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Appendix 3

Environmental Study

{ Ove Arup & Partners Hong Kong Ltd }

Hong Kong Resort Company
Limited

**Optimization of Land Use in
Discovery Bay for Area 10b, Area
4a and Area 22**

Environmental Study

235928

This report takes into account the particular
instructions and requirements of our client.

It is not intended for and should not be relied
upon by any third party and no responsibility
is undertaken to any third party.

Job number 235928

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Executive Summary

Hong Kong Resort Company Limited (HKRCL) has been considering the feasibility of implementing additional development areas within the existing boundary of Discovery Bay to provide additional housing supply at Area 10b and Area 4a. A planning statement, titled "Optimisation of Land Use in Discovery Bay" was submitted to Planning Department (PlanD) in July 2013 for Area 10b. A round of comments from various government departments was received on December 2013 (ref PlanD.'s letter (L1/L/DBNC/352-17 dated 17 December 2013). Another round of submission was made on August 2014 and the corresponding set of comments was received from various government departments on December 2014 (ref PlanD.'s letter (L1/L/DBNS/352-17(CR) dated 23 December 2014). Subsequently, another round of submission was made in March 2015 and comments were received from various government departments. A round of submission was then made in November 2016 and comments were received from various government departments in December 2016 - January 2017. The latest round of submission was made in February 2017 and comments were received from various government departments. In order to address those comments, the development proposal has been refined accordingly.

This Environmental Study refers to Area 10b (i.e. existing Area 10b West), Area 4a (i.e. existing Area 22 West for Marina Club use) and Area 22 (i.e. existing Area 22 East and Area 10b East) (hereinafter referred to as "the Application Site"), which are included in the latest approved Discovery Bay Outline Zoning Plan for a range of "Other Specified Uses" and "Government, Institution and Community", despite the fact that some of their development parameters and locations are proposed to be amended.

An Environmental Study for the Application Site has been conducted on the latest development proposal is to demonstrate land use compatibility and acceptability of the proposed development by providing necessary information, findings and conclusions. Some of those comments from various government departments on the planning statement for the Application Site relating to the need for formal Environmental Impact Assessment Report for any Schedule 2 and Schedule 3 Designated Projects (DPs) would be separately handled when the Environmental Impact Assessment Ordinance (EIAO) process is formally initiated subsequent to a rezoning approval and prior to implementation. The issues considered in this Environmental Study include noise, air quality, water quality, waste management, land contamination, ecology and fisheries. Those relating to sewerage and drainage, and water supply are separately presented in another report. The

following potential DP has been identified and these would be further investigated during the detailed design stage.

- Item A6 of Schedule 2 - Transport depot for buses and golf carts.

Air Quality

All the relevant air emission sources in the vicinity that would have potential air quality impacts on the Application Site have been identified and assessed. Key air emission sources include marine vessels (such as the ferries between Discovery Bay and Central, kaitos, oil tankers for diesel delivery and sand barges), and sewage pumping stations. A literature review on best available information including Environmental Protection Department (EPD)'s publications, approved Environmental Impact Assessment (EIA) Reports and operators' data has been conducted to establish the emission strengths of these air emission sources. These emission strengths are then included in EPD's approved air quality dispersion models to simulate air quality impacts on both existing and planned air sensitive receivers. Assessment results indicate that the existing and planned air sensitive receivers would unlikely be subject to adverse air quality impact. Adverse odour impact of the existing sewage pumping station is also not anticipated.

Noise

All the relevant noise sources in the vicinity that would have noise impacts on the Application Site have been identified and assessed. These noise sources include marine vessels (such as the ferries between Discovery Bay and Central, kaitos, oil tankers and barges, etc.), existing sewage pumping stations, traffic along nearby road network and the firework at Hong Kong Disneyland Park. Where practicable, noise measurements have been conducted to establish the noise caused by these noise sources. The measurement data is then used to assess the noise impacts on both existing and planned noise sensitive receivers. Results indicate that the predicted noise impacts would comply with the relevant noise limits and hence the proposed land uses would not be subject to insurmountable noise impacts.

Water Quality

Although most of the construction works would not involve marine works, some minor reclamation work would still be required. The minor reclamation would be conducted by decking over piles and hence any water quality impacts caused would unlikely be significant. Any release of sediment would be readily controlled after the implementation of good practices. Refinement and appropriate mitigation measures would be required to minimise any adverse impacts on hydrodynamic and water quality during construction phase. The sewage generated during operational phase will be collected by the existing

sewage pumping station and conveyed to SHWSTW and hence would not cause adverse water quality impact during operational phase.

Other aspects

For waste management issue, the Application Site include residential premises together with the necessary infrastructure and landscaping elements. Although the construction methodologies are yet to be developed in subsequent detail design stage, the construction and reclamation work would adopt an environmentally friendly approach. With the implementation of good site practices and waste reduction measures, the quantity of construction waste is estimated to be around 29,000 m³.

Site inspection and review of historical photos have revealed that most of the areas within the potential development area have low potential of land contamination. However, the existing bus depot and services areas have some potential for land contamination. It is recommended to prepare a Contamination Assessment Plan (CAP) after the rezoning approval and during the subsequent statutory EIA. The CAP shall cover all the potential development area and would recommend the need for Site Investigation to collect soil and ground water samples for analysis, and subsequent actions as required. For the Discovery Bay (DB) Community Green Square at Area 4a, although it has been identified as a location with no potential for contamination, a site visit is recommended to be conducted to review the above findings prior to construction commencement.

For ecology, the Application Site comprises of developed area where vegetation only occupies a small portion of the site. The existing site area is mostly urbanised and subject to moderate to high anthropogenic disturbance, hence the ecological value of the area should be relatively low. Terrestrial ecological impacts are considered insignificant. Besides, Nim Shue Wan is a known site for seagrass. Water quality control measures/good site practice would be applied to minimize any potential indirect impact to the seagrass area. No significant ecological impact is anticipated.

For fisheries, the nearest fish culture zones are located more than 6km away and the nearest nursery and spawning ground for fisheries resources in the southern waters are located at 5.6km away. Given these large separation distance, together with the use of deck-over approach for the reclamation and mitigation measures such as silt curtains, both direct and indirect impacts are considered insignificant.

1 Introduction

1.1 Background

- 1.1.1.1** Hong Kong Resort Company Limited (HKRCL) has been considering the feasibility of implementing additional development areas within the existing boundary of Discovery Bay to provide additional housing supply at Area 10b and Area 4a. A planning statement, titled "Optimization of Land Use in Discovery Bay" was submitted to Planning Department (PlanD) in July 2013 for Area 10b. A round of comments from various government departments was received on December 2013 (ref PlanD.'s letter (L1/L/DBNC/352-17) dated 17 December 2013).
- 1.1.1.2** Another round of submission was made on August 2014 and the corresponding set of comments was received from various government departments on December 2014 (ref PlanD.'s letter (L1/L/DBNS/352-17(CR)) dated 23 December 2014). A subsequent round of submission was made on March 2015 and comments were received from various government departments. Another round of submission was then made in November 2016 and comments were received from various government departments in December 2016 - January 2017. The latest round of submission was made in February 2017 and comments were received from various government departments.
- 1.1.1.3** In order to resume the Application for Area 10b, comments from various government departments were addressed and the development proposal has been refined accordingly.
- 1.1.1.4** Ove Arup & Partners HK Ltd (Arup) has been appointed by HKRCL to conduct an Environmental Study for Area 10b (i.e. existing Area 10b West), Area 4a (i.e. existing Area 22 West for Marina Club use), Area 22 (i.e. existing Area 22 East and Area 10b East), helicopter landing pad and access road (hereinafter referred to as "the Application Site") relating to environmental aspects including noise, air quality, water quality, waste management, land contamination, ecology, fisheries, sewerage and drainage, and water supply. However, given the purpose of this Environmental Study is to demonstrate land use compatibility and acceptability of the proposed development by providing necessary information, findings and conclusions, some of those comments from various government departments on the planning statement in previous submissions for Area 10b relating to the need for statutory Environmental Impact

Assessment Report would be separately handled when the Environmental Impact Assessment Ordinance (EIAO) process is formally initiated prior to implementation. A separate study on the helicopter landing pad is also included in the Study (Appendix 7).

- 1.1.1.5** This Environmental Study assesses environmental aspects relating to noise, air quality, water quality, land contamination and ecology for the Application Site. Those issues relating to sewerage and drainage, and water supply are separately presented in another report accompanying this planning application.

1.2 Key Objectives of this Environmental Study

- 1.2.1.1** This Environmental Study is not intended to fulfil the statutory requirements under the EIAO for the DPs and the aim of this Environmental Study is to support the rezoning application for the Application Site. This key objectives for this Environmental Study Report are given below:

- Summarise the relevant legislations and regulations that are applicable;
- Establish the baseline environmental conditions;
- Identify the representative environmental sensitive receivers that may be affected by the proposed development;
- Present the assessment methodologies applicable to various environmental aspects;
- summarise the key findings for those relevant environmental aspects;
- Propose mitigation measures where needed; and
- Identify further studies that may be required during the subsequent statutory EIA.

2 Project Description

2.1 Land Uses

- 2.1.1.1** The current land uses for the Application Site (i.e. Area 10b, Area 4a, Area 22, helicopter landing pad and access road) include “Government, Institution and Community” and “Other Specified Use” for a range of supporting services (see **Appendix 2.1** for the key plan of relevant zones). Once the proposed development in the Application Site is implemented, they would be changed from the current land uses to the proposed land uses of residential and various supporting service uses. The following table summarises both the current and proposed land uses for Area 10b, Area 4a and Area 22 (see **Figure 2-1** for their locations). The total site area for Application Site is about 7.1 ha and would accommodate a total of 2,145 additional population.

Table 2.1: Current and proposed land uses

Area	Land uses	
	Existing ^[1]	Proposed
Area 10b	Existing Area 10b West: “OU” (Service Area, Staff Quarters (1), Dangerous Goods Store, etc.) and “Government, Institution and Community” for various supporting service uses.	Other Specified Uses (Service Area with Residential Development Above Residential (Group C)13 Residential (Group C)14
Area 4a	Existing Area 22 West: “OU” (Sports and Recreation Club (4) Area B)	Residential (Group C)15
Area 22	Existing Area 10b East: “OU” (Service Area, Petrol Filling Station)	Other Specified Uses (Sports and Recreations Club) (4)
Helicopter landing pad and access road	“OU” (Marina)	“OU” (Marina)

[1] – As shown in OZP S/I-DB/4 - Discovery Bay

- 2.1.1.2** Area 10b is located at the existing seafront along Marina Drive leading to the existing Lantau Yacht Club. Site observation reveals that the site is mainly occupied by a number of services facilities including the depot for vehicles, petrol filling station, ferry pier, etc. The entire depot area is paved with concrete.
- 2.1.1.3** Area 4a is located at the eastern side of Capevale Drive leading to Haven Court and Verdant Court of Peninsula Village. Site observation reveals that the site is mainly occupied by DB Community

Green Square with an area of community farmland and structures. The structures are located at area paved with concrete.

- 2.1.1.4 Area 22 is located at the eastern side of Peninsula Village. Site observation reveals that the site is mainly occupied by Lantau Yacht Club and the existing helicopter landing pad near Marina Drive.
- 2.1.1.5 Within Area 10b and Area 4a, it is proposed to have residential premises together with the necessary infrastructure and landscaping elements. Besides, some of the existing services would also be relocated and accommodated in a podium structure, but still within Area 10b. Besides, the marine light diesel (MLD) refilling facility will be relocated inside the new Lantau Yacht Club. It is mainly for filling of yachts, speedboats and sailboats, etc. According to information from the operator and on-site observations, there is very low frequency of yachts, speedboats and sailboats, etc. visiting the existing MLD refilling facility, with only few trips a day.
- 2.1.1.6 For sewerage system, the sewage generated from the additional population from the Application Site will be conveyed to Siu Ho Wan Sewage Treatment Works (SHWSTW) as discussed in the Study on Sewerage Systems accompanying this planning application. Hence, on-site sewage treatment works is not required.
- 2.1.1.7 For fresh water, it would be supplied from Siu Ho Wan Water Treatment Works. Hence, on-site storage of chlorine gas is not required.
- 2.1.1.8 The existing seawall along Marina Drive has adopted the configuration as a sloping seawall. In order to cater for the additional housing development, it is proposed to include an additional narrow strip of reclamation, in the form as a decking with a width of 9-37m. The total area for this additional decking would be approximately 1.4ha. It should be noted that the extent of the deck would be within the gazetted zone approved under the Foreshore and Sea-bed (Reclamation) Ordinance in 1977.
- 2.1.1.9 Besides, it is proposed to relocate the existing helicopter landing pad (Helipad LT17) near Marina Drive to the south-eastern end of the Lantau Yacht Club. The relocated helipad would be within the reclamation boundary and in the form as a deck structure. The access road to the relocated helipad would be mainly constructed on the existing eastern breakwater for Lantau Yacht Club together with a short section of piled road section connecting to the helipad. The relocation of the helipad is separately presented in another report accompanying this planning submission.

- 2.1.1.10** As confirmed with the facility operator, the Bounty services which is previously available at Area 10b will not be re-provisioned in the future construction and operational phase of the Project. Hence, berthing area for Bounty would no longer be necessary.
- 2.1.1.11** Similar to the existing developments within Discovery Bay, the municipal wastes from the Application Site will be transported away by vehicles.

2.2 Tentative Construction Methodology

- 2.2.1.1** The construction methodologies are yet to be developed in the subsequent stages. Nevertheless, the reclamation work at Area 10b and Area 22 would adopt an environment friendly approach by decking over piles instead of using the conventional dredging approach. This would significantly reduce the release of sediment during the construction phase. However, minor modification works would still be required for the existing vertical seawall along the Area 10b, including relocation of existing piers. The construction of the new helipad would also require the installation of piles to support the deck.
- 2.2.1.2** Some site clearance works would be required for Area 10b and then followed by superstructure works. Similarly for Area 4a and Area 22, minor site formation works would be required and then followed by superstructure works.
- 2.2.1.3** In order to avoid/minimise water quality impacts due to the piling works for the reclamation works at Area 10b, Area 22 and the proposed helipad, steel casings will firstly be installed at the proposed pile locations. The steel casings would extend above the sea level and will prevent soil or rock arisings from being dispersed into the sea. The excavated materials will be removed from within the piles and transferred to a barge anchored close to the piles. Once the materials inside the casings are removed, steel reinforcements/structural sections will be lowered inside the casing and then followed by concreting work. Silt curtain will be installed as secondary measures to prevent any accidental release of excavated materials into the sea.

2.3 Tentative Implementation Programme

- 2.3.1.1** According to the latest design, the tentative time for the population intake of the Application Site would be beyond 2028 and the actual date would be reviewed throughout the design process.

2.4 Designated Project

2.4.1.1 The elements within the Application Site have been reviewed to determine whether they are qualified as either Schedule 2 or Schedule 3 Designated Projects (DPs) under the EIAO. An overview of these potential DPs is given in the table below for further evaluation. However, it should be noted that this list of potential DPs would need to be continuously reviewed and updated as the design progresses. The following table lists out those potential DPs which are further discussed and evaluated in the following sections.

Table 2.2: Potential designated projects to be reviewed

DP Item	Description
Item A1 of Sch 2	A road which is an expressway, trunk road, primary distributor road or district distributor including new roads and major extensions or improvements to existing road.
Item A6 of Sch 2	A transport depot
Item C1, C2 & C12 of Sch 2	Reclamation works and dredging works
Item O2 of Sch 2	A marina to provide dry storage for not less than 30 vessels used primarily for pleasure or recreation
Item 1 of Sch 3	Engineering feasibility study of urban development projects with a study area covering more than 20ha or involving a total population of more than 100,000.

2.4.1.2 It should be noted that the Application Site is included in the latest approved Discovery Bay Outline Zoning Plan (OZP) No. S/I-DB/4 and has been partly implemented, despite the fact that some of their development parameters and locations are proposed to be amended.

2.4.2 Summary of Designated Projects

2.4.2.1 After the review, the following potential DP has been identified and this would be further investigated during the detailed design stage.

- Item A6 of Schedule 2: Transport depot for buses and golf carts.

2.4.3 Item A6 of Schedule 2

2.4.3.1 Item A6 of Schedule 2 refers to “A transport depot located less than 200m from the nearest boundary of an existing or planned (a) residential area; (b) place of worship; (c) education institutions; or (d) health care institution.”

2.4.3.2 There is an existing depot for the buses and golf carts within Area 10b. Most of the maintenance area of this depot is enclosed. The nearest residential premises is the Twilight Court, which is located at

around 50m away. Given that this depot has been operated before the enactment of the EIAO, it is an exempted DP under the EIAO.

- 2.4.3.3 According to the latest design, the existing depot for buses and golf carts within Area 10b would be retained but modified and relocated. The new depot will be accommodated in a podium with residential blocks on top. Vehicular and pedestrian access to the depot and residential blocks are totally separated at different levels. The depot is accessed by vehicles at ground level, whereas that of residential blocks is on top of podium roof. However, the future depot would still be within 200m from the planned residential area in Area 10b. Obviously, accommodating the depot in a podium with suitably located openings will help to avoid and minimise many environmental issues, such as noise, air, visual, etc as much as practicable. Moreover, this exempted DP would not have material change under EIAO. Nevertheless, this depot would still be a DP under Item A6 of Schedule 2.

2.4.4 Others

- 2.4.4.1 Other than the above DPs, other Schedule 2 and Schedule 3 DPs have been reviewed and summarised below:

- 2.4.4.2 *Item A1 of Schedule 2* refers to “A road which is an expressway, trunk road, primary distributor road or district distributor including new roads and major extensions or improvements to existing road.”

- 2.4.4.3 According to the latest design, only local roads would be required for the Application Site. None of the roads proposed will be categorised as expressways, trunk roads, primary distributor roads or district distributors. Hence, all the local roads proposed would not be qualified as DP under Item A1 of Schedule 2.

- 2.4.4.4 *Item C of Schedule 2* refers to reclamation works. It should be noted that the proposed development would involve certain reclamation and dredging to slightly extend the land area by approximately 1.4ha. However, the extent of reclamation and dredging will be within the boundary of the approved under the Foreshore and Seabed Ordinance in 1977 (see **Figure 2-2**). Hence, by virtue of Clause 9(2)(c) of the EIAO, the reclamation and dredging works are exempted from the EIAO.

- 2.4.4.5 *Item O2 of Schedule 2* refers to “A marina designed to provide moorings or dry storage for not less than 30 vessels used primarily for pleasure or recreation.” According to the latest design, there will not be moorings of vessels and the dry storage of vessels for pleasure or

2.4.4.6 *Item 1 of Schedule 3 refers to “Engineering feasibility study of urban development projects with a study area covering more than 20ha or involving a total population of more than 100,000.” According to the latest design, the total size area of the Application Site is approximately 7.1 ha and will accommodate 2,145 population. Hence, the proposed development will not be qualified as a DP under Item 1 of Schedule 3.*

2.5.1.1 A review has been conducted to collate the information on potential concurrent projects that are available from the public domain. These potential concurrent projects are discussed in the following sections to evaluate if there are potential for cumulative impacts during the construction and operation phase of the proposed development in Discovery Bay.

2.5.1.3 Besides, the EIA SBs for Route 11⁴ and Road P1⁵ have also been issued. The separation distances between these 2 highway infrastructure and the Application Site are approximately 2km. Given the above proposed developments will be located at or more than 2km away, adverse cumulative impacts are unlikely.

⁵ Study Brief of Road P1 (Tai Ho – Sunny Bay Section). Lantau (ESB-337/2020)

water quality are unlikely and would be further discussed in **Section 6.4**.





2.6 EIAO Implications

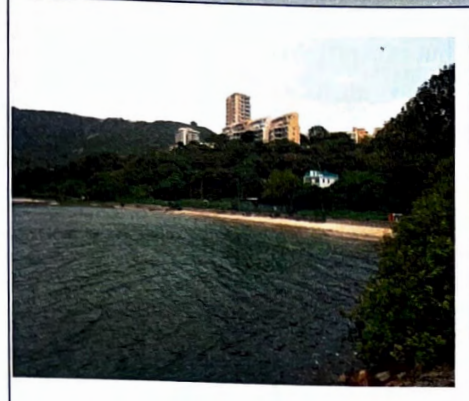
- 2.6.1.1** As discussed above, one of the construction items (i.e. depot) in the proposed development may constitute a DP under the EIAO. It is well noted the potential environmental impacts evaluated in this Environmental Study Report shall be revisited in the later statutory EIA. In accordance with the requirements of Section 5(1) of the EIAO, a Project Profile (PP) for the Project would need to be submitted to the Director of Environmental Protection (DEP) for application for an EIA Study Brief (EIA SB). Once the development proposal is further developed, a PP will be submitted to DEP to issue an EIA SB for the DP. The project proponent would need to submit an EIA Report to fulfil all the requirements in the EIA SB and the TM-EIAO. Detailed assessments/surveys shall be conducted and any proposed mitigation measures in this Environmental Study Report will be further explored and agreed with relevant authorities in the future EIA. An Environmental Permit (EP) would be required prior to the commencement of any construction works.

3 Site Inspection

3.1.1.1 Several site visits were carried out in April – June 2014, August 2016 and February – March 2022 to identify potential sources of environmental impact and sensitive receivers in the vicinity of the Application Site. The following table presents the images within and in the vicinity of the Application Site.

Table 3.1: Existing environment conditions

Viewpoint 1: Golf cart repair workshop	Viewpoint 2: Bus depot
	
Viewpoint 3: Overnight bus parking	Viewpoint 4: A public refuse collection point
	

Viewpoint 5: Nim Shue Wan	Viewpoint 6: Public ferry to Peng Chau / Mui Wo
	
Viewpoint 7: Existing boatyard	Viewpoint 8: Petrol filling station
	
Viewpoint 9: DB Community Green Square	
	

4 Air Quality Assessment

4.1 Description of the Environment

4.1.1.1 Discovery Bay has a relatively clean environment without any major air pollution sources that would impose adverse air impacts on the neighbouring community. All the existing roads within Discovery Bay are private roads on which only licenced vehicles such as golf carts, shuttle buses and services vehicles are allowed to use.

4.2 Air Sensitive Receivers

4.2.1.1 In accordance to Annex 12 of the TM-EIAO, Air Sensitive Receivers (ASRs) include any domestic premises, hotel, hostel, hospital, clinic, nursery, temporary housing accommodation, school, educational institution, office, factory, shop, shopping centre, place of public worship, library, court of law, sports stadium or performing arts centre. Any other premises or places with which, in terms of duration or number of people affected, have a similar sensitivity to the air pollutant as the aforelisted premises and places would also be considered as a sensitive receiver.

4.2.1.2 Representative Air Sensitive Receivers (ASRs) within the 500m Assessment Area from the Application Site have been identified in Table 4.1 and are illustrated in Figure 4-1.

Table 4.1: Representative ASRs for air quality assessment

ASR ID	Location	No. of Storeys	Land Use	Assessment Height (mAG)	
				Lowest	Highest
Existing ASRs					
A01	Tennis Court	1	Recreational	1.5	-
A02	Basketball Court	1	Recreational	1.5	-
A03	Lantau Yacht Club	3	Recreational	1.5	10
A04	Lantau Yacht Club	3	Recreational	1.5	10
A05	Verdant Court	17	Residential	5	60
A06	Haven Court	17	Residential	5	60
A07	Jovial Court	17	Residential	5	60
A08	Crestmont Villa Block 2	5	Residential	1.5	15
A09	Coastline Villa Block 28	5	Residential	1.5	15
A10	Coastline Villa Block 30	6	Residential	1.5	15
A11	Blossom Court	18	Residential	5	60
A12	Crestmont Villa Block 41	5	Residential	1.5	15
A13	Crestmont Villa Block 1	5	Residential	1.5	15
A14	Crestmont Villa Block 1	5	Residential	1.5	15
A15	Twilight Court	17	Residential	5	60
A16	Crestmont Villa Block 13	5	Residential	1.5	15

ASR ID	Location	No. of Storeys	Land Use	Assessment Height (mAG)	
				Lowest	Highest
A17	Crestmont Villa Block 4	5	Residential	1.5	15
A18	Costa Court	17	Residential	5	60
A19	Onda Court	17	Residential	5	60
A20	La Costa Block 22	4	Residential	5	15
A21	La Costa Block 18	4	Residential	5	15
A22	Village House 10A	3	Residential	1.5	10
A23	La Vista Block 7B	5	Residential	5	15
A24	La Vista Block 8B	5	Residential	5	15
A25	Village House	3	Residential	1.5	10
A26	Village House	3	Residential	1.5	10
A27	Lantau Yatch Club Building	2	Recreational	1.5	10
Planned ASRs					
P01	Planned Residential Areas	6	Residential	10	20
P02	Planned Residential Areas	6	Residential	10	20
P03	Planned Residential Areas	2	Residential	1.5	10
P04	Planned Residential Areas	2	Residential	1.5	10
P05	Planned Residential Areas	2	Residential	1.5	10
P06	Planned Residential Areas	2	Residential	1.5	10
P07	Planned Residential Areas	2	Residential	1.5	10
P08	Planned Residential Areas	2	Residential	1.5	10
P09	Planned Residential Areas	6	Residential	10	20
P10	Planned Residential Areas	6	Residential	10	20
P11	Planned Residential Areas	6	Residential	10	20
P12	Planned Residential Areas	6	Residential	10	20
P13	Planned Residential Areas	16	Residential	10	50
P14	Planned Residential Areas	16	Residential	10	50
P15	Planned Residential Areas	18	Residential	1.5	60
P16	Planned Residential Areas	18	Residential	1.5	60
P17	Planned Residential Areas	18	Residential	1.5	60
P18	Planned Residential Areas	5	Residential	1.5	15
P19	Planned Residential Areas	5	Residential	1.5	15

4.2.1.3 The assessment results of the representative ASRs are compared with the criteria in Air Pollution Control Ordinance (APCO) (Cap.311) which is the principal legislation for controlling air pollutants and its subsidiary regulations, which defines statutory Air Quality Objectives (AQOs).

4.2.1.4 The APCO (Cap. 311) provides the power for controlling air pollutants from a variety of stationary and mobile sources and encompasses several AQOs. Additionally, Chapter 9 of the HKPSG provides the following overall policies:

- Limit the contamination of the air in Hong Kong, through land use planning and through the enforcement of the APCO to safeguard the health and well-being of the community; and

- Ensure that the AQOs for seven common air pollutants are met as soon as possible.

4.2.1.5 Currently, the AQOs stipulate limits on concentrations for seven pollutants which are listed in **Table 4.2** below.

Table 4.2: Hong Kong Air Quality Objectives (HKAQOs)

Pollutant	Limits on Concentration, $\mu\text{g}/\text{m}^3$ ^[1] (The Number of Exceedance per calendar year allowed is shown in brackets)				
	10-min	1-hour	8-hour	24-hour	Annual
Sulphur dioxide (SO_2)	500 (3)			50 (3)	
Respirable suspended particulates (RSP) ^[2]				100 (9)	50
Fine suspended particulates (FSP) ^[3]				50 (35)	25
Carbon monoxide (CO)		30,000 (0)	10,000 (0)		
Nitrogen Dioxide (NO_2)		200 (18)			40
Ozone (O_3)			160 (9)		
Lead (Pb)					0.5

Notes:

[1] All measurements of the concentration of gaseous air pollutants, i.e., sulphur dioxide, nitrogen dioxide, ozone and carbon monoxide, are to be adjusted to a reference temperature of 293 Kelvin and a reference pressure of 101.325 kilopascal.

[2] Respirable suspended particulates (RSP) mean suspended particles in air with a nominal aerodynamic diameter of 10 μm or less.

[3] Fine suspended particulates (FSP) mean suspended particles in air with a nominal aerodynamic diameter of 2.5 μm or less.

4.3 Air Pollution Sources

4.3.1 Construction Activities

Construction Dust

4.3.1.1 During construction phase, the reclamation works and the construction works for the relocated helipad will be conducted by decking over the piles at the seashore or near to an existing breakwater. No backfilling of soil and major earth moving activities are required as compared to conventional reclamation. Hence, no adverse dust impact is anticipated from the reclamation works and the construction works for the relocated helipad.

4.3.1.2 For the site clearance and superstructure works, the construction works for the Application Site will not be conducted at the same time, but in multiple work fronts on the completed decking or existing flatland and no extensive excavation and site clearance works will be required. Hence, significant dust emission is therefore not anticipated provided that the relevant good practices recommended in the Air Pollution Control (Construction Dust) Regulation are implemented.

4.3.1.3 Vehicle washing facilities will be provided at every designated exit point of the construction worksites. All construction vehicles will be washed at the exit before leaving the construction worksites. As a good practice, the following dust suppression measures given in the Air Pollution Control (Construction Dust) Regulation should be incorporated by the Contractor to control the dust nuisance throughout the construction phase:

- Any stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or reinstated where practicable within 24 hours of the excavation or unloading;
- Any dusty material remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads;
- A stockpile of dusty material should not extend beyond the pedestrian barriers, fencing or traffic cones;
- The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle;
- Where practicable, vehicle washing facilities including a high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;
- When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period;
- The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials;
- Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously;
- Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the three sides;
- Immediately before leaving a construction site, every vehicle shall be washed to remove any dusty materials from its body and wheels;
- Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; and
- Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen,

shortcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.

Emission control on Non-Road Mobile Machinery (NRMMs)

4.3.1.4 Fuel combustion from the use of powered mechanical equipment (PME) during construction works would be a source of air emission. To improve air quality, EPD has introduced the Air Pollution Control (NRMMs) (Emission) Regulation in 2015 to regulate emissions from machines and non-road vehicles. Under the Regulation, NRMMs, except those exempted, are required to comply with the prescribed emission standards. All regulated machines sold or leased for use in Hong Kong must be approved or exempted with a proper label in a prescribed format issued by EPD. Only approved or exempted NRMMs with a proper label are allowed to be used in specified activities and locations including construction sites.

4.3.1.5 In addition, the following good site practices that can control and reduce the emission from the use of non-road mobile machinery from the Project are recommended:

- Regulated machines shall be used and exempted NRMMs should be avoided where practicable.
- Use cleaner fuel such as ULSD in diesel-operated construction plant to reduce sulphur dioxide emission.
- Use of electric PMEs where practicable.
- Use power supplied from power utilities when practicable (e.g. to replace generators).
- Switch off the engine of PMEs when idling.
- Implement regular and proper maintenance for plant and equipment.
- Employ plant and equipment of adequate size and power output and avoid overloading of the plant.
- Locate the PMEs away from sensitive receivers as far as possible.
- Erect screen to shield the emission source from sensitive receivers where necessary and practicable.

