

A vertical strip on the left edge of the page showing the spiral binding of a notebook. The spiral wire is visible, and the edges of several lined pages are seen through the binding.

Appendix 5.2

Marine Traffic Noise Assessment Methodology and Source Term Measurement

Methodology

The following procedures will be adopted for marine traffic noise assessment. The noise generated by the vessels at stationary mode (e.g. idling) will be assessed as fixed noise sources.

General

The navigation routes located within the 300m assessment area of Area 10b and Area 4a are considered in this noise assessment. Any representative planned Noise Sensitive Receivers (NSRs) located within the assessment area would be considered in this noise assessment, adopting the noise criteria as discussed in **Appendix 5.1**.

Operational Information of Marine Vessels

All operational information of vessels is based on either site observation or operation schedule from operators for typical days. The operational information for the existing Discovery Bay ferry, kaito and services pier vessels are summarized in the table below.

Table A5.2: Operational information for the existing ferry, kaito and services pier vessels

Operation Parameters	Existing Discovery Bay Ferry	Kaito	Tug boat with barge	Sand barge	LPG container	Oil tanker
Ferry per hour	7 ^[1]	6 ^[1]	1 ^[3]	1 ^[3]	1 ^[3]	1 ^[3]
Speed knots/h ^[2]	~10	~10	~2	~4	~4	~9

Notes:

[1] According to operation schedule from operator.

[2] Based on site observation from typical days and weekends in Discovery Bay.

[3] According to operation schedule from operator, the tug boat with barge and sand barge would arrive the pier once a season (~3 months), while LPG container vessels for gas bottle and Oil tanker would arrive once per week.

Apart from existing Discovery Bay ferry and kaito, tugboat with barge from LPG supplier, sand barge with sand loading, LPG containers for gas bottle, bounty, oil tanker and ferries/vessels petrol filling near kaito pier are also observed.

Marine Noise Source Determination

In order to determine the Sound Exposure Level (SEL) in accordance with ISO 2922-1975(E), which has been adopted in several approved EIA, such as AEIAR-178/2013, noise measurements for marine noise source terms have been conducted as below:

- Noise measurements for marine noise source terms at Discovery Bay Public Pier and kaito pier for the existing ferry, kaito, tugboat with barge from LPG supplier, etc.
- For the measurements at Discovery Bay Public Pier, the separation distance was about 50 – 100m, depending on the transit route.
- For the measurements at kaito pier, the separation distance was about 20 – 100m, depending on the transit route.

The table below summarizes the marine noise source term.

Table A5.3: Marine noise source term measurement

Description ^[1]	Direction	SEL at 25m, dB(A) ^[2]
Peng Chau Kaito (Including those via Trappist Monastery)	Approaching	71.3
	Departing	74.5
Mui Wo Kaito	Approaching	77.7
	Departing	78.6
Discovery Bay Ferry	Approaching	85.6
	Departing	86.1
Tugboat	Approaching	80.0
	Departing	79.0
Sand Barge	Approaching	77.7 ^[3]
	Departing	77.7
LPG Containers	Approaching	71.2
	Departing	71.2 ^[4]
Oil Tanker	Approaching	73.2
	Departing	80.2

Notes:

- [1] Only non-disturbed events have been tabulated in the above table.
- [2] SEL corrected to 25m at reference speed of about 16knots/h for existing ferry.
- [3] SEL measurement was disturbed by other noisy activities, such as bus idling and oil tanker operation. Since non-disturbed events could not be measured, SEL for “Departing” has been adopted to represent that for “Approaching”.
- [4] SEL measurement was disturbed by other noisy activities, such as bus idling and oil tanker operation. Since non-disturbed events could not be measured, SEL for “Approaching” has been adopted to represent that for “Departing”.

Prediction of Noise Impacts

The SELs summarized in the above tables are then converted to establish the facade noise levels at NSRs, taking into account various consideration such as operation time, distances, number of concurrent vessels, facade effects. A summary of equations adopted in the marine traffic noise assessment is given in the table below.

Table A5.4: Summary of equations for marine traffic noise assessment

Parameters	Equations
SEL, dB(A)	$SEL = L_{max} + 10\log(kd/V),$ <p style="text-align: center;">where</p> $L_{max} = \text{Measured marine traffic passby noise level, dB(A)}$ $k = \text{Empirical constant}$ $d = \text{Perpendicular distance between measurement location and the marine traffic, m}$ $V = \text{Speed of the marine traffic, m/s}$
$L_{eq\ 1hr}$, dB(A)	$L_{eq\ 1hr} = SEL - 10\log(d_1/d) - 10\log(T) + 10\log(N) + FC + Dir$ <p style="text-align: center;">where</p> $d_1 = \text{Perpendicular slant distance between marine traffic and NSR, m}$ $T = \text{Time period under consideration (3600), s}$ $N = \text{Number of marine traffic}$ $FC = \text{With 3 dB(A) facade correction}$ $Dir = -10dB(A) \text{ correction for without line of sight}$

However, site constraints would eliminate more than one activity for vessels for the LPG containers for gas bottle, sand barge, tugboat with barge and oil tanker to occur concurrently. Besides, all these activities would not occur during night-time period as well. Since all the noise sources from the marine vessels movements would not occur at the same time, it is important to analyse and establish the possible cases during a typical 1-hour period that would constitute noise impacts. The details of different scenarios have been presented in below table and Appendix 5.3.

Table A5.5: Summary of all observed possible cases in a standard sample period (60mins)

Case	Description [1]						
	PC	MW	DB	TB	SB	LPG	OT
1	✓	✓ ^[2]	✓	✓ ^[2]			
2	✓	✓ ^[2]	✓		✓ ^[2]		
3	✓	✓ ^[2]	✓			✓ ^[2]	
4	✓	✓ ^[2]	✓				✓ ^[2]

Note:

- [1] PC – Peng Chau kaito;
- MW – Mui Wo kaito;
- DB – Discovery Bay Ferry;

- TB – Tugboat with barge from LPG supplier;
SB – Sand Barge;
LPG – LPG Container; and
OT – Oil Tanker.
[2] Marine vessels operate in daytime only.

It can be seen that the marine vessel movements for Peng Chau kaito, Mui Wo kaito, and existing Discovery Bay ferry would also occur during a typical hour. The operation of sand barge and tugboat would be carried out once a season (~3 months), while LPG container vessels and Oil tanker would operate once per week during daytime period.

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 noise impact is not anticipated and therefore would not be included in this noise assessment.

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 the Bounty would no longer be necessary. Therefore, bounty is not included in this noise assessment.

Appendix 5.3

Predicted SPL due to Marine Traffic

EAS Noise Assessment

10. Discovery Bay Ferry & Tugboat with barge in 60mins

SEL @ 25m, dB(A) ^[a]				Time, s ^[b]				No. of Ferry				Distance, m				Correction, dB(A)				Predicted Noise Level, L _{eq} (min) dB(A)		Overall Noise Level, L _{eq} (min) dB(A)		Prevailing Noise Level, L _{eq} (min) dB(A) ^[c]		Remark
SEL @ 25m, dB(A) ^[a]	Time, s ^[b]	No. of Ferry	Distance, m	Time	No.	Facade	Barrier	Distance	Time	No.	Facade	Barrier	Distance	Time	No.	Facade	Barrier	Distance	Predicted Noise Level, L _{eq} (min) dB(A)	Overall Noise Level, L _{eq} (min) dB(A)	Prevailing Noise Level, L _{eq} (min) dB(A) ^[c]	Remark				
71.3	3600	2	50	36	3	3	0	-3	36	3	3	0	-3	36	3	3	0	-3	39	49	53	-	For worst case 60min scenario, activity with higher SEL would be used for assessment			
74.5	3600	2	50	36	3	3	0	-3	36	0	3	0	-3	36	0	3	0	-3	42							
77.7	3600	1	50	36	0	3	0	-3	36	0	3	0	-3	36	0	3	0	-3	42							
78.6	3600	1	50	36	0	3	-10	-14	36	5	3	-10	-14	36	5	3	-10	-14	34							
85.6	3600	3	630	36	6	3	-10	-14	36	6	3	-10	-14	36	6	3	-10	-14	36							
86.1	3600	4	630	36	0	3	0	-5	36	0	3	0	-5	36	0	3	0	-5	42							
80.0	3600	1	80	36	-	-	-	-	36	-	-	-	-	36	-	-	-	-	-							
79.0	3600	-	80	-	-	-	-	-	36	0	3	0	-3	36	0	3	0	-3	36							
71.3	3600	1	50	36	0	3	0	-3	36	0	3	0	-3	36	0	3	0	-3	39							
74.5	3600	1	50	36	0	3	0	-3	36	-	-	-	-	36	-	-	-	-	-							
77.7	3600	-	50	-	-	-	-	-	36	-	-	-	-	36	-	-	-	-	-	42	47	-	No operation during nighttime			
78.6	3600	-	50	-	-	-	-	-	36	-	-	-	-	36	-	-	-	-	-							
85.6	3600	2	630	36	3	3	-10	-14	36	3	3	-10	-14	36	3	3	-10	-14	32							
86.1	3600	2	630	36	3	3	-10	-14	36	3	3	-10	-14	36	3	3	-10	-14	33							
80.0	3600	-	80	-	-	-	-	-	36	-	-	-	-	36	-	-	-	-	-							
79.0	3600	-	80	-	-	-	-	-	36	0	3	0	-	36	-	-	-	-	-							

W/o Kai To; DB - Discovery Bay Ferry; TB - Tugboat + barge of 25m.

All at free field condition - facade correction (+3 dB(A)) has been added

(NL) at free field condition, faculae correction ($+3 \text{ dB}(f_0)$) has been subtracted.

