Environmental Impact Assessment
Proposed Residential cum Passive Recreational Development within "Recreation" ("REC") Zone and "Residential (Group C)" Zone at Various Lots in DD 104, Yuen Long, N.T.

(**Volume I – Main Text and Appendices**)
(Final Report)

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1. INTRODUCTION

1.1 Background

The Project Site comprises various lots in D.D. 104 near Fairview Park, Mai Po, Yuen Long. It has an area of about 9 ha. The site is sandwiched between Yau Pok Road and Fairview Park. **Figure 1-1** presents the location of the Project Site. A cycle track connecting North West New Territories with North East New Territories – Tuen Mun to Sheung Shui Section is to be constructed by the Government at the eastern boundary of the Project site beside Yau Pok Road.

The Project Site is primarily zoned "Recreation" ("REC") with a small portion in the southern tip of the site zoned "Residential (Group C)" ("R(C)") on the Approved Mai Po and Fairview Park Outline Zoning Plan (OZP) No. S/YL-MP/6 (Subject OZP). According to the Notes of the Subject OZP, the planning intention of the "REC" zone is primarily for recreational developments for the use of the general public. It encourages the development of active and/or passive recreation and tourism/eco-tourism. Uses in support of the recreational developments may be permitted subject to planning permission. Whereas, the planning intention of the "R(C)" zone is primarily for low-rise, low-density residential developments.

ENVIRON Hong Kong Ltd. (the ENVIRON) has been commissioned by the Project Proponent, Capital Chance Limited, who is also the registered owner of the private lots within the Project Site, to conduct an Environmental Impact Assessment (EIA) for the proposed development. A project profile was submitted to EPD for the proposed development on 04 May 2009. Pursuant to section 5(7)(a) of the Environmental Impact Assessment Ordinance (EIAO), EPD issued an EIA study brief (Ref. No. ESB-207/2009) on 12 June 2009 for this Project.

Subsequent to the issuance of the EIA Study Brief, a small piece of private land zoned "R(C)" near the junction of Yau Pok Road and Fairview Park Boulevard is included in the Project Site following the acquisition of the said land by the Project Proponent. As the land is small and already designated by the Government for residential use under the OZP, its inclusion in the Project Site does not alter the nature of the Project. The proposed residential development cum passive recreational uses within the Deep Bay Buffer Zone 2 is a designated project under Schedule 2 of the EIAO. Applications to and approvals from relevant authorities such as the Town Planning Board, the Building Departments for the proposed development will be obtained in accordance with the Town Planning Ordinance, the Buildings Ordinance and other relevant legislations in order to effect the proposed development.

The current EIA submission is assessed on the basis of a worst case scenario. ENVIRON conducted this EIA (the Study) in association with consultants from various fields. The consultants' team includes:

- Planning – TMA Planning & Design Limited
- Architectural – Archiplus International Limited
- Ecological – Asia Ecological Consultants Limited
- Engineering – AECOM
- Landscape and Visual – Urbis Limited
- Traffic - AECOM
- Cultural Heritage - AECOM

1.2 The Project Location

Figure 1-1 presents the location of the Project Site. The site has an area of about 9 ha. It is bounded by Ngau Tam Mei Drainage Channel and Yau Pok Road to its immediate east and Fairview

Park to its immediate west, southwest and northwest. Between the eastern boundary of the site and Yau Pok Road, a cycle track linking the existing local cycle track networks of Yuen Long to Sheung Shui will be constructed by the Government under PWP Item 259RS with an Environmental Permit (EP) obtained.

Several existing residential developments including Palm Springs, Royal Palms, Yau Mei San Tsuen and Wo Shang Wai are located to the further north of the Project Site. Further to the east of the site across the Ngau Tam Mei Drainage Channel and Kam Pok Road is an area designated by the Government for residential use under "Residential (Group D)" ("R(D)") and "Village Type Development" ("V") zoning. Residential developments have been approved by the Town Planning Board (TPB) for the "R(D)" sites in this area, whereas existing villages such as Chuk Yuen Tsuen, Tai Yuen Villa, Hang Fook Gardens and Ha San Wai Tsuen, and a few open storage uses are witnessed in the "V" zone.

1.3 The Project Description

The Project comprises a residential development in the Southern Portion, and a landscaped open area, landscape pond and some passive recreational and supporting uses in the Northern Portion of the site. The existing ground level of the Project Site mainly varies from about +2mPD to about +5mPD, with an average level at about +4mPD, whereas the proposed mean site formation level is about +5.4mPD.

Under the current proposal, the existing wasteland in the Northern Portion of the site (about 52% of the total Project Site area) will be replaced with a landscape area, landscape pond and some passive recreational uses (e.g. boardwalk, sitting area, children's play area, hobby farm, etc., permitted as of right within the current "REC" zone) and supporting facilities (e.g. toilet, management office, bike kiosk and eating place) complementary to the Government's cycle track project to be implemented at the eastern boundary of the site and compatible with the nearby rural and natural landscape.

The existing wasteland in the Southern Portion of the site (about 48% of the total Project Site area) will be replaced with a residential development and ancillary uses (e.g. a residents' clubhouse and swimming pool). A total of 106 houses [with 2 residential storeys (6.6m) above ground level on the top of one storey basement carpark] and a residents' club house and ancillary facilities are proposed for this portion of the site. The proposed development is compatible with the existing Fairview Park residential development on the adjoining "R(C)" site and the planned residential developments on the adjacent "R(D)" sites.

The proposed development layout for the Project Site is shown in **Figure 2-1**, whereas the proposed elements of the Project are depicted in **Figure 11-19**. Separate planning application for the proposed development will be submitted by the Project Proponent to the Town Planning Board (TPB) for consideration in accordance with the relevant provisions under the Town Planning Ordinance (TPO).

1.4 EIAO and Designated Projects

According to Item P of Part 1, Schedule 2 of the EIAO, residential or recreational development other than New Territories exempted house (NTEH) within the Deep Bay Buffer Zone 1 or 2 is a Designated Project. As the Project Site falls within the Deep Bay Buffer Zone 2 and the proposed Project comprises residential development cum passive recreational uses other than NTEH, the Project is considered as a Designated Project, requiring Environmental Permit (EP) from the Director of Environmental Protection prior to the project implementation.

1.5 Continuous Public Involvement

Continuous public involvement (CPI) is one of the initiatives incorporated into the EIA process for engaging the public. CPI involves dialogue with local residents in parallel with the EIA preparation process in soliciting their views and opinions on the Project.

1.6 Scope

The scope of the EIA study covers the Project and its potential environmental impacts. The EIA addresses key issues as described below:

- Noise impacts arising from construction and operation of the Project;
- Dust impact arising from construction of the Project to nearby air sensitive receivers (ASRs) and odor impact from the existing and planned sewage treatment plants to the development and nearby ASRs;
- Landscape and visual impacts during construction and operation of the Project;
- The potential water quality impacts caused by site formation, drainage diversion, and any other works activities during construction; the potential water quality impacts caused by the operation of the Project;
- Potential impacts on historical buildings/architectures and monuments;
- Direct and indirect terrestrial and aquatic ecological impacts, in particular the potential impacts of disturbance and fragmentation to the recognized sites of conservation importance in the vicinity including, for example, the Mai Po Nature Reserve, Mai Po Inner Deep Bay Ramsar Site, Mai Po Village Site of Special Scientific Interest (SSSI), Mai Po Marshes SSSI, Wetland conservation Area (WCA) and Wetland Buffer Area (WBA) and important habitats such as fishponds, egretries, due to the construction and operation of the Project;
- Fisheries impacts during construction and operation of the Project; and
- The maintenance and management of the proposed landscape pond within the Project Site.

1.7 Objectives of the EIA Study

The objectives of the EIA study are:

- to describe the Project and associated works together with the requirements for carrying out the Project;
- to identify and describe elements of community and environment likely to be affected by the Project and/or likely to cause adverse impacts to the Project, including both the natural and man-made environment;
- to identify and quantify all environmental sensitive receivers, emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- to identify and quantify any potential losses or damage to flora, fauna and wildlife habitats;
- to identify any negative impacts on sites of cultural heritage and to propose measures to mitigate these impacts;
- to identify and quantify any potential landscape and visual impacts and to propose measures to mitigate these impacts;
- to propose the provision of infrastructure or mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction and operation of the Project;
- to identify, predict and evaluate the residual (i.e. after practicable mitigation) environmental impacts and the cumulative effects expected to arise during the construction and operational phases of the Project in relation to the sensitive receivers and potential affected uses;
- to identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the Project which are necessary to mitigate these environmental impacts and reducing them to acceptable levels;
- to investigate the extent of secondary environmental impacts that may arise from the proposed mitigation measures and to identify constraints associated with the mitigation measures recommended in the EIA study, as well as the provision of any necessary modification;
- to identity, within the Assessment Area, any individual project(s) that fall under Schedule 2 and/or Schedule 3 of the EIA Ordinance; to ascertain whether the findings of this EIA study have

adequately addressed the environmental impacts of those projects; and where necessary, to identify the outstanding issues that need to be addressed in any further detailed EIA study; and

- to design and specify the environmental monitoring and audit requirements, if required, to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted.

1.8 Programme

Appendix 1-1 presents the implementation programme. According to the programme, the construction works are tentatively scheduled to begin in 2017 and to be completed in 2020, subject to the commissioning of local public sewerage system (please refer to **Chapter 6** for details). After site formation works to raise the site formation level, the construction of buildings, internal driveways and underground services will commence within the Project Site. The implementation of site hoarding will be scheduled to avoid peak winter bird season (between October and March) to minimize disturbance.

1.9 Major Concurrent Projects

A number of development projects are known to be implemented near the Project Site. They include the followings:

- Yuen Long and Kam Tin Sewerage and Sewage Disposal under PWP Item 4235DS (EIA Application No. EIA-094/2004);
- Cycle Tracks Connecting North West New Territories with North East New Territories – Tuen Mun to Sheung Shui section (EIA Application No. EIA 159/2008);
- Proposed Residential Development within "Residential (Group D)" zone at various lots in DD 104, Yuen Long, N.T. (Study Brief No. ESB - 204/2009) (hereinafter referred to as the "RD Site");
- Proposed Low-rise and Low-density Residential Development at Various Lots and their Adjoining Government Land in D.D. 104, East of Kam Pok Road, Mai Po, Yuen Long, N.T. (Study Brief No. ESB - 210/2009) (hereinafter referred to as the "Kam Pok Road Site"); and
- Comprehensive Development and Wetland Protection near Yau Mei San Tsuen, Yuen Long (Study Brief No. ESB - 182/2008) (hereinafter referred to as the "Yau Mei Site").

The locations of the above-mentioned development projects (including a section of the proposed public sewerage and cycle track near the Project Site) are also shown in **Figure 1-2**. The works programme for the Project Site may overlap with that for the above projects.

With regards to the above, the first two projects are the government projects which have already obtained approval on their EIA reports under the EIAO process. The public sewerage project near Ngau Tam Mei Channel concerns the construction of a section of gravity trunk sewer underneath Kam Pok Road and Yau Pok Road as well as construction of the proposed Ngau Tam Mei Sewage Pumping Station (NTMSPS) near the road junction between Kam Pok Road and Castle Peak Road. According to the approved EIA report for this project (i.e. Agreement No. CE 66/2001(EP), EIA and TIA Studies for the Stage 2 of PWP Item No. 215DS - Yuen Long and Kam Tin Sewerage and Sewage Disposal (YLKTSSD), Environmental Impact Assessment (Final), March 2004 (EIA Application No. 094/2004)), the construction works would commence in mid-2005 for completion by the end of 2007. However, there is currently no fixed construction programme for this project.

For the cycle track project, a section of the cycle track will be constructed in the area between Yau Pok Road and the Project Site. According to the approved EIA report for this cycle track project (i.e. Construction of Cycle Tracks and the Associated Supporting Facilities From Sha Po Tsuen to Shek Sheung River, December 2008 (EIA Application No. EIA-159/2008)), the construction works would commence in mid-2009 for completion by early 2012. Currently, there is no fixed construction programme for this cycle track project.

As the above 2 projects have already obtained EIA approval, overlapping of their works programme with that of the proposed residential development project on the Project Site cannot be precluded at this stage, and hence they are taken into account in this EIA study.

For the last three private residential development projects listed above, none of them have obtained EIA approval. However, for both "Kam Pok Road Site" and "RD Site" projects, the respective planning applications were approved by the Town Planning Board under the Town Planning Ordinance. Based on the current best available information, the construction of the planned "RD Site" project will commence in year 2016 for completion in 2019, whereas the construction works for the planned "Kam Pok Road Site" project will commence in 2015 for completion in 2016. In this regard, the programme of some of the construction works for these 2 projects may overlap with that for the Project Site.

For the planned "Yau Mei Site" project, no planning approval nor EIA approval has been obtained by the respective project proponent so far. The development programme shown in the project profile of the respective project is also outdated. There is no committed development programe/ information available. It is therefore considered that the programme of the construction works for that project will not overlap with that for the Project Site, and the "Yau Mei Site" project is not considered further in the cumulative impact assessment of this EIA report.

1.10 Structure of the EIA Report

This EIA presents the findings of the Study and contains the following Chapters which demonstrate that the criteria in relevant Chapters of the Technical Memorandum (TM) on the Environmental Impact Assessment Process of the EIAO (EIAO-TM) are complied:

- Chapter 1 (this Chapter) provides an introduction of the Study.
- Chapter 2 presents the background and the need for this Study. It also describes the consideration of possible development options, construction methods and sequence of works for the Project.
- Chapter 3 provides information of the air quality impact assessment.
- Chapter 4 describes the potential noise impact during construction and operation of the Project and recommends mitigation measures.
- Chapter 5 presents the water quality impact assessment.
- Chapter 6 presents the sewerage and sewage treatment implications.
- Chapter 7 presents the waste management implications.
- Chapter 8 presents the ecological impact assessment. It contains the findings of the baseline survey and the identification of appropriate mitigation measures to avoid, minimize and compensate for ecological impacts.
- Chapter 9 presents the fisheries impact assessment.
- Chapter 10 presents considerations of cultural heritage.
- Chapter 11 presents the landscape and visual impact assessment.
- Chapter 12 is the summary of environmental outcomes.
- Chapter 13 provides the environmental monitoring and audit requirements
- Chapter 14 is the Project implementation schedule
- Chapter 15 presents the conclusions of the Study.

Appendix 1-3 presents the Study Brief checklist, which cross references the Chapters in this EIA Report where issues in the Study Brief are addressed.

Volume I of this EIA Report includes the main text and all the appendices attached with this report, while Volume II of the same report contains all figures.

2. CONSIDERATION OF ALTERNATIVES

2.1 Summary

2.1.1.1 This Chapter explains the need for the Project and documents the evolution and selection of development options. The need for the Project and relevant background information are explained in order to set out the guiding framework for the Project. Later Chapters of the report describe the evaluation process for options considered and hence the derivation of the recommended option for further assessment. This Chapter responds directly to Sections 3.3 to 3.6 of the Study Brief.

2.1.2 The Project Site

2.1.2.1 The Project Site comprises various lots and the adjoining Government land in D.D. 104 near Fairview Park, Yuen Long. It has an area of about 9 ha with an existing ground level varying mianly from about +2mPD to about +5mPD. The subject locality of the Project Site is residential in nature. The site is bounded by a large-scale residential development – Fairview Park, to the west, southwest and northwest. To the east of the Project Site are Yau Pok Road and Ngau Tam Mei Drainage Channel. To the northeast is an agricultural land designated by the Government for residential development with fish pond conservation under the zoning of "Other Specified Uses" annotated "Comprehensive Development to Include Wetland Protection Area" ("OU(CDWPA)"). Further to the north of the Project Site are two other existing large-scale residential developments called Palm Springs and Royal Palms, and a village called Yau Mei San Tsuen. Further to the east of the site across the Ngau Tam Mei Drainage Channel and Kam Pok Road are two sites zoned "Residential (Group D)" ("R(D)") with planning permissions granted by the TPB also for residential developments (TPB Ref: A/YL-MP/170 & 205).

2.1.2.2 The Project Site can be broadly divided into 2 portions – the Northern Site and Southern Site. In view of the existing and planned residential use on its adjacent sites, the Southern Site of the Project is proposed for residential development, whereas the Northern Site is proposed for an open area comprising a landscape area, landscape pond and some passive recreational uses and supporting facilities to enhance the visual amenity of the entire Project and complement the Government's cycle track project, which will be implemented at the eastern boundary of the site.

2.1.2.3 While the Southern Site of the Project does not fall within the WBA or WCA, the Project Site as a whole falls within the Deep Bay Buffer Zone 2. According to Item P of Part 1, Schedule 2 of the EIAO, the proposed residential development cum passive recreational uses within the Deep Bay Buffer Zone 1 or 2 is considered as a "Designated Project". An Environmental Permit (EP) from the Director of Environmental Protection is therefore required prior to the project implementation.

2.1.3 History of the Project Site

2.1.3.1 The Project Site has been partly zoned "REC" and partly zoned "R(C)" since the publication of the first Mai Po and Fairview Park OZP (i.e. the Draft Mai Po and Fairview Park OZP No. S/YL-MP/1) in June 1994. It is understood that the northern portion of the Project Site was previously largely occupied by agricultural use. Subsequently, most of the farmland was abandoned. The southern portion of the site was previously used for golf driving range and related uses. This part of the site has been largely paved to make way for such uses. At present, both the northern and southern portions of the Project Site are left vacant.

2.1.4 Statutory Planning Intention for the Project Site

According to the Approved Mai Po and Fairview Park OZP dated 1 February 2005, the Project Site is largely zoned "REC" with a small area in the southern tip of the site zoned "R(C)". The planning intention of the "REC" zone is primarily for recreational developments for the use of the general public.

It encourages the development of active and/or passive recreation and tourism/eco-tourism. Uses in support of the recreational developments may be permitted subject to planning permission from TPB. Such uses as "Place of Recreation, Sports or Culture" (e.g. hobby farm) and "Agriculture" (e.g. nursery grounds/shelter) are always permitted within the "REC" zone, whereas such uses as "Flat", "House", "Eating Place" and "Shop & Services" require permission from TPB. No residential development (except New Territories Exempted House) within the zone shall result in a total development in excess of a maximum plot ratio of 0.2 and a maximum building height of 2 storeys (6m). However, minor relaxation of plot ratio and building height restrictions may be permitted by TPB subject to individual merits of a development or redevelopment proposal. In regard to the "R(C)" zone, the planning intention of the zone is primarily for low-rise, low-density residential developments. No development within the zone shall result in a maximum plot ratio of 0.4 and a maximum building height of 3 storeys (9m) including car park. However, minor relaxation of plot ratio and building height restrictions may be permitted by TPB subject to individual merits of a development or redevelopment proposal.

2.2 Site Context

2.2.1 Existing Condition of the Project Site

2.2.1.1 The Project Site is situated in a low-lying area, and it is currently vacant. The general landscape pattern of the Project Site comprises mainly grassland/shrubland formed from abandoned agricultural land, a small piece of reedbed and seasonally wet grassland, and an abandoned pond is also witnessed on the site.

2.2.2 Existing Condition of the Surrounding Area

2.2.2.1 The surrounding area of the Project Site is characterized by a mixture of rural landscape, residential use and primarily abandoned agricultural fields with occasionally farm land. The western boundary of the Project Site is occupied by the large-scale residential development known as Fairview Park. The Project Site is bounded by the Ngau Tam Mei Drainage Channel and Yau Pok Road. Between the eastern boundary of the Project Site and the Yau Pok Road, a cycle track connecting the existing cycle track networks of Yuen Long to Sheung Shui forming part of the recreational cycle track network of the New Territories is to be constructed by the Government (to be commenced in 2012 under PWP Item 259RS). Across the Ngau Tam Mei Channel in the east is a large "R(D)" zone in which two sites have obtained planning permissions from the Town Planning Board (TPB) for residential development. A large cluster of village-type development including Tai Yuen, Chuk Yuen Tsuen, Hang Fook Gardens, Sheung San Wai Tsuen and Ha San Wai Tsuen are located to the further east of the Project Site while several existing residential developments including Palm Springs, Royal Palms, Yau Mei San Tsuen and Wo Shang Wai are located to further north of the site.

2.3 Consideration of Alternatives

2.3.1 Introduction

The EIA Study Brief requires the consideration of alternative layout options with justifications and evaluations for these alternatives. The comparison of environmental merits and demerits of each alternative layout option and the selection process for the preferred option also needs to be documented. The preferred option should avoid and minimize adverse environmental impact to the maximum extent.

2.4 Development Options

As discussed in Section 1.3 above, the Project is mainly for residential purpose with a landscape area, landscape pond and some passive recreational uses and supporting facilities provided within the site. The Project has a plot ratio (PR) of 0.2. Alternative options including different development scenarios

(at the same PR) are also considered for the purpose of comparison and evaluation. Due to the elongated shape of the Project Site, different development scenarios have been duly considered with residential development proposed either in the Southern Portion or the Northern Portion of the Project Site, or spreading out across the entire Project Site. When developing the development scenarios, due consideration has also been given to avoid and minimize the disturbance to the adjacent site of conservation importance especially the Wetland Conservation Area (WCA) near Fairview Park.

Different factors considered in the option selection and comparison of environmental benefits and disbenefits of different development scenarios have been made with a view to recommending the preferred option to avoid and minimize adverse environmental effects to the maximum extent and enhance the landscape and visual quality in the area.

2.4.1 Development Option 1

This development option is shown in **Figure 2-2**. Under this option, houses are proposed in both Northern and Southern Portions of the Project Site with some small landscape ponds and landscape area scattered within the site.

In this development scenario, certain buffer to separate the proposed houses from the WCA located further to the north is provided by means of the proposed peripheral green features. The development as a whole is considered compatible with the existing or planned residential developments on the adjacent sites. However, the size of the existing pond located in the north-western corner of the site will have to be reduced to make way for the proposed houses and the associated facilities (e.g. EVA / internal driveways). While the said pond is not ecologically important and a number of smaller ponds will be provided within the site to make the total pond area not less than that of the existing pond for visual amenity purpose, the smaller ponds created will be inevitably highly fragmented and isolated. In addition, as the proposed houses are spread across the entire Project Site, the internal road network required under this option will be slightly higher than that under Options 2 and 3, and more existing trees may be affected, likely resulting in a higher landscape impact. There will also be a higher visual impact under this development scenario since there are Visual Sensitive Receivers (VSRs) for both the Northern and Southern Portions of the Project Site. A detailed comparison of pros and cons of this development scenario is provided in **Table 2-1**. The overall environmental impacts of this development scenario based on its current setting may outweigh the benefits, thus it is not considered further.

2.4.2 Development Option 2

This development option is shown in **Figure 2-3**. Under this option, only the Northern Portion of the Project Site will be used for residential purpose, whereas the southern portion of the site will be exclusively used for a landscape area, landscape pond and some passive recreational uses (e.g. boardwalk, sitting area, children's play area, hobby farm, etc., permitted as of right within the "REC" zone) and supporting facilities (e.g. bike kiosk, toilet, management office, eating place, and cycle parking and car park, etc.).

This development option, which has all the houses in the Northern Site only, will have a lower visual impact than the Option 1 due to a smaller number of VSRs affected. The required internal road network due to the residential development will also be reduced and as such, more trees in the Southern Site could be retained. This development option is therefore subject to less landscape impact than Option 1. The landscape pond created in the Southern Site with a size comparable to the existing pond located in the Northern Site would have a less fragmentation effect than the provision of a number of small, scattered ponds in both Northern and Southern Sites under the Development Option 1. Having said that, clustering all the houses/most of the development intensity in the Northern Site within the WBA is considered less desirable than both Options 1 and 3. Besides, the landscape pond created in the Southern Site under this development option will be completely isolated by the existing and proposed anthropogenic structures, and thus less desirable in visual and

landscape terms. In view of the above, this development scenario is not considered further. A detailed comparison of pros and cons of this development option is provided in **Table 2-1**.

2.4.3 Development Option 3: Preferred Scenario

This option is to develop the proposed residential development in the Southern Site only, where the land have been largely paved for the previously approved golf driving range and related uses, and the surrounding environment is already disturbed by the existing developments (e.g. Fairview Park and adjacent road network) (**Figure 2-1** refers).

A landscape area, landscape pond and some passive recreational uses (e.g. boardwalk, sitting area, children's play area, hobby farm, etc., permitted as of right within the "REC" zone) and ancillary facilities (e.g. bike kiosk, toilet, management office, eating place and cycle parking and car park, etc.) are proposed in the Northern Site. The existing pond in the Northern Site will be retained and slightly enlarged from 0.5 ha to 0.6 ha and properly landscaped to enhance its visual amenity. This development option is considered favourable in land-use planning, and visual and landscape points of view for several reasons. As the residential cluster is proposed in the Southern Site only, which has been largely paved for the previously approved golf driving range and related uses, and is disturbed by the adjacent urbanized uses, the associated landscape impact are limited when compared with Options 1 and 2. The overall visual impacts are also reduced under this development option as there are less VSRs if the residential use is largely confined to the Southern Site. Compared with the other 2 development options, this development option could enhance the overall landscape and visual quality of the area due to better visual and landscape integration of the proposed landscape area within the site with the natural rural setting further to the north and northwest of the site. A detailed comparison of pros and cons of this development scenario is provided in **Table 2-1**.

This development scenario maximizes the benefits of other development options while reducing the environmental impacts to the minimum, thus it is preferred option for this Project.

2.5 Evaluation of Options

The abovementioned options are compared and evaluated in the **Table 2-1** below. The evaluation compares the relative strengths and weaknesses of each development option in ecological, planning, visual and landscape, environmental and engineering respects in the context of specific project objectives.

Table 2-1 Evaluation of Development Options

	Objectives	Option 1	Option 2	Option 3 (Preferred Scenario)
Ecological	Protecting the ecological integrity of the fish ponds and wetland within the WCA and preventing development that would have a negative off-site disturbance impact on the ecological value of fish ponds within the WCA	The fish ponds in the north and the habitats within the WCA are buffered by the existing Fairview Park; no impact to the ecological values of the WCA is anticipated.	The fish ponds in the north and the habitats within the WCA are buffered by the existing Fairview Park; no impact to the ecological values of the WCA is anticipated	The fish ponds in the north and the habitats within the WCA are buffered by the existing Fairview Park; no impact to the ecological values of the WCA is anticipated
	Minimizing habitat fragmentation	No ecological linkage with other wetland habitats. Fragmentation effect is high as the proposed ponds are small and surrounded by houses.	Some limited ecological linkage for herpetofauna species via the channel south of Fairview Park.	Some limited ecological linkage for herpetofauna species via the channel south of Fairview Park.

	Objectives	Option 1	Option 2	Option 3 (Preferred Scenario)
	Minimizing disturbance to surrounding habitats within the WCA	The habitats within the WCA will be buffered by the existing Fairview Park; no additional ecological impacts are anticipated.	The habitats within the WCA will be buffered by the existing Fairview Park; no additional ecological impacts are anticipated.	The habitats within the WCA will be buffered by the existing Fairview Park; no additional ecological impacts are anticipated.
Planning	Comply with the TPB guidelines for the developments within Deep Bay Area	The development option is in line with the TPB PG No. 12B regarding the requirements on EcoIA submission (as part of this EIA Report), no net increase in pollution load to Deep Bay Area (due to proper sewage disposal arrangement proposed) and provision of visual buffer to the WCA (by means of both tree planting and provision of small landscape ponds at or near the periphery of the Northern Site).	The development option is in line with the TPB PG No. 12B regarding the requirements on EcoIA submission (as part of this EIA Report), no net increase in pollution load to Deep Bay Area (due to proper sewage disposal arrangement proposed) and provision of visual buffer to the WCA (by means of tree planting provided at the northern periphery of the Project Site).	The development option is in line with the TPB PG No. 12B regarding the requirements on EcoIA submission (as part of this EIA Report), no net increase in pollution load to Deep Bay Area (due to proper sewage disposal arrangement proposed) and provision of visual buffer to the WCA (by means of provision of a large landscape area in the Northern Site).
	Compatible with surrounding residential developments	As the Project Site is surrounded by a number of existing and planned residential developments (with planning permissions) and village settlements, the proposed development comprising residential element is considered to be compatible with the surrounding developments in land use planning terms.	As the Project Site is surrounded by a number of existing and planned residential developments (with planning permissions) and village settlements, the proposed development comprising residential element is considered to be compatible with the surrounding developments in land use planning terms.	As the Project Site is surrounded by a number of existing and planned residential developments (with planning permissions) and village settlements, the proposed development comprising residential element is considered to be compatible with the surrounding developments in land use planning terms. In addition, most of the development intensity is provided in the Southern Site which has been largely paved and therefore suitable for house development, whereas the proposed landscape pond, landscape area and passive recreational and ancillary uses in the Northern Site is compatible with the natural landscape near the Deep Bay Area.
	Fully utilize the development potential of the Project Site	With an appropriate form of residential development and some passive recreational and supporting uses as proposed at both Northern and Southern Sites, the development potential (PR 0.2) of the Project Site can be fully utilized.	With an appropriate form of residential development as proposed at Northern Site and some passive recreational and supporting uses as proposed at the Southern Site, the development potential (PR 0.2) of the Project Site can be fully utilized.	With an appropriate form of residential development as proposed at the Southern Site and some passive recreational and supporting uses at the Northern Site, the development potential (PR 0.2) of the Project Site can be fully utilized.

	Objectives	Option 1	Option 2	Option 3 (Preferred Scenario)
Landscape and Visual	Minimise Potential Landscape Impact	Spreading the house development across the entire Project Site will maximise the required internal road network, thus increasing the landscape impact. Positioning the houses around the perimeter of the site will inevitably affect more trees although they are mainly of poor to fair health and low amenity value.	Containing the house development to the Northern Site will reduce the required internal road network compared to the layout under Option 1, thus reducing the landscape impact. The number of trees affected by the development will be minimised as more trees in the Southern Site can be retained and incorporated into the landscape area. A single large landscape area provided in the Southern Site is visually more desirable than the fragment landscape area design/ layout under Option 1.	Containing the house development to the Southern Site will reduce the required internal road network compared to the layout under Option 1, thus reducing the landscape impact. The development layout has been designed to allow for retention of more trees in the south as screen planting. By developing the Northern Site as a landscape area, landscape pond and some passive recreational and ancillary uses, more trees in the Northern Site can be retained where appropriate and a slight positive landscape impact will be achieved. A single large landscape area provided in the Northern Site integrating with the existing greenry natural setting further to the north and northwest of the site is visually more desirable than the fragment or isolated landscape area design/ layout under Options 1 and 2.
	Avoid Potential Visual Impact to Sensitive Receivers	Positioning the houses around the perimeter of both Northern and Southern Sites will inevitably cause a relatively higher visual impact, affecting most potential VSRs overlook in the site.	Positioning all housing in the Northern Site will reduce the number of VSRs affected by the development, thereby reducing the overall visual impact when compared to Option 1.	Positioning all housing in the Southern Site will further reduce the overall visual impact when compared with both Options 1 & 2 as there are less VSRs overlooking this part of the site. In addition the trees retained along the south-western boundary will further mitigate the visual impact of the development.
Engineering	Practical and Feasible Hydrological System	Drainage works are required to collect surface runoff	Drainage works are required to collect surface runoff	Drainage works are required to collect surface runoff

	Objectives	Option 1	Option 2	Option 3 (Preferred Scenario)
Environmental	Minimise Site Formation Works and Retaining Works Required and Associated Environmental Impacts	The whole Project Site (both northern and southern sites) will be filled for site formation works. Several small, isolated ponds will be created in both the northern and southern sites for amenity purpose, and thus subject to increased construction impacts due to extra construction / excavation works for pond creation.	The Northern Site will be filled for site formation works, while the proposed landscape features proposed in the Southern Site will require less extensive site formation works. The pond created in the Southern Site locates on a higher elevation level (~4mPD) than the Northern Site (~2mPD), and thus subject to increased construction impacts due to more extensive excavation.	The Southern Site area will be filled for site formation works, while the retention of pond in the Northern Site will require less extensive site formation works. The pond retained in the Northern Site locates on a lower elevation level (~2mPD) than the Southern Site (~4mPD). No further excavation work within the existing pond area is considered necessary (subject to the authories and engineering design), and thus is subject to less construction impacts when compared to both Options 1 & 2.
	Minimise Potential Water Quality Impacts	Surface run-off is to divert to the constructed surface drains	Surface run-off is to divert to the constructed surface drains	Surface run-off is to divert to the constructed surface drains

In view of the above, Option 3 is considered most appropriate and preferred for the Project Site. This proposed development option is shown in **Figure 2-1**.

2.6 Construction Methods and Sequences of Works

2.6.1 Construction Activities

As discussed in Section 1.3, the proposed development comprises a residential development, landscape pond, landscape area and some passive recreational and supporting uses. Based on the preferred development option, the Project Site is broadly divided into two portions, with the Northern Portion proposed for a landscape area, landscape pond and some passive recreational and supporting uses, and the Southern Site mainly used for residential purpose.

Since the Project Site is adjacent to existing residential developments and school [e.g. Fairview Park, Helene Terrace, Bethel High School and the nearby planned residential development sites such as the Planned Yau Mei Site, planned RD Site, and planned Kam Pok Road Site (see **Figure 4-2A**)], due consideration shall be given to the construction methods and sequence of works so as to minimize potential impacts during the construction period.

2.6.2 Alternative Construction Sequence

Similar to other general building project, the sequence of works of this Project will generally involve foundation (piling) works, site formation works, superstructure works, underground services and utilities, roadworks.

Since the Project Site is divided into Northern Portion and Southern Portion, works can be arranged to be carried out at these two portions individually, and the construction programme of the two portions are independent to each other. A preliminary construction programme was established based on the shortest possible construction period (about 3 years) (see **Appendix 1-2**), and the construction programme for the Northern Portion and Southern Portion is considered separately.

This programme has been developed merely based on construction sequence at each respective site without considering potential cumulative impacts due to concurrent works. However, based on this construction programe there will be many overlapping of construction works between the Northern Portion and the Southern Portion of the Project Site as depicted in the construction programe shown in **Appendix 1-2**. Thus, significant impacts on construction noise would arise due to the extensive construction area and concurrent works. Significant construction dust impact may also arise due to concurrent site formation works undertaken at both the Northern Portion and Southern Portion of the Project Site.

As such, an alternative construction programe has been developed with due consideration on sequence of works with a view to minimize concurrent construction at the Northern Portion and Southern Portion of the Project Site (See **Appendix 1-1**). This programe has provided due consideration to the potential cumulative construction impacts and concurrent works are avoided as much as possible. According to this alternative construction programe, some of the construction works (e.g. site formation works) for the Northern Portion and the Southern Portion will be undertaken separately. This arrangement would minimize potential impacts on construction noise and construction dust due to concurrent site formation works at the two portions of the Project Site. In addition, the construction programme has been extended to about four years so that overlapping of construction activities, particularly between the Northern and Southern Portions is minimized as far as possible. With this arrangement, potential impacts due to construction activities can be significantly reduced to a minimal as both the number and type of construction equipment to be used during each construction phase is minimized (by avoiding concurrent works) when compared to the original construction programme.

