

## Permanent Aviation Fuel Facility (EP-139/2002/A)

Third Monthly Environmental Monitoring and Audit Report – February 2006

2<sup>nd</sup> March 2006

**Environmental Resources Management**

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2<sup>nd</sup> March 2006

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For and on behalf of Environmental Resources Management	
Approved by:	Freeman Cheung
Signed:	
Position:	Environmental Team Leader
Date:	2 <sup>nd</sup> March 2006

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## ***EXECUTIVE SUMMARY***

This third monthly Environmental Monitoring and Audit (EM&A) report presents the EM&A works carried out during the period from 15<sup>th</sup> January 2006 to 14<sup>th</sup> February 2006 in accordance with the EM&A Manual.

### *Breaches of all Action and Limit Levels*

No breaches of action or limit levels was occurred during the reporting month as no monitoring, except visual dolphin monitoring was undertaken. No dolphin was found within or close to the site during the piling activities.

### *Complaint Log*

No environmental complaint was received during the reporting period.

### *Notifications of any Summons and Successful Prosecutions*

No environmental summon or prosecutions was received in this reporting period.

### *Underwater Noise Monitoring Results*

The performance of the bubble jacket mitigation measures complied with the EP conditions.

### *Future Key Issues*

Key issues to be considered in the next one month will include:

- Impacts on dolphins due to piling works;
- Noise from operating machinery and equipment; and,
- Dust release and suppression.

Leighton Contractors (Asia) Limited (LCAL) has appointed ERM-Hong Kong, Limited (ERM) as the Environmental Team (ET) to implement the Environmental Monitoring and Audit (EM&A) programme for the Permanent Aviation Fuel Facility (the Project) during construction works.

*1.1**PURPOSE OF THE REPORT*

This is the 3<sup>rd</sup> EM&A report which summarizes the monitoring results and audit findings for the EM&A programme during the reporting period from **15<sup>th</sup> January 2006** to **14<sup>th</sup> February 2006**.

## 2 ENVIRONMENTAL STATUS

### 2.1 PROJECT AREA

The project area is in Area 38 of Tuen Mun and the pipelines are located in Urmston Road between Tuen Mun Area 38 and Sha Chau. The site is illustrated in *Annex B*.

### 2.2 ENVIRONMENTAL SENSITIVE RECEIVERS

No air and noise sensitive receivers were identified close to the project area. However, water sensitive receivers and ecological sensitive receivers were identified in the EIA study, and are shown in *Annex A*.

### 2.3 MAJOR CONSTRUCTION ACTIVITIES

A summary of the major works undertaken in this reporting period is shown in *Table 2.1*.

*Table 2.1 Summary of Works Undertaken During the Reporting Period, between 15<sup>th</sup> January and 14<sup>th</sup> February 2006*

Area	Works undertaken
Tuen Mun Area 38	Marine Piling Works Site Preparation Works Surcharge construction

### 2.4 MONITORING SCHEDULE OF THE REPORTING MONTH

Only dolphin visual monitoring was conducted during the piling activities over the reporting month. Piling activities were conducted during the 18<sup>th</sup> to 27<sup>th</sup> January, and 6<sup>th</sup> to 14<sup>th</sup> February except the 11<sup>th</sup> February 2006, Sundays and public holidays.

### 2.5 STATUS OF ENVIRONMENTAL APPROVAL DOCUMENTS

A summary of the relevant permits, licences, and/or notifications on environmental protection for this Project as of 14<sup>th</sup> February 2006 is presented in *Table 2.2*.

**Table 2.2** *Summary of Environmental Licensing, Notification and Permit Status*

<b>Permit/ Licenses/ Notification</b>	<b>Reference</b>	<b>Validity Period</b>	<b>Remarks</b>
Environmental Permit	EP-139/2002	Throughout Project	Issued on 2 August 2002
Variation of Environmental Permit	VEP-133/2004	Throughout Project	Issued on 28 January 2004
Amended Environmental Permit	EP-139/2002/A	Throughout Project	Issued on 24 February 2004
Chemical Waste Producer Registration	WPN 5111-421-L2174-25	Throughout Project	Issued on 10 November 2005
Notification of Construction Works under Air Pollution Control (Construction Dust) Regulation	001004989	Throughout Project	Notification on 5 November 2005 (Tank Farm at TM Area 38, Jetty at Urmston Road and Fuel Pipeline)
Construction Noise Permit	PP-RW0024-05	12 Nov 05 to 31 Mar 06	Issued on 7 November 2005, for Hydraulic Hammer (single acting) driving steel pile
Construction Noise Permit	GW-RW0785-05	7 Dec 05 to 31 Mar 06	Issued on 7 December 2005, for General Works (Welding) at Jetty Area
Wastewater Discharge License	--	--	Applied on 23 January 06

**2.6**

***SUMMARY OF NON-COMPLIANCE WITH THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS***

*Summary of Environmental Non-compliance*

No environmental non-compliance was found during the reporting period.

*Summary of Environmental Complaints*

No environmental complaint was received during the reporting period. A statistical summary of environmental complaints since project commencement is presented in *Annex E*.

*Summary of Environmental Summons*

No summons was received in this reporting period. A statistical summary of legal proceeding since project commencement is presented in *Annex E*.

### 3.1 PREVIOUS ENVIRONMENTAL DEFICIENCIES AND FOLLOW-UP ACTIONS

As no environmental complaint was received over the last reporting period, no follow-up action was required.

Weekly site inspections were carried out by the ET on the 20<sup>th</sup>, 26<sup>th</sup>, January 2006, 4<sup>th</sup> and 10<sup>th</sup> February 2006. The site was in good orderly manner and no non-compliance was found. Environmental deficiencies and follow-up actions/mitigation measures were identified during the inspections, as follows:

#### *Air Quality*

- No noticeable dust emission was observed during the stockpile loading activity and vehicle movement within the site ;
- Earth mounds (surcharge) were covered to avoid dust emission. However, a C&D stockpile was found not covered during the 4<sup>th</sup> Feb 06 site inspection. Although no dust emission was observed, it was recommended to the Contractor that the C&D stockpiles should be covered to avoid potential dust emission. The C&D stockpile was removed during the 10<sup>th</sup> Feb 06 site inspection;
- Unpaved road appeared to be regularly wetted. The site in general was also regularly wetted with water sprayed to the dust generating activities;
- Site temporary entrance/exit was paved and wheel-washing facility was provided at the site exit to avoid dust deposit in the access road; and,
- Main access road within the site (near the entrance/exit) was paved to avoid dust emission.

#### *Noise*

- No noisy activity was found during the audit;
- A silenced generator was used on the piling barge to reduce noise emission. Noise insulation device was provided at the bottom of the generator to reduce noise emission from the barge;
- The air compressor had already got rubber tires to minimize noise emission from the barge; and,

- Bubble jacket was used during the marine percussive piling activity.

#### *Water Quality*

- Sedimentation tank was in the progress of installation during the reporting month. No wastewater was discharged from the site. The wastewater generated from the wheel-washing facility was reused. The Contractor submitted an application for the wastewater discharge license on 23<sup>rd</sup> January 2006;
- Trench was formed next to the surcharges to contain any potential release of water generated from the surcharges;
- Manholes outside the site were free of sand;
- Chemical toilets were provided on site;
- No sediment plumes were observed during the marine piling activities;

#### *Waste Management*

- No chemical waste was disposed during the reporting month; and,
- Chemical waste drums were found without labels in the chemical waste storage facility during the 4<sup>th</sup> Feb 06 site inspection. The Contractor was reminded to label all containers in accordance with the code of practice. The drums were labeled during the 10<sup>th</sup> Feb 06 site inspection.

Overall, the site was in a good orderly manner. Suitable mitigation measures, such as the use of water truck regularly and tarpaulin covers should continuous be used to ensure dust emission is avoided on site.

The ET will keep track on the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

### **3.2**

#### ***IMPLEMENTATION STATUS ON ENVIRONMENTAL PROTECTION REQUIREMENTS***

The implementation status of environmental mitigation measures and requirements as stated in the EIA Report, Environmental Permits and EM&A Manual during the reporting period is summarized in *Annex C*.



### 3.3 ENVIRONMENTAL MONITORING

#### 3.3.1 *Air and Noise*

Air and Noise monitoring was not required for the project. The underwater noise monitoring conducted during the initial PAFF piling activity was part of the ecology monitoring. Results are presented in *Section 3.3.7* below.

#### 3.3.2 *Water Quality*

Water quality monitoring at the monitoring stations was not required as no dredging activity was taken place.

#### 3.3.3 *Waste Management*

Auditing the Contractor's Waste Management Plan (WMP) is part of the EM&A requirements. The Contractor submitted their Waste Management Plan on the 19<sup>th</sup> January 2006 and a revised version on the 11 February. The WMP had been reviewed and comments were made on the 7<sup>th</sup> and 16<sup>th</sup> February 2006. It is expected the finalised version of WMP will be submitted to the EPD by the end of February 2006.

#### 3.3.4 *Cultural Heritage*

As no dredging activity was conducted along the pipe trench during the reporting period, marine archaeological monitoring was not required.

#### 3.3.5 *Landscape and Visual*

According to the EIA report and EM&A manual, mitigation measures and site inspection are required during the landscaping/planting works. No landscaping or planting works were conducted on site during the reporting period.

The weekly site inspections include audits on landscape and visual issues to ensure that the site was in orderly acceptable manner.

#### 3.3.6 *Land Contamination, Hazard to Life and Fuel Spill Risk*

According to the EIA report and EM&A manual, mitigation measures and design phase audit are required to minimise the risk of fuel spill and hazards. As there was no construction works related to such issues in the reporting period, audit on the mitigation design and measures was not required. However, weekly site inspection covered the waste management aspects which included measures to prevent land contamination by chemical wastes.

*Dolphin Visual Monitoring*

The action plan for dolphin monitoring is shown in *Annex D*. A 500m dolphin exclusion zone is enforced during all marine piling operations. A qualified person was present during all piling activities and conducted visual monitoring in accordance with the monitoring requirements. Piling activities were conducted during the 18<sup>th</sup> to 27<sup>th</sup> January, and 3<sup>rd</sup> to 14<sup>th</sup> February except the 11<sup>th</sup> February 2006. Dolphins were spotted on the 23<sup>rd</sup> January, 8<sup>th</sup> and 9<sup>th</sup> February 2006 at the distance of 1100m, 800m and 830m respectively during the piling works. No dolphins were observed within the 500m exclusion zone during any of the piling works. The dolphin sighting record sheets are attached in *Annex F*.

*Underwater Noise Monitoring Study*

Underwater Noise Monitoring Study was conducted between 23<sup>rd</sup> and 25<sup>th</sup> November 2005. Three boats were employed to take measurement of noise levels at a distance of 250m, 500m and 1000m from the piling barge. Both the ambient and the piling (with mitigated measures) noise levels were recorded. All possible precautions were taken to avoid any interference to the results during the measurements. The Summary Report is attached in *Annex G*.

Tables 3.1 and 3.2 summarized the results being analyzed from the monitoring data.

**Table 3.1 Broadband Noise Levels and Noise Attenuation within the Broadband Range 100 Hz to 25.6 kHz**

Position	EP Criteria (dB)	Ambient Level (dB)	Mitigated Noise Level (dB)	Compliant with EP Criteria
1 (250m)	162	139	146	Yes
2 (500m)	152	128	127	Yes
3 (1000m)	145	129	128	Yes

**Table 3.2 Broadband Noise Levels and Noise Attenuation within the EIA Dolphin Sensitive Range 400 Hz to 12.8 kHz**

Position	EP Criteria (dB)	Ambient Level (dB)	Mitigated Noise Level (dB)	Compliant with EP Criteria
1 (250m)	162	133	138	Yes
2 (500m)	152	122	122	Yes
3 (1000m)	145	124	124	Yes

### Conclusion

- The mitigation measures were effective. The mitigated noise levels generated from the piling activities complied with the EP requirement.
- The piling noise was negligible over ambient at a distance of 500m or more.
- Background noise levels from heavy marine traffic and construction activities contributed to the high ambient noise levels.

## **4 FUTURE KEY ISSUES**

### **4.1 KEY ISSUES FOR THE NEXT ONE MONTH**

Key issues to be considered in the next one month will include:

- Impacts on dolphins due to piling works;
- Noise from operating machinery and equipment; and,
- Dust release and suppression.