4.3.2 Vehicular Emission

4.3.2.1 The Hong Kong Panning Standards and Guidelines (HKPSG) has specified the minimum setback distances between ASRs and different categories of roads, including trunk road and primary distributor, district distributor and local distributor. Yet, all the roads within Discovery Bay are private road and have no specific road type assigned. There is no specific road buffer requirement in

HKPSG for private road. In order to assess the potential air quality impact from vehicular emission, the road buffer requirements in HKPSG of road type in similar nature are referenced.

4.3.2.2 As the Discovery Bay Road and Marina Drive provide direct access to the buildings within the district, the nature of these roads would be the same as “Local Distributor”. Therefore, the buffer requirement of “Local Distributor” (i.e. 5m) is referenced for the purpose of evaluating the potential air quality impact induced by the road traffic activities.

4.3.2.3 For both Discovery Bay Road and Marina Drive, the separation distance will be more than 5m. Hence, adverse air quality impacts due to Discovery Bay Road are not anticipated.

4.3.2.4 A depot for bus is proposed in a podium with residential blocks to address overnight parking need, approximately 50 veh/day from 11:00pm to 7:00am. The design of the bus depot should follow the requirement of Practice Note for Professional Persons – Control of Air Pollution in Semi-confined Public Transport Interchanges (ProPECC PN1/98). Good design such as providing air purifying units and locating the exhaust air outlets away from the nearby residents would be implemented to avoid any air quality nuisance.

4.3.3 Industrial Emission

4.3.3.1 Site surveys conducted in April – June 2014, August 2016 and February – March 2022 revealed that there is no existing chimney within 500m assessment area. Hence, no cumulative air quality impact from industrial emission is anticipated.

4.3.4 Marine Vessels Emission

4.3.4.1 Site inspections have revealed marine vessels activities within the 500m assessment area. These activities include:

- Passenger ferry service between Discovery Bay and Central;
- Kaito ferry service between Discovery Bay and Peng Chau;
- Kaito ferry service between Discovery Bay and Mui Wo;
- Marine light diesel refilling activities;
- Marine Vessels using Services Pier; and
- Yacht, speedboat and sailboat at Lantau Yacht Club and nearby area.

Passenger Ferry Service and Kaito Ferry Services

4.3.4.2 There are ferry services between Discovery Bay and Central, between Discovery Bay and Mui Wo, and between Discovery Bay and Peng Chau. Schedule of these ferry services are shown in **Appendix 4.1**.

- 4.3.4.3** As certain amounts of pollutants are generated during combustion of diesel from the ferries, emissions from these ferry services are included in the near-field model. In addition, according to the proposed development layout shown in **Figure 2-1**, re-provision of the existing pier of kaito ferry is required. Therefore, for the purpose of this assessment, the routes of the kaito services have been adjusted accordingly to allow for the same separation distance from the shoreline. The navigation routes adopted for various ferries are shown in **Appendix 4.1**.
- 4.3.4.4** There are two types of vessels, Catamaran ferries and Monohull ferries, providing ferry service between Discovery Bay and Central. The capacities of Catamaran ferries and Monohull ferries are about 500 and 300 passengers respectively. On the other hand, there is no information from the operators of kaito ferry services between Discovery Bay and Mui Wo, and between Discovery Bay and Peng Chau.
- 4.3.4.5** With reference to the Traffic Impact Assessment accompanying this planning statement, the existing ferry service between Discovery Bay and Central would still operate with sufficient capacity with the additional residential developments in place. Therefore, no additional trip and projection of the emission from ferry service between Discovery Bay and Central is required.
- 4.3.4.6** Besides, there is no need to increase the kaito ferry between Discovery Bay and Mui Wo, and Discovery Bay and Peng Chau. However, in order to consider the cumulative impacts, the emission from existing kaito ferry services at the adjusted navigation route for the relocated pier is also included in the assessment.

Marine Light Diesel Refilling Activities

- 4.3.4.7** The marine light diesel (MLD) refilling facility will be located inside the new Lantau Yacht Club. It is mainly for filling of yachts, speedboats and sailboats, etc. According to information from the operator and on-site observations, there is very low frequency of yachts, speedboats and sailboats, etc. visiting the existing MLD refilling facility, with only few trips a day. Hence, emissions from yachts, speedboats and sailboats, visiting the MLD refilling facility are considered insignificant. Hence, marine emission due to the refilling activities would not be included in this assessment.

Marine Vessels using Services Pier

- 4.3.4.8** The several types of vessels using the services pier are described as below:
- Oil tanker for diesel delivery to the marine light diesel refilling facility;
 - Tug boat and barge for LPG tanker vehicles delivery;
 - Vessel for LPG bottle delivery; and
 - Sand barge;
- 4.3.4.9** The operating time of all these marine vessels would be limited to daytime (i.e. 7:00 am to 7:00 pm) during weekdays only. The oil tanker will deliver MLD to

the relocated refilling facility inside the Lantau Yacht Club depends on demand, while the barge towed by a tugboat will carry LPG tanker vehicles to the Discovery Bay every 5 to 6 days (i.e. about 5 to 6 times per month). Based on the information from the operators, the operation of the sand barge and LPG bottle delivery would be carried out once per three months and once per week during daytime respectively. Their navigation route (see **Appendix 4.1**) and engine powers are also similar.

- 4.3.4.10** Due to site constraints, only one vessel can berth at the loading/unloading point at any one time. Hence, concurrent operations of these 4 types of vessel are not anticipated. For the purpose of this study, a continuous operation of vehicles using services pier from 7:00 am to 7:00 pm during weekdays is assumed in the quantitative assessment. This conservative approach would cover the operations of oil tanker, tug boat/barge for LPG tanker vehicles delivery, vessel for LPG bottle delivery and sand barge.

Yachts, Speedboats and Sailboats at Lantau Yacht Club

- 4.3.4.11** According to the operator and on-site observations, there is very low frequency of yachts, speedboats and sailboats movements within the Lantau Yacht Club with only few trips a day (i.e. average 1.5 yachts in and 1.5 yachts out of Lantau Yacht Club every day in Feb 2022). In addition, once these yachts, speedboats and sailboats parked at the berths, their engines will be stopped and switched to power supplied by the club. Together with the fact that these yachts, speedboats and sailboats have much smaller engines as compared to ferries, it is considered that their emission is unlikely significant. Hence, adverse cumulative air quality impact is not anticipated and therefore would not be included in the quantitative assessment.

4.3.5 Organic Resources Recovery Centre Phase 1

- 4.3.5.1** Organic Resources Recovery Centre Phase 1 (O ▪ Park1) is a major point source within 4km from the boundary of the Application Site (see **Appendix 4.2**). However, the distance between O ▪ Park1 and the Application Site is more than 3km and there is a 200m high terrain in between. In addition, the prevailing wind of Hong Kong is easterly wind while the O ▪ Park1 is located at the northwest of the Application Site. Thus, significant cumulative impact from O ▪ Park1 is not anticipated and therefore would not be included in the quantitative assessment.

4.3.6 Fireworks Displays at Hong Kong Disneyland Park

- 4.3.6.1** Hong Kong Disneyland Park is located at approximately 2.5 km north-east of Discovery Bay. According to their approved EIA Report, there are fireworks displays every night, including weekdays and weekends, although the fireworks have been suspended in recent years due to pandemic circumstances. However, since it is outside 500m assessment area and it is not a 4km major point sources

classified by EPD, adverse impacts from fireworks are not anticipated and therefore would not be included in the quantitative assessment.

4.3.7 Odour from Existing Sewage Pumping Stations

- 4.3.7.1 The existing sewage pumping station would be a potential odour source for the planned receivers within the Application Site. According to site observation, there is no noticeable odour at the nearby of the existing sewage pumping station. Hence, odour impact from the existing sewage pumping station is not anticipated.

4.4 Assessment Methodology

Marine Vessels Emission

- 4.4.1.1 Marine emissions from the activities discussed in **Section 4.3** have been referenced to the EPD's "Study on Marine Vessels Emission Inventory, Final Report". The marine emissions for different time-in-mode including hotelling, manoeuvring, slow cruise and fairway cruise have been calculated. **Appendix 4.3** presents the detailed calculation of emission.

- 4.4.1.2 Marine emissions have been modelled using the EPD's approved AERMOD model. Modelling parameters including surface roughness, etc. have been referred to EPD's "Guidelines on Choice of Models and Model Parameters" and USEPA AP-42. Assumptions of the AERMOD model are shown in **Appendix 4.3**.

Far-field Source Contribution

- 4.4.1.3 The latest PATH v2.1, for Year 2025 released by EPD in July 2021 has been adopted as the background concentration. The project involves 4 grids in the PATH v2.1, which are 24_30, 24_31, 25_30 and 25_31 as shown in **Appendix 4.3**.

Determination of Representative Air Pollutants

- 4.4.1.4 Navigation is a dominant source of NO₂, RPS, FPS and CO. Nonetheless, according to the latest Air Quality in Hong Kong 2020, CO concentration in Hong Kong is well below AQOs and is not considered as a representative air pollutant.
- 4.4.1.5 On the other hand, although the Air Pollution Control (Marine Light Diesel) Regulation stipulates that the sulphur content of marine light diesel (MLD) used in marine vessels shall not exceed 0.05% by weight which could reduce 90% of SO₂ emission by navigation from the previous sulphur content of about 0.5%, SO₂ emission from navigation is still high according to the latest statistics of 2019 Hong Kong Emission Inventory Report. SO₂ should be considered as a representative air pollutant. Hence, the representative air pollutants would be NO₂, RPS, FPS and SO₂.

Cumulative Impacts

4.4.1.6 Cumulative air quality impact is a combination of the emission impacts contributed from the marine vessels and far-field sources on an hourly basis. Ozone Limiting Method (OLM) is adopted for the conversion of residual NO_x to NO₂, using the predicted O₃ levels and NO₂ levels from PATH v.2.1 model. The same initial NO₂/NO_x ratios, i.e. 10%, for marine emission sources with reference to the approved EIA study of Tung Chung New Town Extension (AEIAR-196/2016) have been followed in this assessment.

4.5 Assessment Results

4.5.1.1 The cumulative NO₂, RSP, FSP and SO₂ concentrations at each representative ASRs have been assessed. Summary of the maximum predicted concentrations at planned ASRs among all assessment heights are presented in Table 4.3 and assessment results at all assessment heights are detailed in Appendix 4.4. As shown in Table 4.3 and Appendix 4.4, all the ASRs would comply with the AQOs.

Table 4.3: Cumulative NO₂, RSP, FSP and SO₂ concentrations at ASRs

ASR ID	Concentration (µg/m ³)							
	NO ₂		RSP		FSP		SO ₂	
	19 th highest 1-hour	Annual	10 th highest 24-hour	Annual	36 th highest 24-hour	Annual	4 th highest 10-minute	4 th highest 24-hour
AQO	200	40	100	50	50	25	500	50
Existing ASRs								
A01	112	30	64	28	22	15	68	11
A02	112	31	64	28	22	15	68	11
A03	111 - 113	31 - 32	64	28	22	15	67	11
A04	110 - 113	31	64	28	22	15	67	11
A05	110 - 167	28 - 32	64	28	22	14 - 15	67	11 - 12
A06	110 - 158	28 - 31	64	28	22	14 - 15	67	11 - 12
A07	110 - 150	28 - 30	64	28	22	14 - 15	67	11 - 12
A08	110 - 168	29 - 30	64	28	22	15	67	11 - 12
A09	110 - 170	29 - 30	64	28	22	15	67	11 - 12
A10	110 - 164	29 - 30	64	28	22	15	67	11 - 12
A11	113 - 160	31 - 33	64	28	22	15	70	11 - 12
A12	113 - 157	31 - 32	64	28	22	15	70	11 - 12
A13	110 - 143	29 - 30	64	28	22	14 - 15	67	11 - 12
A14	110 - 144	29 - 30	64	28	22	14 - 15	67	11 - 12
A15	110 - 129	28 - 30	64	28	22	14 - 15	67	11 - 12
A16	113 - 132	31 - 32	64	28	22	15	70	11 - 12
A17	113 - 132	31 - 32	64	28	22	15	70	11 - 12
A18	113 - 131	31 - 33	64	28	22	15	70	11 - 12
A19	113 - 133	31 - 33	64	28	22	15	70	11 - 12

ASR ID	Concentration ($\mu\text{g}/\text{m}^3$)							
	NO ₂		RSP		FSP		SO ₂	
	19 th highest 1-hour	Annual	10 th highest 24- hour	Annual	36 th highest 24- hour	Annual	4 th highest 10-minute	4 th highest 24-hour
AQO	200	40	100	50	50	25	500	50
A20	110 - 122	25 - 26	64 - 65	27	23	14 - 15	83	12
A21	110 - 123	25 - 26	64	27	23	14 - 15	83	12
A22	110 - 112	23	65	27	23	15	73	11
A23	110 - 118	23 - 24	65	27	23	15	73	11
A24	110 - 117	23 - 24	65	27	23	15	73	11
A25	111 - 114	24	65	27	23	15	73	11
A26	110 - 113	23	65	27	23	15	73	11
A27	112 - 113	31 - 32	64	28	22	15	68	11
Planned ASRs								
P01	113 - 188	34 - 36	64	28	22 - 23	15	67 - 74	11 - 12
P02	113 - 154	31 - 32	64	28	22	15	67	11 - 12
P03	112 - 115	30 - 34	64	28	22	15	67	11
P04	112 - 113	30 - 31	64	28	22	15	67	11
P05	111 - 113	29	64	28	22	14 - 15	67	11
P06	111 - 113	29	64	28	22	14	67	11
P07	110 - 113	29	64	28	22	14	67	11
P08	110 - 113	28 - 29	64	28	22	14	67	11
P09	113 - 152	31 - 32	64	28	22	15	67	11 - 12
P10	112 - 131	29 - 30	64	28	22	15	67	11 - 12
P11	112 - 129	29 - 30	64	28	22	14 - 15	67	11 - 12
P12	111 - 127	29 - 30	64	28	22	14 - 15	67	11
P13	110 - 125	28 - 30	64	28	22	14 - 15	67	11
P14	110 - 126	28 - 30	64	28	22	14	67	11
P15	110 - 127	28 - 30	64	28	22	14	67	11
P16	110 - 126	23 - 25	65	27	23	15	73	11 - 12
P17	110 - 129	28 - 30	64	28	22	14	67	11
P18	111 - 171	30 - 32	64	28	22	15	67	11 - 12
P19	110 - 168	30 - 31	64	28	22	15	67	11 - 12

4.6 Recommended Mitigation Measures

- 4.6.1.1** The key air pollutants (i.e. NO₂, RSP, FSP, SO₂) at all existing and planned ASRs would comply with AQOs and relevant assessment criteria, no adverse air quality impact is therefore anticipated and no mitigation measures are required.

4.7 Conclusion

- 4.7.1.1** All the relevant air emission sources, including vehicular emission and marine vessels emission in the vicinity of Discovery Bay, O · Park1, fireworks displays

at Hong Kong Disneyland Park have been identified and assessed where appropriate.

- 4.7.1.2 Considering the comparatively low local traffic volume, significant air quality impact from vehicular emission on the proposed development is not anticipated.
- 4.7.1.3 Quantitative air quality assessment, taking into account the marine vessels emission in the vicinity of Discovery Bay has been conducted. It is concluded that the predicted cumulative air quality impacts on all air sensitive uses would comply with the AQOs and relevant assessment criteria. Hence, adverse air quality impact on the proposed development is not anticipated.
- 4.7.1.4 The odour impact of the existing sewage pumping stations is not significant.

5 Noise Assessment

5.1 Description of the Environment

- 5.1.1.1 Discovery Bay has a relatively tranquil environment without any major noise sources that would impose adverse noise impacts on the neighbouring community. All the existing roads within Discovery Bay are private roads on which only licenced vehicles such as golf carts, shuttle buses and services vehicles are allowed to use. As observed on site, all the shuttle buses are Euro IV buses.
- 5.1.1.2 Other than road traffic, the commuting ferries between Discovery Bay and Central are another noise source within the Discovery Bay area. However, the majority of the residential developments in Discovery Bay have ample separation from the main navigation route. Besides, there are some services areas along the seafront north of Nim Shue Wan at which bus depot, petrol filling stations, sewage pumping station, etc. are located. The kaitos commuting to Peng Chau and Mui Wo also land at this seafront.

5.2 Noise Sensitive Receivers

- 5.2.1.1 Several site visits were carried out in April – June 2014, August 2016 and February – March 2022 to identify potential sources of environmental impact and sensitive receivers in the vicinity of the site. Photographs taken on site and the neighbouring areas are shown in **Section 3** which illustrate the existing context. Some general descriptions in terms of the noise environment have been described in **Section 5.1**. The following sections present the Noise Sensitive Receivers (NSRs) identified for the potential development area for subsequent noise assessment.
- 5.2.1.2 The Application Site (see **Figure 5-1**) will accommodate residential premises within the existing services areas along Marina Drive. The existing facilities

including bus depot and landing point for kaito would be relocated to suit the development layout. As confirmed with the facility operator, the Bounty services currently available at Area 10b will not be re-provisioned in the future construction and operational phase of the Project. Hence, berthing area for the Bounty would no longer be necessary. Relevant legislation that are applicable to noise impact is given in **Appendix 5.1**.

- 5.2.1.3** Since the future residential premises facing Nim Shue Wan would also be overlooking on marine light diesel refilling activities at boats refilling station and vessel movements, including the kaito movements, sand barge operations, etc. a number of considerations have been incorporated in the layout design of Area 10b and Area 22 (see **Figure 2-1**) to reduce the fixed noise impact due to these activities. Those design include enclosing the pump at boats refilling station or installing it underground, and fixed the side window at 2-storey low rise development next to kaito pier. A number of representative NSRs have been selected for this assessment. These representative NSRs include the following:

Table 5.1: Selected representative planned NSRs

NSR ID	Description	Uses
N10b-L11a	6 storey development	Residential
N10b-H34a	2 storey development	Residential

5.3 Road Traffic Noise Assessment

- 5.3.1.1** As discussed in **Section 5.1**, unlike the situations in other urban areas, all the shuttle buses operating within Discovery Bay are Euro IV type vehicles. Only licensed vehicles are allowed using the Discovery Bay Tunnel to access various parts of Discovery Bay. Besides, delivery vehicles to residential areas which do not need a licence are limited between 8am to 9pm.
- 5.3.1.2** With all the proposed developments in place, the traffic flow would only be approximately 89 vehicles/hour and 43 vehicles/hour for Discovery Bay Road and Marina Drive respectively with all the developments in the Application Site in place. Hence, given that relatively low traffic flows, adverse road traffic noise impacts are not anticipated and mitigation measures are not required.

5.4 Marine Traffic Noise Assessment

5.4.1 Assessment Results

- 5.4.1.1** Potential marine traffic noise impacts on the Application Site are anticipated from existing public ferry, kaito, tugboat with barge, sand barge, oil tankers and LPG container vessel. The marine traffic noise assessment methodology and source term measurement are given in **Appendix 5.2** and the predicted cumulative

marine noise levels at the representative NSRs in Area 10b are presented in **Appendix 5.3** and summarized in the tables below.

Table 5.2: Predicted marine traffic noise impacts for Area 10b (Daytime & Evening time)

NSR ID	Period	PNL, L ₉₀	Max Predicted Noise Levels ^[1] , dB(A)
N10b-L11a	Daytime & Evening time	53	49
N10b-H34a			50

Note:

[1] Bold value denotes non-compliance with criteria.

Table 5.3: Predicted marine traffic noise impacts for Area 10b (Nighttime)

NSR ID	Period	PNL, L ₉₀	Max Predicted Noise Levels ^[1] , dB(A)
N10b-L11a	Nighttime	47	42
N10b-H34a			43

Note:

[1] Bold value denotes non-compliance with criteria.

5.4.1.2 It can be seen from the above table that the predicted marine traffic noise levels at all the representative NSRs in Area 10b will be below the PNL. Area 4a is located further away from the existing public ferry, kaito, tugboat with barge, sand barge and LPG container vessel. Hence, marine traffic noise impact is not anticipated and further noise mitigation measures are not required.

5.5 Fixed Noise Assessment

Land-based Fixed Noise Sources

- 5.5.1.1** Existing noise sources include an existing sewage pumping station, a golf cart repair workshop, bus depot and overnight bus parking area, a public refuse collection point, all of which are located along Marina Drive.
- 5.5.1.2** According to site survey, noise generated from the existing sewage pumping station was not noticeable. Hence, it would not contribute to any potential fixed noise impact.
- 5.5.1.3** According to the latest information, these existing noise sources such as the golf cart repair workshop, bus depot, refuse collection point, will be located at a podium structure which is fully enclosed except the ingress / egress of such facilities. The current layout design has considered the siting of ingress / egress of such facilities to avoid any potential fixed noise impact. In the layout design of Area 10b, the ingress / egress for bus has been allocated at the western side, which is further away from the opposite residential development along Marina Drive to minimise any potential fixed noise impact. Although the ingress / egress of golf cart repair workshop is located at the opposite of residential developments along Marina Drive, the frequency of golf cart using the ingress / egress is expected to be low. Besides, noise generated from golf carts are expected to be lower when compared with buses. According to the information from operator, there is no operation during nighttime for golf cart repair workshop. With the

above arrangement of ingress / egress, potential fixed noise impact due to existing noise sources is not anticipated. With reference to HKPSG, where opportunity arises and having due regard to the operational requirements, the siting of such facilities should also take into account the potential locations of ingress/egress and the consequent noise disturbances due to traffic routings, particularly during sensitive hours in the detailed design stage. Consideration should also be given to adopting administrative controls so that the degree of noise disturbances can be further reduced.

- 5.5.1.4** In addition, the podium is an enclosed structure except the ingress / egress of facilities and ventilation opening. It should also be noted that there would not be any maintenance activity within the depot during night-time period unless during emergency. Since the exact location of ventilation opening is yet available, a backward calculation of fixed noise source is conducted for the maximum allowable Sound Power Level (SWL). As the minimum distance from the proposed building to podium edge is 5m (subject to detailed design) and an ASR A has been adopted (i.e. Daytime noise criterion of 55 dB(A)) for the development, the maximum SWL will be 74 dB(A) according to standard acoustic principle of point source correction with 3dB(A) facade correction. This SWL shall be further reviewed during the subsequent detailed design. Therefore, although mechanical ventilation is required, with the use of silencer / acoustic louvre, adverse noise impacts caused by these fixed noise sources are not anticipated.

Marine-based Fixed Noise Sources

- 5.5.1.5** As discussed in **Section 5.5.1**, the noise generated by the idling marine vessels would be assessed as fixed noise sources. According to the latest design, the following marine-based fixed noise sources shall be considered:

- Vessels idling (e.g. kaito, tugboat, sand barge, oil tankers, vessel for the gas bottle supplier);
- Lift on and off landing board of barge;
- Lorries engine on barge;
- Loading and unloading of gas bottles;
- Loading and unloading of sand barge (operation of conveyor belt on sand barge and trucks); and
- Marine light diesel refilling activities.

- 5.5.1.6** The marine light diesel refilling facility will be located inside the Lantau Yacht Club. It is mainly for filling of yachts, speedboats and sailboats, etc. According to the operator and on-site observations, there is very low frequency of yachts, speedboats and sailboats, etc. with only few trips a day.

- 5.5.1.7** As discussed in **Section 5.5.1**, most of the industrial noise sources along Marina Drive would be located to a enclosed podium structure except the ingress / egress of such facilities. The current layout design has considered the siting of ingress /

egress of such facilities to avoid any potential fixed noise impact. Therefore, the potential fixed noise impacts would be only due to marine activities from ferry idling at public ferry and kaito pier, idling, sand loading due to operation of conveyor at sand barge, LPG glass bottle and unloading, idling and operation of oil tanker and marine light diesel refilling activities.

5.5.1.8 According to the information from operator, there would be acoustic treatment, such as acoustic mat for the conveyor belt of sand barge and temporary noise barrier for crane of LPG glass bottle loading and unloading in future operation. Typically, a noise reduction of 10dB(A) for acoustic mat and temporary noise barrier for stationary source was adopted as in other in approved EIA Reports such as that for North East New Territories New Development Areas (AEIAR-175/2013). A noise reduction of 10 dB(A) for conveyor belt during sand loading and LPG glass bottle loading by crane has therefore been adopted in this assessment. The predicted noise levels at the representative NSRs are presented in the table below.

5.5.1.9 Moreover, according to the information from the operators and/or the operation pattern observed, there would be no night-time operation of sand barge, LPG container vessels, tug boat, oil tanker, marine light diesel refilling activities and Mui Wo kaito. As such, these activities were not included in the night-time fixed noise assessment. The fixed noise assessment methodology and source term measurement are given in **Appendix 5.4** and the detailed calculation of predicted fixed noise levels is shown in **Appendix 5.5**.

5.5.1.10 It can be seen from the table that the predicted fixed noise levels at all the representative NSRs will comply with the noise criteria and hence further noise mitigation measures are not required.

Table 5.4: Fixed noise assessment results – unmitigated case (daytime and evening time)

NSRs ID	Period	Criterion (ANL-5), dB(A)	Max Predicted noise level, dB(A)	Exceedance dB(A)
N10b-L11a	Daytime & Evening	55	54	-
N10b-H34a			55	-

Table 5.6: Fixed noise assessment results – unmitigated case (nighttime)

NSRs ID	Period	Criterion (ANL-5), dB(A)	Max Predicted noise level, dB(A)	Exceedance dB(A)
N10b-L11a	Nighttime	45	43	-
N10b-H34a			45	-

5.6 Firework Display Noise Assessment

5.6.1.1 Hong Kong Disneyland Park is located at approximately 2.5 km north-east of Discovery Bay. According to their approved EIA Report, there are fireworks displays every night, including weekdays and weekends, although the fireworks

have been suspended in recent years due to pandemic circumstances. Since it is located at about 2.5 km from Discovery Bay, adverse noise impacts from fireworks are not anticipated.

5.7 Recommended Mitigation Measures

- 5.7.1.1 The noise assessments results have shown that noise impact due to road traffic, marine traffic, fixed noise, and fireworks are not anticipated for the Application Site.
- 5.7.1.2 As stated in **Section 5.5**, a podium structure will be provided for Area 10b. The relocation of existing noise sources will be fully enclosed within the podium structure except the ingress / egress of such facilities and considerations of allocating ingress / egress of such facilities have been incorporated in the current layout design. During the detailed design stage, the siting of such facilities should take into account the potential locations of ingress/egress and the consequent noise disturbances due to traffic routings, particularly during sensitive hours with reference to HKPSG.
- 5.7.1.3 In addition, as discussed in **Section 5.2**, a number of considerations have been incorporated in the layout design of Area 10b and Area 22 (see **Figure 5-2**) to reduce the fixed noise impact due to these activities. Those design include enclosing the pump at boats refilling station or installing it underground, and fixed the side window at 2-storey low rise development next to kaito pier.
- 5.7.1.4 For Area 4a, it is located further away from the noise sources of marine traffic and fixed noise. With the consideration of housing the fixed noise sources such as the golf cart repair workshop, bus depot, refuse collection point, within a fully enclosed podium structure, no further mitigation measures is required.

5.8 Conclusion

- 5.8.1.1 A noise impact assessment has been conducted to evaluate the operational impacts based on the current layout.
- 5.8.1.2 Road traffic noise impact has been reviewed. Results indicate that adverse road traffic noise impact would not be anticipated.
- 5.8.1.3 An assessment has been conducted for marine noise impact based on measurement data. Results indicate that the noise impacts on NSRs would be below the measured background noise level and hence further mitigation measure is not required.
- 5.8.1.4 A preliminary assessment has been conducted for fixed noise impact based on site measurement and operational information from operators. With implementing the consideration in layout design (such as enclosing the pump at boats refilling station, etc.) and acoustic mat for conveyor belt, temporary noise barrier for

crane, use of silencer / acoustic louvre), adverse fixed noise impacts would not be anticipated.

- 5.8.1.5** Since the firework display in Hong Kong Disneyland Park is located at about 2.5 km from Discovery Bay, adverse noise impacts from fireworks are not anticipated.

6 Water Quality Assessment

6.1 Description of the Environment

6.1.1 Existing Water Environment

6.1.1.1 The Application Site falls within the Southern Water Control Zone (WCZ) and are located at Discovery Valley at east Lantau, downstream of Lo Fu Tau and Discovery Bay Reservoir. Tai Pak Wan, a non-gazetted beach, is within the boundary of Discovery Bay. Besides, a Coastal Protection Area is located at the northern edge of Tai Pak Tsui Peninsula to conserve the natural coastline.

6.1.1.2 Area 10b and Area 22 are located at the seawall in the southwest side of Tai Pak Tsui Peninsula. Nim Shue Wan adjoins the southern boundary of Area 10b and Area 22, and the water current in Nim Shue Wan is generally calm. Surface runoff from existing land area is discharged into Nim Sue Wan.

6.1.1.3 Area 4a is located at the eastern side of Capevale Drive leading to the Haven Court and Verdant Court of Peninsula Village. Currently, the site is mainly occupied by DB Community Green Square with an area of community farmland and structures. The site is an area paved with concrete and the surface runoff from existing land area is discharged into Hai Tei Wan.

6.1.2 Existing Sewerage System

6.1.2.1 Discovery Bay has been implemented with a sewerage system to collect all the sewage and wastewater generated from daily activities. All the existing sewage and wastewater collected from the sewerage system is conveyed to Siu Ho Wan Sewerage Treatment Works via pumping stations and the outfall is located at north Lantau which is far away from Discovery Bay.

6.1.3 Water Quality Sensitive Receivers

6.1.3.1 A review has been conducted to identify the Water Quality Sensitive Receivers (WSRs) in the vicinity that may be impacted by the potential development area. The following table summarizes these WSRs and they are illustrated in **Figure 6-1**. The relevant legislation and standards related to water quality are summarised in **Appendix 6.1**.

