

4 EIA ON NEW SEWAGE PUMPING STATIONS SERVING THE PLANNED KTD

4.1 Introduction

- 4.1.1 This section presents an environmental impact assessment during construction and operational phase of the sewage pumping stations (SPSs) within Kai Tak Development (KTD) area that are classified as Designated Project (DP) under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (hereafter referred as “the DP2 Project” in this section).
- 4.1.2 Six sewage pumping stations (SPSs), excluding the proposed SPS of the DWFI compound at JVBC (JVBC-PS), are located within KTD. As part of the sewerage improvement scheme in the hinterland to reduce the pollution loading into KTAC, DSD will initially construct two new SPSs, namely PS1 & PS3 and the Environmental Permit No. EP-314/2008 covering PS1 and PS3 had been issued to DSD on 6 October 2008. The initial phase of these two SPSs is tentatively programmed to be completed in 2012 to convey sewage flow generated from the hinterland to To Kwa Wan Preliminary Treatment Work. The initial phase of these two SPSs will then be upgraded / expanded to the ultimate phase to cater for the sewage flow generated from north apron area of the Kai Tak Development. For the purpose of this EIA to assess the worst case environmental impacts, the ultimate phase of these two SPSs are examined.
- 4.1.3 PS6 to serve the Runway development will have to be completed in later 2011 in time for commissioning of the Phase I Berth of the Cruise Terminal in 2012. PS1A is designed to convey sewage flow generated from the public housing sites, schools and residential sites serving part of the North Apron development. Due to the very tight programme, it is considered that PS1A would not be completed on time for the initial population intake of public housing developments in Sites 1A and 1B in September 2012. Instead, the initial sewage flow collected from these housing sites will be discharged directly to the existing sewer and inverted siphon along Eastern Road to the existing trunk sewer culvert via new gravity sewer as an interim measures. PS1A is planned to be available by 2014 or earlier. The reprovision of SPS located in Site 5A1 (NPS) which is an existing pumping station to collect the stormwater low flow from existing box culvert discharging to Kowloon Bay, to the existing sewage system will be available in 2014. PS2 is located at the Site 1L5 and designed to convey sewage flows generated in the developments in Sites 1M, 1P, 1K, 1L 2A and 2B.
- 4.1.4 All these SPSs, except PS6, are located within 150m from existing and/or planned residential area or educational institution and with an installed capacity of more than 2000 m³ per day and, therefore these SPSs are classified as DPs under Item F.3, Part I, Schedule 2 of the EIAO. The locations of the SPSs for the DP2 Project are shown in **Figure 1.3**. The general layouts of the SPSs are shown in **Figures 4.0.1 to 4.0.6**.
- 4.1.5 The proposed PS6 is located near the southern tip of the former Kai Tak Airport runway. The installed capacity of PS6 is more than 2000 m³ but less than 300,000 m³ per day. PS6 is located at more than 150 m away from any existing or planned residential area, place of worship, educational institution, health care institution, site of special scientific interest, site of cultural heritage, bathing beach, marine park or marine reserve, fish culture zone, or seawater intake point. Therefore with reference to Item F.3, Part I, Schedule 2 of the EIAO, the proposed PS6 is not classified as a DP under the EIAO.
- 4.1.6 Potential environmental impacts associated with the DP2 Project (namely all the SPSs described above except PS6 and JVBC-PS) have been identified and are summarized in **Table 4.1**. Appropriate mitigation measures are proposed to alleviate any adverse environmental impacts if necessary.

Table 4.1 Summary of Environmental impacts

	Construction Phase	Operational Phase
Air	✓	✓
Noise	✓	✓
Water Quality	✓	✓
Waste Management	✓	✓
Land Contamination	✓	✗
Hazard to Life	✗	✗
Cultural Heritage	✓	✗
Landscape and Visual Impact	✓	✓
Ecological Impact	✗	✗
Fisheries Impact	✗	✗

4.2 Air Quality Impact

Environmental Legislation, Policies, Plans, Standards and Criteria

- 4.2.1 The criteria for evaluating air quality impacts and the guidelines for air quality impact assessment are set out in Annex 4 and Annex 12 of the *Technical Memorandum on Environmental Impact Assessment Process* (EIAO-TM).

Air Quality Objectives and EIAO-TM

- 4.2.2 The Air Pollution Control Ordinance (APCO) provides the statutory authority for controlling air pollutants from a variety of sources. The Hong Kong Air Quality Objectives (AQOs), which must be satisfied, stipulate the maximum allowable concentrations over specific periods for typical pollutants. The relevant AQOs are listed in **Table 4.2**.

Table 4.2 Hong Kong Air Quality Objectives

Pollutant	Maximum Concentration ($\mu\text{g m}^{-3}$) ⁽¹⁾			
	Averaging Time			
	1 hour ⁽²⁾	8 hour ⁽³⁾	24 hour ⁽³⁾	Annual ⁽⁴⁾
Total Suspended Particulates (TSP)	-	-	260	80
Respirable Suspended Particulates (RSP) ⁽⁵⁾	-	-	180	55
Sulphur Dioxide (SO ₂)	800	-	350	80
Nitrogen Dioxide (NO ₂)	300	-	150	80
Carbon Monoxide (CO)	30,000	10,000	-	-
Photochemical Oxidants (as Ozone, O ₃) ⁽⁶⁾	240	-	-	-

Notes:

- (1) Measured at 298 K 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) Suspended particulates in air with a nominal aerodynamic diameter of 10 μm or smaller.
(6) Photochemical oxidants are determined by measurement of ozone only.

- 4.2.3 The EIAO-TM stipulates that the hourly TSP level should not exceed 500 $\mu\text{g m}^{-3}$ (measured at 25°C and one atmosphere) for construction dust impact assessment. Standard mitigation measures for construction sites are specified in the *Air Pollution Control (Construction Dust) Regulation*.

- 4.2.4 In accordance with the EIAO-TM, odour level at an air sensitive receiver should meet 5 odour units based on an averaging time of 5 seconds for odour prediction assessment.

Air Pollution Control (Construction Dust) Regulation

- 4.2.5 Notifiable and regulatory works are under the control of *Air Pollution Control (Construction Dust) Regulation*. Notifiable works are site formation, reclamation, demolition, foundation and superstructure construction for buildings and road construction. Regulatory works are building renovation, road opening and resurfacing slope stabilisation, and other activities including stockpiling, dusty material handling, excavation, concrete works, stockpiling, dusty material handling etc. The DP2 Project is expected to include both notifiable works and regulatory works. Contractors and site agents are required to inform the Environmental Protection Department (EPD) on carrying out construction works and to adopt dust reduction measures to reduce dust emission to the acceptable level.

Description of the Environment

- 4.2.6 The DP2 Project is located in the north apron area of the former Kai Tak Airport and the existing To Kwa Wan area. There is no air quality monitoring station located in the proximity of the DP2 Project area. EPD's Sham Shui Po and Kwun Tong air quality monitoring stations are the nearest stations to the DP2 Project site. **Table 4.3** summarizes the annual average concentrations of the air pollutants recorded at these two monitoring stations in Year 2006.

Table 4.3 Annual Average Concentrations of Pollutants in Year 2006 at EPD's Sham Shui Po and Kwun Tong Air Quality Monitoring Stations

Pollutant	Annual Average AQO ($\mu\text{g m}^{-3}$)	Year 2006 Annual Average Concentration ($\mu\text{g m}^{-3}$)	
		Sham Shui Po station	Kwun Tong station
TSP	80	79	75
RSP	55	55	55
NO ₂	80	67	61
SO ₂	80	24	19

Air Quality Sensitive Receivers

- 4.2.7 In accordance with Annex 12 of the EIAO-TM, any domestic premises, hotel, hostel, hospital, clinic, nursery, temporary housing accommodation, school, educational institution, office, factory, shop, shopping centre, place of public worship, library, court of law, sports stadium or performing arts centre are considered to be an air sensitive receiver (ASR). Any other place with which, in terms of duration or number of people affected, has a similar sensitivity to the air pollutants as the aforesaid places are also considered to be an ASR, for example, playground, sitting area of parks / promenade.
- 4.2.8 In accordance with Section 3.4.5.3 of the EIA Study Brief No. ESB-152/2006, the air quality impact assessment area is defined by a distance of 500m expanded from the boundary of the Kai Tak Development (KTD) Project. The study area of air quality impact assessment for the KTD Project is shown in **Figure 3.1** which also covers the study area of the DP2 Project.
- 4.2.9 The identified representative ASRs are listed in **Table 4.4** and the corresponding locations are shown in **Figure 3.1**.

Table 4.4 Summary of Representative Air Sensitive Receivers

ASRs	District (1)	Location	Existing / Planned Land Use	Max. Building Height, m (2)	Distance to Project Boundary, m	SPSs
A17	KB	Hong Kong International Trade & Exhibition Centre	Commercial	54	326	PSIA
A18	KB	Hong Kong Bank New Treasury Building	Commercial	12	308	PSIA
A19	KB	Electrical & Mechanical Services Department Headquarters	G/IC	21	129	PSIA
A20	KB	Sino Industrial Plaza	Industrial	30	247	PSIA
A21	KB	Skyline Tower	Commercial	117	212	PSIA
A22	KB	Football field	Recreation	1.5	317	PSIA
A23	KB	Kowloon Health Centre	G/IC	30	440	PSIA
A24	KB	Bicycle Track Near Richland Garden	Recreation	1.5	332	PSIA
A25	NCW	Richland Gardens Shopping Centre	Shopping Center	30	394	PSIA
A26	NCW	Richland Gardens	Residential	99	488	PSIA
A27	NCW	Kam Bik House, Choi Hung Estate	Residential	60	853	PSIA
A28	NCW	Pik Hoi House, Choi Hung Estate	Residential	60	920	PS1
A29	NCW	Rhythm Garden	Residential	87	705	PS1
A30	SPK	Cognitio College	Educational	18	244	
A31	SPK	Sir Robert Black Health Centre	Clinic	9	67	PS1
A32	SPK	Lee Kau Yan Memorial School	Educational	10	95	PS1
A33	SPK	Shek Ku Lung Road Playground	Recreation	1.5	152	PS1
A34	SPK	Regal Oriental Hotel	Hotel	42	291	PS3
A35	SPK	South Mansion	Residential	15	228	PS3
A36	SPK	Jenford Building	Residential	12	129	PS3
A37	KC	Sung Wong Toi Playground	Recreation	1.5	128	PS3
A38	KC	Sung Wong Toi Garden	Recreation	1.5	217	PS3
A39	KC	Parc 22	Residential	33	288	PS3
A40	KC	Sky Tower	Residential	141	303	PS3
A41	TKW	Freder Centre	Industrial	153	331	NPS
A42	TKW	K K Industrial Building	Industrial	12	262	NPS
A43	TKW	HK Society for Blind hostel	Hostel	9	34	NPS
A44	TKW	Mok Cheong Street Residential District	Residential	18	57	NPS
A45	TKW	China Gas Company	Commercial	15	211	NPS
A46	TKW	Ming Lun Street Residential District	Residential	21	231	NPS
A47	TKW	Grand Waterfront	Residential	153	185	NPS
A48	TKW	Merit Industrial Center	Industrial	36	329	NPS
A49	TKW	Wei Chien Court	Residential	39	377	NPS
A51	TKW	United Daily	Industrial	48	423	NPS
A52	TKW	Holly Carpenter Primary School	Educational	18	535	NPS
A53	TKW	Oblate Father's Primary School	Educational	21	598	NPS
PA9	KTD	Site 1B1 (Planned)	Residential	115	367	PSIA
PA10	KTD	Site 1B1 (Planned)	Residential	115	398	PSIA
PA11	KTD	Site 1B1 (Planned)	Residential	115	324	PSIA
PA12	KTD	Site 1B1 (Planned)	Residential	115	488	PSIA
PA13	KTD	Site 1B1 (Planned)	Residential	115	853	PSIA

ASRs	District (1)	Location	Existing / Planned Land Use	Max. Building Height, m ⁽²⁾	Distance to Project Boundary, m	SPSs
PA14	KTD	Site 1B1 (Planned)	Residential	115	920	PS1
PA15	KTD	Site 1B4 (Planned)	Educational	40	705	PS1
PA16	KTD	Site 1C1 (Planned)	G/IC	85	244	
PA17	KTD	Site 1D2 (Planned)	Commercial	95	67	PS1
PA18	KTD	Site 1D3 (Planned)	G/IC	55	95	PS1
PA19	KTD	Site 1D4 (Planned)	G/IC	95	152	PS1
PA22	KTD	Site 1F1 (Planned)	Commercial	145	291	PS3
PA23	KTD	Site 1F2 (Planned)	Commercial	170	228	PS3
PA24	KTD	Site 1G2 (Planned)	G/IC	75	129	PS3
PA25	KTD	Site 1H1 (Planned)	Residential	105	128	PS3
PA26	KTD	Site 1H2 (Planned)	Residential	105	217	PS3
PA27	KTD	Site 1H3 (Planned)	Residential	105	288	PS3
PA28	KTD	Site 1I1 (Planned)	Residential	95	303	PS3
PA29	KTD	Site 1I2 (Planned)	Residential	95	331	NPS
PA30	KTD	Site 1I3 (Planned)	Residential	95	262	NPS
PA31	KTD	Site 1J1 (Planned)	G/IC	55	34	NPS
PA32	KTD	Site 1J3 (Planned)	G/IC	25	57	NPS
PA33	KTD	Site 1K1 (Planned)	Residential	105	324	PSIA
PA34	KTD	Site 1K2 (Planned)	Residential	105	243	PSIA
PA35	KTD	Site 1K3 (Planned)	Residential	95	187	PSIA
PA36	KTD	Site 1L1 (Planned)	Residential	95	110	PSIA
PA37	KTD	Site 1L2 (Planned)	Residential	95	437	PS1
PA38	KTD	Site 1L3 (Planned)	Residential	95	306	PS1
PA39	KTD	Site 1L4 (Planned)	Residential	25	130	PS1
PA40	KTD	Site 1M1 (Planned)	Commercial	35	216	PS1
PA41	KTD	Site 1M1 (Planned)	Commercial	35	219	PS1
PA42	KTD	Site 1M2 (Planned)	Commercial	35	136	PS1
PA43	KTD	Site 2A1 (Planned)	G/IC	65	405	PS1
PA44	KTD	Site 2A2 (Planned)	G/IC	65	344	PSIA
PA45	KTD	Site 2A3 (Planned)	G/IC	65	348	PSIA
PA46	KTD	Site 2A4 (Planned)	G/IC	65	351	PSIA
PA47	KTD	Site 2A5 (Planned)	G/IC	65	59	PSIA
PA48	KTD	Site 2A6 (Planned)	G/IC	40	24	PS3
PA49	KTD	Site 2B1 (Planned)	Residential	105	360	PS1
PA50	KTD	Site 2B1 (Planned)	Residential	105	280	PS1
PA51	KTD	Site 2B2 (Planned)	Residential	95	330	PS3
PA52	KTD	Site 2B3 (Planned)	Residential	80	230	PS3
PA53	KTD	Site 2B4 (Planned)	Residential	80	200	PS3
PA54	KTD	Site 2B5 (Planned)	Residential	80	150	PS3
PA55	KTD	Site 2B6 (Planned)	Residential	80	130	PS3
PA56	KTD	Site 2D1 (Planned)	Recreation	40	278	PSIA
PA57	KTD	Site 2D1 (Planned)	Recreation	40	345	PSIA
PA58	KTD	Site 3C1 (Planned)	Hospital	55	274	PSIA
PA59	KTD	Site 3C1 (Planned)	Hospital	55	273	PS1
PA60	KTD	Site 3C1 (Planned)	G/IC	55	79	PS1
PA61	KTD	Site 3C1 (Planned)	Hospital	55	102	PS1
PA62	KTD	Site 3D1 (Planned)	Commercial	95	84	PS1
PA63	KTD	Site 3D2 (Planned)	Commercial	95	259	PS1
PA64	KTD	Site 3D3 (Existing)/ Site 3D3 (Planned)	Industrial / Commercial	168/ 95	454	PS1
PA65	KTD	Site 3D4 (Planned)	Commercial	95	337	PS1
PA66	KTD	Site 3D4 (Planned)	Commercial	95	112	PS1
PA67	KTD	Site 4A1 (Planned)	Residential	60	1316	NPS
PA68	KTD	Site 4A1 (Planned)	Residential	60	1259	NPS
PA69	KTD	Site 4A2 (Planned)	Commercial	40	1249	NPS
PA70	KTD	Site 4A3 (Planned)	Commercial	75	1177	NPS
PA71	KTD	Site 4A (Planned)	Recreation	1.5	1050	NPS

ASRs	District (1)	Location	Existing / Planned Land Use	Max. Building Height, m (2)	Distance to Project Boundary, m	SPSs
PA72	KTD	Site 4A (Planned)	Recreation	1.5	1121	NPS
PA73	KTD	Site 4A (Planned)	Recreation	1.5	817	NPS
PA74	KTD	Site 4A (Planned)	Recreation	1.5	800	NPS
PA75	KTD	Site 4A (Planned)	Recreation	1.5	469	NPS
PA76	KTD	Site 4A (Planned)	Recreation	1.5	416	NPS
PA77	KTD	Site 4B1 (Planned)	Residential	50	1415	PS2
PA78	KTD	Site 4B1 (Planned)	Residential	50	1251	PS2
PA79	KTD	Site 4B2 (Planned)	Residential	50	1562	PS2
PA80	KTD	Site 4B2 (Planned)	Residential	50	1485	PS2
PA81	KTD	Site 4B3 (Planned)	Residential	60	1715	PS2
PA82	KTD	Site 4B3 (Planned)	Residential	60	1621	PS2
PA83	KTD	Site 4B4 (Planned)	Residential	50	1898	PS2
PA84	KTD	Site 4B4 (Planned)	Residential	50	1823	PS2
PA85	KTD	Site 4B5 (Planned)	Residential	40	2110	PS2
PA86	KTD	Site 4B5 (Planned)	Residential	40	2103	PS2
PA87	KTD	Site 4B5 (Planned)	Residential	40	2001	PS2
PA88	KTD	Site 4B5 (Planned)	Residential	40	2001	PS2
PA89	KTD	Site 4C1 (Planned)	Commercial	40	1436	PS2
PA90	KTD	Site 4C2 (Planned)	Commercial	50	1588	PS2
PA91	KTD	Site 4C3 (Planned)	Commercial	40	1727	PS2
PA92	KTD	Site 4C4 (Planned)	Commercial	40	1883	PS2
PA93	KTD	Site 4C5 (Planned)	Commercial	40	2117	PS2
PA94	KTD	Site 4D2 (Planned)	G/IC	1.5	2658	PS2
PA95	KTD	Site 4D2 (Planned)	G/IC	1.5	2658	PS2
PA96	KTD	Site 4D2 (Planned)	G/IC	1.5	2886	PS2
PA97	KTD	Site 4D2 (Planned)	G/IC	1.5	2912	PS2
PA98	KTD	Site 4D3 (Planned)	Commercial	30	2298	PS2
PA99	KTD	Site 4D3 (Planned)	Commercial	30	2457	PS2
PA100	KTD	Site 4D3 (Planned)	Commercial	30	2681	PS2
PA101	KTD	Site 4D3 (Planned)	Commercial	30	2809	PS2
PA102	KTD	Site 5A4 (Planned)	Residential	60	89	PS2
PA103	KTD	Site 5A4 (Planned)	Residential	105	155	PS2
PA104	KTD	Site 3B1 (Planned)	Undesignated	40	485	PS2
PA105	KTD	Site 3B2 (Planned)	Undesignated	40	644	PS2
PA106	KTD	Site 3B3 (Planned)	Undesignated	40	782	PS2
PA107	KTD	Site 3B4 (Planned)	Undesignated	40	860	PS2
PA108	KTD	Site 4D2 (Planned) Tourism node	Other Specified Uses	95	2264	PS2
PA109	KTD	Site 4D2 (Planned) Tourism node	Other Specified Uses	95	2434	PS2
PA110	KTD	Site 4D2 (Planned) Tourism node	Other Specified Uses	95	2664	PS2
PA111	KTD	Site 4D2 (Planned) Tourism node	Other Specified Uses	95	2620	PS2
PA112	KTD	Site 4D2 (Planned) Tourism node	Other Specified Uses	95	2559	PS2
PA113	KTD	Site 4D2 (Planned) Tourism node	Other Specified Uses	95	2339	PS2

Note: (1) KT – Kwun Tong; NTK – Ngau Tau Kok; KB – Kowloon Bay; NCW – Ngau Chi Wah; SPK – San Po Kong; KC – Kowloon City, TKW – To Kwa Wan; HH – Hung Hom; KTD – Kai Tak Development

(2) The maximum height for Planned ASR was made reference to the RODP.

Assessment Methodology

Construction Phase

- 4.2.10 Given the small scale of construction activities and work site to be involved in the DP2 Project, no significant construction dust emissions are anticipated. With the implementation of the requirements stipulated in the *Air Pollution Control (Construction Dust) Regulation* during construction phase, adverse dust impact would not be expected and quantitatively assessment is not necessary. The assessment has been conducted in accordance with the procedures below:

- Identify the potentially fugitive dust emission during construction phase; and
- Assess the significance of construction dust emissions from construction phase.

Operational Phase

- 4.2.11 In order to investigate any odour impact during operation of the SPSs, and odour impact assessment was conducted in accordance with the following procedures to identify and locate the odour emission sources and determine its impact.

- Identify and locate the odour emission sources within the study area;
- Identify and locate representative ASRs that may be affected by the odour sources; and
- Assess the significance of odour impact.

Identification, Prediction and Evaluation of Environmental Impacts

Construction Phase

- 4.2.12 Construction activities at the SPSs will involve ground formation works, superstructure works and installation of associated utilities facilities. Extensive excavation works is not expected. Given the limited work area for the SPSs, the potential dust impacts at the ASRs in the vicinity of the SPSs would be low. All the above activities are not expected to generate significant amount of construction dust.
- 4.2.13 Control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* of Air Pollution Control Ordinance (APCO) should be implemented to ensure that construction impacts are controlled within the relevant standards described above. An environmental audit programme for construction phase will be devised to verify the effectiveness of the control measures so as to ensure proper construction dust control. With proper implementation of dust control measures, significant construction dust impacts at ASRs during the construction phase of the DP2 Project is not anticipated.
- 4.2.14 Referring to construction programme of the DP2 Project, there would be a number of concurrent projects taking place in the proximity of the assessment area. The concurrent projects are:
- Cruise Terminal Development and related advance works
 - Infrastructure works at North Apron, Phase 1 - Housing Sites and Government Offices
 - Kai Tak Nullah modification works
 - Infrastructure works at runway and Metro Park
 - Infrastructure works at North Apron, Phase 2
 - Trunk Road T2 and infrastructure works at South Apron
 - SCL Construction
 - CKR Construction
 - Anderson Road Project, etc.
- 4.2.15 The potential construction dust arising from the above construction activities have been presented in **Section 3.2** of this Report.

Operational Phase

- 4.2.16 Potential odour emission from wet well and discharge chamber are possible odour sources of SPS. Wet well and other sewage facilities would be covered and foul air would be ventilated to 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 urban area to successfully control the potential odour impacts. With proper implementation of these odour mitigation measures, adverse odour impact from SPS would not be expected.

Mitigation of Environmental Impacts

Construction Phase

- 4.2.17 In order to ensure compliance with the acceptable criteria at the ASRs at all time, requirements of the *Air Pollution Control (Construction Dust) Regulation* shall be adhered to during the construction period. An environmental audit program shall be implemented to monitor the construction process in order to enforce controls and modify methods of work if dusty conditions are arisen. In addition, the following good site practices are recommended to minimise dust impacts during transportation and handling of dusty materials:
- Stockpiling site(s) should be lined with impermeable sheeting and bunded. Stockpiles should be fully covered by impermeable sheeting to reduce dust emission.
 - Misting for the dusty material should be carried out before being loaded into the vehicle.
 - Any vehicle with an open load carrying area should have properly fitted side and tail boards.
 - Material having the potential to create dust should not be loaded from a level higher than the side and tail boards and should be dampened and covered by a clean tarpaulin.
 - The tarpaulin should be properly secured and should extend at least 300 mm over the edges of the sides and tailboards. The material should also be dampened if necessary before transportation.
 - The vehicles should be restricted to maximum speed of 10 km per hour and confined haulage and delivery vehicle to designated roadways inside the site. On-site unpaved roads should be compacted and kept free of loose materials.
 - Vehicle washing facilities should be provided at every vehicle exit point.
 - The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores.
 - Every main haul road should be sealed with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet.
 - Every stock of more than 20 bags of cement should be covered entirely by impervious sheeting placed in an area sheltered on the top and the three sides.
 - Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites.

