

FORM 5
ENVIRONMENTAL IMPACT ASSESSMENT ORDINANCE
(CHAPTER 499)
SECTION 13(1)

Application for Variation of an Environmental Permit

PART A PREVIOUS APPLICATIONS

- No previous application for variation of an environmental permit.
 - The environmental permit was previously amended.
- Application No. : VEP-553/2018

PART B DETAILS OF APPLICANT

B1. Name : (person or company)

Civil Engineering and Development Department

[Note : In accordance with section 13(1) of the Ordinance, the person holding an environmental permit or a person who assumes responsibility for the designated project may apply for variation of the environmental permit.]

B2. Business Registration No. :

(if applicable)

B3. Correspondence Address :

B4. Name of Contact Person :

B5. Position of Contact Person :

B6. Telephone No. :

B7. Fax No. :

B8. E-mail Address : (if any)

PART C DETAILS OF CURRENT ENVIRONMENTAL PERMIT

C1. Name of the Current Environmental Permit Holder :

Civil Engineering and Development Department

C2. Application No. of the Current Environmental Permit : VEP-553/2018 (EP-134/2002/M)

C3. The Current Environmental Permit was Issued in : month / year

1 | 2 | 2 | 0 | 1 | 8

Important Notes : Please submit the application together with

(a) 3 copies of this completed form; and

(b) appropriate fee as stipulated in the Environmental Impact Assessment (Fees) Regulation

to the Environmental Protection Department at the following address :

The EIA Ordinance Register Office,
27th floor, Southorn Centre, 130 Hennessy Road,
Wan Chai, Hong Kong.

Tick (✓) the appropriate box



PART D PROPOSED VARIATIONS TO THE CONDITIONS IN CURRENT ENVIRONMENTAL PERMIT

D1 Condition(s) in the Current Environmental Permit	D2 Proposed Variation(s)	D3 Reasons for Variation(s)	D4 Describe the environmental changes arising from the proposed variation(s) :	D5 Describe how the environment and the community might be affected by the proposed variation(s)	D6 Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7 Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
<p>Condition 2.8B</p> <p>At any one time, only 3 out of the 6 construction and demolition material sorting facilities and 3 out of the 5 barging points and tipping halls in the area coloured yellow as shown in Figure 2 of this Permit can be operated round-the-clock everyday. The remaining construction and demolition material sorting facilities, barging points and tipping halls shall not be operated between 11:00 p.m. and 7:00 a.m. on the following day unless otherwise agreed by the Director. The area coloured yellow as shown in Figure 2 of this Permit shall be closed during the Chinese New Year Holiday.</p>	<p>Condition 2.8B</p> <p>At any one time, only 6 out of the 7 construction and demolition material sorting facilities and 6 out of the 7 barging points and tipping halls in the area coloured yellow as shown in Figure 2 of this Permit can be operated round-the-clock everyday. The remaining construction and demolition material sorting facility, barging point and tipping hall shall not be operated between 11:00 p.m. and 7:00 a.m. on the following day unless otherwise agreed by the Director. The area coloured yellow as shown in Figure 2 of this Permit shall be closed during the Chinese New Year Holiday.</p>	<p>Extension of the operating hours of 2 of the Construction and Demolition Material Sorting Facilities and the associated barging points south of the TKO Basin from (7:00 a.m. to 11:00 p.m.) to 24 hours; operate 1 additional Construction and Demolition Material Sorting Facility and the associated barging point for 24 hours; and operate 1 additional barging point south of the TKO Basin from (7:00 a.m. to 11:00 p.m.) in order to facilitate the clearance of the stockpiled materials at the TKOFB.</p>	<p>Key potential environmental impacts associated with the proposed variation include air quality, noise, water quality and nighttime glare and they have been reviewed. No adverse environmental impacts are anticipated due to proposed variation.</p>	<p>To verify no adverse impact on the environment and the community, the key potential environmental impacts due to the proposed variation (including air quality, noise, water quality and nighttime glare) have been reviewed and are concluded to be in compliance with the relevant environmental standards set out in the approved EIA Report (AEIAR-060/2002) and the Technical Memorandum on EIA Process, as shown in the attached Environmental Review Report.</p>	<p>The environmental performance requirements set out in the approved EIA Report will not be violated and will comply with the Technical Memorandum on EIA Process.</p>	<p><u>No additional measures are required.</u></p>

D1 Condition(s) in the Current Environmental Permit	D2 Proposed Variation(s)	D3 Reasons for Variation(s)	D4 Describe the environmental changes arising from the proposed variation(s) :	D5 Describe how the environment and the community might be affected by the proposed variation(s)	D6 Describe how and to what extent the environmental performance requirements set out in the EIA report previously approved or project profile previously submitted for this project may be affected :	D7 Describe any additional measures proposed to eliminate, reduce or control any adverse environmental impact arising from the proposed variation(s) and to meet the requirements in the Technical Memorandum on Environmental Impact Assessment Process :
	Figure 2 has been revised to illustrate the amendments required.					

PART E DECLARATION BY APPLICANT

E1. I hereby certify that the particulars given above are correct and true to the best of my knowledge and belief. I understand the environmental permit may be suspended, varied or cancelled if any information given above is false, misleading, wrong or incomplete.



Signature of Applicant



Full Name in Block Letters



Position



on behalf of Civil Engineering and Development Department

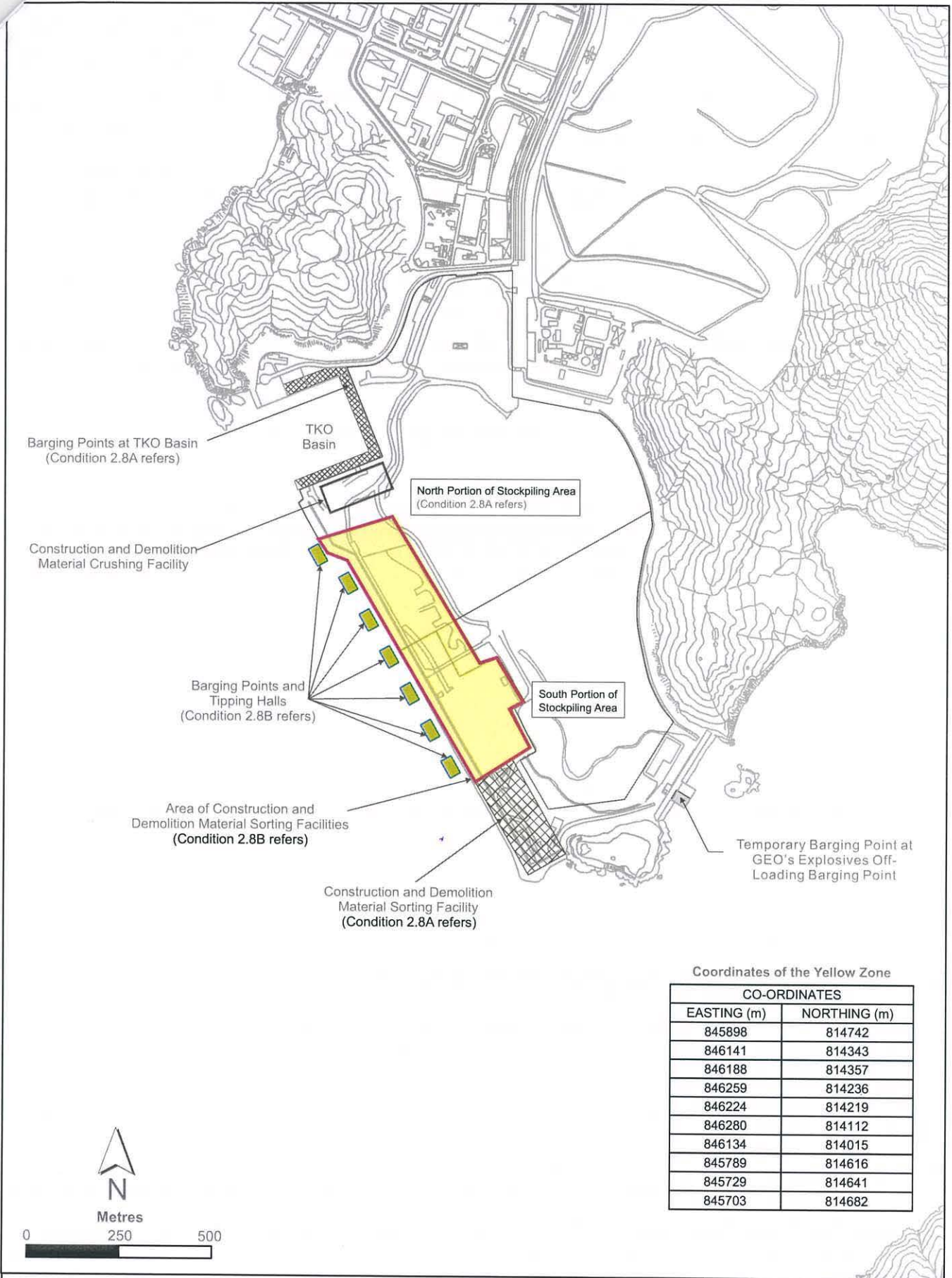
Company Name and Chop (as appropriate)

23 July 2019

Date

NOTES :

1. A person who constructs or operates a designated project in Part I of Schedule 2 of the Ordinance or decommissions a designated project listed in Part II of Schedule 2 of the Ordinance without an environmental permit or contrary to the permit conditions commits an offence under the Ordinance and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.
2. A person for whom a designated project is constructed, operated or decommissioned and who permits the carrying out of the designated project in contravention of the Ordinance commits an offence and is liable to a maximum fine of \$5,000,000 and to a maximum imprisonment for 2 years.



Coordinates of the Yellow Zone

CO-ORDINATES	
EASTING (m)	NORTHING (m)
845898	814742
846141	814343
846188	814357
846259	814236
846224	814219
846280	814112
846134	814015
845789	814616
845729	814641
845703	814682

Figure 2

Locations of Facilities within Tseung Kwan O Fill Bank

File: T:\GIS\CONTRACT\0414816\mxd\0414816_TKOFB_Dust_Scn_1.mxd
 (0500385b.cdr)
 Date: 23/07/2019

Environmental
 Resources
 Management



REPORT

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Civil Engineering and Development
Department

Proposed Change of Operation of the
Construction and Demolition
Material Sorting Facilities and the
Barging Points at TKO Fill Bank
Environmental Review Report

July 2019

Environmental Resources Management

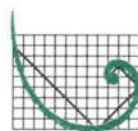
2507, 25/F One Harbourfront
18 Tak Fung Street
Hung Hom, Kowloon
Hong Kong

Telephone: (852) 2271 3000

Facsimile: (852) 2723 5660

E-mail: post.hk@erm.com

<http://www.erm.com>



ERM


VEP-563/2019
Total: 1
d.d. 25.7.2019

Civil Engineering and Development
Department

Proposed Change of Operation of the
Construction and Demolition
Material Sorting Facilities and the
Barging Points at TKO Fill Bank
Environmental Review Report

July 2019

Reference 0500385

For and on behalf of ERM-Hong Kong, Limited	
Approved by:	<u>Frank Wan</u>
Signed:	<u></u>
Position:	<u>Partner</u>
Date:	<u>23 July 2019</u>

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 potential environmental impacts associated with the construction, operation and decommissioning of the Fill Bank at Tseung Kwan O Area 137 (TKOFB or the Site) has been presented in the approved Environmental Impact Assessment (EIA) Report for the "Fill Bank at Tseung Kwan O Area 137" (EIAO Register No.: AEIAR-060/2002) (hereafter referred to as the approved EIA Report).

In accordance with the requirements set out in Condition 2.8B of the current Environmental Permit (EP-134/2002/M) and the Environmental Review Report for the Variation of Environmental Permit (VEP) in 2018 (hereafter referred to as "the 2018 ER Report"), 6 Construction and Demolition Material Sorting Facilities (C&DMSFs) and 5 barging points are allowed to be operated to the south of the Tseung Kwan O (TKO) Basin. The 6 C&DMSFs are located within the highlighted area as shown in Figure 2 of the current EP. Among the aforementioned 6 C&DMSFs and 5 barging points, only 3 C&DMSFs and 3 barging points are allowed to be operated 24 hours. The remaining 3 C&DMSFs and 2 barging points are only permitted to be operated between 07:00 hrs and 23:00 hrs.

To facilitate the effective clearance of the stockpiled materials at the TKOFB which is permitted to operate until the end of 2021 under the current EP, Civil Engineering and Development Department (CEDD) proposes to extend the operating hours of the existing C&DMSFs and barging points, as well as to implement and operate additional C&DMSF and barging points to the south of the TKO Basin.

ERM-Hong Kong, Ltd (ERM) has been commissioned to undertake an environmental review to assess the potential environmental impacts of the proposed change to determine the environmental acceptability of the proposal.

2.1 PROPOSED CHANGE TO THE TKOFB OPERATION

To facilitate the clearance of the stockpiled materials at the TKOFB, CEDD proposes the following changes with respect to the operation of the C&DMSFs and barging points to the south of the TKO Basin:

- Extend the operating hours of the two existing C&DMSFs (i.e. NSA and NSB) and two barging points (i.e. NB1 and NB2) as well as the associated truck movements from the current 16 hours to 24 hours;
- Operate one additional C&DMSF (i.e. NSG) and one associated additional barging point (i.e. NB0) as well as the associated truck movements for 24 hours on a daily basis; and
- Operate one additional barging point (i.e. NB6) between 07:00 hrs and 23:00 hrs.

The aforementioned proposed changes to the operation of the C&DMSFs and barging points to the south of the TKO Basin are hereafter collectively referred to as the “proposed change”. The proposed change in comparison with the assumptions made in the 2018 ER Report are summarised in *Table 2.1*. The locations of the C&DMSFs and associated barging points are illustrated in *Figure 2.1*.

