programme, construction of TMCLKL is expected to commence in 2011 for completion by 2016. This is subject to confirmation pending findings of other relevant technical studies.
2.3 Interfacing with other Projects

Potential projects that would interface with TMCLKL have been identified and are listed below. This list should be re-visited during the EIA stage to ensure all the latest projects available from the respective stakeholders are incorporated.

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<tr>
<th>Phase</th>
<th>Other Projects in the Vicinity</th>
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<tr>
<td>Construction</td>
<td>Proposed CLP 132kV Submarine Cables</td>
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<td></td>
<td>Proposed New Contaminated Mud Marine Disposal Facility at Airport East / East Sha Chau Area</td>
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<td>Proposed Road P1</td>
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<td>Proposed construction and demolition materials handling facilities in Tuen Mun Area 38</td>
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<td>Existing temporary fill bank, construction waste and public fill sorting facilities in Tuen Mun Area 38</td>
</tr>
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<td>Existing disposal facilities at East of Sha Chau, North of Brothers and North of Lantau</td>
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<td></td>
<td>Existing marine borrow area at North of Brothers</td>
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<td>SkyPier II and hotel development at the Airport Island</td>
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<td></td>
<td>Proposed North Lantau Highway Connection of HZMB</td>
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<td>Proposed Hong Kong Boundary Crossing Facilities</td>
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<td></td>
<td>Proposed Permanent Aviation Fuel Facilities</td>
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<td>Proposed Liquefied Natural Gas Terminal</td>
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<td>Proposed Tuen Mun Western Bypass</td>
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<td></td>
<td>Possible expansion of the Hong Kong International Airport</td>
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</table>

| Operation | Proposed North Lantau Highway Connection of HZMB |
|           | Proposed Hong Kong Boundary Crossing Facilities |
|           | Proposed EcoPark at Tuen Mun Area 38 |
|           | Tung Chung East and West Future Developments |
|           | Proposed Road P1 |
|           | Proposed Transport hub at MTRCL Siu Ho Wan Depot |
|           | Castle Peak and Black Point Power Stations |
|           | Proposed Lantau Logistics Park |
|           | Proposed construction and demolition materials handling facilities in Tuen Mun Area 38 |
|           | Proposed New Contaminated Mud Marine Disposal Facility at Airport East / East Sha Chau Area |
|           | Proposed Tuen Mun Western Bypass |
|           | Possible expansion of the Hong Kong International Airport |

3. POSSIBLE IMPACT ON THE ENVIRONMENT

3.1 Outline of Process Involved

Based on the preliminary study, the TMCLKL would conceptually be made up of the following elements:

- Elevated bridges
- Reclamation
• Immersed tube tunnel
• Toll plaza
• Ventilation buildings

The elevated bridges are likely to be of pre-stressed concrete construction with piled foundation. The immersed tube tunnel of TMCLKL will be installed on a dredged trench in the seabed. Thereafter, the tunnel will be covered and protected by armours. Reclamations of TMCLKL will be designed with minimum dredging of marine mud. The layouts and construction methods of the bridges and tunnel will be examined under the investigation assignment of this project; and considerations would be taken in the selection of the project alignment and the design to avoid and/or minimize the environmental impacts to the sensitive receivers.

3.2 Existing Available Data

In 2005, Highways Department engaged consultant to undertake a Feasibility Study for the possible alignment of the TMCLKL. A large number of areas along the western part of Hong Kong were examined and assessed based on environment criteria such as air quality, noise, water quality, ecology, fishery, landscape and visual, cultural heritage and waste management.

Several studies have already been conducted within or near the tentative study envelope, including Agriculture, Fisheries & Conservation Department’s study on marine benthic communities and the Port Survey. These studies provide up-to-date information on the benthic fauna and on fisheries production and fishing operation of Hong Kong, and will be very useful to the study for evaluating the possible impact on the environment.

Studies on Chinese White Dolphins (Indo-Pacific Hump-backed Dolphin) have also been carried out extensively in the North Lantau waters. Dolphin distribution patterns and recent data relating to dolphins in the waters of the tentative study envelope are available for this study.

