

3 AIR QUALITY ASSESSMENT

3.1 Overview

This section describes the potential air quality impacts associated with the construction and operation of the NENT NDAs. Construction dust impact has been assessed. With the implementation of practical mitigation measures, adverse construction dust impact is not anticipated.

During operational phase, vehicular emission from the associated road traffic and the odour emission of sewerage treatment works have been investigated. The predicted air quality impacts due to vehicular emission and chimney emissions are well within acceptable levels when comparing to the prevailing Air Quality Objectives (AQO).

Odour levels of the proposed SWHSTW expansion in FLN, which will be equipped with an odour removal system, are predicted at the identified air sensitive receivers (ASRs) to be in compliance with the odour criterion. Adverse odour impacts due to the project are not anticipated.

The air quality impact assessment has been conducted in accordance with the requirements of Annexes 4 and 12 of the TM-EIAO as well as the requirements set out under Clause of the EIA Study Brief.

3.2 Environmental Legislation, Standards and Guidelines

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

- Air Pollution Control Ordinance (APCO) (Cap 311);
- Air Pollution Control (Construction Dust) Regulation;
- Environmental Impact Assessment Ordinance (EIAO) (Cap. 499), Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO), Annex 4 and Annex 12; and
- Practice Note on Control of Air Pollution in Vehicle Tunnels.

3.2.1 Air Quality Objectives

The principal legislation for controlling air pollutants is the APCO and its subsidiary regulations, which define statutory Air Quality Objective (AQOs) for 7 common air pollutants. The AQOs for these air pollutants are tabulated in **Table 3.1** below.

Table 3.1 – Hong Kong Air Quality Objectives

Pollutant	Concentration in micrograms per cubic metre ^[1] (Parts per million, ppm in brackets)				
	1 Hour ^[2]	8 Hours ^[3]	24 Hours ^[3]	3 Months ^[4]	1 Year ^[4]
Sulphur Dioxide	800 (0.3)		350 (0.13)		80 (0.03)
Total Suspended Particulates	500 ^[7]		260		80
Respirable Suspended Particulates ^[5]			180		55
Carbon Monoxide	30,000 (26.2)	10,000 (8.7)			
Nitrogen Dioxide	300 (0.16)		150 (0.08)		80 (0.04)
Photochemical Oxidants (as ozone) ^[6]	240				
Lead				1.5	

Notes:

[1] Measured at 298K and 101.325 kPa.

[2] Not to be exceeded more than three times per year.

[3] Not to be exceeded more than once per year.

[4] Arithmetic mean.

[5] Respirable suspended particulates means suspended particulates in air with a nominal aerodynamic diameter of 10 micrometres or smaller.

[6] Photochemical oxidants are determined by measurement of ozone only.

[7] Not an AQO but is a criterion for evaluating air quality impacts as stated in Technical Memorandum on Environmental Impact Assessment Process.

3.2.2 Air Pollution Control (Construction Dust) Regulation

The Air Pollution Control (Construction Dust) Regulation identifies works that require special dust control. Works relevant to this Project are the site formation and infrastructure elements, for which Total Suspended Particulates (TSP) concentration shall not exceed the respective criterion in **Table 3.1**.

3.2.3 Odour Criteria

In accordance with Annex 4 of TM-EIAO, the limit of 5 odour units based on an averaging time of 5 seconds for odour prediction assessment should not be exceeded at any sensitive receivers.

3.3 Description of Environment

3.3.1 Assessment Area

With reference to the EIA Study Brief, the assessment area for air quality impact assessment should generally be defined by a distance of 500 metres expanded from the boundary of the NDAs and associated infrastructure works. **Figures 2.1 and Figures 2.2** show the proposed landuse for each NDA, associated works, and 500m assessment boundary. The assessment includes existing and planned sensitive receivers in the assessment area. Potential sources of impact within the assessment area are identified, where appropriate.

3.3.2 Baseline Condition

There is no EPD baseline air quality monitoring station (AQMS) within the Study Area. According to Appendix B-2 Section 3.2 of the EIA Study Brief for this project, the district of Shatin, Tai Po, Junk Bay, Hong Kong South and Yuen Long are Rural/New Development areas. The mean of the annual average concentrations monitored at these 5 districts could therefore be adopted to represent the baseline concentrations for the current study area. However, there is no monitoring station in Hong Kong South and Tseung Kwan O. Air quality monitoring data is not available for the two AQMS. The latest 5 published years of available air quality monitoring data, i.e. 2007 to 2011 are tabulated in **Table 3.2** below:

Table 3.2 – Air quality monitoring data in Year 2007-2011

Pollutant	Station	Annual Concentration ($\mu\text{g}/\text{m}^3$)					5-year Mean
		2007	2008	2009	2010	2011	
NO ₂	Shatin	45	44	40	42	45	48.5
	Tai Po	53	52	45	46	45	
	Yuen Long	55	56	52	54	54	
RSP	Shatin	52	50	45	45	47	50.5
	Tai Po	53	50	46	45	46	
	Yuen Long	64	60	51	49	54	
TSP	Shatin	73	66	60	67	66	73.1
	Tai Po	73	73	60	64	69	
	Yuen Long	97	87	77	78	86	
SO ₂	Shatin	19	17	11	12	14	14.3
	Tai Po	16	17	9	8	8	
	Yuen Long	24	21	14	11	13	

Notes:

[1] Air quality data not available.

In view of the air quality data between 2007 and 2011, the annual averaged concentrations of air pollutants (e.g. NO₂, RSP) showed a gradual decreasing trend. The 5-year mean of annual average concentrations at Shatin, Tai Po, Tseung Kwan O, Hong Kong South and Yuen Long Monitoring Stations in 2007 – 2011 have been taken as the baseline air quality data.

3.4 Air Sensitive Receivers

The representative air sensitive receivers (ASRs) within 500m from the boundary of NDAs and associated road network have been identified. These include any domestic premises, hotel, 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. Existing ASRs outside the site boundary mainly comprise village houses and residential developments.

The existing and planned ASRs outside the NDA boundary were identified from topographic maps, aerial photos, land status plans and site surveys. Planned ASRs within the NDA boundary were identified by making reference to the Recommended Outline Development Plans (RODP) mentioned in **Section 2.3**, Population Intake Programme and Implementation Programme.

Since the population intake would proceed in phases, certain land-lots of existing ASRs inside the NDAs would be resumed for development and some of the planned ASRs would exist before the Project development is fully completed. Therefore, consideration of the phased development over time has been taken to identify ASRs, representative of the different implementation stages of the Project.

The locations of representative existing ASRs within the 500m assessment area of KTN and FLN NDAs and are shown in **Figure 3.1 and Figure 3.2**, and tabulated in **Table 3.3 and Table 3.4** respectively.

Locations of representative planned ASRs within the 500m assessment area of KTN and FLN NDAs have been identified and are shown in **Figure 3.3 and Figure 3.4** and tabulated in **Table 3.5 and Table 3.6** respectively. Details of the future land lots of the Revised RODP (including land uses, building heights) are shown in **Appendix 2.1**.

Table 3.3 – Representative existing ASRs within the 500m assessment area and in the vicinity of KTN NDA

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
Dills Corner Garden	KTN-E1	R	6	within the KTN NDA	2018
	KTN-E3	R	6	within the KTN NDA	2018
	KTN-E4	R	6	within the KTN NDA	2018
	KTN-E5	R	6	within the KTN NDA	2018
	KTN-E6	R	6	within the KTN NDA	2018
	KTN-E7	R	6	within the KTN NDA	2018
	KTN-E8	R	6	within the KTN NDA	2018
	KTN-E9	R	6	within the KTN NDA	2018
	KTN-E10	R	6	within the KTN NDA	2018
	KTN-E11	R	6	within the KTN NDA	2018
Kwu Tung Playground	KTN-E15	RC	1.5	within the KTN NDA	2024
Oil Wah School	KTN-E18	E	12	within the KTN NDA	2024
Home of Loving Faithfulness	KTN-E19	H	9	within the KTN NDA	2024
Temporary Structure near Han Clan Grave	KTN-E20	OU	3	within the KTN NDA	2024
	KTN-E21	OU	3	within the KTN NDA	2024
	KTN-E22	OU	3	within the KTN NDA	2024
Temporary Structure near Sheung Yue River	KTN-E24	OU	3	within the KTN NDA	2025
	KTN-E25	OU	3	within the KTN NDA	2024
	KTN-E26	OU	3	within the KTN NDA	2024

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	KTN-E27	OU	3	within the KTN NDA	2024
Temporary Structure near Shek Tsai Leng	KTN-E28	OU	3	within the KTN NDA	2024
	KTN-E30	OU	3	within the KTN NDA	2024
Shek Tsai Leng Factory	KTN-E31	I	3	within the KTN NDA	2024
	KTN-E32	I	3	within the KTN NDA	2024
	KTN-E33	I	3	within the KTN NDA	2024
	KTN-E34	I	3	within the KTN NDA	2024
	KTN-E35	I	3	within the KTN NDA	2024
	KTN-E36	I	3	within the KTN NDA	2024
	KTN-E37	I	3	within the KTN NDA	2024
	KTN-E38	I	3	within the KTN NDA	2024
	KTN-E39	I	3	within the KTN NDA	2024
Temporary Structure at Fung Kong	KTN-E40	R	3	within the KTN NDA	2024
	KTN-E41	R	3	within the KTN NDA	2024
	KTN-E42	R	3	within the KTN NDA	2024
	KTN-E43	R	3	within the KTN NDA	2024
	KTN-E44	R	3	within the KTN NDA	2024
	KTN-E45	R	3	within the KTN NDA	2024
Shek Tsai Leng Factory	KTN-E46	I	3	within the KTN NDA	2024
Factory near Ho Sheung Heung Road	KTN-E47	I	3	within the KTN NDA	2024
	KTN-E48	I	3	within the KTN NDA	2024
	KTN-E49	I	3	within the KTN NDA	2024

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
Village Houses between Tung Kok and Tung Fong	KTN-E50	R	6	within the KTN NDA	2024
	KTN-E52	R	6	within the KTN NDA	2024
	KTN-E53	R	6	within the KTN NDA	2024
	KTN-E54	R	6	within the KTN NDA	2024
Temporary Structure at Tung Fong	KTN-E55	OU	6	within the KTN NDA	2018
	KTN-E56	OU	6	within the KTN NDA	2018
	KTN-E57	OU	6	within the KTN NDA	2018
	KTN-E58	OU	6	within the KTN NDA	2018
	KTN-E59	OU	6	within the KTN NDA	2018
Temporary Structure at Pak Shek Au	KTN-E60	OU	6	within the KTN NDA	2018
	KTN-E61	OU	6	within the KTN NDA	2018
	KTN-E62	OU	6	within the KTN NDA	2018
	KTN-E63	OU	6	within the KTN NDA	2018
	KTN-E64	OU	6	within the KTN NDA	2018
	KTN-E65	OU	6	within the KTN NDA	2018
	KTN-E67	OU	6	within the KTN NDA	2018
	KTN-E68	OU	6	within the KTN NDA	2018
	KTN-E69	OU	6	within the KTN NDA	2018
	KTN-E70	OU	6	within the KTN NDA	2018
	KTN-E71	OU	6	within the KTN NDA	2018
	KTN-E72	OU	6	within the KTN NDA	2018
	KTN-E73	OU	6	within the KTN NDA	2018

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	KTN-E78	OU	6	within the KTN NDA	2018
	KTN-E79	OU	6	within the KTN NDA	2018
Temporary Structure Western to Yin Kong Tsuen	KTN-E80	OU	3	within the KTN NDA	2024
	KTN-E81	OU	3	within the KTN NDA	2024
	KTN-E82	OU	3	within the KTN NDA	2024
	KTN-E83	OU	3	within the KTN NDA	2024
	KTN-E84	OU	3	within the KTN NDA	2024
	KTN-E85	R	9	within the KTN NDA	2044
Yin Kong Tsuen	KTN-E86	R	9	within the KTN NDA	2044
	KTN-E87	R	9	within the KTN NDA	2044
Sports Ground near Enchi Lodge	KTN-E88	RC	1.5	within the KTN NDA	2044
Temporary Structure near Castle Peak Road	KTN-E89	OU	3	within the KTN NDA	2044
	KTN-E90	OU	3	within the KTN NDA	2044
	KTN-E91	OU	3	within the KTN NDA	2044
Temporary Structure Southern to Ho Sheung Heung Village	KTN-E92	OU	3	within the KTN NDA	2022
	KTN-E93	OU	3	within the KTN NDA	2022
Ho Sheung Heung Temple	KTN-E94	W	3	within the KTN NDA	2044
Ho Sheung Heung Village	KTN-E97	R	9	within the KTN NDA	2044
	KTN-E99	R	9	within the KTN NDA	2044
	KTN-E100	R	9	within the KTN NDA	2044
	KTN-E101	R	9	within the KTN NDA	2044
Temporary Structure Northern to Ho Sheung Heung Village	KTN-E102	OU	3	within the KTN NDA	2044

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
Village Houses near Tsung Yuen	KTN-E104	R	9	within the KTN NDA	2044
	KTN-E106	R	9	within the KTN NDA	2044
	KTN-E108	R	9	within the KTN NDA	2044
Temporary Structure at Tsung Yuen	KTN-E109	R	3	within the KTN NDA	2044
Temporary Structure near Lo Wu Correctional Institution	KTN-E110	OU	3	within the KTN NDA	2044
Lo Wu Correctional Institution Basketball Court	KTN-E111	RC	1.5	within the KTN NDA	2044
Lo Wu Correctional Institution	KTN-E112	IC	3	within the KTN NDA	2044
Temporary Structure near Phoenix Garden	KTN-E113	OU	3	within the KTN NDA	2024
Temporary Structure along Fung Kong Shan	KTN-E114	OU	3	within the KTN NDA	2024
	KTN-E115	OU	3	within the KTN NDA	2024
	KTN-E116	OU	3	within the KTN NDA	2024
	KTN-E117	OU	3	within the KTN NDA	2024
	KTN-E118	OU	3	within the KTN NDA	2024
	KTN-E119	OU	3	within the KTN NDA	2019
	KTN-E120	OU	3	within the KTN NDA	2019
Lo Wu Firing Range (Eastern)	KTN-E123	IC	1.5	within the KTN NDA	2044
Temporary Structure at Ma Tso Lung (Eastern)	KTN-E124	R	3	within the KTN NDA	2024
	KTN-E125	R	3	within the KTN NDA	2024
	KTN-E126	R	3	within the KTN NDA	2024
	KTN-E127	R	3	within the KTN NDA	2024
Lo Wu Firing Range (Western)	KTN-E128	IC	1.5	within the KTN NDA	2044

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
Temporary Structure at Ma Tso Lung (Western)	KTN-E129	OU	3	within the KTN NDA	2024
	KTN-E130	OU	3	within the KTN NDA	2024
	KTN-E131	OU	3	within the KTN NDA	2024
Temporary Structure near Lo Wu Firing Range	KTN-E133	OU	3	within the KTN NDA	2024
	KTN-E134	OU	3	within the KTN NDA	2024
	KTN-E135	OU	3	within the KTN NDA	2024
Giant Soccer Academy	KTN-E136	IC	1.5	within the KTN NDA	2017
Temporary Structure near Fung Kong Shan	KTN-E137	OU	3	within the KTN NDA	2024
	KTN-E138	OU	3	within the KTN NDA	2024
	KTN-E139	OU	3	within the KTN NDA	2024
	KTN-E140	OU	3	within the KTN NDA	2024
Temporary Structure near Giant Soccer Academy	KTN-E141	OU	3	within the KTN NDA	2024
Temporary Structure near Community Sports	KTN-E142	OU	3	within the KTN NDA	2024
Temporary Structure near Fung Kong	KTN-E143	OU	3	within the KTN NDA	2024
	KTN-E145	OU	3	within the KTN NDA	2024
Open Storage near Fung Kong	KTN-E146	OS	1.5	within the KTN NDA	2018
Temporary Structure near Fung Kong	KTN-E148	OS	3	within the KTN NDA	2018
Temporary Structure near Ma Tso Lung Road	KTN-E149	R	3	within the KTN NDA	2018
	KTN-E150	R	3	within the KTN NDA	2018
	KTN-E151	R	3	within the KTN NDA	2018
Temporary Structure near Fung Kong	KTN-E152	R	3	within the KTN NDA	2024

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
Ho Sheung Heung Village	KTN-E154	R	9	within the KTN NDA	2044
	KTN-E155	R	9	within the KTN NDA	2044
	KTN-E156	R	9	within the KTN NDA	2044
Temporary Structure near Dills Corner Garden	KTN-E157	OU	3	within the KTN NDA	2018
	KTN-E158	OU	3	within the KTN NDA	2018
	KTN-E159	OU	3	within the KTN NDA	2018
Kwu Tung Grass Soccer Pitch	KTN-E160	RC	1.5	within the KTN NDA	2024
	KTN-E161	RC	1.5	within the KTN NDA	2024
Temporary Structure near Fanling Highway (near Pak Shek Au)	KTN-E162	OU	3	within the KTN NDA	2044
	KTN-E163	OU	3	within the KTN NDA	2044
	KTN-E164	OU	3	within the KTN NDA	2044
Temporary Structure at Pak Shek Au	KTN-E165	OU	3	within the KTN NDA	2018
	KTN-E166	OU	3	within the KTN NDA	2018
	KTN-E167	OU	3	within the KTN NDA	2018
	KTN-E168	OU	3	within the KTN NDA	2018
	KTN-E169	OU	3	within the KTN NDA	2018
	KTN-E170	OU	3	within the KTN NDA	2025
	KTN-E171	OU	3	within the KTN NDA	2025
	KTN-E172	OU	3	within the KTN NDA	2025
	KTN-E173	OU	3	within the KTN NDA	2025
	KTN-E174	OU	3	within the KTN NDA	2025
	KTN-E175	OU	3	within the KTN NDA	2025

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	KTN-E176	OU	3	within the KTN NDA	2018
Temporary Structure near Shek Tsai Leng	KTN-E177	OU	3	within the KTN NDA	2024
	KTN-E178	OU	3	within the KTN NDA	2024
	KTN-E179	OU	3	within the KTN NDA	2024
	KTN-E180	OU	3	within the KTN NDA	2024
	KTN-E181	OU	3	within the KTN NDA	2024
Pui Yau Kindergarten	KTN-E182	E	9	within the KTN NDA	2024
Temporary Structure near Tung Fong	KTN-E183	R	3	within the KTN NDA	2024
	KTN-E184	R	3	within the KTN NDA	2024
Village Houses between Tung Kok and Tung Fong	KTN-E185	R	9	within the KTN NDA	2024
	KTN-E186	R	9	within the KTN NDA	2024
	KTN-E187	R	9	within the KTN NDA	2024
	KTN-E188	R	9	within the KTN NDA	2024
Temporary Structure near Tung Fong	KTN-E189	R	6	within the KTN NDA	2024
	KTN-E190	R	6	within the KTN NDA	2024
Village Houses between Tung Kok and Tung Fong	KTN-E191	R	6	within the KTN NDA	2024
Temporary Structure near Fung Kong	KTN-E192	R	6	within the KTN NDA	2024
	KTN-E193	R	6	within the KTN NDA	2024
	KTN-E194	R	6	within the KTN NDA	2024
	KTN-E195	R	6	within the KTN NDA	2024
	KTN-E196	R	6	within the KTN NDA	2024
	KTN-E197	R	6	within the KTN NDA	2024

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	KTN-E198	R	6	within the KTN NDA	2024
	KTN-E199	R	6	within the KTN NDA	2024
	KTN-E200	R	6	within the KTN NDA	2024
	KTN-E201	R	6	within the KTN NDA	2024
	KTN-E202	R	6	within the KTN NDA	2024
Open Storage near Fung Kong	KTN-E203	OS	1.5	within the KTN NDA	2024
Temporary Structure near Lo Wu Fire Range	KTN-E204	R	3	within the KTN NDA	2024
Temporary Structure near Fung Kong Shan	KTN-E205	OU	3	within the KTN NDA	2019
	KTN-E206	OU	3	within the KTN NDA	2019
	KTN-E207	OU	3	within the KTN NDA	2019
	KTN-E208	OU	3	within the KTN NDA	2019
Ma Tso Lung San Tsuen	KTN-E209	R	9	within the KTN NDA	2044
Temporary Structure Western to Ho Sheung Heung Village	KTN-E210	OU	3	within the KTN NDA	2024
	KTN-E211	OU	3	within the KTN NDA	2024
	KTN-E212	OU	3	within the KTN NDA	2024
	KTN-E213	OU	3	within the KTN NDA	2024
Open Storage along Castle Peak Road - San Tin	KTN-E1001	OS	1.5	991	2044
Container Trailer Park along Kwu Tung Road	KTN-E1002	OS	1.5	195	2044
Europa Garden Phase I	KTN-E1003	R	9	23	2044
Lady Ho Tung Welfare Centre	KTN-E1004	IC	6	73	2044
Valais Phase 1	KTN-E1005	R	9	25	2044

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	KTN-E1006	R	9	13	2044
	KTN-E1007	R	9	73	2044
Village House north to Casas Domingo	KTN-E1008	R	3-9	292	2044
St Paul's House of Prayer	KTN-E1009	W	12	22	2044
Kam Tsin Village Ho Tung School	KTN-E1010	E	3	9	2044
Golf Parkview	KTN-E1011	R	12	34	2044
Tsung Pak Long	KTN-E1012	R	3-9	51	2044
Tsung Pak Long (Hakka Wai)	KTN-E1013	R	3-9	209	2044
Tai Tau Leng	KTN-E1014	R	10	568	2044
	KTN-E1015	R	10	638	2044
Choi Ngan House	KTN-E1016	R	110	777	2044
Scattered Village Houses at Northern Boundary of KTN	KTN-E1017	R	3-9	14	2044
	KTN-E1018	R	3-9	11	2044
Village Houses at Ma Tso Lung	KTN-E1019	R	3-9	27	2044
Village Houses at Tit Hang	KTN-E1020	R	3-9	27	2044
Workshop northwest to Pak Shek Au	KTN-E1021	I	9	17	2044
Chau Tau Tsuen	KTN-E1022	R	9	509	2044
Village House southeast to Chau Tau Tsuen	KTN-E1023	R	3-9	150	2044
Open Storage north to Pai Tau Lo	KTN-E1024	OS	1.5	360	2044

Notes:

[1] Existing ASRs inside NDAs would be resumed for development, and thus the time effect has been considered for the identification of existing ASRs: i.e. KTN-E1 would not be identified as an ASR after Year 2018.