### **4.2 IMPACT PREDICTION FOR THE NEXT ONE MONTH**

Provided that environmental mitigation measures including good on-site practises are properly implemented, it is not expected that unacceptable adverse impact will arise.






### **4.3 WORKS AND MONITORING SCHEDULE FOR THE NEXT ONE MONTH**

Work programme for the next one month includes piling works and site works. Only dolphin visual monitoring is required during piling activities. Weekly site inspections will also be undertaken. The contractor indicated that piling activities will be conducted during all weekdays (Monday to Saturday) between 7am to 7pm except public holidays in the next reporting period between 15<sup>th</sup> February and 14<sup>th</sup> March 2006. Thus, dolphin visual monitoring will be conducted during this period.

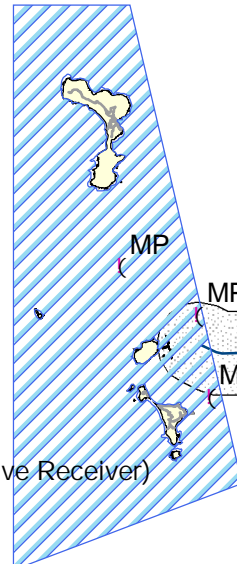
Annex A

**Water Quality Monitoring  
Locations, Water Quality  
and Ecological Sensitive  
Receivers**

**KEY**

-  Control Stations
-  Impact Stations
-  Proposed Pipeline
-  Marine Park
-  Potential IMO1 & IMO2 MONitoring Zone

Marine Park  
(Water Sensitive Receiver)



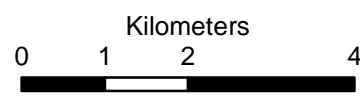
C2 (NM5)

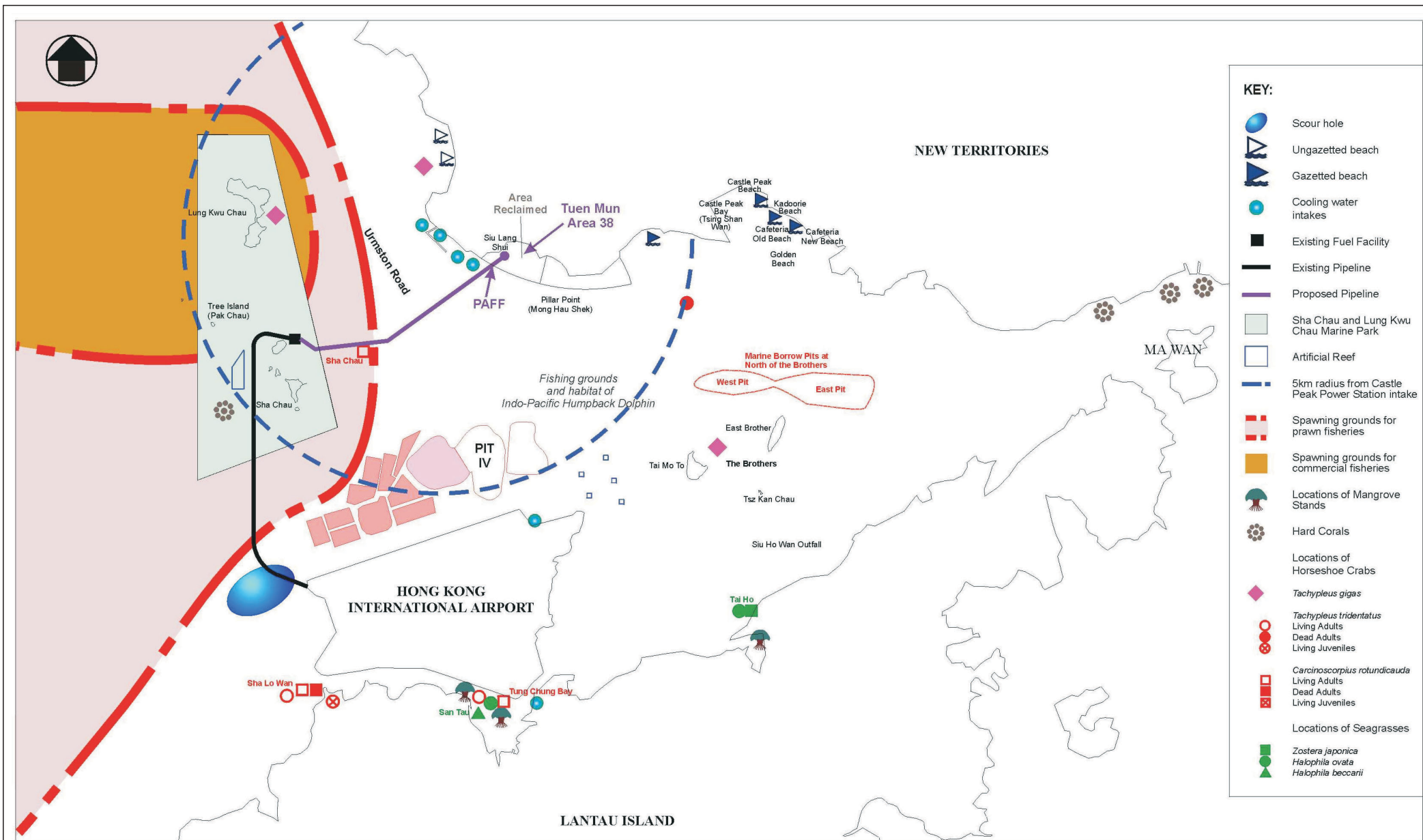
C1 (NM3)

MPB1

MPB2

C3 (NM6)





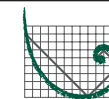
Annex A

### Water Quality and Ecological Sensitive Receivers

FILE: C2475aa  
DATE: 25/01/2006

(Source : PAFF for Hong Kong International Airport EIA, Mouchel 2002)

Environmental  
Resources  
Management

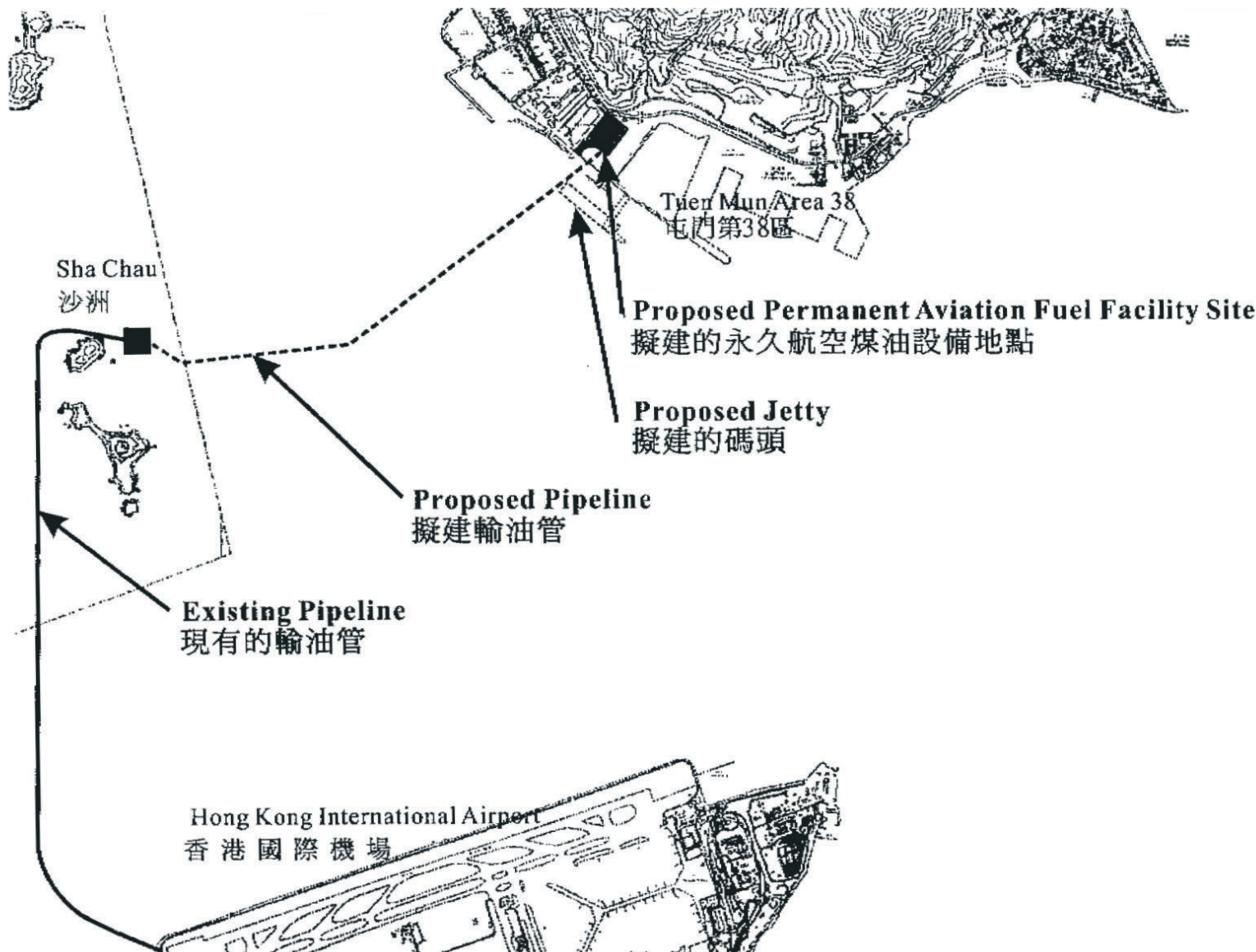


ERM



Annex B

## Project Location



NOT TO SCALE

Annex B

PROJECT LOCATION

FILE: 0018105aa1  
DATE: 12/12/2005

Environmental Resources Management

**ERM**

Annex C

## Implementation Programme of Mitigation Measures

**AnnexC Required Submissions Specified in Environmental Permit (Implementation Programme of Mitigation Measures)**

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
<b>1A General Submission Requirements</b>					
1.9	During Submissions	All submissions, as required under this Permit, shall be rectified in accordance with the comments, if any, made by the Director within one month of the receipt of the Director's comments or otherwise as specified by the Director.	All parties, as appropriate.		Ongoing
1.10	During Submissions	All submissions approved by the Director, all submissions deposited without comments by the Director, or all submissions rectified in accordance with comments by the Director under this Permit shall be construed as part of the permit conditions described in Part C of this Permit. Any variation of the submissions shall be approved by the Director in writing or as prescribed in the relevant permit conditions. All submissions or any variation of the submissions shall be certified by the Environmental Team (ET) Leader and verified by the Independent Environmental Checker (IEC) referred to in Conditions 2.1 and 2.2 below, before submitting to the Director under this Permit.	All parties, as appropriate.		Ongoing
1.11	During Submissions	The Permit Holder shall release all finalized submissions as required under this Permit to the public by depositing copies in the Environmental Impact Assessment Ordinance Register Office, or in any other places, or any internet websites as specified by the Director, or by any other means as specified by the Director for public inspection. For this purpose, the Permit Holder shall provide sufficient copies of the submissions.	All parties, as appropriate.		Ongoing
1.12	During Submissions	All submissions to the Director required under this Permit shall be delivered either in person or by registered mail to the Environmental Impact Assessment Ordinance Register Office (currently at 27/F, Southorn Centre, 130 Hennessy Road, Wanchai, Hong Kong). Electronic copies of all finalized submissions required under this Permit shall be prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 4.0 or later), unless otherwise agreed by the Director, and shall be submitted at the same time as the hard copies.	All parties as appropriate.		Ongoing

