



The Government of the Hong Kong Special Administrative Region

Civil Engineering and Development Department

Road P1 (Tai Ho – Sunny Bay Section), Lantau

(prepared in accordance with
the Environmental Impact Assessment Ordinance (Cap. 499))

Project Profile

December 2020

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Figure 1 Road P1 (Tai Ho – Sunny Bay Section) – Location Plan

1. BASIC INFORMATION

1.1 Project Title

1.2.1 Road P1 (Tai Ho – Sunny Bay Section)

1.2 Purpose and Nature of the Project

1.2.1 The concept of Road P1 has been mentioned in the Northshore Lantau Development Feasibility Study completed in 2001, which suggested Road P1 to connect the Hong Kong International Airport with Sunny Bay. Road P1 was proposed as a dual 2-lane carriageway parallel to the North Lantau Highway (NLH).

1.2.2 The Revised Concept Plan for Lantau drawn up by the Lantau Development Task Force in 2007 affirmed the need of Road P1 to accommodate long-term traffic demand in North Lantau.

1.2.3 The Lantau Development Advisory Committee and the Government conducted a series of public engagement (PE) exercise on the proposed development strategy for Lantau from end January to April 2016. During the PE, there was general public support to the proposal of developing the North Lantau Corridor (where the proposed Road P1 forms a part) for economic and housing developments.

1.2.4 In the Sustainable Lantau Blueprint promulgated in 2017, Road P1 was proposed to strengthen the connectivity of the major developments along the northshore of Lantau.

1.2.5 The NLH is a major route connecting Lantau, including Tung Chung and the Hong Kong International Airport, with the urban areas. At present, whenever there is a traffic incident on the NLH, the road traffic connecting Lantau and urban areas would be seriously affected. With the progressive implementation of the planned developments in North Lantau (e.g. Tung Chung New Town Extension and the SKYCITY development project at the airport), it is forecasted that the traffic congestion of the NLH would get serious during peak hours starting from 2031.

1.2.6 Road P1 is about 12 km long in total, with two sections which are about 2.5 km of Tung Chung to Tai Ho Section and about 9.5 km of Tai Ho to Sunny Bay Section. Road P1 (Tung Chung – Tai Ho Section) is within the scope of 799CL entitled

“Tung Chung New Town Extension – Detailed Design and Site Investigation”, and the detailed design was completed. This project is to cover the remaining section of Road P1 from Tai Ho to Sunny Bay, which is approximately 9.5 km long.

1.2.7 In order to relieve the traffic pressure on the NLH, cope with the housing and economic developments at North Lantau, and enhance the resilience of the North Lantau transport network, we have to implement the Road P1 (Tai Ho – Sunny Bay Section) project (“the Project”) as soon as possible.

1.3 Name of Project Proponent

1.3.1 The Project Proponent is the Sustainable Lantau Office, the Civil Engineering and Development Department (CEDD) of the Government of the Hong Kong Special Administrative Region.

1.4 Location and Scale of Project and History of Site

1.4.1 The location plan of the Project is shown in **Figure 1**. The tentative study envelope for the Project covers the Northeast Lantau area.

1.4.2 Subject to the engineering study of the Project, the scope of works of the Project mainly consists of the following works components:

1. a dual 2-lane carriageway of approximately 9.5 km long, with slip roads at appropriate locations to connect with the NLH near the Penny Bay Highway, the Sunny Bay and the proposed Route 11, in the form of elevated or at-grade road which extends from the Tai Ho Interchange to Sunny Bay;
2. a dual 2-lane tunnel approximately 1 km long between Ta Pang Po and Yan O Wan, and the associated tunnel portals, administration building and ventilation facilities;
3. reclamation works of about 15 hectares between Tai Ho Interchange and Sham Shui Kok (about 150m away from the Brothers Marine Park);
4. widening the westbound carriageway of NLH from 3-lane to 4-lane between the Sunny Bay Interchange and the Lantau Link Toll Plaza;
5. constructing cycle tracks and walkways along appropriate road section(s) between Tai Ho and Sunny Bay; and

6. the associated building, civil, structural, geotechnical, marine, electrical and mechanical, landscaping, environmental protection and mitigation works, drainage and sewerage works, waterworks, utilities and other works associated with the Project.

1.4.3 As part of the Project falls within the potential reclamation site of the potential Sunny Bay development, close coordination with the potential Sunny Bay development is required when exploring the alignment options and connection arrangements for Road P1(Tai Ho – Sunny Bay Section).

1.4.4 The proposed works components mentioned in Section 1.4.2 above are tentative and subject to review. 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 cost and programme, traffic implications, land requirements, public consultation, the interface coordination with other on-going projects and planning studies (including the proposed Route 11 and the potential Sunny Bay development), and other engineering considerations, etc.

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

1.5.1 The Project involves the construction and operation of highways and the associated slip roads, which is classified as a Designated Project under the following categories under Part I, Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance:

- A.1- A road which is primary distributor road including new roads, and major extensions or improvements to existing roads;
- A.7- A road tunnel more than 800 m in length between portals;
- A.8- A road bridge more than 100 m in length between abutments;
- C.1- Reclamation is more than 5 hectares in size; and
- C.2- Reclamation more than 1 hectare in size and is less than 500m from the nearest boundary of an existing marine park or marine reserve.

1.6 Name and Telephone Number of Contact Person

1.6.1 All enquiries regarding the Project can be addressed to:

Ms. WU Wai Yu, Sharon
Chief Engineer/ Lantau 2 (Acting)

Sustainable Lantau Office
Civil Engineering and Development Department
13/F, North Point Government Offices
333 Java Road, North Point, Hong Kong

Tel: 2231 4439

Fax: 2577 5040

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Planning and Implementation

2.1.1 The Road P1 (Tai Ho – Sunny Bay Section) will be implemented under a Public Works Programme item. Consultants will be appointed to carry out the engineering study of the Project.

2.2 Project Timetable

2.2.1 According to the current programme, consultants would be appointed to undertake the engineering study of Road P1 (Tai Ho – Sunny Bay Section) for the Project. We will strive to timely complete the construction of Road P1 (Tai Ho – Sunny Bay Section) by 2030. The packaging and programme of the Project are subject to confirmation pending findings of other relevant technical studies.