3.3 Construction and Operational Environmental Impact

It is anticipated that surrounding sensitive receivers could be affected by air quality, noise, water quality, ecological, fishery, landscape and visual, cultural heritage, hazardous to life and waste management impacts during the construction and operational stages.

3.3.1 Air Quality

During construction phase, construction dust will be potentially generated from excavation works, backfilling, wind erosion of exposed area, temporary storage of spoil on site, transportation and handling of spoil and slope cutting.

During operational phase, air pollution sources will be associated with emissions from the traffic using the highway, tunnel portal and ventilation buildings. Cumulative air quality impact would need to be taken into account of neighbouring roads. Cross boundary emissions and emissions from Castle Peak and Black Point Power Plants may need to be considered as well.

3.3.2 Noise

During construction phase, potential noise impacts on noise sensitive receivers will be associated with construction activities and powered mechanical equipment. The key construction activities which would create noise impacts will be piling for foundation, reclamation, excavation and concreting etc. The impact for any night time work would need to be considered as well.
During operational phase, noise sources will be associated with the traffic using the highway and the ventilation noise. The cumulative noise impact of neighbouring roads and other fixed noise sources would need to be considered.

3.3.3 Water Quality

During construction phase, potential major sources of water quality impacts for TMCLKL and its Southern Connection may arise from sediment release from reclamation, immersed tube tunnel construction and sea viaduct construction, construction runoff and sewage generated by workforce.

During operational phase, local flow pattern may be affected in the vicinity of reclamation area and the pier foundation. Other potential water pollution sources would include the surface runoff from the viaduct and accidental chemical spillage. Cumulative water quality impact due to other concurrent projects would need to be considered.

3.3.4 Ecology

During construction phase, major potential impacts on ecology will be marine habitat loss due to reclamation and piers construction, disturbance to Chinese White Dolphin and other marine life due to reclamation activities/related vessel traffic. There will also be a potential risk of chemical spillage to the surrounding water during offshore and coastal construction, which will affect the ecological system.

During operational phase, potential ecological impacts include the change in water flow due to reclamation and disturbance impacts to marine habitat and associated wildlife.

3.3.5 Fishery

During construction phase, reclamation and construction of immersed tube tunnel and viaduct may lead to fishing ground and spawning ground loss and disturbance on fishing operation. There may also be a potential risk of chemical spillage to the surrounding water during offshore and coastal construction, which may affect fishing operations.

During operational phase, the reclamation will change the water flow, and may affect spawning ground.

3.3.6 Landscape and Visual

For the TMCLKL, northern landfall reclamation at seafront near Tuen Mun River Trade Terminal might cause impact on surrounding industrial urban landscape and inshore water landscape. The southern landfall reclamation and the proposed sea viaducts of Southern Connection will affect the island landscape and inshore water landscape in terms of landscape and visual impact during construction and operation phases. Construction works at Tai Ho, Tung Chung and area near Airport may cause a loss of vegetation and blockage of seaview. The construction activities will be visible to small population by-passers near Tuen Mun River Trade Terminal and medium population of visitors at the Airport Island.

3.3.7 Cultural Heritages

The area of archaeological interest and potential offshore marine deposits, which have not been investigated and/or adequately studied previously, may be affected.

3.3.8 Waste Management

Activities during construction phase may result in the generation of a variety of waste generally comprising excavated materials, marine sediment, chemical waste, construction waste and general refuse. Sediment handling will depend on the pollution levels.
3.3.9 **Hazardous to Life**

The proposed TMCLKL and its Southern Connection would not run close to the fuel tank farm on the Airport Island and the Siu Ho Wan Water Treatment work. Hence, hazardous to life is not anticipated.

4. **MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT**

4.1 **Existing and Planned Sensitive Receivers**

The existing and planned sensitive receivers are discussed below. Any planned sensitive receivers identified during the study will be considered. Detailed investigation and surveys will be carried out under the project to assess the impact.

4.1.1 **Air Quality**

Potential air sensitive receivers are located at:

- Offices and workshops at Tuen Mun Area 40, Tuen Mun River Trade Terminal, Airport Island, Proposed Hong Kong Boundary Crossing Facilities and Proposed Lantau Logistics Park;
- Tung Chung New Town, Proposed Tung Chung East and West Future Developments;
- Residential area along the coast of Tuen Mun West, including Butterfly Estate, Melody Garden etc.; and
- Butterfly Beach and Butterfly Beach Park.