Operational Phase

- 4.2.18 The major odour sources (wet well and distribution chambers) of SPS would be located within enclosed building structures. With proper enclosure and ventilation system to divert the odour emissions to deodorizer for treatment before discharge to environment, odour impacts could be mitigated to an acceptable level and no insurmountable environmental impact is therefore expected.

Residual Environmental Impacts

- 4.2.19 With the implementation of dust suppression measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* during construction, no adverse residual air quality impact would be expected.
- 4.2.20 No residual odour impact would be expected. To facilitate compliance of the odour criterion stipulated in the EIAO-TM, commissioning tests for all deodorization systems should be included in the Design and Construction Contract Document.

Environmental Monitoring and Audit

- 4.2.21 Air quality monitoring is not required. A regular site audit (weekly audit) will be conducted to ensure compliance of the *Air Pollutant Control (Construction Dust) Regulation*.

Summary

- 4.2.22 Control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* of Air Pollution Control Ordinance (APCO) should be implemented to ensure that construction dust impacts are controlled within the relevant standards. With proper implementation of dust control measures, significant construction dust impacts at ASRs during the construction phase of the DP2 Project is not anticipated.
- 4.2.23 The fully covered design of the odour sources of the SPS and installation of deodorization system at the exhaust of ventilation system will provide adequate control of the potential impact. Adverse odour impact arising from the SPS is not anticipated.

4.3 Noise Impact

Environmental Legislation, Policies, Plans, Standards and Criteria

General

- 4.3.1 Noise impacts have been assessed in accordance with the criteria and methodology given in the Technical Memoranda (TMs) under the Noise Control Ordinance (NCO), and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).
- 4.3.2 The NCO and EIAO provide the statutory framework for noise control. Assessment procedures and standards are set out in five TMs listed below:
- TM on Environmental Impact Assessment Process (EIAO-TM)
 - TM on Noise from Construction Work other than Percussive Piling (GW-TM)
 - TM on Noise from Percussive Piling (PP-TM)
 - TM on Noise from Construction Work in Designated Areas (DA-TM)
 - TM on Noise from Places other than Domestic Premises, Public Places or Construction Sites (IND-TM)

Construction Noise – General Construction

- 4.3.3 The NCO provides the statutory framework for noise control of construction work, other than percussive piling, using powered mechanical equipment (PME) between the hours of 1900 and 0700 hours or at any time on Sundays and general holiday (that is, restricted hours). Noise control on construction activities taking place at other times is subject to the *Criteria for Evaluating Noise Impact* stated in Table 1B of Annex 5 in the EIAO-TM. The noise limit is $L_{eq(30\text{ minutes})}$ 75 dB(A) at the façades of dwellings and 70 dB(A) at the façade of schools (65 dB(A) during examinations).

- 4.3.4 Between 1900 and 0700 hours and all day on Sundays and public holidays, activities involving the use of PME for the purpose of carrying out construction work is prohibited unless a construction noise permit (CNP) has been obtained. A CNP may be granted provided that the Acceptable Noise Level (ANL) for the NSRs can be complied with. ANLs are assigned depending upon the area sensitive rating (ASR). The corresponding basic noise levels (BNLs) for evening and night time periods are given in **Table 4.5**.

Table 4.5 Construction Noise Criteria for Activity other than Percussive Piling

Time Period	Basic Noise Level (BNLs)		
	ASR A	ASR B	ASR C
Evening (1900 to 2300 hours) ⁽¹⁾	60	65	70
Night (2300 to 0700 hours)	45	50	55

Notes: (1) Includes Sundays and Public Holidays during daytime and evening

- 4.3.5 Despite any description or assessment made in this EIA on construction noise aspects, there is no guarantee that a Construction Noise Permit (CNP) will be issued for the project construction. The Noise Control Authority will consider a well-justified CNP application, once filed, for construction works within restricted hours as guided by the relevant Technical Memoranda issued under the Noise Control Ordinance. The Noise Control Authority will take into account of contemporary conditions / situations of adjoining land uses and any previous complaints against construction activities at the site before making his decision in granting a CNP. Nothing in this EIA shall bind the Noise Control Authority in making his decision. If a CNP is to be issued, the Noise Control Authority shall include in it any condition he thinks fit. Failure to comply with any such conditions will lead to cancellation of the CNP and prosecution action under the NCO.

Operational Phase - Fixed Plant Noise

- 4.3.6 Fixed plant noise sources at SPS are controlled by the NCO and IND-TM with a criteria of 5 dB(A) below the appropriate Acceptable Noise Levels (ANL) shown in Table 3 of the TM on Noise from Places other than Domestic Premises, Public Places or Construction Sites or the prevailing background noise levels (for quiet areas with level 5dB(A) below the ANL). The acceptable noise level for fixed plant noise is summarised in **Table 4.6** below.

Table 4.6 Acceptable Noise Level for Fixed Plant Noise

Time Period	NCO criteria		EIAO-TM	
	ASR 'B'	ASR 'C'	ASR 'B'	ASR 'C'
Daytime and Evening (0700-2300 hours)	65	70	60	65
Night-time (2300-0700 hours)	55	60	50	55

- 4.3.7 In any event, the Area Sensitivity Rating assumed in this EIA is for indicative assessment. It should be noted that the fixed noise sources are controlled under section 13 of the NCO. At the time of investigation, the Noise Control Authority shall determine noise impact from concerned fixed noise sources on the basis of prevailing legislation and practices being in force, and taking account of contemporary conditions/situations of adjoining land uses. Nothing in this EIA shall bind the Noise Control Authority in the context of law enforcement against all the fixed noise sources being assessed.

4.3.8 The Project areas are located in the proximity to well developed urban areas and the prevailing background noise level measurements at selected representative NSRs have been conducted and it is demonstrated that the prevailing background noise level are higher than ANL-5 (**Appendix 7.1**). Thus, ANL-5 has been adopted for the fixed plant noise impact assessment. The Area Sensitive Rating (ASR) of the type of area within which the NSR is located was determined for assessment. Determination of ASR was considered the below item.

- The type of area within the concerned NSR is located;
- The Influencing Factor (IF) identified;
- The Degree to which the NSR is affected by IF; and
- If applicable, nearby OZP “Industrial” or “Industrial Estates” zone

4.3.9 A summary of the Area Sensitive Rating (ASR) for the NSR for the fixed plant noise assessment is given in **Table 4.7**.

Table 4.7 Summary of Area Sensitive Rating for NSR for Fixed Plant Noise Assessment

NSRs	District ⁽¹⁾	Location	Existing / Planned Land Use	ASR ⁽²⁾	Remarks
N11	SPK	Cognitio College	Educational	C	(3) (a)
N12	SPK	Sir Robert Black Health Centre	Clinic	C	(3) (a)
N13	SPK	Lee Kau Yan Memorial School	Educational	C	(3) (a)
N14	SPK	South Mansion	Residential	C	(3) (a)
N15	SPK	Jenford Building	Residential	C	(3) (a)
N16	KC	Parc 22	Residential	C	(3) (b)
N17	KC	Sky Tower	Residential	C	(3) (b)
N18	KC	HK Society for Blind hostel	Residential	B	
N19	TKW	Mok Cheong Street Residential District	Residential	B	
PN41	KTD	Site 112 (Planned)	Residential	B	
PN52	KTD	Site 1L3 (Planned)	Educational	B	
PN61	KTD	Site 2B6 (Planned)	Educational	B	

Note: (1) SPK – San Po Kong; KC – Kowloon City, TKW – To Kwa Wan; KTD – Kai Tak Development

(2) All NSRs are located at the Urban Area

(3) NSR affected by the “major road” which has a heavy and generally continuous flow of vehicular traffic and, in normal circumstances, means a road with an annual average daily traffic flow in excess of 30,000.

(a) affected by Prince Edward Road East

(b) affected by Ma Tau Chung Road

Description of Environment

4.3.10 The DP2 Project is located in the north apron area of the former Kai Tak Airport and the existing To Kwa Wan area.

4.3.11 The existing land uses in adjoining areas are commercial, industrial, residential and recreational uses. Prince Edward Road East, Kwun Tong Bypass and other distributor networks are dominant noise sources in the area.

Noise Sensitive Receivers

- 4.3.12 In order to evaluate the construction and operational noise impacts from the DP2 Project, representative Noise Sensitive Receivers (NSRs) within the Study Area are identified for assessment. Only the first layer of NSRs has been identified for assessment because it would provide acoustic shielding to those receivers at further distance behind. As the centrally air-conditioned buildings do not rely on opened windows for ventilation, the noise standard as stipulated in Table 1 of EIAO-TM would not be applicable, and hence these buildings are not selected for noise impact assessment. **Table 4.8** and **Figure 3.12** shows the representative NSRs for this noise impact assessment. The photographs of the representative NSRs are shown in **Appendix 3.19**.

Table 4.8 Representative Noise Sensitive Receivers for Construction Noise Impact Assessment

NSRs	District ⁽¹⁾	Location	Existing / Planned Land Use	Max. Building Height, m
N11	SPK	Cognitio College	Educational	18
N12	SPK	Sir Robert Black Health Centre	Clinic	9
N13	SPK	Lee Kau Yan Memorial School	Educational	10
N14	SPK	South Mansion	Residential	15
N15	SPK	Jenford Building	Residential	12
N16	KC	Parc 22	Residential	33
N17	KC	Sky Tower	Residential	141
N18	KC	HK Society for Blind hostel	Residential	9
N19	TKW	Mok Cheong Street Residential District	Residential	18
PN41	KTD	Site 1I2 (Planned)	Residential	95
PN52	KTD	Site 1L3 (Planned)	Residential	45
PN61	KTD	Site 2B6 (Planned)	Residential	80

Note: (1) SPK – San Po Kong; KC – Kowloon City, TKW – To Kwa Wan; KTD – Kai Tak Development

Assessment Methodology

Construction Noise During Unrestricted Hours

- 4.3.13 The construction tasks of the DP2 Project taking place concurrently within 300 m of a given NSR are considered to contribute to the cumulative impact at that NSR. Noise sources from the areas greater than this distance was excluded from the assessment.
- 4.3.14 The methodology outlined in the GW-TM was used for the assessment of construction noise (excluding percussive piling). Sound Power Levels (SWLs) of the equipment was taken from Table 3 of this TM. Where no SWL is provided in the GW-TM, reference was made to BS 5228 or other previous similar studies or from measurements taken at other sites in Hong Kong.

4.3.15 Referring to the construction programme of the KTD Project and other projects within the study area, it is noted that construction period of following projects might overlap with the DP2 Project:

- Cruise Terminal Development and related advance works
- Infrastructure works at North Apron, Phase 1 - Housing Sites and Government Offices
- Kai Tak Nullah modification works
- Infrastructure works at runway and Metro Park
- Infrastructure works at North Apron, Phase 2
- Trunk Road T2 and infrastructure works at South Apron
- SCL Construction
- CKR Construction
- Anderson Road Project, etc.

4.3.16 The above concurrent construction activities are considered to contribute to the cumulative impact at the noise assessment points and were included in the cumulative assessment if any of these construction activities are undertaken within 300m of a given noise assessment point. Locations of notional sources and distance for NSRs are given in **Appendix 3.20**.

4.3.17 A positive 3 dB(A) façade correction was added to the predicted noise levels in order to account for the facade effect at each noise assessment point.

Operational Phase (Fixed Plant Noise)

4.3.18 Fixed plant noise source is controlled by the NCO and IND-TM, 5dB(A) below the appropriate Acceptable Noise Levels (ANL) shown in Table 3 of the TM on Noise from Place other than Domestic Premises, Public Places or Construction Sites or the prevailing background noise levels. The following procedures were applied to the operational phase fixed plant noise assessment.

- Identify fixed plant noise;
- Calculate the correction factors based on the distance between the NSRs and the noise source positions;
- Apply acoustics correction factors for façade, distance, barrier attenuation, acoustic reflection where applicable;
- Calculate the maximum allowable Sound Power Level (SWL) as the compliance criteria for each fixed noise sources; and
- Quantify the level of impact at the NSRs in accordance with IND-TM.

Identification of Environmental Impacts

Construction Phase

4.3.19 The potential construction impact arising from the DP2 Project includes ground formation works, superstructure works, and installation of associated utilities facilities. These construction activities will involve the use of Powered Mechanical Equipment (PME) including breakers, excavators, lorries, mobile cranes, concrete truck mixers, pokers, rollers, etc. The use of PME adopted for the assessment are detailed in **Appendix 3.22**.

4.3.20 For the barging point of the development project at Anderson Road, this project is to be implemented by CEDD/Special Duties (Works) from Jan 2008 through Dec 2014. The barging point facilities at middle Runway for transporting the surplus C&D materials from the development area to receptor sites. Given the shortest notional source distance to NSR is more than 1km, the related cumulative construction noise impact arising from these barging facilities was not assessed in this section.

Operational Phase (Fixed Plant Noise)

- 4.3.21 The major noise source comes from the ventilation fan inside the SPSs. The locations of the ventilation fans and the maximum sound power levels (SWLs) required to meet the relevant noise criteria were determined.
- 4.3.22 Apart from the restriction on the sound power levels, the openings of the proposed ventilation fans should be oriented such that they would be faced away from any nearby NSRs and adopt any necessary further mitigation measures like acoustic louvers and silencers. With proper implementation of mitigation measures, the potential noise impact at nearby NSRs due to the operation of the ventilation fans are expected to be minimal.

Prediction and Evaluation of Environmental Impacts

Construction Phase

- 4.3.23 For normal daytime working hours, exceedances of the construction noise criteria ($L_{eq (30-min)}$ 75 dB(A) for residential uses and 70 dB(A) for educational institutions (65 dB(A) during examinations)) are predicted at representative NSRs in the absence of mitigation measures. Details of construction noise calculations and results are presented in **Appendix 3.23**. Results show that the predicted cumulative noise levels related to the concurrent construction works of the DP2 Project are in the range of 54 to 86 dB(A) $L_{eq (30-min)}$. A summary of the unmitigated construction noise levels of the representative NSRs during normal daytime working hours within the construction period of the DP2 Project is listed in **Table 4.9**. Noise mitigation measures would therefore be required to reduce noise levels to the stipulated standard.

Table 4.9 Summary of Cumulative Unmitigated Construction Noise Levels at Representative NSRs during Normal Daytime Working Hours

NSR	Noise Criteria, dB(A)	Predicted Unmitigated Construction Noise Levels during Normal Daytime Working Hour ($L_{eq (30-min)}$, dB(A))	Exceedance, dB(A)
N11	65/70*	59 - 84	19/14
N12	75	60 - 84	9
N13	65/70*	60 - 82	17/12
N14	75	60 - 89	14
N15	75	60 - 86	11
N16	75	59 - 78	3
N17	75	60 - 82	7
N18	75	63 - 83	8
N19	75	62 - 82	7

Operational Phase (Fixed Plant Noise)

- 4.3.24 The major noise source comes from the ventilation fan inside the SPSs. The locations of the ventilation fans and the maximum sound power levels (SWLs) required to meet the relevant noise criteria were determined. **Table 4.10** shows the proposed locations of the SPSs and the required sound power level for the nearest affected NSRs to achieve noise compliance. The detailed calculations are shown in **Appendix 7.2**.

Table 4.10 Predicted Maximum Allowable Sound Power Levels for SPSs

SPSs	Likely affected NSRs	ASRs	Approx Distance to NSR, m	Sound Power Level (SWL, dB(A)) required at source in order to meet the criteria	
				Daytime	Nighttime
PS1A	PN41	B	25	90	80
PS1	N12	C	111	108	98
PS2	PN52	B	9	66	61
PS3	PN61	B	135	105	94
PS-NPS	N18	B	49	96	84

- 4.3.25 The above SWL criteria should be implemented and refined during the detailed design stage of the respective SPS by the contractor(s). Any new NSRs should also be identified and incorporated into the design as necessary. The contractor(s) shall install sound attenuators, noise barriers and acoustic enclosures as appropriate to ensure that the specified maximum SWLs in the above **Table 4.10** are achieved. The performance of the sound attenuators shall be obtained by comparing the total SWL of noise emanating from the facade and the specified maximum SWL specified in the above **Table 4.10**. The predicted noise levels at NSRs due to cumulative fixed plant operations (include ESS and ventilation shafts) are presented in **Table 4.11**.

Table 4.11 Summary of Predicted Operational Noise Level

NSR	NSR Description	Predicted Noise Level, dB(A)	
		Daytime	Nighttime
N12	Sir Robert Black Health Centre	65	55
N17	Sky Tower	60	50
N18	HK Society for Blind hostel	60	49
N19	Mok Cheong Street Residential District	60	50
PN41	Site 1I2 (Planned)	60	50
PN52	Site 1L3 (Planned)	57	50
PN61	Site 2B6 (Planned)	60	50
PN69	Site 1F2 (Planned)	60	50

Mitigation of Environmental Impacts

Construction Phase

- 4.3.26 In order to reduce the excessive noise impacts at the affected NSRs during normal daytime working hours, mitigation measures such as adopting quiet powered mechanical equipment, movable noise barriers and temporary noise barriers are recommended. The contractor(s) may be able to obtain particular models of plant that are quieter than the PMEs given in GW-TM. It is considered too restrictive to specify that a contractor has to use specific items of plant for the construction operations. It is practical to specify the total SWL of all plant to be used on site so that the contractor is allowed some flexibility to select plant to suit his needs.
- 4.3.27 The use of quiet plant associated with the construction works is prescribed in British Standard "Noise Control on Construction and Open Sites, BS5228: Part 1: 1997" which contains the SWLs for specific quiet PME. The SWLs for quiet PMEs adopted for the assessment are detailed in **Appendix 3.26**.
- 4.3.28 To alleviate the construction noise impact on the affected NSRs, movable noise barrier for Asphalt Paver, Breaker, Excavator and Hand-held breaker and full enclosure for Air Compressor, Bar Bender, Concrete Pump, Generator and Water Pump are proposed. Movable temporary noise barriers that can be located close to noisy plant and be moved iteratively with the plant along a worksite can be very effective for screening noise from NSRs. A typical design which has been used locally is a wooden framed barrier with a small cantilevered upper portion of superficial density no less than 14kg/m^2 on a skid footing with 25mm thick internal sound absorptive lining. This measure is particularly effective for low level zone of NSRs. A cantilevered top cover would be required to achieve screening benefits at upper floors of NSRs. It is anticipated that suitably designed barriers could achieve at least 5 - 10dB(A) reduction. For a conservative assessment, only a reduction of 5dB(A) is assumed.
- 4.3.29 The use of full enclosure has been considered in this assessment to shelter relatively static plant including air compressor, bar bender, concrete pump, generator and water pump.. These enclosures can provide about 10dB(A) noise reduction.

- 4.3.30 Noise reduction from the use of mitigation measures including quiet plant, noise barrier and enclosure for construction plants as described above has been applied in the assessment. Detailed results of construction noise assessment for “mitigated” scenario are given in **Appendix 3.27**. The predicted cumulative noise levels and the exceedance over daytime construction noise criteria are summarised in the following **Table 4.12**.

Table 4.12 Summary of Cumulative Mitigated Construction Noise Levels at Representative NSRs During Normal Daytime Working Hours

NSR	Noise Criteria, dB(A)	Predicted Mitigated Construction Noise Levels during Normal Daytime Working Hour (Leq (30-min), dB(A))	Exceedance, dB(A)	Duration, Month
N11	65/70*	47 - 75	10/5	66 include examination period
N12	75	47 - 74	0	0
N13	65/70*	47 - 74	9/4	66 include examination period
N14	75	47 - 78	3	12
N15	75	47 - 75	0	0
N16	75	46 - 70	0	0
N17	75	47 - 75	0	0
N18	75	50 - 76	1	7
N19	75	50 - 75	0	0

Note: *For normal daytime working hours, the noise criteria are 70 dB(A) and 65 dB(A) for normal teaching periods and examination periods, respectively.

- 4.3.31 With the exception of N11, N13, N14 and N18, the predicted mitigated construction noise levels arising from the DP2 Project at all other NSRs selected for construction noise impact assessment would comply with the EIAO-TM construction noise criteria.

Operational Phase

- 4.3.32 The main sources of noise for SPS are pumps and ventilation system. The detailed design should incorporate the following good practice in order to minimise the nuisance on the neighbouring NSRs:

- The exhaust of the ventilation system and any opening of the building should be located facing away from any NSRs;
- Louver or other acoustic treatment equipment could also be applied to the exhaust exit of the building; and
- Pumps and mechanical ventilation are either underground or enclosed within a structure or building.

Evaluation of Residual Impacts

- 4.3.33 With the exception of N11, N13, N14 and N18, the predicted mitigated construction noise levels arising from the DP2 Project at all other NSRs selected for construction noise impact assessment would comply with the EIAO-TM construction noise criteria. The affected NSRs are educational use and a maximum noise level of 72dB(A) is found at N13 (Lee Kau Yan Memorial School). It is identified that the predicted exceedances on those affected NSRs are due to the other project(s) as summarised in **Table 4.13**.

Table 4.13 Construction Noise Residual Impacts

NSR	Exceedance of the EIAO-TM Criterion		Construction Activity Causing Exceedance	Approximate duration of Exceedance
	65 dB(A)	70 dB(A)		
N11	10 (Sept 2009 to Apr 2010 and Jul 2010 to Dec 2015)	5 (Jul 2010 to Dec 2015)	<ul style="list-style-type: none">• Construction of Road D1• Local Roads L1, L2, L3, L11, L15 and associated footpaths at North Apron• Drainage, Sewerage & Watermain• Construction of Footbridge at Rhythm Garden (LW-04)• Rebuild Kai Tak Nullah• Construction of Landscape Walkway LW-02• SCL	66 month include examination period
N13	9 (Sept 2009 to Apr 2010 and Jul 2010 to Dec 2015)	4 (Jul 2010 to Dec 2015)	<ul style="list-style-type: none">• Construction of Road D1• Local Roads L1, L2, L3, L11, L15 and associated footpaths at North Apron• Drainage, Sewerage & Watermain• Construction of Footbridge at Rhythm Garden (LW-04)• Construction of Landscape Walkway LW-03• Underground Shopping Street (SB-01)• Upgrading of Pumping Station PS1• Rebuild Kai Tak Nullah• Construction of Landscape Walkway LW-02• SCL	66 month include examination period
NSR	Exceedance of the EIAO-TM Criterion		Construction Activity Causing Exceedance	Approximate duration of Exceedance
	75 dB(A)			
N14	2 (Jan 2015 to Dec 2015)		<ul style="list-style-type: none">• Construction of Road D1, L7, L8, L9 & L16• Underground Shopping Street (SB-01)	12 month
N18	1 (Jan 2015 to July 2015)		<ul style="list-style-type: none">• SCL	7 month

- 4.3.34 The on-site survey has revealed that both N11 and N13 have already been noise insulated with air-conditioners. With the provision of air-conditioners, it is considered that the noise impact would be minimised by keeping the windows closed during the construction activities. For the N14 & N18, the exceedance is due to the other projects.

- 4.3.35 Having said that, the good site practices listed below shall be adopted by the contractor(s) to further ameliorate the noise impacts. Although the noise mitigating effects are not easily quantifiable and the benefits may vary with the site conditions and operating conditions, good site practices are easy to implement and do not impact upon the works schedule.
- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program.
 - Mobile plant, if any, should be sited as far away from NSRs as possible.
 - Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum.
 - Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs.
 - Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.
- 4.3.36 Residual operational noise impacts are not anticipated. In order to ensure compliance of the operational noise level with the stipulated noise standards in TM, noise commissioning tests for all major fixed noise sources should be included in the Contract Document.

Environmental Monitoring and Audit

Construction Phase

- 4.3.37 An EM&A programme is recommended to be established according to the predicted occurrence of noisy activities. All the recommended mitigation measures for daytime normal working activities should be incorporated into the EM&A programme for implementation during construction. Details of the programme are provided in the EM&A Manual.

Operational Phase

- 4.3.38 Residual fixed plant noise impacts are not anticipated. In order to ensure compliance of the operational noise level with the stipulated noise standards in TM, noise commissioning tests for all major fixed noise sources should be included in the Contract Document.

Summary

- 4.3.39 The construction noise impacts associated with the construction activities were identified. The detailed prediction of construction noise levels have been carried out and demonstrated that no adverse construction noise impact is expected at the identified NSRs. It is identified that the predicted exceedances on those affected NSRs are due to the other project(s)
- 4.3.40 Operational noise impacts from ventilation fans can be effectively mitigated by implementing noise control treatment at source during the design stage and residual operation noise impacts are not anticipated.