Asides from avoiding concurrent works by extending the construction period, due consideration has also been given to the sequence of works when developing the construction programe. In order to avoid unnecessary excavation between different phases of construction, construction of underground services and utilities will be constructed before the roadworks so that excavation of road surface to install underground services and utilities can be avoided. This arrangement will also avoid generation of unnecessary construction waste due to excavation.

In addition, since the Northern Site is relatively close to wetland than the Southern Site, the installation of the site hoarding (which will screen off any potential disturbance from the construction works to wintering birds) has also avoided the peak winter bird season. Given to the above, the construction programme and sequence of works presented in **Appendix 1-1** is more preferable than the original construction programe shown in **Appendix 1-2**.

2.6.3 Alternative Construction Method

As discussed earlier, the Project is for construction of low-rise residential development, a landscape area, landscape pond and some passive recreational and supporting uses, thus the extent of building structures construction will be minimum. Subject to the site condition, piling works may be required for the proposed development. Piling works may be undertaken by percussive piling method. However, this construction method will generate significant level of construction noise and is subject to Construction Noise Permit to be issued by EPD. In addition, there will be restriction on the duration of piling works that can be undertaken each day. Given that sensitive receivers are located in close proximity of the Project Site, this piling method is not preferred.

Instead, Continuous Flight Auger has been proposed to be used. The drilling method allows excavating in a wide variety of soils, dry or water-logged, loose or cohesive. This piling method is relatively quiet than the percussive piling method as no shocks or vibrations are induced when the system is performed. In addition, no bentonite mud is needed for the excavation, thus handling of bentonite slurries will not be required.

The proposed development will require excavation and filling works, thus excavated materials and filling materials will need to be handled carefully in order to minimize waste generation. One way to

handle excavated materials is by off-site disposal to public fill facility and/or landfill site subject to the quality of excavated materials. However, this would increase the amount of waste generated by the Project. Instead, due consideration has been given to reduce waste generation and disposal, and the excavated material will be utilized on site where possible as fill materials and for the landscaping area. The Contractor will be required to reuse materials on site as far as practicable and to minimize waste from arising. This construction method would reduce the amount of waste to be generated which requires off-site disposal. As excavated materials are re-used on-site, the amount of fill materials required would be minimized as well.

3. AIR QUALITY

3.1 Summary

This air quality impact assessment is carried out in accordance with Section 3.9.1 of the EIA Study Brief to qualify and quantify the potential air quality impacts associated with the Project. This Chapter follows the criteria and guidelines for evaluating and assessing air quality impacts as stated in Section 1 of Annex 4 and Annex 12 of the EIAO-TM.

This Chapter addresses the potential air quality impacts during construction phase and operational phase of the Project. The Assessment Area for air quality impact assessment is defined by a distance of 500 m from the boundary of the Project Site as per the Study Brief requirements.

3.2 Proposed Development

The proposed Project is for residential purpose in the Southern Portion, and a landscape area, landscape pond and some passive recreational and supporting uses in the Northern Portion of the site. Detailed elements of the proposed development and the MLP are provided in **Figure 2-1** and **Figure 11-16**, which is also discussed in Section 1.3.

3.3 Legislation, Standards, Guidelines and Criteria

The principal legislation regulating air quality in Hong Kong is the Air Pollution Control Ordinance (APCO) (Cap. 311). Air Quality Objectives (AQOs) are set for the whole of Hong Kong, which specify the statutory limits for various criteria pollutants and the maximum number of exceedance allowed over a specified period of time. The prevailing AQOs specified under the Air Pollution Control (Amendment) Ordinance 2013, have been adopted in this air quality assessment.

The AQOs for Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), and Respirable Suspended Particulates (RSP), and Fine Suspended Particulates (PM2.5), which are relevant to this assessment, are summarized in **Table 3-1** below.

Table 3-1 Hong Kong Air Quality Objectives (on and after 1 January 2014)

Pollutants	Averaging Period *	Pollutants Concentration ($\mu g/m^3$) *	No. of Exceedances Allowed *
CO	1 hour	30,000	0
	8 hours	10,000	0
NO_2	1 hour	200	18
	Annual	40	N.A.
SO_2	10-min.	500	3
	Daily (24 hours)	125	3
RSP	Daily (24-hours)	100	9
	Annual	50	N.A.
PM2.5	Daily (24-hours)	75	9
	Annual	35	N.A.

Remark:

* Based on the Air Quality Objectives under the Air Pollution Control (Amendment) Ordinance 2013.

N.B. Concentrations measured at 293 K and 101.325 kPa (one atmospheric pressure).

N.A. Not applicable.

PM2.5 means suspended particles in air with a nominal aerodynamic diameter of 2.5 μm or less.

RSP means suspended particles in air with a nominal aerodynamic diameter of 10 μm or less

In addition to the AQOs, an hourly Total Suspended Particulates (TSP) limit of 500 μg/m^3 measured at 298K(25^{o}C) and 101.325 kPa (one atmostphere) for construction dust impact assessment and 5 odour units based on an averaging time of 5 seconds for the odour prediction assessment is required according to the criteria for evaluating air quality impact under Annex 4 in EIAO-TM.

Construction dust is controlled under the Air Pollution Control (Construction Dust) Regulation. Works such as site formation, construction of the foundation and superstructure of buildings, road construction works are classified as "notifiable work" under the Regulation. Any works which involve stockpiling of dusty materials, loading, unloading or transfer of dusty materials, transfer of dusty materials using a belt conveyor system, use of vehicles, debris handling, excavation or earth moving, site clearance, etc. are regarded as "regulatory work".

A Schedule specifying the dust control requirements for a variety of construction activities is included in the Regulation. Contractors responsible for a construction site where a notifiable work and/ or regulatory work are involved have to ensure that the work is carried out in accordance with the Schedule with regards to dust control.

3.4 Ambient Contribution (Background) for Evaluating Air Quality Impacts

According to "Guidelines on Assessing the 'TOTAL' Air Quality Impacts" published in EPD's website, hour-by-hour background contribution is estimated using output of PATH model. As such, background contributions are based on PATH's concentration output for the purpose of evaluating the construction and operational phase air quality impacts.

Background contribution of PM2.5 is not directly available from PATH model. According to "Guidelines on the Estimation of PM2.5 for Air Quality Assessment in Hong Kong", background contribution of PM2.5 is deduced based on the following conservative formula.

Daily(μg/m^3): PM2.5 = 0.75 x RSP

Annual(μg/m^3): PM2.5 = 0.71 x RSP

For TSP background contribution, the RSP contribution in PATH's concentration output is adopted instead.

Regarding the proposed development which falls within grid(20,40) in PATH system, the background contributions of RSP is based on concentration of each hour in PATH's concentration output for grid(20,40). For background contribution of PM2.5 and TSP, these are calculated based on the RSP values as discussed above. As construction of the proposed development is to be commenced in year 2017, PATH's concentration output for Year 2015 is adopted as a conservative approach.

Appendix 3-1B shows details of background contribution from the PATH output for grid (20,40).

3.5 Air Sensitive Receivers

3.5.1 Construction Phase

Existing ASRs

Representative ASRs within 500 m from the Project Site boundary are identified according to the criteria listed in the EIAO-TM through site inspections and a review of land use plans. ASRs and their horizontal distance to the nearest emission source are summarized in **Table 3-2** below. Their geographical locations are also shown in **Figure 3-1**. The representative ASRs selected for construction phase air quality impact assessment are shown **Figure 3-2**.

Table 3-2 Locations of Representative Air Sensitive Receivers

Description	Usage	No. of Storeys	Shortest Distance from Project Site Boundary (approx.), m **	Ground Level, mPD *
Fairview Park @	Residential	2-3	~ 11m	3.9 – 4.6
Bethel High School (A10, A10A)	School	3	~15m	4.4
Wong Chan Sook Ying Memorial School (A14)	School	4	~98m	4.4
Royal Palms (A25)	Residential	2	~ 410m	4.9
Palm Springs (A17, A34, A35)	Residential	2-3	~ 260m	5.7
Yau Mei San Tsuen village house (A18, A36, A07, A23)	Residential	2	~ 220m	3.1 – 3.6
Hang Fook Garden (A20)	Residential	3	~ 430m	4.2
Chuk Yuen Tsuen (A19, A08, A09)	Residential	2-3	~ 220m	2.3 – 3.5
Ha San Wai Tsuen (A21, A22)	Residential	3	~ 403m	3.5 – 4.2
Helen Terrace and Villa Camellia (A11, A12)	Residential	2	~ 125m	4.5 – 6.5
Man Yuen Tsuen (A15)	Residential	3	~ 146m	4.1
Hong Chi Morninglight School Yuen Long (A26)	School	3	~337m	4.4
Christian Ministry Institute (A24)	School	2	~396m	3.5
Existing building (near Ha San Wai Road) (A27)	Commercial	3	~189m	4.5
Restaurant nearby Helene Terrace (A32)	Commercial	2	~87m	4.5

Remark: * Existing ground level of representative ASRs

** Shortest horizontal distance between the ASRs and the nearest Project Site boundary.

@ Representative ASRs at Fairview Park A01, A01A, A02, A02A, A03, A04, A05, A05A, A05B, A06, A06A, A13, A16, A16A, A28, A29, A30, A31, A33 as shown in Figure 3-2.

Planned ASRs

Identification of potential planned/ committed ASRs has been based on best available information such as relevant plans[1] , current Outline Zoning Plan (OZP No. S/YL-MP/6), and Town Planning Board (TPB) records, which have been reviewed. The registry of EIAO projects was also reviewed for identifying EIA projects. Based on information reviewed, there are a few planned residential development projects in the vicinity of the proposed development site. These planned residential developments are also classified as designated project under the EIAO; as such they have to go through the EIAO process. These potential future development cases are listed in **Table 3-3** below, and their geographical locations are also shown in **Figure 3-2**.

Table 3-3 Planned Air Sensitive Receivers

Planned Site	ASR ID	EIAO Application Number / Relevant Town Planning Board No.	Description	Appro-val from TPB	Appro-val of EIAO	Ground mPD Level, (approx.) *	No. of Storey *	Distance, m **
Planned residential development projects								
Yau Mei Site	A1P	ESB-182/2008	Comprehensive Development and Wetland Protection near Yau Mei San Tsuen, Yuen Long	No	No	2	3	~12
Kam Pok Road Site	A2P	ESB-210/2009. A/YL-MP/136; Also in A/YL-MP/170	Proposed Residential Development at "R(D)" zone	Yes	No	5	2	~70
	A3P					7	2	~79
RD Site	A4P	ESB-204/2009. Different scales of development and site areas were also under A/YL-MP/132, A/YL-MP/146, A/YL-MP/193 and A/YL-MP/205	Proposed Residential Development within "R(D)" Zone at Various Lots in DD 104.	Yes	No	3	2	~75
	A5P					3	2	~86
"V" zone/ "R(D)" zone in OZP	V01	A/YL-MP/172-3 and A/YL-MP/183-1	Proposed new territory exempted village house development	Yes	-	3	3	~270m
	V02, V03/ V04	Nil	Village zone / "R(D)" zone in OZP, respectively	-	-	2.4/ 4.8	3	~95m to ~213m

1 According to information available on Planning Department's website (available at: http://www.pland.gov.hk/pland_en/info_serv/tp_plan/index.html), the Project Site is not covered by existing Development Permission Area Plans. Instead, it is currently covered by the Outline Zoning Plan (OZP) No. S/YL-MP/6. Records of both the adopted and draft departmental plans in the area were obtained from Planning Department. According to the records obtained, relevant plans were reviewed such as the "L/YL-FP/1C Residential Layout - Fairview Park Access Road, Yuen Long" adopted in year 1982; as well as the draft departmental plan "DP/NWNT/1C North West New Territories - Development Plan" approved in year 1984. As all of these plans were prepared in 1980s', planned uses indicated in these plans are outdated and are superseded by the existing OZP. As advised by Planning Department, the existing OZP is the latest version regarding planned land uses in the area.

Remark: * Based on existing ground level. According to the OZP, allowed building height of the planned development sites are 6m high, it is therefore assumed the planned developments are 2 storeys buildings. For Yau Mei Site, the maximum allowed building is 3 storeys.

** Shortest horizontal distance between the nearest Project site boundary and the ASR locations shown in Figure 3-2.

None of the above residential development projects have obtained approval from both the Town Planning Board (TPB) and provisions under the EIAO. Although these development sites have no committed development programme, these planned ASRs have also been taken into account in the construction phase air quality impact assessment. Details of the assessment and assumptions adopted have been provided in the following sections.

In addition to the above planned development projects, there are also approved new territories exempted house development sites on the opposite side of Ngau Tam Mei Drainage Channel (e.g. case number A/YL-MP/172-3 and A/YL-MP/183-1) within the Village Development ("V") zone under the Outline Zoning Plan No. S/YL-MP/6 ("V01" in **Figure 3-2** refers). Asides from the above, the existing "V" zone and "R(D)" zone in the Outline Zoning Plan No. S/YL-MP/6 are also selected for assessment (V02, V03, and V04 in **Figure 3-2** refer). It is expected that development within these areas will be typical 3 storeys buildings. Although there is no committed development programe for these development sites, the concerned development sites are also taken into account in the air quality assessment.

3.5.2 Operational Phase

During the operation, representative ASRs of this Project are the proposed residential houses within the Project Site. **Figure 2-1** shows the layout of the proposed houses.

3.6 Air Quality Impact Assessment

3.6.1 Construction Phase

3.6.1.1 Identification of Potential Impacts

The Project works comprise construction of residential buildings (2 storeys above a basement carpark) and ancillary facilities (e.g. residents' club house), and a landscape pond, landscaped open area and some passive recreational and supporting uses as discussed in Section 1.3. Since the proposed development intensity is not high, significant air quality impacts due to construction of foundation, building structures and the finishing works are not anticipated. As "ready-mixed" concrete will be used during the pile cap construction, significant air quality impact is not expected. As such, major sources of air quality impact during the construction phase would be fugitive dust emissions during the site formation stage due to earth movement activities and transportation of excavated/ fill materials. As suspended particles will be the main air quality parameter concerned for construction works which involve handling of excavated/ fill materials, TSP, RSP and PM2.5 have been identified as the parameters for further air quality impact assessment for dust emission impact.

Emissions of other air pollutants such as carbon monoxide and dioxide, nitrogen oxides and sulphur dioxide generated by powered mechanical equipment and vehicle exhausts on-site should not be significant since only limited amount of construction plants will be used on-site. Therefore, unacceptable impacts from the criteria pollutants (such as NOx, SO_2, and CO) are unlikely to occur as significant emissions of pollutants are not anticipated, and further assessment is not necessary.

Given the Project Site area is relatively flat no rock crushing will be necessary. It is expected that no concrete batching plants will be used on-site. Concrete will be brought to the site in "ready-mixed" state or in pre-cast sections. Similarly, construction of pile caps for the residential buildings will use

"ready-mixed" concrete. Thus emissions due to operation of cement works or rock crushing activities are not anticipated.

One small abandoned pond is located in the Northern Portion of the Project Site (**Figure 7-2** refers). Pond sediment may be rich in organic matters and emit odour during earth movement. As the abandoned pond will form part of the proposed landscape pond at the same location, no dredging of sediment or pond filling activities will be required for this Project.

There are two sections of fixed temporary noise barriers (with a barrier height of 9m and 5.5m, respectively) proposed to be erected near the site boundary in adjacent to Fairview Park during the construction phase (see Section 4.8.3 and **Figure 4-6**). Since the Project construction site is in an open area, the proposed vertical noise barriers along a portion of the Site boundary will not affect the dispersion of air pollutants from the construction site or the ASRs. Thus, no further assessment is necessary.

3.6.1.2 Evaluation of Impacts

According to the construction programme, the Project's construction period will tentatively commence in 2017 with the residential development ready for occupation by 2020. An indicative construction programme is shown in **Appendix 1-1**.

During site formation stage, earth movement activities and transportation of excavated/ fill materials will be involved, which would attribute to dust emissions. As discussed earlier, TSP, RSP, PM2.5 have been identified as the parameter for air quality impact assessment during the site formation stage. Activities that would attribute to dust emissions are:

- Removal and unloading of soil materials by excavators;
- Earth loading/ unloading, and stockpiling;
- Bulldozing and surface compaction;
- Wind erosion on exposed ground; and
- Vehicle movements on haul roads;

During construction, the Contractor(s) will be required to transport only the adequate amount of fill materials to the Project Site in order to avoid cumulating filling materials on-site and the filled area shall be compacted as soon as possible (relevant requirement has been stated in Section 3.9.1). In addition, excavated materials will be reused as fill materials within the Project Site so as to minimize dust emission due to transportation of fill materials. In case temporary stockpiling of small amount of materials is required, the stockpiling location will be covered by tarpaulin sheets and backfilled as soon as possible.

The potential air quality impact is anticipated to be short-term and can be effectively controlled through appropriate design and good site practice stipulated in the Air Pollution Control (Construction Dust) Regulation. Notwithstanding the above, an EM&A programme will be implemented to monitor the construction process to facilitate the enforcement of dust controls and modification of work methods in order to reduce the dust emission to an acceptable level.

An assessment on impact of TSP, RSP and PM2.5 emissions have also been undertaken for the Project works, and the results are depicted in the following sections.

3.6.1.3 Concurrent Construction Due to Adjacent Approved EIA Projects

According to the approved EIA report, namely the "EIA and TIA Studies for the Stage 2 of PWP Item No. 215DS - Yuen Long and Kam Tin Sewerage and Sewage Disposal" [2], a sewage pumping station (SPS) (Ngau Tam Mei SPS), has been proposed at an offsite location about 345m northeast of the Project Site. The approximate location of the proposed SPS, based on the above EIA report, is shown in **Figure 3-1**.

Under the same project (current PWP Item 4235DS), a gravity trunk sewer will be constructed along Castle Peak Road between Ngau Tam Mei and San Tin, and a section of alignment will be constructed along the Ngau Tam Mei Channel. The construction of the above sewerage project has been assessed in the above-mentioned EIA report.

Currently, there is no solid construction programme of the said sewage pumping system and the public sewers. The EIA report has stated that all works will be carried out in small section areas within a short period. These activities should not generate significant amount of construction dust and result in cumulative impact. It has also recommended in the same report the construction works will be carried out in 50m segments. The contractor is also obliged to follow the procedures and requirements given in the *Air Pollution Control (Construction Dust) Regulation*. Therefore, the active areas should be small. In addition, an EM&A programme will be implemented for this project to ensure implementation of and review of the effectiveness of the mitigation measures.

Similarly, based on the information in a separate EIA report for "Construction of Cycle Tracks and the Associated Supporting Facilities from Sha Po Tsuen to Shek Sheung River" (EIA Application No. EIA-159/2008), a cycle track will also be provided along the Castle Peak Road and the Yau Pok Road as part of the cycle track project between Tuen Mun and Sheung Shui under PWP Item 7259RS.

According to the EIA report, the concerned construction of cycle track project will involve construction of a narrow strip of cycle track, which will be constructed in sections. Typically, the working area will be 40 m long by 4 m wide and no adjacent sections (200m between two neighbouring sections) will be constructed simultaneously. Currently, there is no fixed construction programme for the cycle track project. The EIA report concluded that the construction dust can be controlled at source to acceptable level with the implementation of dust control measures as required under the *Air Pollution Control (Construction Dust) Regulation*. The approved EIA report has also recommended a series of measures for suppressing dust on site, including spraying the works area for site clearance with water both before, during and after the operation so as to maintain the entire surface wet.

By the wetting of the whole construction site and keeping the construction area small, the potential dust impacts arising from the cycle track construction works are expected to be minimal. Hence, no unacceptable impact is anticipated. In addition, an EM&A programme will be implemented for that Project during its construction phase, to check the effectiveness of the recommended mitigation measures and compliance with relevant statutory criteria.

Given that the concerned construction works of the two approved EIA projects are relatively small in scale (i.e. laying sewers along existing road, and construction of a cycle track), and the construction will only be carried out in small sections (less than 50m for the public sewers, and 40m for the cycle track), adverse dust impacts are not expected from the concerned construction works with the implementation of mitigation measures recommended in the approved EIA reports.

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2 Agreement No. CE 66/2001(EP), EIA and TIA Studies for the Stage 2 of PWP Item No. 215DS - Yuen Long and Kam Tin Sewerage and Sewage Disposal (YLKTSSD), Environmental Impact Assessment (Final), Mar., 2004.

In addition, the contractors will be required to follow the procedures and requirements as stipulated in the Air Pollution Control (Construction Dust) Regulation and dust emissions will be effectively controlled through implementation of mitigation measures recommended in the above-mentioned EIA reports.

EM&A programmes will also be implemented for this Project to monitor the effectiveness of the mitigation measures during construction of the projects. As all of these approved projects will also be subject to control under the EIAO, cumulative air quality impact from this Project will be controlled through implementation measures described in this report and those committed for the other projects. According to the above-mentioned EIA reports, with the recommended mitigation measures, adverse dust impacts are not expected to arise from these projects and the residual construction air quality impacts are expected to be acceptable. As such, no adverse air quality impacts due to the above-mentioned adjacent projects are expected and are not considered further in this Study.

3.6.1.4 Concurrent Construction Due to Nearby Planned Development Projects

As discussed in Section 3.5.1, there are a few planned development projects in adjacent to the Project Site. According to the EIA Study Brief of these planned development projects, the proposed developments of these projects are also for residential purpose (i.e. similar to this Project). Since all these projects are located in relatively flat area, it is expected that the construction scale of these project sites will be similar to this Project and major sources of air quality impact during the construction of these planned development sites would be fugitive dust emissions during the site formation stage.

As discussed in Section 1.9, construction of planned Kam Pok Road Site and planned RD Site may overlap with this Project and are selected for cumulative impact assessment. Both the planned Kam Pok Road Site and the planned RD Site are EIA projects under the EIAO and both of them have previously obtained approval from the TPB, thus reference was made to the published information as well as construction programe obtained from those projects. Based on best available information, the site formation works for the planned Kam Pok Road site will be undertaken during year 2015, while site formation for the planned RD site will be in year 2017 (see **Appendix 3-1A**). While, the site formation of this Project will commence in later year 2017 (**Appendix 1-1** refers). Since construction works of this Project will unlikely overlap with the adjacent planned development sites, cumulative air quality impacts due to concurrent works are very unlikely, and are not considered further in this assessment. Therefore, no adverse impact due to cumulative construction activities is anticipated. Nevertheless, air quality impact from this Project will be controlled through implementation measures described in this report and those committed for the other projects under their respective EIA studies.

3.6.2 Operational Phase

3.6.2.1 Identification of Potential Impacts

According to Para 3.9.1.4 (iv) of the EIA Study Brief a quantitative impact evaluation following the methodology in para. 3.9.1.4(v) shall be carried out if the assessment indicates likely exceedance of the recommended limits set forth in the TM on the Project Area and at nearby air sensitive receivers (ASRs). There are no planned dust generating or air pollutant emission sources from the operation of this Project. Thus, the Project Site itself will not contribute to any air pollution nuisance upon identified ASRs during the operational phase.

Vehicular emissions from off-site sources could be a potential source of air pollution during the operational phase of the Project. However, since sufficient setback distance has already been provided between the development and the road networks, its potential impacts are anticipated to be insignificant.

A review of chimney locations based on EPD's register previously obtained, were carried out. No chimneys were identified within the Assessment Area. Additional chimney surveys were also conducted on 30th Mar., 2009, 10th Jul., 2009 and 29th Oct., 2010 to verify the findings. There was no change to the site condition observed during subsequent visits on 10th Dec., 2010, 28th Jul., 2011, 12th Oct., 2011 and 18th Oct., 2013. As no chimneys were identified within the Assessment Area, no air quality impact related to chimney emissions is expected and therefore not considered further in this assessment.

As there is no existing sewage treatment plants within the 500m Assessment Area from the Project Area, potential odour impacts are not a concern of this Project. The future Ngau Tam Mei Sewage Pumping Station (SPS) is planned to be located at the junction of Kam Pok Road and Castle Peak Road (about 345m northeast from the Northern Portion of this Project) (**Figure 3-1** refers). With the careful design of the pumping station and installation of odour removal system, it is expected that odour impact due to the pumping station will be insignificant.

During the operational phase, the sewage generated by the proposed development will be discharged to the planned public sewerage system at Yau Pok Road, which is to be constructed under PWP No. 4235DS by Hong Kong SAR Government Drainage Services Department (DSD). The Project will not have population intake until the commissioning of the planned local public sewerage works (Please refer to **Chapter 6** of this report for details). Thus, there will be no odour impact during the Project operational phase.

The layout of the facilities for the proposed development will be carefully planned such that the refuse collection point (a potential odour source) will be away from the residential area as far as possible but will be close to the main access area connecting the main road. During the detailed design phase, the minimisation of odour at the refuse collection point will be considered to further reduce any localized impact.

As discussed earlier, there is one small abandoned pond located in the Northern Portion of the Project Site (**Figure 7-2** refers). As the landscape pond is also proposed at the same location, no pond filling or dredging of sediment will be required for this Project. Thus, odour emission due to excavation of pond sediment or bio-gas emission due to pond filling will not be a concern to this Project and it is not assessed further.

3.6.2.2 Evaluation of Impacts

Vehicular Emissions

Vehicular emissions impact from the major roads (e.g. San Tin Highway (an Expressway) and Castle Peak Road (a Rural Road)), are considered insignificant as the sensitive receivers of this Project are located more than 500m from the concerned major roads (**Figure 3-1** refers), which can satisfy the buffer distance requirement stated in Chapter 9, Environment of the Hong Kong Planning Standard and Guidelines (HKPSG) for Trunk Road (i.e. >20m) for active and passive recreational uses.

As for nearby local access roads (e.g. Fairview Park Boulevard, Yau Pok Road and Kam Pok Road), the Project Site is also setback from these roads by existing roadside slopes surrounding the Project Site. The separation distance measured between the nearest sensitive uses of the Project Site and the road edge was shown in **Figure 3-1**, which varies from 8m to over 22m. The separation distance can already satisfy the buffer distance requirement for Local Distributor (i.e. >5m) for active and passive recreational uses according to Chapter 9 of the HKPSG.

Since the buffer distance provided can already satisfy the HKPSG requirement, no adverse air quality impacts due to vehicular emissions are expected. Thus, it is not assessed further in this assessment.

Industrial Emissions

As discussed in Section 3.6.2.1, no industrial chimneys were identified within the Assessment Area. Thus, potential air quality impacts due to emissions from chimneys are not anticipated for this Project. Thus, it is not assessed further.

Odour from Proposed Ngau Tam Mei SPS

A planned sewage pumping station (Ngau Tam Mei SPS) is about 345 m northeast of the proposed development (**Figure 3-1** refers). According to the approved EIA report of the said SPS project (i.e. Stage 2 of PWP Item No. 215DS – Yuen Long and Kam Tin Sewerage and Sewage Disposal (EIA-094/2004)), odour removal filtering system will be installed in the Ngau Tam Mei SPS and the maximum odour concentration at the existing ASRs would be reduced to 0.093 OU (Odour Unit), which is 1.9% of the 5 OU criteria. With the odour removal filtering system and long buffer distance of the future SPS, its odour impact on the proposed development is unlikely. Thus, no adverse impact is anticipated.

3.7 Assessment Methodology

3.7.1 Emission During Construction Phase

As discussed earlier, fugitive dust could be generated during the site formation stage, and TSP, RSP and PM2.5 have been identified as the parameter for air quality assessment. The following paragraphs describe the air quality assessment methodology. For the purpose of this air quality impact assessment, information such as boundaries of sub-zones and works programme have been based on similar construction activities and information provided by the Engineer. During the detailed design stage, there may be minor amendment according to the site condition (e.g. the boundaries of sub-zones). However, it is expected that such minor amendments will not affect the outcome of assessment results given that construction of each sub-zone would represent an average of about 5% of the site area within either the Northern Portion or the Southern Portion of the Project Site in any one time (area of each sub-zone is shown in **Appendix 3-9**).

3.7.1.1 Emission Sources

In order to minimize potential dust impacts, the construction programme for the Project Site (see **Appendix 1-1**) has been designed so that site formation work for the Northern Portion and Southern Portion of the Project Site will be constructed separately without overlapping in construction programme. According to the construction programme, site formation for the Southern Portion will be carried out between November 2017 and middle of June 2018. For the Northern Portion of the Project Site, the site formation works will be undertaken between later half of June 2018 and January 2019.

In addition, the construction programme of the Project Site will not overlap with the adjacent planned development sites so that cumulative impacts can be avoided (Section 3.6.1.4 refers).

According to Section 3.6.1.2, the following activities during site formation stage that would attribute to dust emissions have been taken into account in the assessment:

- Removal and unloading of soil materials by excavators;
- Earth loading/ unloading, and stockpiling;
- Bulldozing and surface compaction;
- Wind erosion on exposed ground; and
- Vehicle movements on haul roads;

3.7.1.2 Emission Strength

Unmitigated Scenario

Emission rates of the dusty activities given above were based on typical values and emission factors documented in Compilation of Air Pollutant Emission Factors (AP-42) 5th Edition published by USEPA. In order to represent the worst case scenario, the upper bound or the lower bound of the range of typical values provided in the AP-42 document has been used in deriving the emission rates (i.e. higher emission rate is adopted) (also refer to **Appendix 3-2** for details). The unmitigated scenario refers to the calculated emission rates based on AP-42 without any mitigation measures. The works area will refer to the corresponding site boundary for the Southern Portion and Northern Portion of the Project Site, respectively, without any phasing construction. It is expected that paved haul road will be constructed.

The identified dust emission sources have been modelled as area sources. Detailed calculation of emission rates corresponding to each of the activities described in Section 3.7.1.1, are also given in **Appendix 3-2**.

In the assessment, it has been assumed that the whole area of the Southern Portion will be constructed at the same time and soil surface is exposed to atmosphere. Similar assumption has also been adopted for the construction of the Northern Portion.

Mitigated Scenario

Based on the above worst case emission rates calculated according to the AP-42 document, the mitigated scenario refers to mitigated emission rates after the implementation of proposed mitigation measures of this Project and measures stipulated in the *Air Pollution Control (Construction Dust) Regulation (Section 3.9.1 of this report refers)*. Detailed calculation of mitigated emission rates corresponding to each of the activities described in Section 3.7.1.1, are also given in **Appendix 3-3**.

Currently, the Project Site is a green field site and the whole Project Site is covered by grass. During the construction phase, construction works will be carried out in phases and the grass land at the unaffected area will be maintained so that the soil underneath is not exposed to the atmosphere (i.e. there will be no wind erosion).

In order to minimize dust emission during site formation, it is expected that the Southern Portion will be divided into different sub-zones (a total of 19 sub-zones), and there will be only one sub-zone under construction in any one time. As mentioned above, the Project Site is currently a green field site, as such, the construction works within the sub-zone will be only emission source as remaining area of the Project Site is covered by grass and will not be affected (i.e. no dust emission for the remaining areas). Once construction for a sub-zone is completed, the works area will be compacted, covered by tarpaulin sheet and hydroseeded before construction of another zone. Watering will also be applied on regular basis. Thus, there will be no cumulative construction impacts. Similarly, the Northern Portion of the Project Site will also be constructed in phases and only one zone will be constructed in any one time.

According to the current construction programme shown in **Appendix 1-1**. The site formation works for the Southern Portion and the Northern Portion of the Project Site will require a construction period of about 7.5 months, respectively. The site formation for the Southern Portion will commence in November until half of June of next year, while the construction for the Northern Portion will be undertaken between second half of June and January of next year. Accordingly, it is estimated that construction of each construction sub-zone will take an average of about 12 calendar days to complete, which has also been adopted in the air quality assessment.

The site formation of the Southern Portion will last for about 7.5 months, after that the site will be hard paved and there is no significant air quality impact anticipated at the site. Thus, in assessing the short-term impact (i.e. hourly and daily), it is based on 7.5 months' construction period. For the long-

term impact (i.e. annually), there will be no contribution to RSP and PM2.5 levels due to the Project works for the remaining 4.5 months during the year, thus only background level is taken into account during this period of time.

Similar assumption has also been assumed for assessing the short term and long term impact for the site formation works in the Northern Portion.

For the purpose of this air quliaty impact assessment, details of locations of different sub-zones have been based on similar construction activities and information provided by the Project Proponent and the Engineer (see **Appendix 3-8**).

Due to the phased construction area, only limited space and construction plants will be available for construction in any one time. Thus, the construction activities that would contribute to dust emissions as identified in Section 3.7.1.1, particularly the removal and unloading of soil materials by excavators; earth loading/ unloading, stockpiling; and bulldozing and surface compaction, will unlikely to operate at the same time. In fact, only one of the above activities will operate in any one time. However, to be conservative, air quality impacts due to simultaneous construction of these activities have been taken into account in the assessment.

3.7.1.3 Modelling Approach

The TSP, RSP and PM2.5 were modelled using the software "Industrial Source Complex Short Term (ISCST)" developed by Trinity Consultants Incorporated. The ISCST model is based on the principle of Gaussian dispersion and is widely accepted by authorities worldwide including the United States Environmental Protection Agency (USEPA) and the Hong Kong Environmental Protection Department (EPD).

Meteorological data derived using MM5 model has been adopted for the assessment.

Since the representative ASRs nearby are mainly low-rise (2 to 3-storeys high) buildings, the assessment height for the ASRs is taken from the ground level including 1.5m breathing zone up to 7.5m for the upper floor at the ASRs.

Maximum 1-hour average TSP concentrations, as well as 24-hour average, and annual average RSP and PM2.5 concentrations were predicted at the representative ASRs and superimposed with the background level derived from the PATH output (see Section 3.4) for comparison with the air quality criteria specified in **Table 3-1** as well as the 1-hour TSP limit of 500$\mu g/m^3$ specified in the EIAO-TM.

Contour plots of the above parameters are prepared based on the worst hit level. Contour plots of the maximum 1-hour average TSP concentrations and the annual average RSP and PM2.5 concentrations, are based on the maximum predicted level. Contour plots of the 24-hour average RSP and PM2.5 concentrations are based on the 10^{th} highest predicted level in accordance with the relevant AQOs.

The following assumptions have been adopted in the modeling exercise for both the unmitigated and mitigated scenarios:

- The construction works will be undertaken from 0800 to 1800 hours during general weekdays (i.e. day-time);
- It is expected that there will be no construction works during restricted hours (i.e. 1900 to 0700 hours of the next day, and any time on a general holidays, including Sunday). Construction works within restricted hours would require advance application for a Construction Noise Permit from EPD;
- The calculated emission rates in Section 3.7.1.2 have been applied to day-time hours during general weekdays only (i.e. 0800 to 1800 hours) only. While the hours from 1800 to 0800

during general workdays and on Sundays and general holidays are adopted for impact assessment of wind erosion on the site;

- The estimated maximum no. of trucks during site formation is 10 trucks per hour according to the Engineer; and
- According to the construction programe in **Appendix 1-1**, the site formation works for the Northern Portion and Southern Portion of the Project Site will be constructed separately without overlapping in construction programme, thus this has been taken into account in the assessment;

For the unmitigated scenario, it is assumed that the construction activities will be carried out within the whole construction site of either the Northern Portion or the Southern Portion, i.e. no phasing of the construction activities.