[2] R– Residential; E – Educational; H – Hospital/Clinic/ home for the aged; G – Government; IC – Institution and Community; O – Open space; OS – Open storage; RC – Recreational; OU – Other specific uses

Table 3.4 – Representative existing ASRs within 500m assessment area and in the vicinity of FLN NDA

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
Village Houses at Fu Tei Au Tsuen (Western)	FLN-E1	R	3-9	within the FLN NDA	2024
Agriculture Lands at Fu Tei Au Tsuen	FLN-E2	AGR	3-9	within the FLN NDA	2044
	FLN-E3	AGR	3-9	within the FLN NDA	2044
	FLN-E4	AGR	3-9	within the FLN NDA	2044
	FLN-E5	AGR	3-9	within the FLN NDA	2044
	FLN-E6	AGR	3-9	within the FLN NDA	2044
	FLN-E7	AGR	3-9	within the FLN NDA	2044
	FLN-E8	AGR	3-9	within the FLN NDA	2044
	FLN-E9	AGR	3-9	within the FLN NDA	2044
	FLN-E10	AGR	3-9	within the FLN NDA	2044
	FLN-E11	AGR	3-9	within the FLN NDA	2044
	FLN-E12	AGR	3-9	within the FLN NDA	2044
Man Ming Temple at Fu Tei Au Tsuen	FLN-E13	W	3-9	within the FLN NDA	2044
Village Houses at Fu Tei Au Tsuen (Eastern)	FLN-E14	R	3-9	within the FLN NDA	2024
	FLN-E15	R	3-9	within the FLN NDA	2018
	FLN-E16	R	3-9	within the FLN NDA	2018
	FLN-E17	R	3-9	within the FLN NDA	2018
	FLN-E18	R	3-9	within the FLN NDA	2018
	FLN-E19	R	3-9	within the FLN NDA	2018
	FLN-E20	R	3-9	within the FLN NDA	2018
	FLN-E21	R	3-9	within the FLN NDA	2018

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	FLN-E22	R	3-9	within the FLN NDA	2018
	FLN-E23	R	3-9	within the FLN NDA	2018
	FLN-E24	R	3-9	within the FLN NDA	2044
	FLN-E25	R	3-9	within the FLN NDA	2044
	FLN-E26	R	3-9	within the FLN NDA	2044
	FLN-E27	R	3-9	within the FLN NDA	2044
	FLN-E28	R	3-9	within the FLN NDA	2044
Hung Kiu Sun Tsuen	FLN-E29	R	3-9	within the FLN NDA	2018
	FLN-E30	R	3-9	within the FLN NDA	2018
	FLN-E31	R	3-9	within the FLN NDA	2018
	FLN-E32	R	3-9	within the FLN NDA	2018
	FLN-E33	R	3-9	within the FLN NDA	2018
	FLN-E34	R	3-9	within the FLN NDA	2018
	FLN-E35	R	3-9	within the FLN NDA	2018
Temporary Structure Southern to Ng Tung River	FLN-E36	OU	3	within the FLN NDA	2019
	FLN-E37	OU	3	within the FLN NDA	2019
	FLN-E38	OU	3	within the FLN NDA	2019
	FLN-E39	OU	3	within the FLN NDA	2019
	FLN-E40	OU	3	within the FLN NDA	2019
	FLN-E41	OU	3	within the FLN NDA	2019
	FLN-E42	OU	3	within the FLN NDA	2019
	FLN-E43	OU	3	within the FLN NDA	2024
	FLN-E44	OU	3	within the FLN NDA	2024

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	FLN-E45	OU	3	within the FLN NDA	2019
	FLN-E46	OU	3	within the FLN NDA	2024
	FLN-E47	OU	3	within the FLN NDA	2024
	FLN-E48	OU	3	within the FLN NDA	2024
	FLN-E49	OU	3	within the FLN NDA	2024
	FLN-E50	OU	3	within the FLN NDA	2024
	FLN-E51	OU	3	within the FLN NDA	2024
	FLN-E52	OU	3	within the FLN NDA	2024
	FLN-E53	OU	3	within the FLN NDA	2024
	FLN-E54	OU	3	within the FLN NDA	2024
	FLN-E55	OU	3	within the FLN NDA	2024
Tin Ping Shan Tsuen	FLN-E56	R	3-9	within the FLN NDA	2024
	FLN-E57	R	3-9	within the FLN NDA	2024
	FLN-E58	R	3-9	within the FLN NDA	2024
	FLN-E59	R	3-9	within the FLN NDA	2024
	FLN-E60	R	3-9	within the FLN NDA	2024
	FLN-E61	R	3-9	within the FLN NDA	2024
Scattered Village Houses North of Proposed Potential Town-park	FLN-E62	R	3-9	within the FLN NDA	2025
Temporary Structure Eastern to Woodland Crest	FLN-E63	OU	3	within the FLN NDA	2024
Temporary Structure at Wu Nga Lok Yeung (Western)	FLN-E64	R	3-9	within the FLN NDA	2024
	FLN-E65	R	3-9	within the FLN NDA	2024
	FLN-E66	R	3-9	within the FLN NDA	2024
	FLN-E67	R	3-9	within the FLN NDA	2024

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	FLN-E68	R	3-9	within the FLN NDA	2024
	FLN-E69	R	3-9	within the FLN NDA	2024
Temporary Structure at Ma Shi Po (Eastern)	FLN-E70	R	3-6	within the FLN NDA	2019
Temporary Structure at Wu Nga Lok Yeung (Northern)	FLN-E71	R	3-9	within the FLN NDA	2024
	FLN-E72	R	3-9	within the FLN NDA	2024
Village Houses at Ma Shi Po (Northern)	FLN-E73	R	3-9	within the FLN NDA	2024
	FLN-E74	R	3-9	within the FLN NDA	2024
	FLN-E75	R	3-9	within the FLN NDA	2024
	FLN-E76	R	3-9	within the FLN NDA	2019
Village Houses at Ma Shi Po (Eastern)	FLN-E77	R	3-9	within the FLN NDA	2019
	FLN-E78	R	3-9	within the FLN NDA	2019
	FLN-E79	R	3-9	within the FLN NDA	2019
	FLN-E80	R	3-9	within the FLN NDA	2019
	FLN-E81	R	3-9	within the FLN NDA	2019
	FLN-E82	R	3-9	within the FLN NDA	2019
	FLN-E83	R	3-9	within the FLN NDA	2019
	FLN-E84	R	3-9	within the FLN NDA	2019
North District Temporary Wholesale Market for Agricultural Products	FLN-E85	G, C	6	within the FLN NDA	2019
Temporary Structure at Wu Nga Lok Yeung (Southern)	FLN-E86	R	3-9	within the FLN NDA	2024
	FLN-E87	R	3-9	within the FLN NDA	2024
	FLN-E88	R	3-9	within the FLN NDA	2024
	FLN-E89	R	3-9	within the FLN NDA	2024
	FLN-E90	R	3-9	within the FLN NDA	2024

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	FLN-E91	R	3-9	within the FLN NDA	2024
Temporary Structure at Wu Nga Lok Yeung (Eastern)	FLN-E92	R	3-9	within the FLN NDA	2024
	FLN-E93	R	3-9	within the FLN NDA	2024
	FLN-E94	R	3-9	within the FLN NDA	2024
	FLN-E95	R	3-9	within the FLN NDA	2024
	FLN-E97	R	3-9	within the FLN NDA	2024
	FLN-E98	R	3-9	within the FLN NDA	2024
Village Houses at Ma Shi Po (Southern)	FLN-E99	R	3-9	within the FLN NDA	2024
	FLN-E100	R	3-9	within the FLN NDA	2019
	FLN-E101	R	3-9	within the FLN NDA	2019
	FLN-E102	R	3-9	within the FLN NDA	2019
Buddhist Li Chong Yuet Ming Nursing Home for The Elderly	FLN-E103	H	20	1150	2044
Choi Po Court	FLN-E104	R	110	1130	2044
Tai Tau Leng	FLN-E105	R	10	1260	2044
No. 56 San Fung Avenue	FLN-E106	R	15	650	2044
Po Sheung Tsuen	FLN-E107	R	10	600	2044
Tsui Lai Garden	FLN-E108	R	100	330	2044
Hing Yan Tsuen	FLN-E109	R	10	430	2044
Sheung Pak Tsuen	FLN-E110	R	3-9	370	2044
Fung Kai Liu Man Shek Tong Secondary School	FLN-E111	E	27	410	2044
Woodland Crest	FLN-E112	R	40	40	2044
Tin Ping Shan Tsuen	FLN-E113	R	3-9	80	2044

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
Fung Kai Primary School	FLN-E114	E	6-9	280	2044
Fung Kai No. 1 Secondary School	FLN-E115	E	6-9	240	2044
Fung Kai No. 2 Secondary School	FLN-E116	E	6-9	140	2044
Man Kok Village	FLN-E117	R	3-9	100	2044
Ancestor of Lui Temple (Tak Yeung Tong)	FLN-E118	W	3	5	2044
Hung Kiu San Tsuen	FLN-E119	R	3-9	30	2044
Tin Hau Ancient Temple	FLN-E120	W	3	60	2044
Scattered Village Houses in Sheung Shui Wa Shan	FLN-E121	R	3-9	140	2044
Scattered Village Houses North of Proposed Potential Town-park	FLN-E122	R	3-9	40	2044
On Kwok Villa	FLN-E123	R	9	20	2044
Noble Hill	FLN-E124	R	54	10	2044
Good View New Village	FLN-E125	R	6-9	40	2044
Scattered Village Houses East of Good View New Village	FLN-E126	R	3-9	40	2044
Wing Fok Centre	FLN-E127	C	84	30	2044
Wing Fai Centre	FLN-E128	C	102	30	2044
Belair Monte	FLN-E129	R	90	20	2044
Siu Hang San Tsuen	FLN-E130	R	3-9	220	2044
Siu Hang Tsuen	FLN-E131	R	3-9	270	2044
Kan Lung Tsuen	FLN-E132	R	3-9	120	2044
The Sisters of the Precious Blood Children Village	FLN-E133	R	3-9	230	2044
San Uk Tsuen	FLN-E134	R	3-9	60	2044
Wing Ning Wai	FLN-E135	R	3-9	50	2044
Wing Ning Tsuen	FLN-E136	R	10	50	2044

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
	FLN-E137	R	10	110	2044
Ma Wat Tsuen	FLN-E138	R	10	210	2044
Ma Wat Wai	FLN-E139	R	10	200	2044
Village House near Ma Wat Wai	FLN-E140	R	3-9	60	2044
Village House near Fanling Tsung Kyam Church	FLN-E141	R	3-9	370	2044
Village House near On Lok Garden	FLN-E142	R	3-9	500	2044
Village House near Tong Hang	FLN-E143	R	3-9	830	2044
Village House at Tong Hang	FLN-E144	R	3-9	1260	2044
Wong Kong Shan	FLN-E145	R	10	1180	2044
	FLN-E146	R	10	1400	2044
Wo Hop Shek Village	FLN-E147	R	10	1590	2044
Kau Lung Hang	FLN-E148	R	3-9	1760	2044
Shek Wu Hui Sewage Treatment Works	FLN-E149	G	6	230	2044
On Wu Centre	FLN-E150	C	19	690	2044
Smile Centre	FLN-E151	C	19	480	2044
Kader Industrial Centre	FLN-E152	I	19	620	2044
Heraeus Technology Centre	FLN-E153	C	19	190	2044
Wo Fung Building	FLN-E154	I	19	840	2044
Village House near Wu Nga Lok Yeung	FLN-E155	R	3-9	15	2044
	FLN-E156	R	3-9	10	2044
North District Sports Ground	FLN-E157	RC	1.5	350	2044
Grand Tower Block A	FLN-E158	R	50	550	2044
Tin Ping Estate Tin Mei House	FLN-E159	R	93	280	2044

Description	ASRID	Landuse	Building Height Above Ground (approx.) (m)	Separation Distance between ASR and Site Boundary (approx.) (m)	Assessment Year ^[1]
Golf Parkville Block 7	FLN-E160	R	17	130	2044
Yuk Po Court Tsun Wu House	FLN-E161	R	65	860	2044
Temporary Structure at Wu Nga Lok Yeung (Eastern)	FLN-E162	R	3-9	within the FLN NDA	2024
	FLN-E163	R	3-9	within the FLN NDA	2024
	FLN-E164	R	3-9	within the FLN NDA	2024
	FLN-E165	R	3-9	within the FLN NDA	2024
	FLN-E166	R	3-9	within the FLN NDA	2024
	FLN-E167	R	3-9	within the FLN NDA	2024
Village Houses at Ma Shi Po (Southern)	FLN-E168	R	3-9	within the FLN NDA	2019
	FLN-E169	R	3-9	within the FLN NDA	2019
	FLN-E170	R	3-9	within the FLN NDA	2019
Tin Ping Estate Tin Cheung House	FLN-E171	R	100	310	2044
Sunningdale Garden Block 1	FLN-E172	R	65	340	2044
102 Jockeyclub Road	FLN-E173	R	11	500	2044
Grand Regentville Block 6	FLN-E174	R	101	200	2044

Notes:

[1] Existing ASRs inside NDAs would be resumed for development, and thus the time effect has been considered for the identification of existing ASRs: i.e. KTN-E1 would not be identified as an ASR after Year 2018.

[2] R– Residential; E – Educational; H – Hospital/ Clinic/ Home for the aged; G – Government; RC – Recreational; W – Worship; I – Industrial; C – Commercial; AGR – Agricultural; OU – Other specific uses

Table 3.5 – Representative planned ASRs within 500m assessment area and in the vicinity of KTN NDA ^[1]

Land Lot	Description	ASRID	Landuse	Proposed Building Height Above Ground (m)	Population Intake Year
A1-2	Residential home for the elderly (RCHEs); Nursery Classes and Kindergartens; Local Rehousing ^[3]	KTN-1 to KTN-11	P	78.75 - 110.25	2023
A1-4	Nursery Classes and Kindergartens ^[4]	KTN-12 to KTN-18	R	68.85 - 97.2	2023
A1-5	Nursery Classes and Kindergartens; Post Offices	KTN-19 to KTN-28	C	68.85 - 97.2	2023
A1-6	Nursery Classes and Kindergartens ^[4] , Early Education and Training Centre	KTN-29 to KTN-37	R	68.85 - 97.2	2029
A1-8	Nursery Classes and Kindergartens ^[4]	KTN-38 to KTN-46	H	68.85 - 97.2	2030
A1-9	Residential Uses	KTN-47 to KTN-65	R	47.25 - 63	2031
A2-11	Primary School	KTN-66 to KTN-75	E	36	2028
A2-13	Secondary School	KTN-76 to KTN-81	E	36	2028
A2-2	Nursery Classes and Kindergartens (2 nos); District Elderly Community Centre ^[3]	KTN-82 to KTN-99	P	78.75 - 110.25	2023
A2-4	Nursery Classes and Kindergartens ^[4]	KTN-100 to KTN-107	H	68.85 - 97.2	2030
A2-5	Special Child Care Centre ^[4]	KTN-108 to KTN-115	R	68.85 - 97.2	2029
A2-7	Nursery Classes and Kindergartens; Neighbourhood Elderly Community	KTN-116 to KTN-128	P	78.75 - 110.25	2030

Land Lot	Description	ASRID	Landuse	Proposed Building Height Above Ground (m)	Population Intake Year
	Centre[3]				
A2-9	Residential Uses	KTN-129 to KTN-144	R	47.25 - 63	2031
A3-1	Primary School	KTN-145 to KTN-149	E	36	2028
A3-2	Secondary School	KTN-150 to KTN-154	E	36	2028
A3-3	Nursery Classes and Kindergartens (3 nos); Integrated Children and Youth Services Centre; Day Care Centre for the Elderly ; Supported Hostel for Ex-mentally Ill Persons , Half-way House and Long Stay Care Home; Post Office[3][5]	KTN-155 to KTN-174	P	78.75 - 110.25	2030
A3-4	Primary School	KTN-175 to KTN-180	E	36	2028
A3-6	Residential Uses	KTN-181 to KTN-195	R	47.25 - 63	2031
B2-10	Commercial, Research & Development; Residential and Preservation of Home of Loving Faithfulness's Building; Day Activity Centre, Hostel for Severely Mentally Handicapped, Integrated Vocational and Rehabilitation Service Centre, Hostel for Moderately Mentally Handicapped Persons:, Hostel for Severely Physically Handicapped Persons, Care and Attention Home for Severely Disable Persons	KTN-196 to KTN-203	CDA	45 - 90	2029
B2-12	Commercial, Research & Development	KTN-204 to KTN-210	OU(C,R&D)	18 - 45	2029
B2-2	Hospital, Polyclinic - Site Reservation: 4700 (sqm) and Clinic - Site Reservation: 2200 (sqm)	KTN-211 to KTN219	GIC	45	2029

Land Lot	Description	ASRID	Landuse	Proposed Building Height Above Ground (m)	Population Intake Year
B2-5	Primary School	KTN-220 to KTN-224	E	36	2022
B2-6	Secondary School	KTN-225 to KTN-230	E	36	2022
B2-7	Primary School	KTN-231 to KTN-232	E	36	2022
B2-8	Sports Centre , District Library, Integrated Children and Youth Services Centre and Family Service Centre; Integrated Community Centre for Mental Wellness, Child Care Centre and Social Security Field Unit	KTN-233 to KTN-237	GIC	45	2022
B3-12	Commercial, Research & Development	KTN-238 to KTN-247	OU(C,R&D)	18 - 45	2029
B3-16	Visitor Centre	KTN-248 to KTN-249	GIC	10	2020
B3-2	Post Office	KTN-250 to KTN-258	OU(C,R&D)	18 - 45	2029
B3-5	Commercial, Research & Development	KTN-259 to KTN-264	OU(C,R&D)	18 - 45	2029
B3-8	Hotel and Conference Facilities; Post Office	KTN-265 to KTN-270	OU(C,R&D)	18 - 45	2029
C1-11	Reprovision Site of Kwu Tung Vegetable Marketing and Credit Co-operative Society	KTN-271	GIC	-	2027
C1-9	Long Valley Core Area, Area for Wetland Enhancement Works and Area for Facilities Supporting the Nature Park	KTN-272 to KTN287	GIC	-	2020

Land Lot	Description	ASRID	Landuse	Proposed Building Height Above Ground (m)	Population Intake Year
D1-11	Residential Uses	KTN-288 to KTN-301	R2	25.2 - 31.5	2031
D1-12	Potential Activity Centre	KTN-302 to KTN308	GIC	0	2023
D1-13	Potential Activity Centre	KTN-309 to KTN314	GIC	0	2023
D1-14	Government Reserve	KTN-315 to KTN-320	GIC	36	2028
D1-5	Village Resite	KTN-321 to KTN-326	VR	8.23	2024
D1-7	Residential Uses	KTN-327 to KTN-347	R2	66.15 - 78.75	2031
E1-2	Primary School	KTN-348 to KTN-352	E	36	2028
E1-3	District Headquarters and Divisional Police Station	KTN-353, KTN-359 to 361	GIC	56.7	2029
E1-3	Reprovisioning of Fan Garden Junior Police Officers' Police Married Quarters	KTN-354 to KTN-358	GIC	56.7	2022
E1-4	Secondary School	KTN-362 to KTN367	E	36	2028
E1-5	Standard Swimming Pool and Sports Centre	KTN-368 to KTN-376	GIC	22.5	2028
E1-6	Fire Station and Ambulance Depot	KTN-377 to KTN-382	GIC	40.5	2022
E1-7	Open Space, Fung Kong Shan and Cycle Park	KTN-383 to KTN-390	O	-	2027

Land Lot	Description	ASRID	Landuse	Proposed Building Height Above Ground (m)	Population Intake Year
F1-1	Sports Ground/Sports Complex[6]	KTN-391 to KTN-394	GIC	13.5	2028
F1-3	Reserve for Supporting Lok Ma Chau Loop Development[6]	KTN-395 to KTN407	OU(R&D)	45	2028
F1-4	Disused School (Potential for Eco-tourism Education Centre, Holiday Camping or Other Recreational Uses)[6]	KTN-408 to KTN-411	GIC	13.5	2020
PFS	Proposed houses at Zone A/NE -Temporary Structure/267	KTN-C1	R	9	2017

Notes:

- [1] Based on Revised RODP shown in **Appendix 2.1**.
- [2] R1c – Residential Zone 1 (with Commercial); R2 – Residential Zone 2; R3 – Residential Zone 3; E – Educational; CDA – Comprehensive Development Areas; PRH – Public Rental Housing; GIC – Government, Institution & Community, VR – Village Resite; OU (C, R &D) – Other Specified Uses (Commercial, Research & Development); OU (NP) – Other Specified Uses (Nature Park); OU (R &D) – Other Specified Uses (Research & Development); O – Open Space
- [3] Free standing non-domestic purpose-built buildings in PRH sites are for retail and carparking facilities (all carparks assumed to be underground) are assumed
- [4] Commercial podium development of R1c and CDA sites are assumed to be not more than 2 storeys.
- [5] The no. of flats includes that for reprovisioning of Fan Garden Junior Police Officers' Police Married Quarters as well as that for the District Headquarters Associated Married Staff Quarters.
- [6] As per the GFS Helicopter Landing Site Specification Guidelines, development of sites falling within the flight paths of the helipad at Lo Wu Fire Range will be subject to the GFS's (height restriction) requirement for safety (i.e. Section 5(d) of GFS Helicopter Landing Site Specification

Table 3.6 – Representative planned ASRs within 500m assessment area and in the vicinity of FLN NDA^[1]