4.4 Water Quality Impact

Water Quality Sensitive Receivers

- 4.4.1 No existing water sensitive receiver (WSR) was identified within 300 m from the DP2 Project site boundary. The existing WSD flushing water intakes and cooling water intakes identified closest to the Kai Tak Development (KTD) Project site (which also covers the DP2 Project site) are shown in **Figure 8.2** and all of them are located outside the assessment area (i.e. 300 m from the DP3a Project site boundary) of the DP3a Project.
- 4.4.2 A new District Cooling System (DCS) will be implemented in the KTD area and the associated seawater intake would be considered as a planned WSR. Based on the RODP, the seawater intake will be located along the waterfront of the former Kai Tak airport runway (**Figure 8.5**).

Environmental Legislation, Policies, Plans, Standards and Criteria

- 4.4.3 The criteria for evaluating water quality impacts in this Study include:

Environmental Impact Assessment Ordinance (EIAO)

- 4.4.4 The Technical Memorandum on Environmental Impact Assessment Process (Environmental Impact Assessment Ordinance) (EIAO-TM) was issued by EPD under Section 16 of the EIAO. It specifies the assessment method and criteria that are to be followed in this Study. Reference sections in the EIAO-TM provide the details of assessment criteria and guidelines that are relevant to the water quality impact assessment, including:
- Annex 6 – Criteria for Evaluating Water Pollution
 - Annex 14 – Guidelines for Assessment of Water Pollution.

Water Quality Objectives

- 4.4.5 The Water Pollution Control Ordinance (WPCO) provides the major statutory framework for the protection and control of water quality in Hong Kong. According to the Ordinance and its subsidiary legislation, Hong Kong waters are divided into ten Water Control Zones (WCZs). Corresponding statements of Water Quality Objectives (WQOs) are stipulated for different water regimes (marine waters, inland waters, bathing beaches subzones, secondary contact recreation subzones and fish culture subzones) in the WCZs based on their beneficial uses. The DP2 Project site is located within the Victoria Harbour WCZ and the corresponding WQOs are listed in **Table 4.14**.

Table 4.14 Summary of Water Quality Objectives for the Victoria Harbour WCZ

Parameters	Objectives	Sub-Zone
Offensive odour, tints	Not to be present	Whole zone
Visible foam, oil scum, litter	Not to be present	Whole zone
Dissolved oxygen (DO) within 2m of the seabed	Not less than 2.0mg/l for 90% of samples	Marine waters
Depth-averaged DO	Not less than 4.0mg/l for 90% of samples	Marine waters
pH	To be in the range of 6.5 - 8.5, change due to human activity not to exceed 0.2	Marine waters
Salinity	Change due to human activity not to exceed 10% of ambient	Whole zone
Temperature	Change due to human activity not to exceed 2 °C	Whole zone
Suspended solids (SS)	Not to raise the ambient level by 30% caused by human activity	Marine waters
Unionised ammonia (UIA)	Annual mean not to exceed 0.021mg/l as unionised form	Whole zone
Nutrients	Shall not cause excessive algal growth	Marine waters
Total inorganic nitrogen (TIN)	Annual mean depth-averaged inorganic nitrogen not to exceed 0.4mg/l	Marine waters
Toxic substances	Should not attain such levels as to produce significant toxic, carcinogenic, mutagenic or teratogenic effects in humans, fish or any other aquatic organisms.	Whole zone
	Human activity should not cause a risk to any beneficial use of the aquatic environment.	Whole zone

Source: Statement of Water Quality Objectives (Victoria Harbour (Phases One, Two and Three) Water Control Zone).

Water Supplies Department (WSD) Water Quality Criteria

- 4.4.6 Besides the WQOs stipulated under the WPCO, the WSD has specified a set of objectives for water quality at flushing water intakes. The list is shown in **Table 4.15**. The target limit for suspended solids (SS) at these intakes is 10mg/l or less.

Table 4.15 WSD's Water Quality Criteria for Flushing Water at Sea Water Intakes

Parameter (in mg/l unless otherwise stated)	Target Limit
Colour (HU)	< 20
Turbidity (NTU)	< 10
Threshold Odour Number (odour unit)	< 100
Ammoniacal Nitrogen	< 1
Suspended Solids	< 10
Dissolved Oxygen	> 2
Biochemical Oxygen Demand	< 10
Synthetic Detergents	< 5
<i>E. coli</i> (no. per 100ml)	< 20,000

Cooling Water Intake Standards

- 4.4.7 Based on a questionnaire survey conducted under the approved Comprehensive Feasibility Study for Wan Chai Development Phase II (CFSWDII) EIA ⁽¹⁾, a SS limit of 40mg/l was adopted as the assessment criterion for Admiralty Centre intake and MTRC South intake. No information on the SS limit is available for other cooling water intakes. These findings have been confirmed by a telephone survey conducted under the recent approved EIA for the Hong Kong Convention and Exhibition Centre (HKCEC) Atrium Link Extension (ALE) and further verified by a questionnaire survey conducted under another recent approved EIA for the Dredging Works for Proposed Cruise Terminal at Kai Tak. The locations of the cooling water intakes are shown in **Figure 8.2**.

Technical Memorandum

- 4.4.8 Discharges of effluents are subject to control under the WPCO. The Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS) gives guidance on the permissible effluent discharges based on the type of receiving waters (foul sewers, storm water drains, inland and coastal waters). The limits control the physical, chemical and microbial quality of effluents. Any effluent from the DP2 Project must comply with the standards for effluents discharged into the foul sewers, inshore waters or marine waters of Victoria Harbour WCZ, as given in the TM-DSS.

Practice Note

- 4.4.9 A Practice Note for Professional Persons (ProPECC) was issued by the EPD to provide guidelines for handling and disposal of construction site discharges. The ProPECC PN 1/94 "Construction Site Drainage" provides good practice guidelines for dealing with ten types of discharge from a construction site. These include surface runoff, groundwater, boring and drilling water, bentonite slurry, water for testing and sterilisation of water retaining structures and water pipes, wastewater from building constructions, acid cleaning, etching and pickling wastewater, and wastewater from site facilities. Practices given in the ProPECC PN 1/94 should be followed as far as possible during construction to minimise the water quality impact due to construction activities.

Description of the Environment

- 4.4.10 The marine water quality monitoring data routinely collected by EPD in the Victoria Harbour were used to establish the baseline condition. A summary of water quality data for selected EPD monitoring stations is presented in **Table 4.16** for the Victoria Harbour WCZ (VM1 VM2, VM4-VM8, VM12 and VM15). Locations of the monitoring stations are shown in **Figure 8.2**. As the HATS Stage I was commissioned in late 2001, the data shown in **Table 4.16** represent the situation after the commissioning of HATS Stage I. Descriptions of the baseline conditions for individual WCZ provided in the subsequent sections are extracted from the EPD's report "Marine Water Quality in Hong Kong 2006" (which is the latest version available at the time of preparing this Report).
- 4.4.11 In 2006, the marked improvements in the eastern Victoria Harbour (VM1 and VM2) and moderate improvements in the mid harbour area (VM4 and VM5) since HATS Stage 1 was commissioned were generally sustained. Several monitoring stations in the WCZ are located close to sewage outfalls, including VM5 (Wan Chai East and Wan Chai West PTW outfall), VM6 (Central PTW outfall), VM4 (North Point PTW outfall) and VM8 (Stonecutters Island STW – HATS Stage I outfall). The water quality at these stations was inevitably subject to the direct impact of sewage discharge from these outfalls.

⁽¹⁾ Territory Development Department (July 2001). Agreement No. CE 74/98, Wan Chai Development Phase II, Comprehensive Feasibility Study, Environmental Impact Assessment Report, Volume I – Text.

- 4.4.12 Compliance with the WQO for TIN was 80% in 2006. The TIN level exceeded the WQO at two stations (VM7 and VM14) in the Harbour west and Rambler Channel respectively. Full compliance with WQOs for UIA and bottom DO was achieved in 2006 at all stations. The compliance with the WQO for depth-averaged DO was 90%. The depth-averaged DO level exceeded the WQO at VM12 in Rambler Channel.

Table 4.16 Summary Statistics of 2006 Marine Water Quality in the Victoria Harbour

Parameter		Victoria Harbour East		Victoria Harbour Central		Victoria Harbour West		Stonecutters Island		Rambler Channel		WPCO WQO (in marine waters)
		VM1	VM2	VM4	VM5	VM6	VM7	VM8	VM15	VM12	VM14	
Temperature (°C)		23.2 (17.4 – 26.7)	23.5 (17.4 – 27.5)	23.6 (17.4 – 27.6)	23.7 (17.4 – 27.5)	23.6 (17.5 – 27.4)	23.8 (16.9 – 27.9)	23.8 (16.9 – 27.9)	23.7 (17.6 – 27.7)	23.8 (17.2 – 27.1)	24.2 (17.4 – 27.8)	Not more than 2 °C in daily temperature range
Salinity		32.2 (29.5 – 33.4)	31.7 (27.8 – 33.0)	31.6 (27.4 – 33.0)	31.4 (27.3 – 32.8)	31.5 (27.3 – 32.8)	30.8 (24.1 – 33.0)	20.7 (23.3 – 33.0)	31.1 (26.2 – 32.8)	30.8 (25.4 – 32.9)	28.7 (16.8 – 33.0)	Not to cause more than 10% change
Dissolved Oxygen (DO) (% Saturation)	Depth average	82 (46 – 101)	81 (49 – 97)	80 (61 – 94)	77 (65 – 91)	78 (60 – 89)	80 (60 – 107)	85 (61 – 105)	80 (67 – 93)	77 (46 – 98)	84 (61 – 108)	Not available
	Bottom	80 (24 – 111)	81 (36 – 103)	79 (47 – 98)	76 (56 – 94)	75 (40 – 93)	77 (48 – 98)	82 (49 – 109)	78 (55 – 91)	75 (38 – 97)	83 (57 – 104)	Not available
Dissolved Oxygen (DO) (mg/l)	Depth average	5.9 (3.2 – 7.5)	5.8 (3.4 – 7.1)	5.7 (4.1 – 7.3)	5.5 (4.3 – 7.1)	5.5 (4.0 – 6.9)	5.7 (4.0 – 7.3)	6.0 (4.1 – 7.7)	5.7 (4.5 – 6.9)	5.5 (3.1 – 7.4)	6.0 (4.3 – 7.6)	Not less than 4 mg/l for 90% of the samples
	Bottom	5.7 (1.7 – 8.0)	5.8 (2.5 – 7.4)	5.6 (3.2 – 7.2)	5.4 (3.8 – 7.3)	5.4 (2.7 – 7.2)	5.5 (3.3 – 7.0)	5.8 (3.3 – 7.8)	5.5 (3.8 – 7.0)	5.3 (2.6 – 7.4)	5.9 (3.9 – 7.2)	Not less than 2 mg/l for 90% of the samples
pH		7.9 (7.7 – 8.2)	7.9 (7.7 – 8.1)	7.9 (7.7 – 8.1)	7.9 (7.7 – 8.1)	7.9 (7.7 – 8.1)	8.0 (7.7 – 8.3)	8.0 (7.8 – 8.3)	7.9 (7.7 – 8.0)	8.0 (7.8 – 8.3)	8.0 (7.8 – 8.4)	6.5 - 8.5 (± 0.2 from natural range)
Secchi disc Depth (m)		2.1 (1.2 – 3.0)	2.0 (1.4 – 3.1)	2.0 (1.4 – 3.0)	1.8 (1.4 – 2.7)	2.1 (1.5 – 2.7)	2.0 (1.2 – 2.5)	1.9 (1.0 – 2.5)	2.0 (1.3 – 2.5)	1.5 (0.5 – 2.1)	1.5 (1.0 – 2.0)	Not available
Turbidity (NTU)		12.6 (6.9 – 17.6)	11.2 (5.4 – 23.4)	12.1 (5.6 – 23.4)	11.6 (6.5 – 18.5)	11.1 (5.2 – 14.2)	11.5 (5.8 – 20.5)	11.9 (5.3 – 19.0)	12.4 (6.4 – 22.9)	15.6 (10.0 – 28.0)	12.6 (7.0 – 22.2)	Not available
Suspended Solids (SS) (mg/l)		5.5 (2.1 – 18.0)	4.2 (1.2 – 12.8)	4.9 (1.1 – 12.3)	4.6 (1.7 – 8.9)	4.5 (2.0 – 8.9)	5.5 (1.8 – 11.6)	5.9 (2.1 – 11.0)	6.1 (1.8 – 13.9)	11.0 (3.1 – 19.0)	5.9 (2.9 – 12.7)	Not more than 30% increase
5-day Biochemical Oxygen Demand (BOD ₅) (mg/l)		0.6 (0.1 – 1.5)	0.6 (0.1 – 1.2)	0.7 (0.1 – 1.4)	1.0 (0.2 – 1.9)	0.8 (0.1 – 1.8)	0.8 (0.1 – 1.2)	0.7 (0.2 – 1.1)	0.7 (0.1 – 1.7)	0.7 (0.2 – 1.6)	0.7 (0.2 – 1.2)	Not available
Nitrite Nitrogen (NO ₂ -N) (mgN/l)		0.019 (0.004 – 0.067)	0.024 (0.004 – 0.084)	0.024 (0.006 – 0.079)	0.027 (0.009 – 0.093)	0.027 (0.009 – 0.095)	0.033 (0.014 – 0.053)	0.035 (0.009 – 0.060)	0.033 (0.010 – 0.120)	0.036 (0.011 – 0.053)	0.053 (0.010 – 0.100)	Not available
Nitrate Nitrogen (NO ₃ -N) (mgN/l)		0.08 (0.03 – 0.20)	0.10 (0.03 – 0.25)	0.11 (0.03 – 0.25)	0.12 (0.04 – 0.27)	0.13 (0.04 – 0.28)	0.16 (0.06 – 0.38)	0.16 (0.04 – 0.40)	0.15 (0.06 – 0.36)	0.17 (0.08 – 0.37)	0.27 (0.06 – 0.64)	Not available
Ammonia Nitrogen (NH ₃ -N) (mgN/l)		0.07 (0.04 – 0.13)	0.11 (0.04 – 0.20)	0.13 (0.05 – 0.23)	0.16 (0.09 – 0.30)	0.16 (0.11 – 0.25)	0.21 (0.07 – 0.52)	0.17 (0.13 – 0.26)	0.18 (0.12 – 0.29)	0.18 (0.05 – 0.28)	0.16 (0.04 – 0.23)	Not available

Parameter	Victoria Harbour East		Victoria Harbour Central		Victoria Harbour West		Stonecutters Island		Rambler Channel		WPCO WQO (in marine waters)
	VM1	VM2	VM4	VM5	VM6	VM7	VM8	VM15	VM12	VM14	
Unionised Ammonia (UIA) (mgN/l)	0.002 (0.001 – 0.004)	0.004 (0.001 – 0.007)	0.004 (0.002 – 0.007)	0.005 (0.003 – 0.008)	0.005 (0.003 – 0.007)	0.008 (0.003 – 0.018)	0.007 (0.004 – 0.016)	0.006 (0.003 – 0.009)	0.006 (0.003 – 0.011)	0.007 (0.003 – 0.014)	Not more than 0.021 mg/l for annual mean
Total Inorganic Nitrogen (TIN) (mgN/l)	0.18 (0.07 – 0.29)	0.23 (0.07 – 0.40)	0.26 (0.08 – 0.44)	0.31 (0.14 – 0.50)	0.32 (0.16 – 0.51)	0.40 (0.24 – 0.67)	0.37 (0.20 – 0.64)	0.36 (0.18 – 0.67)	0.39 (0.26 – 0.49)	0.48 (0.21 – 0.88)	Not more than 0.4 mg/l for annual mean
Total Nitrogen (TN) (mgN/l)	0.34 (0.22 – 0.49)	0.42 (0.20 – 0.64)	0.47 (0.22 – 0.69)	0.55 (0.30 – 0.83)	0.53 (0.34 – 0.73)	0.58 (0.45 – 0.75)	0.53 (0.38 – 0.86)	0.58 (0.35 – 0.86)	0.57 (0.39 – 0.75)	0.64 (0.31 – 1.06)	Not available
Orthophosphate Phosphorus (PO ₄) (mgP/l)	0.02 (0.01 – 0.03)	0.03 (0.01 – 0.04)	0.03 (0.01 – 0.04)	0.03 (0.02 – 0.04)	0.03 (0.02 – 0.05)	0.03 (0.01 – 0.05)	0.03 (0.02 – 0.04)	0.03 (0.01 – 0.04)	0.03 (0.01 – 0.04)	0.03 (0.01 – 0.04)	Not available
Total Phosphorus (TP) (mgP/l)	0.04 (0.03 – 0.07)	0.05 (0.03 – 0.06)	0.05 (0.03 – 0.07)	0.06 (0.03 – 0.08)	0.06 (0.03 – 0.08)	0.05 (0.03 – 0.08)	0.04 (0.03 – 0.06)	0.06 (0.04 – 0.07)	0.05 (0.03 – 0.08)	0.04 (0.03 – 0.06)	Not available
Chlorophyll- <i>a</i> (µg/L)	2.6 (0.8 – 6.8)	3.0 (1.0 – 8.9)	2.9 (1.0 – 9.2)	2.8 (0.9 – 8.6)	2.9 (0.9 – 10.1)	2.6 (0.6 – 9.0)	2.7 (1.0 – 11.3)	3.5 (1.1 – 16.6)	2.1 (0.8 – 6.9)	3.4 (0.9 – 19.5)	Not available
<i>E. coli</i> (cfu/100 ml)	440 (44 – 3400)	1100 (58 – 14000)	2600 (510 – 12000)	7700 (1900 – 22000)	5500 (650 – 33000)	9400 (2600 – 57000)	6100 (350 – 11000)	1800 (590 – 11000)	3400 (1500 – 6600)	1300 (320 – 5100)	Not available
Faecal Coliforms (cfu/100 ml)	940 (74 – 8600)	2600 (130 – 25000)	6500 (1800 – 40000)	19000 (3500 – 65000)	13000 (2500 – 100000)	23000 (5400 – 180000)	15000 (930 – 55000)	4800 (1300 – 23000)	8100 (4200 – 14000)	2800 (460 – 13000)	Not available

- Notes: 1. Except as specified, data presented are depth-averaged values calculated by taking the means of three depths: Surface, mid-depth, bottom.
2. Data presented are annual arithmetic means of depth-averaged results except for *E. coli* and faecal coliforms that are annual geometric means.
3. Data in brackets indicate the ranges.

Identification of Environmental Impacts

Operational Phase

- 4.4.13 The potential water quality concerns associated with the operation of the sewage pumping station (SPS) will include the following:
- Occasional overflow of sewage effluent during storm event under normal operation
 - Emergency sewage effluent discharge as the consequences of pump failure or interruption of the electrical power supply
- 4.4.14 During the sewage effluent overflow or emergency discharge, it is likely that there would be a transient elevation of the water pollution level in the receiving water body. The degree of impact would depend on the quantity and level of pollutants in the sewage discharge, the assimilation capacity of pollutants in the receiving water as well as the nature and location of the WSR. **Table 4.17** summarises the preliminary design information for the proposed SPSs.

Table 4.17 Design Information for Sewage Pumping Station

SPS ID (refer to Figure 1.3)	Preliminary Design Peak Flow (m ³ /sec)	Preliminary Design Average Flow (m ³ /day)	Sewage Overflow or Emergency Discharge Route (refer to Figure 8.4)
PS1	1.88	68,256	Discharge at storm outfall N via KTN
PS1A	0.41	11,753	
PS2	0.40	11,627	
PS3	2.02	72,576	Discharge at the inner corner of Kowloon Bay via storm outfall 5
Site 5A1	0.49	14,130	

- 4.4.15 Provision of standby pump facilities and dual power supply would minimize the occurrence of such effluent discharge. With the implementation of suitable design measure, there should not be any insurmountable water quality impacts associated with the SPS operation.

Construction Phase

Stormwater Discharges

- 4.4.16 Stormwater and drainage discharges from the construction sites may contain considerable loads of SS and contaminants during construction activities. Potential water quality impact includes run-off and erosion of exposed bare soil and earth, drainage channels, earth working area and stockpiles. Minimum distances of 100 m shall be maintained between the existing or planned stormwater discharges and the existing or planned seawater intakes during construction and operational phases.
- 4.4.17 Local and coastal water pollution impact may be substantial if the construction site run-off is allowed to discharge into the storm drains or natural drainage without mitigation.

Construction Runoff and Drainage

- 4.4.18 Surface runoff generated from the construction site may contain increased loads of SS and contaminants. Potential water quality from site run-off may come from:
- contaminated ground water from any dewatering activities as a result of excavation;
 - release of any bentonite slurries and other grouting materials with construction run-off, storm water or ground water dewatering process;
 - wash water from dust suppression sprays and wheel washing facilities;
 - fuel, oil and lubricants from maintenance of construction vehicles and equipment.

General Construction Activities

- 4.4.19 The general construction works that will be undertaken for the proposed SPSs will be primarily land-based and may have the potential to cause water pollution. These could result from the accumulation of solid waste such as packaging and construction materials, and liquid waste such as sewage effluent from the construction work force, discharge of bilge water and spillage of oil, diesel or solvents by vessels and vehicles involved with the construction. If uncontrolled, any of these could lead to deterioration in water quality. Increased nutrient levels result from contaminated discharges and sewage effluent could also lead to a number of secondary water quality impacts including decreases in DO concentrations and localised increase in $\text{NH}_3\text{-N}$ concentrations which could stimulate algal growth and reduction in oxygen levels.
- 4.4.20 Sewage will arise from sanitary facilities provided for the on-site construction work force. It is characterised by high level of BOD, $\text{NH}_3\text{-N}$ and *E.coli* counts. For some of the works areas, there will be no public sewers available for domestic sewage discharge on-site.

Assessment Methodology

Operational Phase

- 4.4.21 Practical mitigation measures are proposed to be included in the design of these SPSs to mitigate the associated water quality impacts.

Construction Phase

- 4.4.22 Assessment of the potential impact of land-based construction activities on water quality has been undertaken in a qualitative manner. Proposed construction activities were reviewed to assess the land-based water quality impact upon the nearby water bodies. Practical water pollution control measures / mitigation proposals have been subsequently recommended to prevent local flooding and to ensure that effluent discharged from the construction site will comply with the WPCO criteria. Consideration has been given to control potentially harmful impacts from site works and to the use of 'best' practice measures to minimise the potential for discharges of pollutants to the nearby waters of the Victoria Harbour.

Prediction and Evaluation of Potential Environmental Impacts

Operational Phase

- 4.4.23 With the provision of standby pump or dual power supply, the chance of emergency discharge due to equipment malfunction or power failure would be extremely remote. With the implementation of suitable design measure as recommended in **Section 4.4.25** below, there should not be any insurmountable water quality impacts associated with the SPS operation.

Construction Phase

- 4.4.24 Water quality impacts from land-based construction are associated with the surface runoff, effluent discharge from the site, and sewage from on-site construction workers. Impacts can be controlled to comply with the WPCO standards by implementing the recommended mitigation measures. No unacceptable residual impacts on water quality are anticipated.

Mitigation of Environmental Impacts

Operational Phase

- 4.4.25 The following mitigation measures are proposed to be incorporated in the design of the SPS, including:
- Dual power supply or emergency generator should be provided at all the SPSs to secure electrical power supply;
 - Standby pumps should be provided at all SPSs to ensure smooth operation of the SPS during maintenance of the duty pumps;
 - An alarm should be installed to signal emergency high water level in the wet well at all SPSs; and
 - For all unmanned SPSs, a remote monitor system connecting SPSs with the control station through telemetry system should be provided so that swift actions could be taken in case of malfunction of unmanned facilities.
- 4.4.26 With the above mitigation measures, the possibility of sewage overflow due to the event of pump failure or power failure would be minimized. The occurrence of emergency overflow of SPSs was envisaged to be minimal.

Construction Phase

Construction site runoff and drainage

- 4.4.27 Construction site runoff and drainage should be prevented or minimised in accordance with the guidelines stipulated in the EPD's Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 1/94). Good housekeeping and stormwater best management practices, as detailed in below, should be implemented to ensure that all construction runoff complies with WPCO standards and that no unacceptable impact on the WSRs arises due to construction of the DP2 Project. All discharges from the construction site should be controlled to comply with the standards for effluents discharged into the Victoria Harbour WCZ under the TM-DSS.

Sewage Effluent

- 4.4.28 Construction work force sewage discharges on site are expected to be connected to the existing trunk sewer or sewage treatment facilities. The construction sewage may need to be handled by portable chemical toilets prior to the commission of the on-site sewer system. Appropriate numbers of portable toilets shall be provided by a licensed contractor to serve the large number of construction workers over the construction site. The Contractor shall also be responsible for waste disposal and maintenance practices.

Refuse and Debris

- 4.4.29 It is recommended that collection and removal of floating refuse should be performed at regular intervals on a daily basis. The contractor should be responsible for keeping the water within the site boundary and the neighbouring water free from rubbish during construction.

