

JOB No.: TCS01325/23

CONTRACT NO. EP/SP/186/21

**WEST NEW TERRITORIES LANDFILL EXTENSION
(WENTX)**

**CONTINGENCY PLANS ON NON-COMPLIANCE WITH
ODOUR CRITERIA**

**SUBMISSION FOR
EP-393/2010/A CONDITION 2.7
FEP-01/393/2010/A CONDITION 2.7**

**PREPARED FOR
HONG KONG RESOURCES RECOVERY PARK**

Date

Reference No.

Certified By

24 May 2024

TCS01325/23/600/R0011v7



Tam Tak Wing
(Environmental Team Leader)

Version	Date	Remarks
1	12 January 2024	First Submission
2	22 January 2024	Amended according to IEC, Service Manager and EPD's comments
3	23 January 2024	Updated according to DC's comment
4	7 March 2024	Amended according to EPD's comments
5	11 March 2024	Amended according to SM's comments on 8 March 2024
6	9 April 2024	Amended according to EPD's comments
7	24 May 2024	Amended according to EPD's comments

Our Ref: TCS01325/23/300/L0046

Hong Kong Resources Recovery Park

29/F China Overseas Building,
139 Hennessy Road, Hong Kong

Attn: Mr. Kenneth Lau

27 May 2024

By email

Dear Sir,

**Re: Contract No. EP/SP/186/21
West New Territories Landfill Extension (WENTX)
ETL's Certification letter for Contingency Plan on Non-compliance with Odour
Criteria (Condition 2.7 of EP-393/2010/A and FEP-01/393/2010/A)**

With reference to the submission of Contingency Plan on Non-compliance with Odour Criteria, which has been revised according to the EPD's comment on 20 May 2024. In accordance with Condition 2.7 of EP-393/2010/A and FEP-01/393/2010/A, we hereby certify this submission as conforming to the information and recommendations contained in the approved EIA report (Register No.: AEIAR-147/2009).

Should you have any queries or require further information, please feel free to the undersigned at Tel: 2959-6059 or Fax: 2959-6079.

Yours sincerely,
For and on Behalf of
Action-United Environmental Services & Consulting



Tam Tak Wing
Environmental Team Leader

cc

ANewR (IEC)

Mr. James Choi

By e-mail



Environmental Protection Department
2nd floor, West Wing
Island West Transfer Station
88 Victoria Road
Kennedy Town
Hong Kong

Your reference:

Our reference: HKEPD259/50/109799

Date: 27 May 2024

Attention: Ms Kins Lo

BY EMAIL & POST
(email: wklo@epd.gov.hk)

Dear Sirs

Quotation Ref. 23-02230
Provision of Independent Environmental Checker Consultancy Services for
West New Territories Landfill Extension
Contingency Plan on Non-compliance with Odour Criteria (Version 7)

We refer to emails of 24 and 27 May 2024 from Hong Kong Resources Recovery Park attaching the Contingency Plan on Non-compliance with Odour Criteria (Version 7) of the captioned.

We have no further comment and hereby verify the captioned plan in accordance with Clause 2.7 of the Environmental Permit (EP No. EP-393/2010/A) and Further Environmental Permit (FEP No. FEP-01/393/2010/A).

Should you have any queries, please do not hesitate to contact the undersigned or our Mr Ricky Lau at 2618 2831.

Yours faithfully
ANEWR CONSULTING LIMITED

James Choi
Independent Environmental Checker

CPSJ/LCCR/csym

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1 INTRODUCTION

1.1 BACKGROUND

- 1.1.1 The West New Territories Landfill Extension (WENTX) is classified as a Designated under Schedule 2, Part I of the Environmental Impact Assessment Ordinance (EIAO) (Cap. 499). The Environmental Impact Assessment (EIA) Report (AEIAR-147/2009) of WENTX was approved in November 2009 and the respective EP (EP-393/2010) was granted in June 2010.
- 1.1.2 For the WENTX development scheme adopted in the WENTX-EIA in 2009 (hereby referred to the Original Scheme), the site covering about 188 hectares (ha) of land adjacent to the existing WENT Landfill has been confirmed feasible to provide approximately 81 million m³ (Mm³) of additional landfill capacity. Since then, a number of interfacing projects, commitments and neighbourhood enhancement initiatives have been proposed and considered in conjunction with the Project. The reference design and implementation programme for the WENTX (hereby referred to the Enhanced Scheme) has been revised accordingly. Due to the boundary of WENTX reduced under the Enhanced Scheme and the waste filling area and landfill capacity updated, Variation of EP (application number VEP-617/2022) was applied by the project proponent and EP-393/2010/A was issued by Environmental Protection Department (EPD) on 29 July 2022 subsequently.
- 1.1.3 In August 2023, Hong Kong Resources Recovery Park (hereinafter named “HKRRP”) was awarded the Design, Build and Operate Contract of WENTX (hereinafter named “the Project”). Further Environmental Permit (FEP-01/393/2010/A) was granted by HKRRP from EPD on 6 October 2023. In addition, Ove Arup & Partners Hong Kong Ltd will be the Service Manager of the Project and they will perform the same role / same as the Independent Consultant as recommended in the EIA report.
- 1.1.4 Same as the Original Scheme, WENTX will be designed to receive municipal solid waste (MSW), construction waste and other special wastes, including sludge under special circumstances. EIA had assessed the potential sources of odour impact during the operation of WENTX. These include odour emissions and surface gas emissions from waste tipping operations as well as odour emissions from leachate treatment facilities during operation stage. Odour control measures (e.g. application of daily cover) would be implemented to minimise the odour impact.