Table 2.1 *Summary of Proposed Change*

Key Item	Assumptions in the 2018 ER Report	Proposed Change
C&DMSFs south of the TKO Basin	<ul style="list-style-type: none"> • NSA (07:00-23:00 hrs) • NSB (07:00-23:00 hrs) • NSC (24 hours) • NSD (24 hours) • NSE (24 hours) • NSF (07:00-23:00 hrs) 	<ul style="list-style-type: none"> • NSA (24 hours) • NSB (24 hours) • NSC (24 hours) • NSD (24 hours) • NSE (24 hours) • NSF (07:00-23:00 hrs) • NSG (24 hours)
Barging points south of the TKO Basin for exporting public fill	<ul style="list-style-type: none"> • NB1 (07:00-23:00 hrs) • NB2 (07:00-23:00 hrs) • NB3 (24 hours) • NB4 (24 hours) • NB5 (24 hours) 	<ul style="list-style-type: none"> • NB1 (24 hours) • NB2 (24 hours) • NB3 (24 hours) • NB4 (24 hours) • NB5 (24 hours) • NB6 (07:00-23:00 hrs) • NB0 (24 hours)

Daily operation of the other facilities at the TKOFB **remain unchanged and no off-site road traffic will be generated by the proposed change.**

2.2 PROJECTS IN THE VICINITY OF THE TKOFB

The following projects in the vicinity of TKOFB have been considered in this environmental review.

2.2.1 *Extension of South East New Territories (SENT) Landfill*

The existing SENT Landfill is located to the north-east and east of the TKOFB. EPD has proposed to extend the SENT Landfill to the south of its existing boundary. The construction of SENT Landfill Extension has commenced in late 2018, while its operation is expected to commence tentatively in 2020. The SENT Landfill Extension will be opened for accepting construction waste from 08:00 hrs to 22:00 hrs and the site office will be closed at 23:00 hrs. The cumulative impact associated with the construction and operation of SENT Landfill Extension is therefore considered in this environmental review. The cumulative impacts arising from the construction and operation of the SENT Landfill Extension are discussed in *Section 3*.

2.2.2 *Desalination Plant*

Water Supplies Department (WSD) is proposing a desalination plant south of the proposed SENT Landfill Extension with a site area of about 10 ha. The construction works is expected to complete in the third quarter of 2022 and therefore its operation is not expected to overlap with the TKOFB operation, which shall not be receiving further public fill from 1st January 2022 in accordance with the requirements set out in Condition 2.16 of the current EP.

2.2.3 *Cross Bay Link and Tseung Kwan O - Lam Tin Tunnel*

Tseung Kwan O - Lam Tin Tunnel is a dual two-lane highway approximately 4.2 km long connecting TKO at Po Shun Road in the east with proposed Trunk Road T2 in Kai Tak Development in the west. Part of the highway, approximately 2.6 km long, is designed as the tunnel. Cross Bay Link will connect Tseung Kwan O - Lam Tin Tunnel to Wan Po Road near Area 86 to cope with the future traffic demand in TKO. The construction of the Tseung Kwan O - Lam Tin Tunnel has already commenced in July 2016 and is expected to complete by mid-2022.

2.3 *POTENTIAL ENVIRONMENTAL IMPACT*

Potential environmental impacts associated with the proposed change at TKOFB are listed in *Table 2.2*. Detailed discussions of the potential environmental impacts are shown in the subsequent sections.

Table 2.2 *Potential Environmental Issues*

Type of Potential Impacts	Potential Issues
Gaseous emissions (vehicular emissions within TKOFB and also marine traffic related emissions)	✓
Dust	✓
Odour	×
Noisy operation	✓
Off-site Road traffic generation	×
Liquid effluent, discharge, or contaminated run-off	✓
Generation of waste or by-products	×
Storage, handling, transport, or disposal of hazardous materials or wastes	×
Risk of accidents which would result in pollution or hazard	×
Landfill gas hazard	×
Landscape and visual implications	✓
Nighttime glare	✓
✓ possible × not expected	

3.1 INTRODUCTION

As a result of the proposed change as described in *Section 2.1*, the potential air quality impact needs to be reviewed. This *Section* reviews and assesses the potential air quality impact associated with the proposed change.

3.2 LEGISLATIVE REQUIREMENT AND EVALUATION CRITERIA

The principal legislation for the management of air quality in Hong Kong is the *Air Pollution Control Ordinance (APCO)* (Cap. 311). Under the APCO, the *Hong Kong Air Quality Objectives (AQOs)* (see *Table 3.1*) stipulate the statutory limits for air pollutants and the maximum allowable numbers of exceedances over specific periods.

Table 3.1 Hong Kong Air Quality Objectives

Air Pollutant	Averaging Time	Concentration ($\mu\text{g m}^{-3}$) ^(a)	No. of Exceedances Allowed per Year
Sulphur Dioxide (SO ₂)	10 minute	500	3
	24-hours	125	3
Respirable Suspended Particulates (RSP) ^(b)	24-hours	100	9
	Annual	50	-
Fine Suspended Particulates (FSP) ^(c)	24-hours	75	9
	Annual	35	-
Nitrogen Dioxide (NO ₂)	1-hour	200	18
	Annual	40	-
Carbon Monoxide (CO)	1-hour	30,000	0
	8-hour	10,000	0
Ozone (O ₃)	8-hour	160	9
Lead	Annual	0.5	-

Notes:

(a) Measured at 293K and 101.325 kPa.

(b) Suspended particles in air with a nominal aerodynamic diameter of 10 μm or less

(c) Suspended particles in air with a nominal aerodynamic diameter of 2.5 μm or less

The *Technical Memorandum on the Environmental Impact Assessment Process (EIAO-TM)* issued under the *EIAO* states the hourly concentration of Total Suspended Particulates (TSP) should not exceed 500 $\mu\text{g m}^{-3}$ (measured at 25°C and 1 atmosphere) at Air Sensitive Receivers (ASRs) for dust impact assessment. The *Air Pollution Control (Construction Dust) Regulation* also recommends dust control measures for dust generating activities. Requirements stipulated in the *Air Pollution Control (Non-road Mobile*

Machinery) (Emission) Regulation will also be followed to control potential emissions from non-road mobile machinery within TKOFB.

3.3 BASELINE CONDITIONS

The Study Area is within 500m from the TKOFB site boundary as shown in Figure 3.1. SENT Landfill and TVB City are located to the north-east and north of the Site, respectively. Wan Po Road is the major road linking the Site and TKO town. The local air quality of the Project Site area is primarily influenced by vehicular emissions from local road networks and within TKOFB, as well as emissions associated with the operation of the TKOFB, including dust emissions from fill handling activities, truck movements and stockpiling areas, as well as marine emissions.

3.3.1 EPD's Air Quality Monitoring Station

The nearest EPD's Air Quality Monitoring Station (AQMS) is located at TKO District. The latest 5-year concentrations (2014 - 2018) of RSP, FSP, NO₂ and SO₂ recorded at this AQMS are presented in Table 3.2.

Table 3.2 Concentrations of Air Pollutants Measured at the EPD's TKOAQMS in the Past 5 Years (2014 - 2018)

Year	Concentration of Pollutants ($\mu\text{g m}^{-3}$)							
	19 th highest 1-hour NO ₂	Annual NO ₂	4 th highest 24-hour SO ₂	4 th highest 10-min SO ₂ ^(a)	10 th highest 24-hour RSP	Annual RSP	10 th highest 24-hour FSP	Annual FSP
	2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-
2016	127	29	13	40	59	27	41	17
2017	165	28	15	39	65	31	43	18
2018	135	28	11	38	53	28	32	15
Prevailing AQOs	200	40	125	500	100	50	75	35

Note:

(a) Operation of TKO AQMS was commenced in 2016.

No measurement was conducted at the TKO AQMS from 2014 to 2015. The NO₂, SO₂, RSP and FSP concentrations from 2016 to 2018 are below their respective prevailing AQOs.

It should be noted that the TKO AQMS is situated in TKO residential area and more than 5km away from the Project site. Given the differences in land use and the considerable separation distance, the monitoring data recorded at TKO AQMS may not be representative of the current baseline air quality at the Project site.

3.4

AIR SENSITIVE RECEIVERS

A number of representative existing and planned ASRs have been identified within the Study Area and they are listed in Table 3.3. The locations of the identified representative ASRs are shown in Figure 3.1.

Table 3.3 Identified Representative ASRs

ASR	Description	Type of Use ^(a)	Approx. Separation Distance from the Site Boundary (m)	Approx. Base Elevation (m)	Approx. Max. Height (m above ground)
A1	TVB City	Commercial	60	5.3	30
A2	TVB City	Commercial	90	5.3	30
A3	HAESL	Industrial	310	5.3	30
A4	TVB City	Commercial	360	6.1	30
A5	HAESL Component Overhaul Building	Industrial	420	5.8	30
A6	Digital Savvis Investment	Commercial	485	9.5	30
A7	Trade Development Council	Commercial	510	7.7	20
A8	Office Building of SENT Landfill Extension (Indicative Location) ^(b)	Industrial	75 ^(a)	5.0	4.5

Notes:

(a) Approximate separation distance from the reduced TKOFB boundary after land hand over for the proposed SENT Landfill Extension.

(b) The location and maximum height of ASR A8 are provided by Landfills and Development Group of EPD.

3.5

POTENTIAL SOURCES OF AIR EMISSIONS

3.5.1

Air Emission Sources Associated with TKOFB Operation

Potential key air emission sources within TKOFB were identified as below:

- Dust emissions from the TKOFB operational activities including fill material handling at stockpiling areas and barging points, operation of material crushing and sorting facilities, truck movements on major haul roads, as well as wind erosion from stockpiling areas;
- Vehicular emissions from internal roads within TKOFB (incoming trucks and internal trucks); and
- Emissions from marine vessels (e.g. barges, derrick lighters, tug boats) during berthing and maneuvering for exporting and importing fill materials; and
- Emissions from diesel generators for the operation of the material crushing and sorting facilities, site offices and other general site operation.

3.5.2 *Air Emission Sources in the Vicinity of TKOFB*

Other potential key air emission sources within the Study Area include:

- Dust emissions during construction of the proposed SENT Landfill Extension;
- Vehicular emissions from external roads within 500m of the Study Area; and
- Emissions associated with the operation of the proposed SENT Landfill Extension and the existing HAESL located in Tseung Kwan O Industrial Estate (TKOIE).

Tentatively, the construction period of SENT Landfill Extension is expected to be from late 2018 to 2020, while that of the proposed Desalination Plant is from 2019 to 2022.

The work sites of the Tseung Kwan O - Lam Tin Tunnel, which is currently under construction and is expected to complete by mid-2022, are located more than 1 km away from the nearest identified ASRs in the Study Area. Potential cumulative air quality impact arising from the associated construction works is not expected.

3.5.3 *Key Air Pollutants of Concern*

The proposed change involves the extension of operating hours of the existing C&DMSFs and barging points and the associated truck deliveries from 07:00-23:00 hrs to 24 hours. Operation of additional C&DMSFs and barging points were also proposed. The additional daytime and night-time operation associated with the proposed change, which involves a number of activities including fill material handling and screening, truck movements on haul road and marine vessel movements, have the potential to give rise to additional air quality impact in terms of TSP, RSP, FSP, NO₂ and SO₂ to nearby identified ASRs. Therefore, TSP, RSP, FSP, NO₂ and SO₂ were identified to be the key air pollutants of concern associated with the proposed change and they have been assessed quantitatively.

3.6 *ASSESSMENT METHODOLOGY AND ASSUMPTIONS*

3.6.1 *Dust Emissions from TKOFB Operational Activities*

The dust emission sources associated with TKOFB operational activities include fill material handling (loading/unloading at stockpiling areas, C&DMSFs and barging points), truck movements on haul roads, and wind erosion from stockpiling areas. The locations of the aforementioned dust emission sources are illustrated in *Figures 3.2a* and *3.2b*. The TSP, RSP and FSP emission rates were estimated based on published documents and references such as *Compilation of Air Pollutant Emission Factors, AP-42, 5th Edition* by the United States Environmental Protection Agency (USEPA).

Dust mitigation measures as discussed in *Section 3.7* have been considered in the assessment.

3.6.2 *Emissions from Marine Vessels and Diesel Generators*

Berthing and maneuvering emissions from marine vessels (i.e. barges, derrick lighters, tug boats) for exporting and importing fill materials, as well as emissions from diesel generators associated with the overall site operation may give rise to RSP, FSP, NO₂ and SO₂ impacts. The locations of the barging points, marine vessel maneuvering routes and the diesel generators as shown in *Figures 3.2a* and *3.2b*.

3.6.3 *Vehicular Emissions from Internal and External Roads*

NO₂, RSP and FSP emissions arising from TKOFB internal road traffic (incoming trucks and internal trucks) and other external road traffic within the Study Area will contribute to the overall air quality impacts and thus have been considered in the quantitative assessment. As a result of the proposed change, there will be additional truck trips between the stockpiling areas and the C&DMSFs. The predicted traffic flows for internal truck movement have been updated, while the projected traffic flows for the identified external roads remain unchanged. The traffic data used in the Air Quality Impact Assessment are the same as those used in the Traffic Impact Assessment for which the traffic forecast has been endorsed by Transport Department. The internal road alignment is illustrated in *Figures 3.2a* and *3.2b*. Other external roads identified within the Study Area are illustrated in *Figures 3.3a* and *3.3b*.

3.6.4 *Other Emissions in the Vicinity of TKOFB*

Excavation and material handling works are required during the construction of the SENT Landfill Extension which has commenced in late 2018. During the operation of the proposed SENT Landfill Extension, potential dust emissions from active filling and haul roads as well as stack emissions may arise. The relevant assumptions related to SENT Landfill Extension were confirmed with Landfill and Development Group of EPD. In addition, emissions from the existing HAESL stack may contribute to the overall air quality impacts within the Study Area. Therefore, these emissions have also been included in this assessment.

3.6.5 *Assumptions and Modelling Approach*

Modelling Scenarios

Two modelling scenarios, Scenario 1 and Scenario 2, have been assessed. Scenario 1 represents the assessment year of 2019 and considers the case prior to the operation of the proposed SENT Landfill Extension. Scenario 2 represents the assessment year of 2020 assuming SENT Landfill Extension has commenced operation.

Potential air quality impacts at the existing ASRs A1 to A7 have been assessed in Scenario 1. Potential air quality impacts at the future office of SENT

Landfill Extension (ASR A8), in addition to ASRs A1 to A7, have been assessed in Scenario 2. Details of Scenario 1 and Scenario 2 are summarised in Table 3.4.