Stormwater Discharges

- 4.4.30 Minimum distances of 100 m shall be maintained between the existing or planned stormwater discharges and the existing or planned seawater intakes.

Summary

Operational Phase

- 4.4.31 Provision of standby pump facilities and dual power supply would minimize the occurrence of emergency discharge event. With the implementation of suitable design measure, there would not be any insurmountable water quality impacts associated with the SPS operation.

Construction Phase

- 4.4.32 Water quality impacts from land-based construction, including road works, waterfront facilities and public utilities, are associated with the surface runoff, effluent discharge from the site, and sewage from on-site construction workers. Impacts can be controlled to comply with the WPCO standards by implementing the recommended mitigation measures. No unacceptable residual impacts on water quality are anticipated.

4.5 Waste Management Implications

Environmental Legislation, Policies, Plans, Standards and Criteria

- 4.5.1 The criteria and guidelines for assessing waste management implications are set out in Annex 7 and Annex 15 of the Technical Memorandum on Environmental Impact Assessment Ordinance (EIAO-TM), respectively.
- 4.5.2 The following legislation relates to the handling, treatment and disposal of wastes in the Hong Kong SAR and has been used in assessing potential impacts:
- Waste Disposal Ordinance (Cap. 354)
 - Waste Disposal (Chemical Waste) (General) Regulation (Cap. 354)
 - Land (Miscellaneous Provisions) Ordinance (Cap. 28)
 - Public Health and Municipal Services Ordinance (Cap. 132) - Public Cleansing and Prevention of Nuisances Regulation
 - Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)

Waste Management

- 4.5.3 The Waste Disposal Ordinance (WDO) prohibits the unauthorised disposal of wastes. Construction waste is defined as any substance, matter or thing that is generated from construction work and abandoned, whether or not it has been processed or stockpiled before being abandoned, but does not include any sludge, screenings or matter removed in or generated from any desludging, desilting or dredging works. Under the WDO, wastes can be disposed of only at designated waste disposal facilities.
- 4.5.4 Under the WDO, the Chemical Waste (General) Regulation 1992 provides regulations for chemical waste control, and administers the possession, storage, collection, transport and disposal of chemical wastes. The Environmental Protection Department (EPD) has also issued a guideline document, the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes* (1992), which details how the Contractor should comply with the regulations on chemical wastes.
- 4.5.5 The Public Cleansing and Prevention of Nuisances Regulation provides control on illegal tipping of wastes on unauthorised (unlicensed) sites.

Chemical Waste

- 4.5.6 Under the Waste Disposal (Chemical Waste) (General) Regulations, all producers of chemical waste must register with EPD and treat their wastes, either utilising on-site plant licensed by EPD, or arranging for a licensed collector to transport the wastes to a licensed facility. The regulation also prescribes the storage facilities to be provided on site, including labelling and warning signs, and requires the preparation of written procedures and training to deal with emergencies such as spillages, leakages or accidents arising from the storage of chemical wastes.

Construction and Demolition (C&D) Materials

- 4.5.7 The current policy related to the disposal of C&D material is documented in the Works Branch Technical Circular No. 2/93, 'Public Dumps'. Construction and demolition materials that are wholly inert, namely public fill, should not be disposed of to landfill, but taken to public filling areas, which usually form part of reclamation schemes. The Land (Miscellaneous Provisions) Ordinance requires that dumping licences be obtained by individuals or companies who deliver public fill to public filling areas. The Civil Engineering and Development Department (CEDD) issues the licences under delegated powers from the Director of Lands.
- 4.5.8 Under the Waste Disposal (Charges for Disposal of Construction Waste) Regulation, enacted in January 2006, construction waste delivered to a landfill for disposal must not contain more than 50% by weight of inert material. Construction waste delivered to a sorting facility for disposal must contain more than 50% by weight of inert material, and construction waste delivered to a public fill reception facility for disposal must consist entirely of inert material. In accordance with the Environment, Transport and Works Bureau (ETWB) TCW No. 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Materials", for all contracts that are expected to generate inert C&D materials (e.g. soil, broken rock, broken concrete and building debris etc.) requiring disposal from the site, the project office shall write to the Public Fill Committee (PFC) through the Secretary of the PFC to request a designated disposal ground for incorporation into the tender documents. For contracts where the estimated amount of non-inert C&D materials requiring disposal at landfill facilities equal or exceed 50m³, the project office shall seek confirmation from the Director of Environmental Protection (DEP) as to whether landfill facilities will be available for disposal of such materials. The DEP will designate landfill facilities, if available, for the contract. Where the estimated amount of non-inert C&D materials to be generated from the contract is less than 50m³, the project office is not required to apply to DEP for designated landfill facilities. However, the project office should still specify in the tender documents appropriate landfill facilities (e.g. Outlying Islands Transfer Facilities managed by the EPD, SENT Landfill at Tseung Kwan O, NENT Landfill at Ta Kwu Ling and WENT Landfill at Nim Wan).

- 4.5.9 Measures have been introduced under ETWB TCW No. 33/2002, “Management of Construction and Demolition Material Including Rock” to enhance the management of construction and demolition material, and to minimize its generation at source. The enhancement measures include: (i) drawing up a Construction and Demolition Material Management Plan (C&DMMP) at the feasibility study or preliminary design stage to minimize C&D material generation and encourage proper management of such material; (ii) vetting of the C&DMMP prior to upgrading of the project to Category A in the Public Works Programme; and (iii) providing the contractor with information from the C&DMMP in order to facilitate him in the preparation of the Waste Management Plan (WMP) and to minimize C&D material generation during construction. Projects generating C&D material less than 50,000m³ or importing fill material less than 50,000m³ are exempt from the C&DMMP. The new ETWB TCW No. 19/2005 “Environmental Management on Construction Sites” includes procedures on waste management requiring contractors to reduce the C&D material to be disposed of during the course of construction. Under ETWB TCW No. 19/2005, the contractor is required to prepare and implement an Environmental Management Plan (EMP) and the WMP becomes part of the EMP. Besides, ETWB TCW No.31/2004 “Trip Ticket System for Disposal of Construction and Demolition Materials” promulgates the latest trip ticket system for public works contracts including capital works contracts, term contracts and design and build contracts, where C&D materials including waste generated on site require disposal.

Assessment Methodology

General

- 4.5.10 The criteria for assessing waste management implications are outlined in Annex 7 of the EIAO-TM. The methods for assessing potential waste management impacts during the construction phase of the DP2 Project follow those presented in Annex 15 of the EIAO-TM and include the following:
- Estimation of the types and quantities of the wastes generated.
 - Assessment of potential impacts from the management of solid waste with respect to potential hazards, air and odour emissions, noise, wastewater discharge and transport.
 - Assessment of impacts on the capacity of waste collection, transfer and disposal facilities.

Identification of Environmental Impacts

4.5.11 The construction phase activities to be carried out for the DP2 Project would generate a variety of wastes that can be divided into distinct categories based on their composition and ultimate method of disposal. The identified waste types include:

- C&D material
- Chemical waste
- General refuse

4.5.12 Each type of waste arising is described below, together with an evaluation of the potential environmental impacts associated with the generation, handling, storage and transport of the waste.

Construction and Demolition Materials

4.5.13 Construction and demolition (C&D) materials arise from construction activities such as site clearance, excavation works and site formation. Based on the latest information, the quantity of C&D material generated from the five proposed SPSs namely PS1, PS2, PS3, PS1A and SPS located in the Site 5A1 are about 45,000 m³ in total (about 9,000 m³ C&D materials for each of the SPSs).

Chemical Waste

4.5.14 The maintenance and servicing of construction plant and equipment may generate some chemical wastes such as cleaning fluids, solvents, lubrication oil and fuel. It is difficult to quantify the amount of chemical waste that will arise from the construction activities since it will be dependent on the contractor's maintenance requirements and the amount of plant utilised. However, it is anticipated that the quantity of chemical waste, such as lubricating oil and solvent produced from plant maintenance, would be small and in the order of a few cubic metres per month. The amount of chemical waste to be generated will be quantified in the site Waste Management Plan to be prepared by the contractor.

4.5.15 Chemical wastes arising during the construction phase may pose environmental, health and safety hazards if not stored and disposed of in an appropriate manner as stipulated in the Waste Disposal (Chemical Waste) (General) Regulations. The potential hazards include:

- Toxic effects to workers
- Adverse impacts on water quality from spills
- Fire hazards

4.5.16 Materials classified as chemical wastes will require special handling and storage arrangements before removal for appropriate treatment at the Chemical Waste Treatment Facility (CWTF) or other licensed facility. Wherever possible, opportunities should be taken to reuse and recycle materials. Mitigation and control requirements for chemical wastes are detailed below. Provided that the handling, storage and disposal of chemical wastes are in accordance with these requirements, adverse environmental impacts would not be expected to result.

General Refuse

- 4.5.17 The construction workforce would generate general refuse comprising food scraps, waste paper, empty containers, etc. As the introduction of these wastes is likely to have detrimental effects on water quality in the area, such refuse should be properly managed so intentional or accidental release to the surrounding environment does not occur. Disposal of refuse at sites other than approved waste transfer or disposal facilities shall be prohibited. Effective collection of site wastes would be required to prevent waste materials being blown around by wind, flushed or leached into the marine environment, or creating an odour nuisance. The waste storage area should be well maintained and cleaned regularly so as to prevent from attracting pests and vermin to the work sites.
- 4.5.18 With the implementation of waste management practices at the site, adverse environmental impacts on potential hazard, air and odour emissions, noise, wastewater discharge, and public transport would not be expected from the storage, handling and transportation of refuse.
- 4.5.19 Wastes that would be generated during operational phase of the SPSs are the screenings of sewage at the inlet works of pumping station. During the operation / maintenance of the SPS, grease oil would be required to be used periodically, probably once a year and hence only minimum amount of waste grease would be generated. The screenings will be collected by licensed waste collector. The collected waste will be delivered to the landfill sites in Hong Kong by refuse collection vehicles for final disposal. No adverse impact associated with the wastes generated during the operational phase of the SPSs is anticipated.

Mitigation of Environmental Impacts

Good Site Practices

- 4.5.20 It is not anticipated that adverse waste management related impacts would arise, provided that good site practices are adhered to. Recommendations for good site practices during the construction activities include:
- Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site.
 - Training of site personnel in proper waste management and chemical waste handling procedures.
 - Provision of sufficient waste disposal points and regular collection for disposal.
 - Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers.
 - A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites).

Waste Reduction Measures

- 4.5.21 Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:
- Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal.
 - Encourage collection of aluminium cans, PET bottles and paper by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the work force.
 - Any unused chemicals or those with remaining functional capacity should be recycled.
 - Proper storage and site practices to minimise the potential for damage or contamination of construction materials.

Construction and Demolition Materials

- 4.5.22 Mitigation measures and good site practices should be incorporated in the contract document to control potential environmental impact from handling and transportation of C&D material. The mitigation measures include:
- Where it is unavoidable to have transient stockpiles of C&D material within the Project work site pending collection for disposal, the transient stockpiles shall be located away from waterfront or storm drains as far as possible.
 - Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric.
 - Skip hoist for material transport should be totally enclosed by impervious sheeting.
 - Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving a construction site.
 - The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores.
 - The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle.
 - All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet.
 - The height from which excavated materials are dropped should be controlled to a minimum practical height to limit fugitive dust generation from unloading.
- 4.5.23 When delivering inert C&D material to public fill reception facilities, the material shall consist entirely of inert construction waste and of size less than 250mm or other sizes as agreed with the Secretary of the Public Fill Committee. In order to monitor the disposal of the surplus C&D material at the designed public fill reception facility and to control fly tipping, a trip-ticket system as stipulated in the ETWB TCW No. 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Materials" should be included as one of the contractual requirements and implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. An Independent Environmental Checker should be responsible for auditing the results of the system.

Chemical Waste

- 4.5.24 After use, chemical wastes (for example, cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Spent chemicals should be collected by a licensed collector for disposal at the CWTF or other licensed facility, in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation*.

General Refuse

- 4.5.25 General refuse should be stored in enclosed bins or compaction units separate from C&D material. A licensed waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. Effective collection and storage methods (including enclosed and covered area) of site wastes would be required to prevent waste materials from being blown around by wind, wastewater discharge by flushing or leaching into the marine environment, or creating odour nuisance or pest and vermin problem.

Evaluation of Residual Environmental Impacts

- 4.5.26 With the implementation of the recommended mitigation measures for the handling, transportation and disposal of the identified waste arisings, no residual impact is expected to arise during the construction of the DP2 Project.

Environmental Monitoring and Audit

- 4.5.27 Waste management will be the contractor's responsibility to ensure that all wastes produced during the construction activities are handled and disposed of in accordance with the recommended mitigation measures and EPD's regulations and requirements. The mitigation measures recommended above should form the basis of the site Waste Management Plan to be developed by the contractor during the construction stage.

Summary

- 4.5.28 Wastes generated by the DP2 Project are likely to include construction and demolition (C&D) material generated from the construction of SPSS within the project boundary, general refuse from the workforce and chemical waste from the maintenance of construction plant and equipment. Provided that these identified waste arisings are handled, transported and disposed of using approved methods and that the recommended good site practices are strictly followed, adverse environmental impacts would not be expected during the construction phase of the DP2 Project.
- 4.5.29 Wastes from screening would be generated during the operational phase. With the implementation of proper waste management procedures, the waste management implications of the DP2 Project would be insignificant.

4.6 Land Contamination Impact

Environmental Legislation, Policies, Plans, Standards and Criteria

- 4.6.1 The "Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair /Dismantling Workshop" (the Guidance Note) issued by the Environmental Protection Department (EPD) shall be referred to for land contamination assessment.
- 4.6.2 The Practice Note for Professional Persons ProPECC PN3/94 "Contaminated Land Assessment and Remediation" issued by the EPD was widely used as the assessment guideline for contaminated sites. The Practice Note makes reference to criteria developed in the Netherlands (the "Dutch ABC Guidelines").

- 4.6.3 Starting from 15 August 2007, a new guideline, Risk-based Remediation Goals (RBRGs) stipulated in the “*Guidance Note for Contaminated Land Assessment and Remediation*” (the GN) and “*Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management*”, dated July 2007 (the GM) were promulgated for use. A transition period of 3 months (from 15 August to 14 November 2007) was granted, during which project proponents were free to choose either the Dutch B levels stipulated in the ProPECC PN3/94 or the RBRGs stipulated in the GN and GM are used as the assessment guidelines for their contaminated sites.
- 4.6.4 As all the Contamination Assessment Plans (CAPs) prepared under this EIA study were submitted and approved by the EPD before 15 August 2007, land contamination assessment conducted under this EIA study employed the Dutch Guidelines stipulated in the ProPECC PN 3/94. The Dutch “B” levels under the Dutch Guidelines have been used for assessing soil contamination. Since the Dutch criteria were established based on the assumption that groundwater is used as potable water, it is not so appropriate to be applied directly in Hong Kong where groundwater is not generally for potable use. Hence, the Dutch B levels would be only for screening out the chemicals-of-concern (COCs) for risk assessment and are not for assessing groundwater contamination in Hong Kong.
- 4.6.5 A risk-based assessment would therefore be carried out for groundwater contaminants with the concentration exceeding the Dutch B level to evaluate the risks posed to the sensitive receptors. The risk-based assessment that has been adopted in U.S. Environmental Protection Agency (USEPA) takes into account concentrations of individual contaminants in groundwater, the anticipated most sensitive human receptor and the potential exposure pathways. It should be noted that risk assessment could only be undertaken for those chemicals that have a recognized oral slope factor or oral reference dose.
- 4.6.6 Further consideration of contamination issues is provided in Section 3 (Potential Contaminated Land Issues) of Annex 19 “Guidelines for Assessment of Impact on Sites of Cultural Heritage and Other Impacts” of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM).

Description of the Environment

- 4.6.7 The scope of the DP2 Project involves construction of SPSs to accommodate the future need on the sewerage system in the KTD area. The locations of the SPSs covered under the DP2 Project are indicated in **Figure 1.3** and are summarized in **Table 4.18**.

Table 4.18 Summary of Locations of the Sewage Pumping Stations

Sewage Pumping Station	Location
PS1	Inside North Apron of the former Kai Tak Airport
PS2	Inside North Apron of the former Kai Tak Airport
PS3	Inside North Apron of the former Kai Tak Airport
PS1A	Inside North Apron of the former Kai Tak Airport
PS NPS	Inside EMSD Sung Wong Toi Vehicle Repair & Maintenance Workshop (outside the boundary of the former Kai Tak Airport)

Assessment Methodology

- 4.6.8 In this Study, land contamination assessment in the previous EIA studies for the Kai Tak Airport North Apron Decommissioning (NAKTA Decommissioning EIA) (EIAO Register No: AEIAR – 002/1998 and the Environmental Permit No.: EP-006/1998), the Comprehensive Feasibility Study for the Revised Scheme of South East Kowloon Development (SEKDCFS EIA) (EIAO Register No: AEIAR-044/2001) and Decommissioning of the Former Kai Tak Airport other than the North Apron (KTA Decommissioning EIA) (EIAO Register No. AEIAR-114/2007) were reviewed. Some of the findings, wherever applicable, are summarised and adopted in this assessment.
- 4.6.9 Additional information was also obtained through desktop review to further update the findings. In addition, site reconnaissance was also carried out to identify and confirm the potential contaminative landuses within the Study Area. **Figure 4.1** summarised the previous findings on land contamination that may pose impacts on the scheduled development in this Study, which are to be further elaborated in the following sections.
- 4.6.10 A summary of the location of each SPS with reference to the coverage of the previous study is presented below in **Table 4.19**.

Table 4.19 Zoning for the Current Assessment with reference to the Coverage of the Previous Studies

Sewage Pumping Station	Location	Previous Study
PS1	North Apron	NAKTA Decommissioning EIA
PS2	North Apron	NAKTA Decommissioning EIA
PS3	North Apron	NAKTA Decommissioning EIA
PS1A	North Apron	NAKTA Decommissioning EIA
PS NPS	EMSD Sung Wong Toi Vehicle Repair & Maintenance Workshop	SEKDCFS EIA

Review of Previous EIA Studies

NAKTA Decommissioning EIA

- 4.6.11 The NAKTA Decommissioning EIA was completed in April 1998 and approved under the EIA Ordinance in September 1998. The reference of the approved report in the EIAO Register is AEIAR-002/1998.
- 4.6.12 The land contamination impact assessment of the NAKTA Decommissioning EIA covered the North Apron of the former Kai Tak Airport (NAKTA) and the vicinity of the NAKTA area. The assessment started with a review of the Kai Tak Airport site history including records of historical leakage from the hydrant fuel system within the airport apron. A range of land uses with potential land contamination impact was also identified.
- 4.6.13 A detailed site investigation within the Kai Tak Airport had been undertaken to ascertain the nature, scale and extent of possible ground contamination resulted from known leaks of aviation fuels. The investigation was carried out in two phases, which:

- Characterised soil gas conditions in 195 boreholes to assess indirectly the likely subsurface soil contamination levels; and installed 77 groundwater wells for soil and groundwater sampling for chemical analyses.
 - Established the extent of the aviation fuel contamination.
 - Identified some “hotspots” coinciding approximately with the locations of historical leaks of aviation fuel and also with other sources. Elevated levels of methane and anaerobic conditions were found in some areas.
 - Verified the extent and nature of contamination so as to formulate feasible and site-specific remediation options.
- 4.6.14 An Environmental Permit has already been obtained for the area of North Apron. The identified contaminated areas at the NAKTA had been cleaned up during the period from 1998 to 2007 in accordance with the Environmental Permit conditions. The permit holder, the then Territory Development Department (now namely Civil Engineering and Development Department), has implemented and completed all necessary works for decommissioning accordingly.
- SEKDCFS EIA
- 4.6.15 The SEKDCFS EIA was completed in July 2001 and approved under the EIA Ordinance in September 2001. The reference of the approved report in the EIAO Register is AEIAR-044/2001.
- 4.6.16 The SEKDCFS EIA reviewed two relevant studies namely Environmental Impact Assessment for the Feasibility Study for South East Kowloon Development (SEKDFS EIA) and the NAKTA Decommissioning EIA, to provide the background information for assessment of land contamination impact of the EIA study. The SEKDCFS have identified some sites within the former Kai Tak Airport, which were mainly fuel storage tanks, which were not included in the NAKTA Decommissioning EIA and suggested that land contamination assessment on these sites would be needed when the sites become accessible. In addition, a preliminary contamination assessment (review of site history) at the ex-Government Flying Service (ex-GFS) building was conducted in the SEKDCFS EIA.
- 4.6.17 The SEKDCFS EIA also reviewed the conditions of the urban areas outside the former Kai Tak Airport at the time of the SEKDCFS EIA study. As provided in the SEKDCFS EIA report, these urban areas as a whole did not have a major contamination problem but for specific hotspots, which might be of potential contamination concerns. Potential contaminative landuses in the urban areas included car repair workshops (clusters found in Ma Tau Wai and Kowloon Bay), various petrol stations, Ma Tau Kok gas works, bus terminals, passenger ferry pier at Kowloon City, Electrical and Mechanical Services Department (EMSD) workshops (Sung Wong Toi Road and Cheung Yip Street) and light industries (clusters found in Kwan Tong and Kowloon Bay).
- 4.6.18 To sum up, a table of site investigation findings reviewed in these EIAs and the relevant CAP, Contamination Assessment Report and /or Remediation Action Plan (CAR/RAP) has been provided in **Table 4.20**.

Table 4.20 Summary of findings in the relevant EIA reviewed

EIA reviewed	Site Investigation Findings	Date of Approval
NAKTA Decommissioning EIA		
NAKTA Decommissioning EIA	<ul style="list-style-type: none"> 195 boreholes and 77 groundwater wells were installed for soil and groundwater contamination assessment. Land Contamination hotspots were identified. Elevated levels of methane and anaerobic conditions were found in some areas. The identified contaminated areas at the NAKTA had been cleaned up during the period from 1998 to 2007 in accordance with the Environmental Permit conditions. 	September 1998 EIAO Register: AEIAR-002/1998
CAP, CAR/RAP for South East Kowloon Development Infrastructure at North Apron Area of Kai Tak Airport	<ul style="list-style-type: none"> Accessed areas within NAKTA which were not covered in NAKTA decommissioning project due to accessibility issue. 134 boreholes were constructed for the purpose of land contamination assessment. Remediation were found to be necessary at 15 borehole locations with soil samples contaminated with metals, Benzo(a)pyrene and Total Petroleum Hydrocarbons (TPH) exceeding Dutch B/C levels. Findings from groundwater risk assessment indicated that the risk level associated with groundwater during construction was acceptable and no remediation for groundwater would be necessary. Free product, identified at one of the groundwater sampling wells, however, required remediation. Solidification / stabilization and biopiling were recommended as the remediation method for metal contaminated soil and organic contaminated soil respectively whereas free product recovery was recommended for groundwater remediation. 	CAP: June 2003 CAR/RAP: October 2005
Remediation Report for South East Kowloon Development Infrastructure at North Apron Area of Kai Tak Airport	<ul style="list-style-type: none"> The Remediation works were conducted according to the CAR/RAP of <i>South East Kowloon Development Infrastructure at North Apron Area of Kai Tak Airport</i> under Contract No. KL39/03 approved by Environmental Protection Department (EPD), HKSAR, in 2005 <p>Free product found in the groundwater monitoring well was manually skimmed off. For soil remediation, cement solidification/stabilization (CSS) was implemented for heavy metal contaminated soil and biopiling was operated for organic contaminated soil as proposed in the approved CAR/RAP. The remediation works were conducted in the period from December 2005 to March 2007.</p>	August 2007

EIA reviewed	Site Investigation Findings	Date of Approval
SEKDCFS EIA		
SEKDCFS EIA	<ul style="list-style-type: none"> Reviewed SEKDFS EIA and NAKTA Decommissioning EIA Identified Potential contamination hotspots within former Kai Tak Airport and the vicinity. 	September 2001 EIAO Register: AEIAR-044/2001

Identification of Potential Environmental Impacts

- 4.6.19 Based on the reviewed findings of the previous EIA studies as presented in the previous sections, all the contaminated areas identified in the North Apron of the former Kai Tak Airport had been cleaned up already. As a result, it is considered that potential land contamination impact to the construction of PS1, PS2, PS3 and PS1A is not anticipated.
- 4.6.20 The SPS at Site 5A1 (PS NPS) will be located inside and occupying part of the site of the existing EMSD Sung Wong Toi Vehicle Repair & Maintenance Workshop. The EMSD Sung Wong Toi Vehicle Repair & Maintenance Workshop is outside the boundary of the former Kai Tak Airport. A comprehensive review indicates that past and current land uses of the site include vehicle repairing and maintenance activities, underground fuel tanks, storage of dangerous good and spent oil. The evaluation of the environmental impacts is detailed in **Section 4.6.24**.
- 4.6.21 The potential land contamination impacts identified associated with each SPS is summarized in **Table 4.21**.