1.2 PURPOSE OF SUBMISSION

- 1.2.1 Location of WENT Landfill Extension site is shown in *Appendix A*. Eastern part of the site is located in Tsang Kok Valley which is a hilly terrain site sparsely vegetated with grass and limited patched of shrubs. The easterly ridge forms a boundary with the existing landfill. The northern part is the China Light and Power Company (CLP) Tsang Tsui Ash Lagoons and the former BBC Relay Station. The southern area is bounded by the natural topography, with ridgelines rising southwards from the coastline to meet the major east-west trending ridgeline at about +290mPD. The southern part of the site will also encroach onto the Tsing Shan Firing Range.
- 1.2.2 Since WENTX will be a new source of odour during its operating. As per condition 2.7 of EP-393/2010/A and FEP-01/393/2010/A, a Contingency Plans on Non-compliance with Odour Criteria is required to be submitted to the Director of Environmental Protection (DEP) at least 1 month before the commencement of construction of the Project. The contingency plan shall include actions of relevant parties and mitigation measures to be taken for any possible exceedances of the Action and Limit Levels of odour impact as stipulated in the EM&A Manual, such as reducing the number of

tipping areas, moving tipping areas further away from concerned sensitive receivers and increasing the thickness of covering soil. Before submission to the Director, the contingency plan shall be certified by the Environmental Team (ET) Leader and verified by the Independent Environmental Checker (IEC) as conforming the information and recommendations contained in the approved EIA report (Register No. AEIAR-147/2009).

- 1.2.3 AUES has been appointed by HKRRP to assist to preparing the Contingency Plans on Non-compliance with Odour Criteria. The contingency plan is prepared will be based on the approved EIA Report and EM&A Manual as fulfill Condition 2.7 of the EP-393/2010/A and FEP-01/393/2010/A.

2 CONTINGENCY PLANS

2.1 GENERAL

- 2.1.1 In the EIA Report, odour assessment results show that some operational constraints on the locations of tipping faces are required to ensure compliance of the odour limits for the receivers, and odour removal facilities would be installed to reduce the odour level for the air sensitive receivers (ASRs) as appropriate. Other odour control measures (e.g. application of daily cover) would be implemented to minimise the odour impact.
- 2.1.2 Same as the Original Scheme, WENTX will be designed to receive municipal solid waste, construction waste and other special wastes, including sludge under special circumstances. Under the Enhanced Scheme, there would be about 50% decrease in waste filling area and with the reduced waste boundary, the distance between the active tipping faces and ASRs are general greater, if not the same as the approved WENTX EIA.
- 2.1.3 In addition to the 150 mm thick daily soil cover as per the approved WENTX EIA, Posi-shell and/or other suitable materials will be applied to cover the active tipping face at the end of each operation day according to the Enhanced Scheme. There will also be immediate cover of 300 mm thick soil on the special trench for special wastes. Moreover, according to the approved WENTX EIA and the WENTX EP, the deodourisers for the new leachate treatment plants for WENTX will be designed with odour removal efficiency of at least 99% to minimize the odour emission. All these would help further reduce the odour emission.
- 2.1.4 As per condition 2.7 of EP-393/2010/A and FEP-01/393/2010/A, a Contingency Plans on Non-compliance with Odour Criteria is required to be submitted to the DEP at least 1 month before the commencement of construction of the Project. The contingency plan shall include actions of relevant parties and mitigation measures to be taken for any possible exceedances of the Action and Limit Levels of odour impact as stipulated in the EM&A Manual, such as reducing the number of tipping areas, moving tipping areas further away from concerned sensitive receivers and increasing the thickness of covering soil. Before submission to the Director, the contingency plan shall be certified by the ET Leader and verified by the IEC as conforming the information and recommendations contained in the approved EIA report (Register No. AEIAR-147/2009).