2.3 Interactions with Other Projects

2.3.1 Potential projects that would have interface with the Project have been identified and are listed below. Some of these projects are under planning or implementation has yet to be approved. This list should be revisited during the subject EIA study to ensure all the latest projects available from the respective stakeholders are incorporated. Any cumulative impacts from these concurrent projects during both construction and operational phases of the Project, including but not limited to the following, would need to be identified and addressed as appropriate.

1. Expansion of Hong Kong International Airport into a Three-Runway System
2. Tung Chung New Town Extension
3. Tung Chung Line Extension
4. Construction of additional sewage rising mains and rehabilitation of the existing sewage rising main between Tung Chung and Siu Ho Wan
5. Topside Development at Hong Kong Boundary Crossing Facilities Island of Hong Kong-Zhuhai-Macao Bridge
6. Siu Ho Wan Water Treatment Works Extension – Investigation, Design and Construction
7. Extension of Siu Ho Wan Sewage Treatment Works
8. Refurbishment, Modification and Upgrading of North Lantau Transfer Station and Outlying Island Transfer Facilities

9. The proposed Route 11 (between North Lantau and Yuen Long)
10. Development of Columbarium at the Western End of Sham Shui Kok Drive
11. The proposed Siu Ho Wan Station and Siu Ho Wan Depot Replanning Works
12. The proposed Comprehensive Residential and Commercial Development atop Siu Ho Wan Depot
13. Strategic Transport Plan proposed in Lantau Tomorrow Vision and other proposed strategic transport corridors in Hong Kong 2030+
14. All the planned and committed public housing developments in Tung Chung Area
15. SKYCITY at Hong Kong International Airport
16. The potential Sunny Bay development.
17. The possible Tsing Yi - Lantau Link

3. POSSIBLE IMPACTS ON THE ENVIRONMENT

3.1 General

3.1.1 Road P1 (Tai Ho – Sunny Bay Section) would involve reclamation, marine-based and land-based construction works, including site clearance, earthworks, piling or foundation works, construction of viaducts, tunnels with tunnel portals and ventilation buildings, at-grade roads, slope works and retaining structures, noise mitigation measures, diversion of existing storm water drains, sewers, water mains and other utilities works, etc.

3.1.2 It is anticipated that the surrounding sensitive receivers could be affected by air quality, noise, water quality, fisheries, waste management, land contamination, ecological, cultural heritage, hazard to life as well as landscape and visual impacts during the construction and operation stages of the Project, as detailed in the following sub-sections.

3.2 Air Quality

Construction Impacts

3.2.1 Dust generation from the construction activities including excavation works, backfilling, wind erosion of exposed area, temporary storage of spoil on site, transportation and handling of spoil, etc., as well as gaseous emissions from constructional plants are expected to be the major sources of impact during construction phase. Cumulative impacts from other potential interfacing projects should also be taken into account.

Operational Impacts

3.2.2 During operation phase, potential air quality impacts will be associated with the emissions from the traffic using the highway, tunnel portals and ventilation buildings of the proposed Road P1. Cumulative air quality impact would need to be taken into account of neighbouring roads and other background emissions.

3.3 Noise

Construction Impacts

- 3.3.1 During construction phase, potential noise impacts on noise sensitive receivers (NSRs) will be associated with the use of powered mechanical equipment including breakers, excavators, lorries, mobile cranes, concrete truck mixers, pokers, rollers, etc. For construction works, the key construction activities which would create noise impacts will be reclamation, tunneling, piling for foundation, excavation and concreting, etc. The noise impact arising from those construction activities will be minimized. Night time work will be avoided as far as possible. The impact for night time work, if required, will need to be considered.

Operational Impacts

- 3.3.2 During operation phase, noise sources will be associated with the traffic using the highway and the tunnel ventilation. The cumulative noise impact of neighbouring rails, roads such as NLH, Cheung Tung Road, Route 11 and other fixed noise sources would need to be considered.

3.4 Water Quality

Construction Impacts

- 3.4.1 Release and suspension of sediments may occur during marine-based activities such as reclamation works and marine bridge works. Non-dredged reclamation methods for seawall and new land and adequate mitigation measures would be adopted to minimize the water quality impact caused to the nearby sensitive receivers such as Ma Wan fish culture zone, seagrass bed and mangrove site in Yan O Wan and Tai Ho Wan, the beaches in Tsuen Wan and Ma Wan and The Brothers Marine Park. For land-based works, the construction site runoff, as well as other potential wastewater generated by the construction activities mentioned in Section 3.1.1, which may cause blockage of drainage channels and increase the suspended solid levels, has to be studied and addressed. Sewage arising from on-site construction workforce, as well as accidental spillage, may also cause water pollution if direct discharge into adjacent water bodies is not controlled. All the above impacts and mitigation measures will be assessed and studied in the EIA study. Cumulative impacts arising from concurrent projects as mentioned in

Section 2.3.1 will also need to be addressed.

- 3.4.2 The proposed reclamation area for the proposed Road P1 is in close vicinity to The Brothers Marine Park, which encompasses historic hotspots of Chinese White Dolphins (CWD) habitat. Site-specific CWD surveys had been carried out under the Technical Study on Developments at Siu Ho Wan and the Associated Transport Infrastructures between Feb 2016 and Apr 2017 to study the current occurrence and behaviour of CWD in shallow waters of Siu Ho Wan (SHW) as well as the fine scale usage of CWD habitat. No CWD sightings were recorded at Siu Ho Wan during the monitoring period. Nevertheless, the passive acoustic monitoring had recorded some usage in the area of SHW by CWD at night time. This indicated that CWD may avoid the anthropogenic disturbance in the area during the day time, while utilising the area more frequently at night. Construction phase activities have the potential to generate water quality impacts that could affect CWD distribution and behavior in the habitat outside the reclamation area. These water quality impacts will be assessed in the EIA study.

