China State Construction Engineering (Hong Kong) Limited.

Regular Marine Travel Routes Plan

Hong Kong – Zhuhai – Macao Bridge Hong Kong Link Road

Section between Scenic Hill and Hong Kong Boundary Crossing Facilities

Revision No.: 6

Revision No.:	6
Issue Date:	20 August 2013
Prepared by (Senior Engineer)	Wong Kwok Keung, Paul
Received by (Construction Manager)	William Chu
Reviewed by (Safety Officer)	Keung Fu Wah
Approved by (Contractor's Representative)	S. Y. Tse

DOCUMENT CHANGE RECORD

Revision No.	Date of Revision	Date of Next Review	Description of Change	Reason for Change
1	15 July 2012	16 Jan 2013	First Issue	N/A
2	24 Sep 2012	23 Mar 2013	Revised Version	Drawing Amendment
3	10 Apr 2013	9 Oct 2013	Revised Version	Drawing Amendment
4	24 May 2013	23 Nov 2013	Revised Version	Responses to ENPO's comment & Drawing Amendment
4	23 Jul 2013	22 Jan 2014	Revised Version	Responses to ENPO's comment & Drawing Amendment
6	20 Aug 2013	19 Feb 2014	Revised Version	Responses to ENPO's comment & Drawing Amendment

DOCUMENT DISTRIBUTION RECORD

Issue No.	Holder	Location / Unit
1	China Sate Construction Engineering (Hong Kong) Limited.	29/F, China Overseas Building,139 Hennessy road Hong Kong
2	The Engineer's Representative Hong Kong Zhuhai Macao Bridge Hong Kong Link Road Section between Scenic Hill and Hong Kong Boundary Crossing Facilities	CRE/SOR Office

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1.0 CONTRACT NFORMATION

1.1 Scopes of Contract

1.1.1 This Regular Marine Travel Routes Plan is prepared for Contract HY/2011/03 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between Scenic Hill and Hong Kong Boundary Facilities ("the Contract") for the Highways Department of HKSAR. The Contract was awarded to China State Construction Engineering (Hong Kong) Limited ("the Contractor") and BMT Asia Pacific was appointed as the Environmental Team by the Contractor.

1.1.2 The Contract is part of the Hong Kong – Zhuhai – Macao Bridge Hong Kong Link Road Project, the Contract works is part of a "Designated Contract" under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap 499) and an Environmental Impact Assessment (EIA) Report was prepared for the Contract Register No. AEIAR-144/2009). The current Environmental Permit (EP) EP-352/2009/B was issued on 01 August 2013. These documents are available through the EIA Ordinance Register.

The scope of this Contract (HY/2011/03) includes:

- Reclaim 23 hectares of sea along the east coast of the HKIA,
- Construct 1 kilometre long tunnel with 3 lanes for eastbound carriageway heading to the HKBCF and 4 lanes for westbound carriageway heading to the HZMB Main Bridge from Scenic Hill to the new reclamation,
- Construct an abutment of the viaduct portion of the HKLR at the west portal of Tunnel SHT and associated roadworks at west portal of Tunnel SHT;
- Construct an 1.6 kilometres road dual with 3 lane carriageway with hard shoulder for each bound on the new relamation aling the east coast of the HKIA to connect with the HKBCF
- Modify the existing roads in the HKIA, involving viaducts, at grade roads and tunnels.

1.2 Purpose of the Regular Marine Travel Routes (RMTR) Plan

To describe the design considerations for selection of regular marine travel routes, method of implementation and monitoring as well as precautionary measures to minimize any potential impacts to Chinese White Dolphin during the course of reclamation works and other construction activities of HKLR.

This Regular Marine Travel Routes Plan is prepared to fulfil Condition 2.9 of EP-352/2009/B which states "To minimize the chance of vessel collision and the disturbance to the Chinese white dolphins, the Permit Holder shall deposit with the Director, at least two weeks before the commencement of the construction of the Contract, three hard copies and one electronic copy of a plan showing the regular marine travel routes of vessels moving to and from the Contract work sites. Any subsequent changes to the regular routes shall be verified by the IEC as conforming to the requirements in the EIA Report and deposited with the Director."

2.0 DESIGN OF REGULAR MARINE TRAVEL ROUTES

2.1 Types of Working Vessels

Different construction activities in this Contract involve different types of working vessels, for example:

Laying of silt curtain and geotextile – Derrick lighter, flat top barge and tug boat.

Construction of rock platform and seawall - Derrick lighter, flat top barge, split hopper barge, pelican barge and tug boat.

Reclamation – Derrick lighter, flat top barge, split hopper barge and tug boat.

Disposal of excavated materials - Derrick lighter, flat top barge, split hopper barge and tug boat.

The ship particulars of different types of working ships deployed for the construction under this Contract are attached in Appendix D.

These working fleets can be divided into three main categories:

2.1.1 Non self propelled working fleets in the vicinity of the site
This category includes derrick lighters, flat top barges, crane barges, hopper barge etc. The potential impact to Chinese White Dolphin (CWD) of these working fleets will be low, as they will mainly station within HKLR boundary and the maneuvering or positioning will be carried out in slow speed. Tow, positioning and anchoring will be done by tug boats and anchor boats.

2.1.2 Self propelled working fleets in the vicinity of HKLR site
This category includes tug boats, anchor boats, passenger boats, sampan and pelican barges. Marine traffic disturbance or collision risk due to this fleet category will also be low, as the construction activities are mainly carried out nearby the HKLR site, and most of working fleets will be slow moving (around 5 knots up to maximum 10 knots).

2.1.3 Delivery material to HKLR reclamation work site
This category comprises tug boats, anchor boats and derrick barges. Potential impact of cumulative marine traffic disturbance or collision risk on CWD due to the large sized and slowly moving (around 5 to 10 knots) working fleets with relatively low traffic flow during construction stage are anticipated to be low. Nevertheless, speed limits and regular travel routes will be implemented to control and minimize marine traffic disturbance on CWD.

Typically, all working vessels will adopt the travel route shown in Appendix A every time entering or leaving site. Specifically, material barges for public fill (i.e. split hopper barge & derrick lighter) will adopt the route plan shown in Appendix B while material barges for sand fill and rock fill (i.e. pelican barge) will use the routes in Appendix C.

2.2 Design Criteria of Regular Marine Travel Routes (RWTR)

The design criteria of this RMTR are summarized as folllows:

2.2.1 Hotspots of Chinese White Dolphin in Brothers Island

The existing Tung Chung Navigation Channel falls into the proposed Marine Park which cannot be avoided. Therefore, the finalized marine travel route will pass through the south east corner of proposed marine park in Brothers Island therefore precautionary and mitigation measures shall be implemented. The route will shift along the edge of proposed marine park as much as practical. The travelling speed will keep not exceeding 5 knots when crossing the edge of the proposed marine park.

2.2.2 Existing Navigation Channel and Marine Traffic

Existing fairways such as Urmston Road Channel and northern/western fairway will be selected as the main travel routes for delivery of material to HKLR site.

The existing traffic route in the vicinity of HKLR site and Urmston Road Channel is attached Appendix A. Because of the existing volume of marine traffic, the contract related working fleets are required to draw extra attention and safety awareness while passing through this region. The marine travel routes will also be locally adjusted in order to minimize the potential risk of marine traffic incident.

2.2.3 Practice of Navigation Safety

The licensed captain will be the only authorized person to control the working fleets under safe marine operation. The captain will strictly follow all navigation safety requirements and international practices with the aids from navigation instument and the support from marine traffic control team of Marine Department.

Markers buoys and navigation buoys will be adopted for marine based indicators to demarcate proper navigation channel. These aids will assist the captain to determine the proper travel routes under actual situation and any unexpected incidents.

