4 AIR QUALITY IMPACT

4.1 Legislation, Standards and Guidelines

4.1.1 General

4.1.1.1 The relevant legislations, standards and guidelines applicable to the present study for the assessment of air quality impacts include:

- Air Pollution Control Ordinance (APCO) (Cap 311);
- Air Pollution Control (Construction Dust) Regulation;
- Hong Kong Planning Standards and Guidelines (HKPSG); and
- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499), Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO), Annex 4 and Annex 12.

4.1.2 Air Quality Objectives

4.1.2.1 The principal legislation for controlling air pollutants is the APCO (Cap 311) and its subsidiary regulations, which defines statutory Air Quality Objectives (AQOs).

4.1.2.2 The APCO (Cap.311) provides the power for controlling air pollutants from a variety of stationary and mobile sources and encompasses a number of Air Quality Objectives (AQOs). In addition to the APCO, the following overall policy objectives are laid down in Chapter 9 of the Hong Kong Planning Standards and Guidelines (HKPSG) as follows:

- Limit the contamination of the air in Hong Kong, through land use planning and through the enforcement of the APCO to safeguard the health and well-being of the community; and
- Ensure that the AQOs for 7 common air pollutants are met as soon as possible.

4.1.2.3 The prevailing AQOs are summarized in **Table 4.1** below.

Table 4.1 Hong Kong Air Quality Objectives (HKAQOs)

Pollutant	Limits on Concentration, µg/m^3 [1] (Number of Exceedance per year allowed in brackets)				
	10-min	1-hour	8-hour	24-hour [2]	Annual [2]
Sulphur Dioxide	500 (3)			125 (3)	
Respirable Suspended Particulates (RSP) [3]				100 (9)	50 (0)
Fine Suspended Particulates (FSP) [4]				75 (9)	35 (0)
Carbon Monoxide		30,000 (0)	10,000 (0)		
Nitrogen Dioxide		200 (18)			40 (0)
Ozone			160 (9)		

Pollutant	Limits on Concentration, µg/m^3 [1] (Number of Exceedance per year allowed in brackets)				
	10-min	1-hour	8-hour	24-hour [2]	Annual [2]
Lead					0.5 (0)

Notes:
[1] Measured at 293K and 101.325kPa.
[2] Arithmetic mean.
[3] Respirable suspended particulates means suspended particulates in air with a nominal aerodynamic diameter of 10 micrometres or smaller.
[4] Fine suspended particulates means suspended particulates in air with a nominal aerodynamic diameter of 2.5 micrometres or smaller.

4.1.3 Air Pollution Control (Construction Dust) Regulation

4.1.3.1 The Air Pollution Control (Construction Dust) Regulation specifies processes that require special dust control. The Contractors are required to inform the EPD and adopt proper dust suppression measures while carrying out "Notifiable Works" (which requires prior notification by the regulation) and "Regulatory Works" to meet the requirements as defined under the regulation.

4.1.4 Total Suspended Particulate Criterion

4.1.4.1 There is no criterion on TSP under the AQOs. In accordance with Annex 4 of TM-EIAO, a limit of 500µg/m^3 for 1-hour TSP concentration at any sensitive receivers should be adopted for evaluating air quality impacts.

4.1.5 Odour Criterion

4.1.5.1 In accordance with Annex 4 of TM-EIAO, a limit of 5 odour units based on a time-averaging period of 5 seconds should not be exceeded at any sensitive receivers.

4.2 Description of the Environment

4.2.1 Baseline Condition

4.2.1.1 Historical air quality monitoring data from the Air Quality Monitoring Stations (AQMSs) operated by EPD have been examined. The nearest EPD AQMS is located at Yuen Long. The air quality monitoring data monitored at Yuen Long AQMS for recent 5 years (i.e. Year 2010 to Year 2014) are tabulated in **Table 4.2**.