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
1.14	Timing consideration for interpreting submissions.	For the purpose of this Permit, "commencement of construction" does not include works related to site clearance and preparations, or other works as agreed by the Director.	None.		
1.13	At least 1 month prior to construction	<p><b>Notification of Commencement Date:</b></p> <p>The Permit Holder shall notify the Director in writing the commencement date of construction of the Project no later than one month prior to the commencement of construction of the Project. The Permit Holder shall notify the Director in writing immediately if there is any change of the commencement date of the construction.</p>	<ul style="list-style-type: none"> <li>AA to inform EPD of commencement date (cc to ERM/LCAS).</li> </ul>		Completed
2.1 (PART – see EM&A Section)	At least 1 month prior to construction (BC)	<p><b>Environmental Team:</b></p> <p>An ET shall be established by the Permit Holder no later than one month before commencement of construction of the Project. The ET shall not be in any way an associated body of the Contractor or the IEC for the Project. The ET shall be headed by an ET Leader. The ET leader shall be a person who has at least 7 years' of experience in environmental monitoring and auditing (EM&amp;A) or environmental management. The ET and the ET Leader shall be responsible for the implementation of the EM&amp;A programme in accordance with the requirements as contained in the EM&amp;A Manual.</p>	<ul style="list-style-type: none"> <li>AA to inform EPD that ERM have been appointed as the ET (cc to ERM/LCAS).</li> </ul>		Completed
2.2 (PART – see EM&A Section)	At least 1 month prior to construction (BC)	<p><b>Independent Environmental Consultant:</b></p> <p>An IEC shall be employed by the Permit Holder no later than one month before commencement of construction of the Project. The IEC shall not be in any way an associated body of the Contractor or the ET for the Project. The IEC shall be a person who has at least 7 years' of experience in EM&amp;A or environmental management.</p>	<ul style="list-style-type: none"> <li>AA to inform EPD that Hyder have been appointed as the IEC (cc to ERM/LCAS/Hyder)</li> </ul>		Completed

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
2.3	At least 1 month prior to construction (BC)	<p><b>Qualified Person:</b></p> <p>A qualified person with degree in biology shall be employed to carry out monitoring and visual inspection of dolphin under Conditions 3.3, 3.20 and 3.22 of this Permit. The qualification and experience of the qualified person shall be certified by ET Leader and verified by the IEC. The qualified person shall form part of the ET.</p>	<ul style="list-style-type: none"> <li>ERM to provide the qualified person and submit his/her qualification and experience with the certification to LCAS/IEC</li> <li>Hyder to forward Verification Form to AA (cc to LCAS/ERM)</li> </ul>		Complete
2.4	At least 1 month prior to construction (BC)	<p><b>Updating of EM&amp;A Manual:</b></p> <p>The Permit Holder shall, no later than one month before the commencement of the Project, submit to the Director for approval four hard copies and one electronic copy of an updated EM&amp;A Manual for the Project. The updated EM&amp;A Manual shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the EIA Report. The updated EM&amp;A Manual shall include the setting up of additional water quality monitoring stations for all marine construction activities.</p>	<ul style="list-style-type: none"> <li>ET to prepare and certify updated EM&amp;A manual to IEC/AA (cc to LCAS)</li> <li>IEC to forward verification Form to AA (cc to ERM/LCAS)</li> <li>AA to forward updated EM&amp;A manual, certification &amp; verification Forms to EPD (cc to ERM/ Hyder/LCAS)</li> </ul>		Completed
3.1	Within 1 month after start of construction (C)	<p><b>Management Organization:</b></p> <p>The Permit Holder shall, within one month after commencement of construction of the Project, inform the Director in writing the management organization of the main construction companies and/or any form of joint ventures associated with the construction of the Project. The submitted information shall include at least an organization chart, names of responsible persons and their contact details.</p>	<ul style="list-style-type: none"> <li>LCAS to provide their management organization to AA (cc to ERM)</li> <li>AA to forward this information to EPD (cc to ERM/ LCAS/Hyder)</li> </ul>		Completed

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
3.2	At least 2 months prior to commencement of the works (BC)	<p><b>Testing Results of the Bubble Jacket Trial</b></p> <p>Trial of bubble jacket shall be carried out to demonstrate noise attenuation effect of 3 dB or more as recommended in the approved EIA Report (Register No. AEIAR-062/2002). The Permit Holder shall, at least 2 months before commencement of piling works, submit the testing results of the bubble jacket trial to the Director for approval and shall deposit 15 copies of the testing results of the bubble jacket trial to the Secretary of the EIA Sub-committee of the Advisory Council on the Environment (ACE) at 10/F., Citibank Tower, 3 Garden Road, Central, Hong Kong. The Director may require the Permit Holder to make a presentation to the ACE on the bubble jacket trial to seek approval prior to commencement of construction. The submission shall be certified by ET Leader and verified by the IEC before submission to the Director.</p>	<ul style="list-style-type: none"> <li>• LCAS to provide testing result of the Bubble Jacket Trail to ET and IEC.</li> <li>• ET to forward certification Form to AA/IEC (cc to LCAS)</li> <li>• IEC to forward verification form to AA (cc to ERM/LCAS)</li> <li>• AA to forward testing result, certificate &amp; verification Forms to EPD (cc to ERM/Hyder/LCAS)</li> </ul>		Completed
3.3	At least 1 month prior to marine construction (BC)	<p><b>Dolphin Monitoring Programme and Action Plan</b></p> <p>Dolphin monitoring for pre- and post-construction activities shall be carried out. The Permit Holder shall submit the dolphin monitoring programme and the action plan to the Director for approval at least 1 month before commencement of marine construction works of the Project. The action plan shall include recommendations for further monitoring should dolphin numbers be significantly different to the pre-construction activity. The submission shall be certified by ET Leader and verified by the IEC before submission to the Director. The monitoring shall be undertaken by a qualified person (minimum requirement of graduate qualification in marine biology of equivalent biological science with 5 yrs experience).</p>	<ul style="list-style-type: none"> <li>• ET to prepare the monitoring programme and the action plan and submit to IEC/AA (cc to LCAS)</li> <li>• IEC to forward verification Form to AA (cc to ERM/LCAS)</li> <li>• AA to forward the monitoring programme and action; and verification Forms to EPD (cc to ERM/Hyder/LCAS)</li> </ul>		Completed



EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
3.4	At least 2 months before the commence of the survey	<p><b>Marine Archaeology Investigation:</b></p> <p>A qualified marine archaeologist shall be engaged to carry out a marine archaeological investigation of the pipeline route. The Permit Holder shall submit the methodology for the survey and the curriculum vitae of the qualified marine archaeologist to the Director for approval at least one month before commencement of any field work of the marine archaeological investigation.</p>	<ul style="list-style-type: none"> <li>• ET to provide the qualified person and methodology of the survey.</li> <li>• ET to provide the marine archaeological investigation result to LCAS/IEC.</li> <li>• ET to forward certification Form to AA/IEC (cc to LCAS)</li> </ul>		Completed
	Within 2 months after completion of the survey	<p>The Permit Holder shall, within 2 months after completion of the marine archaeological investigation, submit the results of the survey and the recommendations to avoid, minimize and mitigate any archaeological impact to the Director for approval. The submissions shall be certified by ET Leader and verified by the IEC before submission to the Director.</p>	<ul style="list-style-type: none"> <li>• IEC to forward verification Form to AA (cc to ERM/LCAS)</li> <li>• AA to forward the result, certificate &amp; verification Forms to EPD (cc to ERM/IEC/LCAS)</li> </ul>		

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
3.6	Within 1 month after the commencement of construction (C)	<p><b>Waste Management Plan (WMP)</b></p> <p>The Permit Holder shall, within one month after the commencement of construction of the Project, deposit with the Director three hard copies and one electronic copy of a Waste Management Plan (WMP) for the construction stage of the Project. The WMP shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the approved EIA Report (Register No. AEIAR-062/2002). The WMP shall describe the arrangements for avoidance, reuse, recovery and recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities and shall include the recommended mitigation measures on waste management in Section 14.7 of the approved EIA Report (Register No. AEIAR-062/2002). The WMP shall indicate the disposal location(s) of all surplus excavated spoil and other waste. A trip ticket system shall be included in the WMP. Surplus excavated spoil and other wastes shall only be disposed of at designated disposal locations unless otherwise approved by the Director. All measures recommended in the approved WMP shall be fully and properly implemented by the Permit Holder and any person working on the Project throughout the construction period.</p>	<ul style="list-style-type: none"> <li>• LCAS to provide the WMP to ET and IEC.</li> <li>• ET to forward certification Form to AA/IEC (cc to LCAS)</li> <li>• IEC to forward verification Form to AA (cc to ERM/LCAS)</li> <li>• AA to forward the WMP, certificate &amp; verification Forms to EPD (cc to ERM/IEC/LCAS)</li> </ul>		Contractor submitted the draft WMP, in the progress of review

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
3.8	At least 1 month before construction in these areas (BC)	<p><b>Landscape Plan</b></p> <p>At least one month before commencement of the landscape works, the Permit Holder shall deposit with the Director 3 sets of the landscape plan prepared for the Project. The landscape plan shall include the locations, design details, implementation schedules, and drawings in the scale of 1:1000 or other appropriate scale showing the landscape and visual mitigation measures. The measures shall include 1.5m high perimeter landscaped bund, 4m high landscape mound and landscape works for the area of the site which is not initially required for fuel tanks. The landscape plan shall be certified by the ET Leader and verified by the IEC as conforming to the requirements set out in Section 8.10 of the approved EIA Report (Register No. AEIAR-062/2002) before deposit.</p>	<ul style="list-style-type: none"> <li>• LCAS to provide the landscape plan to ET and IEC.</li> <li>• ET to forward certification Form to AA/IEC (cc to LCAS)</li> <li>• IEC to forward verification Form to AA (cc to ERM/LCAS)</li> <li>• AA to forward the landscape plan, certificate &amp; verification Forms to EPD (cc to ERM/ IEC/LCAS)</li> </ul>		Ongoing, first submission was made on 23 December 2006
3.9 (PART – see Table 2)	At least 1 month before commencement of the implementation (BO).	<p><b>Measures to Prevent Fuel Spill, Land Contamination and Water Quality Impact during Operation:</b></p> <p>The Permit Holder shall, at least one month before commencement of implementation of the measures to prevent fuel spill, land contamination and water quality impact during operation of relevant parts of the Project, deposit with the Director 3 sets of design drawings with explanatory statements showing details of measures to be used in relevant parts of the Project. Before submission to the Director, the drawings shall be certified by the ET Leader and verified by the IEC as conforming to the information and recommendations contained in the approved EIA Report (Register No. AEIAR-062/2002).</p>	<ul style="list-style-type: none"> <li>• LCAS to provide the design drawing to ET and IEC.</li> <li>• ET to forward certification Form to AA/IEC (cc to LCAS)</li> <li>• IEC to forward verification Form to AA (cc to ERM/LCAS)</li> <li>• AA to forward the design drawing, certificate &amp; verification Forms to EPD (cc to ERM/ IEC/LCAS)</li> </ul>		Pending

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
4.1	At least 3 months before operation of the Project (BO)	<p><b>Measures to Prevent Fuel Spill, Land Contamination and Water Quality Impacts during Operation</b></p> <p>The Permit Holder shall be fully responsible for monitoring and audit the effectiveness of the measures and systems specified in Condition 3.9 of this Permit to prevent fuel spill, land contamination and water quality impact during operation of the Project. The Permit Holder shall, at least three month before operation of the Project, deposit with the Director 3 sets of audit report showing the incorporation of the measures and systems in the Project and the effectiveness of the measures and systems.</p>	<ul style="list-style-type: none"> <li>AA to implement</li> </ul>		Pending
4.2	Annually	<p>The effectiveness of the measures and systems specified in Condition 3.9 of this Permit shall be tested and audited at least once a year. Annual audit report of the performance of the measures and systems shall be deposited with the Director.</p>	<ul style="list-style-type: none"> <li>AA to implement</li> </ul>		Pending
4.3	At least 2 months before operation of relevant parts (BO)	<p><b>Contingency Plan</b></p> <p>The Permit Holder shall formulate a comprehensive contingency plan to handle the event of fire, fuel spillage and fuel leakage. The contingency plan shall at least detail the remedial actions, the emergency response planning and procedures, the logistic arrangements and coordination and the notification arrangements for the event of fire, fuel spillage and fuel leakage. Oil dispersant shall not be used. The Permit Holder shall carry out regular rehearsal of the contingency plan to ensure the effectiveness of the plan. The Permit Holder shall, at least two month before operation of relevant parts of the Project, deposit with the Director 5 sets of the contingency plan.</p>	<ul style="list-style-type: none"> <li>AA to provide the contingency plan for the event of fire, fuel spillage and fuel leakage to EPD.</li> </ul>		Pending

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
4.4	Prior operation (BO)	<p><b>Environmental Management System</b></p> <p>The Permit Holder shall, before the operation of the Project or otherwise agreed by the Director, develop and implement an Environmental Management System (EMS) for the operation of the Project. The EMS is to ensure that the operation of the Project is in environmentally friendly manner and in accordance with all relevant environmental legislations. The EMS shall include at least regular audit of the Project to ensure that it is properly operated and maintained to avoid or minimize any environmental impact. The Permit Holder shall engage an Environmental Manager to oversee and implement the EMS. The Environmental Manager shall be a person who has at least 7 years' of experience in Environmental Monitoring and Audit (EM&amp;A) or environmental management. The EMS shall be certified under ISO 14000 within 1 year after the operation of the Project or otherwise agreed by the Director.</p>	<ul style="list-style-type: none"> <li>• LCAS to implement the EMS.</li> </ul>		Pending
5.2 (PART – see Table 2	At least 2 weeks before construction (BC)	<p><b>Baseline Monitoring Report</b></p> <p>The Permit Holder shall submit two hard copies and one electronic copy of the Baseline Monitoring Report to the Director at least 2 weeks before commencement of construction of the Project. The submissions shall be certified by the ET Leader and verified by the IEC before submission to the Director. Additional copies of the submission shall be provided upon request by the Director.</p>	<ul style="list-style-type: none"> <li>• ET to prepare baseline monitoring report and forward to AA/IEC (cc to LCAS)</li> <li>• IEC to forward verification Form to AA (cc to LCAS/ERM)</li> <li>• AA to forward baseline monitoring report, certification &amp; verification Form to EPD (cc to ERM/IEC/LCAS)</li> </ul>		Dolphin Baseline Report was completed.