In addition, since fleet navigation will also be affected by natural constraints such as wind, current, wave, etc., as well as other marine operators such as speed boats, turbo jets, container vessels and river trade vessels, the marine travel routes of contract related working fleets will be adjusted locally to avoid any incident and to ensure safe navigation.

2.2.4 Restricted Areas and Height Restriction of Hong Kong International Airport

According to the Airport Height Restriction and Airport Restricted Area presented in Figure 1, there are seven restricted areas in the vicinity of Hong Kong International Airport where working fleets are not allowed to pass through without authorization. Moreover, the airport height restriction limit will govern the marine travel routes of working fleets for the delivery of reclamation materials to HKLR site.

2.2.5 Reduction of Sediment Plume at Shallow Water Areas

The Contractor will schedule, according to the predicted tides of Hong Kong Observatory all their pelican barges to travel into work site at high tide in order to

i. reduce sediment plume at shallow water [of the works] areas.
ii. minimize mooring at Sham Shui Kok.

2.3 Selected Regular Marine Travel Routes

Public fill materials will be obtained from two local fill banks. Materials delivered from Tseung Kwan O Area 137 fill bank will travel westward, passing through Eastern Fairway, Central Fairway, Tathong Channel, Hung Hom Fairway, Northern Fairway and Ma Wan Fairway into the work area. Materials delivered from Tuen Mun Area 38 fill bank will travel directly southward near Sham Shui Kok Anchorage, then via Tung Chung Navigation Channel and enter the work area.

Sand fill and rock fill material will arrive from six quarries in distinct parts of China, namely Zhu Jiang Kou Sha Chang, Hui Zhou Hong Hai Wan Sha Chang, Li Hai Sha Chang, Xin Hui Tai Sheng Shi Chang, Hui Zhou Guan Tian Shi Chang and Bo Luo Yi He Shi Chang. Barges carrying materials from all quarries will travel to the work area using the most efficient route as highlighted in Appendix C.

Based on the abovementioned designed criteria, the marine travel routes for different construction activities are designed and presented in the following:

Appendix B: Marine Travel Routes for delivery of Public Fill Materials
Appendix C: Marine Travel Routes for delivery of Sandfill and Rockfill Materials

The main marine travel routes entering to the HKLR site will be from the north fairway or west. Working fleets with large storing capacity will be deployed so as to minimize the number of trips passing through those ecologically sensitive areas.

3.0 IMPLEMENTATION AND MONITORING

3.1 Supervision Staff

The Project Director will be the ultimate person for minimizing ecological impacts including dolphin monitoring and marine traffic control. The supervising staff including Project Manager, Construction Manager, Site Foreman and the representative of subcontractors and specialists will assist the Project Director onsite to implement all precautionary and mitigation measures approved by the Supervising Officer.

3.2 Method of Implementation and Monitoring

The construction works are divided into onsite and offsite works.

Onsite works include all construcion activities such as seawall construction and reclamation within the site area. As the working fleets are mainly stationed within the site boundary and occasionally will be relocated, solely, to suit the work progress, the potential impacts to CWD will be low.

Offsite works mainly comprise the delivery of materials such as sandfill from Pearl River Estuary and public fill from fill banks in Hong Kong.

All barges and other vessels (include tug boat, anchor boat and other self-propelled working fleets) will be equipped with Very High Frequency or/and GPS for track logging of vessels.

The daily record of marine travel route of offsite working fleets will be collected and filed by the supervising staff for inspection and monitoring purposes. Graphical plots of all the vessel tracks overlaid on HK base map will be provided at monthly interval to SO, ETL, IEC/ENPO to demonstrate the conformance of the vessel to the proposed route If any vessel track log showed the approved marine travel route is not followed, formal warning will be issued to the captain and his shipping company or material supplier.

3.3 Precautionary Measures

3.3.1 Considerations of Operation Procedure

The major ecological risk of marine vessel is a moving vessel striking and injuring Chinese White Dolphin during travel and navigation. Information regarding the locations of frequent sighting near the proposed vessel routes indicated that the following would also be required to minimize the chance of a vessel striking marine animals.

Once approaching or leaving the entrance of the silt curtain, all vessels will travel at a speed no greater than 5 knots for a distance of 250m from the silt curtain then at a speed no greater than 10 knots for a distance of at least 1.5km away from the silt curtain. The vessels can then navigate at normal speed after that distance unless other restrictions are imposed.

If any dolphins are sighted within 250m of a vessel then the vessel will slow down to a speed no greater than 5 knots for at least 3 minutes after the last sighting.

These procedures will be applied until current and updated dolphin sighting data is processed by the contract Environmental Team (ET). It is expected that the works and the inclusion of the silt curtain will not change the dolphin activity in this area so it may not necessary to modify the above instructions and possibly the routes in the future.

However, upon required (i.e. when the Environmental Team Leader considered review is necessary based on the CWD monitoring data). If amendment to the regular marine travel routes has been made, new routes will be deposited to EPD.

3.3.2 Skipper Training

The training material will be designed and prepared by the dolphin specialist and be updated time to time during the course of HKLR construction.

The dolphin specialist is responsible to provide training to the trainers of HKLR's main contractor (Train the Trainer Scheme). The training will be given by the dolphin specialist or training personnel approved by IEC/ENPO or AFCD.

All captains and the supervising staff should undergo training to learn about local dolphins and porpoises. They should be trained to be aware of the protocol for 'dolphin friendly' vessel operation (refer to the Code of Conduct for Dolphin Watching Activities from AFCD).

The training course will be given to the licensed vessel captains by the trainers within three working days after commencement of working onsite and refreshment course will be provided every quarter.

All the relevant training records will be submitted to SO, IEC/ENPO at monthly interval to demonstrate the conformance to the EM&A documents.

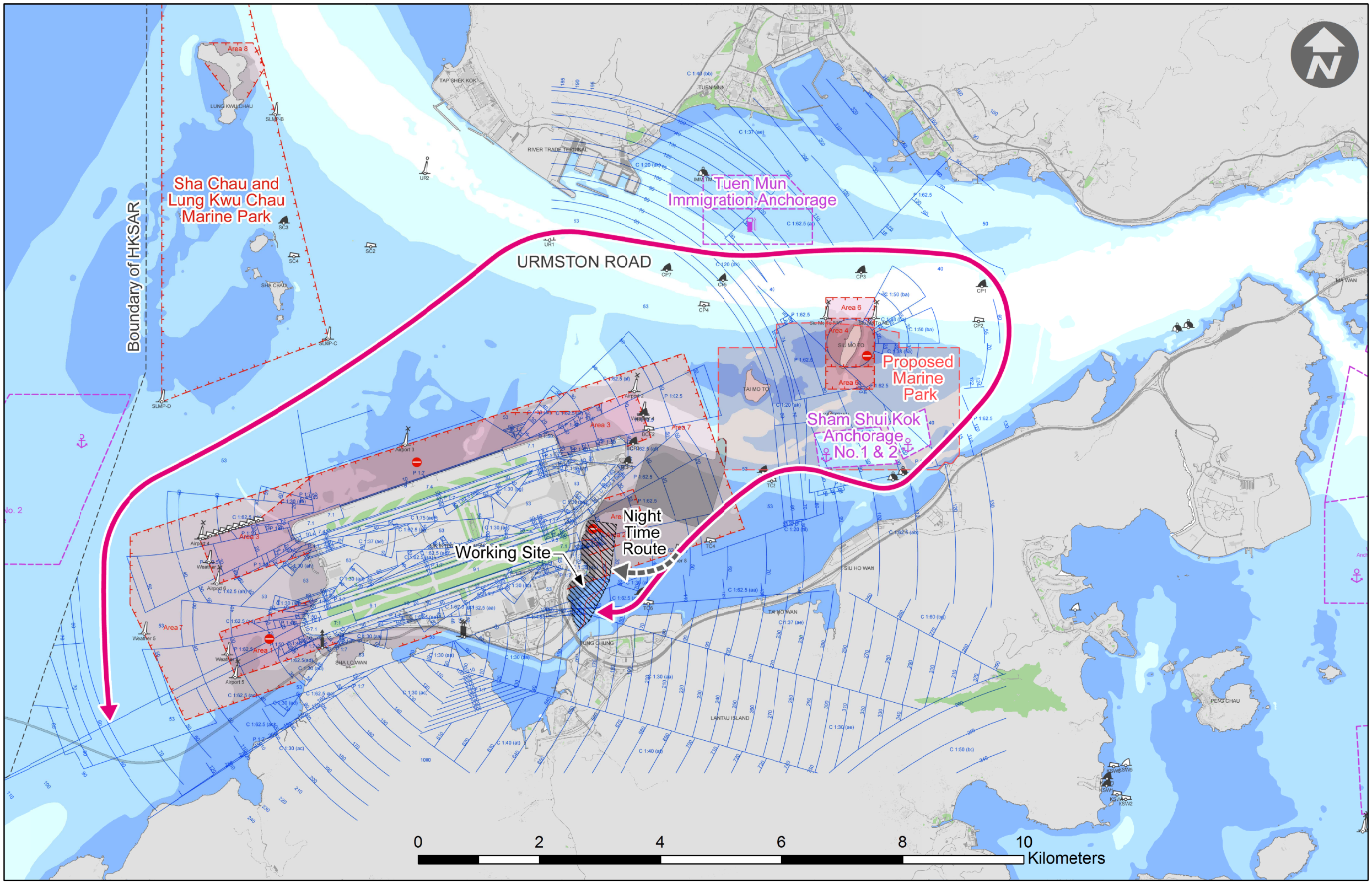
The training material and its updates will also be provided to SO and IEC/ENPO for records.