Table 4.2 Air Quality Monitoring Data (Yuen Long AQMS, 2010-2014)

Pollutant	Year	Highest 1-hour Conc. beyond the allowed exceedance (µg/m^3) [1] [2]	Highest 8-hour Conc. beyond the allowed exceedance (µg/m^3) [1] [2]	Highest 24-hour Conc. beyond the allowed exceedance (µg/m^3) [1] [2]	Annual Conc. (µg/m^3) [1] [2]
SO_2	2010	-	-	36	-
	2011	-	-	33	-
	2012	-	-	29	-
	2013	-	-	33	-
	2014	92 [4]	-	27	-

Pollutant	Year	Highest 1-hour Conc. beyond the allowed exceedance ($\mu g/m^3$)[1] [2]	Highest 8-hour Conc. beyond the allowed exceedance ($\mu g/m^3$) [1] [2]	Highest 24-hour Conc. beyond the allowed exceedance ($\mu g/m^3$) [1] [2]	Annual Conc. ($\mu g/m^3$) [1] [2]
	5-year mean	-	-	32 [25%]	-
	AQOs	500 (3) [4]	N/A	125 (3)	N/A
NO_2	2010	194	-	-	**54**
	2011	188	-	-	**54**
	2012	147	-	-	**49**
	2013	183	-	-	**54**
	2014	165	-	-	**52**
	5-year mean	175 [88%]	-	-	**53 [133%]**
	AQOs	200 (18)	N/A	N/A	40
CO	2010	2,730	2,318	-	-
	2011	3,210	2,610	-	-
	2012	2,200	1,945	-	-
	2013	2,690	1,950	-	-
	2014	2,560	2319	-	-
	5-year mean	2,678 [9%]	2228 [22%]	-	-
	AQOs	30,000 (0)	10,000 (0)	N/A	N/A
O_3	2010	-	136	-	-
	2011	-	**163**	-	-
	2012	-	**185**	-	-
	2013	-	**163**	-	-
	2014	-	**177**	-	-
	5-year mean	-	**165 [103%]**	-	-
	AQOs	N/A	160 (9)	N/A	N/A
RSP (PM_{10})	2010	-	-	**115**	49
	2011	-	-	**111**	**54**
	2012	-	-	100	44
	2013	-	-	**142**	**56**
	2014	-	-	**124**	50
	5-year mean	-	-	**118 [118%]**	**51 [102%]**
	AQOs	N/A	N/A	100 (9)	50
FSP ($PM_{2.5}$)	2010	-	-	73	32
	2011	-	-	**76**	**36**
	2012	-	-	65	29

Pollutant	Year	Highest 1-hour Conc. beyond the allowed exceedance ($\mu g/m^3$)[1] [2]	Highest 8-hour Conc. beyond the allowed exceedance ($\mu g/m^3$) [1] [2]	Highest 24-hour Conc. beyond the allowed exceedance ($\mu g/m^3$) [1] [2]	Annual Conc. ($\mu g/m^3$) [1] [2]
	2013	-	-	**106**	**37**
	2014	-	-	**86**	35
	5-year mean	-	-	**81 [108%]**	34 [97%]
	AQOs	N/A	N/A	75 (9)	35

Note:

[1] Underlined and **bold** values mean exceedance of the AQOs.

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

[3] Percentages (%) of the AQOs are shown in [ ]. The 5-year means are the arithmetic average.

[4] Values are given as 4th highest 10-minute SO_2 concentrations. The 10-minute SO_2 monitoring data is only available in Year 2014 from the EPD's "Air Quality in Hong Kong".

[5] N/A – Not applicable since there are no AQOs for these parameters.

[6] In consideration of the numbers of exceedances allowance in the AQOs, the 4th highest 10-minute and 24-hr SO_2, 19th highest 1-hr NO_2, 10th highest 8-hr Ozone, 10th highest 24-hour RSP and 10th highest 24-hour FSP concentrations are presented in above Table.