2.2 ODOUR SOURCE

- 2.2.1 Same as the Original Scheme, the major odour emission sources during the operation, restoration and aftercare stages of the Project are the active waste tipping faces and the leachate treatment facilities.

2.3 ODOUR PATROL

- 2.3.1 The EM&A programme as specified in the updated EM&A Manual shall be implemented to detect any odour and rectify the situation in a timely manner. Once the WENTX starts receiving domestic waste, odour patrol performed by independent trained personnel / competent persons will be patrolling and sniffing around the boundary of WENTX and ASRs. The perceived odour intensity level by the independent trained personnel / competent persons will to be divided into 5 levels which are ranked in the descending order as follows:

Table 2-1 Odour Intensity Level

Class	Odour Intensity Level	Description
0	Not Detected	No odour perceived or an odour so weak that it cannot be easily characterised or described

Class	Odour Intensity Level	Description
1	Slight	Identified odour, slight
2	Moderate	Identified odour, moderate
3	Strong	Identified odour, strong
4	Extreme	Severe odour

2.4 ODOUR PATROL LOCATIONS

- 2.4.1 The odour patrol locations were recommended in the updated EM&A Manual. During VEP, two proposed odour patrol locations at the Project boundary need to be adjusted, and additional odour patrol location at Tsang Tsui Columbarium was recommended. The status and locations of ASRs may change after issuing this manual. If such cases exist, the ET Leader shall propose updated monitoring locations and seek approval from Service Manager (SM) and IEC and agreement from EPD on the proposal.
- 2.4.2 For AM(O)4 - Black Point Power Station (Office and Control Room), the corresponding team of Black Point Power Station replied that due to the safety and security reason, they rejected to provide access for monitoring activities in their premise. Therefore, the proposed updated location AM(O)4a would be at the entrance of premises, which close to the site boundary and feasible for monitoring.
- 2.4.3 During the recent site visit on AM(O)10 - Tsang Tsui Columbarium - Garden of Remembrance, it is considered this monitoring location not suitable due to the burner emission from the Columbarium. The propose updated monitoring location would be at the entrance of Tsang Tsui Columbarium, which is closer to the site boundary of WENTX landfill.
- 2.4.4 The odour monitoring locations are summarized in **Table 2-2** and are illustrated in **Appendix B**.

Table 2-2 Odour Monitoring Locations

Station ID	ASR ID	Location	Monitoring Parameter
AM(O)1	A1-1	Ha Pak Nai	Odour Intensity Level
AM(O)2	A1-2	Ha Pak Nai	
AM(O)3	A1-3	Ha Pak Nai	
AM(O)4a	A2-1	Entrance of Black Point Power Station	
AM(O)5	A4-1	Lung Kwu Sheung Tan	
AM(O)6	-	Project Boundary	
AM(O)7	-		
AM(O)8	-		
AM(O)9	-		
AM(O)10a	A5-2	Entrance of Tsang Tsui Columbarium	

2.5 EVENT AND ACTION

- 2.5.1 **Table 2-3** shows the Action and Limit levels to be used, and the patrol frequency are listed in **Table 2-4**. Should non-compliance of the air quality criteria occur, the ET, the IEC and the Contractor shall undertake the relevant action in accordance with the Action Plan in **Table 2-5**.

Table 2-3 Action and Limit Levels for Odour Nuisance

Parameters	Action	Limit
Odour Nuisance	• When two documented	• Five or more consecutive

(from odour patrol)	complaints are received within a week; or	genuine documented complaints within a week; or
	<ul style="list-style-type: none"> Odour Intensity Level of 2 is perceived from odour patrol. 	<ul style="list-style-type: none"> Odour Intensity Level of 3 or above is perceived from odour patrol.

Table 2-4 Odour Patrol Frequency

Phase	Patrol Locations	Patrol Frequency	Parameters
Operation / Restoration	Patrol along Extension Site Boundary and ASRs	Daily, three times a day in the morning, afternoon and evening / night (between 1800 and 2300) conducted by the ET and the IEC. Three times per week on different days conducted by an independent third party together with the ET and IEC ^[1] .	Odour Intensity Level (see Table 2-1)
Aftercare	Patrol along Extension Site Boundary and ASRs	Weekly odour patrol.	Odour Intensity Level (see Table 2-1)

[1] Patrol shall be scheduled so that they are carried out together with one of the daily patrols to be carried out jointly by the ET and the IEC.