Discovery Bay Ferry & Sand Barge in 60mins

SEL @ 25m, dB(A) ^[2]	Time, s ^[3]	Correction, dB(A)						Predicted Noise Level, L _{eq} (Noise) dB(A)	Overall Noise Level, L _{eq} (Scenario) dB(A)	Prevailing Noise Level, L _{eq} (noise) dB(A) ^[4]	Remark
		No. of Ferry	Distance, m	Time	No.	Facade	Barrier				
71.3	3600	2	50	36	3	3	0	-3	49	53	-
74.5	3600	2	50	36	3	3	0	-3			-
77.7	3600	1	50	36	0	3	0	-3			-
78.6	3600	1	50	36	0	3	0	-3			-
85.6	3600	3	630	36	5	3	-10	-14			-
86.1	3600	4	630	36	6	3	-10	-14			-
77.7	3600	1	80	36	0	3	0	-5			-
77.7	3600	-	80	-	-	3	0	-			-
71.3	3600	1	50	36	0	3	0	-3			-
74.5	3600	1	50	36	0	3	0	-3			-
77.7	3600	-	50	-	-	3	0	-	42	47	No operation during nighttime
78.6	3600	-	50	-	-	3	0	-			No operation during nighttime
85.6	3600	2	630	36	3	3	-10	-14			-
86.1	3600	2	630	36	3	3	-10	-14			-
77.7	3600	-	80	-	-	3	0	-			No operation during nighttime
77.7	3600	-	80	-	-	3	0	-			No operation during nighttime

Kai To: DB - Discovery Bay Farms SB - Sca-12

Kai To; DB - Discovery Bay Ferry; SB - Sand Barge
25m.

237L

Volume correction (+3 dB(A)) has been added.

Assessment

Discovery Bay Ferry & LPG container vessel in 60mins

SEL @ 25m, dB(A) ⁽²⁾	Time, s ⁽³⁾	No. of Ferry	Distance, m	Correction, dB(A)				Predicted Noise Level, L _{eq} (min) dB(A)	Overall Noise Level, L _{eq} (min) dB(A)	Prevailing Noise Level, L _{eq} (min) dB(A) ⁽⁴⁾	Remark
				Time	No.	Facade	Barrier				
71.3	3600	2	50	36	3	3	0	-3	39	48	53
74.5	3600	2	50	36	3	3	0	-3	42		
77.7	3600	1	50	36	0	3	0	-3	42		
78.8	3600	1	50	36	0	3	0	-3	43		
85.6	3600	3	630	36	5	3	-10	-14	34		
86.1	3600	4	630	36	6	3	-10	-14	36		
71.2	3600	1	80	36	0	3	0	-5	34		
71.2	3600	-	80	-	-	3	0	-	-		
71.3	3600	1	50	36	0	3	0	-3	36		
74.5	3600	1	50	36	0	3	0	-3	39		
77.7	3600	-	50	-	-	3	0	-	-	42	47
78.6	3600	-	50	-	-	3	0	-	-		
85.6	3600	2	630	36	3	3	-10	-14	32		
86.1	3600	2	630	36	3	3	-10	-14	33		
71.2	3600	-	80	-	-	3	0	-	-		
71.2	3600	-	80	-	-	3	0	-	-		

For worst case 60min scenario, SEL of arrival activity would be used for departure activity in the assessment.

-

No operation during nighttime

No operation during nighttime

-

No operation during nighttime

No operation during nighttime

o Kai To; DB - Discovery Bay Ferry; LPG - LPG container vessel
of 25m.

(NL) at free field condition , facade correction (+3 dB(A)) has been added.

Discovery Bay Ferry & Oil tanker in 60mins

SEL @ 25m, dB(A) ⁽²⁾	Time, s ⁽³⁾	No. of Ferry	Distance, m	Correction, dB(A)				Predicted Noise Level, L _{eq} (min) dB(A)	Overall Noise Level, L _{eq} (min) dB(A)	Prevailing Noise Level, L _{eq} (min) dB(A) ⁽⁴⁾	Remark
				Time	No.	Facade	Barrier				
71.3	3600	2	50	36	3	3	0	-3	39	49	53
74.5	3600	2	50	36	3	3	0	-3	42		
77.7	3600	1	50	36	0	3	0	-3	42		
78.6	3600	1	50	36	0	3	0	-3	43		
85.6	3600	3	630	36	5	3	-10	-14	34		
86.1	3600	4	630	36	6	3	-10	-14	36		
73.2	3600	-	80	-	-	3	0	-	-		
80.2	3600	1	80	36	0	3	0	-5	43		
71.3	3600	1	50	36	0	3	0	-3	36		
74.5	3600	1	50	36	0	3	0	-3	39		
77.7	3600	-	50	-	-	3	0	-	-	42	47
78.8	3600	-	50	-	-	3	0	-	-		
85.6	3600	2	630	36	3	3	-10	-14	32		
86.1	3600	2	630	36	3	3	-10	-14	33		
73.2	3600	-	80	-	-	3	0	-	-		
80.2	3600	-	80	-	-	3	0	-	-		

No operation during nighttime

No operation during nighttime

-

No operation during nighttime

No operation during nighttime

Wo Kai To; DB - Discovery Bay Ferry; OT - Oil tanker
of 25m.

(NL) at free field condition , facade correction (+3 dB(A)) has been added.

by EAS
Marine Noise Assessment

Kaito, Discovery Bay Ferry & Tugboat with barge in 60mins

Day	SEL @ 25m, dB(A) ^[2]	Time, s ^[3]	No. of Ferry	Distance, m	Correction, dB(A)					Predicted Noise Level, L _{eq} (min) dB(A)	Overall Noise Level, L _{eq} (min) dB(A)	Prevailing Noise Level, L _{eq} (min) dB(A) ^[4]	Remark
					Time	No.	Facade	Barrier	Distance				
Arriving	71.3	3600	2	35	36	3	3	0	-1	40	50	53	-
Arriving	74.5	3600	2	35	36	3	3	0	-1	43			-
Arriving	77.7	3600	1	35	36	0	3	0	-1	44			-
Arriving	78.6	3600	1	35	36	0	3	0	-1	45			-
Arriving	85.6	3600	3	615	36	5	3	-10	-14	34			-
Arriving	86.1	3600	4	615	36	6	3	-10	-14	36			-
Arriving	80.0	3600	1	120	36	0	3	0	-7	41			-
Arriving	79.0	3600	-	120	-	-	3	0	-	-			For worst case 60min scenario, activity with higher SEL would be used for assessment
Arriving	71.3	3600	1	35	36	0	3	0	-1	37			-
Arriving	74.5	3600	1	35	36	0	3	0	-1	40			-
Arriving	77.7	3600	-	35	-	-	3	0	-	-			No operation during nighttime
Arriving	78.6	3600	-	35	-	-	3	0	-	-			No operation during nighttime
Arriving	85.6	3600	2	615	36	3	3	-10	-14	32	43	47	-
Arriving	86.1	3600	2	615	36	3	3	-10	-14	33			-
Arriving	80.0	3600	-	120	-	-	3	0	-	-			No operation during nighttime
Arriving	79.0	3600	-	120	-	-	3	0	-	-			No operation during nighttime

- Mui Wo Kai To; DB - Discovery Bay Ferry; TB - Tugboat + barge

distance of 25m.

period.

level (BNL) at free field condition , facade correction (+3 dB(A)) has been added.

Wo Kaito, Discovery Bay Ferry & Sand Barge in 60mins

Day	SEL @ 25m, dB(A) ^[2]	Time, s ^[3]	No. of Ferry	Distance, m	Correction, dB(A)					Predicted Noise Level, L _{eq} (min) dB(A)	Overall Noise Level, L _{eq} (min) dB(A)	Prevailing Noise Level, L _{eq} (min) dB(A) ^[4]	Remark
					Time	No.	Facade	Barrier	Distance				
Arriving	71.3	3600	2	35	36	3	3	0	-1	40	50	53	-
Arriving	74.5	3600	2	35	36	3	3	0	-1	43			-
Arriving	77.7	3600	1	35	36	0	3	0	-1	44			-
Arriving	78.6	3600	1	35	36	0	3	0	-1	45			-
Arriving	85.6	3600	3	615	36	5	3	-10	-14	34			-
Arriving	86.1	3600	4	615	36	6	3	-10	-14	36			-
Arriving	77.7	3600	1	120	36	0	3	0	-7	38			For worst case 60min scenario, activity with higher SEL would be used for assessment
Arriving	77.7	3600	-	120	-	-	3	0	-	-			-
Arriving	71.3	3600	1	35	36	0	3	0	-1	37			-
Arriving	74.5	3600	1	35	36	0	3	0	-1	40			No operation during nighttime
Arriving	77.7	3600	-	35	-	-	3	0	-	-			No operation during nighttime
Arriving	78.6	3600	-	35	-	-	3	0	-	-	43	47	-
Arriving	85.6	3600	2	615	36	3	3	-10	-14	32			-
Arriving	86.1	3600	2	615	36	3	3	-10	-14	33			No operation during nighttime
Arriving	77.7	3600	-	120	-	-	3	0	-	-			No operation during nighttime
Arriving	77.7	3600	-	120	-	-	3	0	-	-			No operation during nighttime

WW - Mui Wo Kai To; DB - Discovery Bay Ferry; SB - Sand Barge

ce distance of 25m.

period.

level (BNL) at free field condition , facade correction (+3 dB(A)) has been added.

essment

every Bay Ferry & LPG container vessel in 60mins

				Correction, dB(A)				Predicted Noise Level, L _{eq} (min) dB(A)	Overall Noise Level, L _{eq} (min) dB(A)	Prevailing Noise Level, L _{eq} (min) dB(A) ^[4]	Remark	
≥ 25m, dB(A) ^[2]	Time, s ^[3]	No. of Ferry	Distance, m	Time	No.	Facade	Barrier	Distance				
71.3	3600	2	35	36	3	3	0	-1	40	50	53	-
74.5	3600	2	35	36	3	3	0	-1	43			-
77.7	3600	1	35	36	0	3	0	-1	44			-
78.6	3600	1	35	36	0	3	0	-1	45			-
85.6	3600	3	615	36	5	3	-10	-14	34			-
86.1	3600	4	615	36	6	3	-10	-14	36			-
71.2	3600	1	120	36	0	3	0	-7	32			
71.2	3600	-	120	-	-	3	0	-	-			For worst case 60min scenario, SEL of arrival activity would be used for departure activity in the assessment
71.3	3600	1	35	36	0	3	0	-1	37			-
74.5	3600	1	35	36	0	3	0	-1	40			-
77.7	3600	-	35	-	-	3	0	-	-			No operation during nighttime
78.6	3600	-	35	-	-	3	0	-	-			No operation during nighttime
85.6	3600	2	615	36	3	3	-10	-14	32			-
86.1	3600	2	615	36	3	3	-10	-14	33			
71.2	3600	-	120	-	-	3	0	-	-			No operation during nighttime
71.2	3600	-	120	-	-	3	0	-	-			No operation during nighttime

DB - Discovery Bay Ferry; LPG - LPG container vessel

In field condition, facade correction (+3 dB(A)) has been added.

