

MTR Corporation Limited

**Shatin to Central Link –
Tai Wai to Hung Hom Section and Mong
Kok East to Hung Hom Section**

Continuous Noise Monitoring Plan (CNMP)

(January 2014)

Verified by: Fredrick Leong



Position: Independent Environmental Checker

Date: 16 January 2014

MTR Corporation Limited

**Shatin to Central Link –
Tai Wai to Hung Hom Section and
Mong Kok East to Hung Hom Section**

Continuous Noise Monitoring Plan (CNMP)

(January 2014)

Certified by: Richard Kwan 

Position: Environmental Team Leader

Date: 20 January 2014

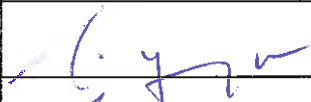

MTR Corporation Limited

Consultancy Agreements No.
C11033 & C11033B

**Shatin to Central Link - Tai Wai to Hung
Hom Section and Mong Kok East
to Hung Hom Section**

Continuous Noise Monitoring Plan

January 2014

	Name	Signature
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Reviewed & Approved:	Josh Lam	

Version:

1

Date: 20 January 2014

This Continuous Noise Monitoring Plan is prepared for MTR Corporation Limited and is given for its sole benefit in relation to and pursuant to Consultancy Agreements No. C11033 & 11033B and may not be disclosed to, quoted to or relied upon by any person other than MTR Corporation Limited without our prior written consent. No person (other than MTR Corporation Limited) into whose possession a copy of this report comes may rely on this plan without our express written consent and MTR Corporation Limited may not rely on it for any purpose other than as described above.

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1 Introduction

1.1 Background

- 1.1.1 The Shatin to Central Link (SCL) is a 17km extension of the existing Ma On Shan Line (MOL) and East Rail Line (EAL) comprising (i) The East-West Corridor which extends the MOL from Tai Wai to Hung Hom via East Kowloon to connect with the West Rail Line (WRL) at Hung Hom Station (HUH) and Stabling Sidings at Hung Hom Freight Yard (HHS); and (ii) The North-South Corridor which is an extension of the East Rail Line (EAL) at Hung Hom across the harbour to Admiralty Station (ADM).
- 1.1.2 Shatin to Central Link – Tai Wai to Hung Hom Section [SCL (TAW-HUH)] and Shatin to Central Link – Mong Kok East to Hung Hom Section [SCL (MKK-HUH)] (hereafter referred to as “the Project”) are parts of the SCL. Shatin to Central Link – Stabling Sidings at Hung Hom Freight Yard [SCL (HHS)] is a proposed stabling sidings option for SCL (TAW – HUH) at the former freight yard in Hung Hom.
- 1.1.3 The Environmental Impact Assessment (EIA) Reports for SCL (TAW-HUH) (Register No.: AEIAR-167/2012), SCL (MKK-HUH) (Register No.: AEIAR-165/2012) and SCL (HHS) (Register No.: AEIAR-164/2012) were approved on 17 February 2012 under the Environmental Impact Assessment Ordinance (EIAO). Following the approval of the EIA Reports, two Environmental Permits (EPs) were granted on 22 March 2012, one covers SCL (TAW-HUH) and SCL (HHS) (EP No: EP-438/2012) and the other covers SCL (MKK-HUH) and SCL (HHS) (EP No.: EP-437/2012), for their construction and operation. Variations of environmental permit (VEP) was subsequently applied for EP-438/2012 and the latest Environmental Permit (EP No: EP-438/2012/D) was issued by Director of Environmental Protection (DEP) on 13 September 2013.
- 1.1.4 As per Condition 2.10 of EP-438/2012/D and Condition 2.8 of EP-437/2012, a Continuous Noise Monitoring Plan for the Project is required to be prepared and submitted to EPD before the commencement of the construction of the Project.

1.2 Purpose of this Continuous Noise Monitoring Plan

- 1.2.1 This Continuous Noise Monitoring Plan (CNMP) is submitted to fulfil the requirements under Condition 2.10 of EP-438/2012/D and Condition 2.8 of EP-437/2012 pertaining to update environmental monitoring and audit (EM&A) requirements for continuous noise monitoring at the noise sensitive receivers (NSRs) shown in Table 1 of EP-438/2012/D and Figure 1 of EP-437/2012 with exceedance after mitigation in air-borne construction noise impact as predicted in the approved SCL (TAW-HUH), SCL (MKK-HUH) and SCL (HHS) EIA Reports and as updated in the Construction Noise Mitigation Measures Plan (CNMMP) approved under Condition 2.9 of EP-438/2012/D and Condition 2.7 of EP-437/2012.
- 1.2.2 To fulfil the requirements of above-mentioned EP Conditions, the following information has been included in the CNMP for individual Contracts as prepared by the respective Contractors:
- Updated EM&A requirements for continuous noise monitoring at the corresponding NSRs shown in Table 1 of EP-438/2012/D and Figure 1 of EP-437/2012;
 - Drawings in the scale of 1:5,000 showing the proposed locations for conducting continuous noise monitoring;
 - Monitoring methodology and measurement parameters;
 - A system to report the continuous noise monitoring results on a website; and
 - An Event and Action Plan detailing the immediate active remedial measures in the event that the measured noise levels exceed the worst-case scenario predicted in the approved SCL(TAW-HUH), SCL(MKK-HUH) and SCL(HHS) EIA Reports or the levels as updated

by the CNMMP approved under Condition 2.9 of EP-438/2012/D and Condition 2.7 of EP-437/2012.

2 Continuous Noise Monitoring Plan

- 2.1.1 The construction of SCL has been divided into different civil construction works contracts. The SCL Works Contracts as listed in the table below would cover the noise monitoring for the NSRs as shown in Table 1 of EP-438/2012/D and Figure 1 of EP-437/2012. As such, CNMP would be prepared under these Works Contracts to update the EM&A requirements relating to continuous noise monitoring as per EP Conditions.

Works Contract	Contract Title	Works Covered in Environmental Permit No.
1102	Hin Keng Station and Approach Structures	EP-438/2012/D
1103	Hin Keng to Diamond Hill Tunnels	EP-438/2012/D
1106	Diamond Hill Station	EP-438/2012/D
1107	Diamond Hill to Kai Tak Tunnels	EP-438/2012/D
1109	Stations and Tunnels of Kowloon City Section	EP-438/2012/D
1111	Hung Hom North Approach Tunnels	EP-437/2012 & EP-438/2012/D
1112 ^[1]	Hung Hom Station and Stabling Sidings	EP-437/2012 & EP-438/2012/D

Note:

[1] The continuous noise monitoring required for Works Contract 1112 has been covered by Works Contract 1111. As such, no CNMP is required to be prepared under Works Contract 1112.

- 2.1.2 The CNMPs for Works Contracts 1109, 1111, 1103, 1106, 1107 and 1102 have been prepared by the respective Contractor's ET and are provided in **Appendices A to F** respectively.
- 2.1.3 The CNMPs for Contracts 1102, 1103, 1106, 1107, 1109 and 1111 detail the updated EM&A requirements, proposed monitoring methodology, measurement parameters, reporting system and Event and Action Plan for the continuous noise monitoring at the corresponding NSRs shown in Table 1 of EP-438/2012/D and Figure 1 of EP-437/2012 with exceedance after mitigation in air-borne construction noise impact as predicted in the approved SCL (TAW-HUH), SCL (MKK-HUH) and SCL (HHS) EIA Reports and as updated in the CNMMP approved under Condition 2.9 of EP-438/2012/D and Condition 2.7 of EP-437/2012. This CNMP will be updated to cover the CNMPs of remaining NSRs to be prepared by the relevant Contractor's ET after the award of contracts.
- 2.1.4 A summary of the proposed continuous noise monitoring plan is presented in **Table 2.1**. Event and Action Plan for the continuous noise monitoring is presented in **Table 2.2**.

Table 2.1 Summary of Proposed Continuous Noise Monitoring Plan

NSR ID	NSR Description	Uses ^[1]	Action/Limit Level ^[2] / dB(A)	Proposed Continuous Noise Monitoring Location	Measurement Period ^{[3][7]}
Works Contract 1102					
TAW-6-7 ^{[4] [11]}	C.U.H.K.A.A. Thomas Cheung School	E	-	-	-
Works Contract 1103					
TAW-6-7 ^[11]	C.U.H.K.A.A. Thomas Cheung School	E	66 ^[9]	TAW-6-7 (C.U.H.K.A.A. Thomas Cheung School)	April 2013 ^[6]
Works Contracts 1103 & 1106					
DIH-9-1 ^[4]	Shek On Building	E + W	-	-	-
DIH-13-1 ^[4]	Canossa Primary School	E	-	-	-
Works Contracts 1106 & 1107					
DIH-14-1 ^[4]	Rhythm Garden Block 2	R	-	-	-
DIH-14-5 ^[4]	Rhythm Garden Block 1	R	-	-	-
Works Contracts 1103, 1106 & 1107					
DIH-14-4 ^[4]	Canossa Primary School (San Po Kong)	E	-	-	-
Works Contract 1109					
TKW-1-1 ^[4]	Parc 22	R	-	-	-
TKW-2-2 ^[4]	Skytower Tower 2	R	-	-	-
TKW-3-2	Prosperity House	R	80	TKW-3-2(A) (No. 420 Prince Edward Road West)	Sept 2014 – Dec 2014
MTW-12-3	Lucky Mansion	R	80	MTW-12-3 (Lucky Mansion)	Aug 2014 – Jan 2015, Mar 2015 – Jun 2015
MTW-12-4	352-354 Ma Tau Wai Rd (East Façade)	R	80	MTW-12-4 (352-354 Ma Tau Wai Rd (East Façade))	Aug 2014 – Jun 2015
MTW-12-4-1	352-354 Ma Tau Wai Rd (North Façade)	R	82	MTW-12-4-1(A) (59 Maidstone Road)	Oct 2014, Dec 2014 – Jun 2015

NSR ID	NSR Description	Uses ^[1]	Action/Limit Level ^[2] / dB(A)	Proposed Continuous Noise Monitoring Location	Measurement Period ^{[3][7]}
MTW-12-10	Lucky Building (South Façade)	R	84	MTW-12-10 (Lucky Building (South Façade))	Mar 2015 – Apr 2015, Sept 2015 – Jan 2016
MTW-12-10-1	Lucky Building (East Façade)	R	80	MTW-12-10-1 (Lucky Building (East Façade))	Dec 2014 – May 2015, Sept 2015 – Jan 2016
MTW-12-11	Jing Ming Building	R	81	MTW-12-11 (Jing Ming Building)	Sept 2014 – Jun 2015
MTW-16-1	SKH Good Shepherd Primary School	E	79	MTW-16-1 (SKH Good Shepherd Primary School)	Dec 2012 – Jan 2013, Apr 2013 – Dec 2013, Aug 2014 – Mar 2016 ^[6]
MTW-18-2 ^[5]	No. 2 Kowloon City Road	R	-	-	-
HOM-2-1-A ^[4]	Faerie Court (East Façade)	R	-	-	-
Works Contract 1111					
OM4a	Carmel Secondary School (South Block)	E	68 ^[9]	OM4a (Carmel Secondary School (South Block))	Feb and Jun 2014, Jan to Feb 2015 ^[6]
Works Contracts 1111 & 1112					
HH2 ^{[8][10]}	Wing Fung Building	R	77	HH2 (No. 234-238 Chatham Road North)	Sept 2014 – Dec 2014, Jan / Mar 2015 – May 2015

Notes:

- [1] R- Residential; E – Educational institution; W-Worship
- [2] Reference to the predicted maximum noise level as contained in the corresponding CNMMP.
- [3] Measurement will be taken during the construction period with residual impact exceeding noise criteria predicted at the NSRs in the corresponding CNMMP.
- [4] No continuous noise monitoring is required as no residual impact exceeding noise criteria was predicted in the updated CNMMP.
- [5] The building at MTW-18-2 has been demolished. During the period of residual noise impact exceeding criteria predicted in the corresponding CNMMP, there will be no NSR occupied at this location. It is therefore not necessary carry out continuous noise monitoring at this location.
- [6] Typical examination period is in May, June, November and December for TAW-6-7 and MTW 16-1 and in March, April, May and December for OM4a. The measurement period duration during examination is subject to the school activity schedule of TAW-6-7, MTW-16-1 and OM4a when available. It is confirmed by the latest school time table, examinations were conducted at MTW-16-1 in December 2012 and January 2013, and at TAW-6-7 in mid of April and mid of June 2013. For OM4a, it is confirmed by the latest school time table, examination period will be carried out in January, February and June 2014. From June 2014 onwards, based on the 2013-2014 Calendar of Carmel Secondary School, the typical examination period in January, February and June will be adopted for assessment.
- [7] The measurement periods are tentative only and will be reviewed and updated with respect to the actual construction programme. The ET of the relevant Works Contract will confirm the measurement period two weeks before the commencement of the continuous noise monitoring and will notify the Contractor, MTRC, IEC and EPD the latest measurement period.

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- [8] HH2 named as HUH-1-3 in SCL (TAW-HUH) and SCL (HHS) EIA Reports.
- [9] Action/Limit level will only be applicable during the examination period.
- [10] Continuous noise monitoring will be undertaken under Works Contract 1111.
- [11] According to the latest CNMMP, the assessment period at TAW-6-7 covered from September 2013 to September 2017 under Works Contract 1102 and from November 2012 to September 2017 under Works Contract 1103. Exceedance was predicted under 1103 in April 2013 while no exceedance was predicted under 1102.

Table 2.2 Event and Action Plan

Event	Action			
	Contractor's ET	IEC	ER	Contractor
Action / Limit Level	<ol style="list-style-type: none"> 1. Identify source. 2. Repeat measurement. If two consecutive measurements exceed Action/Limit Level, the exceedance is then confirmed. 3. If exceedance is confirmed, notify IEC, ER and Contractor. 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. Discuss jointly with the IEC, ER and Contractor and formulate remedial measures. 6. Assess effectiveness of Contractor's remedial actions and keep IEC and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check the Contractor's working method. 3. Discuss with the ER, ET and Contractor on the potential remedial measures. 4. Review and advise the ET and ER on the effectiveness of the remedial measures proposed by the Contractor. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor and IEC. 3. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure the proper implementation of remedial measures. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Identify source with the ET. 2. If exceedance is confirmed, investigate the causes of exceedance and take immediate action to avoid further exceedance. 3. Submit proposals for remedial measures to the ER with copy to the IEC and ET of notification. 4. Implement the agreed proposals. 5. Liaise with ER to optimize the effectiveness of the agreed mitigation. 6. Revise and resubmit proposals if problem still not under control. 7. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Appendix A

**Continuous Noise Monitoring Plan for
Works Contract 1109 –
Stations and Tunnels of Kowloon City Section**

MTR Corporation Limited

**Shatin to Central Link –
Tai Wai to Hung Hom Section**

Continuous Noise Monitoring Plan (CNMP)

Works Contract 1109 -
Stations and Tunnels of Kowloon City Section
(January 2014)

Certified by:  Winnie Ko

Position: Environmental Team Leader

Date: 2014/1/15

Samsung-Hsin Chong JV

Shatin to Central Link (SCL) - Tai
Wai to Hung Hom Section:
Works Contract 1109 - Stations and
Tunnels of Kowloon City Section
Continuous Noise Monitoring Plan
(Revision G)

January 2014

Environmental Resources Management

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Shatin to Central Link (SCL) - Tai
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Works Contract 1109 - Stations and
Tunnels of Kowloon City Section
Continuous Noise Monitoring Plan
(Revision G)

January 2014

Reference 0171181

For and on behalf of
ERM-Hong Kong, Limited

Approved by: Frank Wan

Signed: 

Position: Partner

Date: 15 January 2014

This report has been prepared by ERM-Hong Kong, Limited with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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The Shatin to Central Link – Tai Wai to Hung Hom Section (hereafter referred to as SCL (TAW-HUH)) is an approximately 11 km long extension of the Ma On Shan Line and connects the West Rail Line at Hung Hom forming a strategic east-west rail corridor. It is a Designated Project under the *Environmental Impact Assessment Ordinance* (Cap. 499) (EIAO).

The construction of the SCL (TAW-HUH) has been divided into a series of civil construction Works Contracts and Works Contract 1109 covers the construction of To Kwa Wan station (TKW) and Ma Tau Wai station (MTW), and the tunnels between TKW and Ho Man Tin station (HOM). This construction contract was awarded to Samsung-Hsin Chong JV (SSHCJV) in July 2012.

The Environmental Impact Assessment (EIA) Report of the SCL (TAW-HUH) (Register No. AEIAR-167/2012) was approved by the Environmental Protection Department (EPD) under the EIAO in February 2012. An Environmental Permit (EP-438/2012) has been issued in March 2012. The EP has been varied recently and a varied EP (EP-438/2012/D) was issued in September 2013.