4.0 SUMMARY AND CONCLUSION

This RMTR Plan presents a review of major construction works of HKLR, working fleets particulars and design criteria of marine travel routes. According to the review, preferred marine travel routes for different construction works are recommended. Method of implementation and monitoring as well as precautionary measures are proposed to minimize any potential impacts to Chinese White Dolphin during the course of reclamation works and other construction activities of Contract No. HY/2011/03 for HKLR.

Appendix A

Marine Travel Routes of Vessels



NOTES

1. FOR THE SOUTHERN BOUNDARY OF THE PROPOSED MARINE PARK, AS IT IS UNAVOIDABLE TO PASS THROUGH IN ORDER TO ENTER THE SITE AREA, THE ROUTES ARE DECIDED TO PASS THROUGH THE SOUTHEAST CORNER TO MINIMIZE THE IMPACT TO THE MARINE PARK.
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   - 75 METRES HEI LING CHAU TYPHOON SHELTER

Rev	Description	By	Date
B	AMENDMENT	WL	JUL13
A	FIRST ISSUE	WL	MAY13

Consultant

ARUP 奧雅納工程顧問 Ove Arup & Partners Hong Kong Limited

Main Contractor :

中國建築工程(香港)有限公司 CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG) LTD.

Contract No. and Title:

Contract No. HY/2011/03

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road -
Section Between Scenic Hill and
Hong Kong Boundary Crossing Facilities

Drawing title

MARINE TRAVEL ROUTE OF WORKING VESSELS OF HY/2011/03

Drawing no.	Rev.
HY/2011/03/M/02025	B

Drawn	Date	Checked	Approved
WL	JUL13	PW	FW

Scale	Status
N.T.S.	FOR INFORMATION

路政署 HIGHWAYS DEPARTMENT
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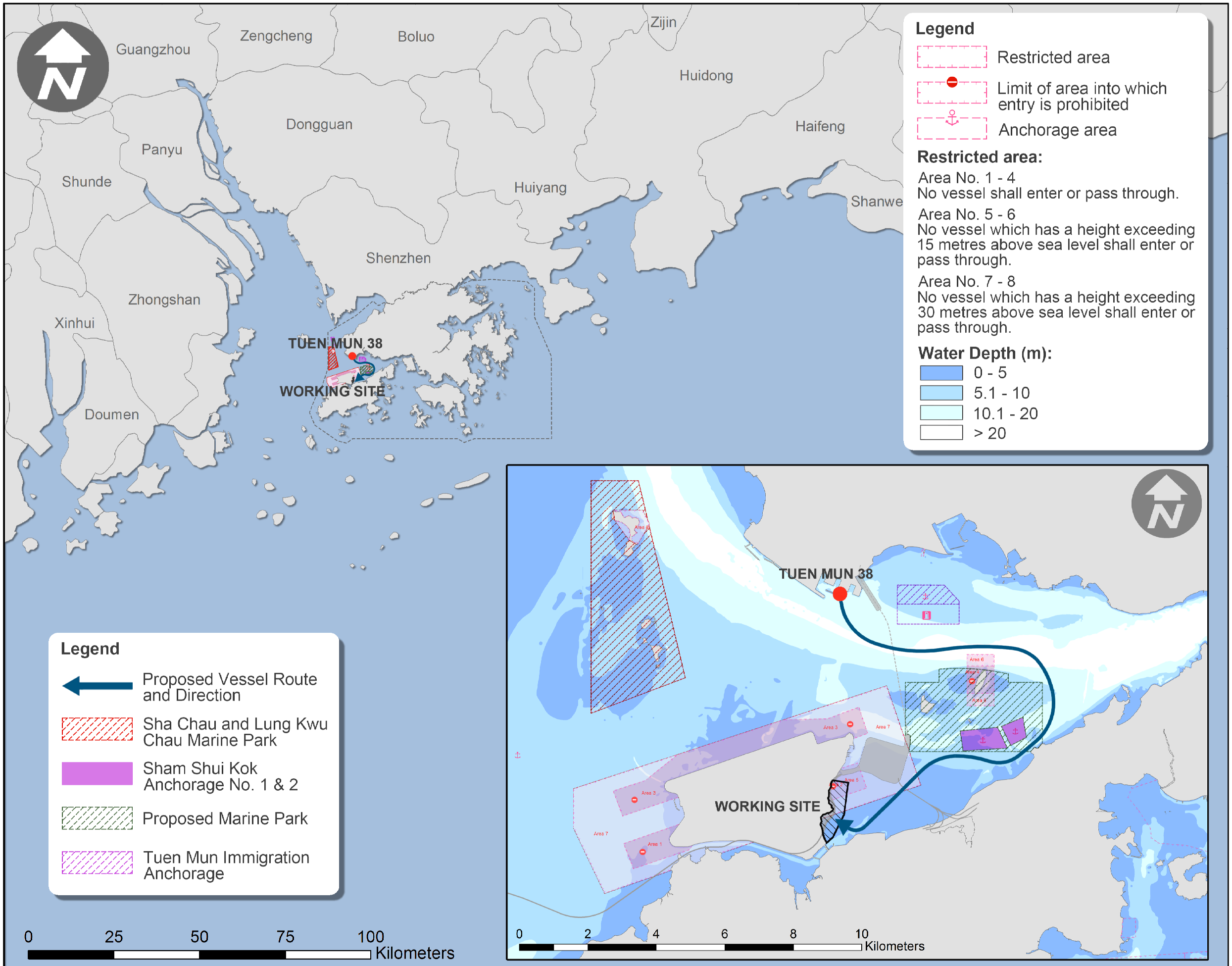
FILENAME: $FILE$

Appendix B

Marine Travel Routes of Public Fill Materials



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Rev	Description	By	Date
D	AMENDMENT	WL	JUL13
C	AMENDMENT	WL	MAY13
B	MINOR AMENDMENT	K	24SEP12
A	FIRST ISSUE	CYM	15AUG12