every Bay Ferry & Oil tanker in 60mins

				Correction, dB(A)				Predicted Noise Level, L _{eq} (min) dB(A)	Overall Noise Level, L _{eq} (min) dB(A)	Prevailing Noise Level, L _{eq} (min) dB(A) ^[4]	Remark	
≥ 25m, dB(A) ^[2]	Time, s ^[3]	No. of Ferry	Distance, m	Time	No.	Facade	Barrier	Distance				
71.3	3600	2	35	36	3	3	0	-1	40	50	53	-
74.5	3600	2	35	36	3	3	0	-1	43			-
77.7	3600	1	35	36	0	3	0	-1	44			-
78.6	3600	1	35	36	0	3	0	-1	45			-
85.6	3600	3	615	36	5	3	-10	-14	34			-
86.1	3600	4	615	36	6	3	-10	-14	36			-
73.2	3600	-	120	-	-	3	0	-	-			-
80.2	3600	1	120	36	0	3	0	-7	41			-
71.3	3600	1	35	36	0	3	0	-1	37			-
74.5	3600	1	35	36	0	3	0	-1	40			-
77.7	3600	-	35	-	-	3	0	-	-			No operation during nighttime
78.6	3600	-	35	-	-	3	0	-	-			No operation during nighttime
85.6	3600	2	615	36	3	3	-10	-14	32			-
86.1	3600	2	615	36	3	3	-10	-14	33			-
73.2	3600	-	120	-	-	3	0	-	-			No operation during nighttime
80.2	3600	-	120	-	-	3	0	-	-			No operation during nighttime

DB - Discovery Bay Ferry; OT - Oil tanker

In field condition, facade correction (+3 dB(A)) has been added.

Appendix 5.4

Fixed Noise Assessment Methodology and Source Term Measurement

Methodology

General

The fixed noise sources located within 300m of this development are considered as assessment area. Any representative planned Noise Sensitive Receivers (NSRs) located within the assessment area would be considered in this noise assessment, adopting the noise criteria as discussed in **Appendix 5.1**.

Operational Information

All operational information is based on either site observation or operation schedule from operators for typical days. Based on site observation, marine-based fixed noise sources were mainly generated from Peng Chau kaito, Mui Wo kaito, tugboat with barge, vessel for the gas bottle supplier, sand barge, oil tanker and marine light diesel refilling activities. As shown in **Figure 2-1**, the pump at boats refilling station will be enclosed or placed underground, and the side window at 2-storey low rise development next to kaito pier will be fixed.

Besides, further enquiry has been made with the operators, and they confirmed that there will be acoustic treatment to enclose the conveyor belt on sand barge and temporary noise barrier for crane on LPG container vessels to reduce noise impact in future operation, therefore, these acoustic treatment would be considered in the noise assessment.

Determination of Sound Power Levels (SWLs)

In order to determine the SWL of each activity, noise measurements for each selected marine-based fixed noise sources along Marina Drive have been conducted. SWLs of each activity were predicted with standard acoustic principles for noise attenuation (such as time, distance). The calculated SWL and the locations of noise sources are presented in this appendix.

Prediction of Noise Impacts

A summary of equations adopted in the marine-based fixed noise assessment is given in the table below.

Table A5.6: Summary of equations for marine-based fixed noise assessment

Parameters	Equations
SWL, dB(A)	$\text{SWL} = \text{L}_{\text{eq}}(\text{source}) + (20\log(d)+8),$ <p style="text-align: center;">where</p> <p>$\text{L}_{\text{eq}}(\text{source})$ = Measured marine-based fixed noise level, dB(A) d = Distance between measurement location and the fixed noise source, m</p>

Parameters	Equations
$L_{eq\ 30min}$, dB(A)	$L_{eq\ 30min} = SWL - (20\log(d_1)+8) + 20\log(t_1/T) + FC + BC$ <p style="text-align: center;">where</p> <p style="text-align: center;">d_1 = Distance between fixed noise source and NSR, m t_1 = Operation time of fixed noise source within a standard assessment period of 30min T = Time period under consideration (30), min FC = With 3 dB(A) facade correction BC = barrier correction (assuming worst case scenario of 125Hz) according to Figure F.3 Screening Effects of Barriers of BSS228-1 2014, Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise</p>

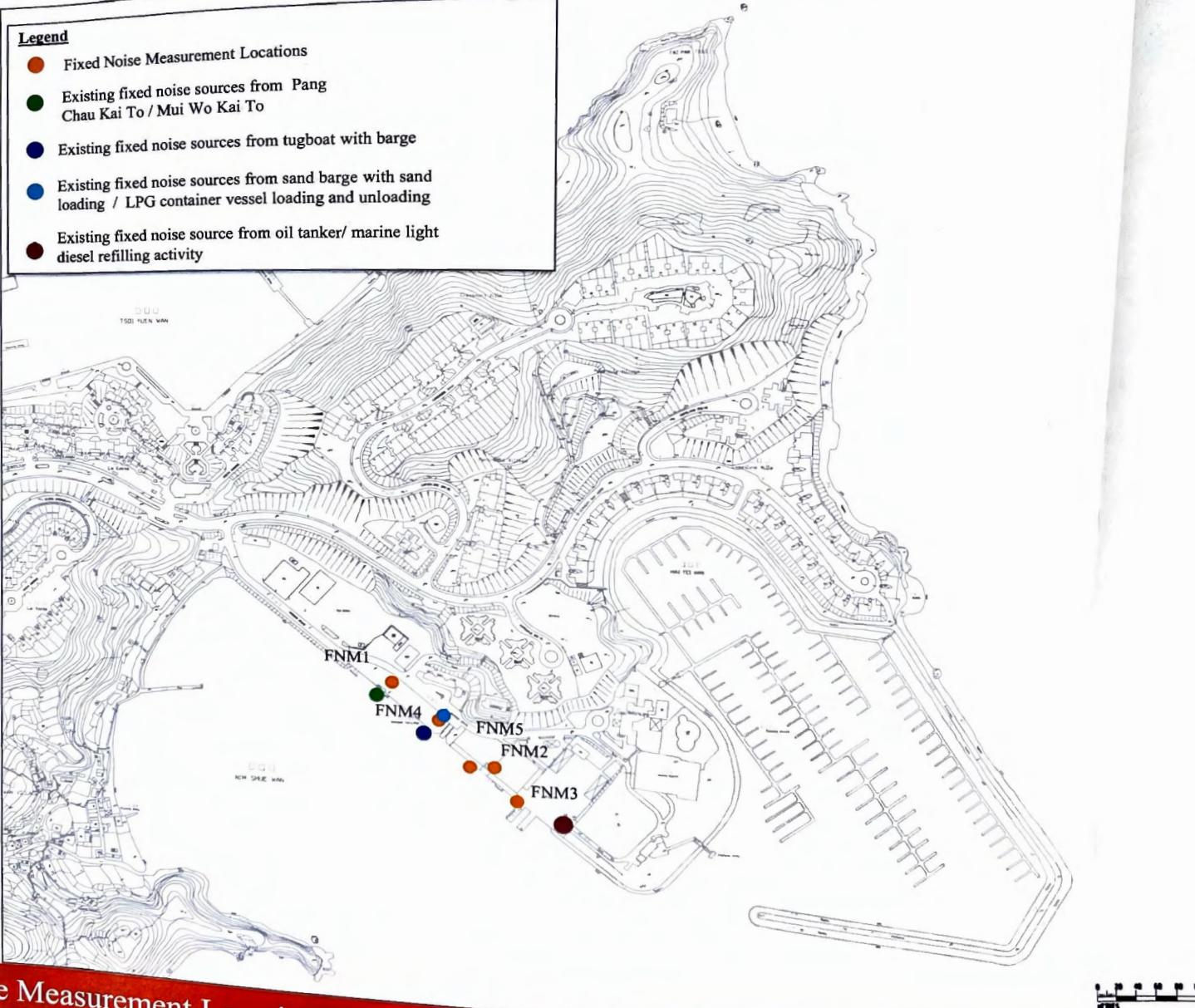
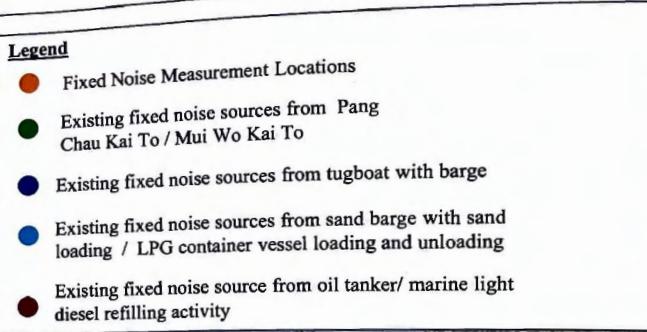
Since all the noise sources from the marine vessels would not occur at the same time, it is important to analyze and establish the possible cases during a typical 30-minute period that would constitute noise impacts. The details of different scenarios are summarized in **Appendix 5.5**.