According to the Condition 2.10 of the EP-438/2012/D, the Permit Holder shall, no later than one month before the commencement of construction of the Project submit to the Director of Environmental Protection for approval four hard copies and one electronic copy of a Continuous Noise Monitoring Plan (CNMP) for the Project. The CNMP shall include:

- (a) *updated environmental monitoring and audit requirements relating to continuous noise monitoring at the NSRs shown in Table 1 of this Permit with exceedance after mitigation in air-borne construction noise impact as predicted in the approved SCL(TAW-HUH) EIA Report (Register No. AEIAR-167/2012) and SCL(HHS) EIA Report (Register No. AEIAR-164/2012) and as updated in the CNMMP approved under Condition 2.9;*
- (b) *drawings in the scale of 1:5,000 or other appropriate scale as agreed by the Director showing the proposed locations for conducting continuous noise monitoring;*
- (c) *monitoring methodology and measurement parameters;*
- (d) *a system to report the continuous noise monitoring results on a website within a period of 2 working days after the relevant noise monitoring data are collected or become available; and*
- (e) *an Event and Action Plan giving details of the immediate active remedial measures in the event that the measured noise levels exceed the worst-case scenario predicted in the approved SCL(TAW-HUH) EIA Report (Register No. AEIAR-167/2012) and SCL(HHS) EIA Report (Register No. AEIAR-*

164/2012) or the levels as updated by the CNMMP approved under Condition 2.9.

Before submission to DEP, the CNMP will be certified by the Environmental Team (ET) and verified by the Independent Environmental Checker (IEC) as conforming to the relevant information and recommendations contained in the approved SCL (TAW-HUH) EIA Report (Register No. AEIAR-167/2012) or the updated prediction of noise levels as contained in the Construction Noise Mitigation Measures Plan (CNMMP) approved under EP Condition 2.9. All measures recommended in the CNMMP will be fully and properly implemented during construction.

This CNMP is prepared to comply with the above-mentioned requirements.

2

CONTINUOUS NOISE MONITORING LOCATIONS

With reference to the findings and recommendations of the CNMMP, residual air-borne construction noise impacts exceeding noise criteria were identified at nine (9) Noise Sensitive Receivers (NSRs) during the construction of the SCL (TAW-HUH) under Works Contract 1109. These NSRs are presented in *Table 2.1* and shown in *Figures 2.1a* and *2.1b*.

According to EP Condition 2.10, continuous noise monitoring should be conducted at the 9 NSRs with residual air-borne construction noise impact exceeding noise criteria predicted. However, the building at 2 Kowloon City Road (MTW-18-2) has been demolished recently. No noise sensitive uses will be occupied at this location during the period in which residual noise impact exceeding criteria is predicted in CNMMP (ie, May 2013 – August 2013), therefore, it is not necessary to conduct continuous noise monitoring at MTW-18-2. A total of 8 continuous noise monitoring locations are thus proposed.

The proposed continuous noise monitoring locations are presented in *Table 2.1* and shown in *Figures 2.2a* and *2.2b*. Due to the access problem at TKW-3-2 and MTW-12-4-1, alternative monitoring locations are proposed.

The monitoring position will normally be at a point 1m from the exterior of the proposed monitoring location building façade and be at a position 1.2m above local ground.

Site visits and liaison with the NSRs' occupants are being conducted and the latest status is presented in *Table 2.1*. If there is problem with access to the monitoring positions at the proposed 8 NSRs predicted to have residual air-borne construction noise impact exceeding noise criteria, an alternative position will be proposed and a correction to the measurements will be made.

The alternative continuous noise monitoring location will be chosen based on the following criteria:

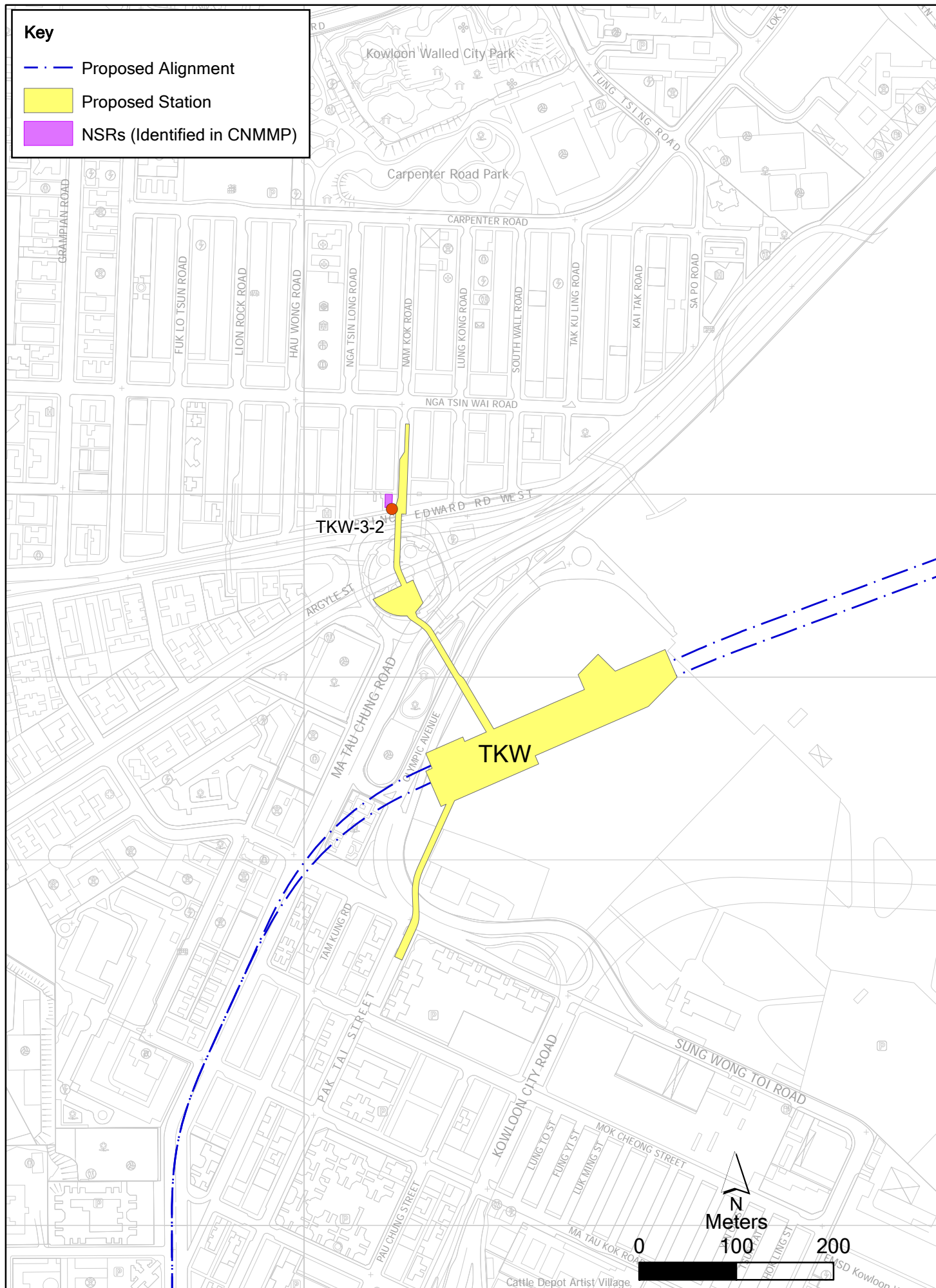


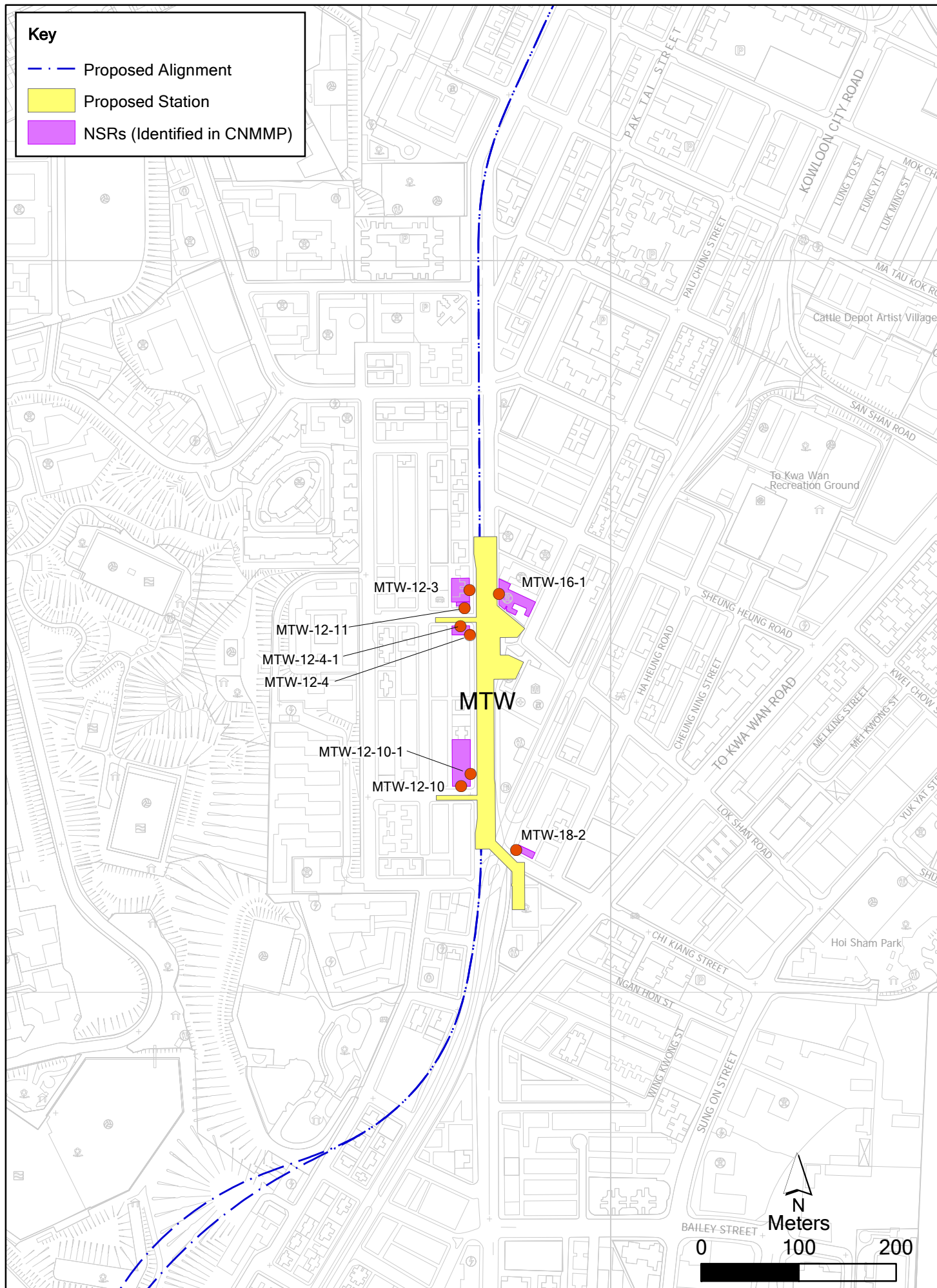
Figure 2.1a

Noise Sensitive Receivers (NSRs) with Predicted Residual Air-borne Construction Noise Impacts exceeding Noise Criteria
(Identified in CNMMP)

Name: 0171181_NSR_with_
Noise_Impacts_TKW.mxd
Date: 26/7/2012

Environmental
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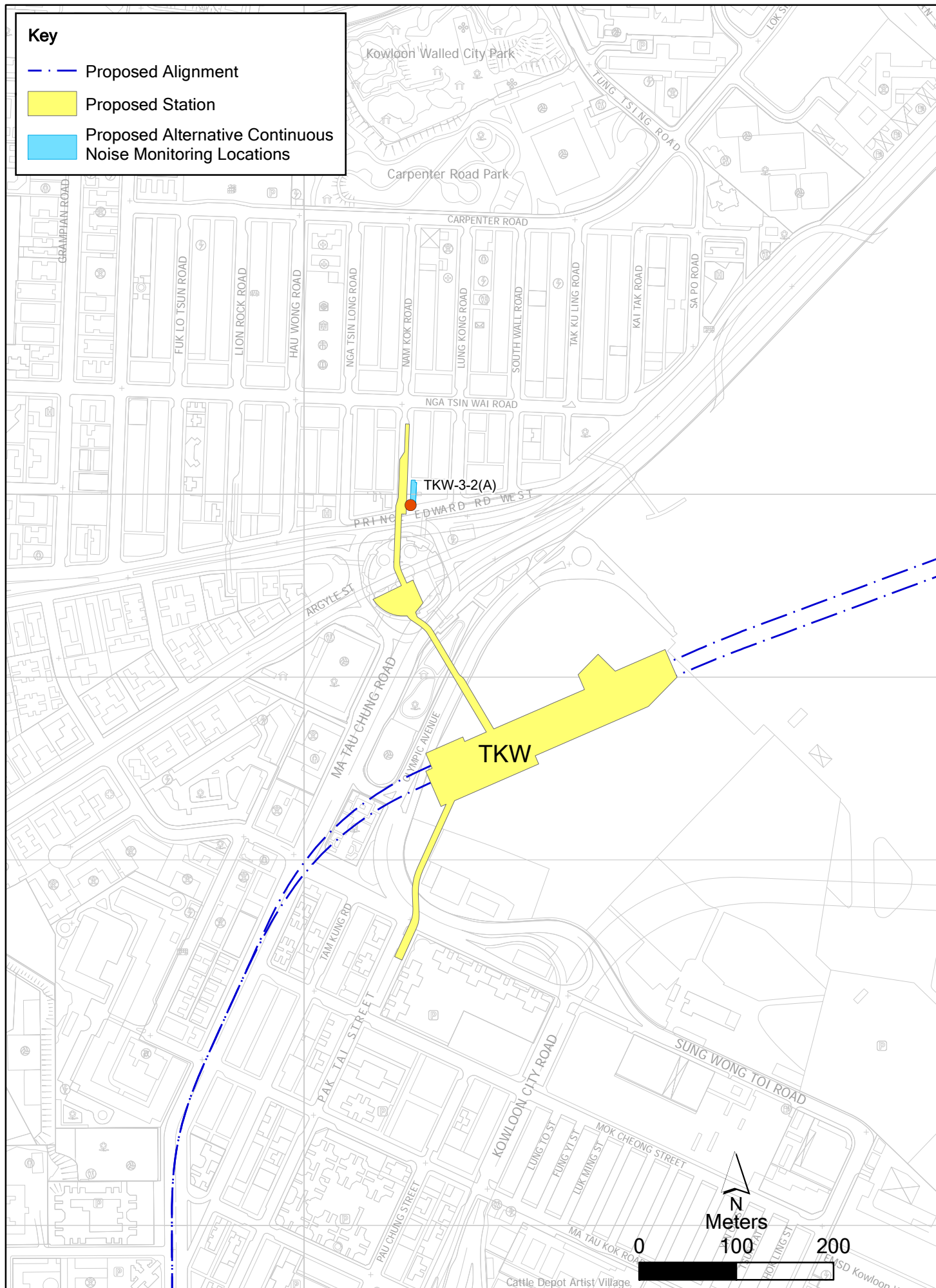
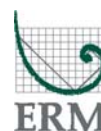


