

3 Air Quality Impact

3.1 Introduction

3.1.1.1 This section presents the assessment on potential air quality impacts arising from construction and operation of the Project, which has been conducted in accordance with the criteria and guidelines as stated in Section 1 of Annex 4 and Annex 12 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) as well as the requirements given in the EIA Study Brief (No. ESB-321/2019).

3.2 Environmental Legislation, Standards and Guidelines

3.2.1.1 The criteria for evaluating air quality impacts and the guidelines for air quality assessment are laid out in Annex 4 and Annex 12 of the TM-EIAO.

3.2.2 Air Quality Objectives

3.2.2.1 The principal legislation for the management of air quality in Hong Kong is the Air Pollution Control Ordinance (APCO) (Cap. 311). The Air Quality Objectives (AQOs) given under the APCO stipulate the statutory ambient limits for air pollutants and the maximum allowable number of exceedances over specific averaging periods. The latest AQOs, which has been in effect from 1 January 2022, are presented in **Table 3.1**.

Table 3.1 Hong Kong Air Quality Objectives

Pollutants	Averaging Time	Concentration Limit ($\mu\text{g}/\text{m}^3$)	Number of Exceedance Allowed per Year
Sulphur Dioxide (SO_2) ^[1]	10-min	500	3
	24-hour	50	3
Respirable Suspended Particulates (RSP or PM10) ^[2]	24-hour	100	9
	Annual	50	N/A
Fine Suspended Particulates (FSP or PM2.5) ^[3]	24-hour	50	18 ^[4]
	Annual	25	N/A
Nitrogen Dioxide (NO_2) ^[1]	1-hour	200	18
	Annual	40	N/A
Ozone (O_3) ^[1]	8-hour	160	9
Carbon Monoxide (CO) ^[1]	1-hour	30,000	0
	8-hour	10,000	0
Lead (Pb)	Annual	0.5	NA

Note:

[1] Measured at 293K and 101.325 kPa.

[2] Suspended particles in air with a nominal aerodynamic diameter of 10 μm or less

[3] Suspended particles in air with a nominal aerodynamic diameter of 2.5 μm or less

[4] The number of exceedances allowed per year for 24-hour averaged FSP should be 18 days per calendar year for government projects

3.2.3 Technical Memorandum on EIA Process

3.2.3.1 A maximum hourly Total Suspended Particles (TSP) level of 500 $\mu\text{g m}^{-3}$ at Air Sensitive Receivers (ASRs) is also stipulated in Section 1, Annex 4 of the EIAO-TM to assess potential construction dust impacts. The measures stipulated in the Air Pollution Control (Construction Dust) Regulation should also be followed whenever possible to ensure that

any dust impacts are reduced.

3.2.3.2 Annex 4 of the EIAO-TM has also stipulated that the odour level at an ASR should not exceed 5 odour units based on an averaging time of 5 seconds for odour prediction assessment.

3.2.1 Air Quality Standards for Non-AQO Criteria Pollutants

3.2.2 Aside from the AQO criteria pollutants mentioned in Section 3.2.2, Volatile Organic Compounds (VOCs), Hydrogen Chloride (HCl) and Hydrogen Fluoride (HF) would also be emitted from the combustion of biogas at the proposed biogas engine and boilers. In accordance with Annex 4 of EIAO-TM, for air pollutants with no established criteria under the Air Pollution Control Ordinance nor in the EIAO-TM, standards or criteria adopted by recognized international organizations shall be met. The air quality standards for these pollutants are detailed in **Table 3.2**.

Table 3.2 Air Quality Standards for Non-AQO Criteria Pollutants

Pollutants	Averaging Time	Air Quality Standard ($\mu\text{g}/\text{m}^3$)	Reference
Methane (CH_4)	15-minute	600,000	TEEL-1 (the threshold concentration below which most people will experience no adverse health effects) from https://edms3.energy.gov/pac/Docs/Revision_26_Table4.pdf
Hydrogen Chloride (HCl)	1-hour	2100	https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary
	Annual	20	Integrated Risk Information System, USEPA
Hydrogen Fluoride (HF)	1-hour	240	https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary
	Annual	14	https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary
Formaldehyde (CH_2O)	30-min	100	World Health Organization Air Quality Guidelines for Europe (https://www.euro.who.int/_data/assets/pdf_file/0005/74732/E71922.pdf)
	Annual	9	Office of Environmental Health Hazard Assessment (OEHHA) Toxicity Criteria Database, California, USA (http://www.oehha.ca.gov/tcdb/index.asp).

3.2.3 Air Pollution Control (Construction Dust) Regulation

3.2.3.1 Notifiable and regulatory works are under the control of Air Pollution Control (Construction Dust) Regulation. This Project is expected to include notifiable works (foundation and superstructure construction and demolition) and regulatory works (dusty material handling and excavation). Contractors are required to inform Environmental Protection Department (EPD) and adopt dust reduction measures to minimize dust emission, while carrying out construction works, to the acceptable level.

3.2.4 Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation

3.2.4.1 Under the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation, only approved or exempted non-road mobile machineries with a proper label are allowed to be used in the construction site. The contractors are required to ensure the adopted non-road

mobile machinery under the Project could meet the prescribed emission standards and requirement.

3.2.5 **Air Pollution Control (Fuel Restriction) Regulation**

3.2.5.1 Under the Air Pollution Control (Fuel Restriction) Regulation, types of fuel allowed for use and the sulphur contents in commercial and industrial processes are controlled to reduce sulphur dioxide (SO₂) emissions. The contractors are required to use only fuels which are complied with the respective requirements such as gaseous fuel, conventional solid fuel with a sulphur content not exceeding 1% by weight, and liquid fuel with a sulphur content not exceeding 0.005% by weight and a viscosity not more than 6 centistokes at 40°C (i.e. Ultra Low Sulphur Diesel (ULSD)).

3.2.6 **Recommended Pollution Control Clauses for Construction Contracts**

3.2.6.1 The Recommended Pollution Control Clauses (RPCC) are a set of engineering practice to minimize the inconvenience and environmental nuisance to nearby residents and sensitive receivers. The contractors shall follow the requirements under RPCC, observe and comply with the Air Pollution Control Ordinance and its subsidiary regulations. Before the commencement of any work, the Engineer shall require the methods of working, plant, equipment and air pollution control system to be used on the site to be made available for inspection and approval to ensure that they are suitable for the project.

3.2.7 **DEVB's TC No.13/2020, Timely Application of Temporary Electricity and Water Supply for Public Works Contracts and Wider Use of Electric Vehicles in Public Works Contracts**

3.2.7.1 The timely application of temporary electricity and water supply as well as the wider use of electric vehicles (EVs) in public works contracts are under this Circular. Timely provision of electricity and adoption of EVs could be able to improve roadside air quality and reduce carbon emissions, while timely provision of water supply could not only improve personal hygiene but also reduce pollution. Project team should timely apply for the temporary electricity and water supply with a target that the necessary cable/water mains laying works could be completed before the commencement date, and also specify the use of EVs in each public works contract in accordance with the minimum number as required under this Circular.

3.2.8 **DEVB's TC No.1/2015, Emissions Control of NRMM in Capital Works Contracts of Public Works**

3.2.8.1 In addition to the statutory requirements of the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation, this Circular promulgates the requirements for the use of non-road mobile machinery ("NRMM") approved under the regulation in new capital work contracts of public works including design and build contracts. No exempted NRMM for four types of NRMM, namely generators, air compressors, excavators and crawler cranes, are allowed in new capital works contracts of public works from 1 June 2019 onwards.

3.3 **Study Area**

3.3.1.1 Clause 3.4.4.2 of the EIA Study Brief prescribes the Study Area which is generally defined by a distance of 500 m from boundary of the Project, or to include other project locations as identified in the EIA. **Figures 3.1** shows the Study Area within the 500 m envelope of the Project (including the works areas) and the identified representative ASRs which have been described in the next section in details. The Study Area is the same for both the construction and operational phases.

3.4 Identification of Air Sensitive Receivers

3.4.1.1 Air Sensitive Receivers (ASRs) have been identified in accordance with Annex 12 of EIAO-TM and are summarised in **Table 3.3** and shown in **Figure 3.1**.

Table 3.3 Identified Representative Air Sensitive Receivers

ID	Name	Nature	No. of Storeys	Assessment Height (mAG)	Separation Distance from the Nearest Site Boundary (m)
ASR 1	Watson's Water	Industrial	5	1.5, 5, 10, 15 and 20	39
ASR 2	Hong Kong Yakult	Industrial	3	1.5, 5 and 10	44
ASR 3	Maxim's Food Factory 2	Industrial	5	1.5, 5, 10, 15 and 20	40
ASR 4	PC3 Product Customization and Consolidation Centre	Industrial	8	1.5, 5, 10, 15, 20, 25, 30 and 35	53
ASR 5	Oriental Press Group Limited	Industrial	14	1.5, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 and 65	133
ASR 6	APT Telecom Services Ltd	Industrial	5	1.5, 5, 10, 15 and 20	96
ASR 7	Cabot Plastics Hong Kong Limited	Industrial	3	1.5, 5 and 10	38
ASR 8	Winner Food Products Limited	Industrial	6	1.5, 5, 10, 15, 20 and 23	40
ASR 9	Tung Fong Hung	Industrial	3	1.5, 5 and 10	4
ASR 10	Arvcto Digital Services	Industrial	4	1.5, 5, 10 and 15	4
ASR 11	Process Automation Ltd.	Industrial	4	1.5, 5, 10 and 15	4
ASR 12	Zama Industries Co., Ltd.	Industrial	3	1.5, 5 and 10	36
ASR 13	Taclon Industrial Ltd.	Industrial	3	1.5, 5 and 10	25
ASR 14	Hung Hing Offset Printing Centre	Industrial	3	1.5, 5 and 10	8
ASR 15	Tai Po Waterfront Park Viewing Point	Recreational	-	1.5	240
ASR 16	Shuen Wan Golf Course ⁽¹⁾	Recreational	-	1.5	495
ASR 17	Shuen Wan Golf Course ⁽¹⁾	Recreational	-	1.5	531
ASR 18	Shuen Wan Golf Course ⁽¹⁾	Recreational	-	1.5	67
ASR 19	Shuen Wan Golf Course ⁽¹⁾	Recreational	-	1.5	56

Note (1) Shuen Wan Golf Course (SWGC) is a proposed project, which will be operated by end 2023 prior to the construction of this Project. ASR 16 and ASR 17 are representative receiver points with reference to the information provided in the approved EIA for SWGC (EIAO Register No.: AEIAR-221/2019).