Table A5.7: Summary of all observed possible cases within 30mins

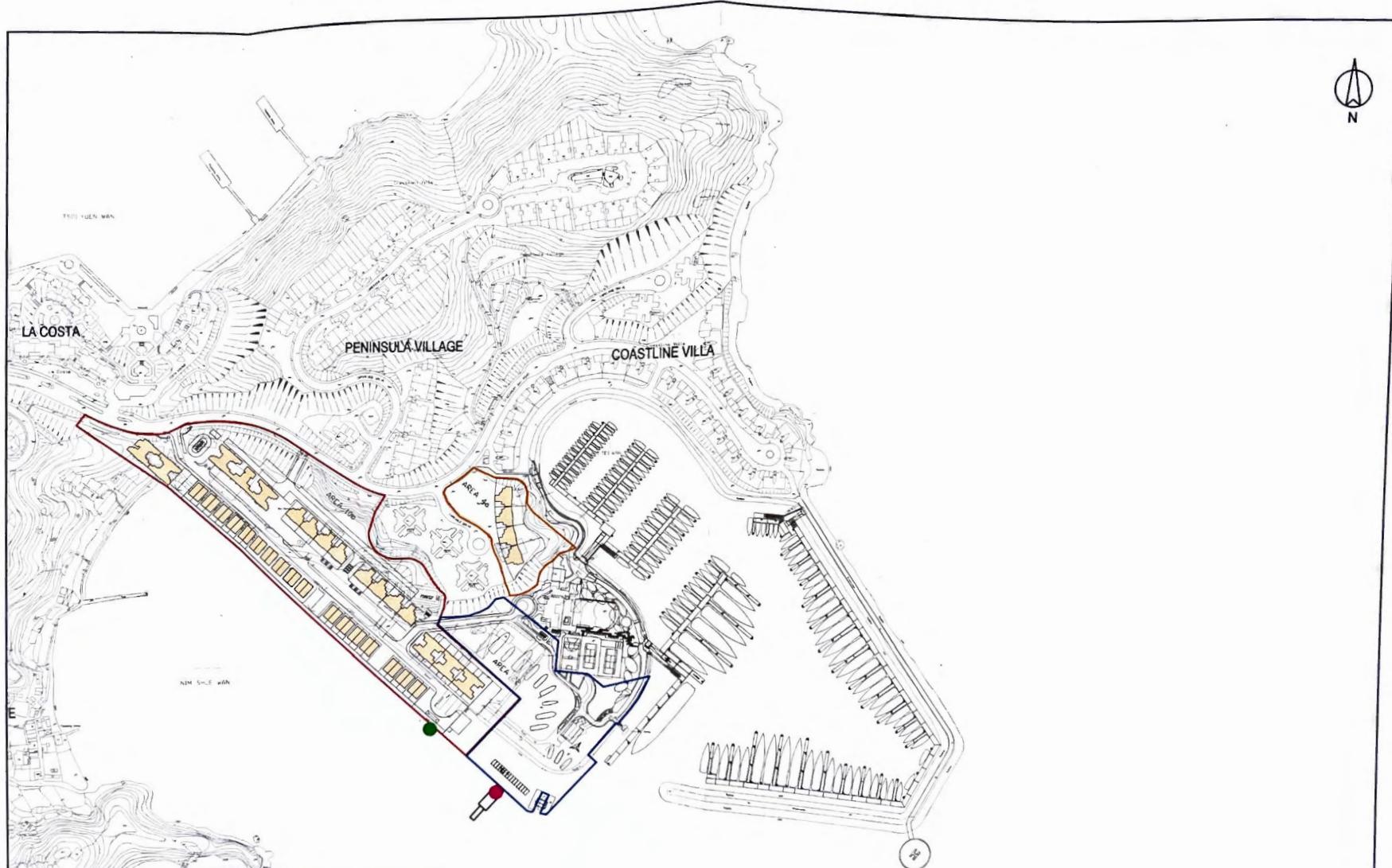
Case	Description [1]						
	PC	MW	TB	SB	LPG	OT	MH
1	✓	✓ ^[2]	✓ ^[2]				
2	✓	✓ ^[2]		✓ ^[2]			
3	✓	✓ ^[2]			✓ ^[2]		
4	✓	✓ ^[2]				✓ ^[2]	
5	✓	✓ ^[2]					✓ ^[2]

Note:

- [1] PC – Peng Chau Kaito;
MW – Mui Wo Kaito;
TB – Tugboat with barge from LPG supplier;
SB – Sand barge with sand loading;
LPG – LPG Container;
OT – Oil Tanker; and
MH – Marine Light Diesel Refilling Activity (Monohull).
- [2] Marine vessels operate in daytime only.



Noise Measurement Location and Existing Marine-based Fixed Noise Sources Locations



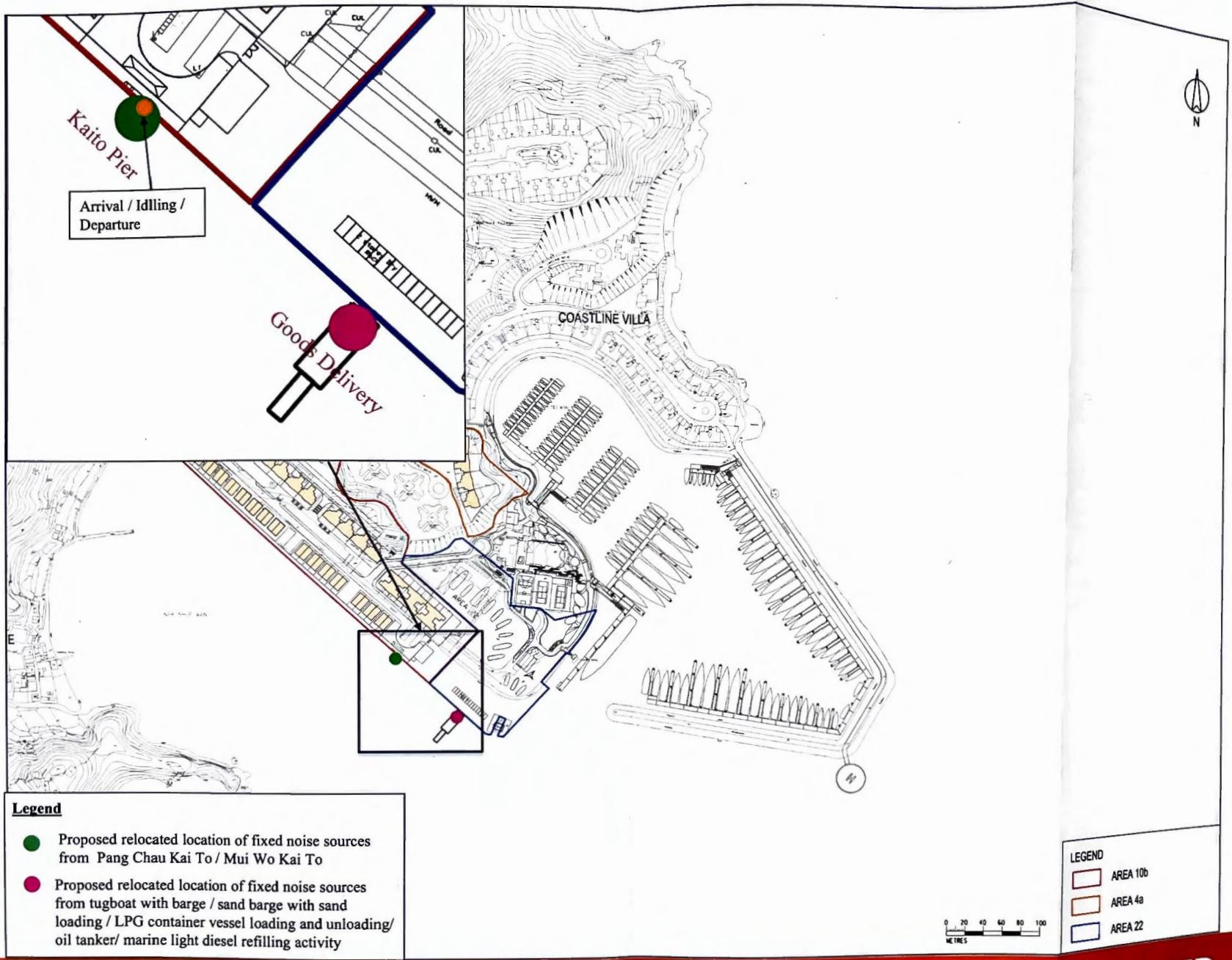
Legend

- Proposed relocated location of fixed noise sources from Pang Chau Kai To / Mui Wo Kai To
- Proposed relocated location of fixed noise sources from tugboat with barge / sand barge with sand loading / LPG container vessel loading and unloading/ oil tanker/ marine light diesel refilling activity

LEGEND

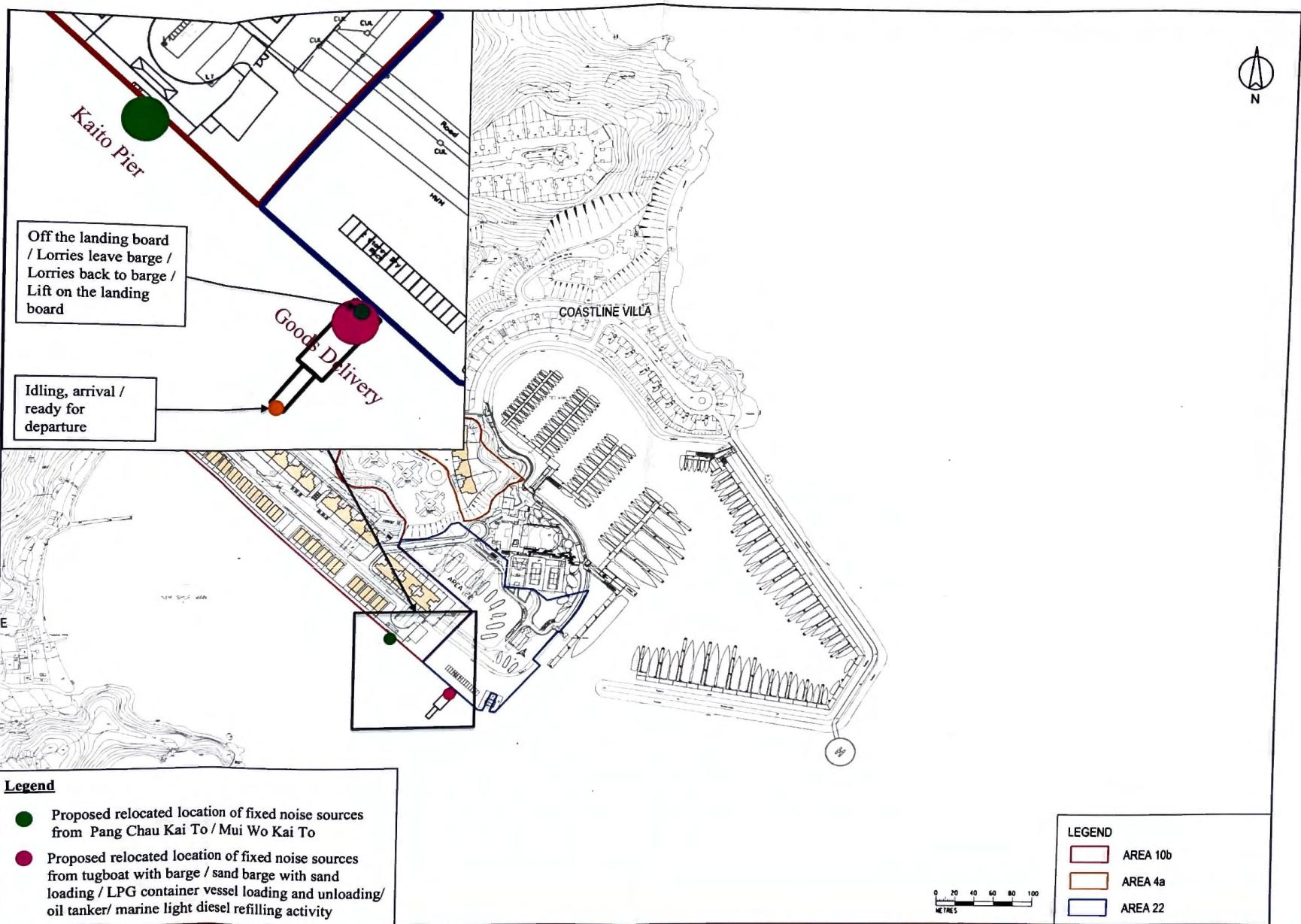
- | |
|----------|
| AREA 10b |
| AREA 4a |
| AREA 22 |