Consultant
ARUP 奧雅納工程顧問 Ove Arup & Partners Hong Kong Limited

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Contract No. and Title:
Contract No. HY/2011/03
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road -
Section Between Scenic Hill and
Hong Kong Boundary Crossing Facilities

Drawing title
PROPOSED VESSEL ROUTE PLAN FOR DELIVERY OF PUBLIC FILL MATERIALS (SHEET 1/2)

Drawing no.	Rev.
HY/2011/03/M/2018	D

Drawn	Date	Checked	Approved
WL	JUL13	PW	FW

Scale: N.T.S.
Status: FOR INFORMATION

路政署 HIGHWAYS DEPARTMENT
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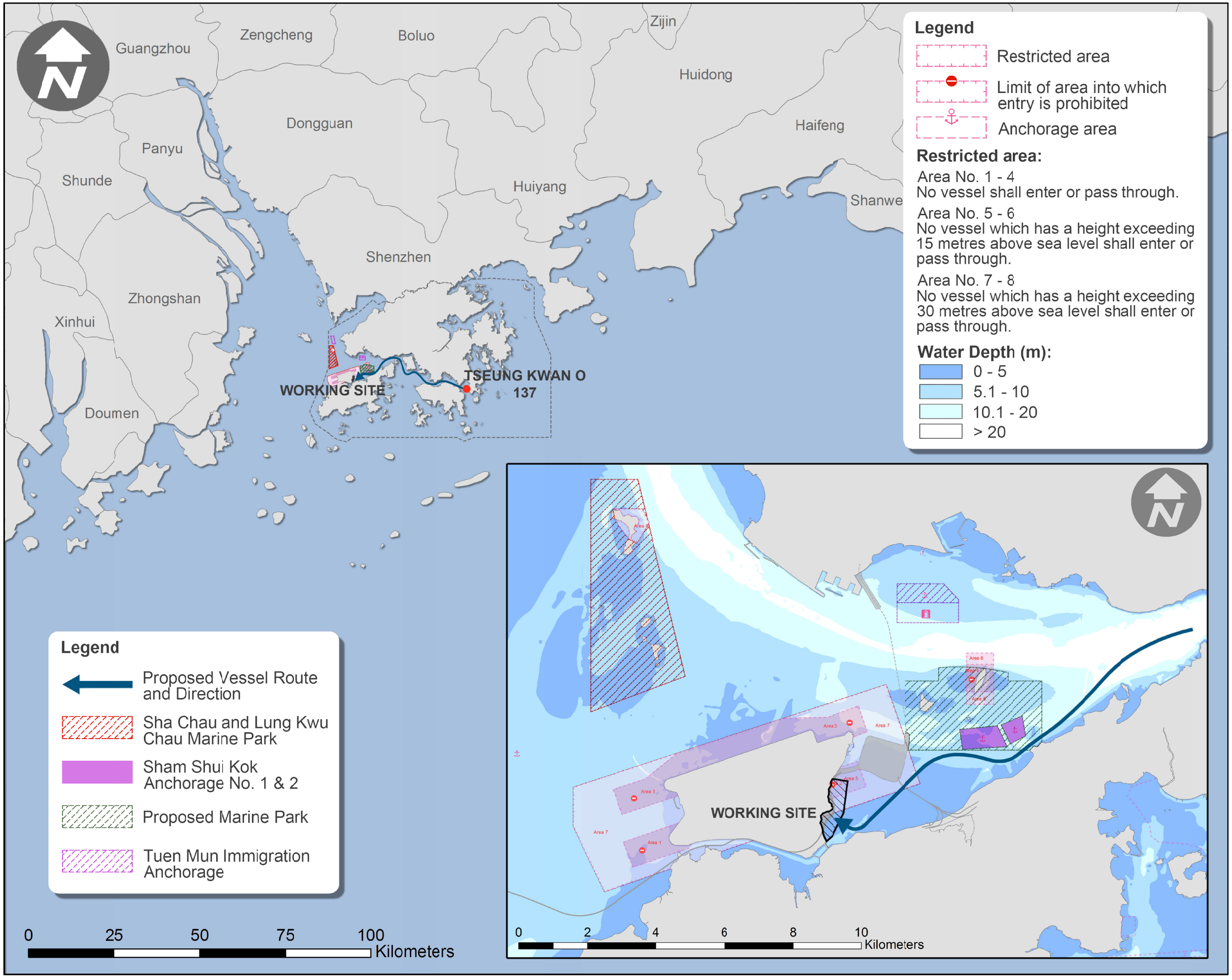
FILENAME: $FILE$ $DATE$



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Rev	Description	By	Date
D	AMENDMENT	WL	JUL13
C	AMENDMENT	WL	MAY13
B	MINOR AMENDMENT	K	24SEP12
A	FIRST ISSUE	CYM	15AUG12

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Contract No. and Title:
Contract No. HY/2011/03
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road -
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Drawing title
PROPOSED VESSEL ROUTE PLAN FOR DELIVERY OF PUBLIC FILL MATERIALS (SHEET 2/2)

Drawing no.	Rev.
HY/2011/03/M/2019	D

Drawn	Date	Checked	Approved
WL	JUL13	PW	FW

Scale: N.T.S.
Status: FOR INFORMATION

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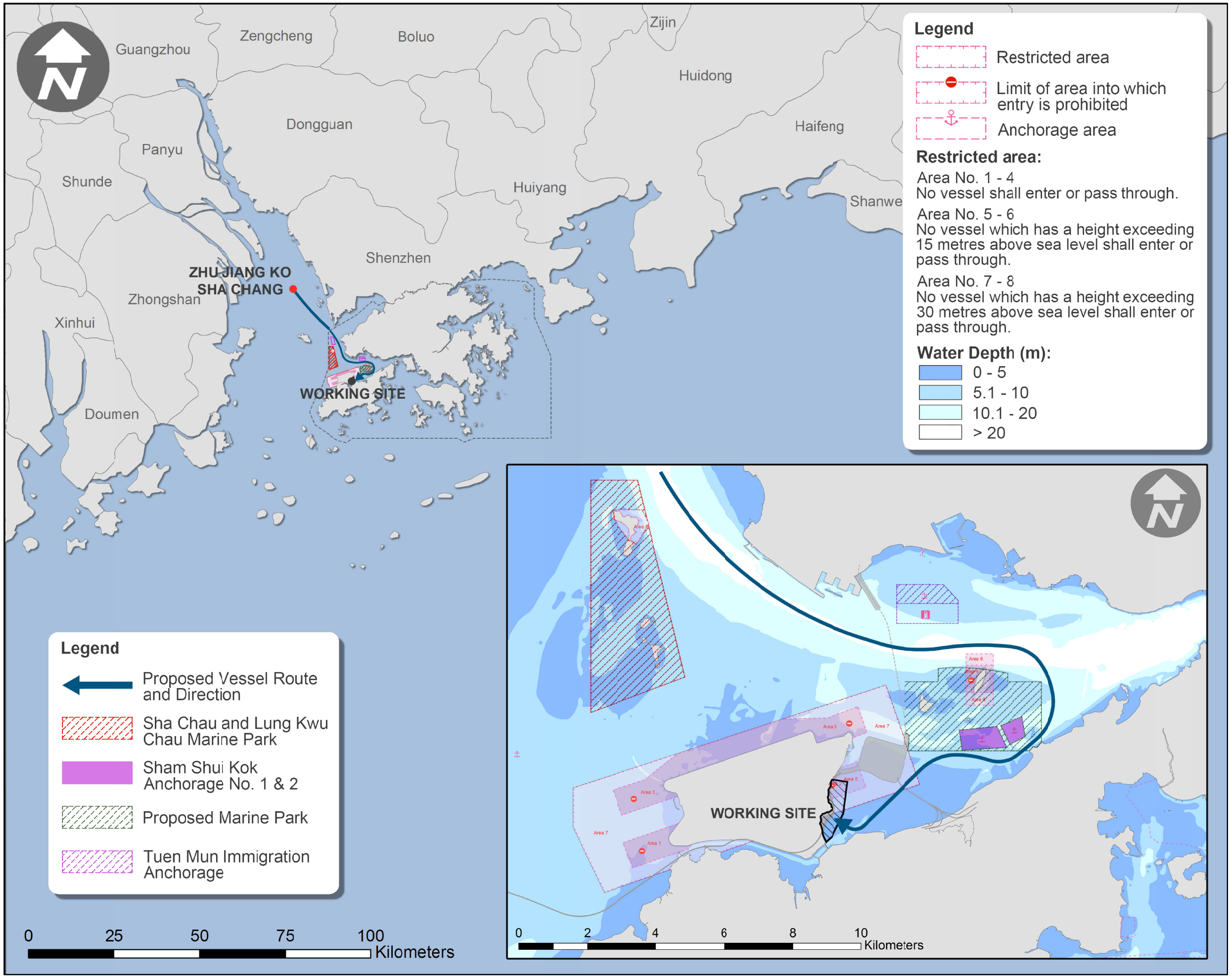
Appendix C