3.5 Existing Air Quality

3.5.1.1 The Project is to upgrade the existing Tai Po Sewage Treatment Works (TPSTW). The existing TPSTW is situated at Dai Kwai Street, Tai Po Industrial Estate (TPIE).

3.5.1.2 Existing air quality in the Study Area is affected by emissions from the chimneys in TPIE and existing traffic from local roads, as well as odour emission from exposed area of some sewage treatment facilities in existing TPSTW.

3.5.1.3 Data collected by EPD air quality monitoring programme during the period of 2016 to 2020 were examined with the average period value presented in **Table 3.4**.

Table 3.4 5-year Averaged Annual Background Concentration of Air Pollutants recorded at Tai Po Station by EPD for the Period of 2016-2020

Pollutant	Parameter	Concentrations ($\mu\text{g}/\text{m}^3$)						AQOs ($\mu\text{g}/\text{m}^3$) ^[2]
		2016	2017	2018	2019	2020	5-year mean	
SO ₂	4 th highest 10-minute	37	39	24	20	19	28	500 (3)
	4 th highest 24-hour	10	9	8	10	7	9	50 (3)
RSP	10 th highest 24-hour	74	82	69	65	58	70	100 (9)
	Annual	29	32	31	31	24	29	50
FSP	19 th highest 24-hour	43	46	38	41	33	40	50 (18)
	Annual	20	22	19	20	15	19	25
NO ₂	19 th highest 1-hour	112	127	125	142	106	122	200 (18)
	Annual	33	39	36	36	30	35	40
O ₃	10 th highest 8-hour	147	<u>181</u>	<u>167</u>	<u>197</u>	<u>165</u>	<u>171</u>	160 (9)
CO	Max. 1-hour	N/A	N/A	N/A	N/A	N/A	N/A	30,000
	Max. 8-hour	N/A	N/A	N/A	N/A	N/A	N/A	10,000

Notes:

[1] N/A - Not Available.

[2] Values in () indicate the number of exceedances allowed per year.

[3] Data extracted from EPD Website (<http://www.aqhi.gov.hk/en/download/air-quality-reportse469.html?showall=&start=1>)

[4] Bolded and underlined values represent exceedances of the AQOs.

3.5.1.4 All measured 19th highest 1-hour NO₂ levels from 2016 to 2020 complied with the AQO of 200 $\mu\text{g}/\text{m}^3$. All measured annual mean levels were within the AQO of 40 $\mu\text{g}/\text{m}^3$.

3.5.1.5 The 10th highest daily RSP levels from 2016 to 2020 complied with the AQO of 100 $\mu\text{g}/\text{m}^3$. The annual RSP levels were all within the AQO of 50 $\mu\text{g}/\text{m}^3$.

3.5.1.6 The 19th highest daily FSP levels had decreased from 43 $\mu\text{g}/\text{m}^3$ in 2016 to 33 $\mu\text{g}/\text{m}^3$ in 2020, as compared with the AQO of 50 $\mu\text{g}/\text{m}^3$. The annual FSP levels were all within the AQO of 25 $\mu\text{g}/\text{m}^3$.

3.5.1.7 All the measured 4th highest 10-minute and 4th highest 24-hour SO₂ levels were well within their respective AQOs of 500 $\mu\text{g}/\text{m}^3$ and 50 $\mu\text{g}/\text{m}^3$.

3.5.1.8 The highest 8-hour O₃ levels ranged from 197 to 147 $\mu\text{g}/\text{m}^3$. Ozone is a product of photochemical reactions of NO_x and volatile organic compounds (VOCs) instead of being emitted directly from human activities. In the presence of NO_x (a common roadside pollutant), ozone will be broken down into oxygen. Exceedances found from Year 2017 to

Year 2020 may be due to the regional O₃ background and low local vehicle emissions, which result in small ozone scavenging effect and generally high level.

3.5.1.9 The highest 1-hour and 8-hour CO levels were not measured at Tai Po Station.

3.5.1.10 The future year background concentrations are made reference to the EPD's PATH v2.1 modelling results. The dust (RSP and FSP) concentrations of the assessment year extracted from Year 2025 PATH results are presented in **Table 3.5**.

Table 3.5 Background Concentrations extracted from PATH v2.1 Model

Pollutant	Parameter	Concentrations in various PATH Grids (µg/m ³)				AQOs (µg/m ³) ^[1]
		41_48	41_49	42_48	42_49	
SO ₂	4 th highest 10-mins ^[2]	66	65	66	64	500 (3)
	4 th highest 24-hour	10	10	10	10	50 (3)
RSP	10 th highest 24-hour ^[3]	63	65	61	63	100 (9)
	Annual ^[4]	27	27	26	27	50
FSP	19 th highest 24-hour	34	36	32	36	50 (18)
	Annual ^[4]	15	15	14	15	25
NO ₂	19 th highest 1-hour	76	73	69	70	200 (18)
	Annual	14	12	11	11	40
O ₃	10 th highest 8-hour	<u>195</u>	<u>194</u>	<u>195</u>	<u>193</u>	160 (9)
CO	Max. 1-hour	820	820	803	802	30,000
	Max. 8-hour	754	754	745	745	10,000

Note:

[1] Values in () indicate number of exceedance allowed under the AQO.

[2] Values are given as highest 10-minute SO₂ concentrations, which are estimated based on EPD's "Guidelines on the Estimation of 10-minute Average SO₂ Concentration for Air Quality Assessment in Hong Kong".

[3] For 24-hr average PM₁₀, the concentration is adjusted by adding 11.0 µg/m³, extracted from EPD's Guidelines on Choice of Models and Model Parameters.

[4] For annual average PM₁₀ and PM_{2.5} the concentration is adjusted by adding 10.3 µg/m³ and 3.5 µg/m³, extracted from EPD's Guidelines on Choice of Models and Model Parameters.

[5] Bolded and underlined values represent exceedances of the AQOs

3.5.1.11 The background concentrations of non-AQO air pollutants assumed in this assessment are presented in **Table 3.6**.

Table 3.6 Background Concentrations of Non-AQO Air Pollutants

Non-AQO Air Pollutants	HCl	HF	CH ₂ O	CH ₄
Background Conc. (µg/m ³)	N/A	N/A	3.86 ^[1]	N/A

Note:

[1] Reference to EPD's Air Quality in Hong Kong 2020 Report (EPD/TR 1/21).

[2] N/A: Not Available.

3.5.1.12 Odour surveys were conducted within TPSTW and areas near the TPSTW to determine the odour emission rate of different facilities within TPSTW and review the background odour intensity of ambient air in the vicinity of the TPSTW in Sep-Nov 2020 and Jul-Aug 2021. Based on the odour survey result, relatively high odour concentration was observed at various locations. The TPSTW has undergone odour improvement works including coverage of primary sedimentation tanks and the equipment modification / replacement works of the aeration tanks of the East Plant, as well as other reparation works. The plant is not operating at design operating condition. Therefore, emission rate for primary sedimentation tanks and aeration tanks were considered not representative to be used to conduct assessment. The final sedimentation tanks were located at the downstream of the concerned primary

sedimentation and aeration tanks and therefore the emission rates measured at the final sedimentation tanks were also considered not representative to be used. Reference as stated in **Section 3.8.1.2** were used for deriving the odour emission rates at the abovementioned locations. The detail of the odour surveys is presented in **Appendix 3.7**.

3.6 Identification of Pollution Sources

3.6.1 Construction Phase

3.6.1.1 Construction of the Project will be undertaken by stages. The New West Plant will be constructed in the expansion site first. Demolition of the existing West Plant and the upgrading works within the existing TPSTW will commence after commissioning of the New West Plant in the expansion site. The construction period of the New West Plant will be starting from 2025 and ended in 2029. The demolition and construction works within the existing TPSTW will be starting from 2029 and completed by 2036. The key air pollution sources in association with the Project during construction phase would be the dust emission (TSP, RSP and FSP) from the construction activities of the Project. The dusty construction activities include:

- Site clearance and site formation
- Demolition works
- Excavation for site formation work
- Wind erosion of construction site

3.6.1.2 Heavy construction activities such as demolition, excavation and wind erosion of exposed site area would contribute to construction dust. The locations of construction workforce for construction phases are presented in **Appendix 3.1**. The construction period is conservatively assumed to be 7 days per week and 10 operation hours per day from 08:00 to 18:00. Wind erosion is assumed for non-operation hours from 18:00 to 08:00 of the follow day.