4.2.1.2 Based on the monitoring data, there was a decreasing trend for the 19th highest 1-hour NO_2 concentration. The 19th highest 1-hour NO_2 concentration ranged from 147µg/m^3 in Year 2012 to 194µg/m^3 in Year 2010. All years complied the AQOs of 200 µg/m^3. There was no obvious trend for the annual NO_2 concentration, ranging from 49µg/m^3 to 54µg/m^3. All five years exceeded the AQOs of 40µg/m^3.

4.2.1.3 There was no obvious trend for 10th highest 24-hour RSP concentration, ranging from 100µg/m^3 in Year 2012 to 142µg/m^3 in Year 2013, all exceeding the AQOs of 100 µg/m^3 except in Year 2012. No obvious trend for annual RSP was also observed from Year 2010 to Year 2014. The annual RSP concentration ranged from 44 to 56µg/m^3. Non-compliances of AQOs of 50µg/m^3 were recorded in Year 2011 and Year 2013.

4.2.1.4 There was no obvious trend for 10th highest 24-hour FSP concentration, ranging from 65µg/m^3 to 106µg/m^3. Non-compliances of the AQOs of 75µg/m3 were recorded in Year 2011, Year 2013 and Year 2014. No obvious trend for annual FSP was also observed from Year 2010 to Year 2014. The annual FSP concentration ranged from 29 to 37µg/m^3. Non-compliances of AQOs of 35µg/m^3 were recorded in Year 2011 and Year 2013.

4.2.1.5 There was an increasing trend for the 10th highest 8-hour O_3 concentration, ranging from 136µg/m^3 in Year 2010 to 185µg/m^3 in Year 2012. All the 10th highest 8-hour O_3 concentration exceeded the AQOs of 160 µg/m^3 except in Year 2010. According to EPD's "Air Quality in Hong Kong", O_3 is not a pollutant directly emitted from man-made sources but formed by photochemical reactions of primary pollutants such as NOx and volatile organic compound (VOC) under sunlight. As it takes several hours for these photochemical reactions to take place, O_3 recorded in one place could be attributed to VOC and NO_x emission from places afar. Hence, the exceedances of O_3 is due to regional air pollution problem.

4.2.1.6 Monitoring records of SO_2 and CO indicated that the concentrations of SO_2 and CO were in relatively low level and well within the AQOs in previous 5 years.

4.2.2 Future Ambient Air Quality

4.2.2.1 The ambient air quality described in **Section 4.2.1** is based on historical data. According to the 12th meeting of the Hong Kong-Guangdong Joint Working Group on Sustainable Development and Environmental Protection (JWGSDEP) on 23 November 2012, both Hong Kong Government and Guangdong Government have endorsed a major air pollutant emission reduction plan for the Pearl River Delta (PRD) region up to 2020 and agreed on key environmental cooperation actions leading to Year 2013. In the 13th, 14th and 15th meeting of the JWGSDEP on 13 January 2014, 19 March 2015 and 14 December 2015 respectively, it was further agreed to continue to take forward the PRD Regional Air Quality Management Plan and implement enhanced emission reduction measures.

4.2.2.2 According to the latest construction programme, the construction of the Project will commence in Year 2018 and complete in Year 2022. In order to predict the ambient air quality taking into account the pollution emission reduction plan, the regional air quality model developed by EPD, PATH-2016 (Pollutants in the Atmosphere and their Transport over Hong Kong) model, was adopted. As Year 2018 is closed to Year 2020, the PATH-2016 modelling result in Year 2020 provided by EPD is adopted for this study. The pollutants concentrations predicted by PATH-2016 in Year 2020 are summarized in **Table 4.3** and the locations of the concerned PATH grids are illustrated in **Figure 4.1**.