Land Lot	Description	ASRID	Landuse	Proposed Building Height Above Ground (m)	Population Intake Year
A1-8	Police Driving and Traffic Training Division	FLN-1 to FLN-14	GIC	31.5	2022
A1-11	Weapons Training Division	FLN-15 to FLN-22	GIC	22.5	2022
B1-7	Residential Buildings	FLN-23 to FLN-33	R2	31.5 – 47.25	2031
B1-8	Village Resite	FLN-34 to FLN-36	VR	8.23	2018
B1-9	Residential Buildings	FLN-37 to FLN-46	R3	25.2 - 37.8	2031
B2-4	Government Reserve	FLN-47 to FLN-50	GIC	22.5	2028
B2-6	Residential Buildings	FLN-51 to FLN-58	PRH	63 - 78.75	2030
B2-7	Residential Buildings, Nursery Classes and Kindergartens, Care and Attention Home for Severely Disable Persons [3]	FLN-59 to FLN-69	PRH, E, H, GIC	78.75 - 110.25	2030
B2-11	Residential Buildings	FLN-70 to FLN-77	PRH	63 - 78.75	2031
B2-12	Residential Buildings, Hostel for Severely Physically Handicapped Persons, Day Care Centre for the Elderly, Post Office [3]	FLN-78 to FLN-88	PRH, H, GIC	78.75 - 110.25	2030
B3-2	Residential Buildings	FLN-89 to FLN-94	PRH	63 - 78.75	2031
B3-3	Residential Buildings, Hostel for Moderately Mentally Handicapped Persons [3]	FLN-95 to FLN-106	PRH, H, GIC	78.75 - 110.25	2030
B3-4	Primary School	FLN-107 to FLN-112	E	36	2028
B3-5	Primary School	FLN-113 to FLN-118	E	36	2028
B3-6	Residential and Commercial Buildings, Nursery Classes and Kindergarten [5]	FLN-119 to FLN-127	R2c, E	49.95 - 65.7	2031
B3-7	Residential Buildings	FLN-128 to FLN-135	R2	47.25 - 63	2031
B3-9	Residential Buildings	FLN-136 to FLN-143	R2	47.25 - 63	2031
B3-10	Secondary School	FLN-144 to FLN-150	E	36	2028
B3-12	Primary School	FLN-151 to FLN-155	E	36	2028
C2-5	Clinic	FLN-156 to FLN-159	H	22.5	2028

Land Lot	Description	ASRID	Landuse	Proposed Building Height Above Ground (m)	Population Intake Year
C2-6	Sports Centre (Leisure Centre), Integrated Children and Youth Service Centre, Special Child Care Centre, Early Education and Training Centre	FLN-160 to FLN-164	RC, GIC, E	22.5	2029
C2-7	Primary School	FLN-165 to FLN-170	E	36	2028
C2-8	Town Park	FLN-171 to FLN-181	RC	1.5	2027
C2-9	Secondary School	FLN-182 to FLN-187	E	36	2028
D1-6	Existing North District Temporary Wholesale Market for Agricultural Products	FLN-188 to FLN-191	GIC	22.5	2019
D2-2	Residential Buildings	FLN-192 to FLN-206	HOS	47.25 - 63	2031
D2-4	Residential Buildings	FLN-207 to FLN-218	R2	47.25 - 63	2031
D2-6	Residential Buildings	FLN-219 to FLN-225	PRH	63-78.75	2030
D2-9	Residential Buildings, Nursery Classes and Kindergartens, Neighbourhood Elderly Community Centre, Residential Home for the Elderly, Post Office [5]	FLN-226 to FLN-243	PRH, E, GIC, H	94.5 - 110.25	2023
D2-12	Residential Buildings	FLN-244 to FLN-254	R2	47.25 - 63	2024
D3-1a	Residential Buildings	FLN-255 to FLN-264	R1	78.75 - 94.5	2029
D3-1b	Residential Buildings	FLN-265 to FLN-274	HOS	66.15 - 94.5	2030
D3-1c	Residential and Commercial Buildings, Nursery Classes and Kindergartens	FLN-275 to FLN-285	R1c, E	68.85 - 97.2	2029
D3-3	Residential and Commercial Buildings [4]	FLN-286 to FLN-295	R1c	68.85 - 97.2	2031
D3-4	Residential and Commercial Buildings, Nursery Classes and Kindergartens [4]	FLN-296 to FLN-310	R1c, E	68.85 - 97.2	2031
D3-6	Residential and Commercial Buildings, Nursery Classes and Kindergartens [4]	FLN-311 to FLN-324	R1c, E	68.85 - 97.2	2029
D3-7	Residential and Commercial Buildings [4]	FLN-325 to FLN-338	R1c	68.85 - 97.2	2029
D3-8	Residential Buildings, Nursery Classes and Kindergartens, Integrated Vocational and Rehabilitation Service Centre	FLN-339 to FLN-349	PRH, E, GIC	78.75 - 94.5	2030
D3-11	Secondary School	FLN-350 to FLN-355	E	36	2023
D3-12	Primary School	FLN-356 to FLN-362	E	36	2023

Notes:

[1] Based on Revised RODP shown in **Appendix 2.1**.

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- [2] R1c – Residential Zone 1 (with Commercial); R2c – Residential Zone 2 (with Commercial); R2 – Residential Zone 2; R3 – Residential Zone 3; E – Educational; PRH – Public Rental Housing; GIC – Government, Institution & Community; VR – Village Resite; RC – Recreational; HOS – Home Ownership Scheme Residential Buildings; H – Hospital/ Clinic/ Home for the aged;
- [3] Free standing non-domestic purpose-built buildings in PRH sites are for retail and carparking facilities (all carparks assumed to be underground) and assumed to be not more than 3 stories.
- [4] Commercial podium developments of R1c and R2c sites are assumed to be not more than 2 stories.
- [5] Due to site constraints, free standing non-domestic purpose-built buildings in this PRH site are assumed to be not more than 5 stories.

3.5 Assessment Methodology

3.5.1 Construction Phase

The prediction of dust emissions is based on the typical values and emission factors obtained from United States Environmental Protection Agency (USEPA) Compilation of Air Pollution Emission Factors, AP-42, 5th Edition.

According to the implementation programme, the construction of KTN and FLN NDAs will be divided into six development packages. Each of these packages would be implemented according to the development programme and the associated dusty construction activities for each package will be assessed.

Since the air quality impact due to different construction packages will vary, the assessment identifies the worst case scenario over the entire construction phase to address the specific impacts arising from each of different work areas.

Construction dust assessment for short-term impact (i.e. 1-hour and 24-hour average) will be undertaken by a 3-Tier approach. Tier 1 screening assessment is a theoretical worst case scenario evaluation to identify hot spot areas of construction air quality impact by assuming 100% active construction area for all worksites. The identified hot spot areas will be further assessed by a more focused Tier 2 assessment to predict a more realistic worst case impact by altering the active construction areas to 15% and locating them nearest to the ASRs. Specific hot spot areas will be assessed by a Tier 3 assessment to predict a detailed impact by altering the active construction areas to the actual active area and locating them nearest to the ASRs. Long-term impact (i.e. annual average) will be assessed with 6% active construction area for all work sites. Details discussions are given in the following subsections.

Odour impact due to the emission of existing sewage treating facilities at the Shek Wu Hui Sewage Treatment Works during the expansion works will be also assessed.

3.5.1.1 Assessment Year

The construction programme given in **Appendix 3.1** and implementation programme given in **Appendix 2.1** have been reviewed to identify the assessment years for inclusion in the assessment.

According to the implementation programme, the Project will be implemented under six development packages.

Each development package comprises a number of works contracts (WC) and are works area of each WC will be divided into sub-areas (up to 6 sub-areas). Construction works at each of these sub-areas will be carried out in sequence based on the estimation as shown in **Appendix 3.1**.

Within the boundary of each WC, construction works will be carried out and dust emissions will arise from dusty construction activities such as site clearance, ground excavation etc. According to **Table 3.7** and the extent of different works contracts given in **Appendix 3.3**, major site formation for different works contracts will be carried out after the first population intake, i.e. Year 2025 for both KTN NDA and FLN NDA. Hence, Year 2025 is considered as the worst-case scenario for both KTN NDA and FLN NDA.

Table 3.7 – Dust emission sources for dust impact assessment ^[1]

Year when Major Site Formation Works is On-going	Development Package	Works Contract/ Dust Emission Sources	Designated Project
Year 2018	Advance Works Package – Infrastructure and Development at KTN and FLN	WC03, WC04, WC07, WC09, WC19, WC33	DP3, DP4, DP5, DP12
	Package 1 – First Stage of Infrastructure and Development at KTN and FLN	WC21	
	Package 2 – Infrastructure and development at KTN (South)	WC31	
Year 2021	Advance Works Package – Infrastructure and Development at KTN and FLN	WC03, WC04, WC06, WC07, WC28, WC32, WC33	DP5, DP10, DP13
	Package 2 – Infrastructure and development at KTN (South)	WC29	
	Package 3 - Infrastructure and Development at KTN (North)	WC31	
	Package 4 – Remaining Infrastructure and Development at FLN	WC13	

Year when Major Site Formation Works is On-going	Development Package	Works Contract/ Dust Emission Sources	Designated Project
	(East)		
Year 2025	Package 2 – Infrastructure and development at KTN (South)	WC10, WC11, WC26	DP1, DP3, DP4, DP8, DP9
	Package 3 - Infrastructure and Development at KTN (North)	WC12, WC21,	
	Package 4 – Remaining Infrastructure and Development at FLN (East)	WC14, WC15	
	Package 5 – Remaining Infrastructure and Development at FLN (West)	WC22	
Year 2028	Package 2 – Infrastructure and development at KTN (South)	WC10, WC11, WC26	DP1, DP4, DP5, DP8, DP9, DP13
	Package 3 - Infrastructure and Development at KTN (North)	WC12	
	Package 4 – Remaining Infrastructure and Development at FLN (East)	WC14	
	Package 5 – Remaining Infrastructure and Development at FLN (West)	WC22	

Note

[1] Based on Implementation Programme shown in **Appendix 2.1**.

As certain WCs are scheduled to commence and finish before or after the worst case assessment year, two additional assessment years for both KTN and FLN (as shown in **Table 3.8**) have been adopted. Moreover, to ensure all the designated projects in FLN have been covered by the assessment, 4 additional WC/ WC sub-areas i.e. WC08 and sub-areas b/d/e of WC14 (as shown in **Table 3.9**) have also been included.

Table 3.8 – Summary of additional assessment year

Name of NDA	Additional Assessment Year
KTN	2018, 2028
FLN	2018, 2021

Table 3.9 – Additional WC included in the assessment for FLN NDA

WC	Designated Projects	Proposed Schedule for the Site Formation Works	Assessment Year to be included
WC08	DP7 & DP11	2022 – 2024	2021
WC14b	DP8	2027 – 2029	2025
WC14d	DP9, DP13	2026 – 2028	2025
WC14e	DP9	2028 – 2029	2025

3.5.1.2 Construction Vehicle Access

Dust emissions from construction vehicle movement within the work contract sites and the temporary construction access routes have been taken into account. An estimated average of 66 trucks/hour would travel into and out of the work contract sites through the construction access routes during working hours.

Effective from September 2009, all grab-mounted dump trucks travelling into and out construction sites should be equipped with suitable covers before the trucks leaving the site. It is expected that dust emission from dump trucks travelling on the temporary construction access road outside the site would be minimal. Construction dust emissions from vehicle movement inside the site are included in the assessment.

3.5.1.3 Operating Hours

Subject to the construction work being required and permitted at night-time and during Sundays or holiday, normal construction working periods of 26 days a month and 12 hours a day are assumed.

3.5.1.4 Tier 1 Screening Assessment

In terms of the construction programme, it should be noted that the sequencing of works activities within individual work sites or areas will be determined by the Contractor and is not known at this stage. However, due to the size of the work sites and the need for orderly sequencing of construction activities, active construction activities will occur in different locations of the work site at different time periods. Therefore, it is not possible to pinpoint the exact locations of individual dust emission sources over the entire work site in any short-term period (i.e. 1-hour and 24-hour).

Base on previous experience, there would be no more than 15% of active work area in each work site during any short period of time. Hence, the chance of having all 15% active works areas is unlikely within an individual work site.

Tier 1 screening assessment is to establish a theoretical worst case scenario for identifying hot spot areas with potential short term 1-hour and 24-hour impacts on ASRs. The basis of the Tier 1 screening assessment for short term impact evaluation has assumed a 100% active work area for all worksites. Areas within the criteria contour (i.e. exceeding the criteria) are considered hot spot locations for which a focused Tier 2 assessment will be conducted.

3.5.1.5 Tier 2 Assessment

In Tier 2 assessment, each hot spot area is assumed with 15% active works areas occurring nearest to the potentially worst affected ASRs. Although results of Tier 2 assessment are still conservative based on previous experience, areas within the criteria contour (i.e. exceeding the criteria) are considered hot spot locations for which a focused Tier 3 assessment will be conducted.

3.5.1.6 Tier 3 Assessment

In Tier 3 assessment, the specific hot spot area is assumed with the actual active works areas occurring nearest to the potentially worst affected ASRs. Results of the Tier 3 assessment serve as a representation of the detailed construction dust impact prediction for the study.

3.5.1.7 Long-term Annual Predictions

Dust modelling assessment for long term annual predictions assumes that the work activities would evenly distribute across the whole area of each site over the year with an effective 6% active work area. In the modelling analysis, the dust emission rates are proportionally reduced to produce this effect in the assessment. **Appendix 3.2** present the justifications for the percentage of active areas and tentative construction programme respectively.

3.5.1.8 Dust Dispersion Modelling

Dust impact assessment was undertaken using the Fugitive Dust Model (FDM) developed by USEPA and approved by EPD. It is a Gaussian plume model for computing air dispersion due to fugitive dust emission. Modelling parameters including dust emission factors, particle size distributions, surface roughness, etc can be referred to in EPD guideline entitled “Guideline on Choice of Models and Model parameters in Air Quality Assessment” and the USEPA AP-42.

The density of dust was assumed to be 2.5g/m^3 . The 5-year mean of the annual averaged TSP concentration will be taken as the background concentration. As mentioned in **Section 3.3.2**, the TSP background concentration of $73.1\text{ }\mu\text{g/m}^3$ is adopted for the fugitive dust modelling. A surface roughness of 100 cm is assumed in the model to represent the terrain.

During daytime working hours (7am to 7pm), it is assumed that dust emissions would be generated from all dust generating activities and site erosion. During night-time non-working hours (7pm to 7am the next day), Sunday and public holidays, dust emission would be from site erosion only as there would not be normally construction activities during these hours.

The worst-case 1-hour, 24-hour and annual average TSP concentrations were predicted with Year 2011 meteorological data from Ta Kwu Ling Weather Station and mixing height from King's Park Station.

Fugitive dust impacts have been modeled for ASR heights at 1.5m, 5m and 10m above ground. Since all the dust generating sources associated with the Project are at ground level only, these assessment levels would therefore represent the worst-case scenario. Both the unmitigated and mitigated scenarios for the project are presented. Key modelling parameters are summarized in **Table 3.10**.

Table 3.10 - Modelling parameters for FDM

Parameters	Input	Remark
Particle size distribution	1.25um = 7% 3.75um = 20% 7.5um = 20% 12.5um = 18% 22.5um = 35%	Reference from S13.2.4.3 of USEPA AP-42
Background Concentration	Recent 5-year average value of monitoring stations of rural and new development category (2007 -2011)	Shatin, Tai Po and Yuen Long included as no data available from Tseung Kwan O and Hong Kong South and Monitoring Stations (73.1 µg/m ³)
Modeling mode	Flatted terrain	-
Meteorological data	Data recorded in 2011 at Ta Kwu Ling (TKL) Meteorological Station	-
Anemometer Height	13m for TKL	-
Surface Roughness	100cm	-
Emission period	General construction activities during daytime working hours (7 am to 7 pm); Wind erosion during both day-time (7am to 7pm) and night-time (7pm to 7am of the next day)	-
ASR calculating levels	1.5m, 5m and 10m	

3.5.1.9 Dust Emission Factor and Assumptions

Fugitive dust impact assessment was carried out based on typical values and emission factors from United States Environmental Protection Agency (USEPA) Compilation of Air Pollution Emission Factors (AP-42), 5th Edition. Calculation of dust emission factors is given in **Appendix 3.3**. References of the calculations of dust emission factors for different dust

generating activities are listed in **Table 3.11**. Detailed descriptions are also discussed in the following sections.

Table 3.11 - References of dust emission factors for different activities

Activities	Operating Sites	Equations and Assumptions	Reference
Heavy construction activities including land clearance, ground excavation, cut and fill operations, construction of the facilities, haul road, etc	All construction and excavation sites	$E = 1.2 \text{ tons/acre/month of activity or;}$ $= 2.69 \text{ Mg/hectare/month of activity}$	USEPA AP42, S.13.2.3.3
Wind Erosion	All construction sites, any stockpile areas, barging area (all open sites)	$E = 0.85 \text{ Mg/hectare/yr (24 hour emission)}$	USEPA AP42, S.11.9, Table 11.9.4

3.5.2 Operational Phase

The prediction of operational air quality impact covers chimney emission from existing industrial area, road traffic emission from associated road network and odour emission due to the operation of sewage treating facilities at the Shek Wu Hui Sewage Treatment Works and Sheung Sui Slaughter House.

3.5.2.1 Determination of Assessment Year

According to Clause 3.4.4.3 (v) (b) of the EIA Study Brief for this project, the air pollution impacts of future road traffic should be calculated based on the highest emission strength from vehicles within the next 15 years after commencement of operation of the proposed road.

Based on the current implementation schedule, for KTN NDA, the planned roads will be implemented in 3 stages, with completion of the 1st stage for operation in 2021, the 2nd stage for operation in 2028, and the 3rd stage for operation in 2029. For FLN NDA, the planned roads will be implemented in 4 stages, with completion of the 1st stage for operation in 2022, the 2nd stage for operation in 2023, the 3rd stage for operation in 2028, and the 4th stage for operation in 2029. Sensitivity test has been conducted based on these operational years by using the Emfac-HK model (v2.5, dated 3 January 2013) to determine the worst assessment years given the combination of vehicular emission factors and the projected traffic flow. Appendix 3.4 presents the detailed methodology.

3.5.2.2 Vehicular Emission from Open Roads

NO₂ and RSP generated from the additional open-road networks associated with the proposed NDAs in the study area are the major air pollutants due to vehicular emissions and have been adopted for assessment of their potential air quality impacts. Additional traffic flow would also be induced on the existing roads and therefore a corresponding increase in vehicular emissions is anticipated. EmFAC-HK was used to calculate the vehicular tailpipe emission in lieu of the traditional fleet average emission factors. The road grouping for this assessment is shown in **Annex A** of **Appendix 3.4**.

Preliminary traffic flows in each assessment year presented in **Annex E** of **Appendix 3.4** have been reviewed and highest traffic flow (either PM Peak or AM peak) for each assessment year has been selected to represent the worst case. **Appendix 3.4** presents the key assumptions for the EmFAC-HK modelling. A 24-hour daily profile in terms of total traffic flow has been assumed for all vehicle classes. **Appendix 3.5** presents the detailed estimation of the vehicular emission factors from open roads for NO₂ and RSP within the assessment area. Assessment points are shown in **Table 3.3** and **Table 3.4**.

The air dispersion model, CALINE4 developed by the California Department of Transport and approved by USEPA was used to assess vehicular emission impacts from the existing and planned road network. In view of the limitation of the model, elevated roads higher than 10m were set to the maximum height of 10m to represent the condition, albeit in a more conservative manner.

In determining the surface roughness, due consideration was given to the number of existing mid-rise and high-rise buildings sited within 1km study area. A surface roughness of 100cm was therefore considered appropriate. Hourly meteorological data, including wind direction, wind speed, temperature and stability, collected from the nearest weather station, the Ta Kwu Ling meteorological station in Year 2011 were adopted in this assessment. The mixing height data from the King's Park Station in Year 2011 were adopted.

For background concentrations, they were made to the 5 years mean of annual-averaged NO₂ and RSP concentration at Shatin, Tai Po, Tseung Kwan O, Hong Kong South and Yuen Long Monitoring Stations from 2007 to 2011. It was assumed that 20% of NO_x would be converted to NO₂, in accordance with the EPD's "Guidelines on Choice of Models and Model Parameters".

In addition, the effect of existing and proposed noise barrier on the dispersion of vehicular emission has been taken into account in this study.

3.5.2.3 Portal Emission

During the operation of KTN NDA and FLN NDA, a short portion of Castle Peak Road will go beneath the slip roads and another short portion of Fanling Bypass will go beneath the Lung Yeuk Tau Interchange in the form of underpass. Some full-enclosures are also proposed in both KTN NDA and FLN NDA. In respect of these, the ISCST3 Model was adopted to estimate the portal emission from the underpasses and proposed full-enclosures in accordance with the Permanent International Association of Road Congress Report (PIARC, 1991), where it is assumed that pollutants will be ejected from the portal as a portal jet such that 2/3s of the total emission will be dispersed within first 50m, and the remaining 1/3 of the total emission within the next 50m. Portal emission factors are summarized in **Appendix 3.5**.

3.5.2.4 In-tunnel Air Quality

In accordance with the “Practice Note on Control of Air Pollution in Vehicle Tunnels”, the air quality inside the tunnel should achieve the EPD recommended standard of 1ppm NO₂ concentration. Given that the length of underpass is less than 200m, mechanical ventilation system will not be required. The in-tunnel air quality assessment for each underpass section and each proposed full-enclosure is given in **Appendix 3.6**. Results indicated that the EPD recommended standard will be achieved.

3.5.2.5 Chimney Emission from Industrial Areas

Gaseous emissions from the identified existing industrial chimneys identified have been assessed by ISCST3 model. The modelling parameters are listed in **Table 3.12**. The assumptions, chimney configuration and emission rates presented in the TP13 have been adopted in this assessment. In addition, the chimneys presented in the approved EIA Study “Provision of Cremators at Wo Hop Shek Crematorium” (EIA-146/2008) have been adopted. For the chimneys newly identified during the site survey in 2012, an average fuel usage of 200 L/hr is assumed for the calculation of emissions, while the heights and internal diameters of the chimneys are based on observation.

Table 3.12 – Modelling parameters for ISCST3

Parameters	Input
Background Concentration	Averaged value recorded from Tai Po, Yuen Long, and Sha Tin Monitoring Stations (Year 2007 – Year 2011)
Modeling mode	Urban without terrain effect
Meteorological data	Ta Kwu Ling weather station in Year 2011; in accordance with EPD Guidelines on Choice of Models and Model Parameters, the validity is over 90%

Parameters	Input
Loading Factor (for existing industrial source only)	Daytime (0800-2000) : 41% Night-time (2000-0800) : 23%

Moreover, for the chimney emission from the North District Hospital (NDH), it is noted from the fuel consumption data provided by the hospital (NDH) that about 1,250,000 unit of town gas and 3190 litres of ultra low sulphur diesel oil were used in Year 2009-10. Chimney emissions from these sources were therefore estimated based on the method adopted in approved EIA for *Provision of a Poultry Slaughtering Centre in Sheung Shui* (AEIAR-142/2009) or emission factor from AP42, USEPA. **Table 3.13** summarizes the emission factors. **Appendix 3.7** presents the detailed calculations of chimney emission.