3.6.1.3 Construction vehicles, estimated to be at most about 5 round trips per hour, will generally make use of Dai Kwai Street to access the Project Site. Dust emissions from these vehicles will generally be limited within the worksites and have already been taken into account in the derivation for heavy construction activities. Watering facilities will be provided at all vehicular egress. All construction vehicles will be thoroughly washed and those loaded with dusty materials will be covered by clean impervious sheets prior to leaving the construction site. Hence, the dust nuisance from construction vehicles outside the construction site is unlikely to be significant.

3.6.1.4 The requirements as stipulated in the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation will be followed to control potential emissions from non-road mobile machinery. Therefore, gaseous emission (NO_x, SO₂ and CO) from diesel-fueled construction equipment would be minor and would not cause any adverse air quality impact.

3.6.1.5 Based on current available information, the construction of Shuen Wan Golf Course (at the existing Shuen Wan Restored Landfill) will be finished by 2023. The proposed Organic Waste Pre-treatment Centre (New Territories East) (OWPC) involves the re-development of the existing Shuen Wan Landfill Leachate Pre-treatment Works and the existing pilot-scale Food Waste Pre-treatment Facilities is located to the immediate north of the existing TPSTW. Since the construction of OWPC will be commenced by 2025 and completed by 2029, it will be included in the cumulative quantitative construction dust impact assessment of the construction works of the New West Plant and upgrading works of the West Plant.

3.6.1.6 The Proposed Upgrading of Tolo Harbour Effluent Export Scheme (THEES) expansion is partly located within the TPSTW. It has been included in the cumulative quantitative

construction dust impact assessment. The key component of the THEES upgrading works (i.e. Upgrading of Tai Po Effluent Pumping Station) has been incorporated into the Project layout and located within the Project site (refers to Area 11 in **Figure 3.2**). Besides, there will be no other concurrent construction Projects within 500m assessment area during the construction of the Project. Therefore, no cumulative impact from other project is anticipated.

- 3.6.1.7 Apart from the construction dust emissions, cumulative air quality impact at the representative ASRs would also be expected due to the background pollutant concentrations, operation of the existing combined heat and power (CHP) generating system, vehicular emissions from existing open roads, vehicular emissions associated with the existing bus termini, heavy goods vehicle and coach parking sites and industrial emissions from Tai Po Industrial Estate (TPIE). The CHP generating system and industrial emissions from Tai Po Industrial Estate (TPIE) are shown in **Appendix 3.2**.
- 3.6.1.8 All the sewage treatment facilities including sedimentation tanks, aeration tanks and sludge tanks will be cleaned before demolition, odour emission is therefore not expected from the demolition works during construction phase.
- 3.6.1.9 Some of the buildings at the existing TPSTW have been built over 40 years. Asbestos containing materials (ACM) may be found in these old buildings. As the existing TPSTW is still in operation, asbestos survey on these buildings is not available at the time of this assessment. It is proposed that the asbestos investigations shall be conducted by registered asbestos consultants before the decommissioning of existing TPSTW. If any ACM is identified, the asbestos consultant shall formulate overall asbestos management and abatement strategies. The removal and disposal of the ACM shall be conducted by registered asbestos contractor following the Air Pollution Control (Asbestos) (Administration) Regulation.

3.6.2 Operational Phase

- 3.6.2.1 During the operation of the proposed sewage treatment works, odourous gases, biogas and ammonia will be generated. Odourous gases will be emitted from the sewage itself and produced during the breakdown of sewage during the treatment process. The major process equipment of the upgraded TPSTW and Co-digestion Facilities will be confined inside the substructure/superstructure, except for the final sedimentation tanks at the existing East Plant. The final sedimentation tanks at the existing East Plant would remain as open tanks and would not be enclosed during the Project operation as these tanks were not considered as major odour sources from the available survey data. Two stages de-odourization system (bio tricking filter and carbon adsorption) will be installed to treat the collected odourous gases. The overall odour removal efficiency would be not less than 99%. Odour releasing from the de-odourization system and exposed area of sewage would be the major odorous gases generated due to the operation of the upgraded TPSTW and Co-digestion Facilities. The proposed OWPC will be operated by 2029 and would contribute cumulative impact. The locations of the odour emission source is presented in **Appendix 3.8**.
- 3.6.2.2 Biogas would be produced during the anaerobic digestion of sludge. Nutrient like ammonium nitrogen would also be produced during the digestion and returned to the liquid stream in the filtrate/centrate from dewatering process of the digested sludge. This filtrate/centrate, which is known as sidestream, will be pre-treated before flow back to the biological treatment of the plant. Sidestream will be treated by using Anammox technology in order to remove the ammonium nitrogen content. Anammox is a biological process which convert ammonium nitrogen to nitrogen gas by oxidize partially to nitrite by Ammonium Oxidizing Bacteria and then further removed by Anammox bacteria. Ammonia gas (NH₃) may also be formed during the Anammox process and will be collected via the odour duct to the deodorization system for treatment before discharge to the atmosphere. Therefore emission of NH₃ would not be a concern. While for the biogas generated at the digester, it will be

treated at the gas treatment facility before utilize as an energy source by the CHP generation system that produce electricity and heat. The major pollutants of emissions from operation of CHP generating system will be NO₂, RSP, FSP and SO₂. Treatment process within the gas treatment facility will include H₂S removal by iron sponge, therefore, emission of SO₂ is considered very minimal. Nevertheless, SO₂, NO₂, RSP and FSP and were included in the quantitative assessment.

- 3.6.2.3 It is expected pre-treatment of the organic waste, to avoid food packaging films and plastics in the organic wastes, shall be performed before transferring to TPSTW for digestion. It is expected that the food waste and sludge are unlikely to contain chlorinated food wastes and the emission of HF and HCl from the process is expected to be negligible. Regarding volatile organic compounds (VOCs), methane (CH₄) and carbon monoxide(CO), which may be produced during incomplete combustion of biogas, the design of CHP will ensure proper mixing of the air and fuel, provide sufficient residence time and combustion temperature to prevent incomplete combustion. As a conservative approach, HCl, HF, VOCs (in terms of Formaldehyde CH₂O), CH₄ and CO emissions from the CHP generating system were also included in the quantitative assessment.
- 3.6.2.4 Flare system is also proposed for emergency use, only operate when all CHP systems were offline. The proposed design includes four 2MW CHP systems (3 duty and 1 standby) and three 600kW CHP systems (2 duty and 1 standby) to minimize the chances of emergency condition. Since it is used only during emergency situation and the chances is minimal, quantitative assessment is not included for the flare system.
- 3.6.2.5 Similar to the construction phase, the industrial emissions from TPIE and vehicular emission from the road traffic within the assessment area described in **Section 3.6.1.7** are considered in the cumulative air quality impact assessment.
- 3.6.2.6 Besides, dewatered sludge will be transferred to TPSTW by covered storage container to avoid odour leakage during transportation to minimise the potential odour nuisance. While food waste from OWPC will be transferred by enclosed pipes, no odour nuisance is expected during transportation of food waste from OWPC to TPSTW.

3.7 Assessment Methodology – Construction Phase

3.7.1 Construction Dust from the Project

- 3.7.1.1 Construction activities with significant particulate emission were identified from the engineering design of construction method. Construction dust impact was predicted based on emission factors from US Environmental Protection Agency (USEPA) Compilation of Air Pollution Emission Factors (AP-42), 5th edition and activity information from engineering design. The major dusty construction activities for the Project to be concerned and considered in the modelling assessment include site clearance, demolition of the existing TPSTW facilities, piling and construction for TPSTW facilities as heavy construction activities during working hours. Wind erosion of open heavy construction work site was considered during non-working hours
- 3.7.1.2 The Project will be developed in phases. The heavy construction work fronts for different part (i.e. New West Plant and upgrade of existing West Plant) are illustrated in **Appendix 3.1**. Each part will be constructed separately. Since the site is flat, extensive site formation works is not expected. 100% active works area was assumed in the screening test. A focused assessment is undertaken whereby the percentage of daily maximum active works areas, which is assumed to be 50% of each work front, for the Project of each part are positioned closest to the potentially worst affected ASRs. The scenarios are presented in **Table 3.7**.

Table 3.7 Construction Dust Assessment Scenarios

Scenario	Active Works Area % and Locations		
	Construction of New West Plant	Upgrade of Existing West Plant	OWPC
A	100%	0%	100%
B	0%	100%	100%
C1	50% (South)	0%	50% (West)
C2	50% (North)	0%	50% (West)
C3	50% (South)	0%	50% (East)
C4	50% (North)	0%	50% (East)
D1	0%	50% (South)	50% (West)
D2	0%	50% (North)	50% (West)
D3	0%	50% (South)	50% (East)
D4	0%	50% (North)	50% (East)

Notes:

[1] The locations of works area for each scenario can be referred to Appendix 3.1.

3.7.1.3 The emission factors for identified dust sources are summarized in **Table 3.8** below. The detailed calculation of dust emission rates is presented in **Appendix 3.1**.