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
5.3	Within 2 weeks after the end of the reporting month. (C/AC)	<p><b>Monthly EM&amp;A Report</b></p> <p>The Permit Holder shall submit two hard copies and one electronic copy of the monthly EM&amp;A Report to the Director within 2 weeks after the end of the reporting month. The submissions shall be certified by the ET Leader and verified by the IEC before submission to the Director. Additional copies of the submission shall be provided upon request by the Director.</p>	<ul style="list-style-type: none"> <li>• ET to prepare EM&amp;A report and forward to AA/IEC (cc to LCAS)</li> <li>• IEC to forward verification Form to AA (cc to LCAS/ERM)</li> <li>• AA to forward monthly EM&amp;A report, certification &amp; verification Form to EPD (cc to ERM/ Hyder/LCAS)</li> </ul>		Ongoing
5.8	Within 1 month after the commencement of the Project	<p><b>Web Cameras Plan</b></p> <p>Within three months of the commencement of construction of the Project, the Permit Holder shall install and thereafter maintain a system of web cameras covering the works areas at Tuen Mun site. The system shall provide real time visual monitoring of the site condition accessible by public through the dedicated web site set up by the Permit Holder under Condition 6.2 below. Within one month of the commencement of the Project, the Permit Holder shall propose a plan and a system of web cameras for the Director's agreement.</p>	<ul style="list-style-type: none"> <li>• LCAS to prepare the web camera plan to AA (cc to ERM)</li> <li>• AA to forward the web camera plan to EPD (cc to ERM/ LCAS/IEC)</li> </ul>		Completed. Revised plan was submitted to EPD on 8 Feb 06

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
6.1	At the same time as hard copies as described in Conditions 5.2 and 5.3.	<p><b>Electronic Reporting of EM&amp;A Information</b></p> <p>To facilitate public inspection of the EM&amp;A Reports via the EIAO Internet Website and at the EIAO Register Office, electronic copies of these Reports shall be prepared in the Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 4.0 or later), unless otherwise agreed by the Director and shall be submitted at the same time as the hard copies as described in Conditions 5.2 and 5.3 of this Permit. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of these Reports shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in these Reports shall be provided in the main text from where the respective references are made. All graphics in these Reports shall be in interlaced GIF format unless otherwise agreed by the Director. The content of the electronic copies of these Reports must be the same as the hard copies.</p>	<ul style="list-style-type: none"> <li>ET to prepare the EM&amp;A report in the HTML and PDF format.</li> </ul>		Ongoing
6.2	Within 6 weeks after the start of Construction (C)	<p>The Permit Holder shall, set up a dedicated web site and notify the Director in writing the internet address where the environmental monitoring and project data is to be placed, within six weeks after the commencement of the Project. All environmental monitoring results described in Condition 6.1 above shall be made available to the public via a dedicated web site to be set up by the Permit Holder in the shortest possible time and in no event later than 2 weeks after the relevant environmental monitoring data are collected or become available, unless otherwise agreed with the Director.</p>	<ul style="list-style-type: none"> <li>LCAS to prepare the web site and submit the internet address to AA (cc to ERM)</li> <li>AA to forward the address to EPD (cc to ERM/ IEC/LCAS)</li> </ul>		Ongoing



**Table 2 General Conditions of the Environmental Permit**

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
<b>1A General Environmental Permit Conditions</b>					
1.1	At all times (BC/C/AC)	The Permit Holder and any person working on the Project shall comply with all conditions set out in this Permit. Any non-compliance by any person may constitute a contravention of the Environmental Impact Assessment Ordinance (Cap. 499) and may become the subject of appropriate action being taken under the Ordinance.	• AA to write to LCAS to remind them of their obligation to comply with EP condition (cc to ERM).		Ongoing
1.2	At all times (BC/C/AC)	The Permit Holder shall ensure full compliance with all legislation from time to time in force including, without limitation to, the Noise Control Ordinance (Cap. 400), Air Pollution Control Ordinance (Cap. 311), Water Pollution Control Ordinance (Cap. 358), Dumping at Sea Ordinance (Cap. 466), Waste Disposal Ordinance (Cap. 354), Dangerous Goods Ordinance (Cap. 295), Shipping and Port Control Ordinance (Cap. 313), Marine Parks Ordinance (Cap. 476), Occupational Safety and Health Ordinance (Cap.509) and Factories and Industrial Undertakings Ordinance (Cap.59). This Permit does not of itself constitute any ground of defence against any proceedings instituted under any legislation or imply any approval under any legislation.	• AA to write to LCAS to remind them of their obligation to comply with all environmental legislation in force (cc to ERM).		Ongoing
1.3	At all times (BC/C/AC)	The Permit Holder shall ensure full compliance with all fire safety requirements formulated by the Fire Services Department to address the potential fire risks of all possible areas within the Project site including the jetty. Implementation of measures under this Permit does not of itself constitute any ground of defense against any fire safety requirements instituted by the Fire Services Department.	• AA to write to LCAS to remind them of their obligation to comply with all fire safety requirement (cc to ERM).		Ongoing
<b>1B Posting and Notification of EP Requirements</b>					

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
1.4	At all times (BC/C/AC)	The Permit Holder shall make copies of this Permit together with all documents referred to in this Permit and the documents referred to in Part A of the Permit readily available at all times for inspection by the Director or his authorised officers at all sites/offices covered by this Permit. Any reference to the Permit shall include all documents referred to in the Permit and also the relevant documents in the Register.	<ul style="list-style-type: none"> <li>• LCAS to advise AA whether they have all necessary document (cc to ERM)</li> <li>• AA to provide document to LCAS, as required (cc to ERM)</li> <li>• LCAS to keep document at all sites/offices covered by this EP.</li> </ul>		Ongoing
1.5	At start of construction works and during introduction of new site staff (C)	The Permit Holder shall give a copy of this Permit to the person(s) in charge of the site(s) and ensure that such person(s) fully understands all conditions and all requirements incorporated by the Permit. The site(s) refers to site(s) of construction and operation of the Project and shall mean the same hereafter.	<ul style="list-style-type: none"> <li>• LCAS to advise AA of "Person in charge" for the site (cc to ERM)</li> <li>• AA to write to LCAS provide copy of EP to person in charge (cc to ERM)</li> </ul>		Completed
1.6	Immediately prior to and during construction (BC/C)	The Permit Holder shall display conspicuously a copy of this Permit on the Project site(s) at all vehicular site entrances/exits or at a convenient location for public information at all times. The Permit Holder shall ensure that the most updated information about the Permit, including any amended permit, is displayed at such locations. If the Permit Holder surrenders a part or the whole of the Permit, the notice he sends to the Director shall also be displayed at the same locations as the original Permit. The suspended, varied or cancelled Permit shall be removed from display at the Project site(s).	<ul style="list-style-type: none"> <li>• LCAS to display copy of full permit at all vehicular site entrances/exits or at a convenient location for public information at all times.</li> </ul>		Completed
<b>1C Design and Construction in Accordance with EIA/EP/EM&amp;A</b>					
1.7	During Construction and Operation (C/O)	The Permit Holder shall construct and operate the Project in accordance with the project description in Part B of this Permit.	<ul style="list-style-type: none"> <li>• AA to write to LCAS to remind them of their obligation to comply with EP condition (cc to ERM)</li> </ul>		Ongoing

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
1.8	At all times (BC/C/AC)	The Permit Holder shall ensure that the Project is designed, constructed and operated in accordance with the information and all recommendations described in the approved EIA Report (Register No. AEIAR-062/2002), other relevant documents in the Register, the information and mitigation measures described in this Permit, mitigation measures to be recommended in submissions that shall be deposited with or approved by the Director as a result of permit conditions contained in this Permit, and mitigation measures to be recommended under on-going surveillance and monitoring activities during all stages of the Project. Where recommendations referred to in the documents of the Register are not expressly referred to in this Permit, such recommendations are nevertheless to be implemented unless expressly excluded or impliedly amended in this Permit.	<ul style="list-style-type: none"> <li>AA to write to LCAS to remind them of their obligation to comply with all recommendations described in the approved EIA report, other relevant documents in the Register and the EP condition (c to ERM)</li> </ul>		Completed
5.1	At all times	The EM&A programme shall be implemented in accordance with the procedures and requirements in the updated EM&A Manual approved under Condition 2.4 of this Permit. Any changes to the EM&A programme shall be justified by the ET Leader and verified by the IEC as conforming to the requirements set out in the EM&A Manual and shall seek the prior approval from the Director before their implementation.	<ul style="list-style-type: none"> <li>ERM to implement the EM&amp;A programme</li> </ul>		Ongoing
5.4	At all times	The actions described in the Event /Action Plans of the EM&A Manual shall be fully and properly carried out in accordance with the time frame as set out in the Event/Action Plans, or as agreed by the Director.	<ul style="list-style-type: none"> <li>LCAS/ERM to implement Event/Action plans</li> </ul>		Ongoing
5.5	At all times	All environmental monitoring and audit data submitted under this Permit shall be true, valid and correct.	<ul style="list-style-type: none"> <li>ERM to submit the valid EM&amp;A data</li> </ul>		Ongoing
5.6	At all times	To ensure a high degree of transparency regarding the monitoring data and results in view of the public concern about the Project, all environmental monitoring and audit data and results and all submissions and all performance test data and results required by this Permit shall be made available by the Permit Holder to the public through a dedicated web site to be set up by the Permit Holder under Condition 6.2 below, in the shortest possible time and in no event later than 2 weeks after such information is available.	<ul style="list-style-type: none"> <li>ERM to upload the EM&amp;A data, result and all submissions and all performance test data and results required by this Permit to the web site.</li> </ul>		Ongoing

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
6.1	At all times	To facilitate public inspection of the EM&A Reports via the EIAO Internet Website and at the EIAO Register Office, electronic copies of these Reports shall be prepared in the Hyper Text Markup Language (HTML) (version 4.0 or later) and in Portable Document Format (PDF version 4.0 or later), unless otherwise agreed by the Director and shall be submitted at the same time as the hard copies as described in Conditions 5.2 and 5.3 of this Permit. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of these Reports shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in these Reports shall be provided in the main text from where the respective references are made. All graphics in these Reports shall be in interlaced GIF format unless otherwise agreed by the Director. The content of the electronic copies of these Reports must be the same as the hard copies.	<ul style="list-style-type: none"> <li>ERM to prepare the electronic copies of the EM&amp;A reports in the HTML and PDF format</li> </ul>		Ongoing
<i>1D Measures to Prevent Fuel Spill, Land Contamination and Water Quality Impact During Operation</i>					
3.9	During Operation	<p>The measures shall include, but not limited to, the following requirements:</p> <p>a) <u>Bundling system of tank farm for storage of aviation fuel</u></p> <p>All fuel tanks shall be located in bunded compounds with capacity of at least 110% of the largest individual tank in each compound. A security wall of breeze-block type shall be provided outside the bund wall to act as secondary containment in the event of overtopping of the bund. The security gate at the security wall shall be provided with a ramp and leak tight seal at the bottom of the gate up to the first hinge to contain any spill within the site. A drainage ditch with sloping catchment shall be provided outside the security wall to trap any liquid splash over the security wall and the security gate.</p> <p>b) <u>Drainage isolation and containment system of tank farm for storage of aviation fuel</u></p> <p>Impermeable layer under fuel tanks shall be used to prevent seepage of aviation fuel to ground. Storm drainage system shall be equipped with valve, collection sump and oil separator to retain spilled fuel.</p>	<ul style="list-style-type: none"> <li>LCAS to implement</li> <li>ER to enforce</li> </ul>		Pending
					Pending