Table 3.13 – References of chimney emission factors

Fuel Type	Pollutant	Emission Factor	Assumptions	Reference
Fuel Oil	NO _x	E = 20 lb/103 gal	-	USEPA AP42, S.1.3, Table 1.3-1
	SO ₂	E = 142S lb/103 gal	S = 0.5% (for general fuel) S = 0.005% (for ultra low sulphur diesel)	
	RSP	E = 2 lb/103 gal	-	
Towngas	NO _x	E = 220 mg/kWh	-	EIA for Provision of a Poultry Slaughtering Centre in Sheung Shui

A hospital and polyclinics are also proposed in the KTN NDA, which are considered as a potential emission source. However, during this Final Stage EIA, there is no available information on the chimney design and the pollutant emission rate. The chimney emission is therefore estimated based on pro-rata of the existing information of the NDH.

According to information provided by from Town Gas and Hospital Authority, the fuels are used by Bunsen burners, cooking range, steam boilers and emergency generator. With such application, it is understood that the total chimney emission from a hospital should be proportional to the total number of patient accommodated in the hospital (i.e. number of bed). According to the latest Department of Health Annual Report 2009/10, it is noted that there are a total of 607 beds available in the NDH, while the number of beds in the proposed hospital and polyclinics is estimated to be about 860. Therefore, in order to estimate the emission from the proposed hospital and polyclinics, a correction factor of 1.42 has been multiplied to the chimney emission from NDH.

Expansion of Shek Wu Hui Sewage Treatment Works is proposed in the FLN NDA. According to the outline design report of “Tender for the Provision of Services for Shek Wu Hui Sewage Treatment Works – Further Expansion – Feasibility Study” from EPD, two layout options have been developed. As option 2 is more preferable from an operations and maintenance perspective (see **section 3.6.2.3**), it is considered as a preferred option and has therefore been adopted by this study for further assessment.

The biogas produced from the sludge digestion process will be collected and stored in the gas holders. After pre-treatment, desulphurization and moisture removal, the biogas will be utilized by a combined heat and power (CHP) generator to produce hot water and electricity, and the residual will be flared in a biogas burner. The CHP and biogas burner are considered as potential emission sources within the assessment area of this study. **Appendix 3.7** presents the detailed calculations of biogas production based on the latest design of sewage treatment capacity (190000 m³/day) after the expansion, and the emission rates of CHP and biogas burner.

3.5.2.6 Odour Emission

Dispersion Model and Modelling Parameters

Odour propagation was modelled by AUSPLUME model, which is based on the Gaussian dispersion equation. The use of AUSPLUME has been approved by EPD. Other modelling parameters were determined according to EPD’s “Guidelines on Choice of Models and Model Parameters”.

Hourly meteorological data, including wind speed, wind direction, air temperature, and Pasquill stability class as recorded at the Ta Kwu Ling weather station in 2011, and the daily mixing height data measured at King’s Park Station were obtained from the Hong Kong Observatory for modelling the 1-hour average odour concentrations.

As required in the TM-EIAO, the odour criterion is defined as 5 OU units based on an averaging time of 5 seconds. Hence, it is required to convert the predicted odour concentration in 1-hour averaging time from the AUSPLUME model to 5-second average. Reference has been made to the peak-to-mean ratio stated in the “*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 (NSW Approved Method). In accordance with the NSW Approved Method, the conversion factors for converting 1-hour average to 1-second average concentration are adopted directly to convert the 1-hour concentration predicted by the AUSPLUME model to 5-second concentration as a conservative approach. The conversion factors for

different types of source and stability classes are listed in **Table 3.14** below.

Table 3.14 – Conversion factors for 1-hour to 5-second averaging time

Pasquill Stability Class	Point Sources	Area Sources	Volume Sources
A	2.3	2.5	2.3
B	2.3	2.5	2.3
C	2.3	2.5	2.3
D	2.3	2.5	2.3
E	2.3	2.3	2.3
F	2.3	2.3	2.3

The overall modelling parameters are summarised in **Table 3.15** for ease of reference.

Table 3.15 – Modelling parameters for AUSPLUME

Parameters	Input
Background Concentration	No
Modelling Mode	Flat terrain
Surface Roughness	100cm
Meteorological data	Ta Kwu Ling and King's Park weather station in Year 2011
Anemometer Height	13m
Emission period	24-hour

Odour Emission Rates

Proposed Sewage Treatment Work Expansion in FLN NDA

On-site odour measurement was conducted in September 2011 of different components inside the existing SWHSTW. Since the treatment process of the proposed STW Expansion is in general similar to that of the existing SWHSTW, the odour emission will be similar. As such, the recent odour emission measurement results for existing SWHSTW have been adopted as the basis to estimate the odour emission rates of sources associated with the proposed STW Expansion. The odour measurement was conducted by the Hong Kong Polytechnic University during the hot season to represent the worst-case scenario. **Table 3.16** summarises the measured odour emission rates of each source in existing SWHSTW. **Table 3.17** summarises the odour emission rate adopted at each source in the proposed STW Expansion. Detailed calculation is presented in **Appendix 3.8**.

Table 3.16 – Summary of measured odour emission rate in existing SWHSTW

Location	Maximum Emission Rate (OU/m ² /s)
Inlet pumping station	3.26
Fine Screening (at screen debris chamber)	3.51
Grit Channels	1.84
Degritting	1.10
Primary Sedimentation Tank (Weir Zone)	1.54
Primary Sedimentation Tank (Quiescent Zone)	4.03
Bioreactor	1.65
Feed Channel to FST	0.02
Final Sedimentation Tank	0.02
Sludge Holding Tank	0.43
Sludge Dewatering House	0.06
Thickener	3.98
Sludge Conditioning Tank	0.20

Table 3.17 – Odour emission rates for the proposed STW expansion

Odour Source	Corresponding Odour Source in SWHSTW	Odour Emission Rate (OU/m ² /s)
Inlet Works	Inlet pumping station	3.26
Primary Sedi	Primary Sedimentation Tank (Quiescent Zone)	4.03
MBR Pretreatment Screen	Primary Sedimentation Tank (Quiescent Zone)	4.03
Bioreactor	Bioreactor	1.65
Membrane Tank	Final Sedimentation Tank	0.02
Primary Sludge Thickener	Thickener	3.98
SAS Consolidation House	Thickener	3.98
Sludge Holding Tank	Sludge Holding Tank	0.43
Dewatering House	Sludge Dewatering House	0.06

All measured odour emission rates adopted for the proposed STW expansion were adjusted to the local ambient temperature. According to the equation from the approved EIA for Harbour Area Treatment Scheme (HATS) Stage 2A (EIA-148/2008) below:

$$G = M[BOD5]1.07^{T-20}$$

where G = sulphide flux from wall slimes, g/m²h

$[BOD5]$ = 5-day biochemical oxygen demand

T = temperature, °C

M = coefficient, m/h

For example, maximum hourly temperature at Ta Kwu Ling during Year 2011 was 36 °C and the odour emission was measured at temperature ~32-34 °C. Based on the equation above, the odour emission rate would be increased by 14%-31%.

Existing Sheung Shui Slaughter House

Reference has been made to the odour emission inventory adopted in the approved EIA study “Supplementary EIA Study for Sheung Shui Slaughter House” (EIA-069/BC). **Table 3.18** summarises the odour emission rate of each source under mitigated condition. **Appendix 3.8** presents the details of odour emissions.

Table 3.18 – Odour emission rates for existing Sheung Shui Slaughter House

Source Type	Odour Source	Mitigated Odour Emission Rate (OU/s)	Remarks
Lairages	Pig lairage	597.25	Odour emission from these sources are centralized and released via 1 exhaust.
	Manure collection rooms		
Slaughter Block Room 1	Blood handling room	223.70	Odour emission from these sources are centralized and released via 1 exhaust.
	Isolation lairage		
Slaughter Block Room 2	Manure pump rooms	30.63	Odour emissions from these sources are centralized and released via 1
	Pig bristle chute room		

Source Type	Odour Source	Mitigated Odour Emission Rate (OU/s)	Remarks
	By-product collection room & unloading bay		exhaust.
By-product Plant	Wastewater treatment plant	1980.70	Odour emission from these sources are centralized and released via 1 exhaust.
	By-product room		
Wastewater Treatment Plant	-	290.00	-
Livestock Transit Pens	-	13	10 sources in total
Livestock Train Unloading Area	-	7.8	20 sources in total
Livestock Truck Unloading Area	-	14.69	-

3.6 Identification of Environmental Impact

3.6.1 Construction Phase

3.6.1.1 Construction Dust

The construction programme for the project is listed in **Appendix 3.1**. It is anticipated that the major construction works associated with the development of the NDAs will be site formation and construction of the following infrastructure:

KTN NDA

- San Tin Highway / Fanling Highway Kwu Tung Section Widening (between San Tin Interchange and Po Shek Wu Interchange) (Major Improvement); (DP1)
- Castle Peak Road Diversion (Major Improvement) (DP2)
- KTN NDA Road P1 and P2 (New Road), and associated new Kwu Tung Interchange (New Road) and Pak Shek Au Interchange Improvement (Major Improvement) (DP 3)
- KTN NDA Road D1 to D5 (New Road) (DP 4)
- New Sewage Pumping Stations (SPS) in KTN (DP5)
- Utilization of Treated Sewage Effluent from SWHSTW (DP 7)

FLN NDA

- Utilization of Treated Sewage Effluent from SWHSTW (DP 7)
- Po Shek Wu Interchange Improvement (Major Improvement) (DP 8)
- Fanling Bypass Western Section (New Road) (DP 9)
- Fanling Bypass Eastern Section (New Road) (DP10)
- Shek Wu Hui Sewage Treatment Works - Further Expansion at FLN NDA (DP 11)
- Reprovision of temporary wholesale market in FLN NDA (DP 12)
- New Sewage Pumping Stations (SPS) in FLN NDA (DP13)

Potential dust impact from other construction activities such as the utilities works, building and landscape works within the two NDAs is considered to be minor. Locations of the dust emission sources mentioned above for different works contracts are shown in **Appendix 3.3**.

According to the best available information at the time of this study, the only concurrent projects activities for cumulative air quality assessment

are the site formation from the construction work on the Lok Ma Chau Loop during Year 2025. Hence, these concurrent construction activities are included in the construction impact assessment.

3.6.2 Operational Phase

Operational air quality impact assessments have been carried out based on conservative assumptions of the following projects and their cumulative impacts:

KTN NDA

- San Tin Highway / Fanling Highway Kwu Tung Section Widening (between San Tin Interchange and Po Shek Wu Interchange) (Major Improvement) (DP1)
- Castle Peak Road Diversion (Major Improvement) (DP2)
- KTN NDA Road P1 and P2 (New Road), and associated new Kwu Tung Interchange (New Road) and Pak Shek Au Interchange Improvement (Major Improvement) (DP 3)
- KTN NDA Road D1 to D5 (New Road) (DP 4)
- New Sewage Pumping Stations (SPS) in KTN (DP5)

FLN NDA

- Utilization of Treated Sewage Effluent from Shek Wu Hui Sewage Treatment Works (SWHSTW) (DP 7)
- Po Shek Wu Interchange Improvement (Major Improvement) (DP 8)
- Fanling Bypass Western Section (New Road) (DP 9)
- Fanling Bypass Eastern Section (New Road) (DP10)
- Shek Wu Hui Sewage Treatment Works - Further Expansion at FLN NDA (DP 11)
- Reprovision of temporary wholesale market in FLN NDA (DP 12)
- New Sewage Pumping Stations (SPS) in FLN NDA (DP13)

3.6.2.1 Industrial Emission

Existing Industrial Emission

The key environmental pollutants due to industrial chimneys (employing diesel) include nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and respirable suspended particulates (RSP).

As previously investigated in the “Technical Paper 13 – Planning and Development Study on North East New Territories” (TP13), a number of chimneys were identified in On Lok Tsuen industrial area, located at the

junction of Lok Yip Street and Sha Tau Kok Road at Fanling. Other than On Lok Tsuen, there are other industrial chimneys scattered in the area adjacent to KTN NDA and FLN NDA.

Subsequent site surveys and another reconnaissance survey were conducted in 2008 and 2012 respectively to verify the chimneys identified in TP13. The more recent survey revealed that some of these chimneys have been demolished or relocated. Industrial emissions from these chimneys are therefore updated in the assessment accordingly. Site surveys have also identified some chimneys, which were not mentioned in TP13, for the assessment. A total of 14 existing chimneys have been identified within the Study Area.

In addition, with reference to the approved EIA Study “Provision of Cremators at Wo Hop Shek Crematorium” (EIA-146/2008), a total number of 9 chimneys would be installed at the Wo Hop Shek Crematorium, which is located at about 1800m to the South of FLN NDA. These chimneys have been included in this assessment to account for the cumulative impact. The emission of the chimneys has been updated according to the corresponding specified process license.

Emission inventory of industrial chimneys are presented in **Appendix 3.7** and their locations are illustrated in **Figure 3.7**.

Chimney Emission from the North District Hospital (NDH)

Two chimneys located at the NDH are identified within 500m study area from the boundary of NDAs. The latest chimney details as well as fuel consumption data have been obtained from the NDH in 2010, as given in **Appendix 3.7**, and the information has been included in the assessment to account for the cumulative impact. **Figure 3.7** shows the locations of industrial chimneys adopted in the assessment.

Industrial Emission associated with the NDAs

Based on the latest development plan, KTN NDA and FLN NDA will comprise mainly residential developments with associated employment and community facilities. Chimney emissions have not been identified for the existing rural industrial and open storage sites in NDAs during site survey. It is expected that the operational modes of these relocated industrial premises will be similar to previous industries. Hence, chimney emissions from these industrials are therefore not expected.

A hospital & polyclinics is also proposed in the KTN NDA (Site B2-2), which is considered as a potential emission source. The associated chimney emission has been included in the assessment.

Expansion of Shek Wu Hui Sewage Treatment Works is proposed in the FLN NDA (Site A2-3). Emissions from the CHP and biogas burner are considered as potential emission sources. On comparing with the existing emission, the future emission is anticipated to be increased. The associated chimney emissions have been included in the assessment.

Table 3.19 summarises the air pollution sources within each NDA. **Figure 3.8** and **Figure 3.9** illustrate the locations of these potential air pollution sources. Emission inventory of air pollutants sources is shown in **Appendix 3.7**.

Table 3.19 – Industrial emission sources in each NDA ^[1]

Land lot	Landuse ^[2]	Emission Type	Description
KTN NDA			
B2-2	G	Industrial	Hospital, polyclinics and clinic
FLN NDA			
A2-3	OU(STW)	Industrial	Sewage treatment works

Notes:

[1] Based on Revised RODP shown in **Appendix 2.1**

[2] G - Government; OU(STW) – Other specific uses (sewage treatment works)

3.6.2.2 Vehicular Emission

During the operational phase of the Project, major sources of vehicular emission for each NDA include:

KTN NDA

- Vehicular emission from proposed road networks within 500m from KTN NDA boundary.
- Vehicular emission from existing road networks within 500m from KTN NDA boundary.
- Vehicular emission from San Tin Highway / Fanling Highway Kwu Tung Section Widening (between San Tin Interchange and Po Shek Wu Interchange) (Major Improvement) (DP1)
- Vehicular emission from Castle Peak Road Diversion (Major Improvement) (DP2)
- Vehicular emission from KTN NDA Road P1 and P2 (New Road), and associated new Kwu Tung Interchange (New Road) and Pak Shek Au Interchange Improvement (Major Improvement) (DP 3)
- Vehicular emission from KTN NDA Road D1 to D5 (New Road) (DP 4)

FLN NDA

- Vehicular emission from proposed road networks within 500m from FLN NDA boundary.

- Vehicular emission from existing road networks within 500m from FLN NDA boundary.
- Vehicular emission from Po Shek Wu Interchange Improvement (Major Improvement) (DP 8)
- Vehicular emission from Fanling Bypass Western Section (New Road) (DP 9)
- Vehicular emission from Fanling Bypass Eastern Section (New Road) (DP10)

Vehicular tailpipe emissions from open roads are calculated based on the EmFAC-HK model. The latest model version EmFAC-HK v2.5 has been employed in this assessment. Traffic data were prepared by traffic engineer and have been separately submitted to the Transport Department (TD) for endorsement. No adverse comment is raised by TD (see Appendix 3.4). **Appendix 3.4** presents the methodology and assumptions adopted in estimating the vehicular emission factors. The results have concluded that Year 2021 is the worst assessment year for KTN NDA and Year 2022 for FLN NDA. Table 3.20 and Table 3.21 below summarize the total daily emissions within each NDA for each of selected assessment years.

Table 3.20 – Summary of total daily air pollutant emissions for KTN NDA

Year of Assessment	Total Daily NO _x Emission(kg/day)	Total Daily RSP Emission (kg/day)	Remark
2021	492	28	Commissioning year for 1 st Stage road network
2025	350	24	Interim year between Year 2021 and Year 2028
2028	271	21	Commissioning year for 2 nd Stage road network
2029	250	20	Commissioning year for 3 rd Stage road network
2044	187	16	15 years after commencement of operation of all proposed roads

Table 3.21 – Summary of total daily air pollutant emissions for FLN NDA

Year of Assessment	Total Daily NO _x Emission (kg/day)	Total Daily RSP Emission (kg/day)	Remark
2022	618	33	Commissioning year for 1 st Stage road network
2023	571	32	Commissioning year for 2 nd Stage road network
2026	434	28	Interim year between Year 2023 and Year 2028
2028	355	25	Commissioning year for 3 rd Stage road network
2029	328	24	Commissioning year for 4 th Stage road network
2044	233	19	15 years after commencement of operation of all proposed roads

According to the latest development plan, for KTN NDA, the planned roads will be implemented in 3 stages, with completion of the 1st stage for operation in 2021, the 2nd stage for operation in 2028, and the 3rd stage for operation in 2029. Emissions for Year 2021, Year 2025, Year 2028, Year 2039 and Year 2044 were determined. Year 2021 is taken as the assessment year as vehicular emission within the KTN NDA will be the highest when compared with the other four years. As Year 2029 is the year with all roads opened, this gives the 2nd highest emission, and has also been assessed to predict the air quality impact from the entire open-road network.

For FLN NDA, the planned roads will be implemented in 4 stages, with completion of the 1st stage for operation in 2022, the 2nd stage for operation in 2023, the 3rd stage for operation in 2028, and the 4th stage for operation in 2029. Emissions for Year 2022, Year 2023, Year 2026, Year 2028, Year 2039 and Year 2044 were determined. Year 2022 is taken as the assessment year as it generates the highest vehicular emission within the FLN NDA when compared with the other five years. As Year 2029 is the year with all roads opened, this gives the 2nd highest emission, and has also been assessed to predict the air quality impact from the entire open-road network.

3.6.2.3 Odour Emission

Existing Odour Sources

The existing odour sources adjacent to the KTN and FLN NDAs may include the Sheung Shui Slaughter House (SSSH), Ma Tso Lung Restored Landfill, NENT Landfill and its extension, and livestock farm.

Existing Sheung Shui Slaughter House (SSSH)

The site covers an area of about 57,800m² and comprises several functional blocks. It can accommodate 12,000 pigs, 2,200 cattle and 300 goats, and the designed daily production throughput is 5,000 pigs, 400 cattle and 300 goats. **Figure 3.9** illustrates the location of SSSH. The SSSH receives approximately 100 livestock carrying trucks per day from China via Man Kam To Boundary Control Point.

Environmental impacts of SSSH has been assessed and presented in the approved EIA study “Supplementary EIA Study for Sheung Shui Slaughter House” (EIA-069/BC). A number of mitigation measures have been implemented in order to reduce the potential odour impact, including wet scrubbers, ozone systems and neutralising agent systems, etc. **Table 3.22** summarizes the potential odour sources:

Table 3.22 – Potential odour sources in the existing SSSH and mitigation measures adopted

Area	Control Technology			Removal Efficiency (%)
	Neutralising Spray	Ozone	Wet Scrubber	
Pig lairage	✓		✓	97.5
Manure collection rooms		✓	✓	95
Blood handling room		✓		90
Isolation lairage	✓			90
Manure pump rooms		✓		90
Pig bristle chute room		✓		90
Wastewater treatment plant			✓	95
By-product collection room & unloading bay		✓		90
By-product room		✓		90
Livestock transit pens	✓			90
Train unloading area	✓			90
Livestock truck unloading area	✓			90

Ref: Sheung Shui Slaughter House Supplementary Environmental Impact Assessment

The current assessment has been conducted based on information from the approved EIA study “Supplementary EIA Study for Sheung Shui Slaughter House” (EIA-069/BC).

Ma Tso Lung Restored Landfill

According to information provided by EPD (Special Waste and Landfill Restoration Group, Landfill Restoration and Aftercare Section), the restoration works on the Ma Tso Lung Landfill (MTLL) were completed by the end of May 2000 and it was returned to Tung Wah Group of Hospitals in August 2000 for recreational use. EPD is currently undertaking “Aftercare” of landfill which includes operating and maintaining the landfill gas management system and quarterly monitoring work. The contract period of the Aftercare would last for about 30 years, commencing in June 2000 and completing in May 2030.

In addition, according to the record of odour monitoring conducted by EPD in 2007-2012, there was no odour nuisance during this period. The

detailed odour monitoring record is presented in **Appendix 3.8**. It is therefore anticipated that MTLL would not cause any odour concern at the neighbouring receivers and hence would not cause any constraints on the development plan. As such, odour assessment of MTLL is not necessary. **Figure 3.8** illustrates the location of the Ma Tso Lung Restored Landfill.

NENT Landfill and its Extension

An extension of the existing NENT Landfill is planned to be ready for solid waste disposal after the existing NENT Landfills reaches its capacity. The proposed NENT Extension is about 63 ha in size with an estimated waste capacity of 21.4 Mm³. The NENT Landfill Extension is forecasted to operate for about 10 to 12 years.