Table 3.8 Emission Factor for Dusty Construction Activities

Activity	Emission Factor	Remarks
Heavy Construction Activities	$E(\text{TSP}) = 2.69 \text{ Mg/hectare/month of activity}$ $E(\text{RSP}) = E(\text{TSP}) \times 0.473$ $= 1.27 \text{ Mg/hectare/month of activity}$ $E(\text{FSP}) = E(\text{TSP}) \times 0.072$ $= 0.19 \text{ Mg/hectare/month of activity}$	USEPA AP-42, Section 13.2.3 USEPA AP-42, Section 13.2.4 USEPA AP-42, Section 13.2.4
Wind Erosion	$E(\text{TSP}) = 0.85 \text{ Mg/hectare/year}$ $E(\text{RSP}) = E(\text{TSP}) \times 0.473 = 0.40 \text{ Mg/hectare/year}$ $E(\text{FSP}) = E(\text{TSP}) \times 0.072 = 0.06 \text{ Mg/hectare/year}$	USEPA AP-42, Table 11.9.4 USEPA AP-42, Section 13.2.4 USEPA AP-42, Section 13.2.4

3.7.1.4 The construction period is assumed to be 10-hour (08:00-18:00) per day, 7 days a week in the assessment. Only wind erosion was assumed for other non-working hours (18:00 to 08:00 of the following day). Watering facilities will be provided at every designated vehicular exit point. Since all vehicles will be washed at exit points and vehicle loaded with the dusty materials will be covered entirely by clean impervious sheeting before leaving the construction site, dust nuisance from construction vehicle movement outside the worksites is unlikely to be significant.

3.7.2 Industrial Emission in the Surrounding Vicinity

3.7.2.1 The industrial emissions from TPIE within the assessment area were also considered as potential air pollutant emission sources. The chimneys and emission points from Specified Process (SP) and non-SP within TPIE were identified. For SP operation, the parameters and emission data of the emission points were extracted from the SP Licenses. For the non-SPs industries, the minimum emission rates for each air pollutant among the SP operation were adopted. CHP chimney within existing TPSTW was also included in the assessment. The location and emission inventory of the identified chimneys considered in the cumulative

impact assessment are presented in **Appendix 3.2**.

3.7.3 Vehicular Emission from Open Roads

3.7.3.1 The roads included for the vehicular assessment is presented in **Appendix 3.4**. The construction period will be from year 2025 to year 2036. For a conservative estimation of vehicular emission, the vehicle emission factor is chosen by using the first year of the construction programme (i.e. year 2025), and predicted traffic flow of the last year of the construction year (i.e. year 2036). This combination represents the worst case scenario for the vehicular emission. The traffic forecast is presented in **Appendix 3.4**.

3.7.3.2 EMFAC-HK 4.3 model is adopted to estimate the emission rates of 18 types of vehicles and the inventories of exhaust oxides of nitrogen and particulate matter for worst-case scenario (year 2025). "EMFAC" mode is used for predicting the vehicular emission of 18 vehicle classes with different speed profiles. Vehicular emission factors of each road section of each hour of a day were derived using EPD's EMFAC-HK v4.3 software. As a conservative approach, the following assumption has been adopted in the EMFAC model:

- Temperature : 6 deg.C (extracted from HKO Tai Po weather station in year 2020)
- Relative humidity : 24% (extracted from HKO Tai Po weather station in year 2020)
- Cold start emissions were assumed to roads with a speed limit of 50 km/hr

3.7.3.3 Emission from the vehicular emission in the vicinity of the Project, in particular Dai Kwai Street, Dai Hei Street and Dai Li Street within TPIE, were considered in the cumulative impact assessment.

3.7.3.4 As recommended in the EPD's Guideline on Modelling Vehicle Emissions for cold start emissions, default vehicle populations forecast in EMFAC-HK is used. The default accrual rates in EMFAC-HK are estimated from the local mileage data adjusted to reflect the total vehicle-kilometer-travelled (VKT) for each vehicle class. The default value has been used. Cold start emissions are assumed to be relevant to the roads with a speed limit of 50 km/hr for conservative approach. The percentage of minor roads within the HKSAR are estimated using the data published by the Transport Department, which is used to estimate the trips per VKT for the roads with cold start emissions. The maximum starting emission (g/trip) among different durations (from 5 min to 720 min) is used to reflect the worst case scenario. The details of the calculations of emission factors are presented in **Appendix 3.6**. The hourly composite start emission factor (TSP, RSP, FSP, initial NO and initial NO₂) was determined by:

$$\text{Hourly Composite Start Emission Factor (g/km - veh) =}$$

$$\sum \left[\frac{\text{Starting emission factor (g/trip) for each vehicle class}}{\text{hourly no. of trip of each vehicle class} \div \text{VKT of the road}} \right]$$

3.7.3.5 For running emissions, the hourly running exhaust emission factor (TSP, RSP, FSP, initial NO and initial NO₂) for each vehicle class was determined by the running exhaust emission factor for the average road speed of the concerned road link. The completed calculation result is displayed in **Appendix 3.6**. The hourly composite running exhaust emission factor (TSP, RSP, FSP, initial NO and initial NO₂) was determined by:

$$\text{Hourly composite running exhaust emission factor (g/km - veh) =}$$

$$\sum \left[\frac{\text{Hourly running exhaust emission factor (g/km - veh) for each vehicle class}}{\% \text{ composition of corresponding vehicle class}} \right]$$

- 3.7.3.6 The traffic data including the projected 24-hour traffic flows and vehicle compositions which were provided by the traffic consultant were adopted in this air quality assessment. The details of traffic data are presented in **Appendix 3.4**.
- 3.7.3.7 The raw Hong Kong Observatory data are presented in **Appendix 3.5**. The EMFAC output emission factors are provided in **Appendix 3.6**.
- 3.7.4 **Vehicular emissions associated with the Existing Bus Termini, Heavy Goods Vehicle and Coach Parking Sites**
- 3.7.4.1 The start emissions, running exhaust emissions and idling emissions associated with the vehicles at the existing bus termini, heavy goods vehicle and coach parking sites within the assessment area (TSP, RSP, FSP, initial NO and initial NO₂) were calculated and included in the assessment. The calculation was based on the start emission and running exhaust emission factors predicted by EMFAC-HK model, cold idling emission factors from *Calculation of Start Emissions in Air Quality Impact Assessment* published by EPD, warm idling emission factors from *Road Tunnels: Vehicle Emissions and Air Demand for Ventilation published by World Road Association* and traffic data provided by the traffic consultant.
- 3.7.4.2 Calculations of emissions associated with the bus terminuses were made reference to the *Calculation of Start Emissions in Air Quality Impact Assessment* published by EPD. Start emissions for diesel vehicles fitted with selective catalytic reduction (SCR) devices and LPG vehicles were adjusted based on the idling emission and would be released over a total spread distance of 700 m and 150 m respectively from where the start takes place, while running exhaust and idling emissions would be released on the spot. The locations of emission sources and the detailed calculation of the emissions are presented in **Appendix 3.6**.
- 3.7.5 **Background Contributions**
- 3.7.5.1 As suggested by “Guidelines on Assessing the ‘TOTAL’ Air Quality Impacts”, an integrated modelling system, Pollutants in the Atmosphere and their Transport over Hong Kong model (PATH v2.1) which is developed and maintained by EPD was applied to estimate the background pollutant concentrations.
- 3.7.5.2 The study area covers 4 grid cells of PATH v2.1, namely grid (41,48), (41,49), (42,48) and (42,49). The construction phase will be commenced in Year 2025, therefore PATH v2.1 data for Year 2025 of these 4 grid cells were adopted as the background concentration for the assessment. The hourly TSP concentration was assumed to be the same as that for RSP, as the best estimation.
- 3.7.6 **Dispersion Modelling & Modelling Approach**
- 3.7.6.1 According to the Model Guidelines, the steady-state Gaussian dispersion model United States Environmental Protection Agency (USEPA) AERMOD model was adopted for assessing the potential air quality impact arising from the construction activities and industrial emissions. The assessment area mostly falls under PATH v2.1 grid (41,48),(41,49),(42,48) and (42,49). Hourly meteorological data from the concerned grids are adopted in the model run. Mixing heights from the PATH v2.1 which are lower than the minimum mixing height recorded by the Hong Kong Observatory (HKO) in Year 2015 (i.e. 131m) are capped at 131m. For the treatment of calm hours, the wind speeds are capped at 1m/s for those from PATH v2.1 below 1m/s.
- 3.7.6.2 Dominant or representative land use in the vicinity of the assessment area was identified with the land utilization information (version 2020) disclosed by the Planning Department. Details of assumptions and methods to determine the surface characteristics of the grids is recorded in **Appendix 3.3**. The modelling parameters are summarised in **Table 3.9** below.

Table 3.9 Modelling Parameters

Parameter	Input
Background Concentration	PATH v2.1 Year 2025
Modelling Mode	Urban
Terrain Effect	With terrain effect
Population	2,000 (Estimated from PlanD population projection data)
Land use	Refer to Appendix 3.3 for surface characteristic parameters (Albedo, Bowen ratio, grid-specific surface roughness)
Meteorological Data	Year 2015 hourly meteorological data adopted in PATH v2.1
Anemometer Height	6m

3.7.6.3 For vehicular emission from open roads, California Line Source Dispersion Model, version 4 (CALINE4), the USEPA approved line source air dispersion model developed by the California Department of Transport is used to assess the secondary contribution due to vehicular emission. The 500m quantitative assessment area is considered to be rural area. Therefore, surface roughness of 100cm is chosen with reference to EPD's Guidelines on Choice of Models and Model Parameter (hereafter refer as "the Model Guidelines"). Flat terrain approach was adopted in CALINE4 to assume all road links to be at-grade. Width of the roads are added by 3m on both sides to represent the mixing zone. RSP and FSP concentrations were modelled by CALINE4, while hourly TSP concentration was assumed to be the same as that for RSP in the assessment.