2.5.2 If exceedances of the Action and Limit Levels of odour impact in period of WENTX operation, the protocol in the contingency plan set out should be followed in the following sub-sections.

2.6 CONTINGENCY PLAN OF ODOUR NON-COMPLIANCE OF MEASURES

2.6.1 When exceedance Action and Limit of the trigger levels, recommended contingency measures to be implemented, where necessary are presented in **Table 2-5**.

Table 2-5 Event/Action Plan for Odour Nuisance

Event	ET	IEC	SM	Contractor
Action Level	<ul style="list-style-type: none"> Identify source / reason of nuisance Inform IEC, SM and Contractor If nuisance stops or external source has been identified, resume monitoring to routine mode Recommend precautionary measures 	<ul style="list-style-type: none"> Review submissions and reports from ET 	<ul style="list-style-type: none"> Notify Contractor Ensure implementation of precautionary measures 	<ul style="list-style-type: none"> Rectify any unacceptable practice Review the operation of odour enhancement facilities at leachate treatment plants Amend working methods if appropriate Carry out precautionary measures
Limit Level	<ul style="list-style-type: none"> Identify source / reason of nuisance Inform IEC, SM and the Contractor the causes and actions taken for the nuisance Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SM informed of the 	<ul style="list-style-type: none"> Discuss amongst SM, ET Leader and Contractor on the potential remedial actions. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise SM accordingly Supervise the implementation of remedial 	<ul style="list-style-type: none"> Confirm receipt of notification of exceedance in writing Notify Contractor Require Contractor to propose remedial measures for the analysed odour nuisance Ensure remedial measures are properly implemented If nuisance continues, instruct Contractor to stop that activity of work suspected to be the origin of the 	<ul style="list-style-type: none"> Take immediate action to avoid further nuisance Submit proposals for remedial actions to IEC within 3 working days of notification Proposals include reducing the number of tipping areas, moving tipping areas further away from concerned sensitive receivers and increasing the thickness of covering soil

Event	ET	IEC	SM	Contractor
	results • If nuisance stops or external source has been identified, resume monitoring to routine mode	measures	nuisance source until the nuisance is abated	• Implement the agreed proposals • Resubmit proposals if problem still not under control

Notes:

ET – Environmental Team

IEC – Independent Environmental Checker

SM – Service Manager

2.7 MITIGATION MEASURES

Odour from Leachate Treatment Facilities

2.7.1 For the proposed leachate treatment plant in WENT Landfill Extension, the overall leachate treatment facilities include:

- Adopted updated treatment method such as Sequencing Batch Reactor for future leachate treatment. Provision of ventilated cover for the leachate storage tanks and emissions extracted to suitable odour removal filters with odour removal efficiency of 99%.
- Ferric nitrate or sodium hypochlorite can be added to oxidise the odourous chemical in the leachate. The pH value of leachate can be controlled to a suitable value from future on-site experiment such that the generation of any odourous H₂S and ammonia can be optimised.
- The locations of discharge points and discharge heights should be in accordance with the assumptions adopted in the EIA Report. If the future locations / heights of the stacks deviate from the assumptions adopted in the EIA Study, reassessment of the air quality impact should be conducted.
- The overall arrangement should be investigated in details by the Contractor and agreed with IEC and EPD. As such, the odour emission from the future leachate treatment facilities will be insignificant.

Odour from Waste Transfer and Tipping Activities

During Operation / Restoration Phases

- Planting rows of trees along the northern side of WENT Landfill Extension (i.e. slope toe) and along Nim Wan Road.
- Providing a vehicle washing facility before the exit of the landfill and providing sufficient signage to remind RCV drivers to pass through the facility before leaving the landfill.
- Reminding the RCV drivers to empty the liquor collection sump and close the valve before leaving the tipping face.
- Washing down the area where spillage of RCV liquor is discovered promptly.
- Reminding operators to properly maintain their RCVs properly and that liquor does not leak from the vehicles.
- Installation of vertical and/or horizontal LFG extraction system to enhance extraction of LFG from the waste mass and hence minimise odour associated with fugitive LFG emissions.
- Progressive / temporary restoration of the areas which reach the finished profile (a final capping system including an impermeable liner will be put in place) and installation of a permanent LFG extraction system.
- Daily cover the compacted waste with 150mm of soil.