Table 6.1 Water Quality Sensitive Receivers

Water Sensitive Receivers ^[1]	Description
WSR01 – Discovery Bay Reservoir	Primary reservoir for flushing, located upstream of the potential development areas
WSR 02 – Discovery Bay Reservoir Spillway and Tributaries	Spillway from Discovery Bay Reservoir and the tributaries, chainage runs along Discovery Valley Road and downstream to Tsoi Yuen Wan
WSR03 – Nim Shue Wan Stream	Natural stream downstream from the existing golf course to Nim Shue

Water Sensitive Receivers ^[1]	Description
	Wan
WSR04 – Tai Pak Wan	Non-gazetted beach downstream to Discovery Bay Reservoir Spillway
WSR05 – Hai Tei Wan Marina	Marina at Hai Tei Wan next to Discovery Bay Road
WSR 06 – Nim Shue Wan	Nim Shue Wan
WSR07 – Tai Pak Tsui Peninsula Coastal Protection Area (CPA)	Protected natural shoreline at north of Tai Pak Tsui Peninsula

Note:

[1] The nearest water gathering ground is located at 5.6 km away

6.2 Identification and Evaluation of Environmental Impacts during Construction Phase

6.2.1 Pollution Sources

Site Runoff

6.2.1.1 During rainstorm events, construction site runoff would come from all over the works site. These surface runoff might be polluted by:

- Runoff and erosion from site surfaces, earth working areas and stockpiles;
- Wash water from dust suppression sprays and wheel washing facilities; and
- Chemicals spillage such as fuel, oil, solvents and lubricants from maintenance of construction machinery and equipment.

6.2.1.2 Construction runoff may cause physical, biological and chemical effects. The physical effects include potential blockage of drainage channels and increase of suspended solid levels in the Southern WCZ. Runoff containing significant amounts of concrete and cement-derived material may cause primary chemical effects such as increasing turbidity and discoloration, elevation in pH, and accretion of solids. A number of secondary effects may also result in toxic effects to water biota due to elevated pH values, and reduced decay rates of faecal micro-organisms and photosynthetic rate due to the decreased light penetration. All the best practices will be implemented to reduce and minimise the generation of construction run-off.

Sewage from Workforce

6.2.1.3 Sewage effluents will arise from the sanitary facilities provided for the on-site construction workforce. According to Table T-2 of Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning, the unit flow is 0.15 m³/day/employed population. The characteristics of sewage would include high levels of BOD₅, Ammonia and *E. coli* counts. Since sufficient portable chemical toilets and sewage holding tanks will be provided, no adverse water quality impact is anticipated.

Construction of Decking-Over Piles Along Waterfronts and for the Helipad

- 6.2.1.4** The low-rise residential buildings in Area 10b will be constructed on the southwest seashore of Tai Pak Tsui Peninsula adjoining Nim Shue Wan (WSR04) and the entrance of Hai Tai Wan Marina (WSR03). As discussed in **Section 2**, the existing seafront would be expanding by a width of 9-34m. According to the latest design, in order to minimize hydrodynamic and water quality impact, the new platform along the coastline would be constructed by decking-over piles and only minor modification works would be required for the existing seawall, including relocation of existing piers, will need to be conducted below water level, and the details will be established in the detailed design stage. Similar construction methodology would be adopted for the relocated helipad.
- 6.2.1.5** To avoid/minimise water quality impacts due to the piling works, steel casings will firstly be installed at the proposed pile locations. The steel casings extend above the sea and will prevent excavated materials from being dispersed into the sea. The excavated materials will be removed from within the piles to a barge anchored close to the piles. Once the materials inside the casings were removed, steel reinforcements/structural sections will be lowered inside the casing and then followed by concreting work. To control the sediment plume that may be dispersed to nearby WSRs during seabed disturbance, environment friendly construction methods such as installing silt curtains should be considered. However, further studies would need to be conducted to determine the size and spacing of the piles etc.

Wastewater from Decontamination Works

- 6.2.1.6** As the existing site comprises bus repair workshop, boat servicing yard, etc. should land decontamination works be carried out during construction phase of this area, the method for handling and disposal of wastewater contaminated with chemical waste should be addressed. As a general site practice of soil decontamination works (i.e. Stabilization/ Solidification or Biopile), impermeable sheeting should be used to cover stockpiles of the treated soil to prevent dust and runoff. Concrete bunds surrounding the treatment area should also be implemented to collect the possible spillage or leachate generated and recycled back to the treatment. In case there is any sign of excess leachate present within the site, the excess leachate should be diverted to a designated storage area for temporary storage and collected by a licensed chemical waste collector.

6.3 Recommended Mitigation Measures during Construction Phase

6.3.1 General Construction Activities the Potential Development Area

Site Runoff and Sewage from Workforce

6.3.1.1 Given the relatively small amount of site formation work for the Application Site, the water quality impacts during construction phase are not anticipated. Nevertheless, standard good site practices such as perimeter cut off drains, silt removal facilities, temporary toilet etc. would still be required. For site runoff, perimeter cut off with internal drainage works and erosion and sedimentation control facilities around the site area shall be implemented. Channels, earth bunds and sand bag barriers would also be provided on site to direct storm water to silt removal facilities. In addition, the design of temporary on-site drainage should prevent runoff going through site surface, construction machinery and equipment to avoid polluted runoff. Sedimentation tanks with sufficient capacity should also be provided as mitigation measure for settling surface runoff prior to disposal. Also, discharge into the Lantau Yacht Club will be avoided. With the implementation of the above mitigation measures, it is anticipated that the impacts from discharge of site runoff / wastewater is not insurmountable. A comprehensive list of those standard measures is given in **Appendix 6.2**.

6.3.1.2 During the construction works for the platform along the waterfront of Area 10b and that for the relocated helipad, open sea dredging would be avoided and a deck will be constructed over piles. As compared to the conventional reclamation process that would demand dredging, the current methodology would avoid the release of significant amount of sediment which may have certain impacts on the neighbouring WSRs. The following good practice shall apply for the construction of piles.

- Install efficient cage-typed silt curtains, i.e. at least 80% SS reduction, at the point of marine works to control the dispersion of SS;
- Water quality monitoring should be implemented to ensure effective control of water pollution and recommend additional mitigation measures required; and
- All vessels should be sized so that adequate clearance is maintained between vessels and the pileabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.

6.4 Identification and Evaluation of Environmental Impacts during Operational Phase

6.4.1.1 The additional sewage (847 m³/day) of averaged daily dry weather flow) generated from the additional population (2,145 residential use) in the Application Site will be collected by the existing sewage pumping station within

Discovery Bay, which would be conveyed to the existing sewerage system and subsequently to Siu Ho Wan Wastewater Treatment Work (SHWSTW) for treatment.

- 6.4.1.2** The platform along the waterfront will be supported by decking over piles with a narrow strip of approximately 9-34m only. The pile arrays will be generally along flow directions and will not block any major flow streamlines within Nim Shue Wan (WSR04). Thus, hydrodynamic impact and the associate change to water quality regime is unlikely to be significant.

6.4.2 Mitigation Measures

- 6.4.2.1** With the proper sewage connection, no adverse water quality impact during operational phase is anticipated, no additional mitigation measures are considered to be needed.

6.5 Conclusion

- 6.5.1.1** The potential issues that may arise during both the construction and operational phases have been identified. Mitigation measures will be implemented during the construction phase to reduce water quality impact. The sewage generated from the additional population from the Application Site during operational phase will be collected by the existing sewage pumping station and conveyed to SHWSTW for treatment. Therefore, adverse water quality impact is not anticipated during both construction phase and operational phase.

7 Other Aspects

7.1 Review of Waste Management Issues

- 7.1.1.1** As mentioned in **Section 2**, the Application Site of Discovery Bay includes residential premises together with the necessary infrastructure and landscaping elements. A podium structure would be built to cover the existing maintenance activities which would be relocated. In order to cater for the additional residential development, an additional narrow strip of reclamation would be proposed in form as a decking with a width of 9-34m.
- 7.1.1.2** Although the construction methodologies are yet to be developed in subsequent detail design stage, the construction and reclamation work would adopt an environment friendly approach. With the implementation of good site practices and waste reduction measures, the quantity of construction waste is estimated to be around 29,000 m³.

7.2 Review on Land Contamination Issues

- 7.2.1.1** A desktop review has been conducted by studying the previous aerial photos for the concerned areas for the Application Site. These photos have provided useful information to ascertain any historical land uses that may have potential for land contamination. The relevant legislation and standards relating to land contamination is given in **Appendix 7.1** and the related historic aerial photos is given in **Appendix 7.2**. The following table summarises these findings.

Table 7.1 Summary of historical aerial photographs for Area 10b, Area 4a and Area 22

Year	Description		
	Area 10b	Area 4a	Area 22
1973	<ul style="list-style-type: none"> Mainly natural terrain and coastline with a number of villages scattering around. No signs for industrial developments. 	<ul style="list-style-type: none"> Mainly natural terrain. No signs for industrial developments. 	<ul style="list-style-type: none"> Mainly marine area.
1982	<ul style="list-style-type: none"> Reclamation works in Area 10b were in progress. The seawall in the Lantau Yacht Club was formed 	<ul style="list-style-type: none"> The land uses at this site remained unchanged in nature compared with Year 1973. 	<ul style="list-style-type: none"> The land uses at this site remained unchanged in nature compared with Year 1973.
1993	<ul style="list-style-type: none"> Most of the site formation work and reclamation works had been completed. The scale of the Lantau Yacht Club was less than that currently being operated. 	<ul style="list-style-type: none"> Natural terrain and vacant land. 	<ul style="list-style-type: none"> Most of the site formation work and reclamation works had been completed. The scale of the Lantau Yacht Club, helicopter landing pad and overnight bus parking area were similar to that currently being operated.
2012	<ul style="list-style-type: none"> The land uses at this site remained unchanged in 	<ul style="list-style-type: none"> Natural terrain with an area of farmland and structures. 	<ul style="list-style-type: none"> The land uses at this site remained unchanged in

Year	Description		
	nature compared with Year 1993 except the scale of the Lantau Yacht Club was larger than that in the 90's.		nature compared with Year 1993.
2021	<ul style="list-style-type: none"> The land uses at this site remained unchanged in nature compared with Year 2012. 	<ul style="list-style-type: none"> The land uses at this site remained unchanged in nature compared with Year 2012. 	<ul style="list-style-type: none"> The land uses at this site remained unchanged in nature compared with Year 2012.

7.2.2 Description of Environment

7.2.2.1 Site surveys were conducted in April - June 2014, August 2016 and February – March 2022 to ground truth the findings from desktop review to identify any land uses within the Application Site that may have the potential for contamination in soil and groundwater. Photos taken during the site inspection showing the land uses within each of the area are given in **Section 3**. The following paragraphs summarises the findings from the surveys.

7.2.2.2 The area within Area 10b is currently occupied by a number of services facilities including the depot for vehicles, petrol filling station, staff quarters, Kaito etc. The areas within those depot, petrol filling stations are paved with concrete. Some of these area may have storage for dangerous goods as well. According to the EPD's *Guidance Note for Contamination Land Assessment and Remediation* (GN), these land uses have the potential for land contamination.

7.2.2.3 The area within Area 4a is currently occupied by DB Community Green Square with an area of community farmland and structures. The structures are located at area paved with concrete. The area within Area 22 is currently occupied by Lantau Yacht Club, helicopter landing pad and overnight bus parking area. The entire area is paved. According to the EPD's GN for Contamination Land Assessment and Remediation, these land uses do not have the potential for land contamination.

7.2.3 Identification of Potentially Contaminated Areas

7.2.3.1 As discussed in the above sections, locations where land contamination would be more likely would be the depot for buses and golf carts and petrol filling stations.

7.2.3.2 According to the EPD's GN for Contamination Land Assessment and Remediation, project proponents and professionals responsible for major works or re-development on sites associated within industrial operations listed in the GN (including depot and LPG filling stations) should, before commencement of any works, carry out a site assessment to determine whether the site is contaminated and assess the extent of any contamination and, if necessary, implement proper remedial measures to restore the land to an acceptable condition for its intended purpose. Although the area within Area 4a has been identified as a location with

no potential for contamination, a site visit is recommended to be carried out to review the above findings prior to the commencement of any construction works.

7.2.3.3 For the purpose of this study, it is recommended a Contamination Assessment Plan (CAP) to be prepared after the rezoning approval and prior to implementation. The CAP shall cover the whole potential development area and would recommend the need for Site Investigation (SI) to collect soil and ground water samples for analysis, and any subsequent actions, as per the statutory requirements.

7.2.3.4 Following the completion of environmental SI and lab testing works, the project proponent would prepare the Contamination Assessment Report (CAR) which would present the findings of the SI and evaluate the level and extent of potential contamination. The potential environmental and human health impact based on the extent of potential contamination identified would also be evaluated.

7.2.3.5 If land contamination is identified during the proposed environmental SI and remediation is required, a Remediation Action Plan (RAP) will be prepared. The objectives of RAP are:

- To undertake further site investigation where required;
- To evaluate and recommend appropriate remedial measures for the contaminated materials identified in the assessment;
- To recommend good handling practices for the contaminated materials during the remediation works;
- To recommend approximate handling and disposal measures; and
- To formulate optimal and cost-effective mitigation and remedial measures for EPD's agreement.

7.2.3.6 A Remediation Report (RR), if required, would also be prepared to demonstrate that the clean-up works are adequate. No construction / development works would be carried out within the potentially contaminated areas prior to the agreement of the RR with EPD.

7.2.4 Conclusion

7.2.4.1 An initial land contamination appraisal has been conducted to identify any locations within the potential development area that may have the potential for contamination in soil and groundwater. The appraisal mainly includes a review of the desktop information and supplemented with site surveys.

7.2.4.2 Based on the findings at this stage, the depot area and petrol filling stations within Area 10b have been identified as potential locations for contamination. For the purpose of this report, it is recommended that a CAP to be prepared after the rezoning approval and prior to implementation. Where necessary, environmental site investigation shall be conducted to collect soil and groundwater samples to

confirm the presence of any contamination, and any subsequent actions. Although the area within Area 4a has been identified as locations with no potential for contamination, it is recommended that a site visit to be carried out to review the above findings prior to the commencement of any construction works.

7.3 Review on Ecological Issues

Marine Ecology

Construction Phase

7.3.1.1 The proposed development is a residential development together with the necessary infrastructure are proposed within the Application Site which is located at the northern side of the bay area of Nim Shue Wan. The coast is proposed to be extended 9-37m further off the artificial coast by decking over from the existing seawall.

7.3.1.2 During the construction phase, the decking works along the existing artificial seawall/boulders coastline would cause minor direct loss of marine habitats. As a worst-case scenario, about 1.4ha of subtidal habitat would be directly impacted during the construction phase. Since the deck will be supported by piers, the actual area of permanent loss would be the total area of the piers used to support the deck, which would be smaller than 1.4ha. The coast along the Application Site is an artificial boulder seawall and shallow water subtidal habitat with limited ecological value. A number of boats was observed parking along this area which indicated that it was subject to human disturbance. The potential ecological impact of the minor permanent habitat loss should be low given that the affected area is of limited ecological value.

7.3.1.3 Seagrass in Nim Shue Wan⁶ (~100m from the Application Site) and coral in Peng Chau⁷ (~1.6 km from the Application Site) are identified as important habitats by the definition of Annex 8 of TM-EIAO. Indirect water quality impacts may affect important marine habitats in the vicinity. The coral site in Peng Chau is more than 1km away from the Application Site hence the indirect impact should be insignificant. The seagrass habitat is relatively closer to the proposed marine works. A series of mitigation measures have been recommended in **Section 6.3** to minimize any indirect water quality impacts. With the measures in place, adverse indirect impacts to the seagrass site are insignificant.

Operational Phase

7.3.1.4 During the operational phase, minor permanent loss of marine habitats is expected from decking over the coast. Permanent loss is anticipated at the

⁶https://www.afcd.gov.hk/english/conservation/con_wet/con_wet_sea/con_wet_sea_dis/con_wet_sea_dis.html

⁷ <https://www.wwf.org.hk/en/news/?7880/WWF-Launches-Hong-Kongs-First-Marine-Biodiversity-Map-Reveals-Fascinating-Ocean-Treasures>

supporting piers below the deck. As mentioned above, the ecological value of artificial boulder seawall and subtidal habitat are limited as the affected coastal area are subject to disturbance from boats, marine traffic and human activities. In addition, indirect impacts such as human disturbance are expected to be low due to the low ecological value of artificial seawall and subtidal habitat.

Terrestrial Ecology

- 7.3.1.5** Area 10b consists of developed area and a strip of isolated vegetation along the slope, sandwiched by the existing golf cart repair workshop and Discovery Bay Road. During the construction phase, the site clearance and formation work would cause direct loss of vegetated slope (approx. 0.6ha) and their associated fauna. The remain area (approx. 5.5ha) of Area 10b are developed area. The ecological value of the vegetated slope is limited by its elongated shape which is susceptible to anthropogenic disturbance and the fragmentation by developed areas. The vegetation composition consists of mainly pioneer disturbance tolerant species e.g., *Mallotus paniculatus* and *Macaranga tanarius* etc. The trees also appeared to be relatively young. The potential ecological value is limited. For fauna records, based on the observation during site visit, two species of conservation importance i.e., Little Egret (*Egretta garzetta*) and Pacific Reef Heron (*Egretta sacra*) were recorded utilising the Nim Shue Wan Beach and coast area near Area 10b. Indirect impact such as human disturbance, construction noise and dust and water quality may temporarily affect wildlife during the construction phase. Given that the high mobility of avifauna, the indirect impacts of both species of conservation importance are expected to be low. As Area 4a is an existing community garden which is considered as a developed area (approx. 0.2ha), adverse ecological impact is not expected.
- 7.3.1.6** Besides, Area 22 consists of both vegetation and developed area. Vegetation area (approx. 0.8ha) would be directly loss due to site clearance and formation work during construction phase. The vegetation composition consists of turf grass and other locally common disturbance tolerant plant species. The potential ecological value is expected to be low. The remain area of Area 22 are developed area (approx. 0.7ha). No ecological impact would arise in the developed area. Due to human disturbance and fragmentation by developed area, the potential ecological value of the vegetation area would be limited.
- 7.3.1.7** During the operational phase, permanent loss of vegetated area in the Application site is anticipated. Due to the limited ecological value of the vegetated area in the Application site, the ecological impact would be low. Potential indirect impacts from human disturbance to species of conservation importance i.e., Little Egret (*Egretta garzetta*) and Pacific Reef Heron (*Egretta sacra*) would be anticipated. Given that the existing area is already subject to certain level of human disturbance e.g. boats, human activities on the beaches and that these two species are disturbance tolerant to a certain level and widely distributed in some disturbed

coast areas e.g. typhoon shelter, beaches, piers etc., the indirect impacts of both species of conservation importance are expected to be low.

7.4 Review on Fisheries

- 7.4.1.1** The nearest fish culture zones (FCZs) are Cheung Sha Wan and Ma Wan which are located at more than 6.5 km and 7.3 km away respectively. Given these large separation distance, together with the use of deck-over approach for the reclamation and mitigation measures such as silt curtains, both direct and indirect impacts are considered insignificant.
- 7.4.1.2** The distance with the nearest nursery and spawning ground for fisheries resources in the southern waters is at least 5.6 km away from works site. Direct or indirect adverse impacts on the nursery and spawning ground for fisheries resources are not anticipated.
- 7.4.1.3** According to the Port Survey published by AFCD in 2016, the number of fishing fleets using the waters immediately outside the Application Site was around 400-600 per grid cell, of which majority of them were small vessels/ sampan under 15m in length. The fisheries production within the area was around 200-300 kg/ha in Year 2016. Direct impact on fishing grounds is not anticipated as there would be no reclamation works at the works site. For indirect impacts, the water quality impact to the nearby marine waters should be minimal as there would not be additional wastewater treatment works.

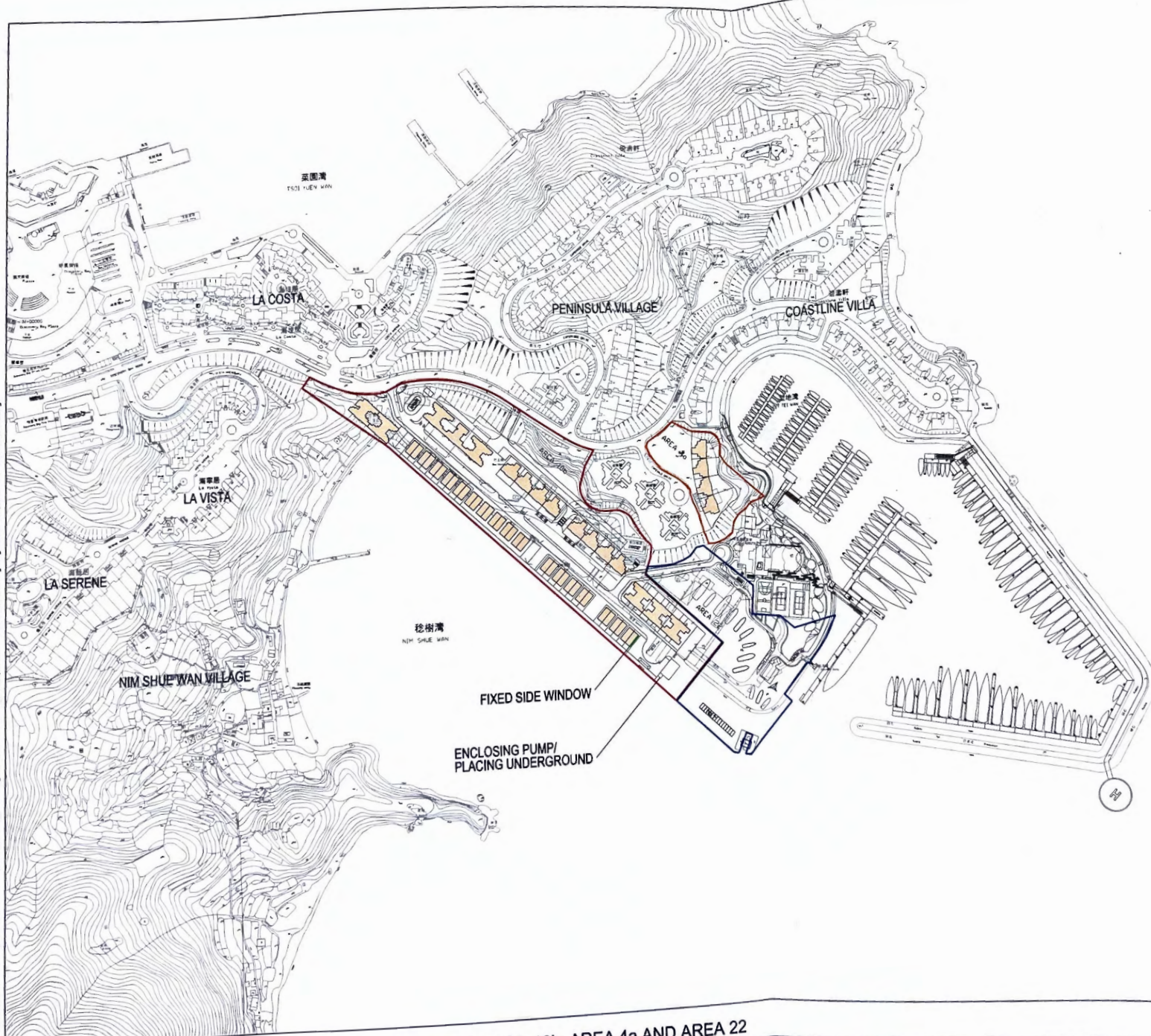
8 Conclusion

- 8.1.1.1** An environmental assessment has been conducted to review the Application Site in Discovery Bay. Key aspects that have been assessed include air quality, noise and water quality. Potential issues on waste management, land contamination, ecology and fisheries have also been reviewed. Those relating to sewerage and drainage, and water supply are separately presented in other reports accompanying this application.
- 8.1.1.2** All the relevant noise and air quality emission sources in the vicinity that would have potential impacts on the Application Site have been identified and assessed as necessary. The strength of these sources have been established by measurement or from best available information and subsequently included in the assessment. Results indicate that the noise and air quality impacts on existing and planned sensitive receivers would comply with the relevant noise criteria and hence further mitigation measures are not required. The need for any additional mitigation measures for the bus depot shall be subject to the subsequent statutory EIA.
- 8.1.1.3** Although most of the development would not involve major marine works, minor reclamation work conducted by decking over piles would still be required for

Area 10b. By adopting a non-dredged approach (i.e. decking over piles) and other good site practices, any release of sediment would be readily controlled and would have been minimised. The need for any additional mitigation measures shall be subject to the findings from the detailed cumulative impact assessment to be conducted as part of the subsequent statutory EIA.

- 8.1.1.4** Sewage generated during operational phase will be conveyed to SHWSTW and hence would not cause adverse water quality impact.
- 8.1.1.5** Potential for land contamination due to the operation of the existing bus depot and services area has been identified. Further investigation should be conducted after the rezoning and prior to implementation to collect soil and water samples as required, and hence any subsequent remediation actions to fulfil the statutory requirements. For the DB Community Green Square at Area 4a, although it has been identified as a location with no potential for contamination, a site visit is recommended to be carried out to review the above findings prior to the commencement of any construction works.
- 8.1.1.6** In the aspect of ecology, terrestrial ecological impact due to the proposed development would not be significant. Impacts to marine ecology and fisheries would be minimized by proper control and implementation of mitigation measures.

g:\a27\CIEN\work\project\235928\13 Drawing Deliverables\Report\86-EAS_2022\Figure 2-1 Potential Development Areas in Discovery Bay (Area 10b, Area 4a and Area 22).dgn



LEGEND

- AREA 10b
- AREA 4a
- AREA 22

FIGURE 2-1

ARU

Job Title

OPTIMIZATION OF LAND USE IN DISCOVERY BAY FOR AREA 10b, AREA 4a AND AREA 22

Date

06/2022

Scale

1:4000 @A3

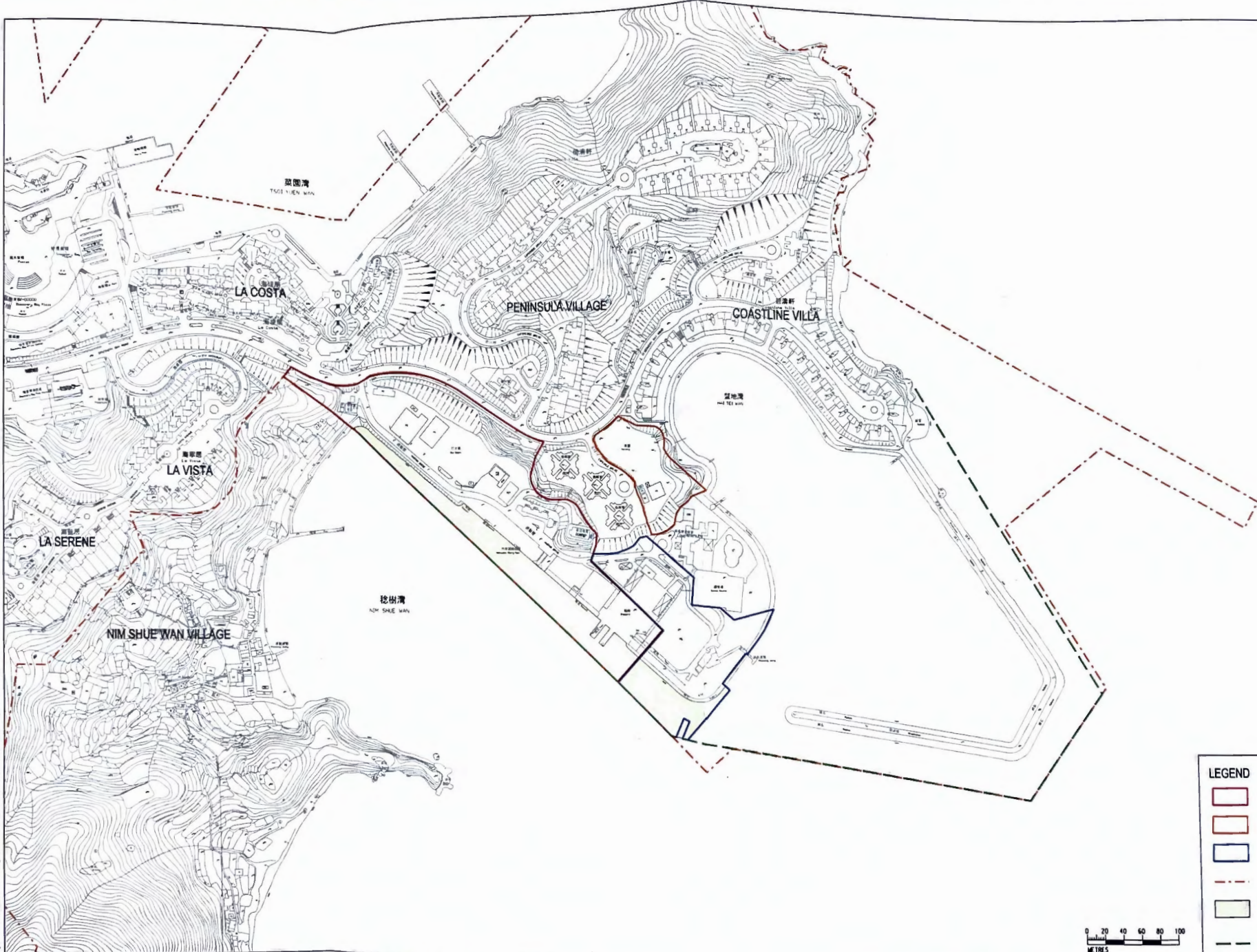
Drawn

Job No.