Table 4.3 Summary of PATH-2016 background in Year 2020

Pollutant	PATH Grids	Highest 1-hour Conc. beyond the allowed exceedance (µg/m³)[1]	Highest 8-hour Conc. beyond the allowed exceedance (µg/m³)	Highest 24-hour Conc. beyond the allowed exceedance (µg/m³)	Annual Conc. (µg/m³)
SO_2	24_46	114	-	26	-
	24_47	111	-	26	-
	24_48	110	-	26	-
	25_46	112	-	26	-
	25_47	112	-	26	-
	25_48	111	-	26	-
	AQOs	500 (3)	N/A	125 (3)	N/A
NO_2	24_46	93	-	-	23
	24_47	95	-	-	24
	24_48	94	-	-	23
	25_46	112	-	-	26
	25_47	114	-	-	28
	25_48	95	-	-	25
	AQOs	200 (18)	N/A	N/A	40
CO	24_46	1,024	901	-	-
	24_47	1,010	898	-	-

Pollutant	PATH Grids	Highest 1-hour Conc. beyond the allowed exceedance ($\mu g/m^3$)[1]	Highest 8-hour Conc. beyond the allowed exceedance ($\mu g/m^3$)	Highest 24-hour Conc. beyond the allowed exceedance ($\mu g/m^3$)	Annual Conc. ($\mu g/m^3$)
	24_48	1,051	893	-	-
	25_46	1,064	922	-	-
	25_47	1,004	917	-	-
	25_48	1,099	910	-	-
	AQOs	30,000 (0)	10,000 (0)	N/A	N/A
O_3	24_46	-	158	-	-
	24_47	-	158	-	-
	24_48	-	160	-	-
	25_46	-	154	-	-
	25_47	-	153	-	-
	25_48	-	156	-	-
	AQOs	N/A	160 (9)	N/A	N/A
RSP[5]	24_46	-	-	94	41
	24_47	-	-	93	41
	24_48	-	-	94	42
	25_46	-	-	94	42
	25_47	-	-	94	42
	25_48	-	-	94	41
	AQOs	N/A	N/A	100 (9)	50
FSP[4] [6]	24_46	-	-	70	30
	24_47	-	-	69	29
	24_48	-	-	69	29
	25_46	-	-	69	30
	25_47	-	-	70	30
	25_48	-	-	70	30
	AQOs	N/A	N/A	75 (9)	35

Note:

[1] Values are given as highest 10-minute SO_2 concentrations.

[2] Values in ( ) indicate number of exceedance allowed under the AQOs.

[3] In consideration of the number of exceedance allowance of the AQOs, the values presented indicate the concentration levels beyond the AQOs allowance limit, details as below:
- 4^{th} highest concentration for 24-hour SO_2;
- 19^{th} highest concentration for 1-hour NO_2; and
- 10^{th} highest concentration for 8-hour O_3, 24-hour RSP and 24-hour FSP.

[4] FSP concentrations were estimated in accordance with EPD's "Guidelines on the Estimation of $PM_{2.5}$ for Air Quality Assessment in Hong Kong".

[5] According to Section 2.8 of EPD's "Guideline on Choices of Models and Model Parameters", adjustment of PATH-2016's output of RSP concentrations by adding 37.6μg/m^3 and 21.9μg/m^3 into 10th highest daily RSP concentration and annual RSP concentration have been followed respectively.

[6] According to EPD's "Guidelines on the Estimation of $PM_{2.5}$ for Air Quality Assessment in Hong Kong", conservation factor of 0.75 and 0.71 are adopted for converting daily and annual RSP concentrations into daily and annual FSP concentrations respectively. Refer to Footnote [5], 28.2μg/m^3 (i.e. 37.6x0.75) and 15.5μg/m^3 (i.e. 21.9x0.71) are added into the 10th highest daily FSP concentration and annual FSP concentration

4.2.2.3 It could be seen from the above tables that, future background air quality in Year 2020 would be improved from the existing background air quality in general. All the parameters would fully comply with the AQOs.