Figure 2.2a

Proposed Continuous Noise Monitoring Locations

Name: 171181_Continuous_Noise_Monitoring_Locations_TKW.mxd
Date: 26/7/2012

Environmental
Resources
Management



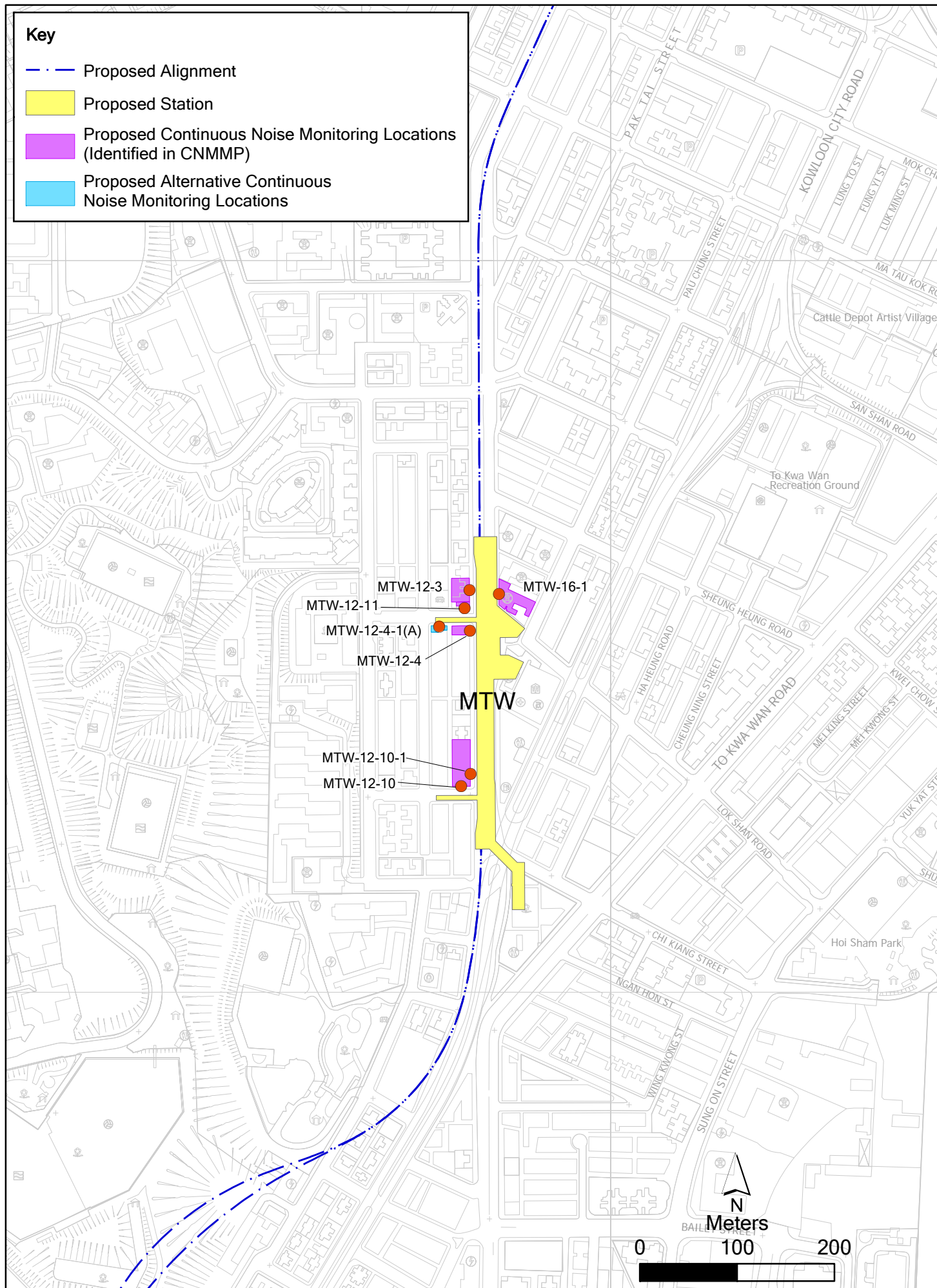
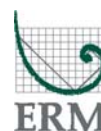


Figure 2.2b

Proposed Continuous Noise Monitoring Locations

Name: 171181_Continuous_Noise_Monitoring_Locations_MTW_v2.mxd
Date: 13/12/2012

Environmental
Resources
Management



- At locations close to the major site activities which are likely to have noise impacts;
- Close to the most affected NSRs; and
- For monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.

A façade correction of +3 dB(A) will be made to the free field measurements.

The ET of Works Contract 1109 will seek approval from the Engineer Representative (ER) and agreement from the IEC and EPD on the monitoring positions and the corrections to be adopted.

Table 2.1 *Status on Access Grant of the NSRs with Residual Air-borne Construction Noise Impact predicted exceeding noise criteria in CNMMP and Proposed Continuous Noise Monitoring Positions*

NSR with residual impact exceeding noise criteria identified in CNMMP ^(a)	Description	Status	Proposed Continuous Noise Monitoring Position	Description	Status
TKW-3-2	Prosperity House	<ul style="list-style-type: none"> Responsible party cannot be identified and contacted 	TKW-3-2(A)	No. 420 Prince Edward Road West	<ul style="list-style-type: none"> Access granted Approval from the ER and agreement from IEC and EPD have been obtained
MTW-12-3	Lucky Mansion	<ul style="list-style-type: none"> Ongoing liaison with Management Office (MO) and Owners' Corporation (OC) To be confirmed 	MTW-12-3	Lucky Mansion	-
MTW-12-4	352-354 Ma Tau Wai Rd (East Façade)	<ul style="list-style-type: none"> Responsible party is yet to be identified and contacted To be confirmed 	MTW-12-4	352-354 Ma Tau Wai Rd (East Façade)	-
MTW-12-4-1	352-354 Ma Tau Wai Rd (North Façade)	<ul style="list-style-type: none"> Responsible party cannot be identified and contacted 	MTW-12-4-1(A)	59 Maidstone Road	<ul style="list-style-type: none"> Access granted 59 Maidstone Road is located next to No. 352-354 Ma Tau Wai Road (North Façade) to the west and adjoins the at-grade works area. Therefore, 59 Maidstone Road is considered a suitable alternative location. Approval from the ER has been obtained
MTW-12-10	Lucky Building (South Façade)	<ul style="list-style-type: none"> Access granted 	MTW-12-10	Lucky Building (South Façade)	-
MTW-12-10-1	Lucky Building (East Façade)	<ul style="list-style-type: none"> Access granted 	MTW-12-10-1	Lucky Building (East Façade)	-
MTW-12-11	Jing Ming Building	<ul style="list-style-type: none"> Responsible party is yet to be identified and contacted 	MTW-12-11	Jing Ming Building	-
MTW-16-1	SKH Good Shepherd Primary School	<ul style="list-style-type: none"> Access granted 	MTW-16-1	SKH Good Shepherd Primary School	-

NSR with residual impact exceeding noise criteria identified in CNMMP ^(a)	Description		Status	Proposed Continuous Noise Monitoring Position	Description		Status
MTW-18-2	No. 2 Kowloon City Road		• Building has been demolished	- ^(b)	-		-

Notes:

(a) Reference to CNMMP.

(b) The building at MTW-18—2 has been demolished. During the period of residual noise impact exceeding criteria predicted in the CNMMP (ie, May 2013 – August 2013), there will be no NSR occupied at this location. It is therefore not necessary carry out continuous noise monitoring at this location.

CONTINUOUS NOISE MONITORING PARAMETERS

Continuous noise level will be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq\ 30min}$ will be used as the continuous noise monitoring parameter for the time period between 0700 and 1900 hours on normal working hours (ie, Mondays to Saturdays) during the construction period that residual noise impacts exceeding noise criteria are predicted at the identified NSRs after exhausting all possible mitigation measures assessed in the CNMMP.

MONITORING EQUIPMENT

As referred to in the Technical Memorandum (TM) issued under the *Noise Control Ordinance* (NCO), sound level meters in compliance with the *International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1)* specifications will be used for carrying out the noise monitoring. Immediate prior to the noise measurement, the accuracy of the sound level meter will be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The accuracy of the sound level meter will also be checked on regularly basis. Measurements will be accepted as valid only if the calibration level before and after the noise measurement agrees to within 1.0 dB.

Noise measurements will be made in accordance with standard acoustical principles and practices in relation to weather conditions.

The ET of Works Contract 1109 is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment. He/she will ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the impact continuous noise monitoring. All the equipment and associated instrumentation will be clearly labelled.

MONITORING METHODOLOGY

Continuous monitoring of $L_{eq\ 30min}$ noise levels will be carried out at the proposed 8 NSRs predicted to have residual air-borne construction noise impact exceeding noise criteria during the normal construction working hours (0700 – 1900 Monday to Saturday). The duration of the continuous noise monitoring will be limited to the period when the NSRs were predicted with residual impact exceeding noise criteria in the CNMMP. The monitoring data will be downloaded from the sound level meter once a week and reported onto the dedicated SCL Project website within 2 working days after the data is collected. If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

Noise measurements should not be made in the presence of fog, rain, wind with a steady speed exceeding 5ms^{-1} or wind with gusts exceeding 10ms^{-1} . The wind speed should be checked with a portable wind speed meter capable of measuring wind speeds in ms^{-1} .

6 EVENT AND ACTION PLAN

The maximum noise levels predicted in the CNMMP submitted under EP Condition 2.9 will be used to set the Action/Limit Levels for the continuous noise monitoring programme and they are presented in *Table 6.1*.

Table 6.1 *Action/Limit Levels for Construction Airborne Noise*

Proposed Continuous Noise Monitoring Stations	Description	Action / Limit Level ^(a)	Measurement Period ^{(d) (f)}
TKW-3-2(A)	No. 420 Prince Edward Road West	80 ^(b)	Sept 2014 – Dec 2014
MTW-12-3	Lucky Mansion	80	Aug 2014 – Jan 2015, Mar 2015 – Jun 2015
MTW-12-4	352-354 Ma Tau Wai Rd (East Façade)	80	Aug 2014 – Jun 2015
MTW-12-4-1(A)	59 Maidstone Road	82 ^(c)	Oct 2014, Dec 2014 – Jun 2015
MTW-12-10	Lucky Building (South Façade)	84	Mar 2015 – Apr 2015, Sept 2015 – Jan 2016
MTW-12-10-1	Lucky Building (East Façade)	80	Dec 2014 – May 2015, Sept 2015 – Jan 2016
MTW-12-11	Jing Ming Building	81	Sept 2014 – Jun 2015
MTW-16-1	SKH Good Shepherd Primary School	79	Dec 2012 – Jan 2013 ^(g) , Apr 2013 – Dec 2013, Aug 2014 – Mar 2016 ^(e)

Proposed Continuous Noise Monitoring Stations	Description	Action / Limit Level ^(a)	Measurement Period ^{(d) (f)}
Notes:			
(a) Reference to the predicted maximum noise level as contained in the CNMMP.			
(b) Reference to predicted maximum level at TKW-3-2 (Prosperity House) due to same distance to the works area.			
(c) Reference to predicted maximum noise level at MTW-12-4-1 (352-354 MTW Road (North Façade)) due to the same distance to the works area.			
(d) Measurement will be taken during the construction period with residual impact exceeding noise criteria predicted at the NSRs in the CNMMP.			
(e) Typical examination period is in May, June, November and December. The measurement period during examination is subject to the school activity schedule of MTW-16-1 when available.			
(f) The measurement periods for continuous noise monitoring at the NSRs during which they are expected to be subject to air-borne construction noise impacts exceeding Action/Limit Levels are tentative only and will be reviewed/updated with respect to the actual construction programme/ activities. The measurement period will be updated if there is any change to the construction programme. The ET of this Works Contract will confirm the measurement period 2 weeks before the commencement of the continuous noise monitoring and will notify the Contractor, MTRC, IEC and EPD the latest measurement period.			
(g) According to the school time table, examinations were conducted at MTW-16-1 in Dec 2012 and Jan 2013.			

Should exceedance of the Action/Limit Level occur, actions in accordance with the Event and Action Plan (EAP) given in *Table 6.2* will be carried out.

Table 6.2 *Event and Action Plan*

Event	Action				
	Works Contract 1109 ET	IEC	ER	Contractor	
Action/Limit Level	<ol style="list-style-type: none"> 1. Identify source 2. Repeat measurement. If two consecutive measurements exceed Action/Limit Level, the exceedance is then confirmed 3. If exceedance is confirmed, notify IEC, ER and Contractor 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented 5. Discuss jointly with the IEC, ER and Contractor and formulate remedial measures 6. Assess effectiveness of Contractor's remedial actions and keep IEC and ER informed of the results 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the Works Contract 1109 ET 2. Check the Contractor's working method 3. Discuss with the ER, Works Contract 1109 ET and Contractor on the potential remedial measures 4. Review and advise the Works Contract 1109 ET and ER on the effectiveness of the remedial measures proposed by the Contractor 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing 2. Notify the Contractor and IEC 3. In consultation with the Works Contract 1109 ET and IEC, agree with the Contractor on the remedial measures to be implemented 4. Ensure the proper implementation of remedial measures 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated 	<ol style="list-style-type: none"> 1. Identify source with Works Contract 1109 ET 2. If exceedance is confirmed, investigate the cause of exceedance and take immediate action to avoid further exceedance 3. Submit proposals for remedial measures to the ER with copy to the IEC and ET of notification 4. Implement the agreed proposals 5. Liaise with ER to optimize the effectiveness of the agreed mitigation 6. Revise and resubmit proposals if problem still not under control 7. Stop the relevant portion of works as determined by the ER until the exceedance is abated 	

Appendix B

**Continuous Noise Monitoring Plan for
Works Contract 1111 –
Hung Hom North Approach Tunnels**

Gammon- Kaden SCL 1111 Joint Venture

**Shatin to Central Link
Contract 1111
Hung Hom North Approach Tunnels
Continuous Noise Monitoring Plan**

January 2014

	Name	Signature
Prepared & Checked:	Joanne Tsoi	
Reviewed & Approved:	YT Tang	

Version: 5

Date: 16 January 2014

This Plan is prepared for Gammon-Kaden SCL1111 JV and is given for its sole benefit in relation to and pursuant to SCL1111 and may not be disclosed to, quoted to or relied upon by any person other than Gammon-Kaden SCL1111 JV without our prior written consent. No person (other than Gammon-Kaden SCL1111 JV into whose possession a copy of this plan comes may rely on this plan without our express written consent and Gammon-Kaden SCL1111 JV may not rely on it for any purpose other than as described above.

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1 INTRODUCTION

1.1 Background

- 1.1.1 The Shatin to Central Link (SCL) is one of the priority railways recommended for implementation in the Railway Development Strategy 2000. The Executive Council has endorsed on 11 March 2008 the SCL scheme jointly developed by the MTR Corporation Limited (MTR) and the HKSAR government to proceed with further planning and design for this line.
- 1.1.2 The SCL alignment comprises 17 kilometres of rail line that will connect several existing railway lines, creating two distinct east-west and north-south railway corridors. It will also provide interchange opportunities at six of its ten stations (Tai Wai, Diamond Hill, Homantin, Hung Hom, Exhibition and Admiralty). From east to west, the SCL will connect the existing Ma On Shan Line with the West Rail Line. The north-south corridor will be formed by extending the existing East Rail Line to Hung Hom Station (HUH) and then across Victoria Harbour to the planned Exhibition Station (EXH) and Admiralty Station (ADM). At ADM, interchanges will be provided with the existing Island Line, Tsuen Wan Line and the South Island Line (East) (SIL(E)).
- 1.1.3 The Shatin to Central Link Environmental Impact Assessment Report for Mong Kok East to Hung Hom Section [SCL (MKK-HUH)] (AEIAR-165/2012), Tai Wai to Hung Hom Section [SCL (TAW-HUH)] (AEIAR-167/2012) and Stabling Sidings at Hung Hom Freight Yard [SCL (HHS)] (AEIAR-164/2012) were submitted and subsequently approved with conditions by the Environmental Protection Department (EPD) on 17 February 2012 respectively. Two EPs were subsequently obtained (EP-437/2012 and EP 438/2012/D).
- 1.1.4 The construction of the SCL had been divided into different sections. This Construction Noise Mitigation Plan (CNMMP) for Works Contract 1111 cover part of the construction activities located at Hung Hom under the two EPs which include :
- SCL - Mong Kok East to Hung Hom Section (SCL (MKK – HUH))
 - (i) Construction of an realigned and modified railway from Portal 1A near Oi Man Estate to Hung Hom Station;
 - (ii) Construction of Noise Enclosure at Portal 1A;
 - (iii) Modification works on the existing Homantin Siding;
 - (iv) New EVA near Hung Hom Station.
 - SCL – Tai Wai to Hung Hom Section (SCL (TAW – HUH))
 - (i) Part of the railway tunnel from Ho Man Tin Station to Hung Hom.
 - SCL – Hung Hom Stabling Siding (SCL (HHS))
 - Construction of tracks and noise barrier of Hung Hom Stabling Sidings
- 1.1.5 Since the Works Contract 1111 covered works under SCL (MKK – HUH), SCL (TAW-HUH) and SCL (HHS), this CNMP would need to fulfil condition 2.8 of the approved Environmental Permit No. EP-437/2012 for Shatin to Central Link (SCL) – Mong Kok East to Hung Hom Section; and condition 2.10 approved Environmental Permit No. EP-438/2012/D for Shatin to Central Link (SCL) – Tai Wai to Hung Hom Section.
- 1.1.6 As per the EP conditions, a Continuous Noise Monitoring Plan for the Project is required to update environmental monitoring and audit requirements in relation to continuous noise monitoring.