4.1.2 **Noise**

Potential noise sensitive receivers are located at:

- Residential area along the coast of Tuen Mun West, including Butterfly Estate, Melody Garden etc.; and
- Tung Chung New Town, Proposed Tung Chung East and West Developments.

4.1.3 **Water Quality**

Potential water sensitive receivers would be:

- Gazetted and non-gazetted Beaches in Tuen Mun;
- Existing and planned seawater water intake in Tuen Mun and Tung Chung;
- Seawater/cooling water intake at the Hong Kong International Airport;
- Sha Chau and Lung Kwu Chau Marine Park;
- Chinese White Dolphin Habitat;
- Fish cultural zones;
- Tai Ho Stream Site of Special Scientific Interest (SSSI), San Tau SSSI; and
- Other ecological sensitive receivers (mangroves, seagrass, habitats of horseshoe crabs).

4.1.4 **Ecology**

Potential ecological sensitive receivers would be:

Marine
- Sha Chau and Lung Kwu Chau Marine Park;
- Tai Ho Stream SSSI and San Tau SSSI;
- Habitat for Chinese White Dolphin;
- Artificial Reefs in the Chek Lap Kok Marine Exclusion Zone 3 and inside Sha Chau and Lung Kwu Chau Marine Park; and
- Horseshoe Crab Breeding Sites.

**Terrestrial**
- Siu Lang Shui Butterfly Overwintering Site; and
- Scenic Hill.

### 4.1.5 Fisheries

Fishing areas in the vicinity of the study area would be:
- Fishing Grounds in North Lantau Waters;
- Spawning Grounds of Commercial Fisheries Species in North Lantau waters;
- Artificial Reefs in the Chek Lap Kok Marine Exclusion Zone 3 and inside Sha Chau and Lung Kwu Chau Marine Park; and
- Ma Wan Fish Culture Zone.

### 4.1.6 Landscape and Visual

Potential landscape and visual sensitive receivers would be:

**Landscape Sensitive Receivers**
- Inshore water landscape between Tuen Mun and Hong Kong International Airport;
- Island landscape at Tai Mo To;
- Industrial urban landscape near Tuen Mun River Trade Terminal;
- Butterfly Beach and Butterfly Beach Park; and
- Open Space zone at Butterfly Beach and Butterfly Beach Park.

**Visual Sensitive Receivers**
- Workers at Tuen Mun River Trade Terminal;
- Visitors at Butterfly Beach and Butterfly Beach Park;
- Residents at Butterfly Estate;
- Passengers at Tuen Mun Ferry Pier;
- Visitors at Gold Coast;
- Residents at Sam Shing Hui, Gold Coast, So Kwun Wat and residential developments along west coast of Tuen Mun;
- Workers and visitors on Northeast part of the Airport Island;
- Residents in Tung Chung New Town;
- Villages in Tai Ho;
• Users of Proposed Hong Kong Boundary Crossing Facilities, Proposed Lantau Logistics Park, Siu Ho Wan Railway Depot and North Lantau Highway;
• Hikers in Tai Ho; and
• Residents at Tuen Mun waterfront.

4.1.7 Cultural Heritage
Cultural and heritage resources in the vicinity of the study area would be:
• Ha Law Wan archaeological site in Airport Island.

4.2 Major Elements of Surrounding Environment and Land Uses
The northern landing point of TMCLKL will be at the artificial coastline near to River Trade Terminal. There are several sawmills and a metalwork factory at the east of the River Trade Terminal. The Butterfly Beach is also within the study area. Southern connection point of TMCLKL will be connected to the north shore of Lantau / east of Airport Island.

5. ENVIRONMENTAL MITIGATION MEASURES
Based upon the potential impacts as a result of the construction and operation of the project, it is anticipated that mitigation measures will be required. Measures to minimise environmental effects are detailed below.