4.3 Air Sensitive Receivers

4.3.1.1 In accordance with Annex 12 of the TM-EIAO, Air Sensitive Receivers (ASRs) include domestic premises, hotel, hostel, hospital, clinic, nursery, temporary housing accommodation, school, educational institution, office, factory, shop, shopping centre, place of public worship, library, court of law, sports stadium or performing arts centre. Any other premises or places with which, in terms of duration or number of people affected, has a similar sensitivity to the air pollutants as the aforementioned premises and places would also be considered as a sensitive receiver. Representative ASRs within a distance of 500m from the Site boundary have been identified.

4.3.1.2 Existing ASRs are identified by means of reviewing topographic maps, aerial photos, land status plans and will be supplemented by site inspections. They mainly include developed residential buildings, industrial buildings, educational institutions, parks, sports stadiums, village houses, a theatre, etc.

4.3.1.3 Planned/committed ASRs are identified by making reference to relevant Outline Zoning Plans (OZP), Outline Development Plans, Layout Plans and other published plans in the vicinity of the development, including:

- Yuen Long Outline Zoning Plan (No. S/YL/22).

4.3.1.4 The locations of representative ASRs for air quality impact assessment are summarized in **Table 4.4** and their locations are shown in **Figure 4.1**.

Table 4.4 Representative air sensitive receivers

ASR ID	Description	Land Use	Distance from the site boundary (approx.)
Existing ASRs			
AE-01	Hor Ping House, Long Ping Estate	Residential	140m
AE-02	Village House, Tai Kiu Tsuen	Residential	<10m
AE-03	Po Fai Building	Residential	<10m
AE-04	Man Yip Building	Residential	<10m
AE-05	Fook On House	Residential	10m
AE-06	Healey House	Residential	<10m
AE-07	Wah Cheung Mansion	Residential	<10m
AE-08	Kin Sing Building	Residential	<10m

ASR ID	Description	Land Use	Distance from the site boundary (approx.)
AE-09	Yuen Long Building	Residential	<10m
AE-10	Chun Kwong Primary School	Educational	<10m
AE-11	Yuen Tung House	Residential	<10m
AE-12	Chi King House	Residential	<10m
AE-13	Yuen Cheung House	Residential	<10m
AE-14	Block A Siu Fung Building	Residential	<10m
AE-15	Happy House	Residential	<10m
AE-16	Ho Sing building	Residential	10m
Planned ASRs[1]			
AP-01	West Rail Long Ping Station (North) Property Development	Residential	90m
AP-02	West Rail Long Ping Station (South) Property Development	Residential	<10m
AP-03	West Rail Long Ping Station (South) Property Development	Residential	<10m
AP-04	Proposed comprehensive commercial / residential development at Tai Kiu Tsuen	Residential	Within the site boundary
AP-05	Proposed comprehensive commercial / residential development at Tai Kiu Tsuen	Residential	Within the site boundary

Note:
[1] The construction works of the planned ASRs would be completed in:
- West Rail Long Ping Station (North) Property Development – Year 2018
- West Rail Long Ping Station (South) Property Development – Year 2019
- Proposed comprehensive commercial / residential development at Tai Kiu Tsuen – No Information available.

4.4 Construction Phase Impact Assessment

4.4.1 Identification of Pollution Sources and Pollutants

4.4.1.1 The key air pollution sources in the vicinity of the Project that may upon the air quality during construction phase include dust emission associated with the construction activities due to the Project and the concurrent project, and odour emission from the excavated materials, such as soil and sediment.

Construction Dust Emission from the Project

4.4.1.2 During the construction phase, at-grade heavy construction activities would generate fugitive dust with potential impacts on neighbouring ASRs from various construction activities, including site clearance, temporary erection and piling works, and wind erosion of the Site. Potential dust impact from other construction activities such as column and tables top construction, steel works and road works (i.e. landscaping work mainly) are considered to be minor and no associated adverse dust impact is anticipated.