1.2 Purpose of this Continuous Noise Monitoring Plan

- 1.2.1 This Continuous Noise Monitoring Plan (CNMP) is submitted to fulfil the requirements under EP-437/2012 (Condition 2.8) and EP-438/2012/D (Condition 2.10) pertaining to update environmental monitoring and audit (EM&A) requirements for continuous noise monitoring at the noise sensitive receivers (NSRs) with exceedance after mitigation in air-borne construction noise impact as predicted in the approved SCL (MKK – HUH) EIA report and SCL (TAW-HUH) EIA Report, and as updated in the Construction Noise Mitigation Measures Plan (CNMMP) approved under the two EP. This plan included:
- (a) Updated environmental monitoring and audit requirements relating to continuous noise monitoring at the Noise Sensitive Receivers (NSRs) with exceedance after mitigation in air-borne construction noise impact as predicted in the approved SCL (MKK – HUH) EIA report (AEIAR-165/2012), SCL (TAW – HUH) EIA Report (AEIAR-167/2012), SCL (HHS) EIA report (AEIAR-164/2012) and as updated in the CNMMP approved under Condition 2.7 of EP-437/2012 and condition 2.9 of No. EP-438/2012/D;
 - (b) Drawings in the scale of 1:5,000 or other appropriate scale as agreed by the Director showing the proposed locations for conducting continuous noise monitoring;
 - (c) Monitoring methodology and measurement parameters;
 - (d) A system to report the continuous noise monitoring results on a website as required, within a period of 2 working days after the relevant noise monitoring data are collected or become available; and
 - (e) An Event and Action Plan giving details of the immediate active remedial measures in the event that the measured noise levels exceed the worst-case scenario approved SCL (MKK – HUH) EIA report, SCL (TAW – HUH) EIA Report, SCL (HHS) EIA report or the levels as updated by the CNMMP approved under Condition 2.7 of EP-437/2012 and condition 2.9 of No. EP-438/2012/D.

2 CONTINUOUS NOISE MONITORING LOCATIONS

- 2.1.1 With reference to the findings and recommendations of the CNMMP, residual air-borne construction noise impacts exceeding noise criteria were identified at Wing Fung Building and Carmel Secondary School during the construction of the SCL (MKK – HUH) and SCL (TAW – HUH) under Works Contract 1111. The location of Carmel Secondary School and Wing Fung Building is shown in **Figure 1 and 2**.
- 2.1.2 According to EP conditions under EP-437/2012 (Condition 2.8) and EP-438/2012/D (Condition 2.10), continuous noise monitoring should be conducted at the 2 NSRs with residual air-borne noise impact exceeding noise criteria predicted.
- 2.1.3 The proposed continuous noise monitoring locations are presented in **Table 2.1** and shown in **Figure 1 and 2**. The monitoring position will normally be at a point 1m from the exterior of the proposed monitoring location building façade and be at a position 1.2m above local ground. Due to the access problem at HH2, alternative monitoring location at No. 234-238 Chatham Road North is proposed based on the approved Works Contracts 1103, 1106 and 1111 Baseline Environmental Monitoring – Alternative Noise and Duct Monitoring Location Proposal dated on 13 September 2012. This alternative monitoring location is considered as an appropriate alternative noise monitoring station.
- 2.1.4 If there is problem with access to the monitoring position at the two proposed NSRs predicted to have residual air-borne construction noise impact exceeding noise criteria, an alternative position will be proposed and a correction to the measurement will be made.
- 2.1.5 The alternative continuous noise monitoring location will be chosen based on the following criteria:
- At locations close to the major site activities which are likely to have noise impacts;
 - Close to the most affected NSRs; and
 - For monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.
- A façade correction will be made the free field measurements.
- 2.1.6 The ET of Works Contract 1111 will seek approval from the Engineer Representative (ER) and agreement from the IEC and EPD on the monitoring positions and the corrections to be adopted.

Table 2.1 Summary of Proposed Continuous Noise Monitoring Location

NSR ID	NSR Description	Uses	Proposed Continuous Noise Monitoring Location	Alternative Noise Monitoring Location
OM4a	Carmel Secondary School (South Block)	Educational	NM1	-
HH2	Wing Fung Building	Residential	NM2	No. 234-238 Chatham Road North

Remark: The designation of NSR ID and noise monitoring locations refer to that in the EM&A Manual

3 CONTINUOUS NOISE MONITORING PARAMETERS

- 3.1.1 Continuous noise level will be measured in terms of the A-weighted equivalent continuous sound pressure level for 30 minutes ($L_{eq, 30 \text{ min}}$) will be used as continuous noise monitoring parameter for time period between 0700 and 1900 hours on normal working hours (i.e. Mondays to Saturdays) during the construction period that residual noise impacts exceeding noise criteria are predicted at the identified NSRs after exhausting all possible measures assessed in the CNMMP.

4 MONITORING EQUIPMENT

- 4.1.1 As referred to in the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications will be used for carrying out the noise monitoring. Immediate prior to the noise measurement, the accuracy of the sound level meter will be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The accuracy of the sound level meter will also be checked on regularly basis. Measurements will be accepted as valid only if the calibration level before and after the noise measurement agrees to within 1.0 dB. Noise measurements will be made in accordance with standard acoustical principles and practices in relation to weather conditions. The ET of Works Contract 1111 is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment. He/she will ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the impact continuous noise monitoring. All the equipment and associated instrumentation will be clearly labeled.

5 MONITORING METHODOLOGY

- 5.1.1 Continuous monitoring of $L_{eq, 30 \text{ min}}$ noise levels will be carried out at the proposed 2 NSRs predicted to have residual air-borne construction noise impact exceeding noise criteria during the normal construction working hours (0700 – 1900 Monday to Saturday). The duration of the continuous noise monitoring will be limited to the period when the NSRs were predicted with residual impact exceeding noise criteria in the CNMMP. The monitoring data will be downloaded from the sound level meter once a week and reported onto the dedicated SCL Project website within 2 working days after the data is collected. If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

6 EVENT AND ACTION PLAN

- 6.1.1 The maximum noise levels predicted in the CNMMP submitted under EP-437/2012 (Condition 2.7) and EP-438/2012/D (Condition 2.9) will be used to set the Action/Limit Levels for the continuous noise monitoring programme. Measurement will be taken during the construction period with residual impact exceeding noise criteria predicated at the NSRs in the corresponding CNMMP. Summary of Proposed Continuous Noise Monitoring Plan are presented in Table 6.1. The Event and Action Plan for the continuous noise monitoring is presented in Table 6.2. Should exceedance of the Action/Limit Levels occur, actions in accordance with the Event and Action Plan will be carried out.

Table 6.1 Summary of Proposed Continuous Noise Monitoring Plan

Monitoring Location	NSR Description / Alternative Monitoring Location	Action /Limit Level, dB(A)	Measurement Period
NM1	Carmel Secondary School (South Block)	68 ^[1]	Feb and Jun 2014, Jan and Feb 2015 ^{[2][3]}
NM2	Wing Fung Building / No. 234-238 Chatham Road North	77	Sep to Dec of 2014 Jan/ Mar to May 2015

Footnote:

[1] Action/Limit level will only be applicable during the examination period.

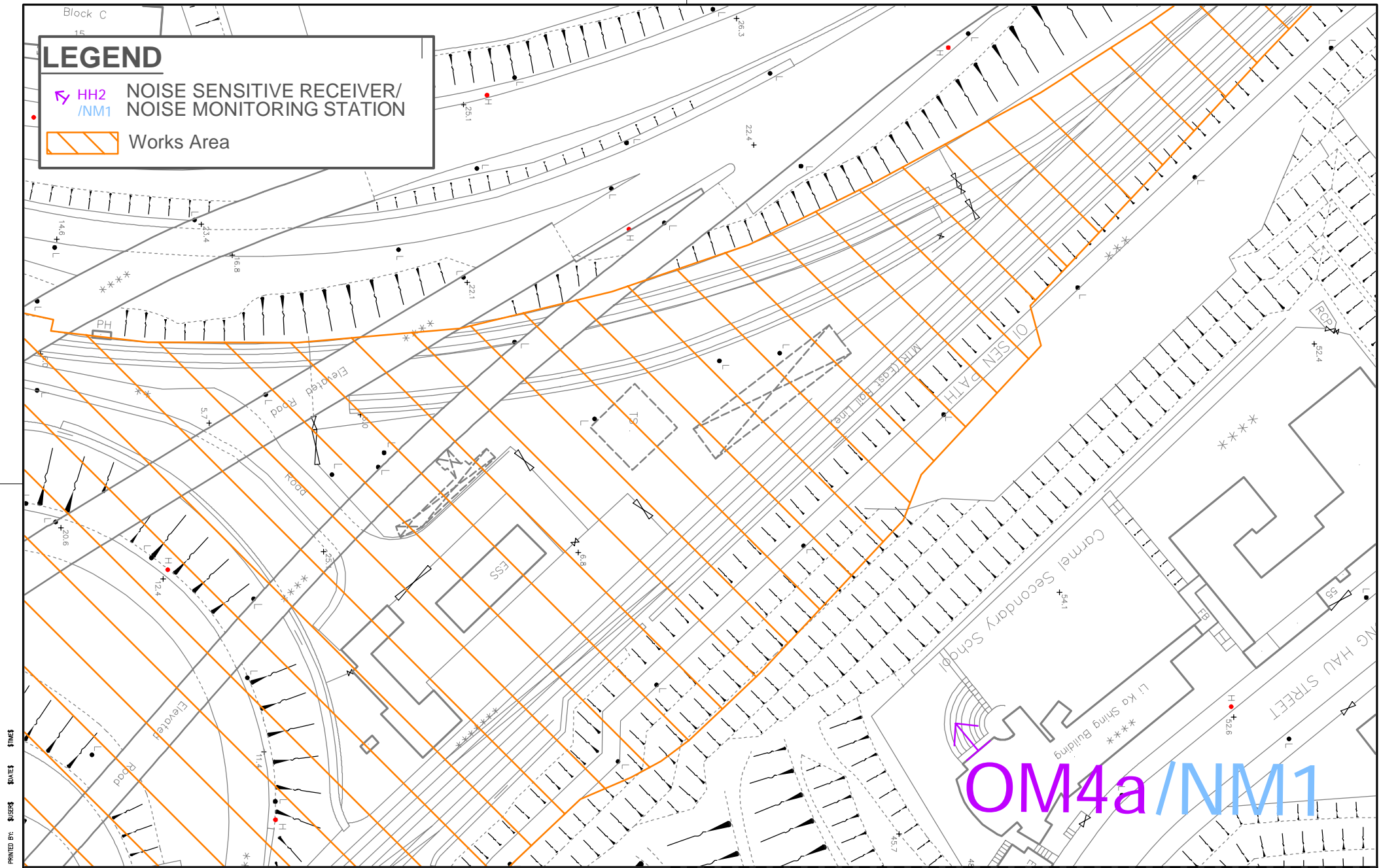
[2] Based on 2013-2014 Calendar of Carmel Secondary School, the examination periods are assumed to be January, February and June.

[3] The continuous noise monitoring periods will be reviewed and updated based on the latest calendar of Carmel Secondary School.


Table 6.2 Event and Action Plan


EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action/Limit Level	<ol style="list-style-type: none"> 1. Identify source ; 2. Repeat measurement. If two consecutive measurements exceed Action/Limit Level, the exceedance is then confirmed; 3. If exceedance is confirmed, notify IEC, ER and Contractor; 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented; 5. Discuss jointly with the IEC, ER and Contractor and formulate remedial measures; and 6. Assess effectiveness of Contractor's remedial actions and keep IEC and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the Works Contract 1111 ET; 2. Check the Contractor's working method; 3. Discuss with the ER, Works Contract 1111 ET and Contractor on the potential remedial measures; and 4. Review and advise the Works Contract 1111 ET and ER on the effectiveness of the remedial measures proposed by the Contractor. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing; 2. In consultation with the Works Contract 1111 ET and IEC, agree with the Contractor on the remedial measures to be implemented; 3. Ensure the proper implementation of remedial measures; and 4. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Identify source with the Works Contract 1111 ET; 2. If exceedance is confirmed, investigate the cause of exceedance and take immediate action to avoid further exceedance; 3. Submit proposals for remedial measures to the ER with copy to the IEC and ET of notification; 4. Implement the agreed proposals; 5. Liaise with ER to optimize the effectiveness of the agreed mitigation; 6. Revise and resubmit proposals if problem still not under control; and 7. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Figures



LEGEND




 **HH2 /NM1** NOISE SENSITIVE RECEIVER/
NOISE MONITORING STATION

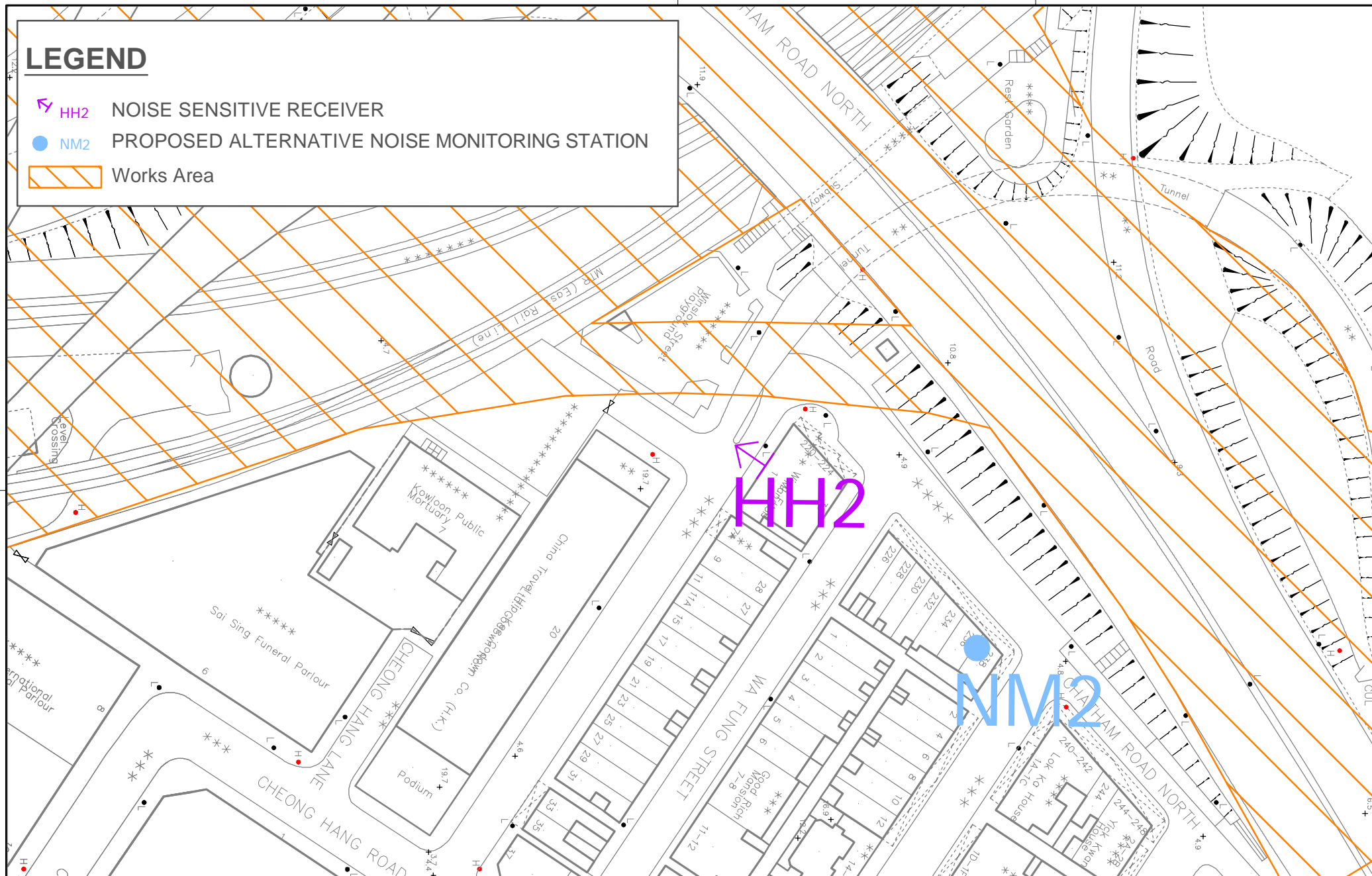
 Works Area

PRINTED BY: \$USER\$ \$DATE\$ \$TIME\$
PLOT DRW: \$PLOTDRW\$ \$MODEL\$ \$FILE\$

DRAWN: HSF				MTR				TITLE			
DESIGNED: HSF				SHATIN TO CENTRAL LINK				CONTRACT 1111			
CHECKED: HSF				CONTRACTOR				HUNG HOM NORTH APPROACH TUNNELS			
APPROVED: HSF				GAMMON KADEN				NSL & EWL TUNNELS -			
DATE: 16/NOV/2012				ORIGINATOR				LOCATIONS OF NOISE MONITORING STATIONS (1 OF 2)			
BY: HSF				LAMBETH				SCALE			
DATE: 28/AUG/12				CADD REF.				1:100 @ A4			
REV				DRAWING NO.				FIGURE 1			
DESCRIPTION				REV				A			

LEGEND

-  HH2 NOISE SENSITIVE RECEIVER
-  NM2 PROPOSED ALTERNATIVE NOISE MONITORING STATION
-  Works Area



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DRAWN	HSF
DESIGNED	HSF
CHECKED	HSF
APPROVED	HSF
DATE	16/NOV/2012



SHATIN TO CENTRAL LINK

CONTRACTOR



ORIGINATOR



CADD REF.