5.1 Measures to Minimize Environmental Impacts
5.1.1 Air Quality
Appropriate dust mitigation measures as stipulated in the Air Pollution Control (Construction Dust) Regulations will be implemented to control fugitive dust emission. The key measures are:
1. Regular watering on all exposed and unpaved surface, particularly during dry weather;
2. Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers;
3. Covering all excavated or stockpile of dusty material by impervious sheeting or spraying with water to maintain the entire surface wet;
4. Provision of wheel washing facilities at the exit points of the site;
5. Covering of any dusty materials on vehicles leaving the site; and
6. Avoid slope cutting and minimize extent of cut-&-cover tunnelling section.

Subject to investigation, the following measures will be considered during operational period to minimize the air quality impacts on nearby air sensitive receivers
1. Provision of buffer area between the sources and the receivers; and
2. Location of ventilation building and tunnel portal far away from the air sensitive receivers.

5.1.2 Noise
Subject to investigation, the following measures will be considered during construction period to minimize construction noise impacts on nearby noise sensitive receivers.
1. Implementing good site practices such as orientating the noisy plant away from the nearby noise sensitive receivers, proper fitting of silencer on the construction equipment and use of quiet plant;

2. Temporary noise barriers are likely to be required along the construction site boundary such that construction equipment and noise are screened;

3. Silencers on construction equipment should be properly fitted and maintained during the construction works; and

4. Mobile plant should be sited as far as away from noise sensitive receivers as possible and practicable.

Subject to investigation, the following measures will be considered during operational period to minimize the traffic noise impacts on nearby noise sensitive receivers.

1. Short noise barriers and low noise surface material may be required along some sections of the new highway for reducing traffic noise during the operational noise.

5.1.3 Water Quality

The following mitigation measures will be adopted to control the water quality impact:

1. Good site practice in accordance with the ProPECC PN 1/94 “Construction Site Drainage” and “Recommended Pollution Control Clauses for Construction Contracts” issued by EPD, and the procedures in ETWB TCW No. 5/2005 “Protection of Natural Stream / Rivers from adverse impact arising from construction works”;

2. All runoffs arising from the construction site should be properly collected and treated to ensure the effluent comply with Water Pollution Control Ordinance. Silt trap and oil interceptor will be provided to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before being pumped to the public stormwater drainage system. The silt traps and oil interceptors will be cleaned and maintained regularly;

3. During dredging and filling works, appropriate construction methods will be selected to control the generation of sediment plumes; and

4. Proper construction techniques will be employed to prevent sediment release during construction. Stringent site sediment control and mitigation measures will be implemented to prevent elevation of suspended solid.

The following measures will be adopted during operational period to minimize the water quality impacts on nearby water sensitive receivers.

1. The bridge pier will also obstruct the flow and hence reducing the flushing capacity. In order to reduce the impact due to the bridge piers, the number of piers in the water column will be reduced by adopting longer span;

2. Stormwater from road surface should be collected into drainage system via silt traps and oil interceptor to remove silt / grit and oil before discharging; and

3. Develop contingency plan for accidental chemical spillage.

5.1.4 Ecology

Avoidance of any identified sensitive sites will be the preferred mitigation measures. Subject to investigation, the following mitigation measures during construction phase will be considered to minimize the impact.

1. The water quality mitigation measures proposed in S.5.1.3 will be adopted;

2. Construction vessels would be kept at a slow speed in order to avoid dolphin-vessel collision; and
3. Disruption to terrestrial sensitive areas will be avoided as far as possible.

The following mitigation measures during operational phase will be considered to minimize the impact.

1. The water quality mitigation measures proposed in S.5.1.3 will be adopted.

5.1.5 Fishery

Subject to investigation, the following mitigation measures during construction phase will be considered to minimize the impact.

1. The water quality mitigation measures proposed in S.5.1.3 will be adopted.

The following mitigation measures during operational phase will be considered to minimize the impact.

1. The water quality mitigation measures proposed in S.5.1.3 will be adopted.

5.1.6 Cultural Heritage

Archaeological field investigation will be conducted by qualified archaeologists / marine archaeologists to identify any unknown archaeological sites and built heritage along the proposed alignments. For land archaeological survey, investigation will include field walking, augering and test trenching. For marine archaeological survey, investigation will include geophysical survey and diver inspection. Mitigation measures for cultural heritage impacts in the first instance will include avoidance of the area of importance and minimisation of direct impacts.