0 20 40 60 80 100
METRES



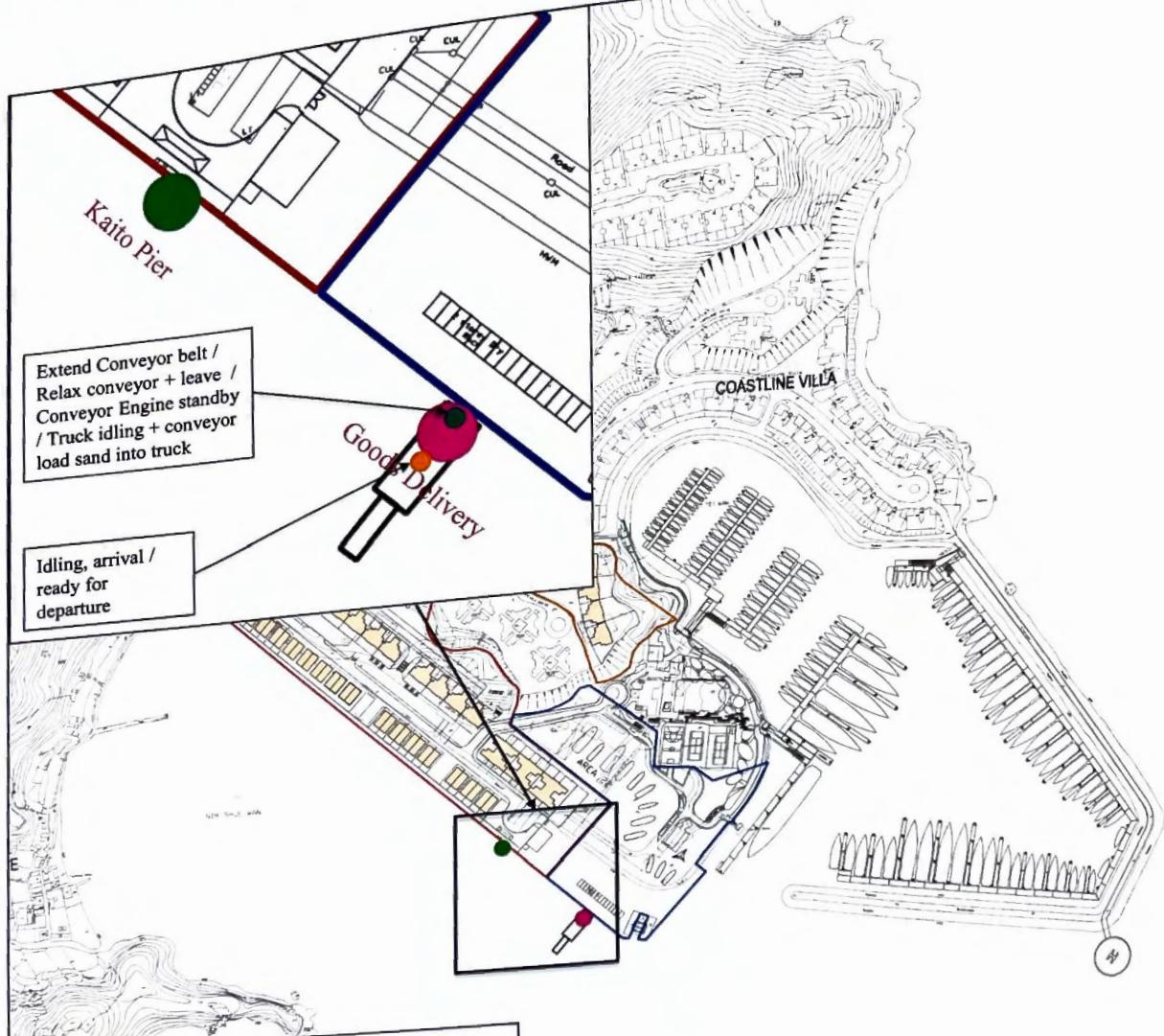
Locations of Activities for Peng Chau Kaito / Mui Wo Kaito