Table 4.21 Identification of Potential Land Contamination Impacts

Sewage Pumping Station	Location in the Kai Tak Development	Potential Land Contamination Impacts
PS1	North Apron	x
PS2	North Apron	x
PS3	North Apron	x
PS1A	North Apron	x
PS NPS	EMSD Sung Wong Toi Vehicle Repair & Maintenance Workshop	✓

Identification of Sensitive Receivers

- 4.6.22 Construction workers are the most likely group to be exposed to any potential contaminated materials during construction stage. The principle exposure routes for workers include:
- Direct ingestion of contaminated soils through eating or drinking/smoking on site; and
 - Dermal contact with contaminated soils.
- 4.6.23 There would be no sensitive receivers during the operational phase of the DP2 Project, provided that remediation actions have been carried out if necessary.

Prediction and Evaluation of Environmental Impacts

- 4.6.24 The EMSD Sung Wong Toi Vehicle Repair & Maintenance Workshop is located outside the boundary of the former Kai Tak Airport, a comprehensive review on the current and historical land uses and past records of dangerous goods storage and chemical waste handling was conducted to identify the potential sources of contamination in relation to the land uses. The review found that the operation of the EMSD Sung Wong Toi Repair / Maintenance Workshop has ceased. The past and current landuses of the site include vehicle repairing and maintenance activities, underground fuel tanks, storage of dangerous good and spent oil, etc. The findings of the historical land uses together with the related concerns of the potential contamination area are summarized in **Table 4.22** below.

Table 4.22 Summary of Reviewed Information on Potential Contaminative Land Uses

Potentially Contaminative Uses	Location	Historical Land Uses	Possible/Potential Sources of Contamination
EMSD Sung Wong Toi Vehicle Maintenance Workshop	Sung Wong Toi Road	<ul style="list-style-type: none"> 1967: Workshop constructed with stockpiling at the car park area of the main workshop 	<ul style="list-style-type: none"> Diesel storage tank of 1000 litres Battery cell, flammable liquid, oil sludge, acidic/alkaline electrolytes, solvents, mineral/lube oil, refrigerants, paints, heavy metal compounds, paints and scrap metal have been used, stored or generated

- 4.6.25 In view of the past potential contaminative uses of the EMSD Sung Wong Toi Vehicle Maintenance Workshop, EMSD as the current occupant should conduct a detailed land contamination assessment and complete the necessary remediation prior to the future handing over the site to the Government for construction of the proposed PS NPS. The land contamination assessment should follow EPD's GN and GM together with the Guidance Note.

Mitigation Measures

- 4.6.26 With proper implementation and completion of the appropriate remediation action by EMSD, if necessary, for the proposed PS NPS, further mitigation measures with regards to land contamination would not be necessary for the construction and operation of the DP2 Project.

Residual Environmental Impacts

- 4.6.27 No adverse residual environmental impact would be envisaged, with the implementation of appropriate remediation action by EMSD for the contaminated area if necessary.

Environmental Monitoring and Audit Requirements

- 4.6.28 No environmental monitoring and audit requirements with regards to land contamination will be required for the DP2 Project.

Conclusion

- 4.6.29 The implications of land contamination associated with the five SPSs included in the DP2 Project (namely PS1, PS2, PS3, PS1A and PS NPS) located within the KTD area, are presented in this section. PS1 to PS3 and PS1A are located inside the boundary of the former Kai Tak Airport. The proposed PS NPS is located within the EMSD Sung Wong Toi Vehicle Repair & Maintenance Workshop outside the boundary of the former Kai Tak Airport.
- 4.6.30 Based on the reviewed findings from the previous EIA studies and additional information from desktop study and site inspection, no potential land contamination associated with PS1 to PS3, and PS1A is anticipated; while there may be potential land contamination concerns in association with the proposed PS NPS.
- 4.6.31 The EMSD Sung Wong Toi Vehicle Repair & Maintenance Workshop is outside the boundary of the former Kai Tak Airport. A comprehensive review has been conducted for EMSD Sung Wong Toi Vehicle Repair & Maintenance Workshop to review the potential contaminative land uses of the area within the Workshop that will be occupied by the proposed PS NPS. The review found that the operation of the EMSD Sung Wong Toi Repair / Maintenance Workshop has been ceased. The past uses of the site included vehicle repairing and maintenance activities, underground fuel tanks, storage of dangerous good and spent oil, etc.
- 4.6.32 In view of the past potential contaminative uses of the EMSD Sung Wong Toi Vehicle Maintenance Workshop, EMSD as the current occupant should conduct a detailed land contamination assessment and complete the necessary remediation prior to the future handing over the site to the Government for construction of the proposed PS NPS. The land contamination assessment should follow EPD's GN and GM together with the Guidance Note. No adverse residual land contamination impact would be envisaged, with the implementation of appropriate remediation action for the contaminated area, if necessary.

4.7 Impact on Cultural Heritage

Introduction

- 4.7.1 There are five proposed sewage pumping stations (SPSs) associated with the Kai Tak Development covered under DP2 Project and will be included in the following section, see **Figure 4.2** for the locations of the SPSs.

Environmental Legislation and Standards

- 4.7.2 Legislation, Standards, Guidelines and Criteria relevant to the consideration of cultural heritage impacts under this study include the following:
- Antiquities and Monuments Ordinance
 - Environmental Impact Assessment Ordinance
 - Hong Kong Planning Standards and Guidelines
 - Technical Memorandum on Environmental Impact Assessment Process
 - Criteria for Cultural Heritage Impact Assessment

Antiquities and Monuments Ordinance

- 4.7.3 The Antiquities and Monuments Ordinance (the Ordinance) provides the statutory framework for the preservation of objects of historical, archaeological and palaeontological interest. The Ordinance contains the statutory procedures for the Declaration of Monuments. The proposed monument can be any place, building, site or structure, which is considered to be of public interest by reason of its historical, archaeological or palaeontological significance.

- 4.7.4 Under Section 6 and subject to sub-section (4) of the Ordinance, the following acts are prohibited in relation to certain monuments, except under permit:
- To excavate, carry on building works, plant or fell trees or deposit earth or refuse on or in a proposed monument or monument
 - To demolish, remove, obstruct, deface or interfere with a proposed monument or monument
- 4.7.5 The discovery of an Antiquity, as defined in the Ordinance must be reported to the Antiquities Authority (the Authority), or a designated person. The Ordinance also provides that, the ownership of every relic discovered in Hong Kong after the commencement of this Ordinance shall vest in the Government from the moment of discovery. The Authority on behalf of the Government may disclaim ownership of the relic.
- 4.7.6 In addition, no archaeological excavation may be carried out by any person, other than the Authority and the designated person, without a licence issued by the Authority. A licence will only be issued if the Authority is satisfied that the applicant has sufficient scientific training or experience to enable him to carry out the excavation and search satisfactorily, is able to conduct, or arrange for, a proper scientific study of any antiquities discovered as a result of the excavation and search and has sufficient staff and financial support.

Environmental Impact Assessment Ordinance

- 4.7.7 The Environmental Impact Assessment Ordinance (EIAO) was implemented on 1 April 1998. Its purpose is to avoid, minimise, and control the adverse impact on the environment of designated projects, through the application of the EIA process and the Environmental Permit (EP) system.

Hong Kong Planning Standards and Guidelines (HKPSG)

- 4.7.8 Chapter 10 of the HKPSG details the principles of conservation of natural landscape and habitats, historical buildings and archaeological sites. It also addresses the issue of enforcement. The appendices of HKPSG have also listed the legislation and administrative controls for conservation, other conservation related measures in Hong Kong, and Government departments involved in conservation.

Technical Memorandum on Environmental Impact Assessment Process

- 4.7.9 The general criteria and guidelines for evaluating and assessing impacts to cultural heritage are listed in Annexes 10 and 19 of the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The guidelines state that preservation in totality and measures for the integration of sites of cultural heritage into the proposed project will be a beneficial impact.

Criteria for Cultural Heritage Impact Assessment

- 4.7.10 This document, as issued by the Antiquities and Monuments Office, outlines the specific technical requirements for conducting terrestrial archaeological and built heritage impact assessments. It includes the parameters and scope for the Baseline Study, specifically desk-based research, field survey and the reporting requirements. As well, the prerequisite conditions for conducting impact assessment and mitigation measures are presented in detail.

Assessment Methodology

- 4.7.11 A desk-based study has been undertaken to determine the nature and history of the sites for the proposed SPSs. This was achieved through reference to documentary, cartographical and photographic sources. This information was used to evaluate the heritage significance of any identified built heritage resources and areas determined to have the potential to contain archaeological resources. The information was also used to assess impacts and make mitigation recommendations as required.

Evaluation of Archaeological Potential

- 4.7.12 As can be seen on the geological map in **Figure 4.2**, three of the pumping station sites (PS1A, PS2 and PS at site 5A1 (PS NPS)) are located on modern reclamation and have no archaeological potential. PS1 and PS3 are both situated on solid geology and have the potential to contain archaeological deposits.
- 4.7.13 PS1 is situated on land adjacent to the original coastline in alluvial deposits in an area predicted to be dominated by recent fluvial and estuarine deposits and the likelihood that the site will contain in situ archaeological deposits is low.
- 4.7.14 PS3 is situated to the northeast of the former Sacred Hill and also in the vicinity of the predicted location of the former Kai Pui Shek village. Trench (AA3) undertaken as part of the Kai Tak Development Archaeological Investigation (see **Figure 12.20** for location of Trench AA3) has identified a large volume of Sung Period ceramics at about 20m away from the proposed PS3 site boundary. Based upon these findings and the fact that Trench AA3 is situated on Quaternary Alluvium, the area around Trench AA3 is evaluated as having high archaeological potential.
- 4.7.15 It is noted that an archaeological investigation will be conducted at the sites of PS1 and PS3 by the Drainage Services Department under Agreement No. CE 4/2007 (DS) Sewage Interception Scheme in Kowloon City – Investigation to evaluate the archaeological potential of the two sites.

Evaluation of Built Heritage Potential

- 4.7.16 None of the pumping stations are situated in the vicinity of any built heritage resources.

Impact Assessment

- 4.7.17 Depends on the extent of archaeological deposits contained around the location of Trench AA3, the construction of PS3 may cause direct adverse impacts to archaeological deposits.
- 4.7.18 There will be no impacts to built heritage resources as a result of the construction or operation of the pumping stations.

Mitigation of Environmental Impacts

- 4.7.19 PS3 is located in close proximity of Trench AA3. Since the location of Trench AA3 is identified as an area of high archaeological potential, further archaeological investigation of the area around Trench AA3 is recommended in **Section 12** of this EIA Report. The purpose of the further archaeological investigation will be to determine if the area around Trench AA3 contains any evidence of the demolished village of Kau Pui Shek or archaeological deposit associated with the former Sacred Hill. The objectives will be achieved through an attempt to determine the extent of any in-situ archaeological deposits similar to the findings of Trench AA3. It is also an objective of the further archaeological investigation to specify the size and location of a rescue excavation commensurate with the nature and extent of Song Dynasty remains recovered in the vicinity of Trench AA3. Upon completion of the required rescue excavation in the vicinity of Trench AA3, the area would be ready for any future development including the construction of PS3. The further archaeological investigation and the rescue excavation for the area around Trench AA3 are the mitigation recommendations for KTD as described in **Section 12** of this EIA.
- 4.7.20 There will be no mitigation required for built heritage.

Evaluation of Residual Environmental Impacts

- 4.7.21 Upon completion of the archaeological investigation and any further measures such as rescue excavation for the area around Trench AA3, no residual impacts will arise from the construction or operation of the proposed SPSs.

Environmental Monitoring and Audit

- 4.7.22 The sites of the proposed SPSs are not in close proximity to any of the existing built heritage resources and are not on any area of archaeological potential, except PS3. For PS3, further archaeological investigation and rescue excavation for the area around Trench AA3 will be conducted as the mitigation recommendations for KTD. No mitigation and monitoring and audit programme specific for cultural heritage would be required for the construction of the proposed SPS.
- 4.7.23 However, given the close proximity of PS3 to Trench AA3 that is identified as an area of high archaeological potential, an archaeological excavation as described in **Section 4.7.19** should be conducted as part of the further archaeological field investigation that will be undertaken for the Kai Tak Development Project. Full details of the scope and methodology of the further archaeological investigation should be submitted and agreed with the Antiquities and Monuments Office.

Summary

- 4.7.24 The construction and operation of the proposed SPSs will not have any impact on built heritage resources. Depends on the extent of archaeological deposits contained around the location of Trench AA3, the construction of PS3 may cause direct adverse impacts to archaeological deposits. Further archaeological investigation of the area around Trench AA3 is recommended.

References

1. Hong Kong Geological Survey Sheet 11 (Hong Kong and Kowloon: Solid and Superficial Geology) Series HGM20, Scale 1: 20 000, Geotechnical Control Office Hong Kong 1986.

4.8 Landscape and Visual Impact

Environmental Legislation, Policies, Plans, Standards and Criteria

4.8.1 The following legislation, standards and guidelines are applicable to the evaluation of landscape and visual impacts associated with the construction and operation of the DP2 Project:

- Environmental Impact Assessment Ordinance (Cap.499.S.16) and the Technical Memorandum on EIA Process (EIAO-TM), particularly Annexes 10 and 18;
- Town Planning Ordinance (Cap 131);
- EIAO Guidance Note 8/2002;
- ETWB TCW No. 2/2004 - Maintenance of Vegetation and Hard Landscape Features, and Tree Preservation;
- ETWB TCW No. 3/2006 - Tree Preservation;
- ETWB TCW No. 36/2004 - Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS);
- Hong Kong Planning Standards and Guidelines;
- Land Administration Office Instruction (LAOI) Section D-12 - Tree Preservation;
- Study on Landscape Value Mapping of Hong Kong;
- WBTC No. 25/92 - Allocation of Space for Urban Street Trees; and
- WBTC No. 7/2002 - Tree Planting in Public Works.

4.8.2 Reference has also been made to the following studies:

- Comprehensive Feasibility Study for the Revised Scheme of South East Kowloon Development; and
- Kai Tak Planning Review.

4.8.3 In addition, reference has been made to the following OZP:

- Approved Kai Tak (KPA22) Outline Zoning Plan no. S/K22/2 (6.11.2007);
- Approved Ngau Chi Wan (KPA 12) Outline Zoning Plan no. S/K12/16 (2.11.2004);
- Approved Tsz Wan Shan, Diamond Hill & San Po Kong (KPA 11) Outline Zoning Plan No. S/K11/2/23 (22.08.2008);
- Approved Wang Tau Hom & Tung Tau (KPA 8) Outline Zoning Plan No. S/K8/17 (12.4.2005); and
- Draft Ma Tau Kok (KPA 10) Outline Zoning Plan No. S/K10/19 (18.01.2008).

Assessment Methodology

4.8.4 Landscape and visual impacts have been assessed separately for the construction and operation phases.

4.8.5 The assessment of landscape impacts has involved the following procedure.

- **Identification of the baseline landscape resources (physical and cultural) and landscape characters found within the study area.** This is achieved by site visit and desktop study of topographical maps, information databases and photographs.
- **Assessment of the degree of sensitivity to change of the landscape resources.** This is influenced by a number of factors including whether the resource/character is common or rare, whether it is considered to be of local, regional, national or global importance, whether there are any statutory or regulatory limitations/ requirements relating to the resource, the quality of the resource/character, the maturity of the resource, and the ability of the resource/character to accommodate change.

The sensitivity of each landscape feature and character area is classified as follows:

High: Important landscape or landscape resource of particularly distinctive character or high importance, sensitive to relatively small changes.

Medium: Landscape or landscape resource of moderately valued landscape characteristics reasonably tolerant to change.

Low: Landscape or landscape resource, the nature of which is largely tolerant to change.

- **Identification of potential sources of landscape impacts.** These are the various elements of the construction works and operational procedures that would generate landscape impacts.
- **Identification of the magnitude of landscape impacts.** The magnitude of the impact (or magnitude of change) depends on a number of factors including the physical extent of the impact, the landscape and visual context of the impact, the compatibility of the project with the surrounding landscape; and the time-scale of the impact - i.e. whether it is temporary (short, medium or long term), permanent but potentially reversible, or permanent and irreversible. Landscape impacts have been quantified wherever possible.

4.8.6 The magnitude of landscape impacts is classified as follows:

Large: The landscape or landscape resource would suffer a major change.

Intermediate: The landscape or landscape resource would suffer a moderate change.

Small: The landscape or landscape resource would suffer slight or barely perceptible changes.

Negligible: The landscape or landscape resource would suffer no discernible change.

- **Identification of potential landscape mitigation measures.** These may take the form of adopting alternative designs or revisions to the basic engineering and architectural design to prevent and/or minimize adverse impacts; remedial measures such as colour and textural treatment of building features; and compensatory measures such as the implementation of landscape design measures (e.g. tree planting, creation of new open space etc) to compensate for unavoidable adverse impacts and to attempt to generate potentially beneficial long term impacts. A programme for the mitigation measures is provided. The agencies responsible for the funding, implementation, management and maintenance of the mitigation measures are identified.
- **Prediction of the significance of landscape impacts before and after the implementation of the mitigation measures.** By synthesizing the magnitude of the various impacts and the sensitivity of the various landscape resources it is possible to categorize impacts in a logical, well-reasoned and consistent fashion. **Table 4.23** shows the rationale for dividing the degree of significance into four thresholds, namely insubstantial, slight, moderate, and substantial, depending on the combination of a negligible-small-intermediate-large magnitude of impact and a low-medium-high degree of sensitivity of landscape resource/character.
- **Prediction of Acceptability of Impacts.** An overall assessment of the acceptability, or otherwise, of the impacts according to the five criteria set out in Annex 10 of the EIAO-TM.

Table 4.23 Relationship between Receptor Sensitivity and Impact Magnitude in Defining Impact Significance

Magnitude of Impact (Both Adverse and Beneficial Impact are assessed.)	Large	Slight / Moderate	Moderate / Substantial	Substantial
	Intermediate	Slight / Moderate	Moderate	Moderate / Substantial
	Small	Insubstantial / Slight	Slight / Moderate	Slight / Moderate
	Negligible	Insubstantial	Insubstantial	Insubstantial
		Low	Medium	High
		Receptor Sensitivity (of Landscape Resource, Landscape Character Area or VSRs)		

Note: All impacts are Adverse unless otherwise noted with Beneficial.

4.8.7 The assessment of visual impacts has involved the following procedures.

- **Identification of the Zones of Visual Influence during the construction and operation phases of the project.** This is achieved by site visit and desktop study of topographic maps and photographs, and preparation of cross-sections to determine visibility of the project from various locations.
- **Identification of the Visually Sensitive Receivers (VSRs) within the ZVIs at construction and operation phases.** These are the people who would reside within, work within, play within, or travel through, the ZVIs.
- **Assessment of the degree of sensitivity to change of the VSRs.** Factors considered include:

- the type of VSRs, which is classified according to whether the person is at home, at work, at play, or travelling. Those who view the impact from their homes are considered to be highly sensitive as the attractiveness or otherwise of the outlook from their home will have a substantial effect on their perception of the quality and acceptability of their home environment and their general quality of life. Those who view the impact from their workplace are considered to be only moderately sensitive as the attractiveness or otherwise of the outlook will have a less important, although still material, effect on their perception of their quality of life. The degree to which this applies depends on whether the workplace is industrial, retail or commercial. Those who view the impact whilst taking part in an outdoor leisure activity may display varying sensitivity depending on the type of leisure activity. Those who view the impact whilst travelling on a public thoroughfare will also display varying sensitivity depending on the speed of travel.
- other factors which are considered (as required by EIAO GN 8/2002) include the value and quality of existing views, the availability and amenity of alternative views, the duration or frequency of view, and the degree of visibility.

The sensitivity of VSRs is classified as follows:

- High:** The VSR is highly sensitive to any change in their viewing experience.
Medium: The VSR is moderately sensitive to any change in their viewing experience.
Low: The VSR is only slightly sensitive to any change in their viewing experience.

- **Identification of relative numbers of VSRs.** This is expressed in term of whether there are many, medium, few VSRs in any one category of VSR.
- **Identification of potential sources of visual impacts.** These are the various elements of the construction works and operation that would generate visual impacts.
- **Assessment of the potential magnitude of visual impacts.** Factors considered include
 - the compatibility with the surrounding landscape,
 - the duration of the impact,
 - the reversibility of the impact,
 - the scale of the impact and distance of the source of impact from the viewer, and
 - the degree of visibility of the impact, and the degree of which the impact dominates the field of vision of the viewer.

The magnitude of visual impacts is classified as follows:

- Large:** The VSRs would suffer a major change in their viewing experience.
Intermediate: The VSRs would suffer a moderate change in their viewing experience.
Small: The VSRs would suffer a small change in their viewing experience.
Negligible: The VSRs would suffer no discernible change in their viewing experience.

- **Identification of potential visual mitigation measures.** These may take the form of adopting alternative designs or revisions to the basic engineering and architectural design to prevent and/or minimize adverse impacts; remedial measures such as colour and textural treatment of building features; and tree planting to screen the roads and associated bridge structures. A programme for the mitigation measures is provided. The agencies responsible for the implementation, management and maintenance of the mitigation measures are identified.
- **Prediction of the significance of visual impacts before and after the implementation of the mitigation measures.** By synthesizing the magnitude of the various visual impacts and the sensitivity of the VSRs, and the numbers of VSRs that are affected, it is possible to categorize the degree of significance of the impacts in a logical, well-reasoned and consistent fashion. **Table 4.23** shows the rationale for dividing the degree of significance into four thresholds, namely, insubstantial, slight, moderate and substantial, depending on the combination of a negligible-small-intermediate-large magnitude of impact and a low-medium-high degree of sensitivity of VSRs. Consideration is also given to the relative numbers of affected VSRs in predicting the final impact significance - exceptionally low or high numbers of VSRs may change the result that might otherwise be concluded from **Table 4.23**.

The significance of visual impacts is categorized as follows:

Substantial:	Adverse / beneficial impact where the proposal would cause significant deterioration or improvement in existing visual quality.
Moderate:	Adverse / beneficial impact where the proposal would cause a noticeable deterioration or improvement in existing visual quality.
Slight:	Adverse / beneficial impact where the proposal would cause a barely perceptible deterioration or improvement in existing visual quality.
Insubstantial:	No discernible change in the existing visual quality.

- **Prediction of Acceptability of Impacts.** An overall assessment of the acceptability, or otherwise, of the impacts according to the five criteria set out in Annex 10 of the EIAO-TM.

- 4.8.8 Funding, implementation, management and maintenance of the mitigation proposals will be resolved according to the principles in EIAO-TM, ETWB TCW No. 2/2004 and 3/2006. All mitigation proposals in this report are practical and achievable within the known parameters of funding, implementation, management and maintenance. The suggested agents for the funding and implementation (and subsequent management and maintenance, if applicable) are indicated in **Table 4.29 and 4.30** included in the report.

Scope and Content of the Study

- 4.8.9 Scope and content of the DP2 Project refer to **Section 4.1**. As required by the EIA Study Brief, the area for the landscape impact assessment shall include all area within 500 metres from the boundary of the scope of the DP2 Project whilst the area for visual impact assessment shall be defined by the visual envelope from the Project and associated works.

Baseline Study

- 4.8.10 Baseline Study on Landscape Resources during the Construction and Operation Phase are shown in Figure 4.11A and 4.11B respectively. Key Existing and Planned Landscape Resources identified within the Study Areas are described below.

Physical Landscape Resources

Topography

- 4.8.11 The landform in the landscape study area which is the former Kai Tak Airport comprises flat reclaimed land with no features of topographical interest or value.

Ridgeline

- 4.8.12 The Ridgeline of the Kowloon Hills to the north of the southern areas of Kowloon provides a dramatic natural backdrop to the high-rise urban areas of Kowloon. The ridgeline is a physical landscape resource as well as a key visual resource in South East Kowloon. The ridgeline is partially breached by the existing high-rise developments particularly in Lam Tin, Sau Mau Ping and Ngau Tau Kok. Views to the natural ridgeline shall be preserved as far as possible particular from the strategic vantage points at Quarry Bay Park, Hong Kong Convention and Exhibition Centre New Wing, and Sun Yat Sen Memorial Park viewing from Hong Kong Island.

Victoria Harbour

- 4.8.13 Victoria Harbour is a unique public asset and natural heritage of Hong Kong, its preservation is for the benefit of the current generation as well as the future ones. This is considered to be of high value and sensitivity. Since the proposed development will not involve any reclamation, there will not be any impact on Victoria Harbour.

Drainage

- 4.8.14 There are no natural drainage features in the study area. The section of Kai Tak Nullah runs through the centre of the site and currently has no inherent landscape value.