- Covering the non-active phase with 300mm to 600mm of soil / an impermeable liner (on top of the intermediate cover), which will not only prevent odour emissions from landfilled waste but also enhance LFG extraction by the LFG extraction system.
- Providing deodoriser for the LTP.
- Enclosing all the leachate storage and treatment tanks and diverting the exhaust air from these tanks to a deodoriser to avoid potential odour emissions from the LTP.
- As an improvement measure to enhance to environmental standard for waste transfer, EPD could take the initiative to recommend others to use enclosed type RCVs (dominantly government vehicles and sludge vehicles).
- Cleaning / watering of the surface and clearing of the waste water receptor of government RCV is recommended before leaving refuse transfer station or government Refuse Collection Point (FEHD).
- The trench for special waste shall be covered with soil immediately upon the disposal of special waste to reduce the odour emission.
- For Waste requiring co-disposal (e.g., special waste) by trench, the open trench shall be covered with a mobile de-odouriser cover when the trench is not in use for waste disposal, including the time interval between two consecutive disposal operations.
- The use of alternative daily cover (less permeable layer) instead of inert material should be considered under worst-case weather condition, subject to EM&A Programme.
- The use of immediate daily cover for odorous waste such as animal waste etc. under critical condition should also be considered, subject to EM&A Programme.
- In accordance with some reference from New Zealand, odour from active tipping area can be much reduced if the waste is covered by sandwich covering material such that it is confined in a solid/semi solid condition. Such covering material will be acted as sandwich protective layers to block the interaction of waste. Only diffusion mode (small scale) will be present. These would be applied during very hot and stable weather condition. Twice daily covering (mid day and close of business) can be arranged in case odour patrol identify potential odour nuisance, subject to EM&A Programme.
- Posi-shell and/or other suitable materials will be applied to cover the active tipping face at the end of each operation day according to the Enhanced Scheme.
- There will also be immediate cover of 300 mm thick soil on the special trench for special wastes.
- Continue to maintain the integrity of the capping system.
- Provision of vertical and/or horizontal LFG extraction system to enhance extraction of LFG from the waste mass and hence minimise odour associated with fugitive LFG emissions.
- Enclosing all the leachate storage and treatment tanks and diverting the exhaust air from these tanks to a deodoriser to avoid potential odour emissions from the LTP.

During Aftercare Phase

- Continue to maintain the integrity of the capping system.
- Provision of vertical and/or horizontal LFG extraction system to enhance extraction of LFG from the waste mass and hence minimise odour associated with fugitive LFG emissions.
- Enclosing all the leachate storage and treatment tanks and diverting the exhaust air from these tanks to a deodoriser to avoid potential odour emissions from the LTP.

2.7.2 The environmental mitigation implementation schedule is shown in *Appendix C*.

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 CONCLUSIONS

- 3.1.1 The WENT Landfill Extension is classified as a Designated Project under Schedule 2, Part I of the Environmental Impact Assessment Ordinance (Cap. 499). The EIA Report (AEIAR-147/2009) of WENTX was approved in November 2009 and the respective EP (EP-393/2010) was granted in June 2010. Due to the boundary of WENTX reduced under the Enhanced Scheme and the waste filling area and landfill capacity updated, Variation of EP (application number VEP-617/2022) was applied by the project proponent and EP-393/2010/A was issued by EPD on 29 July 2022 subsequently.
- 3.1.2 In August 2023, HKRRP” was awarded the Project and further Environmental Permit (FEP-01/393/2010/A) was granted by HKRRP from EPD on 6 October 2023. In addition, Ove Arup & Partners Hong Kong Ltd will be the Service Manager of the Project and they will perform the same role / same as the Independent Consultant as recommended in the EIA report.
- 3.1.3 The Contingency Plans on Non-compliance with Odour Criteria include the actions of relevant parties and mitigation measures to be taken for any possible exceedances of the Action and Limit Levels of odour impact as stipulated in the EM&A Manual, such as reducing the number of tipping areas, moving tipping areas further away from concerned sensitive receivers and increasing the thickness of covering soil.

3.2 RECOMMENDATIONS

- 3.2.1 This Contingency Plans on Non-compliance with Odour Criteria is subject to be updated before implementation of the operation phase.