Table 3.4 Summary of Modelling Scenarios Adopted in the Assessment

Modelling Scenario	Descriptions	ASR	Emission Sources
Scenario 1	Prior to the operation of SENT Landfill Extension	ASR 1 to ASR 7	<ul style="list-style-type: none"> • Emissions associated with TKOFB operational activities (Figure 3.2a) ^(a) • Vehicular emissions from external roads within Study Area (Figure 3.3a) • Dust emissions from SENT Landfill Extension construction (Figure 3.3a) • Industrial emissions (i.e. existing HAESL stack) (Figure 3.3a)
Scenario 2	During operation of SENT Landfill Extension	ASR 1 to ASR 8	<ul style="list-style-type: none"> • Emissions associated with TKOFB operational activities (Figure 3.2b) ^(a) • Vehicular emissions from external roads within Study Area (Figure 3.3b) • Dust emissions from SENT Landfill Extension operation (Figure 3.3b) • Industrial emissions (i.e. proposed stacks of SENT Landfill Extension and the existing HAESL stack) (Figure 3.3b)

Note:

- (a) TKOFB operational area covers the site area for the proposed Desalination Plant. Emissions from material handling activities and wind erosion associated with TKOFB operation within the site area of the proposed Desalination Plant have been assumed. According to the approved EIA report for the Desalination Plant (AEIAR-192/2015), the key land-based construction activities during the construction phase would be minor excavation works for pile foundation and concreting works and thus dust emissions may arise from material handling during excavation and wind erosion of exposed areas. The nature of works associated with TKOFB operation within the site area of the proposed Desalination Plant is similar to that being carried out during the construction phase of the Desalination Plant. Also, as concluded in the approved EIA report, the construction dust impact arising from the construction of the Desalination Plant is expected to be minor, with the implementation of dust control measures recommended in the *Air Pollution Control (Construction Dust) Regulations* and good site practices. Therefore, it is considered that activities associated with TKOFB operation sufficiently reflects the potential dust impact that may arise during the construction of the Desalination Plant. Dust emissions may also arise from a potential concrete batching plant during the construction phase. As mentioned in the approved EIA report, the potential concrete batching plant will be located more than 500m away from the nearest ASR (i.e. ASR A8) and that potential impact from its operation would be minimal.

Air Dispersion Model and Meteorological Data

An EPD recommended air dispersion model, AERMOD, was used to assess the air quality impact at the identified ASRs from dust emission sources and marine emissions. The quantitative assessment has been conducted following the latest EPD's *Guidelines for Local-scale Air Quality Assessment Using Model*.

The relevant PATH grids in which the identified ASRs are located have been identified. The predicted meteorological data for the relevant PATH grids were used for model input. The relevant PATH grids for the identified ASRs are shown in *Table 3.5*.

Table 3.5 *Relevant PATH Grids for the Representative ASRs*

ASR	Description	Relevant PATH Grid
A1	TVB City	50, 29
A2	TVB City	50, 29
A3	HAESL	50, 29
A4	TVB City	50, 29
A5	HAESL Component Overhaul Building	50, 29
A6	Digital Savvis Investment	50, 29
A7	Trade Development Council	50, 29
A8	Office Building of SENT Landfill Extension (Indicative Location)	50, 28

AERMET was run to generate AERMOD-ready meteorological data for AERMOD model input. The land use parameters, including albedo, bowen ratio and surface roughness are required inputs for AERMET. The land use of 1km from the identified ASRs within each PATH grid has been evaluated to determine the PATH-grid specific surface roughness values. The land use of 10km x 10km from the Project site has also been evaluated to determine the values of albedo and bowen ratio for the PATH grids.

The AERMET/AERMOD model input parameters and assumptions for the assessment are summarised in *Table 3.6*.

Table 3.6

Model Input Parameters and Assumptions for Assessment

Input Parameters & Assumptions	Descriptions
Air dispersion model	AERMOD
Type of source	<ul style="list-style-type: none"> • Point sources, area sources
Assessment parameter	<ul style="list-style-type: none"> • 1-hour TSP • 24-hour RSP and annual RSP • 24-hour FSP and annual FSP • 1-hour NO₂ and annual NO₂ • 10-minute SO₂ and 24-hour SO₂
Meteorological data	<ul style="list-style-type: none"> • Weather Research and Forecasting Model (WRF) data in 2010 from PATH-2016 to be used to input into AERMET to produce AERMOD-ready meteorological data • PATH Grid - (50,28) and (50,29) • Actual mixing heights recorded by the HKO in 2010 were in the range of 121m to 1,667m. Mixing heights from WRF data which are lower than 121m or higher than 1,667m to be adjusted to 121m and 1,667m, respectively • Wind direction of 0° to be adjusted to 360° • Wind speed smaller than 1m s⁻¹ to be adjusted to 1m s⁻¹ • Anemometer height of WRF data = 9m

An EPD recommended model, EMFAC-HK v4.1, was used to predict the vehicular emission factors of NO_x, RSP and FSP for the 16 vehicle types in 2019 (for Scenario 1) and 2020 (for Scenario 2). "EMFAC" mode was used for the model run.

An EPD recommended air dispersion model, CALINE4, was used for predicting the NO₂, NO, RSP and FSP impacts due to vehicular emissions from the identified internal roads and external roads within the Study Area for Scenario 1 and Scenario 2. Since the highest road height allowed in the input into CALINE4 model is limited at 10m, any road with road height greater than 10m was set at a height of 10m in the CALINE4 model as a conservative approach.

The land use types have been examined within an area of 3 km radius from the concerned PATH grids. As industrial, commercial and residential land uses account for less than 50% of the examined area, rural area was assumed and the surface roughness height of 100 cm for rural area was adopted for the CALINE4 model run. Wind directional variability was calculated based on the following formula according to the stability class with reference to Irwin, J.S., 1980⁽¹⁾.

$$S_o = S \times (Z_o/15\text{cm})^{0.2}$$

(1) Dispersion Estimate Suggestion #8: Estimation of Pasquill Stability Categories. U.S. Environmental Protection Agency, Research Triangle Park, NC. (Docket Reference No.II-B-10), Irwin, J.S., 1980.

Where

Z_o = is the surface roughness length (in cm) of the PATH grid;

S_o = is the standard deviation of the horizontal wind direction Fluctuations (in degrees)

S = is the standard deviation of the horizontal wind direction fluctuations (in degrees) for an aerodynamic surface roughness length of 15cm with reference to Irwin, J.S., 1980. S is a function of Pasquill stability class.

Table 3.7 shows the standard deviations of the horizontal wind direction fluctuations under different Pasquill Stability categories for the concerned PATH grid.

Table 3.7 *The Standard Deviation of the Horizontal Wind Direction Fluctuations under Different Pasquill Stability Categories*

Pasquill Stability Class	Standard Deviation of the Horizontal Wind Direction Fluctuations (in degrees)
PATH Grid (50,28), (50,29)	
A	32.9
B	32.9
C	25.6
D	18.3
E	11.0
F	5.6

The CALINE4 model input parameters and assumptions are summarised in Table 3.8.

Table 3.8 Model Input Parameters and Assumptions for Assessment of Vehicular Emissions

Input Parameters & Assumptions	Descriptions
Air dispersion model	<ul style="list-style-type: none"> CALINE4
Vehicle emission factors	<ul style="list-style-type: none"> EMFAC-HK emission factors for 2019 (Scenario 1) EMFAC-HK emission factors for 2020 (Scenario 2)
Assessment parameter	<ul style="list-style-type: none"> 24-hour RSP and annual RSP 24-hour FSP and annual FSP 1-hour NO₂ and annual NO₂
Meteorological data	<ul style="list-style-type: none"> Weather Research and Forecasting Model (WRF) data in 2010 from PATH-2016 PATH Grid - (50,28) and (50,29) Actual mixing heights recorded by the HKO in 2010 were in the range of 121m to 1667m. Mixing heights from WRF data which are lower than 121m or higher than 1,667m to be adjusted to 121m and 1,667m, respectively Wind speeds smaller than the 0.5 m s⁻¹ recommended by the CALINE4 model were adjusted to 0.5 m s⁻¹. Stability class calculated by PCRAMMET (version 99169) Calculation of wind directional variability based on stability class and surface roughness length of 100 cm for rural areas.

Background Air Quality

The background air pollutant concentrations predicted by the PATH-2016 model in 2019 and 2020 for the PATH grids within the Study Area adopted in this assessment are presented in *Table 3.9*.

Table 3.9 Background Air Pollutant Concentrations Predicted by the PATH-2016 Model in 2019 and 2020

PATH Grid	Concentration of Pollutants (µg m ⁻³)									
	19 th highest 1-hour NO ₂	Annual NO ₂	4 th highest 24-hour SO ₂	4 th highest 10-min SO ₂ (a)	10 th highest 24-hour RSP (b)	Annual RSP (b)	10 th highest Daily Max. 8-hour O ₃	Daily Max. 1-hour CO	Daily Max. 8-hour CO	
<i>Year 2019</i>										
50, 27	72	8	21	105	69	32	156	1004	816	
50, 28	76	8	21	107	68	30	155	1002	813	
50, 29	78	8	21	109	68	30	156	1003	815	
<i>Year 2020</i>										
50, 27	68	8	21	105	68	31	156	1004	815	
50, 28	73	8	21	107	67	30	155	1001	813	
50, 29	74	7	21	109	68	30	156	1002	815	
Prevailing AQOs	200	40	125	500	100	50	160	30,000	10,000	

Notes:

(a) The multiplicative factor for the stability class calculated for each hour was applied to the 1-hour SO₂ concentrations to estimate the 10-minute SO₂ concentrations.

(b) An adjustment of 26.5ug/ m³ and 15.6ug/ m³ were added to the RSP background for calculation of 24-hour RSP and annual RSP, respectively.

As shown in Table 3.9, the background air pollutant concentrations in the relevant PATH grids in 2019 and 2020 are below the relevant AQO criteria.

The hourly background NO₂, RSP and SO₂ concentrations in 2019 and 2020 predicted by the PATH-2016 model were used to establish the background contributions for the cumulative impact assessment under Scenario 1 and Scenario 2, respectively. In accordance with the *Guidelines on Choice of Models and Model Parameters* published by EPD, an adjustment of 26.5 µg m⁻³ and 15.6 µg m⁻³ was added to hourly RSP background predicted by PATH-2016 for the assessment of 24-hour and annual RSP, respectively.

FSP data are not available in the hourly PATH-2016 background concentration results provided by the EPD. According to the EPD's *Guidelines on the Estimation of PM_{2.5} for Air Quality Assessment in Hong Kong*, FSP hourly background data can be obtained by multiplying the PATH-2016 hourly RSP background with a weight fraction. Table 3.10 presents the EPD recommended FSP to RSP ratios which are adopted in this assessment.

Table 3.10 FSP to RSP Ratios as recommended by the EPD

	Annual	24-hour
FSP (PM _{2.5})/RSP (PM ₁₀) ratio	0.71	0.75

Note:
 (a) Reference to EPD's "Guidelines on the Estimation of PM_{2.5} for Air Quality Assessment in Hong Kong".

Post-processing of Modelling Results

For stack emissions, the hourly concentrations of NO_x were predicted at the relevant assessment heights of the identified ASRs. Ozone Limiting Method (OLM) was adopted for the conversion of NO_x to NO₂. The initial NO₂/NO_x ratio for stack emissions was assumed to be 0.1 ⁽¹⁾ and the conversion of NO_x to NO₂ was calculated as follows:

$$[NO_2]_{pred} = 0.1 \times [NO_x]_{pred} + \text{MIN} \{0.9 \times [NO_x]_{pred}, \text{ or } (46/48) \times [O_3]_{bkgd}\}$$

where

- $[NO_2]_{pred}$ = the predicted NO₂ concentration
- $[NO_x]_{pred}$ = the predicted NO_x concentration
- MIN means the minimum of the two values within the brackets
- $[O_3]_{bkgd}$ = the representative O₃ background concentration; (46/48) is the molecular weight of NO₂ divided by the molecular weight of O₃

For vehicular emissions, individual NO₂/NO_x ratios of each vehicle type in 2019 (for Scenario 1) and 2020 (for Scenario 2) have been used to estimate the overall NO and NO₂ emissions arising from road traffic with reference to recommendation in EPD's *Guidelines for Local-scale Air Quality Assessment Using Models*. The predicted NO concentrations were converted to NO₂ based on OLM and were added with the predicted NO₂ concentrations to

(1) Air Quality Studies for Heathrow: Base Case, Segregated Mode, Mixed Mode and Third Runway Scenarios modelled using ADMS-Airport, 2007.

determine the total predicted NO₂ concentrations at the ASRs. The total predicted NO₂ concentrations were calculated as follows:

$$[\text{NO}_2]_{\text{pred total}} = [\text{NO}_2]_{\text{pred}} + \text{MIN} \{[\text{NO}]_{\text{pred}}, \text{ or } (46/48) \times [\text{O}_3]_{\text{bkgd}}\}$$

where

- $[\text{NO}_2]_{\text{pred total}}$ = the total predicted NO₂ concentration
- $[\text{NO}_2]_{\text{pred}}$ = the predicted NO₂ concentration directly emitted from tailpipe emissions
- $[\text{NO}]_{\text{pred}}$ = the predicted NO concentration
- MIN means the minimum of the two values within the brackets
- $[\text{O}_3]_{\text{bkgd}}$ = the representative O₃ background concentration; (46/48) is the molecular weight of NO₂ divided by the molecular weight of O₃

Predicted ozone concentrations in 2019 (for Scenario 1) and 2020 (for Scenario 2) obtained from the PATH-2016 model were used for the conversion of NO_x to NO₂ in OLM.

The hourly SO₂ concentrations at the identified ASRs were converted into 10-minute SO₂ concentrations for comparison with the respective AQO criterion. According to the EPD's "Guidelines on the Estimation of 10-minute Average SO₂ Concentration for Air Quality Assessment in Hong Kong", it is recommended that the stability-dependent multiplicative factors from Duffee *et al.*, 1991⁽¹⁾ be used. The conversion factors adopted in this assessment for the different stability classes are shown in Table 3.11.