Soil

- 4.8.15 The study area is the former Kai Tak Airport which primarily consists of preliminary concrete surface. There is no soil material which is of landscape interest and value.

Open Spaces

- 4.8.16 The study area is a densely urbanized area with limited open space which has significant amenity value. Approximately 8 nos. public open spaces with a total area of 15.9 ha are identified, varying from small rest gardens, playgrounds, to large parks such as Kowloon Walled City Park and Hoi Sham Park. In general, within a densely urbanized area, all public open spaces are considered to be of high value and sensitivity due to their importance as landscape resources within the city.

Existing Trees

- 4.8.17 Broad brush tree survey has been carried out within the study area as show in **Figure 13.2A**. Within the study area, there are more than 2,405 no. of trees. Tree species include *Acacia confusa*, *Aleurites moluccana*, *Ailanthus fordii*, *Aleurites moluccana*, *Archontophoenix alexandrae*, *Araucaria heterophylla*, *Bauhinia blakeana*, *Bombax ceiba*, *Callistemon viminalis*, *Caryota ochlandra*, *Cassia siamea*, *Cassia surattensis*, *Casuarina equisetifolia*, *Chrysalidocarpus lutescens*, *Cycas revoluta*, *Delonix regia*, *Erythrina variegata*, *Ficus microcarpa*, *Ficus virens* var. *sublanceolata*, *Juniperus chinensis* cv. *Kaizuka*, *Lagerstroemia speciosa*, *Leucaena leucocephala*, *Livistona chinensis*, *Macaranga tanarius*, *Melaleuca quinquenervia*, *Michelia x alba*, *Morus alba*, *Phoenix roebelenii*, *Phoenix roebelenii*, *Plumeria rubra* and *Roystonea regia*. . Many of the trees are found within LCSD open spaces. They are in general of medium to high amenity value and sensitivity to change. Trees found within the former airport site are in low to medium amenity value and small in size. None of these trees are OVT nor Champion Trees.

Human Landscape Resources

Cultural Features

- 4.8.18 The current Hong Kong Aviation Club Buildings were first built in 1958 and then subsequently expanded in 1974 and consist of a hangar, workshops and club building. The buildings were formerly part of the Far East Flying Training School and were sold to the Aviation Club in 1983. The Far East Flying Training School was established in 1943 and moved to the Sung Wong Toi Road in 1958. The Aviation Club Buildings will be preserved under the proposed KTD proposed development.

Historical Features

- 4.8.19 Song Wong Toi Inscription Rock was originally situated at the top of the Sacred Hill and is associated with the last emperor of the Sung Dynasty. On expansion of the airport it was moved to the Sung Wong Toi Garden to the north of Olympic Avenue, retaining its view corridor to Lei Yue Mun. The Sung Wong Toi Inscription Rock will not be affected by the infrastructure work of KTD. However, whether the Sung Wong Toi Inscription Rock will be relocated to the new Sung Wong Toi Park in KTD will be subject to future consideration by the project proponent of the new Sung Wong Toi Park.
- 4.8.20 The baseline landscape resources (primarily existing open spaces and trees) which will be potentially affected by the development, together with their sensitivity to change and ability to accommodate changes are described in **Table 4.24**. The locations of baseline landscape resources during Construction and Operation Phase are mapped in **Figure 4.11A** and **4.11B** respectively. Photo views illustrating the landscape resources within the study area are illustrated in **Figure 13.2.1** to **13.2.8** inclusive.

Landscape Character Areas

- 4.8.21 Landscape character zones have been identified within the Study Area in accordance with the Study on Landscape Value Mapping of Hong Kong. The Landscape Character Areas during Construction and Operation Phase are described in Table 4.24 and illustrated in **Figure 4.12A** and **4.12B** respectively. Photo views illustrating the landscape character areas within the study area are illustrated in **Figure 13.3.1** to **13.3.3** inclusive.

Table 4.24 Landscape Resources / Landscape Character Areas and Their Sensitivity to Change

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)
Baseline Landscape Resources		
LR01	Olympic Garden This is a public local open space (~ 0.7ha) at the west end of the Prince Edward Road East and located under existing flyover network of Kowloon City, containing seating areas and planting beds. It is a popular resting and gathering place for local residents. Ornamental tree and shrub planting are provided throughout the open space. There are more than 100 trees with height around 4-13 m, spread 2-10 m, trunk diameter 120-500 mm. Species include <i>Bauhinia blakeana</i> , <i>Callistemon viminalis</i> , <i>Chrysalidocarpus lutescens</i> , <i>Ficus microcarpa</i> , <i>Lagerstroemia speciosa</i> and <i>Roystonea regia</i> .	High
LR02	Sung Wong Toi Garden This is a formal public open space (~ 0.4ha) where the Emperor's Rock is kept comprising formal clipped hedgerows and screen tree planting along the periphery of the open space. There are approximately 30 mature trees with height around 4-8 m, spread 3-10 m, trunk diameter 150-700 mm. Species include <i>Aleurites moluccana</i> , <i>Casuarina equisetifolia</i> , <i>Ficus microcarpa</i> , <i>Livistona chinensis</i> and <i>Macaranga tanarius</i> .	High
LR03	Sung Wong Toi Playground This is a public open space (~ 0.9ha) comprising basketball courts, meandering footpaths, seating areas and ornamental tree and shrub planting. There are more than 100 trees with height around 4-13 m, spread 2-8 m, trunk diameter 120-450 mm. Species include <i>Bauhinia blakeana</i> , <i>Bombax ceiba</i> , <i>Casuarina equisetifolia</i> , <i>Delonix regia</i> and <i>Ficus virens</i> var. <i>sublanceolata</i> .	High
LR04A	Rest Garden near Nga Tsin Wai Road The Rest Garden is a local open space (~ 0.2ha) with lush trees and shrub planting. It consists of children's play equipment and seating areas under tree shade primarily for passive recreation. There are approximately 10 mature trees with height around 4-8 m, spread 2-10 m, trunk diameter 300-750 mm. Species include <i>Aleurites moluccana</i> and <i>Ficus microcarpa</i> .	High
LR04B	Amenity area near Sha Po Road The amenity area consists of 26 trees of medium size and amenity value. The height of trees is around 5-6 m, spread 3 m, trunk diameter 150-200 mm. The species are mostly <i>Bauhinia blakeana</i> .	Medium

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)
LR05	<p>Shek Ku Lung Road Playground</p> <p>This is an open space (~1.4ha) with predominantly hard surface primarily for active recreation provision. Five-a-side football pitches and tennis courts are the main elements in the open space. Seating areas are also provided. There are more than 330 trees with height around 4-9 m, spread 3-8 m, trunk diameter 150-600mm. Species include <i>Acacia confusa</i>, <i>Ailanthus fordii</i>, <i>Bauhinia blakeana</i>, <i>Bombax ceiba</i>, <i>Cassia surattensis</i>, <i>Delonix regia</i>, <i>Erythrina variegata</i>, <i>Ficus microcarpa</i>, <i>Macaranga tanarius</i>, <i>Melaleuca quinquenervia</i>, <i>Michelia x alba</i> and <i>Plumeria rubra</i>.</p>	High
LR06	<p>Argyle Street Playground</p> <p>This is an open space (~ 0.8ha) with predominantly hard surface primarily for active recreation provision. Football pitches are the main elements in the open space. Seating areas are also provided at the northern side of the playground. There are approximately 20 trees with height around 4-7 m, spread 3-10 m, trunk diameter 180-400 mm. Species include <i>Delonix regia</i> and <i>Lagerstroemia speciosa</i>.</p>	High
LR09	<p>To Kwa Wan Recreation Ground</p> <p>This is an open space (~ 2.8ha) with predominantly hard surface primarily for active recreation provision. There are approximately 150 trees in these amenity areas with height around 3-13 m, spread 2-7 m, trunk diameter 120-500 mm. Species include <i>Aleurites moluccana</i>, <i>Araucaria heterophylla</i>, <i>Bauhinia blakeana</i>, <i>Chrysalidocarpus lutescens</i>, <i>Juniperus chinensis</i> cv. <i>Kaizuca</i>, <i>Macaranga tanarius</i>, <i>Michelia x alba</i> and <i>Roystonea regia</i>.</p>	High

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)
LR11	<p>Kowloon Walled City Park and Carpenter Road Park</p> <p>Kowloon Walled City Park is a one of the most historic sites in Kowloon. It is a regional open space (~ 3.3ha) in early Qing Dynasty style. The park consists of a mix of active and passive recreation in a tree and shrub landscape setting. It is a popular park for local residents and tourists. There are more than 350 trees of high amenity value with height around 4-10 m, spread 2-8 m, trunk diameter 200-700 mm. Species include <i>Aleurites moluccana</i>, <i>Bauhinia blakeana</i>, <i>Bombax ceiba</i>, <i>Delonix regia</i>, <i>Ficus microcarpa</i>, <i>Juniperus chinensis</i> cv. <i>Kaizuca</i>, <i>Lagerstroemia speciosa</i>, <i>Macaranga tanarius</i>, <i>Melaleuca quinquenervia</i>, <i>Michelia x alba</i> and <i>Roystonea regia</i>.</p> <p>Carpenter Road Park is a regional open space (~ 5.4 ha). The park provides active recreation with cycle track and passive recreation in a tree and shrub landscape setting. There are more than 150 trees of high amenity value with height around 4-8 m, spread 2-8 m, trunk diameter 200-500 mm. Predominate species include <i>Aleurites moluccana</i>, <i>Ficus microcarpa</i>, <i>Juniperus chinensis</i> cv. <i>Kaizuca</i> and <i>Roystonea regia</i>.</p>	High
LR17	<p>Trees near Aviation Club Buildings</p> <p>There are approximately 32 mature trees at the periphery of the development boundary along Song Wong Toi Road with height around 4-13 m, spread 3-7 m, trunk diameter 180-350 mm. The amenity value of these trees is considered as high. Predominant species consist of <i>Aleurites moluccana</i>, <i>Casuarina equisetifolia</i>, <i>Delonix regia</i>, <i>Ficus microcarpa</i>, <i>Macaranga tanarius</i> and <i>Morus alba</i>.</p>	High
LR18	<p>Trees at the periphery of existing lot boundary along Sung Wong Toi Road</p> <p>There are approximately 10 semi-mature/mature trees at the periphery of the existing lot boundary along Sung Wong Toi Road with height around 3-9 m, spread 3-10 m, trunk diameter 200-500 mm. The amenity value of these trees is considered as medium. Predominant species consist of <i>Bauhinia blakeana</i>, <i>Delonix regia</i>, <i>Ficus microcarpa</i>, <i>Macaranga tanarius</i>, <i>Michelia x alba</i> and <i>Phoenix roebelenii</i>.</p>	Medium

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)
LR19	<p>Trees in the Amenity Areas along Sung Wong Toi Road</p> <p>There are approximately 19 trees found in the Amenity Areas near the Ventilation Building of the Airport Tunnel along Sung Wong Toi Road with height around 3-12 m, spread 2-8 m, trunk diameter 150-500 mm. Predominant species consist of <i>Acacia confusa</i>, <i>Aleurites moluccana</i>, <i>Bauhinia blakeana</i>, <i>Ficus microcarpa</i> and <i>Phoenix roebelenii</i>.</p>	Medium
LR22	<p>Trees in Amenity Areas near the Interchange in Kowloon Bay</p> <p>There are more than 510 existing trees in the amenity areas near the interchange in Kowloon Bay with height around 4-13 m, spread 2-7 m, trunk diameter 150-350 mm. The amenity value of these trees is considered as medium. Predominant species are <i>Aleurites moluccana</i>, <i>Bauhinia blakeana</i>, <i>Casuarina equisetifolia</i>, <i>Leucaena leucocephala</i> and <i>Melaleuca quinquenervia</i>.</p>	Medium
LR23	<p>Trees in Amenity Areas of San Po Kong Interchange</p> <p>There are approximately 38 trees in the amenity areas of San Po Kong Interchange with height around 4-8 m, spread 2-5 m, trunk diameter 150-300 mm. The amenity value of these trees is considered as medium. Species include <i>Ailanthus fordii</i>, <i>Callistemon viminalis</i>, <i>Cycas revoluta</i>, <i>Erythrina variegata</i>, <i>Lagerstroemia speciosa</i>, <i>Livistona chinensis</i> and <i>Phoenix roebelenii</i>.</p>	Medium
LR25	<p>Trees near Grand Waterfront</p> <p>There are approximately 30 mature trees in the amenity areas near Grand Waterfront of height around 4-7 m, spread 3-7 m, trunk diameter 150-350 mm. The amenity value of these trees is considered as high. The species are mostly <i>Bombax ceiba</i> and <i>Melaleuca quinquenervia</i>.</p>	High
LR28	<p>Trees in North Apron of Former Airport</p> <p>There are more than 500 trees in the amenity areas and on the podium near Kai Tak Government Building with height around 3-12 m, spread 2-6 m, trunk diameter 150-400 mm. The amenity value of these trees is considered as medium. Predominant species consist of <i>Aleurites moluccana</i>, <i>Archontophoenix alexandrae</i>, <i>Bauhinia blakeana</i>, <i>Caryota ochlandra</i>, <i>Cassia siamea</i>, <i>Delonix regia</i>, <i>Ficus microcarpa</i>, <i>Livistona chinensis</i> and <i>Phoenix roebelenii</i>.</p>	Medium
LR31A	<p>Kai Tak Nullah</p> <p>An open drainage channel running through the centre of the site with little landscape value.</p>	Low

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)
LR31B	Victoria Harbour It is a recognised and distinctive feature of Hong Kong worldwide, both as a tourist attraction and working port. The Harbour forms a centrepiece of the Hong Kong setting, with the airport runway forming a unique coastline to it.	High
Planned Landscape Resources		
LR34	Planned Multi-purpose Stadium Complex Plaza It is a planned landscape plaza at the Multi-purpose Stadium Complex which connects the Kai Tak City Centre and the Metro Park.	High
LR35	Planned Sung Wong Toi Park It is a planned district open space with a Sung Dynasty Theme at the Sports Hubs close to the hinterland.	High
LR36	Planned Station Square It is a planned open plaza outside the Kai Tak Station which interacts the commercial and residential uses at the Kai Tak City Centre.	High
LR38	Planned Chinese Cultural Garden It is a planned open space along the waterfront at Ma Tau Kok forms part of waterfront promenade at KTD.	High
LR31A	Planned Kai Tak Nullah It will become either a decked open space or a new river channel with enhanced open space at the both sides of the river.	High
Baseline Landscape Character Areas		
LCA01	Former Kai Tak Airport Landscape Character Area This comprises the former Kai Tak Airport where the future development is to be located. This area is flat, open, primarily hard standing with a few existing buildings that relate to the use of the former airport at the north. The area is currently occupied by various parties for different temporary uses.	Low
LCA02	Kowloon City and To Kwa Wan Grid Mixed Urban Landscape This is an area of primarily mixed residential / commercial use. This comprises a mix of low to high buildings for residential and commercial uses. The streetscape is utilitarian with no soft or little landscape treatment.	Medium

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)
LCA03	<p>Kowloon Bay Late 20C / Early 21C Commercial / Residential Complex Landscape</p> <p>This is an area of primarily mixed residential / commercial use. This comprises a mix of low to high buildings for residential, commercial uses. The streetscape is utilitarian with no soft or little landscape treatment.</p>	Medium
LCA04	<p>San Po Kong Industrial Urban Landscape</p> <p>This is an area of industrial use. This comprises medium rise industrial buildings. Some of the low rise industrial buildings have been demolished for future development. The Planning Consultancy Study for San Po Kong Flatted Factory is under studied. The streetscape is utilitarian with no soft landscape treatment.</p>	Low
LCA05	<p>Kwun Tong Industrial Urban Landscape</p> <p>This is an area of industrial use. This comprises medium to high rise industrial buildings. The streetscape is utilitarian with no soft landscape treatment.</p>	Low
LCA09	<p>To Kwa Wan Typhoon Shelter Landscape</p> <p>This is an area for typhoon shelter use in To Kwa Wan. It is substantially enclosed by coast and offshore breakwater.</p>	Low
LCA12	<p>Kowloon City Medium / High-rise Commercial Urban Landscape</p> <p>This is an area predominantly of commercial, industrial and retail land uses. This comprises a mix of medium and high rise buildings. The streetscape is utilitarian with no soft or little landscape treatment.</p>	Medium

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)
Planned Landscape Character Areas		
LCA01A	Planned Kai Tak City Centre Urban Landscape It is a new Kai Tak urban centre with a mixture of residential and commercial uses. The existing Kai Tak Nullah will be turned into a 'river' which it brings a natural element into the new modern city; and with natural landscape and plaza zone, the railway station shall be intended to locate in a park-like area.	Medium
LCA01B	Planned Kai Tak Sports Hub Urban Landscape The Main Stadium will be the new icon of South East Kowloon. It will provide great views out to the water for spectators seated in the stadium. Programming along the dedicated pedestrian walkways within the landscape deck connecting across Road D2 shall enhance connectivity between spaces. Large open areas around stadiums shall act as a plaza-like for gathering and holding difference functions.	Medium
LCA01C	Planned Kai Tak Metro Park Urban Landscape It consists of a 27ha Metro Park at the centre of South East Kowloon – both geographically and psychologically. Anchored by the Multi-purpose Stadium Complex at the northern base of the runway, this new landscape character area will be the signature public open space of South East Kowloon.	High

Visual Envelope

- 4.8.22 DP2 comprises five Sewage Pumping Stations located in different parts of the north apron area of future KTD. In general, its Visual Envelope is defined by Victoria Harbour to the south, San Po Kong and Kowloon City to the north, Kowloon Bay to the east, and Ma Tau Kok to the west. The Visual Envelopes, i.e. zones of visual influence of DP2 during construction and operation phases are illustrated in **Figure 4.13A and 4.13B**.

Visually Sensitive Receivers (VSRs)

- 4.8.23 Given that the development scale of DP2 is small and localized, only the key existing and planned VSRs in close vicinity to the project areas of DP2 during construction and operation phases have been identified and shown in **Figures 4.13A and 4.13B**. Photo views illustrating the VSRs within the study area are illustrated shown in **Figure 13.4A1 to 13.4A5**. Baseline viewpoints from Key VSRs at local level illustrating the quality of existing views are shown in **Figure 13.4A6 and 13.4A10**. The baseline assessment of existing VSRs at local level and the planned VSRs within KTD is shown in **Table 4.25**.

VSRs at Local Level

- 4.8.24 The sensitivity to change of the VSRs at local level is much depending on the location and distance from the individual sewage pumping stations and hence the degree of visibility, as well as the VSR type which determines the duration and frequency of views. In general, the sensitivity of VSRs at the residential developments or open spaces in Ma Tau Kok, Kowloon City, San Po Kong and Kowloon Bay is considered to be high for they will have direct and frequent views towards the works areas of the sewage pumping stations. For residential VSRs in San Po Kong and Kowloon Bay, their sensitivity to DP2 will be lowered during the operation phase, as their views to the sewage pumping stations will be blocked by the other planned VSRs within KTD.
- 4.8.25 For institutional, commercial and industrial VSRs, even if they locate in close proximity to the works areas of DP2, their sensitivity is considered to be medium as their views to the sewage pumping stations are relatively shorter in duration and less in frequency. Motorists traveling on the major roads in the periphery of KTD and pedestrians walking along Sung Wong Toi Road have low sensitivity for their views are transient in nature.
- 4.8.26 There are a number of existing VSRs for which the current landuses are different from the planned landuses. Under this VIA study, the current landuse is used as the baseline for visual impact assessment for construction phase. Given the implementation programme of DP2 is long, it is assumed that when all the sewage pumping stations are completed and in operation, the planned landuse will be in place and is used as the baseline for visual impact for operation phase.

VSRs at KTD per se

- 4.8.27 DP2 will be completed on site before most of the other future developments within KTD are in place. Planned VSRs within KTD will only be considered in the assessment for operation phase of DP2 as shown in **Figure 4.13B**. Most of the planned VSRs are located in close proximity to the individual sewage pumping stations and will have direct and full views to them. The sensitivity of the planned VSRs in the future residential developments and open spaces in Kai Tak City Centre is considered to be high whilst that of the future commercial or GIC developments is considered to be medium.

Visual Resources

- 4.8.28 The Ridgeline of the Kowloon Hills to the north of the southern areas of Kowloon provides a dramatic natural backdrop to the high-rise urban areas of Kowloon. It is visual resource within the visual envelop. With the control of development height, the views to the natural ridgeline have been preserved from the strategic vantage points at Quarry Bay Park, Hong Kong Convention and Exhibition Centre New Wing, and Sun Yat Sen Memorial Park viewing from Hong Kong Island.
- 4.8.29 Victoria Harbour is a unique public asset and natural visual resource of Hong Kong, providing an open sea view to the urban core along the northern coast of Hong Kong Island and the Kowloon Peninsula.
- 4.8.30 Major open spaces, including Sung Wong Toi Park, Station Square, Kai Tak River, Stadium Complex are proposed in the north apron area of future KTD. Upon completion, these major green spaces will provide new visual resources to the surrounding VSRs.