Appendix A

Layout Plan of the Project



- LEGEND**
- WENT LANDFILL EXTENSION (WENTX) BOUNDARY
 - WENTX WASTE BOUNDARY
 - LANDFILL INFRASTRUCTURE FOR WENTX
 - WENT LANDFILL BOUNDARY
 - TREE PLANTING BUFFER

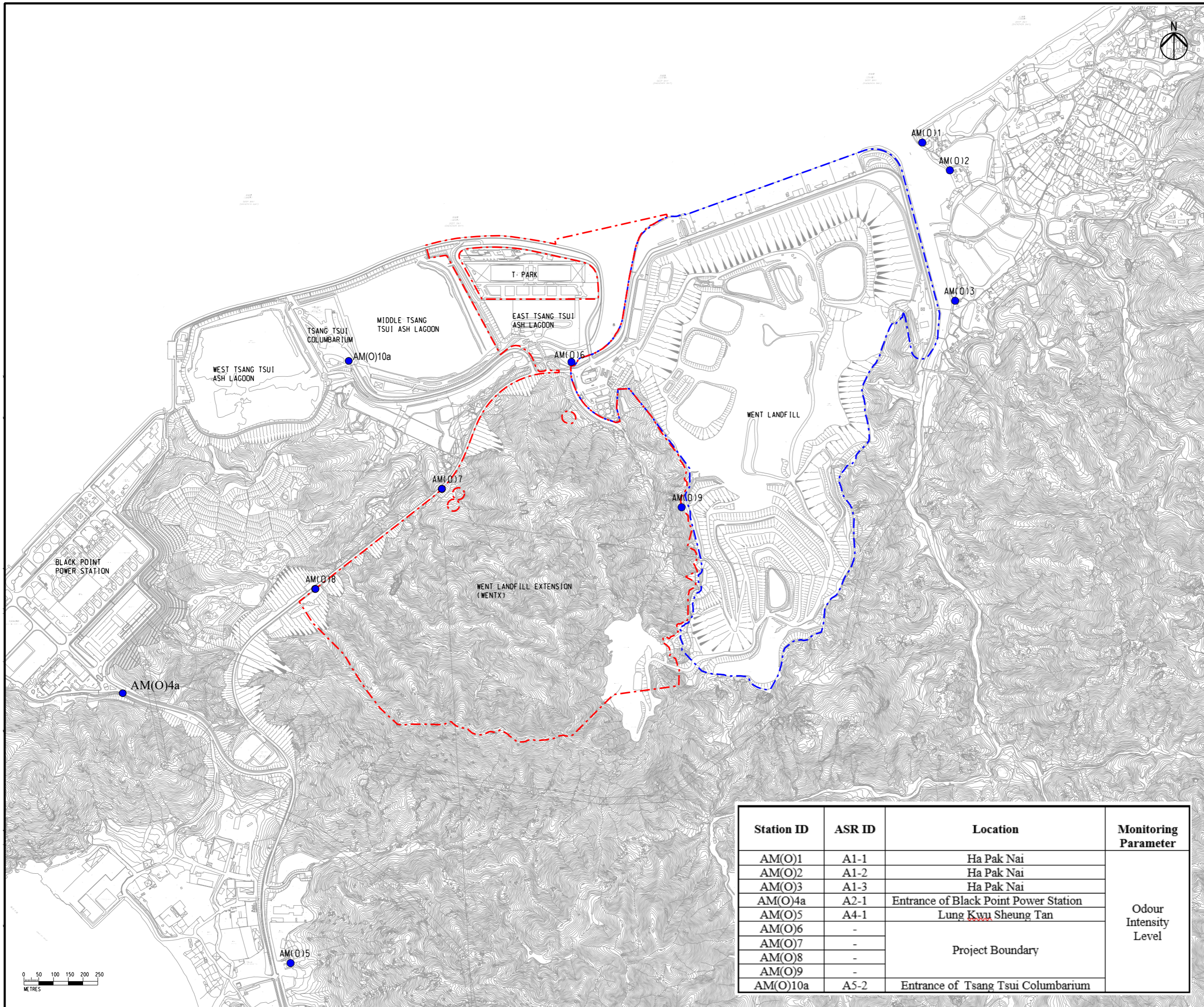
Project title
**Contract No. EP/
 SP/186/21
 West New Territories
 Landfill Extension**

Drawing title
**GENERAL PLAN
 OF ENHANCED SCHEME**

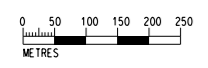


Appendix B

Odour Patrol Locations



- LEGEND**
- WENT LANDFILL EXTENSION (WENTX) BOUNDARY
 - WENT LANDFILL BOUNDARY
 - ODOUR PATROL LOCATIONS



Project title
 Contract No. EP/SP/186/21
 West New Territories
 Landfill Extension

Drawing title
 LOCATIONS OF
 ODOUR PATROL

Station ID	ASR ID	Location	Monitoring Parameter
AM(O)1	A1-1	Ha Pak Nai	Odour Intensity Level
AM(O)2	A1-2	Ha Pak Nai	
AM(O)3	A1-3	Ha Pak Nai	
AM(O)4a	A2-1	Entrance of Black Point Power Station	
AM(O)5	A4-1	Lung Kwu Sheung Tan	
AM(O)6	-	Project Boundary	
AM(O)7	-		
AM(O)8	-		
AM(O)9	-		
AM(O)10a	A5-2	Entrance of Tsang Tsui Columbarium	