Operational Impacts

- 3.4.3 Potential water pollution sources would include the surface runoff and accidental chemical spillage from the at-grade roads, viaducts, cycle tracks and walkways; sewage effluent generated from staffs working at administration building and operation of the ventilation facilities. Cumulative water quality impact due to other concurrent projects would need to be considered. Proper drainage system, designed with pollution management measures, e.g. oil interceptors, needs to be provided to avoid pollution to marine waters and water sensitive receivers (WSRs).
- 3.4.4 With the reclaimed land and marine bridge structures below water level, local flow pattern might be changed which in turn may affect the nearby WSRs including The Brothers Marine Park, Tai Ho Wan, Ma Wan Fish Culture Zone, as well as the beaches in Tsuen Wan and Ma Wan, the hydrodynamic and water quality impacts will be reviewed in the EIA study.

3.5 Ecology

- 3.5.1 The potential terrestrial and marine ecological impacts on existing ecological sensitive receivers (e.g. The Brothers Marine Park, Tai Ho Stream Site of Special Scientific Interest, Mangrove and seagrass habitat at Tai Ho Wan and Yan O Wan,

and Lantau North (Extension) Country Park, etc.) arising of the Project will be associated with:

Construction Impacts

- (i) Direct habitat loss and habitat fragmentation at temporary works areas;
- (ii) Disturbance to wildlife and ecological sensitive receivers (e.g. The Brothers Marine Park, mudflat, mangroves, seagrass bed, coral communities, pipefish and horseshoe crabs);
- (iii) Increased sedimentation;
- (iv) Potential risk of chemical spillage to the surrounding water during offshore and coastal construction;
- (v) Temporary loss of CWD habitat due to the works areas though there is only low and probably occasional occurrence of CWD recorded in Siu Ho Wan in the past;
- (vi) Temporary habitat loss and habitat degradation due to impacts from the construction activities;
- (vii) Disturbance impact on CWD and The Brothers Marine Park due to working vessels (collisions and noise) and construction works (underwater noises); and
- (viii) Loss of artificial seawall habitat for colonization of marine fauna due to the reclamation work.

Operational Impacts

- (i) Permanent loss of intertidal and marine habitat arising from the reclamation footprint;
- (ii) Permanent loss of CWD habitat arising from the reclamation footprint, though there is only low and probably occasional occurrence of CWD recorded in Siu Ho Wan in the past;

- (iii) Ecological barrier;
- (iv) Potential impacts arising from change of water flow due to reclamation and marine-based piers;
- (v) Change of hydrodynamic regime, erosion and sedimentation patterns; and
- (vi) Disturbance to wildlife due to increased human activities.

3.6 Fisheries

Construction Impacts

- 3.6.1 Marine-based works (including reclamation) may lead to potential temporary and permanent loss and/or disturbance of fishing ground, spawning and nursery ground. Marine-based works may also lead to disturbance of nearby fish culture zone(s), cause impacts to water quality and hence fisheries due to potential increase in suspended solids concentration and deterioration of water quality. In the vicinity of the Project site, the increase in marine traffic of working vessels during construction may affect the fishing operation in nearby waters. There may also be potential risk of accidental chemical spillage to the surrounding water during offshore and coastal construction, which may affect fisheries resources nearby the Project site. Potential impact due to the Project and the related changes in water quality or hydrodynamics regime on fisheries nearby the proposed Project site will be assessed in the EIA study.

Operational Impacts

- 3.6.2 During operational phase, the proposed reclamation would lead to a direct loss of fishing grounds within the proposed reclamation area. Also, disturbance to fisheries resources arising from increased human activities and possible water pollution.
- 3.6.3 The proposed reclamation may change the local hydrodynamic regime and water quality. The fisheries resources as well as spawning or nursery grounds and aquaculture sites nearby the Project site may also be affected and the associated impact will be assessed in the EIA study.

3.7 Waste Management

Construction Impacts

- 3.7.1 With the adoption of non-dredged reclamation method for seawall and new land formation, very limited quantity of sediments, if unavoidable, may be dredged and disposed of.
- 3.7.2 Construction and demolition (C&D) materials will be generated from the construction activities at the proposed sites.
- 3.7.3 Chemical waste generated during construction without careful and proper handling may pose environmental, health and safety hazards.
- 3.7.4 The construction workforce will generate general refuse comprising food scraps, waste paper, empty containers, etc. The general refuse may give rise to adverse environmental impacts e.g. odour generation, windblown litter, vermin, if the waste storage areas are not properly maintained and regularly cleared.

Operational Impacts

- 3.7.5 It is not anticipated that the Project would generate any adverse environmental impact associated with waste.

3.8 Cultural Heritage

Construction Impacts

- 3.8.1 The sites of archaeological interest, area of archaeological potential and potential offshore marine archaeological remains, which have not been investigated and/or adequately studied previously, may be affected. Construction works may result in damage to or loss of buried archaeological sites by:
- (i) Disturbance through excavation at or near a Site of Archaeological Interest (SAI), topsoil stripping and the passage of heavy machinery on exposed and buried deposits;
 - (ii) Burial of areas resulting in limitation on accessibility for future archaeological investigations (including surface survey and remote sensing technique) and obscuring visible surface evidence;

- (iii) Ground compaction due to construction activities may cause damage or distortion to buried archaeological remains;
- (iv) Impacts caused by reclamation on any remains of cultural significance buried in the seabed; and
- (v) Indirect impacts such as visual and vibration intrusion on the setting and amenity of archaeological resources.

3.8.2 The Project site will not affect any declared monuments, proposed monuments, graded historic sites/buildings and Government historic sites identified by the Antiquities and Monuments Office (AMO).

3.8.3 The Yam O SAI is close to the indicative alignment of the proposed Road P1. The Luk Keng Tsuen SAI is about 300m from the indicative alignment of the proposed Road P1. The impacts on the Yam O SAI and Luk Keng Tsuen SAI would be assessed and addressed in the EIA study. The design of the road alignment will consider the impacts on the Yam O SAI. Relevant mitigation measures will also be considered.