TITLE

CONTRACT 1111
HUNG HOM NORTH APPROACH TUNNELS
NSL & EWL TUNNELS -
LOCATIONS OF NOISE MONITORING STATIONS (1 OF 2)

SCALE
1:100 @ A4

DRAWING NO.
FIGURE 2

REV.
A

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BY DATE APPROVED

HSF 28AUG12 HSF

DESCRIPTION

BY DATE APPROVED

REV

DESCRIPTION

REV

Appendix C

**Continuous Noise Monitoring Plan for
Works Contract 1103 –
Hin Keng to Diamond Hill Tunnels**

MTR Corporation Limited

**Shatin to Central Link
Tai Wai to Hung Hom Section
and
Mong Kok East to Hung Hom Section**

Continuous Noise Monitoring Plan
(CNMP)

Works Contract 1103
Hin Keng To Diamond Hill Tunnels

(April 2013)

Verified by: Coleman Ng 

Position: Environmental Team Leader

Date: 25/4/13

MTR Corporation Limited

**Shatin to Central Link (SCL) - Tai
Wai to Hung Hom Section: Works
Contract 1103 - Hin Keng to
Diamond Hill Tunnels**

Continuous Noise Monitoring Plan

CNMP

19 April 2013

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

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

Job number 228105-27

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ARUP

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- Figure 1.7: Locations of Project Works Areas – General Alignment of Contract 1103 (Sheet 6 of 6)**
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1 Introduction

The Shatin to Central Link (SCL) is one of the railway projects recommended for implementation in Railway Development Strategy 2000. It is an integral component of the expanded rail network, which will be required to support the economic, social and population growth of the HKSAR in the coming years. In particular, it will support the urban renewal of the existing Kowloon City District, planned Kai Tak Development (KTD) and further developments in North East New Territories (including Ma On Shan) by providing direct and efficient rail service between Shatin and the Central Business District of the Hong Kong Island via KTD.

The SCL is also one of the ten large-scale infrastructure projects announced by the Chief Executive in his 2007-2008 Policy Address. According to updated information, SCL is targeted to commence construction by early 2013. For the purposes of the Environmental Impact Assessment (EIA), five EIA Studies have been conducted to cover different sections of the SCL. They include:

- SCL – Tai Wai to Hung Hom Section [SCL (TAW-HUH)] (hereinafter referred to as “the Project”, being considered in this EIA) – the extension of Ma On Shan Line from Tai Wai Station via Hing Keng, Diamond Hill, Kai Tak, To Kwa Wan, Ma Tau Wai and Ho Man Tin to Hung Hom, and link up with the existing West Rail Line, along with a proposed stabling sidings option in Diamond Hill (DHS).
- SCL – Mong Kok East to Hung Hom Section [SCL (MKK-HUH)] – the realignment work for the existing East Rail Line tracks from the tunnel portal near Oi Man Estate (Portal 1A) to the proposed North Ventilation Building (NOV) in Hung Hom;
- SCL – Hung Hom to Admiralty Section [SCL (HUH-ADM)] – the section from NOV, Plant Rooms and Emergency Access in Hung Hom across the harbour to the Causeway Bay Typhoon Shelter (CBTS), Exhibition Station (EXH) and then to ADM;
- SCL Protection works at Causeway Bay Typhoon Shelter – the section of approximately 160m long of the SCL tunnel protection works at the crossing over Central-Wan Chai Bypass (CWB) tunnels, which would be constructed under the CWB project; and
- SCL – Stabling Sidings at Hung Hom Freight Yard [SCL (HHS)] – another stabling sidings option for SCL (TAW – HUH) proposed at the former freight yard in Hung Hom .

The Project is an approximately 11km long extension of the Ma On Shan Line and connects the West Rail Line at Hung Hom forming a strategic east-west rail corridor. **Figure 1.1** shows the alignment of the Project.

The Project has been divided into several works contracts and this report will cover Works Contract 1103 which consists of the tunnels between Hin Keng and Diamond Hill. **Figures 1.2 to 1.7** show the work fronts of the Works Contracts 1103.

The Environmental Impact Assessment (EIA) for the project (Register No. AEIAR-167/2012) was approved by the Environmental Protection Department (EPD) in February 2012. In July 2012, an Environmental Permit (EP-438/2012) was issued. Applications of variation of EP were subsequently made in relation to Construction and Demolition Materials Management Plan, Sediment Management Plan and figures. The latest VEP (EP-438/2012/B) was issued from EPD on 26 October 2012.

According to the Condition 2.10 of the VEP (EP-438/2012/B), the Permit Holder shall, no later than one month before the commencement of construction of the Project, submit to the Director of Environmental Protection for approval four hard copies and one electronic copy of a Continuous Noise Monitoring Plan (CNMP) for the Project.

In accordance with the VEP, this CNMP shall include:

- (i) Updated environmental monitoring and audit requirements relating to continuous noise monitoring at the NSRs shown in Table 1 of the permit with exceedance after mitigation in air-borne construction noise impact as predicted in the approved SCL(TAW-HUH) EIA Report (Register No. AEIAR-167/2012) and SCL(HHS) EIA Report (Register No. AEIAR-164/2012) and as updated in the CNMMP approved under Condition 2.9;
- (ii) Drawings in the scale of 1:5000 or other appropriate scale as agreed by the Director showing proposed locations for conducting continuous noise monitoring;
- (iii) Monitoring methodology and measurement parameters;
- (iv) A system to report the continuous noise monitoring results on a website within a period of 2 working days after the relevant noise monitoring data are collected or become available; and
- (v) An Event and Action Plan giving details of the immediate active remedial measures in the event that the measured noise levels exceed the worst-case scenario predicted in the approved SCL(TAW-HUH) EIA Report (Register No. AEIAR-167/2012) and SCL(HHS) EIA Report (Register No. AEIAR-164/2012) and as updated in the CNMMP approved under Condition 2.9.

Before submission to the Director, the CNMP shall be certified by the Environmental Team (ET) and verified by the Independent Environmental Checker (IEC) as conforming to the relevant information and recommendations contained in the approved SCL(TAW-HUH) EIA report Register No. AEIAR-167/2012) and SCL(HHS) EIA Report (Register No. AEIAR-164/2012) and as updated in the Construction Noise Mitigation Measures Plan (CNMMP) approved under Condition 2.9. All measures recommended in the CNMMP approved under this condition shall be fully and properly implemented.

2 Updated Environmental Monitoring and Audit Requirements

2.1 Continuous Noise Monitoring Locations

In accordance with the findings presented in the Construction Noise Mitigation and Management Plan (CNMMP), selection of continuous noise monitoring locations is based on the NSRs which have noise residual impact after mitigation and are related to the Works Contract 1103. Based on these principles, the proposed continuous noise monitoring location is presented in **Table 2.1**. **Figure 2.1** shows the location of the proposed noise monitoring.

Table 2.1 Continuous noise monitoring location

ID	Description
TAW-6-7	CUHKAA Thomas Cheung School

2.2 Noise Audit

Reference will be made to the EM&A Manual of the Project to conduct the noise audit. It will be accomplished by means of:

- (i) Site inspection;
- (ii) Environmental Compliance;
- (iii) Choice of Construction Method; and
- (iv) Environmental Complaints.

2.2.1 Site Inspection

Site inspection provides a direct means to initiate and enforce specified environmental protection and pollution control measures. These will be undertaken routinely to inspect construction activities to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented.

Site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area.

The ET will formulate the environmental site inspection programme as well as the deficiency and action reporting system, and for carrying out the site inspections. The proposal for rectification, if any, will be prepared and submitted to the ET Leader and IEC by the Contractor.

Regular site inspection will be carried out and led by the Engineer's Representative (ER) and attended by the Contractor and ET once per week during the construction phase. The areas of inspection will not be limited to the environmental situation, pollution control and mitigation measures within the site. It will also review the environmental situations outside the works area which is likely to be affected, directly or indirectly, by the construction site activities of the

Project. The ET will make reference to the following information in conducting the inspection. During the inspection, the following information will be referred to:

- (i) EIA Report recommendations on environmental protection and pollution control mitigation measures;
- (ii) works progress and programme;
- (iii) individual works methodology proposals (which shall include the proposal on associated pollution control measures);
- (iv) contract specifications on environmental protection;
- (v) relevant environmental protection and pollution control legislations; and
- (vi) previous site inspection results.

The Contractor will keep the ER and ET Leader updated with all relevant environmental related information on the construction contract necessary for him to carry out the site inspections. Site inspection results and associated recommendations for improvements to the environmental protection and pollution control efforts will be recorded and followed up by the Contractor in an agreed time-frame. The Contractor will follow the procedures and time-frame as stipulated in the environmental site inspection, and the deficiency and action reporting system formulated by the ET, to report on any remedial measures subsequent to the site inspections.

The ER, ET and the Contractor will also carry out ad-hoc site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of a valid environmental complaint, or as part of the investigation work, as specified in the Action Plan for the EM&A programme.

2.2.2 Environmental Compliance

There are statutory requirements on environmental protection and pollution control requirements with which construction activities must comply.

In order that the works comply with all method statements of works will be submitted by the Contractor to the ER for approval and to the ET Leader to ensure sufficient environmental protection and pollution control measures have been included. Reference will be made to the Environmental Mitigation Implementation schedule (EMIS) stipulated in the EM&A Manual of the Project. Any proposed changes to the mitigation measures will be certified by the ET Leader and verified by the IEC as conforming to the relevant information and recommendations contained in the EIA Report.

The ER and ET will also review the progress and programme of the works to check that relevant environmental legislations have not been violated, and that any foreseeable potential for violating laws can be prevented.

The Contractor will provide the update of the relevant documents to the ET Leader so that checking can be carried out. The document will at least include the updated Works Progress Reports, updated Works Programme, method statements, any application letters for different licences / permits under the environmental

protection laws, and copies of all valid licences / permits. The site diary and environmental records will also be available for inspection by the relevant parties.

After reviewing the document, the ET will advise the IEC and Contractor of any non-compliance with legislative requirements on environmental protection and pollution control so that they can timely take follow-up actions as appropriate. If the follow-up actions may still result in potential violation of environmental protection and pollution control requirements, the ER and ET will provide further advice to the Contractor to take remedial action to resolve the problem.

Upon receipt of the advice, the Contractor will undertake immediate actions to correct the situation. The ER and ET will follow up to ensure that appropriate action has been taken in order to satisfy legal requirements.

2.2.3 Choice of Construction Method

At times during the construction phase the Contractor may submit method statements for various aspects of construction. This state of affairs would only apply to those construction methods that the EIA has not imposed conditions while for construction methods that have been assessed in the EIA, the Contractor is bound to follow the requirements and recommendations in the EIA study.

The Contractor's options for alternative construction methods may introduce adverse environmental impacts into the Project. It is the responsibility of the Contractor and ET, in accordance with established standards, guidelines and EIA study recommendations and requirements, to review and determine the adequacy of the environmental protection and pollution control measures in the Contractor's proposal in order to ensure no unacceptable impacts would result.

2.2.4 Environmental Complaints

The following procedures should be undertaken upon receipt of any environmental complaint:

- (i) The Contractor to log complaint and date of receipt onto the complaint database and inform the ER, ET and IEC immediately;
- (ii) The Contractor to investigate, with the ER and ET, the complaint to determine its validity, and assess whether the source of the problem is due to construction works of the Project with the support of additional monitoring frequency and stations, if necessary;
- (iii) The Contractor to identify remedial measures in consultation with the IEC, ET and ER if a complaint is valid and due to the construction works of the Project;
- (iv) The Contractor to implement the remedial measures as required by the ER and to agree with the ET and IEC any additional monitoring frequency and stations, where necessary, for checking the effectiveness of the remedial measures;
- (v) The ER, ET and IEC to review the effectiveness of the Contractor's remedial measures and the updated situation;

- (vi) The ET to undertake additional monitoring and audit to verify the situation if necessary, and oversee that circumstances leading to the complaint do not recur;
- (vii) If the complaint is referred by the EPD, the Contractor to prepare interim report on the status of the complaint investigation and follow-up actions stipulated above, including the details of the remedial measures and additional monitoring identified or already taken, for submission to EPD within the time frame assigned by the EPD; and
- (viii) The ET to record the details of the complaint, results of the investigation, subsequent actions taken to address the complaint and updated situation including the effectiveness of the remedial measures, supported by regular and additional monitoring results in the monthly EM&A reports.

3 Monitoring Methodology and Measurement Parameters

3.1 Monitoring Methodology

3.1.1 Monitoring Equipment

As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications will be used for carrying out the noise monitoring.

Immediately prior to and following each noise measurement, the accuracy of the sound level meter will be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration level before and after the noise measurement agrees to within 1.0 dB.

Noise measurements should be made in accordance with standard acoustical principles and practices in relation to weather conditions.

The ET is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment. He shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation will be clearly labelled.

3.1.2 Monitoring Location

Continuous noise monitoring will be conducted at the monitoring locations shown in **Table 2.1**.

The monitoring station will normally be at a point 1m from the exterior of the sensitive receiver building facade and be at a position 1.2 m above local ground. If there is problem with access to the normal monitoring position, an alternative position may be chosen, and a correction to the measurements shall be made.

For reference, a facade correction of +3 dB(A) will be made to the free field measurements. The ET will agree with the IEC and EPD on the monitoring position and the corrections adopted.

As baseline monitoring at CUHKAA Thomas Cheung School (TAW-6-7) was conducted, the impact monitoring at this NSR will be carried out at the same position. If changes to the monitoring station is required in future, the ET will propose alternative locations based on the selection criteria described in Section 2.2 and seek approval from the ER and agreement from the IEC and EPD on the proposal.

3.2 Noise Monitoring Parameters

Construction noise level will be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq\ 30\ min}$ will be used as the monitoring

parameter for the time period between 0700 and 1900 hours on normal working hours (Monday to Saturday) during the construction period.

As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference

The monitoring data will be downloaded from the sound level meter once a week and inputted onto the dedicated SCL Project Website within 2 working days.

For construction monitoring stations at schools, noise monitoring will be carried out during the school examination periods. The ET shall liaise with the school's personnel to ascertain the exact dates and times of all examination periods during the course of the contract.

4 Monitoring Results Reporting System

4.1 Monitoring Result Collection

Noise monitoring results will be downloaded from respective sound level meters once a week and reported on the dedicated SCL project website and EM&A report accordingly.

4.2 EM&A Report

The monitoring results and findings will be recorded in the monthly EM&A report prepared by the ET and endorsed by the IEC in accordance with the Project's EM&A Manual.

The monitoring results will include the following information:

- Monitoring methodology;
- monitoring parameters;
- monitoring locations;
- monitoring date and time;
- weather conditions during the period; and
- any other factors which might affect the monitoring results.

Should any non-compliance is revealed from the monitoring results, the Event and Action Plan (details refer to **Section 5**) will strictly be followed.

The ET will review the number and location of the monitoring stations and parameters every six months, or on as needed basis, in order to cater for any changes in the surrounding environment and the nature of works in progress.

5 Event and Action Plan

The criterion and predicted maximum noise level as stated in EP-438/2012/B for the NSR identified as having a residual impact in the CNMMP is shown below in **Table 5.1**.

Table 5.1 Action and Limit levels

Proposed Continuous Noise Monitoring Locations	Description	Action/Limit Level dB(A)	Measurement Period ⁽²⁾
TAW-6-7	C.U.H.K.A.A. Thomas Cheung School	66	April 2013

Notes:

- (1) Typical examination period is in May, June, November and December. However, it is now confirmed by the latest school time table, examination is conducted in April and June 2013 during the 2nd school term of 2012/2013.
- (2) Measurements will be taken during the construction period where residual impacts have been predicted in the CNMMP.