Table 4.25 Visual Sensitive Receivers (VSRs) and Their Sensitivity to Change

VSR Type & ID.	Key Visually Sensitive Receiver (VSR)	Number of Individuals (Many/ Medium/ Few/)	Quality of Existing View (Good/ Fair/ Poor)	Availability of Alternative Views (Yes/ No)	Average Distance between VSRs and Impact Source (m)	Degree of Visibility (Full/ Partial/ Glimpse)	Duration of View (Long/ Medium/ Short)	Frequency of View (Frequent/ Occasional/ Rare)	Sensitivity to Change (Low, Medium, High)
VSRs at Local Level									
R1	Sky Tower and adjacent residential developments along Sung Wong Toi Road	Medium	Fair	No	20m	Full	Long	Frequent	High
R3	Regal Oriental Hotel and Low to Medium-rise Residential Development in Kowloon City	Many	Fair	No	100m	Full	Long	Frequent	High
R6	Rhythm Garden	Many	Fair	No	40m	Full	Long	Frequent	High
R7	Choi Hung Estate	Many	Fair	No	80m	Full	Long	Frequent	High
R9	Richland Gardens	Many	Fair	No	60m	Partial	Long	Frequent	High
R16	Grand Waterfront (same planned use under KTD)	Many	Fair	Yes	100m	Full	Long	Frequent	High
R18	Low-rise Residential Development adjacent to Grand Waterfront (same planned use under KTD)	Medium	Fair	Yes	100m	Partial	Long	Frequent	High
R19	R(A) zone at King Fuk Street	Medium	Fair	No	100m	Full	Long	Frequent	High
R20	R(A) zone to the southeast of Tung Tau Estate	Medium	Fair	No	150m	Full	Long	Frequent	High
R21	Le Billionaire and adjacent R(A) Zone in Kowloon City	Medium	Fair	No	110m	Full	Long	Frequent	High
R22	Low-rise Residential Developments along Mok Cheong Street (planned CDA in operation stage)	Medium	Fair	No	200m	Full	Long	Frequent	High

VSR Type & ID.	Key Visually Sensitive Receiver (VSR)	Number of Individuals (Many/ Medium/ Few/)	Quality of Existing View (Good/ Fair/ Poor)	Availability of Alternative Views (Yes/ No)	Average Distance between VSRs and Impact Source (m)	Degree of Visibility (Full/ Partial/ Glimpse)	Duration of View (Long/ Medium/ Short)	Frequency of View (Frequent/ Occasional/ Rare)	Sensitivity to Change (Low, Medium, High)
C4	Newport Centre (planned residential use under KTD)	Medium	Fair	Yes	100m	Full	Long	Frequent	Medium – Construction Stage High – Operation Stage
GIC2	Ng Wah College, Lee Kau Yan Memorial School, Sir Robert Black Health Centre, Petrol Station	Medium	Fair	No	40m	Full	Medium	Occasional	Medium
GIC3	Cognitio College	Medium	Fair	No	40m	Full	Medium	Occasional	Medium
GIC5	Kai Tak Operation Base and Existing Electricity Substation (same planned uses under KTD)	Few	Fair	No	20m	Full	Medium	Occasional	Medium
GIC6	EMSD Headquarters (same planned uses under KTD)	Few	Fair	Yes	20m	Full	Medium	Occasional	Medium (construction stage only)
GIC18	EMSD Workshops (planned sewage pumping station and open space under KTD)	Medium	Fair	No	50m	Full	Long	Occasional	High (construction stage only)
GIC25	Hong Kong Society for the Blind Factory (planned CDA in operation stage)	Medium	Fair	No	10m	Full	Long	Frequent	High
O1	Visitors at Olympic Garden	Medium	Fair	No	100m	Partial	Short	Occasional	Medium
O2	Visitors at Sung Wong Toi Garden	Medium	Fair	No	100m	Partial	Short	Occasional	High
O3	Visitors at Sung Wong Toi Playground	Medium	Fair	No	80m	Partial	Short	Occasional	High

VSR Type & ID.	Key Visually Sensitive Receiver (VSR)	Number of Individuals (Many/ Medium/ Few/)	Quality of Existing View (Good/ Fair/ Poor)	Availability of Alternative Views (Yes/ No)	Average Distance between VSRs and Impact Source (m)	Degree of Visibility (Full/ Partial/ Glimpse)	Duration of View (Long/ Medium/ Short)	Frequency of View (Frequent/ Occasional/ Rare)	Sensitivity to Change (Low, Medium, High)
O4	Visitors at Rest Garden next to Nga Tsin Wai Road	Medium	Fair	No	100m	Partial	Short	Occasional	High
O5	Visitors at Shek Ku Lung Road Playground	Medium	Fair	No	60m	Full	Short	Occasional	High
I1	Industrial Buildings in San Po Kong (planned residential use in operation stage)	Many	Poor	No	40m	Full	Long	Occasional	Medium
I4	Industrial Development along Mok Cheong Street (planned CDA in operation stage)	Medium	Poor	No	400m	Full	Long	Occasional	Low – (Construction Stage) High – (Operation Stage)
OU1	Tunnel Administration Building (same planned use under KTD)	Few	Fair	No	10m	Full	Long	Occasional	Medium
OU3	Business and Industrial Developments in San Po Kong (Planned commercial use in operation stage)	Many	Fair	No	20m	Full	Long	Occasional	Medium
T1	Motorists on Prince Edward Road East	Many	Fair	Yes	20m	Full	Short	Occasional	Low
T2	Motorists on carriageway and Pedestrians on Footpaths along Sung Wong Toi Road	Many	Fair	Yes	20m	Full	Short	Occasional	Low
T3	Motorists on Kwun Tong Bypass	Many	Fair	Yes	20m	Full	Short	Occasional	Low
Planned VSR at KTD per se									
R23P	Planned Residential Developments at Site 1A and 1B	Many	Fair	Yes	10m	Full	Medium	Frequent	High

VSR Type & ID.	Key Visually Sensitive Receiver (VSR)	Number of Individuals (Many/ Medium/ Few/)	Quality of Existing View (Good/ Fair/ Poor)	Availability of Alternative Views (Yes/ No)	Average Distance between VSRs and Impact Source (m)	Degree of Visibility (Full/ Partial/ Glimpse)	Duration of View (Long/ Medium/ Short)	Frequency of View (Frequent/ Occasional/ Rare)	Sensitivity to Change (Low, Medium, High)
R24P	Planned Residential Developments at Site 1H, II, 1J, IK, IL, and 2A	Many	Fair	Yes	10m	Full	Medium	Frequent	High
C7P	Planned Commercial Developments at Site 2A	Many	Fair	Yes	10m	Full	Medium	Occasional	Medium
GIC25P	Planned GIC Developments at Site 3B, 3C	Many	Fair	Yes	10m	Full	Medium	Occasional	Medium
GIC26P	Planned GIC Developments at Site 1C, 1D	Medium	Fair	Yes	10m	Full	Medium	Occasional	Medium
GIC27P	Planned GIC Developments at Site 2C	Medium	Fair	Yes	20m	Full	Medium	Occasional	Medium
GIC28P	Planned GIC Developments at Site 2A	Medium	Fair	Yes	20m	Full	Medium	Occasional	Medium
GIC29P	Planned GIC Developments at Site 1A	Medium	Fair	Yes	550m	Partial	Medium	Occasional	Medium
GIC30P	Planned GIC Developments at Site 1B	Many	Fair	Yes	100m	Full	Medium	Occasional	Medium
GIC31P	Planned GIC Developments at Site 1N	Medium	Fair	Yes	100m	Full	Medium	Occasional	Medium
CDA2P	Planned CDA Developments at Kai Tak City Centre	Many	Fair	Yes	10m	Full	Medium	Occasional	Medium
O21P	Planned Multi-purpose Stadium Complex	Many	Fair	Yes	10m	Full	Medium	Occasional	High
O22P	Planned Sung Wong Toi Park	Many	Fair	Yes	20m	Partial	Medium	Occasional	High
O23P	Planned Station Square	Many	Fair	Yes	10m	Full	Medium	Occasional	High

C = Commercial, GIC = Government/Institution/Community, O = Open space, OU = Other use, R = Residential, T = Transport related.

Landscape Impacts Assessment

Potential Sources of Impacts

- 4.8.31 The nature and scope of works are described in detail in **Section 4.1**. Sources of impacts in the construction phase would include:

Direct Impacts include:

- construction of sewage pumping stations serving the hinterland and the planned KTD (the DP2 Project) and
- loss of existing trees and vegetation due to DP2.

Indirect Impacts include:

- construction traffic;
- the laying down of utilities, including water, drainage and power;
- temporary site access areas, site cabins and heavy machinery;
- increased road traffic congestion;
- after dark lighting and welding; and
- dust during dry weather.

- 4.8.32 The sources of impacts of the project at the operation stage would be the operation of sewage pumping stations serving the hinterland and the planned KTD (the DP2 Project);

Degree of compatibility of the Project and associated Works

- 4.8.33 The sewage pumping stations (the DP2 Project) are essential infrastructures and are restricted in height. Equipments have been considered to put in basement level as far as practicable to reduce the building height. The height of sewage pumping stations (the DP2 Project) will be 7-8 m above ground. There will be planting to soften the proposed structures. Green roofs and vertical greening are proposed where appropriate to provide visual relief to VSRs at high level. The provision of the sewage pumping station buildings can be blended in with the urban environment and considered as compatible with adjacent landscape setting.

Nature and Magnitude of Unmitigated Landscape Impacts in Construction Phase

- 4.8.34 The magnitude of the impacts, before implementation of mitigation measures, on the landscape resources and landscape character areas that would occur in the construction phase are described below and tabulated in **Table 4.26**. All impacts are adverse unless otherwise stated.
- 4.8.35 The DP2 Project will cause permanent loss of 4 existing trees of LR28 - Trees in North Apron of Former Airport (**Table 4.26**). The loss trees include *Cassia siamea* and *Livistona chinensis*. Compensatory tree planting will be incorporated into the proposed DP2 where trees are affected (**Table 4.29 & 4.30**). Therefore, it is considered that the unmitigated impact on LR28 is slight (**Table 4.26**). There will be no impact on other LR. There will be no impact on LCAs outside KTD because the sewage pumping stations will be integrated with the overall urban design and planning of the KTD.
- 4.8.36 The magnitude of impacts before implementation of mitigation measures on the landscape characters is slight as the extent of the pumping station footprint is very small and localized.

Table 4.26 Landscape Impacts of the Proposed Works during Construction Phase

ID No.	Landscape Resources/ Landscape Character Areas	Source of Impact	Description of Impacts	Magnitude of Impacts
LR28	Trees in North Apron of Former Airport	<ul style="list-style-type: none"> sewage pumping stations (the DP2 Project) construction to be commenced in around mid 2009 	<ul style="list-style-type: none"> Approximately 3 trees will be affected by PS1 and 1 tree will be affected by PS2. The height of trees are around 4-6 m, spread 2-4 m, trunk diameter 200 mm. The amenity value of these trees is considered as medium. The species consist of <i>Cassia siamea</i> and <i>Livistona chinensis</i>. 	Small
LCA01	Former Kai Tak Airport Landscape Character Area (KTD in Operation Phase)	<ul style="list-style-type: none"> sewage pumping stations (the DP2 Project) construction to be commenced in around mid 2009 	<ul style="list-style-type: none"> Impact due to construction works, excavation works, temporary works and associated impacts 	Small
LCA02	Kowloon City and To Kwa Wan Grid Mixed Urban Landscape	<ul style="list-style-type: none"> sewage pumping stations (the DP2 Project) construction to be commenced in around mid 2009 	<ul style="list-style-type: none"> Impact due to construction works, excavation works, temporary works and associated impacts 	Negligible
LCA04	San Po Kong Industrial Urban Landscape	<ul style="list-style-type: none"> sewage pumping stations (the DP2 Project) construction to be commenced in around mid 2009 	<ul style="list-style-type: none"> Impact due to construction works, excavation works, temporary works and associated impacts 	Negligible
LCA05	Kwun Tong Industrial Urban Landscape	<ul style="list-style-type: none"> sewage pumping stations (the DP2 Project) construction to be commenced in around mid 2009 	<ul style="list-style-type: none"> Impact due to construction works, excavation works, temporary works and associated impacts 	Negligible

ID No.	Landscape Resources/ Landscape Character Areas	Source of Impact	Description of Impacts	Magnitude of Impacts
LCA09	To Kwa Wan Typhoon Shelter Landscape	<ul style="list-style-type: none"> sewage pumping stations (the DP2 Project) construction to be commenced in around mid 2009 	<ul style="list-style-type: none"> Impact due to construction works, excavation works, temporary works and associated impacts 	Negligible
LCA12	Kowloon City Medium / High-rise Commercial Urban Landscape	<ul style="list-style-type: none"> sewage pumping stations (the DP2 Project) construction to be commenced in around mid 2009 	<ul style="list-style-type: none"> Impact due to construction works, excavation works, temporary works and associated impacts 	Negligible

Nature and Magnitude of Unmitigated Landscape Impacts in Operation Phase

- 4.8.37 The magnitude of the impacts, before implementation of mitigation measures, on the landscape resources areas are the same as operation phase the impact on existing trees are irreversible. The unmitigated landscape impact in operation phase is slight and only a few trees are affected. The height of affected trees is around 4-6 m, spread 2-4 m, and trunk diameter 200 mm. The amenity value of these trees is considered as medium. The species consist of *Cassia siamea* and *Livistona chinensis*.
- 4.8.38 The magnitude of impacts before implementation of mitigation measures on landscape characters shown in **Table 4.27** is slight as the extent of pumping station footprint is very small and the locations of these pumping stations are planned in accordance with the PODP and RODP of KTD.

Table 4.27 Significance of Landscape Impacts in Construction and Operation Phases

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)		Magnitude of Change (Negligible, Small, Intermediate, Large)		Impact Significance Threshold BEFORE Mitigation (Insubstantial, Slight, Moderate, Substantial)		Recommended Mitigation Measures	Residual Impact Significance Threshold AFTER Mitigation (Insubstantial, Slight, Moderate, Substantial)		
		Construction	Operation	Construction	Operation	Construction	Operation		Construction	Operation	
										DAY 1	YEAR 10
Existing Landscape Resources											
LR01	Olympic Garden	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR02	Sung Wong Toi Garden	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR03	Sung Wong Toi Playground	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR04A	Rest Garden and amenity area near Nga Tsin Wai Road	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR04B	Amenity area near Sha Po Road	Medium	Medium	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR05	Shek Ku Lung Road Playground	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR06	Argyle Street Playground	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR09	To Kwa Wan Recreation Ground	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR11	Kowloon Walled City Park and Carpenter Road Park	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR17	Trees near Aviation Club Buildings	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR18	Trees at the periphery of existing lot boundary along Sung Wong Toi Road	Medium	Medium	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR19	Trees in the Amenity Areas along Sung Wong Toi Road	Medium	Medium	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)		Magnitude of Change (Negligible, Small, Intermediate, Large)		Impact Significance Threshold BEFORE Mitigation (Insubstantial, Slight, Moderate, Substantial)		Recommended Mitigation Measures	Residual Impact Significance Threshold AFTER Mitigation (Insubstantial, Slight, Moderate, Substantial)		
		Construction	Operation	Construction	Operation	Construction	Operation		Construction	Operation	
										DAY 1	YEAR 10
LR22	Trees in Amenity Areas near the Interchange in Kowloon Bay	Medium	Medium	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR23	Trees in Amenity Areas of San Po Kong Interchange	Medium	Medium	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR25	Trees near Grant Waterfront	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR28	Trees in North Apron of Former Airport	Medium	Medium	Small	Small	Slight	Slight	CM1, CM2 and OM1	Slight	Insubstantial	Insubstantial
LR31A	Kai Tak Nullah	Medium	Medium	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LR31B	Victoria Harbour	High	High	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
Planned Landscape Resources											
LR34	Planned Multi-purpose Stadium Complex Plaza	-	High	-	Negligible	-	Insubstantial	-	-	-	Insubstantial
LR35	Planned Sung Wong Toi Park	-	High	-	Negligible	-	Insubstantial	-	-	-	Insubstantial
LR36	Planned Station Square	-	High	-	Negligible	-	Insubstantial	-	-	-	Insubstantial
LR38	Planned Chinese Cultural Garden	-	High	-	Negligible	-	Insubstantial	-	-	-	Insubstantial
Existing Landscape Character Areas											
LCA01	Former Kai Tak Airport Landscape Character Area (KTD in Operation Phase)	Low	-	Small	-	Slight	-	CM1 to CM4	Slight	-	-
LCA02	Kowloon City and To Kwa Wan Grid Mixed Urban Landscape	Medium	Medium	Negligible	Negligible	Insubstantial	Insubstantial		Insubstantial	Insubstantial	Insubstantial

ID. No.	Landscape Resources / Landscape Characters	Sensitivity to Change (Low, Medium, High)		Magnitude of Change (Negligible, Small, Intermediate, Large)		Impact Significance Threshold BEFORE Mitigation (Insubstantial, Slight, Moderate, Substantial)		Recommended Mitigation Measures	Residual Impact Significance Threshold AFTER Mitigation (Insubstantial, Slight, Moderate, Substantial)		
									Construction	Operation	
		Construction	Operation	Construction	Operation	Construction	Operation			DAY 1	YEAR 10
LCA04	San Po Kong Industrial Urban Landscape	Low	Low	Negligible	Negligible	Insubstantial	Insubstantial		Insubstantial	Insubstantial	Insubstantial
LCA05	Kwun Tong Industrial Urban Landscape	Low	Low	Negligible	Negligible	Insubstantial	Insubstantial		Insubstantial	Insubstantial	Insubstantial
LCA09	To Kwa Wan Typhoon Shelter Landscape	Low	Low	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
LCA12	Kowloon City Medium / High-rise Commercial Urban Landscape	Medium	Medium	Negligible	Negligible	Insubstantial	Insubstantial	-	Insubstantial	Insubstantial	Insubstantial
Planned Landscape Character Areas											
LCA01A	Planned Kai Tak City Centre Urban Landscape	-	Medium	-	Small	-	Slight	OM1, OM2 and OM5	-	Insubstantial	Insubstantial
LCA01B	Planned Kai Tak Sports Hub Urban Landscape	-	Medium	-	Small	-	Slight	OM1, OM2 and OM5	-	Insubstantial	Insubstantial
LCA01C	Planned Kai Tak Metro Park Urban Landscape	-	High	-	Negligible	-	Slight	OM1, OM2 and OM5	-	Insubstantial	Insubstantial
LCA01E	Planned Kai Tak South Apron Corner Urban Landscape		Medium	-	Negligible	-	Insubstantial	-	-	Insubstantial	Insubstantial

Note: It is assumed that during the construction phase of DP2, part of the development in LCA01A will be completed. The impact on these areas due to DP2 during construction is assessed.

Visual Impacts Assessment

Potential Sources of Visual Impacts

- 4.8.39 The nature and scope of works of DP2 are described in detail in **Section 4.1**. Sources of impacts in the construction phase would include:

Direct Impacts include visual incompatibility of the works to the surrounding landscape and degrading of visual quality due to the following activities:

- construction of sewage pumping stations serving the hinterland and the planned KTD (the DP2 Project) and
- loss of existing trees and vegetation due to DP2.

Indirect Impacts include:

- construction traffic;
- the laying down of utilities, including water, drainage and power;
- temporary site access areas, site cabins and heavy machinery;
- increased road traffic congestion;
- after dark lighting and welding; and
- dust during dry weather.

- 4.8.40 The sources of impacts of the project at the operation phase would be visual incompatibility to the surrounding landscape due to the operation of individual sewage pumping station.

Prediction and Evaluation of Visual Impacts

Nature and Magnitude of Unmitigated Visual Impacts in Construction Phase

- 4.8.41 During the construction phase, the unmitigated visual impacts are adverse in nature and mainly include visual incompatibility of the construction works with the surroundings and degrading of visual quality of existing views. Since the scale of construction works for DP2 is small and localized, the potential impact on most of the VSRs is considered to be slight in general. Some VSRs are located in the immediate surrounding of the individual sewage pumping stations (e.g. Sung Wong Toi Playground is just 3m away from PS3) and the potential impact on these VSRs is considered to be moderate.

Nature and Magnitude of Unmitigated Visual Impacts in Operation Phase

- 4.8.42 During the operation phase, the major unmitigated visual impact is visual incompatibility of the sewage pumping stations with the surroundings. Since the development scale of DP2 is small and localized, the potential impact on the VSRs at local level and at KTD per se is considered to be slight in general. Some VSRs are located in the immediate surrounding of the individual sewage pumping stations; for instance, the planned CDA and residential developments in Ma Tau Kok will be facing NPS whilst the planned residential developments in Sites 1I, 1J and 1L will have direct views to PS2 and PS1A. The potential impact on these VSRs is considered to be moderate to substantial for they will have direct and full views to the sewage pumping stations.

Table 4.28 Significance of Visual Impacts in the Construction and Operation Phases (Note: All impacts adverse unless otherwise noted)

VSR Type & ID.	Key Visually Sensitive Receiver (VSR)	Main Source of Visual Impact	Magnitude of Impact (Negligible, Small, Intermediate, Large)		Receptor Sensitivity (Low, Medium, High)		Impact Significance Threshold Before Mitigation (Insubstantial, Slight, Moderate, Substantial)		Recommended Mitigation Measures	Residual Impact Significance Threshold After Mitigation (Insubstantial, Slight, Moderate, Substantial)		
			Construction	Operation	Construction	Operation	Construction	Operation		Construction	Operation	
											DAY 1	YEAR 10
Existing VSR												
R1	Sky Tower and adjacent residential developments along Sung Wong Toi Road	DP2	Small	Small	High	High	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
R3	Regal Oriental Hotel and Low to Medium-rise Residential Development in Kowloon City	DP2	Small	Small	High	High	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
R6	Rhythm Garden	DP2	Small	-	High	-	Slight	-	CM3, CM4	Insubstantial	-	-
R7	Choi Hung Estate	DP2	Small	Small	High	High	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
R9	Richland Gardens	DP2	Small	-	High	-	Slight	-	CM3, CM4	Insubstantial	-	-
R16	Grand Waterfront (same planned use under KTD)	DP2	Small	Small	High	High	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
R18	Low-rise Residential Development adjacent to Grand Waterfront (same planned use under KTD)	DP2	Small	Small	High	High	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
R19	R(A) zone at King Fuk Street	DP2	Small	Small	High	High	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
R20	R(A) zone to the southeast of Tung Tau Estate	DP2	Small	Small	High	High	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial

VSR Type & ID.	Key Visually Sensitive Receiver (VSR)	Main Source of Visual Impact	Magnitude of Impact (Negligible, Small, Intermediate, Large)		Receptor Sensitivity (Low, Medium, High)		Impact Significance Threshold Before Mitigation (Insubstantial, Slight, Moderate, Substantial)		Recommended Mitigation Measures	Residual Impact Significance Threshold After Mitigation (Insubstantial, Slight, Moderate, Substantial)		
										Construction	Operation	
			Construction	Operation	Construction	Operation	Construction	Operation			DAY 1	YEAR 10
R21	Le Billionaire and adjacent R(A) Zone in Kowloon City	DP2	Small	Small	High	High	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
R22	Low-rise Residential Developments along Mok Cheong Street (planned CDA in operation stage)	DP2	Intermediate	Intermediate	High	High	Moderate	Substantial	CM3, CM4, OM1, OM2, OM5	Slight	Slight	Slight
C4	Newport Centre (planned residential use under KTD)	DP2	Intermediate	Intermediate	Medium	High	Moderate	Substantial	CM3, CM4, OM1, OM2, OM5	Slight	Slight	Slight
GIC2	Ng Wah College, Lee Kau Yan Memorial School, Sir Robert Black Health Centre, Petrol Station	DP2	Small	Small	Medium	Medium	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Slight	Slight	Slight
GIC3	Cognitio College	DP2	Small	-	Medium	-	Slight	-	CM3, CM4	Insubstantial	-	-
GIC5	Kai Tak Operation Base and Existing Electricity Substation (same planned uses under KTD)	DP2	Small	-	Medium	-	Slight	-	CM3, CM4	Insubstantial	-	-
GIC6	EMSD Headquarters (same planned uses under KTD)	DP2	Large	-	Medium	-	Moderate	-	CM3, CM4, OM1, OM2, OM5	Slight	-	-
GIC18	EMSD Workshops (planned sewage pumping station and open space under KTD)	DP2	Intermediate	Intermediate	High	High	Moderate	Moderate	CM3, CM4, OM1, OM2, OM5	Slight	Slight	Slight
GIC25	Hong Kong Society for the Blind Factory (planned CDA in operation stage)	DP2	Large	Intermediate	Medium	High	Moderate	Substantial	CM3, CM4, OM1, OM2, OM5	Slight	Moderate	Slight

VSR Type & ID.	Key Visually Sensitive Receiver (VSR)	Main Source of Visual Impact	Magnitude of Impact (Negligible, Small, Intermediate, Large)		Receptor Sensitivity (Low, Medium, High)		Impact Significance Threshold Before Mitigation (Insubstantial, Slight, Moderate, Substantial)		Recommended Mitigation Measures	Residual Impact Significance Threshold After Mitigation (Insubstantial, Slight, Moderate, Substantial)		
										Construction	Operation	
			Construction	Operation	Construction	Operation	Construction	Operation			DAY 1	YEAR 10
O1	Visitors at Olympic Garden	DP2	Small	Small	Medium	Medium	Slight	Slight	CM3, CM4	Insubstantial	Insubstantial	Insubstantial
O2	Visitors at Sung Wong Toi Garden	DP2	Intermediate	Intermediate	High	High	Moderate	Moderate	CM3, CM4, OM1, OM2, OM5	Slight	Slight	Slight
O3	Visitors at Sung Wong Toi Playground	DP2	Large	Intermediate	High	High	Moderate	Moderate	CM3, CM4, OM1, OM2, OM5	Slight	Slight	Slight
O4	Visitors at Rest Garden next to Nga Tsin Wai Road	DP2	Small	-	High	-	Slight	-	CM3, CM4	Insubstantial	-	-
O5	Visitors at Shek Ku Lung Road Playground	DP2	Small	-	High	-	Slight	-	CM3, CM4	Insubstantial	-	-
I1	Industrial Buildings in San Po Kong (planned residential use in operation stage)	DP2	Small	-	Medium	-	Slight	-	CM3, CM4	Insubstantial	-	-
I4	Industrial Development along Mok Cheong Street (planned CDA in operation stage)	DP2	Small	Small	Low	High	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
OU1	Tunnel Administration Building (same planned use under KTD)	DP2	Small	Small	Medium	Medium	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
OU3	Business and Industrial Developments in San Po Kong (Planned commercial use in operation stage)	DP2	Small	Small	Medium	Medium	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
T1	Motorists on Prince Edward Road East	DP2	Small	Small	Low	Low	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial

VSR Type & ID.	Key Visually Sensitive Receiver (VSR)	Main Source of Visual Impact	Magnitude of Impact (Negligible, Small, Intermediate, Large)		Receptor Sensitivity (Low, Medium, High)		Impact Significance Threshold Before Mitigation (Insubstantial, Slight, Moderate, Substantial)		Recommended Mitigation Measures	Residual Impact Significance Threshold After Mitigation (Insubstantial, Slight, Moderate, Substantial)		
										Construction	Operation	
			Construction	Operation	Construction	Operation	Construction	Operation			DAY 1	YEAR 10
T2	Motorists on carriageway and Pedestrians on Footpaths along Sung Wong Toi Road	DP2	Small	Small	Low	Low	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
T3	Motorists on Kwun Tong Bypass	DP2	Small	Small	Low	Low	Slight	Slight	CM3, CM4, OM1, OM2, OM5	Insubstantial	Insubstantial	Insubstantial
Planned VSR												
R23P	Planned Residential Developments at Site 1A and 1B	DP2	-	Small	-	High	-	Slight	OM1, OM2, OM5	-	Insubstantial	Insubstantial
R24P	Planned Residential Developments at Site 1H, II, 1J, IK, IL, and 2A	DP2	-	Intermediate	-	High	-	Moderate	OM1, OM2, OM5	-	Slight	Slight
C7P	Planned Commercial Developments at Site 2A	DP2	-	Small	-	Medium	-	Slight	OM1, OM2, OM5	-	Insubstantial	Insubstantial
GIC25P	Planned GIC Developments at Site 3B, 3C	DP1	-	Small	-	Medium	-	Slight	OM1, OM2, OM5	-	Insubstantial	Insubstantial
GIC26P	Planned GIC Developments at Site 1C, 1D	DP1	-	Intermediate	-	Medium	-	Moderate	OM1, OM2, OM5	-	Slight	Insubstantial
GIC27P	Planned GIC Developments at Site 2C	DP1	-	Small	-	Medium	-	Slight	OM1, OM2, OM5	-	Insubstantial	Insubstantial
GIC28P	Planned GIC Developments at Site 2A	DP1	-	Small	-	Medium	-	Slight	OM1, OM2, OM5	-	Insubstantial	Insubstantial
GIC29P	Planned GIC Developments at Site 1A	DP1	-	Small	-	Medium	-	Slight	OM1, OM2, OM5	-	Insubstantial	Insubstantial

VSR Type & ID.	Key Visually Sensitive Receiver (VSR)	Main Source of Visual Impact	Magnitude of Impact (Negligible, Small, Intermediate, Large)		Receptor Sensitivity (Low, Medium, High)		Impact Significance Threshold Before Mitigation (Insubstantial, Slight, Moderate, Substantial)		Recommended Mitigation Measures	Residual Impact Significance Threshold After Mitigation (Insubstantial, Slight, Moderate, Substantial)		
										Construction	Operation	
			Construction	Operation	Construction	Operation	Construction	Operation			DAY 1	YEAR 10
GIC30P	Planned GIC Developments at Site 1B	DP1	-	Small	-	Medium	-	Slight	OM1, OM2, OM5	-	Insubstantial	Insubstantial
GIC31P	Planned GIC Developments at Site 1N	DP1	-	Small	-	Medium	-	Slight	OM1, OM2, OM5	-	Insubstantial	Insubstantial
CDA2P	Planned CDA Developments at Kai Tak City Centre	DP2	-	Intermediate	-	Medium	-	Moderate	OM1, OM2 OM5	-	Slight	Insubstantial
O21P	Planned Multi-purpose Stadium Complex	DP2	-	Small	-	High	-	Slight	OM1, OM2 OM5	-	Insubstantial	Insubstantial
O22P	Planned Sung Wong Toi Park	DP2	-	Small	-	High	-	Slight	OM1, OM2 OM5	-	Insubstantial	Insubstantial
O23P	Planned Station Square	DP2	-	Small	-	High	-	Slight	OM1, OM2 OM5	-	Insubstantial	Insubstantial

C = Commercial, GIC = Government/Institution/Community, O = Open space, OU = Other use, R = Residential, T = Transport related.