ARUP



Locations of Activities for Tug Boat and Barge

ARUP

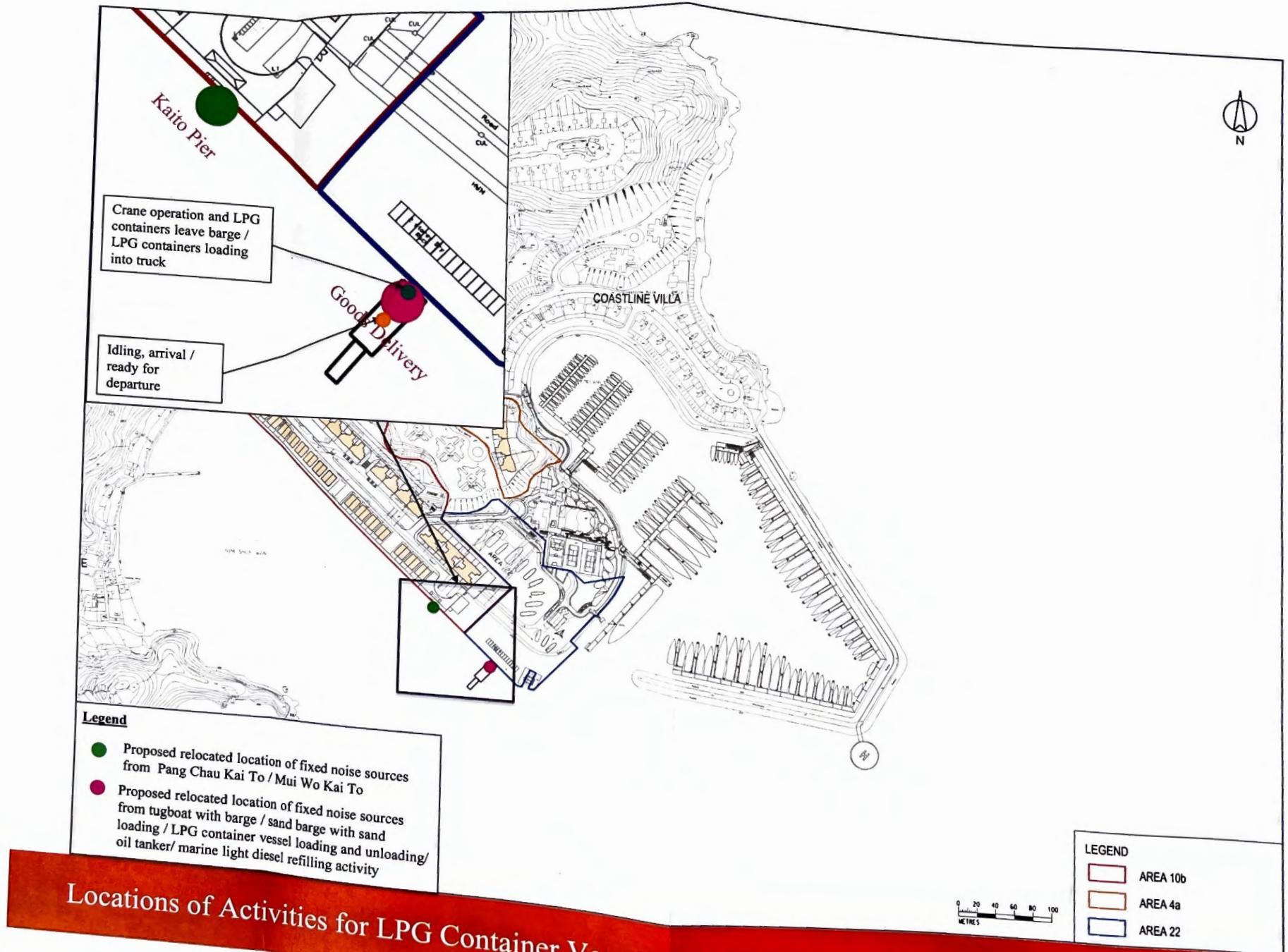


0 20 40 60 80 100 METRES

LEGEND
AREA 10b
AREA 4a
AREA 22

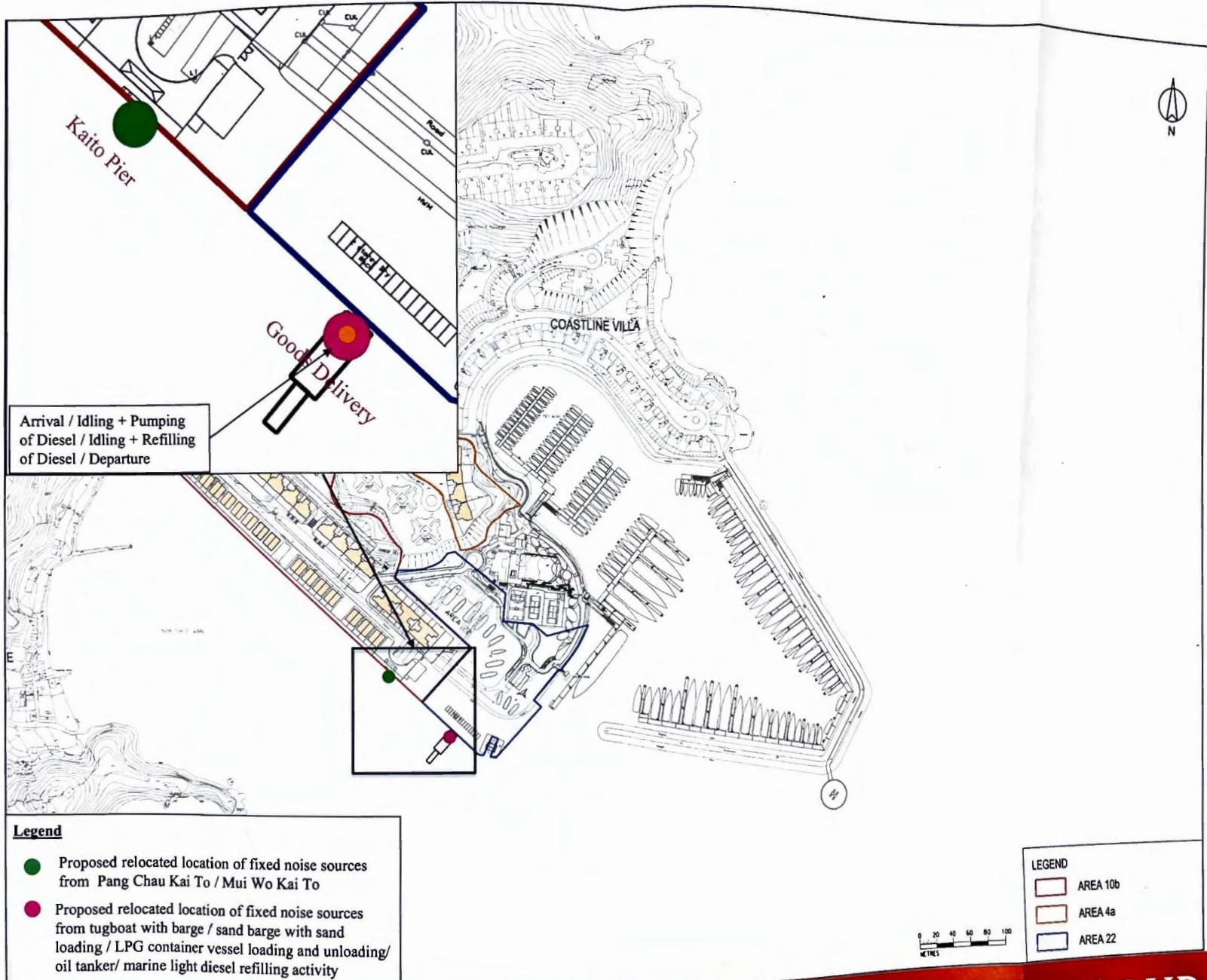
Locations of Activities for Sand Barge and Sand Loading Truck

ARUP



Locations of Activities for LPG Container Vessel and LPG Containers Loading Truck

ARIJD



Locations of Activities for Oil Tanker/ Marine Light Diesel Refilling

ARUP

Project : Discovery Bay EAS
 Job No.: 235928
 Title: Fixed Noise Assessment
 Subtitle: Calculation of Sound Power Level (SWL) for each source

Hong Kong Resort Company Limited

Noise Source ID	Description	Activities/Equipment	Activities ID	Measurement Distance, m	Measured SPL, dB(A)	Distance Correction, dB(A)	SWL, dB(A)	Based on observation and operator information worst operating time, min	Assumed daytime worst operating time in 30min, min	Assumed nighttime worst operating time in 30min, min	Operation Period		Remark
											Daytime	Nighttime	
PC	Peng Chau Kaito	Idling - arrival	PC1	15.0	56.8	31.5	88	~1	1	1	Y	Y	
		Idling	PC2	15.0	56.7	31.5	88	~5	5	3	Y	Y	
		Idling - ready for departure	PC3	15.0	59.6	31.5	91	~1	1	1	Y	Y	
MW	Mui Wo Kaito	Idling - arrival	MW1	15.0	66	31.5	98	~1	1	0	Y	N	
		Idling	MW2	15.0	58.4	31.5	90	~5	5	0	Y	N	
		Idling - ready for departure	MW3	15.0	66.4	31.5	98	~1	1	0	Y	N	
OT	Oil Tanker	Idling - arrival	OT1	20.0	71.2	34.0	105	~1	1	0	Y	N	
		Idling + pump	OT2	25.0	60.9	36.0	97	-120	28	0	Y	N	
		Idling - ready for departure	OT3	20.0	74.2	34.0	108	-2	2	0	Y	N	
MH	Marine Light Diesel Refilling Activity (Monohull)	Idling - arrival	MH1	20.0	59.9	34.0	94	~1	1	0	Y	N	
		diesel filling + idling	MH2	20.0	58.6	34.0	93	-30	28	0	Y	N	
		Idling - ready for departure	MH3	20.0	67.7	34.0	102	-2	2	0	Y	N	
TB	Tug Boat + Barge	Idling for arrival	TB1	25.0	62.9	36.0	99	-10	10	0	Y	N	
		Off the landing board	TB2	15.0	68.1	31.5	100	~1	1	0	Y	N	
		Lorries leave barge	TB3	15.0	68.3	31.5	100	~5	5	0	Y	N	
		Lorries back to barge	TB4	15.0	68.3	31.5	100	-5	5	0	Y	N	
		Lift on the landing board	TB5	15.0	66.3	31.5	98	~1	1	0	Y	N	
		Idling for departure	TB6	25.0	62.9	36.0	99	-5	5	0	Y	N	
SB	Sand Barge + Sand Loading Truck	Idling	SB1	15.0	69.8	31.5	101	~1	1	0	Y	N	
		Extend Conveyor belt	SB2	12.0	69.5	29.6	99	~1	1	0	Y	N	
		Conveyor Engine standby	SB3	25.0	57.9	36.0	94	-30	20	0	Y	N	
		Truck idling + conveyor load sand into truck	SB4	25.0	66.8	36.0	103	-9	9	0	Y	N	
		Relax conveyor + leave	SB5	15.0	70.7	31.5	102	~1	1	0	Y	N	
LPG	LPG Container Vessel + LPG Containers Loading Truck	Idling - arrival	LPG1	5.0	71.2	22.0	93	-1.5	2	0	Y	N	
		Crane operation and LPG containers leave barge	LPG2	10.0	84.3	28.0	112	-0.5	1	0	Y	N	
		LPG containers loading into truck	LPG3	5.0	73.5	22.0	95	~1	1	0	Y	N	
		Idling	LPG4	5.0	69	22.0	91	-5	5	0	Y	N	
		Crane operation and LPG containers back to barge	LPG5	10.0	79.5	28.0	108	-0.5	1	0	Y	N	
		Idling - ready for departure	LPG6	5.0	82.9	22.0	105	-1.5	2	0	Y	N	

Appendix 5.5

Calculation of SPL for Fixed Noise Sources

Project : Discovery Bay EAS
 Job No.: 235928
 Title: Fixed Noise Assessment
 Subtitle: Calculation of SPL at Receivers (Daytime)
 NSR ID: 10b-L11a

Hong Kong Resort Company Limited

Case 1 Peng Chau Kaito, Mui Wo Kaito & Tug Boat with Barge

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35	For worst case 30 minutes scenario, TB1, TB2 & TB3 have selected for assessment.	
PC2		Idling	88	45	5	-41	-8	0	0	3	42		
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	38		
MW1	Mui Wo Kaito	Idling - arrival	98	45	1	-41	-15	0	0	3	38	For worst case 30 minutes scenario, TB1, TB2 & TB3 have selected for assessment.	
MW2		Idling	90	45	5	-41	-8	0	0	3	45		
MW3		Idling - ready for departure	98	45	1	-41	-15	0	0	3	44		
TB1	Tug Boat + Barge	Idling for arrival	99	120	10	-50	-5	0	0	3	45	For worst case 30 minutes scenario, TB1, TB2 & TB3 have selected for assessment.	
TB2		Off the landing board	100	95	1	-47	-15	0	0	3	48		
TB3		Lorries leave barge	100	95	5	-47	-8	0	0	3	41		
TB4		Lorries back to barge	100	95	5	-47	-8	0	0	3	48		
TB5		Lift on the landing board	98	95	1	-47	-15	0	0	3	-		
TB6		Idling for departure	99	120	5	-50	-8	0	0	3	-		
						Predicted Overall Noise Level, Leq (30min)dB(A)					54		
						Daytime criterion (ANL-5), dB(A)					55		
						Exceedance, dB(A)					-		

Case 2 Peng Chau Kaito, Mui Wo Kaito & Sand Barge + Truck sand loading

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35	For worst case 30 minutes scenario, SB3, SB4 & SB5 have selected for assessment.	
PC2		Idling	88	45	5	-41	-8	0	0	3	42		
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	45		
MW1	Mui Wo Kaito	Idling - arrival	98	45	1	-41	-15	0	0	3	44	For worst case 30 minutes scenario, SB3, SB4 & SB5 have selected for assessment.	
MW2		Idling	90	45	5	-41	-8	0	0	3	45		
MW3		Idling - ready for departure	98	45	1	-41	-15	0	0	3	-		
SB1	Sand Barge + Truck sand loading	Idling	101	100	1	-48	-15	0	0	3	-	For worst case 30 minutes scenario, SB3, SB4 & SB5 have selected for assessment.	
SB2		Extend Conveyor belt	99	95	1	-47	-15	0	0	3	48		
SB3		Engine standby	94	95	20	-47	-2	0	0	3	43		
SB4		Truck idling + conveyor load sand into truck	103	95	9	-47	-5	0	-10	3	43		
SB5		Relax conveyor + leave	102	95	1	-47	-15	0	0	3	-		
						Predicted Overall Noise Level, Leq (30min)dB(A)					53		
						Daytime criterion (ANL-5), dB(A)					55		
						Exceedance, dB(A)					-		

Case 3 Peng Chau Kaito, Mui Wo Kaito & LPG Container Vessel + LPG Containers Loading Truck

Hong Kong Resort Company Limited

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35		
PC2		Idling	88	45	5	-41	-8	0	0	3	42		
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	38		
MW1	Mui Wo Kaito	Idling - arrival	98	45	1	-41	-15	0	0	3	45		
MW2		Idling	90	45	5	-41	-8	0	0	3	44		
MW3		Idling - ready for departure	98	45	1	-41	-15	0	0	3	45		
LPG1	LPG Container Vessel + LPG Containers Loading Truck	Idling - arrival	93	100	2	-48	-12	0	0	3	36		
LPG2		Crane operation and LPG containers leave barge	112	95	1	-47	-15	0	-10	3	43		
LPG3		LPG containers loading into truck	95	95	1	-47	-15	0	0	3	36		
LPG4		Idling	91	100	5	-48	-8	0	0	3	38		
LPG5		Crane operation and LPG containers back to barge	108	95	1	-47	-15	0	-10	3	39		
LPG6		Idling - ready for departure	105	100	2	-48	-12	0	0	3	48		
											Predicted Overall Noise Level, L _{eq} (30min)dB(A)	54	
											Daytime criterion (ANL-5), dB(A)	55	
											Exceedance, dB(A)	-	