Appendix C

Environmental Mitigation Implementation Schedule

EIA Ref	EM&A Log Ref	Recommended Precautionary / Mitigation Measures (to be implemented when the trigger level is exceeded, where necessary)	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
S3.8.2	A2	<p>The following measures shall be exercised for stack discharge from Ammonia Stripping Plant (ASP), Flare and LFG Power Generator:</p> <ul style="list-style-type: none"> The maximum allowable discharge limit and pollutant removal efficiency for ASP, flare and LFG power generator should be specified in the design specification. Owing to the requirement for the installation of stack, the design requirement shall be submitted to IEC and SM for vetting by the Contractor. Subject to the subsequent EPD's requirement on chimney installation, regular stack monitoring of air pollutants, including NO_x, SO₂, RSP, NMOCs, vinyl chloride, and benzene shall be carried out at a quarterly interval (i.e. once every 3 months), and the operating conditions, including exhaust gas temperature and velocity shall be monitored continuously in order to demonstrate compliance during the operations. A monthly monitoring report should be prepared by ET and submitted to IEC and SM for approval. 	Minimize the release of harmful air pollutant to the atmosphere	Contractor	Flare, ASP and LFG Power Generator of WENT Landfill Extension	Design, Operation and Restoration phases	<ul style="list-style-type: none"> TM-EIA, Annex 4
S3.8.2	3A	<p>The following measures shall be exercised for the VOC surface emission:</p> <ul style="list-style-type: none"> The arrangement of the landfill gas collection system and surface covering material for inactive tipping area shall be reviewed by Contractor every 5 years to identify any modern technology/arrangement (covering material, LFG well spacing and locations). A working team shall be formulated to review all processes, control practice and extraction system in order to maximize the efficiency of the system. A review report should be prepared by the Contractor for the submission to SM and IEC on the implementation/arrangement of LFG extraction system. The first review report should be 	Minimize the release of harmful VOC to the environment	Contractor	Active, Inactive and Restored Tipping areas	Design, Before commencement of Operation, Operation and Restoration phases	<ul style="list-style-type: none"> TM-EIA, Annex 4

EIA Ref	EM&A Log Ref	Recommended Precautionary / Mitigation Measures (to be implemented when the trigger level is exceeded, where necessary)	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
		<p>submitted to SM and IEC for agreement before commencement. With a good system to collect LFG (high extraction efficiency), surface release of VOC to the nearby environment can be much reduced or utilised.</p> <ul style="list-style-type: none"> • Maintain a slightly negative pressure within the entire tipping area (by suction). Minimise any potential leakage of LFG to the surrounding by increase the number of gas-extraction wells. Improve the extraction efficiency by checking/reinstate gas wells with abnormally low extraction rate due to blockage/soil movement or sedimentation. • Increase the coverage of inactive tipping phases with HDPE/plastic sheet which can enhance the anaerobic decomposition (reduce air getting in and VOC leaking out). • EM&A will be conducted at ASR to establish the future VOC ambient level. This monitoring work should be carried out in a frequency once every 3 months. By comparing the monitoring data at the boundary and at ASR, the cause of VOC and the general downwind dispersion effect (dilution effect) from the boundary to the ASR can be identified. The findings of the monitoring should be incorporated into the landfill gas collection system review report as mentioned above. 					
S3.8.2	4A	<p>The following design options shall be considered in the future leachate treatment plants:</p> <ul style="list-style-type: none"> • Adopted updated treatment method such as Sequencing Batch Reactor for future leachate treatment. Provision of ventilated cover for the leachate storage lagoons / tanks and emissions extracted to suitable odour removal filters with odour removal efficiency of 99%. • Ferric nitrate or sodium hypochlorite can be added 	Environmental Enhancement to improve the air quality and visual impact to nearby sensitive receivers	Contractor	Leachate treatment plants	Design / Operation and Restoration phases	<ul style="list-style-type: none"> • Environmental Enhancement