NENT Landfill is located approximately 4500m from FLN NDA. With reference to the findings in the approved EIA Study “North East New Territories (NENT) Landfill Extension – Feasibility Study” (EIA-133/2007), odour impact is insignificant at such separation distance. Hence, odour impact on the development is not anticipated.

Livestock Farm

There are scattered livestock farms / poultry farms in the Study Area. Farms within the NDAs will be cleared for development and therefore odour impact from these farms is not anticipated.

Potential Odour Sources

Sewage Treatment Work (STW) Expansion in FLN NDA

To cater for the increase in sewage due to the KTN NDA and FLN NDA, expansion of Shek Wu Hui Sewage Treatment Works is necessary. Based on the capacity and effluent quality requirement, two layout options have been developed in the outline design report of “Tender for the Provision of Services for Shek Wu Hui Sewage Treatment Works - Further Expansion – Feasibility Study” from EPD. These two layout options include:

Option 1: To conduct separate treatment work of 40,000m³ / day plus 20,000 m³/day at the proposed site, which is south of Ng Tung River and to retrofit / upgrade the existing SHSTW to provide 110,000m³/ day at tertiary level.

Option 2: To retrofit / update the existing facilities so as to confine the whole sewage stream of 170,000m³/day at tertiary level within the existing SWHSTW and to construct associated sludge handling facilities at the proposed site.

Option 2 will impose less odour, visual and/or ecological impacts to the adjacent sensitive receivers and it is more preferable in terms of operations and maintenance perspective. Hence, Option 2 is considered as a preferred option. Based on the latest design, the sewage treatment capacity will be upgraded to 190,000 m³/day after the expansion.

The expansion of the Shek Wu Hui Sewage Treatment Works would be carried out in three phases:

- Phase 1A – from year 2015 to year 2020 (the total treatment capacity will be increase to 133,000 m³/day)
- Phase 1B – from year 2021 to year 2023 (the total treatment capacity will be increase to 153,000 m³/day)
- Phase 2 – from year 2022 to year 2028 (the total treatment capacity will be increase to 190,000 m³/day)

During the expansion works, newly constructed and retrofitted odour sources will be covered and provided with deodourizing unit. Therefore, the odour impact from the existing SHWSTW will improve as a result of the expansion works. Potential odour impact of the SWHSTW and other odour emission sources after the completion of the expansion works (i.e the ultimate scenario) will be assessed.

The layout plan of the proposed STW expansion is shown in **Figure 3.10**. A summary of the key treatment process elements in the proposed STW Expansion for the preferred Option 2 is given below:

- | | |
|---|---|
| • Sewage Treatment | • Sludge Treatment |
| • Inlet works | • Primary Sludge Thickening |
| • Preliminary Treatment | • Waste Activated Sludge Thickening |
| • Equalization | • Sludge Digestion and Biogas Utilization |
| • Primary Sedimentation | • Sludge Dewatering |
| • MBR Pre-treatment Screen | • |
| • Bioreactor and Membrane Filtration System | |

Chlorination and dechlorination facilities for the treated sewage effluent

Superchlorination will be adopted for colour removal from reclaimed water.

Sodium hypochlorite solution will then be delivered to the contact tank. After mixing of the sodium hypochlorite solution with the treated sewage effluent, the chemical will react with the ammonia in the effluent to form chloramines, which will give a “swimming pool” odour. As superchlorination process resembles breakpoint chlorination, higher dosage of sodium hypochlorite will be added and chloramines will themselves be broken down under this situation resulting their chloramines removed. In addition, the contact tank will be covered. Hence, no odour impact is expected.

Proposed Sewage Pumping Stations

According to the latest development plan, a total of 6 sewerage pumping stations (SPS) have been proposed within the NDAs including KTN D1-3, KTN F1-2, FLN A1-6, FLN B1-4, FLN B2-3 and FLN C2-3. Potential odour emission sources include wet well and discharge chamber.

The wet well and other sewage facilities would be covered and foul air ventilated to a deodorizer for treatment before discharge to the environment. The ventilation system would also maintain a slight negative pressure within the facilities. Similar odour mitigation measures have also been implemented at other SPSs in the urban areas which successfully controlled odour nuisance. With proper implementation of these mitigation measures, adverse odour impact from SPS is not anticipated.

Table 3.23 below summarises the location of potential odour emission sources associated with the Project. **Figure 3.8** and **Figure 3.9** illustrates

the location of the proposed sewage pumping stations in KTN NDA and FLN NDA respectively.

Table 3.23 – Summary of potential odour emission sources associated with the Project ^[1]

Land lot	Landuse ^[2]	Emission Type	Description
KTN NDA			
D1-3	OU (SPS)	Odour	Sewage pumping station
F1-2	OU (SPS)	Odour	Sewage pumping station
FLN NDA			
A2-3	OU(STW)	Odour	Sewage treatment works expansion
A1-6	OU(SPS)	Odour	Sewage pumping station
B1-4	OU(SPS)	Odour	Sewage pumping station
B2-3	OU(SPS)	Odour	Sewage pumping station
C2-3	OU(SPS)	Odour	Sewage pumping station

Notes:

[1] Based on Revised RODP shown in **Figure 2.5 – 2.7**.

[2] OU (SPS) – Other specific uses (sewage pumping station); OU(STW) – Other specific uses (sewage treatment works).

3.6.2.4 Other Emission Sources

Shooting Range and Weapons Training Facilities

Two shooting ranges have been identified within and in the vicinity of the NDA sites including Lo Wu Classification Range and San Wai/ Tai Ling Firing Range. Due to security reason, information on the number and types of bullets fired is not available from Hong Kong Police Force (HKPF), and People Liberation Army (PLA).

Weapons training facilities within the weapon training division site (FLN A1-11) of the HKPF are also proposed within the FLN NDA site. Gunfire will be involved in the training activities at this location.

There is limited emission from normal gun shots. With reference to the approved EIA Study “Proposed Shooting Range at Pillar Point Valley Landfill” (DIR-164/2008), the lead content of lead shots is about 97%. Lead dust, including lead metal, lead ion, and oxidized lead compound, are generated during the breakdown of a lead bullet. It is understood that most of airborne lead, in form of lead dust or lead fume, emitted from gunshot comes from the bullet being ejected. Drag force during gun shot is impulsive but not considered to be an important mechanism that would carry lead dust further away and hence the lead emission will be localized. Given that the firing range and weapons training facilities are located in open spaces and accumulation of air pollutants leading to

exceedance of criteria is not anticipated, potential impacts due to lead dust emission from the firing practice are not anticipated.

Helipad

Four helipads, at Lo Wu Camp, Crest Hill Operation Base, Lo Wu Classification Range, and San Wai/ Tai Ling Firing Range, have been identified within 500m of the proposed development area. The helipad at Lo Wu Camp has been closed, and is therefore not included in this assessment. The other three helipads at Crest Hill Operation Base, Lo Wu Classification Range, and San Wai/ Tai Ling Firing Range are of low usage frequency and are located at open spaces, and therefore accumulation of emissions from helicopters associated with these three helipads are not expected.

3.6.2.5 Emission from Concurrent Projects

Concurrent projects in the vicinity, which would have potential cumulative air quality impact to existing and planned ASRs, have been identified. These projects include the vehicular emissions from the committed Liantang / Heung Yuen Wai Boundary Control Point (BCP) and its associated road networks, planned Development of Lok Ma Chau Loop, and the industrial emissions from existing industries, proposed hospital in KTN NDA previously described, and Wo Hop Shek Crematorium.

Committed Liantang / Heung Yuen Wai BCP and its associated road networks

The Liantang/ Heung Yuen Wai BCP will connect with the Eastern Corridor and provide efficient access to Guangdong, Fujian, and Jiangxi for enhancing ties between Hong Kong and the Mainland. It will also help extend the economic hinterland of Hong Kong and Shenzhen and promote regional development. In addition, the BCP will satisfy the long-term transport needs and help re-distribute the cross-boundary traffic from Man Kam To BCP and Sha Tau Kok BCP to alleviate the frequent traffic congestions.

For the purpose of cumulative air quality assessment, the induced traffic caused by Liantang/ Heung Yuen Wai BCP and the road sections located within 500m from the project boundary have been included in this assessment.

In addition, according to the approved EIA Study of “Liantang / Heung Yuen Wai Boundary Control Point and Associated Works” (AEIAR-161/2011), vehicular emissions inside the long tunnel with a length of about 4.8km would be released via a ventilation shaft located near the Tong Hang Tung Chuen, which is within 500m of the study area. The

tunnel emission from the ventilation shaft at its southern portal has also been included in the assessment to account for the cumulative impact.

Planned Development of Lok Ma Chau Loop

In the “Hong Kong 2030: Planning Vision and Strategy Study”, the Lok Ma Chau Loop was identified as an area having potential for special uses pertinent to its boundary location. A comprehensive plan has been formulated for the development of the Loop meet the long-term social, economic and environmental needs.

The induced traffic flow due to the operation of the eastern connection road of the Lok Ma Chau Loop has been included to take into account the cumulative air quality impacts in this assessment.

3.7 Prediction and Evaluation of Impacts

3.7.1 Construction Phase

For fugitive dust impacts, the environmental performance of the unmitigated scenario would likely exceed the TSP criterion at majority of ASR locations. Therefore, mitigation measures are needed to reduce the predicted dust impacts. **Appendix 3.9** shows the results of unmitigated scenarios for the two NDA areas and **Tables 3.24 to 3.26** present a summary of these results. **Figures 3.11 to 3.28** show the contours of unmitigated cumulative 1-hour, 24-hour, and annual TSP concentrations in the study area. Results of dust impact assessment with mitigations are discussed in **Section 3.8**.

Table 3.24 – Summary of 1-hour TSP concentrations results under unmitigated scenario

NDA	Assessment Year	1-hour TSP Concentrations at Various Heights ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m
KTN	2018	603 - 9280	662 – 5609	626 – 3287
	2025	1624 – 12631	1799 – 7805	1698 – 5236
	2028	430 – 10095	460 – 5464	426 – 3143
FLN	2018	138 - 7227	150 - 3129	147 - 1688
	2021	587 – 7494	653 – 5070	622 - 3473
	2025	568 – 7124	646 - 5038	619 – 3374

Notes:

[1] Values which exceed the criterion of $500 \mu\text{g}/\text{m}^3$ are shown in bold

[2] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Table 3.25 – Summary of 24-hour TSP concentrations results under unmitigated scenario

NDA	Assessment Year	24-hour TSP Concentrations at Various Heights ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m
KTN	2018	102 – 2593	105 – 1335	103 – 858
	2025	159 – 3667	168 – 2339	163 – 1537
	2028	114 – 2504	117 – 1458	113 – 836
FLN	2018	78 - 1854	78 – 872	78 - 460

NDA	Assessment Year	24-hour TSP Concentrations at Various Heights ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m
	2021	135 – 2321	141 – 1358	137 – 807
	2025	132 – 1775	138 – 1167	133 – 749

Notes:

[1] Values which exceed the criterion of $260 \mu\text{g}/\text{m}^3$ are shown in bold

[2] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Table 3.26 – Summary of annual TSP concentrations results under unmitigated scenario

NDA	Assessment Year	Annual TSP Concentrations at Various Heights ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m
KTN	2018	73.1 – 120.0	73.2 – 99.3	73.2 – 88.2
	2025	73.3 – 122.0	73.3 – 108.5	73.3 – 98.4
	2028	73.2 – 87.5	73.2 – 81.0	73.2 – 78.2
FLN	2018	73.1 – 95.1	73.1 – 83.2	73.1 – 77.9
	2021	73.7 – 94.9	73.8 – 90.3	73.7 – 84.5
	2025	73.5 – 89.4	73.2 – 84.2	73.2 – 80.5

Notes:

[1] Values which exceed the criterion of $80 \mu\text{g}/\text{m}^3$ are shown in bold

[2] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

3.7.2 Cumulative Emission during Operational Phase

3.7.2.1 NO₂ and RSP

The cumulative 1-hour, 24-hour and annual NO₂ concentrations and 24-hour and annual RSP concentrations generated by chimney plume impingement and vehicular emission have been assessed at all existing and planned ASRs in KTN NDA for the worst case assessment year of Year 2021 and in FLN NDA for the worst case assessment year of Year 2022. The assessment results are presented in **Appendix 3.10**. A summary of the results for the worst case assessment year at worst hit level is presented in **Table 3.27**:

Table 3.27 – Cumulative NO₂ and RSP concentrations at worst hit level at worst assessment year

Overall worst assessment year.						
NDA	Worst Assessment Year	NO2 Concentration (µg/m ³)			RSP Concentration (µg/m ³)	
		1-Hour	24-Hour	Annual	24-Hour	Annual
Background		48.5			50.5	
Vehicular Emission and Chimney Emission						
KTN	2021	10.7 – 84.0	1.5 – 22.8	0.3 – 10.2	0.6 – 5.8	0.2 – 2.6
FLN	2022	15.8 – 57.8	2.9 – 18.8	0.7 – 10.7	0.7 – 5.6	0.2 – 3.1
Cumulative Concentration						
KTN	2021	59.2 – 131.4	50.0 – 71.3	48.8 – 58.7	51.1 – 56.3	50.7 – 53.1
FLN	2022	64.3 – 106.3	51.4 – 67.3	49.2 – 59.2	51.2 – 56.1	50.7 – 53.6

Note: [1] Worst hit level is 1.5m above ground.

The following figures illustrate the contour plots of NO₂ and RSP:

- **Figures 3.29 – 3.31:** 1-hour, 24-hour and annual NO₂ concentrations at 1.5m above ground in KTN NDA at Year 2021
- **Figures 3.32 – 3.34:** 1-hour, 24-hour and annual NO₂ concentrations at 1.5m above ground in FLN NDA at Year 2022
- **Figures 3.35 – 3.36:** 24-hour and annual RSP concentrations at 1.5m above ground in KTN NDA at Year 2021
- **Figure 3.37 – Figure 3.38:** 24-hour and annual RSP concentrations at 1.5m above ground in FLN NDA at Year 2022

For KTN NDA in Year 2021, no exceedances of NO₂ and RSP concentrations are identified at all ASRs within 500m from the boundary of KTN NDA and associated road networks, except annual-averaged RSP concentrations at certain areas within and along Fanling Highway. These non-compliance regions do not encroach into any air sensitive use. Adverse cumulative air quality impact within and in the vicinity of KTN NDA is not anticipated during operational phase in Year 2021.

For FLN NDA in Year 2022, no exceedances of NO₂ and RSP concentrations are identified at all ASRs within 500m from the boundary of FLN NDA and associated road networks, except that exceedance in annual-averaged RSP concentration at certain areas within and along

Fanling Highway is observed. These non-compliance regions do not encroach into any air sensitive use. Adverse cumulative air quality impact within and in the vicinity of FLN NDA is not anticipated during operational phase in Year 2022.

Since the entire proposed road network for KTN NDA and FLN NDA would be completed and operating by Year 2029, the assessment results in **Table 3.27** do not include the emissions from the entire planned open-road development in both NDAs. According to the emission information between the year of “all roads completed year” and 15 years after, Year 2029 represents a worst emission scenario for KTN NDA and FLN NDA. Hence, air quality impact during Year 2029 has also been assessed to provide supplementary information on air quality impact. Cumulative NO₂ and RSP concentrations for “all roads completion year” at various heights are listed in **Appendix 3.10**. A summary of results cumulative NO₂ and RSP concentrations for all roads completion year at worst hit level is presented in **Table 3.28**.

Table 3.28 – NO₂ and RSP concentrations at worst hit level at all roads completion year

NDA	Worst Assessment Year	NO ₂ Concentration (µg/m ³)			RSP Concentration (µg/m ³)	
		1-Hour	24-Hour	Annual	24-Hour	Annual
Background		48.5			50.5	
Vehicular Emission and Chimney Emission						
KTN	2029	5.7 – 42.8	0.9 – 10.5	0.2 – 4.5	0.5 – 4.4	0.2 – 1.7
FLN	2029	10.0 – 33.6	1.8 – 10.2	0.2 – 4.5	0.6 – 5.8	0.2 – 2.6
Cumulative Concentration						
KTN	2029	54.2 – 91.4	49.4 – 59.0	48.7 – 53.0	51.0 – 54.9	50.7 – 52.2
FLN	2029	58.5 – 82.1	50.3 – 58.7	49.0 – 54.2	51.1 – 56.3	50.7 – 53.1

Note: [1] Worst hit level is 1.5m above ground.

The following figures illustrate the contour plots of NO₂ and RSP:

Figures 3.39 – 3.41: 1-hour, 24-hour and annual NO₂ concentrations at 1.5m above ground in KTN NDA at Year 2029

Figures 3.42 – 3.44: 1-hour, 24-hour and annual NO₂ concentrations at 1.5m above ground in FLN NDA at Year 2029

Figures 3.45 – 3.46: 24-hour and annual RSP concentrations at 1.5m above ground in KTN NDA at Year 2029

Figures 3.47 – 3.48: 24-hour and annual RSP concentrations at 1.5m above ground in FLN NDA at Year 2029

For KTN NDA in Year 2029, no exceedances of NO₂ and RSP concentrations are identified at all ASRs within 500m from the boundary of KTN NDA and associated road networks. Hence, there is no adverse cumulative air quality impact on the ASRs within and in the vicinity of KTN NDA during operational phase in Year 2029.

For FLN NDA in Year 2029, no exceedances of NO₂ and RSP concentrations are identified at all ASRs within 500m from the boundary of FLN NDA and associated road networks, except that exceedance in annual-averaged RSP concentration at the area of Po Shek Wu Road Interchange along Fanling Highway is observed. It is also observed that the non-compliance regions do not encroach into any air sensitive use. Hence, there is no adverse cumulative air quality impact in the FLN NDA and the vicinity of FLN NDA during operational phase in Year 2029.

3.7.2.2 SO₂

The worst case assessment year for SO₂ is considered to be Year 2029 and onwards after the commissioning of the proposed hospital in KTN NDA and the Shek Wu Hui Sewage Treatment Works Expansion. Contours of 1-hour, 24-hour and annual-averaged SO₂ concentration from chimney emissions at worst hit level are shown in **Figures 3.49 – 3.51** for KTN NDA and **Figures 3.52 – 3.54** for FLN NDA. The results show that the predicted SO₂ concentrations are well below the relevant criteria in both NDAs. Mitigation measures are not required. Cumulative SO₂ concentrations at worst hit level are presented in **Appendix 3.11**. A summary of cumulative concentrations at all ASRs at worst hit level is presented in the **Table 3.29**.

Table 3.29 – Cumulative SO₂ concentration at worst hit level at worst assessment year

assessment year			
NDA	SO ₂ Concentration (µg/m ³)		
	1-Hour	24-Hour	Annual
Background	14.3		
Chimney Emission			
KTN	2.4 – 15.6 ^[1]	0.5 – 2.7 ^[1]	0.1 – 0.5 ^[1]
FLN	5.4 – 45.9 ^[3]	0.9 – 7.8 ^[3]	0.3 – 1.4 ^[2]
Cumulative Concentration			
KTN	16.7 – 29.9 ^[1]	14.8 – 17.0 ^[1]	14.4 – 14.8 ^[1]
FLN	19.7 – 60.2 ^[3]	15.2 – 22.1 ^[3]	14.6 – 15.7 ^[2]

Notes:

[1] Worst hit level is 10m above ground.

[2] Worst hit level is 35m above ground.

[3] Worst hit level is 40m above ground.

3.7.2.3 Odour

Proposed Sewage Treatment Work Expansion in FLN NDA

The maximum 5-second averaged odour concentrations at all ASRs in FLN and KTN NDA at Year 2028 and onwards were assessed and presented in **Appendix 3.12**. No exceedance in odour criterion at all ASRs in FLN and KTN NDA are identified. According to the contours of odour concentrations at ground level (1.5m above ground) and worst hit level (55m above ground) shown in **Figure 3.55a** and **Figure 3.55b**, the 5OU non-compliance zone (i.e. at 55m above the ground) have been identified. According to the revised RODP, there is no sir sensitive use within the non-compliance zone. Nevertheless, for the future development, it is necessary to ensure that no sensitive receivers will fall into this non-compliance zone.

A summary of results of 5-second averaged odour concentrations at existing and planned sensitive receivers is presented in **Table 3.30**.

Table 3.30 – 5-second averaged odour concentration at sensitive receivers

NDA	ASR Status	Odour Concentration (OU)
FLN (Year 2028 and onwards)	Existing	0.2 – 0.7 ^[1]
	Planned	0.2 – 0.7 ^[1]
KTN (Year 2028 and onwards)	Existing	0.6 ^[1]
	Planned	0.2 – 0.5 ^[1]

Note:

[1] Worst hit level is at 55m above ground. 5OU unit is identified near the boundary of the SHWSTW

3.8 Mitigation Measures

3.8.1 Construction Phase

In order to reduce the dust impact and achieve compliance with TSP criteria at ASRs, mitigation measures in the form of regular watering under good site practice should be adopted. In accordance with the “Control of Open Fugitive Dust Sources” (USEPA AP-42) as given in **Appendix 3.2**, watering once per hour on exposed worksites and haul roads is proposed to achieve a dust removal efficiency of 92.1%. This dust suppression efficiency is derived from average haul road traffic, average evaporation rate and an assumed application intensity of 1.7 L/m² for the respective watering frequencies (see **Appendix 3.2**). Any potential dust impact and watering mitigation would be subject to actual site conditions. For example, a construction activity that produces inherently wet conditions or in cases under rainy weather, the above water application intensity may not be necessary. While the above watering frequencies are to be followed, the extent of watering may vary depending on actual site conditions but should be sufficient to maintain an equivalent intensity of no less than 1.7 L/m² to achieve the respective dust removal efficiencies. The dust levels would be monitored and managed under an EM&A programme as specified in the EM&A Manual.

In addition, the Contractor is also obliged to follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation. The regulation stipulates the construction dust control requirements for both Notifiable (e.g. site formation) and Regulatory (e.g. road opening) Works to be carried out by the Contractor. The following dust suppression measures should also 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 be extended 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 from the vehicle;
- Where practicable, vehicle washing facilities with 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;
- Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet;
- Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding;
- Any skip hoist for material transport should be totally enclosed by impervious sheeting;
- 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 3 sides;
- 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;
- Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; 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.