235928

Drawing Title

POTENTIAL DEVELOPMENT AREAS IN DISCOVERY BAY (AREA 10b, AREA 4a and Area 22)



LEGEND

- AREA 10b
- AREA 4a
- AREA 22
- LEASE BOUDNARY
- PROPOSED RECLAMATION AREA
- APPROVED RECLAMATION BOUNDARY LINE

OPTIMIZATION OF LAND USE IN DISCOVERY BAY FOR AREA 10b, AREA 4a AND AREA 22

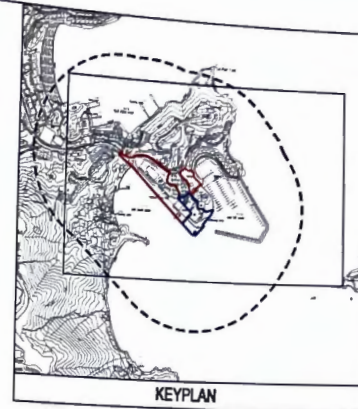
FIGURE 2-2

Date	Scale
06/2022	1:4000 @A3
Drawn	Job No.
GL	235928

APPROVED RECLAMATION BOUNDARY UNDER THE FORESHORE AND SEA-BED ORDINANCE IN 1977

ARUP

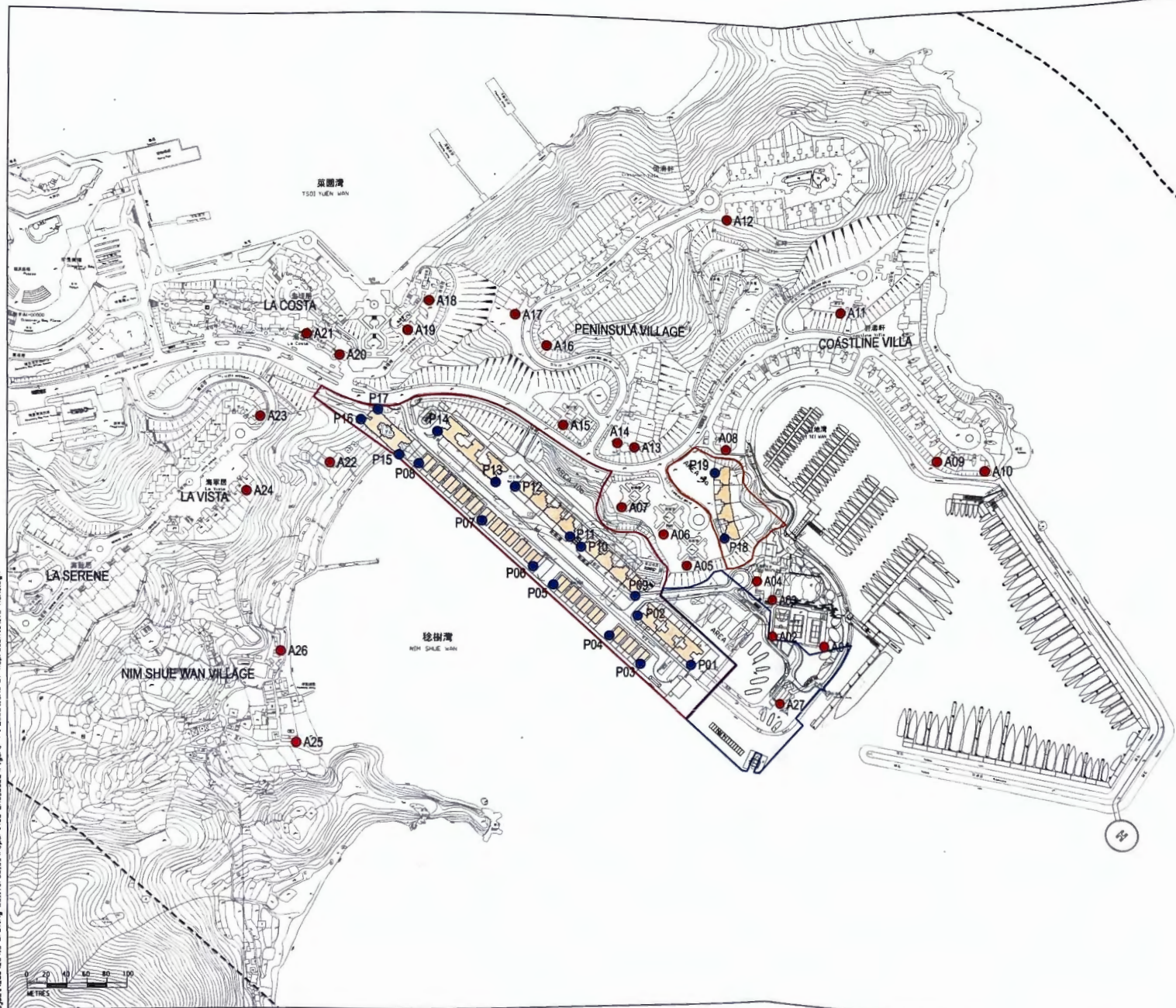
\\magna27\cibm\env\project\335928\3 Drawing Deliverables\report\06-06-2022\Figure 2-2 Approved Reclamation Boundary under the Foreshore and Sea-bed Ordinance in 1977.dgn



- LEGEND
- AREA 10b
 - AREA 4a
 - AREA 22
 - 500m ASSESSMENT AREA
 - EXISTING ASRs
 - PLANNED ASRs

FIGURE 4-1

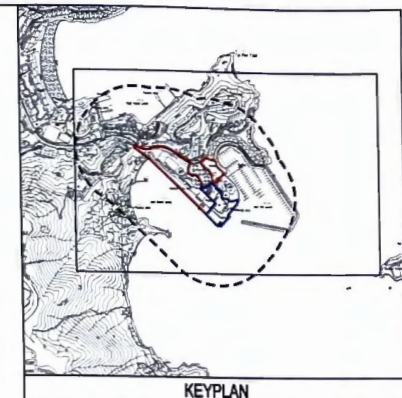
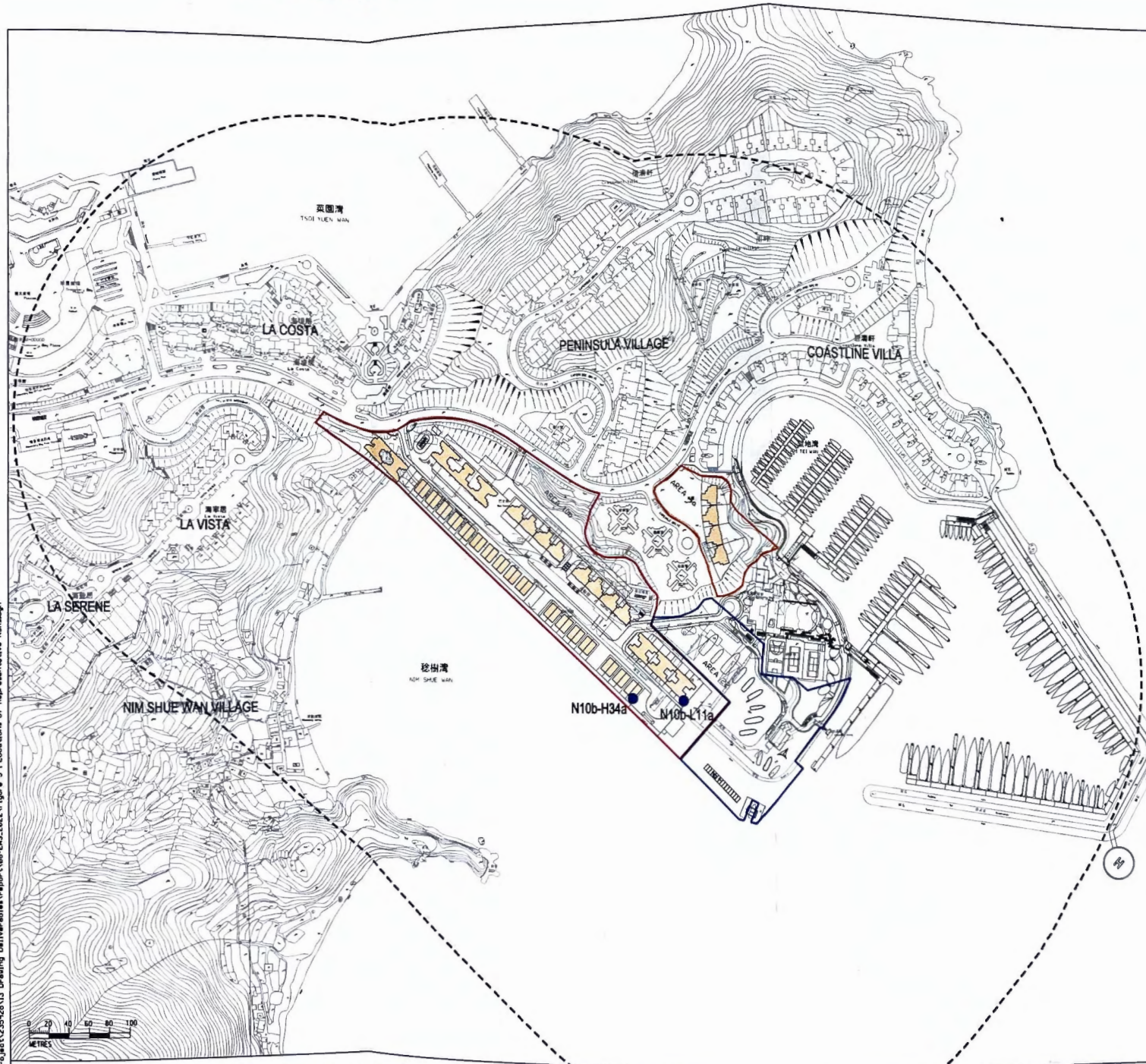
ARUP



OPTIMIZATION OF LAND USE IN DISCOVERY BAY FOR AREA 10b, AREA 4a AND AREA 22

Date	06/2022
Scale	1:4000 @A3
Drawn	GL
Job No.	235928

LOCATIONS OF REPRESENTATIVE ASRs



- LEGEND**
- AREA 10b
 - AREA 4a
 - AREA 22
 - 300m ASSESSMENT AREA
 - PLANNED NSRs

Job Title
OPTIMIZATION OF LAND USE IN DISCOVERY BAY FOR AREA 10b, AREA 4a AND AREA 22

Date	06/2022
Scale	1:4000 @A3
Drawn	GL
Job No.	.235928

Drawing Title
LOCATIONS OF REPRESENTATIVE NSRs

FIGURE 5-1

ARUP

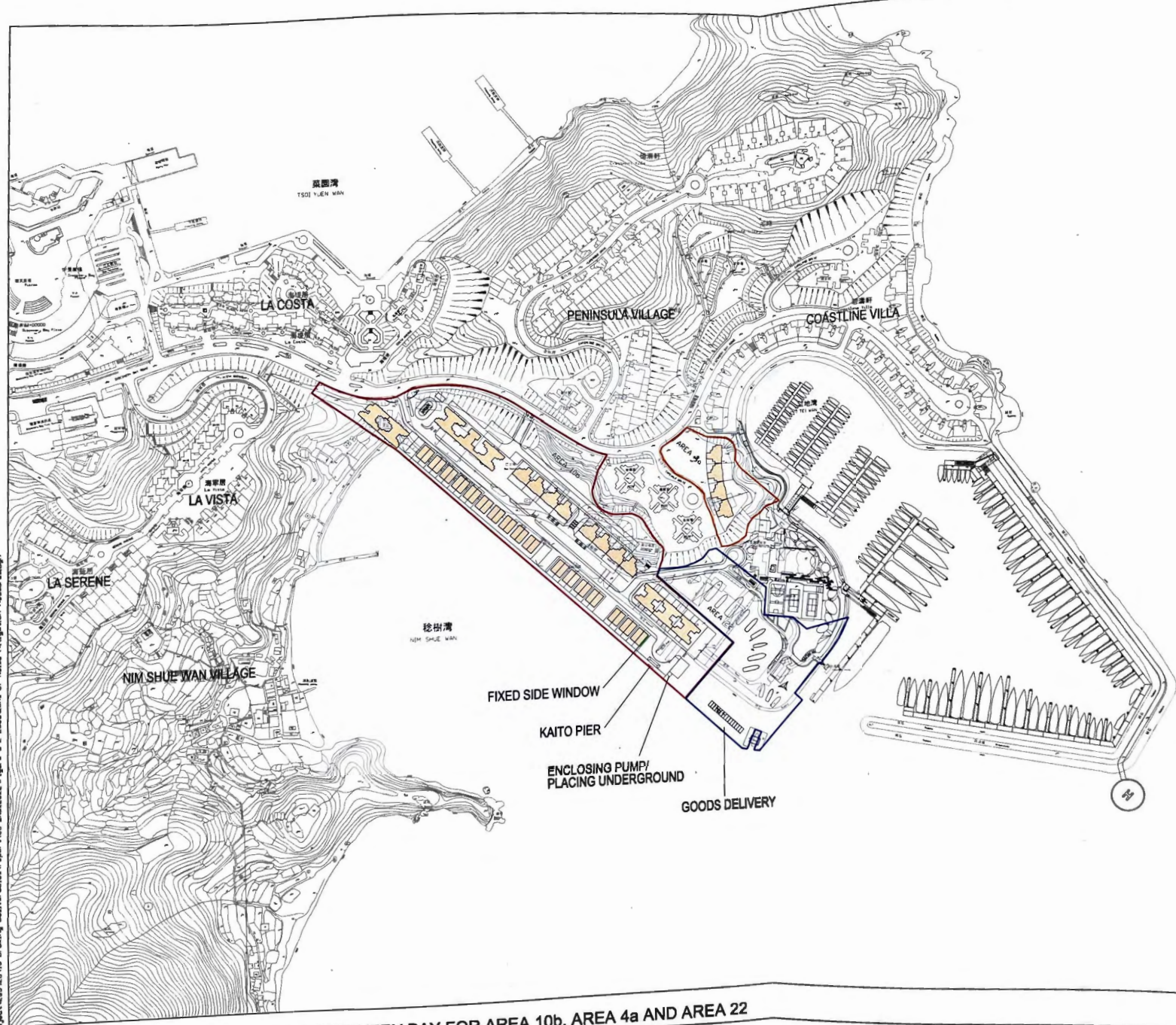
\\magna27\CIENV\env\project\235928\13 Drawing Deliverables\report\06-EA5-2022\Figure 5-1 Locations of Representative NSR.dgn



- LEGEND
- AREA 10b
 - AREA 4a
 - AREA 22

FIGURE 5-2

ARUP

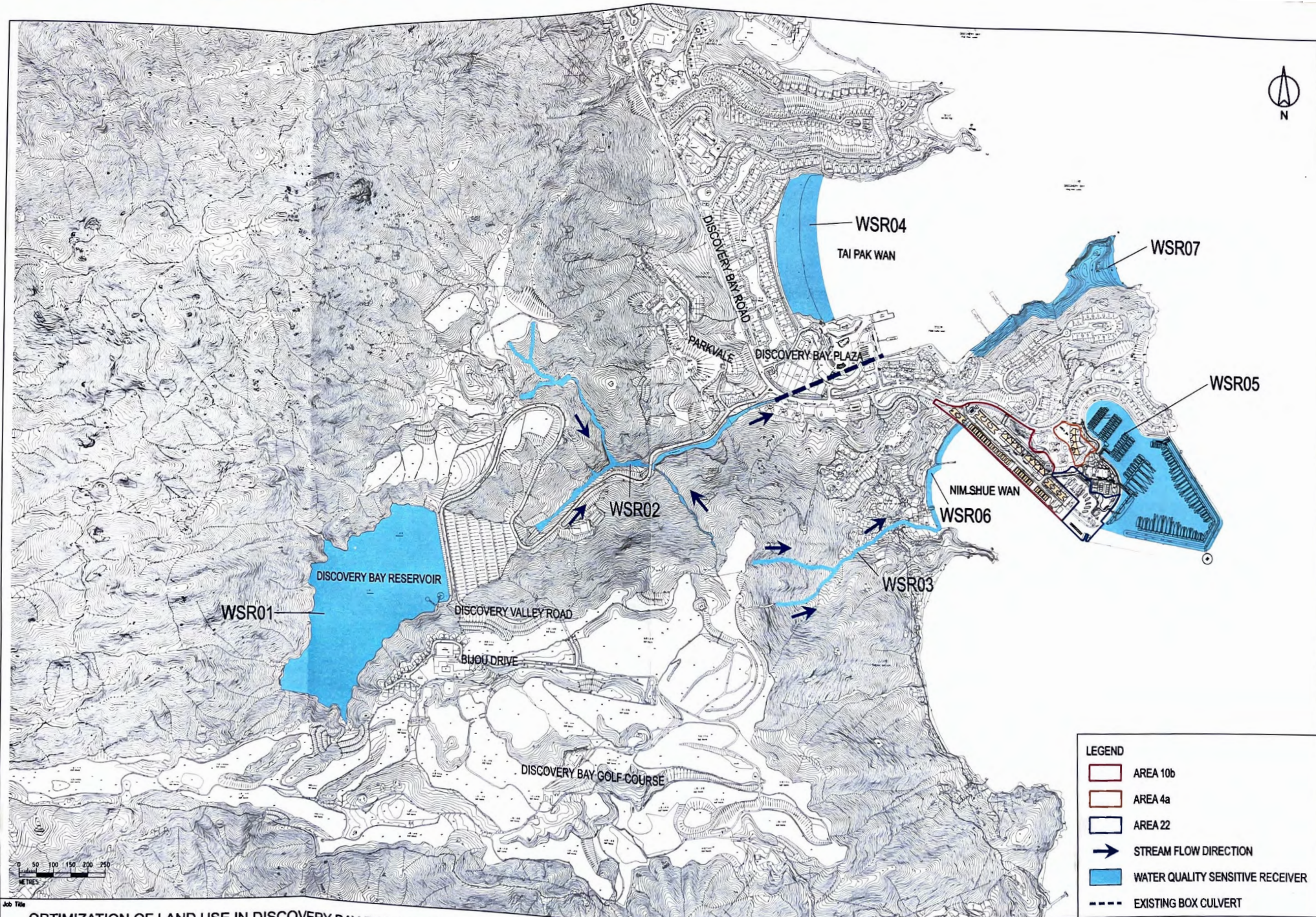


Job Title
OPTIMIZATION OF LAND USE IN DISCOVERY BAY FOR AREA 10b, AREA 4a AND AREA 22

Date	Scale
06/2022	1:4000 @A3
Drawn	Job No.
GL	235928

Drawing Title
LOCATIONS OF NOISE MITIGATION MEASURES

\\Magnit27\client\magnit27\project\235928\13 Drawing Deliverables\report\86-ENG-2022\Figure 6-1 Water Quality Sensitive Receivers.dwg



Job Title

OPTIMIZATION OF LAND USE IN DISCOVERY BAY FOR AREA 10b, AREA 4a AND AREA 22

Date
JUN 22

Scale
1:10000

Drawing Title

LOCATIONS OF REPRESENTATIVE WSRs

Drawn
GL

Job No.
235928

FIGURE 6-1

ARUP

Appendix 2.1

Key Plan of Relevant Zones

Existing Name in Master Plan	Area 22 (referred as Area 22 West in this submission)
Existing OZP Uses	Other Specified Uses (SPORTS AND RECREATION CLUB(4) Area B)
Proposed Name in Master Plan	Area 4a
Proposed OZP Uses	Residential

Existing Name in Master Plan	Area 22 (referred as Area 22 East in this submission)
Existing OZP Uses	Other Specified Uses (SPORTS AND RECREATION CLUB(4) Area A)
Proposed Name in Master Plan	Area 22 (referred as Area 22 East in this submission)
Proposed OZP Uses	The same as existing

Existing Name in Master Plan	Area 10b (referred as Area 10b West in this submission)
Existing OZP Uses	Other Specified Uses (SERVICE AREA, STAFF QUARTER, DG GOODS STORE, ETC.)
Proposed Name in Master Plan	Area 10b
Proposed OZP Uses	Residential

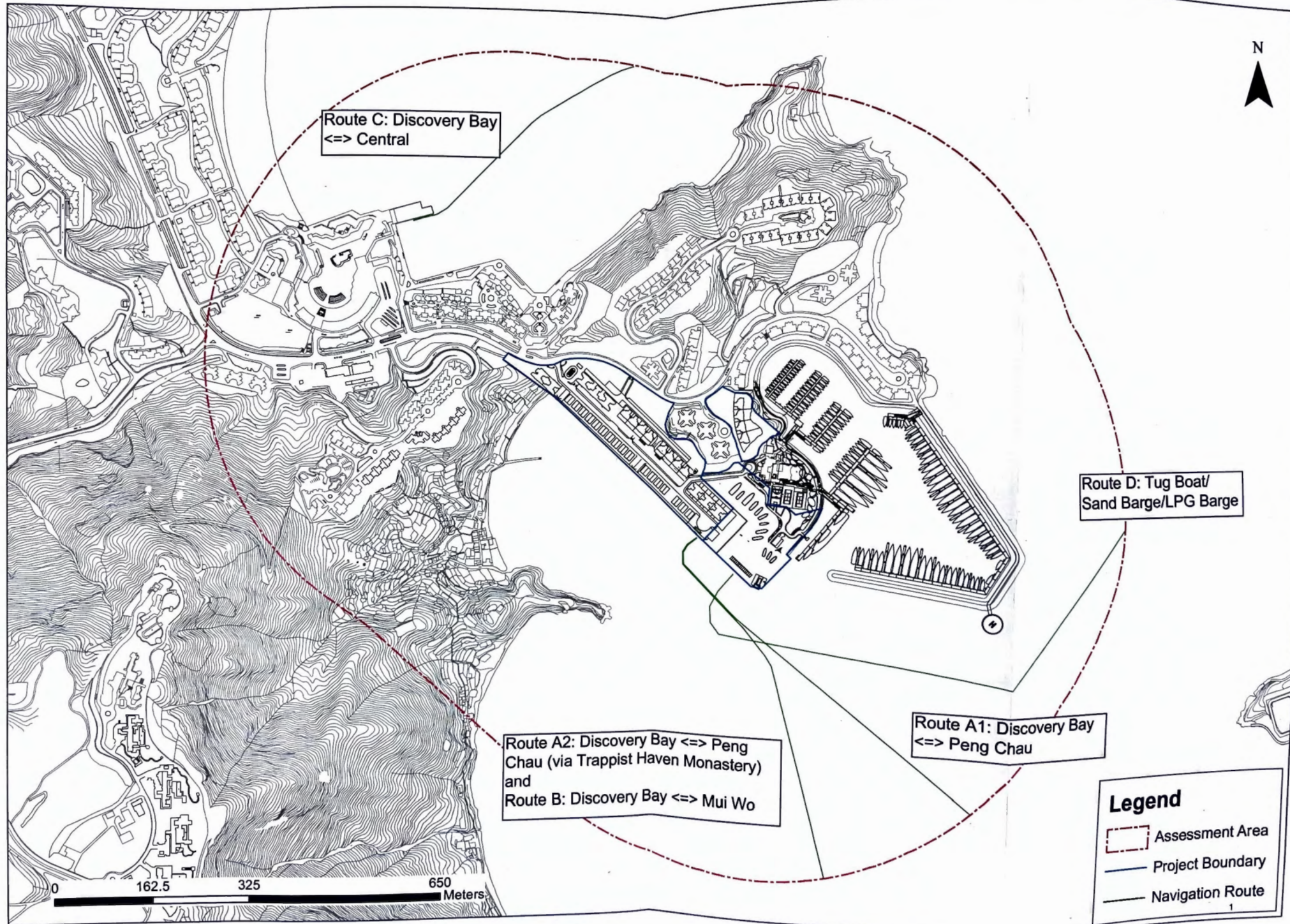
Existing Name in Master Plan	Area 10b (referred as Area 10b East in this submission)
Existing OZP Uses	Other Specified Uses (SERVICE AREA)
Proposed Name in Master Plan	Area 22 (referred as Area 22 South in this submission)
Proposed OZP Uses	Other Specified Uses (SPORTS AND RECREATION CLUB(4) Area B)

- EXISTING OZP BOUNDARY OF MARINA CLUB
- PROPOSED OZP BOUNDARY OF MARINA CLUB
- PROPOSED OZP BOUNDARY FOR AREA 4a & 10b RESIDENTIAL AREA

Discovery Bay Lease Boundary

Appendix 4.1

Marine Emission



Emission Inventory (Marine Emission)

Route	Source	Source ID	Type	X	Y	Release Height [1]	Exit Temperature [2]	Exit velocity [2]	Internal diameter [1]	Emission Rate per Trip			
				(m)	(m)	(m)	(K)	(m/s)	(m)	NOx (g/s) / (g/s/sq m)	RSP (g/s) / (g/s/sq m)	FSP (g/s) / (g/s/sq m)	SO2 (g/s) / (g/s/sq m)
Route A1: Discovery Bay	Hotelling Maneuvering	DPM001	POINT	820377	817007	6.2	773	8	0.7	6.57E-03	2.63E-04	2.56E-04	1.37E-04
		DPM001	POINT	820361	816995	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM002	POINT	820353	816977	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM003	POINT	820357	816958	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM004	POINT	820371	816944	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM005	POINT	820386	816930	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM006	POINT	820400	816916	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM007	POINT	820414	816902	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM008	POINT	820428	816888	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM009	POINT	820443	816874	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM010	POINT	820458	816861	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM011	POINT	820473	816849	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
	Slow Cruising	DPM012	POINT	820489	816836	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DPM013	POINT	820505	816824	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM014	POINT	820520	816811	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM015	POINT	820536	816799	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM016	POINT	820551	816786	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM017	POINT	820567	816774	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM018	POINT	820583	816761	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM019	POINT	820598	816749	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM020	POINT	820614	816736	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM021	POINT	820629	816724	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM022	POINT	820645	816711	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM023	POINT	820661	816699	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM024	POINT	820676	816686	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM025	POINT	820692	816674	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM026	POINT	820708	816661	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM027	POINT	820723	816649	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM028	POINT	820739	816636	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM029	POINT	820754	816624	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM030	POINT	820770	816611	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM031	POINT	820786	816599	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM032	POINT	820801	816586	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM033	POINT	820816	816574	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05
		DPM034	POINT	820833	816561	6.2	773	8	0.7	9.34E-04	2.88E-05	2.79E-05	1.94E-05

Emission Inventory (Marine Emission)

Route	Source	Source ID	Type	X (m)	Y (m)	Release Height [1] (m)	Exit Temperature [2] (K)	Exit velocity [2] (m/s)	Internal diameter [1] (m)	Emission Rate per Trip			
										NOx (g/s) / (g/s/sq m)	RSP (g/s) / (g/s/sq m)	FSP (g/s) / (g/s/sq m)	SO2 (g/s) / (g/s/sq m)
Route A2: Discovery Bay	Hotelling	DTH001	POINT	820376	817008	6.2	773	8	0.7	6.57E-03	2.63E-04	2.56E-04	1.37E-04
	Maneuvering	DTM001	POINT	820360	816996	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM002	POINT	820352	816978	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM003	POINT	820354	816959	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM004	POINT	820368	816945	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM005	POINT	820383	816931	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM006	POINT	820397	816917	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM007	POINT	820411	816903	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM008	POINT	820425	816889	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM009	POINT	820439	816874	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM010	POINT	820453	816860	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM011	POINT	820466	816845	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
		DTM012	POINT	820479	816830	6.2	773	8	0.7	1.54E-03	4.81E-05	4.65E-05	3.20E-05
	Slow Cruising	DTM013	POINT	820492	816814	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM014	POINT	820503	816798	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM015	POINT	820510	816779	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM016	POINT	820515	816760	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM017	POINT	820520	816740	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM018	POINT	820525	816721	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM019	POINT	820530	816702	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM020	POINT	820535	816682	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM021	POINT	820540	816663	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM022	POINT	820545	816644	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM023	POINT	820550	816624	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM024	POINT	820555	816605	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM025	POINT	820561	816586	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM026	POINT	820566	816566	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM027	POINT	820571	816547	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM028	POINT	820576	816528	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM029	POINT	820581	816508	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM030	POINT	820586	816489	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM031	POINT	820591	816470	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DTM032	POINT	820596	816450	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05

Emission Inventory (Marine Emission)

Route	Source	Source ID	Type	X	Y	Release Height [1]	Exit Temperature [2]	Exit velocity [2]	Internal diameter [1]	Emission Rate per Trip			
				(m)	(m)	(m)	(K)	(m/s)	(m)	NOx	RSP	FSP	SO2
										(g/s) / (g/s/sq m)	(g/s) / (g/s/sq m)	(g/s) / (g/s/sq m)	(g/s) / (g/s/sq m)
Route B: Discovery Bay ↔ Mui Wo	Hotelling Maneuvering	DMM001	POINT	820376	817008	6.2	773	8	0.7	6.57E-03	2.63E-04	2.56E-04	1.37E-04
		DMM001	POINT	820360	816996	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM002	POINT	820352	816978	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM003	POINT	820354	816959	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM004	POINT	820368	816945	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM005	POINT	820383	816931	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM006	POINT	820397	816917	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM007	POINT	820411	816903	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM008	POINT	820425	816889	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM009	POINT	820439	816874	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM010	POINT	820453	816860	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM011	POINT	820466	816845	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
		DMM012	POINT	820479	816830	6.2	773	8	0.7	1.54E-03	4.81E-05	4.67E-05	3.20E-05
	Slow Cruising	DMM013	POINT	820492	816814	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM014	POINT	820503	816798	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM015	POINT	820510	816779	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM016	POINT	820515	816760	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM017	POINT	820520	816740	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM018	POINT	820525	816721	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM019	POINT	820530	816702	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM020	POINT	820535	816682	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM021	POINT	820540	816663	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM022	POINT	820545	816644	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM023	POINT	820550	816624	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM024	POINT	820555	816605	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM025	POINT	820561	816586	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM026	POINT	820566	816566	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM027	POINT	820571	816547	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM028	POINT	820576	816528	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM029	POINT	820581	816508	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM030	POINT	820586	816489	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM031	POINT	820591	816470	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05
		DMM032	POINT	820596	816450	6.2	773	8	0.7	9.65E-04	2.98E-05	2.89E-05	2.01E-05

Emission Inventory (Marine Emission)

Route	Source	Source ID	Type	X	Y	Release Height [1]	Exit Temperature [2]	Exit velocity [2]	Internal diameter [1]	Emission Rate per Trip			
				(m)	(m)	(m)	(K)	(m/s)	(m)	NOx (g/s) / (g/s/sq m)	RSP (g/s) / (g/s/sq m)	FSP (g/s) / (g/s/sq m)	SO2 (g/s) / (g/s/sq m)
Route C: Discovery Bay ↔ Central	Hotelling Maneuvering	DCH001	POINT	819879	817544	6.2	773	8	0.7	3.67E-02	1.14E-03	1.06E-03	7.78E-04
		DCM001	POINT	819899	817549	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM002	POINT	819918	817554	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM003	POINT	819935	817565	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM004	POINT	819949	817579	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM005	POINT	819963	817594	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM006	POINT	819977	817608	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM007	POINT	819991	817622	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM008	POINT	820004	817637	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM009	POINT	820018	817651	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM010	POINT	820032	817666	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM011	POINT	820046	817680	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
	Slow Cruising	DCM012	POINT	820060	817694	6.2	773	8	0.7	8.64E-03	2.11E-04	1.98E-04	1.42E-04
		DCM013	POINT	820074	817709	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM014	POINT	820089	817721	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM015	POINT	820106	817732	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM016	POINT	820123	817743	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM017	POINT	820140	817753	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM018	POINT	820157	817764	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM019	POINT	820174	817775	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM020	POINT	820191	817785	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM021	POINT	820209	817794	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM022	POINT	820227	817803	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04
		DCM023	POINT	820245	817810	6.2	773	8	0.7	7.36E-03	1.76E-04	1.65E-04	1.19E-04