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
		c) <u>Tank overfill monitoring system</u> Overfill monitoring system with automatic shutdown inlet valve shall be provided for fuel tanks.			Pending
		d) <u>Installations at the jetty</u> Installations at the jetty shall include the provision of defensive fenders to prevent possible collision from small craft and the provision of coupling points with slop collection utilities to prevent minor fuel spill during unloading. Slop collection utilities shall be connected to oil separator.			Pending
		e) <u>Fuel pipelines protective measures</u> Fuel pipelines shall be covered with a protective rock armour layer of minimum thickness of 1m to prevent the pipelines from damaging by anchors.			Pending
		f) <u>Leak detection system for fuel pipelines</u> Continuous leak detection system with automatic shut-off device shall be provided for fuel pipelines.			Pending
<b>1E Measures to Mitigate Water Quality Impact During Construction</b>					
3.10	During construction	No more than one dredger shall be in operation at any time during construction.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Pending
3.11	During construction	No Lean Material Overboard (LMOB) system shall be used.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Pending
3.12	During construction	No hopper dredger with leaking pipe shall be used during construction.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Pending
3.13	During construction	Bottom openings of barges and hopper dredgers shall be tightly sealed to prevent leakage of dredged materials. Freeboard on barges shall be provided to ensure that decks are not washed by wave action.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Pending
3.14	During construction	No dredged material shall be splashed to the surrounding water during loading of dredged material to barges and hopper dredgers.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Pending

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
3.15	During construction	No dredged material shall be overflowed from barges and hopper dredgers during loading or transportation.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Pending
3.16	During construction	To mitigate environmental impacts due to site runoff and other potential water pollution caused by construction activities, mitigation measures described in Appendix A shall be implemented throughout the construction period.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing
Appendix A (a) (i)	During construction	Surface run-off from the construction site shall be directed into adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins before discharge into storm drains. Channels, earth bunds or sand bag barriers shall be provided on site to properly direct stormwater to such silt removal facilities.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing
Appendix A (a) (ii)	During construction	Catchpits and perimeter channels shall be constructed in advance of site formation works and earthworks.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing
Appendix A (a) (iii)	During construction	Silt removal facilities, channels and manholes shall be maintained with the deposited silt and grit being removed at least once a week, and at the onset of and after each rainstorm to ensure that these facilities are functioning at all times.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing
Appendix A (a) (iv)	During construction	Open stockpiles of construction materials (e.g. aggregates and sand) on site shall be covered with tarpaulin or similar fabric during rainstorms. Measures such as providing sand bag barriers shall be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing
Appendix A (a) (v)	During construction	Manholes (including any newly constructed ones) shall always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers. Discharges of surface run-off into foul sewers shall always be prevented in order not to unduly overload the foul sewerage system.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
Appendix A (b)	During construction	At all parts of all works areas and construction sites, and throughout the full duration of the construction contract(s), debris and rubbish on site shall be handled and disposed of to avoid entering the water column and causing water quality impacts. Temporary on-site storage of excavated materials shall be covered with tarpaulin or similar fabric during rainstorms. Any washout of construction or excavated materials should be diverted to the drainage system via sediment traps. Stockpiling of the excavated material can be minimised by scheduling the construction programme in a way that one section of the alignment can be constructed and completed before the excavation works of the next section commence.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing
<b><i>1F Measures to Protect Marine Park (Sha Chau &amp; Lung Kwu Chau) and Avoid or Mitigate Ecological Impact During Construction</i></b>					
3.17	During construction	No construction work shall be carried out from shore or land within the Marine Park.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Pending
3.18	During construction	No hydraulic dredging shall be carried out within the Marine Park.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Pending
3.19	During construction	Pipeline trench dredging within the Marine Park shall be scheduled to coincide with maintenance dredging for marine access channel for Sha Chau Aviation Fuel Receiving Facility.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Pending
3.20	During construction	A 250m dolphin exclusion zone during dredging within the Marine Park shall be implemented. Dredging work shall not be carried out until the area is certified by a qualified person to ensure continuously clear of dolphins within the 250m exclusion zone for 30 minutes.	<ul style="list-style-type: none"> <li>• LCAS to implement the 250m dolphin exclusion zone</li> <li>• ER to enforce</li> <li>• ERM to provide the qualified person</li> </ul>		Pending

EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
3.21	During construction	Piling works shall not be carried out during April to June of the year to avoid peak calving period of dolphin.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> <li>• ET to monitor whether piling works is undertaken during April to June</li> </ul>		Ongoing
3.22	During construction	A 500m dolphin exclusion zone during piling activities for the jetty shall be implemented. Piling work shall not be carried out until the area is certified by a qualified person to ensure continuously clear of dolphins within the 500m exclusion zone for 30 minutes. Piling work shall cease if dolphins move into the 500m exclusion zone during piling. Piling work shall not be resumed until the area is certified by a qualified person to ensure continuously clear of dolphins for 30 minutes.	<ul style="list-style-type: none"> <li>• LCAS to implement 500m dolphin exclusion zone</li> <li>• ER to enforce</li> </ul>		Ongoing
3.23	During construction	Spot acoustic monitoring of the 500m dolphin exclusion zone during piling activities shall be conducted for three days of the first week of piling to confirm that dolphins are not missed in the visual inspection carried out under Condition 3.22 of this Permit. The spot acoustic monitoring shall be conducted in accordance with the procedures and requirements in the updated EM&A Manual approved under Condition 2.4 of this Permit.	<ul style="list-style-type: none"> <li>• LCAS to provide spot acoustic monitoring</li> </ul>		Completed
3.24	During construction	Bubble jacket shall be used for piling work to reduce underwater piling noise to achieve the following underwater mitigated noise levels: 162 dB at 250m, 152 dB at 500m and 145dB at 1000m.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing
3.25	During construction	Underwater noise monitoring shall be conducted during piling to ensure that the underwater mitigated noise levels as specified in Condition 3.24 of this Permit are achieved. Underwater mitigated noise levels shall be recorded over the initial three days of the first week of piling work. Underwater noise monitoring shall be conducted in accordance with the procedures and requirements in the updated EM&A Manual approved under Condition 2.4 of this Permit.	<ul style="list-style-type: none"> <li>• LCAS to provide underwater noise monitoring</li> </ul>		Completed. Summary Report was included in the 3 <sup>rd</sup> Monthly EM&A Report



EP PART C	Timing	Condition	Responsibility for Action	Latest Date for Completion of Action*	Status
3.26	During construction	Piling hammer at the beginning of each piling session shall be ramped up gradually. Piling activities shall be continuous without short-break and shall avoid sudden random loud noise emission. Piling activities shall occur on a regular basis, be scheduled to occur with similar activities and commence at the same time each day. No piling works shall be carried out during 11:00 p.m. to 7:00 a.m.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing
3.27	During construction	Piling and related equipment installed on the piling barge shall be acoustically decoupled from the hull of the barge.	<ul style="list-style-type: none"> <li>• LCAS to implement</li> <li>• ER to enforce</li> </ul>		Ongoing

**Table 3 Project Specific Mitigation Measures**

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
<b>1. Air Quality Measures</b>				
	Land based areas / During construction	S 4.5.3	Twice daily watering of all exposed site areas shall be undertaken.	Contractor
	Land based areas / During construction	S 4.5.3	No debris or other materials shall be burnt on the works areas.	Contractor
	Land based areas / During construction	S 4.5.3	All exposed road surfaces and dust sources shall be maintained as wet.	Contractor
	Land based areas / During construction	S 4.5.3	Watering shall be undertaken during rock/concrete breaking.	Contractor
	Land based areas / During construction	S 4.5.3	Open dropping heights for excavated materials shall be controlled to a maximum height of 2m.	Contractor
	Land based areas / During construction	S 4.5.3	Stockpiles of imported material kept on site shall be contained within hoardings, dampened and/or covered during dry and windy weather.	Contractor
	Land based areas / During construction	S 4.5.3	Site hoarding not less than 2.4m at site boundary shall be provided.	Contractor
	Land based areas / During construction	S 4.5.3	Dust creating activities shall be reprogrammed in periods of high winds.	Contractor
	Land based areas / During construction	S 4.5.3	Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is practicable.	Contractor
	Land based areas / During construction	S4.5.3	Stockpiling of the excavated material can be minimised by scheduling the construction programme in a way that one section of the alignment can be constructed and completed before the excavation works of the next section commence.	Contractor
	Land based areas / During construction	S 4.5.3	Any vehicle used for moving materials which have the potential to create dust shall have properly fitting side and tail boards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	Contractor
	Site entrances and exits / During construction	S 4.5.3	No earth, mud, debris, dust and the like shall be deposited on public facility shall be usable prior to any earthworks roads. Wheel washing excavation activity on the Site.	Contractor
	Land based Site / During construction	S 4.9.1	EM&A in the form of site audit of dusty activities.	Contractor
	PAFF/Operational phase	S 4.7.1	Best practicable means as specified by the Air Pollution Control Ordinance for Part IV specified process shall be adhered to.	Franchisee

**2. Noise**

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	Land based Site / During construction	S 5.7.1	Use quiet equipment with suitable noise levels and labels.	Franchisee
	Land based Site / During construction	S 5.7.1	Regular maintenance of equipment.	Contractor
	Land based Site / During construction	S 5.7.1	Ensure noise attenuation devices are fitted to plant and equipment.	Contractor
	Land based Site / During construction	S 5.7.1	Fitting more efficient exhaust sound reduction equipment and ensuring the Manufacturers' enclosure panels are kept closed on dump trucks, lorries, excavators and cranes.	Contractor
	Land based Site / During construction	S 5.7.1	Fitting suitably designed muffler or sound reduction equipment and using dampened bit to eliminate ringing on breakers.	Contractor
	Land based Site / During construction	S 5.7.1	Ensure all leaks in air lines are sealed on all pneumatic equipment.	Contractor
	Land based Site / During construction	S 5.7.1	Use temporary noise barriers where applicable.	Contractor
	Land based Site / During construction	S 5.7.1	Restrict or modify working hours to minimise high noise activities.	Contractor
	Land based Site / During construction	S 5.7.1	Provide awareness training in the need to minimise noise.	Contractor
	Land based Site / During construction	S 5.7.1	Proper planning of work area.	Contractor
	Land base Site/ During construction	S 5.7.1	Good site practice to limit noise emissions at source	Contractor
	Land based Site / During construction	S 5.9.1	EM&A in the form of site audit of noise activities	Contractor

### 3. Water Quality

	Dredged areas/Design Phase	S 6.7.1.4	Standard good dredging practice measures shall be written into the dredging contract.	Franchisee
	Marine Park / Pipeline Dredging	S 6.7.1.1	There should be no access to the shore or working from land within the Marine Park. No marine anchors shall be used within the Marine Park.	Contractor
	Marine Park / Pipeline Dredging	S 6.7.1.2	No hydraulic dredging within Marine Park.	Contractor
	Sha Chau AFRF Marine access channel	S 6.7.1.3	Dredging for pipeline trench should be timed to coincide with maintenance dredging for Sha Chau AFRF marine access channel.	Airport Authority
	Dredged areas/ Pipeline Dredging	S 6.7.1.4	Use of Lean Material Overboard (LMOB) systems shall be prohibited. No mud overflow is to be permitted for dredging using trailer suction hopper dredgers.	Contractor
	Dredged areas/ Pipeline Dredging	S 6.7.1.4	Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted.	Contractor
	Dredged areas/ Pipeline Dredging	S 6.7.1.4	Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material.	Contractor
	Dredged areas/ Pipeline Dredging	S 6.7.1.4	Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes.	Contractor