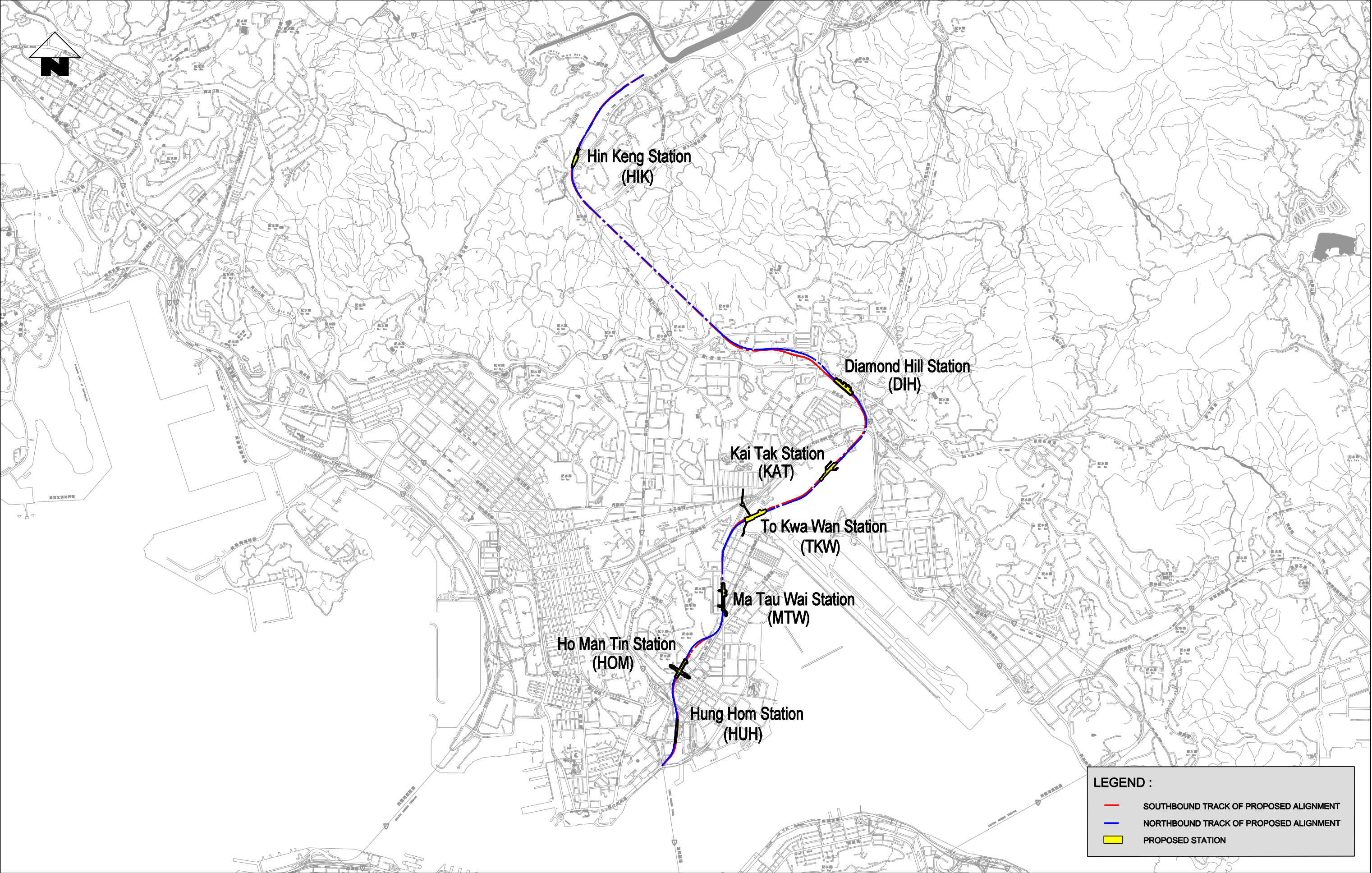
Should non-compliance of the criteria occur, action in accordance with the Event and Action Plan in **Table 5.2** will be carried out.

Table 5.2 Event and Action Plan

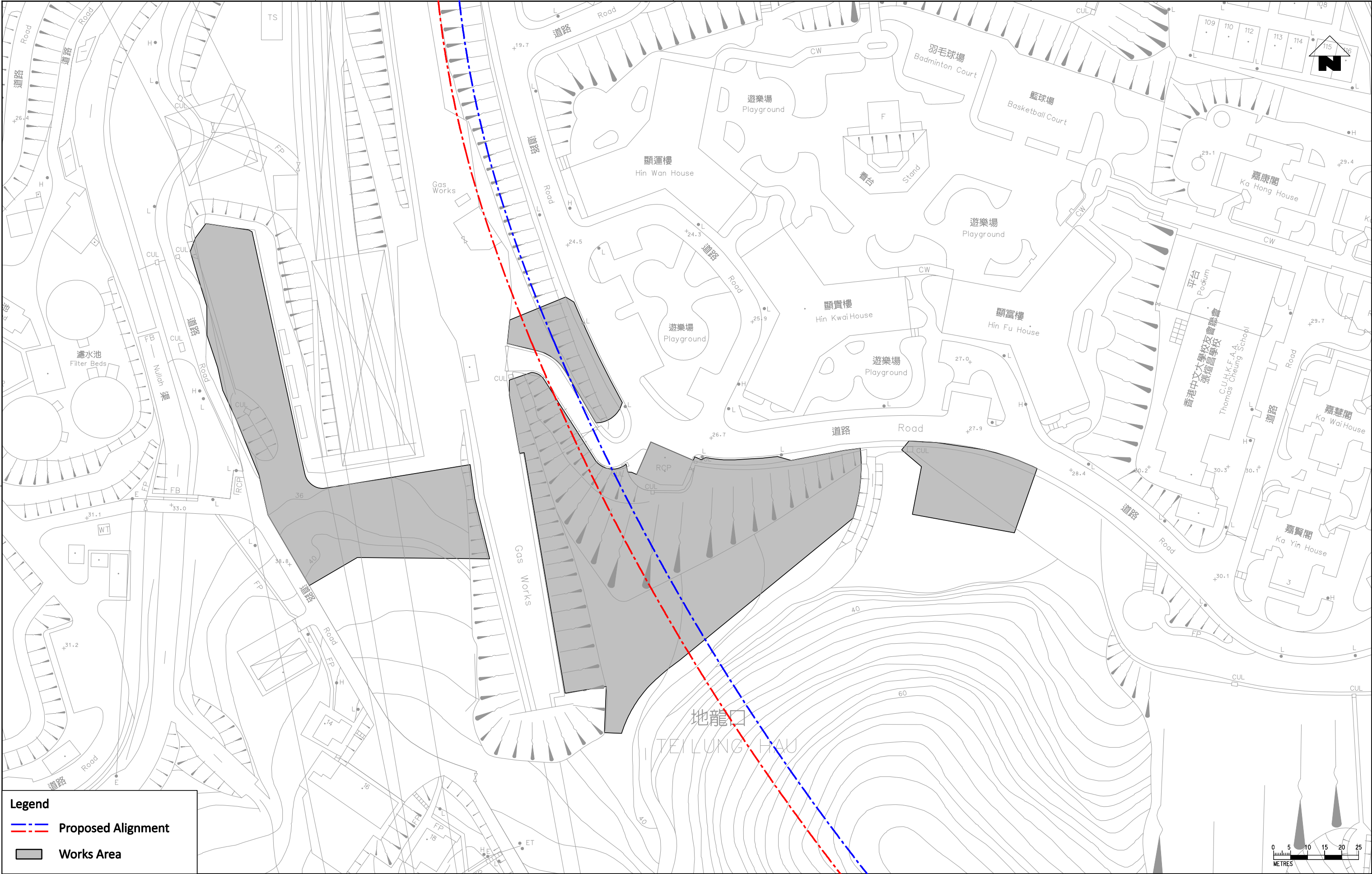
Event	Action			
	Works Contract 1103 ET	IEC	ER	Contractor
Action/Limit Level	<ol style="list-style-type: none"> 1. Identify Source 2. Repeat Measurement. If two consecutive measurements exceed Action/Limit Level the exceedance is then confirmed 3. If exceedance is confirmed, notify IEC, ER and Contractor 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. Discuss jointly with the IEC, ER and Contractor and formulate remedial measures. 6. Assess effectiveness of the Contractor's remedial actions and keep IEC and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the Works Contract 1103 ET. 2. Check the Contractor's working method. 3. Discuss with the ER, Works Contract 1103 ET and Contractor on the potential remedial measures. 4. Review and advise the Works Contract 1103 ET and ER on the effectiveness of the remedial measures proposed by the Contractor. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor and IEC. 3. In consultation with the Works Contract 1103 ET and IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure the proper implementation of remedial measures. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Identify source with Works Contract 1103 ET 2. If exceedance is confirmed, investigate the cause of exceedance and take immediate action to avoid further exceedance. 3. Submit proposals for remedial measures to the ER with copy to the IEC and ET of notification. 4. Implement the agreed proposals. 5. Liaise with ER to optimize the effectiveness of the agreed mitigation. 6. Revise and resubmit proposals if problem still not under control. 7. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Figures

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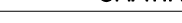
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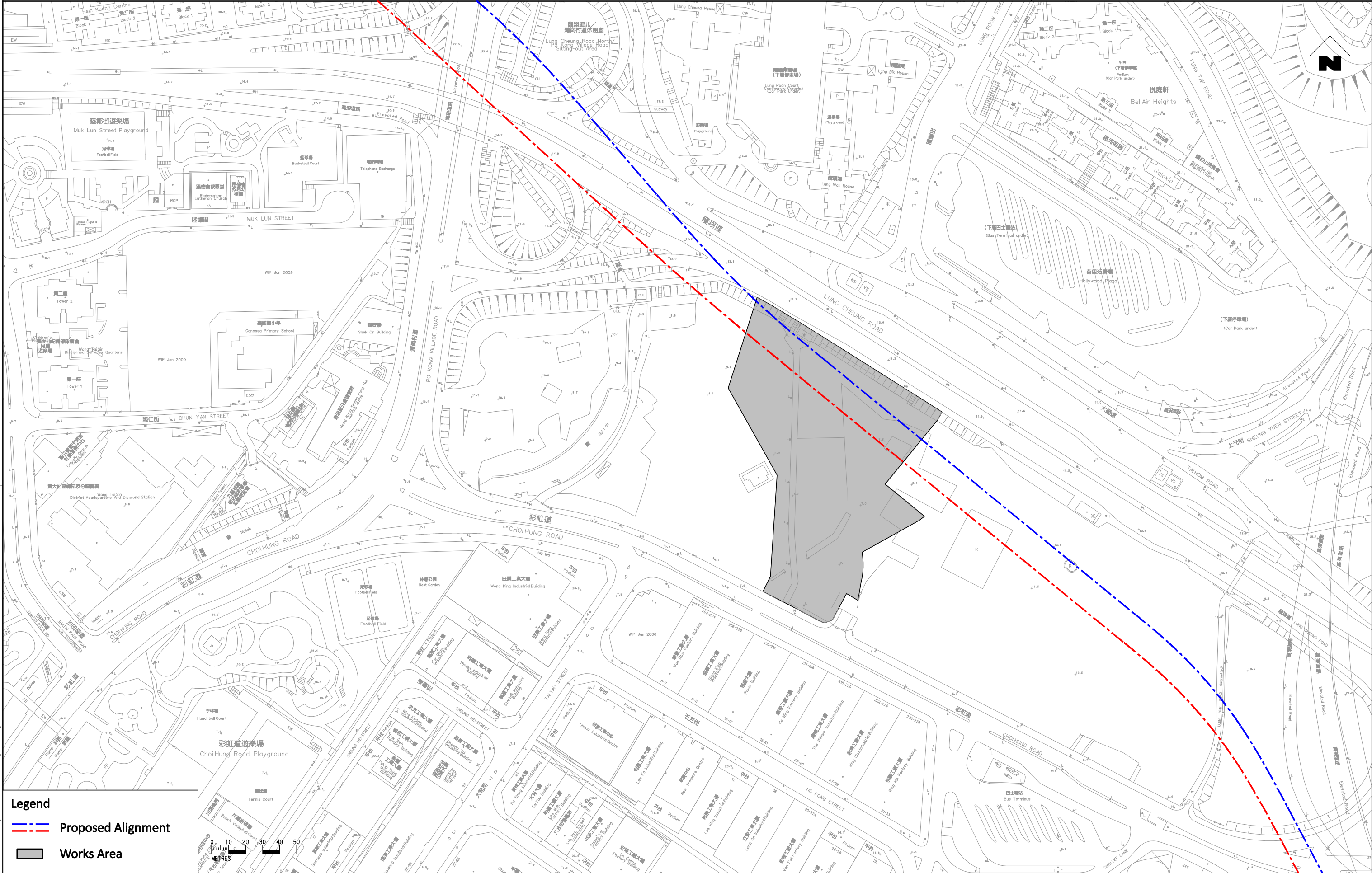
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Proposed Alignment

Works Area

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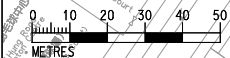
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Proposed Alignment

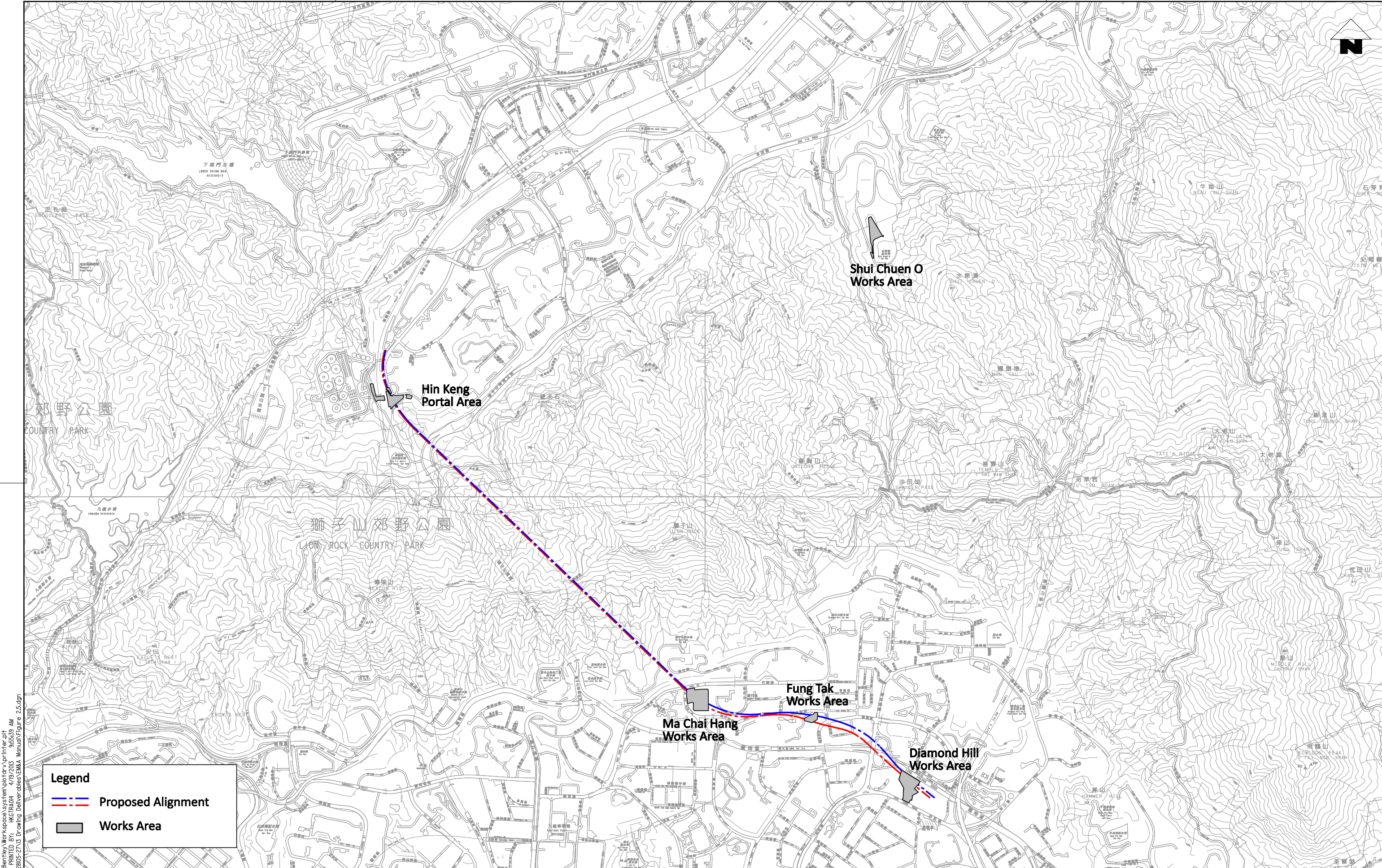
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**Continuous Noise Monitoring Plan for
Works Contract 1106 –
Diamond Hill Station**


MTR Corporation Limited

**Shatin to Central Link –
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Continuous Noise Monitoring Plan (CNMP)

Works Contract 1106 – Diamond Hill Station

(January 2014)

Certified by: 
_____ Dr. Priscilla Choy

Position: Environmental Team Leader

Date: 15th January 2014

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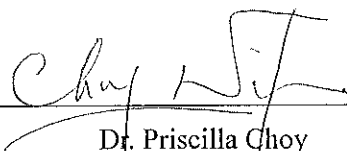
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Table 7.1	Event and Action Plan

1 INTRODUCTION

Background

- 1.1 The Shatin to Central Link – Tai Wai to Hung Hom Section (hereafter referred to as SCL (TAW-HUH)) is an approximately 11 km long extension of the Ma On Shan Line and links up with the West Rail Line at Hung Hom forming a strategic east-west rail corridor. It is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO).
- 1.2 The Environmental Impact Assessment (EIA) Report of the SCL (TAW-HUH) (Register No. AEIAR-167/2012) and SCL – Stabling Sidings at Hung Hom Freight Yard (hereafter referred to as SCL (HHS)) (Register No. AEIAR-164/2012) were approved by the Environmental Protection Department (EPD) under the EIAO on 17 February 2012. An Environmental Permit (EP-438/2012) has been issued on 22 March 2012. The EP has been varied recently and a varied EP (EP-438/2012/D) was issued on 13 September 2013.
- 1.3 The construction of the SCL (TAW-HUH) and SCL (HHS) have been divided into a series of civil construction works contracts. This Works Contract 1106 covers construction of SCL Diamond Hill Station (DIH) which is under the SCL (HHS) EIA Report. This construction contract was awarded to Sembawang-Leader Joint Venture (SLJV) in December 2012.