Case 4 Peng Chau Kaito, Mui Wo Kaito & Oil Tanker

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35		
PC2		Idling	88	45	5	-41	-8	0	0	3	42		
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	38		
MW1	Mui Wo Kaito	Idling - arrival	98	45	1	-41	-15	0	0	3	45		
MW2		Idling	90	45	5	-41	-8	0	0	3	44		
MW3		Idling - ready for departure	98	45	1	-41	-15	0	0	3	45		
OT1	Oil Tanker	Idling - arrival	105	95	1	-48	-15	-5	0	3	-	For worst case 30 minutes scenario, OT2 & OT3 have selected for assessment.	
OT2		Idling + pump	97	95	28	-48	0	-5	0	3	47		
OT3		Idling - ready for departure	108	95	2	-48	-12	-5	0	3	47		
											Predicted Overall Noise Level, L _{eq} (30min)dB(A)	53	
											Daytime criterion (ANL-5), dB(A)	55	
											Exceedance, dB(A)	-	

Case 5 Peng Chau Kaito, Mui Wo Kaito & Marine Light Diesel Refilling Activity (Monohull)

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35		
PC2		Idling	88	45	5	-41	-8	0	0	3	42		
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	38		
MW1	Mui Wo Kaito	Idling - arrival	98	45	1	-41	-15	0	0	3	45		
MW2		Idling	90	45	5	-41	-8	0	0	3	44		
MW3		Idling - ready for departure	98	45	1	-41	-15	0	0	3	45		
MH1	Marine Light Diesel Refilling Activity (Monohull)	Idling - arrival	94	95	1	-48	-15	0	0	3	-	For worst case 30 minutes scenario, MH2 & MH3 have selected for assessment.	
MH2		diesel filling + idling	93	95	28	-48	0	0	0	3	48		
MH3		Idling - ready for departure	102	95	2	-48	-12	0	0	3	46		
											Predicted Overall Noise Level, L _{eq} (30min)dB(A)	54	
											Daytime criterion (ANL-5), dB(A)	55	
											Exceedance, dB(A)	-	

Project : Discovery Bay EAS
 Job No.: 235928
 Title: Fixed Noise Assessment
 Subtitle: Calculation of SPL at Receivers (Nighttime)
 NSR ID: 10b-L11a

Hong Kong Resort Company Limited

Case 1 Peng Chau Kaito, Mui Wo Kaito & Tug Boat with Barge

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35		
PC2		Idling	88	45	3	-41	-10	0	0	3	40		
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	38		
MW1	Mui Wo Kaito	Idling - arrival	-	-	-	-	-	-	-	-	-	No Nighttime operation	
MW2		Idling	-	-	-	-	-	-	-	-	-	No Nighttime operation	
MW3		Idling - ready for departure	-	-	-	-	-	-	-	-	-	No Nighttime operation	
TB1	Tug Boat + Barge	Idling for arrival	-	-	-	-	-	-	-	-	-	No Nighttime operation	
TB2		Off the landing board	-	-	-	-	-	-	-	-	-		
TB3		Lorries leave barge	-	-	-	-	-	-	-	-	-		
TB4		Lorries back to barge	-	-	-	-	-	-	-	-	-		
TB5		Lift on the landing board	-	-	-	-	-	-	-	-	-		
TB6		Idling for departure	-	-	-	-	-	-	-	-	-		
						Predicted Overall Noise Level, $Leq_{(30min)}$ dB(A)					43		
						Nighttime criterion (ANL-5), dB(A)					45		
						Exceedance, dB(A)					-		

Case 2 Peng Chau Kaito, Mui Wo Kaito & Sand Barge + Truck sand loading

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35		
PC2		Idling	88	45	3	-41	-10	0	0	3	40		
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	38		
MW1	Mui Wo Kaito	Idling - arrival	98	-	-	-	-	-	-	-	-	No Nighttime operation	
MW2		Idling	90	-	-	-	-	-	-	-	-	No Nighttime operation	
MW3		Idling - ready for departure	98	-	-	-	-	-	-	-	-	No Nighttime operation	
SB1	Sand Barge + Truck sand loading	Idling	101	-	-	-	-	-	-	-	-	No Nighttime operation	
SB2		Extend Conveyor belt	99	-	-	-	-	-	-	-	-		
SB3		Engine standby	94	-	-	-	-	-	-	-	-		
SB4		Truck idling + conveyor load sand into truck	103	-	-	-	-	-	-	-	-		
SB5		Relax conveyor + leave	102	-	-	-	-	-	-	-	-		
						Predicted Overall Noise Level, $Leq_{(30min)}$ dB(A)					43		
						Nighttime criterion (ANL-5), dB(A)					45		
						Exceedance, dB(A)					-		

Case 3 Peng Chau Kaito, Mui Wo Kaito & LPG Container Vessel + LPG Containers Loading Truck

Hong Kong Resort Company Limited

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark
						Distance	Time	Directivity	Mitigation	Facade		
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35	
PC2		Idling	88	45	3	-41	-10	0	0	3	40	
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	38	
MW1	Mui Wo Kaito	Idling - arrival	98	-	-	-	-	-	-	-	-	No Nighttime operation
MW2		Idling	90	-	-	-	-	-	-	-	-	No Nighttime operation
MW3		Idling - ready for departure	98	-	-	-	-	-	-	-	-	No Nighttime operation
LPG1	LPG Container Vessel + LPG Containers Loading Truck	Idling - arrival	93	-	-	-	-	-	-	-	-	
LPG2		Crane operation and LPG containers leave barge	112	-	-	-	-	-	-	-	-	
LPG3		LPG containers loading into truck	95	-	-	-	-	-	-	-	-	
LPG4		Idling	91	-	-	-	-	-	-	-	-	
LPG5		Crane operation and LPG containers back to barge	108	-	-	-	-	-	-	-	-	
LPG6		Idling - ready for departure	105	-	-	-	-	-	-	-	-	No Nighttime operation

Predicted Overall Noise Level, Leq (30min) dB(A)

Nighttime criterion (ANL-5), dB(A)

Exceedance, dB(A)

43

45

-

Case 4 Peng Chau Kaito, Mui Wo Kaito & Oil Tanker

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark
						Distance	Time	Directivity	Mitigation	Facade		
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35	
PC2		Idling	88	45	3	-41	-10	0	0	3	40	
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	38	
MW1	Mui Wo Kaito	Idling - arrival	98	-	-	-	-	-	-	-	-	No Nighttime operation
MW2		Idling	90	-	-	-	-	-	-	-	-	No Nighttime operation
MW3		Idling - ready for departure	98	-	-	-	-	-	-	-	-	No Nighttime operation
OT1	Oil Tanker	Idling - arrival	105	-	-	-	-	-	-	-	-	
OT2		Idling + pump	97	-	-	-	-	-	-	-	-	
OT3		Idling - ready for departure	108	-	-	-	-	-	-	-	-	No Nighttime operation

Predicted Overall Noise Level, Leq (30min) dB(A)

Nighttime criterion (ANL-5), dB(A)

Exceedance, dB(A)

43

45

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Case 5 Peng Chau Kaito, Mui Wo Kaito & Marine Light Diesel Refilling Activity (Monohull)

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark
						Distance	Time	Directivity	Mitigation	Facade		
PC1	Peng Chau Kaito	Idling - arrival	88	45	1	-41	-15	0	0	3	35	
PC2		Idling	88	45	3	-41	-10	0	0	3	40	
PC3		Idling - ready for departure	91	45	1	-41	-15	0	0	3	38	
MW1	Mui Wo Kaito	Idling - arrival	98	-	-	-	-	-	-	-	-	No Nighttime operation
MW2		Idling	90	-	-	-	-	-	-	-	-	No Nighttime operation
MW3		Idling - ready for departure	98	-	-	-	-	-	-	-	-	No Nighttime operation
MH1	Marine Light Diesel Refilling Activity (Monohull)	Idling - arrival	94	-	-	-	-	-	-	-	-	
MH2		diesel filling + idling	93	-	-	-	-	-	-	-	-	
MH3		Idling - ready for departure	102	-	-	-	-	-	-	-	-	No Nighttime operation

Predicted Overall Noise Level, Leq (30min) dB(A)

Nighttime criterion (ANL-5), dB(A)

Exceedance, dB(A)

43

45

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Project : Discovery Bay EAS
 Job No.: 235928
 Title: Fixed Noise Assessment
 Subtitle: Calculation of SPL at Receivers (Daytime)
 NSR ID: 10b-H34a

Hong Kong Resort Company Limited

Case 1 Peng Chau Kaito, Mui Wo Kaito & Tug Boat with Barge

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	35	1	-39	-15	0	0	3	37	For worst case 30 minutes scenario, TB1, TB2 & TB3 have selected for assessment.	
PC2		Idling	88	35	5	-39	-8	0	0	3	44		
PC3		Idling - ready for departure	91	35	1	-39	-15	0	0	3	40		
MW1	Mui Wo Kaito	Idling - arrival	98	35	1	-39	-15	0	0	3	47		
MW2		Idling	90	35	5	-39	-8	0	0	3	46		
MW3		Idling - ready for departure	98	35	1	-39	-15	0	0	3	47		
TB1	Tug Boat + Barge	Idling for arrival	99	135	10	-51	-5	0	0	3	47		
TB2		Off the landing board	100	125	1	-50	-15	0	0	3	38		
TB3		Lorries leave barge	100	125	5	-50	-8	0	0	3	45		
TB4		Lorries back to barge	100	125	5	-50	-8	0	0	3	-		
TB5		Lift on the landing board	98	125	1	-50	-15	0	0	3	-		
TB6		Idling for departure	99	135	5	-51	-8	0	0	3	-		
						Predicted Overall Noise Level, L _{eq} (30min)dB(A)					55		
						Daytime criterion (ANL-5), dB(A)					55		
						Exceedance, dB(A)					-		