For the mitigated scenario, the following assumptions have been adopted in the modeling exercise:

- The construction programe and duration of site formation works has been based on the construction programme in **Appendix 1-1** and the phased construction method described in **Appendix 3-8.** As shown in **Appendix 3-8**, the construction site of both Northern and Southern Portion is divided into 19 sub-zones; and the construction period of each sub-zone is about 12 calendar days. Therefore, in assessing the air quality impact (both short-term and long-term), only one sub-zone is considered in the assessment, i.e. totally 38 scenarios covering both Northern and Southern Portion have been considered;
- As the construction will be carried out in phases, the duration of consturciton works affecting each ASR will be relatively short. The construction of each sub-zone that is nearest to one ASR, will only last for 12 calendar days, after that the construction works will be shifted to another sub-zone which is relatively far away from the ASR (i.e. less affected by construction works). In order to simulate the phased construction approach, 12 calendar days is set for each sub-zone and the model is driven by the obtained hourly meteorological data (i.e. 8,760 hours/ year) in order to obtain the hourly TSP, RSP and PM2.5 emission levels. Based on which, the maximum hourly TSP level, daily average RSP and PM2.5 levels, as well as annual average RSP and PM2.5 levels have been derived accordingly;
- During construction of each sub-zone, construction activities within that sub-zone will be the only dust emission source, while the remaining area of the Project Site is currently covered by grass and will not contribute to any dust emission (i.e. zero contribution);
- The designated haul road should be hard paved (this requirement has been stated in Section 3.9.1, and will be followed by the Contractor(s) of this Project);
- Dust suppression measures in terms of frequent watering are proposed. Water will be sprayed frequently during day-time (e.g. eight times a day) with water browser or manually. The calculated dust suppression efficiency taken into account the dust suppression measures is also provided in **Appendix 3-9**. A dust suppression efficiency of 90% is adopted in this assessment. The concerned dust suppression efficiency has been applied to both the short-term impacts (e.g. hourly and daily) and long-term impacts (e.g. annual); and
- Relevant requirement of the above has also been stated in Section 3.9.1 and will be included in the Project EM&A Manual for implementation.

3.7.2 Operational Phase

As discussed in Section 3.6.2.2, the proposed development can satisfy the HKPSG requirements in terms of buffer distance from nearby roads and there are no industrial chimneys identified within the Assessment Area. Thus, no adverse air quality impacts due to vehicular and industrial emissions are anticipated and are not assessed further.

The Project does not involve any pond filling activity or pond sediment dredging activity, thus there will be no air quality impacts due to handling of dredged sediment.

3.8 Assessment Results (Unmitigated Scenario)

3.8.1 Short-term and Long-term Impacts

The predicted unmitigated maximum hourly TSP concentrations as well as daily average and annual average RSP and PM2.5 concentrations due to construction of this Project were assessed according to the methodology described in Section 3.7.1, and the results are presented in **Tables 3-4** to **3-13**. Location map of representative ASRs selected for construction dust assessment is presented in **Figure 3-2**.

Details of the calculated emission rates are also provided in **Appendices 3-2 and 3-3**. Details of assessment results are also presented in **Appendices 3-4 and 3-5.** Contour plots based on the worst hit level (Section 3.7.1.3 refers) are also provided in **Figures 3-3A to 3-7B.**

Table 3-4 Predicted Maximum Hourly TSP Concentrations Due to This Project Southern Portion of the Project Site (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	6993 / 3501 / 1977	7157 / 3665 / 2141
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	5093 / 3141 / 1885	5257 / 3306 / 2050
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	6593 / 3281 / 2220	6758 / 3446 / 2384
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	7681 / 4165 / 2459	7846 / 4329 / 2624
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	5887 / 3364 / 2346	6051 / 3528 / 2511
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	6314 / 3350 / 2396	6478 / 3515 / 2560
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	1356 / 1330 / 1280	1520 / 1495 / 1445
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	2230 / 2068 / 1784	2394 / 2233 / 1949
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	1327 / 1279 / 1190	1491 / 1444 / 1354
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	894 / 875 / 840	1058 / 1040 / 1004
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	853 / 816 / 773	1018 / 980 / 938
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	610 / 603 / 588	775 / 767 / 752
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	1168 / 1109 / 1021	1333 / 1274 / 1185
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	1234 / 1205 / 1149	1399 / 1369 / 1313
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	6445 / 3454 / 2124	6609 / 3618 / 2289
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	5427 / 2827 / 1759	5591 / 2991 / 1923
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	2775 / 2503 / 2047	2939 / 2668 / 2211
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	1554 / 1470 / 1315	1719 / 1634 / 1479
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	6898 / 4524 / 2782	7063 / 4688 / 2947
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	4044 / 3458 / 2588	4209 / 3622 / 2752

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (μg/m^3)	
				Without Background *	With Background **
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	1955 / 1879 / 1773	2119 / 2043 / 1937
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	880 / 865 / 835	1045 / 1029 / 1000
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	1000 / 980 / 942	1164 / 1144 / 1106
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	570 / 564 / 552	734 / 728 / 716
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	736 / 718 / 684	900 / 883 / 848
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	1113 / 1088 / 1040	1277 / 1252 / 1204
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	2432 / 2309 / 2081	2596 / 2473 / 2246
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	1707 / 1610 / 1433	1871 / 1774 / 1598
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	1721 / 1668 / 1568	1886 / 1833 / 1732
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	626 / 620 / 607	791 / 784 / 771
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	521 / 515 / 505	685 / 680 / 670
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	617 / 604 / 578	781 / 768 / 743
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	621 / 614 / 600	785 / 778 / 765
A27	Existing building	4.5	1.5 / 4.5 / 7.5	2797 / 2593 / 2234	2962 / 2758 / 2398
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	734 / 720 / 691	899 / 884 / 856
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	817 / 810 / 796	981 / 974 / 961
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	3586 / 2722 / 2373	3751 / 2887 / 2537
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	736 / 724 / 700	900 / 888 / 865
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	3581 / 3070 / 2295	3746 / 3234 / 2459
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	848 / 834 / 805	1013 / 998 / 970
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	532 / 526 / 515	697 / 691 / 679
A35	Palm Springs	5	1.5 / 4.5 / 7.5	563 / 558 / 547	728 / 722 / 712
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	815 / 794 / 753	980 / 958 / 917
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	938 / 917 / 876	1102 / 1081 / 1041
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	4824 / 3808 / 2534	4989 / 3972 / 2698
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	3135 / 2598 / 2285	3299 / 2763 / 2450
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	2012 / 1762 / 1670	2177 / 1927 / 1834
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	844 / 827 / 793	1008 / 991 / 958
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	3391 / 3063 / 2507	3555 / 3228 / 2671

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (μg/m^3)	
				Without Background *	With Background **
V02	Planned "V" zone	2.4	1.5 / 4.5 / 7.5	908 / 894 / 866	1073 / 1058 / 1031
V03	Planned "V"zone	3	1.5 / 4.5 / 7.5	2362 / 2073 / 1601	2527 / 2238 / 1765
V04	Planned "RD" zone	4.8	1.5 / 4.5 / 7.5	3925 / 3314 / 2419	4089 / 3478 / 2584
Max. Conc.	**-**		**-**	**7681**	**7846**
Criteria	**-**		**-**	**500**	**500**

Remark: * Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted TSP level due to this Project has already exceeded the relevant air quality criteria regardless the background level (i.e. mitigation measures will be required regardless the background level), thus in calculating the total concentration of TSP (i.e. background + Project contribution), the maximum hourly RSP level from the PATH output file (i.e. 164.4 μg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Table 3-5 Predicted Maximum Hourly TSP Concentrations Due to This Project Northern Portion of the Project Site (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	1296 / 1264 / 1202	1460 / 1428 / 1367
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	1038 / 992 / 907	1203 / 1157 / 1072
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	1826 / 1773 / 1672	1990 / 1937 / 1837
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	2062 / 1989 / 1853	2226 / 2154 / 2017
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	1727 / 1636 / 1470	1892 / 1800 / 1634
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	2312 / 2161 / 1961	2476 / 2326 / 2125
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	5637 / 3299 / 1827	5801 / 3463 / 1992
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	5161 / 2622 / 1863	5325 / 2786 / 2028
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	6381 / 3194 / 1706	6545 / 3358 / 1870
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	5056 / 2958 / 2018	5220 / 3123 / 2182
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	4801 / 3041 / 2149	4965 / 3206 / 2314
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	2119 / 1960 / 1679	2283 / 2124 / 1843
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	1508 / 1428 / 1282	1672 / 1593 / 1447
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	1552 / 1483 / 1355	1717 / 1648 / 1519
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	1501 / 1365 / 1185	1665 / 1530 / 1350
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	1381 / 1280 / 1177	1545 / 1445 / 1342
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	828 / 814 / 786	993 / 978 / 951
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	717 / 695 / 654	881 / 860 / 818

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (μg/m^3)	
				Without Background *	With Background **
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	649 / 634 / 611	814 / 799 / 775
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	775 / 750 / 702	940 / 914 / 866
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	971 / 944 / 892	1135 / 1108 / 1056
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	3504 / 3058 / 2445	3669 / 3222 / 2609
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	5275 / 3325 / 2367	5440 / 3490 / 2531
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	892 / 857 / 799	1057 / 1022 / 963
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	1095 / 1009 / 883	1259 / 1173 / 1048
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	850 / 824 / 773	1015 / 988 / 938
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	1116 / 1088 / 1034	1281 / 1253 / 1199
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	1308 / 1281 / 1228	1473 / 1445 / 1392
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	458 / 456 / 452	622 / 620 / 616
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	1804 / 1713 / 1546	1968 / 1878 / 1710
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	1552 / 1479 / 1342	1717 / 1643 / 1506
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	889 / 864 / 817	1053 / 1029 / 982
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	899 / 871 / 819	1064 / 1036 / 983
A27	Existing building	4.5	1.5 / 4.5 / 7.5	840 / 808 / 749	1004 / 973 / 913
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	7825 / 3517 / 2060	7989 / 3681 / 2224
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	7735 / 3438 / 2045	7900 / 3603 / 2209
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	4942 / 3604 / 2501	5107 / 3769 / 2666
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	2355 / 2222 / 1987	2519 / 2387 / 2151
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	708 / 694 / 668	872 / 859 / 832
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	2656 / 2399 / 1990	2821 / 2563 / 2154
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	1197 / 1177 / 1143	1362 / 1342 / 1308
A35	Palm Springs	5	1.5 / 4.5 / 7.5	959 / 949 / 928	1124 / 1113 / 1093
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	1597 / 1517 / 1368	1762 / 1681 / 1532
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	5966 / 3323 / 2213	6131 / 3488 / 2377
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	1076 / 1049 / 995	1241 / 1213 / 1160
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	1762 / 1650 / 1450	1927 / 1815 / 1614
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	2540 / 2104 / 1855	2704 / 2268 / 2019
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	1936 / 1866 / 1734	2101 / 2030 / 1899

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (µg/m^3)	
				Without Background *	With Background **
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	1266 / 1218 / 1128	1430 / 1382 / 1292
V02	Planned "V" zone	2.4	1.5 / 4.5 / 7.5	1578 / 1451 / 1251	1743 / 1615 / 1415
V03	Planned "V"zone	3	1.5 / 4.5 / 7.5	721 / 690 / 680	886 / 855 / 844
V04	Planned "RD" zone	4.8	1.5 / 4.5 / 7.5	987 / 966 / 925	1151 / 1130 / 1090
Max. Conc.	**-**		**-**	**7825**	**7989**
Criteria	**-**		**-**	**500**	**500**

Remark: * Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted TSP level due to this Project has already exceeded the relevant air quality criteria regardless the background level (i.e. mitigation measures will be required regardless the background level), thus in calculating the total concentration of TSP (i.e. background + Project contribution), the maximum hourly RSP level from the PATH output file (i.e. 164.4 µg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Table 3-6 Predicted Daily Average RSP Concentrations Due to This Project Southern Portion (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (µg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	414 / 197 / 124	537 / 319 / 246
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	309 / 187 / 104	431 / 309 / 226
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	379 / 199 / 118	501 / 322 / 240
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	337 / 184 / 113	459 / 307 / 235
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	306 / 178 / 104	428 / 300 / 226
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	276 / 154 / 100	398 / 276 / 222
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	67 / 64 / 57	190 / 186 / 180
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	80 / 75 / 66	202 / 197 / 189
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	61 / 59 / 55	184 / 181 / 177
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	38 / 37 / 36	161 / 160 / 158
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	45 / 44 / 42	168 / 167 / 165
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	14 / 14 / 14	137 / 136 / 136
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	38 / 37 / 35	160 / 159 / 157
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	32 / 31 / 29	154 / 153 / 152
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	301 / 174 / 98	424 / 296 / 221
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	281 / 173 / 101	403 / 295 / 224
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	59 / 54 / 48	181 / 177 / 170

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	35 / 34 / 31	158 / 156 / 153
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	303 / 199 / 118	426 / 322 / 240
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	201 / 170 / 126	324 / 292 / 248
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	71 / 65 / 55	194 / 188 / 178
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	24 / 24 / 23	147 / 146 / 145
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	27 / 27 / 26	149 / 149 / 148
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	18 / 18 / 17	140 / 140 / 140
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	14 / 14 / 13	136 / 136 / 136
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	29 / 29 / 28	152 / 151 / 150
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	39 / 38 / 36	161 / 160 / 158
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	48 / 47 / 44	170 / 169 / 167
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	34 / 33 / 32	157 / 156 / 154
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	18 / 18 / 17	140 / 140 / 140
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	16 / 15 / 15	138 / 138 / 137
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	11 / 11 / 11	134 / 134 / 134
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	19 / 19 / 18	141 / 141 / 141
A27	Existing building	4.5	1.5 / 4.5 / 7.5	54 / 51 / 45	177 / 173 / 168
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	39 / 38 / 36	161 / 160 / 158
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	42 / 40 / 38	164 / 163 / 161
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	157 / 128 / 95	280 / 250 / 218
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	35 / 34 / 33	157 / 156 / 155
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	74 / 66 / 56	196 / 189 / 178
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	28 / 28 / 27	151 / 150 / 149
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	25 / 24 / 24	147 / 147 / 146
A35	Palm Springs	5	1.5 / 4.5 / 7.5	14 / 14 / 14	137 / 136 / 136
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	16 / 15 / 15	138 / 138 / 138
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	31 / 30 / 29	154 / 153 / 152
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	138 / 115 / 86	260 / 237 / 208
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	134 / 111 / 83	257 / 234 / 206

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	66 / 61 / 56	188 / 183 / 178
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	27 / 26 / 25	149 / 149 / 148
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	71 / 68 / 62	193 / 190 / 185
V02	Planned "V" zone	2.4	1.5 / 4.5 / 7.5	27 / 26 / 25	149 / 148 / 148
V03	Planned "V"zone	3	1.5 / 4.5 / 7.5	82 / 77 / 69	204 / 199 / 191
V04	Planned "RD" zone	4.8	1.5 / 4.5 / 7.5	86 / 75 / 59	208 / 197 / 181
Max. Conc.			**-**	**414**	**537**
No. of exceedance @				**>9**	**>9**
Criteria			**-**	**100 (no. of exceedance allowed <= 9)**	

Remark: The above results are based on the 1st highest daily average concentrations.

@ According to Appendix 3-5, the no. of exceedance would exceed the relevant air quality criteria/ AQOs as the 10th highest value would also exceed the relevant air quality criteria/ AQOs.

* Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted RSP level due to this Project at some of the ASRs nearby has already exceeded the relevant air quality criteria/ AQOs regardless the background level, thus in calculating the total concentration of RSP (i.e. background + Project contribution), the maximum daily average RSP level from the PATH output file (i.e. 122.4 μg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Table 3-7 Predicted Daily Average RSP Concentrations Due to This Project Northern Portion (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	68 / 67 / 63	191 / 189 / 186
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	55 / 54 / 51	178 / 176 / 174
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	62 / 59 / 55	184 / 182 / 177
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	72 / 68 / 62	194 / 190 / 184
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	96 / 88 / 77	218 / 211 / 199
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	165 / 142 / 111	288 / 265 / 233
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	307 / 156 / 97	429 / 279 / 219
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	291 / 152 / 90	413 / 274 / 213
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	360 / 165 / 104	482 / 287 / 226
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	225 / 140 / 89	348 / 262 / 212
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	186 / 119 / 76	308 / 241 / 198

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	30 / 29 / 27	153 / 151 / 149
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	37 / 35 / 32	160 / 158 / 154
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	35 / 33 / 30	157 / 156 / 153
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	91 / 86 / 76	213 / 208 / 199
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	90 / 87 / 79	213 / 209 / 202
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	21 / 21 / 20	144 / 143 / 142
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	21 / 21 / 20	144 / 143 / 142
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	32 / 31 / 30	155 / 154 / 152
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	26 / 25 / 24	148 / 147 / 146
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	21 / 21 / 20	143 / 143 / 143
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	150 / 117 / 93	272 / 240 / 215
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	252 / 147 / 101	375 / 270 / 224
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	39 / 37 / 34	162 / 160 / 157
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	40 / 39 / 36	163 / 161 / 158
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	21 / 20 / 19	143 / 142 / 141
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	17 / 16 / 15	139 / 139 / 138
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	17 / 17 / 16	140 / 139 / 139
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	11 / 11 / 10	133 / 133 / 133
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	24 / 23 / 20	146 / 145 / 143
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	21 / 19 / 18	143 / 142 / 140
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	38 / 37 / 34	160 / 159 / 157
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	32 / 31 / 29	155 / 154 / 151
A27	Existing building	4.5	1.5 / 4.5 / 7.5	24 / 23 / 22	146 / 146 / 145
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	322 / 173 / 102	444 / 295 / 225
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	346 / 174 / 100	468 / 297 / 222
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	235 / 173 / 112	357 / 295 / 235
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	112 / 96 / 76	234 / 219 / 198
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	24 / 23 / 22	146 / 146 / 145
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	131 / 104 / 83	253 / 226 / 205
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	54 / 51 / 47	176 / 174 / 169

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A35	Palm Springs	5	1.5 / 4.5 / 7.5	32 / 31 / 29	155 / 153 / 151
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	48 / 46 / 42	171 / 168 / 165
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	250 / 136 / 83	372 / 258 / 206
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	30 / 29 / 28	152 / 152 / 150
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	62 / 56 / 48	184 / 179 / 170
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	92 / 77 / 61	214 / 200 / 183
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	78 / 74 / 66	201 / 196 / 188
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	22 / 21 / 20	144 / 144 / 143
V02	Planned "V" zone	2.4	1.5 / 4.5 / 7.5	46 / 44 / 42	168 / 166 / 164
V03	Planned "V"zone	3	1.5 / 4.5 / 7.5	27 / 26 / 25	149 / 148 / 147
V04	Planned "RD" zone	4.8	1.5 / 4.5 / 7.5	26 / 25 / 24	148 / 147 / 146
Max. Conc.			**-**	**360**	**482**
No. of exceedance @				**>9**	**>9**
Criteria		**-**		**100 (no. of exceedance allowed <= 9)**	

Remark: The above results are based on the 1st highest daily average concentrations.

@ According to Appendix 3-5, the no. of exceedance would exceed the relevant air quality criteria/ AQOs as the 10th highest value would also exceed the relevant air quality criteria/ AQOs.

* Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted RSP level due to this Project at some of the ASRs nearby has already exceeded the relevant air quality criteria/ AQOs regardless the background level, thus in calculating the total concentration of RSP (i.e. background + Project contribution), the maximum daily average RSP level from the PATH output file (i.e. 122.4 μg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Table 3-8 Predicted Daily Average PM2.5 Concentrations Due to This Project Southern Portion (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	124 / 59 / 37	216 / 151 / 129
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	93 / 56 / 31	184 / 148 / 123
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	114 / 60 / 35	206 / 152 / 127
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	101 / 55 / 34	193 / 147 / 126
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	92 / 53 / 31	184 / 145 / 123

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	83 / 46 / 30	174 / 138 / 122
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	20 / 19 / 17	112 / 111 / 109
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	24 / 22 / 20	116 / 114 / 112
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	18 / 18 / 16	110 / 109 / 108
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	11 / 11 / 11	103 / 103 / 103
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	14 / 13 / 13	105 / 105 / 104
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	4 / 4 / 4	96 / 96 / 96
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	11 / 11 / 11	103 / 103 / 102
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	10 / 9 / 9	101 / 101 / 101
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	90 / 52 / 30	182 / 144 / 121
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	84 / 52 / 30	176 / 144 / 122
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	18 / 16 / 14	109 / 108 / 106
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	11 / 10 / 9	102 / 102 / 101
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	91 / 60 / 35	183 / 152 / 127
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	60 / 51 / 38	152 / 143 / 130
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	21 / 20 / 17	113 / 111 / 108
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	7 / 7 / 7	99 / 99 / 99
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	8 / 8 / 8	100 / 100 / 100
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	5 / 5 / 5	97 / 97 / 97
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	4 / 4 / 4	96 / 96 / 96
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	9 / 9 / 8	101 / 100 / 100
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	12 / 11 / 11	103 / 103 / 103
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	14 / 14 / 13	106 / 106 / 105
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	10 / 10 / 9	102 / 102 / 101
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	5 / 5 / 5	97 / 97 / 97
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	5 / 5 / 5	96 / 96 / 96
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	3 / 3 / 3	95 / 95 / 95
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	6 / 6 / 5	97 / 97 / 97
A27	Existing building	4.5	1.5 / 4.5 / 7.5	16 / 15 / 14	108 / 107 / 105
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	12 / 11 / 11	103 / 103 / 103

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	13 / 12 / 11	104 / 104 / 103
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	47 / 38 / 29	139 / 130 / 120
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	10 / 10 / 10	102 / 102 / 102
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	22 / 20 / 17	114 / 112 / 108
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	8 / 8 / 8	100 / 100 / 100
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	7 / 7 / 7	99 / 99 / 99
A35	Palm Springs	5	1.5 / 4.5 / 7.5	4 / 4 / 4	96 / 96 / 96
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	5 / 5 / 5	96 / 96 / 96
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	9 / 9 / 9	101 / 101 / 101
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	41 / 35 / 26	133 / 126 / 118
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	40 / 33 / 25	132 / 125 / 117
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	20 / 18 / 17	112 / 110 / 109
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	8 / 8 / 8	100 / 100 / 99
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	21 / 20 / 19	113 / 112 / 110
V02	Planned "V" zone	2.4	1.5 / 4.5 / 7.5	8 / 8 / 8	100 / 100 / 99
V03	Planned "V"zone	3	1.5 / 4.5 / 7.5	24 / 23 / 21	116 / 115 / 112
V04	Planned "RD" zone	4.8	1.5 / 4.5 / 7.5	26 / 22 / 18	117 / 114 / 110
Max. Conc.			**-**	**124**	**216**
No. of exceedance @				**>9**	**>9**
Criteria		**-**		**75 (no. of exceedance allowed <= 9)**	

Remark: The above results are based on the 1st highest daily average concentrations.

@ According to Appendix 3-5, the no. of exceedance would exceed the relevant air quality criteria/ AQOs as the 10th highest value would also exceed the relevant air quality criteria/ AQOs.

* Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted PM2.5 level due to this Project at some of the ASRs nearby has already exceeded the relevant air quality criteria/ AQOs regardless the background level, thus in calculating the total concentration of PM2.5 (i.e. background + Project contribution), the maximum daily average PM2.5 level from the PATH output file (i.e. 91.8 µg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Table 3-9 Predicted Daily Average PM2.5 Concentrations Due to This Project Northern Portion (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	20 / 20 / 19	112 / 112 / 111
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	17 / 16 / 15	108 / 108 / 107
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	19 / 18 / 16	110 / 110 / 108
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	21 / 20 / 19	113 / 112 / 110
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	29 / 27 / 23	120 / 118 / 115
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	50 / 43 / 33	141 / 135 / 125
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	92 / 47 / 29	184 / 139 / 121
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	87 / 45 / 27	179 / 137 / 119
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	108 / 49 / 31	200 / 141 / 123
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	68 / 42 / 27	159 / 134 / 119
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	56 / 36 / 23	148 / 127 / 115
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	9 / 9 / 8	101 / 100 / 100
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	11 / 11 / 9	103 / 102 / 101
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	11 / 10 / 9	102 / 102 / 101
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	27 / 26 / 23	119 / 117 / 115
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	27 / 26 / 24	119 / 118 / 116
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	6 / 6 / 6	98 / 98 / 98
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	6 / 6 / 6	98 / 98 / 98
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	10 / 9 / 9	101 / 101 / 101
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	8 / 7 / 7	99 / 99 / 99
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	6 / 6 / 6	98 / 98 / 98
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	45 / 35 / 28	137 / 127 / 120
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	76 / 44 / 30	167 / 136 / 122
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	12 / 11 / 10	104 / 103 / 102
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	12 / 12 / 11	104 / 103 / 103
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	6 / 6 / 6	98 / 98 / 97
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	5 / 5 / 5	97 / 97 / 96
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	5 / 5 / 5	97 / 97 / 97
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	3 / 3 / 3	95 / 95 / 95

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	7 / 7 / 6	99 / 99 / 98
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	6 / 6 / 5	98 / 98 / 97
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	11 / 11 / 10	103 / 103 / 102
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	10 / 9 / 9	102 / 101 / 101
A27	Existing building	4.5	1.5 / 4.5 / 7.5	7 / 7 / 7	99 / 99 / 98
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	97 / 52 / 31	188 / 144 / 122
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	104 / 52 / 30	196 / 144 / 122
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	70 / 52 / 34	162 / 144 / 126
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	34 / 29 / 23	125 / 121 / 115
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	7 / 7 / 7	99 / 99 / 98
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	39 / 31 / 25	131 / 123 / 117
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	16 / 15 / 14	108 / 107 / 106
A35	Palm Springs	5	1.5 / 4.5 / 7.5	10 / 9 / 9	101 / 101 / 100
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	15 / 14 / 13	106 / 106 / 104
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	75 / 41 / 25	167 / 133 / 117
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	9 / 9 / 8	101 / 101 / 100
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	18 / 17 / 14	110 / 109 / 106
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	28 / 23 / 18	119 / 115 / 110
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	24 / 22 / 20	115 / 114 / 111
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	7 / 6 / 6	98 / 98 / 98
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	14 / 13 / 12	106 / 105 / 104
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	8 / 8 / 7	100 / 100 / 99
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	8 / 7 / 7	99 / 99 / 99
Max. Conc.			**-**	**108**	**200**
No. of exceedance @				**>9**	**>9**
Criteria			**-**	**75 (no. of exceedance allowed <= 9)**	

Remark: The above results are based on the 1st highest daily average concentrations.

@ According to Appendix 3-5, the no. of exceedance would exceed the relevant air quality criteria/ AQOs as the 10th highest value would also exceed the relevant air quality criteria/ AQOs.

* Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted PM2.5 level due to this Project at some of the ASRs nearby has already exceeded the relevant air

quality criteria/ AQOs regardless the background level, thus in calculating the total concentration of PM2.5 (i.e. background + Project contribution), the maximum daily average level PM2.5 from the PATH output file (i.e. 91.8 μg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Table 3-10 Predicted Annual Average RSP Concentrations Due to This Project Southern Portion (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	146 / 69 / 37	190 / 112 / 81
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	118 / 74 / 44	162 / 118 / 87
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	92 / 43 / 24	135 / 87 / 67
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	67 / 34 / 19	110 / 77 / 63
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	141 / 62 / 31	184 / 105 / 75
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	75 / 35 / 23	118 / 79 / 66
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	12 / 12 / 11	55 / 55 / 54
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	12 / 12 / 11	56 / 55 / 54
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	11 / 10 / 10	54 / 54 / 53
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	6 / 6 / 5	49 / 49 / 49
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	7 / 6 / 6	50 / 50 / 49
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	124 / 68 / 36	167 / 111 / 79
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	110 / 62 / 32	153 / 105 / 76
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	3 / 3 / 3	47 / 46 / 46
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	87 / 58 / 36	131 / 101 / 79
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	32 / 27 / 21	75 / 70 / 64
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	4 / 4 / 3	47 / 47 / 46
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	3 / 3 / 3	46 / 46 / 46
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	4 / 4 / 3	47 / 47 / 47
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	2 / 2 / 2	46 / 46 / 46
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	3 / 3 / 2	46 / 46 / 46

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	3 / 3 / 3	46 / 46 / 46
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A27	Existing building	4.5	1.5 / 4.5 / 7.5	4 / 4 / 4	48 / 47 / 47
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	6 / 6 / 6	50 / 49 / 49
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	7 / 7 / 6	50 / 50 / 50
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	29 / 25 / 20	72 / 68 / 63
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	5 / 5 / 5	48 / 48 / 48
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	5 / 5 / 4	49 / 48 / 47
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	4 / 4 / 4	48 / 47 / 47
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	4 / 4 / 3	47 / 47 / 47
A35	Palm Springs	5	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	3 / 3 / 3	47 / 47 / 47
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	16 / 13 / 10	59 / 56 / 53
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	17 / 15 / 11	61 / 58 / 54
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	8 / 7 / 7	51 / 51 / 50
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	5 / 5 / 5	48 / 48 / 48
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	1 / 1 / 1	45 / 45 / 44
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	6 / 6 / 5	50 / 49 / 49
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	9 / 8 / 6	52 / 51 / 50
Max. Conc.	**-**		**-**	**146**	**190**
Criteria	**-**		**-**	**50**	**50**

Remark: * Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted RSP level due to this Project at some of the ASRs nearby has already exceeded the relevant air quality criteria/ AQOs regardless the background level, thus in calculating the total concentration of RSP (i.e. background +

Project contribution), the maximum annual average RSP level from the PATH output file (i.e. 43.2μg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Table 3-11 Predicted Annual Average RSP Concentrations Due to This Project Northern Portion (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	8 / 8 / 7	51 / 51 / 51
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	6 / 6 / 5	49 / 49 / 49
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	11 / 11 / 10	54 / 54 / 53
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	13 / 13 / 12	57 / 56 / 55
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	11 / 10 / 9	54 / 53 / 53
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	24 / 20 / 17	67 / 64 / 60
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	112 / 67 / 40	155 / 110 / 83
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	99 / 62 / 39	142 / 105 / 83
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	144 / 73 / 39	187 / 116 / 82
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	64 / 33 / 18	107 / 76 / 62
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	50 / 29 / 16	93 / 72 / 59
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	3 / 3 / 3	47 / 47 / 46
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	3 / 3 / 3	46 / 46 / 46
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	3 / 3 / 2	46 / 46 / 46
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	10 / 10 / 9	54 / 53 / 52
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	11 / 10 / 10	54 / 54 / 53
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	3 / 3 / 3	47 / 46 / 46
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	2 / 2 / 2	46 / 46 / 45
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	26 / 20 / 15	69 / 64 / 58
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	53 / 28 / 17	96 / 71 / 61
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	6 / 6 / 5	49 / 49 / 49
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	4 / 4 / 4	47 / 47 / 47
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	1 / 1 / 1	45 / 45 / 44
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	44 / 44 / 44
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	3 / 3 / 3	46 / 46 / 46
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A27	Existing building	4.5	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	58 / 25 / 13	101 / 68 / 56
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	89 / 42 / 21	132 / 85 / 65
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	61 / 41 / 28	104 / 85 / 72
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	19 / 16 / 12	62 / 59 / 55
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	1 / 1 / 1	45 / 45 / 44
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	25 / 20 / 15	68 / 63 / 58
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	6 / 6 / 6	50 / 49 / 49
A35	Palm Springs	5	1.5 / 4.5 / 7.5	5 / 4 / 4	48 / 48 / 47
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	5 / 4 / 4	48 / 48 / 47
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	73 / 37 / 20	116 / 81 / 63
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	2 / 2 / 2	45 / 45 / 45
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	5 / 5 / 5	49 / 48 / 48
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	14 / 12 / 10	57 / 55 / 53
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	8 / 7 / 7	51 / 51 / 50
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	1 / 1 / 1	45 / 45 / 44
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	5 / 5 / 4	48 / 48 / 47
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	1 / 1 / 1	44 / 44 / 44
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	1 / 1 / 1	45 / 45 / 45
Max. Conc.	**-**		**-**	**144**	**187**
Criteria	**-**		**-**	**50**	**50**

Remark: * Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted RSP level due to this Project at some of the ASRs nearby has already exceeded the relevant air quality criteria/ AQOs regardless the background level, thus in calculating the total concentration of RSP (i.e. background + Project contribution), the maximum annual average RSP level from the PATH output file (i.e. 43.2 μg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Table 3-12 Predicted Annual Average PM2.5 Concentrations Due to This Project Southern Portion (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	44 / 21 / 11	75 / 51 / 42
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	36 / 22 / 13	66 / 53 / 44
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	28 / 13 / 7	58 / 44 / 38
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	20 / 10 / 6	51 / 41 / 37
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	42 / 19 / 9	73 / 49 / 40
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	22 / 11 / 7	53 / 41 / 37
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	4 / 3 / 3	34 / 34 / 34
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	4 / 4 / 3	34 / 34 / 34
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	3 / 3 / 3	34 / 34 / 34
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	2 / 2 / 2	32 / 32 / 32
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	2 / 2 / 2	33 / 33 / 33
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	37 / 20 / 11	68 / 51 / 41
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	33 / 18 / 10	64 / 49 / 40
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	26 / 17 / 11	57 / 48 / 41
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	10 / 8 / 6	40 / 39 / 37
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 31
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A27	Existing building	4.5	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	2 / 2 / 2	33 / 33 / 32
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	2 / 2 / 2	33 / 33 / 33
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	9 / 7 / 6	39 / 38 / 37
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	2 / 2 / 1	32 / 32 / 32
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	2 / 1 / 1	32 / 32 / 32
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A35	Palm Springs	5	1.5 / 4.5 / 7.5	1 / 0 / 0	31 / 31 / 31
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	5 / 4 / 3	35 / 35 / 34
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	5 / 4 / 3	36 / 35 / 34
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	2 / 2 / 2	33 / 33 / 33
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	1 / 0 / 0	31 / 31 / 31
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	2 / 1 / 1	32 / 32 / 32
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	2 / 2 / 2	33 / 33 / 32
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	3 / 2 / 2	33 / 33 / 33
Max. Conc.	**-**		**-**	**44**	**75**
Criteria	**-**		**-**	**35**	**35**

Remark: * Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted PM2.5 level due to this Project at some of the ASRs nearby has already exceeded the relevant air quality criteria/ AQOs regardless the background level, thus in calculating the total concentration of PM2.5 (i.e. background + Project contribution), the maximum annual average PM2.5 level from the PATH output file (i.e. 30.7 µg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Table 3-13 Predicted Annual Average PM2.5 Concentrations Due to This Project Northern Portion (Unmitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	2 / 2 / 2	33 / 33 / 33
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	2 / 2 / 2	32 / 32 / 32
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	3 / 3 / 3	34 / 34 / 34
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	4 / 4 / 4	35 / 35 / 34
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	3 / 3 / 3	34 / 34 / 33
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	7 / 6 / 5	38 / 37 / 36
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	34 / 20 / 12	64 / 51 / 43
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	30 / 19 / 12	60 / 49 / 42
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	43 / 22 / 12	74 / 52 / 42
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	19 / 10 / 5	50 / 41 / 36
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	15 / 9 / 5	46 / 39 / 36
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 31 / 31
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	3 / 3 / 3	34 / 34 / 33
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	3 / 3 / 3	34 / 34 / 34
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	8 / 6 / 4	38 / 37 / 35
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	16 / 8 / 5	47 / 39 / 36
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	2 / 2 / 2	33 / 32 / 32
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	1 / 1 / 0	31 / 31 / 31
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	31 / 31 / 31
A27	Existing building	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	17 / 7 / 4	48 / 38 / 35
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	27 / 13 / 6	57 / 43 / 37
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	18 / 12 / 9	49 / 43 / 39
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	6 / 5 / 4	36 / 35 / 34
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	7 / 6 / 4	38 / 37 / 35
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	2 / 2 / 2	33 / 33 / 32
A35	Palm Springs	5	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	22 / 11 / 6	53 / 42 / 37
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	1 / 1 / 0	31 / 31 / 31
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	2 / 1 / 1	32 / 32 / 32
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	4 / 4 / 3	35 / 34 / 34
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	2 / 2 / 2	33 / 33 / 33
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	1 / 1 / 1	32 / 32 / 32
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	0 / 0 / 0	31 / 31 / 31
Max. Conc.	-		-	**43**	**74**
Criteria	-		-	**35**	**35**

Remark: * Concentration due to contribution of Project Site.