3.7.6.4 Guided by a Working Group consisting of experts in air quality modelling, PATH v2.1 has gone through extensive testing. It was determined that PATH v2.1's output of RSP and FSP concentrations should be adjusted as follows before being applied for EIA to account for the limited information on pollutant emissions on a larger scale:

- 10th highest daily RSP concentration: add 11.0 µg/m³.
- Annual RSP concentration: add 10.3 µg/m³
- 19th highest daily FSP concentration: Nil.
- Annual FSP concentration: add 3.5 µg/m³

3.7.6.5 For the estimation of SO₂ Concentration, EPD's "Guidelines on the Estimation of 10-minute Average SO₂ Concentration for Air Quality Assessment in Hong Kong" as followed. The stability-dependent multiplicative factors for converting 1-hour average concentrations to 10-minute average concentrations are extracted in **Table 3.10** below.

Table 3.10 1-hour to 10-minute Conversion Factors

Pasquill Stability Class ^[1]	A	B	C	D	E	F
Conversion Factors	2.45	2.45	1.82	1.43	1.35	1.35

[1] PCRAMMET was applied to generate Pasquill-Gifford stability class hour by hour based on the meteorological data from the PATH v2.1.

3.7.6.6 For the estimation of methane and formaldehyde, 1-hour to 15-minute and 1-hour to 30-minute conversion factors were calculated. The model output (1-hour average) is first converted to 15-minute average value and 30-minute average value using the power law formula proposed by *Duffee et al* given below:

$$C_i = C_s(t_s/t_i)^p$$

where C_l = concentration for the longer time-averaging period;
 C_s = concentration for the shorter time-averaging period;
 t_s = shorter averaging time;
 t_l = longer averaging time; and
 p = power law exponent which is dependent on the Pasquill stability class.

Reference to Duffee et al., 1991 (*Richard A. Duffee, Martha A. O'Brien and Ned Ostojic, 'Odor Modelling - Why and How', Recent Developments and Current Practices in Odor Regulations, Controls and Technology, Air & Waste Management Association, 1991*)

3.7.6.7 Such that the 1-hour average concentrations predicted by the AERMOD model were converted to 15-minute and 30-minute average concentrations. The conversion factors for different Pasquill stability classes are listed in **Table 3.11** below.

Table 3.11 1-hour to 15-minute and 1-hour to 30-minute Conversion Factors

Pasquill Stability Class ^[1]	A	B	C	D	E	F
1-hour to 15 minute Conversion Factors	2	2	1.59	1.32	1.26	1.26
1-hour to 30 minute Conversion Factors	1.41	1.41	1.26	1.16	1.15	1.12

Note:

[1] PCRAMMET was applied to generate Pasquill-Gifford stability class hour by hour based on the meteorological data from the PATH v2.1.

3.7.7 Cumulative Air Quality Impact

3.7.7.1 Cumulative air quality impacts upon ASRs were derived from the sum of predictions by local air quality models and background concentration from PATH v2.1 for Year 2025 on hour-by-hour basis. Averaging results, namely hourly, daily and annual, were derived from the cumulative hour-by-hour results in accordance with Title 40, Code of Federal Regulations, US Environmental Protection Agency (USEPA 40 CFR) Part 51 "Revision to the Guideline on Air Quality Models, Version 2005". Hours with invalid Caline4's output were excluded from the calculation of cumulative impact. Cumulative average predictions at each ASR amongst 365 days were ranked by highest concentration and compared with the maximum allowable concentration to determine the number of exceedances throughout a year. The air quality impact upon ASRs was evaluated by number of exceedances per annum against the AQO criteria.

3.8 Assessment Methodology – Operational Phase

3.8.1 Odour Emission Inventory of TPSTW

3.8.1.1 The general layout plan of the upgraded TPSTW is presented in **Figure 3.2**. Potential odour sources identified in the upgraded TPSTW include the following:

- Inlet works
- Primary treatment facilities
- Biological treatment facilities
- Sludge thickening facilities
- Digester battery

- Sludge dewatering facilities
- Side-stream treatment facilities
- Biogas recovery facilities
- Import sludge reception facilities

3.8.1.2 On-site odour measurement has been conducted at the facilities of the existing TPSTW in Sep-Nov 2020 and Jul-Aug 2021 to determine the odour emission rates by odour sampling and olfactometric analysis. The ambient temperature during sampling was ranged from 25–36°C. The odour sampling and analysis report including the sampling location plan and sampling procedures is presented in **Appendix 3.7**. The measured odour emission rates of the sampling locations are summarized in **Appendix 3.8**. Besides, odour emission rates were referenced from Odour survey conducted within TPSTW in 2016, Yuen Long Effluent Polishing Plant (AEIAR-220/2019 - Yuen Long Effluent Polishing Plant), Shatin Sewage Treatment Works (AEIAR-202/2016 - Sha Tin Cavern Sewage Treatment Works) and Stonecutters Island Sewage Treatment Works (AEIAR-121/2008 - Harbour Area Treatment Scheme (HATS) Stage 2A). The emission rates for the same corresponding odour source for the proposed TPSTW were compared, the highest emission rates were adopted as the worst case scenario in this assessment. As mentioned in **Section 3.5.1.11**, the TPSTW is not operating at design operating condition. Therefore, emission rate for primary sedimentation tanks, aeration tanks and final sedimentation tanks collected from odour survey of this Project were considered not representative to be used to conduct assessment and survey result from other reference were adopted. The emission rate comparison table is presented in **Appendix 3.8**.

3.8.1.3 Unmitigated scenario and mitigated scenario are assessed for the odour impact. For the unmitigated scenario, on-site survey data on Year 2020 and 2021 were adopted where appropriate. The emission rates for unmitigated and mitigated scenario are presented in **Appendix 3.8**.

3.8.2 Odour Emission in the Surrounding Vicinity

3.8.2.1 The odour emissions from the adjacent Organic Waste Pre-treatment Centre (New Territories East) (OWPC) is considered as a potential odour emission source. Based on available information, the treatment capacity of OWPC will be upgraded from the existing 50 tonnes per day to 500 tonnes per day by 2030s. As a worst case scenario, the emission rate of the upgraded OWPC is assumed to be 10 times of the existing plant. The emission details of the upgraded OWPC is presented in **Appendix 3.8**.

3.8.3 Dispersion Modelling & Modelling Approach

3.8.3.1 AERMOD, the EPD approved air dispersion model, was employed to predict the odour impact from the operation of the Project at the representative ASRs. Odour emission from stacks and exhaust of de-odourization units were modelled as point sources in the assessment while open sewage tanks and channels were modelled as area source in the assessment. The upgraded TPSTW and Co-digestion Facilities, and OWPC were assumed to operate continuously on a 24-hour-per-day and 7-day-per-week basis.

3.8.3.2 The assessment has been based on the assumed reasonably worst case scenario under normal operating condition of the Project in year 2036. The modelled hourly averaged odour concentrations at the ASRs by the AERMOD were converted into 5-second averaged odour concentrations for comparison with the odour assessment's criterion stipulated in the EIAO-TM. A set of conversion factors stipulated in "Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales" published by the Department of Environment and Conservation, New South Wales, Australia were adopted in this assessment. As the emission points will be located at ground level, at the top of the

deodourization units or build roof of the odour control buildings which would be less than 2.5 times of building structures. Therefore, building wake effect is expected. The conversion factors stated in this method are for converting 1-hour averaged concentrations to 1-second averaged concentration for near field regions. In this assessment, the conversion factors were directly adopted for converting 1-hour averaged concentrations to 5-second averaged concentration as a conservative approach. The conversion factors adopted in this assessment for different stability classes are shown in **Table 3.12**.

Table 3.12 1-hour to 5-second Conversion Factors

Pasquill Stability Class ^[1]	Conversion Factor ^[2]	
	Point Source	Area Source
A	2.3	2.5
B	2.3	2.5
C	2.3	2.5
D	2.3	2.5
E	2.3	2.5
F	2.3	2.5

Note:

[1] PCRAMMET was applied to generate Pasquill-Gifford stability class hour by hour based on the meteorological data from the PATH v2.1.

[2] Reference to *Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales* published by the Department of Environment and Conservation, New South Wales, Australia. The derivation of the peak-to-mean ratios stated in the method was based on experimental and theoretical analyses and had assumed a 0.1% exceedance level (With reference to "Statistical Elements of Predicting Water Science and Technology, Australia, 44:0 pp 157-164, 2001")

3.8.4 Air Pollutants Emission Inventory of TPSTW

3.8.4.1 The general layout plan of the proposed TPSTW is presented in **Figure 3.2**. Potential air pollutant sources identified in the proposed TPSTW include the following:

- Emission from CHP generating system
- Flare system

3.8.4.2 As discussed in Section 3.6.2.2, the major pollutants of emissions from operation of CHP generating system will be NO₂, RSP, FSP, SO₂, HCl, HF, VOCs (in terms of Formaldehyde CH₂O), CH₄ and CO. Flare system is proposed to consume the excess biogas collected from the digestion tanks by combustion. Since the use of flare system would not be operated in normal situation, it is not included in the assessment. The emission rates of the air pollutants at the exhausts of the CHP generating system are provided by Design Engineer. The detailed emission inventory is presented in **Appendix 3.2**.

3.8.5 Industrial Emission in the surrounding vicinity

3.8.5.1 As discussed in Section 3.7.2, the industrial emissions from TPIE within the assessment area were also considered as potential air pollutant emission sources. The location and emission inventory of the identified chimneys considered in the cumulative impact assessment are presented in **Appendix 3.2**.

3.8.5.2 The maximum concentration of the NO₂ were calculated using the Ozone Limiting Method. For industrial chimneys, in accordance with USEPA AP-42, a 10% NO₂/NO_x ratio was assumed at the chimney emission points (Chapter 1.3 of USEPA AP-42 refers). The background concentration of ozone was taken from PATH v2.1 (Year 2025) data.