4.4.1.3 However, the above mentioned works will be confined within small work area and it is understood that construction activities will not be taken place on the entire work sites at the same time, but to be undertaken at moving multiple work fronts. According to the latest construction methodology, there would be a number of small active areas (i.e. the area with construction works concurrently occur) scattering in the vicinity of the nullah. Given the site constraints, each of these active areas with potential dust generating activities would be relatively small, in the order of 100-150m^2. Besides, all these active work areas would not be conducted concurrently. Based on the latest construction programme, the total active working area of the Project at any time during the construction phase will not exceed 700m^2. During the peak construction months (i.e. with estimated total active working area of about 700m^2), the key construction activities include piling works. Refer to the locations of workfronts shown in **Appendix 4.1**, these active working areas are scattered along the length of the proposed elevated pedestrian corridor of about 540m. Besides, the active working area of piling works will be separated from another active working area by more than 50m during majority of the construction period based on the construction programme.

4.4.1.4 In consideration of the construction activities will be conducted in relatively small active working area scattered long the nullah, significant dust emission from the construction activities is not expected. Detail information is given in **Appendix 4.1**.

4.4.1.5 In addition, majority of above mentioned works will be conducted within the Yuen Long Town Nullah which is about 4m to 5m lower than the ground level of the surrounding ASRs. Dust dispersion from the work area within the nullah to the surrounding ASRs is considered unlikely.

4.4.1.6 In consideration of no significant dust emission and dust dispersion from the work area to the surrounding ASRs, adverse construction dust impact at the ASRs is not anticipated. Therefore, quantitative construction dust assessment is considered unnecessary.

Emission from Fuel Combustion Equipment / Vehicles to be used during Construction Work of the Project

4.4.1.7 Fuel combustion from the use of Powered Mechanical Equipment (PME) during construction works could be a source of NO_2, SO_2 and CO. To improve air quality and protect public health, EPD has introduced the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation, which came in operation on 1 June 2015, to regulate emissions from machines and non-road vehicles. Starting from 1 December 2015, only approved or exempted non-road mobile machinery are allowed to be used in construction sites. Hence, with the effect of the Regulation, the emissions from PMEs are considered relatively small and will not cause adverse air quality impact. Therefore, quantitative assessment on emission from fuel combustion equipment is considered unnecessary.

4.4.1.8 According to the Traffic Census 2014 published by the Transport Department (TD), the annual average daily traffic (AADT) of the major roads within 500m assessment area, including Yuen Long On Ning Road, Castle Peak Road (Yuen Long Section) and Kau Yuk Road are 17240, 36490 and 14260 in Year 2014 respectively. The construction vehicles required for the Project would be in total of not more than 10 trips per hour and the vehicles would leave the site through two different vehicles exits (one located near Tai Shu Ha Road West and one located near Wang Lok Street). The emissions from construction vehicles are considered relatively small

and will not cause adverse air quality impact. Therefore, quantitative assessment on vehicular emission during construction phase is considered unnecessary.

Odour Emission from the Project

4.4.1.9 During the construction phase, excavation of potential odorous materials, such as soil and sediment, is required during piling works. The excavation works will be conducted along the edges and within the Yuen Long Town Nullah in multiple workfronts which would be in small size and scattered along the nullah as mentioned in **Section 4.4.1.3**. According to the previous drilling records, only a small quantity of sediment was found along the eastern edge of the nullah near Tai Kiu Tsuen. Therefore, it is anticipated that very small quantity (i.e. 20,550m^3) of excavated materials, in which small amount (i.e. less than 100m^3) of sediment with potential odour emission present, will be generated and stored on-site simultaneously that the excavated sediment will be removed from site as soon as possible and overnight storage will be avoided. In addition, the odorous excavated materials will be placed away from the sensitive receivers as far as possible and covered with tarpaulin sheets during storage and transportation to minimize the odour emission. Hence, adverse odour impact is therefore not anticipated with the implementation of good site practice as recommended in **Section 4.4.3**. Therefore, quantitative odour impact assessment is considered unnecessary.