3.8.4 The Tai Ho SAI and the Pak Mong SAI are located on the opposite side of North Lantau Highway and about 400m from the indicative alignment of the proposed Road P1. Impact on these SAIs caused by the Project is not anticipated. However, the design of the road alignment will consider impacts on these SAIs and propose relevant mitigation measures if necessary.

Operational Impacts

3.8.5 Cultural heritage impact during operational stage is not expected.

3.9 Landscape and Visual

3.9.1 The existing visual and landscape characters at the Project Site includes the open sea, Siu Ho Wan MTR Depot, facilities such as Siu Ho Wan Sewage Treatment Works and Siu Ho Wan Water Treatment Works along the northern shoreline from Siu Ho Wan to To Kau Wan, log pond in Yan O Wan, villages at Luk Keng, hilly terrain at Luk Keng, Yan O Wan and Lantau North (Extension) Country Park. The proposed at-grade/elevated road along the Northshore Lantau as well as the associated tunnel portals, ventilation facilities and noise mitigation measures (if

any), will affect the island landscape and inshore water landscape in terms of landscape and visual impact during construction and operation phases.

3.9.2 Existing landscape resources include open sea water, coastal bay, grassland, artificial seawall, natural rocky shore/ sandy shore, road and urban infrastructures. Visually sensitive receivers includes the residents of existing village and travelers at Luk Keng; travellers along NLH, MTR Tung Chung Line and Airport Express; and recreational users of coastal footpath and Lantau North (Extension) Country Park. The proposed reclamation and roadwork at seafront near Siu Ho Wan might have landscape and visual impacts on the proposed Comprehensive Residential and Commercial Development atop Siu Ho Wan Depot. The proposed roadworks which is close to or fall within the potential Sunny Bay development area might also cause landscape and visual impacts on the future development under the potential Sunny Bay development. The expected sources of landscape and visual impacts arising from the Project would include, but not limited to, the following:

Construction Impacts

- (i) Loss of landscape elements and visual amenity such as woodland, marshland/wetland, trees, small ponds and natural topography, coastal water and natural coastline, and visual appearance of any temporary use and construction activities; and
- (ii) Land reclamation works and associated activities at sea.

Operational Impacts

- (i) Visual quality, intrusion and obstruction created by the structures of Road P1 (Tai Ho – Sunny Bay Section), including at-grade roads and viaducts as well as the associated tunnel portals, administration building and ventilation facilities, in particular for receivers in the proposed Comprehensive Residential and Commercial Development atop Siu Ho Wan and the potential Sunny Bay development; and
- (ii) Permanent loss of landscape and visual amenity of the sea and natural environment due to Road P1 (Tai Ho – Sunny Bay Section).

3.10 Land Contamination

3.10.1 For the reclamation and sea viaduct, it is unlikely to have land contamination impact. Siu Ho Wan MTR Depot, the North Lantau Refuse Transfer Station, the Ta Pang Po Offtake and Piggings Station, the shipyards near Tsing Chai Wan and To Kau Wan, etc. are close to the indicative alignment of the proposed Road P1 and may give rise to land contamination issue to be dealt with under this Project. The possibility of land contamination at the Project site, in particular the abovementioned areas, would be further examined.

3.11 Potential Hazard to Life

3.11.1 Potential hazard to life issue may arise from the use of explosives for possible blasting for the tunnel between Ta Pang Po and Yan O Wan. A risk assessment will be conducted to assess the risk due to transportation and storage of explosives, and the blasting operation.

3.11.2 Part of the proposed works falls into the Potentially Hazardous Installations (PHI) consultation zone of Siu Ho Wan Water Treatment Works (SHWWTW). The chlorine storage at the SHWWTW may cause hazard to life issues to the workers during construction and future road, cycle track and walkway users during operation. There is also an existing Chlorine Transshipment Dock at Sham Shui Kok and it may be converted to a Cat.1 dangerous goods pier in future. Moreover, the existing Organic Resources Recovery Centre Phase 1 at Siu Ho Wan would produce and store biogas during its operation. Risk assessment shall be conducted in EIA to evaluate the impacts associated with the above existing facilities during construction phase and operational phase.

4. MAJOR ELEMENTS OF SURROUNDING ENVIRONMENT

4.1 Existing Environment and Planned Developments

4.1.1 The major existing and planned sensitive receivers and sensitive parts of the natural environment that may be affected by the proposed project include, but not limited to, the following:

- (i) Existing village at Luk Keng;
- (ii) Ma Wan Fish Culture Zone;
- (iii) Sites of archaeological interest in Tai Ho, Pak Mong, Luk Keng Tsuen and Yam O;
- (iv) Gazetted and non-gazetted beaches in Tsuen Wan and Ma Wan;
- (v) CWD habitat though there is only low and probably occasional occurrence of CWD recorded in Siu Ho Wan in the past;
- (vi) Intertidal mudflat area at Yan O Wan supporting mangroves, seagrass, pipefish and horseshoe crab;
- (vii) Coral community along coastline in the vicinity of the proposed reclamation site and the alignment of the proposed Road P1;
- (viii) Fisheries spawning ground, nursery ground and fishing grounds at North Lantau waters;
- (ix) Tai Ho Stream Site of Special Scientific Interest;
- (x) Mangrove and seagrass habitat at Tai Ho Wan;
- (xi) Lantau North (Extension) Country Park;
- (xii) The Brothers Marine Park;
- (xiii) The proposed 3RS Marine Park;
- (xiv) The proposed Comprehensive Residential and Commercial Development atop Siu Ho Wan Depot;

- (xv) Various government facilities including Siu Ho Wan Water Treatment Works, Siu Ho Wan Sewage Treatment Works, Organic Resources Recovery Centre Phase 1 and Toll Plaza of Lantau Link at Northshore Lantau; and
- (xvi) The potential Sunny Bay Development.

5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

5.1 General

5.1.1 The EIA study will investigate those environmental impacts (both cumulative impacts and those arising from the Project) and propose the appropriate mitigation measures with the intention that the Project would be environmentally acceptable and cost effective. The residual impacts, if any, would be confined within the allowable limits. Environmental monitoring and auditing of potential impacts that may arise from implementation of the works proposed by the Project will be provided for the construction and operational phases. Subject to the findings of the EIA study, the following mitigation measures would be incorporated in the design and construction of the Project.