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	Dredged areas/ Pipeline Dredging	S 6.7.1.4	Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	Contractor
	Dredged areas/ Pipeline Dredging	S 6.7.1.4	Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.	Contractor
	Dredged areas/ Pipeline Dredging	S 6.7.1.4	Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action.	Contractor
	Dredged areas/ Pipeline Dredging	S 6.7.1.4	All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.	Contractor
	Dredged areas/ Pipeline Dredging	S 6.7.1.4	The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.	Contractor
	Pipeline trench / Pipeline Dredging	S 6.7.1.5	Placement of pipeline trench backfill should be undertaken in a controlled manner to minimize impacts. Backfilling with rock should be undertaken either down pipe or by a reverse grab operation or other controlled technique to ensure that this material does not mound on the seabed.	Contractor
	Land Site / During Construction	S 6.7.1.6	Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters.	Contractor
	Land Site / During Construction	S 6.7.1.6	Sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided.	Contractor
	Land Site / During Construction	S 6.7.1.6	Storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sandbag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.	Contractor
	Land Site / During Construction	S 6.7.1.6	Silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm.	Contractor
	Land Site / During Construction	S 6.7.1.6	Temporary access roads should be surfaced with crushed stone or gravel.	Contractor

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	Land Site / During Construction	S 6.7.1.6	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	Contractor
	Land Site / During Construction	S 6.7.1.6	Measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system.	Contractor
	Land Site / During Construction	S 6.7.1.6	Open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms.	Contractor
	Land Site / During Construction	S 6.7.1.6	Manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers.	Contractor
	Land Site / During Construction	S 6.7.1.6	Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.	Contractor
	Land Site / During Construction	S 6.7.1.6	All vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit.	Contractor
	Land Site / During Construction	S 6.7.1.6	Wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain.	Contractor
	Land Site / During Construction	S 6.7.1.6	The section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel.	Contractor
	Land Site / During Construction	S 6.7.1.6	Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects.	Contractor
	Land Site / During Construction	S 6.7.1.6	Vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal.	Contractor
	Land Site / During Construction	S 6.7.1.6	The contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned, up immediately.	Contractor
	Land Site / During Construction	S 6.7.1.6	Waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance.	Contractor
	Land Site / During Construction	S 6.7.1.6	All fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank.	Contractor

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	Land Site / During Construction	S 6.7.1.6	Surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.	Contractor
	All works / During construction	S 6.10.1	All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.	Contractor
	Submarine Pipeline / During Design and construction	S 6.7.2.1	Submarine section of aviation fuel pipeline shall be covered with rock armour protection which shall not protrude above the level of the adjacent natural seabed.	Franchisee
	Jetty / During construction	S 6.7.2.2	Coupling points on the jetty will be protected with slop collection utilities.	Franchisee
	Tank farm / During construction	S 6.7.2.2	Oily drainage systems and slop collection systems will connect to an oil/water separator.	Franchisee
	Tank farm / During construction	S 6.7.2.2	All tanks shall be bunded to a capacity of at least 110% of the largest individual tank in each compound. Tank pits shall be protected by an impermeable bed (e.g. geotextile sheeting) to prevent seepage of aviation fuel to ground. A leak detection system shall be installed beneath The containment membrane.	Franchisee
	Tank farm / During construction	S 6.7.2.2	Valves shall be installed within the storm drainage system to facilitate the retention of spillages.	Franchisee
	Impact monitoring stations located 500m north/northwest and south/south east of any dredger during dredging works at a distance greater than 1000m outside of the Marine Park	S 6.10.2	Water quality monitoring shall be undertaken for suspended solids, turbidity, and dissolved oxygen.	Contractor
	Designated monitoring stations as defined in EM&A Manual <i>Section 7</i> Construction period when dredging takes place within 1000m of Marine Park.	S 6.10.2	Water quality monitoring shall be undertaken for suspended solids, turbidity, and dissolved oxygen.	Contractor
	All facilities / Operational phase	S 6.7.2.2	Detailed emergency response procedures shall be drawn up. These will include requirements to maintain floating oil booms, absorbent materials and skimmers on site at all times.	Franchisee
	Tank farm / Operational phase	S 6.7.2.2	Auxiliary tanks shall be permanently maintained at the tank farm for recovered fuel and slops.	Franchisee

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	Tank farm/Operational phase	S 6.7.2.2	There shall be no direct outlet from the bund. A collection sump shall be included in the base. Removal of accumulated rainwater shall be activated manually and discharged to storm drain via an oil / water separator.	Franchisee
	Tank farm/Operational phase	S 6.7.2.2	Contingency procedures shall be drawn up to ensure containment and safe disposal of any fuel lost from tanks or pipework. Suitable absorbent materials (e.g. sand or earth) shall be kept on site to deal with spillages.	Franchisee
	Tank Farm / Tank farm Commissioning	S 6.7.1.7	Wastewater from pipe commissioning de-watering exercises shall be stored on site and for chemical analysis and safe disposal in accordance with the WPCO.	Franchisee

#### 4. Ecology

	Detailed Design Phase (D)	S 7.8.2.7	Specification for 500m dolphin exclusion zone during piling shall be prepared.	Consultant
	Detailed Design Phase (D)	S 7.8.2.8	Specification for 250m dolphin exclusion zone during dredging in the Marine Park shall be prepared.	Consultant
	Detailed Design Phase (D)	S 7.8.2.18	Specification for pre and post construction dolphin abundance monitoring.	Consultant
	Detailed Design Phase (D)	S 7.8.2.10	Specification for underwater noise monitoring during piling shall be prepared.	Consultant
	Detailed Design Phase (D)	S 7.8.2.9	Specification for acoustic monitoring shall be prepared.	Consultant
	Detailed Design Phase (D)	S 7.8.2.5	Design of bubble jacket for pile shall be prepared.	Consultant
	Detailed Design Phase (D)	S 7.8.2.13	Design of acoustic decoupling methods.	Consultant
	Prior to piling. (C)	S 7.8.2.17	Data review shall be undertaken using available long term data set prior to the works to check that dolphin distribution patterns are consistent with those assumed in the EIA.	Contractor
	Around each jetty pile / During piling activities. (C)	S 7.8.2.5	Implementation of bubble jacket to achieve a 3-5 dB reduction. Specific underwater noise targets are as follows: 162 dB at 250m, 152 dB at 500m and 145dB at 1000m.	Contractor
	500m around piling barge/ During piling activities. (C)	S 7.8.2.7	A 500m dolphin exclusion zone shall be implemented and piling shall not begin until the observer has confirmed that the area has been clear for 30 minutes.	Contractor
	250m around dredger in Marine Park / During dredging in Marine Park (C)	S 7.8.2.8	A 250m dolphin exclusion zone shall be implemented and dredging shall not begin until the observer has confirmed that the area has been clear for 30 minutes.	Contractor
	Within dolphin exclusion zone/ 3 days in first week of piling (C)	S 7.8.2.9	Spot acoustic monitoring shall be undertaken for 3 days in the first week of piling.	Contractor
	250m, 500m and 1000m from piling barge/during piling. (C)	S 7.8.2.10	Underwater noise monitoring during percussive piling activities.	Contractor
	April to June	S 7.8.2.12	Piling shall be scheduled outside the period April to June.	Contractor

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	Piling barge/During piling. (C)	S 7.8.2.13	Implement acoustic decoupling measures in accordance with specifications prepared during the design phase.	Contractor
	Piling barge/During piling. (C)	S 7.8.2.14	Ramping up of the piling hammer shall be implemented at the start of each piling session.	Contractor
	Piling barge/During piling. (C)	S 7.8.2.15	Piling activities shall be continuous and short breaks and random sudden noises avoided.	Contractor
	During piling. (C)	S 7.8.2.15	Piling events shall be scheduled to occur on a regular basis and commence at the same time each day.	Contractor
	Jetty / During piling. (C)	S 7.8.2.15	The piling shall be scheduled to allow a rest period of 7 hours during the night-time.	Contractor
	Jetty / During piling. (C)	S 7.8.2	All mitigation measures shall be audited to ensure effectiveness.	Contractor
	Jetty / During piling. (C)	S 7.11	Design and construction phase EM&A to prepared specifications and undertaken monitoring and audit during piling.	Contractor

#### 5. Landscape and Visual

	PAFF site/ During construction (D/C)	S8.10.2.1	Screen mounding including hydroseeded and part tree planted would be constructed and planted early on in the construction programme prior to the building of the Phase 1 tanks	Contractor
	PAFF site/ During construction (D/C)	S 8.10.2.3	The construction programme for the PAFF should be reduced to the shortest possible period and should be executed in phases with future phases of tanks built in sets of 2-4.	Contractor
	PAFF site/ During construction (C/O)	S 8.10.2.3	The extent and periphery of the works areas should be managed so that they are as small as possible and do not appear cluttered, untidy and unattractive, particularly to road traffic along Lung Mun Road.	Contractor
	PAFF site/ During construction (D/C)	S 8.10.2.3	Temporary hoarding barriers should be of a recessive visual appearance in both colour and form.	Contractor
	PAFF site/ During construction (C/O)	S 8.10.2.3	Materials should be stored in areas with the least obstruction to residents, pedestrians and traffic.	Contractor
	PAFF site/ During construction (C/O)	S 8.10.2.3	All material stockpiles should be covered with an impermeable material and sandbagging diversions should be placed around exposed soil.	Contractor
	PAFF site/ Construction period of fuel tank expansion (O)	S 8.10.2.2	Conservation of existing and imported soil resources. Existing soil resources on site will be conserved in stockpiles with a maximum height of 2m, and re-used in the formation of the proposed screen bund	Contractor



Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	PAFF site/ On commencement of construction (D/C)	S 8.10.3.1	Transplantation of existing road side whips affected by the proposed works and new compensatory planting works should be carried as early as possible in the construction period.	Project Proponent
	PAFF site/ On commencement of construction (D/C)	S 8.10.3	Temporary earth mounding, tree planting and hydroseeding should be implemented on the area of site not initially required for tanks.	Project Proponent
	PAFF site/ During construction (D/C/O)	S 8.10.3.1	A raised bund/earth mound comprising containment bund-wall, access road and planting buffer shall be built and maintained around the tank farm.	Project Proponent
	PAFF site/ During construction (D/C)	S8.10.3.1	The existing whips in the amenity areas and along the access road are proposed to be transplanted to form a planting buffer around the site at phase 2005. The planting buffer will comprise a mix of native species and species that have a tall habit and are fast growing.	Project Proponent
	PAFF site/ During construction (C)	S.8.10.3.2	A 24-month maintenance period will be needed to ensure transplantation/plant establishment is successful	Project Proponent
	PAFF site / Design (D/C)	S 8.10.4.3	The design of the PAFF should incorporate materials, details and textures which are visually recessive.	Project Proponent
	PAFF site tanks /Design (D/C)	S 8.10.4.2	Colours should be of low chromatic intensity to reduce the potential contrast between the structures and their background.	Project Proponent
	Site perimeter (D/C/O))	S 8.10	Visually permeable security fencing should be used around the perimeter.	Project Proponent
	Tanks / Operational phase (D/C/O)	S 8.10.5.1	Minimum amount of lighting for the tanks shall be used, only applied for safety at the key access points and staircases.	Project Proponent
	PAFF site/Operational phase (D/C/O)	S 8.10.5.1	Limited lighting intensity on the site.	Project Proponent
	PAFF site/ Operational phase	S 8.10.5.1	Directional down lighting is suggested to minimise light spill to the surrounding area	Project Proponent
	PAFF site/Operational phase (D/C/O)	S 8.13.10	Construction and operational stage EM&A to prepared and undertaken monitoring and audit of the compensatory planting/transplantation and planting establishment.	Contractor
<b>6. Cultural Heritage</b>				
	Along pipeline alignment / Prior to dredging works	S 9.7.7	A complete marine archaeological investigation shall be carried by a qualified marine archaeologist of the pipeline route before any construction works start.	Franchisee
	Along pipeline alignment / Prior to dredging works	S 9.7.7	The marine archaeological investigation shall comprise a geophysical survey followed by a diver survey, if required, to confirm the results of the geophysical survey.	Franchisee