Table 3.11 Conversion Factors from 1-hour to 10-minutes Mean Concentrations

Pasquill Stability Class	Conversion Factor (1-hour to 10-minute)
A	2.45
B	2.45
C	1.82
D	1.43
E	1.35
F	1.35

Note:
 (a) Reference to the EPD's "Guidelines on the Estimation of 10-minute Average SO₂ Concentration for Air Quality Assessment in Hong Kong"

Cumulative Impact

The predicted TSP, RSP, FSP, NO₂ and SO₂ results from AERMOD and CALINE4 model at each ASR were added up with the PATH-2016 background RSP and FSP concentrations on an hour-by-hour basis. Considering that vehicular RSP emissions also contribute to the total TSP impact, TSP results from AERMOD were added up with the RSP results from CALINE4 and PATH-2016 background RSP concentrations to assess the cumulative TSP impact. The relevant time period averages for each air pollutant assessed were calculated and compared with the relevant

(1) Richard A. Duffee, Martha A. O'Brien and Ned Ostojic (1991) Odor Modeling - Why and How. Page 295, *Recent Developments and Current Practices in Odor Regulations, Controls and Technology*. Air & Waste Management Association, 1991.

assessment criteria to evaluate the cumulative air quality impact at the identified ASRs.

3.7

MITIGATION MEASURES FOR PROPOSED CHANGE

Relevant dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* and requirements stipulated in the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* will continue to be followed during the operation of TKOFB. The relevant air quality mitigation measures associated with the operation of the C&DMSFs and barging points include the following:

- Major haul roads and material stockpiling areas will be watered at least once every hour during operation to ensure that the roads and stockpiling areas are kept sufficiently dampened;
- At the barging point, the drop height between the barge and dump trucks shall be minimised;
- Truck speed shall be controlled to within 10 km/hour;
- All dusty fill materials shall be sprayed with water or a dust suppression chemical prior to loading, unloading or transfer so as to maintain the fill material wet, except of situations where the moisture content of the dusty material is a matter of concern;
- Belt conveyor systems used for transfer of dusty materials shall be enclosed on top and 2 sides. Every transfer point between two conveyors shall be totally enclosed. There is no emission associated with the belt conveyor systems;
- Belt conveyor shall be equipped with bottom plates or other similar means to prevent falling of materials from the return belt;
- The vertical distance between the belt conveyor and the material landing point shall be maintained at no more than 1m; and
- Dusty materials loaded from a belt conveyor outlet to stockpiles, storage bins, trucks, barges and other open areas shall be sprayed with water or a dust suppression chemical.

3.8

EVALUATION OF IMPACTS

3.8.1

TSP, RSP and FSP Impacts

Cumulative TSP, RSP and FSP impacts on the identified ASRs for Scenario 1 and Scenario 2 have been assessed. The predicted cumulative maximum 1-hour TSP, the 10th highest 24-hour and annual RSP, and the 10th highest 24-hour and annual FSP at the worst affected height of the identified ASRs for

Scenario 1 and Scenario 2 are presented in Table 3.12, and Table 3.13, respectively.

Table 3.12 *Predicted Cumulative TSP, RSP and FSP Concentrations at the Worst Affected Height at Identified ASRs (Scenario 1)*

ASR	Predicted Cumulative Concentration ($\mu\text{g m}^{-3}$)				
	Max 1-hour TSP	10 th Highest 24-hour RSP ^(a)	Annual RSP	10 th Highest 24-hour FSP ^(a)	Annual FSP
A1	372.0	71.5	33.9	52.4	22.6
A2	345.2	71.4	33.2	52.3	22.4
A3	244.8	69.7	31.9	52.3	22.0
A4	245.2	69.9	31.9	52.5	22.1
A5	223.6	69.8	31.7	52.4	21.9
A6	225.2	69.7	31.6	52.0	21.9
A7	211.7	69.6	31.1	51.9	21.7
Criteria ^(b)	500	100	50	75	35

Notes:

(a) The AQO allows 9 exceedances over a year, therefore, the results presented are in the 10th highest.

(b) The 1-hour TSP criterion is referenced from EIAO-TM. RSP and FSP criteria are AQO criteria.

Table 3.13 *Predicted Cumulative TSP, RSP and FSP Concentrations at the Worst Affected Height at Identified ASRs (Scenario 2)*

ASR	Predicted Cumulative Concentration ($\mu\text{g m}^{-3}$)				
	Max 1-hour TSP	10 th Highest 24-hour RSP ^(a)	Annual RSP	10 th Highest 24-hour FSP ^(a)	Annual FSP
A1	421.1	74.8	35.4	57.4	24.6
A2	346.6	73.2	34.2	57.2	23.8
A3	247.0	69.8	32.3	52.4	22.6
A4	259.4	70.1	32.3	52.7	22.7
A5	228.8	68.7	31.9	52.5	22.3
A6	240.1	69.8	31.9	52.5	22.5
A7	211.8	69.8	31.3	52.3	22.1
A8	484.4	89.8	39.7	71.9	26.3
Criteria ^(b)	500	100	50	75	35

Notes:

(a) The AQO allows 9 exceedances over a year, therefore, the results presented are in the 10th highest.

(b) The 1-hour TSP criterion is referenced from EIAO-TM. RSP and FSP criteria are AQO criteria.

The assessment results show that the cumulative TSP, RSP and FSP impacts at the identified ASRs for both scenarios comply with the relevant AQO criteria. Therefore, adverse dust impact due to the proposed change is not anticipated.

3.8.2 *NO₂ Impacts*

Cumulative NO₂ impacts on the identified ASRs for Scenario 1 and Scenario 2 have been assessed. The predicted cumulative 19th highest 1-hour NO₂ and

annual NO₂ at the worst affected height of the identified ASRs for Scenario 1 and Scenario 2 are presented in Table 3.14.

Table 3.14 *Predicted Cumulative NO₂ Concentrations at the Worst Affected Height at Identified ASRs*

ASR	Predicted Cumulative Concentration ($\mu\text{g m}^{-3}$)			
	Scenario 1		Scenario 2	
	19 th Highest 1-hour NO ₂ ^(a)	Annual NO ₂	19 th Highest 1-hour NO ₂ ^(a)	Annual NO ₂
A1	163.4	21.8	165.1	21.8
A2	155.0	18.4	154.5	18.7
A3	138.1	15.3	138.0	15.3
A4	134.5	19.2	134.8	18.9
A5	128.2	16.9	127.8	16.8
A6	134.6	16.6	133.8	16.4
A7	123.9	12.5	124.2	12.6
A8	-	-	154.7	21.8
AQO Criteria	200	40	200	40

Note:

(a) The AQO allows 18 exceedances over a year, therefore, the results presented are in the 19th highest.

The assessment results show that the cumulative NO₂ impacts at the identified ASRs for both scenarios comply with the relevant AQO criteria. Therefore, adverse cumulative NO₂ impact arising from the proposed change is not anticipated.

3.8.3 SO₂ Impacts

Cumulative SO₂ impacts on the identified ASRs for Scenario 1 and Scenario 2 have been assessed. The predicted cumulative 4th highest 10-minute SO₂ and 4th highest 24-hour SO₂ at the worst affected height of the identified ASRs for Scenario 1 and Scenario 2 are presented in Table 3.15.

Table 3.15 *Predicted Cumulative SO₂ Concentrations at the Worst Affected Height at Identified ASRs*

ASR	Predicted Cumulative Concentration ($\mu\text{g m}^{-3}$)			
	Scenario 1		Scenario 2	
	4 th Highest 10-min SO ₂ ^(a)	4 th Highest 24-hour SO ₂ ^(a)	4 th Highest 10-min SO ₂ ^(a)	4 th Highest 24-hour SO ₂ ^(a)
A1	108.8	21.0	109.0	20.9
A2	108.8	21.0	109.0	20.9
A3	108.8	21.0	108.9	20.9
A4	108.8	21.0	108.9	20.9
A5	108.8	21.0	108.9	20.9
A6	108.8	21.0	108.8	20.9
A7	108.8	21.0	108.8	20.9
A8	-	-	107.2	24.0

ASR	Predicted Cumulative Concentration ($\mu\text{g m}^{-3}$)			
	Scenario 1		Scenario 2	
	4 th Highest 10-min SO_2 ^(a)	4 th Highest 24-hour SO_2 ^(a)	4 th Highest 10-min SO_2 ^(a)	4 th Highest 24-hour SO_2 ^(a)
AQO Criteria	500	125	500	125

Note:
(a) The AQO allows 3 exceedances over a year, therefore, the results presented are in the 4th highest.

The assessment results show that the cumulative SO_2 impacts at the identified ASRs for both scenarios comply with the relevant AQO criteria. Therefore, adverse air quality impact from potential SO_2 emissions due to the proposed change is not anticipated.

3.9

EM&A REQUIREMENTS

The monitoring locations, monitoring frequency and equipment used for the existing 1-hour and 24-hour TSP monitoring as required under the EM&A programme will remain unchanged. 1-hour TSP levels and 24-hour TSP levels will be monitored three times every six days and once every six days, respectively, using high volume samplers. The locations of TKO-A1 and TKO-A2 are shown in *Figure 3.1*.

4 NOISE

4.1 INTRODUCTION

This *Section* assesses the potential noise impacts associated with the proposed change at the TKOFB.

4.2 LEGISLATIVE REQUIREMENTS AND EVALUATION CRITERIA

4.2.1 Fixed Plant Noise

The principal legislation relating to the control of operational noise is the *EIAO*. The *EIAO-TM*, issued under the *EIAO*, provides guidelines and noise criteria for evaluating the noise impacts.

The *Noise Control Ordinance (Cap. 400) (NCO)* also provides means to assess operational noise impacts. The *Technical Memorandum on Noise From Places Other than Domestic Premises, Public Places or Construction Sites (IND-TM)* issued under the *NCO* specifies the applicable Acceptable Noise Levels (ANLs) for the operation of the TKOFB.

In accordance with the approved EIA Report and the ER Reports associated with previous VEP, noise generated from the use of Powered Mechanical Equipment (PME) in the TKOFB would be within the ANL - 5dB(A) criterion, i.e. 60 dB(A) and 50dB(A), during the daytime and evening period, and night-time period, respectively.

4.2.2 Road Traffic Noise

The traffic noise standards for planning purposes specified in Table 1 under Annex 5 of the *EIAO-TM* was employed as the noise limits for the road traffic noise impact assessment. The applicable road traffic noise standards are 70dB(A) $L_{10, 1hr}$ and 65dB(A) $L_{10, 1hr}$ for domestic premises and education institutions, respectively. These noise limits were applied for the peak hour traffic flows and for uses that rely on opened windows for ventilation.

In situations where the predicted traffic noise levels at the Noise Sensitive Receivers (NSRs) are above the noise standards but noise contribution attributable to TKOFB operations is less than 1.0 dB(A), the noise contribution from TKOFB operations is considered insignificant.

4.3 NOISE SENSITIVE RECEIVERS

The Study Area is shown in *Figure 4.3a*. The locations of the identified representative existing and planned NSRs selected for assessment are presented in *Figures 4.3b to 4.3e*. NSRs Island Resort (IR1) and Lohas Park (LP2) are still considered as the worst assessment points.

4.4 POTENTIAL SOURCES OF IMPACT

4.4.1 Fixed Plant Operation

Operations of the C&DMSFs and Barging Points at TKOFB during all Periods

Noise will arise from the use of PME during the proposed operation of the C&DMSFs and barging points at TKOFB.

Comparing with the assumptions in the 2018 ER Report, changes to the operation of the C&DMSFs and barging points south of the TKO Basin include the following:

- Extension of operation hours for the existing C&DMSFs (i.e. NSA and NSB) and barging points (i.e. NB1 and NB2) from 07:00-23:00 hours to 24 hours;
- 24-hour operation of one additional C&DMSF (i.e. NSG)⁽¹⁾ and one associated additional barging point (i.e. NB0);
- Operation of one additional barging point (i.e. NB6) between 07:00 hours and 23:00 hours; and
- Truck movement due to the additional truckload within TKOFB.

The locations of the key noise sources are shown in *Figure 4.4*. Due to the abovementioned proposed change, the PME associated with the operation of the C&DMSFs and barging points south of the TKO Basin during all periods has been updated and the latest fixed plant inventory is summarised in *Table 4.1*.

Table 4.1 *Fixed Plant Inventory for the C&DMSFs and Barging Points during All Periods*

PME	Quantity (Daytime & Evening/Night-time)
Dump truck (5.5 tons<Gross vehicle weight≤38 tons) ^(d)	96/81
Excavator	12/9
Excavator (QPME) ^{(c)(d)}	6/6
Generator, standard	4/3
Generator (QPME) ^{(c)(d)}	3/3
Derrick barge ^(d)	7/6
Sorting Facility ^{(a)(d)}	6/5

(1) C&D material sorting activities at NSG only involves manual sorting (no mechanical sorting).

Notes:

- (a) Reference has been made to the approved EIA Report for TKOFB (Register No.: AEIAR-060/2002) for the sorting facility which includes vibrating feeder, magnetic separator and conveyor belts.
 - (b) Barging point (NB6) and sorting facility (NSF) will not be operated during night-time period.
 - (c) QPMEs have been adopted at C&DMSFs NSG, NSA and NSB.
 - (d) Grouping and reductions on percentage on time have been adopted at C&DMSFs NSG, NSA and NSB during night-time period.
-

4.4.2 *Road Traffic Noise*

As described in *Sections 2.1*, no off-site road traffic will be generated by the proposed change. The number of trucks associated with the transportation of materials to the TKOFB (i.e. at public roads outside the TKOFB) will also remain unchanged. The assessment points are still considered as the worst affected location as presented in *Section 4.3*. Therefore, there is no change to the road traffic noise impact assessment as a result of the proposed change and there will be no adverse road traffic noise impact due to the proposed change.

4.5 *ASSESSMENT METHODOLOGY*

4.5.1 *Fixed Plant Operation*

Noise impact assessment due to fixed plant noise from TKOFB is undertaken based on standard acoustic principles as per the requirements of the *EIAO-TM*.

4.6 *EVALUATION OF IMPACTS*

4.6.1 *Fixed Plant Operation*

The predicted noise levels due to the operation of the TKOFB at the representative NSRs are summarised in *Table 4.2*. The predicted noise levels comply with the noise criteria as stated in *Section 4.2.1*.

Table 4.2 *Predicted Operational Noise Levels at Representative NSRs (Worst Assessment Points)*

NSR	Predicted Noise Level, dB(A)		Noise Criteria, dB(A)	
	Daytime (Evening)	Night-time	Daytime & Evening	Night-time
Island Resort	55(57)	49	60	50
The Lohas Park	55(56)	44	60	50

Based on the above-mentioned results, no adverse fixed plant noise impact is expected due to the proposed change associated with the operation of the TKOFB.