Concurrent Project

4.4.1.10 The tentative commencement year for the construction of the Project is Year 2018 with target full completion in Year 2022. Concurrent projects in the vicinity of the Project, which may have cumulative environmental impacts, have been discussed in **Section 3.5**. Key concurrent projects of air quality concern during the construction phase of the Project have been identified and are summarised in the **Table 4.5**. The implementation programme of these concurrent projects are provided by the respective project proponents. Where information is not available, references have been made to the best available information such as respective project proponents' websites.

Table 4.5 Key concurrent projects for construction dust assessment and odour assessment during construction phase

Key Concurrent Projects	Tentative Programme		Potential Cumulative Impact
	Start	Complete	
West Rail Long Ping Station (North) Property Development	2013	2018	Construction Dust
West Rail Long Ping Station (South) Property Development	2014	2019	Construction Dust

West Rail Long Ping Station (North) Property Development

4.4.1.11 For the West Rail Long Ping Station (North) Property Development, the construction period will overlap with the Project in Year 2018.

4.4.1.12 In consideration of the major construction activities of the property development will be construction of superstructures, no significant construction dust will be generated. Hence, no adverse construction dust impact is anticipated and quantitative construction dust assessment is therefore considered unnecessary.

West Rail Long Ping Station (South) Property Development

4.4.1.13 For the West Rail Long Ping Station (South) Property Development, the construction period will overlap with the Project in Year 2018 and Year 2019.

4.4.1.14 In consideration of the major construction activities of the property development will be construction of superstructures, no significant construction dust will be generated. Hence, no adverse construction dust impact is anticipated and quantitative construction dust assessment is therefore considered unnecessary.

4.4.2 Prediction and Evaluation of Cumulative Environmental Impacts

Construction Dust Impact

4.4.2.1 As mentioned in **Section 4.4.1**, the Project will not generate significant dust emission during the construction works due to small scale of construction works and construction activities will be conducted at moving multiple work fronts. Besides, majority of the construction works with potential dust generation will be conducted within the Yuen Long Town Nullah that is about 4m to 5m lower than the ground level of the surrounding ASRs. Hence, dust dispersion from the work area to the ASRs is also considered unlikely. Therefore, adverse construction dust impact is not anticipated from the Project.

4.4.2.2 In consideration of both the Project and concurrent projects will not generate significant dust emission. Adverse cumulative construction dust impact is not anticipated. Nevertheless, dust suppression measures are recommended in **Section 4.4.3** to minimize the potential dust emission from the Project.

Emission from Fuel Combustion Equipment / Vehicles to be used during Construction Work of the Project

4.4.2.3 As mentioned in **Section 4.4.1,** the emission from the PMEs and construction vehicles from the Project is relatively small and will not contribute to adverse air quality impact. Hence, adverse cumulative air quality impact is not anticipated.

Odour Impact

4.4.2.4 As mentioned in **Section 4.4.1**, the excavation works will be conducted along the edges and within the Yuen Long Town Nullah in multiple workfronts which would be in small size scattered along the nullah. According to the previous drilling records, only a small quantity of sediment was found along the eastern edge of the nullah near Tai Kiu Tsuen. Potential odour emission and adverse odour impact is therefore not anticipated with the implementation of good site practice as recommended in **Section 4.4.3**.

4.4.2.5 In consideration of both the Project and concurrent projects will not generate significant odour emission. Adverse cumulative odour impact is not anticipated.

4.4.3 Mitigation Measures

4.4.3.1 According to **Section 4.4.2**, adverse cumulative construction dust and odour impact is not anticipated. Therefore, no mitigation measure is required during the construction phase. However, dust suppression measures and odour control measures are recommended to minimize the potential construction dust and odour emission from the Project.