** Total concentration due to contribution of the Project Site as well as background concentration in the PATH output. The predicted PM2.5 level due to this Project at some of the ASRs nearby has already exceeded the relevant air quality criteria/ AQOs regardless the background level, thus in calculating the total concentration of PM2.5 (i.e. background + Project contribution), the maximum annual average PM2.5 level from the PATH output file (i.e. 30.7 µg/m^3 according to Appendix 3-1B) is used as a conservative approach.

Based on the above results, in the absence of any mitigation measures the unmitigated TSP, RSP and PM2.5 levels due to construction of the Project Site would exceed the relevant air quality criteria/ AQOs as well as the no. of exceedance allowed under the AQO, regardless the background level. Thus, mitigation measures as stipulated in Section 3.9.1 will be required to be implemented in order to alleviate adverse impacts.

3.9 Mitigation Measures

3.9.1 During Construction

To ensure compliance with the AQOs at the ASRs at all times, it is recommended to include requirements of good site practice in the contract clauses in order to minimize cumulative dust impact and to implement a dust monitoring and audit programme to ensure proper implementation of the identified mitigation measures. The Contractor shall follow the requirements stipulated in the Air Pollution Control (Construction Dust) Regulation to ensure constructional dust impacts are controlled within the relevant standards.

Good site management practices are important in reducing potential air quality impacts. As a general guidance, the contractor shall maintain high standard of housekeeping to prevent emission of fugitive dust emission. Loading, unloading, handling and storage of fuel, raw materials, products, wastes or by-products should be carried out in a manner so as to minimize the release of visible dust emission. Dusty materials should be covered to prevent erosion and dust could be suppressed by regular site watering. For example, site watering twice a day could reduce dust contribution from exposed area by 50%. Increasing the watering frequency would achieve a higher dust suppression efficiency. Based on the assessment in **Appendix 3-9**, it is recommended that the active works areas within the construction site should be watered 8 times a day during day time from 0800 to 1800 hours.

The speed of the trucks travelling on haul roads within the Project Site will be controlled at 10 kph or below in order to reduce dust impact and for safe movement around the Project Site. Any piles of materials accumulated on or around the work areas shall be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas shall be carried out in a manner without generating fugitive dust emissions. The material shall be handled properly to prevent fugitive dust emission before cleaning.

It is expected that no concrete batching will be required for the Project works, and concrete will be brought to the site in “ready-mixed” state or in pre-cast sections instead. However, if concrete batching is required at the site, the plant should be cleaned and watered regularly as a good practice. Cement and other fine grained materials delivered in bulk should be stored in enclosed silos fitted with high level alarm indicator. Wet mix batching process is preferred over dry mix batching. A specified process licence shall be obtained from the authority which will give guidelines on dust mitigation measures required as terms and conditions.

General Mitigation Measure

All the relevant dust control measures stipulated in the Air Pollution Control (Construction Dust) Regulation would be fully implemented. Typical mitigation measures include:

- The designated haul road should be hard paved to minimize fugitive dust emission;
- During the site formation works, the active works areas should be water sprayed with water browser or sprayed manually eight times during day-time from 0800 to 1800 hours including holidays. The Contractor(s) should ensure that the amount of water spraying is just enough to dampen the exposed surfaces without over-watering which could result in surface water runoff;
- Dump trucks for transporting dusty materials should be totally enclosed using impervious sheeting;

- Any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated as soon as possible;
- Dusty materials remaining after a stockpile is removed should be wetted with water;
- 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 e.g. concrete, bituminous materials or hardcore or similar;
- The Contractor(s) shall only transport adequate amount of fill materials to the Project Site to minimize stockpiling of fill materials on-site, thus reducing fugitive dust emission due to wind erosion;
- Should temporary stockpiling of dusty materials be required, it shall be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet;
- All dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet;
- Vehicle speed to be limited to 10 kph except on completed access roads;
- The portion of road leading only to a construction site that is within 30 m of a designated vehicle entrance or exit should be kept clear of dusty materials;
- Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites;
- The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle;
- The working area of excavation should be sprayed with water immediately before, during and immediately after (as necessary) the operations so as to maintain the entire surface wet; and
- Use of effective dust screens, sheeting or netting to be provided to enclose dry scaffolding which may be provided from the ground floor level of the building or if a canopy is provided at the first floor level, from the first floor level, up to the highest level (maximum three floors high for this Project) of the scaffolding where scaffolding is erected around the perimeter of a building under construction.

Site-specific Mitigation Measures

As mentioned in Section 2.6.2, alternative construction programme/ phasing has been considered in developing the construction programme with a view to minimize potential construction impacts.

In order to minimize potential cumulative dust impacts, the Contractor(s) shall carry out site formation works for the Northern Portion and Southern Portion of the Project Site separately without overlapping in construction programme. In addition, to minimize dust emission, the site formation works is expected to carry out in phases (i.e. different zones), and there will be only one zone under construction in any one time (Section 3.7.1.2 and Appendix 3-8 refer). Once construction for a zone is completed, the works area will be compacted, covered by tarpaulin sheet and hydroseeded before construction of another zone. Watering will also be applied on regular basis. Thus, there will be no cumulative construction dust impacts. Works area shall be properly covered at the end of working day to minimize wind erosion.

Precautionary Measures for Odour Impact

No excavation of pond sediment is expected during the construction and no significant odour impact due to excavation of sediment is therefore anticipated. However, as a precautionary measure, should any excavation of sediment be required during the construction, the following measures shall be implemented:

- Exposed surface shall be immediately filled by filling materials;
- All malodorous excavated material, if any, should be placed as far as possible from any ASRs;
- The stockpiled malodorous materials should be removed from Project Area within 24 hours or as soon as practicable;
- The stockpiled malodorous materials should be covered entirely by plastic tarpaulin sheets;
- Odour patrol during excavation of pond sediments to examine the effectiveness of the above control measures; and
- Should disposal of excavated sediment be required, it shall follow the requirements stated in Buildings Department's PNAP No. 252 for "Management Framework for Disposal of Dredged/ Excavated Sediment".

With proper measures, potential odour impact will be short-term and controllable. In addition, odour patrol will be carried out during excavation of pond sediments in order to examine the effectiveness of these control measures.

3.9.2 During Operation

Air quality aspect has been taken into account during the Project planning by providing adequate buffer distance between the Project Site and the nearby roads (Section 3.6.2.2 refers). Thus, the potential impacts in terms of air quality during the operational phase are insignificant and, and no specific mitigation measures are required.

3.10 Assessment Results (Mitigated Scenario)

3.10.1 Short-term and Long-term Impacts

The predicted mitigated maximum hourly TSP concentrations as well as daily average and annual average RSP and PM2.5 concentrations due to construction of this Project with the implementation of mitigation measures provided in Section 3.9.1, were assessed according to the methodology described in Section 3.7.1, and the results are presented in **Tables 3-14** to **3-23**. Location map of representative ASRs selected for construction phase air quality impact assessment is presented in **Figure 3-2**.

Details of the calculated emission rates are also provided in **Appendices 3-2 and 3-3**. Details of assessment results are also presented in **Appendices 3-6** and **3-7.** Contour plots based on the worst hit level (Section 3.7.1.3 refers) are also provided in **Figures 3-8A to 3-12B**.

Table 3-14 Predicted Maximum Hourly TSP Concentrations Due to This Project Southern Portion of the Project Site (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (µg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	165 / 69 / 45	229 / 164 / 164
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	195 / 98 / 57	326 / 203 / 166
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	126 / 70 / 46	173 / 164 / 164
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	335 / 81 / 46	405 / 164 / 164
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	143 / 102 / 62	179 / 164 / 164
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	178 / 122 / 84	225 / 166 / 164
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	34 / 32 / 29	164 / 164 / 164

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (μg/m^3)	
				Without Background *	With Background **
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	35 / 34 / 33	164 / 164 / 164
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	30 / 28 / 26	164 / 164 / 164
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	16 / 16 / 15	164 / 164 / 164
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	20 / 20 / 19	164 / 164 / 164
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	9 / 9 / 8	164 / 164 / 164
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	23 / 21 / 19	164 / 164 / 164
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	25 / 24 / 22	164 / 164 / 164
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	104 / 70 / 44	164 / 164 / 164
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	138 / 64 / 50	217 / 164 / 164
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	31 / 28 / 24	164 / 164 / 164
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	22 / 21 / 19	165 / 165 / 165
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	121 / 81 / 54	215 / 182 / 167
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	108 / 80 / 49	164 / 164 / 164
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	36 / 35 / 33	164 / 164 / 164
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	14 / 14 / 13	164 / 164 / 164
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	16 / 15 / 15	164 / 164 / 164
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	7 / 7 / 7	164 / 164 / 164
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	8 / 8 / 8	164 / 164 / 164
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	19 / 18 / 17	164 / 164 / 164
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	49 / 47 / 42	164 / 164 / 164
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	17 / 16 / 15	164 / 164 / 164
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	22 / 21 / 20	165 / 165 / 165
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	7 / 7 / 7	164 / 164 / 164
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	6 / 6 / 6	164 / 164 / 164
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	7 / 7 / 7	164 / 164 / 164
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	7 / 7 / 7	164 / 164 / 164
A27	Existing building	4.5	1.5 / 4.5 / 7.5	61 / 57 / 49	167 / 167 / 166
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	18 / 17 / 16	164 / 164 / 164
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	19 / 19 / 18	164 / 164 / 164
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	78 / 73 / 65	164 / 164 / 164

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (μg/m^3)	
				Without Background *	With Background **
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	13 / 13 / 12	164 / 164 / 164
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	60 / 52 / 40	164 / 164 / 164
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	12 / 12 / 12	164 / 164 / 164
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	9 / 8 / 8	164 / 164 / 164
A35	Palm Springs	5	1.5 / 4.5 / 7.5	8 / 7 / 7	164 / 164 / 164
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	9 / 9 / 9	164 / 164 / 164
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	19 / 19 / 17	164 / 164 / 164
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	90 / 68 / 40	165 / 165 / 165
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	98 / 86 / 65	181 / 170 / 164
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	47 / 43 / 37	164 / 164 / 164
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	10 / 10 / 10	164 / 164 / 164
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	40 / 36 / 28	164 / 164 / 164
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	12 / 12 / 12	164 / 164 / 164
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	41 / 37 / 31	178 / 175 / 169
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	94 / 82 / 63	164 / 164 / 164
Max. Conc.	**-**		**-**	**335**	**405**
Criteria	**-**		**-**	**500**	**500**

Remark: * Concentration due to contribution of Project Site.

** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

Table 3-15 Predicted Maximum Hourly TSP Concentrations Due to This Project Northern Portion of the Project Site (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	22 / 21 / 21	158 / 158 / 158
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	10 / 10 / 9	158 / 158 / 158
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	29 / 29 / 27	161 / 160 / 158
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	31 / 30 / 28	162 / 161 / 159
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	26 / 23 / 18	158 / 158 / 158
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	50 / 38 / 30	170 / 169 / 167
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	141 / 109 / 65	254 / 222 / 179

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (μg/m^3)	
				Without Background *	With Background **
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	146 / 77 / 48	216 / 183 / 161
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	197 / 75 / 44	232 / 158 / 158
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	134 / 76 / 41	183 / 158 / 158
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	192 / 108 / 47	232 / 158 / 158
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	31 / 30 / 28	158 / 158 / 158
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	19 / 18 / 17	158 / 158 / 158
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	23 / 22 / 19	158 / 158 / 158
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	20 / 18 / 15	158 / 158 / 158
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	23 / 22 / 21	158 / 158 / 158
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	8 / 8 / 8	158 / 158 / 158
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	9 / 8 / 8	158 / 158 / 158
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	10 / 10 / 9	158 / 158 / 158
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	6 / 6 / 6	158 / 158 / 158
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	16 / 15 / 14	158 / 158 / 158
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	63 / 54 / 40	172 / 164 / 159
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	164 / 59 / 29	182 / 159 / 158
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	19 / 18 / 17	158 / 158 / 158
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	18 / 17 / 16	168 / 167 / 167
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	16 / 15 / 14	158 / 158 / 158
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	9 / 9 / 8	158 / 158 / 158
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	12 / 12 / 11	158 / 158 / 158
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	4 / 4 / 4	158 / 158 / 158
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	15 / 15 / 14	158 / 158 / 158
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	19 / 18 / 17	158 / 158 / 158
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	14 / 13 / 13	169 / 169 / 168
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	10 / 10 / 9	158 / 158 / 158
A27	Existing building	4.5	1.5 / 4.5 / 7.5	12 / 12 / 11	158 / 158 / 158
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	65 / 54 / 46	158 / 158 / 158
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	178 / 76 / 40	194 / 158 / 158
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	135 / 110 / 74	266 / 241 / 205

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	TSP Concentration (µg/m^3)	
				Without Background *	With Background **
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	76 / 70 / 58	158 / 158 / 158
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	10 / 10 / 9	158 / 158 / 158
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	77 / 63 / 42	158 / 158 / 158
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	21 / 20 / 19	158 / 158 / 158
A35	Palm Springs	5	1.5 / 4.5 / 7.5	15 / 15 / 13	158 / 158 / 158
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	16 / 15 / 14	165 / 164 / 164
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	131 / 68 / 37	253 / 181 / 165
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	13 / 13 / 12	158 / 158 / 158
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	29 / 27 / 24	158 / 158 / 158
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	93 / 63 / 42	202 / 187 / 166
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	64 / 57 / 46	158 / 158 / 158
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	35 / 34 / 31	158 / 158 / 158
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	47 / 44 / 38	158 / 158 / 158
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	13 / 13 / 12	158 / 158 / 158
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	10 / 10 / 9	158 / 158 / 158
Max. Conc.	**-**		**-**	**197**	**266**
Criteria	**-**		**-**	**500**	**500**

Remark: * Concentration due to contribution of Project Site.

** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

Table 3-16 Predicted Daily Average RSP Concentrations Due to This Project Southern Portion (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (µg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	13 / 5 / 2	117 / 112 / 111
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	8 / 5 / 2	114 / 113 / 112
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	11 / 5 / 2	111 / 111 / 111
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	7 / 2 / 1	111 / 111 / 111
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	11 / 5 / 2	111 / 111 / 111
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	14 / 4 / 2	111 / 111 / 111

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	2 / 1 / 1	111 / 111 / 111
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	1 / 1 / 0	111 / 111 / 111
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	5 / 3 / 2	112 / 111 / 111
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	4 / 3 / 2	113 / 112 / 111
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	1 / 1 / 0	111 / 111 / 111
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	11 / 4 / 3	111 / 111 / 111
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	5 / 4 / 2	111 / 111 / 111
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	1 / 0 / 0	111 / 111 / 111
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A27	Existing building	4.5	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	1 / 0 / 0	111 / 111 / 111
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	1 / 1 / 0	111 / 111 / 111

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	4 / 2 / 2	111 / 111 / 111
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A35	Palm Springs	5	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	2 / 2 / 1	111 / 111 / 111
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	5 / 3 / 2	111 / 111 / 111
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	2 / 2 / 2	111 / 111 / 111
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	0 / 0 / 0	111 / 111 / 111
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	1 / 1 / 1	111 / 111 / 111
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	2 / 1 / 1	112 / 112 / 111
Max. Conc.	**-**		**-**	**14**	**117**
No. of Exceedance				**-**	**2**
Criteria	**-**		**-**	**100 (no. of exceedance allowed <= 9)**	

Remark: The above results are based on the 1st highest daily average concentrations.

* Concentration due to contribution of Project Site.

** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

Table 3-17 Predicted Daily Average RSP Concentrations Due to This Project Northern Portion (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	1 / 1 / 0	122 / 122 / 122
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	3 / 2 / 1	122 / 122 / 122
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	5 / 4 / 2	122 / 122 / 122
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	11 / 3 / 2	122 / 122 / 122
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	11 / 4 / 3	122 / 122 / 122
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	11 / 3 / 1	123 / 122 / 122
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	10 / 4 / 2	122 / 122 / 122
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	5 / 3 / 2	122 / 122 / 122
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	13 / 3 / 1	123 / 122 / 122
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A27	Existing building	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	5 / 2 / 1	122 / 122 / 122
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	9 / 3 / 2	122 / 122 / 122
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	7 / 3 / 2	122 / 122 / 122
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	3 / 3 / 2	123 / 122 / 122
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	6 / 3 / 2	122 / 122 / 122
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
A35	Palm Springs	5	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	10 / 3 / 2	131 / 123 / 122
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	2 / 2 / 2	122 / 122 / 122
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	1 / 1 / 1	122 / 122 / 122
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	1 / 1 / 0	122 / 122 / 122
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	0 / 0 / 0	122 / 122 / 122
Max. Conc.	**-**		**-**	**13**	**131**
No. of Exceedance				**-**	**3**
Criteria	**-**		**-**	**100 (no. of exceedance allowed <= 9)**	

Remark: The above results are based on the 1st highest daily average concentrations.

* Concentration due to contribution of Project Site.

** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

Table 3-18 Predicted Daily Average PM2.5 Concentrations Due to This Project Southern Portion (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	4 / 1 / 1	85 / 83 / 83
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	3 / 1 / 1	84 / 84 / 83
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	3 / 1 / 1	83 / 83 / 83
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	2 / 0 / 0	83 / 83 / 83
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	3 / 2 / 1	83 / 83 / 83
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	4 / 1 / 1	83 / 83 / 83
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	1 / 0 / 0	83 / 83 / 83
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	83 / 83 / 83
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	1 / 1 / 1	84 / 83 / 83
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	3 / 1 / 1	83 / 83 / 83
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	2 / 1 / 1	83 / 83 / 83
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A27	Existing building	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	1 / 1 / 1	83 / 83 / 83
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A35	Palm Springs	5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	1 / 0 / 0	83 / 83 / 83
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	1 / 1 / 1	83 / 83 / 83
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	1 / 1 / 0	83 / 83 / 83
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	0 / 0 / 0	83 / 83 / 83
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	1 / 0 / 0	83 / 83 / 83
Max. Conc.	**-**		**-**	**4**	**85**
No. of Exceedance				**-**	**2**
Criteria	**-**		**-**	**75 (no. of exceedance allowed <= 9)**	

Remark: The above results are based on the 1st highest daily average concentrations.

* Concentration due to contribution of Project Site.

** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

Table 3-19 Predicted Daily Average PM2.5 Concentrations Due to This Project Northern Portion (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	1 / 1 / 0	91 / 91 / 91
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	2 / 1 / 1	91 / 91 / 91
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	3 / 1 / 1	91 / 91 / 91
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	3 / 1 / 1	91 / 91 / 91
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	3 / 1 / 0	92 / 91 / 91
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	3 / 1 / 0	91 / 91 / 91
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	1 / 1 / 1	92 / 91 / 91
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	4 / 1 / 0	92 / 92 / 91
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (μg/m^3)	
				Without Background *	With Background **
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A27	Existing building	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	1 / 1 / 0	91 / 91 / 91
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	3 / 1 / 0	91 / 91 / 91
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	2 / 1 / 1	91 / 91 / 91
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	1 / 1 / 1	92 / 91 / 91
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	2 / 1 / 1	91 / 91 / 91
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A35	Palm Springs	5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	3 / 1 / 1	94 / 92 / 91
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	1 / 1 / 0	91 / 91 / 91
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	0 / 0 / 0	92 / 92 / 91
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	0 / 0 / 0	91 / 91 / 91
Max. Conc.	**-**		**-**	**4**	**94**
No. of Exceedance				**-**	**3**
Criteria	**-**		**-**	**75 (no. of exceedance allowed <= 9)**	

Remark: The above results are based on the 1st highest daily average concentrations.

* Concentration due to contribution of Project Site.

** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

Table 3-20 Predicted Annual Average RSP Concentrations Due to This Project Southern Portion (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	1 / 0.4 / 0.2	44.2 / 43.6 / 43.5
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.7 / 0.4 / 0.2	43.9 / 43.6 / 43.5
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.4 / 0.2 / 0.1	43.7 / 43.4 / 43.4
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0.1	43.4 / 43.4 / 43.3
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.7 / 0.3 / 0.2	43.9 / 43.6 / 43.4
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	0.5 / 0.2 / 0.1	43.7 / 43.5 / 43.4
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.3 / 43.3 / 43.3
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.3 / 43.3 / 43.3
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.3 / 43.3 / 43.3
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	0.4 / 0.2 / 0.1	43.7 / 43.5 / 43.4
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	0.3 / 0.2 / 0.1	43.6 / 43.5 / 43.4
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	0.4 / 0.3 / 0.2	43.7 / 43.5 / 43.4
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0.1	43.4 / 43.4 / 43.3
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	0 / 0 / 0	43.2 / 43.2 / 43.2
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.2 / 43.2 / 43.2
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A27	Existing building	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	0.2 / 0.2 / 0.1	43.4 / 43.4 / 43.4
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A35	Palm Springs	5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	43.3 / 43.3 / 43.3
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.4 / 43.3 / 43.3
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	43.3 / 43.3 / 43.3
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
Max. Conc.	**-**		**-**	**1.0**	**44.2**
Criteria	**-**		**-**	**50**	**50**

Remark: * Concentration due to contribution of Project Site.

** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

Table 3-21 Predicted Annual Average RSP Concentrations Due to This Project Northern Portion (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.3 / 43.3 / 43.3
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.3 / 43.3 / 43.3
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.3 / 43.3 / 43.3
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.4 / 43.4 / 43.3
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.5 / 0.3 / 0.1	43.8 / 43.5 / 43.4
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.6 / 0.3 / 0.2	43.9 / 43.5 / 43.4
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.6 / 0.3 / 0.1	43.8 / 43.5 / 43.4
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.5 / 0.2 / 0.1	43.7 / 43.4 / 43.3
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.4 / 0.2 / 0.1	43.7 / 43.4 / 43.3
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.3 / 43.3 / 43.3
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.3 / 43.3 / 43.3
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.2 / 43.2 / 43.2
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0.1	43.4 / 43.3 / 43.3
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.3 / 0.1 / 0.1	43.6 / 43.4 / 43.3
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.2 / 43.2 / 43.2
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.2 / 43.2 / 43.2
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	43.2 / 43.2 / 43.2

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	RSP Concentration (μg/m^3)	
				Without Background *	With Background **
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.2 / 43.2 / 43.2
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A27	Existing building	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.2 / 43.2 / 43.2
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0.1	43.4 / 43.3 / 43.3
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	0.3 / 0.1 / 0.1	43.5 / 43.4 / 43.3
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	0.4 / 0.2 / 0.2	43.6 / 43.5 / 43.4
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0.1	43.4 / 43.4 / 43.3
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0.1	43.5 / 43.4 / 43.3
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	0.1 / 0 / 0	43.3 / 43.3 / 43.3
A35	Palm Springs	5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	0.4 / 0.2 / 0.1	43.7 / 43.4 / 43.3
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0.1	43.3 / 43.3 / 43.3
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	0 / 0 / 0	43.3 / 43.3 / 43.3
Max. Conc.	**-**		**-**	**0.6**	**43.9**
Criteria	**-**		**-**	**50**	**50**

Remark: * Concentration due to contribution of Project Site.

** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

Table 3-22 Predicted Annual Average PM2.5 Concentrations Due to This Project Southern Portion (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (μg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.3 / 0.1 / 0.1	31 / 30.8 / 30.8
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0.1	30.9 / 30.8 / 30.8
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	30.8 / 30.8 / 30.7
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.1 / 0 / 0	30.8 / 30.7 / 30.7
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0	30.9 / 30.8 / 30.8
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	30.8 / 30.8 / 30.7
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	30.8 / 30.8 / 30.7
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	30.8 / 30.8 / 30.7
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	30.8 / 30.8 / 30.8
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.8 / 30.7 / 30.7
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (μg/m^3)	
				Without Background *	With Background **
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A27	Existing building	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	0.1 / 0 / 0	30.8 / 30.7 / 30.7
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A35	Palm Springs	5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
Max. Conc.	**-**		**-**	**0.3**	**31**
Criteria	**-**		**-**	**35**	**35**

Remark: * Concentration due to contribution of Project Site.

** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

Table 3-23 Predicted Annual Average PM2.5 Concentrations Due to This Project Northern Portion (Mitigated Scenario)

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A01	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A01A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A02	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A02A	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A03	Fairview Park	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A04	Fairview Park	4.3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A05	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0	30.9 / 30.8 / 30.7
A05A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0	30.9 / 30.8 / 30.7
A05B	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.2 / 0.1 / 0	30.9 / 30.8 / 30.7
A06	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.1 / 0 / 0	30.8 / 30.8 / 30.7
A06A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	30.8 / 30.8 / 30.7
A07	Yau Mei San Tsuen village house	3.1	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A08	Chuk Yuen Tsuen village house	2.3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A09	Chuk Yuen Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A10	Bethel High School	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A10A	Bethel High School	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A11	Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A12	Villa Camilla	6.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A13	Fairview Park	4.6	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A14	Wong Chan Sook Ying Memorial School	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A15	Man Yuen Tsuen village house	4.1	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A16	Fairview Park	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.8 / 30.7 / 30.7
A16A	Fairview Park	4.2	1.5 / 4.5 / 7.5	0.1 / 0 / 0	30.8 / 30.7 / 30.7
A17	Palm Springs	5.7	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A18	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A19	Chuk Yuen Tsuen village house	3.3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A20	Hang Fook Garden	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A21	Ha San Wai village house	4.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A22	Ha San Wai village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7

ASR No.	Description	Ground Level, mPD	Height Above Ground, m	PM2.5 Concentration (µg/m^3)	
				Without Background *	With Background **
A23	Yau Mei San Tsuen village house	3.6	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A24	Christian Ministry Institute	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A25	Royal Palms	4.9	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A26	Hong Chi Morninglight School Yuen Long	4.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A27	Existing building	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A28	Fairview Park	4.3	1.5 / 4.5 / 7.5	0.1 / 0 / 0	30.8 / 30.7 / 30.7
A29	Fairview Park	4.3	1.5 / 4.5 / 7.5	0.1 / 0 / 0	30.8 / 30.7 / 30.7
A30	Fairview Park	4.5	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	30.8 / 30.8 / 30.8
A31	Fairview Park	3.9	1.5 / 4.5 / 7.5	0 / 0 / 0	30.8 / 30.7 / 30.7
A32	A Restaurant near Helene Terrace	4.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A33	Fairview Park	3.9	1.5 / 4.5 / 7.5	0.1 / 0 / 0	30.8 / 30.7 / 30.7
A34	Palm Springs	5.2	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A35	Palm Springs	5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A36	Yau Mei San Tsuen village house	3.5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A1P	Planned Yau Mei Site	2	1.5 / 4.5 / 7.5	0.1 / 0.1 / 0	30.8 / 30.8 / 30.7
A2P	Planned Kam Pok Road Site	5	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A3P	Planned Kam Pok Road Site	7	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A4P	Planned RD Site	3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
A5P	Planned RD Site	3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
V01	Planned NT exempted houses	3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
V02	Planned “V” zone	2.4	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
V03	Planned “V”zone	3	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
V04	Planned “RD” zone	4.8	1.5 / 4.5 / 7.5	0 / 0 / 0	30.7 / 30.7 / 30.7
Max. Conc.	-		-	**0.2**	**30.9**
Criteria	-		-	**35**	**35**

Remark: * Concentration due to contribution of Project Site.

** ** The above results have included the background level extracted from the PATH Output (year 2015). The hour-by-hour background contribution is estimated using output of PATH model, and added hour-by-hour to the Project contribution.

It is found that with the implementation of general mitigation measures listed out in Section 3.9.1; and the proposed site-specific measures, the dust level can be significantly reduced and can comply with

the relevant air quality criteria/ AQOs for TSP, RSP and PM2.5, respectively. Thus, no further mitigation measures will be necessary.

As the dust level can comply with the relevant air quality criteria/ AQOs, no residual impact is anticipated.

With regard to the above, the air quality impact of construction activities has been assessed using a conservative emission rate (Section 3.7.1.2 and **Appendices 3-2** and **3-3** refer), in order to represent a worst case scenario. To be conservative, simultaneous construction of construction activities as identified in Section 3.7.1.1 (i.e. removal and unloading of soil materials by excavators; earth loading/ unloading, stockpiling; and bulldozing and surface compaction), has also been assumed. Thus, the predicted air quality impact upon ASRs as shown above is based on a conservative approach. However, the concerned activities are considered unlikely to operate at the same time due to the phased construction method, where there are only limited space and construction plants available for construction in any one time. Thus, it is expected that the actual air quality impact due to construction works would be less significant.

The site formation works of this Project will only last for 7.5 months for the Southern Portion and the Northern Portion, respectively. After that, the site will be hard paved and there will be no significant air quality impact at the site over the long term. In addition, due to the adoption of phased construction method, the construction duration of each sub-zone will only last for about 12 calendar days, after that the construction activities will be moved to another sub-zone and so on. As a result, the air quality impact upon ASRs will be relatively short-term and temporarily as the nearest dust emission sources of individual ASR will not last for the whole period of site formation stage and will discontinue after a short period of time.

It should also note that practical mitigation measures have already been proposed in Section 3.9.1; the works area will be constructed in phases with each sub-zone representing an average of about 5% of the site area within either the Southern Portion or the Northern Portion, respectively (see **Appendix 3-9**), which cannot be practically reduced further; frequent watering will be applied; exposed surfaces will be compacted, covered by tarpaulin sheets and hydroseeded after works. Thus, the air quality impact due to construction of this Project has already been reduced to a minimal and practical mitigation measures have been exhausted.

3.11 Environmental Monitoring and Audit

Given the mitigated TSP, RSP and PM2.5 levels (with implementation of recommended mitigation measures) can comply with the relevant air quality criteria/ AQOs, no adverse impact will be anticipated due to the Project works, and no environmental monitoring and audit (EM&A) will be necessary.

Nevertheless, in order to ensure the effectiveness of implementation of mitigation measures, it is proposed that an environmental monitoring and audit (EM&A) program is carried out during construction to monitoring the short-term impacts. The Environmental Team (ET) shall check the contractor(s)' practice and ensure the above recommendations are properly implemented. Should adverse dust impacts be identified, the source of fugitive dust emission should be identified. Additional mitigation measures shall be proposed by the Contractor(s) before concerned construction works is continued. Details of the EM&A requirements are provided in **Chapter 13** of this report.

3.12 Conclusion

Through implementation of dust control measures required under the Air Pollution Control (Construction Dust) Regulation; recommended specific measures in the EIA report; and good housekeeping practice by the works contractors, construction dust impacts can be controlled to acceptable levels. Practical mitigation measures have already been proposed for this Project to alleviate potential impacts. The concerned site formation works will only be short-term and potential

air quality impacts have been reduced to a minimal through recommended mitigation measures and can comply with the relevant air quality criteria/ AQOs. Thus, no adverse impact is anticipated. There is no residual impact as a result.

Although the Project is not expected to generate excessive construction phase air quality impact, an EM&A programme as well as an odour patrol have been recommended to demonstrate compliance with air quality criteria/ AQOs and the proper implementation of mitigation measures.

Appropriate precautionary measures (e.g. peripheral setback from the site boundaries) have been incorporated in the layout to alleviate potential vehicular emissions impacts. It was found that the Project Site can satisfy the buffer distance requirements stated in the HKPSG for both active and passive recreational uses, thus no unacceptable air quality impacts due to vehicular emission are expected. No unacceptable air quality impacts due to industrial emissions are expected as no industrial emission sources were identified within 500m from the Project boundary.

During the operational stage, the sewage generated by the proposed development will be discharged to the planned public sewers at Yau Pok Road. Thus, no adverse odour residual impacts are envisaged for the construction and operational phase of the Project.

4. NOISE

4.1 Summary

A noise impact assessment has been undertaken in accordance with Section 3.9.2 of the EIA Study Brief to define the nature and scale of potential noise impacts associated with the Project. The Assessment Area for the noise impact assessment is defined by a distance of 300m from the boundary of the Project Site as per the EIA Study Brief. This Chapter also follows the criteria and guidelines for evaluating and assessing noise impacts as stated in Annex 5 and Annex 13 of the TM.

The Project Site is currently vacant, and the existing land uses in its vicinity comprise village development, Ngau Tam Mei Drainage Channel, and road networks such as Kam Pok Road, Fairview Park Road and Yau Pok Road. This Chapter also addresses the potential noise impact associated with the construction of the proposed development as well as the operational phase noise impact due to nearby road networks and industrial noise activities further east of the Project Site. According to the approved EIA report, namely the "EIA and TIA Studies for the Stage 2 of PWP Item No. 215DS - Yuen Long and Kam Tin Sewerage and Sewage Disposal[2]", Ngau Tam Mei SPS has been proposed to be located at an offsite location over 670m northeast of the proposed NSRs of this Project Site, which is outside the 300m Study boundary specified in the Study Brief. Thus, adverse impacts due to construction and operation of the pumping station are not anticipated. The approximate location of the proposed SPS, based on the above EIA report, is shown in **Figure 4-5**. According to the same, this future SPS will be self-protected with openings or louvers directed away from NSRs. It is a requirement in the above approved EIA Report[2] that the SPS has to be designed to minimize potential noise impact to the nearby NRS locations. Mitigation measures such as acoustic enclosure, silencer at inlet and outlet, anti-vibration spring mount, and acoustic louver are required during the detailed design of the SPS. It is also a requirement in the EIA report that the maximum permissible Sound Power Level (SWL) at the louver location of the SPS should not exceed 83.3dB(A). It is estimated that this development project will not be subject to any unacceptable noise level.

4.2 Proposed Development

The proposed Project is for residential purpose with a landscape pond, landscaped open area and some passive recreational uses and supporting facilities. Detailed elements of the proposed development and the MLP are discussed in Section 1.3.