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	Along pipeline alignment / Prior to dredging works	S 9.7.7	The methodology for the survey shall be submitted to the Director of Environmental Protection for approval no less than one month before any field work commences and the results of the survey and any mitigation measures shall be to the approval of the Director of Environmental Protection.	Franchisee
	Along pipeline alignment / Prior to dredging works	S 9.7.7	The CV of the marine archaeologist shall be submitted to the EPD for approval prior to the start of the investigation at the time of submission of the methodology.	Franchisee
	Along pipeline alignment / Prior to dredging works	S 9.7.7	The MAI shall be carried out by a qualified marine archaeologist who shall apply for a license under the Antiquities and Monuments Ordinance, Cap 53.	Franchisee
	Along pipeline alignment/Prior to dredging works	S9.7.7	The Project Proponent shall comply with the recommendations of the MAI	Franchisee
	During dredging (c )		During the dredging of the pipe trench, a watching brief will be implemented where the trench intersects sub-surface targets SS1 and SS2.	Contractor
	During dredging ( c )		Dredge operators to be made aware of the likely presence of a shipwreck near the coordinates given for SS1 and SS2 and are to report any unusual resistance or slowing down of the dredging in these areas.	Contractor
	During dredging (c )		Dredging to cease in the nominated areas, SS1 and SS2, after a few 3 and 2 m of sediment has been removed respectively. Divers, under the supervision of a licensed maritime archaeologist, are then to examine the trench for possible cultural remains of significance.	Contractor

#### 7. Waste Management

	Contract mobilisation / During construction (C)	S 14.7.2	The Contractor shall identify a coordinator for the management of waste.	Contractor
	Contract mobilisation / During construction (C)	S 14.7.2	The waste coordinator shall prepare and implement a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and to ensure that illegal disposal of wastes does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed.	Contractor
	Contract mobilisation / During construction (C)	S 14.7.2	The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.	Contractor
	PAFF Site / During construction	S 14.7.2	No waste shall be burnt on site.	Contractor
	All sites / During construction (C)	S 14.7.2	Excavated material shall be used on site for purposes of landscaping or formation of bund walls.	Contractor

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	All areas / During construction (C)	S 14.7.2	All material shall be reused on site as far as practicable, including formwork plywood, topsoil and excavated material.	Contractor
	Contract preparation stage (D)	S 14.7.2	Suitable provisions shall be included in the construction contract to ensure that the Contractor sorts and recycles waste.	HyD
	All areas / During construction (C)	S 14.7.2	Re-use and recycling of waste must always be considered first. Waste disposal shall only be undertaken in the last resort. Any surplus material generated shall be sorted on site into construction and demolition (C&D) waste and the public fill fraction. A sorting facility shall be set up on the site.	Contractor
	All areas / During construction (C)	S 14.7.2	The site and surroundings shall be kept tidy and litter free.	Contractor
	CED public fill stockpile in Mui Wo, North Lantau or Mui Wo refuse transfer stations/ During construction (C)	S 14.7.2	The C&D waste shall be disposed of at a licensed landfill or deposited at an authorised waste transfer facility and the material suitable for public fill delivered to a public filling area, public filling barging point or public fill stockpile area after obtaining the appropriate licence.	Contractor
	Along alignment of haulage road and road link / Site Clearance activities (C)	S 14.7.2	Vegetation shall be stripped prior to site clearance, chopped and compacted using a mobile compactor to reduce the volume of material to be transported and disposed of.	Contractor
	All areas / During construction (C)	S 14.7.2	Stockpiled material shall avoid vegetated areas.	Contractor
	All areas / During construction, particularly dry season (C)	S 14.7.2	Stockpiles shall be covered by tarpaulins and/or watered as required.	Contractor
	All areas / During construction (C)	S 14.7.2	Storage of material on site should be kept to a minimum.	Contractor
	All areas, particularly at site exits / During construction (C)	S 14.7.2	Excavated material in trucks shall be covered by tarpaulins.	Contractor
	Site entrances and exits / During construction (C)	S 14.7.2	Wheel washing facilities shall be used by all trucks leaving the site to prevent the transfer of mud onto public roads.	Contractor
	Works site / During construction (C)	S 14.7.2	Suitable chemical waste storage areas should be formed at the works site for temporary storage pending collection	Contractor
	Chemical waste treatment facility at Tsing Yi/ During construction (C)	S 14.7.2	A licensed contractor shall be employed to collect chemical waste for delivery to a licensed treatment facility.	Contractor
	All areas / During construction (C)	S 14.7.2	Temporary storage areas for general refuse should be enclosed to avoid environmental impacts.	Contractor
	All areas / During construction (C)	S 14.7.2	Sufficient dustbins should be provided for storage of waste.	Contractor

Item No.	Location/Timing	EIA Reference	Mitigation Measures	Implementation Agent
	All areas, WENT Landfill or NWNT refuse transfer stations/ During construction (C)	S 14.7.2	General refuse should be cleared daily and should be disposed of to the nearest licensed facility.	Contractor
	Site offices, along alignments / During construction (C)	S 14.7.2	Nightsoil arising from chemical toilets and chemical treatment facilities should be transported by a licensed contractor to government Sewage Treatment Works for disposal.	Contractor
	PAFF site / During construction (C)	S 14.7.2	Waste oils, chemicals or solvents shall not be disposed of to drain.	Contractor
	PAFF site / During construction (C)	S 14.7.2	Good site practice shall be implemented to avoid waste generation and promote waste minimisation.	Contractor
	PAFF site / During construction (C)	S 14.7.2	Waste materials such as paper, metal, timber and waste oil shall be recycled as far as practicable.	Contractor
	PAFF site / During construction (C)	S 14.7.2	Temporary structures used during construction shall be provided in the form of proprietary Portakabin type units sited on areas of permanent hard paving units as far as practicable.	Contractor
		S 14.7.2	Dredged marine mud shall be disposed of in a gazetted marine disposal ground under the requirements of the Dumping at Seas Ordinance.	Contractor
	PAFF site / During construction (C)	S 14.7.2	All waste containers shall be in good condition and fitted with lids or covers to prevent waste from escaping or the ingress of water.	Contractor
	PAFF site / During construction (C)	S 14.7.2	All waste containers shall be in a secure area on hardstanding.	Contractor
	PAFF site / During construction (C)	S 14.7.2	Emergency equipment to deal with any spillage or fire shall be kept on site.	Contractor
	PAFF site / During construction (C)	S 14.7.2	All containers used for storage of chemical waste shall be maintained in good condition and clearly labelled in both English and Chinese.	Contractor
	PAFF site / During construction (C)	S 14.7.2	All storage areas for chemical waste shall be: <ol style="list-style-type: none"> <li>1. clearly labelled;</li> <li>2. enclosed on at least 3 sides;</li> <li>3. have impermeable floor and bunding sufficient to fully retain any spillage or leakages;ventilated; and</li> <li>4. covered to prevent rainfall from entering.</li> </ol>	Contractor
	PAFF site / During construction (C)	S 14.7.2	All types of asbestos including sources (such as clutch linings) shall be treated as chemical waste, Asbestos containing wastes shall be kept separate from other wastes.	Contractor
	PAFF site / During construction (C)	S 14.7.2	All leaking containers shall be contained and removed from site as soon as is reasonably practicable.	Contractor

<b>Item No.</b>	<b>Location/Timing</b>	<b>EIA Reference</b>	<b>Mitigation Measures</b>	<b>Implementation Agent</b>
	PAFF site / During construction (C)	S 14.7.2	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling.	Contractor
	All areas / During construction (C)	S 14.10.1	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	Contractor

Annex D

## Action Plan for Dolphin Monitoring

*Annex D Action Plan for Dolphin Monitoring*

EVENT	ACTION			
	ET	IEC	FSR	Contractor
Dolphin numbers recorded in the post-construction monitoring are significantly lower than those recorded in the pre-construction monitoring	<ol style="list-style-type: none"> <li>1. Repeat statistical data analysis to confirm findings;</li> <li>2. Review historical data to ensure differences are as a result of natural variation or previously observed seasonal differences;</li> <li>3. Identify source(s) of impact;</li> <li>4. Inform the IEC, FSR and Contractor;</li> <li>5. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>6. Discuss mitigation measures, such as additional dolphin monitoring, with the IEC and Contractor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with the ET and the Contractor on the mitigation measures;</li> <li>2. Review proposals on mitigation measures submitted by the Contractor and advise the FSR accordingly;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with the IEC on the proposed mitigation measures;</li> <li>2. Make agreement on the mitigation measures to be implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the FSR and confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Discuss with the ET and the IEC and propose mitigation measures to the IEC and the FSR;</li> <li>6. Implement the agreed mitigation measures.</li> </ol>

Annex E

## Cumulative Complaints Statistics



## Annex E Cumulative Complaints Statistics

### *Statistical Summary of Environmental Complaints*

Reporting Period	Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
Before construction works	1	1	Dust
18/11/05 – 15/12/05	1	2	Dust
15/12/05 – 14/01/06	0	2	Nil
15/01/06 – 14/02/06	0	2	Nil

### *Statistical Summary of Environmental Summons*

Reporting Period	Environmental Summons		
	Frequency	Cumulative	Summon Nature
18/11/05 – 15/12/05	0	0	--
16/12/05 – 14/01/06	0	0	--
15/01/06 – 14/02/06	0	0	--

Annex F

## Visual Monitoring Dolphin Sightings Record Sheet

Annex F

## Visual Monitoring Dolphin Sightings Record Sheet

Land-based Observation Datasheet (ERM)

Date: 18 Jan 06

Weather: Sunny

p. 1 of 1  
 Site: PAFF Piling Barge Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
9:16	BE	2	u				
10:05	EC	2-3	u				
11:00	EC	2	u				
15:00	EE	2	u				12:17 Piling works started 15:00 Piling works ended
16:45	BE	3-4	u				
17:46	EC	3	u				
18:00	EC	3	u				17:48 Piling works started again 18:00 Getting dark
18:15	EE	3	u				18:15 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

Land-based Observation Datasheet (ERM)

Date: 19 Jan 06

Weather: Sunny

p. \_of \_1  
Site: PAFF Piling Barge

Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
9:15	BE	2	u				
10:56	EE	2	u				9:57 Piling works started 10:56 Piling works ended
13:00	BE	2	u				
15:50	EC	2	u				15:45 Piling works started 15:50 Getting foggy
17:59	EE	2	u				17:59 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?



Land-based Observation Datasheet (ERM)

Date: 20 Jan 06

Weather: Cloudy + Rainy

p. 1 of 1

Site: PAFF Piling Barge

Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
11:10	B E	2	u				11:58 Piling work started
12:30	E C	2	u				12:30 Started Raining
14:05	E E	2	u				14:05 Piling work ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

Land-based Observation Datasheet (ERM)

Date: 21 Jan 06

Weather: Cloudy

p. 1 of 1

Site: PAFF Piling Barge Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
10:30	BE	2	U				
11:50	EE	2	U				11:27 Piling works started 11:50 Piling works ended
13:00	BE	2	U				
15:01	EE	2	U				14:00 Piling works started again 15:01 Piling works ended
							22 Jan 06 is Sunday, thus there will be no piling works <del>there</del>
							23 Jan 06 works will be resumed

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?







Land-based Observation Datasheet (ERM)

Date: 24 Jan 06

Weather: Cloudy + Sunny

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Site: PAFF Piling Barge

Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
11:30	B E	2	U				
11:45	E C	2	U				11:45 Getting Sunny
15:15	E E	2	U				12:20 Piling started 15:15 Piling work ended
16:30	B E	2	U				17:15 Piling work started
18:00	E C	2	U				18:00 Getting dark
18:10	E E	2	U				18:10 Piling work ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

Land-based Observation Datasheet (ERM)

Date: 25 Jan 06

Weather: Sunny

p. 1 of 1

Site: PAFF Piling Barge Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
9:45	BE	2	U				
11:05	EE	2	U				10:17 Piling works started
							11:05 Piling works ended due to machine malfunction
14:45	BE	3	U				15:40 Piling works resumed
16:10	EC	2	U				16:10 Sea became clam
18:03	EC	2	U				18:03 Getting dark
18:20	EE	2	U				18:20 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?



Land-based Observation Datasheet (ERM)

Date: 26 Jan 06

Weather: Sunny

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 Site: PAFF Piling Bay Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
10:10	BE	2	U				
11:55	EE	2	U				11:15 Piling works started
							11:55 Piling works ended
12:45	BE	2	U				
13:57	EE	2	U				13:30 Piling works started
							13:57 Piling works ended
15:27	BE	2	U				
17:45	EE	2	U				16:20 Piling works started
							17:45 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

Land-based Observation Datasheet (ERM)

Date: 27 Jan 06

Weather: Sunny

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Site: PAFF Piling Barge Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
9:05	BE	2	U				9:45 Piling works started
11:37	EE	2	U				11:37 Piling works ended
12:30	BE	2	U				13:19 Piling works resumed
14:57	EE	2	U				14:57 Piling works ended
							From Jan 27 to Feb 2, no piling works will be conducted due to holidays for Lunar Chinese New Year. Piling works will be resumed on Fri, Feb 3 06

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?