Dust Suppression Measures

4.4.3.2 The Contractor is recommended to follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation. It stipulates the construction dust control requirements for both Notifiable and Regulatory Works to be carried out by the Contractor. The following dust suppression measures should be incorporated by the Contractor to control the dust nuisance throughout the construction phase:

- Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading;
- Any dusty material remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads;
- A stockpile of dusty material should not extend beyond the pedestrian barriers, fencing or traffic cones;
- The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak form the vehicle;
- Where practicable, vehicles washing facilities including a high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;
- When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period;
- The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials;
- Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously;
- Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the three sides;
- Immediately before leaving a construction site, every vehicle shall be washed to remove any dusty materials from its body and wheels;
- Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; and
- Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shortcrete or other suitable surface stabiliser within six months after the last construction activity

on the construction site or part of the construction site where the exposed earth lies.

Odour Control Measures

4.4.3.3 The Contractor is recommended to implement the following good site practices to control the odour nuisance throughout the construction phase:

- The odorous excavated materials should be placed away from the sensitive receivers as far as possible;
- The odorous excavated materials should be properly covered with tarpaulin sheets during storage and transportation to minimize the odour emission;
- The odorous excavated materials should be removed from the construction site as soon as possible; and
- Overnight on-site storage of odorous materials should be avoided.

4.4.3.4 These requirements should be incorporated into the contract specification for the civil work. In addition, a monitoring and audit programme during the construction phase should be implemented by the project proponent to ensure the recommended dust suppression and odour control measures have been implemented properly. Detailed requirements for the environmental monitoring and audit (EM&A) programme are given separately in the EM&A Manual.

4.4.4 EM&A Requirement

4.4.4.1 Refer to the **Section 4.4.2**, adverse cumulative construction dust and odour impact is not anticipated during the construction phase. Therefore, air quality and odour monitoring are not required. Regular site audits will be conducted to ensure compliance of the relevant requirements of the Air Pollution Control (Construction Dust) regulation and the implementation of the proposed odour control measures.

4.4.5 Residual Environmental Impacts

4.4.5.1 No adverse residual air quality impact is anticipated during the construction phase.

4.5 Operational Phase Impact Assessment

4.5.1 Identification of Pollution Sources

4.5.1.1 The Project is an elevated pedestrian corridor with associated infrastructures. There will be no air pollutants and odour emission sources during operation of the Project.

4.5.2 Prediction and Evaluation of Cumulative Environmental Impacts

4.5.2.1 As mentioned in **Section 4.5.1**, there is no identified air pollutants and odour emission sources of the Project during operational phase. Therefore, adverse cumulative air quality impact is not anticipated.

4.5.3 Mitigation Measures

4.5.3.1 As adverse cumulative air quality impact is not anticipated, no mitigation measures will be required during the operational phase.

4.5.4 EM&A Requirement

4.5.4.1 As there is no adverse cumulative air quality anticipated and no mitigation measures would be required. Hence, no EM&A programme is required during the operational phase.

4.5.5 Residual Environmental Impacts

4.5.5.1 No adverse residual air quality impact is anticipated during the operational phase.

4.6 Conclusion

4.6.1 Construction Phase

4.6.1.1 Potential dust impact would be generated from the various construction activities, including site clearance, temporary erection and piling works, and wind erosion during the construction phase. A qualitative construction dust assessment has therefore been conducted for the construction of Project. The assessment result indicated that no adverse cumulative construction dust impact is anticipated. However, dust control measures are recommended to minimize the potential dust emission from the Project.

4.6.1.2 Emission from PMEs and construction vehicles are other source of air pollution during the construction phase. A qualitative air quality assessment has therefore been conducted. Assessment results indicate that no adverse cumulative air quality impact is anticipated.

4.6.1.3 Besides, odour impact would be generated from the excavated materials, such as soil and sediment, during the construction activities. A qualitative odour impact assessment has therefore been conducted for the construction of Project. The assessment result indicated that no adverse cumulative odour impact is anticipated. However, odour control measures are recommended to minimize the potential odour emission from the Project.

4.6.2 Operational Phase

4.6.2.1 The Project is an elevated pedestrian corridor with associated infrastructures. There will be no air pollutants and odour emission sources during operation of the Project. Hence, no adverse cumulative air quality impact is anticipated.