Marine Travel Routes of Sandfill and Rockfill Materials



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Drawing title
PROPOSED VESSEL ROUTE PLAN FOR IMPORTATION OF SANDFILL & ROCKFILL (SHEET 1/6)

Drawing no.	Rev.
HY/2011/03/M/2012	D

Drawn	Date	Checked	Approved
WL	JUL13	PW	FW

Scale: N.T.S.
Status: FOR INFORMATION

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港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

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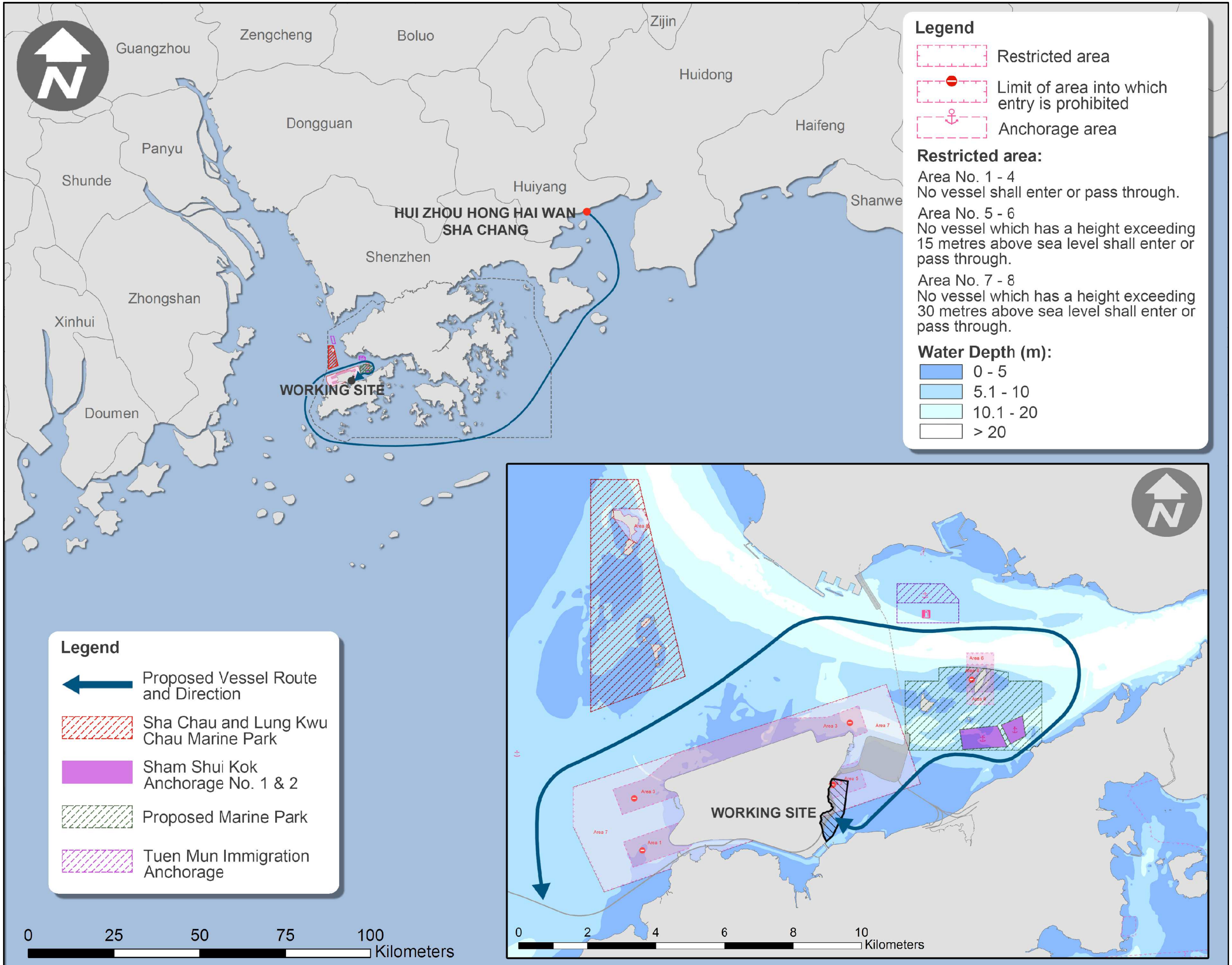

NOTES

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Rev	Description	By	Date
D	AMENDMENT	WL	JUL13
C	AMENDMENT	WL	MAY13
B	MINOR AMENDMENT	K	24SEP12
A	FIRST ISSUE	CYM	15AUG12

Consultant
ARUP 奧雅納工程顧問 Ove Arup & Partners Hong Kong Limited

Main Contractor:
中國建築工程(香港)有限公司 CHINA STATE CONSTRUCTION ENGINEERING (HONG KONG) LTD.

Contract No. and Title:
Contract No. HY/2011/03
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road -
Section Between Scenic Hill and
Hong Kong Boundary Crossing Facilities

Drawing title
PROPOSED VESSEL ROUTE PLAN FOR IMPORTATION OF SANDFILL & ROCKFILL (SHEET 2/6)