4.3 Government Legislation and Standards

4.3.1 Noise Standard for Construction

Construction noise is controlled under the Noise Control Ordinance (NCO) which prohibits the use of powered mechanical equipment (PME) during the restricted hours (7 p.m. to 7 a.m. on normal weekdays and any time on a public holiday, including Sunday) without a valid Construction Noise Permit (CNP) granted by the Authority. The criteria and procedures for issuing such a permit are specified in the "Technical Memorandum on Noise from Construction Works Other than Percussive Piling" (TM1).

For construction works other than percussive piling, although TM1 do not provide control over daytime construction activities, noise limits are set out in Annex 5 of the EIAO-TM. The TM applies to designated projects, including residential or recreational development planned within Deep Bay Buffer Zones 1 or 2. The relevant noise standards are summarised in **Table 4-1** below.

Table 4-1 Noise Limits for Daytime Construction Activities

NSR	0700 to 1900 hours on any day not being a Sunday or general holiday L_{eq} (30 min.) dB (A)
All domestic premises including temporary housing accommodation	75
Educational institutions including kindergartens, nurseries.	70 65 (during examination)

N.B.

(i) The above standards apply to uses which reply on opened windows for ventilation.

(ii) The above standards shall be viewed as the maximum permissible noise levels assessed at 1m from the external facade.

Noise impacts arising from general construction activities (excluding percussive piling) conducted during the restricted hours (19:00-07:00 hours on any day and anytime on Sunday or general holiday) and percussive piling during anytime are governed by the Noise Control Ordinance ("NCO").

For carrying out of any general construction activities involving the use of any Powered Mechanical Equipment ("PME") within restricted hours, a Construction Noise Permit (CNP) is required from the Authority under the NCO.

The noise criteria and the assessment procedures for issuing a CNP are specified in Technical Memorandum on Noise from Construction Work Other Than Percussive Piling (GW-TM) under the NCO.

The use of Specified PME ("SPME") and/or the carrying out of Prescribed Construction Work ("PCW") within a Designated Area ("DA") under the NCO during the restricted hours are also prohibited without a CNP. The relevant technical details can be referred to Technical Memorandum on Noise from Construction Work in Designated Areas (DA-TM) under NCO.

Designated areas, in which the control of SPME and PCW shall apply, are established through the Noise Control (Construction Work Designated Areas) Notice made under Section 8A(1) of the NCO.

According to the latest Designated Area defined under the NCO [Plan No.: EPD/AN/NT-01 by the Environment Bureau], the Project Area is within Designated Areas.

During the construction phase, the Contractor has the responsibility to check the latest status and coverage of the Designated Areas at time of construction of the project.

Percussive piling is only permitted when the Authority has granted a CNP. Technical Memorandum on Noise from Percussive Piling (PP-TM) under the NCO sets out the permitted hours of operation of percussive piling and Acceptable Noise Level ("ANL") requirements, which are dependent on the level of exceedance of the Acceptable Noise Level ("ANL"). For this Project in particular, percussive piling is not considered necessary at this stage.

Regardless of any description or assessment made in this Chapter, in assessing a filed application for a CNP the Authority will be guided by the relevant Technical Memoranda. The Authority will consider all the factors affecting their decision taking contemporary situations/ conditions into account. Nothing in this report shall pre-empt the Authority in making their decisions, and there is no guarantee that a CNP will be issued. If a CNP were issued, the Authority may include any conditions they consider appropriate and such conditions are to be followed while the works covered by the CNP are being carried out. Failing to do so may lead to cancellation of the permit and prosecution action under the NCO.

4.3.2 Noise Standard During Operation

The land uses surrounding the Project Site include existing private residential developments, drainage channel and roads. The dominant noise sources are domestic premises to the west of the Project Site and the surrounding road networks (e.g. Yau Pok Road, Kam Pok Road, Fairview Park Road and Fairview Park Boulevard). Castle Peak Road and San Tin Highway are located to the further east of the Project Site with separation distance of over 500m from the proposed residential development of this Project (**Figure 4-3A**). Existing village developments (e.g. Chuk Yuen Tsuen, Hang Fuk Garden, and Golden Age Home for Senior Citizens) located in between this Project and the roads, shield the Project Site from traffic noise generated from these roads. As Castle Peak Road and San Tin Highway are outside the 300m radius Assessment Area specified in the Project EIA Study Brief, these roads are not considered further in this noise assessment.

Within 300m radius from the boundary of the Project Site, there are also a few existing industrial activities outside the Project Site boundary to the east. However, these industrial activities are relatively far away from the Project Site, and the horizontal distance between the Noise Sensitive Receivers of the proposed Development and the identified industrial noise sources is over 250m. During operation of this Project, direct line of sight from the Project Site to these industrial activities will be blocked by the proposed residential development within "Residential (Group D)" zone to the east of Ngau Tam Mei Channel (i.e. Approved S16 application No. A/YL-MP/170).

4.3.2.1 Road Traffic

Environmental Impact Assessment Ordinance (EIAO)

Noise criteria for the assessment of road traffic noise impact on the Project are provided in **Table 1A** of Annex 5 of EIAO-TM and are summarised below. According to the guidelines, the maximum allowed road traffic noise level, measured in terms of L_{10}(1-hr), at typical facades of new dwellings of the proposed Project is to be 70 dB(A).

Noise standards are recommended in **Table 1A** of the Technical Memorandum on Environmental Impact Assessment Process for planning against possible noise impact from road traffic, railway and aircrafts. According to the guidelines, the maximum allowed road traffic noise level, measured in terms of L10(1-hr.), at typical facades of new dwellings like the proposed development is recommended to be 70 dB(A).

Table 4-2 Relevant Road Traffic Noise Standard

Common Uses	Road Traffic Noise L10 (1 hour), dB(A)
All domestic premises including temporary housing accommodation	70
Hotel and hostels	70
Offices	70
Educational institutions including kindergartens, nurseries and all others where unaided voice communication is required	65
Places of public worship and courts of law	65
Hospital, clinics, convalescences and homes for the aged, diagnostic rooms, wards	55

Note:

(i) The above standards apply to uses which reply on opened windows for ventilation;

(ii) The above standards shall be viewed as the maximum permissible noise levels assessed at 1m from the external façade.

4.3.2.2 Fixed Plant Noise

Noise Control Ordinance (NCO)

The Noise Control Ordinance (NCO) provides the statutory framework for the control of fixed plant. It defines statutory limits applicable to the fixed plants used during the operational phase of the Project. The Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites (IND-TM) sets the criteria - Acceptable Noise Level (ANL) for governing fixed plant noise.

Environmental Impact Assessment Ordinance (EIAO)

According to the **Table 1A** of EIAO-TM, the noise impact due to fixed noise sources shall comply with the following criteria:

- 5 dB(A) below the appropriate Acceptable Noise Levels (ANLs) given in **Table 2** of the IND-TM; or
- The prevailing background noise levels where it is 5 dB(A) below the ANL.

Noise sensitive receivers (NSR) are classified according to the Area Sensitivity Rating (ASR). Any NSR shall be assigned an ASR of "C" if it is within 100 m of a zone designated as "Industrial" or "Industrial Estate" on a statutory Outline Zoning Plan, or an ASR of "B" if it is between 100 m and 250 m from such a zone, except for cases which indicate an ASR of "C".

As Project Site is located in rural area, to be conservative, the Area Sensitive Rating (ASR) of “A” has been assumed, and the planning noise standard of “ANL–5 dB(A)” should be 55 dB(A) for day-time and evening time periods, and 45 dB(A) for night time accordingly. The ANL for Area Sensitivity Ratings of “A” is depicted in **Table 4-3**.

Table 4-3 Relevant Noise Standard for Fixed Noise Sources

Standards	Criteria in relevant Time Periods	Acceptable Noise Level (ANL)	Criteria (ANL-5 dB(A))
NCO	Day and Evening (07:00 – 23:00)	60 dB(A) and	55 dB(A) and
NCO	Night (23:00 – 07:00)	50 dB(A)	45 dB(A)

It should be noted that fixed plant noise is controlled under Section 13 of the NCO during operation of the plant. In exercising the control, the Noise Control Authority shall determine the noise impact from concerned fixed noise sources on the basis of prevailing legislation and practices in force, and taking into account the prevailing conditions/ situations of adjoining land uses. The Area Sensitivity Ratings (ASRs) proposed in this EIA are intended for assessment only. Nothing in the EIA shall bind the Noise Control Authority in the context of enforcement against any of the fixed noise sources identified and assessed in the future.

4.4 Identification of Potential Noise Impacts

The potential noise impacts associated with construction and operational phases of the proposed development, are identified and described in this Chapter.

4.4.1 Potential Noise Impacts During Construction Phase

Noise impacts arising from construction of the proposed development are mainly due to the use of powered mechanical equipment (PME) for various construction activities. The construction work for the proposed development is generally divided into the following stages:

- Stage A – Site Formation, Filling and Excavation;
- Stage B – Construction of Underground Services and Utilities;
- Stage C – Construction of Roadworks;
- Stage D – Foundation;
- Stage E – Superstructure; and
- Stage F – Sub-structure (pile cap)

Stage A works mainly involve site formation, excavation and filling activities. While, Stages B to F involve construction of underground utilities, roadworks, foundation, infrastructure and superstructure works, as well as landscaping works of the residential portion at the Project Site. Prior to the above construction works, there will be site clearance to removal surface vegetation within the Project Site manually by hand tools, and preparation works to fence off the construction site (shown as "site clearance and preparation" in the construction programme provided in **Appendix 1-1**).

Non-percussive piling method shall be used for the foundation works of the proposed development. The construction activities that are likely to cause noise impacts include excavation, piling, materials loading and unloading and concreting. No noisy operations are expected during the landscaping works and the "finishing" activities inside the buildings. The landscaping works would involve planting of various plantations; while the "finishing" activities would be carried out within the buildings. The potential noise impact during the construction phase of the development was assessed quantitatively in later Sections.

4.4.2 Potential Noise Impacts During Operational Phase

Traffic Noise Impact

It is expected that the traffic noise from the nearby road networks is the dominant noise source for the proposed development. Detailed traffic noise impact assessments are described in Section 4.7.2 below.

Existing and Planned Pumping Stations

As discussed in earlier Sections, there is an existing Chuk Yuen Floodwater pumping station to the east of the Project Site on the opposite side of Ngau Tam Mei Channel, which is managed by the Hong Kong SAR Government Drainage Services Department (DSD). Operational noise level during the operation of the pumping station could potentially affect the Project Site. The potential noise impacts due to the existing pumping station have been further assessed in the following Sections. The location of the existing pumping station is also depicted in **Figure 4-5**.

There are also planned public sewerage networks and a sewage pumping station (i.e. Ngau Tam Mei SPS) in the area. According to the approved EIA report, namely the "EIA and TIA Studies for the Stage 2 of PWP Item No. 215DS - Yuen Long and Kam Tin Sewerage and Sewage Disposal[2]", Ngau Tam Mei SPS has been proposed to be located at an offsite location distant away from the Project Site. The approximate location of the proposed SPS, based on the above EIA report, is shown in **Figure 4-5**. The proposed pumping station is about 345m away from the northern site boundary of this Project where non-noise sensitive uses are proposed (i.e. landscape pond and some passive recreational and supporting uses). The concerned pumping station is also over 670m away from the proposed residential uses in the Southern Portion of the Project Site. As the pumping station is

beyond 300m Assessment Area specified in the Project EIA Study Brief, adverse noise impact due to the pumping station is not expected. Nevertheless, this future SPS will be self-protected with openings or louvers directed away from NSRs that are located in between the future SPS and the Project Site. It is also a requirement in the above approved EIA Report[2] that the SPS has to be designed to minimize potential noise impact to the nearby NRS locations. Mitigation measures such as acoustic enclosure, silencer at inlet and outlet, anti-vibration spring mount, and acoustic louver are required during the detailed design of the SPS. Thus, it is estimated that this Project will not be subject to any unacceptable noise level due to the pumping station.

Industrial Noise Sources

Existing industrial activities within the 300 m radius from the Project Site are identified to the east of the Project Site (**Figure 4-4A** refers). These include:

- An open storage site for precast units with associated warehouse (Fan Keung Kee); and
- A totally enclosed godown (Tai Sang Hong);

Although the identified industrial sites are within 300m from the Project Site, they are relatively far away. The horizontal distance between the NSRs of this Project and the nearest industrial noise sources at Fan Keung Kee, is over 250m. Although the totally enclosed godown (Tai Sang Hong) is within 300m radius from the Project boundary, the horizontal distance between the proposed NSRs of this Project and the identified noise sources, is over 300m (**Figure 4-4A** refers).

Table 4-4 summarises the identified industrial noise sources and number of plants. The respective locations and photos of the identified industrial sites are also depicted in **Figure 4-4A** and **Figure 4-4B**, respectively.

Table 4-4 Identified Industrial Sites and Noise Sources

Source ID	Description	Consideration of Shielding Effect	Identified Noise Source	Max. No. of Plants Used in Noise Assessment
S1-1	Fan Keung Kee (sheltered warehouse)	The concerned warehouse is within a sheltered area with hoarding erected on 3 sides and the top, which shields the Project Site from this warehouse.	Operating noise	General operating noise of the warehouse
S2-3	Fan Keung Kee (open storage).	-	Loading and unloading using forklift	One forklift
S2-1	Fan Keung Kee (for open storage of precast units)	-	Movement of Lorry	Movement of one lorry
S2-2	Fan Keung Kee (for open storage of precast units)	-	Lifting of container by a mobile crane	One mobile crane
S10-1	Totally enclosed godown (Tai Sang Hong)	The structure of the godown shields the Project Site.	Loading and unloading using forklift	One forklift
S10-2	Totally enclosed godown (Tai Sang Hong)	The structure of the godown shields the Project Site.	Movement of lorry	One lorry

Site visits were carried out between February 2008 and December 2009, to identify industrial activities in the vicinity of the site. Patterns of operation of these industrial sites and number and type of noisy plants were also documented during the site visits. Further visits were also conducted

between March 2010 and October 2013 including both daytime and nighttime periods to verify the previous findings. Details of the site visits are also provided in **Appendix 4-8A**.

The open storage site (i.e. S1-1 and S2-1 to S2-3 in **Table 4-4**) is for storage of precast units. There is also a warehouse within the open storage site, which is sheltered on 3 sides and the top by site hoarding. While the godown (i.e. S10-1 and S10-2 in **Table 4-4**) is a totally enclosed building. It is understood from the operator that both the godown and the open storage site do not have night-time operation. Subsequent field observations from February 2008 to October 2013 confirm the above findings that they were closed around 7:00pm. Night-time surveys were also carried out during the above-mentioned period and identified that these activities did not have any operation in night-time.

Noise sources within these industrial sites were identified during the field visits. The identified plants within the open storage site (i.e. Fan Keung Kee) include one mobile crane, one lorry, one forklift, and the general operating noise of the sheltered warehouse. While, one forklift and one lorry were found within the godown. Sound Power Level (SWL) of the identified plants, based on site measurement, was used for the noise assessment. Please refer to Section 4.6.2.2 and Section 4.7.3.2 for details of the noise measurement.

Potential noise impacts due to operation of these industrial operations are further assessed in the following Sections.

Petrol Filling Station within Fairview Park

There is also a small petrol filling station within Fairview Park to the south of the Project Site (**Figure 4-4C** refers). As the petrol filling station is within Fairview Park (a private development) and is separated from other public roads by an existing vehicular entrance/ security gate, the main users of the station will be the residents of Fairview Park (e.g. using private vehicles) and heavy vehicles serving the commercial centre at Fairview Park. Since Fairview Park is a residential estate and the commercial centre is surrounded by residential houses, visits of heavy vehicles during night-time period after 11:00pm is unlikely. To be conservative, noise impact due to movement of heavy vehicles has been taken into account in the noise assessment.

The petrol filling station does not provide any vehicle repairing services, and the movement of vehicles in and out of the station and during refilling of the underground storage tank will be the only noise source during its operation during day-time. According to on-site observation, vehicles entering and leaving the petrol filling station would travel in a slow speed due to the small size of the petrol filling station. Thus, the noise generated due to movement of vehicles within the station is not significant due to the slow motion of movement of vehicles.

According to the operator of the petrol filling station, refilling of underground storage tank by oil tanker will only be arranged during day-time (usually around 10:00am to 1:00pm) in order to avoid potential noise impact due to the close proximity of nearby existing residential buildings within Fairview Park. As mentioned above, the petrol filling station is within the boundary of Fairview Park, thus visit by heavy vehicles at night will be controlled through Fairview Park's existing vehicular entrance/ security gate. It shall also be noted that there are existing residential houses surrounding the petrol filling station at Fairview Park with a separation distance as short as about 23m (see **Figure 4-4C**). These existing residential houses would be worst affected by the operation of the petrol filling station.

Site visits undertaken in July 2011, September 2011, and subsequent visits between August 2012 and October 2013 also confirm the above observation (i.e. noise sources at the petrol filling station are due to movement of vehicle within the station, and refilling of underground storage tank only occurs during day-time) (see **Appendix 4-8A** for the field survey records).

Based on on-site observation, the refilling of underground storage tank itself does not generate noise impact as no mechanical movement of equipment is involved in the refilling process. Instead,

movement of the oil tanker within the petrol filling station will be noise source, which has been taken into account in the day-time noise assessment.

Fixed Noise Source Due to the Proposed Development

During the operational stage, the sewage generated by the proposed development will be discharged to the public sewerage system. Thus, no adverse impacts are envisaged for the operational phase of the Project (i.e. there will be no sewage treatment plant within the Project Site).

4.5 Determination of Noise Sensitive Receivers

4.5.1 Existing Sensitive Uses For Construction Noise Impact Assessment

With reference to Annex 13 of the EIAO-TM, noise sensitive receivers are identified within the 300m assessment area. These NSRs included all existing NSRs. The uses and description of the identified representative existing noise sensitive uses within the Assessment Area are shown in **Table 4-5**. The locations of assessment points for construction noise impact assessment are also shown in **Figure 4-2A**, photographs of the selected NSRs are also provided in **Figure 4-2B**.

Table 4-5 Identified Existing Noise Sensitive Receivers For Construction Noise Assessment

NSR ID	Description	Current Use	No. of Storey	Ground mPD Level, m	mPD level at Upper Floor, m *
N1	Fairview Park	Residential	3	4.4	11.2
N2	Fairview Park	Residential	3	4.4	11.2
N3	Fairview Park	Residential	3	4.4	11.2
N4	Fairview Park	Residential	3	4.3	11.1
N5	Fairview Park	Residential	3	4.2	11
N6	Fairview Park	Residential	2-3	4.3	11.1
N7	Yau Mei San Tsuen	Residential	2	3.1	7.1
N8	Chuk Yuen Tsuen	Residential	2	2.3	6.3
N9	Chuk Yuen Tsuen	Residential	3	3.5	10.3
N10	Bethel High School	Education	3	4.4	12.6 **
N11	Helene Terrace	Residential	3	4.5	11.3
N12	Villa Camllia	Residential	3	6.5	13.3
N13	Fairview Park	Residential	2	4.6	11.4
N14	Wong Chan Sook Ying Memorial School	Education	4	4.4	15.6
N15	Man Yuen Tsuen	Residential	3	4.1	10.9
N16	Fairview Park	Residential	2-3	4.2	11
N17	Palm Springs	Residential	3	5.7	12.5
N18	Temp. house at Yau Mei San Tsuen	Residential	2	3.5	7.5
N19	Existing village house	Residential	2	4.5	8.5
N20	Fairview Park	Residential	3	4.3	11.1

Remark: * As the NSR is 3-storey high building, the mPD level is based on 1.2m above the floor level on the third floor. The floor height is assumed to be 2.8m and has taken into account the relevant ground mPD level. For example: NSR N1 is a 3-storey building. The mPD level at upper floor is calculated by 4.4m (existing ground mPD level) + 2.8m/ per floor) x 2 floors) + 1.2m above the ground floor on the third floor).

** The Bethel High School is a 3 storeys building. The floor to floor height for the ground floor is taken to be 4m while the floor to floor height for classrooms on 1/F and 2/F are taken to be 3m high.

4.5.2 Potential Planned Sensitive Uses For Construction Noise Impact Assessment

Information such as relevant plans[3] , current Outline Zoning Plan No. S/YL-MP/6, and Town Planning Board (TPB) records have been reviewed in order to identify potential planned/ committed NSRs. The registry of EIAO projects was also reviewed for EIA projects. Based on information reviewed, there are a few residential development projects in the vicinity of the proposed development site. These residential developments are also classified as designated project under the EIAO; as such they have to go through the EIAO process. These potential future development cases are listed in **Table 4-6** below.

Table 4-6 Status of the Proposed Near-by Sensitive Uses

Planned Site	NSR ID	Relevant Town Planning Board / EIAO Application Number	Description	Appro-val of TPO	Appro-val of EIAO	Ground mPD Level, m	mPD Level at Upper Floor, m
Planned residential development proposals							
Yau Mei Site	N1P	ESB-182/2008	Comprehensive Development and Wetland Protection near Yau Mei San Tsuen, Yuen Long	No	No	2.2	9.4 *
Kam Pok Road Site	N2P	ESB-210/2009. A/YL-MP/136; Also in A/YL-MP/170	Proposed Residential Development at R(D) zone	Yes	No	4.8	9 *
	N3P					6.5	10.7 *
RD Site	N4P	ESB-204/2009. Different scales of development and site areas were also under A/YL-MP/132, A/YL-MP/146, A/YL-MP/193 and A/YL-MP/205	Proposed Residential Development within R(D) Zone at Various Lots in DD 104.	Yes	No	2.4	6.6 *
	N5P					2.4	6.6 *

Remark: * According to the OZP, allowed building height of the planned development sites are 6m high. Thus, it is assumed the planned developments are 2 storeys buildings with floor to floor height at 3m. For Yau Mei Site, the maximum allowed building is 3 storeys in OZP No. S/YL-MP/6, thus it is assumed to be 3-storey building and each floor is assumed to be 3m high. The mPD level shown in the table is based on 1.2m above the upper floor level. For example, the mPD level for N4P is calculated by 2.4m (existing ground mPD level) + 3m/ per floor + 1.2m above the ground floor = 6.6mPD).

None of the above residential development proposals have obtained approval from both the Town Planning Ordinance (TPO) and under the EIAO, and there is no committed development programme for these planned development sites. For Kam Pok Road Site and RD Site, planning application was

3 According to information available on Planning Department's website (available at: http://www.pland.gov.hk/pland_en/info_serv/tp_plan/index.html), the Project Site is not covered by existing Development Permission Area Plans. Instead, it is currently covered by the Outline Zoning Plan (OZP) No. S/YL-MP/6. Records of both the adopted and draft departmental plans in the area were obtained from Planning Department. According to the records obtained, relevant plans were reviewed such as the "L/YL-FP/1C Residential Layout - Fairview Park Access Road, Yuen Long" adopted in year 1982; as well as the draft departmental plan "DP/NWNT/1C North West New Territories - Development Plan" approved in year 1984. As all of these plans were prepared in 1980s', planned uses indicated in these plans are outdated and are superseded by the existing OZP. As advised by Planning Department, the existing OZP is the latest version regarding planned land uses in the area

previously submitted and approved under the Town Planning Ordinance, thus these two planned project sites have been considered in the noise assessment. Noise impacts upon these potential planned NSRs due to construction of this Project as well as the potential concurrent construction activities has been addressed in Sections 4.9.3 and Section 4.8.2.

For Yau Mei Site, the project has not yet been approved by both the TPO and EIAO. According to the OZP No. S/YL-MP/6, it is within the Other Specified Uses (Comprehensive Development and Wetland Protection Area) (OU(CDWPA)) zone. Residential houses development may be permitted upon application to the TPB. Since residential uses may be permitted, it is considered as a potential future NSRs in this noise assessment.

According to TPB records, there are approved new territories exempted house development sites on the opposite side of Ngau Tam Mei Drainage Channel (e.g. case number A/YL-MP/172-3 and A/YL-MP/183-1) within the Village Development ("V") zone under the Outline Zoning Plan No. S/YL-MP/6 near to the Chuk Yuen Tsuen (see **Figure 4-2A**). It is expected that these proposed new territories exempted village houses will be typical 3 storeys buildings. There is currently no committed development programe for these village houses at the moment. Since these planned village houses are further setback from Kam Pok Road, and NSRs that are worst affected by the construction of this Project have already been taken into account in the construction noise assessment (e.g. the planned Kam Pok Road site, and existing village houses N8, N9) have already been taken into account in the construction noise assessment, the concerned planned village houses development is not considered further in the following noise assessment.

4.5.3 Planned Sensitive Uses Under This Project During the Operational Phase

Noise sensitive uses of this Project are the planned residential blocks within the Southern Portion of the Project Site. A unique reference number has been assigned for each of the proposed residential blocks and are shown in **Appendix 4-9**. These reference numbers are merely to facilitate the assessment and to clearing define the location of residential blocks which would require mitigation measures. Representative sensitive uses proposed under this Project, which are selected for operational phase road traffic noise assessment and industrial noise impact assessment, are provided in **Table 4-7** and **Table 4-8**, respectively.

Table 4-7 Representative NSRs for Operational Phase Road Traffic Noise Assessment

NSR ID	Proposed No. of Residential Storey	mPD Level (1.2m Above Floor Level) *
N01A to N22	2	6.6 (G/F) – 10.2 (1/F)

Remark: Please refer to **Figures 4-3B** for the locations of the NSRs.

* The proposed site formation level is 5.4mPD. The proposed floor to floor height is 3.6m for the ground floor and 3.0m for the first floor, respectively. Thus, mPD level of the ground floor is calculated by 5.4 (ground mPD level) + 1.2m above ground level = 6.6mPD; and the mPD level of the first floor is calculated by 5.4 (ground mPD level) + 3.6m (G/F) + 1.2m above floor level = 10.2mPD.

Table 4-8 Representative NSRs for Operational Phase Noise Impact Assessment

NSR ID	Proposed No. of Residential Storey	mPD Level (1.2m Above Floor Level) *
Representative NSRs Selected for Fixed Noise Sources Impact Assessment		
N-ind1	2	6.6 (G/F) – 10.2 (1/F)
N-ind2	2	
N-ind2A	2	
N-ind2B	2	
N-ind3	2	
N-ind9	2	

NSR ID	Proposed No. of Residential Storey	mPD Level (1.2m Above Floor Level) *
Representative NSRs Selected for Existing Petrol Filling Station Noise Impact Assessment		
N-Ind5 ##	2	6.6 (G/F) – 10.2 (1/F)
N-ind6 ##	2	
N-ind7 ##	2	
N-ind8 ##	2	
N-ind9	2	
N-ind2	2	
N-ind2A	2	
Representative NSRs Selected for Existing/ Proposed Pumping Stations Noise Assessment		
N-ind4 # & ##	2	6.6 (G/F) – 10.2 (1/F)
N-ind3A #	2	6.6 (G/F) – 10.2 (1/F)

Remark: Please refer to **Figure 4-4A, Figure 4-4C,** and **Figure 4-5** for the locations of NSRs.

* The proposed site formation level is 5.4mPD. The proposed floor to floor height is 3.6m for the ground floor and 3.0m for the first floor, respectively. Thus, mPD level of the ground floor is calculated by 5.4 (ground mPD level) + 1.2m above ground level = 6.6mPD; and the mPD level of the first floor is calculated by 5.4 (ground mPD level) + 3.6m (G/F) + 1.2m above floor level = 10.2mPD.

NSRs N-ind4 and N-ind3A were selected for the noise estimation of existing/ proposed pumping stations as they are the nearest NSRs affected by the concerned pumping stations (**Figure 4-5** refers).

NSRs are not selected for noise assessment of fixed noise sources as they are outside the 300m study radius from the concerned fixed noise sources. Thus, these NSRs are not assessed further.

4.6 Assessment Methodology

4.6.1 Construction Noise Assessment Methodology

The approach used in the assessment of noise from construction works other than percussive piling is based on standard acoustic principles, and the guidelines given in Para. 5.3 and 5.4 of Annex 13 of the EIAO-TM. The methodology adopted is the same as that presented in TM1.

Noise impact arising from the construction works of this Project have been predicted using the following typical procedures: -

- Based on the tentative construction programme (see **Appendix 1-1**). The worst construction scenarios of each construction activities were identified;
- Identify the corresponding SWL of each preliminary planned powered mechanical equipment (PME) as listed in the Technical Memorandum on Noise from Construction Works other than Percussive Piling of the Noise Control Ordinance and EPD's Quality PMEs (QPMEs) inventory, where appropriate;
- Select representative NSRs for the construction noise impact assessment;
- Identify the notional source position for each representative assessment point (RAP). The identification of the notional source position will follow the methodology given in the Section 2 of the Technical Memorandum on Noise from Construction Works other than Percussive Piling of the Noise Control Ordinance;
- Calculate the Predicted Noise Level (PNL) based on distance attenuation from notional source positions to the representative NSRs;
- With consideration of the effect of facade reflection at the NSRs, the Corrected Noise Level (CNL) at the NSRs was predicted; and
- Based on a comparison of the CNL with the noise criteria presented in **Table 4-1**, situations/ locations where the need for noise mitigation measures can be identified.

As discussed in earlier paragraphs, the Project Site involves construction of residential buildings within the Southern Portion and a landscaped open area, landscape pond and some passive recreational uses and supporting facilities within the Northern Portion. Thus, construction noise level due to construction activities within the Northern Potion and the Southern Potion are considered respectively in this noise assessment. The location of the Northern Portion and Southern Portion is also shown in **Figure 4-2A**.

As the Project Site is adjacent to the existing residential development at Fairview Park, thoughtful consideration has been undertaken when developing the Project construction programme/ sequence, type of equipment to be used, and construction method in order to minimize potential construction noise impact to adjacent NSRs. The Project construction programme has also been designed in such a way that concurrent construction activities are avoided as much as possible. The current construction programme within indication of concurrent construction activities of this Project is provided in **Appendix 1-1**.

Table 4-9 and **Table 4-10** show the list of plant inventory for construction works practicable of each construction phase within the Northern Portion and the Southern Portion, respectively. The inventory was provided by the Project Engineer (AECOM). As confirmed by the Project Engineer and the Project Proponent, the plant inventory and the number of equipment are considered to be appropriate and practical for completing works within the proposed works programme. Cumulative construction noise due to potential concurrent construction activities of this Project (construction programme in **Appendix 1-1** refers), and also due to other nearby planned development projects, were also estimated in order to represent the worst case scenario.

With regard to noise level due to travelling of dump trucks on haul road within the Project construction area, it was evaluated based on maximum number of dump trucks as advised by the Project Engineer, and the noise level is estimated according to the procedure given in British Standard, Noise Control on Construction and Open Sites, BS 5228: Part 1:2009 with the equation below:

$$LAeq = SWL - 33 + 10\log_{10} Q - 10 \log_{10} V - 10\log_{10} D$$

Where,

SWL = Sound Power Level of the dump truck

Q is the number of vehicles per hour (no. of veh./hr)

V is the average speed (10 km/hr)

D is the distance of receiver position from the haul road (m).

Table 4-9 Inventory of Powered Mechanical Equipment To Be Used in Northern Portion (Unmitigated)

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
Site Formation, Filling and Excavation	A1	Excavation and Filling	Air Compressor	CNP003	4	104
			Excavator	CNP081	6	112
			Generator, Standard	CNP101	6	108
			Dump Truck	CNP067	6	117
	A2	Breaking excavated hard/ oversize materials	Breaker, Excavator mounted	CNP027	2	122
			Excavator	CNP081	1	112
	A3	Ground Compression	Roller, vibratory	CNP186	8	108
			Bulldozer	CNP030	8	115
Construction of Underground Services and	B1	Earthwork	Breaker, Excavator mounted	CNP027	1	122
			Dump Truck	CNP067	3	117

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
Utilities			Excavator	CNP081	3	112
	B2	Utilities laying	Air Compressor	CNP003	2	104
			Generator, Standard	CNP101	3	108
			Lorry	CNP141	2	112
			Water Pump, Submersible (Electric)	CNP283	3	85
	B3	Ground reinstatement	Concrete Lorry Mixer	CNP044	2	109
			Power Rammer (Petrol)	CNP169	2	108
			Poker, Vibratory, Hand-held	CNP170	2	113
			Roller, Vibratory	CNP186	2	108
Road works	C1	Earthwork	Dump Truck	CNP067	3	117
			Excavator	CNP081	2	112
	C2	Concreting Works	Concrete Lorry Mixer	CNP044	2	109
			Generator, Standard	CNP101	3	108
			Poker, Vibratory, Hand-held	CNP170	2	113
	C3	Road Finishing	Air Compressor	CNP003	2	104
			Asphalt Paver	CNP004	2	109
			Generator, Standard	CNP101	3	108
			Lorry	CNP141	2	112
			Power Rammer (Petrol)	CNP169	2	108
			Road Roller	CNP185	2	108
Foundation	D1	General foundation construction	Air Compressor	CNP003	4	104
			Bar bender and cutter (electric)	CNP021	6	90
			Generator, standard	CNP101	3	108
			Drill/grinder, hand-held (electric)	CNP065	6	98
			Saw, circular, wood	CNP201	3	108
			Water pump, submersible (electric)	CNP283	6	85
			Excavator	CNP081	4	112
			Lorry	CNP141	3	112
			Mobile Crane	CNP048	2	112
	D2	Piling works	Generator, standard	CNP101	3	108
			Continuous Flight Auger (CFA) piles (piling, earth auger)	CNP167	3	114
	D3	Concreting works	Concrete Lorry Mixer	CNP044	3	109
			Generator, standard	CNP101	3	108
			Poker, vibratory, hand-held	CNP170	3	113
Superstructure	E1	General construction works	Air Compressor	CNP003	4	104
			Bar bender and cutter (electric)	CNP021	6	90
			Mobile Crane	CNP048	2	112
			Drill/grinder, hand-held (electric)	CNP065	6	98
			Generator, standard	CNP101	4	108

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
			Saw, circular, wood	CNP201	10	108
	E2	Concreting works	Concrete Lorry Mixer	CNP044	4	109
			Concrete Pump	CNP047	2	109
			Generator, standard	CNP101	4	108
			Poker, vibratory, hand-held	CNP170	3	113
Dump Trucks Travelling on Haul Road during site formation (Veh./hr)	F	Dump Truck (Moving on Haul Road)	Dump Truck	CNP067	10	117

Remark: # Each Construction Activity has been divided into several sub. work groups based on the sequence of construction works. The respective sub-work groups of each Construction Activity will not overlap with one another.

The calculated highest SWLs of each Construction Activity used for construction noise impact assessment, are provided in **Appendix 4-3**.