4.7

CUMULATIVE IMPACT

In accordance with the approved EIA Report for SENT Landfill Extension (Register No.: AEIAR-117/2008), the predicted maximum operational noise levels at the Lohas Park and Island Resort are summarised in *Table 4.3*.

Cumulative noise levels at the representative NSRs comply with the noise criteria for all periods. Hence, cumulative impacts are therefore not anticipated during operation phase.

Table 4.3 Cumulative Noise Levels at Representative NSRs (Worst Assessment Points)

NSR	Max Noise Level from SENTX, dB(A)		Cumulative Noise Level, dB(A)		Noise Criteria, dB(A)	
	Daytime (Evening)	Night-time	Daytime (Evening)	Night-time	Daytime & Evening	Night-time
Island Resort	50(50)	46	57(57)	50	60	50
The Lohas Park	53(53)	47	57(58)	49	60	50

4.8

MITIGATION MEASURES

The contractor will continue to implement the noise management measures currently adopted as per the recommendations in *Section 5.5.13* of the approved EIA Report.

As no adverse noise impact is expected due to the proposed change associated with the TKOFB operation, no additional mitigation measures are considered necessary.

4.9

CONCLUSION

The number of truck associated with the offsite transportation of materials to the TKOFB will remain unchanged. There is no change to the road traffic noise impact assessment and thus adverse road traffic noise impact is not expected due to the proposed change.

With the updated plant inventory reflecting the proposed operation of the C&DMSFs and barging points, predicted noise levels at the representative NSRs comply with the relevant criteria during all periods. Therefore, no adverse fixed plant noise impact is anticipated due to the proposed change.

5.1

WATER QUALITY

Operation of the TKOFB involves handling, transfer and stockpiling of fill materials at the fill bank, including the barging points. Potential water quality impact from these activities could be resulted from erosion of stockpiled materials, accidental dropping of materials to the sea, and non-point source discharge of surface runoff containing high levels of suspended solids. The potential water quality impacts have been assessed in the approved EIA Report and previous ER Reports. Practical mitigation measures have been recommended accordingly to minimise the potential water quality impacts. It is recommended that these measures should continue to be implemented during the TKOFB operation. The guidelines for handling and disposal of construction site discharges as stipulated in EPD's *ProPECC Note PN1/94 Construction Site Drainage* should be followed.

Similar to the existing operations, public fill will be delivered to and removed from the TKOFB by barges at the barging points during the TKOFB operation. To prevent water pollution due to transportation of fill materials by barges, all environmental control and mitigation measures recommended in the approved EIA Report and previous ER Reports will be followed, including the following:

- All barges used should be of appropriate size such that adequate clearance is maintained between the vessels and the seabed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movements;
- All vessels used for transportation of fill material should have tight fitting seals to their bottom openings to prevent leakage of materials during transport;
- The equipment and transfer methods used shall avoid dropping of fill materials into the sea during the transfers at all times;
- Barges should not be filled to a level which may cause the overflow of materials during loading or transportation; and
- Barge effluents (e.g. muddy water) should be properly collected and treated prior to disposal.

With the implementation of the appropriate mitigation measures, it is anticipated that no adverse water quality impacts will arise as a result of the proposed change to the TKOFB operation.

The existing water quality monitoring programme will remain unchanged. It is recommended that the monitoring parameters, frequency and equipment will be maintained as the existing monitoring programme.

5.2

LANDSCAPE AND VISUAL IMPLICATIONS

There will be new structures including one additional C&DMSF and two additional barging points under the proposed changes. In accordance with the recommendation in Supporting Document of VEP for Fill Bank at TKO Area 137 (VEP-389/2013), chromatic treatment will be provided to the design of the proposed additional C&DMSF and two additional barging points. The material use, colour and finish of structures of the proposed facilities will be compatible to the existing facilities in the fill bank. Colour shall be blended into the fill bank design and natural landscape, i.e. the use of light colours and tones such as green, grey and brown. The materials used will be in low reflectivity and the form of structure will be similar to the form of the fill bank.

With the continued implementation of the above-mentioned measures, no significant landscape and visual impact due to the proposed change at TKOFB is anticipated.

5.3

NIGHTTIME GLARE

Additional illuminations will be required at the C&DMSFs area south of the TKO Basin as a result of the proposed change. Illuminations shall be provided at active works areas only, which include the C&DMSFs, the barging points, access roads and the working areas of the stockpiling area. Nighttime glare may cause nuisance to adjacent visual sensitive receivers at night time if the lighting intensity and direction are not properly controlled. To avoid light spill to surrounding area, all lightings provided at night should be directional downward, generally focused and shielded to reduce glare and should illuminate the required areas only. Other possible control measures as recommended in the *Guidelines on Industry Best Practices for External Lighting Installations* shall be followed where appropriate and as far as practicable. Yet, given the large separation distance between the residential sensitive receivers and the TKOFB (i.e. more than 1.8 km), the light intensity would drop significantly and therefore the light glare is not considered significant.

With the continued implementation of the above-mentioned measures, no significant nighttime glare nuisance due to the proposed change at TKOFB is anticipated.

CONCLUSIONS

Besides the three C&DMSFs and three barging points south of the TKO Basin that are currently allowed for 24-hour operation according to the current EP, CEDDD proposes to extend the operating hours of the other two existing C&DMSFs and barging points from 16 hours to 24 hours, to implement one additional C&DMSF for 24-hour operation, as well as to operate two additional barging points (one for 24-hour operation and the other between 07:00 hrs to 23:00 hrs) in order to facilitate the clearance of the stockpiled materials at the TKOFB.

An environmental review has been carried out to assess the potential environmental impacts associated with the proposed change. The assessment indicates that no adverse environmental impacts are anticipated from the proposed change.

The proposed change at TKOFB complies with the requirements described in the EIAO-TM and will not constitute a material change to the TKOFB. It is considered that the change could be incorporated into the Environmental Permit of the TKOFB via a variation of the existing EP.

7

PROPOSED VARIATIONS OF THE EXISTING EP

7.1

PROPOSED AMENDMENT OF FIGURE 2 OF THE EP

It is proposed to update the area of C&DMSFs and the locations of the barging points south of the TKO Basin in Figure 2.

7.2

PROPOSED AMENDMENT OF CONDITION 2.8B IN PART C OF EP

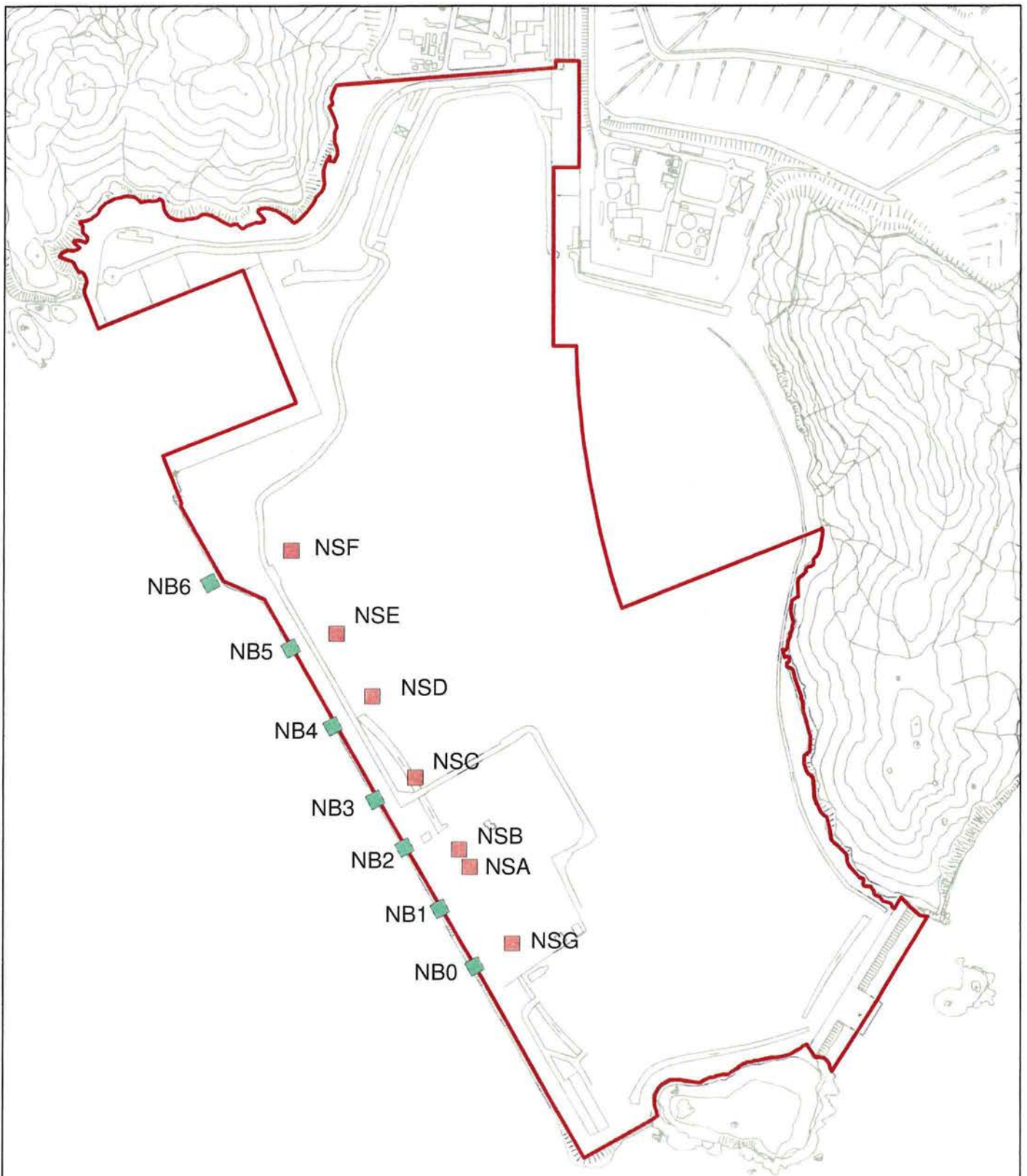
It is proposed to amend Condition 2.8B from:

"At any one time, only 3 out of the 6 construction and demolition material sorting facilities and 3 out of the 5 barging points and tipping halls in the area coloured yellow as shown in Figure 2 of this Permit can be operated round-the-clock everyday. The remaining construction and demolition material sorting facilities, barging points and tipping halls shall not be operated between 11:00 p.m. and 7:00 a.m. on the following day unless otherwise agreed by the Director. The area coloured yellow as shown in Figure 2 of this Permit shall be closed during the Chinese New Year Holiday."

to:

"At any one time, only 6 out of the 7 construction and demolition material sorting facilities and 6 out of the 7 barging points and tipping halls in the area coloured yellow as shown in Figure 2 of this Permit can be operated round-the-clock everyday. The remaining construction and demolition material sorting facility, barging point and tipping hall shall not be operated between 11:00 p.m. and 7:00 a.m. on the following day unless otherwise agreed by the Director. The area coloured yellow as shown in Figure 2 of this Permit shall be closed during the Chinese New Year Holiday."

Figures



Key

- Construction & Demolition Material Sorting Facilities (Others)
- Other Barging Points for Exporting Materials
- Tseung Kwan O Fill Bank

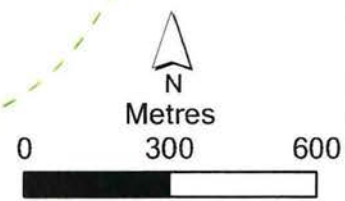
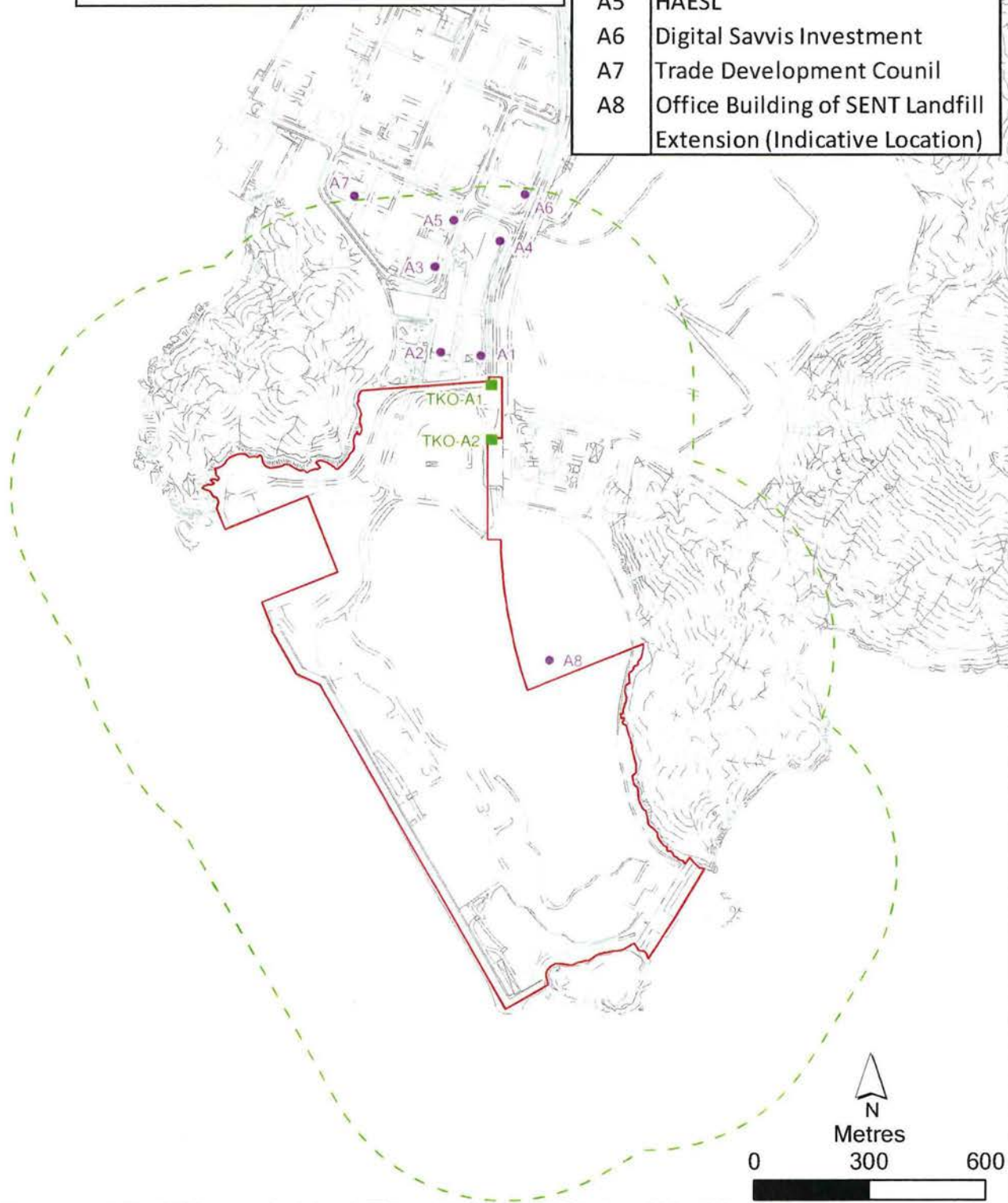
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Figure 2.1
Locations of Construction and Demolition Material Sorting Facilities and Barging Points to the South of TKO Basin