Drawing no.	Rev.
HY/2011/03/M/2013	D

Drawn	Date	Checked	Approved
WL	JUL13	PW	FW

Scale: N.T.S.
Status: FOR INFORMATION

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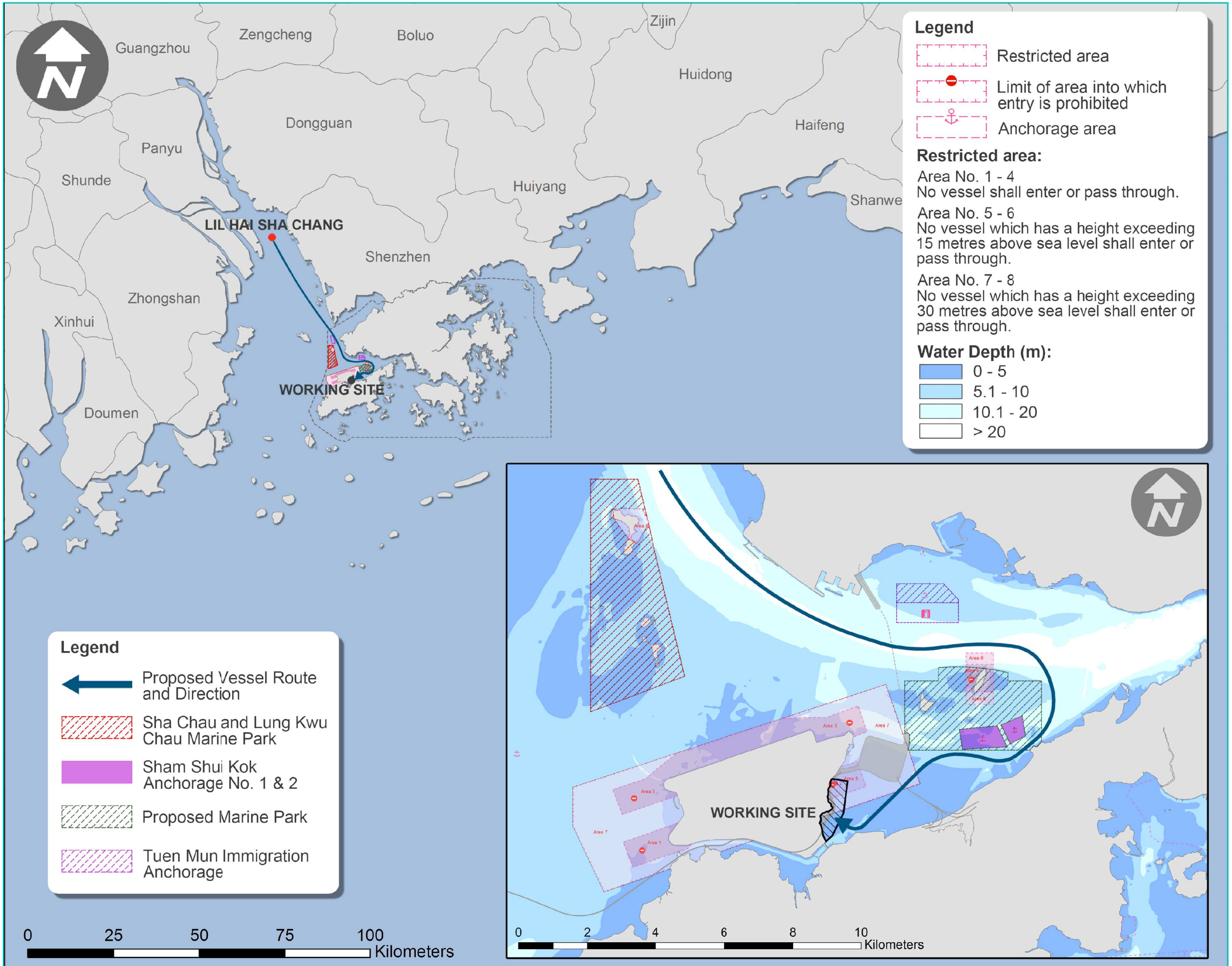
FILENAME: $FILE$



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Rev	Description	By	Date
D	AMENDMENT	WL	JUL13
C	AMENDMENT	WL	MAY13
B	MINOR AMENDMENT	K	24SEP12
A	FIRST ISSUE	CYM	15AUG12

Consultant
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Contract No. and Title:
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Hong Kong-Zhuhai-Macao Bridge
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Drawing title
PROPOSED VESSEL ROUTE PLAN FOR IMPORTATION OF SANDFILL & ROCKFILL (SHEET 3/6)

Drawing no.	Rev.
HY/2011/03/M/2014	D

Drawn	Date	Checked	Approved
WL	JUL13	PW	FW

Scale: N.T.S. Status: FOR INFORMATION

路政署 HIGHWAYS DEPARTMENT
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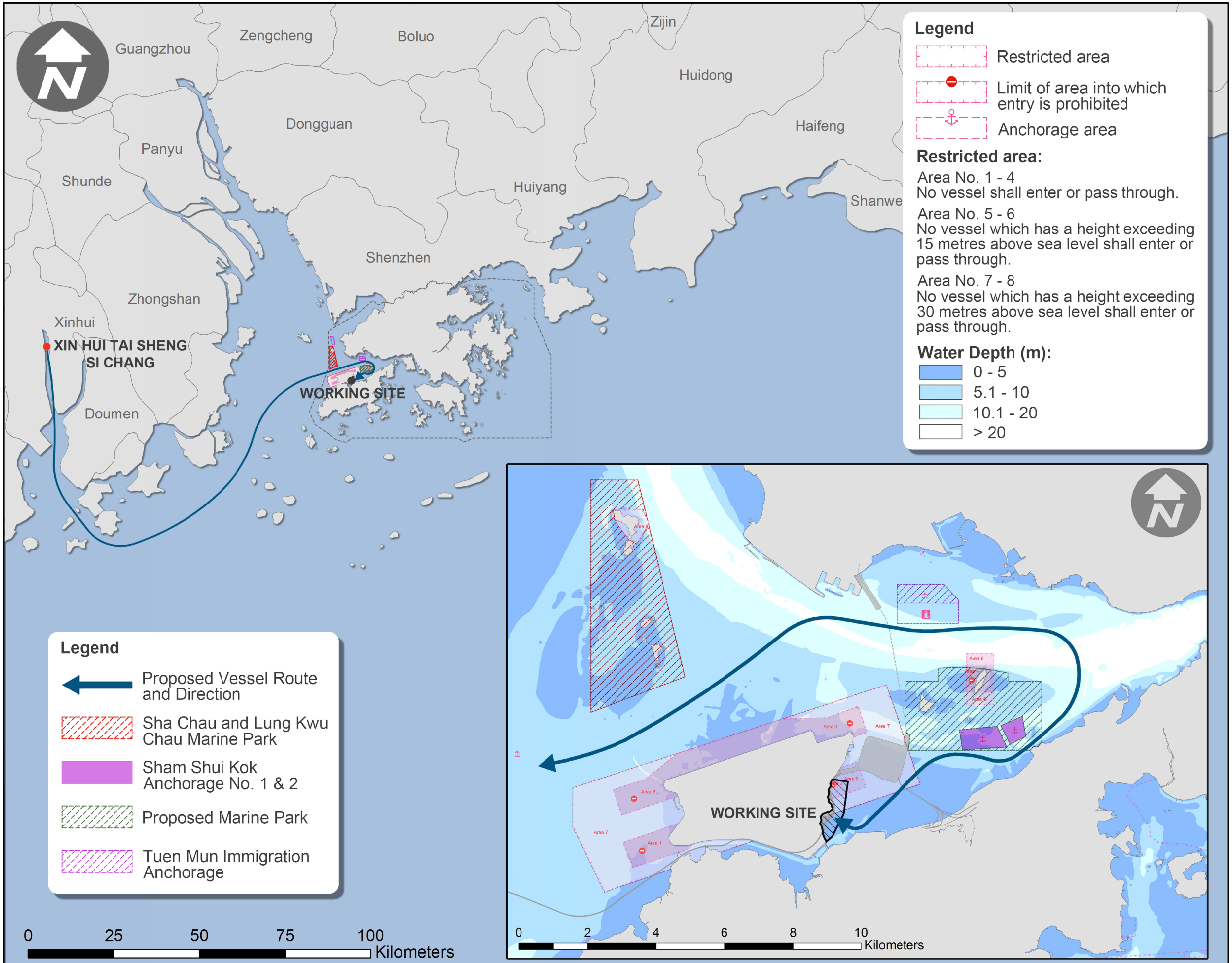
FILENAME: $FILE$ $DATE$



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D	AMENDMENT	WL	JUL13
C	AMENDMENT	WL	MAY13
B	MINOR AMENDMENT	K	24SEP12
A	FIRST ISSUE	CYM	15AUG12

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Contract No. and Title:
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Hong Kong Link Road -
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Drawing title
PROPOSED VESSEL ROUTE PLAN FOR IMPORTATION OF SANDFILL & ROCKFILL (SHEET 4/6)