Table 4-10 Inventory of Powered Mechanical Equipment To Be Used in Southern Portion (Unmitigated)

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
Site Formation, Filling and Excavation	A1	Excavation and Filling	Air Compressor	CNP003	3	104
			Excavator	CNP081	4	112
			Generator, Standard	CNP101	3	108
			Dump Truck	CNP067	4	117
	A2	Breaking excavated hard/ oversize materials	Breaker, Excavator mounted	CNP027	1	122
			Excavator	CNP081	1	112
	A3	Ground Compression	Roller, vibratory	CNP186	4	108
			Bulldozer	CNP030	4	115
Construction of Underground Services and Utilities	B1	Earthwork	Breaker, Excavator mounted	CNP027	1	122
			Dump Truck	CNP067	2	117
			Excavator	CNP081	2	112
	B2	Utilities laying	Air Compressor	CNP003	3	104
			Generator, Standard	CNP101	4	108
			Lorry	CNP141	2	112
			Water Pump, Submersible (Electric)	CNP283	2	85
	B3	Ground reinstatement	Concrete Lorry Mixer	CNP044	2	109
			Power Rammer (Petrol)	CNP169	2	108
			Poker, Vibratory, Hand-held	CNP170	2	113
			Roller, Vibratory	CNP186	2	108
Road works	C1	Earthwork	Dump Truck	CNP067	4	117
			Excavator	CNP081	3	112
	C2	Concreting Works	Concrete Lorry Mixer	CNP044	3	109
			Generator, Standard	CNP101	4	108
			Poker, Vibratory, Hand-held	CNP170	2	113
	C3	Road Finishing	Air Compressor	CNP003	3	104
			Asphalt Paver	CNP004	3	109
			Generator, Standard	CNP101	3	108
			Lorry	CNP141	2	112
			Power Rammer (Petrol)	CNP169	2	108
			Road Roller	CNP185	2	108
Foundation	D1	General foundation construction	Air Compressor	CNP003	6	104
			Bar bender and cutter (electric)	CNP021	6	90
			Generator, standard	CNP101	4	108
			Drill/grinder, hand-held (electric)	CNP065	6	98
			Saw, circular, wood	CNP201	5	108
			Water pump, submersible (electric)	CNP283	6	85
			Excavator	CNP081	3	112
			Lorry	CNP141	3	112
			Mobile Crane	CNP048	3	112
	D2	Piling works	Generator, standard	CNP101	4	108

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
			Continuous Flight Auger (CFA) piles (piling, earth auger)	CNP167	3	114
	D3	Concreting works	Concrete Lorry Mixer	CNP044	4	109
			Generator, standard	CNP101	4	108
			Poker, vibratory, hand-held	CNP170	4	113
Superstructure	E1	General construction works	Air Compressor	CNP003	7	104
			Bar bender and cutter (electric)	CNP021	11	90
			Mobile Crane	CNP048	5	112
			Drill/grinder, hand-held (electric)	CNP065	11	98
			Generator, standard	CNP101	7	108
			Saw, circular, wood	CNP201	11	108
	E2	Concreting works	Concrete Lorry Mixer	CNP044	4	109
			Concrete Pump	CNP047	2	109
			Generator, standard	CNP101	6	108
			Poker, vibratory, hand-held	CNP170	3	113
Sub-structure (pile cap)	F1	General pile cap construction	Bar bender and cutter (electric)	CNP021	10	90
			Generator, standard	CNP101	5	108
			Lorry	CNP141	2	112
	F2	Concreting works	Concrete Lorry Mixer	CNP044	4	109
			Concrete Pump	CNP047	2	109
			Generator, standard	CNP101	6	108
			Poker, vibratory, hand-held	CNP170	3	113
	F3	Backfill and reinstate	Excavator	CNP081	2	112
			Roller, vibratory	CNP186	1	108
Dump Trucks Travelling on Haul Road during site formation (Veh./hr)	F	Dump Truck (Moving on Haul Road)	Dump Truck	CNP067	10	117

Remark: # Each Construction Activity has been divided into several sub. work groups based on the sequence of construction works. The respective sub-work groups of each Construction Activity will not overlap with one another.

The calculated highest SWLs of each Construction Activity used for construction noise impact assessment, are provided in **Appendix 4-3**.

4.6.2 Operational Phase Noise Assessment Methodology

4.6.2.1 Traffic Noise

Noise standards are recommended in Table 1 of the EIAO-TM and the Hong Kong Planning Standards and Guidelines (HKPSG) for planning against noise impact from sources such as road traffic, railway, and aircraft, etc. According to the HKPSG, the maximum noise level from road traffic, measured in terms of L10 (1 hr) is recommended to be 70 dB(A) at typical facades of new dwellings.

The assessment involves the prediction of the maximum hourly L10 level at the noise sensitive receivers (NSRs) of the proposed development due to the projected traffic flow from major road 300 m from the proposed development.

The assessment involves the prediction of the maximum hourly L10 traffic noise level at noise sensitive receivers (NSRs) of the proposed development due to the projected peak hour traffic flow on the adjacent major road networks (e.g. Kam Pok Road, Fairview Park Road, and Fairview Park Boulevard). As discussed in Section 4.3.2, Castle Peak Road and San Tin Highway are located outside the 300m radius Assessment Area specified in the Project EIA Study Brief (more than 500m), thus these roads are not considered further in this noise assessment. In addition, existing village developments are also located between the Project Site and the concerned roads, thus these roads are not considered further in this noise assessment. With considering the tentative operation information of the residential development projects along Kam Pok Road as well as the future Kam Pok Road Extension, the projected peak hour traffic flow data for year 2035, which is considered to be the worst case scenario within 15 years upon completion of the development projects, is used for the noise assessment. The nearby residential development projects that have been considered in the traffic forecast include but not limited to the two residential developments at the R(D) zone east of the Project site, and the residential development at the OU(CDWPA) zone northwest of the Project site, etc. The traffic flow data was predicted by the Project traffic consultant. Further details of the projected traffic flow data is described in the following paragraphs.

The UK Department of Transport's procedures - “Calculation of Road Traffic Noise” has been used in the prediction of the road traffic noise at the representative noise sensitive receivers of the proposed development. The existing topographic details, such as existing village houses, have been considered in the assessment.

The noise prediction was carried out using the in-house computer noise model, Traffic Noise Impact Assessment System (TNIA) V2.0, which is a computerized model developed on the basis of *the UK Department of Transport’s Calculation of Road Traffic Noise* (CRTN) procedures.

4.6.2.2 Fixed Noise Sources

The extent of noise assessment was based on an area within 300m radius from the Project Site boundary. The identified industrial noise sources include an open storage site and a godown as discussed in Section 4.4.2. The pattern of operation of these industrial sites and the type and number of equipment used, were identified during site surveys. Background noise was also measured near the Project Site for the noise assessment.

In evaluating the impact of these industrial sites, Sound Power Levels (SWL) of the identified plants are based on site measurement and general acoustic principal (see **Appendix 4-7**). Noise measurements were by using Brüel & Kjaer (B&K) Precision Integration Sound Level Meter Type 2238, which complies with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). The weather condition was good with calm wind condition (<5m/s) during measurement, which satisfies the required criteria. The equipment was properly calibrated immediately prior to and following each measurement by a B&K Sound Level Calibrator Type 4321. The noise levels before and after measurement agreed to within 1.0dB. During the noise measurement, the noise level was dominated by the identified noise source.

In assessing the noise level, it is assumed that the identified noisy equipment is located at the notional noise source location in order to represent a worst case scenario (see **Figure 4-4A**).

To predict the noise level at the future noise sensitive uses, the following correction factors have been accounted for:

- Distance correction: based on the slant distance between the identified noise sources and the NSR, the distance correction is projected based on standard acoustical principle for point source;
- As observed during the site visits, the noise sources were found to operate occasionally. Although it is unlikely that all the identified industrial sources will be in operation simultaneously, to be conservative, it has been assumed that all the identified noise sources are in operation at the same time, which also represents a worst case scenario. Noise sources are assumed to operate continuously instead of in occasion as observed onsite and all noise sources are regarded as point source;
- Façade correction: a +3dB(A) correction is applied to account for noise reflection from façade; and
- Barrier correction: The barrier attenuation is calculated based on Path Difference Method. Maekawa equation is applied in the calculation of barrier effect.

Corrected Noise Level (CNL) at the NSRs of the proposed development can be calculated by applying the above corrections to the measured SWL of the noise sources in accordance with the following formula:

$$\mathbf{CNL = SWL + C_{dist} + C_{fac} + C_{barr}}$$

Where,

CNL is the corrected noise level at the Noise Sensitive Receiver in dB(A)

SWL is the measured sound power level of the industrial plant in dB(A)

$\mathbf{C_{dist}}$ is the distance correction in dB(A) in accordance with the Technical Memorandum on Noise From Construction Works Other than Percussive Piling.

$\mathbf{C_{fac}}$ is façade correction, +3 dB(A)

$\mathbf{C_{barr}}$ is the barrier correction in dB(A). The barrier attenuation is calculated based on Path Difference Method. Maekawa equation and general acoustic principle is applied in the calculation of barrier effect.

As there are existing residential development sites that are much closer to the concerned industrial sites than the Project Site and with a separate distance of about 48m (from Villa Camllia) and 59m (from Ha San Wai Village), respectively (see **Figure 4-4A**), these village houses would be worst affected by the concerned industrial sites when compared with the Project Site. The potential industrial noise impact under the worst case scenario was then checked. For establishment of worst case scenario, it is assumed that the existence of NSRs would limit the extent and scale of operation as noise emissions would be capped by the ANL (60/50 dB(A) day/night) under the NCO.

4.7 Prediction and Evaluation of Noise Impacts

4.7.1 Unmitigated Construction Phase Noise Impacts

According to the EIAO-TM, the construction noise standard for domestic premises is $L_{eq\ (30\ minutes)}$ 75 dB(A) and that for education institute is $L_{eq\ (30\ minutes)}$ 70 dB(A) (65 dB(A) during examination period).

Construction noise levels due to this Project has been assessed based on the plant inventory shown in **Table 4-9** and **Table 4-10** for the Northern Portion and Southern Portion of the Project Site, respectively. Noise due to concurrent construction works is also assessed. The construction programme and duration of concurrent construction activities are also provided in **Appendix 1-1**. **Table 4-11** below shows the predicted unmitigated construction noise levels at the representative

NSRs due to construction of this Project, which represents the unmitigated scenario. The geographical locations of the NSRs are also depicted in **Figure 4-2A**.

Based on the results, the unmitigated noise levels due to construction activities of this Project at the representative NSRs would exceed the relevant noise criteria specified in **Table 4-1** above. SWL information used for the noise calculation, NSRs separation distance information, detailed results of calculated construction noise levels at the NSRs, and sample calculations are also provided in **Appendix 4-3**. As such, noise mitigation measures would be required to alleviate the potential construction noise impacts (see Sections 4.8.1 and 4.8.2).

Table 4-11 Estimated Unmitigated Construction Noise Levels at Existing NSRs Under Worst Case Scenario

		Northern Portion						Southern Portion							Northern and Southern Portions *								
NSR Label	Descriptions	A	B	C	D	E	G	A	B	C	D	E	F	G	Noise Level Due To Concurrent Construction Activities								Noise Criteria
		Site Formation, Filling and Excavation	Construction of Underground Services and Utilities	Road works	Foundation	Superstructure	Dump Trucks Travelling on Haul Road During Site Formation	Site Formation, Filling and Excavation	Construction of Underground Services and Utilities	Road works	Foundation	Superstructure	Sub-structure (Pile Cap)	Dump Trucks Travelling on Haul Road During Site Formation	Northern: D; Southern: D	Northern: Nil; Southern: A+G+F	Northern: A+G; Southern: nil	northern: E; Southern: E	northern: B; Southern: E	northern: C; Southern: E	northern: nil; Southern: B+C	Highest Noise Level (due to REC site), dB(A) (A)	
N1	Fairview Park	69	69	66	66	64	68	85	85	84	83	83	82	76	83	87	71	83	83	83	87	87	75
N2	Fairview Park	70	70	67	67	65	69	84	84	83	82	82	81	76	82	86	72	82	83	82	87	87	75
N3	Fairview Park	74	74	71	71	69	71	84	84	83	82	82	81	76	82	86	76	82	82	82	86	86	75
N4	Fairview Park	79	79	76	76	74	73	84	84	83	82	82	81	76	83	86	80	83	84	83	87	87	75
N5	Fairview Park	85	85	82	82	80	76	72	72	71	70	70	69	70	82	75	85	80	85	82	75	85	75
N6	Fairview Park	85	85	82	82	80	76	67	67	66	65	65	64	67	82	71	85	80	85	82	69	85	75
N7	Yau Mei San Tsuen	72	72	69	69	67	69	63	63	62	61	61	60	66	69	68	74	68	72	69	66	74	75
N8	Chuk Yuen Tsuen	72	72	69	69	67	70	68	68	67	66	66	65	68	71	72	74	69	73	71	70	74	75
N9	Chuk Yuen Tsuen	72	72	69	69	67	69	67	67	66	65	65	64	67	70	71	74	69	72	70	69	74	75
N10	Bethel High School	73	73	70	70	68	70	84	84	83	82	82	81	76	82	86	75	82	82	82	86	86	70 (65 during exam)
N11	Helene Terrace	67	67	64	64	62	67	75	75	74	73	73	72	72	74	78	70	73	74	74	78	78	75
N12	Villa Camllia	66	66	63	63	61	66	70	70	69	68	68	67	69	69	74	69	69	70	69	73	74	75
N13	Fairview Park	67	67	64	64	62	67	82	82	81	80	80	79	75	80	84	70	80	80	80	84	84	75
N14	Wong Chan Sook Ying Memorial School	66	66	63	63	61	67	77	77	76	75	75	74	72	75	79	69	75	75	75	79	79	70 (65 during exam)
N15	Man Yuen Tsuen	65	65	62	62	60	66	74	74	73	72	72	71	71	72	77	69	72	73	72	77	77	75
N16	Fairview Park	81	81	78	78	76	74	66	66	65	64	64	63	67	78	70	82	76	81	78	68	82	75
N17	Palm Springs	70	70	67	67	65	69	63	63	62	61	61	60	65	68	68	73	67	71	68	65	73	75
N18	Temp. house at Yau Mei San Tsuen	71	71	68	68	66	69	63	63	62	61	61	60	65	68	68	73	67	71	68	65	73	75
N19	Existing village house	67	67	64	64	62	67	73	73	72	71	71	70	70	71	76	70	71	72	71	75	76	70
N20	Fairview Park	85	85	82	82	80	76	66	66	65	64	64	63	67	82	71	86	80	85	82	69	86	70

Note: Please refer to **Appendix 4-3** for the sample calculation and **Figure 4-2A** for the NSR locations.

* Please refer to **Table 4-9** and **Table 4-10** and **Appendix 1-1** for the equipment inventory, construction programme and duration of concurrent construction activities.

Hatched numbers indicate exceedance of the relevant noise criteria for construction activities.

4.7.2 Operational Phase Traffic Noise Impact Assessment Results

The local road network (i.e. Kam Pok Road, Yau Pok Road, Fairview Park Road and Fairview Park Boulevard) are considered as the major noise sources potentially affecting the proposed development. The Project Site is bounded by Yau Pok Road at the east, Kam Pok Road to the further east, and Fairview Park Road and Fairview Park Boulevard at the south, respectively.

The information on peak hour traffic volume and percentage of heavy vehicle using these roads were provided by the Project traffic consultant and are shown in **Table 4-12**, which represents the worst case scenario of projected traffic flows. The concerned traffic forecast data has been endorsed by TD (**Appendix 4-1** refers). The traffic projection has taken into account other nearby residential development projects as well as the future Kam Pok Road Extension. Nearby residential development projects that have been considered in the traffic forecast include but not be limited to the two proposed residential developments at the R(D) zone east of the Project Site, and proposed residential development at the OU(CDWPA) zone northeast of the Project Site, etc.

As the projected traffic flows during the peak hour in the morning (AM peak hour) is generally higher than those in the afternoon, the peak hour traffic flows in the morning were used for the assessment. A comparison table between the projected AM and PM peak hour traffic flows is also provided in **Appendix 4-1** for reference.

Table 4-12 Road Characteristics During AM Peak Hour in Year 2035

Road Name	Road Section	Total, Veh./hr	% Heavy Veh.	Road Surface Type	Speed, km/h
Fung Chuk Road	-	100	20	Impervious	50
Ha Chuk Yuen Road	-	100	20	Impervious	50
Kam Pok Road	Fairview Park Boulevard to Ha Chuk Yuen Road	400	30	Impervious	50
Kam Pok Road	Ha Chuk Yuen Road and Castle Peak Road	500	28	Impervious	50
Yau Pok Road	-	100	20	Impervious	50
Fairview Park Boulevard - EB	-	950	20	Impervious	50
Fairview Park Boulevard - WB	-	600	35	Impervious	50
Fairview Park Road South - EB	-	1050	5	Impervious	50
Fairview Park Road South - WB	-	650	5	Impervious	50

In addition, a sensitivity test on road traffic noise has also been undertaken based on projected traffic flow data (year 2028) from the nearby approved planning application (i.e. A/YL-MLP/170). To be conservative, a 1% annual traffic flow growth rate has been used in order to represent peak hour traffic flow in the assessment year of this Project (i.e. year 2035). The projected traffic flow data and the assessment results are also provided in **Appendix 4-2A** for reference.

An assessment on the road traffic noise level at the NSRs based on the above traffic flow data has been conducted and the results are presented in **Appendix 4-2** and **Appendix 4-2A**, respectively, as

unmitigated scenario. Based on the assessment results, the predicted road traffic noise would exceed the relevant noise criteria.

As such, precautionary noise measures have been proposed for this Project to alleviate road traffic noise impacts, these measures have been included in the road traffic noise assessment as mitigated scenario (**Figure 4-3B** refers). The concerned measures include:

- 2.5m to 4m tall noise barriers along portion of the southern and southeastern site boundary above a site formation level of 5.4mPD.
- Fixed glazing or blank façade facing Yau Pok Road at residential buildings R100 and R94, as shown in **Figure 4-3B**).

Incorporation of the above mentioned precautionary measures have been accepted by the Project Proponent and the Project Architect.

With these precautionary noise measures, the mitigated road traffic noise levels (based on projected traffic flow data of this Project) at the representative NSRs are presented in **Table 4-13** below. Details of the estimated road traffic noise levels are also depicted in **Appendix 4-2**. The assessment results show that all representative NSRs will not be subject to unacceptable traffic noise impact from the surrounding road networks. A 100% compliance of the noise criterion of $L_{10(1\ hour)}$ 70 dB(A) is expected, and no additional noise mitigation measures would be necessary.

Table 4-13 Range of Predicted Road Traffic Noise Levels at Representative NSRs

NSR ID	Noise Criteria, dB(A)	Range of Estimated Noise Level, L_{10}dB(A)
N01A – N30A	70	51 - 69

Remark: Please refer to **Appendix 4-2** for the estimated noise levels at each NSR and **Figures 4-3B** for the geographical locations of NSRs.

In addition to the above, a sensitivity test on road traffic noise based on projected traffic flow data from the nearby approved planning application (i.e. A/YL-MLP/170) was also carried out. The assessment results are provided in **Appendix 4-2A** for reference. According to the assessment results, a 100% compliance of the noise criterion of L10 (1 hour) 70dB(A) is expected with the proposed precautionary noise measures. Thus, no additional noise mitigation measures would be necessary.

4.7.3 Operational Phase Industrial Noise Sources Impacts

4.7.3.1 Existing and Planned Pumping Stations

As discussed in Section 4.4.2 above, there is an existing floodwater pumping station (i.e. Chuk Yuen Floodwater Pumping Station) in the Assessment Area. The potential impacts due to operation of the pumping station are evaluated further in the following paragraphs.

It was found that the totally enclosed Chuk Yuen Floodwater pumping station, managed by Hong Kong Government Drainage Services Department (DSD) is located to the east of the Project Site on the opposite side of the existing Ngau Tam Mei Channel. This pumping station is a completely enclosed structure and it is designed for discharge of collected rainwater during heavy rainfall, i.e. it will only operate under extreme condition when there is a threat of flooding in the area under extreme storm event.

According to the approved EIA report of this pumping station under the “Main Drainage Channels for Ngau Tam Mei, Yuen Long and Kam Tin” project, Sound Pressure Level immediately outside the louver at the pumping station is 79 dB(A). Thus, noise level at the representative NSR location of this

Project is calculated, and the result is also presented in **Table 4-14.** Geographical locations of the NSRs are also shown in **Figure 4-5**.

Table 4-14 Calculated Noise Level at the Existing Chuk Yuen Floodwater Pumping Station and Sound Pressure Level from Approved EIA Report

NSR ID	Noise Level in the Approved EIA report, dB(A)	Horizontal Distance between NSR and the Pumping Station, m	Distance Correction, dB(A)	Façade Correc-tion, dB(A)	Calculated Noise Level at NSR, dB(A)
NInd-4	79 #	91	-47.2	3	35
Nind-3A	79 #	168	-53	3	29

Remark: # According to Sections 8.3.6 and 8.3.7 of the "Main Drainage Channels for Ngau Tam Mei, Yuen Long and Kam Tin" EIA Report in year 1996, the reverberant noise Sound Pressure Level inside the plant room is 85dB(A). While the Sound Pressure level immediately outside the louver at the pumping station is estimated by subtracting 6dB(A) from the reverberant Sound Pressure level (i.e. 85-6 = 79dB(A)).

Based on information in the EIA report of the "Main Drainage Channels for Ngau Tam Mei, Fan Long and Kam Tin" in year 1996, the noise level at nearby NSR location of this Project is within the noise criteria described in **Table 4-3** above.

As for the proposed sewage pumping station, according to the approved EIA report, namely the "EIA and TIA Studies for the Stage 2 of PWP Item No. 215DS - Yuen Long and Kam Tin Sewerage and Sewage Disposal", Ngau Tam Mei SPS has been proposed about 345m north-east from the Northern Portion of the Project Site and over 670m from the proposed residential development within the Southern Portion of the Project Site. The approximate location of the proposed SPS, based on the above EIA report, is shown in **Figure 4-5**. According to the same, this future SPS will be self-protected with openings or louvers directed away from NSRs. It is a requirement in the approved EIA Report that the SPS has to be designed to minimize potential noise impact to the nearby NRS locations. Mitigation measures such as acoustic enclosure, silencer at inlet and outlet, anti-vibration spring mount, and acoustic louver are required during the detailed design of the SPS.

Since the separation distance between the SPS and proposed NSRs of this Project is over 670m, it is anticipated that the proposed development will not be subject to any unacceptable noise impact due to operation of the proposed SPS in the future.

4.7.3.2 Industrial Noise Assessment Results

Site Survey Results and Background Measurement

Although there are a few existing industrial activities located outside the Project Site boundary, they are relatively far away from the Project Site. Based on interview results with operators of these industrial sites, these sites have no night-time operation. Further on-site observation/ visits conducted between February 2008 and October 2013 also confirm this finding and the industrial sites were found to be closed around 7pm.

In addition to the above, night-time noise measurements were also carried out for 7 consecutive days near the industrial sites during nighttime period (2300 hrs to 0300 hrs) in May 2009 using Brüel & Kjaer (B&K) Precision Integration Sound Level Meter Type 2238, which complies with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). The noise measurement location is shown in **Figure App 4-8A-1** in **Appendix 4-8A**. This noise measurement

location has been selected as it has a direct line of sight to the concerned industrial sites and is not affected by the nearby road traffic such as Fairview Park Boulevard and Kam Pok Road, thus it is considered representative. The weather condition was good with calm wind condition (<5m/s) during measurement, which satisfies the required criteria. The equipment was properly calibrated immediately prior to and following each measurement by a B&K Sound Level Calibrator Type 4321. The noise levels before and after measurement agreed to within 1.0dB. The microphone was oriented and pointed towards Ha Chuk Yuen Road and was mounted above the existing hoarding at the peripheral of Project site boundary using an extension rod in a free-field condition to obtain a more representative baseline condition of the Project Site. Noise levels were recorded in 5 minutes intervals during each noise measurement time period and for 7 consecutive days. A +3 dB(A) correction factor has been applied to the measured noise levels in order to represent the façade noise levels. At the time of noise measurement, there was no noise generating activities within the Project Site as well as the industrial sites, and the noise reading was due to surrounding environment such as road traffic, dog barking and crowd noise from the nearby village development at Ha Chuk Yuen Tsuen. According to the night-time noise survey results, the measured noise level (with facade correction) ranged from 45 dB(A) to 51 dB(A), with an average value of 49 dB(A), which further confirms the absence of noisy industrial activities during the night-time period. Please refers to **Appendix 4-8A** for details of the noise data.

Furthermore, background noise measurement was also undertaken near the Project Site boundary during night-time period (2300 hrs to 0300 hrs) to measure the prevailing background noise level using Brüel & Kjaer (B&K) Precision Integration Sound Level Meter Type 2238 and 2236, which comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). The weather condition was good with calm wind condition (<5m/s) during measurement, which satisfies the required criteria. The equipment was properly calibrated immediately prior to and following each measurement by a B&K Sound Level Calibrator Type 4321. The noise levels before and after measurement agreed to within 1.0dB. The microphone was oriented and pointed towards Kam Pok Road and is 1.2m above ground level in a free-field condition to obtain a representative baseline condition of the Project Site. Noise levels were recorded in 5 minutes intervals during the above noise measurement time period. A +3 dB(A) correction factor has been applied to the measured noise levels in order to represent the façade noise levels.

The noise measurement period and duration of the baseline noise measurement are also summarized in **Table 4-15**. The background noise measurement locations are shown in **Figure 4-1**, and details of the background noise measurement results are also provided in **Appendix 4-8**.

Table 4-15 Baseline Noise Measurement Location and Time Periods

Date	Measurement Location	Measurement Time
Night-time Background Noise Measurement:		
26/08/2010 to 27/08/2010	At Project Site boundary	from 23:00 to 03:00 on the following day
22/02/2013 to 23/02/2013	At Project Site boundary	from 23:00 to 03:00 on the following day

At the time of measurement, there was no operation at the identified industrial sites. The noise reading recorded at the Northern Portion of the Project Site was due to surrounding environment such as local road traffic noise, dog barking and crowd noise from the nearby residential development at Fairview Park. While the noise reading recorded at the Southern Portion of the Project Site was mainly due to road traffic from the adjacent Fairview Park Boulevard and noise from the residential development at Fairview Park. Therefore, the measured noise level is representative of the background noise level at the Project Site.

According to the noise data, the average background noise level (Leq, façade level) recorded at the Project Site during the above-mentioned night-time period was 55dB(A) at location B1 and 51dB(A) at location B2 (see **Appendix 4-8**). As the lowest noise level recorded at the Project Site during the night-time background noise measurement was 51dB(A) (façade noise level), which is higher that of the "ANL-5" criteria (i.e. 45dB(A)), the "ANL-5" noise criteria is used for the noise assessment accordingly.

In addition to the night-time noise survey, day time background noise measurement was also undertaken near the Project Site in March 2010, July 2010, and February 2013. During the noise measurement, the recorded noise levels were dominant by the surrounding environment such as road traffic and crowd noise from the nearby Fairview Park. The recorded average background noise level (façade level) was 63dB(A) at location B1 and 56dB(A) at location B2. As the lowest noise level recorded at the Project Site during the day-time background noise measurement was 56dB(A) (façade noise level), which is higher that of the "ANL-5" criteria (i.e. 55dB(A)), the "ANL-5" noise criteria is used for the noise assessment accordingly. The background noise measurement location is shown in **Figure 4-1**, and the noise data is also provided in **Appendix 4-8**.

Industrial Noise Assessment Results (Based on Field Survey)

There are several industrial operations identified within the Project Assessment Area (**Figures 4-4A** and **4-4B** refer). As discussed above the identified industrial sites have no night-time operation based on site observations from February 2008 to October 2013 (over 5 years' observations). In addition, night-time noise measurements were carried out and no operation of the industrial sites during night-time period was observed. Additional night-time noise surveys have also been undertaken for 7 consecutive days, which further confirms the absence of noisy industrial activities during the night-time period. As night-time operation of industrial sites was not observed, day-time noise assessment was undertaken below.

For the industrial noise assessment, the identified industrial noise sources, number of plants, and the observed existing condition on-site are summarised in **Table 4-4** and **Figure 4-4A**, which are also reproduced below:

Open Storage Site:

- Loading and unloading using forklift x 1 No.
- Lifting of container/ materials by mobile crane x 1 No.
- Moving in/out of lorry x 1 No.
- General operation of warehouse x 1 No.

Enclosed Godown :

- Loading and unloading using forklift x 1 No.
- Moving in/out of lorry x 1 No.

The recorded number of plants at each industrial site and sound power levels of the plants are also summarized in **Appendix 4-7-1** in **Appendix 4-7**, which are used in the noise assessment for projecting the noise level at the planned NSRs under this Project. The geographical locations of NSRs used for the noise assessment is provided in **Figure 4-4A**.

Although it is unlikely that all the identified industrial noise sources will be in operation simultaneously, to be conservative, it has been assumed that all the identified noise sources are in operation at the same time, which also represents a worst case scenario. Noise sources are assumed to operate

continuously instead of in occasion as observed onsite and all noise sources are regarded as point source.

Detailed noise calculations and assumptions based on field observations are provided in **Appendix 4-7**. Based on the noise assessment results, the estimated noise levels due to identified fixed noise sources can comply with the day-time noise criteria specified in **Table 4-3** above (i.e. 55dB(A)). Therefore, no unacceptable industrial noise impact is anticipated, and no noise mitigation measure will be required for this Project.

During operation of this Project, direct line of sight from the Project Site to these industrial activities will be blocked by an approved residential development (planning application No. A/YL-MP/170) within "Residential (Group D)" zone to the east of Ngau Tam Mei Channel and its associated 7.5m high with 0.5m cantilevered noise barrier along the eastern site boundary. Thus, it is expected that noise impacts to the Project Site due to operation of these industrial activities are not significant. Nevertheless, to be conservative, the above noise assessment was based on the absence of the concerned planned noise barrier.

Further Industrial Noise Assessment Based on Worst Case Scenario

As mentioned in Section 4.4.2 above, the concerned two industrial sites include an open storage site and its associated warehouse, and an enclosed godown. The type and no. of noisy equipment used for the above noise assessment has been verified through continuous site surveys, which can represent the operational activities of the concerned industrial sites to date.

It shall be noted there are existing NSRs nearby the Project Site and the industrial sites, which are worst affected by the concerned industrial activities (due to shorter separation distance) (Section 4.6.2.2 refers). These existing NSRs include Villa Camilla to the south of the open storage site and village houses at Ha San Wai village to the southeast of the godown as shown in **Figure 4-4A**. The operation of the concerned industrial sites will also need to comply with the relevant noise criteria (ANL) with respect to these existing NSRs. For establishment of worst case scenario, it is therefore assumed that the existence of NSRs would limit the extent and scale of operation as noise emissions would be capped by the ANL (60/50 dB(A) day/night) under the NCO. Details are provided in the following paragraphs.

Open Storage Site

For the **open storage site**, as the majority of the site is used for storage of precast units, the remaining land area would limit the maximum no. of noisy equipment that can be used in any one time. Also, for safety reason it is unlikely that additional mobile crane can be used on-site within a limited site area. Taking into account the site condition and the ANL at nearest NSR, a sensitivity test has been carried out by assuming a maximum of 2 lorries to be used during day-time (i.e. one lorry leaving the site while another lorry arriving the site). This would represent the worst case scenario of the operation of this industrial site during day-time. For the night-time operation, although no night-time works were observed, assumption has been made by assuming the workshop operates during night-time in the worst case scenario. These are summarised below:

- Day-time:
  - Loading and unloading using forklift x 1 No.
  - Lifting of container/ materials by mobile crane x 1 No.
  - Moving in/out of lorry x 2 Nos.
  - General operation of warehouse x 1 No.
- Night-time:
  - General operation of warehouse x 1 No.

Enclosed Godown

For the **enclosed godown**, based on site observation, operation of this site will involve loading and unloading by forklift and movement of lorry with limited traffic flow in and out of the godown. Taking into account the site condition (where most of the site area is occupied by totally enclosed building structures with limited open space available for parking of equipment) and the ANL at its nearest NSR at Ha San Wai village, a sensitivity test has been carried out by assuming a maximum of 3 lorries (i.e. one leaving the site; one unloading materials; and one arriving the site) and a maximum of 2 forklifts (one loading materials onto the lorry and one unloading materials from lorry), respectively during day-time. Further increase in equipment will not be feasible due to site constraints. For the night-time operation, although no night-time works were observed at this site, assumption has been made by assuming that the forklifts are used at night within the godown. These are summarised below:

- Day-time:
  - Loading and unloading using forklift x 2 No.
  - Moving in/out of lorry x 3 Nos.
- Night-time:
  - Loading and unloading using forklift x 2 No.

The above assumptions regarding the open storage site and the godown have been counter-checked against the ANL at existing nearest NSR for each of the industrial sites, and the results are shown in **Appendix 4-7A**. Based on the assumption mentioned above, the ANLs at the nearest NSR (both day-time and night-time) can just be met. Thus, the assumption on noisy equipment would represent the operation of industrial sites under a worst case scenario.

As such, the noise level at the Project Site was then projected based on the same assumption. According to the assessment results (**Appendix 4-7B** and **Appendix 4-7C**), the calculated noise levels at the NSRs of this Project would comply with the relevant noise criteria (ANL -5) for both day time and night-time period. Therefore, the Project Site is not affected by the industrial noise sources and no noise mitigation measures will be necessary.

4.7.3.3 Cumulative Noise Due to Industrial Noise and Existing Pumping Station

To be conservative, cumulative noise level due to the existing Chuk Yuen Pumping Station and the identified industrial noise sources at the representative NSR locations are also calculated and the results are provided in **Appendix 4-7D**.

Based on the results, the estimated cumulative noise levels can comply with the relevant noise criteria specified in **Table 4-3** above. Therefore, no unacceptable industrial noise impact is anticipated.

4.7.3.4 Operation of Petrol Filling Station

As discussed in Section 4.4.2, there is a small existing petrol filling station within the boundary of Fairview Park and to the south of the Project Site. The petrol filling station is within Fairview Park and access is controlled by an existing vehicular entrance/ security gate at Fairview Park. According to Section 4.4.2, the noise sources due to operation of the petrol filling station include movement of vehicles in and out of the station, and the refilling process of the underground storage tank during day-time. While, movement of vehicles in and out of the station is the only noise source identified during night-time as there is no refilling of underground storage tank at night. It shall be noted that

there are existing residential houses surrounding the petrol filling station at Fairview Park with a separation distance as short as about 23m (**Figure 4-4C**) and would be worst affected by the operation of the petrol filling station. In addition, access to the petrol filling station will be controlled through the existing vehicular access/ security gate at Fairview Park.

Background noise measurement was undertaken in adjacent to Fairview Park as detailed in Section 4.3.2.2. As background noise level recorded in adjacent to Fairview Park was 63dB(A) during day-time and 55 dB(A) at night (see Section 4.3.2.2), the ANL-5 criteria (i.e. 55dB(A) for day-time and 45dB(A) for night-time) has been adopted in the noise assessment.

Day-time Petrol Filling Station Operation Noise Impact

Noise estimation was undertaken at representative NSR locations (**Figure 4-4C** refers) based on the same methodology described in Section 4.6.2.2. The selected NSRs are representative as they are nearest to the filling station and are considered worst affected by the filling station. Based on the assessment results (**Appendix 4-7E** refers), the unmitigated noise level due to the day-time operation of the petrol filling station (up to 58dB(A)) would exceed the above-mentioned day-time noise criteria (55dB(A)). Thus, noise mitigation measures would be required.