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Date: 06-Jun-2019

Key		ASR	Location
●	Air Sensitive Receiver	A1	TVB City
■	TSP Monitoring Stations	A2	TVB City
□	Tseung Kwan O Fill Bank	A3	HAECO Component Overhaul Building
□	Tseung Kwan O Fill Bank 500m Study Area	A4	TVB City
		A5	HAESL
		A6	Digital Savvis Investment
		A7	Trade Development Council
		A8	Office Building of SENT Landfill Extension (Indicative Location)

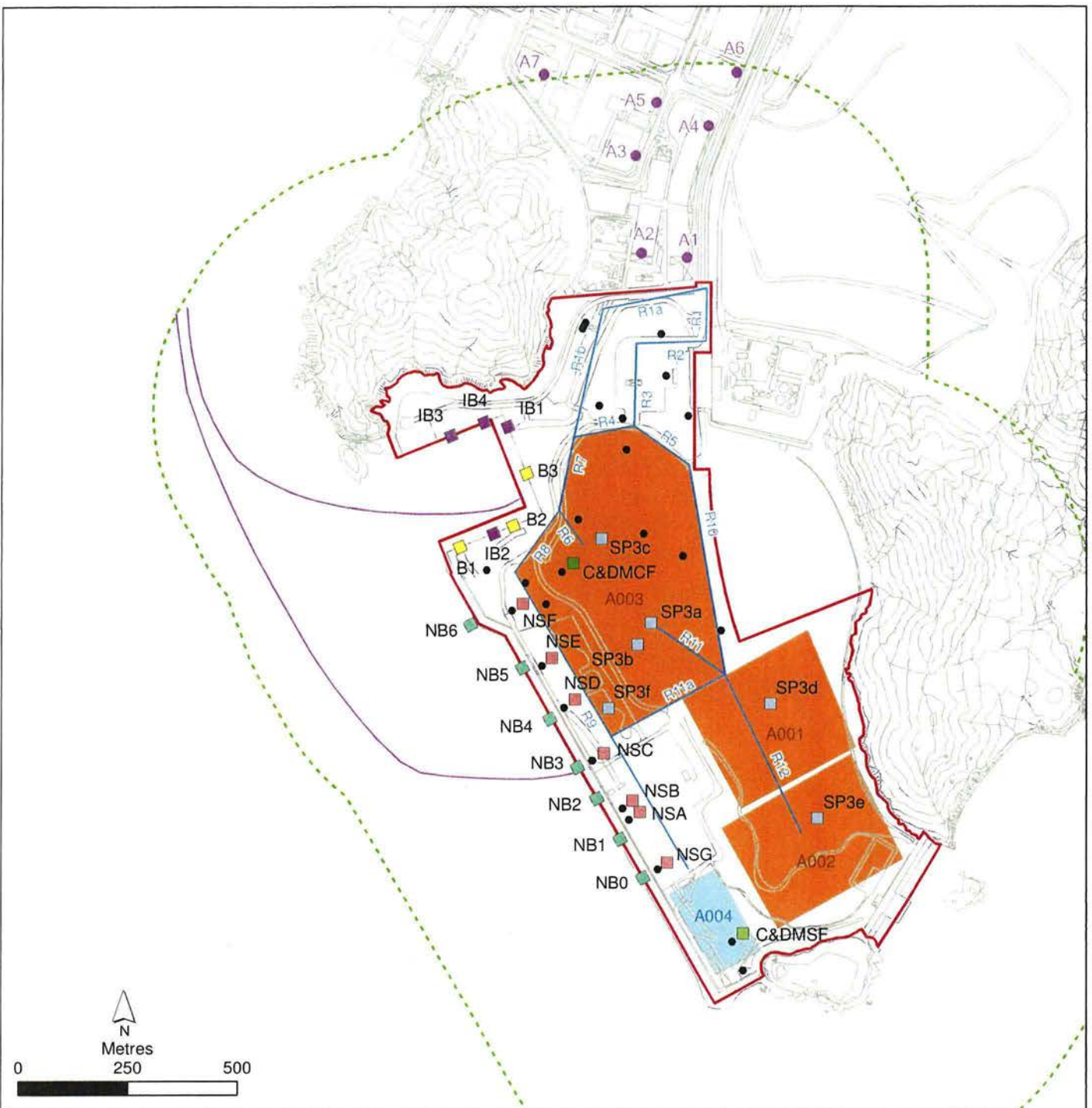


Note: Northeastern part of the TKOFB area was handed over to EPD's project of SENT Landfill Extension on 31 Dec 2018.

Figure 3.1
Locations of Representative Air Sensitive Receivers and TSP Monitoring Stations

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Date: 6/6/2019



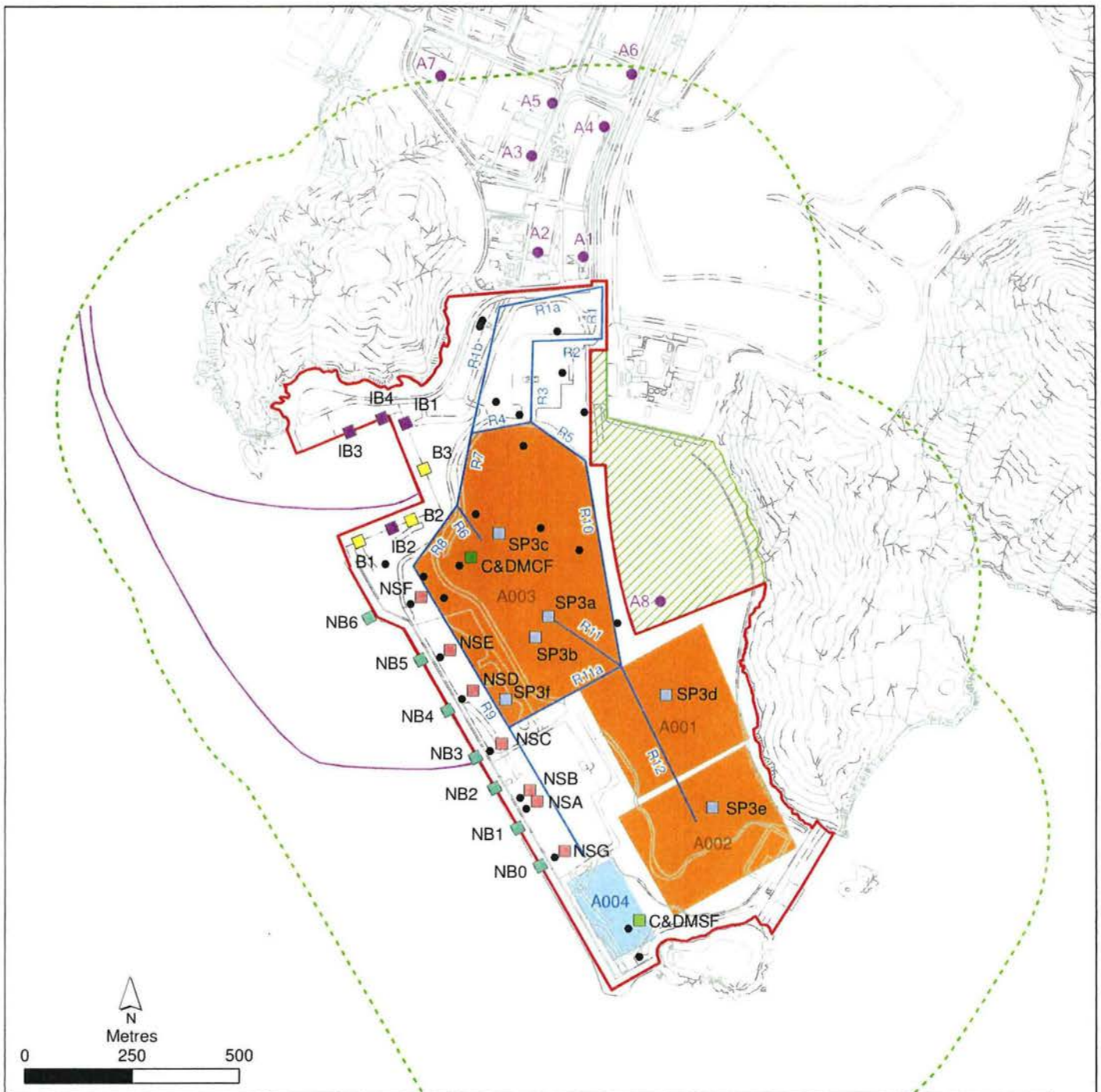


Legend

- | | | |
|--|--|---|
| ● ASR | ■ TKOBF Barging Points for Importing Materials | — Haul Roads |
| ■ Construction & Demolition Material Sorting Facilities (Others) | ■ TKOBF Construction & Demolition Material Crushing Facility | — Marine Vessel Maneuvering Route |
| ■ Fill Loading and Unloading Points | ■ TKOBF Construction & Demolition Material Sorting Facility | ■ Open Area |
| ■ Other Barging Points for Exporting Materials | ● Generators | ■ Stockpiling Areas |
| ■ TKOBF Barging Points for Exporting Materials | | ■ Tseung Kwan O Fill Bank |
| | | ■ Tseung Kwan O Fill Bank 500m Study Area |

Figure 3.2a

Locations of Major Emission Sources Associated with Tseung Kwan O Fill Bank Operation (Scenario 1)



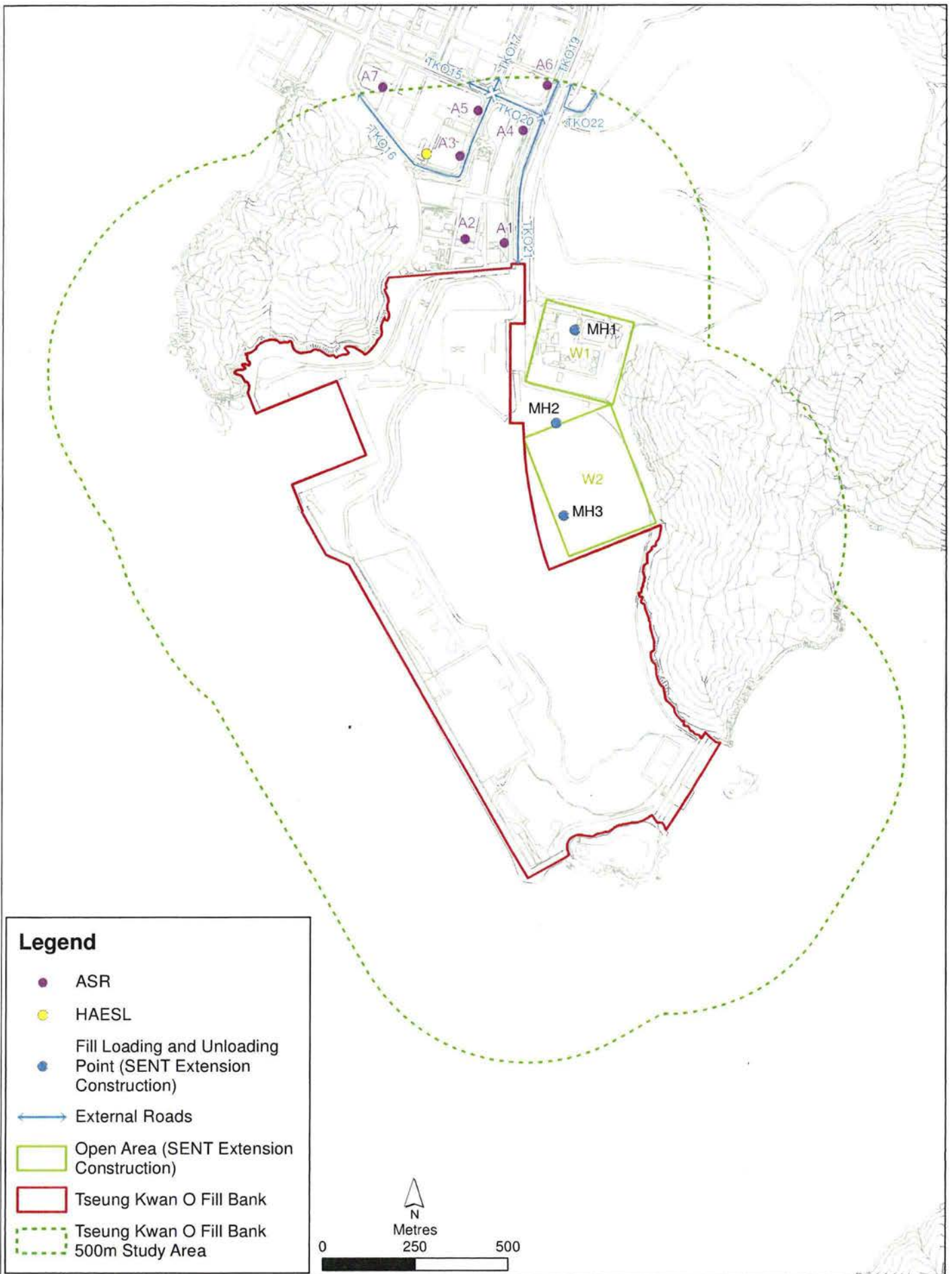
Legend

- ASR
- Construction & Demolition Material Sorting Facilities (Others)
- Fill Loading and Unloading Points
- Other Barging Points for Exporting Materials
- TKOFB Barging Points for Exporting Materials
- TKOFB Barging Points for Importing Materials
- TKOFB Construction & Demolition Material Crushing Facility
- TKOFB Construction & Demolition Material Sorting Facility
- Generators
- Haul Roads
- Marine Vessel Maneuvering Route
- ▨ SENT Landfill Extension
- ▭ Tseung Kwan O Fill Bank
- ▭ Tseung Kwan O Fill Bank 500m Study Area
- Open Area
- Stockpiling Areas