5.1.7 Landscape and Visual

Mitigation measures to minimize environmental impact during both the construction and operational phases should be comprehensively reviewed for both landscape and visual aspects. Possible mitigation measures are as follows:

During construction phase

- Temporary greening treatment on bare soil surface before construction works of structures take place;
- Hoarding to be erected at the interface between the construction site and the existing area;
- Early formation of the planting area and advance planting of vegetations on the concerned landscape sensitive receivers; and
- Sensible locations of viaduct alignment, columns and portals to minimise impact to existing trees.

During operation phase

- Aesthetic design of the portal structures;
- Aesthetic design of any noise barrier on viaduct section near residential areas;
- Aesthetic design of a well-accepted viaduct;
- Tree planting and earth mounds near portals to reduce their apparent size scale and to visually screen and soften the structures;
- Configuration of the reclaimed lands to match the coastline nearby. Curvilinear shape is preferred over rectangular and linear shapes for their relatively more naturalistic appearance. Natural materials for the edge treatment of the coastline are also preferred to blend with the nature;
- Early formation of the planting area and advance planting of vegetations on the concerned landscape sensitive receivers in operation phase;
- Concealing the portal structures on their roof and sides by earth mounds and vegetation planting on top of the mounds;
- Sensible locations of viaduct alignment, columns and portals to minimise impact to existing trees. Felled trees have to be compensated;
- Permanent planters with irrigation system on flyovers in built-up areas (with reference to ETWB TCW No. 10/2005);
- Earth mounds and tree planting near columns to reduce the apparent height and massiveness of supporting columns; and
- Reprovision of any loss open spaces and recreational facilities on-site or off-site.

5.1.8 Waste Management

The waste management hierarchy is to minimise waste generation. If waste generation cannot be avoided, a material/waste management plan will be established prior to commencement of excavation and construction work to outline the methods that can be incorporated into the project for waste minimization, including reuse, recycle, handling, storage, transportation and disposal of expected waste materials. For handling of dredged sediment, the ETWB TCW No. 34/2002 will be followed.

As TMCLKL is a highway for use by road traffic, waste impact during the operational stage is considered as extremely small.

5.2 Severity, Distribution and Duration of Environmental Effects

For TMCLKL, ecology, water quality and landscape and visual impacts will be most severe during construction.

The level of archaeological impact will need to be ascertained subject to detailed land and marine cultural heritage assessments

Subject to investigation on noise impacts, permanent noise barrier / low noise surfacing may be required to keep the noise impact to acceptable level.

5.3 Further Implication

Public consultation will be arranged once sufficient information is available.

6. USE OF PREVIOUSLY APPROVED EIA REPORTS

No previous approved EIA report exists for the proposed project. However, reference may be made to the following previously approved EIA reports within the study area:

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<th>Register No</th>
<th>Title</th>
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<tr>
<td>EIA-006/BC</td>
<td>New Airport Master Plan – Environmental Impact Assessment</td>
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<tr>
<td>EIA-015/BC</td>
<td>EIA of the Proposed 6000MW Thermal Power Station at Black Point: Initial Assessment and Key Issue Assessment</td>
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<tr>
<td>AEIAR-015/1999/8/30</td>
<td>Planning and Development Study of Potential Housing Site in Area 54, Tuen Mun</td>
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<tr>
<td>AEIAR-031/2000</td>
<td>Northshore Lantau Development Feasibility Study</td>
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AEIAR-066/2002  Construction of Lung Kwu Chau Jetty
AEIAR-089/2005  New Contaminated Mud Marine Disposal Facility at Airport East / East Sha Chau Area
DIR-143/2006  Proposed 132kV Submarine Cable Route for Airport "A" to Castle Peak Power Station Cable Circuit
AEP-257/2006  Liquefied Natural Gas Receiving Terminal and Associated Facilities
屯門至赤鱲角連接路 - 初步研究界限
TUEN MUN-CHEK LAP KOK LINK - TENTATIVE STUDY ENVELOPE