It is estimated that a section of 4m to 4.5m tall noise barrier above a site formation level of 5.4mPD will be required between the petrol filling station and the Project Site in order to shield its operational noise (**Figure 4-4C** refers). With the proposed noise barrier, the noise level would be within the day-time noise criteria and no adverse noise impact is anticipated.

The proposed noise barrier along the southern boundary of the site is required not only to alleviate noise impact from the petrol filling station, but also to screen off such visually intrusive use from the future residents.

Night-time Petrol Filling Station Operation Noise Impact

As the petrol filling station will also operate at night, a further noise assessment taking into account the noise source of the petrol filling station during night-time period as identified in Section 4.7.3.4 (i.e. movement of vehicles within the petrol filling station during nighttime operation), has also been provided in **Appendix 4-7F**.

Based on the assessment results provided in **Appendix 4-7F**, the unmitigated noise levels (up to 53dB(A)) would exceed the relevant night-time noise criteria (i.e. 45dB(A)) at NSRs. With the proposed 4m to 4.5m tall boundary noise barriers as shown in **Figure 4-4C**, the noise level due to night-time operation of the petrol filling station would comply with the relevant night-time noise criteria (45dB(A)), and no adverse noise impact is anticipated.

Cumulative Noise Due to Petrol Filling Station and Industrial Noise Sources

A cumulative noise impact assessment taking into account operation of the petrol filling station and operation of the fixed noise sources (i.e. open storage site and the godown to the east of the Project Site), have been conducted. According to the assessment results with mitigations presented in **Appendix 4-7G**, the cumulative noise level would be within the relevant noise criteria. Thus, no adverse noise impact is expected.

4.7.4 Summary of Operational Phase Noise Mitigation Measures

As discussed in Section 4.7.2 above, 2.5m to 4m tall noise barriers have been proposed along portion of the southern and southeastern site boundary in order to alleviate road traffic noise impacts. Fixed glazing or blank façade is also proposed for residential buildings R100 and R94. Please refer to **Figure 4-3B** for details.

Noise impacts due to operation of petrol filling station have also been assessed accordingly in Section 4.7.3.4**.** It is found that a section of 4m to 4.5m tall noise barrier will be required between the petrol filling station and the Project Site in order to provide noise shielding to the proposed houses at the rear side (**Figure 4-4C** refers). As boundary noise barriers are also proposed at the same location due to road traffic noise, the concerned 4.5m tall barrier can be combined with those proposed for road traffic noise to serve both purposes (see **Figure 4-7**).

For industrial sites to the east of the Project Site, they are relatively far away from Project Site (over 200 m), thus no adverse noise impacts are anticipated due to operation of the industrial sites. An assessment based on worst case scenario has been undertaken (see Section 4.7.3.2) and the estimated noise levels at NSRs of this Project was found to be within the relevant noise criteria, thus no noise mitigation measures will be necessary.

With the above noise mitigation measures, noise impact assessment results have shown that the relevant noise criteria would be complied with and there will be no adverse noise impact. The proposed noise mitigation measures are practicable and welly adopted practices, no side effects or constraints due to inclusion of such measures are expected.

To summarise the findings, **Figure 4-7** summarises the proposed noise mitigation measures during the operational phase.

4.8 Evaluation of Construction Noise Impacts After Noise Mitigation Measures (Mitigated Scenario)

4.8.1 Mitigation Measures with Adoption of QPMEs

Since the estimated unmitigated noise level at NSRs would exceed the relevant noise criteria, EPD's quality powered mechanical equipment (QPME) inventory is reviewed and proposed to be used wherever possible as a noise mitigation measure. The Contractor of this Project should diligently seek equivalent models of quiet/ silenced PMEs, and the requirement will be included in the Project EM&A Manual. The updated equipment inventory is shown in **Table 4-16** and **Table 4-17**.

Table 4-16 Inventory of QPMEs To Be Used in Northern Portion

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
Site Formation, Filling and Excavation	A1	Excavation and Filling	Air Compressor	CNP001	4	100
			Excavator	KATO model HD820V (EPD-01233)	6	99
			Generator, Standard	CNP103	6	95
			Dump Truck	EPD *	6	105
	A2	Breaking excavated hard/ oversize materials	Breaker, Excavator mounted	EPD *	2	115
			Excavator	KATO model HD820V (EPD-01233)	1	99
	A3	Ground Compression	Roller, vibratory	SAKAI model SW250-1 (EPD-00509)	8	95

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
			Bulldozer	Komatsu model D21A-8	8	102
Construction of Underground Services and Utilities	B1	Earthwork	Breaker, Excavator mounted	EPD *	1	115
			Dump Truck	EPD *	3	105
			Excavator	EPD *	3	94
	B2	Utilities laying	Air Compressor	CNP001	2	100
			Generator, Standard	CNP103	3	95
			Lorry	EPD *	2	105
			Water Pump, Submersible (Electric)	CNP283	3	85
	B3	Ground reinstatement	Concrete Lorry Mixer	CNP044	2	109
			Power Rammer (Petrol)	Dynapac model LT700 (EPD-00536)	2	107
			Poker, Vibratory, Hand-held	EPD *	2	102
			Roller, Vibratory	SAKAI model SW250-1 (EPD-00509)	2	95
Road works	C1	Earthwork	Dump Truck	EPD *	3	105
			Excavator	KATO model HD820V (EPD-01233)	2	99
	C2	Concreting Works	Concrete Lorry Mixer	CNP044	2	109
			Generator, Standard	CNP103	3	95
			Poker, Vibratory, Hand-held	EPD *	2	102
	C3	Road Finishing	Air Compressor	CNP001	2	100
			Asphalt Paver	VOLVO model. No. ABG5770 (EPD-01226)	2	104
			Generator, Standard	CNP103	3	95
			Lorry	EPD *	2	105
			Power Rammer (Petrol)	Dynapac model LT700 (EPD-00536)	2	107
			Road Roller	HITACHI model CP220-3 (EPD-01183)	2	97
Foundation	D1	General foundation construction	Air Compressor	CNP001	4	100
			Bar bender and cutter (electric)	CNP021	6	90
			Generator, standard	CNP103	3	95
			Drill/grinder, hand-held (electric)	CNP065	6	98
			Saw, circular, wood	CNP201	3	108
			Water pump, submersible (electric)	CNP283	6	85
			Excavator	KATO model HD820V (EPD-	4	99

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
				01233)		
			Lorry	EPD *	3	105
			Mobile Crane	Hitachi Sumitomo SCX700, 132kW	2	101
	D2	Piling works	Generator, standard	CNP103	3	95
			Continuous Flight Auger (CFA) piles (piling, earth auger)	CNP167	3	114
	D3	Concreting works	Concrete Lorry Mixer	CNP044	3	109
			Generator, standard	CNP103	3	95
			Poker, vibratory, hand-held	EPD *	3	102
Superstructure	E1	General construction works	Air Compressor	CNP001	4	100
			Bar bender and cutter (electric)	CNP021	6	90
			Mobile Crane	Hitachi Sumitomo SCX700, 132kW	2	101
			Drill/grinder, hand-held (electric)	CNP065	6	98
			Generator, standard	CNP103	4	95
			Saw, circular, wood	CNP201	10	108
	E2	Concreting works	Concrete Lorry Mixer	CNP044	4	109
			Concrete Pump	CNP047	2	109
			Generator, standard	CNP103	4	95
			Poker, vibratory, hand-held	EPD *	3	102
Dump Trucks Travelling on Haul Road during site formation (Veh./hr)	F	Dump Truck (Moving on Haul Road)	Dump Truck	CNP067	10	117

Remark: # Each Construction Activity has been divided into several sub. work groups based on the sequence of construction works. The respective sub-work groups of each Construction Activity will not overlap with one another.
The calculated highest SWLs of each Construction Activity used for construction noise impact assessment, are provided in **Appendix 4-4**.
* EPD website: http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf

Table 4-17 Inventory of QPMEs To Be Used in Southern Portion

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
Site Formation, Filling and Excavation	A1	Excavation and Filling	Air Compressor	CNP001	3	100
			Excavator	KATO model HD820V (EPD-01233)	4	99
			Generator, Standard	CNP103	3	95

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
			Dump Truck	EPD *	4	105
	A2	Breaking excavated hard/ oversize materials	Breaker, Excavator mounted	EPD *	1	115
			Excavator	KATO model HD820V (EPD-01233)	1	99
	A3	Ground Compression	Roller, vibratory	SAKAI model SW250-1 (EPD-00509)	4	95
			Bulldozer	Komatsu model D21A-8	4	102
Construction of Underground Services and Utilities	B1	Earthwork	Breaker, Excavator mounted	EPD *	1	115
			Dump Truck	EPD *	2	105
			Excavator	EPD *	2	94
	B2	Utilities laying	Air Compressor	CNP001	3	100
			Generator, Standard	CNP103	4	95
			Lorry	EPD *	2	105
			Water Pump, Submersible (Electric)	CNP283	2	85
	B3	Ground reinstatement	Concrete Lorry Mixer	CNP044	2	109
			Power Rammer (Petrol)	Dynapac model LT700 (EPD-00536)	2	107
			Poker, Vibratory, Hand-held	EPD *	2	102
			Roller, Vibratory	SAKAI model SW250-1 (EPD-00509)	2	95
Road works	C1	Earthwork	Dump Truck	EPD *	4	105
			Excavator	KATO model HD820V (EPD-01233)	3	99
	C2	Concreting Works	Concrete Lorry Mixer	CNP044	3	109
			Generator, Standard	CNP103	4	95
			Poker, Vibratory, Hand-held	EPD *	2	102
	C3	Road Finishing	Air Compressor	CNP001	3	100
			Asphalt Paver	VOLVO model. No. ABG5770 (EPD-01226)	3	104
			Generator, Standard	CNP103	3	95
			Lorry	EPD *	2	105
			Power Rammer (Petrol)	Dynapac model LT700 (EPD-00536)	2	107
			Road Roller	HITACHI model CP220-3 (EPD-01183)	2	97
Foundation	D1	General foundation construction	Air Compressor	CNP001	6	100

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
			Bar bender and cutter (electric)	CNP021	6	90
			Generator, standard	CNP103	4	95
			Drill/grinder, hand-held (electric)	CNP065	6	98
			Saw, circular, wood	CNP201	5	108
			Water pump, submersible (electric)	CNP283	6	85
			Excavator	KATO model HD820V (EPD-01233)	3	99
			Lorry	EPD *	3	105
			Mobile Crane	Hitachi Sumitomo SCX700, 132kW	3	101
	D2	Piling works	Generator, standard	CNP103	4	95
			Continuous Flight Auger (CFA) piles (piling, earth auger)	CNP167	3	114
	D3	Concreting works	Concrete Lorry Mixer	CNP044	4	109
			Generator, standard	CNP103	4	95
			Poker, vibratory, hand-held	EPD *	4	102
Superstructure	E1	General construction works	Air Compressor	CNP001	7	100
			Bar bender and cutter (electric)	CNP021	11	90
			Mobile Crane	Hitachi Sumitomo SCX700, 132kW	5	101
			Drill/grinder, hand-held (electric)	CNP065	11	98
			Generator, standard	CNP103	7	95
			Saw, circular, wood	CNP201	11	108
	E2	Concreting works	Concrete Lorry Mixer	CNP044	4	109
			Concrete Pump	CNP047	2	109
			Generator, standard	CNP103	6	95
			Poker, vibratory, hand-held	EPD *	3	102
Sub-structure (pile cap)	F1	General pile cap construction	Bar bender and cutter (electric)	CNP021	10	90
			Generator, standard	CNP103	5	95
			Lorry	EPD *	2	105
	F2	Concreting works	Concrete Lorry Mixer	CNP044	4	109
			Concrete Pump	CNP047	2	109
			Generator, standard	CNP103	6	95
			Poker, vibratory, hand-held	EPD *	3	102
	F3	Backfill and reinstate	Excavator	KATO model HD820V (EPD-01233)	2	99

Construction Activity	Sub. Work Group #		Powered Mechanical Equipment	TM Ref.	Quantity	SWL per unit, dB(A)
			Roller, vibratory	SAKAI model SW250-1 (EPD-00509)	1	95
Dump Trucks Travelling on Haul Road during site formation (Veh./hr)	F	Dump Truck (Moving on Haul Road)	Dump Truck	EPD *	10	105

Remark: # Each Construction Activity has been divided into several sub. work groups based on the sequence of construction works. The respective sub-work groups of each Construction Activity will not overlap with one another.

The calculated highest SWLs of each Construction Activity used for construction noise impact assessment, are provided in **Appendix 4-4**.

* EPD website: http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf

4.8.2 Mitigation Measures with Adoption of QPMEs

Asides from QPMEs, additional noise mitigation measures in terms of movable noise barriers are also proposed to shield construction plants from NSRs (see plant inventory in **Appendix 4-4**), and acoustic shielding material should also be provided to shield the piling machine (i.e. Continuous Flight Auger). The movable noise barriers/ acoustic shielding materials should have sufficient surface density of at least 10 kg/m^2 or material providing equivalent acoustic performance to block the line of sight from the sensitive receivers. There should not be any gaps and openings at the noise barriers and site hoardings to avoid noise leakage. The design of the noise barriers shall be proposed by the work contractor(s), and approved by the Engineers Representative (RE) and the Environmental Team in accordance with the Project EM&A Manual.

According to EIAO Guidance Note No. 9/2010, with provision of noise barriers, a 5dB(A) noise reduction for movable plant, 10 dB(A) for stationary plant and 15 dB(A) for enclosed ones are assumed.

The estimated noise level at both existing and planned NSRs with the adoption of QPMEs and movable noise barriers are provided in **Table 4-18** and **Appendix 4-4**.

According to the results, with the adoption of QPMEs and movable noise barriers, the construction noise levels can be significantly reduced and would comply with the relevant noise criteria. The only exception is at Bethel High School (i.e. N10), which slightly exceeds the noise criteria specified for schools (i.e. 70dB(A)). Thus, further noise mitigation measures would be required at this location.

Table 4-18 Estimated Mitigated Construction Noise Levels at NSRs With the Use of QPMEs and Movable Noise Barriers

		Northern Portion						Southern Portion							Northern and Southern Portions *								
NSR Label	Descriptions	A	B	C	D	E	G	A	B	C	D	E	F	G	Noise Level Due To Concurrent Construction Activities								Noise Criteria
		Site Formation, Filling and Excavation	Construction of Underground Services and Utilities	Road works	Foundation	Superstructure	Dump Trucks Travelling on Haul Road During Site Formation	Site Formation, Filling and Excavation	Construction of Underground Services and Utilities	Road works	Foundation	Superstructure	Sub-structure (Pile Cap)	Dump Trucks Travelling on Haul Road During Site Formation	Northern: D; Southern: D	Northern: Nil; Southern: A+G+F	Northern: A+G; Southern: nil	northern: E; Southern: E	northern: B; Southern: E	northern: C; Southern: E	northern: nil; Southern: B+C	Highest Noise Level (due to REC site), dB(A) (A)	
N1	Fairview Park	56	54	54	57	54	56	71	70	72	74	71	71	64	74	74	59	71	71	71	74	74	75
N2	Fairview Park	57	55	55	58	55	57	70	69	71	73	70	70	64	73	74	60	70	70	70	73	74	75
N3	Fairview Park	61	59	59	62	59	59	70	69	71	73	70	70	64	73	73	63	70	70	70	73	73	75
N4	Fairview Park	66	64	64	67	64	61	70	69	71	73	70	70	64	74	74	67	71	71	71	73	74	75
N5	Fairview Park	72	70	70	73	70	64	58	57	59	61	58	58	58	73	63	72	70	70	70	61	73	75
N6	Fairview Park	72	70	70	73	70	64	53	52	54	56	53	53	55	73	59	73	70	70	70	56	73	75
N7	Yau Mei San Tsuen	59	57	57	60	57	69	49	48	50	52	49	49	66	60	66	70	57	57	57	53	70	75
N8	Chuk Yuen Tsuen	59	57	57	60	57	58	54	53	55	57	54	54	56	62	59	61	59	59	59	57	62	75
N9	Chuk Yuen Tsuen	59	57	57	60	57	57	53	52	54	56	53	53	55	61	59	61	58	58	58	56	61	75
N10	Bethel High School	60	58	58	61	58	58	70	69	71	73	70	70	64	73	73	62	70	70	70	73	73	70 (65 during exam)
N11	Helene Terrace	54	52	52	55	52	55	61	60	62	64	61	61	60	65	66	57	62	62	62	64	66	75
N12	Villa Camllia	53	51	51	54	51	54	56	55	57	59	56	56	57	60	61	57	57	57	57	60	61	75
N13	Fairview Park	54	52	52	55	52	55	68	67	69	71	68	68	63	71	71	58	68	68	68	71	71	75
N14	Wong Chan Sook Ying Memorial School	53	51	51	54	51	55	63	62	64	66	63	63	60	66	67	57	63	63	63	66	67	70 (65 during exam)
N15	Man Yuen Tsuen	52	50	50	53	50	54	60	59	61	63	60	60	59	63	64	56	60	60	60	63	64	75
N16	Fairview Park	68	66	66	69	66	62	52	51	53	55	52	52	55	69	58	69	66	66	66	55	69	75
N17	Palm Springs	57	55	55	58	55	57	49	48	50	52	49	49	53	59	55	60	56	56	56	52	60	75
N18	Temp. house at Yau Mei San Tsuen	58	56	56	59	56	57	49	48	50	52	49	49	53	59	56	60	56	56	56	52	60	75
N19	Existing village house	54	52	52	55	52	55	59	58	60	62	59	59	58	62	63	58	59	59	59	62	63	75
N20	Fairview Park	72	70	70	73	70	64	52	51	53	55	52	52	55	73	58	73	70	70	70	55	73	75
N1P	Planned Development at Yau Mei Site	73	71	71	74	71	64	54	53	55	57	54	54	56	74	59	73	71	71	71	57	74	75
N2P	Planning Development at Kam Pok Road Site	56	54	54	57	54	56	64	63	65	67	64	64	61	68	68	59	65	65	65	68	68	75
N3P	Planning Development at Kam Pok Road Site	63	61	61	64	61	60	64	63	65	67	64	64	61	69	68	65	66	66	66	67	69	75
N4P	Planned Development at R(D) Site	66	64	64	67	64	61	61	60	62	64	61	61	59	69	65	67	66	66	66	64	69	75
N5P	Planned Development at R(D) Site	63	61	61	64	61	60	52	51	53	55	52	52	55	65	58	65	62	62	62	55	65	75

Note: Please refer to **Appendix 4-4** for the sample calculation and **Figure 4-2A** for the NSR locations.

* Please refer to the **Table 4-16** and **Table 4-17** and **Appendix 1-1** for the construction plant inventory, construction programme and the duration of concurrent construction activities.
Hatched numbers indicate exceedance of the relevant noise criteria for construction activities.

4.8.3 Mitigation Measures with Adoption of QPMEs, Movable Noise Barriers and Fixed Temporary Noise Barriers

In addition to the above-mentioned noise mitigation measures, fixed temporary noise barrier is also proposed in adjacent to the school (i.e. NSR N10) in order to alleviate the elevated construction noise level over there. The existing NSRs N3 and N4 nearby will also be benefited by the proposed fixed temporary noise barrier.

In order to ensure construction noise is controlled throughout the construction period, fixed noise barriers shall be erected before the commencement of construction works. It is estimated that 9m high temporary fixed noise barriers (with top level at 14.4mPD level) shall be sufficient to shield the concerned school from construction activities within the Project Site. Temporary fixed noise barrier (5.5m tall and with top level at 10.9mPD) can also provide additional noise shielding to adjacent NSRs such as N3 and N4. Also, standard site hoarding of 3m tall will also be erected along the site boundary. Since site hoarding will be erected along the site boundary, the concerned noise barrier may be combined with the site hoarding.

Figure 4-6 shows the indicative location of the proposed temporary noise barriers. Since site hoarding will be erected along the site boundary, the concerned noise barrier may be combined with the site hoarding. The exact alignment and design is subject to the contractor(s) and the prior approval from the Resident Engineer (RE). Cross sectional diagram showing the proposed noise barrier and nearby sensitive uses are also provided in **Figure 4-6A**. As the proposed temporary fixed noise barrier will be 9m tall, there will be excavation and filling activities to level up the existing ground level for the foundation of the noise barrier. To minimize potential impact, erection of temporary fixed noise barriers will be carried out section by section and precast units will be used for the foundation of the noise barrier. These noise barriers shall be erected before the commencement of construction works.

The temporary fixed noise barriers should have sufficient surface density of at least 10 kg/m^2 or material providing equivalent acoustic performance. There should not be any gaps and openings at the noise barriers and site hoardings to avoid noise leakage. The design of the noise barriers shall be proposed by the work contractor(s), and approved by the Engineers Representative (RE) and the Environmental Team in accordance with the Project EM&A Manual.

The estimated noise level at N10, N3 and N4 with the adoption of temporary fixed noise barriers, are depicted in **Appendix 4-4A**. By using a combination of QPMEs, movable noise barriers, and temporary fixed construction noise barriers, the mitigated construction noise levels at the concerned NSR would be significantly reduced and would comply with the relevant noise criteria. All the proposed noise mitigation measures are practicable and welly adopted in construction industry, no side effects or constraints due to inclusion of such measures are expected. All the mitigated construction noise levels would comply with the relevant construction noise standard and no unacceptable noise impact is anticipated.

Table 4-19 summarises the estimated noise levels at the NSRs with the proposed noise mitigation measures. Based on the assessment results, with the adoption of the above-mentioned noise mitigation measures, the construction noise level due to this Project would be within the relevant noise criteria.

Table 4-19 Mitigated Construction Noise Levels With the Use of QPMEs, Movable Noise Barriers and Temp. Fixed Noise Barriers #

		Northern Portion						Southern Portion							Northern and Southern Portions *								
NSR Label	Descriptions	A	B	C	D	E	G	A	B	C	D	E	F	G	Noise Level Due To Concurrent Construction Activities								Noise Criteria
		Site Formation, Filling and Excavation	Construction of Underground Services and Utilities	Road works	Foundation (Piling)	Superstructure	Dump Trucks Travelling on Haul Road During Site Formation	Site Formation, Filling and Excavation	Construction of Underground Services and Utilities	Road works	Foundation (Piling)	Superstructure	Sub-structure (Pile Cap)	Dump Trucks Travelling on Haul Road During Site Formation	Northern: D; Southern: D	Northern: Nil; Southern: A+G+F	Northern: A+G; Southern: nil	northern: E; Southern: E	northern: B; Southern: E	northern: C; Southern: E	northern: nil; Southern: B+C	Highest Noise Level (due to REC site), dB(A) (A)	
N1	Fairview Park	56	54	54	57	54	56	71	70	72	74	71	71	64	74	74	59	71	71	71	74	74	75
N2	Fairview Park	57	55	55	58	55	57	70	69	71	73	70	70	64	73	74	60	70	70	70	73	74	75
N3	Fairview Park	57	56	55	57	57	54	66	66	67	68	68	66	59	68	69	59	68	68	68	69	69	75
N4	Fairview Park	66	64	64	67	64	61	66	66	67	68	68	66	59	71	70	67	70	70	70	70	71	75
N5	Fairview Park	72	70	70	73	70	64	58	57	59	61	58	58	58	73	63	72	70	70	70	61	73	75
N6	Fairview Park	72	70	70	73	70	64	53	52	54	56	53	53	55	73	59	73	70	70	70	56	73	75
N7	Yau Mei San Tsuen	59	57	57	60	57	69	49	48	50	52	49	49	66	60	66	70	57	57	57	53	70	75
N8	Chuk Yuen Tsuen	59	57	57	60	57	58	54	53	55	57	54	54	56	62	59	61	59	59	59	57	62	75
N9	Chuk Yuen Tsuen	59	57	57	60	57	57	53	52	54	56	53	53	55	61	59	61	58	58	58	56	61	75
N10	Bethel High School	56	55	54	56	56	53	66	66	67	68	68	66	59	68	69	58	68	68	68	69	69	70 (65 during exam)
N11	Helene Terrace	54	52	52	55	52	55	61	60	62	64	61	61	60	65	66	57	62	62	62	64	66	75
N12	Villa Camllia	53	51	51	54	51	54	56	55	57	59	56	56	57	60	61	57	57	57	57	60	61	75
N13	Fairview Park	54	52	52	55	52	55	68	67	69	71	68	68	63	71	71	58	68	68	68	71	71	75
N14	Wong Chan Sook Ying Memorial School	53	51	51	54	51	55	63	62	64	66	63	63	60	66	67	57	63	63	63	66	67	70 (65 during exam)
N15	Man Yuen Tsuen	52	50	50	53	50	54	60	59	61	63	60	60	59	63	64	56	60	60	60	63	64	75
N16	Fairview Park	68	66	66	69	66	62	52	51	53	55	52	52	55	69	58	69	66	66	66	55	69	75
N17	Palm Springs	57	55	55	58	55	57	49	48	50	52	49	49	53	59	55	60	56	56	56	52	60	75
N18	Temp. house at Yau Mei San Tsuen	58	56	56	59	56	57	49	48	50	52	49	49	53	59	56	60	56	56	56	52	60	75
N19	Existing village house	54	52	52	55	52	55	59	58	60	62	59	59	58	62	63	58	59	59	59	62	63	75
N20	Fairview Park	72	70	70	73	70	64	52	51	53	55	52	52	55	73	58	73	70	70	70	55	73	75
Planned NSRs																							
N1P	Planned Development at Yau Mei Site	73	71	71	74	71	64	54	53	55	57	54	54	56	74	59	73	71	71	71	57	74	75
N2P	Planning Development at Kam Pok Road Site	56	54	54	57	54	56	64	63	65	67	64	64	61	68	68	59	65	65	65	68	68	75
N3P	Planning Development at Kam Pok Road Site	63	61	61	64	61	60	64	63	65	67	64	64	61	69	68	65	66	66	66	67	69	75
N4P	Planned Development at R(D) Site	66	64	64	67	64	61	61	60	62	64	61	61	59	69	65	67	66	66	66	64	69	75
N5P	Planned Development at R(D) Site	63	61	61	64	61	60	52	51	53	55	52	52	55	65	58	65	62	62	62	55	65	75

Note: Please refer to **Appendix 4-4** and **Appendix 4-4A** for the sample calculation and **Figure 4-2A** for the NSR locations.

* Please refer to **Appendix 1-1** for the construction programme and the duration of concurrent construction activities.

\# With regard to the above, the mitigated noise level for the NSRs are based on those presented in **Table 4-18** with the adoption of QPMEs and movable noise barriers. While, the mitigated noise levels for NSR N10 and N3 are based on those presented in **Appendix 4-4A** with the adoption of QPMEs, movable noise barriers and temp. fixed noise barrier. For NSR N4, the proposed temp. fixed noise barrier will also provide noise shielding to the Southern Portion as shown in the noise calculation in **Appendix 4-4A**.

4.8.4 Recommendations on Noise Mitigation Measures

It is also recommended that good housekeeping activities shall also be carried out to further minimize the potential construction noise impact, and these are summarised below. The following good site practices are also recommended for incorporation into the contractual requirements.

- Contractor shall comply with and observe the Noise Control Ordinance (NCO) and its current subsidiary regulations;
- Before the commencement of any work, the Contractor shall submit to the Engineer for approval the method of working, equipment and sound-reducing measures intended to be used at the Project Site;
- Contractor shall devise and execute working methods that will minimize the noise impact on the surrounding environment; and shall provide experienced personnel with suitable training to ensure that these methods are implemented;
- Only well-maintained plants should be operated on-site;
- Plants should be serviced regularly during the construction programme;
- Machines that may be in intermittent use should be shut down or throttled down to a minimum between work periods;
- Silencer and mufflers on construction equipment should be utilised and should be properly maintained during the construction programme;
- Noisy activities can be scheduled to minimize exposure of nearby NSRs to high levels of construction noise. For example, noisy activities can be scheduled for midday or at times coinciding with periods of high background noise (such as during peak traffic hours);
- Noisy equipment such as emergency generators shall always be sited as far away as possible from noise sensitive receivers;
- Provision of mobile noise barriers in adjacent to construction plants (e.g. Continuous Flight Auger) shall also be considered by the Contractor(s) where necessary;
- Mobile plants should be sited as far away from NSRs as possible; and
- Material stockpiles and other structures should be effectively utilised as noise barrier, where practicable.
- The contractor(s) is also encouraged to arrange construction activities with care so that concurrent construction activities are avoided as much as possible. The contractor(s) should closely liaise with the school so that noisy activities are not undertaken during school's examination period. With the above noise mitigation measures in place and good site practices, residual noise impact at the school would be temporary and unacceptable noise impact is not expected.
- Similar to other EIA projects, EM&A will be carried out for this Project during the Project construction phase in order to monitor the construction noise level and to verify the effectiveness of the noise mitigation measures. A Project Environmental Team will be formed as part of the Project EM&A works, which will closely monitor contractor(s)' performance and the residual noise level at the school. Should unacceptable construction noise level be identified during the construction noise monitoring, necessary actions following the standard Event and Action Plan specified in the Project EM&A Manual, will be required by the Project Environmental Team.

4.9 Cumulative Construction Noise Impacts

4.9.1 *Concurrent Construction Projects*

Several development projects have been identified nearby the Project Site, a list of which is provided in Section 1.9. These include approved EIA projects as well as planned development projects. For the approved EIA projects (i.e. the planned public sewerage project; cycle track project), there is currently no fixed construction programme available and overlapping of their works programme with this Project cannot be precluded at this stage. However, to be conservative, these approved projects

have been taken into account in the cumulative noise assessment of this Project. For the planned development projects, since there is no committed development programme available only those projects which have obtained approval from either the Town Planning Ordinance or the EIA Ordinance (i.e. with public available information regarding their development programme) have been taken into account in the cumulative impact assessment. Planned development projects which may overlap with this Project (i.e. planned "RD Site" and planned "Kam Pok Road Site") have been selected for cumulative noise impact assessment. For the remaining planned development project (i.e. planned "Yau Mei Site"), since no public available information regarding its development programme is available and it has not yet obtained any approval from the Government for the proposed development, there is no information available for assessment and is not considered further in the cumulative impact assessment.

Potential cumulative impacts have been addressed in the following paragraphs.

4.9.2 *Cumulative Construction Noise Due to Adjacent Approved EIA Projects*

Within the Assessment Area, there is a proposed public sewerage project near Ngau Tam Mei Channel and Castle Peak Road between Ngau Tam Mei and San Tin under PWP Item 4235DS. The concerned public sewerage project has been assessed in a separate EIA report for "Yuen Long and Kam Tin Sewerage and Sewage Disposal Stage 2" (EIA Application No. EIA-094/2004). The concerned public sewerage project near Ngau Tam Mei covers the construction of a section of gravity trunk sewer underneath Kam Pok Road and Yau Pok Road as well as construction of proposed Ngau Tam Mei Sewage Pumping Station (NTMSPS) near the road junction between Kam Pok Road and Castle Peak Road.

The section of proposed public sewers and the NTMSPS are shown in **Figure 4-2A**. The construction of the above sewerage project has been addressed in the above-mentioned EIA report. The EIA report has stated that all works will be carried out in small section areas within a short period. These activities should not generate significant amount of construction dust and result in cumulative impact. It has also recommended in the same report the construction works will be carried out in 50m segments. Since the concerned SPS is outside the 300m radius Assessment Area (**Figure 4-2A** refers), it is not considered further in this noise assessment.

There is currently no fixed construction programme for the above-mentioned public sewerage project. Since overlapping of construction programme of these projects with the construction programme of this Project cannot be precluded at this stage, cumulative construction noise due to construction of the public sewers and the construction of this Project has been considered in this assessment as a worst case scenario. Information such as the plant inventory and SWLs has been extracted from the corresponding EIA report, which is also summarised in **Appendix 4-5**. The calculated construction noise levels due to these approved EIA projects are also presented in **Appendix 4-5**.

Asides from the proposed public sewerage works, there is also a proposed alignment of cycle track between Sha Po Tsuen and Shek Sheung River (EIA Application No. EIA 159/2008). The section of cycle track near the Project Site will be constructed along the edge of Yau Pok Road on the other side of existing Ngau Tam Mei Channel. According to the EIA report, the concerned construction of cycle track project will involve construction of a narrow strip of cycle track, which will be constructed in sections. Typically, the working area will be 40 m long by 4 m wide and no adjacent sections (200m between two neighbouring sections) will be constructed simultaneously. Currently, there is no fixed construction programme for the cycle track project.

Construction plant inventory presented in the approved EIA report of the above-mentioned projects has been adopted in this noise assessment. Although concurrent construction of the above-mentioned approved EIA projects and this Project is unlikely, cumulative construction noise impact has been assessed based on the highest noise level predicted for the above approved projects (using the shortest separation distance) and the highest noise level predicted for this Project, and the results are presented in the following paragraphs. Since the concerned approved EIA projects will be

constructed in short sections (50m for cycle track and 40m for public sewers), both the noise strength and duration of construction nearby the NSRs would be smaller than that predicted in this assessment.

4.9.3 *Cumulative Construction Noise Due to Adjacent Planned Development Projects*

As discussed earlier (Sections 1.9 and 4.9.1), there are other planned development projects in adjacent to the Project Site which may overlap in terms of time with works of this Project. As the concerned planned development projects will be subject to approval from both TPB and EIAO, and also subject to fulfillment of relevant approval conditions, it is expected that overlapping of the peak construction activities of these development sites will unlikely to occur. Thus, adverse impacts due to concurrent construction of peak construction activities of these projects are not anticipated. Having said that, a sensitivity test based on the assumption of concurrent works has been conducted to provide a more conservative assessment.

According to the EIA Study Brief of these planned development projects, the development intentions of these projects are also for residential purpose (similar to this Project). Since all these projects are located in relatively flat area, it is expected that the construction scale of these project sites will be similar to this Project. Thus, the construction scale and plant inventory of these projects in this noise assessment have been based on best available information and assumptions, which is also presented in **Appendix 4-6A** to **Appendix 4-6B**.

Since all these planned development Projects will also be controlled under the EIAO with regard to construction impacts, it is expected that noise mitigation measures (e.g. QPMEs and movable noise barriers) would be adopted for this Projects during the construction. Thus, this noise assessment has taken into account these noise mitigation measures for the purpose of this noise assessment. The calculated construction noise levels due to these planned development projects are also presented in **Appendix 4-6A** to **Appendix 4-6B**.

4.9.4 Cumulative Construction Noise Assessment Results

As the Project Site is subject to both the approved EIA projects as well as adjacent planned development projects, cumulative construction noise impact due to these projects has also been assessed. The assessment has been conducted for both the existing NSRs and planned NSRs based on the following assumptions.

For existing NSRs, cumulative construction noise levels due to the adjacent approved EIA projects as well as planned development sites have been estimated.

As for planned NSRs discussed in Section 4.9.3 above, although these planned development projects have no committed development programme, a sensitivity noise assessment have been undertaken for these planned projects, and two scenarios have been assumed :

- Scenario A – the planned development sites are already occupied during the construction of this Project; and

- Scenario B – the planned development sites are constructed at the same time during the construction of this Project.