Figure 3.2b

Locations of Major Emission Sources Associated with Tseung Kwan O Fill Bank Operation (Scenario 2)

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Date: 6/6/2019



Legend

- ASR
- HAESL
- Fill Loading and Unloading Point (SENT Extension Construction)
- ↔ External Roads
- Open Area (SENT Extension Construction)
- Tseung Kwan O Fill Bank
- ⋯ Tseung Kwan O Fill Bank 500m Study Area

Figure 3.3a

External Roads and Industrial Sources within 500m Study Area (Scenario 1)

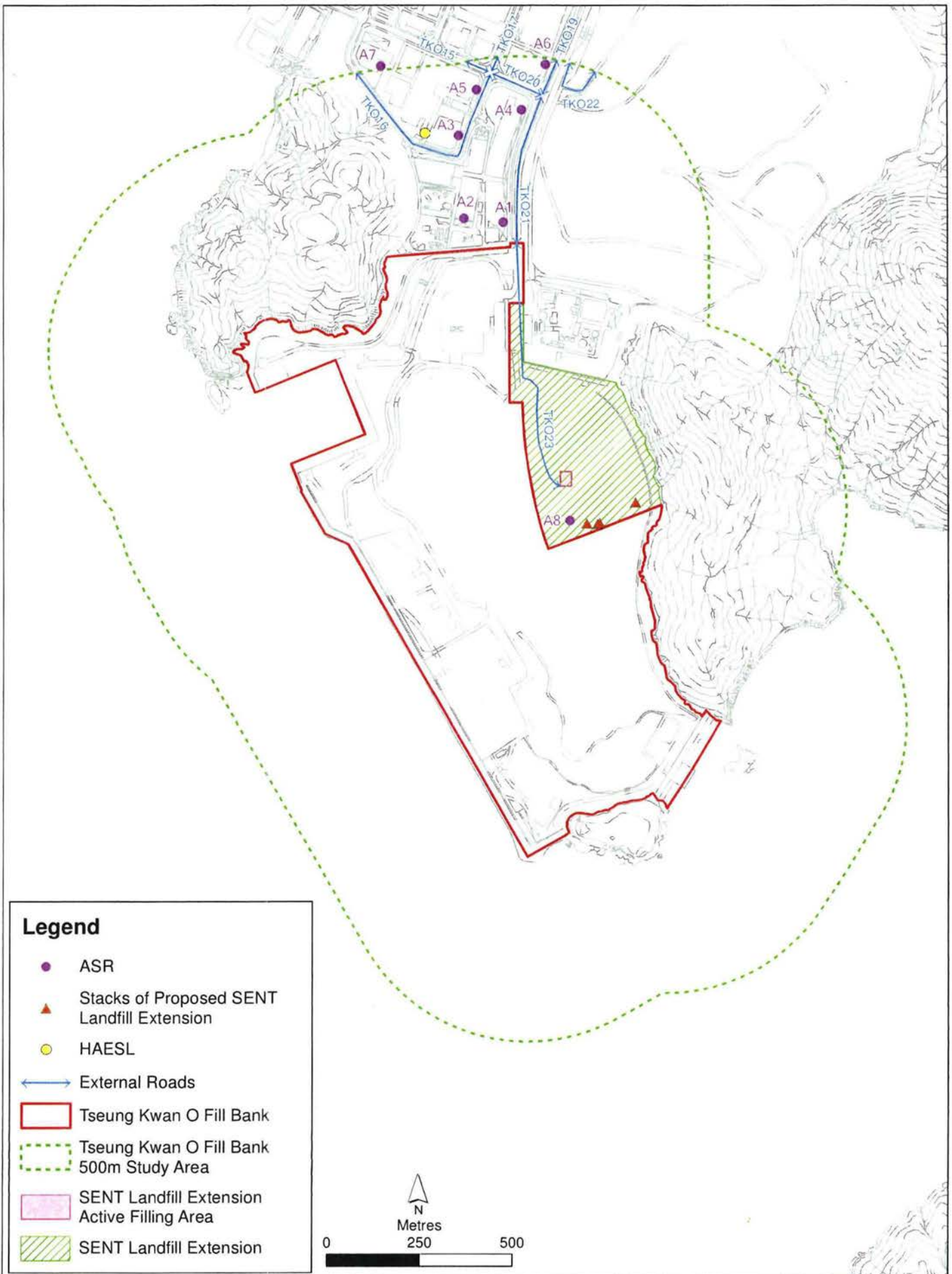


Figure 3.3b

External Roads and Industrial Sources within 500m Study Area (Scenario 2)

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Date: 6/6/2019

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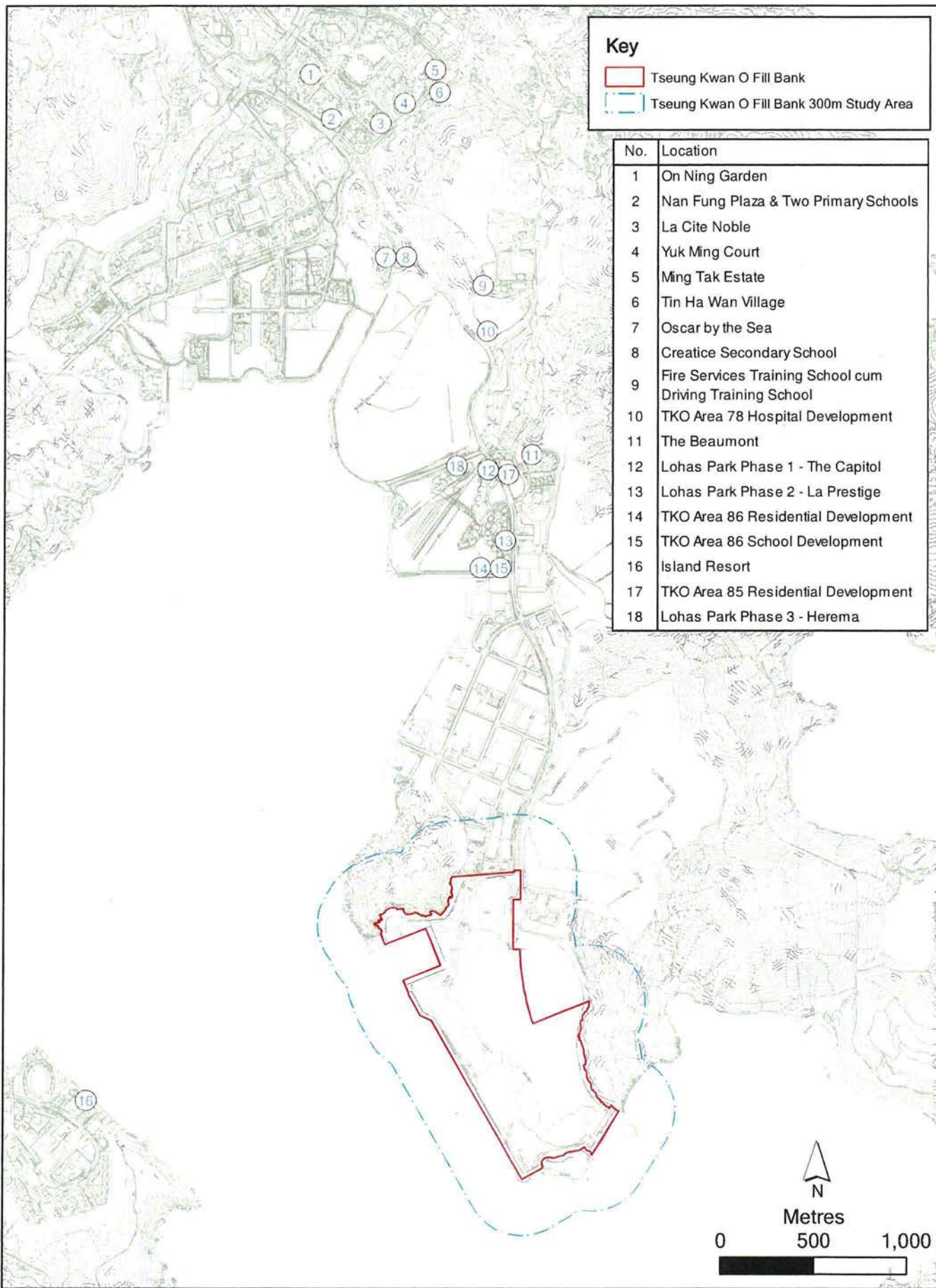


Figure 4.3a

The 300m Study Area for Noise Impact Assessment and Representative Noise Sensitive Receivers along Wan Po Road

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Date: 6/6/2019

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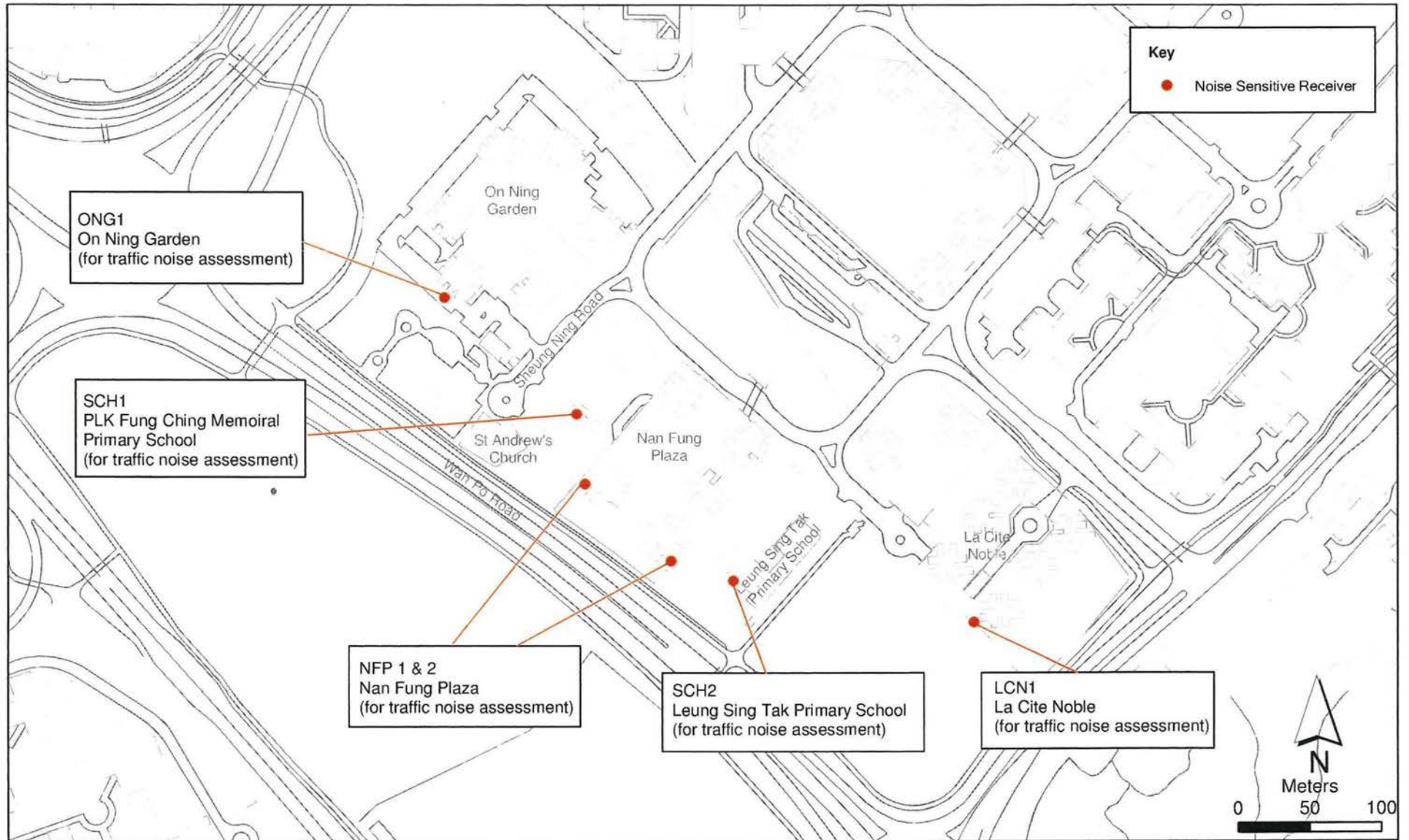