5.2 Air Quality

Construction Phase

5.2.1 In order to prevent adverse impacts on air quality, the control measures stipulated in the Air Pollution Control (Construction Dust) Regulations should be implemented wherever applicable, to limit the dust emissions from the site. Subject to investigation, the following mitigation measures will be considered during construction period to minimize impacts on air quality on nearby air sensitive receivers (ASRs).

- (i) Any vehicles/marine vessels with an open load compartment used for transferring dusty materials off-site will be properly fitted with side and tail boards and cover;
- (ii) No stockpiles of dusty material beyond site boundaries.
- (iii) Stockpiles of sand and aggregate will be enclosed on three sides and water sprays will be used to dampen stored materials and when receiving raw material;

- (iv) Use of appropriate dust suppression measures. For example, the site will be frequently cleaned and watered to minimise fugitive dust emissions;
- (v) In the process of material handling, any material which has the potential to create dust will be treated with water or sprayed with a wetting agent where practicable;
- (vi) Implementation of wheel washing facilities at access roads into and out of construction sites;
- (vii) Speed control of vehicles on-site;
- (viii) Provide hoarding along site boundaries;
- (ix) Locate dusty construction activities as far from ASRs as practical to minimize air quality impacts on the surrounding environment; and
- (x) Arrangement of construction programme and work fronts to avoid adverse dust impacts at ASRs as far as practicable.

Operational Phase

5.2.2 Subject to investigation, the following measures will be considered to minimize air quality impacts on the nearby ASRs:

- (i) Provision of buffer distance between the sources and the receivers; and
- (ii) Locating ventilation buildings and tunnel portals away from the ASRs.

5.3 Noise

Construction Phase

5.3.1 Subject to investigation, the following measures will be considered during construction period to minimize construction noise impacts on nearby NSRs.

- (i) Use of quieter powered mechanical equipment and plant, and/or fitted with muffler/silencers/sound reduction devices;
- (ii) Provision of temporary noise barrier and enclosure where practicable;

- (iii) Noise screening structures or purpose-built noise barriers will be provided along the site boundary to provide additional protection to NSRs nearby, if necessary;
- (iv) Good site practices will be implemented as effective noise mitigation measures. These will include, but not limited to, locating noisy equipment and activities as far from NSRs as practical, scheduling noisy activities to minimise exposure of nearby NSRs to high levels of construction noise, limiting the use and number of equipment operating close to the NSRs, proper maintenance of construction plant and devising methods of working to minimise noise impacts on the surrounding environment; and
- (v) Travelling route of the construction vehicles on public roads should be planned as far as practicable in a way to minimize the noise impacts to NSRs.

Operational Phase

5.3.2 In order to minimize the impacts arising from the Project on the nearby existing / planned NSRs, the following mitigation measures are to be considered :

- (i) the use of noise mitigation measures along roads as appropriate.
- (ii) for fixed noise sources, careful siting of noisy machinery within the site; by enclosing the noisy machinery within building structures; by use of acoustic louver, silencer for ventilating fan, acoustic door and absorptive wall lining; and any opening of the building to be located facing away from any NSRs.

5.4 Water Quality

Construction Phase

5.4.1 In order to prevent adverse impacts on water quality, the following general mitigation measures are to be considered.

- (i) Non-dredged reclamation method for seawall and new land is recommended. Installation of silt curtain to control the dispersion of

suspended solids;

- (ii) 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;
- (iii) Good site practices in accordance with Professional Persons Environmental Consultative Committee Practice Note No. 1/94 "Construction Site Drainage" and "Recommended Pollution Control Clauses for Construction Contracts" issued by Environmental Protection Department (EPD);
- (iv) Implementation of recommended pollution control clauses for construction contracts, and guidelines under Environment, Transport and Works Bureau Technical Circular (Works) (ETWB TC(W)) No. 5/2005 "Protection of Natural Stream / Rivers from Adverse Impact arising from Construction Works";
- (v) Collection of construction surface runoff for treatment by properly maintained silt trap and oil interceptor to remove oil, lubricants, grease, silt, grit and debris, etc. to ensure compliance with the Water Pollution Control Ordinance (Cap. 358);
- (vi) Minimisation of the impacts of concrete washings, use of infiltration/sedimentation pits to settle out the washings before treatment/re-use/discharge, and adoption of treatment units with pH adjustment if necessary; and
- (vii) For bore piling operations, the resulting suspension will be settled in sedimentation/infiltration pit until supernatant is clear and the bentonite solids will be disposed appropriately.

Operational Phase

5.4.2 The following mitigation measures are to be considered:

- (i) Provision of sand/silt and oil/grease traps and blue-green drainage infrastructure such as bioswales, rain gardens, retention ponds, wetland and Sustainable Drainage System like green roof, porous pavements and

rainwater harvesting facilities at suitable locations to prevent ingress of pollutants to the stormwater system/ natural streams;

- (ii) Proper drainage systems with silt traps and oil interceptors for collection and removal of silt/grit and oil before discharging should be installed, maintained and cleaned at regular intervals;
- (iii) Adopting proper integration of blue-green drainage infrastructure with other public facilities at suitable locations to reduce flood risk, enhance runoff quality and unleash the drainage reserve space for public enjoyment;
- (iv) A contingency plan should be developed for accidental spillage;
- (v) In order to reduce the impact due to the bridge piers, the number of marine-based piers will be minimized by adopting longer span as far as practicable;
- (vi) Adopting proper sewerage system to collect the wastewater generated from the Project and connecting to the existing sewerage network in the region; and
- (vii) Adopting streamlined coastline along the reclamation to reduce stagnant region and interference with the marine flow.