Drawing no.	Rev.
HY/2011/03/M/2015	D

Drawn	Date	Checked	Approved
WL	JUL13	PW	FW

Scale: N.T.S.
Status: FOR INFORMATION

路政署 HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

PRINTED BY: $USER$ $DATE$ $TIME$
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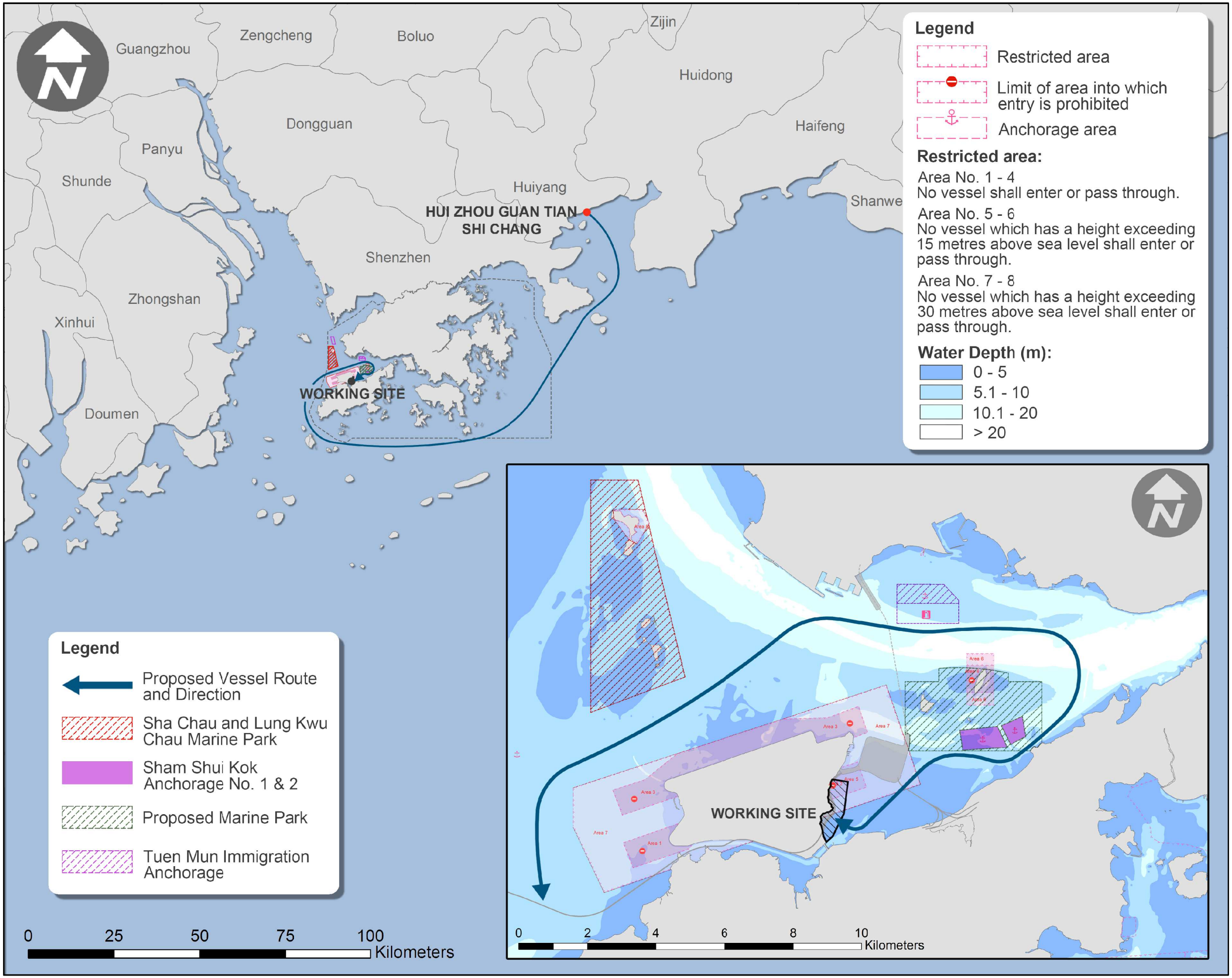

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B	MINOR AMENDMENT	K	24SEP12
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Drawing title
PROPOSED VESSEL ROUTE PLAN FOR IMPORTATION OF SANDFILL & ROCKFILL (SHEET 5/6)

Drawing no.	Rev.
HY/2011/03/M/2016	D

Drawn	Date	Checked	Approved
WL	JUL13	PW	FW

Scale: N.T.S.
Status: FOR INFORMATION

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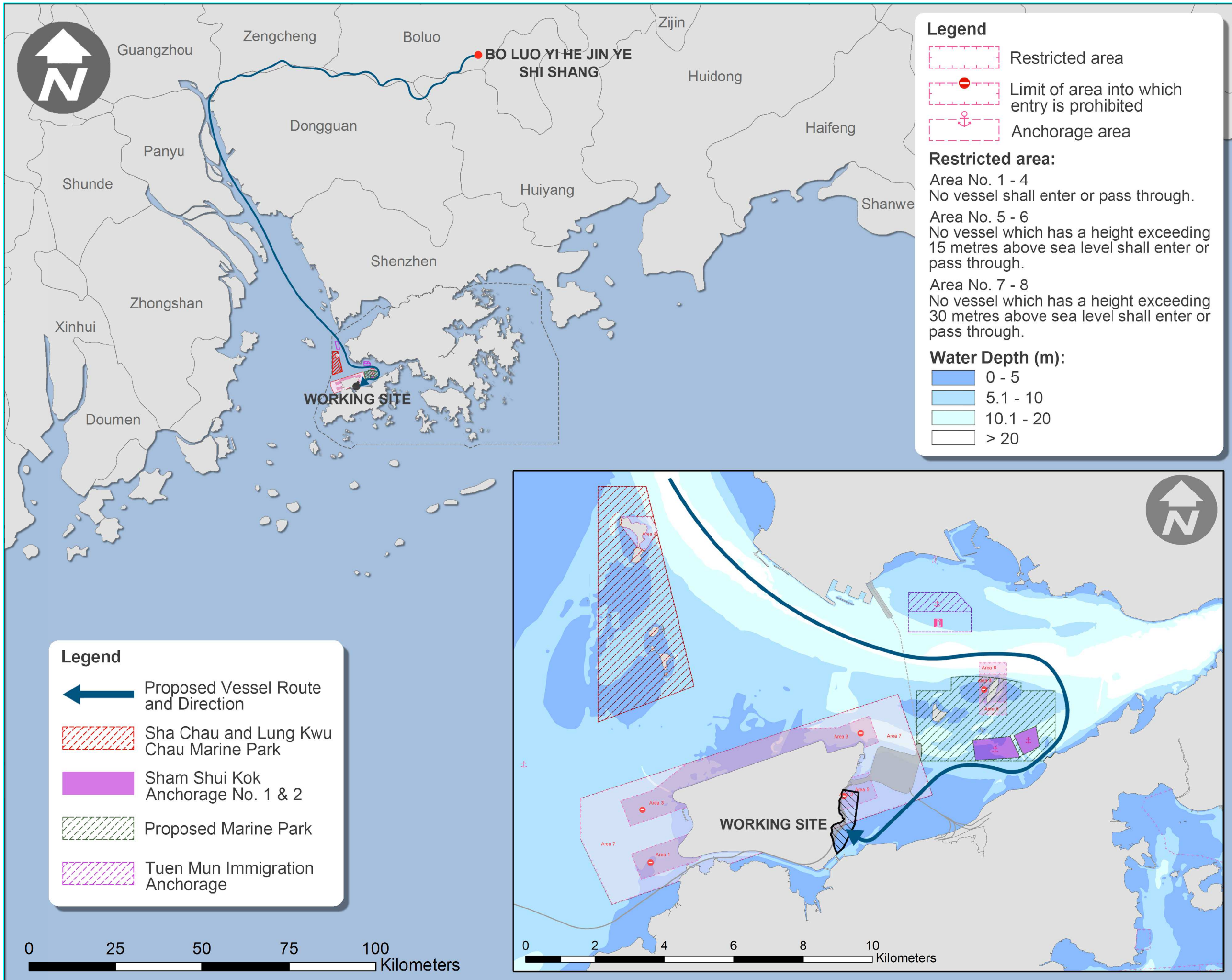