Emission Inventory (Marine Emission)

Route	Source	Source ID	Type	X	Y	Release Height [1]	Exit Temperature [2]	Exit velocity [2]	Internal diameter [1]	Emission Rate per Trip			
				(m)	(m)	(m)	(K)	(m/s)	(m)	NOx (g/s) / (g/s/sq m)	RSP (g/s) / (g/s/sq m)	FSP (g/s) / (g/s/sq m)	SO2 (g/s) / (g/s/sq m)
Route D: Vessels using Service Pier (Tug Boat/Sand Barge/LPG Barge/Oil Tanker)	Hotelling Maneuvering	TBH001	POINT	820441	816946	11	588	8	0.2	1.16E-01	4.62E-03	4.51E-03	2.41E-03
		TBM001	POINT	820431	816935	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM002	POINT	820418	816920	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM003	POINT	820408	816903	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM004	POINT	820401	816885	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM005	POINT	820402	816865	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM006	POINT	820412	816848	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM007	POINT	820429	816840	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM008	POINT	820449	816837	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM009	POINT	820469	816834	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM010	POINT	820489	816831	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM011	POINT	820508	816828	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM012	POINT	820528	816825	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM013	POINT	820543	816823	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM014	POINT	820558	816821	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM015	POINT	820578	816818	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM016	POINT	820597	816815	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM017	POINT	820617	816812	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM018	POINT	820637	816809	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM019	POINT	820657	816806	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM020	POINT	820676	816803	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM021	POINT	820696	816800	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM022	POINT	820716	816797	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM023	POINT	820736	816794	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM024	POINT	820756	816791	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM025	POINT	820775	816788	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM026	POINT	820795	816785	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM027	POINT	820815	816782	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM028	POINT	820835	816779	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM029	POINT	820854	816776	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM030	POINT	820874	816774	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM031	POINT	820894	816771	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM032	POINT	820906	816787	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM033	POINT	820918	816803	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM034	POINT	820930	816819	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM035	POINT	820942	816835	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM036	POINT	820954	816851	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM037	POINT	820966	816867	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM038	POINT	820978	816883	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM039	POINT	820990	816899	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM040	POINT	821002	816915	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM041	POINT	821014	816931	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM042	POINT	821026	816947	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM043	POINT	821038	816963	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM044	POINT	821050	816979	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM045	POINT	821062	816995	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM046	POINT	821074	817011	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04
		TBM047	POINT	821086	817027	11	588	8	0.2	1.80E-02	9.58E-04	9.30E-04	2.92E-04

Passenger Ferry Schedule (Route A1: Discovery Bay <=> Peng Chau)

Hour		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]	
Start	End	Monday to Friday		Saturdays (except public holidays)		Sunday & Public Holidays (except public holidays)	
		Hotelling	Maneuvering	Hotelling	Maneuvering	Hotelling	Maneuvering
0	1						
1	2						
2	3						
3	4						
4	5						
5	6						
6	7	2	2	2	2	2	2
7	8	3	3	3	3	3	3
8	9	2	2	2	2	1	1
9	10	1	1	1	1	2	2
10	11	1	1	1	1	1	1
11	12	1	1	1	1	1	1
12	13	1	1	1	1	1	1
13	14	2	2	2	2	4	4
14	15	1	1	1	1	1	1
15	16			1	1	1	1
16	17	1	1	1	1	1	1
17	18	1	1	2	2	2	2
18	19	3	3	3	3	4	4
19	20	2	2	2	2	2	2
20	21	1	1	2	2	2	2
21	22			1	1	1	1
22	23	3	3	3	3	2	2
23	24						

Number of Activity Adopted for Modelling	
Discovery Bay <=> Peng Chau	
Hotelling	Maneuvering
0	0
0	0
0	0
0	0
0	0
0	0
0	0
2	2
3	3
2	2
2	2
1	1
1	1
1	1
4	4
1	1
1	1
1	1
2	2
4	4
2	2
2	2
1	1
3	3
0	0

Notes:

[1] The daily schedule of the ferry service is referenced to operator's website

(https://www.td.gov.hk/en/transport_in_hong_kong/public_transport/ferries/kaito_services_map/service_details/index.html#k11); accessed on 9 February 2022

Passenger Ferry Schedule (Route A2: Discovery Bay ↔ Peng Chau (via Trappist Monastery))

Hour		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]	
Start	End	Monday to Friday		Saturdays (except public holidays)		Sunday & Public Holidays (except public holidays)	
		Hotelling	Maneuvering	Hotelling	Maneuvering	Hotelling	Maneuvering
0	1						
1	2						
2	3						
3	4						
4	5						
5	6						
6	7						
7	8						
8	9	1	1	1	1	1	1
9	10	1	1	1	1	1	1
10	11	1	1	1	1	1	1
11	12	1	1			1	1
12	13	1	1			1	1
13	14						
14	15	1	1	1	1	1	1
15	16			1	1	1	1
16	17	1	1			1	1
17	18	1	1			1	1
18	19						
19	20						
20	21						
21	22						
22	23						
23	24						

Number of Activity Adopted for Modelling	
Discovery Bay ↔ Peng Chau	
Hotelling	Maneuvering
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
1	1
1	1
1	1
1	1
1	1
0	0
1	1
1	1
1	1
1	1
0	0
0	0
0	0
0	0
0	0
0	0

Notes:

[1] The daily schedule of the ferry service is referenced to operator's website

(https://www.td.gov.hk/en/transport_in_hong_kong/public_transport/ferries/kaito_services_map/service_details/index.html#k11); accessed on 9 February 2022

Passenger Ferry Schedule (Route B: Discovery Bay <=> Mui Wo)

Hour		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]	
Start	End	Monday to Friday		Saturdays (except public holidays)		Sunday & Public Holidays (except public holidays)	
		Hotelling	Maneuvering	Hotelling	Maneuvering	Hotelling	Maneuvering
0	1						
1	2						
2	3						
3	4						
4	5						
5	6						
6	7						
7	8	1	1	2	2		
8	9					1	1
9	10					1	1
10	11			1	1	1	1
11	12			1	1	2	2
12	13					1	1
13	14			2	2	2	2
14	15						
15	16	1	1			2	2
16	17			2	2	2	2
17	18						
18	19			2	2	2	2
19	20						
20	21			2	2	2	2
21	22						
22	23						
23	24						

Number of Activity Adopted for Modelling	
Discovery Bay <=> Mui Wo	
Hotelling	Maneuvering
0	0
0	0
0	0
0	0
0	0
0	0
0	0
2	2
1	1
1	1
1	1
2	2
1	1
2	2
0	0
2	2
2	2
0	0
2	2
0	0
2	2
0	0
0	0
0	0

Notes:

[1] The daily schedule of the ferry service is referenced to operator's website (https://www.td.gov.hk/tc/transport_in_hong_kong/public_transport/ferries/service_details/index.html#o12); accessed on 9 February 2022

Passenger Ferry Schedule (Route C: Discovery Bay ↔ Central)

Hour		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]	
Start	End	Monday to Friday		Saturdays (except public holidays)		Sunday & Public Holidays (except public holidays)	
		Hotelling	Maneuvering	Hotelling	Maneuvering	Hotelling	Maneuvering
0	1	3	3	4	4	4	4
1	2			1	1	1	1
2	3						
3	4						
4	5						
5	6						
6	7	4	4	3	3	3	3
7	8	7	7	5	5	3	3
8	9	7	7	7	7	3	3
9	10	4	4	4	4	4	4
10	11	4	4	4	4	4	4
11	12	4	4	4	4	4	4
12	13	4	4	4	4	4	4
13	14	4	4	4	4	4	4
14	15	4	4	4	4	4	4
15	16	5	5	4	4	4	4
16	17	4	4	4	4	4	4
17	18	4	4	4	4	4	4
18	19	6	6	4	4	4	4
19	20	4	4	4	4	4	4
20	21	4	4	4	4	4	4
21	22	4	4	4	4	4	4
22	23	4	4	4	4	4	4
23	24	4	4	4	4	4	4

Notes:

[1] The daily schedule of the ferry service is referenced to operator's website (<https://www.dbcommunity.hk/icms2/template?series=347>); accessed on 9 February 2022

Number of Activity Adopted for Modelling	
Discovery Bay ↔ Central	
Hotelling	Maneuvering
4	4
1	1
0	0
0	0
0	0
0	0
4	4
7	7
7	7
4	4
4	4
4	4
4	4
4	4
5	5
4	4
4	4
6	6
4	4
4	4
4	4
4	4

Vessel Schedule (Route D: Vessels using Service Pier (Tug Boat/Sand Barge/LPG Barge/Oil Tanker))

Hour		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]		Number of Activity per hour ^[1]	
Start	End	Monday to Friday		Saturdays (except public holidays)		Sunday & Public Holidays (except public holidays)	
		Hotelling	Maneuvering	Hotelling	Maneuvering	Hotelling	Maneuvering
0	1						
1	2						
2	3						
3	4						
4	5						
5	6						
6	7						
7	8	1	2				
8	9	1	2				
9	10	1	2				
10	11	1	2				
11	12	1	2				
12	13	1	2				
13	14	1	2				
14	15	1	2				
15	16	1	2				
16	17	1	2				
17	18	1	2				
18	19	1	2				
19	20						
20	21						
21	22						
22	23						
23	24						

Notes:

[1] The daily schedule of the vessel is referenced to operator.

Number of Activity Adopted for Modelling	
Discovery Bay ↔ Central	
Hotelling	Maneuvering
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
1	2
1	2
1	2
1	2
1	2
1	2
1	2
1	2
1	2
1	2
1	2
1	2
1	2
0	0
0	0
0	0
0	0
0	0

Calculations of TIM for Marine Vessel connecting Discovery Bay / Peng Chau / Mui Wo / Central

Calculations of TIM for Marine Vessel connecting Discovery Bay / Peng Chau

Vessel Type	Length of Sailing Route [1]	Speed (m/s) [2]	Time-In-Mode (minutes) [4]				Distance Travelled under Various Mode (m)					
	(m)		Maneuvering	Slow Cruise	Fairway Cruise	Hotelling	Maneuvering	Slow Cruise	Fairway Cruise			
Route A1: Discovery Bay ↔ Peng Chau												
Ferry	681	2.31	5.14	6.17	5	1.80	1.40	0.00	0	250	431	0
Route A2: Discovery Bay ↔ Peng Chau (via Trappist Haven Monastery)												
Ferry	655	2.31	5.14	6.17	5	1.80	1.31	0.00	0	250	405	0
Route B: Discoery Bay ↔ Mui Wo												
Ferry	655	2.31	5.14	6.17	5	1.80	1.31	0.00	0	250	405	0
Route C: Discovery Bay ↔ Central												
Catamaran Ferry	460	2.31	5.14	14.40	5	1.80	0.68	0.00	0	250	210	0
Monohull Ferry	460	2.31	5.14	11.32	5	1.80	0.68	0.00	0	250	210	0
Route D: Vessels using Service Pier (Tug Boat/Sand Barge/LPG Barge/Oil Tanker)												
Tug Boat	934	1.54	0.00	0.00	60	10.09	0.00	0.00	0	934	0	0

Note:

[1] Length of sailing route within 500m assessment area.

[2] With reference to EPD's study on marine vessel (2012), the average speeds in Maneuvering / Slow Cruise modes are 4.5 and 10 knots respectively (i.e. 2.31 and 5.14 m/s). For fairway cruise mode in Route A to B, Vessel speeds (>12 knots) are referenced to Table 3-24 of EPD's "Study on Marine Vessels Emission Inventory". 12 knots is adopted for conservative approach that longer TIM will be resulted, hence higher emission. Vessel speeds under fairway cruise in Route C is provided by operator. For Route D, as advised by operator, the navigation speed of vessels using service pier is 3 knots and it is defined as maneuvering mode (1-8 knots) according to Table 3-24 of EPD's "Study on Marine Vessels Emission Inventory". Therefore, there is no slow cruise (8-12 knots) and fairway cruise (>12knots) mode for tug boat/barge.

[4] TIMs for Hotelling is collected from site survey. TIMs for Maneuvering are referenced to EPD's Study on Marine Vessel (2012). TIM for Slow Cruise / Fairway Cruise is estimated based on the length of sailing route.

Emission factor for Marine Vessel connecting Discovery Bay / Peng Chau / Mui Wo / Central

Marine Emission

$$\text{Emission Rate} = \text{Engine Power} \times \text{Loading Factor} \times \text{Emission Factor} \times \text{Time-in-mode}$$

Emission Rate = Engine Power x Loading Factor x Emission Factor x Time-in-mode														
Vessel Type	Engine Type	Engine Power [1] (kW)	Loading Factor [2]				Time-In-Mode (minutes) [3]				Emission Factor (g/kWh) [4]			SO ₂ [5]
			Hotelling	Maneuvering	Slow Cruise	Fairway Cruise	Hotelling	Maneuvering	Slow Cruise	Fairway Cruise	NOx	RSP	FSP	
Route A1: Discovery Bay <=> Peng Chau														
Ferry	Main Engine	643	0.00	0.30	0.45	0.45	5.00	1.80	1.40	0.00	10.00	0.30	0.29	0.21
	Auxiliary Engine	66	0.43	0.43	0.43	0.43	5.00	1.80	1.40	0.00	10.00	0.40	0.39	0.21
Route A2: Discovery Bay <=> Peng Chau (via Trappist Haven Monastery)														
Ferry	Main Engine	643	0.00	0.30	0.45	0.45	5.00	1.80	1.31	0.00	10.00	0.30	0.29	0.21
	Auxiliary Engine	66	0.43	0.43	0.43	0.43	5.00	1.80	1.31	0.00	10.00	0.40	0.39	0.21
Route B: Discovery Bay <=> Mui Wo														
Ferry	Main Engine	643	0.00	0.30	0.45	0.45	5.00	1.80	1.31	0.00	10.00	0.30	0.29	0.21
	Auxiliary Engine	66	0.43	0.43	0.43	0.43	5.00	1.80	1.31	0.00	10.00	0.40	0.39	0.21
Route C: Discovery Bay <=> Central														
Catamaran Ferry	Main Engine	3870	0.00	0.13	0.29	0.82	5.00	1.80	0.68	0.00	13.20	0.31	0.29	0.21
	Auxiliary Engine	170	0.45	0.45	0.45	0.45	5.00	1.80	0.68	0.00	10.00	0.31	0.29	0.21
Monohull Ferry	Main Engine	1680	0.00	0.19	0.42	0.92	5.00	1.80	0.68	0.00	13.20	0.31	0.29	0.21
	Auxiliary Engine	182	0.45	0.45	0.45	0.45	5.00	1.80	0.68	0.00	10.00	0.31	0.29	0.21
Route D: Vessels using Service Pier (Tug Boat/Sand Barge/LPG Barge/Oil Tanker)														
Tug Boat	Main Engine	638	0.00	0.50	0.00	0.00	60.00	10.09	0.00	0.00	13.20	0.72	0.70	0.21
	Auxiliary Engine	97	0.43	0.43	0.00	0.00	60.00	10.09	0.00	0.00	10.00	0.40	0.39	0.21

Notes:

[1] For Route A to Route B, no information from operator is available. The engine power is referenced to the vessel (GRT 0-499) in Table 4-5 of EPD's "Study on Marine Vessels Emission Inventory". For Route C and Route D, the engine power is provided by the operator.

[2] For Route A to Route B, loading factors for the Main Engine factors are referenced to vessel type "all except tug" in Table 4-7 of the Study on Marine Vessels Emissions Inventory, February 2012.

For Route C, loading factors for the Main Engine are calculated as below:

- Mechanical Power = Force x Velocity

- Assuming force is constant, loading factor will be proportional to speed (with reference to approved EIA for West Kowloon Cultural District (AEIAR-178/2013))

- Loading factor of each mode = speed of each mode / maximum design speed of the vessel

For Route D, loading factors for the Main Engine are provided by operator.

The loading factors for the Auxiliary Engine for all routes (Route A, B, C and D) are referenced to Table 4-10 of the Study on Marine Vessels Emissions Inventory, February 2012.

[3] TIMs for Hotelling is collected from site survey. TIMs for Maneuvering / Slow Cruise modes are referenced to EPD's Study on Marine Vessel (2012). TIM for fairway cruise is estimated based on the length of sailing route.

[4] For Route A to Route B, the emission factors of main engine (Cat. 1) (All RTVs except (a) chemical/gas/oil tankers with GRT ≥ 1,000 and (b) all tugs) in Table 4-16 of EPD's "Study on Marine Vessels Emission Inventory" and the emission factors of auxiliary engine of RTVs in Table 4-16 of EPD's "Study on Marine Vessels Emission Inventory" are adopted. For Route C, the emission factors of main engine (diesel) and auxiliary engine (diesel) of Macau/PRD ferry in Table 4-17 of EPD's "Study on Marine Vessels Emission Inventory" are adopted. For Route D, the emission factors of Main Engine (Cat. 2) (Chemical/gas/oil tankers with GRT ≥ 1,000 and all tugs boats) in Table 4-16 of EPD's "Study on Marine Vessels Emission Inventory" and the emission factors of auxiliary engine of RTVs in Table 4-16 of EPD's "Study on Marine Vessels Emission Inventory" are adopted.

[5] With effective of the Air Pollution Control (Marine Light Diesel) Regulation on 1st April, 2014, the fuel sulphur content limit of the MLD is 0.05%. Hence, the emission factors of SO₂ are corrected with the fuel sulphur content according to Section 4.2.31 of EPD's "Study on Marine Vessels Emission Inventory" using the following equation: SO₂ Emission Factor = BSFC x 2 x 0.97753 x Fuel Sulphur Fraction, where BSFC of the vessel is reference to Table 4-17 of EPD's "Study on Marine Vessels Emission Inventory".

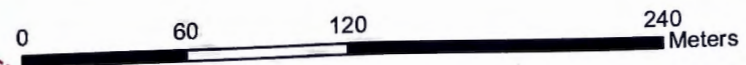
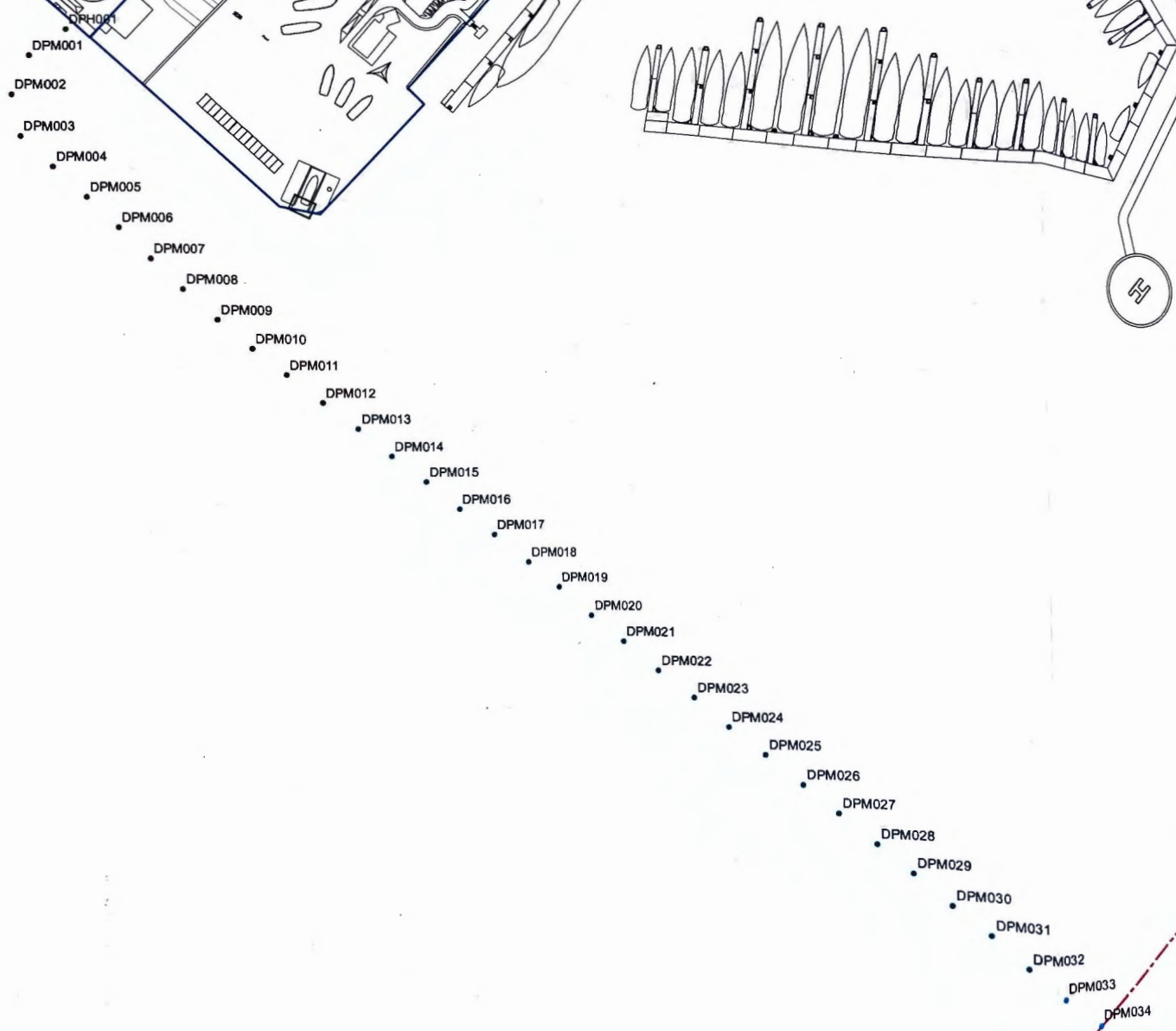
Detailed Emission Rate

Detailed Emission Rate																	
Vessel Type	Engine Type	Emission Rate per Trip (kg/hour)				Maneuvering			FSP	Slow Cruise		Fairway Cruise					
		Hotelling		FSP	SO ₂	NO _x	RSP	SO ₂		NO _x	RSP	FSP	SO ₂	NO _x	RSP	FSP	SO ₂
		NO _x	RSP														
Route A1: Discovery Bay ↔ Peng Chau																	
Ferry	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.79E-02	1.74E-03	1.68E-03	1.20E-03	6.73E-02	2.02E-03	1.95E-03	1.40E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Auxiliary Engine	2.37E-02	9.46E-04	9.22E-04	4.92E-04	8.51E-03	3.41E-04	3.32E-04	1.77E-04	6.61E-03	2.64E-04	2.58E-04	1.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route A2: Discovery Bay ↔ Peng Chau (via Trappist Haven Monastery)																	
Ferry	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.79E-02	1.74E-03	1.68E-03	1.20E-03	6.33E-02	1.90E-03	1.84E-03	1.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Auxiliary Engine	2.37E-02	9.46E-04	9.22E-04	4.92E-04	8.51E-03	3.41E-04	3.32E-04	1.77E-04	6.21E-03	2.48E-04	2.42E-04	1.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route B: Discovery Bay ↔ Mui Wo																	
Ferry	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.79E-02	1.74E-03	1.68E-03	1.20E-03	6.33E-02	1.90E-03	1.84E-03	1.32E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Auxiliary Engine	2.37E-02	9.46E-04	9.22E-04	4.92E-04	8.51E-03	3.41E-04	3.32E-04	1.77E-04	6.21E-03	2.48E-04	2.42E-04	1.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route C: Discovery Bay ↔ Central																	
Catamaran Ferry	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.99E-01	4.68E-03	4.38E-03	3.14E-03	1.68E-01	3.95E-03	3.69E-03	2.65E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Auxiliary Engine	6.38E-02	1.98E-03	1.85E-03	1.35E-03	2.30E-02	7.11E-04	6.66E-04	4.87E-04	8.68E-03	2.69E-04	2.52E-04	1.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Monohull Ferry	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-01	2.97E-03	2.78E-03	1.99E-03	1.06E-01	2.48E-03	2.32E-03	1.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Auxiliary Engine	6.83E-02	2.12E-03	1.98E-03	1.45E-03	2.46E-02	7.62E-04	7.13E-04	5.21E-04	9.29E-03	2.88E-04	2.69E-04	1.97E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route D: Vessels using Service Pier (Tug Boat/Sand Barge/LPG Barge/Oil Tanker)																	
Tug Boat	Main Engine	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.08E-01	3.86E-02	3.74E-02	1.12E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Auxiliary Engine	4.16E-01	1.66E-02	1.62E-02	8.66E-03	7.00E-02	2.80E-03	2.73E-03	1.46E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Notes:

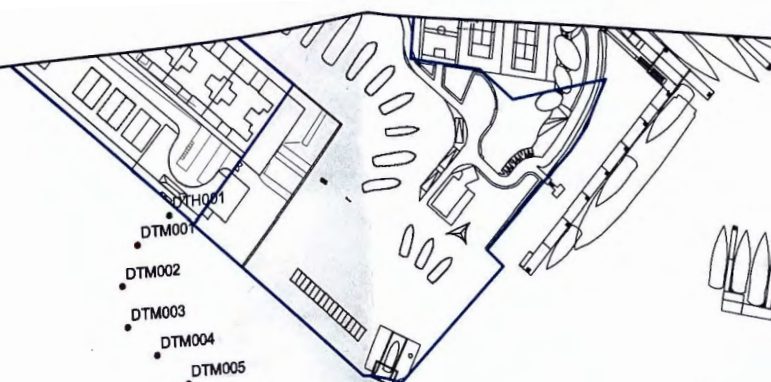
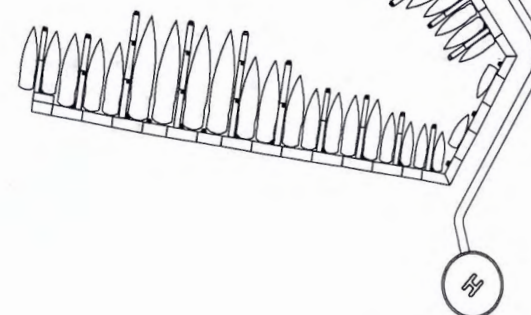
[1] Emission = Engine Power (kW) x Loading Factor x Time-in-mode (hr) x Emission Factor (g/kWh)
 e.g. FSP emission rate of main engine per trip during Maneuvering (Discovery Bay <=> Peng Chau) (kg/hour) = Engine Power (kW) x Loading Factor x Emission Factor (g/kWh) x Time-in-mode (hr) / 1000
 = (643 x 0.3 x 1.2 x 0.29/60) / 1000
 = 0.00112 kg/hour

Route A1: Discovery Bay <=> Peng Chau



Route A2: Discovery Bay <=> Peng Chau
(via Trappist Haven Monastery)

N



- DTM001
- DTM002
- DTM003
- DTM004
- DTM005
- DTM006
- DTM007
- DTM008
- DTM009
- DTM010
- DTM011
- DTM012
- DTM013
- DTM014
- DTM015
- DTM016
- DTM017
- DTM018
- DTM019
- DTM020
- DTM021
- DTM022
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- DTM028
- DTM029
- DTM030
- DTM031
- DTM032

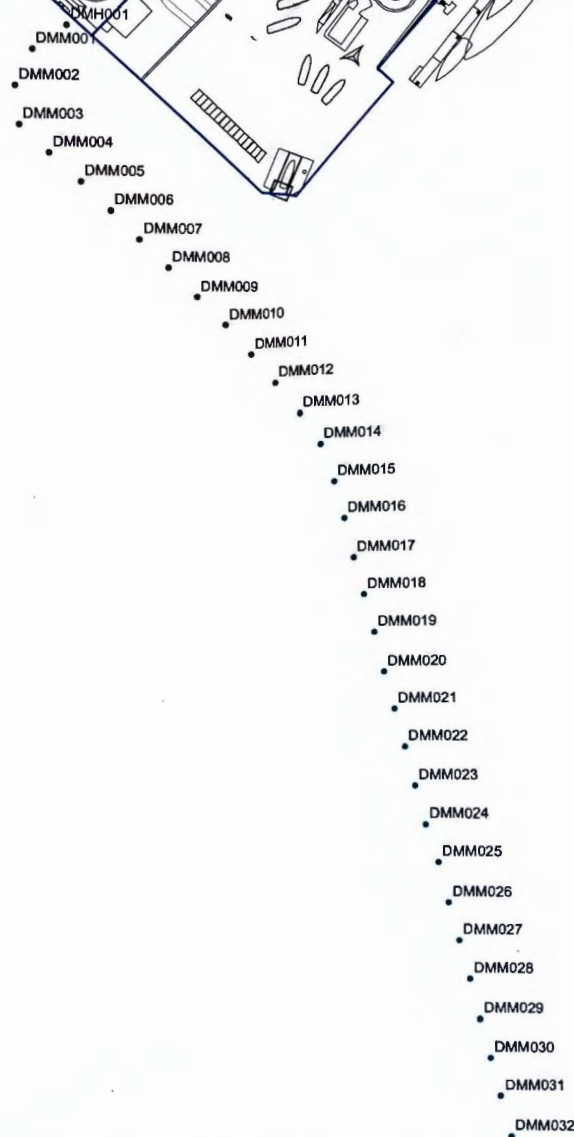
Legend

- Project Boundary
- Assessment Area
- Time In Mode**
 - Hotelling
 - Maneuvering
 - Slow Cruising