5.5 Ecology

Construction Phase

- 5.5.1 The mitigation measures that are to be implemented to minimize the impacts on air quality, noise and water quality will also help to minimize any impacts on ecological resources.
- 5.5.2 As regards ecological impact, the best mitigation is avoidance by examining alternative engineering schemes wherever possible. A comprehensive ecological assessment will be undertaken under the proposed project. As part of the ecological assessment, we will review all existing information and carry out habitat survey to establish an adequate and accurate ecological baseline information. In particular, we will carefully identify, predict and evaluate the potential ecological impacts of the proposed project. For impact which is considered unavoidable,

appropriate mitigation measures will be formulated and adopted to minimize such impact, e.g. translocation of important species, confining works in specific area/season, minimizing reclamation extent, avoiding percussive piling, alternative design/construction methods such as non-dredged reclamation, good site practices, etc. Compensation will be provided for the loss of important habitats, if any.

5.5.3 For potential impact on CWD, additional measures can be implemented during construction phase to mitigate the possible noise disturbance and other impacts though there is only low and probably occasional occurrence of CWD recorded in Siu Ho Wan in the past. A range of mitigation measures, such as dolphin exclusion zone and silt curtains described below will be considered where necessary for land formation and construction works. Also, operation speed of construction vessels will be controlled to avoid any accidental collision with CWDs.

- (i) **Dolphin Exclusion Zone:** A monitored exclusion zone with a diameter of up to several hundred meters can be set up around marine works area for reducing chances of any adverse impact on dolphins. The exclusion zone will be closely monitored in such a way that if dolphins are observed, marine works will be delayed until dolphins have left the exclusion zone;
- (ii) **Silt Curtains:** To avoid the spread of suspended solids which will be re-suspended back into the water column during marine works, silt curtains can be used around work areas or locally around the operating equipment wherever necessary;
- (iii) **Non-dredged methods for land formation,** e.g. deep cement mixing for seawall construction to reduce impact on water quality;
- (iv) **Land-based delivery and disposal of fill materials to the site to reduce the risk of water contamination and traffic volume of construction vessels as far as possible;**
- (v) **Acoustic decoupling of any noisy equipment on barges to reduce noise disturbance to CWDs;**
- (vi) **Restriction of speed and number of trips of vessel transits in the area, so as to reduce disturbance from construction vessels and reduce risk of ship strikes;**

- (vii) Avoidance of underwater construction during the peak calving season of CWDs;
- (viii) Avoid potentially harmful construction methods, such as percussive piling and underwater explosions, that would injure the dolphins' hearing and drive them away from the area;

Operational Phase

- 5.5.4 Implementation of water pollution control measures described in Section 5.4 will minimise the potential ecological impact on marine wildlife during the operational phase of the Project.
- 5.5.5 The loss of intertidal habitats (artificial and rocky shores) and seabed could be compensated through the provision of ecologically-friendly designed seawalls, such as eco-shorelines. In the waters of Siu Ho Wan, hard bottom substrate is limiting as most substrates are large open expanses of soft mud or muddy sands. This limits hard substrate available for colonising sessile organisms.

5.6 Fisheries

Construction Phase

- 5.6.1 Subject to investigation, the mitigation measures on water quality impact proposed in Section 5.4.1 will be considered to minimise the impact on fisheries.

Operational Phase

- 5.6.2 Measures to minimize the impact on fisheries are to be considered:
 - (i) Consideration will be given to provide eco-shorelines along the reclamation site. The provision of ecology-friendly designed seawalls would provide opportunities for sessile organisms colonise and increase the diversity and heterogeneity of the seawalls thereby increasing habitat quality for other species such as juvenile fish and shrimp; and
 - (ii) Water quality and ecology impact mitigation measures proposed in Sections 5.4 and 5.5.

5.7 Waste Management

Construction Phase

5.7.1 The following mitigation measures will be considered during the construction phase to minimize waste generation and provide good control on waste management.

- (i) Good site practice and implementation of Waste Management Plan, in accordance with ETWB TC(W) No. 19/2005 "Environmental Management on Construction Sites", will be adopted to minimize any potential waste impacts;
- (ii) All C&D materials will be sorted and re-used wherever possible;
- (iii) Waste haulier should obtain the necessary registration and licences under the Waste Disposal Ordinance and the Waste Disposal (Chemical Waste) (General) Regulation from the Environmental Protection Department;
- (iv) Careful design, planning and good site management to encourage on-site sorting of C&D materials and minimize their generation during the course of construction;
- (v) Chemical waste will be properly stored and transported off-site for treatment by a licensed collector;
- (vi) Refuse will need to be stored in enclosed bins and reputable waste collector should be employed to remove the generated refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts;
- (vii) A recording system for the amount of wastes generated, recycled and disposed;
- (viii) In order to monitor the management of C&D materials and disposal of solid wastes at public filling facilities and landfills, and control fly-tipping, a trip-ticket system shall be implemented by the Contractor, in accordance with the contract and the requirements of Development Bureau Technical Circular (Works) (DEVB TC(W)) No. 6/2010 "Trip Ticket System for Disposal of Construction & Demolition Materials";

- (ix) Use of reusable non-timber formwork to reduce the amount of C&D material;
- (x) Proper storage and site practices to minimise the potential for damage or contamination of construction materials; and
- (xi) Different reclamation fill options will be examined with a view to promoting beneficial reuse of public fill.
- (xii) Leakage of pollutants or leaching from excavated soil /sediment should be prevented by storing on an impermeable surface.
- (xiii) Any contaminated sediments that may need stockpiling or need to be transported should be covered with tarpaulin.
- (xiv) Any contaminated material should be collected and transported to an appropriate disposal site and procedures should be developed to ensure that illegal disposal of wastes does not occur.
- (xv) The necessary waste disposal permits should be obtained, as required, from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap 354), as required.

5.7.2 With the adoption of non-dredged reclamation method, very limited quantity of sediments may be dredged and disposed of. In case handling of dredged/ excavated sediment is required, ETWB TC(W) No. 34/2002 will be followed should marine disposal be unavoidable.

Operational Phase

5.7.3 As the proposed Road P1 is a highway for use by road traffic, it is anticipated that waste impact during the operation phase would be minimal.

5.8 Cultural Heritage

5.8.1 Since the reclamation and marine piling will cause direct loss or disturbance to the seabed, Marine Archaeological Investigation (MAI), which is part of Cultural Heritage Impact Assessment (CHIA), will be required at EIA stage by a qualified marine archaeologist to ascertain the archaeological value of the affected seabed.