3.8.6 Vehicular Emission from Open Roads

3.8.6.1 As discussed in Section 3.7.3, emission from the vehicular emission in the vicinity of the Project, in particular Dai Kwai Street, Dai Hei Street and Dai Li Street within TPIE, were considered in the cumulative impact assessment. A sensitivity test for vehicular emission from the open roads in year 2036, 2043 and 2051 have been conducted and the result is presented in **Appendix 3.6**. Year 2051 was found to have the highest traffic emission. Therefore, combination of vehicle emission factor and predicted traffic flow in Year 2051 were chosen as the worst case scenario for the vehicular emission. Similar to construction phase, both running emission and cold start emission were included in the assessment. The details of the calculations of emission rate are presented in **Appendix 3.6**. NO, NO₂, RSP and FSP concentrations were modelled by CALINE4 in the assessment.

3.8.6.2 The maximum concentration of the NO₂ were calculated using the Ozone Limiting Method. For tailpipe emission, the predicted NO concentrations were converted to NO₂ based on OLM and were added with the predicted NO₂ concentrations to determine the total predicted NO₂ concentrations at the ASRs. The background concentration of ozone was taken from PATH v2.1 (Year 2025) data.

3.8.6.3 The total predicted NO₂ concentrations were calculated as follows:

$$[\text{NO}_2]_{\text{pred total}} = [\text{NO}_2]_{\text{pred t}} + 0.1 \times [\text{NO}_x]_{\text{pred i}} + \text{MIN} \{ [\text{NO}]_{\text{pred t}} + 0.9 \times [\text{NO}_x]_{\text{pred i}}, \text{ or } (46/48) \times [\text{O}_3]_{\text{bkgd}} \}$$

where

$[\text{NO}_2]_{\text{pred total}}$ = the total predicted NO₂ concentration

$[\text{NO}_2]_{\text{pred t}}$ = the predicted NO₂ concentration directly emitted from tailpipe emissions

$[\text{NO}_x]_{\text{pred i}}$ = the predicted NO_x concentration directly emitted from industrial chimneys

$[\text{NO}]_{\text{pred t}}$ = the predicted NO concentration directly emitted from tailpipe emissions

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

3.8.7 Background Contributions

3.8.7.1 Similar to Section 3.7.5, pollutants in PATH v2.1 for Year 2025 was adopted as the background concentration for the assessment. The PATH v2.1 data for Year 2025 of the relevant grid cells as mentioned in Section 3.7.5 were adopted as the background concentration for the assessment. The hourly TSP concentration was assumed to be the same as that for RSP, as the best estimation.

3.8.8 Dispersion Modelling & Modelling Approach & Cumulative Air Quality Impact

3.8.8.1 Same pollutant dispersion, modelling approach and cumulative air quality impact described in Section 3.7.6 and 3.7.7 were followed for the operational phase air pollutant impact assessment.

3.9 Impact Assessment

3.9.1 Construction Phase

3.9.1.1 The predicted dust impact to the ASRs during the construction of New West Plant are presented in **Table 3.13**. The detailed result is presented in **Appendix 3.9**. The contour plots of the worst impact level (i.e. 1.5mAG for maximum hourly average TSP, 10th highest daily

average RSP and annual average RSP, 20mAG for 19th highest daily average FSP, 23mAG for annual average FSP) are presented in **Figure 3.3** to **3.7**.

Table 3.13 Predicted Cumulative Dust Impact (Scenario A)

Air Sensitive Receiver	Maximum Hourly Average TSP Conc. ($\mu\text{g}/\text{m}^3$)	10 th Highest Daily Average RSP Conc. ($\mu\text{g}/\text{m}^3$)	Annual Average RSP Conc. ($\mu\text{g}/\text{m}^3$)	19 th Highest Daily Average FSP Conc. ($\mu\text{g}/\text{m}^3$)	Annual Average FSP Conc. ($\mu\text{g}/\text{m}^3$)
ASR 1	489	79 (0)	37.6	34.8 (8)	16.2
ASR 2	325	71.2 (0)	31.3	33.6 (8)	15.3
ASR 3	275	67.9 (0)	29.7	33.2 (8)	15.2
ASR 4	214	66.1 (0)	29.0	34.9 (9)	15.9
ASR 5	165	65.5 (0)	28.6	34.9 (10)	16.2
ASR 6	275	65.7 (0)	29.2	36.6 (10)	16.6
ASR 7	406	73.8 (0)	32.1	36.4 (10)	16.4
ASR 8	411	73.6 (0)	33.5	36 (10)	16.7
ASR 9	664	78 (1)	38.9	33.9 (8)	16.5
ASR 10	622	76.1 (0)	36.9	33.5 (8)	16.2
ASR 11	581	68.4 (0)	32.1	32.7 (8)	15.4
ASR 12	381	62.1 (0)	27.5	32.2 (7)	14.7
ASR 13	174	62.9 (0)	27.6	32.3 (8)	15.1
ASR 14	159	62 (0)	26.6	32.1 (7)	14.5
ASR 15	165	63.3 (0)	27.4	33.8 (8)	15.3
ASR 16	161	61.5 (0)	26.0	32 (7)	14.1
ASR 17	165	61.5 (0)	26.1	32 (7)	14.2
ASR 18	160	61.5 (0)	26.3	32 (7)	14.3
ASR 19	298	62 (0)	27.4	32.1 (7)	14.6

Remarks:

[1] Bolded value shows exceedance of relevant criteria of EIAO-TM / AQO.

[2] Values in () indicate the number of exceedances.

3.9.1.2 For the construction of the New West Plant, the predicted cumulative daily average and annual RSP as well as daily average and annual FSP at the representative ASRs complied with the AQO while the predicted hourly average TSP at ASR 9, 10 and 11 exceeded the requirement of EIAO-TM. Focused construction dust assessments, assuming 50% of active works area to be located at the south portion and north portion respectively, were undertaken the construction of New West Plant (see Scenarios C1-C4 of **Appendix 3.1**). The result is presented in Section 3.9.1.5.

3.9.1.3 The predicted dust impact to the ASRs during the upgrade of existing West Plant are presented in **Table 3.14**. The detailed result is presented in **Appendix 3.9**. The contour plots of the worst impact level (i.e. 1.5 mAQ) are presented in **Figure 3.8 to 3.12**.

Table 3.14 Predicted Cumulative Dust Impact (Scenario B)

Air Sensitive Receiver	Maximum Hourly Average TSP Conc. ($\mu\text{g}/\text{m}^3$)	10 th Highest Daily Average RSP Conc. ($\mu\text{g}/\text{m}^3$)	Annual Average RSP Conc. ($\mu\text{g}/\text{m}^3$)	19 th Highest Daily Average FSP Conc. ($\mu\text{g}/\text{m}^3$)	Annual Average FSP Conc. ($\mu\text{g}/\text{m}^3$)
ASR 1	706	82.3 (1)	41.5	35.3 (9)	16.8
ASR 2	730	73.9 (0)	36.0	34.6 (8)	16.0
ASR 3	827	72.4 (0)	34.6	34.6 (8)	15.8
ASR 4	641	87.6 (3)	42.5	38.4 (11)	18.0
ASR 5	380	75.9 (0)	33.9	36.4 (10)	16.7
ASR 6	403	65.6 (0)	29.0	36.6 (10)	16.6
ASR 7	727	81.1 (2)	39.8	37 (10)	17.6
ASR 8	568	67.7 (0)	30.5	35.4 (10)	16.6
ASR 9	561	64.4 (0)	28.9	32.6 (8)	15.0
ASR 10	609	64.1 (0)	28.4	32.5 (8)	14.9
ASR 11	513	63.4 (0)	27.9	32.3 (8)	14.8
ASR 12	284	62.5 (0)	27.5	32.2 (7)	14.7
ASR 13	654	63.8 (0)	29.6	32.3 (8)	15.2
ASR 14	416	62 (0)	27.6	32.1 (7)	14.6
ASR 15	200	63.5 (0)	27.6	33.8 (8)	15.4
ASR 16	163	61.5 (0)	26.1	32 (7)	14.2
ASR 17	172	61.5 (0)	26.2	32 (7)	14.2
ASR 18	311	61.5 (0)	26.7	32 (7)	14.3
ASR 19	307	62 (0)	28.0	32.1 (7)	14.7

Remarks:

[1] Bolded value shows exceedance of relevant criteria of EIAO-TM / AQO.

[2] Values in () indicate the number of exceedances.

3.9.1.4 For the upgrade of existing West Plant, the predicted cumulative daily average and annual RSP as well as daily average and annual FSP at the representative ASRs complied with the AQO while only the predicted hourly average TSP at ASR 5, 6, 12, 14, 15, 16, 17, 18 and 19 met the requirement of EIAO-TM. Focused construction dust assessments, assuming 50% of active works area to be located at the south portion and north portion respectively, were undertaken the upgrade of existing West Plant (see Scenarios D1-D4 of **Appendix 3.1**). The result is presented in Section 3.9.1.5.

3.9.1.5 The range of predicted dust impact of the focused assessments to each ASR during the construction of New West Plant and the upgrade of existing West Plant are presented in **Table 3.15**. The detailed result is presented in **Appendix 3.9**. The contour plots of the worst impact level for construction of New West Plant (Scenarios C1, C2, C3 and C4) (i.e. 1.5mAG for maximum hourly average TSP, 10th highest daily average RSP and annual average RSP, 20mAG for 19th highest daily average FSP, 23mAG for annual average FSP) are presented in **Figure 3.13** to **3.32**. The contour plots of the worst impact level for upgrading of Existing West Plant (Scenarios D1, D2, D3 and D4) (i.e. 1.5mAG for maximum hourly average TSP, 10th highest daily average RSP and annual average RSP, 1.5mAG and 20mAG for 19th highest daily average FSP, 1.5mAG for annual average FSP) are presented in **Figure 3.33** to **3.52**.