Purpose of this Continuous Noise Monitoring Plan

- 1.4 According to the Condition 2.10 of the EP-438/2012/D, the Permit Holder shall, no later than one month before the commencement of construction of the Project submit to the Director of Environmental Protection for approval four hard copies and one electronic copy of a Continuous Noise Monitoring Plan (CNMP) for the Project. The CNMP shall include:
 - (a) updated environmental monitoring and audit requirements relating to continuous noise monitoring at the NSRs shown in Table 1 of this Permit with exceedance after mitigation in air-borne construction noise impact as predicted in the approved SCL(TAW-HUH) EIA Report (Register No. AEIAR-167/2012) and SCL(HHS) EIA Report (Register No. AEIAR-164/2012) and as updated in the CNMMP approved under Condition 2.9;
 - (b) drawings in the scale of 1:5,000 or other appropriate scale as agreed by the Director showing the proposed locations for conducting continuous noise monitoring;
 - (c) monitoring methodology and measurement parameters;
 - (d) a system to report the continuous noise monitoring results on a website within a period of 2 working days after the relevant noise monitoring data are collected or become available; and
 - (e) an Event and Action Plan giving details of the immediate active remedial measures in the event that the measured noise levels exceed the worst-case scenario predicted in the approved SCL(TAW-HUH) EIA Report (Register No.

AEIAR-167/2012) and SCL(HHS) EIA Report (Register No. AEIAR-164/2012) or the levels as updated by the CNMMP approved under Condition 2.9.

- 1.5 Before submission to DEP, the CNMP will be certified by the Environmental Team (ET) and verified by the Independent Environmental Checker (IEC) as conforming to the relevant information and recommendations contained in the approved SCL (TAW-HUH) EIA Report (Register No. AEIAR-167/2012) and approved SCL (HHS) EIA Report (Register No. AEIAR-164/2012) or the updated prediction of noise levels as contained in the Construction Noise Mitigation Measures Plan (CNMMP) approved under EP Condition 2.9. All measures recommended in the CNMMP will be fully and properly implemented during construction.
- 1.6 This CNMP is prepared to comply with the above-mentioned requirements.
- 1.7 Further to the approval of the latest CNMP (August 2013) (ver. H) on 13 September 2013, this CNMP had been updated based on the latest school's examination timetable, Constructor's construction programme and the associated PME list.

2 UPDATED ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

2.1 With reference to the findings and recommendations of the latest Construction Noise Mitigation Measures Plan (CNMMP) of Works Contract 1106 (version 6, in January 2014), the updated mitigated construction noise impact at identified 5 NSRs in the vicinity of Works Contract 1106 as shown in the Table 1 of the Environmental Permit (Permit No.: EP-438/2012/D) is summarized in **Table 2.1**.

Table 2.1 Updated Mitigated Construction Noise Impact at Identified 5 NSRs (Extracted from Works Contract 1106 CNMMP (version 6.0))

NSR	Noise Criteria dB(A) ⁽¹⁾	SCL (TAW-HUH) EIA Prediction ⁽²⁾		SCL (HHS) EIA Prediction ⁽³⁾		CNMMP Prediction ^{(4) (5)}	
		Max Noise Level, dB(A) ⁽⁶⁾	Exceedance Duration (Month)	Max Noise Level, dB(A)	Exceedance Duration (Month)	Max Noise Level, dB(A) ⁽⁶⁾	Exceedance Duration (Month)
DIH-9-1	70 (65)	70 (70)	0 (2)	63	-	66 (65)	-
DIH-13-1	70 (65)	67 (66)	0 (2)	61	-	62 (62)	-
DIH-14-1	75	77	5	66	-	69	-
DIH-14-4	70 (65)	69 (68)	0 (3)	64	-	66 (65) ⁽⁷⁾	-
DIH-14-5	75	78	1	65	-	68	-

Notes:

- (1) Values in parentheses indicate the noise criterion during examination period of educational institution
- (2) Extracted from Table 8.15 of SCL (TAW-HUH) EIA – Residual Impacts at Noise Sensitive Receivers
- (3) Extracted from Table 8.13 of SCL (HHS) EIA – Predicted Maximum Mitigated Construction Noise Levels at Noise Sensitive Receivers
- (4) Cumulative impact arisen from other SCL(TAW-HUH) contracts near SCL DIH is considered.
- (5) Cumulative impact arisen from Tsz Wan Shan Pedestrian Link is not anticipated given the separation distance of >300m between the works sites and NSRs.
- (6) Values in parentheses indicates noise criterion during the examination period (typical examination period in May, June, November and December) of the educational institution. The examination periods of Shek On House [DIH-9-1], Canossa Primary School [DIH-13-1] and Canossa Primary School (San Po Kong) [DIH-14-4] are subject to schools' activity schedules when available.
- (7) According to the schools' activity schedules of Canossa Primary School (San Po Kong) [DIH-14-4] for Years 2013 and 2014, examination periods were scheduled in November 2013, March and June 2014 respectively. From June 2014 onwards, based on the school's previous schedules and for the purpose of assessment, the typical examination period in March, May, June, November and December was used for Canossa Primary School (San Po Kong) [DIH-14-4].

2.2 According to the latest CNMMP, since no residual noise impact after mitigation at the identified 5 NSRs is predicted throughout the construction period of Works Contract 1106, continuous noise monitoring at the NSRs is considered not required.

2.3 Where there is further update in the CNMMP for Works Contract 1106 or the examination schedules of the NSRs, the associated CNMP will be revised according to the updated findings and predictions in the latest CNMMP. In case residual air-borne construction noise impact is predicted at the NSR(s), continuous noise monitoring shall be conducted at NSR(s) and the proposed monitoring requirement in the below section shall be followed.

- 2.4 The ET of Works Contract 1106 will confirm the measurement period 2 weeks before the commencement of the continuous noise monitoring, if any, and will notify the Contractor, MTRC, IEC and EPD the latest measurement period.

3 CONTINUOUS NOISE MONITORING LOCATIONS

- 3.1 As mentioned in Section 2.2, no residual noise impact is predicted at identified NSRs as presented in the CNMMP for Works Contract 1106 and therefore continuous noise monitoring is not required. In case residual air-borne construction noise impact is predicted at the NSR(s) for Works Contract 1106, continuous noise monitoring shall be conducted at NSR(s) as continuous noise monitoring location(s).
- 3.2 The monitoring position should normally be at a point 1m from the exterior of the proposed monitoring location building façade and be at a position 1.2m above local ground.
- 3.3 If there is problem with access to the monitoring positions at the proposed NSRs predicted to have residual air-borne construction noise impact exceeding noise criteria, an alternative position will be proposed and a correction to the measurements will be made.
- 3.4 The alternative continuous noise monitoring location shall be chosen based on the following criteria:
- at locations close to the major site activities which are likely to have noise impacts;
 - close to the most affected NSRs; and
 - for monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.
- 3.5 A façade correction of +3 dB(A) shall be made to the free field measurements.
- 3.6 The ET of Works Contract 1106 shall seek approval from the Engineer Representative (ER) and agreement from the IEC and EPD on the monitoring positions and the corrections to be adopted.

4 CONTINUOUS NOISE MONITORING PARAMETERS

- 4.1 Continuous noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq}(30min)$ shall be used as the continuous noise monitoring parameter for the time period between 0700 and 1900 hours on normal working hours (i.e. Mondays to Saturdays) during the construction period that residual noise impacts exceeding noise criteria are predicted at the identified NSRs after exhausting all possible mitigation measures assessed in the CNMMP.

5 MONITORING EQUIPMENT

- 5.1 As referred to in the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediate prior to the noise measurement, the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The accuracy of the sound level meter shall also be checked on regularly basis. Measurements shall be accepted as valid only if the calibration level before and after the noise measurement agrees to within 1.0 dB.
- 5.2 Noise measurements shall be made in accordance with standard acoustical principles and practices in relation to weather conditions.
- 5.3 The ET of Works Contract 1106 is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment. He/she shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the impact continuous noise monitoring. All the equipment and associated instrumentation shall be clearly labeled.

6 MONITORING METHODOLOGY

- 6.1 Continuous monitoring of L_{eq} 30min noise levels shall be carried out at the proposed NSR(s) predicted to have residual air-borne construction noise impact exceeding noise criteria during the normal construction working hours (0700 – 1900 Monday to Saturday). The duration of the continuous noise monitoring shall be limited to the period when the NSRs were predicted with residual impact exceeding noise criteria in the CNMMP. The monitoring data shall be downloaded from the sound level meter once a week and reported onto the dedicated SCL Project website within 2 working days after the data is collected. If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

7 EVENT AND ACTION PLAN

- 7.1 Under this CNMP, there will be no Action/Limit Level as continuous noise monitoring is not required. In case residual air-borne construction noise impact is predicted at the NSR(s) for Works Contract 1106, the maximum noise levels predicted in the latest CNMMP shall be used to set the Action/Limit Levels for the continuous noise monitoring programme.
- 7.2 Should exceedance of the Action/Limit Levels occur, actions in accordance with the Event and Action Plan (EAP) given in **Table 7.1** shall be carried out.

Table 7.1 Event and Action Plan

Event	Action			
	Works Contract 1106 ET	IEC	ER	Contractor
Action /Limit Level	<ol style="list-style-type: none"> 1. Identify source 2. Repeat Measurement. If two consecutive measurements exceed Action/Limit Level the exceedance is then confirmed 3. If exceedance is confirmed, notify IEC, ER and Contractor 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. Discuss jointly with the IEC, ER and Contractor and formulate remedial measures. 6. Assess effectiveness of the Contractor's remedial actions and keep IEC and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the Works Contract 1106 ET. 2. Check the Contractor's working method. 3. Discuss with the ER, Works Contract 1106 ET and Contractor on the potential remedial measures. 4. Review and advise the Works Contract 1106 ET and ER on the effectiveness of the remedial measures proposed by the Contractor. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor and IEC. 3. In consultation with the Works Contract 1106 ET and IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure the proper implementation of remedial measures. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Identify source with Works Contract 1106 ET. 2. If exceedance is confirmed, investigate the cause of exceedance and take immediate action to avoid further exceedance. 3. Submit proposals for remedial measures to the ER with copy to the IEC and ET of notification. 4. Implement the agreed proposals. 5. Liaise with ER to optimize the effectiveness of the agreed mitigation. 6. Revise and resubmit proposals if problem still not under control. 7. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Appendix E

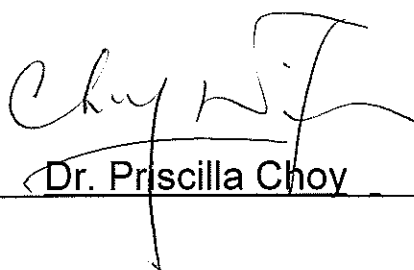
**Continuous Noise Monitoring Plan for
Works Contract 1107 –
Diamond Hill to Kai Tak Tunnels**

MTR Corporation Limited

**Shatin to Central Link –
Tai Wai to Hung Hom Section and
Mong Kok East to Hung Hom Section**

Continuous Noise Monitoring Plan (CNMP)

Works Contract 1107 – Diamond Hill to Kai Tak
Tunnels
(June 2013)

Certified by:  Dr. Priscilla Choy

Position: Environmental Team Leader

Date: 28th May 2013

Chun Wo-SELI Joint Venture

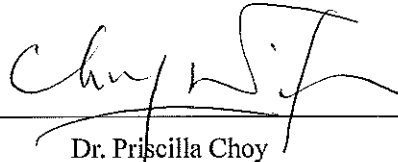
Shatin to Central Link – Contract 1107 Diamond Hill to Kai Tak Tunnels

Continuous Noise Monitoring Plan

(Version 1.3)

May 2013

Certified By



Dr. Priscilla Choy
(Environmental Team Leader)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

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Table 2.1	Updated Mitigated Construction Noise Impact at Identified 3 NSRs (Extracted from Works Contract 1107 CNMMP (version 1.3))
Table 7.1	Event and Action Plan

1 INTRODUCTION

Background

- 1.1 The Shatin to Central Link – Tai Wai to Hung Hom Section (hereafter referred to as SCL (TAW-HUH)) is an approximately 11 km long extension of the Ma On Shan Line and links up with the West Rail Line at Hung Hom forming a strategic east-west rail corridor. It is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO).
- 1.2 The Environmental Impact Assessment (EIA) Report of the SCL (TAW-HUH) (Register No. AEIAR-167/2012) and SCL – Stabling Sidings at Hung Hom Freight Yard (hereafter referred to as SCL (HHS)) (Register No. AEIAR-164/2012) were approved by the Environmental Protection Department (EPD) under the EIAO on 17 February 2012. An Environmental Permit (EP-438/2012) has been issued on 22 March 2012. The EP has been varied recently and a varied EP (EP-438/2012/C) was issued on 30 April 2013.
- 1.3 The construction of the SCL (TAW-HUH) and SCL (HHS) have been divided into a series of civil construction works contracts. This Works Contract 1107 covers the construction of running tunnel from Kai Tak (KAT) North to SCL Diamond Hill (DIH) Station which is under the approved SCL (HHS) EIA Report. This construction contract was awarded to Chun Wo - SELI Joint Venture (CSJV) in March 2013.

Purpose of this Continuous Noise Monitoring Plan

- 1.4 According to the Condition 2.10 of the EP-438/2012/C, the Permit Holder shall, no later than one month before the commencement of construction of the Project submit to the Director of Environmental Protection for approval four hard copies and one electronic copy of a Continuous Noise Monitoring Plan (CNMP) for the Project. The CNMP shall include:
 - (a) updated environmental monitoring and audit requirements relating to continuous noise monitoring at the NSRs shown in Table 1 of this Permit with exceedance after mitigation in air-borne construction noise impact as predicted in the approved SCL(TAW-HUH) EIA Report (Register No. AEIAR-167/2012) and SCL(HHS) EIA Report (Register No. AEIAR-164/2012) and as updated in the CNMMP approved under Condition 2.9;
 - (b) drawings in the scale of 1:5,000 or other appropriate scale as agreed by the Director showing the proposed locations for conducting continuous noise monitoring;
 - (c) monitoring methodology and measurement parameters;
 - (d) a system to report the continuous noise monitoring results on a website within a period of 2 working days after the relevant noise monitoring data are collected or become available; and
 - (e) an Event and Action Plan giving details of the immediate active remedial measures in the event that the measured noise levels exceed the worst-case scenario predicted in the approved SCL(TAW-HUH) EIA Report (Register No.

AEIAR-167/2012) and SCL(HHS) EIA Report (Register No. AEIAR-164/2012) or the levels as updated by the CNMMP approved under Condition 2.9.

- 1.5 Before submission to DEP, the CNMP will be certified by the Environmental Team (ET) and verified by the Independent Environmental Checker (IEC) as conforming to the relevant information and recommendations contained in the approved SCL (TAW-HUH) EIA Report (Register No. AEIAR-167/2012) and approved SCL (HHS) EIA Report (Register No. AEIAR-164/2012) or the updated prediction of noise levels as contained in the Construction Noise Mitigation Measures Plan (CNMMP) approved under EP Condition 2.9. All measures recommended in the CNMMP will be fully and properly implemented during construction.
- 1.6 This CNMP is prepared to comply with the above-mentioned requirements.

2 UPDATED ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

2.1 With reference to the findings and recommendations of the latest Construction Noise Mitigation Measures Plan (CNMMP) of Works Contract 1107 (version 1.3, in May 2013), the updated mitigated construction noise impact at identified 3 NSRs in the vicinity of Works Contract 1107 as shown in the Table 1 of the Environmental Permit (Permit No.: EP-438/2012/C) is summarized in **Table 2.1**.