Figure 4.3b

Locations of the Noise Sensitive Receivers for Assessment

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Date: 15/08/2008

Environmental
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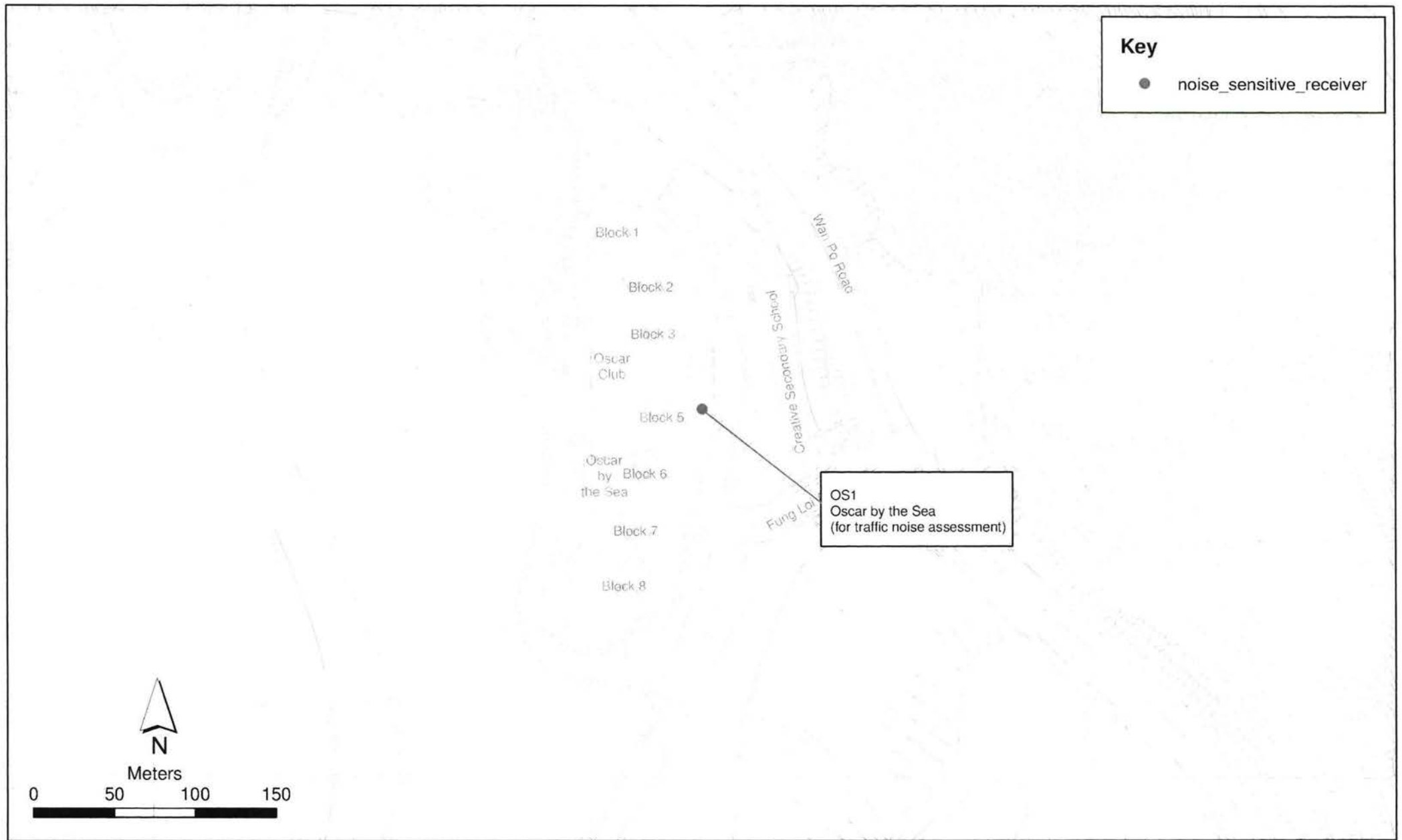


Figure 4.3c

Locations of the Noise Sensitive Receivers for Assessment

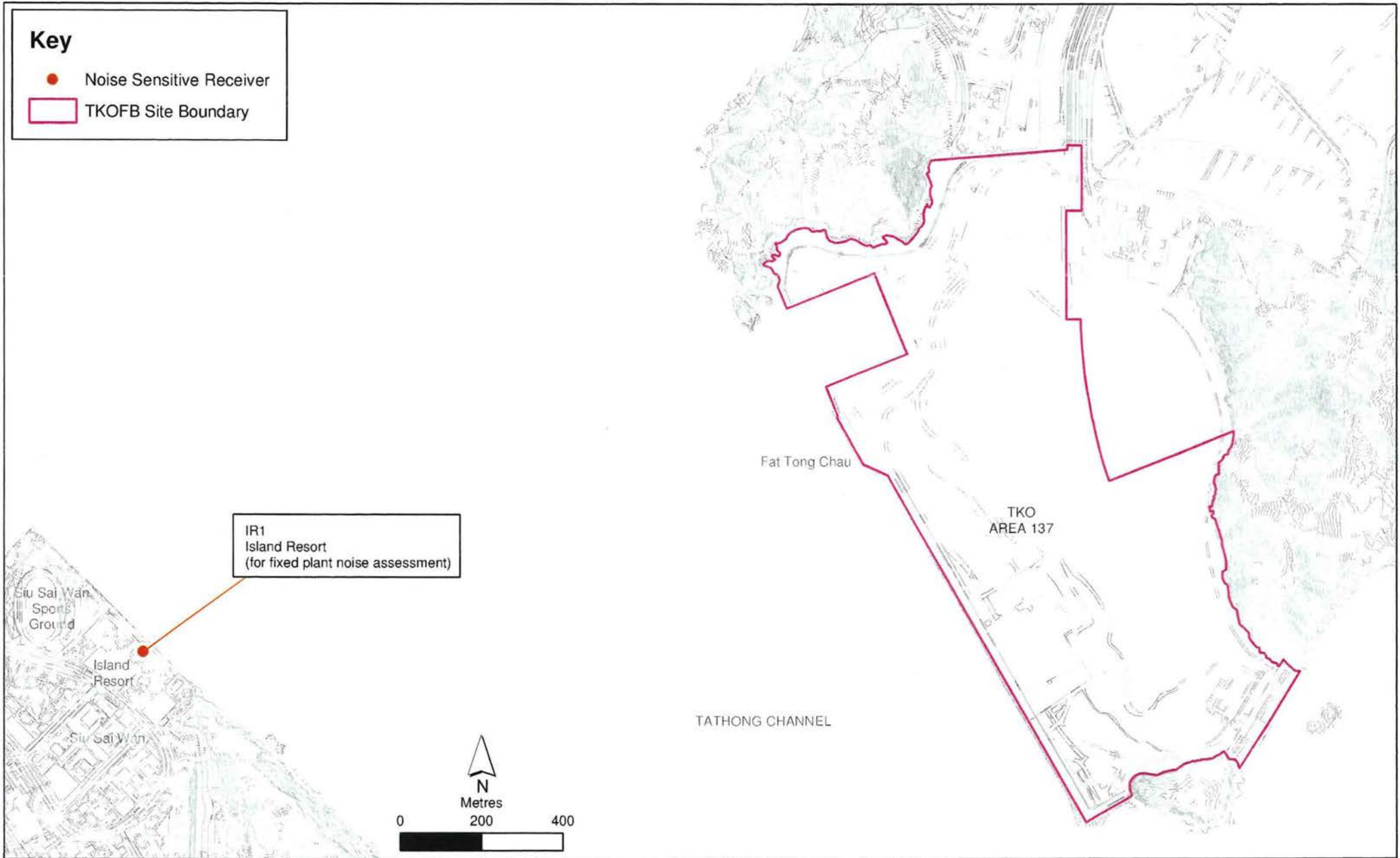


Figure 4.3d

Locations of Existing Noise Sensitive Receivers for Assessment

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Date: 6/6/2019

Environmental
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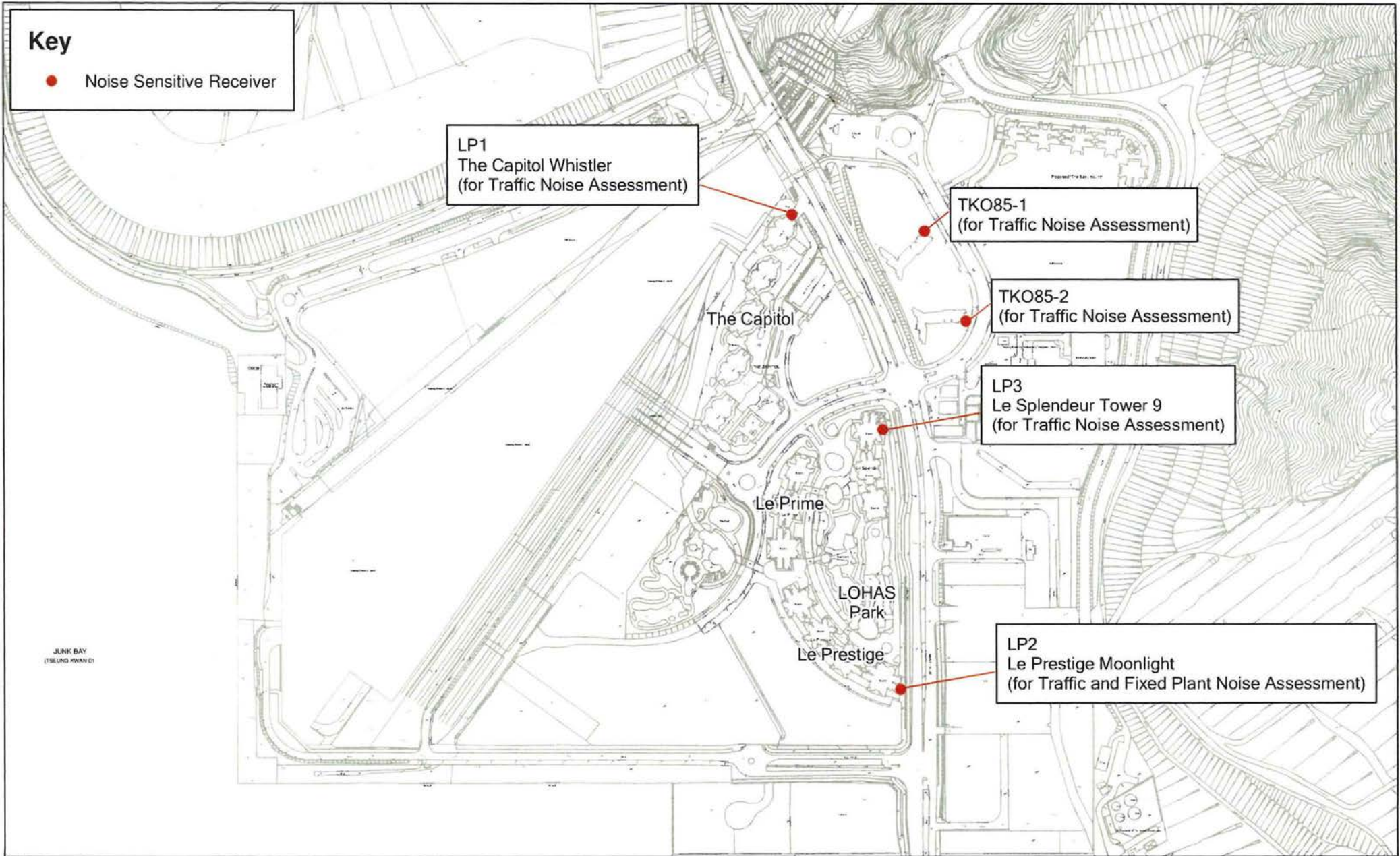


Figure 4.3e

Location of Representative Noise Sensitive Receiver for Assessment

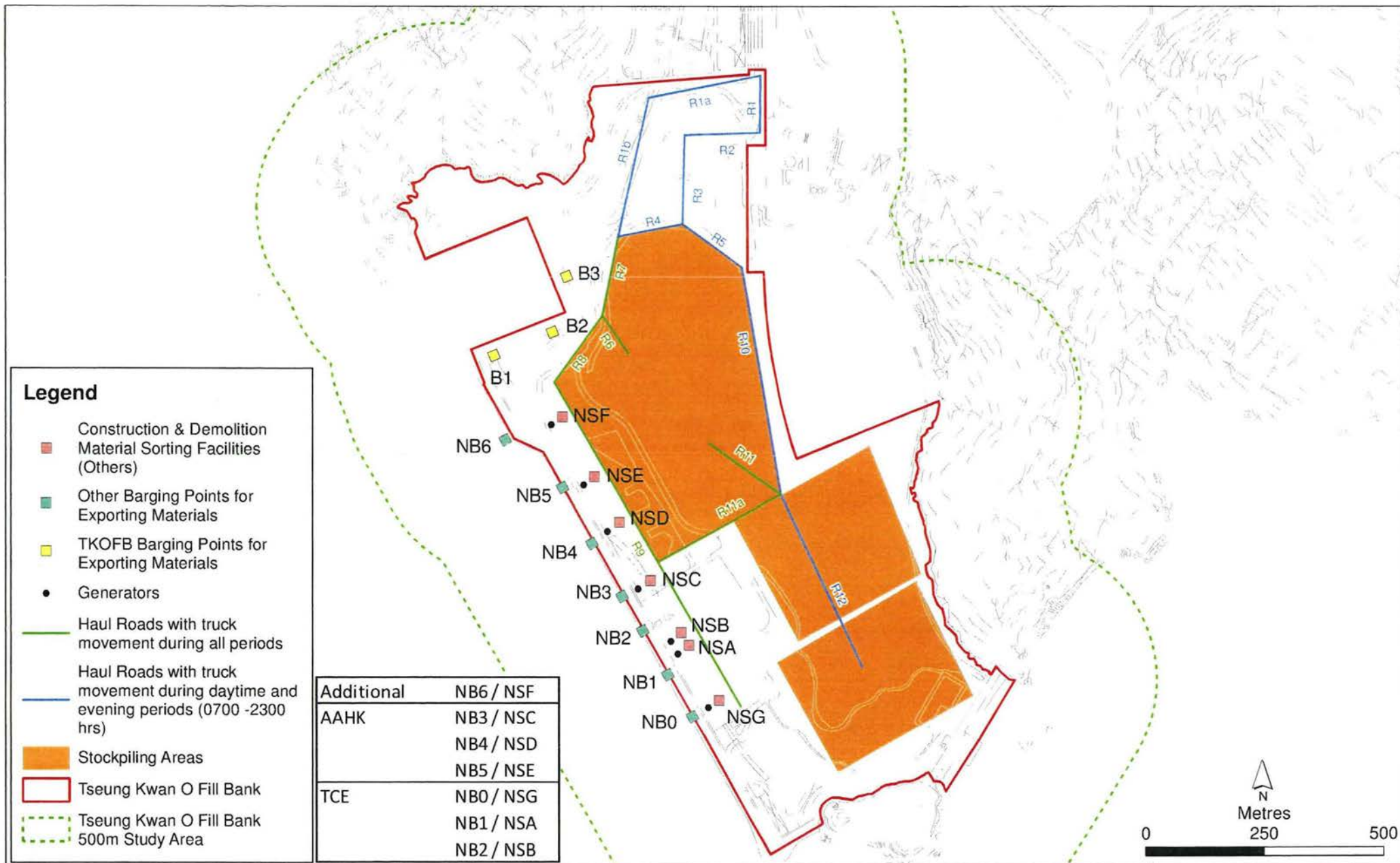


Figure 4.4

Locations of Noise Emission Sources