Table 3.15 The Predicted Cumulative Dust Impacts of the Focused Assessments

Air Sensitive Receiver	Maximum Hourly Average TSP Conc. ($\mu\text{g}/\text{m}^3$)	10th Highest Daily Average RSP Conc. ($\mu\text{g}/\text{m}^3$)	Annual Average RSP Conc. ($\mu\text{g}/\text{m}^3$)	19th Highest Daily Average FSP Conc. ($\mu\text{g}/\text{m}^3$)	Annual Average FSP Conc. ($\mu\text{g}/\text{m}^3$)
ASR 1	159 - 406	62.6 - 74.6 (0)	27 - 36	32.3 - 34.1 (8 - 9)	15 - 16
ASR 2	159 - 446	63.6 - 70.1 (0)	28 - 32	32.4 - 33.7 (8)	15
ASR 3	159 - 474	62.9 - 68.9 (0)	27 - 32	32.4 - 33.8 (8)	15
ASR 4	165 - 378	64.1 - 77.3 (0)	28 - 35	34.3 - 36.6 (9 - 11)	16 - 17
ASR 5	165 - 228	63.6 - 70.1 (0)	27 - 31	33.9 - 35.5 (8 - 10)	15 - 16
ASR 6	165 - 237	64.5 - 65.7 (0)	28 - 29	34.8 - 36.6 (9 - 10)	16 - 17
ASR 7	165 - 397	65.9 - 76.7 (0)	29 - 35	34.8 - 36.4 (9 - 10)	16 - 17
ASR 8	165 - 323	64.5 - 69.2 (0)	28 - 31	34.9 - 35.6 (9 - 10)	16 - 17
ASR 9	159 - 427	62.3 - 74 (0)	27 - 35	32.3 - 33.2 (8)	15 - 16
ASR 10	159 - 385	62.2 - 72.3 (0)	27 - 34	32.2 - 32.8 (8)	15 - 16
ASR 11	159 - 361	62.2 - 67.8 (0)	27 - 31	32.2 - 32.3 (8)	15
ASR 12	160 - 222	61.9 - 62.3 (0)	27 - 27	32.1 - 32.2 (7)	14 - 15
ASR 13	159 - 423	62 - 62.9 (0)	27 - 28	32.2 - 32.3 (7 - 8)	15
ASR 14	159 - 244	61.8 - 62 (0)	26 - 27	32 - 32.1 (7)	14 - 15
ASR 15	165 - 165	63.2 (0)	27	33.8 - 33.8 (8)	15
ASR 16	160 - 161	61.5 (0)	26	32 (7)	14
ASR 17	164 - 165	61.5 (0)	26	32 (7)	14
ASR 18	159 - 187	61.5 (0)	26	32 (7)	14
ASR 19	175 - 195	62 (0)	27	32.1 (7)	14 - 15

Remarks:

[1] Bolded value shows exceedance of relevant criteria of EIAO-TM / AQO.

[2] Values in () indicate the number of exceedances.

- 3.9.1.6 According to **Table 3.15**, the predicted cumulative hourly TSP, annual averaged RSP and FSP, 10th highest daily average RSP and 19th highest daily average FSP complied with the AQO. Therefore, no adverse air quality impact due to construction dust impact from the construction of TPSTW is anticipated.
- 3.9.1.7 As stipulated in the *Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation* will be followed to control potential emissions from non-road mobile machinery. Therefore, gaseous emission from diesel-fueled construction equipment would be minor and would not cause any adverse air quality impact.
- 3.9.1.8 The existing sewage pumping station and mains will be cleaned and flushed out properly to clear away any remaining potential sources of odour emission, such as sewage sludge from the facilities. The demolition including removal of the pumping station and mains will take place after the cleaning and flushing out. No unacceptable odour emission is anticipated during the construction phase. Hence, no adverse odour impact is anticipated from the decommissioning of the TPSTW.

3.9.2 Operational Phase (Gaseous Emission)

- 3.9.2.1 The predicted gaseous emission impact (RSP, FSP, NO₂ and SO₂) to the ASRs during operation of the upgraded TPSTW and Co-digestion Facilities are presented in **Table 3.16**. The detailed result is presented in **Appendix 3.9**. The contour plots of the corresponding worst impact levels for each pollutant (i.e. 20mAG for 10th highest daily averaged RSP and 19th highest daily averaged FSP, 40mAG for annual averaged RSP and annual averaged FSP, 35mAG for 19th highest hourly averaged NO₂, 45mAG for annual averaged NO₂, 65mAG for 4th highest 10-minute averaged SO₂ and 4th highest daily averaged SO₂) are presented in **Figure 3.53 to 3.60**. No air quality sensitive uses were predicted to fall within exceedance zones.

Table 3.16 Predicted Cumulative Gaseous Pollutants (RSP, FSP, NO₂ and SO₂) Concentrations at Representative Air Sensitive Receivers

Air Sensitive Receiver	10 th Highest Daily Average RSP Conc. (µg/m ³)	Annual Average RSP Conc. (µg/m ³)	19 th Highest Daily Average FSP Conc. (µg/m ³)	Annual Average FSP Conc. (µg/m ³)	19 th Highest Hourly Average NO ₂ Conc. (µg/m ³)	Annual Average NO ₂ Conc. (µg/m ³)	4 th Highest 10-min Average SO ₂ Conc. (µg/m ³)	4 th Highest Daily Average SO ₂ Conc. (µg/m ³)
ASR 1	61.8 (0)	26.7	32.3 (8)	14.7	84 (0)	15.6	81.7 (0)	11.8 (0)
ASR 2	62 (0)	26.5	32.2 (7)	14.6	85 (0)	16.0	77.8 (0)	11.8 (0)
ASR 3	62.3 (0)	27.1	32.4 (8)	15.1	88 (0)	17.3	113.3 (0)	11.8 (0)
ASR 4	64.2 (0)	28.6	34.6 (10)	16.7	183 (3)	34.0	79.7 (0)	13.3 (0)
ASR 5	65.5 (0)	28.7	35.4 (10)	16.7	163 (3)	34.5	451.4 (0)	28.7 (0)
ASR 6	65.6 (0)	28.6	36.5 (10)	16.5	100 (0)	25.6	70 (0)	11.8 (0)
ASR 7	63.6 (0)	27.3	34.4 (8)	15.5	91 (0)	24.9	73.3 (0)	11.9 (0)
ASR 8	65.1 (0)	28.5	35.3 (10)	16.4	90 (0)	25.4	71.1 (0)	11.9 (0)

Air Sensitive Receiver	10 th Highest Daily Average RSP Conc. ($\mu\text{g}/\text{m}^3$)	Annual Average RSP Conc. ($\mu\text{g}/\text{m}^3$)	19 th Highest Daily Average FSP Conc. ($\mu\text{g}/\text{m}^3$)	Annual Average FSP Conc. ($\mu\text{g}/\text{m}^3$)	19 th Highest Hourly Average NO ₂ Conc. ($\mu\text{g}/\text{m}^3$)	Annual Average NO ₂ Conc. ($\mu\text{g}/\text{m}^3$)	4 th Highest 10-min Average SO ₂ Conc. ($\mu\text{g}/\text{m}^3$)	4 th Highest Daily Average SO ₂ Conc. ($\mu\text{g}/\text{m}^3$)
ASR 9	62 (0)	26.5	32.3 (8)	14.6	84 (0)	16.8	69 (0)	11.4 (0)
ASR 10	62 (0)	26.8	32.2 (8)	14.8	81 (0)	16.4	69 (0)	11.3 (0)
ASR 11	62.2 (0)	26.6	32.2 (8)	14.7	80 (0)	16.0	69 (0)	10.9 (0)
ASR 12	62.1 (0)	26.4	32.2 (7)	14.5	79 (0)	15.5	69 (0)	10.5 (0)
ASR 13	62.1 (0)	26.9	32.3 (8)	14.9	77 (0)	16.0	69.9 (0)	10.7 (0)
ASR 14	61.9 (0)	26.3	32.1 (7)	14.4	78 (0)	14.1	69.7 (0)	10.8 (0)
ASR 15	63.2 (0)	27.0	33.8 (8)	15.2	82 (0)	17.6	68.8 (0)	11.8 (0)
ASR 16	61.5 (0)	26.0	32 (7)	14.1	79 (0)	12.1	67.3 (0)	10.4 (0)
ASR 17	61.5 (0)	26.0	32 (7)	14.2	76 (0)	12.0	67.5 (0)	10.2 (0)
ASR 18	61.5 (0)	26.1	32 (7)	14.2	75 (0)	12.9	69.7 (0)	10.9 (0)
ASR 19	61.6 (0)	26.3	32.1 (7)	14.4	76 (0)	13.5	94.1 (0)	11.6 (0)

Remarks:

[1] Bolded value shows exceedance of relevant criteria of EIAO-TM / AQO.

[2] Values in () indicate the number of exceedances.