Table 2.1 Updated Mitigated Construction Noise Impact at Identified 3 NSRs (Extracted from Works Contract 1107 CNMMP (version 1.3))

NSR	Noise Criteria dB(A) ⁽¹⁾	SCL (TAW-HUH) EIA Prediction ⁽²⁾		SCL (HHS) EIA Prediction ⁽³⁾		CNMMP Prediction ^{(4) (5)}	
		Max Noise Level, dB(A) ⁽⁶⁾	Exceedance Duration (Month)	Max Noise Level, dB(A)	Exceedance Duration (Month)	Max Noise Level, dB(A) ⁽⁶⁾	Exceedance Duration (Month)
DIH-14-1	75	77	5	66	-	69	-
DIH-14-4	70 (65)	69 (68)	0 (3)	64	-	67 (65)	-
DIH-14-5	75	78	1	65	-	67	-

Notes:

- (1) Values in parentheses indicate the noise criterion during examination period (typical examination period in May, June, November and December) of educational institution
- (2) Extracted from Table 8.15 of SCL (TAW-HUH) EIA – Residual Impacts at Noise Sensitive Receivers
- (3) Extracted from Table 8.13 of SCL (HHS) EIA – Predicted Maximum Mitigated Construction Noise Levels at Noise Sensitive Receivers
- (4) Cumulative impact arisen from other SCL(TAW-HUH) contracts near Works Contract 1107 is considered.
- (5) Cumulative impact arisen from Tsz Wan Shan Pedestrian Link is not anticipated given the separation distance of >300m between the works sites and NSRs.
- (6) Values in parentheses indicate the maximum predicted noise level during examination period (typical examination period in May, June, November and December) of educational institution. The examination period of Canossa Primary School (San Po Kong) [DIH-14-4] is subject to school's activity schedules when available.

2.2 According to the latest CNMMP, since no residual noise impact after mitigation at the identified 3 NSRs is predicted throughout the construction period of Works Contract 1107, continuous noise monitoring at the NSRs is considered not required.

2.3 Where there is further update in the CNMMP for Works Contract 1107, the associated CNMP will be revised according to the updated findings and predictions in the latest CNMMP. In case residual air-borne construction noise impact is predicted at the NSR(s), continuous noise monitoring shall be conducted at NSR(s) and the proposed monitoring requirement in the below section shall be followed.

3 CONTINUOUS NOISE MONITORING LOCATIONS

- 3.1 As mentioned in Section 2.2, no residual noise impact is predicted at identified NSRs as presented in the CNMMP for Works Contract 1107 and therefore continuous noise monitoring is not required. In case residual air-borne construction noise impact is predicted at the NSR(s) for Works Contract 1107, continuous noise monitoring shall be conducted at NSR(s) as continuous noise monitoring location(s).
- 3.2 The monitoring position should normally be at a point 1m from the exterior of the proposed monitoring location building façade and be at a position 1.2m above local ground.
- 3.3 If there is problem with access to the monitoring positions at the proposed NSRs predicted to have residual air-borne construction noise impact exceeding noise criteria, an alternative position will be proposed and a correction to the measurements will be made.
- 3.4 The alternative continuous noise monitoring location shall be chosen based on the following criteria:
- at locations close to the major site activities which are likely to have noise impacts;
 - close to the most affected NSRs; and
 - for monitoring locations located in the vicinity of the sensitive receivers, care shall be taken to cause minimal disturbance to the occupants during monitoring.
- 3.5 A façade correction of +3 dB(A) shall be made to the free field measurements.
- 3.6 The ET of Works Contract 1107 shall seek approval from the Engineer Representative (ER) and agreement from the IEC and EPD on the monitoring positions and the corrections to be adopted.

4 CONTINUOUS NOISE MONITORING PARAMETERS

- 4.1 Continuous noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq}(30min)$ shall be used as the continuous noise monitoring parameter for the time period between 0700 and 1900 hours on normal working hours (i.e. Mondays to Saturdays) during the construction period that residual noise impacts exceeding noise criteria are predicted at the identified NSRs after exhausting all possible mitigation measures assessed in the CNMMP.

5 MONITORING EQUIPMENT

- 5.1 As referred to in the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediate prior to the noise measurement, the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The accuracy of the sound level meter shall also be checked on regularly basis. Measurements shall be accepted as valid only if the calibration level before and after the noise measurement agrees to within 1.0 dB.
- 5.2 Noise measurements shall be made in accordance with standard acoustical principles and practices in relation to weather conditions.
- 5.3 The ET of Works Contract 1107 is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment. He/she shall ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the impact continuous noise monitoring. All the equipment and associated instrumentation shall be clearly labeled.

6 MONITORING METHODOLOGY

- 6.1 Continuous monitoring of L_{eq} 30min noise levels shall be carried out at the proposed NSR(s) predicted to have residual air-borne construction noise impact exceeding noise criteria during the normal construction working hours (0700 – 1900 Monday to Saturday). The duration of the continuous noise monitoring shall be limited to the period when the NSRs were predicted with residual impact exceeding noise criteria in the CNMMP. The monitoring data shall be downloaded from the sound level meter once a week and reported onto the dedicated SCL Project website within 2 working days after the data is collected. If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

7 EVENT AND ACTION PLAN

- 7.1 Under this CNMP, there will be no Action/Limit Level as continuous noise monitoring is not required. In case residual air-borne construction noise impact is predicted at the NSR(s) for Works Contract 1107, the maximum noise levels predicted in the latest CNMMP shall be used to set the Action/Limit Levels for the continuous noise monitoring programme.
- 7.2 Should exceedance of the Action/Limit Levels occur, actions in accordance with the Event and Action Plan (EAP) given in **Table 7.1** shall be carried out.

Table 7.1 Event and Action Plan

Event	Action			
	Works Contract 1107 ET	IEC	ER	Contractor
Action /Limit Level	<ol style="list-style-type: none"> 1. Identify source 2. Repeat Measurement. If two consecutive measurements exceed Action/Limit Level the exceedance is then confirmed 3. If exceedance is confirmed, notify IEC, ER and Contractor 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. Discuss jointly with the IEC, ER and Contractor and formulate remedial measures. 6. Assess effectiveness of the Contractor's remedial actions and keep IEC and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the Works Contract 1107 ET. 2. Check the Contractor's working method. 3. Discuss with the ER, Works Contract 1107 ET and Contractor on the potential remedial measures. 4. Review and advise the Works Contract 1107 ET and ER on the effectiveness of the remedial measures proposed by the Contractor. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor and IEC. 3. In consultation with the Works Contract 1107 ET and IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure the proper implementation of remedial measures. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Identify source with Works Contract 1107 ET. 2. If exceedance is confirmed, investigate the cause of exceedance and take immediate action to avoid further exceedance. 3. Submit proposals for remedial measures to the ER with copy to the IEC and ET of notification. 4. Implement the agreed proposals. 5. Liaise with ER to optimize the effectiveness of the agreed mitigation. 6. Revise and resubmit proposals if problem still not under control. 7. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Appendix F

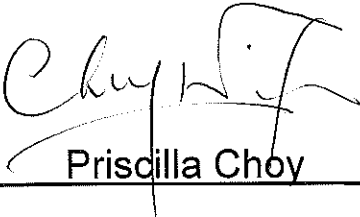
**Continuous Noise Monitoring Plan for
Works Contract 1102 –
Hin Keng Station and Approach Structures**

MTR Corporation Limited

**Shatin to Central Link
Tai Wai to Hung Hom Section
and
Mong Kok East to Hung Hom Section**

**Continuous Noise Monitoring Plan
(CNMP)**

**Works Contract 1102
Hin Keng Station and Approach Structure
(August 2013)**

Verified by:  _____
Priscilla Choy

Position: Environmental Team Leader

Date: August 2013

Penta-Ocean Construction Co., Ltd.

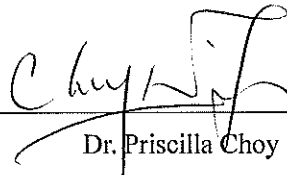
**Shatin to Central Link –
Contract 1102
Hin Keng Station and Approach Structures**

Continuous Noise Monitoring Plan

(Version 1.1)

August 2013

Certified By



Dr. Priscilla Choy
(Environmental Team Leader)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

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Figure

Figure 1 Location of Proposed Continuous Noise Monitoring Station

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Table 2.1 Updated Mitigated Construction Noise Impact at Identified NSR (Extracted from Works Contract 1102 CNMMP (version 1.0))

Table 7.1 Event and Action Plan

1 INTRODUCTION

Background

- 1.1 The Shatin to Central Link – Tai Wai to Hung Hom Section (hereafter referred to as SCL (TAW-HUH)) is an approximately 11 km long extension of the Ma On Shan Line and links up with the West Rail Line at Hung Hom forming a strategic east-west rail corridor. It is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO).
- 1.2 The Environmental Impact Assessment (EIA) Report of the SCL (TAW-HUH) (Register No. AEIAR-167/2012) were approved by the Environmental Protection Department (EPD) under the EIAO on 17 February 2012. An Environmental Permit (EP-438/2012) has been issued on 22 March 2012. The EP has been varied recently and a varied EP (EP-438/2012/C) was issued on 30 April 2013.
- 1.3 The construction works of the SCL (TAW-HUH) have been divided into a series of civil construction works contracts. This Works Contract 1102 covers the construction of Hin Keng Station (HIK) and approach structures which are under the approved SCL (TAW-HUH) EIA Report. This construction contract was awarded to Penta Ocean Construction Co., Ltd. (POC) in July 2013.

Purpose of this Continuous Noise Monitoring Plan

- 1.4 According to the Condition 2.10 of the EP-438/2012/C, Continuous Noise Monitoring Plan shall be prepared and submit to the Director of Environmental Protection (DEP) no later than one month before the commencement of construction of the Project, and the plan should include:
 - (a) updated environmental monitoring and audit requirements relating to continuous noise monitoring at the NSRs shown in Table 1 of the Permit with exceedance after mitigation in air-borne construction noise impact as predicted in the approved SCL(TAW-HUH) EIA Report (Register No. AEIAR-167/2012) and as updated in the CNMMP approved under Condition 2.9;
 - (b) drawings in the scale of 1:5,000 or other appropriate scale as agreed by the Director showing the proposed locations for conducting continuous noise monitoring;
 - (c) monitoring methodology and measurement parameters;
 - (d) a system to report the continuous noise monitoring results on a website within a period of 2 working days after the relevant noise monitoring data are collected or become available; and
 - (e) an Event and Action Plan giving details of the immediate active remedial measures in the event that the measured noise levels exceed the worst-case scenario predicted in the approved SCL(TAW-HUH) EIA Report (Register No. AEIAR-167/2012) or the levels as updated by the CNMMP approved under Condition 2.9.
- 1.5 Before submission to DEP, the CNMP will be certified by the Environmental Team (ET) and verified by the Independent Environmental Checker (IEC) as conforming to the relevant information and recommendations contained in the approved SCL

(TAW-HUH) EIA Report (Register No. AEIAR-167/2012) or the updated prediction of noise levels as contained in the Construction Noise Mitigation Measures Plan (CNMMP) approved under EP Condition 2.9. All measures recommended in the CNMMP will be fully and properly implemented during construction.

1.6 This CNMP is prepared to comply with the above-mentioned requirements.

2 UPDATED ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

- 2.1 With reference to the findings and recommendations of the latest Construction Noise Mitigation Measures Plan (CNMMP) of Works Contract 1102 (version 1.0, in August 2013), the identified NSR in the vicinity of Works Contract 1102 as shown in the Table 1 of the Environmental Permit (Permit No.: EP-438/2012/C) is summarized in **Table 2.1**.
- 2.2 The works area under Works Contract 1102 and the proposed location for noise monitoring are shown in **Figure 1**.

Table 2.1 Identified NSR (Extracted from Works Contract 1102 CNMMP (version 1.0))

NSR	Description	Noise Criteria dB(A) ⁽¹⁾
TAW-6-7	C.U.H.K.A.A. Thomas Cheung School	70(65) ⁽¹⁾

Notes:

(1) Values in parentheses indicate the noise criterion during examination period of educational institution

- 2.3 According to the latest CNMMP, since no residual noise impact after mitigation at the identified NSR is predicted throughout the construction period of Works Contract 1102, continuous noise monitoring at the NSRs is considered not required.
- 2.4 Where there is further update on the CNMMP for Works Contract 1102 or the examination schedule of the NSR, the associated CNMP will be revised according to the updated findings and predictions in the latest CNMMP. In case residual air-borne construction noise impact is predicted at the NSR, continuous noise monitoring will be conducted at the NSR and the proposed monitoring requirement in the below section will be followed.
- 2.5 The ET of Works Contract 1102 will confirm the measurement period 2 weeks before the commencement of the continuous noise monitoring, if any, and will notify the Contractor, MTRC, IEC and EPD the latest measurement period.

3 CONTINUOUS NOISE MONITORING LOCATIONS

- 3.1 As mentioned in Section 2.3, no residual noise impact is predicted at the identified NSR as presented in the CNMMP for Works Contract 1102 and therefore continuous noise monitoring is not required. In case residual air-borne construction noise impact is predicted at the NSR for Works Contract 1102, continuous noise monitoring will be conducted at the NSR as continuous noise monitoring location.
- 3.2 The monitoring position should normally be at a point 1m from the exterior of the proposed monitoring location building façade and be at a position 1.2m above local ground.
- 3.3 If there is problem with access to the monitoring positions at the proposed NSR predicted to have residual air-borne construction noise impact exceeding noise criteria, an alternative position will be proposed and a correction to the measurements will be made.
- 3.4 The alternative continuous noise monitoring location will be chosen based on the following criteria:
- at locations close to the major site activities which are likely to have noise impacts;
 - close to the most affected NSRs; and
 - for monitoring locations located in the vicinity of the sensitive receivers, care will be taken to cause minimal disturbance to the occupants during monitoring.
- 3.5 A façade correction of +3 dB(A) will be made to the free field measurements.
- 3.6 The ET of Works Contract 1102 will seek approval from the Engineer Representative (ER) and agreement from the IEC and EPD on the alternative monitoring position and the corrections to be adopted.

4 CONTINUOUS NOISE MONITORING PARAMETERS

- 4.1 Continuous noise level will be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq}(30min)$ will be used as the continuous noise monitoring parameter for the time period between 0700 and 1900 hours on normal working hours (i.e. Mondays to Saturdays) during the construction period that residual noise impacts exceeding noise criteria are predicted at the identified NSR after exhausting all possible mitigation measures assessed in the CNMMP.

5 MONITORING EQUIPMENT

- 5.1 As referred to in the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804: 1985 (Type 1) specifications will be used for carrying out the noise monitoring. Immediate prior to the noise measurement, the accuracy of the sound level meter will be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The accuracy of the sound level meter will also be checked on regularly basis. Measurements will be accepted as valid only if the calibration level before and after the noise measurement agrees to within 1.0 dB.
- 5.2 Noise measurements will be made in accordance with standard acoustical principles and practices in relation to weather conditions.
- 5.3 The ET of Works Contract 1102 is responsible for the provision, installation, operation, maintenance, dismantle of the monitoring equipment. He/she will ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the impact continuous noise monitoring. All the equipment and associated instrumentation will be clearly labeled.

6 MONITORING METHODOLOGY

- 6.1 Continuous monitoring of L_{eq} 30min noise levels will be carried out at the proposed NSR(s) predicted to have residual air-borne construction noise impact exceeding noise criteria during the normal construction working hours (0700 – 1900 Monday to Saturday). The duration of the continuous noise monitoring will be limited to the period when the NSRs were predicted with residual impact exceeding noise criteria in the CNMMP. The monitoring data will be downloaded from the sound level meter once a week and reported onto the dedicated SCL Project website within 2 working days after the data is collected. If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

7 EVENT AND ACTION PLAN

- 7.1 Under this CNMP, there will be no Action/Limit Level as continuous noise monitoring is not required. In case residual air-borne construction noise impact is predicted at the NSR for Works Contract 1102, the maximum noise level predicted in the latest CNMMP will be used to set the Action/Limit Level for the continuous noise monitoring programme.
- 7.2 Should exceedance of the Action/Limit Levels occur, actions in accordance with the Event and Action Plan (EAP) given in **Table 7.1** will be carried out.

Table 7.1 Event and Action Plan

Event	Action			
	Works Contract 1102 ET	IEC	ER	Contractor
Action /Limit Level	<ol style="list-style-type: none"> 1. Identify source 2. Repeat Measurement. If two consecutive measurements exceed Action/Limit Level the exceedance is then confirmed 3. If exceedance is confirmed, notify IEC, ER and Contractor 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. Discuss jointly with the IEC, ER and Contractor and formulate remedial measures. 6. Assess effectiveness of the Contractor's remedial actions and keep IEC and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the Works Contract 1102 ET. 2. Check the Contractor's working method. 3. Discuss with the ER, Works Contract 1102 ET and Contractor on the potential remedial measures. 4. Review and advise the Works Contract 1102 ET and ER on the effectiveness of the remedial measures proposed by the Contractor. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedance in writing. 2. Notify the Contractor and IEC. 3. In consultation with the Works Contract 1102 ET and IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure the proper implementation of remedial measures. 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Identify source with Works Contract 1102 ET. 2. If exceedance is confirmed, investigate the cause of exceedance and take immediate action to avoid further exceedance. 3. Submit proposals for remedial measures to the ER with copy to the IEC and ET of notification. 4. Implement the agreed proposals. 5. Liaise with ER to optimize the effectiveness of the agreed mitigation. 6. Revise and resubmit proposals if problem still not under control. 7. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

FIGURES