Case 2 Peng Chau Kaito, Mui Wo Kaito & Sand Barge + Truck sand loading

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	35	1	-39	-15	0	0	3	37	For worst case 30 minutes scenario, SB3, SB4 & SB5 have selected for assessment.	
PC2		Idling	88	35	5	-39	-8	0	0	3	44		
PC3		Idling - ready for departure	91	35	1	-39	-15	0	0	3	40		
MW1	Mui Wo Kaito	Idling - arrival	98	35	1	-39	-15	0	0	3	47		
MW2		Idling	90	35	5	-39	-8	0	0	3	46		
MW3		Idling - ready for departure	98	35	1	-39	-15	0	0	3	-		
SB1	Sand Barge + Truck sand loading	Idling	101	125	1	-50	-15	0	0	3	-		
SB2		Extend Conveyor belt	99	125	1	-50	-15	0	0	3	45		
SB3		Engine standby	94	125	20	-50	-2	0	0	3	41		
SB4		Truck idling + conveyor load sand into truck	103	125	9	-50	-5	0	-10	3	40		
SB5		Relax conveyor + leave	102	125	1	-50	-15	0	0	3	-		
						Predicted Overall Noise Level, L _{eq} (30min)dB(A)					54		
						Daytime criterion (ANL-5), dB(A)					55		
						Exceedance, dB(A)					-		

Case 3

Peng Chau Kaito, Mui Wo Kaito & LPG Container Vessel + LPG Containers Loading Truck

Hong Kong Resort Company Limited

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	35	1	-39	-15	0	0	3	37		
PC2		Idling	88	35	5	-39	-8	0	0	3	44		
PC3		Idling - ready for departure	91	35	1	-39	-15	0	0	3	40		
MW1	Mui Wo Kaito	Idling - arrival	98	35	1	-39	-15	0	0	3	47		
MW2		Idling	90	35	5	-39	-8	0	0	3	46		
MW3		Idling - ready for departure	98	35	1	-39	-15	0	0	3	47		
LPG1	LPG Container Vessel + LPG Containers Loading Truck	Idling - arrival	93	125	2	-50	-12	0	0	3	34		
LPG2		Crane operation and LPG containers leave barge	112	125	1	-50	-15	0	-10	3	40		
LPG3		LPG containers loading into truck	95	125	1	-50	-15	0	0	3	33		
LPG4		Idling	91	125	5	-50	-8	0	0	3	36		
LPG5		Crane operation and LPG containers back to barge	108	125	1	-50	-15	0	-10	3	36		
LPG6		Idling - ready for departure	105	125	2	-50	-12	0	0	3	46		
						Predicted Overall Noise Level, Leq (30min)dB(A)					54		
						Daytime criterion (ANL-5), dB(A)					55		
						Exceedance, dB(A)					-		

Case 4 Peng Chau Kaito, Mui Wo Kaito & Oil Tanker

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	35	1	-39	-15	0	0	3	37		
PC2		Idling	88	35	5	-39	-8	0	0	3	44		
PC3		Idling - ready for departure	91	35	1	-39	-15	0	0	3	40		
MW1	Mui Wo Kaito	Idling - arrival	98	35	1	-39	-15	0	0	3	47		
MW2		Idling	90	35	5	-39	-8	0	0	3	46		
MW3		Idling - ready for departure	98	35	1	-39	-15	0	0	3	47		
OT1	Oil Tanker	Idling - arrival	105	125	1	-50	-15	-5	0	3	-	For worst case 30 minutes scenario, OT2 & OT3 have selected for assessment.	
OT2		Idling + pump	97	125	28	-50	0	-5	0	3	45		
OT3		Idling - ready for departure	108	125	2	-50	-12	-5	0	3	44		
						Predicted Overall Noise Level, Leq (30min)dB(A)					54		
						Daytime criterion (ANL-5), dB(A)					55		
						Exceedance, dB(A)					-		

Case 5 Peng Chau Kaito, Mui Wo Kaito & Marine Light Diesel Refilling Activity (Monohull)

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	35	1	-39	-15	0	0	3	37		
PC2		Idling	88	35	5	-39	-8	0	0	3	44		
PC3		Idling - ready for departure	91	35	1	-39	-15	0	0	3	40		
MW1	Mui Wo Kaito	Idling - arrival	98	35	1	-39	-15	0	0	3	47		
MW2		Idling	90	35	5	-39	-8	0	0	3	46		
MW3		Idling - ready for departure	98	35	1	-39	-15	0	0	3	47		
MH1	Marine Light Diesel Refilling Activity (Monohull)	Idling - arrival	98	35	1	-39	-15	0	0	3	-	For worst case 30 minutes scenario, MH2 & MH3 have selected for assessment.	
MH2		diesel filling + idling	94	125	1	-50	-15	0	0	3	46		
MH3		Idling - ready for departure	93	125	28	-50	0	0	0	3	43		
						Predicted Overall Noise Level, Leq (30min)dB(A)					54		
						Daytime criterion (ANL-5), dB(A)					55		
						Exceedance, dB(A)					-		

Project : Discovery Bay EAS
 Job No.: 235928
 Title: Fixed Noise Assessment
 Subtitle: Calculation of SPL at Receivers (Nighttime)
 NSR ID: 10b-H34a

Hong Kong Resort Company Limited

Case 1 Peng Chau Kaito, Mui Wo Kaito & Tug Boat with Barge

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	35	1	-39	-15	0	0	3	37		
PC2		Idling	88	35	3	-39	-10	0	0	3	42		
PC3		Idling - ready for departure	91	35	1	-39	-15	0	0	3	40		
MW1	Mui Wo Kaito	Idling - arrival	-	-	-	-	-	-	-	-	-	No Nighttime operation	
MW2		Idling	-	-	-	-	-	-	-	-	-	No Nighttime operation	
MW3		Idling - ready for departure	-	-	-	-	-	-	-	-	-	No Nighttime operation	
TB1	Tug Boat + Barge	Idling for arrival	-	-	-	-	-	-	-	-	-		
TB2		Off the landing board	-	-	-	-	-	-	-	-	-		
TB3		Lorries leave barge	-	-	-	-	-	-	-	-	-		
TB4		Lorries back to barge	-	-	-	-	-	-	-	-	-		
TB5		Lift on the landing board	-	-	-	-	-	-	-	-	-		
TB6		Idling for departure	-	-	-	-	-	-	-	-	-	No Nighttime operation	
						Predicted Overall Noise Level, L _{eq} (30min)dB(A)		45					
						Nighttime criterion (ANL-5), dB(A)		45					
						Exceedance, dB(A)		-					

Case 2 Peng Chau Kaito, Mui Wo Kaito & Sand Barge + Truck sand loading

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	35	1	-39	-15	0	0	3	37		
PC2		Idling	88	35	3	-39	-10	0	0	3	42		
PC3		Idling - ready for departure	91	35	1	-39	-15	0	0	3	40		
MW1	Mui Wo Kaito	Idling - arrival	98	-	-	-	-	-	-	-	-	No Nighttime operation	
MW2		Idling	90	-	-	-	-	-	-	-	-	No Nighttime operation	
MW3		Idling - ready for departure	98	-	-	-	-	-	-	-	-	No Nighttime operation	
SB1	Sand Barge + Truck sand loading	Idling	101	-	-	-	-	-	-	-	-		
SB2		Extend Conveyor belt	99	-	-	-	-	-	-	-	-		
SB3		Engine standby	94	-	-	-	-	-	-	-	-		
SB4		Truck idling + conveyor load sand into truck	103	-	-	-	-	-	-	-	-		
SB5		Relax conveyor + leave	102	-	-	-	-	-	-	-	-	No Nighttime operation	
						Predicted Overall Noise Level, L _{eq} (30min)dB(A)		45					
						Nighttime criterion (ANL-5), dB(A)		45					
						Exceedance, dB(A)		-					

Case 3 Peng Chau Kaito, Mui Wo Kaito & LPG Container Vessel + LPG Containers Loading Truck

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	35	1	-39	-15	0	0	3	37		
PC2		Idling	88	35	3	-39	-10	0	0	3	42		
PC3		Idling - ready for departure	91	35	1	-39	-15	0	0	3	40		
MW1		Idling - arrival	98	-	-	-	-	-	-	-	-	No Nighttime operation	
MW2	Mui Wo Kaito	Idling	90	-	-	-	-	-	-	-	-	No Nighttime operation	
MW3		Idling - ready for departure	98	-	-	-	-	-	-	-	-	No Nighttime operation	
LPG1		Idling - arrival	93	-	-	-	-	-	-	-	-	No Nighttime operation	
LPG2		Crane operation and LPG containers leave barge	112	-	-	-	-	-	-	-	-		
LPG3	LPG Container Vessel + LPG Containers Loading Truck	LPG containers loading into truck	95	-	-	-	-	-	-	-	-		
LPG4		Idling	91	-	-	-	-	-	-	-	-		
LPG5		Crane operation and LPG containers back to barge	108	-	-	-	-	-	-	-	-		
LPG6		Idling - ready for departure	105	-	-	-	-	-	-	-	-		
						Predicted Overall Noise Level, Leq (30min) dB(A)					45		
						Nighttime criterion (ANL-5), dB(A)					45		
						Exceedance, dB(A)					-		

Case 4 Peng Chau Kaito, Mui Wo Kaito & Oil Tanker

Noise Source ID	Description	Activities/Equipment	SWL, dB(A)	Shortest separation distance (m)	Worst operating time (min)	Correction, dB(A)					Predicted SPL, dB(A)	Remark	
						Distance	Time	Directivity	Mitigation	Facade			
PC1	Peng Chau Kaito	Idling - arrival	88	35	1	-39	-15	0	0	3	37		
PC2		Idling	88	35	3	-39	-10	0	0	3	42		
PC3		Idling - ready for departure	91	35	1	-39	-15	0	0	3	40		
MW1	Mui Wo Kaito	Idling - arrival	98	-	-	-	-	-	-	-	-	No Nighttime operation	
MW2		Idling	90	-	-	-	-	-	-	-	-	No Nighttime operation	
MW3		Idling - ready for departure	98	-	-	-	-	-	-	-	-	No Nighttime operation	
OT1	Oil Tanker	Idling - arrival	105	-	-	-	-	-	-	-	-	No Nighttime operation	
OT2		Idling + pump	97	-	-	-	-	-	-	-	-		
OT3		Idling - ready for departure	108	-	-	-	-	-	-	-	-		
						Predicted Overall Noise Level, Leq (30min) dB(A)		45					
						Nighttime criterion (ANL-5), dB(A)		45					
						Exceedance, dB(A)		-					

Case 5 Peng Chau Kaito, Mui Wo Kaito & Marine Light Diesel Refilling Activity (Monohull)

Noise Source ID	Description	Activities/Equipment	SWL, dBA(A)	Shortest separation	Worst operating	Correction, dBA(A)					Predicted SPL, dBA(A)	Remark
						None	1m	5m	Mitigation	Exposure		