0 70 140 280 Meters

Route B: Discovery Bay <=> Mui Wo

N

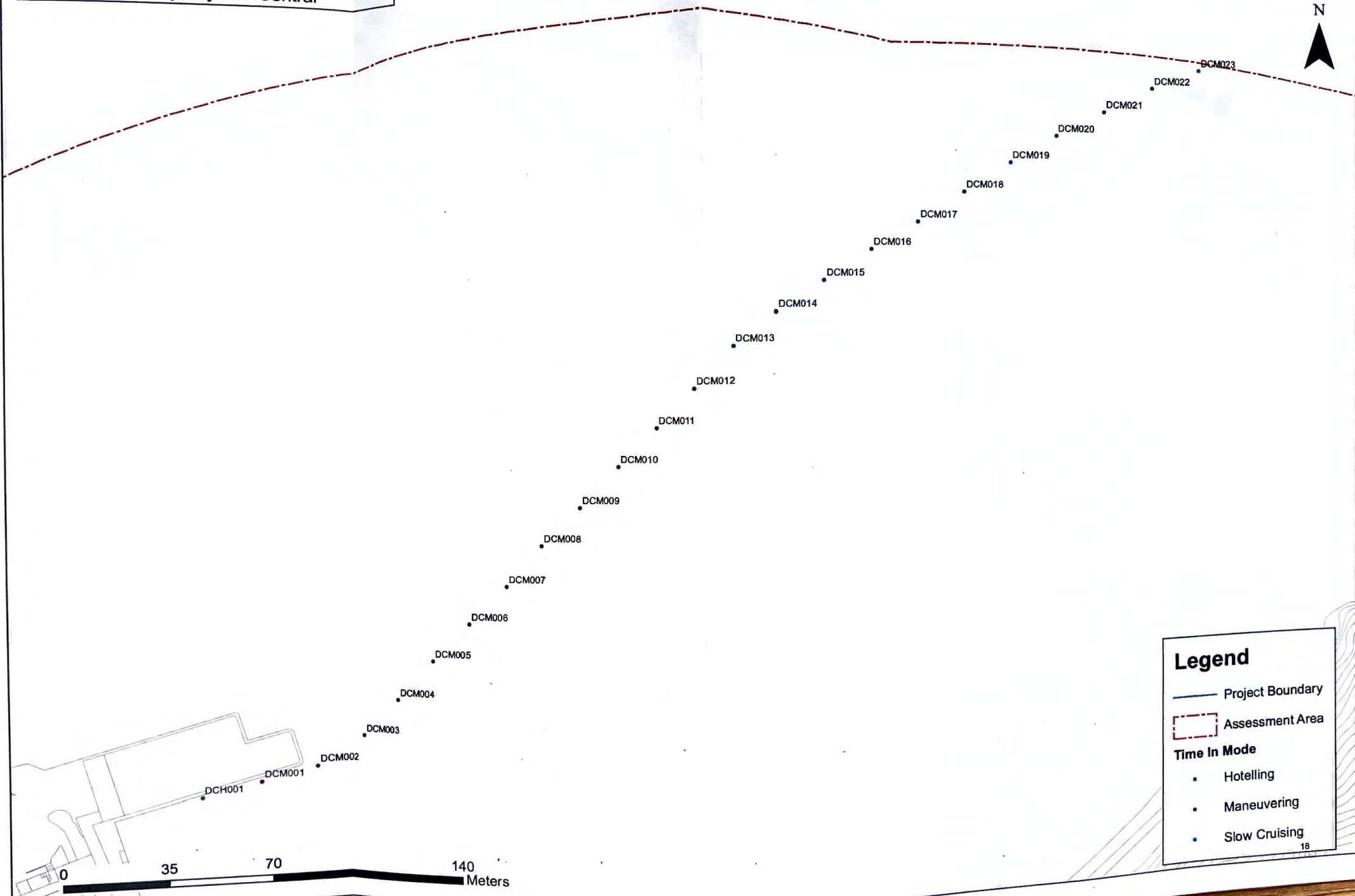


Legend

- Project Boundary
- Assessment Area
- Time In Mode
 - Hotelling
 - Maneuvering
 - Slow Cruising

0 70 140 280 Meters

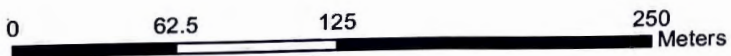
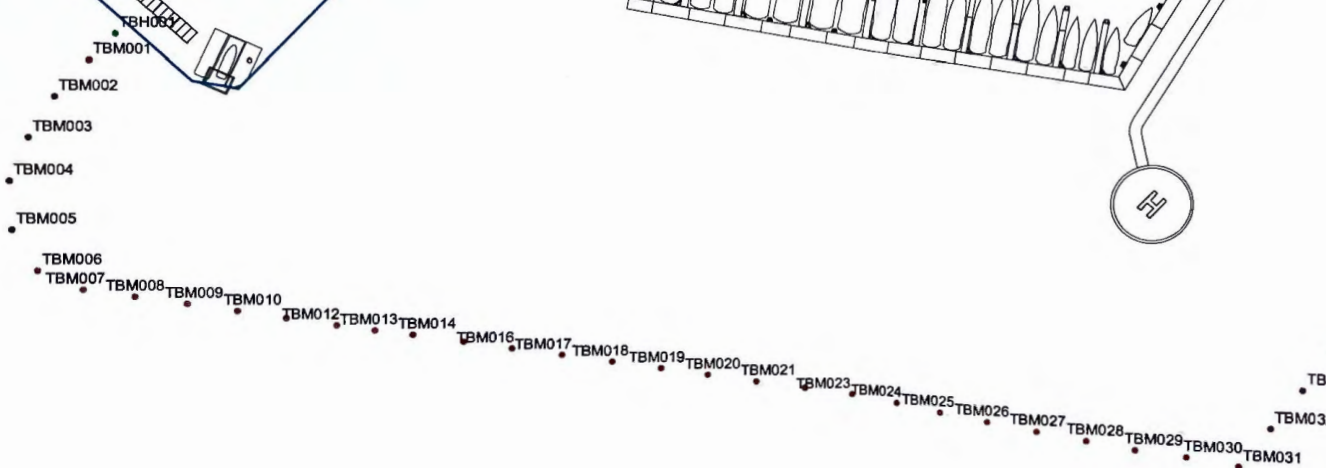
Route C: Discovery Bay <=> Central



Legend

- Project Boundary
- Assessment Area
- Time In Mode
 - Hotelling
 - Maneuvering
 - Slow Cruising

Route D: Tug Boat/Sand Barge/LPG Barge



Legend

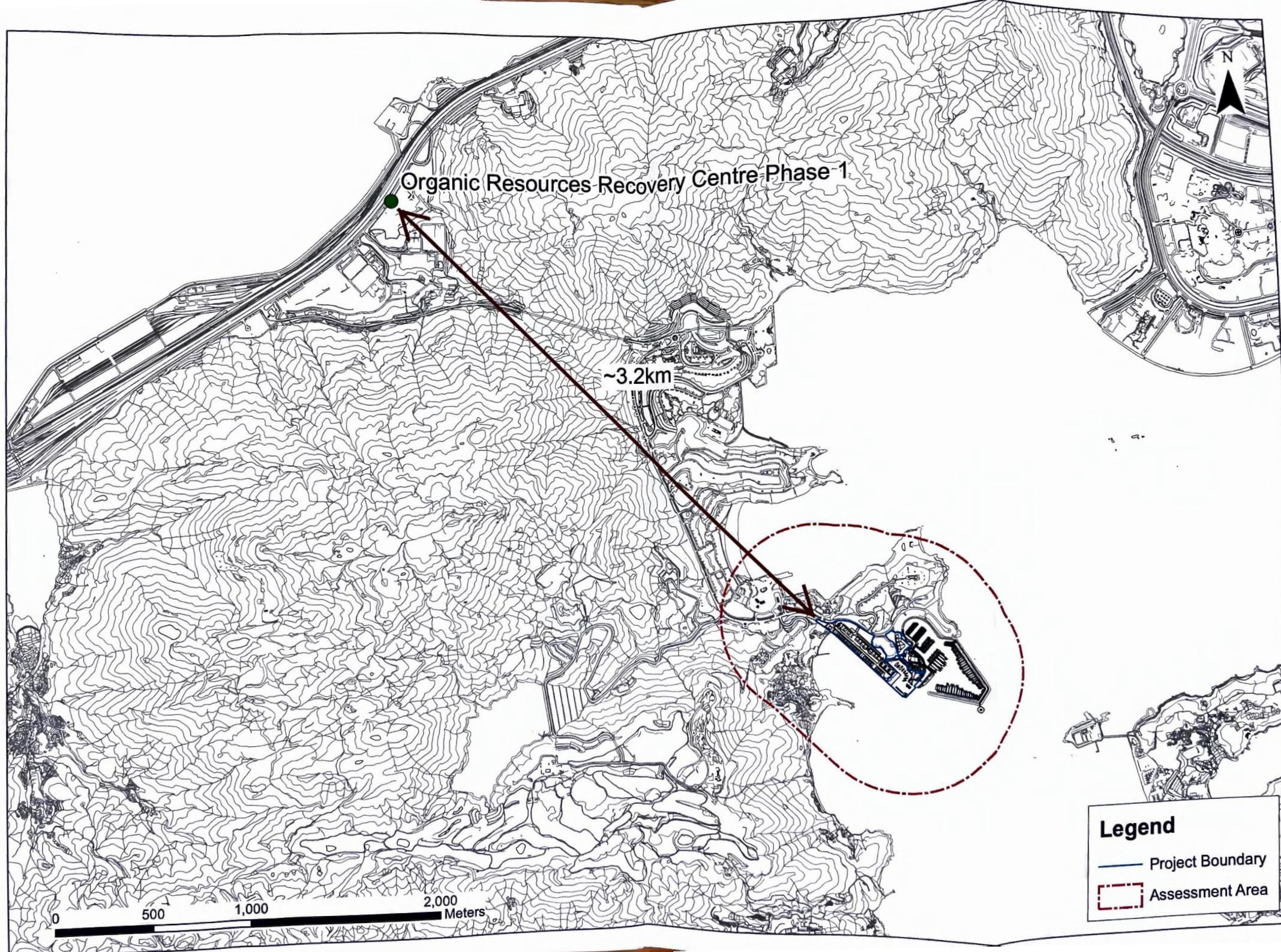
- Project Boundary
- Assessment Area

Time In Mode

- Hotelling
- Maneuvering
- Slow Cruising

Appendix 4.2

Major Point Sources within 4km



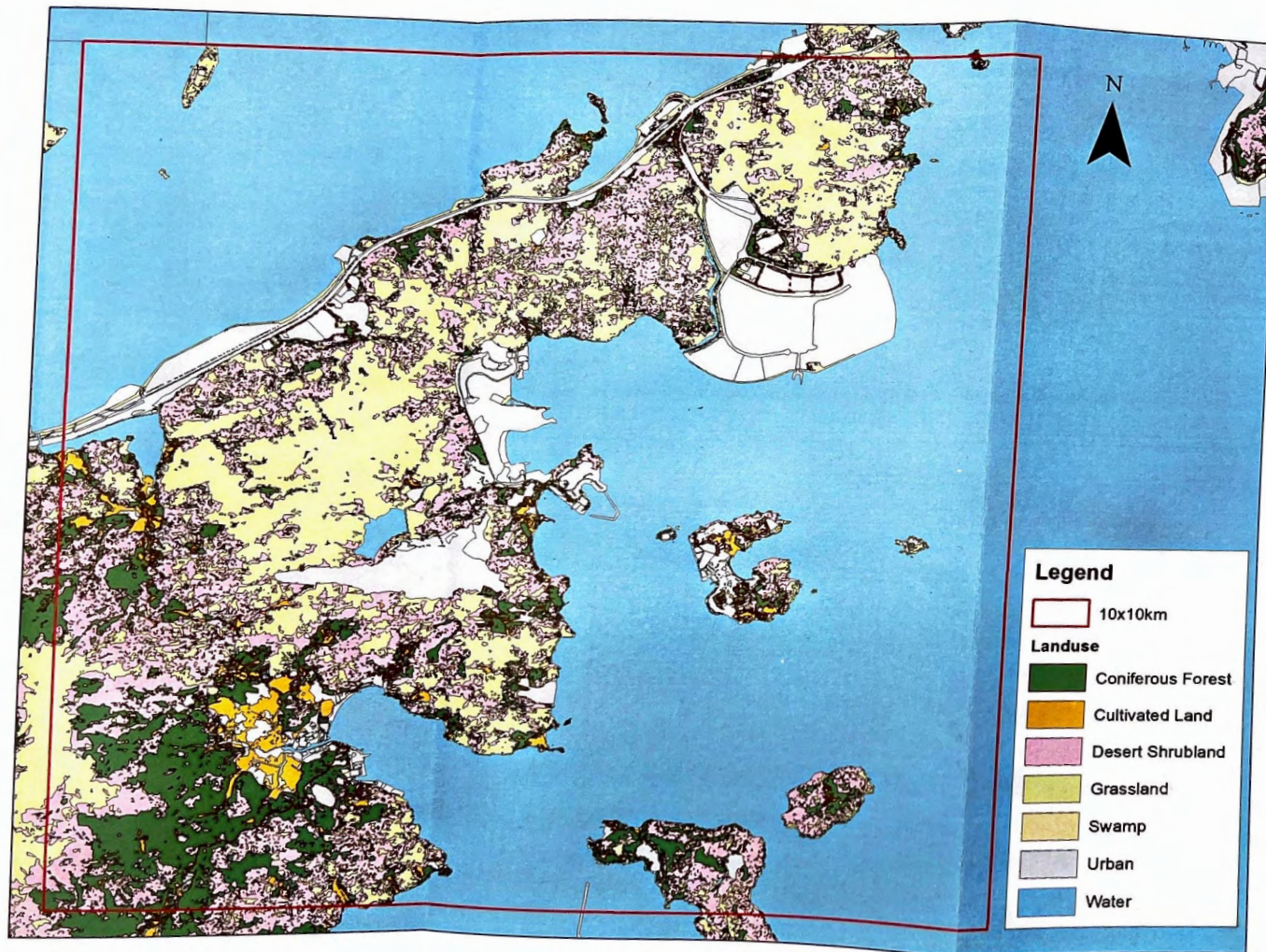
Appendix 4.3

Modelling Assumptions

A summary of AERMOD modelling parameters that has been adopted in the assessment is given in **Table 1** below.

Table 1 Modelling parameters adopted in AERMOD

Parameters	Input
Modelling Mode	Flat terrain and rural mode (non-urban)
Meteorological Data	2015 hourly meteorological data adopted in the PATH v2.1 with the mixing height capped between 131m and 1941m. The wind speeds are capped at 1m/s for those from PATH v2.1 below 1m/s
Anemometer Height	9m (According to EPD's Guidelines on Choice of Models and Model Parameters)
Albedo	Determined within 10km x 10km region from the Project (Shown in following pages)
Bowen Ratio	Determined within 10km x 10km region from the Project (Shown in following pages)
Land Use and Surface Roughness	Surface characteristic determined within 1km for each PATH grid (Shown in following pages)



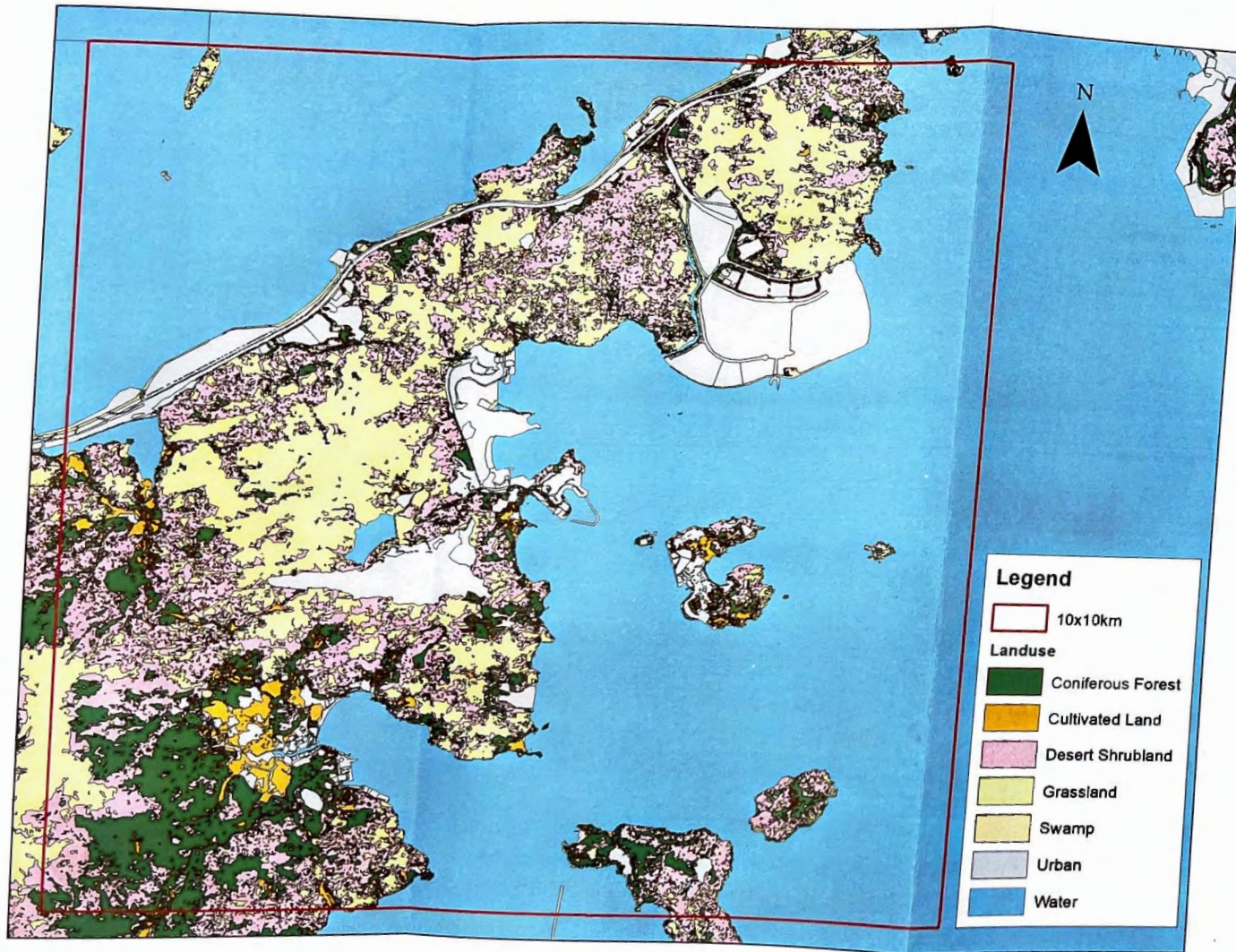
Albedo and Bowen Ratio within 10km x 10km Region

Landuse	Percentage	Albedo	Bowen Ratio
Water	53%	0.120	0.100
Coniferous Forest	8%	0.120	0.552
Swamp	0%	0.140	0.100
Cultivated Land	1%	0.173	0.472
Grassland	15%	0.187	0.684
Urban	8%	0.160	1.587
Desert Shrubland	15%	0.287	4.160
Total ^{[1], [2]}	100%	0.159	0.342

Notes:

[1] The calculation of Albedo is based on arithmetic mean.

[2] The calculation of Bowen Ratio is based on geometry mean.



Albedo and Bowen Ratio within 10km x 10km Region

Landuse	Percentage	Albedo	Bowen Ratio
Water	53%	0.120	0.100
Coniferous Forest	8%	0.120	0.552
Swamp	0%	0.140	0.100
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Total ^{[1], [2]}	100%	0.159	0.342

Notes:

[1] The calculation of Albedo is based on arithmetic mean.

[2] The calculation of Bowen Ratio is based on geometry mean.

Area weighting of each subsection

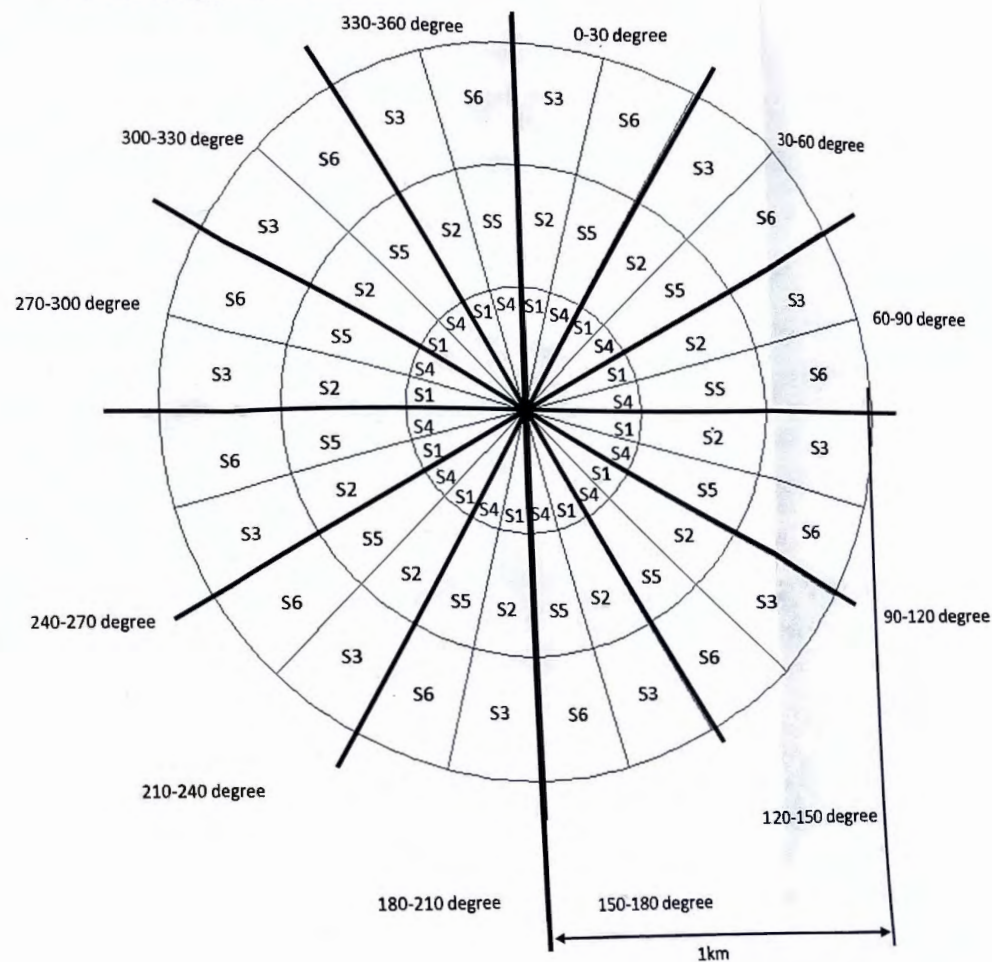
Subsection	Area (km ²)	Fraction of Total Area	Distance (km)	Weighting (Frac/Dist)
S1	0.035	0.056	0.222	0.251
S2	0.105	0.167	0.517	0.322
S3	0.175	0.278	0.842	0.330
S4	0.035	0.056	0.222	0.251
S5	0.105	0.167	0.517	0.322
S6	0.175	0.278	0.842	0.330

Surface Roughness of Different Landuse

Landuse	Surface Roughness
Water	0.000
Deciduous Forest	1.013
Coniferous Forest	1.300
Swamp	0.200
Cultivated Land	0.067
Grassland	0.037
Urban	1.000
Landfill	0.050
Desert Shrubland	0.300

[1] Surface roughness is annual average values

Location Plan of Section and Subsection



Grid: 24_31

12 Sectors Landuse of Individual Grid

[illegible]

Notes

[1] The calculation of the surface roughness is based on inverse distance weighting geometry mean and the information in the Table "Area weighting of each subsection"

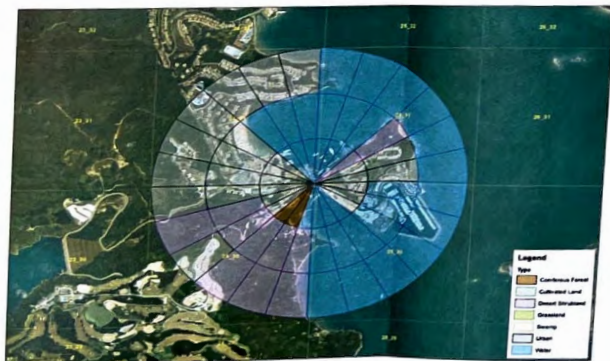
12 Sectors Surface Roughness of Individual Grid

Direction		Surface Roughness
0	30	0.0001
30	60	0.0001
60	90	0.0001
90	120	0.0001
120	150	0.0001
150	180	0.0001
180	210	0.0001
210	240	0.0001
240	270	0.0001
270	300	0.0001
300	330	0.0001
330	360	0.0001

Notes

(1) Refer to P. 3-25 of the User's Guide For the AERMOD Meteorological Preprocessor (AERMET), the reference wind level should be between 7 x surface roughness and 100m.

[2] As the reference wind level in PATH-2016 is 9m, the surface roughness is capped at 1.28m



Grid: 24_30

12 Sectors Landuse of Individual Grid

[illegible]

Notes

[1] The calculation of the surface roughness is based on inverse distance weighting geometry mean, and the information in the Table "Area weighting of each subsection"

12 Sectors Surface Roughness of Individual Grid

Direction		Surface Roughness
0	30	0.0001
30	60	0.0001
60	90	0.0001
90	120	0.0001
120	150	0.0001
150	180	0.0001
180	210	0.0001
210	240	0.0001
240	270	0.0001
270	300	0.0001
300	330	0.0001
330	360	0.0001

Notes

[3] Refer to P.3-25 of the User's Guide For the AERMOD Meteorological Preprocessor (AERMET), the reference wind level should be between 7 x surface roughness and 100m.

[2] As the reference wind level in PATH-2016 is 9m, the surface roughness is capped at 1.28m.



Grid: 25 31

[illegible]

Notes:
 (1) The calculation of the surface roughness is based on inverse distance weighting geometry mean and the information in the Table "Area weighting of each subsection"

12 Sectors Surface Roughness of Individual Grid

Direction		Surface Roughness
0	30	0.0001
30	60	0.0001
60	90	0.0001
90	120	0.0001
120	150	0.0001
150	180	0.0001
180	210	0.0001
210	240	0.0001
240	270	0.0001
270	300	0.0001
300	330	0.0001
330	360	0.0001

[1] Refer to P.3-25 of the User's Guide For the AERMOD Meteorological Preprocessor (AERMET), the reference wind level should be between 7 x surface roughness and 100m



Grid 25_30

[illegible]

[1] The calculation of the surface roughness is based on inverse distance weighting geometry mean and the information in the Table "Area weighting of each substructure".

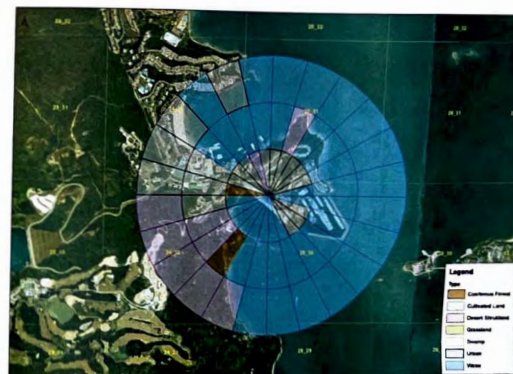
12 Sectors Surface Roughness of Individual Grid

Direction		Surface Roughness
0	30	0.0001
30	60	0.0001
60	90	0.0001
90	120	0.0001
120	150	0.0001
150	180	0.0001
180	210	0.0001
210	240	0.0001
240	270	0.0001
270	300	0.0001
300	330	0.0001
330	360	0.0001

Notes:

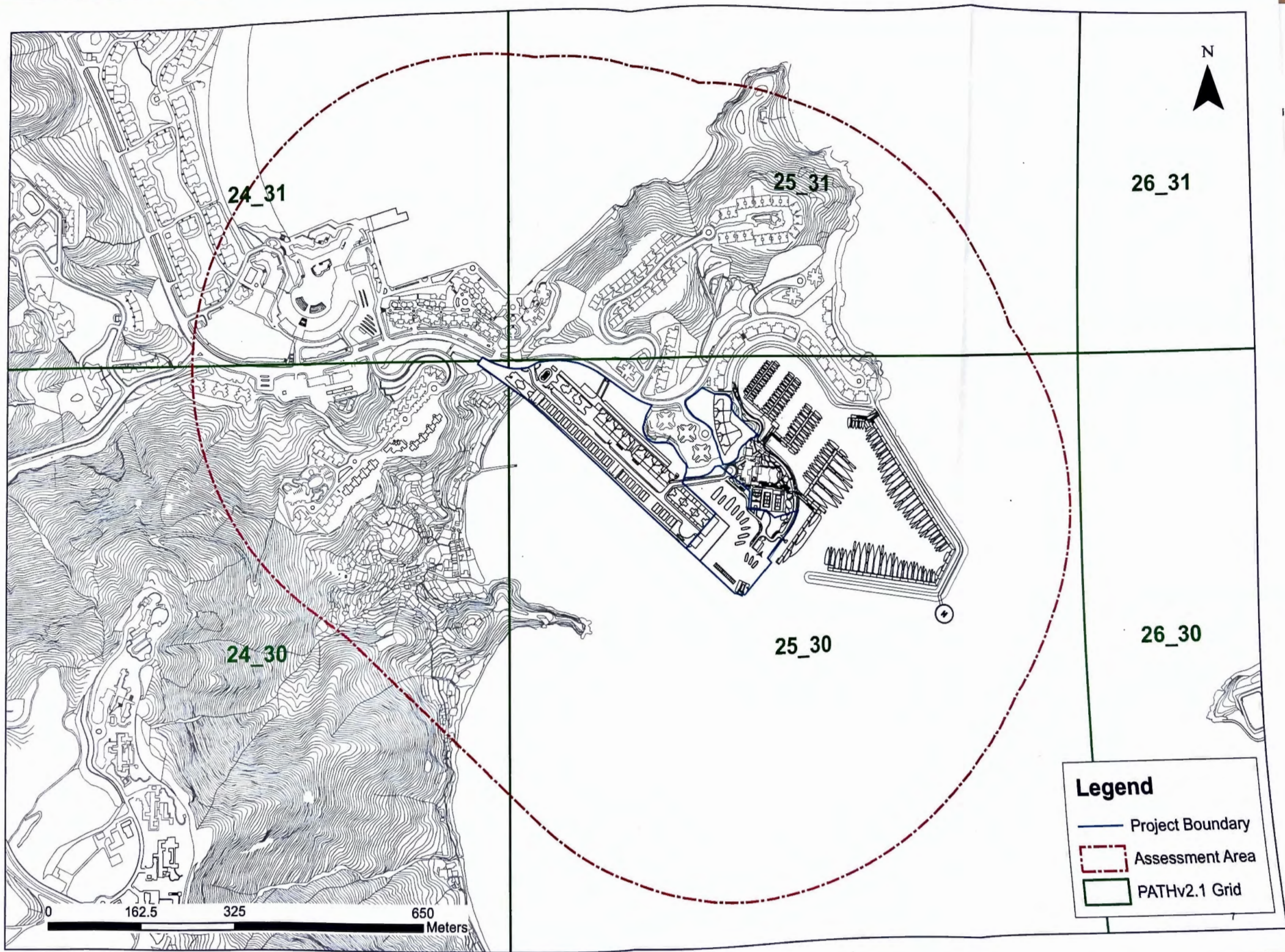
[1] Refer to P.3-25 of the User's Guide For the AERMOD Meteorological Preprocessor (AERMET), the reference wind level should be between 7 x surface roughness and 100m.