If any archaeological material is found, detailed evaluation will need to be conducted and practical mitigation measures, i.e. preservation in totality with sufficient buffer distance, etc., agreed with AMO, would be implemented to preserve the archaeological remains. The MAI shall be conducted in accordance with the "Guidelines for Marine Archaeological Investigation (as at 4 May 2020)" or its latest version issued by the AMO.

- 5.8.2 A CHIA will be carried out under the EIA study. The potential direct and indirect impacts on cultural heritage resources arising from the Project during the construction and operational phases will be assessed at EIA stage. Impacts on cultural heritage will be avoided as far as practicable. If found unavoidable, mitigation measures to minimise the direct and indirect impacts on cultural heritage will be proposed and implemented with prior agreement with the AMO.

5.9 Landscape and Visual

- 5.9.1 With reference to the Annex 10 and 18 of EIAO- Technical Memorandum, and EIAO Guidance Note No. 8/2010 for carrying out the landscape and visual impact assessments, the following mitigation measures are recommended subject to investigation.

Construction Phase

- 5.9.2 The following measures will be considered to minimize landscape impacts on existing landscape resources and visual impacts on nearby sensitive receivers:
- (i) Implementation of good site practices for preservation and protection of the existing landscape resources, including existing natural stream, and mangrove in accordance with ETWB TC(W) No. 5/2005, DEVB TC(W) No. 7/2015;
 - (ii) Optimization of reclamation area, construction area and contractor's temporary works areas to be minimised to avoid impacts on adjacent landscape;
 - (iii) measures should be taken to store and use construction equipment and building materials where they are not visually intrusive, or easily washed away or where they produce less dust;

- (iv) Screening of works areas with hoardings with appropriate colours compatible with the surrounding area;
- (v) Control of night-time lighting by hooding all lights and through minimisation of night working periods;
- (vi) Sensitive landscape design of reclamation edge with attractive landscape treatments and incorporation of coastal vegetation into seawalls to improve the compatibility of the Project with the existing environment;
- (vii) Reduction of construction period to minimum and introduction of phasing of the construction stage;
- (viii) Protection of existing trees and rare/ endangered/ protected plant species in accordance with DEVB TC(W) No. 7/2015 within the site boundary;
- (ix) Transplantation of suitable existing trees which will be in conflict with proposed works; and
- (x) Advance implementation of planting of vegetation.

Operational Phase

5.9.3 The following measures will be considered to minimize landscape impacts on existing landscape resources and visual impacts on nearby sensitive receivers.

- (i) Trees and shrub will be planted to provide adequate greening, screening, and mitigation, and minimise visual impact of the Project, where appropriate;
- (ii) Tree transplanting and compensatory planting for compensation of the loss of existing vegetation (including trees, shrubs, mangroves, etc.) will partially mitigate the impact to the existing trees/woodland;
- (iii) Sensible locations of viaduct alignment, columns and portals to minimise impact to existing trees and adjoining existing, planned and potential developments;
- (iv) The viaduct alignment should avoid intruding the log pond in Yan O Wan as far as possible;

- (v) Aesthetically pleasing design and responsive design will be adopted for the new structures (e.g. tunnel portals and ventilation facilities). Tree planting and earth mounds nearby will be used to reduce their apparent size/scale and to visually screen and soften the structures;
- (vi) Landscape treatment of road embankments and soil slopes will be provided to enhance their visual appearance. Relevant technical documents of Geotechnical Engineering Office Publication No. 1/2011 Technical Guidelines on Landscape Treatment for Slopes by CEDD in 2011 shall be observed;
- (vii) Aesthetic design will be adopted for the road structures such as slip roads, bridges and tunnel portals. Road structures will be designed with considerations and suitable measures to minimise the visual impact of the road corridor. Submission to Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS) in respect of the aesthetic design of the structures associated with the public highway system in accordance with ETWB TC(W) No. 36/2004 will be made during preliminary design; and
- (viii) The visual impact of noise mitigation measures including noise enclosure, if any, will be mitigated by appropriate detailed design, including use of transparent panels, appropriate colour selection of panels and supporting structures, as well as design of supporting structures to incorporate a high level of quality and aesthetics.

5.10 Land Contamination

5.10.1 The possibility of land contamination at the Project site would be further examined, as mentioned in Section 3.10.1. Subject to EIA findings, the following mitigation measures will be considered during the construction phase to minimise any potential exposure to contaminated soils or groundwater:

- (i) Remediation works on land contamination (if required) will be carried out in accordance with the prevailing guidelines prior to commencement of construction works of the Project site;
- (ii) Site workers should wear gloves, masks and other protective clothing

where exposure to vapour or contaminated soil may be encountered; and

- (iii) Adequate washing facilities should be provided and smoking/eating should be prohibited in the area.

5.11 Potential Hazard to Life

5.11.1 Potential hazard to life during construction and operation stages will be assessed. Risk mitigation measures will be considered in the EIA study if required. The investigation study will look into the way of delivery of explosives, including the possibility of establishment of explosives magazine for overnight storage. Hazard assessment for explosives would be conducted taking into account the impact of delivery and use of explosives for tunnel construction on the population in the vicinity of the tunnel alignment, including the risks from transport of explosives, use of explosives and transport of explosives to the blast faces inside the tunnels.

5.11.2 Subject to further study, possible measure includes limiting the working hours and number of workers within the PHI consultation zone of SHWWTW to minimise potential risk to construction workers.

5.12 Severity, Distribution and Duration of Environmental Effects and Further Implications

5.12.1 Based on the findings of assessments, effective control and mitigation measures will be deployed to ensure the impacts will be limited to the acceptable level. The possible severity, distribution and duration of environmental effects such as beneficial and adverse effects; short and long term effects; secondary and induced effects; cumulative effects and transboundary effects will be considered and addressed in the EIA, where applicable. The key results from community consultation, etc should also be documented in the EIA report.