These requirements should be incorporated into the contract specification for the civil work. In addition, an audit and monitoring programme during the construction phase should be implemented by the project proponent

to ensure that the construction dust impacts are controlled to within the required criteria. Detailed requirements for the audit and monitoring programme are given separately in the EM&A manual.

3.8.1.1 Assessment Results – Mitigated Scenarios for KTN NDA

Short-term Assessment (Tier 1) for Worst Case Scenario – Year 2025

The maximum 1-hour and 24-hour TSP concentrations from Tier 1 screening assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.31** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 1) at the ASRs concerned. The results indicate that, for some of the ASRs, exceedance of 1-hour and 24-hour TSP criteria would not be anticipated even with this theoretical worst case situation where the entire worksites were assumed active (i.e. 100%). However, for the ASRs near the work sites (e.g. Lo Wu Firing Range, District Headquarters Associated Married Staff Quarters, Divisional Police Station and Reprovisioning of Fan Garden Junior Police Officers' Police Married Quarters), exceedance of 1-hour and 24-hour TSP criteria is still predicted. As the Tier 1 assessment is for screening purposes only and does not reflect the actual on-site activities, a more focused Tier 2 assessment has been undertaken.

Figure 3.61 and Figure 3.62 show the contours of Tier 1 1-hour and 24-hour TSP concentrations respectively.

Short-term Assessment (Tier 2) for Worst Case Scenario – Year 2025

A more focused Tier 2 assessment has been conducted with the assumed 15% active works areas for the adjacent construction site positioned nearest to the potentially worst affected ASRs. As mentioned in **Section 3.6.1.6**, the Tier 2 assessment is also very conservative and will lead to over prediction of the dust impacts.

The maximum 1-hour and 24-hour TSP concentrations from Tier 2 screening assessment have been predicted. **Appendix 3.14** shows the assessment results and **Table 3.32** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 2) at the ASRs concerned. Results show that the cumulative 1-hour and 24-hour TSP concentrations would comply with the respective criteria except KTN-97. As such, adverse short-term construction dust impact is not anticipated.

Contours are presented in **Figure 3.63 and Figure 3.64** for 1-hour (Tier 2), and 24-hour (Tier 2) TSP concentrations at 1.5m above ground to illustrate the short-term dust impact on the ASR.

Short-term Assessment (Tier 3) for Worst Case Scenario – Year 2025

Based on the Tier 2 assessment which is a reasonably conservative, 1-hour TSP exceedance at one ASR is predicted. However, it is estimated that the actual active area for KTN NDA in 2025 is 7.9%. A more focused Tier 3 assessment has been conducted with the assumed 7.9% active works areas for the adjacent construction site positioned nearest to the potentially worst affected ASRs.

The maximum 1-hour and 24-hour TSP concentrations from Tier 3 screening assessment have been predicted. **Appendix 3.15** shows the assessment results and **Table 3.33** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 3) at the ASR concerned. Results show that the cumulative 1-hour and 24-hour TSP concentrations would comply with the respective criteria and as such, adverse short-term construction dust impact is not anticipated.

Contours have been presented in **Figure 3.65** and **Figure 3.66** for 1-hour (Tier 3) and 24-hour (Tier 3) TSP concentrations at 1.5m above ground to illustrate the short-term dust impact on the ASR.

Long-term Assessment for Worst Case Scenario – Year 2025

The annual TSP concentrations from long-term assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.34** below summarises the cumulative annual TSP impact at the ASRs concerned. In summary, the predicted annual TSP concentrations at all ASRs would comply with the criterion of $80\mu\text{g}/\text{m}^3$, and therefore, no adverse long-term impact is anticipated. Contour of annual TSP concentrations at 1.5m above ground are shown in **Figure 3.67**.

Table 3.31 – Tier 1 assessment – Predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in KTN NDA in Year 2025

Locations	ASR	1-hour TSP concentrations at various height (µg/m³)			24-hour TSP concentrations at various height (µg/m³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Temporary Structure near Sheung Yue River	KTN-E24	941	660	446	294	237	189
Yin Kong Tsuen	KTN-E85	558	527	409	110	107	100
	KTN-E86	501	488	400	102	101	97
	KTN-E87	586	549	418	110	109	103
Sports Ground near Enchi Lodge	KTN-E88	667	623	478	147	137	117
Temporary Structure near Castle Peak Road	KTN-E89	531	535	453	104	105	101
Ho Sheung Heung Temple	KTN-E94	640	587	423	187	173	142
	KTN-E97	542	513	409	149	147	132
Lo Wu Firing Range (Eastern)	KTN-E123	514	439	381	175	158	137
Lo Wu Firing Range (Western)	KTN-E128	515	461	392	169	154	135
Temporary Structure near Fanling Highway (near Pak Shek Au)	KTN-E162	624	403	290	252	172	135
	KTN-E163	504	336	291	190	153	131
	KTN-E164	512	407	299	169	158	136
	KTN-E170	503	316	291	176	135	128
	KTN-E173	583	368	293	256	157	129
	KTN-E174	590	325	287	201	139	128
	KTN-E175	701	425	304	245	166	136

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
Ma Tso Lung San Tsuen	KTN-E209	731	536	369	171	139	114
Lady Ho Tung Welfare Centre	KTN-E1004	517	507	403	140	141	129
Valais Phase 1	KTN-E1005	670	612	442	179	171	149
	KTN-E1006	723	657	470	201	196	171
	KTN-E1007	619	600	471	174	174	158
St Paul's House of Prayer	KTN-E1009	585	587	481	185	175	143
Kam Tsin Village Ho Tung School	KTN-E1010	547	552	462	131	129	117
Scattered Village Houses at Northern Boundary of KTN	KTN-E1017	770	528	384	177	138	112
	KTN-E1018	843	550	372	223	166	125
Village Houses at Ma Tso Lung	KTN-E1019	517	513	423	153	155	144
Village Houses at Tit Hang	KTN-E1020	511	520	442	165	167	152
Workshop northwest to Pak Shek Au	KTN-E1021	650	432	306	223	164	136
Planned/ Committed ASRs							
Nursery Classes and Kindergartens	KTN-12	539	501	371	171	172	156
	KTN-13	597	531	372	182	181	161
	KTN-17	521	469	376	185	183	163
	KTN-18	592	523	377	186	184	163
	KTN-19	761	550	394	233	200	170
	KTN-20	600	510	383	199	190	166

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-21	517	505	400	187	186	164
	KTN-22	565	539	408	200	196	169
	KTN-23	743	616	400	255	229	179
	KTN-24	799	622	395	267	232	179
	KTN-25	784	577	382	273	236	180
	KTN-26	806	597	375	289	237	177
	KTN-27	770	595	385	268	227	176
	KTN-28	643	554	393	242	214	174
Nursery Classes and Kindergartens (2 nos); District Elderly Community Centre	KTN-85	542	480	395	170	168	152
	KTN-86	577	489	410	190	174	158
	KTN-87	576	515	421	194	179	161
	KTN-88	599	576	439	216	203	169
	KTN-89	698	632	444	242	223	176
	KTN-90	921	661	420	323	239	181
	KTN-91	856	628	411	294	238	181
	KTN-92	663	586	426	217	207	174
	KTN-93	541	529	422	181	180	160
	KTN-94	558	537	421	187	186	165
	KTN-97	937	640	410	306	241	180

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-98	910	673	431	295	242	180
	KTN-99	535	523	419	176	176	159
	KTN-227	521	512	405	174	172	153
Secondary School	KTN-228	571	545	410	189	183	157
	KTN-229	549	527	409	179	175	153
	KTN-230	507	501	403	168	167	149
Primary School	KTN-231	550	522	401	191	187	163
	KTN-232	577	548	409	196	190	163
Sports Centre, District Library, Integrated Children and Youth Services Centre and Family Service Centre; Integrated Community Centre for Mental Wellness, Child Care Centre and Social Security Field Unit	KTN-233	678	595	404	227	212	172
	KTN-234	773	600	396	251	217	173
	KTN-235	842	636	407	243	206	164
	KTN-236	713	616	414	203	190	157
	KTN-237	624	566	414	197	188	157
Visitor Centre	KTN-248	970	631	432	242	171	136
	KTN-249	886	655	444	191	163	134
Long Valley Core Area, Area for Wetland Enhancement Works and Area for Facilities Supporting the Nature Park	KTN-272	711	580	446	179	142	127
	KTN-273	640	608	462	178	166	141
	KTN-274	649	572	445	127	125	113

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-275	595	573	451	135	133	119
	KTN-286	625	548	424	131	116	108
	KTN-287	528	529	443	140	124	114
Potential Activity Centre	KTN-302	710	597	417	155	131	118
	KTN-306	523	514	420	136	135	122
	KTN-307	635	586	432	156	148	125
	KTN-308	664	581	404	159	136	117
	KTN-309	537	517	403	140	131	117
	KTN-310	797	551	383	139	128	120
	KTN-311	530	408	317	140	126	117
	KTN-312	518	471	362	122	123	116
Village Resite	KTN-321	803	654	444	190	166	132
	KTN-322	617	583	441	162	154	130
	KTN-323	506	507	420	148	145	128
	KTN-325	635	602	453	154	148	127
	KTN-326	771	652	455	197	161	128
District Headquarters, District Headquarters Associated Married Staff Quarters, Divisional Police Station and	KTN-354	850	657	466	285	252	195
	KTN-355	1065	684	469	378	264	192

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
Reprovisioning of Fan Garden Junior Police Officers' Police Married Quarters	KTN-356	783	602	445	270	231	181
	KTN-357	935	661	432	269	210	169
	KTN-358	709	618	451	260	231	181
Fire Station and Ambulance Depot	KTN-377	687	631	453	174	165	139
	KTN-378	747	651	448	188	172	140
	KTN-379	799	668	448	202	177	141
	KTN-380	944	671	448	263	193	145
	KTN-381	819	659	450	238	194	146
	KTN-382	774	663	456	198	176	141
Disused School (Potential for Eco-tourism Education Centre, Holiday Camping or Other Recreational Uses)	KTN-408	651	505	369	173	146	116
	KTN-409	741	487	353	196	143	112
	KTN-410	756	477	352	212	148	114
	KTN-411	837	512	372	217	151	119
Proposed houses at Zone A/NE -Temporary Structure/267	KTN-C1	576	552	438	197	189	158

Notes:

- [1] Values which exceed the required criterion of $500 \mu\text{g}/\text{m}^3$ for 1-hour TSP and $260 \mu\text{g}/\text{m}^3$ for 24-hour TSP are shown in bolded
- [2] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Table 3.32 – Tier 2 assessment – Predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in KTN NDA in Year 2025.

Locations	ASR	1-hour TSP concentrations at various height (µg/m³)			24-hourTSP concentrations at various height (µg/m³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Temporary Structure near Sheung Yue River	KTN-E24	488	256	160	194	131	103
Yin Kong Tsuen	KTN-E85	276	249	183	86	85	82
	KTN-E86	220	211	172	84	83	81
	KTN-E87	241	212	154	84	84	82
		Sports Ground near Enchi Lodge	KTN-E88	205	198	165	97
Temporary Structure near Castle Peak Road	KTN-E89	158	157	139	83	83	81
Ho Sheung Heung Temple	KTN-E94	383	248	167	121	107	94
	KTN-E97	233	210	152	98	94	87
Lo Wu Firing Range (Eastern)	KTN-E123	383	268	156	111	101	93
Lo Wu Firing Range (Western)	KTN-E128	309	247	163	113	101	93
Temporary Structure near Fanling Highway (near Pak Shek Au)	KTN-E162	408	250	159	167	120	93
	KTN-E163	282	202	146	133	109	92
	KTN-E164	216	175	140	108	101	92
	KTN-E170	223	155	124	105	96	88
	KTN-E173	192	153	124	97	93	86
	KTN-E174	338	164	129	133	99	89
	KTN-E175	348	177	126	123	99	89

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
Ma Tso Lung San Tsuen	KTN-E209	281	190	142	104	89	82
Lady Ho Tung Welfare Centre	KTN-E1004	184	182	157	92	92	88
Valais Phase 1	KTN-E1005	226	222	186	92	92	88
	KTN-E1006	291	244	161	120	110	94
	KTN-E1007	215	200	150	106	102	92
St Paul's House of Prayer	KTN-E1009	183	180	154	90	89	86
Kam Tsin Village Ho Tung School	KTN-E1010	169	171	154	88	88	85
Scattered Village Houses at Northern Boundary of KTN	KTN-E1017	447	237	142	129	97	86
	KTN-E1018	255	161	123	118	96	87
Village Houses at Ma Tso Lung	KTN-E1019	170	172	156	90	91	89
Village Houses at Tit Hang	KTN-E1020	172	175	160	91	92	89
Workshop northwest to Pak Shek Au	KTN-E1021	223	173	123	96	92	87
Planned/ Committed ASRs							
Nursery Classes and Kindergartens	KTN-12	291	253	168	99	97	91
	KTN-13	338	274	164	106	102	94
	KTN-17	321	250	161	110	105	93
	KTN-18	364	269	167	110	104	92
	KTN-19	490	258	169	151	113	95
	KTN-20	384	258	167	121	109	93

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-21	229	209	153	103	100	92
	KTN-22	226	208	155	107	104	94
	KTN-23	243	226	173	117	107	94
	KTN-24	268	238	174	123	109	96
	KTN-25	356	277	172	137	114	99
	KTN-26	456	274	170	154	124	103
	KTN-27	419	250	163	148	120	101
	KTN-28	379	236	160	141	118	99
Nursery Classes and Kindergartens (2 nos); District Elderly Community Centre	KTN-85	311	246	156	107	101	94
	KTN-86	363	228	171	129	107	94
	KTN-87	348	221	177	140	113	95
	KTN-88	337	250	184	167	126	96
	KTN-89	323	267	181	152	119	94
	KTN-90	402	285	182	125	110	93
	KTN-91	472	268	175	182	136	102
	KTN-92	341	270	173	129	120	102
	KTN-93	239	222	165	110	107	97
	KTN-94	265	244	179	108	105	96
	KTN-97	544	275	177	198	136	102

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-98	336	270	172	135	110	94
	KTN-99	260	243	183	105	103	96
	KTN-227	193	184	149	95	94	89
Secondary School	KTN-228	203	186	153	97	95	89
	KTN-229	206	200	167	96	94	89
	KTN-230	229	219	175	93	93	88
Primary School	KTN-231	193	187	155	99	98	91
	KTN-232	187	184	155	101	98	91
Sports Centre, District Library, Integrated Children and Youth Services Centre and Family Service Centre; Integrated Community Centre for Mental Wellness, Child Care Centre and Social Security Field Unit	KTN-233	209	202	167	107	102	92
	KTN-234	238	208	174	117	104	92
	KTN-235	282	197	168	118	102	91
	KTN-236	205	189	162	104	99	90
	KTN-237	218	192	160	100	97	89
Visitor Centre	KTN-248	See Note ^[2]	285	169	186	125	101
	KTN-249	426	289	170	145	117	100
Long Valley Core Area, Area for Wetland Enhancement Works and Area for Facilities Supporting the Nature Park	KTN-272	409	292	182	142	101	89
	KTN-273	286	226	157	121	101	91
	KTN-274	413	325	192	107	95	87

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-275	279	241	176	96	95	89
	KTN-286	346	271	186	101	92	84
	KTN-287	255	232	172	108	94	86
	KTN-302	339	237	166	93	86	81
Potential Activity Centre	KTN-306	164	161	146	86	85	80
	KTN-307	237	181	141	92	87	83
	KTN-308	314	218	144	108	89	83
	KTN-309	225	203	154	85	85	83
	KTN-310	334	214	169	94	88	86
	KTN-311	241	196	169	90	89	86
	KTN-312	206	192	168	88	87	85
	KTN-321	394	257	167	138	115	95
Village Resite	KTN-322	290	236	157	119	111	96
	KTN-323	251	225	159	109	105	95
	KTN-325	289	234	156	118	110	95
	KTN-326	464	274	174	160	121	96
	KTN-354	374	240	174	118	104	92
District Headquarters, District Headquarters Associated Married Staff Quarters, Divisional Police Station and Reprovisioning of Fan Garden Junior Police Officers' Police Married Quarters	KTN-355	See Note ^[2]	279	170	158	112	94
	KTN-356	See Note ^[2]	273	174	216	136	100

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-357	484	315	176	175	129	101
	KTN-358	444	288	183	174	134	101
Fire Station and Ambulance Depot	KTN-377	292	229	153	109	101	90
	KTN-378	336	233	157	123	106	90
	KTN-379	365	231	153	132	110	92
	KTN-380	473	232	146	179	118	95
	KTN-381	436	233	150	174	122	95
	KTN-382	338	226	153	133	112	92
Disused School (Potential for Eco-tourism Education Centre, Holiday Camping or Other Recreational Uses)	KTN-408	437	225	151	116	101	87
	KTN-409	348	208	159	124	98	87
	KTN-410	435	228	158	135	99	88
	KTN-411	400	228	137	161	105	89
Proposed houses at Zone A/NE -Temporary Structure/267	KTN-C1	188	187	164	91	90	86

Notes:

[1] Values which exceed the required criterion of $500 \mu\text{g}/\text{m}^3$ for 1-hour TSP and $260 \mu\text{g}/\text{m}^3$ for 24-hour TSP are shown in bolded

[2] No ASR at the height of 1.5mAG.

[3] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Table 3.33 – Tier 3 assessment – Predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in KTN NDA in Year 2025.

Locations	ASR	1-hour TSP concentrations at various height (µg/m3)			24-hourTSP concentrations at various height (µg/m3)		
		1.5m	5m	10m	1.5m	5m	10m
Planned/ Committed ASRs							
Nursery Classes and Kindergartens (2 nos); District Elderly Community Centre	KTN-97	487	251	159	184	128	98

Notes:

[1] Values include background concentration: $73.1\mu\text{g}/\text{m}^3$ of TSP.

Table 3.34 – Long term assessment - predicted cumulative annual TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in KTN NDA in Year 2025.

Locations	ASR	Annual TSP concentrations at various height (µg/m3)		
		1.5m	5m	10m
Existing ASRs				
Temporary Structure near Sheung Yue River	KTN-E24	75.7	75.2	74.6
Yin Kong Tsuen	KTN-E85	73.4	73.4	73.3
	KTN-E86	73.3	73.3	73.3
	KTN-E87	73.4	73.4	73.3
	KTN-E88	73.4	73.4	73.4
Sports Ground near Enchi Lodge	KTN-E89	73.3	73.3	73.3
Temporary Structure near Castle Peak Road	KTN-E94	74.3	74.1	73.8
Ho Sheung Heung Temple	KTN-E97	73.7	73.7	73.6
Ho Sheung Heung Village	KTN-E123	73.7	73.7	73.6
Lo Wu Firing Range (Eastern)	KTN-E128	73.7	73.7	73.6
Lo Wu Firing Range (Western)	KTN-E162	75.3	74.5	74.0
Temporary Structure near Fanling Highway (near Pak Shek Au)	KTN-E163	74.8	74.3	73.9
	KTN-E164	74.3	74.1	73.9
	KTN-E170	74.6	74.1	73.9
Temporary Structure at Pak Shek Au	KTN-E173	75.1	74.2	73.8
	KTN-E174	75.0	74.3	73.9

Locations	ASR	Annual TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m
	KTN-E175	75.5	74.4	73.9
Ma Tso Lung San Tsuen	KTN-E209	73.4	73.4	73.3
Lady Ho Tung Welfare Centre	KTN-E1004	73.8	73.8	73.8
Valais Phase 1	KTN-E1005	74.2	74.2	74.0
	KTN-E1006	74.6	74.5	74.2
	KTN-E1007	74.2	74.2	74.0
St Paul's House of Prayer	KTN-E1009	73.6	73.6	73.5
Kam Tsin Village Ho Tung School	KTN-E1010	73.3	73.3	73.3
Scattered Village Houses at Northern Boundary of KTN	KTN-E1017	73.4	73.4	73.3
	KTN-E1018	73.6	73.5	73.4
Village Houses at Ma Tso Lung	KTN-E1019	74.2	74.3	74.1
Village Houses at Tit Hang	KTN-E1020	74.1	74.1	74.0
Workshop northwest to Pak Shek Au	KTN-E1021	74.6	74.2	73.8
Planned/ Committed ASRs				
Nursery Classes and Kindergartens	KTN-12	74.5	74.5	74.4
	KTN-13	74.6	74.7	74.5
	KTN-17	74.8	74.8	74.6
	KTN-18	74.8	74.8	74.6
Nursery Classes and Kindergartens; Post Offices	KTN-19	75.4	75.2	74.8

Locations	ASR	Annual TSP concentrations at various height (µg/m3)		
		1.5m	5m	10m
	KTN-20	75.0	75.0	74.7
	KTN-21	74.7	74.7	74.5
	KTN-22	74.8	74.8	74.6
	KTN-23	75.4	75.3	74.8
	KTN-24	75.6	75.4	74.9
	KTN-25	76.1	75.7	75.1
	KTN-26	76.3	75.9	75.2
	KTN-27	76.1	75.8	75.2
	KTN-28	75.7	75.5	75.0
Nursery Classes and Kindergartens (2 nos); District Elderly Community Centre	KTN-85	74.9	74.9	74.6
	KTN-86	75.5	75.3	74.8
	KTN-87	75.8	75.5	75.0
	KTN-88	76.4	76.0	75.3
	KTN-89	76.8	76.3	75.4
	KTN-90	77.8	76.8	75.6
	KTN-91	76.7	76.1	75.3
	KTN-92	75.3	75.2	74.8
	KTN-93	75.1	75.1	74.8
	KTN-94	74.9	74.9	74.6

Locations	ASR	Annual TSP concentrations at various height (µg/m3)		
		1.5m	5m	10m
	KTN-97	77.3	76.4	75.4
	KTN-98	77.5	76.7	75.6
	KTN-99	74.6	74.7	74.5
Secondary School	KTN-227	74.3	74.3	74.1
	KTN-228	74.4	74.4	74.2
	KTN-229	74.3	74.3	74.1
	KTN-230	74.2	74.2	74.0
Primary School	KTN-231	74.6	74.6	74.4
	KTN-232	74.6	74.6	74.4
Sports Centre, District Library, Integrated Children and Youth Services Centre and Family Service Centre; Integrated Community Centre for Mental Wellness, Child Care Centre and Social Security Field Unit	KTN-233	75.1	75.0	74.6
	KTN-234	75.2	75.0	74.6
	KTN-235	74.8	74.7	74.4
	KTN-236	74.4	74.4	74.2
	KTN-237	74.4	74.4	74.2
Visitor Centre	KTN-248	75.4	74.4	73.9
	KTN-249	74.6	74.2	73.8
Long Valley Core Area, Area for Wetland Enhancement Works and Area for Facilities Supporting the Nature Park	KTN-272	75.1	74.3	73.8
	KTN-273	74.5	74.3	73.9
	KTN-274	73.6	73.5	73.4

Locations	ASR	Annual TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m
	KTN-275	73.4	73.4	73.4
	KTN-286	73.6	73.5	73.4
	KTN-287	73.8	73.7	73.5
	KTN-302	73.6	73.6	73.5
Potential Activity Centre	KTN-306	73.4	73.4	73.4
	KTN-307	73.5	73.5	73.5
	KTN-308	73.6	73.6	73.5
	KTN-309	73.5	73.5	73.5
	KTN-310	73.6	73.5	73.5
	KTN-311	73.6	73.5	73.5
	KTN-312	73.5	73.5	73.5
Village Resite	KTN-321	74.0	73.8	73.6
	KTN-322	73.7	73.7	73.5
	KTN-323	73.6	73.6	73.5
	KTN-325	73.6	73.6	73.5
	KTN-326	74.0	73.7	73.5
District Headquarters, District Headquarters Associated Married Staff Quarters, Divisional Police Station and Reprovisioning of Fan Garden Junior Police Officers' Police	KTN-354	77.2	76.4	75.4
	KTN-355	78.5	76.7	75.4
	KTN-356	77.2	76.3	75.3

Locations	ASR	Annual TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m
Married Quarters	KTN-357	76.6	75.9	75.0
	KTN-358	76.8	76.1	75.2
Fire Station and Ambulance Depot	KTN-377	74.6	74.5	74.1
	KTN-378	75.0	74.7	74.2
	KTN-379	75.4	75.0	74.3
	KTN-380	76.5	75.4	74.5
	KTN-381	76.0	75.4	74.6
	KTN-382	75.3	75.0	74.4
Disused School (Potential for Eco-tourism Education Centre, Holiday Camping or Other Recreational Uses)	KTN-408	73.5	73.5	73.4
	KTN-409	73.6	73.5	73.4
	KTN-410	73.6	73.5	73.4
	KTN-411	73.6	73.5	73.4
Proposed houses at Zone A/NE -Temporary Structure/267	KTN-C1	74.1	74.1	73.8

Notes:

[1] Values include background concentration: 73.1 µg/m³ of TSP.