[2] As the reference wind level in PATH-2016 is 9m, the surface roughness is capped at 1.28m.



Annex - 2

PATHv2.1 Grid



Legend

- Project Boundary
- Assessment Area
- PATHv2.1 Grid

Appendix 4.4

Results Summary

Detailed Air Quality Assessment Results

Cumulative 19th Hourly NO₂

PATH Grid	ASR ID	Location	X	Y	19th Hourly NO2 Concentration at Various Heights of ASRs (µg/m3)									
					1.5mAG	5mAG	10mAG	15mAG	20mAG	25mAG	30mAG	50mAG	60mAG	
Existing ASRs														
25_30	A01	Tennis Court	820559	817059	112	-	-	-	-	-	-	-	-	-
25_30	A02	Basketball Court	820502	817068	112	-	-	-	-	-	-	-	-	-
25_30	A03	Lantau Yatch Club	820501	817107	111	111	113	-	-	-	-	-	-	-
25_30	A04	Lantau Yatch Club	820484	817127	110	111	113	-	-	-	-	-	-	-
25_30	A05	Verdant Court	820410	817143	-	110	112	167	120	120	116	110	110	110
25_30	A06	Haven Court	820385	817176	-	110	112	158	119	122	117	110	110	110
25_30	A07	Jovial Court	820342	817204	-	110	112	150	120	123	118	110	110	110
25_30	A08	Crestmont Villa Block 2	820449	817265	110	110	113	168	-	-	-	-	-	-
25_30	A09	Coastline Villa Block 28	820672	817252	110	111	113	170	-	-	-	-	-	-
25_30	A10	Coastline Villa Block 30	820720	817242	110	111	113	164	-	-	-	-	-	-
25_31	A11	Blossom Court	820570	817406	-	114	114	160	126	122	123	113	113	113
25_31	A12	Crestmont Villa Block 41	820447	817503	113	113	114	157	-	-	-	-	-	-
25_30	A13	Crestmont Villa Block 1	820354	817267	110	110	113	143	-	-	-	-	-	-
25_30	A14	Crestmont Villa Block 1	820337	817271	110	110	112	144	-	-	-	-	-	-
25_30	A15	Twilight Court	820282	817288	-	110	113	129	119	122	122	110	110	110
25_31	A16	Crestmont Villa Block 13	820264	817369	113	113	114	132	-	-	-	-	-	-
25_31	A17	Crestmont Villa Block 4	820233	817400	113	113	114	132	-	-	-	-	-	-
25_31	A18	Costa Court	820147	817412	-	113	114	125	129	131	129	113	113	113
25_31	A19	Onda Court	820125	817382	-	113	114	123	129	133	130	113	113	113
24_31	A20	La Costa Block 22	820057	817356	-	110	112	122	-	-	-	-	-	-
24_31	A21	La Costa Block 18	820023	817378	-	110	112	123	-	-	-	-	-	-
24_30	A22	Village House 10A	820048	817246	110	110	112	-	-	-	-	-	-	-
24_30	A23	La Vista Block 7B	819976	817294	-	110	112	118	-	-	-	-	-	-
24_30	A24	La Vista	819962	817217	-	110	112	117	-	-	-	-	-	-
24_30	A25	Village House	820015	816959	111	111	114	-	-	-	-	-	-	-
24_30	A26	Village House	819998	817053	110	111	113	-	-	-	-	-	-	-
25_30	A27	Lantau Yatch Club Building	820511	816996	112	112	113	-	-	-	-	-	-	-
Planned ASRs														
25_30	P01	Planned Residential Areas	820416	817038	-	-	113	188	129	-	-	-	-	-
25_30	P02	Planned Residential Areas	820360	817090	-	-	113	154	122	-	-	-	-	-
25_30	P03	Planned Residential Areas	820363	817039	112	113	115	-	-	-	-	-	-	-
25_30	P04	Planned Residential Areas	820331	817069	112	112	113	-	-	-	-	-	-	-
25_30	P05	Planned Residential Areas	820273	817122	111	111	113	-	-	-	-	-	-	-
25_30	P06	Planned Residential Areas	820252	817141	111	111	113	-	-	-	-	-	-	-
25_30	P07	Planned Residential Areas	820200	817188	110	110	113	-	-	-	-	-	-	-
25_30	P08	Planned Residential Areas	820137	817246	110	110	113	-	-	-	-	-	-	-
25_30	P09	Planned Residential Areas	820357	817111	-	-	113	152	122	-	-	-	-	-
25_30	P10	Planned Residential Areas	820301	817162	-	-	112	131	122	-	-	-	-	-
25_30	P11	Planned Residential Areas	820289	817172	-	-	112	129	121	-	-	-	-	-
25_30	P12	Planned Residential Areas	820233	817224	-	-	111	127	121	-	-	-	-	-
25_30	P13	Planned Residential Areas	820214	817228	-	-	113	122	122	125	122	110	-	-
25_30	P14	Planned Residential Areas	820156	817279	-	-	113	121	123	126	125	110	-	-
25_30	P15	Planned Residential Areas	820118	817255	110	110	113	122	122	127	124	110	110	110
25_30	P16	Planned Residential Areas	820079	817291	110	110	112	118	120	126	121	111	111	111
24_30	P17	Planned Residential Areas	820096	817301	110	110	113	122	122	129	127	110	110	110
25_30	P18	Planned Residential Areas	820449	817172	111	111	113	171	-	-	-	-	-	-
25_30	P19	Planned Residential Areas	820438	817241	110	110	113	168	-	-	-	-	-	-
Hong Kong AQO Criterion					200 (18)									

25_30	A02	Basketball Court	820502	817068	31	-	-	-	-	-	-	-
25_30	A03	Lantau Yatch Club	820501	817107	31	31	32	-	-	-	-	-
25_30	A04	Lantau Yatch Club	820484	817127	31	31	31	-	-	-	-	-
25_30	A05	Verdant Court	820410	817143	-	30	31	32	31	31	30	28
25_30	A06	Haven Court	820385	817176	-	30	30	31	31	30	30	28
25_30	A07	Jovial Court	820342	817204	-	29	30	30	30	30	30	28
25_30	A08	Crestmont Villa Block 2	820449	817265	30	29	30	30	-	-	-	-
25_30	A09	Coastline Villa Block 28	820672	817252	29	29	29	30	-	-	-	-
25_30	A10	Coastline Villa Block 30	820720	817242	29	29	29	30	-	-	-	-
25_31	A11	Blossom Court	820570	817406	-	32	32	33	32	32	32	31
25_31	A12	Crestmont Villa Block 41	820447	817503	31	31	31	32	-	-	-	-
25_30	A13	Crestmont Villa Block 1	820354	817267	29	29	29	30	-	-	-	-
25_30	A14	Crestmont Villa Block 1	820337	817271	29	29	29	30	-	-	-	-
25_30	A15	Twilight Court	820282	817288	-	29	29	30	30	30	29	28
25_31	A16	Crestmont Villa Block 13	820264	817369	31	31	32	32	-	-	-	-
25_31	A17	Crestmont Villa Block 4	820233	817400	31	31	32	32	-	-	-	-
25_31	A18	Costa Court	820147	817412	-	31	31	32	33	33	32	31
25_31	A19	Onda Court	820125	817382	-	31	31	32	33	33	32	31
24_31	A20	La Costa Block 22	820057	817356	-	25	25	26	-	-	-	-
24_31	A21	La Costa Block 18	820023	817378	-	25	25	26	-	-	-	-
24_30	A22	Village House 10A	820048	817246	23	23	23	-	-	-	-	-
24_30	A23	La Vista Block 7B	819976	817294	-	23	23	24	-	-	-	-
24_30	A24	La Vista	819962	817217	-	23	23	24	-	-	-	-
24_30	A25	Village House	820015	816959	24	24	24	-	-	-	-	-
24_30	A26	Village House	819998	817053	23	23	23	-	-	-	-	-
25_30	A27	Lantau Yatch Club Building	820511	816996	31	31	32	-	-	-	-	-
Planned ASRs												
25_30	P01	Planned Residential Areas	820416	817038	-	-	34	36	34	-	-	-
25_30	P02	Planned Residential Areas	820360	817090	-	-	31	32	32	-	-	-
25_30	P03	Planned Residential Areas	820363	817039	30	31	34	-	-	-	-	-
25_30	P04	Planned Residential Areas	820331	817069	30	30	31	-	-	-	-	-
25_30	P05	Planned Residential Areas	820273	817122	29	29	29	-	-	-	-	-
25_30	P06	Planned Residential Areas	820252	817141	29	29	29	-	-	-	-	-
25_30	P07	Planned Residential Areas	820200	817188	29	29	29	-	-	-	-	-
25_30	P08	Planned Residential Areas	820137	817246	28	28	29	-	-	-	-	-
25_30	P09	Planned Residential Areas	820357	817111	-	-	31	32	31	-	-	-
25_30	P10	Planned Residential Areas	820301	817162	-	-	29	30	30	-	-	-
25_30	P11	Planned Residential Areas	820289	817172	-	-	29	30	30	-	-	-
25_30	P12	Planned Residential Areas	820233	817224	-	-	29	29	30	-	-	-
25_30	P13	Planned Residential Areas	820214	817228	-	-	29	29	30	30	29	28
25_30	P14	Planned Residential Areas	820156	817279	-	-	29	29	30	30	29	28
25_30	P15	Planned Residential Areas	820118	817255	28	28	28	29	30	30	29	28
24_30	P16	Planned Residential Areas	820079	817291	23	23	24	24	25	25	24	23
25_30	P17	Planned Residential Areas	820096	817301	28	28	28	29	30	30	29	28
25_30	P18	Planned Residential Areas	820449	817172	30	30	31	32	-	-	-	-
25_30	P19	Planned Residential Areas	820438	817241	30	30	30	31	-	-	-	-
Hong Kong AQO Criterion							40					

Detailed Air Quality Assessment Results

Cumulative 10th Highest 24-hour RSP

Cumulative 10		Highest 24-hour RSP		10th Highest 24-hour RSP Concentration at Various Heights of ASRs (µg/m ³)										
PATH Grid	ASR ID	Location	X	Y	1.5mAG	5mAG	10mAG	15mAG	20mAG	25mAG	30mAG	50mAG	60mAG	
Existing ASRs														
25_30	A01	Tennis Court	820559	817059	64	-	-	-	-	-	-	-	-	
25_30	A02	Basketball Court	820502	817068	64	-	-	-	-	-	-	-	-	
25_30	A03	Lantau Yatch Club	820501	817107	64	64	64	-	-	-	-	-	-	
25_30	A04	Lantau Yatch Club	820484	817127	64	64	64	-	-	-	-	-	-	
25_30	A05	Verdant Court	820410	817143	-	64	64	64	64	64	64	64	64	
25_30	A06	Haven Court	820385	817176	-	64	64	64	64	64	64	64	64	
25_30	A07	Jovial Court	820342	817204	-	64	64	64	64	64	64	64	64	
25_30	A08	Crestmont Villa Block 2	820449	817265	64	64	64	64	-	-	-	-	-	
25_30	A09	Coastline Villa Block 28	820672	817252	64	64	64	64	-	-	-	-	-	
25_30	A10	Coastline Villa Block 30	820720	817242	64	64	64	64	-	-	-	-	-	
25_31	A11	Blossom Court	820570	817406	-	64	64	64	64	64	64	64	64	
25_31	A12	Crestmont Villa Block 41	820447	817503	64	64	64	64	-	-	-	-	-	
25_30	A13	Crestmont Villa Block 1	820354	817267	64	64	64	64	-	-	-	-	-	
25_30	A14	Crestmont Villa Block 1	820337	817271	64	64	64	64	-	-	-	-	-	
25_30	A15	Twilight Court	820282	817288	-	64	64	64	64	64	64	64	64	
25_31	A16	Crestmont Villa Block 13	820264	817369	64	64	64	64	-	-	-	-	-	
25_31	A17	Crestmont Villa Block 4	820233	817400	64	64	64	64	-	-	-	-	-	
25_31	A18	Costa Court	820147	817412	-	64	64	64	64	64	64	64	64	
25_31	A19	Onda Court	820125	817382	-	64	64	64	64	64	64	64	64	
24_31	A20	La Costa Block 22	820057	817356	-	64	64	65	-	-	-	-	-	
24_31	A21	La Costa Block 18	820023	817378	-	64	64	64	-	-	-	-	-	
24_30	A22	Village House 10A	820048	817246	65	65	65	-	-	-	-	-	-	
24_30	A23	La Vista Block 7B	819976	817294	-	65	65	65	-	-	-	-	-	
24_30	A24	La Vista	819962	817217	-	65	65	65	-	-	-	-	-	
24_30	A25	Village House	820015	816959	65	65	65	-	-	-	-	-	-	
24_30	A26	Village House	819998	817053	65	65	65	-	-	-	-	-	-	
25_30	A27	Lantau Yatch Club Building	820511	816996	64	64	64	-	-	-	-	-	-	
Planned ASRs														
25_30	P01	Planned Residential Areas	820416	817038	-	-	64	64	64	-	-	-	-	
25_30	P02	Planned Residential Areas	820360	817090	-	-	64	64	64	-	-	-	-	
25_30	P03	Planned Residential Areas	820363	817039	64	64	64	-	-	-	-	-	-	
25_30	P04	Planned Residential Areas	820331	817069	64	64	64	-	-	-	-	-	-	
25_30	P05	Planned Residential Areas	820273	817122	64	64	64	-	-	-	-	-	-	
25_30	P06	Planned Residential Areas	820252	817141	64	64	64	-	-	-	-	-	-	
25_30	P07	Planned Residential Areas	820200	817188	64	64	64	-	-	-	-	-	-	
25_30	P08	Planned Residential Areas	820137	817246	64	64	64	-	-	-	-	-	-	
25_30	P09	Planned Residential Areas	820357	817111	-	-	64	64	64	-	-	-	-	
25_30	P10	Planned Residential Areas	820301	817162	-	-	64	64	64	-	-	-	-	
25_30	P11	Planned Residential Areas	820289	817172	-	-	64	64	64	-	-	-	-	
25_30	P12	Planned Residential Areas	820233	817224	-	-	64	64	64	-	-	-	-	
25_30	P13	Planned Residential Areas	820214	817228	-	-	64	64	64	64	64	64	-	
25_30	P14	Planned Residential Areas	820156	817279	-	-	64	64	64	64	64	64	-	
25_30	P15	Planned Residential Areas	820118	817255	64	64	64	64	64	64	64	64	64	
24_30	P16	Planned Residential Areas	820079	817291	65	65	65	65	65	65	65	65	65	
25_30	P17	Planned Residential Areas	820096	817301	64	64	64	64	64	64	64	64	64	
25_30	P18	Planned Residential Areas	820449	817172	64	64	64	64	-	-	-	-	-	
25_30	P19	Planned Residential Areas	820438	817241	64	64	64	64	-	-	-	-	-	
Hong Kong AQO Criterion			100 (9)											

Detailed Air Quality Assessment Results

Cumulative Annual RSP

PATH Grid	ASR ID	Location	X	Y	Annual RSP Concentration at Various Heights of ASRs (µg/m³)								
					1.5mAG	5mAG	10mAG	15mAG	20mAG	25mAG	30mAG	50mAG	60mAG
Existing ASRs													
25_30	A01	Tennis Court	H20559	H17059	2H	"	"	"	"	"	"	"	"
25_30	A02	Basketball Court	H20302	H17068	2H	"	"	"	"	"	"	"	"
25_30	A03	Lantau Yacht Club	H20301	H17107	2H	2H	2H	"	"	"	"	"	"
25_30	A04	Lantau Yacht Club	H20484	H17127	2H	2H	2H	"	"	"	"	"	"
25_30	A05	Verdant Court	H20410	H17143	"	2H	2H	2H	2H	2H	2H	2H	2H
25_30	A06	Haven Court	H20385	H17176	"	2H	2H	2H	2H	2H	2H	2H	2H
25_30	A07	Jovial Court	H20342	H17204	"	2H	2H	2H	2H	2H	2H	2H	2H
25_30	A08	Crestmont Villa Block 2	H20449	H17265	2H	2H	2H	2H	"	"	"	"	"
25_30	A09	Coastline Villa Block 2B	H20672	H17252	2H	2H	2H	2H	"	"	"	"	"
25_30	A10	Coastline Villa Block 30	H20720	H17242	2H	2H	2H	2H	"	"	"	"	"
25_31	A11	Blossom Court	H20570	H17406	"	2H	2H	2H	2H	2H	2H	2H	2H
25_31	A12	Crestmont Villa Block 41	H20447	H17503	2H	2H	2H	2H	"	"	"	"	"
25_30	A13	Crestmont Villa Block 1	H20354	H17267	2H	2H	2H	2H	"	"	"	"	"
25_30	A14	Crestmont Villa Block 1	H20337	H17271	2H	2H	2H	2H	"	"	"	"	"
25_30	A15	Twilight Court	H20282	H17288	"	2H	2H	2H	2H	2H	2H	2H	2H
25_31	A16	Crestmont Villa Block 13	H20264	H17369	2H	2H	2H	2H	"	"	"	"	"
25_31	A17	Crestmont Villa Block 4	H20233	H17400	2H	2H	2H	2H	"	"	"	"	"
25_31	A18	Costa Court	H20147	H17412	"	2H	2H	2H	2H	2H	2H	2H	2H
25_31	A19	Onda Court	H20125	H17382	"	2H	2H	2H	2H	2H	2H	2H	2H
24_31	A20	La Costa Block 22	H20057	H17356	"	27	27	27	"	"	"	"	"
24_31	A21	La Costa Block 1B	H20023	H17378	"	27	27	27	"	"	"	"	"
24_30	A22	Village House 10A	H20048	H17246	27	27	27	"	"	"	"	"	"
24_30	A23	La Vista Block 7B	H19976	H17294	"	27	27	27	"	"	"	"	"
24_30	A24	La Vista	H19962	H17217	"	27	27	27	"	"	"	"	"
24_30	A25	Village House	H20015	H16959	27	27	27	"	"	"	"	"	"
24_30	A26	Village House	H19998	H17053	27	27	27	"	"	"	"	"	"
25_30	A27	Lantau Yacht Club Building	H20511	H16996	2H	2H	2H	"	"	"	"	"	"
Planned ASRs													
25_30	P01	Planned Residential Areas	H20416	H17038	"	"	2H	2H	2H	"	"	"	"
25_30	P02	Planned Residential Areas	H20360	H17090	"	"	2H	2H	2H	"	"	"	"
25_30	P03	Planned Residential Areas	H20363	H17039	2H	2H	2H	"	"	"	"	"	"
25_30	P04	Planned Residential Areas	H20331	H17069	2H	2H	2H	"	"	"	"	"	"
25_30	P05	Planned Residential Areas	H20273	H17122	2H	2H	2H	"	"	"	"	"	"
25_30	P06	Planned Residential Areas	H20252	H17141	2H	2H	2H	"	"	"	"	"	"
25_30	P07	Planned Residential Areas	H20200	H17188	2H	2H	2H	"	"	"	"	"	"
25_30	P08	Planned Residential Areas	H20137	H17246	2H	2H	2H	"	"	"	"	"	"
25_30	P09	Planned Residential Areas	H20357	H17111	"	"	2H	2H	2H	"	"	"	"
25_30	P10	Planned Residential Areas	H20301	H17162	"	"	2H	2H	2H	"	"	"	"
25_30	P11	Planned Residential Areas	H20289	H17172	"	"	2H	2H	2H	"	"	"	"
25_30	P12	Planned Residential Areas	H20233	H17224	"	"	2H	2H	2H	"	"	"	"
25_30	P13	Planned Residential Areas	H20214	H17228	"	"	2H	2H	2H	2H	2H	2H	"
25_30	P14	Planned Residential Areas	H20156	H17279	"	"	2H	2H	2H	2H	2H	2H	"
25_30	P15	Planned Residential Areas	H20118	H17255	2H	2H	2H	2H	2H	2H	2H	2H	2H
24_30	P16	Planned Residential Areas	H20079	H17291	27	27	27	27	27	27	27	27	27
25_30	P17	Planned Residential Areas	H20096	H17301	2H	2H	2H	2H	2H	2H	2H	2H	2H
25_30	P18	Planned Residential Areas	H20449	H17172	2H	2H	2H	2H	"	"	"	"	"
25_30	P19	Planned Residential Areas	H20438	H17241	2H	2H	2H	2H	"	"	"	"	"
Hong Kong AQO Criterion					50								

25_30	A02	Basketball Court	820502	817068	28	-	-	-	-	-	-	-
25_30	A03	Lantau Yatch Club	820501	817107	28	28	28	-	-	-	-	-
25_30	A04	Lantau Yatch Club	820484	817127	28	28	28	-	-	-	-	-
25_30	A05	Verdant Court	820410	817143	-	28	28	28	28	28	28	28
25_30	A06	Haven Court	820385	817176	-	28	28	28	28	28	28	28
25_30	A07	Jovial Court	820342	817204	-	28	28	28	28	28	28	28
25_30	A08	Crestmont Villa Block 2	820449	817265	28	28	28	28	-	-	-	-
25_30	A09	Coastline Villa Block 28	820672	817252	28	28	28	28	-	-	-	-
25_30	A10	Coastline Villa Block 30	820720	817242	28	28	28	28	-	-	-	-
25_31	A11	Blossom Court	820570	817406	-	28	28	28	28	28	28	28
25_31	A12	Crestmont Villa Block 41	820447	817503	28	28	28	28	-	-	-	-
25_30	A13	Crestmont Villa Block 1	820354	817267	28	28	28	28	-	-	-	-
25_30	A14	Crestmont Villa Block 1	820337	817271	28	28	28	28	-	-	-	-
25_30	A15	Twilight Court	820282	817288	-	28	28	28	28	28	28	28
25_31	A16	Crestmont Villa Block 13	820264	817369	28	28	28	28	-	-	-	-
25_31	A17	Crestmont Villa Block 4	820233	817400	28	28	28	28	-	-	-	-
25_31	A18	Costa Court	820147	817412	-	28	28	28	28	28	28	28
25_31	A19	Onda Court	820125	817382	-	28	28	28	28	28	28	28
24_31	A20	La Costa Block 22	820057	817356	-	27	27	27	-	-	-	-
24_31	A21	La Costa Block 18	820023	817378	-	27	27	27	-	-	-	-
24_30	A22	Village House 10A	820048	817246	27	27	27	-	-	-	-	-
24_30	A23	La Vista Block 7B	819976	817294	-	27	27	27	-	-	-	-
24_30	A24	La Vista	819962	817217	-	27	27	27	-	-	-	-
24_30	A25	Village House	820015	816959	27	27	27	-	-	-	-	-
24_30	A26	Village House	819998	817053	27	27	27	-	-	-	-	-
25_30	A27	Lantau Yatch Club Building	820511	816996	28	28	28	-	-	-	-	-
Planned ASRs												
25_30	P01	Planned Residential Areas	820416	817038	-	-	28	28	28	-	-	-
25_30	P02	Planned Residential Areas	820360	817090	-	-	28	28	28	-	-	-
25_30	P03	Planned Residential Areas	820363	817039	28	28	28	-	-	-	-	-
25_30	P04	Planned Residential Areas	820331	817069	28	28	28	-	-	-	-	-
25_30	P05	Planned Residential Areas	820273	817122	28	28	28	-	-	-	-	-
25_30	P06	Planned Residential Areas	820252	817141	28	28	28	-	-	-	-	-
25_30	P07	Planned Residential Areas	820200	817188	28	28	28	-	-	-	-	-
25_30	P08	Planned Residential Areas	820137	817246	28	28	28	-	-	-	-	-
25_30	P09	Planned Residential Areas	820357	817111	-	-	28	28	28	-	-	-
25_30	P10	Planned Residential Areas	820301	817162	-	-	28	28	28	-	-	-
25_30	P11	Planned Residential Areas	820289	817172	-	-	28	28	28	-	-	-
25_30	P12	Planned Residential Areas	820233	817224	-	-	28	28	28	-	-	-
25_30	P13	Planned Residential Areas	820214	817228	-	-	28	28	28	28	28	-
25_30	P14	Planned Residential Areas	820156	817279	-	-	28	28	28	28	28	-
25_30	P15	Planned Residential Areas	820118	817255	28	28	28	28	28	28	28	28
24_30	P16	Planned Residential Areas	820079	817291	27	27	27	27	27	27	27	27
25_30	P17	Planned Residential Areas	820096	817301	28	28	28	28	28	28	28	28
25_30	P18	Planned Residential Areas	820449	817172	28	28	28	28	-	-	-	-
25_30	P19	Planned Residential Areas	820438	817241	28	28	28	28	-	-	-	-
Hong Kong AQO Criterion			50									

Detailed Air Quality Assessment Results

Cumulative 36th Highest 24-hour FSP

PATH Grid	ASR ID	Location	X	Y	36th Highest 24-hour FSP Concentration at Various Heights of ASRs (µg/m3)								
					1.5mAG	5mAG	10mAG	15mAG	20mAG	25mAG	30mAG	50mAG	60mAG
Existing ASRs													
25_30	A01	Tennis Court	820559	817059	22	-	-	-	-	-	-	-	-
25_30	A02	Basketball Court	820502	817068	22	-	-	-	-	-	-	-	-
25_30	A03	Lantau Yatch Club	820501	817107	22	22	22	-	-	-	-	-	-
25_30	A04	Lantau Yatch Club	820484	817127	22	22	22	-	-	-	-	-	-
25_30	A05	Verdant Court	820410	817143	-	22	22	22	22	22	22	22	22
25_30	A06	Haven Court	820385	817176	-	22	22	22	22	22	22	22	22
25_30	A07	Jovial Court	820342	817204	-	22	22	22	22	22	22	22	22
25_30	A08	Crestmont Villa Block 2	820449	817265	22	22	22	22	-	-	-	-	-
25_30	A09	Coastline Villa Block 28	820672	817252	22	22	22	22	-	-	-	-	-
25_30	A10	Coastline Villa Block 30	820720	817242	22	22	22	22	-	-	-	-	-
25_31	A11	Blossom Court	820570	817406	-	22	22	22	22	-	-	-	-
25_31	A12	Crestmont Villa Block 41	820447	817503	22	22	22	22	-	-	-	-	-
25_30	A13	Crestmont Villa Block 1	820354	817267	22	22	22	22	-	-	-	-	-
25_30	A14	Crestmont Villa Block 1	820337	817271	22	22	22	22	-	-	-	-	-
25_30	A15	Twilight Court	820282	817288	-	22	22	22	22	22	22	22	22
25_31	A16	Crestmont Villa Block 13	820264	817369	22	22	22	22	-	-	-	-	-
25_31	A17	Crestmont Villa Block 4	820233	817400	22	22	22	22	-	-	-	-	-
25_31	A18	Costa Court	820147	817412	-	22	22	22	22	22	22	22	22
25_31	A19	Onda Court	820125	817382	-	22	22	22	22	22	22	22	22
24_31	A20	La Costa Block 22	820057	817356	-	23	23	23	-	-	-	-	-
24_31	A21	La Costa Block 18	820023	817378	-	23	23	23	-	-	-	-	-
24_30	A22	Village House 10A	820048	817246	23	23	23	-	-	-	-	-	-
24_30	A23	La Vista Block 7B	819976	817294	-	23	23	23	-	-	-	-	-
24_30	A24	La Vista	819962	817217	-	23	23	23	-	-	-	-	-
24_30	A25	Village House	820015	816959	23	23	23	-	-	-	-	-	-
24_30	A26	Village House	819998	817053	23	23	23	-	-	-	-	-	-
25_30	A27	Lantau Yatch Club Building	820511	816996	22	22	22	-	-	-	-	-	-
Planned ASRs													
25_30	P01	Planned Residential Areas	820416	817038	-	-	22	23	22	-	-	-	-
25_30	P02	Planned Residential Areas	820360	817090	-	-	22	22	22	-	-	-	-
25_30	P03	Planned Residential Areas	820363	817039	22	22	22	-	-	-	-	-	-
25_30	P04	Planned Residential Areas	820331	817069	22	22	22	-	-	-	-	-	-
25_30	P05	Planned Residential Areas	820273	817122	22	22	22	-	-	-	-	-	-
25_30	P06	Planned Residential Areas	820252	817141	22	22	22	-	-	-	-	-	-
25_30	P07	Planned Residential Areas	820200	817188	22	22	22	-	-	-	-	-	-
25_30	P08	Planned Residential Areas	820137	817246	22	22	22	-	-	-	-	-	-
25_30	P09	Planned Residential Areas	820357	817111	-	-	22	22	22	-	-	-	-
25_30	P10	Planned Residential Areas	820301	817162	-	-	22	22	22	-	-	-	-
25_30	P11	Planned Residential Areas	820289	817172	-	-	22	22	22	-	-	-	-
25_30	P12	Planned Residential Areas	820233	817224	-	-	22	22	22	-	-	-	-
25_30	P13	Planned Residential Areas	820214	817228	-	-	22	22	22	22	22	22	-
25_30	P14	Planned Residential Areas	820156	817279	-	-	22	22	22	22	22	22	-
25_30	P15	Planned Residential Areas	820118	817255	22	22	22	22	22	22	22	22	22
24_30	P16	Planned Residential Areas	820079	817291	23	23	23	23	23	23	23	23	23
25_30	P17	Planned Residential Areas	820096	817301	22	22	22	22	22	22	22	22	22
25_30	P18	Planned Residential Areas	820449	817172	22	22	22	22	-	-	-	-	-
25_30	P19	Planned Residential Areas	820438	817241	22	22	22	22	-	-	-	-	-
Hong Kong AQO Criterion							50 (35)						