Land-based Observation Datasheet (ERM)

Date: 6 Feb 06

Weather: Sunny

p. 1 of 1

Site: PAFF Piling Barge Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
9:50	B E	2	u				
12:20	E E	2	u				10:40 Piling works started 12:20 Piling works ended
14:45	B E	2	u				
16:40	E C	3	u				16:25 Piling works started 16:40 Big waves generated by boat traffic
16:43	E C	2	u				
17:50	E E	2	u				17:50 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

Land-based Observation Datasheet (ERM)

Date: 7 Feb 06

Weather: Sunny

p. 6 of 1  
 Site: PAFF Piling Barge Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
10:45	B E	2	U				
13:55	E E	2	U				11:45 Piling works started
15:05	B E	2	U				13:55 Piling works ended
16:55	E E	2	U				15:40 Piling works resumed
17:45	B E	2	U				16:55 Piling works ended
19:00	E E	2	U				18:45 Piling works resumed
							19:00 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?



Land-based Observation Datasheet (ERM)

Date: 8 Feb 06

Weather: Sunny

Site: PAFF

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Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
9:15	BE	2	U				9:55 Piling works started
							10:31 2 SC were sighted following a fishing boat at 1100m away from the piling barge at 8 o'clock direction. 1 subadult & 1 adult
11:03	EE	2	U				10:45 Dolphins appeared to disappear
							11:03 Piling works ended
11:30	BE	2-3	U				11:30 Creeting windy & wavy
13:05	EC	2	U				12:00 Piling works started
13:35	EE	2	U				13:05 Creeting calm
15:20	BE	2-3	U				13:35 Piling works ended
17:47	EE	2-3	U				15:55 Piling works resumed
							17:47 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)

Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)

Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

SC = Sousa chinensis

11 Coart 1111

12

9 + 3  
6

Land-based Observation Datasheet (ERM)

Date: 9 Feb 06

Weather: cloudy

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Site: PAFF Piling Barge Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
10:07	BE	2	u				
10:50	EC	2	u				10:50 Getting sunny
							11:11 Piling works started
							11:25 1 SC was sighted at ~800m away from the piling barge following a fishing boat at 7 o'clock direction. An adult was sighted
12:36	EE	2	u				11:44 Dolphin appeared to disappear
15:30	BE	2	u				12:36 Piling works ended
18:15	EE	2	u				16:07 Piling works resumed
							18:15 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

11 Count 111  
 12  
 9 + 3  
 6

SC = Sousa chinensis



Land-based Observation Datasheet (ERM)

Date: 10 Feb 06

Weather: Sunny

p. 1 of 1  
Site: PAFF Piling Barge

Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
11:30	BE	2	U				
13:40	EE	2	U				12:05 Piling works started
15:20	BE	2	U				13:40 Piling works ended
17:50	EE	2	U				16:25 Piling works resumed
							17:50 Piling works ended
							Tomorrow 11 Feb 06 & 12 Feb 06
							there will no piling works being
							conducted
							- Piling works will be resumed on
							13 Feb 06 at around 10 am

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)

Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)

Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

Land-based Observation Datasheet (ERM)

Date: 13 Feb 06

Weather: cloudy

Site: PAFF Piling Barge p. 1 of 1 Observers: RICHARD HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
9:40	BE	2	U				
13:07	EE	2	U				10:28 Piling works started
							13:07 Piling works ended
15:30	BE	2	U				
17:45	EE	2	U				16:03 Piling works started
							17:45 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

Land-based Observation Datasheet (ERM)

Date: 14 Feb 06

Weather: cloudy / Rainy

p. 1 of 1

RICHARD

Site: PAFF Piling Barge Observers: HUANG

Time	Event	Beau	Visib.	Species	Group Size	Behaviour	Other Comments
10:30	BE	2	U				
10:50	EC	2	U				10:50 Raining lightly
13:26	EE	2	U				11:21 Piling works started 13:26 Piling works ended
14:45	BE	2-3	U				14:45 It's raining lightly & windy
15:05	EC	2-3	U				15:05 Getting sunny & rain stopped
17:00	EE	2-3	U				15:47 Piling works started 17:00 Piling works ended

Event: BE (Begin Effort); EE (End Effort); EC (Environmental Change); STG# (Porpoise / Dolphin Sighting)  
 Behaviour: Socializing; Feeding; Milling/Resting; Travelling; Other (please specify)  
 Other Comments: Location? How many adults and juveniles? Presence of mother-calf pair? Interaction with fishing boat? Any subgroups?

Annex G

# Underwater Noise Monitoring Summary Report

### Mitigation Measures Employed during Piling

The mitigation selected for the piling works consisted of a combination of three techniques to surround the pile and barge with air bubbles, to reflect, scatter and absorb the sound generated by the hammering. The three techniques are:

- A 'Canadian bubble jacket' ring close to the seabed, releasing bubbles around the bottom of the pile.
- A fixed steel jacket around the pile, with air bubbles released into the annulus between the steel jacket and the pile.
- A bubble curtain around the whole barge, releasing bubbles from a few metres depth to prevent noise from the barge itself from radiating outside the immediate area.

### Results

Tables 1 and 2 summarized the results being analyzed from the monitoring data.

**Table 1 Broadband Noise Levels and Noise Attenuation within the Broadband Range 100 Hz to 25.6 kHz**

Position	EP Criteria (dB)	Ambient Level (dB)	Mitigated Noise Level (dB)	Compliant with EP Criteria
1 (250m)	162	139	146	Yes
2 (500m)	152	128	127	Yes
3 (1000m)	145	129	128	Yes

**Table 2 Broadband Noise Levels and Noise Attenuation within the EIA Dolphin Sensitive Range 400 Hz to 12.8 kHz)**

Position	EP Criteria (dB)	Ambient Level (dB)	Mitigated Noise Level (dB)	Compliant with EP Criteria
1 (250m)	162	133	138	Yes
2 (500m)	152	122	122	Yes
3 (1000m)	145	124	124	Yes

The interpretations of the results are as follows:

- The noise levels measured from all three positions (250m, 500m and 1000m) were well below the EP criteria.
- The noise levels were typically higher at 250m distance from the piling activity. Ambient noise levels were also higher closer to the seawall.
- The mitigated noise levels at 500m and 1000m did not have much difference than the ambient noise levels.

## PERMANENT AVIATION FUEL FACILITY

### - UNDERWATER NOISE MONITORING SUMMARY REPORT -

#### Background

Marine piling is required for the construction of a jetty to accommodate aviation fuel tankers. According to the EP's requirement (Clause 3.24), 'Bubble jacket shall be used for piling work to reduce underwater piling noise to achieve the following underwater mitigated noise levels:'

<u>Distance from Piling Work (m)</u>	<u>Noise Level (dB)</u>
250	162
500	152
1000	145

*Clause 3.25 'Underwater noise monitoring shall be conducted during piling to ensure that the underwater mitigated noise levels as specified in Condition 3.24 of this Permit are achieved. Underwater mitigated noise levels shall be recorded over the initial three days of the first week of piling work. Underwater noise monitoring shall be conducted in accordance with the procedures and requirements in the updated EM&A Manual approved under Condition 2.4 of this Permit.'*

Underwater noise monitoring was conducted by ERM's subcontractor EGS within the first week of the commencement of piling activities in order to fulfill the EP's requirement.

This report summarized the findings from the monitoring, and to determine whether the mitigated noise levels complied with the EP requirement.

#### Location of Monitoring

Offshore of Tuen Mun Area 38, close to Urmston Road Channel. *Figure 1* shows the monitoring locations of the Study.

#### Date and Time of Monitoring

23, 24 & 25 November 2005, between 8:30am to 5:00pm.

#### Methodology of Monitoring

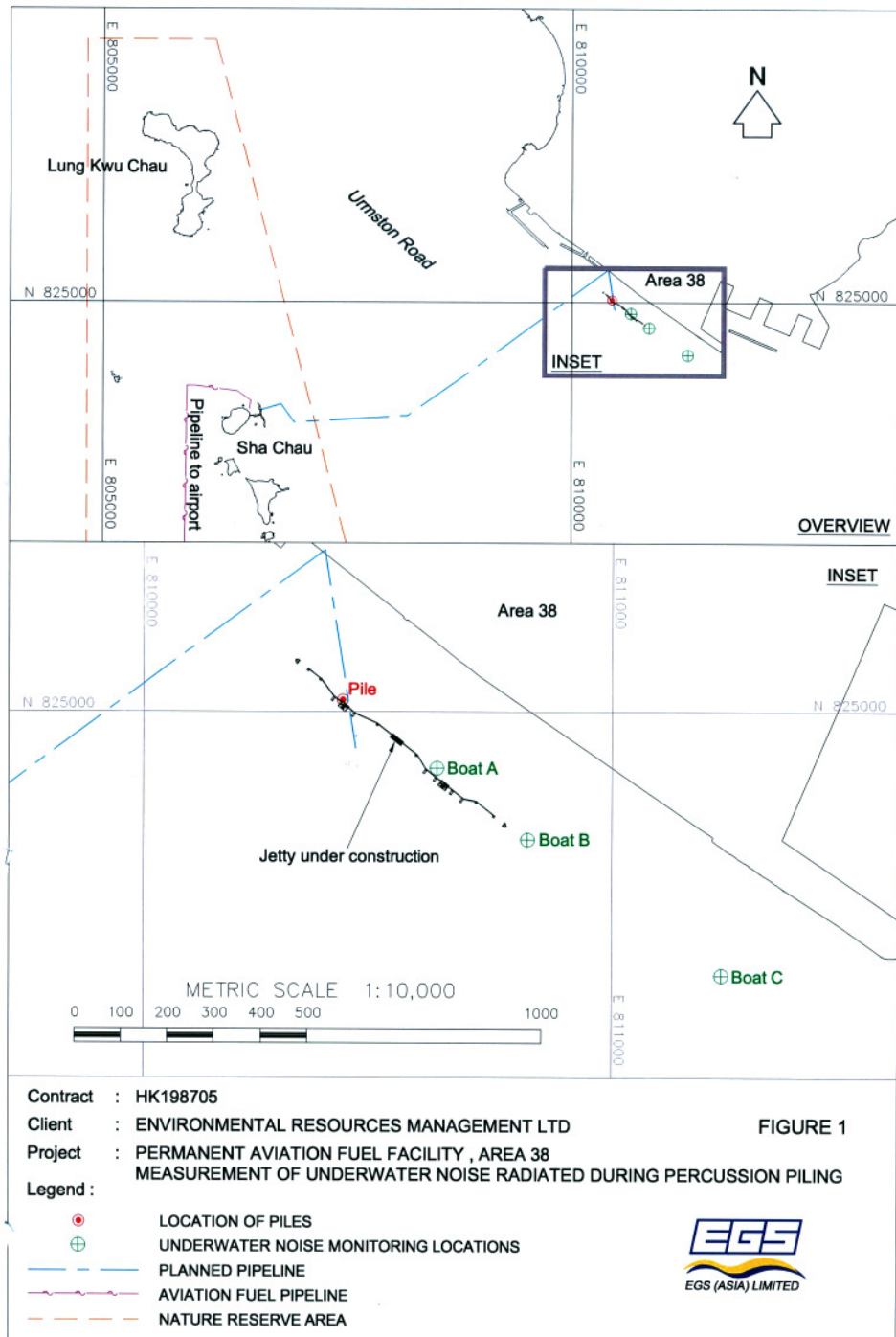
Three boats were employed to take measurement of noise levels at a distance of 250m, 500m and 1000m from the piling barge. Both the ambient and the piling (with mitigated measures) noise levels were recorded. All possible precautions were taken to avoid any interference to the results during the measurements. For details, please refer to EGS's report (HK198705) 'PAFF Jetty at Area 38 – Measurement of Underwater Noise Radiated during Percussion Piling', January 2006.

### Conclusion

- The mitigation measures were effective. The mitigated noise levels generated from the piling activities complied with the EP requirement.
- The piling noise was negligible over ambient at a distance of 500m or more.
- Background noise levels from heavy marine traffic and construction activities contributed to the high ambient noise levels.



**Figure 1** *Monitoring Locations of the Underwater Noise Monitoring Study*





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