Mitigation Measures

Proposed Design Measures for the Sewage Pumping Stations

- 4.8.43 Proposed design measures incorporated in layout and design of the sewage pumping stations are described below.

Locational Considerations

- 4.8.44 The DP2 forms part of the KTD and the locations of the sewage pumping stations are sensitively determined in the formulation of RODP, which has been developed from the PODP under the Kai Tak Planning Review. Whilst the functional requirements to serve the hinterlands have to be fulfilled, the potential landscape and visual impacts to the surroundings would also be minimized by locating the sewage pumping stations in less sensitive sites (e.g. sites abutting major roads or in adjacent to non-sensitive uses, etc.).

Aesthetic Design of Structure

- 4.8.45 Utility building are potentially significant detractors to both the landscape and visual amenity of the Kai Tak Development. In order to minimize the impacts which they may cause, a series of measures have been incorporated in the development layout. These include:

- Provision of a Green Roof,
- Provision of buffer tree planting
- Minimization the extent of building footprint and height of structure.

Provision of Compensatory Planting

- 4.8.46 Trees to be removed from the works shall be compensated by appropriate tree planting within the Pumping Station.

Landscape and Visual Mitigation Measures during Construction and Operation Phases

- 4.8.47 Mitigation measures for DP2 refer to **Tables 4.29 to 4.30** together with the finding, implementation and maintenance agencies.

Table 4.29 Landscape and Visual Mitigation Measures during Construction Phase

ID No.	Landscape and Visual Mitigation Measure	Funding Agency	Implementation Agency
CM1 ¹	All existing trees shall be carefully protected during construction.	CEDD	CEDD
CM2 ¹	Trees unavoidably affected by the works shall be transplanted where practical. Detailed transplanting proposal will be submitted to relevant government departments for approval in accordance with ETWBC 2/2004 and 3/2006. Final locations of transplanted trees shall be agreed prior to commencement of the work.	CEDD	CEDD
CM3 ¹	Control of night-time lighting.	CEDD	CEDD
CM4 ¹	Erection of decorative screen hoarding.	CEDD	CEDD

Note: (1) Mitigation measures refer to Good Site Practices.

Table 4.30 Landscape and Visual Mitigation Measures during Operation Phase

ID No.	Landscape and Visual Mitigation Measure	Funding Agency	Implementation Agency	Maintenance Agency
OM1	Compensatory tree planting should be incorporated into the proposed projects where trees are affected.	CEDD	CEDD	DSD
OM2	Tall buffer screen tree / shrub / climber planting, green roof and vertical green where appropriate should be incorporated to soften hard engineering structures and facilities.	CEDD	CEDD	DSD
OM3	Not used	N/A	N/A	N/A
OM4	Not used	N/A	N/A	N/A
OM5	Aesthetically pleasing design as regard to the form, material and finishes shall be incorporated to all buildings, engineering structures and associated infrastructure facilities.	CEDD	CEDD	DSD

4.8.48 Illustration of mitigation measures are shown in **Figure 13.7, 13.7.1 to 13.7.5**. A typical perspective view showing mitigation measures as identified above to pumping station (PS2) is shown in Viewpoint 8 of **Figure 13.8B2**.

4.8.49 The Construction Phase measures listed above should be adopted from the commencement of construction and should be in place throughout the entire construction period. The Operation Phase measures listed above should be adopted during the detailed design, and be built as part of the construction works so that they are in place at the date of commissioning of the Project. However, it should be noted that the full effect of the soft landscape mitigation measures would not be appreciated for several years.

Residual Landscape and Visual Impact

Prediction of Significance of Landscape and Visual Impacts

4.8.50 The potential significance of the landscape and visual impacts during the construction and operation phases, before and after mitigation refer to **Table 4.27 and 4.28**. This assessment follows the proposed methodology and assumes that the appropriate mitigation measures identified in **Tables 4.29 and 4.30** above would be implemented, and that the full effect of the soft landscape mitigation measures would be realized after ten years.

Residual Landscape Impacts in Construction Phase

- 4.8.51 In the Construction Phase, after the implementation of the proposed mitigation measures, there will still be some residual landscape impacts of significance. They are described below.
- 4.8.52 Based on broad brush survey, approximate 4 trees (within LR28) in the North Apron of former airport will be affected by the DP2 Project. Approximately 4 trees will be affected by DP2. The height of trees is around 4-6 m, spread 2-4 m, trunk diameter 200 mm. The amenity value of these trees is considered as medium. The species consist of *Cassia siamea* and *Livistona chinensis*. Of the 4 trees affected, approximately 1 tree will be transplanted.
- 4.8.53 None of the affected trees are LCSD Champion Trees or Registered Old and Valuable Trees. There are no rare species or endangered species but common species. All the trees with high amenity value which are unavoidably affected by the works will be transplanted where possible. Detailed tree preservation, transplanting and felling including compensatory planting proposals shall be submitted to relevant government departments for approval in accordance with WBTC no. 3/2006. It is considered that the residual impact on tree during Construction Phase is slight.
- 4.8.54 There is no impact on existing open spaces due to the DP2 Project.
- 4.8.55 During Construction, there will be insubstantial residual impact on Landscape Character Areas due to the small scale of construction and the nature of impact is temporary.

Residual Visual Impact in Construction Phase

- 4.8.56 Given that the development scale of DP2 is small and localized, the residual visual impact on the VSRs is considered to be slight or insubstantial with the implementation of mitigation measures like erection of decorative screen hoarding. However, the mitigation measures proposed at ground level would not be able to mitigate the visual impacts for views from the higher level of some of the VSRs, in particular for those in close proximity to the individual sewage pumping stations.

Residual Landscape Impacts in Operation Phase

- 4.8.57 The residual impact on landscape resources in operation phase is generally the same as the construction phase as the impact is irreversible.
- 4.8.58 There is no significant impact on landscape character areas due to the DP2 Project. As the pumping stations are at around 7-8m high and occupy relative small areas. With the implementation of green roof system, buffer planting and aesthetic building design, the residual impact on LCA is insubstantial and considered as acceptable.

Residual Visual Impact in Operation Phase

- 4.8.59 Residual visual impacts in operation phase will be confined to the VSRs in close proximity to the individual sewage pumping stations for they will have direct and full views to the future utility structures. These VSRs include the planned CDA and residential developments in Ma Tau Kok, Sung Wong Toi Playground and the planned Sung Wong Toi Park, as well as the planned residential, CDA and GIC developments at future Kai Tak City Centre. With the implementation of design and mitigation measures like minimizing the building mass, incorporation of green roof system and aesthetic building design, as well as buffer tree planting, the residual adverse impact on these VSRs is considered to be slight. VSRs located further away, such as those located to the north of Prince Edward Road East, will only have partial or glimpsed views to the sewage pumping stations and the residual impact on these VSRs is considered to be insubstantial.
- 4.8.60 The proposed location for sewage pumping stations has been developed from PODP under the Kai Tak Planning Review and then further refined and improved under this Engineering Review in the RODP. During the urban design and planning process, design measures have been incorporated in the development layout so as to minimize any potential adverse visual impact on the VSRs at KTD per se.

Summary

- 4.8.61 Overall, it is considered that the landscape and visual impacts due to the DP2 Project during construction and operation phases are considered to be acceptable with the implementation of mitigation measures.

4.9 Environmental Monitoring and Audit Requirement

- 4.9.1 This section further elaborates the requirements of EM&A for the DP2 Project, based on the assessment results of various environmental issues.
- 4.9.2 The objectives of carrying out EM&A for the Project include the following:
- to provide a database against which any environmental impacts of the DP2 Project can be determined;
 - to provide an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards;
 - to monitor the performance of the Project and the effectiveness of mitigation measures;
 - to verify the environmental impacts predicted in this EIA;
 - to determine project compliance with regulatory requirements, standards and government policies;
 - to take remedial action if unexpected problems or unacceptable impacts arise; and
 - to provide data to enable an environmental audit.
- 4.9.3 The following sections summarise the recommended EM&A requirements. Details of EM&A are provided in the EM&A Manual.

Air Quality Impact

- 4.9.4 Air quality monitoring is not required. A regular site audit (weekly audit) is recommended to ensure compliance of the *Air Pollutant Control (Construction Dust) Regulation*.

Noise Impact

- 4.9.5 As no adverse construction noise impact is expected at the NSRs in the vicinity of the work sites due to the large separation distance between the construction sites and the nearby NSRs, construction noise monitoring is therefore not proposed. However, regular site audit is required to ensure proper implementation of good site practices.

Water Quality Impact

- 4.9.6 With the implementation of recommended mitigation measures, no unacceptable water quality impacts would be expected from the construction and operation of the proposed SPSs. Site inspections should be undertaken routinely during the construction phase to inspect the works areas in order to ensure the recommended mitigation measures are properly implemented.

Waste Management Implications

- 4.9.7 Waste management will be the contractor's responsibility to ensure that all wastes produced during the construction of the DP2 Project are handled, stored and disposed of in accordance with the recommended good waste management practices and EPD's regulations and requirements. The mitigation measures recommended in **Section 4.5** should form the basis of the site Waste Management Plan to be developed by the Contractor at the construction stage.
- 4.9.8 It is recommended that the waste arisings generated during the construction activities should be audited periodically to determine if wastes are being managed in accordance with approved procedures and the site Waste Management Plan. The audits should look at all aspects of waste management including waste generation, storage, transport and disposal. An appropriate audit programme would be to undertake a first audit near the commencement of the construction works, and then to audit on a weekly basis thereafter. In addition, the routine site inspections should check the implementation of the recommended good site practices and other waste management mitigation measures.

Land Contamination Impact

- 4.9.9 No environmental monitoring and audit requirements with regards to land contamination will be required for the DP2 Project.

Impact on Culture Heritage

- 4.9.10 The sites of the proposed SPSs, except PS3, are not in close proximity to any of the existing built heritage resources and are not on any area of archaeological potential.
- 4.9.11 However, given the close proximity of PS3 to Trench AA3 that is identified as an area of high archaeological potential, further archaeological investigation and rescue excavation as described in **Section 4.7.19** should be conducted under the Kai Tak Development Project. Full details of the scope and methodology of the further archaeological investigation should be submitted and agreed with the Antiquities and Monuments Office.
- 4.9.12 No mitigation and monitoring and audit programme specific for cultural heritage would be required for the construction of the proposed SPSs.

Landscape and Visual Impact

- 4.9.13 The EIA has recommended landscape and visual mitigation measures to be undertaken during construction and operation phases of the DP2 Project. The following paragraphs define the EM&A requirements to ensure the proposed landscape and visual impact mitigation measures are effectively implemented.
- 4.9.14 The construction phase EM&A of the landscape and visual environment and mitigation works shall be carried out as part of the site audit programme. Specific EM&A during operation phase of the DP2 Project is not required as long as the proposed mitigation measures in the EIA and as depicted in the Landscape Mitigation Plan are fully implemented.
- 4.9.15 Baseline changes with respect to the landscape and visual environments should be carried out in reference to the recorded baseline conditions of the site as described in Section 3.8 of the EIA. The monitoring should in particular record changes of each landscape resource, landscape character area and the view conditions of each visually sensitive receiver. Parameters used to describe changes in each of the above should be the same as in **Section 4.8** of the EIA.
- 4.9.16 The baseline monitoring should be conducted as a one-off site survey prior to commencement of any construction works.
- 4.9.17 All mitigation measures proposed in the EIA and implemented by the Contractor should be audited by a landscape auditor, as a member of the Environmental Team, on a regular basis to ensure compliance with the intended aims of the measures. Site inspection should be undertaken at least once every two weeks throughout the construction period.
- 4.9.18 In particular, the extent of the agreed works areas should be regularly checked during the construction phase. Any trespass by the contractor outside the limit of the works, including any damage to the existing trees, woodland and vegetation should be noted.
- 4.9.19 The landscape auditor should also audit the proposed operation phase mitigation measures in the EIA to ensure that they are fully implemented within the project design and construction.

4.10 Implementation Schedule of the Proposed Mitigation Measures

Table 4.31 Implementation Schedule for Air Quality Measures

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.2.17	<p>Implementation of dust suppression measures stipulated in <i>Air Pollution Control (Construction Dust) Regulation</i>. The following mitigation measures, good site practices and a comprehensive environmental audit programme are recommended to minimize cumulative dust impacts.</p> <ul style="list-style-type: none"> • Stockpiling site(s) should be lined with impermeable sheeting and bunded. Stockpiles should be fully covered by impermeable sheeting to reduce dust emission. • Misting for the dusty material should be carried out before being loaded into the vehicle. • Any vehicle with an open load carrying area should have properly fitted side and tail boards. • Material having the potential to create dust should not be loaded from a level higher than the side and tail boards and should be dampened and covered by a clean tarpaulin. • The tarpaulin should be properly secured and should extend at least 300 mm over the edges of the sides and tailboards. The material should also be dampened if necessary before transportation. • The vehicles should be restricted to maximum speed of 10 km per hour and confined haulage and delivery vehicle to designated roadways insider the site. On-site unpaved roads should be compacted and kept free of lose materials. • Vehicle washing facilities should be provided at every vehicle exit point. 	Work Sites / During Construction	Contractor		✓			EIAO-TM & Air Quality Objective

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
	<ul style="list-style-type: none"> The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores. Every main haul road should be scaled with concrete and kept clear of dusty materials or sprayed with water so as to maintain the entire road surface wet. Every stock of more than 20 bags of cement should be covered entirely by impervious sheeting placed in an area sheltered on the top and the three sides. Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites. 							
S4.2.18	(i) Provision of deodorization system and odour sources being enclosed; and (ii) Commissioning tests for all deodorization system should be included in the Design and Construction Contract Document.	PS1, PS1A, PS2, PS3, SPS at Site 5A1 and PS6	DSD (for the initial phase of PS1 & PS3) CEDD (for PS1A, PS2, SPS at Site 5A1, PS6, and the ultimate phase of PS1 & PS3)		✓	✓		EIAO-TM

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table 4.32 Implementation Schedule for Noise Measures

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.3	Use of quiet PME, movable barriers barrier for Asphalt Paver, Breaker, Excavator and Hand-held breaker and full enclosure for Air Compressor, Bar Bender, Concrete Pump, Generator and Water Pump.	Work Sites / During Construction	Contractor		✓			EIAO-TM, NCO
S4.3	Good Site Practice: <ul style="list-style-type: none"> Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program. Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program. Mobile plant, if any, should be sited as far away from NSRs as possible. Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum. Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs. Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities. 	Work Sites / During Construction	Contractor		✓			EIAO-TM, NCO
4.3	All the ventilation fans installed in sewage pumping stations should be provided with silencers or acoustics treatment.	PS1, PS1A, PS2, PS3, SPS at Site 5A1 and PS6	DSD (for the initial phase of PS1 & PS3) CEDD (for PS1A, PS2, SPS at Site 5A1, PS6, and the ultimate phase of PS1 & PS3)	✓	✓			EIAO-TM

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table 4.33 Implementation Schedule for Water Quality Measures

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.4	Operational Phase <ul style="list-style-type: none"> Dual power supply or emergency generator should be provided at all the SPSs to secure electrical power supply; Standby pumps should be provided at all SPSs to ensure smooth operation of the SPS during maintenance of the duty pumps; An alarm should be installed to signal emergency high water level in the wet well at all SPSs; and For all unmanned SPSs, a remote monitor system connecting SPSs with the control station through telemetry system should be provided so that swift actions could be taken in case of malfunction of unmanned facilities. 	PS1, PS1A, PS2, PS3, SPS at Site 5A1 and PS6	DSD (for the initial phase of PS1 & PS3) CEDD (for PS1A, PS2, SPS at Site 5A1, PS6, and the ultimate phase of PS1 & PS3)	✓	✓	✓		EIAO-TM, WPCO

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.4	<p><i>Construction Phase</i></p> <p><u>Construction site runoff and drainage</u></p> <p>Construction site runoff and drainage should be prevented or minimised in accordance with the guidelines stipulated in the EPD's Practice Note for Professional Persons, Construction Site Drainage (ProPECC PN 1/94). Good housekeeping and stormwater best management practices, as detailed in below, should be implemented to ensure that all construction runoff complies with WPCO standards and that no unacceptable impact on the WSRs arises due to construction of the Project. All discharges from the construction site should be controlled to comply with the standards for effluents discharged into the Victoria Harbour WCZ under the TM-DSS.</p>	Work Sites / During Construction	Contractor		✓			EIAO-TM, WPCO, ProPECC PN 1/94
S4.4	<p><u>Sewage Effluent</u></p> <p>Construction work force sewage discharges on site are expected to be connected to the existing trunk sewer or sewage treatment facilities. The construction sewage may need to be handled by portable chemical toilets prior to the commission of the on-site sewer system. Appropriate numbers of portable toilets shall be provided by a licensed contractor to serve the large number of construction workers over the construction site. The Contractor shall also be responsible for waste disposal and maintenance practices.</p>	Work Sites / During Construction	Contractor		✓			EIAO-TM, WPCO

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.4	<u>Refuse and Debris</u> It is recommended that collection and removal of floating refuse should be performed at regular intervals on a daily basis. The contractor should be responsible for keeping the water within the site boundary and the neighbouring water free from rubbish during construction.	Work Sites / During Construction	Contractor		✓			EIAO-TM, WPCO
S4.4	<u>Stormwater Discharges</u> Minimum distances of 100 m shall be maintained between the existing or planned stormwater discharges and the existing or planned seawater intakes.	Work Sites / During Construction	Contractor		✓			EIAO-TM, WPCO

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table 4.34 Implementation Schedule for Waste Management Measures

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.5	<p><u>Good Site Practices</u></p> <p>It is not anticipated that adverse waste management related impacts would arise, provided that good site practices are adhered to. Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site. Training of site personnel in proper waste management and chemical waste handling procedures. Provision of sufficient waste disposal points and regular collection for disposal. Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites). 	Work Sites / During Construction	Contractor		✓			EIAO-TM, WDO

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.5	<u>Waste Reduction Measures</u> Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include: <ul style="list-style-type: none"> • Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. • Encourage collection of aluminium cans, PET bottles and paper by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the work force. • Any unused chemicals or those with remaining functional capacity shall be recycled. • Proper storage and site practices to minimise the potential for damage or contamination of construction materials. 	Work sites / during construction	Contractor		√			EIAO-TM, WDO
S4.5	<u>Construction and Demolition Materials</u> Mitigation measures and good site practices should be incorporated in the contract document to control potential environmental impact from handling and transportation of C&D material. The mitigation measures include: <ul style="list-style-type: none"> • Where it is unavoidable to have transient stockpiles of C&D material within the Project work site pending collection for disposal, the transient stockpiles shall be located away from waterfront or storm drains as far as possible. 	Work site / during construction	Contractor and Independent Environmental Checker		√			ETWB TCW No. 33/2002, 31/2004, 19/2005

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
	<ul style="list-style-type: none"> Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric. Skip hoist for material transport should be totally enclosed by impervious sheeting. Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving a construction site. The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores. The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure dust materials do not leak from the vehicle. All dusty materials should be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet. The height from which excavated materials are dropped should be controlled to a minimum practical height to limit fugitive dust generation from unloading. 							

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
	When delivering inert C&D material to public fill reception facilities, the material should consist entirely of inert construction waste and of size less than 250mm or other sizes as agreed with the Secretary of the Public Fill Committee. In order to monitor the disposal of the surplus C&D material at the designed public fill reception facility and to control fly tipping, a trip-ticket system as stipulated in the ETWB TCW No. 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Materials" should be included as one of the contractual requirements and implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. An Independent Environmental Checker should be responsible for auditing the results of the system.							
S4.5	<u>Chemical Waste</u> After use, chemical wastes (for example, cleaning fluids, solvents, lubrication oil and fuel) should be handled according to the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Spent chemicals should be collected by a licensed collector for disposal at the CWTF or other licensed facility, in accordance with the <i>Waste Disposal (Chemical Waste) (General) Regulation</i> .	Work Sites / during construction	Contractor		√			Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.5	<u>General Refuse</u> General refuse should be stored in enclosed bins or compaction units separate from C&D material. A licensed waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D material. Effective collection and storage methods (including enclosed and covered area) of site wastes would be required to prevent waste materials from being blown around by wind, wastewater discharge by flushing or leaching into the marine environment, or creating odour nuisance or pest and vermin problem.							

* Des - Design, C - Construction, O – Operation, and Dec - Decommissioning

Table 4.35 Implementation Schedule for Land Contamination

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.6.25	<p>For EMSD Sung Wong Toi Vehicle Maintenance Workshop</p> <ul style="list-style-type: none"> EMSD as the current occupant of the EMSD Headquarters should conduct a land contamination assessment and complete the necessary remediation according to the relevant guidelines prior to handing over the site to the Government for redevelopment in the future. 	EMSD Sung Wong Toi Vehicle Maintenance Workshop / Prior to construction of PS NPS	EMSD	√			√	<p>“Guidance Note for Contaminated Land Assessment and Remediation”</p> <p>“Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management</p> <p>“Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards and Car Repair /Dismantling Workshop“</p>

Table 4.36 Implementation Schedule for Landscape and Visual Impact

EIA Ref	Environmental Protection Measures / Mitigation Measures	Location / Timing	Implementation Agent	Implementation Stages*				Relevant Legislation and Guidelines
				Des	C	O	Dec	
S4.8	<p>Construction Phase</p> <ul style="list-style-type: none"> All existing trees shall be carefully protected during construction. Trees unavoidably affected by the works should be transplanted where practical. Detailed transplanting proposal will be submitted to relevant government departments for approval in accordance with ETWBC 2/2004 and 3/2006. Final locations of transplanted trees should be agreed prior to commencement of the work. Control of night-time lighting. Erection of decorative screen hoarding. 	Working site / During Construction Phase	Contractor	✓	✓			EIAO-TM
S4.8	<p>Operation Phase</p> <ul style="list-style-type: none"> Compensatory tree planting should be incorporated into the proposed projects where trees are affected. Tall buffer screen tree / shrub / climber planting should be incorporated to soften hard engineering structures and facilities. Aesthetically pleasing design as regard to the form, material and finishes shall be incorporated to all buildings, engineering structures and associated infrastructure facilities. 	Working site / During Design stage and Operation Phase	DSD/CEDD	✓		✓		EIAO-TM

* Des - Design, C - Construction, O – Operation, and Dec – Decommissioning