25_30	A02	Basketball Court	820502	817068	15	-	-	-	-	-	-	-	-
25_30	A03	Lantau Yatch Club	820501	817107	15	15	15	-	-	-	-	-	-
25_30	A04	Lantau Yatch Club	820484	817127	15	15	15	-	-	-	-	-	-
25_30	A05	Verdant Court	820410	817143	-	15	15	15	15	15	15	14	14
25_30	A06	Haven Court	820385	817176	-	15	15	15	15	15	15	14	14
25_30	A07	Jovial Court	820342	817204	-	15	15	15	15	15	15	14	14
25_30	A08	Crestmont Villa Block 2	820449	817265	15	15	15	15	-	-	-	-	-
25_30	A09	Coastline Villa Block 28	820672	817252	15	15	15	15	-	-	-	-	-
25_30	A10	Coastline Villa Block 30	820720	817242	15	15	15	15	-	-	-	-	-
25_31	A11	Blossom Court	820570	817406	-	15	15	15	15	15	15	15	15
25_31	A12	Crestmont Villa Block 41	820447	817503	15	15	15	15	-	-	-	-	-
25_30	A13	Crestmont Villa Block 1	820354	817267	14	14	14	15	-	-	-	-	-
25_30	A14	Crestmont Villa Block 1	820337	817271	14	14	14	15	-	-	-	-	-
25_30	A15	Twilight Court	820282	817288	-	14	14	15	14	14	14	14	14
25_31	A16	Crestmont Villa Block 13	820264	817369	15	15	15	15	-	-	-	-	-
25_31	A17	Crestmont Villa Block 4	820233	817400	15	15	15	15	-	-	-	-	-
25_31	A18	Costa Court	820147	817412	-	15	15	15	15	15	15	15	15
25_31	A19	Onda Court	820125	817382	-	15	15	15	15	15	15	15	15
24_31	A20	La Costa Block 22	820057	817356	-	14	14	15	-	-	-	-	-
24_31	A21	La Costa Block 18	820023	817378	-	14	14	15	-	-	-	-	-
24_30	A22	Village House 10A	820048	817246	15	15	15	-	-	-	-	-	-
24_30	A23	La Vista Block 7B	819976	817294	-	15	15	15	-	-	-	-	-
24_30	A24	La Vista	819962	817217	-	15	15	15	-	-	-	-	-
24_30	A25	Village House	820015	816959	15	15	15	-	-	-	-	-	-
24_30	A26	Village House	819998	817053	15	15	15	-	-	-	-	-	-
25_30	A27	Lantau Yatch Club Building	820511	816996	15	15	15	-	-	-	-	-	-
Planned ASRs													
25_30	P01	Planned Residential Areas	820416	817038	-	-	15	15	15	-	-	-	-
25_30	P02	Planned Residential Areas	820360	817090	-	-	15	15	15	-	-	-	-
25_30	P03	Planned Residential Areas	820363	817039	15	15	15	-	-	-	-	-	-
25_30	P04	Planned Residential Areas	820331	817069	15	15	15	-	-	-	-	-	-
25_30	P05	Planned Residential Areas	820273	817122	14	14	15	-	-	-	-	-	-
25_30	P06	Planned Residential Areas	820252	817141	14	14	14	-	-	-	-	-	-
25_30	P07	Planned Residential Areas	820200	817188	14	14	14	-	-	-	-	-	-
25_30	P08	Planned Residential Areas	820137	817246	14	14	14	-	-	-	-	-	-
25_30	P09	Planned Residential Areas	820357	817111	-	-	15	15	15	-	-	-	-
25_30	P10	Planned Residential Areas	820301	817162	-	-	15	15	15	-	-	-	-
25_30	P11	Planned Residential Areas	820289	817172	-	-	14	15	15	-	-	-	-
25_30	P12	Planned Residential Areas	820233	817224	-	-	14	15	14	-	-	-	-
25_30	P13	Planned Residential Areas	820214	817228	-	-	14	15	14	14	14	14	-
25_30	P14	Planned Residential Areas	820156	817279	-	-	14	14	14	14	14	14	-
25_30	P15	Planned Residential Areas	820118	817255	14	14	14	14	14	14	14	14	14
24_30	P16	Planned Residential Areas	820079	817291	15	15	15	15	15	15	15	15	15
25_30	P17	Planned Residential Areas	820096	817301	14	14	14	14	14	14	14	14	14
25_30	P18	Planned Residential Areas	820449	817172	15	15	15	15	-	-	-	-	-
25_30	P19	Planned Residential Areas	820438	817241	15	15	15	15	-	-	-	-	-
Hong Kong AQO Criterion								25					

Detailed Air Quality Assessment Results

Cumulative 10th Highest 24-hour RSP

Cumulative 10 th Highest 24-hour RSP					10 th Highest 24-hour RSP Concentration at Various Heights of ASRs (µg/m ³)									
PATH Grid	ASR ID	Location	X	Y	1.5mAG	5mAG	10mAG	15mAG	20mAG	25mAG	30mAG	50mAG	60mAG	
Existing ASRs														
25_30	A01	Tennis Court	820559	817059	68	-	-	-	-	-	-	-	-	
25_30	A02	Basketball Court	820502	817068	68	-	-	-	-	-	-	-	-	
25_30	A03	Lantau Yatch Club	820501	817107	67	67	67	-	-	-	-	-	-	
25_30	A04	Lantau Yatch Club	820484	817127	67	67	67	-	-	-	-	-	-	
25_30	A05	Verdant Court	820410	817143	-	67	67	67	67	67	67	67	67	
25_30	A06	Haven Court	820385	817176	-	67	67	67	67	67	67	67	67	
25_30	A07	Jovial Court	820342	817204	-	67	67	67	67	67	67	67	67	
25_30	A08	Crestmont Villa Block 2	820449	817265	67	67	67	67	-	-	-	-	-	
25_30	A09	Coastline Villa Block 28	820672	817252	67	67	67	67	-	-	-	-	-	
25_30	A10	Coastline Villa Block 30	820720	817242	67	67	67	67	-	-	-	-	-	
25_31	A11	Blossom Court	820570	817406	-	70	70	70	70	70	70	70	70	
25_31	A12	Crestmont Villa Block 41	820447	817503	70	70	70	70	-	-	-	-	-	
25_30	A13	Crestmont Villa Block 1	820354	817267	67	67	67	67	-	-	-	-	-	
25_30	A14	Crestmont Villa Block 1	820337	817271	67	67	67	67	-	-	-	-	-	
25_30	A15	Twilight Court	820282	817288	-	67	67	67	67	67	67	67	67	
25_31	A16	Crestmont Villa Block 13	820264	817369	70	70	70	70	-	-	-	-	-	
25_31	A17	Crestmont Villa Block 4	820233	817400	70	70	70	70	-	-	-	-	-	
25_31	A18	Costa Court	820147	817412	-	70	70	70	70	70	70	70	70	
25_31	A19	Onda Court	820125	817382	-	70	70	70	70	70	70	70	70	
24_31	A20	La Costa Block 22	820057	817356	-	83	83	83	-	-	-	-	-	
24_31	A21	La Costa Block 18	820023	817378	-	83	83	83	-	-	-	-	-	
24_30	A22	Village House 10A	820048	817246	73	73	73	-	-	-	-	-	-	
24_30	A23	La Vista Block 7B	819976	817294	-	73	73	73	-	-	-	-	-	
24_30	A24	La Vista	819962	817217	-	73	73	73	-	-	-	-	-	
24_30	A25	Village House	820015	816959	73	73	73	-	-	-	-	-	-	
24_30	A26	Village House	819998	817053	73	73	73	-	-	-	-	-	-	
25_30	A27	Lantau Yatch Club Building	820511	816996	68	68	68	-	-	-	-	-	-	
Planned ASRs														
25_30	P01	Planned Residential Areas	820416	817038	-	-	67	74	67	-	-	-	-	
25_30	P02	Planned Residential Areas	820360	817090	-	-	67	67	67	-	-	-	-	
25_30	P03	Planned Residential Areas	820363	817039	67	67	67	-	-	-	-	-	-	
25_30	P04	Planned Residential Areas	820331	817069	67	67	67	-	-	-	-	-	-	
25_30	P05	Planned Residential Areas	820273	817122	67	67	67	-	-	-	-	-	-	
25_30	P06	Planned Residential Areas	820252	817141	67	67	67	-	-	-	-	-	-	
25_30	P07	Planned Residential Areas	820200	817188	67	67	67	-	-	-	-	-	-	
25_30	P08	Planned Residential Areas	820137	817246	67	67	67	-	-	-	-	-	-	
25_30	P09	Planned Residential Areas	820357	817111	-	-	67	67	67	-	-	-	-	
25_30	P10	Planned Residential Areas	820301	817162	-	-	67	67	67	-	-	-	-	
25_30	P11	Planned Residential Areas	820289	817172	-	-	67	67	67	-	-	-	-	
25_30	P12	Planned Residential Areas	820233	817224	-	-	67	67	67	-	-	-	-	
25_30	P13	Planned Residential Areas	820214	817228	-	-	67	67	67	67	67	67	-	
25_30	P14	Planned Residential Areas	820156	817279	-	-	67	67	67	67	67	67	-	
25_30	P15	Planned Residential Areas	820118	817255	67	67	67	67	67	67	67	67	67	
24_30	P16	Planned Residential Areas	820079	817291	73	73	73	73	73	73	73	73	73	
25_30	P17	Planned Residential Areas	820096	817301	67	67	67	67	67	67	67	67	67	
25_30	P18	Planned Residential Areas	820449	817172	67	67	67	67	-	-	-	-	-	
25_30	P19	Planned Residential Areas	820438	817241	67	67	67	67	-	-	-	-	-	
Hong Kong AQO Criterion					500 (3)									

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Detailed Air Quality Assessment Results

Cumulative 10th Highest 24-hour RSP

Cumulative 10 th Highest 24-hour RSP													
PATH Grid	ASR ID	Location	X	Y	10th Highest 24-hour RSP Concentration at Various Heights of ASRs (µg/m ³)								
					1.5mAG	5mAG	10mAG	15mAG	20mAG	25mAG	30mAG	50mAG	60mAG
Existing ASRs													
25_30	A01	Tennis Court	820559	817059	68	-	-	-	-	-	-	-	-
25_30	A02	Basketball Court	820502	817068	68	-	-	-	-	-	-	-	-
25_30	A03	Lantau Yatch Club	820501	817107	67	67	67	-	-	-	-	-	-
25_30	A04	Lantau Yatch Club	820484	817127	67	67	67	-	-	-	-	-	-
25_30	A05	Verdant Court	820410	817143	-	67	67	67	67	67	67	67	67
25_30	A06	Haven Court	820385	817176	-	67	67	67	67	67	67	67	67
25_30	A07	Jovial Court	820342	817204	-	67	67	67	67	67	67	67	67
25_30	A08	Crestmont Villa Block 2	820449	817265	67	67	67	67	-	-	-	-	-
25_30	A09	Coastline Villa Block 28	820672	817252	67	67	67	67	-	-	-	-	-
25_30	A10	Coastline Villa Block 30	820720	817242	67	67	67	67	-	-	-	-	-
25_31	A11	Blossom Court	820570	817406	-	70	70	70	70	70	70	70	70
25_31	A12	Crestmont Villa Block 41	820447	817503	70	70	70	70	-	-	-	-	-
25_30	A13	Crestmont Villa Block 1	820354	817267	67	67	67	67	-	-	-	-	-
25_30	A14	Crestmont Villa Block 1	820337	817271	67	67	67	67	-	-	-	-	-
25_30	A15	Twilight Court	820282	817288	-	67	67	67	67	67	67	67	67
25_31	A16	Crestmont Villa Block 13	820264	817369	70	70	70	70	-	-	-	-	-
25_31	A17	Crestmont Villa Block 4	820233	817400	70	70	70	70	-	-	-	-	-
25_31	A18	Costa Court	820147	817412	-	70	70	70	70	70	70	70	70
25_31	A19	Onda Court	820125	817382	-	70	70	70	70	70	70	70	70
24_31	A20	La Costa Block 22	820057	817356	-	83	83	83	-	-	-	-	-
24_31	A21	La Costa Block 18	820023	817378	-	83	83	83	-	-	-	-	-
24_30	A22	Village House 10A	820048	817246	73	73	73	-	-	-	-	-	-
24_30	A23	La Vista Block 7B	819976	817294	-	73	73	73	-	-	-	-	-
24_30	A24	La Vista	819962	817217	-	73	73	73	-	-	-	-	-
24_30	A25	Village House	820015	816959	73	73	73	-	-	-	-	-	-
24_30	A26	Village House	819998	817053	73	73	73	-	-	-	-	-	-
25_30	A27	Lantau Yatch Club Building	820511	816996	68	68	68	-	-	-	-	-	-
Planned ASRs													
25_30	P01	Planned Residential Areas	820416	817038	-	-	67	74	67	-	-	-	-
25_30	P02	Planned Residential Areas	820360	817090	-	-	67	67	67	-	-	-	-
25_30	P03	Planned Residential Areas	820363	817039	67	67	67	-	-	-	-	-	-
25_30	P04	Planned Residential Areas	820331	817069	67	67	67	-	-	-	-	-	-
25_30	P05	Planned Residential Areas	820273	817122	67	67	67	-	-	-	-	-	-
25_30	P06	Planned Residential Areas	820252	817141	67	67	67	-	-	-	-	-	-
25_30	P07	Planned Residential Areas	820200	817188	67	67	67	-	-	-	-	-	-
25_30	P08	Planned Residential Areas	820137	817246	67	67	67	-	-	-	-	-	-
25_30	P09	Planned Residential Areas	820357	817111	-	-	67	67	67	-	-	-	-
25_30	P10	Planned Residential Areas	820301	817162	-	-	67	67	67	-	-	-	-
25_30	P11	Planned Residential Areas	820289	817172	-	-	67	67	67	-	-	-	-
25_30	P12	Planned Residential Areas	820233	817224	-	-	67	67	67	-	-	-	-
25_30	P13	Planned Residential Areas	820214	817228	-	-	67	67	67	67	67	67	-
25_30	P14	Planned Residential Areas	820156	817279	-	-	67	67	67	67	67	67	-
25_30	P15	Planned Residential Areas	820118	817255	67	67	67	67	67	67	67	67	67
24_30	P16	Planned Residential Areas	820079	817291	73	73	73	73	73	73	73	73	73
25_30	P17	Planned Residential Areas	820096	817301	67	67	67	67	67	67	67	67	67
25_30	P18	Planned Residential Areas	820449	817172	67	67	67	67	-	-	-	-	-
25_30	P19	Planned Residential Areas	820438	817241	67	67	67	67	-	-	-	-	-
Hong Kong AQO Criterion			500 (3)										

Grid	ASR ID	Location			1.5mAG	5mAG	10mAG	15mAG	20mAG	25mAG	30mAG	50mAG	60mAG
Existing ASRs													
25_30	A01	Tennis Court	820559	817059	11	-	-	-	-	-	-	-	-
25_30	A02	Basketball Court	820502	817068	11	-	-	-	-	-	-	-	-
25_30	A03	Lantau Yatch Club	820501	817107	11	11	11	-	-	-	-	-	-
25_30	A04	Lantau Yatch Club	820484	817127	11	11	11	-	-	-	-	-	-
25_30	A05	Verdant Court	820410	817143	-	11	11	12	11	11	11	11	11
25_30	A06	Haven Court	820385	817176	-	11	11	12	11	11	11	11	11
25_30	A07	Jovial Court	820342	817204	-	11	11	12	11	11	11	11	11
25_30	A08	Crestmont Villa Block 2	820449	817265	11	11	11	12	-	-	-	-	-
25_30	A09	Coastline Villa Block 28	820672	817252	11	11	11	12	-	-	-	-	-
25_30	A10	Coastline Villa Block 30	820720	817242	11	11	11	12	-	-	-	-	-
25_31	A11	Blossom Court	820570	817406	-	11	11	12	11	11	11	11	11
25_31	A12	Crestmont Villa Block 41	820447	817503	11	11	11	12	-	-	-	-	-
25_30	A13	Crestmont Villa Block 1	820354	817267	11	11	11	12	-	-	-	-	-
25_30	A14	Crestmont Villa Block 1	820337	817271	11	11	11	12	-	-	-	-	-
25_30	A15	Twilight Court	820282	817288	-	11	11	12	11	11	11	11	11
25_31	A16	Crestmont Villa Block 13	820264	817369	11	11	11	12	-	-	-	-	-
25_31	A17	Crestmont Villa Block 4	820233	817400	11	11	11	12	-	-	-	-	-
25_31	A18	Costa Court	820147	817412	-	11	11	12	11	12	12	11	11
25_31	A19	Onda Court	820125	817382	-	11	11	11	11	12	12	11	11
24_31	A20	La Costa Block 22	820057	817356	-	12	12	12	-	-	-	-	-
24_31	A21	La Costa Block 18	820023	817378	-	12	12	12	-	-	-	-	-
24_30	A22	Village House 10A	820048	817246	11	11	11	-	-	-	-	-	-
24_30	A23	La Vista Block 7B	819976	817294	-	11	11	11	-	-	-	-	-
24_30	A24	La Vista	819962	817217	-	11	11	11	-	-	-	-	-
24_30	A25	Village House	820015	816959	11	11	11	-	-	-	-	-	-
24_30	A26	Village House	819998	817053	11	11	11	-	-	-	-	-	-
25_30	A27	Lantau Yatch Club Building	820511	816996	11	11	11	-	-	-	-	-	-
Planned ASRs													
25_30	P01	Planned Residential Areas	820416	817038	-	-	11	12	12	-	-	-	-
25_30	P02	Planned Residential Areas	820360	817090	-	-	11	12	11	-	-	-	-
25_30	P03	Planned Residential Areas	820363	817039	11	11	11	-	-	-	-	-	-
25_30	P04	Planned Residential Areas	820331	817069	11	11	11	-	-	-	-	-	-
25_30	P05	Planned Residential Areas	820273	817122	11	11	11	-	-	-	-	-	-
25_30	P06	Planned Residential Areas	820252	817141	11	11	11	-	-	-	-	-	-
25_30	P07	Planned Residential Areas	820200	817188	11	11	11	-	-	-	-	-	-
25_30	P08	Planned Residential Areas	820137	817246	11	11	11	-	-	-	-	-	-
25_30	P09	Planned Residential Areas	820357	817111	-	-	11	12	11	-	-	-	-
25_30	P10	Planned Residential Areas	820301	817162	-	-	11	12	11	-	-	-	-
25_30	P11	Planned Residential Areas	820289	817172	-	-	11	12	11	-	-	-	-
25_30	P12	Planned Residential Areas	820233	817224	-	-	11	11	11	-	-	-	-
25_30	P13	Planned Residential Areas	820214	817228	-	-	11	11	11	11	11	11	-
25_30	P14	Planned Residential Areas	820156	817279	-	-	11	11	11	11	11	11	-
25_30	P15	Planned Residential Areas	820118	817255	11	11	11	11	11	11	11	11	11
24_30	P16	Planned Residential Areas	820079	817291	11	11	11	11	12	12	11	11	11
25_30	P17	Planned Residential Areas	820096	817301	11	11	11	11	11	11	11	11	11
25_30	P18	Planned Residential Areas	820449	817172	11	11	11	12	-	-	-	-	-
25_30	P19	Planned Residential Areas	820438	817241	11	11	11	12	-	-	-	-	-
Hong Kong AQO Criterion			50 (3)										

Appendix 5.1

Legislation and Standards for Noise Assessment

Legislation and Standards

The relevant legislation and associated guidance applicable to the study for the assessment of noise impacts include:

- Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites (TM-Places); and
- Hong Kong Planning Standard and Guidelines (HKPSG).

Road Traffic Noise

In accordance with the HKPSG, the maximum permissible hourly noise level (L_{10}) at the external facades of domestic premises is 70dB(A). This criterion applies to domestic premises relying on opened windows as a primary means for ventilation.

Fixed Noise

The HKPSG stipulates that in order to plan for a better environment, all fixed noise sources should be located and designed so that when assessed in accordance with the TM-Places, the level of the intruding noise at the facade of the nearest sensitive use should be at least 5 dB(A) below the appropriate Acceptable Noise Limit (ANL) as stipulated in TM-Places or, in the case of the background being 5 dB(A) lower than the ANL, should not be higher than the background. The following table presents the ANL for various Area Sensitivity Ratings (ASR).

Table A5.1: ANLs for fixed noise sources

Time Period	ANL, dB(A)		
	ASR A	ASR B	ASR C
Day (0700 to 1900 hours)	60	65	70
Evening (1900 to 2300 hours)	60	65	70
Night (2300 to 0700 hours)	50	55	60

Note:

[1] ASR – Area Sensitivity Rating

For Discovery Bay in particular, it comprises of a combination of both high-rise and low-rise residential and commercial developments, and landscaping areas distributing within the development boundary. Hence, it is considered appropriate to be described as “Low density residential area consisting of low-rise or isolated high-rise developments” as defined in Table 1 of TM-Places. Besides, there are no influencing factors such as industrial areas, major road with daily flow exceeding 30,000 vehicles per day in the vicinity. Hence, it is appropriate to adopt an ASR of “A”. The prevailing noise levels measured near Marina Drive was 50 dB(A) for daytime / evening time periods and 44 dB(A) for nighttime period in free field setting. As such, the minimum of ANL-5 or prevailing noise level would be 55dB(A) for daytime and evening periods (7:00 to 23:00) and 45dB(A) for night-time period (23:00 to 7:00).

Similar to road traffic noise assessment, all these criteria only apply to NSRs relying

on opened windows for ventilation.

Firework Display Noise from Hong Kong Disneyland Park

Hong Kong Disneyland Park is located at approximately 2.5 km north-east of Discovery Bay. This theme park is a Designated Project (DP) under the EIAO and an EIA Report was submitted to EPD and approved under the EIAO (ref AEIAR – 0323/2000). Hence, the operation of theme park is governed by the noise criteria stipulated under TM-Places and TM-EIAO.

Firework events at Disneyland are organized at 8pm every night. According to its approved EIA Report, a noise criterion of $L_{eq} (15 \text{ min})$ 55 dB(A) is recommended for assessing the noise impacts due to fireworks. Hence, this $L_{eq} (15 \text{ min})$ 55 dB(A) is still adopted in this assessment.

Similar to road traffic noise assessment, all these criteria only apply to NSRs relying on opened windows for ventilation.

Marine Traffic Noise

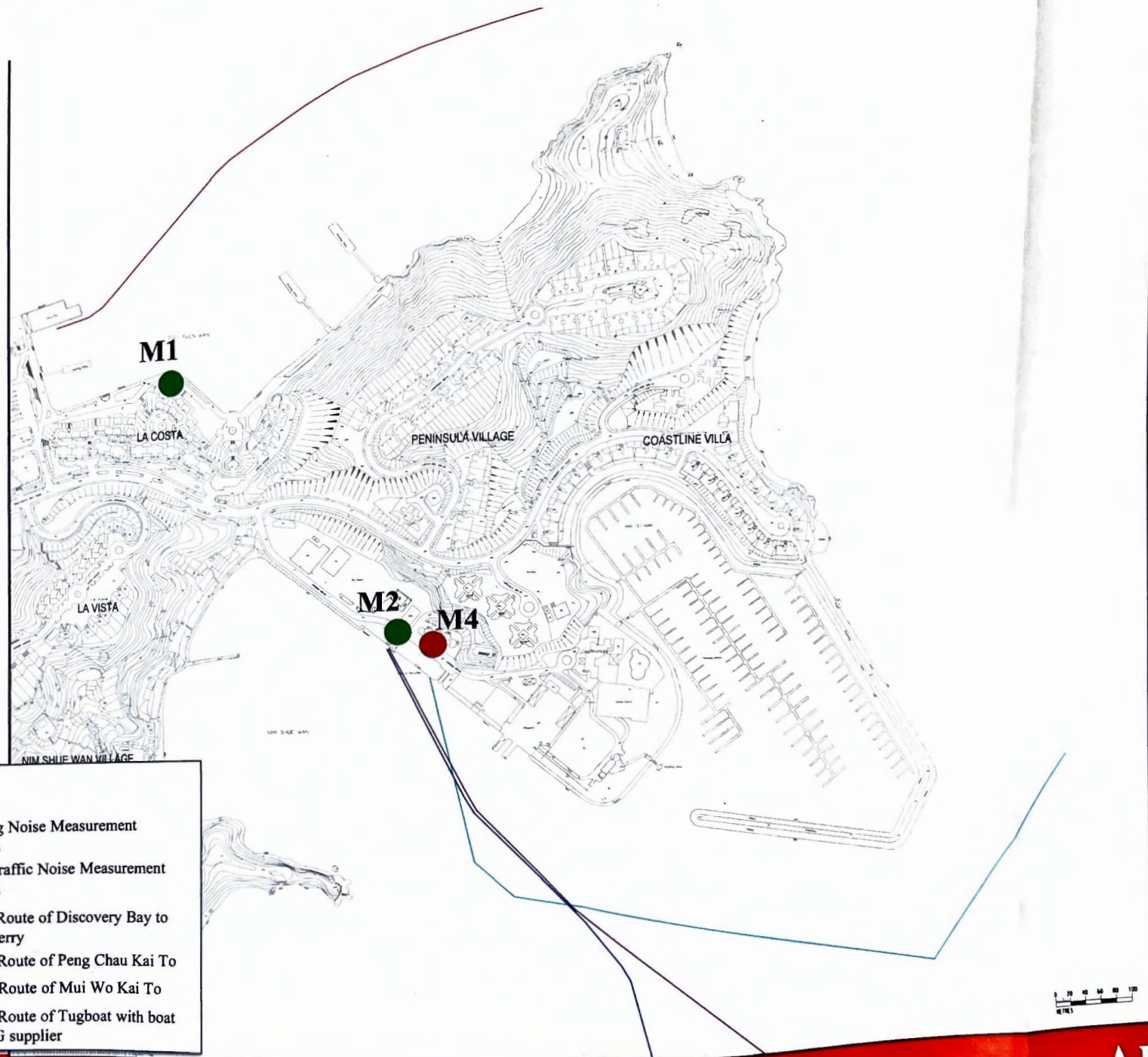
There is no statutory requirement for marine traffic noise. Additional non-statutory noise criteria may therefore need to be considered. An approach has been adopted similar to the approved EIA report for the West Kowloon Cultural District (AEIAR-178/2003). It is considered the predicted noise level will be unlikely to cause any disturbance and nuisance when the marine traffic noise is below the prevailing noise level.

The prevailing noise levels measured near Marina Drive was 50 dB(A) for daytime / evening time periods and 44 dB(A) for nighttime period in free field setting. The selected prevailing noise measurement location is shown in this appendix. Hence, it is considered appropriate to adopt the criteria of 53 dB(A) for daytime / evening time and 47 dB(A) for nighttime periods, including a facade correction of 3 dB(A).

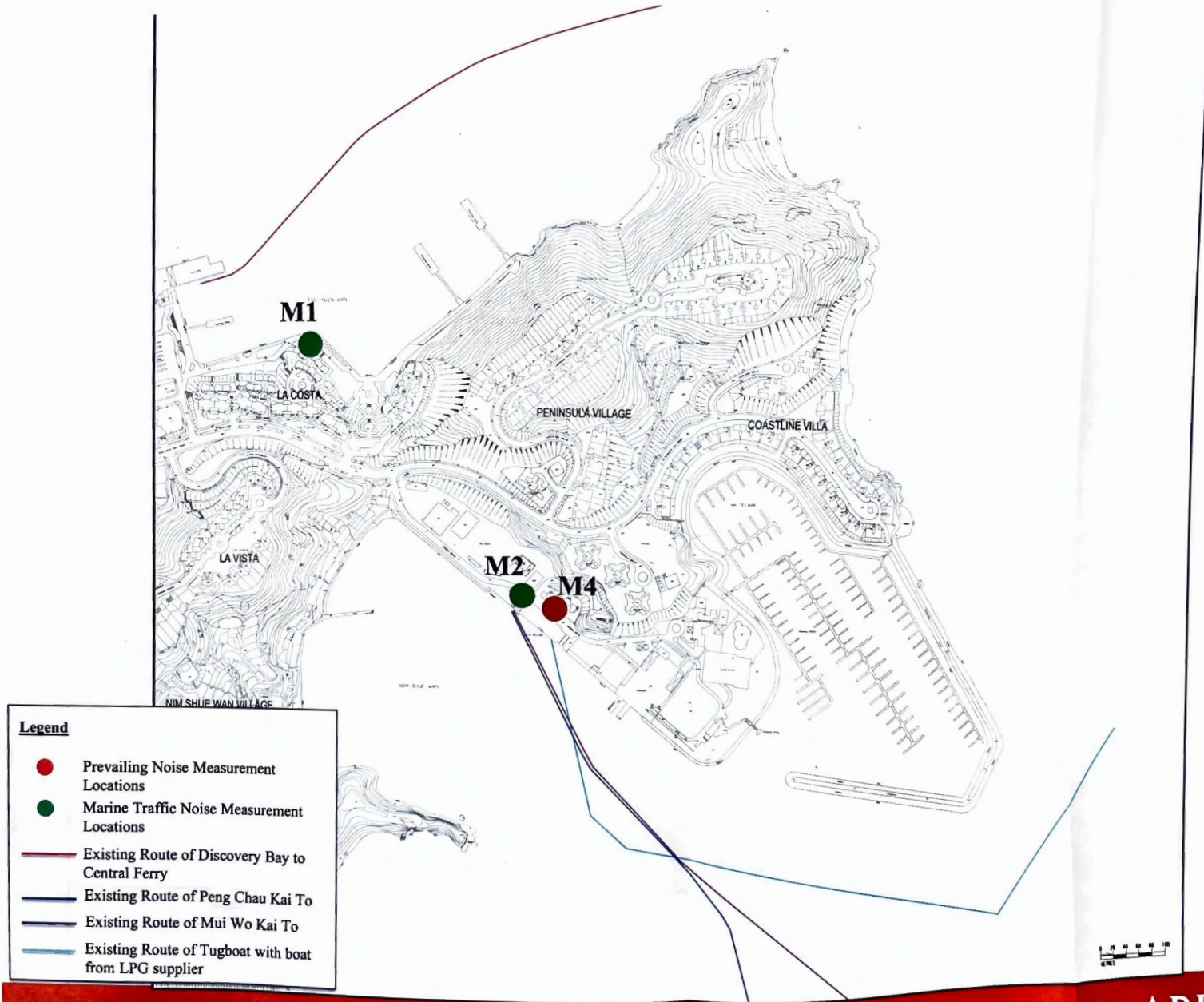
Similar to road traffic noise assessment, all these criteria only apply to NSRs relying on opened windows for ventilation.

Construction Noise

It is considered the development is in a preliminary stage, there is no construction programme or construction plant inventory for this development at this moment. Once the detailed construction programmed and methodology become available during detailed design stage, a quantitative construction noise assessment would be conducted. Mitigation measures will be studied and recommended in detailed design stage to reduce the construction noise impacts.



Noise Measurement Locations and Existing Main Marine Traffic Routes



Noise Measurement Locations and Existing Main Marine Traffic Routes