Short-term Assessment (Tier 1) for Year 2018

The maximum 1-hour and 24-hour TSP concentrations from Tier 1 screening assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.35** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 1) at the ASRs concerned. The results indicate that, for the majority of ASRs, exceedance of 1-hour and 24-hour TSP criteria is not anticipated even with this theoretical worst case situation where the entire worksites were assumed active (i.e. 100%). However, for the ASRs near the work sites (e.g. Pak Shek Au and Fung Kong), exceedance of 1-hour TSP criterion is still predicted. As the Tier 1 assessment is for screening purposes only and does not reflect the actual on-site activities, a more focused Tier 2 assessment has been undertaken. **Figure 3.56** and **Figure 3.57** show the contours of Tier 1 1-hour and 24-hour TSP concentrations.

Short-term Assessment (Tier 2) for Year 2018

A more focused Tier 2 assessment has been conducted with the assumed 15% active works areas for the adjacent construction site positioned nearest to the potentially worst affected ASRs. As mentioned in **Section 3.6.1.6**, the Tier 2 assessment is also very conservative and will lead to over prediction of the dust impacts.

The maximum 1-hour and 24-hour TSP concentrations from Tier 2 screening assessment have been predicted. **Appendix 3.14** shows the assessment results and **Table 3.36** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 2) at the ASRs concerned. Results show that the cumulative 1-hour and 24-hour TSP concentrations would comply with the respective criteria and as such, adverse short-term construction dust impact is not anticipated.

Contours have been presented in **Figure 3.58** and **Figure 3.59** for 1-hour (Tier 2) and 24-hour (Tier 2) TSP concentrations at 1.5m above ground to illustrate the short-term dust impact on the ASR.

Long-term Assessment for Year 2018

The annual TSP concentrations from long-term assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.37** below summarises the cumulative annual TSP impact at the ASRs concerned. In summary, the predicted annual TSP concentrations at all ASRs would comply with the criterion of $80\mu\text{g}/\text{m}^3$, and therefore, no adverse long-term impact is anticipated. Contour of annual TSP concentrations at 1.5m above ground is shown in **Figure 3.60**.

Table 3.35 – Tier 1 assessment - predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of 73.1µg/m³) under mitigated scenario in KTN NDA in Year 2018.

Locations	ASR	1-hour TSP concentrations at various height (µg/m ³)			24-hourTSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Village Houses between Tung Kok and Tung Fong	KTN-E53	523	370	244	176	151	120
	KTN-E54	543	407	250	172	149	120
Temporary Structure at Tung Fong	KTN-E55	692	358	223	269	167	123
	KTN-E56	789	363	225	296	178	126
	KTN-E57	729	452	273	204	160	126
	KTN-E58	737	380	231	223	170	130
Temporary Structure at Pak Shek Au	KTN-E61	621	386	291	194	140	112
	KTN-E62	600	340	271	264	157	115
	KTN-E63	566	331	258	252	144	112
	KTN-E64	635	366	256	256	149	110
	KTN-E65	594	355	261	269	158	115
	KTN-E67	738	412	267	232	141	111
	KTN-E68	676	402	259	239	145	112
	KTN-E69	734	424	275	227	138	108
	KTN-E70	564	466	325	155	136	115
	KTN-E71	762	477	322	235	166	121

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-E73	755	430	257	214	172	131
	KTN-E78	671	355	242	225	145	114
	KTN-E79	611	324	265	214	140	111
Temporary Structure near Community Sports	KTN-E142	598	400	253	199	162	125
Temporary Structure near Fung Kong	KTN-E143	629	467	276	121	112	102
	KTN-E145	686	493	301	214	183	140
	KTN-E146	800	489	295	251	162	125
	KTN-E148	788	439	271	229	136	111
Temporary Structure near Ma Tso Lung Road	KTN-E149	696	381	244	228	146	109
	KTN-E150	668	418	253	274	162	121
	KTN-E151	669	392	245	244	168	124
Temporary Structure near Dills Corner Garden	KTN-E157	608	300	231	229	135	111
	KTN-E158	631	327	228	240	149	113
	KTN-E159	519	343	214	132	120	107
Temporary Structure near Fanling Highway (near Pak Shek Au)	KTN-E162	509	411	315	135	117	104
	KTN-E163	559	421	312	148	122	106
Temporary Structure at Pak Shek Au	KTN-E165	618	358	256	267	151	114

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-E168	534	332	270	202	145	112
	KTN-E170	512	401	296	203	151	113
	KTN-E171	602	446	315	234	164	118
	KTN-E172	679	451	317	197	129	107
	KTN-E176	652	333	245	225	138	116
	KTN-E189	800	367	229	224	160	122
Temporary Structure near Tung Fong	KTN-E190	613	401	247	164	147	122
	KTN-E193	516	461	315	129	123	105
	KTN-E194	691	510	312	177	150	119
	KTN-E195	732	510	306	160	134	113
	KTN-E1003	519	433	282	160	146	121
Europa Garden Phase I	KTN-E1003	519	433	282	160	146	121

Notes:

[1] Values which exceed the required criterion of $500 \mu\text{g}/\text{m}^3$ for 1-hour TSP and $260 \mu\text{g}/\text{m}^3$ for 24-hour TSP are shown in bolded

[2] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Table 3.36 – Tier 2 assessment - predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in KTN NDA in Year 2018.

Locations	ASR	1-hour TSP concentrations at various height (µg/m ³)			24-hour TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Village Houses between Tung Kok and Tung Fong	KTN-E53	204	170	126	102	97	87
	KTN-E54	233	178	127	96	93	86
Temporary Structure at Tung Fong	KTN-E55	414	187	120	165	107	89
	KTN-E56	177	154	133	103	96	87
	KTN-E57	175	166	136	87	86	83
	KTN-E58	See Note ^[1]	228	138	169	113	89
Temporary Structure at Pak Shek Au	KTN-E61	425	245	160	154	112	91
	KTN-E62	396	214	158	180	112	91
	KTN-E63	467	218	136	140	101	88
	KTN-E64	430	223	143	143	105	90
	KTN-E65	426	213	147	185	110	93
	KTN-E67	295	222	148	111	100	89
	KTN-E68	272	208	143	110	100	88
	KTN-E69	296	246	164	107	99	88
	KTN-E70	382	278	164	114	99	87
	KTN-E71	See Note ^[1]	261	159	171	118	93

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-E73	208	190	140	92	90	85
	KTN-E78	258	198	133	113	97	83
	KTN-E79	291	215	143	90	88	84
Temporary Structure near Community Sports	KTN-E142	301	192	140	116	92	84
Temporary Structure near Fung Kong	KTN-E143	349	256	161	102	95	87
	KTN-E145	433	298	174	143	114	93
	KTN-E146	See Note ^[1]	257	153	201	120	96
	KTN-E148	See Note ^[1]	268	169	201	117	94
Temporary Structure near Ma Tso Lung Road	KTN-E149	See Note ^[1]	323	184	212	130	99
	KTN-E150	291	196	132	118	105	89
	KTN-E151	304	191	128	108	96	87
Temporary Structure near Dills Corner Garden	KTN-E157	163	160	138	88	87	84
	KTN-E158	148	148	131	93	88	83
	KTN-E159	156	140	125	86	83	81
Temporary Structure near Fanling Highway (near Pak Shek Au)	KTN-E162	350	244	170	106	94	85
	KTN-E163	395	250	164	115	95	85
Temporary Structure at Pak Shek Au	KTN-E165	498	241	150	158	110	93
	KTN-E168	238	197	131	89	86	83
	KTN-E170	391	248	156	141	106	91

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-E171	461	253	152	182	120	93
	KTN-E172	457	216	135	178	108	91
	KTN-E176	262	206	140	87	85	83
	KTN-E189	425	176	117	150	105	87
Temporary Structure near Tung Fong	KTN-E190	268	173	126	109	98	87
	KTN-E193	240	206	142	102	98	89
	KTN-E194	373	211	141	136	111	94
	KTN-E195	368	211	147	125	105	92
Europa Garden Phase I	KTN-E1003	197	157	125	98	91	83

Notes:

[1] ASR does not exist during the construction period.

[2] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Table 3.37 – Long term assessment - predicted cumulative annual TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in KTN NDA in Year 2018.

Locations	ASR	Annual TSP concentrations at various height (µg/m³)		
		1.5m	5m	10m
Existing ASRs				
Village Houses between Tung Kok and Tung Fong	KTN-E53	74.3	74.1	73.7
	KTN-E54	74.5	74.2	73.8
Temporary Structure at Tung Fong	KTN-E55	77.2	75.2	74.2
	KTN-E56	78.1	75.7	74.5
	KTN-E57	74.9	74.5	74.0
	KTN-E58	75.8	74.3	73.8
Temporary Structure at Pak Shek Au	KTN-E61	75.3	74.5	73.9
	KTN-E62	76.2	74.8	74.0
	KTN-E63	76.2	74.7	74.0
	KTN-E64	76.1	74.7	74.0
	KTN-E65	76.7	74.8	74.0
	KTN-E67	75.7	74.4	73.8
	KTN-E68	75.3	74.3	73.8
	KTN-E69	76.1	74.5	73.8
	KTN-E70	74.5	74.2	73.8
	KTN-E71	75.7	74.6	73.9

Locations	ASR	Annual TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m
	KTN-E73	74.9	74.5	74.0
	KTN-E78	75.7	74.4	73.8
	KTN-E79	75.7	74.5	73.9
Temporary Structure near Community Sports	KTN-E142	75.2	74.6	74.1
Temporary Structure near Fung Kong	KTN-E143	73.4	73.4	73.3
	KTN-E145	74.8	74.3	73.8
Open Storage near Fung Kong	KTN-E146	75.9	74.2	73.6
Temporary Structure near Fung Kong	KTN-E148	76.6	74.2	73.6
Temporary Structure near Ma Tso Lung Road	KTN-E149	75.0	73.8	73.4
	KTN-E150	77.6	75.3	74.2
	KTN-E151	76.7	75.4	74.4
Temporary Structure near Dills Corner Garden	KTN-E157	74.5	73.8	73.5
	KTN-E158	74.5	73.8	73.5
	KTN-E159	73.5	73.5	73.4
Temporary Structure near Fanling Highway (near Pak Shek Au)	KTN-E162	73.9	73.8	73.6
	KTN-E163	74.4	73.9	73.6
Temporary Structure at Pak Shek Au	KTN-E165	76.6	74.7	74.0
	KTN-E168	74.7	74.2	73.8
	KTN-E170	75.0	74.3	73.8

Locations	ASR	Annual TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m
	KTN-E171	75.5	74.5	73.9
	KTN-E172	75.6	74.3	73.8
	KTN-E176	76.1	74.6	73.9
Temporary Structure near Tung Fong	KTN-E189	74.7	74.2	73.8
	KTN-E190	73.9	73.8	73.6
	KTN-E193	73.4	73.4	73.3
	KTN-E194	73.8	73.7	73.5
	KTN-E195	73.7	73.6	73.4
Europa Garden Phase I	KTN-E1003	73.8	73.7	73.5

Notes:

[1] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Short-term Assessment (Tier 1) for Year 2028

The maximum 1-hour and 24-hour TSP concentrations from Tier 1 screening assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.38** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 1) at the ASRs concerned. The results indicate that, for the majority of ASRs, exceedance of 1-hour and 24-hour TSP criteria is not anticipated even with this theoretical worst case situation where the entire worksites were assumed active (i.e. 100%). However, for the ASRs near the work sites (e.g. Castle Peak Road and Lo Wu Firing Range), exceedance of 1-hour and 24-hour TSP criterion is still predicted. As the Tier 1 assessment is for screening purposes only and does not reflect the actual on-site activities, a more focused Tier 2 assessment has been undertaken. **Figure 3.68** and **Figure 3.69** show the contours of Tier 1 1-hour and 24-hour TSP concentrations.

Short-term Assessment (Tier 2) for Year 2028

A more focused Tier 2 assessment has been conducted with the assumed 15% active works areas for the adjacent construction site positioned nearest to the potentially worst affected ASRs. As mentioned in **Section 3.6.1.6**, the Tier 2 assessment is also very conservative and will lead to over prediction of the dust impacts.

The maximum 1-hour and 24-hour TSP concentrations from Tier 2 screening assessment have been predicted. **Appendix 3.14** shows the assessment results and **Table 3.39** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 2) at the ASRs concerned. Results show that the cumulative 1-hour and 24-hour TSP concentrations would comply with the respective criteria and as such, adverse short-term construction dust impact is not anticipated.

Contours have been presented in **Figure 3.70** and **Figure 3.71** for 1-hour (Tier 2) and 24-hour (Tier 2) TSP concentrations at 1.5m above ground to illustrate the short-term dust impact on the ASR.

Long-term Assessment for Year 2028

The annual TSP concentrations from long-term assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.40** below summarises the cumulative annual TSP impact at the ASRs concerned. In summary, the predicted annual TSP concentrations at all ASRs would comply with the criterion of $80\mu\text{g}/\text{m}^3$, and therefore no adverse long-term impact is anticipated. Contour of annual TSP concentrations at 1.5m above ground is shown in **Figure 3.72**.

Table 3.38 – Tier 1 assessment – predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in KTN NDA in Year 2028.

Locations	ASR	1-hour TSP concentrations at various height (µg/m³)			24-hourTSP concentrations at various height (µg/m³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Temporary Structure near Castle Peak Road	KTN-E90	519	309	200	196	118	90
Lo Wu Firing Range (Eastern)	KTN-E123	580	413	244	194	161	119
Ma Tso Lung San Tsuen	KTN-E209	575	375	227	112	96	85
Europa Garden Phase I	KTN-E1003	671	355	260	154	107	97
Valais Phase 1	KTN-E1005	865	497	296	274	198	142
	KTN-E1006	690	499	296	224	174	135
	KTN-E1007	568	482	311	164	153	129
St Paul's House of Prayer	KTN-E1009	546	295	188	158	116	96
Kam Tsin Village Ho Tung School	KTN-E1010	521	294	190	160	115	96
Scattered Village Houses at Northern Boundary of KTN	KTN-E1017	641	395	236	127	109	93
	KTN-E1018	709	443	272	165	130	105
Planned ASRs							
Nursery Classes and Kindergartens; Post Offices	KTN-23	547	424	253	156	140	115
	KTN-24	586	415	259	164	143	116
	KTN-25	593	412	250	166	143	116
	KTN-26	612	429	261	172	143	114

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-27	526	407	256	156	136	112
Sports Centre, District Library, Integrated Children and Youth Services Centre and Family Service Centre; Integrated Community Centre for Mental Wellness, Child Care Centre and Social Security Field Unit	KTN-234	591	413	224	159	137	112
	KTN-235	623	403	242	160	135	109
Reprovision Site of Kwu Tung Vegetable Marketing and Credit Co-operative Society	KTN-271	549	323	184	157	119	96
Government Reserve	KTN-315	617	359	241	221	140	110
	KTN-316	587	352	245	223	145	115
	KTN-318	586	373	248	173	138	114
	KTN-319	561	339	243	162	127	107
Sports Ground/Sports Complex	KTN-391	678	399	242	216	141	112
	KTN-392	762	432	263	220	140	108
	KTN-393	706	378	230	239	153	114
	KTN-394	651	315	205	252	150	112
Reserve for Supporting Lok Ma Chau Loop Development	KTN-395	787	449	247	185	127	99
	KTN-396	672	388	227	221	140	106
	KTN-397	725	345	214	233	145	108
	KTN-398	697	318	190	271	162	115
	KTN-399	740	328	210	291	158	113
	KTN-400	713	379	237	276	172	120

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-401	591	266	183	213	134	101
	KTN-402	688	320	211	184	117	93
	KTN-403	665	334	207	169	108	88
	KTN-404	630	314	205	176	107	90
	KTN-405	691	369	229	184	118	95
	KTN-406	667	371	236	186	123	96
	KTN-407	629	329	201	190	136	103
Disused School (Potential for Eco-tourism Education Centre, Holiday Camping or Other Recreational Uses)	KTN-408	506	344	216	149	116	93
	KTN-409	613	320	198	167	118	93
	KTN-410	633	313	200	162	123	98
	KTN-411	686	343	213	177	126	98

Notes:

[1] Values which exceed the required criterion of $500 \mu\text{g}/\text{m}^3$ for 1-hour TSP and $260 \mu\text{g}/\text{m}^3$ for 24-hour TSP are shown in bolded

[2] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Table 3.39 - Tier 2 assessment - predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in KTN NDA in Year 2028.

Locations	ASR	1-hour TSP concentrations at various height (µg/m ³)			24-hourTSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Temporary Structure near Castle Peak Road	KTN-E90	422	231	142	154	89	79
Lo Wu Firing Range (Eastern)	KTN-E123	276	183	145	112	100	87
Ma Tso Lung San Tsuen	KTN-E209	246	165	109	89	82	77
Europa Garden Phase I	KTN-E1003	330	149	106	94	84	79
Valais Phase 1	KTN-E1005	429	170	141	152	99	90
	KTN-E1006	266	171	119	113	98	85
	KTN-E1007	168	140	108	88	86	81
St Paul's House of Prayer	KTN-E1009	369	177	114	148	102	85
Kam Tsin Village Ho Tung School	KTN-E1010	343	190	134	105	91	82
Scattered Village Houses at Northern Boundary of KTN	KTN-E1017	412	209	137	96	84	78
	KTN-E1018	256	161	123	106	89	81
Planned ASRs							
Nursery Classes and Kindergartens; Post Offices	KTN-23	191	166	116	95	88	82
	KTN-24	211	172	112	97	89	83
	KTN-25	252	175	117	105	96	84
	KTN-26	334	167	116	122	98	84
	KTN-27	282	146	112	110	92	82

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
Sports Centre, District Library, Integrated Children and Youth Services Centre and Family Service Centre; Integrated Community Centre for Mental Wellness, Child Care Centre and Social Security Field Unit	KTN-234	227	173	123	102	89	83
	KTN-235	219	178	127	99	89	83
Reprovision Site of Kwu Tung Vegetable Marketing and Credit Co-operative Society	KTN-271	292	177	121	132	103	86
Government Reserve	KTN-315	209	169	124	94	89	83
	KTN-316	293	180	130	122	95	84
	KTN-318	257	188	136	109	90	83
	KTN-319	236	152	124	109	87	83
Sports Ground/Sports Complex	KTN-391	145	139	115	83	82	80
	KTN-392	215	156	119	93	86	82
	KTN-393	174	155	121	88	86	81
	KTN-394	121	113	103	81	80	79
Reserve for Supporting Lok Ma Chau Loop Development	KTN-395	279	192	141	106	95	84
	KTN-396	234	175	124	101	93	84
	KTN-397	280	165	123	107	94	85
	KTN-398	218	169	123	97	91	83
	KTN-399	314	203	128	123	103	86

Locations	ASR	1-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)			24-hour TSP concentrations at various height ($\mu\text{g}/\text{m}^3$)		
		1.5m	5m	10m	1.5m	5m	10m
	KTN-400	407	234	140	163	114	91
	KTN-401	278	189	119	119	96	84
	KTN-402	221	127	101	132	88	80
	KTN-403	256	164	107	113	88	79
	KTN-404	230	142	104	115	87	78
	KTN-405	387	183	113	156	94	81
	KTN-406	See Note [1]	See Note [1]	See Note [1]	See Note [1]	See Note [1]	See Note [1]
	KTN-407	463	211	123	148	102	86
Disused School (Potential for Eco-tourism Education Centre, Holiday Camping or Other Recreational Uses)	KTN-408	434	178	123	119	93	81
	KTN-409	266	187	112	109	91	81
	KTN-410	368	183	119	122	94	82
	KTN-411	417	180	115	166	100	83

Notes:

[1] ASR does not exist during the construction period.