6. USE OF PREVIOUSLY APPROVED EIA REPORTS

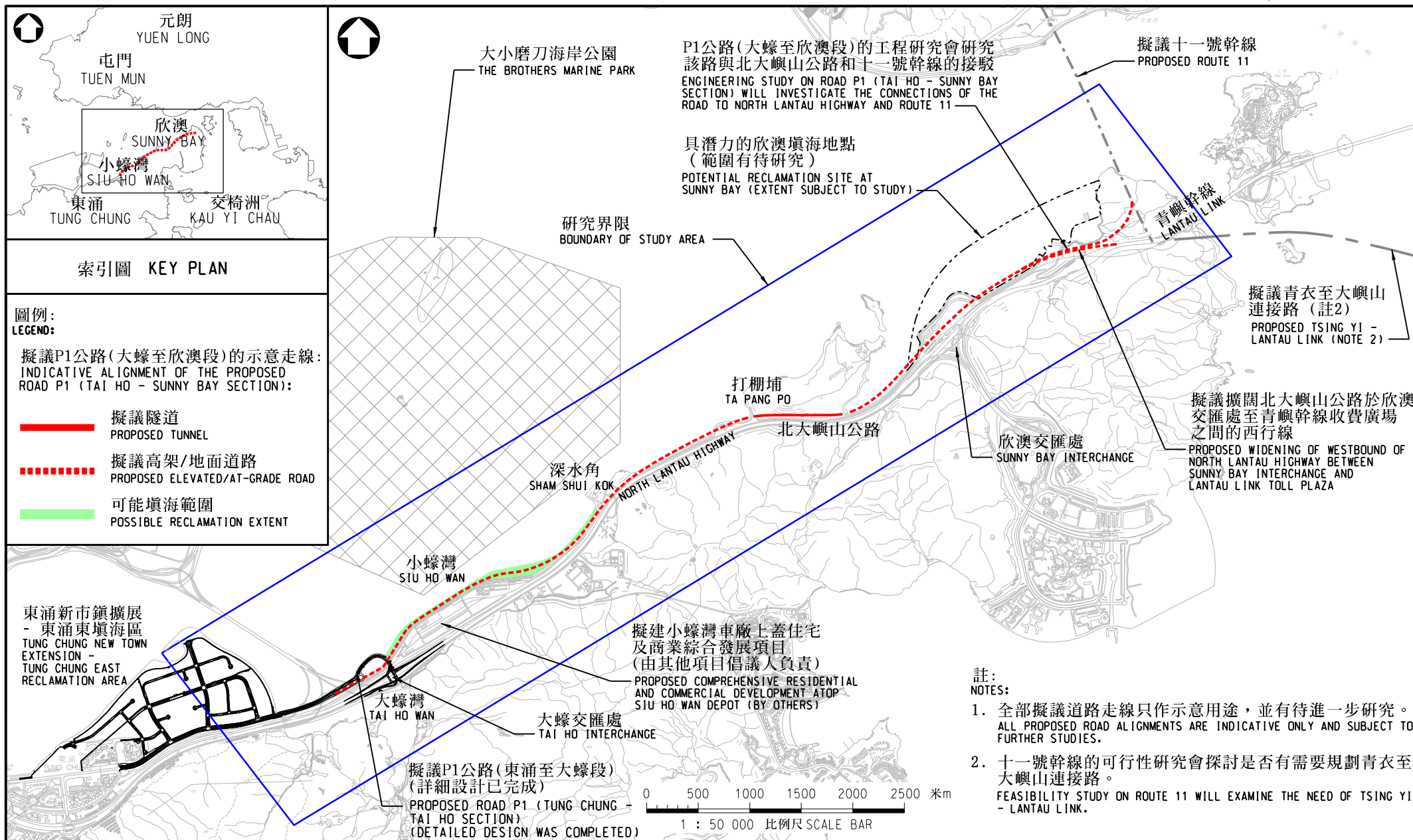
6.1.1 There are no relevant EIA reports already approved under the EIA Ordinance. However, the following studies are relevant and will be referred to in the subsequent EIA study:

Item	Application No./ Register No.	Title
(i)	-	Lantau Port and Western Harbour Development Studies (1991)
(ii)	-	North Lantau Development Feasibility Study (2001)
(iii)	-	Southwest New Territories Development Strategy Review (2001)
(iv)	-	Increasing Land Supply through Reclamation outside Victoria Harbour, in particular the identified potential near shore reclamation sites (2014)
(v)	-	Cumulative Environmental Impact Assessment Study for the Three Potential Nearshore Reclamation Sites in the Western Waters of Hong Kong (2014)
(vi)	EIA-252/2017	Proposed Comprehensive Residential and Commercial Development atop Siu Ho Wan Depot
(vii)	EIA-253/2017	Siu Ho Wan Station and Siu Ho Wan Depot Replanning Works
(viii)	AEIAR-030/2000	Route 10 North Lantau to Yuen Long Highway Investigation and Preliminary Design (Southern Section)
(ix)	AEIAR-082/2004	Siu Ho Wan Water Treatment Works Extension
(x)	AEIAR-090/2005	Road P1 Advance Works at Yam O on Lantau Island
(xi)	AEIAR-144/2009	Hong Kong - Zhuhai - Macao Bridge Hong Kong Link Road

Item	Application No./ Register No.	Title
(xii)	AEIAR-145/2009	Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities
(xiii)	AEIAR-146/2009	Tuen Mun – Chek Lap Kok Link
(xiv)	AEIAR-149/2010	Organic Waste Treatment Facilities, Phase I
(xv)	AEIAR-158/2011	Integration of Siu Ho Wan and Silver Mine Bay Water Treatment Works
(xvi)	AEIAR-185/2014	Expansion of Hong Kong International Airport into a Three-Runway System
(xvii)	AEIAR-196/2016	Tung Chung New Town Extension

Sustainable Lantau Office

Civil Engineering and Development Department



圖則名稱 drawing title

P1公路(大蠔至欣澳段)的工程研究
- 示意走線位置圖

ENGINEERING STUDY ON ROAD P1 (TAI HO - SUNNY BAY SECTION)
- LOCATION PLAN OF INDICATIVE ALIGNMENT