EIA Ref	EM&A Log Ref	Recommended Precautionary / Mitigation Measures (to be implemented when the trigger level is exceeded, where necessary)	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?
		<p>to oxidise the odourous chemical in the leachate. The pH value of leachate can be controlled to a suitable value from future onsite experiment such that the generation of any odourous H₂S and ammonia can be optimised.</p> <ul style="list-style-type: none"> The locations of discharge points and discharge heights should be in accordance with the assumptions adopted in the EIA Report and VEP supporting document. If the future locations / heights of the stacks deviate from the assumptions adopted in the EIA Study and VEP supporting document, reassessment of the air quality impact should be conducted. The overall arrangement should be investigated in details by the Contractor and agreed with IEC and EPD. 					
S3.8.2	A5	<p>The following are some odour precautionary measures that shall be considered by EPD and FEHD:</p> <ul style="list-style-type: none"> As an improvement measure to enhance to environmental standard for waste transfer, EPD could take the initiative to recommend others to use enclosed type RCV in the long run (dominantly government and sludge types). Clearing / watering of the surface and clearing of the waste water receptor of government RCV is recommended before leaving refuse transfer station or government Refuse Collection Point (FEHD). 	Environmental Enhancement to improve the odour impact during the transit of waste	EPD, FEHD	Government RCV from RTS and RCP	Operation phase	<ul style="list-style-type: none"> Environmental Initiative
S3.8.2	A6	<p>The Contract shall exercise adequate precautionary measures to minimize any potential odor nuisance from tipping activities:</p> <ul style="list-style-type: none"> Planting rows of trees along the northern side of WENT Landfill Extension (ie slope toe) and along Nim Wan Road. Providing a vehicle washing facility before the exit of the landfill and providing sufficient signage to 	Minimize the potential odour impact for tipping area to nearby sensitive receivers	Contractor	Tipping areas	Operation and Restoration phases	<ul style="list-style-type: none"> TM-EIA, Annex 4 Odour patrol with 2 Odour Intensity Level or below at ASR without causing potential odour nuisance

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		<p>remind Refuse Collection Vehicles (RCV) drivers to pass through the facility before leaving the landfill.</p> <ul style="list-style-type: none"> • Reminding the RCV drivers to empty the liquor collection sump and close the valve before leaving the tipping face. • Washing down the area where spillage of RCV liquor is discovered promptly. <ul style="list-style-type: none"> • Reminding operators to properly maintain their RCVs properly and that liquor does not leak from the vehicles. • Installation of vertical and/or horizontal LFG extraction system to enhance extraction of LFG from the waste mass and hence minimise odour associated with fugitive LFG emissions. • Progressive / temporary restoration of the areas which reach the finished profile (a final capping system including an impermeable liner will be put in place) and installation of a permanent LFG extraction system. • Daily cover the compacted waste with 150mm of soil. • Covering the non-active phase with 300mm to 600mm of soil / an impermeable liner (on top of the intermediate cover), which will not only prevent odour emissions from landfilled waste but also enhance LFG extraction by the LFG extraction system. • Providing deodoriser for the LTP. • Enclosing all the leachate storage and treatment tanks and diverting the exhaust air from these tanks to a deodoriser to avoid potential odour emissions from the LTP. • As an improvement measure to enhance to environmental standard for waste transfer, EPD could take the initiative to recommend others to use 					

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		<p>enclosed type RCVs (dominantly government vehicles and sludge vehicles).</p> <ul style="list-style-type: none"> • Cleaning / watering of the surface and clearing of the waste water receptor of government RCV is recommended before leaving refuse transfer station or government Refuse Collection Point (FEHD). • The trench for special waste shall be covered with soil immediately upon the disposal of special waste to reduce the odour emission. • For Waste requiring co-disposal (e.g., special waste) by trench, the open trench shall be covered with a mobile de-odouriser cover when the trench is not in use for waste disposal, including the time interval between two consecutive disposal operations. • The use of alternative daily cover (less permeable layer) instead of inert material should be considered under worst-case weather condition, subject to EM&A Programme. • The use of immediate daily cover for odorous waste such as animal waste etc. under critical condition should also be considered, subject to EM&A Programme. • In accordance with some reference from New Zealand, odour from active tipping area can be much reduced if the waste is covered by sandwich covering material such that it is confined in a solid/semi solid condition. Such covering material will be acted as sandwich protective layers to block the interaction of waste. Only diffusion mode (small scale) will be present. These would be applied during very hot and stable weather condition. Twice daily covering (mid day and close of business) can be arranged in case odour patrol identify potential odour nuisance, subject to EM&A Programme. 					

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		<ul style="list-style-type: none"> • Posi-shell and/or other suitable materials will be applied to cover the active tipping face at the end of each operation day according to the Enhanced Scheme. • There will also be immediate cover of 300 mm thick soil on the special trench for special wastes. 					

Notes:
 Entire WENT Landfill Extension site includes Office, Waste Reception Area, Leachate Treatment Works, LFG Treatment Works, Active, Inactive and Restored Tipping Areas.