[2] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Table 3.40 – Long term assessment - predicted cumulative annual TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in KTN NDA in Year 2028.

Locations	ASR	Annual TSP concentrations at various height (µg/m3)		
		1.5m	5m	10m
Existing ASRs				
Temporary Structure near Castle Peak Road	KTN-E90	74.7	73.8	73.4
Lo Wu Firing Range (Eastern)	KTN-E123	73.3	73.3	73.2
Ma Tso Lung San Tsuen	KTN-E209	73.1	73.1	73.1
Europa Garden Phase I	KTN-E1003	73.6	73.4	73.3
Valais Phase 1	KTN-E1005	73.9	73.6	73.5
	KTN-E1006	74.1	73.8	73.6
	KTN-E1007	73.7	73.6	73.5
St Paul's House of Prayer	KTN-E1009	74.3	73.8	73.5
Kam Tsin Village Ho Tung School	KTN-E1010	74.4	73.8	73.5
Golf Parkview	KTN-E1017	73.2	73.1	73.1
Scattered Village Houses at Northern Boundary of KTN	KTN-E1018	73.2	73.2	73.2
Planned ASRs				
Nursery Classes and Kindergartens; Post Offices;	KTN-23	73.4	73.4	73.3
	KTN-24	73.4	73.4	73.3
	KTN-25	73.4	73.4	73.3
	KTN-26	73.4	73.4	73.3
	KTN-27	73.4	73.3	73.3

Locations	ASR	Annual TSP concentrations at various height (µg/m3)		
		1.5m	5m	10m
	KTN-234	73.4	73.4	73.3
	KTN-235	73.5	73.5	73.4
	KTN-271	74.3	73.9	73.5
Nursery Classes and Kindergartens (2 nos); District Elderly Community Centre	KTN-315	73.4	73.2	73.2
	KTN-316	73.5	73.3	73.2
Sports Centre, District Library, Integrated Children and Youth Services Centre and Family Service Centre; Integrated Community Centre for Mental Wellness, Child Care Centre and Social Security Field Unit	KTN-318	73.3	73.3	73.2
	KTN-319	73.3	73.2	73.2
Reprovision Site of Kwu Tung Vegetable Marketing and Credit Co-operative Society	KTN-391	73.4	73.3	73.2
Government Reserve	KTN-392	73.4	73.2	73.2
	KTN-393	73.6	73.3	73.2
	KTN-394	73.5	73.3	73.2
	KTN-395	73.4	73.2	73.2
Sports Ground/Sports Complex	KTN-396	73.5	73.3	73.2
	KTN-397	73.6	73.3	73.2
	KTN-398	73.6	73.4	73.2
	KTN-399	73.6	73.3	73.2

Locations	ASR	Annual TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m
Reserve for Supporting Lok Ma Chau Loop Development	KTN-400	73.5	73.3	73.2
	KTN-401	73.5	73.3	73.2
	KTN-402	73.4	73.2	73.1
	KTN-403	73.3	73.2	73.1
	KTN-404	73.3	73.2	73.1
	KTN-405	73.4	73.2	73.1
	KTN-406	73.3	73.2	73.1
	KTN-407	73.3	73.2	73.2
	KTN-408	73.2	73.2	73.1
	KTN-409	73.3	73.2	73.1
	KTN-410	73.3	73.2	73.2
	KTN-411	73.4	73.2	73.2

Note:

[1] Values include background concentration: 73.1 µg/m³ of TSP.

3.8.1.2 Assessment Results – Mitigated Scenarios for FLN NDA

Short-term Assessment (Tier 1) for Worst Case Scenario – Year 2025

The maximum 1-hour and 24-hour TSP concentrations from Tier 1 screening assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.41** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 1) at the ASRs concerned. The results indicate that for the majority of ASRs, exceedance of 1-hour and 24-hour TSP criteria is not anticipated even with this theoretical worst case situation where the entire worksites were assumed active (i.e. 100%). However, for the ASRs near the work sites (e.g. scattered village houses north of proposed town-park, On Kwok Villa, etc.), exceedance of 1-hour TSP criterion is still predicted. As the Tier 1 assessment is for screening purposes only and does not reflect the actual on-site activities, a more focused Tier 2 assessment has been undertaken.

Figures 3.83 and Figure 3.84 show the contours of Tier 1 1-hour and 24-hour TSP concentrations at 1.5m above ground.

Short-term Assessment (Tier 2) for Worst Case Scenario – Year 2025

A more focused Tier 2 assessment has been conducted with the assumed 15% active works areas for the adjacent construction site positioned nearest to the potentially worst affected ASRs. As mentioned in **Section 3.5.1.5**, the Tier 2 assessment is also very conservative and will lead to over prediction of the dust impacts.

The maximum 1-hour and 24-hour TSP concentrations from Tier 2 screening assessment have been predicted. **Appendix 3.14** shows the assessment results and **Table 3.42** below summarizes the cumulative 1-hour and 24-hour TSP impact (Tier 2) at the ASRs concerned. Results show that the cumulative 1-hour and 24-hour TSP concentrations would comply with the respective criteria and as such, adverse short-term construction dust impact is not anticipated.

Contours have been presented in **Figures 3.85 and Figure 3.86** for Tier 2 1-hour and 24-hour TSP concentrations at 1.5m above ground to illustrate the short-term dust impact on the ASR.

Long-term Assessment for Worst Case Scenario – Year 2025

The annual TSP concentrations from long-term assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.43** below summarises the cumulative annual TSP impact at the ASRs concerned. In summary, the predicted annual TSP concentrations at all ASRs would comply with the criterion of $80\mu\text{g}/\text{m}^3$, and therefore no

adverse long-term impact is anticipated. Contours of annual TSP concentrations at 1.5m above ground are shown in **Figure 3.87**.

Table 3.41 – Tier 1 assessment – predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of $73.1 \mu\text{g}/\text{m}^3$) under mitigated scenario in FLN NDA in Year 2025.

Locations	ASR	1-hour TSP concentrations at various height (µg/m ³)			24-hourTSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Scattered Village Houses North of Proposed Potential Town-park	FLN-E62	630	383	274	158	108	97
On Kwok Villa	FLN-E123	576	414	250	189	149	119
Noble Hill	FLN-E124	628	434	281	203	163	129
Scattered Village Houses East of Good View New Village	FLN-E126	546	465	318	167	151	125
Planned ASRs							
Police Driving and Traffic Training Division	FLN-5	511	445	328	176	150	120
Weapons Training Division	FLN-20	511	375	263	163	134	113
	FLN-21	560	417	287	160	132	113
	FLN-22	604	446	322	192	150	120
Village Resite	FLN-35	612	377	262	194	142	109
	FLN-36	502	377	273	152	133	109
Residential Buildings, Nursery Classes and Kindergartens, Neighbourhood Elderly Community Centre, Residential Home for the Elderly, Post Office	FLN-243	512	411	250	113	104	90

Notes:

[1] Values which exceed the required criterion of $500 \mu\text{g}/\text{m}^3$ for 1-hour TSP and $260 \mu\text{g}/\text{m}^3$ for 24-hour TSP are shown in bolded

[2] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP.

Table 3.42 - Tier 2 assessment - predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of $73.1 \mu\text{g}/\text{m}^3$) under mitigated scenario for existing ASRs in FLN NDA in Year 2025.

Locations	ASR	1-hour TSP concentrations at various height (µg/m ³)			24-hourTSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Scattered Village Houses North of Proposed Potential Town-park	FLN-E62	487	286	214	124	94	87
On Kwok Villa	FLN-E123	352	277	237	113	103	95
Noble Hill	FLN-E124	408	281	215	151	122	101
Scattered Village Houses East of Good View New Village	FLN-E126	325	292	202	109	99	90
Planned ASRs							
Police Driving and Traffic Training Division	FLN-5	240	219	181	108	101	92
Weapons Training Division Weapons Training Division	FLN-20	294	236	201	117	107	93
	FLN-21	309	228	196	124	109	95
	FLN-22	335	245	203	130	111	96
Village Resite	FLN-35	404	331	216	147	111	95
	FLN-36	324	287	200	120	109	96
Residential Buildings, Nursery Classes and Kindergartens, Neighbourhood Elderly Community Centre, Residential Home for the Elderly, Post Office	FLN-243	337	315	234	87	86	82

Note:

[1] Values include background concentration: $73.1 \mu\text{g}/\text{m}^3$ of TSP

Table 3.43 – Long term assessment - predicted cumulative annual TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in FLN NDA in Year 2025.

Locations	ASR	Annual TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m
Existing ASRs				
Scattered Village Houses North of Proposed Potential Town-park	FLN-E62	74.3	73.7	73.5
On Kwok Villa	FLN-E123	73.6	73.6	73.5
Noble Hill	FLN-E124	73.7	73.6	73.4
Scattered Village Houses East of Good View New Village	FLN-E126	73.5	73.5	73.4
Planned ASRs				
Police Driving and Traffic Training Division	FLN-5	74.4	74.1	73.7
Weapons Training Division	FLN-20	74.4	74.1	73.8
	FLN-21	74.6	74.2	73.8
	FLN-22	74.9	74.3	73.9
		FLN-35	73.7	73.4
Village Resite	FLN-36	73.5	73.4	73.3
	Residential Buildings, Nursery Classes and Kindergartens, Neighbourhood Elderly Community Centre, Residential Home for the Elderly, Post Office	FLN-243	73.3	73.3

Note:

[1] Values include background concentration: $73.1\mu\text{g}/\text{m}^3$ of TSP

Short-term Assessment (Tier 1) for Year 2018

The maximum 1-hour and 24-hour TSP concentrations from Tier 1 screening assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.44** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 1) at the ASRs concerned. The results indicate that, for the majority of ASRs, exceedance of 1-hour and 24-hour TSP criteria is not anticipated even with this theoretical worst case situation where the entire worksites were assumed active (i.e. 100%). However, for the ASRs near the work sites (i.e. village houses at Fu Tei Au Tsuen (Eastern)), exceedance of 1-hour TSP criterion is still predicted. As the Tier 1 assessment is for screening purposes only and does not reflect the actual on-site activities, a more focused Tier 2 assessment has been undertaken. **Figures 3.73 and Figure 3.74** show the contours of Tier 1 1-hour and 24-hour TSP concentrations at 1.5m above ground.

Short-term Assessment (Tier 2) for Year 2018

A more focused Tier 2 assessment has been conducted with the assumed 15% active works areas for the adjacent construction site positioned nearest to the potentially worst affected ASRs. As mentioned in **Section 3.5.1.5**, the Tier 2 assessment is also very conservative and will lead to over prediction of the dust impacts.

The maximum 1-hour and 24-hour TSP concentrations from Tier 2 screening assessment have been predicted. **Appendix 3.14** shows the assessment results and **Table 3.45** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 2) at the ASRs concerned. Results show that the cumulative 1-hour and 24-hour TSP concentrations would comply with the respective criteria and as such, adverse short-term construction dust impact is not anticipated.

Contours have been presented in **Figures 3.75 and Figure 3.76** for Tier 2 1-hour and 24-hour TSP concentrations at 1.5m above ground to illustrate the short-term dust impact on the ASR.

Long-term Assessment for Year 2018

The annual TSP concentrations from long-term assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.46** below summarises the cumulative annual TSP impact at the ASRs concerned. In summary, the predicted annual TSP concentrations at all ASRs would comply with the criterion of $80\mu\text{g}/\text{m}^3$, and therefore no adverse long-term impact is anticipated. Contours of annual TSP concentrations at 1.5m above ground are shown in **Figure 3.77**.

Table 3.44 – Tier 1 assessment – predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of 73.1 µg/m³) under mitigated scenario in FLN NDA in Year 2018.

Background and concentration of TSP (µg/m ³) under mitigated scenario in FLN-E28 in Year 2010:							
Locations	ASR	1-hour TSP concentrations at various height (µg/m ³)			24-hour TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Village Houses at Fu Tei Au Tsuen (Eastern)	FLN-E15	625	299	180	155	120	99
	FLN-E16	617	252	162	228	130	101
	FLN-E17	540	249	159	229	130	102
	FLN-E18	612	283	183	234	144	102
	FLN-E19	641	317	196	223	141	103
	FLN-E20	613	261	167	228	138	100
	FLN-E22	539	231	142	220	126	97
	FLN-E23	610	286	178	233	141	104
	FLN-E28	531	264	170	193	132	98

Notes:

[1] Values which exceed the required criterion of 500 µg/m³ for 1-hour TSP and 260 µg/m³ for 24-hour TSP are shown in bolded

[2] Values include background concentration: 73.1 µg/m³ of TSP.

Table 3.45 – Tier 2 assessment – Predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of 73.1µg/m³) under mitigated scenario in FLN NDA in Year 2018.

Locations	ASR	1-hour TSP concentrations at various height (µg/m ³)			24-hour TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Village Houses at Fu Tei Au Tsuen (Eastern)	FLN-E15	116	111	95	75	75	74
	FLN-E16	126	117	94	77	76	75
	FLN-E17	159	131	98	81	79	77
	FLN-E18	317	142	105	131	94	82
	FLN-E19	371	152	105	152	96	81
	FLN-E20	404	162	103	152	97	81
	FLN-E22	147	124	99	78	77	75
	FLN-E23	339	134	95	146	91	78
	FLN-E28	255	173	111	90	85	79

Note:

[1] Values include background concentration: 73.1 µg/m³ of TSP

Table 3.46 – Long term assessment - predicted cumulative annual TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in FLN NDA in Year 2018.

Locations	ASR	Annual TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m
Existing ASRs				
Village Houses at Fu Tei Au Tsuen (Eastern)	FLN-E15	73.5	73.4	73.2
	FLN-E16	74.6	73.6	73.3
	FLN-E17	75.1	73.8	73.4
	FLN-E18	75.3	73.9	73.4
	FLN-E19	74.7	73.8	73.5
	FLN-E20	75.3	74.0	73.5
	FLN-E22	75.4	74.0	73.5
	FLN-E23	75.3	74.0	73.5
	FLN-E28	74.4	73.9	73.5

Note:

[1] Values include background concentration: $73.1\mu\text{g}/\text{m}^3$ of TSP.

Short-term Assessment (Tier 1) for Year 2021

The maximum 1-hour and 24-hour TSP concentrations from Tier 1 screening assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.47** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 1) at the ASRs concerned. The results indicate that for the majority of ASRs, exceedance of 1-hour and 24-hour TSP criteria is not anticipated even with this theoretical worst case situation where the entire worksites were assumed active (i.e. 100%). However, for the ASRs near the work sites (e.g. open storage, Wu Nga Lok Yeung, Wing Fai Centre, Belair Monte, etc.), exceedance of 1-hour and 24-hour TSP criterion is still predicted. As the Tier 1 assessment is for screening purposes only and does not reflect the actual on-site activities, a more focused Tier 2 assessment has been undertaken. **Figures 3.78 and Figure 3.79** show the contours of Tier 1 1-hour and 24-hour TSP concentrations at 1.5m above ground.

Short-term Assessment (Tier 2) for Year 2021

A more focused Tier 2 assessment has been conducted with the assumed 15% active works areas for the adjacent construction site positioned nearest to the potentially worst affected ASRs. As mentioned in **Section 3.5.1.5**, the Tier 2 assessment is also very conservative and will lead to over prediction of the dust impacts.

The maximum 1-hour and 24-hour TSP concentrations from Tier 2 screening assessment have been predicted. **Appendix 3.14** shows the assessment results and **Table 3.48** below summarises the cumulative 1-hour and 24-hour TSP impact (Tier 2) at the ASRs concerned. Results show that the cumulative 1-hour and 24-hour TSP concentrations would comply with the respective criteria and as such, adverse short-term construction dust impact is not anticipated.

Contours have been presented in **Figures 3.80 and Figure 3.81** for Tier 2 1-hour and 24-hour TSP concentrations at 1.5m above ground to illustrate the short-term dust impact on the ASR.

Long-term Assessment for Year 2021

The maximum annual TSP concentrations from long-term assessment have been predicted. **Appendix 3.13** shows the assessment results and **Table 3.49** below summarises the cumulative annual TSP impact at the ASRs concerned. In summary, the predicted annual TSP concentrations at all ASRs would comply with the criterion of $80\mu\text{g}/\text{m}^3$, and therefore no adverse long-term impact is anticipated. Contours of annual TSP concentrations at 1.5m above ground are shown in **Figure 3.82**.

Table 3.47 – Tier 1 assessment – predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of 73.1 µg/m³) under mitigated scenario in FLN NDA in Year 2021.

Locations	ASR	1-hour TSP concentrations at various height (µg/m ³)			24-hourTSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Open Storage	FLN-E44	570	348	209	135	110	97
	FLN-E47	575	317	187	264	153	107
Wu Nga Lok Yeung	FLN-E94	555	443	269	200	167	121
	FLN-E98	525	377	235	217	162	122
Wing Fai Centre	FLN-E128	501	353	215	187	149	108
Belair Monte	FLN-E129	654	447	252	255	189	133
House near Ma Wat Wai	FLN-E140	576	409	279	209	168	133
Village House near Wu Nga Lok Yeung	FLN-E155	505	270	227	182	126	115
Wu Nga Lok Yeung	FLN-E166	504	374	236	209	169	127
Planned ASRs							
Existing North District Temporary Wholesale Market for Agricultural Products	FLN-188	629	450	271	185	144	114
	FLN-190	566	468	303	161	150	123
	FLN-191	659	445	283	191	164	124

Note:

[1] Values include background concentration: 73.1 µg/m³ of TSP

Table 3.48 – Tier 2 assessment – predicted cumulative 1-hour and 24-hour TSP concentrations at 1.5m above ground (including background concentration of 73.1µg/m³) under mitigated scenario in FLN NDA in Year 2021.

Locations	ASR	1-hour TSP concentrations at various height (µg/m³)			24-hourTSP concentrations at various height (µg/m³)		
		1.5m	5m	10m	1.5m	5m	10m
Existing ASRs							
Open Storage	FLN-E44	277	180	134	105	90	84
	FLN-E47	266	231	160	110	98	87
Wu Nga Lok Yeung	FLN-E94	311	218	153	137	115	94
	FLN-E98	372	263	175	145	119	99
Wing Fai Centre	FLN-E128	260	221	143	99	97	90
Belair Monte	FLN-E129	380	253	160	187	131	99
House near Ma Wat Wai	FLN-E140	277	208	164	135	117	103
Village House near Wu Nga Lok Yeung	FLN-E155	434	202	165	144	102	96
Wu Nga Lok Yeung	FLN-E166	389	272	168	152	128	102
Planned ASRs							
Existing North District Temporary Wholesale Market for Agricultural Products	FLN-188	369	268	174	107	102	93
	FLN-190	428	311	202	124	113	98
	FLN-191	468	309	194	136	120	98

Note:

[1] Values include background concentration: 73.1 µg/m³ of TSP.

Table 3.49 - Long term assessment - predicted cumulative annual TSP concentrations at 1.5m above ground (including background concentration of $73.1\mu\text{g}/\text{m}^3$) under mitigated scenario in FLN NDA in Year 2021.

Locations	ASR	Annual TSP concentrations at various height (µg/m ³)		
		1.5m	5m	10m
Existing ASRs				
Open Storage	FLN-E44	73.7	73.6	73.4
	FLN-E47	75.3	74.3	73.7
Wu Nga Lok Yeung	FLN-E94	75.3	74.9	74.2
	FLN-E98	75.5	74.8	74.1
Wing Fai Centre	FLN-E128	74.5	74.3	73.9
Belair Monte	FLN-E129	75.4	74.9	74.2
House near Ma Wat Wai	FLN-E140	74.9	74.3	73.8
Village House near Wu Nga Lok Yeung	FLN-E155	74.2	74.0	73.7
Wu Nga Lok Yeung	FLN-E166	75.4	74.8	74.2
Planned ASRs				
Existing North District Temporary Wholesale Market for Agricultural Products	FLN-188	73.9	73.7	73.5
	FLN-190	73.8	73.7	73.5
	FLN-191	74.1	73.8	73.5

Note:

[1] Values include background concentration: $73.1\mu\text{g}/\text{m}^3$ of TSP

3.8.2 Operation Phase

3.8.2.1 Chimney Emission

Based on the assessment, adverse cumulative air quality impact due to the chimney emissions is not anticipated and no mitigation measures would be required.

3.8.2.2 Vehicular Emission

Based on the assessment, adverse cumulative air quality impact due to the vehicular emissions is not anticipated and no mitigation measures would be required.

3.8.2.3 Odour Emission

With the implementation of the odour control design in the proposed STW expansion in FLN, it is predicted that, even with very conservative assumptions, the odour concentration at all ASRs would comply with the odour criterion. For other future development, any air sensitive use is required to avoid the non-compliance zone as shown in **Figure 3.55b**.

3.9 Conclusion

3.9.1 Construction Phase

The fugitive dust assessment for the construction phase has concluded that watering in all works areas once per hour during working hours (7:00am – 7:00pm) would be required to control the fugitive dust impact. In addition, the Contractor is also recommended to adopt good site practices and is required to follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation.

The results indicate that, with mitigation measures, the predicted 1-hour and 24-hour and annual TSP concentrations at the identified ASRs would comply with the respective criteria. Therefore, it is concluded that there will be no adverse residual air quality impacts during construction phase.

3.9.2 Operational Phase

Vehicular emissions from open roads are expected to be the major air pollutants during the operational phase of the NENT NDA development. Fixed polluting sources such as industrial emissions, odour emissions from sewage treatment works, sewage pumping stations and slaughtering house will also have potential air quality impact to ASRs.

Chimney emissions impact is predicted to be acceptable and no mitigation measures would be required.

The results of the cumulative impact due to vehicular and chimney emissions revealed that 1-hour, 24-hour and annual average NO₂ concentrations and 24-hour and annual average RSP concentrations would comply with the relevant AQO criteria.

Odour impact due to the existing SWHSTW will be improved gradually with the expansion of the STW, since odour control designs will be installed for the newly constructed or retrofitted odour sources during the expansion works. Odour impact due to the proposed STW Extension located in the FLN NDA is not anticipated with the incorporation of all the proposed odour control design. Odour non-compliance zone (the zone where the odour concentration exceeds the statutory odour limit) has been identified. It is necessary to ensure that no planned air sensitive receivers are located inside the non-compliance zone in the future detailed design stage.