- 3.9.2.2 According to the predicted results in **Table 3.16**, the concentrations of the AQO criteria pollutants (RSP, FSP, NO₂ and SO₂) at all representative ASRs would comply with the respective AQOs. Therefore, no adverse air quality impact due to gaseous emission from the operation of TPSTW is anticipated.
- 3.9.2.3 The predicted other non-AQO criteria gaseous emission impact (HCl, HF, CO, CH₄ and CH₂O) to the ASRs during operation of the upgraded TPSTW and Co-digestion Facilities are presented in **Table 3.17**. The detailed result is presented in **Appendix 3.9**. According to the predicted results in **Table 3.17**, the concentrations of the other gaseous pollutants (HCl, HF, CO, CH₄ and CH₂O) at all representative ASRs would comply with the air quality standard stated in **Table 3.2**. Therefore, no adverse air quality impact due to gaseous emission from the operation of TPSTW is anticipated.

Table 3.17 Predicted Cumulative Other Gaseous Pollutants (HCl, HF, CO, CH₄ and CH₂O) Concentrations at Representative Air Sensitive Receivers

Air Sensitive Receiver	Highest 1-hour Average HCl Conc. (µg/m ³)	Annual Average HCl Conc. (µg/m ³)	Highest 1-hour Average HF Conc. (µg/m ³)	Annual Average HF Conc. (µg/m ³)	Highest 1-hour Average CO Conc. (µg/m ³)	Highest 8-hour Average CO Conc. (µg/m ³)	Highest 15-min Average CH ₄ Conc. (µg/m ³)	Highest 30-min Average CH ₂ O Conc. (µg/m ³)	Annual Average CH ₂ O Conc. (µg/m ³)
ASR 1	10.5	0.4	2.1	0.1	746.7	230.7	88.5	11.1	4.0
ASR 2	8.6	0.4	1.7	0.1	746.5	230.1	35.7	6.5	4.0
ASR 3	16.4	0.5	3.3	0.1	747.6	232.2	85.1	9.5	4.0
ASR 4	32.6	1.7	6.5	0.2	1032.3	298.4	353.4	33.2	5.6
ASR 5	104.3	1.9	20.9	0.3	787.8	280.1	257.3	25.2	5.2
ASR 6	15.3	0.2	3.1	0.0	759.1	229.4	23.0	5.8	3.9
ASR 7	10.7	0.3	2.1	0.0	763.1	230.3	33.5	6.6	3.9
ASR 8	20.9	0.3	4.2	0.1	760.8	229.7	35.6	6.8	3.9
ASR 9	4.7	0.3	0.9	0.1	748.8	226.7	16.3	5.2	3.9
ASR 10	6.2	0.4	1.2	0.1	748.2	226.7	26.8	6.1	3.9
ASR 11	6.1	0.6	1.2	0.1	748.1	226.6	18.0	5.4	3.9
ASR 12	5.1	0.5	1.0	0.1	748.3	226.6	20.9	5.6	3.9
ASR 13	5.3	0.2	1.1	0.0	750.6	227.0	19.7	5.3	3.9
ASR 14	5.4	0.3	1.1	0.0	748.7	226.9	18.1	5.4	3.9
ASR 15	8.5	0.1	1.7	0.0	757.3	229.2	15.7	5.2	3.9
ASR 16	7.4	0.1	1.5	0.0	745.8	226.2	10.1	4.7	3.9
ASR 17	7.8	0.1	1.6	0.0	745.2	226.2	8.6	4.6	3.9
ASR 18	6.3	0.2	1.3	0.0	745.8	226.7	16.8	5.3	3.9
ASR 19	9.6	0.3	1.9	0.1	745.6	226.8	13.2	4.9	3.9

Remarks:

[1] Bolded value shows exceedance of relevant criteria of AQO and Table3.2.

3.9.3 Operational Phase (Odour Impact)

3.9.3.1 The predicted odour impact to the ASRs during operation of the upgraded TPSTW and Co-digestion Facilities are presented in **Table 3.18**. The detailed result is presented in **Appendix 3.9**. The contour plots of the worst impact level (i.e. 15mAG) are presented in **Figure 3.61**.

Table 3.18 Predicted Odour Impact at Representative Air Sensitive Receivers

Air Sensitive Receiver	Odour Unit (OU) per m ³
ASR 1	2.3
ASR 2	1.4
ASR 3	2.1
ASR 4	3.2
ASR 5	2.7
ASR 6	2.2
ASR 7	1.5
ASR 8	3.1
ASR 9	2.0
ASR 10	3.3
ASR 11	1.6
ASR 12	1.3
ASR 13	2.2
ASR 14	2.8
ASR 15	1.2
ASR 16	0.9
ASR 17	0.6
ASR 18	1.6
ASR 19	1.2

3.9.3.2 According to the predicted results in **Table 3.18**, the odour concentrations at all representative ASRs would comply with the criterion of 5 OU/m³ based on an averaging time of 5 seconds. No adverse odour impact due to the operation of the TPSTW would be expected.

3.10 Mitigation Measures

3.10.1 Construction Phase

3.10.1.1 Dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* will be implemented during the construction of the Project to control potential fugitive dust emissions. Standard construction practices for dust minimisation, including a number of practical measures such as regular water spraying, provision of vehicle wheel-washing and body washing facilities and shielding or covering with impervious sheet of stockpiled materials or exposed area when it is not use, will be implemented to reduce dust nuisance.

3.10.1.2 In order to avoid potential odour emissions from the decommissioning activities, the existing sewage pumping station and main will be flushed out and sludge will be pumped away before the start of decommissioning works.

3.10.1.3 Site practices such as regular maintenance and checking of the diesel-driven PMEs will be adopted to avoid any black smoke emissions and to reduce gaseous emissions. Good site practices listed below should be carried out to further minimize construction dust impact:

- Use of hourly watering to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather.
- The maximum percentage of active construction works area shall be 50% during construction.
- Use of frequent watering for particularly dusty construction areas and areas close to ASRs.
- Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines.
- Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs.
- Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.
- Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.
- Provision of wind shield and dust extraction units or similar dust mitigation measures at the loading area of barging point, and use of water sprinklers at the loading area where dust generation is likely during the loading process of loose material, particularly in dry seasons/ periods.
- Provision of not less than 2.4m high hoarding from ground level along site boundary where adjoins a road, streets or other accessible to the public except for a site entrance or exit.
- Imposition of speed controls for vehicles on site haul roads.
- Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.
- Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise.

3.10.2 Operational Phase

3.10.2.1 No adverse air quality impact due to gaseous emission from CHP is anticipated during the operational phase of the Project, thus mitigation measure is deemed not necessary.

3.10.2.2 The major process equipment of the upgraded TPSTW and Co-digestion Facilities will be confined inside the substructure/superstructure, except for the final sedimentation tanks at the existing East Plant, to minimize odour nuisance to the surrounding air sensitive receivers. Two stages de-odourization system (bio tricking filter and carbon adsorption) will be installed to treat the collected odourous gases. The overall odour removal efficiency would be not less than 99%. The predicted result shows that all ASRs would be below the criterion of 5 OU/m³ as stated in the EIAO-TM. No further mitigation measure would be required during the operational phase.

3.11 Evaluation of Residual Impacts

3.11.1 Construction Phase

3.11.1.1 With the implementation of the mitigation measures as stipulated in the Air Pollution Control (Construction Dust) Regulation together with the recommended dust control measures and good site practices on the work sites, no adverse residual impact would be expected from construction of TPSTW.

3.11.2 Operational Phase

3.11.2.1 No adverse residual impact is expected during the operational phase of TPSTW.

3.12 Environmental Monitoring and Audit

3.12.1 Construction Phase

3.12.1.1 EM&A for potential dust impacts should be conducted during construction phase so as to check compliance with the legislative requirements. Details of the monitoring and audit programme are contained in a stand-alone EM&A Manual.

3.12.1.2 Regular site audits for potential dust impact are recommended to be conducted during the entire construction phase of the Project so as to ensure the dust mitigation measures and the dust suppression measures stipulated in Air Pollution Control (Construction Dust) Regulation are implemented in order.

3.12.2 Operational Phase

3.12.2.1 No adverse impact would be generated during the operational phase of this Project. Nevertheless, it is recommended to conduct a commissioning test at the exhaust of the CHP and to conduct hydrogen sulphide (H₂S) monitoring at the deodorizers upon commissioning to determine whether it can meet the odour removal performance requirement. In addition, odour patrol should be carried out during the period of maintenance or cleaning of the deodorization systems and the Odour Complaint Registration System is also introduced in the EM&A Programme. Details of the monitoring and audit programme are contained in a stand-alone EM&A Manual.

3.13 Conclusion

3.13.1.1 This Section of the EIA has described the potential air quality impacts associated with the construction and operation of the proposed upgrading of TPSTW and Co-digestion Facilities. The purpose of the assessment is to evaluate the acceptability of the predicted impacts to air quality.

3.13.1.2 Potential air quality impacts arising from construction activities have been considered. With implementation of standard construction practices and mitigation measures, no unacceptable impact on ASRs during the construction phase is anticipated.

3.13.1.3 Potential odour impacts from the operation of the TPSTW have been quantitatively assessed. With the proper implementation of the proposed plant design, provision of adequate ventilation and appropriate deodorization systems, the predicted maximum 5-second odour concentrations at the identified ASRs would comply with the odour criterion stipulated in the *EIAO-TM*. Hence, adverse air quality impact arising from the operational phase of the Project is not anticipated.

3.13.1.4 Notwithstanding the above, regular site inspections will be carried out during the construction phase in order to confirm that the mitigation and control measures are properly implemented and are working effectively. During the operational phase, commissioning test is recommended to be conducted prior to operation of the new facilities of the Project to ascertain the effectiveness of the proposed odour control measures. Odour patrol is also proposed during the period of maintenance of the deodorization system for the upgraded TPSTW and Co-digestion Facilities.