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D	AMENDMENT	WL	JUL13
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A	FIRST ISSUE	CYM	15AUG12

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Drawing title
PROPOSED VESSEL ROUTE PLAN FOR IMPORTATION OF SANDFILL & ROCKFILL (SHEET 6/6)

Drawing no.	Rev.
HY/2011/03/M/2017	D

Drawn	Date	Checked	Approved
WL	JUL13	PW	FW

Scale	Status
N.T.S.	FOR INFORMATION

路政署 HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

Appendix D

Plant List for HY/2011/03

Derrick Lighter

Flat-Top Barge

Pelican Barge

Split Hopper Barge - Non Self Propeller

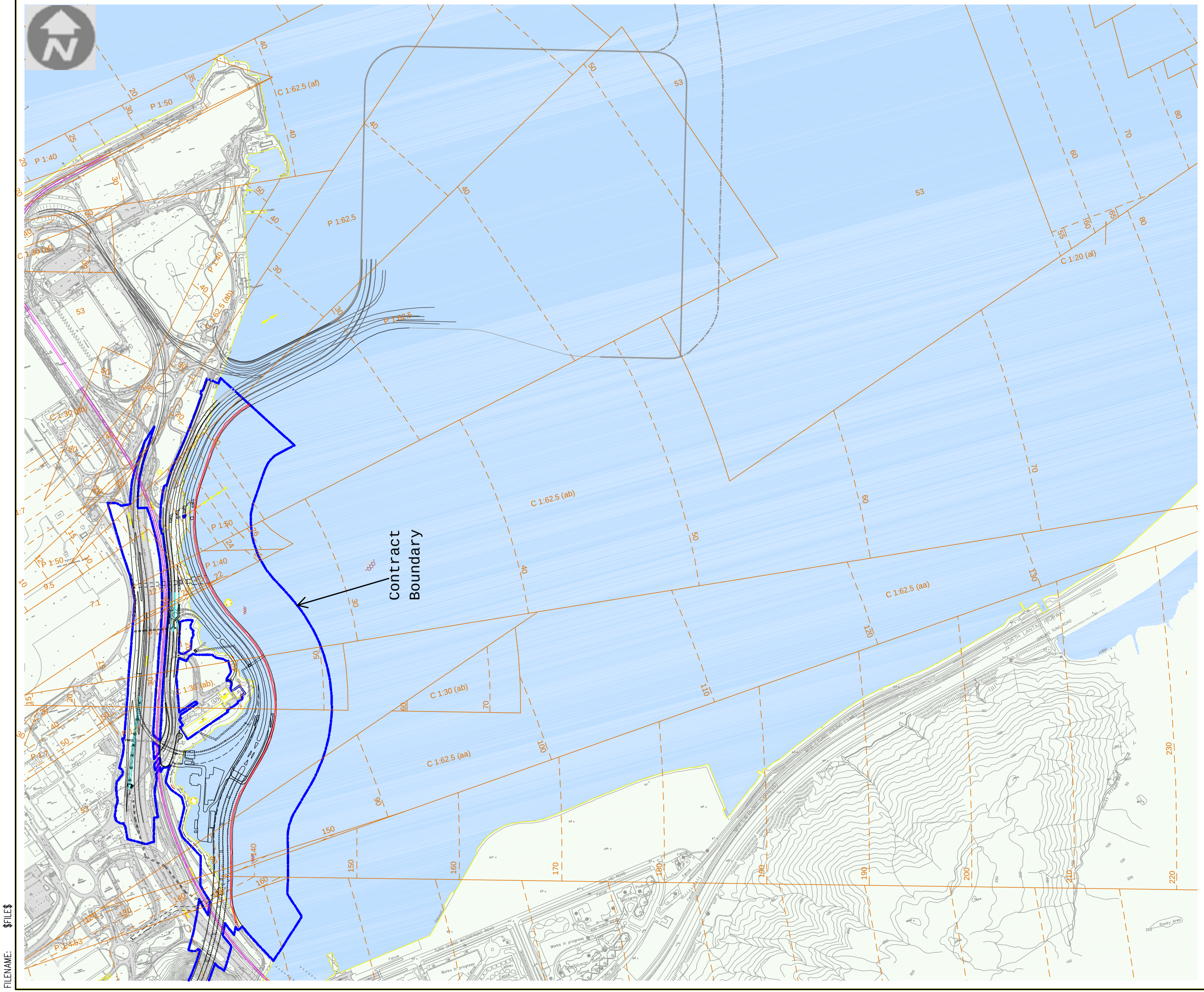
Launch/ Work Boat

Crane Boat

Tug Boat

Figure 1

Airport Height Restriction Plan



NOTES:

1. THE PROPOSED GROUND INVESTGATION STATIONS SHOWN ON THIS ARE TO BE CARRIED OUT PRIOR TO THE COMPLETION OF RECLAMATION.
2. ALL DRILLHOLES SHALL BE TERMINATED AT 5m INTO GRADE III OR BETTER ROCK WITH TCR 85% OR 5m BELOW INVERT LEVEL OF TUNNEL (IF APPLICABLE) WHICHEVER IS LOWER.
3. SPT WITH LINER SAMPLES SHALL BE CARRIED OUT AT 1.5m DEPTH BELOW GROUND LEVEL AT 2m INTERVAL.
4. PISTON UNDISTURBED SAMPLES SHALL BE TAKEN AT 2m INTERVAL AFTER SPT WITH LINER SAMPLES. MAZIER SAMPLES SHALL BE RETRIEVED INSTEAD OF POSTON SAMPLES IN CASE OF SANDY MATERIALS ARE ENCOUNTERED.
5. ROTARY DRILL OF H SIZE FOR ALL SOIL TYPES AND N SIZE IN BEDROCK SHALL BE APPLIED TO ALL DILLHOLES.
6. THE FOLLOWING LABORATORY TESTS SHALL BE CARRIED OUT:
   a) UNCONSOLIDATED UNDRAINED TRIAXIAL AND CONSOLIDATED UNDRAINED TRIAXIAL TEST (SINGLE STAGE) WITH PORE PRESSURE MEASUREMENTS
   b) 1-D CONSOLIDATION TEST FOR CLAYEY SOILS
   c) PARTICLE SIZE DISTRIBUTION, SOIL CLASSIFICATION TEST (INCLUDING ATTERBERG LIMTS).
   d) MOISTURE CONTENT
   e) BULK DENSITY

Hyder — THIS DRAWING HAS BEEN CHECKED AND CERTIFIED BY DESIGN CHECKER.

DATE	DESIGN CHECKER'S SIGNATURE

Rev	Description	By	Date
A	FIRST ISSUE	K	24SEP12

Consultant: ARUP 奧雅納工程顧問 Ove Arup & Partners Hong Kong Limited

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Contract No. and Title:

Contract No. HY/2011/03

Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road - Section Between Scenic Hill and Hong Kong Boundary Crossing Facilities

Drawing title

HEIGHT RESTRICTION PLAN

Drawing no.	Rev.
HY/2011/03/SK/0079	A

Drawn	Date	Checked	Approved
K	20/09/2012		

Scale: AS SHOWN@A3 — Status: FOR APPROVAL

路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

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