Results of the estimated cumulative construction noise levels are presented in **Table 4-20**. The calculation of cumulative construction noise due to concurrent projects should be based on the construction programme of the respective projects and its plant inventory for evaluation of cumulative impacts. However, due to lack of committed construction programme of the concerned nearby project sites, the noise levels presented is based on a conservative approach by assuming concurrent construction of the peak construction activities of these projects (i.e. calculation of cumulative noise is based on highest noise level to be generated from the nearby project sites),

which is not very likely to occur. As discussed in Section 4.9.3 above, some of these projects would still subject to approval from both the EIAO and TPB, due to the delay, concurrent construction is not very likely to occur.

Based on the assessment results (Table 4-20), the calculated cumulative construction noise levels with noise mitigation measures would comply with the relevant noise criteria at most of the NSR locations (except N4, N15, N2P and N3P). However, for these few NSRs, their noise level is dominant by other construction projects while the contribution due to this Project is negligible.

For existing NSR N4, because of its proximity to the approved projects of public sewer and cycle track, cumulative noise impact might be a concern and may exceed the relevant noise criteria if the Project Site is constructed simultaneously with the above approved projects. As such, a short section of fixed temporary noise barrier (5.5m tall above a site formation level of 5.4mPD) is also proposed in adjacent to N4 in order to alleviate the cumulative construction noise level over there due to above-mentioned approved projects (dotted green line as shown in **Figure 4-6** refers), and the mitigated noise level is presented in the following paragraphs.

The temporary fixed noise barriers should have sufficient surface density of at least 10 kg/m^2 or material providing equivalent acoustic performance. There should not be any gaps and openings at the noise barriers to avoid noise leakage and can be combined with the site hoarding of Project Site. The design of the noise barriers shall be proposed by the work contractor(s), and approved by the Engineers Representative (RE) and the Environmental Team in accordance with the Project EM&A Manual.

Although the mitigated noise level at the school (i.e. N10) would comply with the noise criteria for schools (i.e. 70dB(A) during non-examination period), the Contractor is also required to closely liaise with the school so that noisy works of this Project are avoided during the school examination periods in order to minimize potential noise impacts. The Project Environmental Team shall closely monitor contractor(s)' performance and residual noise level at nearby sensitive receivers. Should unacceptable construction noise level be identified during the construction, the concerned construction works shall be stopped temporarily and necessary actions following the standard Event and Action Plan specified in the Project EM&A Manual, shall be implemented. The above requirement will be included in the EM&A manual of this Project for implementation.

Table 4-20 Estimated Mitigated Cumulative Construction Noise Levels at NSRs With the Use of QPMEs, Movable Noise Barriers, and Temporary Fixed Noise Barriers

NSR Label		Calculated Noise Level due to Approved EIA Projects *		Calculated Noise Level due to Adjacent Planned Development Projects *		Cumulative Noise Level - Scenario A			Cumulative Noise Level - Scenario B			Noise Criteria
		Construction of Cycle Track, dB(A)	Construction of Public Sewers, dB(A)	Construction of Kam Pok Road site, dB(A)	Construction of RD site, dB(A)	Cumulative Noise Level Due to Approved EIA Projects only, dB(A)	Highest Mitigated Noise Level Due to Current Project, dB(A) #	Cumulative Noise Level, dB(A)	Cumulative Noise Level Due to Approved EIA Projects and Planned Development Projects, dB(A)	Highest Mitigated Noise Level Due to Current Project, dB(A) #	Cumulative Noise Level, dB(A)	
		A	B	E	F	= A+B	D	=A+B+D	=A+B+E+F	D	=A+B+E+F+D	
Existing NSRs	N1	56	53	59	59	58	74	**74**	63	74	**74**	75
	N2	55	52	59	59	57	74	**74**	63	74	**74**	75
	N3	67	71	64	62	72	69	**74**	73	69	**74**	75
	N4	70	75	65	64	76	71	**77**	77	71	**78**	75
	N5	62	60	59	64	64	73	**74**	68	73	**74**	75
	N6	57	56	56	62	60	73	**73**	65	73	**74**	75
	N7	69	67	64	65	71	70	**74**	73	70	**75**	75
	N8	55	58	60	75	60	62	**64**	75	62	**75**	75
	N9	55	57	59	74	59	61	**63**	74	61	**74**	75
	N10	64	69	63	61	70	69	**73**	71	69	**73**	70 (65 during examination)
	N11	60	67	67	59	68	66	**70**	71	66	**72**	75
	N12	54	56	66	59	58	61	**63**	67	61	**68**	75
	N13	62	57	62	58	63	71	**72**	66	71	**72**	75
	N14	62	60	61	57	64	67	**69**	66	67	**70**	70 (65 during examination)
	N15	80	85	62	57	86	64	**86**	86	64	**86**	75
	N16	58	56	55	62	60	69	**70**	65	69	**70**	75
	N17	50	49	53	58	53	60	**61**	60	60	**63**	75
	N18	56	55	53	61	59	60	**63**	63	60	**65**	75
	N19	57	60	75	60	62	63	**66**	75	63	**75**	75
	N20	59	58	56	63	62	73	**73**	66	73	**74**	75
Planned Development Projects	N1P	64	62	-	-	66		**66**	66	-	-	75
	N2P	65	84	-	-	84	74	**84**	84	-	-	75
	N3P	65	84	-	-	84	68	**84**	84	-	-	75
	N4P	64	73	-	-	74	69	**75**	74	-	-	75
	N5P	64	73	-	-	74	69	**75**	74	-	-	75

Note: * Please refer to **Appendix 4-5 and Appendix 4-6A** and **4-6B** for the calculation of construction noise level as a result of the approved EIA projects and planned development projects, respectively. Since the planned development sites (i.e. the RD Site, and Kam Pok Road Site) are subject to approval from both the TPB and EIAO, the estimated construction noise levels of these projects are presented for reference only based on best available information and assumptions with the adoption of QPMEs and movable noise barriers for the purpose of this noise assessment.

\# The calculated mitigated noise level due to construction of this Project is provided in **Appendix 4-4** and **Appendix 4-4A**.

Please refer to **Figure 4-2A** for the NSR locations.

Hatched numbers indicate exceedance of the relevant noise criteria for construction activities.

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With regards to the above, since a 9m tall temporary fixed noise barrier is proposed for this Project to shield the school (i.e. N10) from construction activities of the Project Site (**Figures 4-6** and **4-6A** refer), the concerned temporary fixed noise barrier would also completely shield the school from the concerned approved EIA projects as well as the nearby planned development sites. Please also note that there are also cluster of existing 3-storey high buildings at Fairview Park, which provides additional noise shielding to the school from construction activities of the nearby approved EIA projects and planned development sites. Given the proposed noise barrier at the school and additional noise shielding provided by nearby existing 3-storey buildings, a correction factor of -10dB(A) has been applied to the above calculated noise level for school, and the resultant noise level is presented as below:

		Calculated Noise Level due to Approved EIA Projects *		Calculated Noise Level due to Adjacent Planned Development Projects *		Cumulative Noise Level - Scenario A			Cumulative Noise Level - Scenario B			
NSR Label		Construction of Cycle Track, dB(A)	Construction of Public Sewers, dB(A)	Construction of Kam Pok Road site, dB(A)	Construction of RD site, dB(A)	Cumulative Noise Level Due to Approved EIA Projects only, dB(A)	Highest Mitigated Noise Level Due to Current Project, dB(A) #	Cumulative Noise Level, dB(A)	Cumulative Noise Level Due to Approved EIA Projects and Planned Development Projects, dB(A)	Highest Mitigated Noise Level Due to Current Project, dB(A) #	Cumulative Noise Level, dB(A)	Noise Criteria
		A	B	E	F	= A+B	D	=A+B+D	=A+B+E+F	D	=A+B+E+F+D	
Existing NSRs	N10	54	59	53	51	60	69	**70**	61	69	**70**	70 (65 during examination)

Remark: * Given the noise barrier effect of the proposed fixed temporary noise barrier and additional noise shielding due to nearby existing residential buildings at Fairview Park, a -10dB(A) correction factor has been applied to the calculated noise levels due to the approved/ planned EIA projects as presented in **Table 4-20** above.

Thus, the noise level at the school would comply with the relevant noise criteria. In addition, the concerned classrooms at the school abutting the Project Site have already been equipped with air-conditioners, thus the actual noise level experienced in the classroom would be smaller than that estimated above. Furthermore, as mentioned before, the concerned approved EIA projects will only be carried out in small segments (i.e. 50m for public sewerage works and 40m for proposed cycle track project), thus the duration of concerned construction works will be short-term and temporary.

During construction, the Contractor of this Project will be required to closely liaise with the school so that noisy works of this Project are avoided during the school examination periods in order to minimize potential noise impacts. The construction noise level will also be closely monitored to ensure compliance with the relevant noise criteria.

Construction plant inventory presented in the approved EIA report of the above-mentioned projects has been adopted in this noise assessment. Cumulative construction noise impact has also been assessed based on the highest noise level predicted for the above approved projects (using the shortest separation distance) and that predicted for this Project in order to represent the worst case scenario, and the results are presented in the following paragraphs. Since the concerned approved EIA projects will be constructed in short sections, concurrent construction of the above-mentioned approved EIA projects and this Project is not very likely. Nevertheless, cumulative construction noise has been assessed in this study.

For NSRs N4 and N3, as discussed in Section 4.9.2, it shall be noted the concerned approved EIA projects (i.e. the cycle track project and the public sewer project) will be constructed in short sections, thus simultaneous construction of these projects and the construction work of this Project is not very likely. As such, the noise level presented in **Table 4-20** above is very conservative.

Since temporary fixed noise barriers (dotted green line in **Figure 4-6**) are proposed directly in front of these NSRs (N3 and N4), the concerned noise barriers will also shield these NSRs from the concerned approved EIA projects. Taken into account this additional noise shielding effect, a correction factor of -5dB(A) has been applied to the calculated noise levels presented in **Table 4-20** for these NSRs, and the resultant noise level is presented as below.

NSR Label		Calculated Noise Level due to Approved EIA Projects *		Calculated Noise Level due to Adjacent Planned Development Projects *		Cumulative Noise Level - Scenario A			Cumulative Noise Level - Scenario B			Noise Criteria
		Construction of Cycle Track, dB(A)	Construction of Public Sewers, dB(A)	Construction of Kam Pok Road site, dB(A)	Construction of RD site, dB(A)	Cumulative Noise Level Due to Approved EIA Projects only, dB(A)	Highest Mitigated Noise Level Due to Current Project, dB(A) #	Cumulative Noise Level, dB(A)	Cumulative Noise Level Due to Approved EIA Projects and Planned Development Projects, dB(A)	Highest Mitigated Noise Level Due to Current Project, dB(A) #	Cumulative Noise Level, dB(A)	
		A	B	E	F	= A+B	D	=A+B+D	=A+B+E+F	D	=A+B+E+F+D	
Existing NSRs	N3	62	66	64	62	67	69	71	70	69	73	75
Existing NSRs	N4	65	70	65	64	71	71	74	73	71	75	75

Remark: * Given the noise barrier effect of the proposed fixed temporary noise, a -5dB(A) correction factor has been applied to the calculated noise levels from the approved EIA projects as presented in **Table 4-20** above.

Based on the assessment results, with the proposed fixed temporary noise barriers the cumulative noise level at N3 and N4 would comply with the noise criteria and no adverse noise impact is anticipated.

It shall be noted that the concerned noise barrier (dotted green line in **Figure 4-6**) will only be required should there be concurrent construction activities with the approved projects of public sewer and cycle track. This is also stated in **Figure 4-6** as well.

Nevertheless, during the construction the Contractor will be required to avoid noisy works near N4 when there is any known concurrent construction due to the approved public sewer project in order to avoid cumulative noise impacts. The Project Environmental Team shall closely monitor contractor(s)' performance and residual noise level at nearby sensitive receivers. Should unacceptable construction noise level be identified during the construction, the concerned construction works shall be stopped temporarily and necessary actions following the standard Event and Action Plan specified in the Project EM&A Manual, shall be implemented. The above requirement will be included in the EM&A manual of this Project for implementation.

To conclude, with the implementation of the recommended noise mitigation measures, unacceptable construction noise impact is not anticipated. Cumulative construction noise impact from this Project will be controlled through implementation measures described in this report and those committed for the other projects.

4.10 Conclusion

4.10.1 Construction Phase

Construction noise due to construction of this Project has been assessed. Noise mitigation measures such as use of quiet type equipment, scheduling of construction programme to avoid concurrent works, and provision of movable/ fixed temporary noise barriers have been proposed in order to mitigate the noise levels. It was found that with the implementation of proposed noise mitigation measures and good practices, construction noise level at the NSRs due to construction of this Project alone would comply with the noise standard.

There is currently no committed construction programme of the adjacent approved/ planned EIA projects, thus it cannot be ascertain the occurrence of cumulative construction noise impacts due to these projects. Cumulative construction noise impact from this Project will be controlled through implementation measures described in this report and those committed for the other projects. A sensitivity noise assessment for the cumulative noise impacts has been undertaken to provide a more conservative assessment. It was found that the cumulative noise levels at NSRs are mainly dominant by the approved EIA Projects and planned development projects rather than construction works of this Project. As such, with the proposed mitigation measures of this Project in place, no residual adverse noise impact is expected.

4.10.2 Operational Phase

Operational phase noise impacts due to road traffic noise levels have been examined. It is found that with the proposed noise mitigation measures in terms of boundary noise barriers and fixed glazing/ blank façade (Section 4.7.2 and **Figure 4-3B** refer), the predicted road traffic noise levels would be within the relevant noise criteria.

There is a petrol filling station located within Fairview Park and in adjacent to the Project Site. The operational noise of the petrol filling station has been assessed. With the proposed 4m to 4.5m tall noise barrier between the petrol filling station and the Project Site (Section 4.7.3.4 and **Figure 4-4C**), the noise level would comply with the relevant noise criteria.

As for industrial noise due to open storage site and godown, the noise impact assessment has found that the noise level would comply with the relevant noise criteria and no noise mitigation measures would be necessary for this Project.

It is found that with the proposed noise mitigation measures, the relevant noise criteria would be complied with and there will be no adverse noise impact.

As various noise mitigation measures have been proposed for different noise sources and representing different scenarios, noise mitigation measures proposed have been summarised and presented in **Figure 4-7**.

5. WATER QUALITY

5.1 Summary

5.1.1 Introduction

This Chapter presents an assessment of the potential water quality impact that may arise from construction and operation of the Project. The assessment has been carried out in accordance with the requirements given in Clause 3.9.3 of the EIA Study Brief and the criteria and guidelines as stated in Annexes 6 and 14 of the EIAO-TM respectively. The Assessment area for the water quality impact assessment is defined by a distance of 500m from the boundary of the Project Site as per the EIA Study Brief.

The assessment area covers surrounding areas in the larger Deep Bay Catchment Area of the Deep Bay Water Control Zone (WCZ) and the Ramsar Site.

The proposed Project is for residential purpose with a landscape pond, landscaped open area and some passive recreational uses and supporting facilities. Detailed elements of the proposed development and the MLP are discussed in Section 1.3.

5.2 Environmental Legislation, Standards, Guidelines and Criteria

5.2.1 Water Pollution Control Ordinance

The Water Pollution Control Ordinance (WPCO) (Cap. 358) enacted in 1980 is the principal legislation controlling water quality in Hong Kong. Under the WPCO, Hong Kong waters are classified into 10 Water Control Zones (WCZ). Statutory Water Quality Objectives (WQOs) are specified for each WCZ. The WQOs for any particular waters, as defined in the WPCO, shall be the quality, which should be achieved and maintained in order to promote conservation and best use of those waters in the public interest. The Project Site is situated within the catchment area of the Deep Bay WCZ.

5.2.2 Other Hong Kong Legislation and Requirements

The Technical Memorandum on “Standards for Effluent Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters” (TM-Effluents) issued under Section 21 of the WPCO defines acceptable discharge limits of effluent to different types of receiving waters. Under the Ordinance, any discharge into the WCZ requires licensing and must comply with the terms and conditions specified in the licence, except for domestic sewage discharged into public foul sewers, and unpolluted water into storm water drains and river courses.

The Project Site is surrounded by existing road networks to the south and east; existing residential development at Fairview Park to the west; and agricultural activities in the north. There is no existing fishpond within or immediately adjacent to the Project Site. However, existing fishponds are located to the further north of the Project Site between Fairview Park and Palm Springs outside the Project boundary, and may potentially be affected indirectly in case of uncontrolled discharge from the Project Site although it is unlikely to occur. As such, the discharge limits of effluent discharged into inland water Group D has been adopted for the Project Site, while Group C standards is adopted for potentially affected fishponds at off-site locations. The effluent discharge limits for Group D and Group C uses are provided in **Table 5-1** and **Table 5-2**. The applicable key WQOs designated for inland waters in Deep Bay WCZ is also provided in **Table 5-3.**

Other legislation and requirements relevant to the Assessment Area include the subsidiary regulations of the WPCO such as the Water Pollution Control (General) Regulations and the Water Pollution Control (Sewerage) Regulations. In addition, the Project is also subject to the EIAO and as well as Annexes 6 and 14 of the EIAO-TM.

The proposed development should comply with all relevant legislations during both the construction and operational stages.

Table 5-1 Standards for effluent discharged into Group D inland waters (All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated)

Flow Rate (m^3/day) / Determinant	≤ 200	> 200 and ≤ 400	> 400 and ≤ 600	> 600 and ≤ 800	> 800 and ≤ 1000	> 1000 and ≤ 1500	> 1500 and ≤ 2000	> 2000 and ≤ 3000
pH (pH units)	6-10	6-10	6-10	6-10	6-10	6-10	6-10	6-10
Temperature (°C)	30	30	30	30	30	30	30	30
Colour (lovibond units) (25mm cell length)	1	1	1	1	1	1	1	1
Suspended solids	30	30	30	30	30	30	30	30
BOD	20	20	20	20	20	20	20	20
COD	80	80	80	80	80	80	80	80
Oil & Grease	10	10	10	10	10	10	10	10
Iron	10	8	7	5	4	2.7	2	1.3
Boron	5	4	3.5	2.5	2	1.5	1	0.7
Barium	5	4	3.5	2.5	2	1.5	1	0.7
Mercury	0.1	0.05	0.001	0.001	0.001	0.001	0.001	0.001
Cadmium	0.1	0.05	0.001	0.001	0.001	0.001	0.001	0.001
Other toxic metals individually	1	1	0.8	0.8	0.5	0.5	0.2	0.2
Total toxic metals	2	2	1.6	1.6	1	1	0.5	0.4
Cyanide	0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.05
Phenols	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.1
Sulphide	1	1	1	1	1	1	1	1
Sulphate	800	600	600	600	600	400	400	400
Chloride	1000	800	800	800	600	600	400	400
Fluoride	10	8	8	8	5	5	3	3
Total phosphorus	10	10	10	8	8	8	5	5
Ammonia nitrogen	20	20	20	20	20	20	20	10
Nitrate + nitrite nitrogen	50	50	50	30	30	30	30	20
Surfactants (total)	15	15	15	15	15	15	15	15
E. coli (count/100 ml)	1000	1000	1000	1000	1000	1000	1000	1000

Table 5-2 Standards for effluent discharged into Group C inland waters (All units in mg/L unless otherwise stated; all figures are upper limits unless otherwise indicated)

Flow Rate (m^3/day) / Determinant	≤ 100	> 100 and ≤ 500	> 500 and ≤ 1000	> 1000 and ≤ 2000
pH (pH units)	6-9	6-9	6-9	6-9
Temperature (°C)	30	30	30	30
Colour (lovibond units) (25 mm cell length)	1	1	1	1
Suspended solids	20	10	10	5
BOD	20	15	10	5
COD	80	60	40	20
Oil & Grease	1	1	1	1
Boron	10	5	4	2
Barium	1	1	1	0.5
Iron	0.5	0.4	0.3	0.2
Mercury	0.001	0.001	0.001	0.001

Flow Rate (m^3/day) / Determinant	≤ 100	> 100 and ≤ 500	> 500 and ≤ 1000	> 1000 and ≤ 2000
Cadmium	0.001	0.001	0.001	0.001
Silver	0.1	0.1	0.1	0.1
Copper	0.1	0.1	0.05	0.05
Selenium	0.1	0.1	0.05	0.05
Lead	0.2	0.2	0.2	0.1
Nickel	0.2	0.2	0.2	0.1
Other toxic metals individually	0.5	0.4	0.3	0.2
Total toxic metals	0.5	0.4	0.3	0.2
Cyanide	0.05	0.05	0.05	0.01
Phenols	0.1	0.1	0.1	0.1
Sulphide	0.2	0.2	0.2	0.1
Fluoride	10	7	5	4
Sulphate	800	600	400	200
Chloride	1000	1000	1000	1000
Total phosphorus	10	10	8	8
Ammonia nitrogen	2	2	2	1
Nitrate + nitrite nitrogen	30	30	20	20
Surfactants (total)	2	2	2	1
E. coli (count/100 ml)	1000	1000	1000	1000

Table 5-3 Key Water Quality Objectives for Inland Waters in Deep Bay Water Control Zone

Parameter	WQOs
pH range	6-9
Maximum 5-Day Biochemical Oxygen Demand, mg/L	5
Maximum Chemical Oxygen Demand, mg/L	30
Maximum Annual Median Suspended Solids, mg/L	20
Minimum Dissolved Oxygen, mg/L	4
Unionised Ammonia (annual mean), mg/L	0.021
E. coli (count/100 ml)	1,000

Remark: WQO follows River Water Quality in Hong Kong in 2009, published by EPD.

5.3 Existing Environment and Sensitive Receivers

5.3.1 Existing Environment

The Project Site is surrounded by existing road networks to the south and east directions; existing residential development at Fairview Park to the west; and agricultural activities in the north. Ngau Tam Mei Drainage Channel (NTMDC) is also situated to the further east of the Project Site.

The Project Site is currently surrounded by existing u-channels. Along the western Project Site boundary is the existing Fairview Park Nullah. There are a few short sections of existing drainage ditch within the Project Site. They collect surface runoff from the Site only and discharge it to the Fairview Park Nullah nearby. The concerned drainage ditches within the Project Site will be removed, however, appropriate new drainage system will be provided within the proposed residential development (see Section 5.5.2) to collect surface runoff. Thus, there will be no adverse water quality impact. There are also stormwater u-channels along roadside of Yau Pok Road with outfalls connected to the NTMDC. Thus, surface runoff within the Project Site is currently discharged into

Fairview Park Nullah and the NTMDC. Please refer to **Figure 5-1**. Asides from the above, there is also an existing abandoned pond at the Northern Portion of Project Site. The concerned pond is abandoned and its location is shown in **Figure 5-1**. The concerned pond will be retained.

With regard to the NTMDC, it is an engineered channel which is divided into upstream section (Section B – upstream of San Tin Highway) and downstream section (Section A – between San Tin Highway and Kam Tin River). The river training works for Section B and Section A were completed in 2003 and early 2005 respectively under the project "Construction of Main Drainage Channels for Ngau Tam Mei" by DSD. The NTMDC is located about 20m to the east of the Project Site with Yau Pok Road situated between the NTMDC and the Project Site.

Currently, the Project Site and the surrounding areas are not equipped with any public sewerage system. According to the information by Drainage Services Department, the Ngau Tam Mei Trunk Sewerage is being designed and will be constructed by Drainage Services Department under Agreement No. CE30/2006(DS) Yuen Long and Kam Tin Sewerage and Sewage Disposal – Design and Construction. This trunk sewerage is a part of the PWP No. 4235DS.

5.3.2 Identification of Water Quality Sensitive Receivers

The Project Site is generally low-lying in terrain and the geographical characteristic of the Project Site is relatively flat. The existing ground level for most area within the Project Site varies from around 2mPD to 4mPD with an average level at 3mPD. The Project Site is proposed to be raised to about +5.4mpD level due to drainage consideration in order to avoid flooding of the Site during operation.

As discussed above, the Project Site is currently surrounded by existing u-channels. There are also stormwater u-channels along roadside of Yau Pok Road with outfalls connected to the NTMDC. Thus, surface runoff within the Project Site is currently discharged into Fairview Park Nullah and the NTMDC. The existing drainage ditches within the Project Site, which collect surface runoff from the Site only and discharge it to the Fairview Park Nullah nearby, will be replaced by appropriate new drainage system within the proposed residential development (see Section 5.5.2) to collect surface runoff. Thus, there will be no adverse water quality impact.

During the construction of the proposed landscape water pond at the Northern Portion, excavation will be carried out in adjacent to the existing abandoned pond as part of the construction of the landscape water pond (please refer to Section 5.5.1). The location of the existing abandoned pond is shown in **Figure 5-1**. As draining of pond water is not expected and proper temporary drainage system will be constructed to divert surface runoff away from the concerned abandoned pond, significant water quality impact on nearby water bodies is not anticipated. Details of assessment on water quality impact are provided in Section 5.5.1.

During operational period, appropriate drainage system will be provided to collect surface runoff from the Project Site before discharging it into the nearby existing stormwater drains and via which into the NTMDC after passing through sand traps. Thus, significant water quality impact on nearby water bodies during operation of the Project is not anticipated. The sewage generated by the proposed development (incl. residential development, club house, and swimming pool in the South Portion and food and beverage and public toilets in the Northern Portion) is proposed to be discharged into the public sewerage system at Yau Pok Road. Thus, there will be no adverse water quality impact as there will be no discharge of sewage into nearby water bodies during operational phase. Please refer to Section 5.5.2 for details of assessment.

As the concerned Fairview Park Nullah and NTMDC will be the receiver of surface runoff from the Project Site, they are identified to be the existing Water Sensitive Receivers (WSRs) that may be affected by the Project during both construction and operational phase. One small abandoned pond is located in the Northern Portion of the Project Site, which will be converted into a larger landscape pond within the Northern Portion of the Project Site, thus the proposed landscape pond will be the future WSRs. The proposed landscape pond will be self-contained and no pond water discharge is

expected. There are no other known planned WSRs in adjacent that would be affected by this Project.

Within the 500m Assessment Area, there are other key potential water sensitive receivers at off-site locations such as ponds to between Fairview Park and Palm Springs to the further north of the Project Site; ponds near Yau Mei San Tsuen, a watercourse along the southern boundary of Palm Springs. To the further east of NTMDC, there are existing drainage ditches along Ha San Wai Road as well as those along Ha Chuk Yuen Road. The drainage ditches along Ha Chuk Yuen Road are connected to DSD's water storage pond for Chuk Yuen Floodwater Pumping Station, which operates during heavy rainfall. Please refer to **Figure 5-1**. The Deep Bay Water Control Zone, the Ramsar Site and the Mai Po Nature Reserve are also the indirect sensitive receivers but are further away from the Project Site and there will be no discharge to these areas due to this Project, thus they are unlikely affected as they are physically separated from the Project Site and are not connected to the Project Site. As such, these sensitive receivers are not WSRs of this Project and are not considered further.

5.3.3 Baseline Water Quality Survey

Baseline Water Quality Survey in August 2009 and March 2010

Information on baseline water quality at the Project Site and its vicinity water bodies was collected by sampling. Water samples were collected at the identified WSRs that may be affected by the Project (see Section 5.3.2) and tested by a HOKLAS accredited laboratory in August 2009.

Water samples were collected from both the NTMDC and Fairview Park Nullah. Water samples were also collected from the existing abandoned pond in the Northern Portion of the Project Site. The water quality sampling locations (i.e. W1, W3, W4, WE3 and WE1) are shown in **Figure 5-1**, and the results of water quality survey are also provided **Table 5-4**.

General speaking, water quality at the water sampling locations was found to be in poor condition. Based on the test results, lower levels of Dissolved Oxygen (DO), and higher concentrations of ammonia-nitrogen content, SS, BOD_5, COD, and *E. coli* were detected at most of the sampling locations. Other parameters tested were either within the water quality criteria or below the reporting limit.

Further water samplings were also carried out in March 2010. Additional water samples were also collected at Fairview Park Nullah near the Northern Portion of the Project Site (i.e. WE2 shown in **Figure 5-1**). During the sampling in March 2010, the water sampling point at W1 of the NTMDC was not accessible, thus an alternative sampling location further downstream was selected for sampling (i.e. W2 in **Figure 5-1**). Since the sampling location at W2 is adjacent to the original W1 and is also within the NTMDC, it is considered representative to show baseline water quality at NTMDC.

As discussed above, a few parameters were identified to be in poor condition during the first water sampling exercise (i.e. year 2009) such as DO, ammonia-nitrogen, SS, BOD_5, COD, and *E. coli.* Thus, a close monitoring on these selected parameters was conducted during the subsequent water sampling and testing exercise in March 2010. Testing on the key WQO parameters stated in **Table 5-3** were also carried out. Details of test results are shown in **Appendix 5-1**, and the average water quality levels are also depicted in Table 5-5 to present the baseline condition.

Additional Baseline Water Quality Survey between September 2012 and January 2013

In order to establish the baseline water quality at the WSRs with due regard to natural and seasonal variation, further water samplings were carried out during the wet season in September 2012 and October 2012, as well as during the dry season in December 2012 and January 2013. The water sampling locations are shown in **Figure 5-2** and the raw test results are provided in **Appendix 5-2**. During the wet season surveys, water samples were collected from the sampling locations three times per week and for a duration of four consecutive weeks. The water sampling and testing were performed by a HOKLAS accredited laboratory.

According to the test results, water quality at the water sampling locations was found to be in poor condition. It was found that there were lower levels of Dissolved Oxygen (DO), and higher concentrations of ammonia-nitrogen content, SS, BOD_5, COD, and *E. coli* at most of the sampling locations during the wet season surveys. Other parameters tested were either within the water quality criteria or below the reporting limit. The finding on water quality is similar to that conducted earlier in August 2009 and March 2010.

Thus, the above-mentioned parameters were selected for a close monitoring during the subsequent water sampling and testing in the dry season. Testing on the key WQO parameters stated in **Table 5-3** were also carried out in dry season. As no significant variation/particular pattern of water quality was observed during the wet season surveys, water samples in the dry season were collected once per week and for four consecutive weeks. The dry season water quality survey results were found to be similar to that in wet season (i.e. low in DO, but high in ammonia-nitrogen content, SS, BOD_5, COD, and *E. coli).* No specific pattern of natural or seasonal variation was observed.

Table 5-6 and **Table 5-7** summarise this additional baseline water quality survey results during both the wet season and dry season, while the raw data is also provided in **Appendix 5-2**.

Table 5-4 Baseline Water Quality Monitoring Results in August 2009

Parameters	Effluent Discharge Std. (Gp. D)#	WQO #	NTMDC			Fairview Park Nullah	Existing Abandoned Pond Within Project Site
			W1	W3	W4	WE1	WE3
Salinity (ppt)	-	-	0.69	1.84	2.09	0.50	1.49
Water flow (m/s)	-	-	0.02	0.03	0.02	0.06	0.01
Water depth (m)	-	-	1.8	1.9	1.9	1.1	0.3
Water Temperature (°C)	30	-	29.2	30.7	31.8	34.0	32.6
pH Value	6-10	6-9	7.07	7.40	7.67	7.53	8.86
Dissolved Oxygen (mg/L)	-	4	4.56	4.07	2.27	1.21	7.79
Dissolved Oxygen Saturation (%)	-	-	59.60	55.10	31.25	17.10	108.70
Turbidity (NTU)	-	-	13.50	16.05	16.00	15.20	54.30
BOD5 (mg/L)	20	5	2	3	3	26	16
COD (mg O_2/L)	80	30	16	20	24	68	116
Total Phosphorous (mg/L)	5-10	-	0.50	0.50	0.50	2.60	1.10
Ortho-Phosphate (mg/L)	-	-	0.41	0.37	0.40	2.24	0.49
Oil and Grease (mg/L)	10		<5 *	<5 *	<5 *	<5 *	6
Conductivity (mS/cm)	-	-	1310	3240	3670	929	2770
Suspended Solids (mg/L)	30	20	14	18	19	15	81
Total Kjeldahl Nitrogen (mg/L)	-	-	3.9	4.8	5.1	7.5	4.4
Ammonia-nitrogen (mg/L)	10-20	0.021	2.68	3.52	3.80	3.85	0.08
E-coli (count/100 ml)	1,000	1,000	5,400	7,200	6,200	45000	39
F-coli (cfu/100 ml)	-	-	15,000	13,000	8,800	62000	47
Aluminum (mg/L)	-	Waste discharges shall not cause the toxins in water to attain such levels as to produce significant toxic carcinogenic, mutagenic or teratogenic effects in humans, fish or any other aquatic organisms, with due regard to biologically cumulative effects in food chain and to toxicant interactions with each other. Waste discharges shall not cause a risk to any beneficial uses of the aquatic environment	0.25	0.37	0.30	0.04	0.46
Copper (mg/L)	-		<0.01 *	<0.01 *	<0.01 *	<0.01 *	<0.01 *
Chromium (mg/L)	-		<0.01 *	<0.01 *	<0.01 *	<0.01 *	<0.01 *
Lead (mg/L)	-		<0.01 *	<0.01 *	<0.01 *	<0.01 *	<0.01 *
Zinc (mg/L)	-		0.06	0.02	0.03	<0.01 *	0.02 *
Cadmium (mg/L)	0.001-0.1		0.004	<0.002 *	<0.002 *	<0.002 *	<0.002 *
Sulphide as S2-	1	-	<0.2 *	<0.2 *	<0.2 *	<0.2 *	<0.2 *

Parameters	Effluent Discharge Std. (Gp. D)#	WQO #	NTMDC			Fairview Park Nullah	Existing Abandoned Pond Within Project Site
			W1	W3	W4	WE1	WE3
Nitrate as N	20-50 **	-	0.47	0.34	0.29	<0.01 *	<0.01 *
Nitrite as N	20-50 **	-	0.17	0.17	0.16	<0.01 *	<0.01 *

Remark:

* denotes that the measured concentration is below the laboratory's reporting limit.

** Effluent discharge standard for "Nitrate + nitrite nitrogen"

According to the standards stated in Section 5.2.2 above.

All sampling and measurements were undertaken by the laboratory, ALS Technichem (HK) Pty Ltd., in August 2009.

Parameters such as Water Depth, Water Flow Rate, Salinity, Water Temperature, pH Value, Dissolved Oxygen, Dissolved Oxygen Saturation and Turbidity were measured in-situ by using portable meters by the same laboratory.

F. coli stands for Faecal coliforms.

E. coli stands for Escherichia coli.

Table 5-5 Average Baseline Water Quality Monitoring Results in August 2009 and March 2010

Sampling Location / Parameters	Effluent Discharge Std. #	WQO #	NTMDC			Fairview Park Nullah		Existing Abandoned Pond Within Project Site
			W1/W2	W3	W4	WE1	WE2	WE3
Salinity (ppt)	-	-	5.73	6.38	2.09	3.73	2.45	1.5
Water flow (L/s)	-	-	2074.2	5279.1	**	122.6	5.7	**
Water depth (m)	-	-	1.4	1.9	1.9	0.6	0.1	0.3
Water Temperature (°C)	30	-	22.2	22.7	31.82	24.1	17.7	32.6
pH Value	6-10	6-9	7.21	7.21	7.67	7.90	7.41	8.86
Dissolved Oxygen (mg/L)	-	4	3.58	3.10	2.27	5.76	7.57	7.79
Dissolved Oxygen Saturation (%)	-	-	42.7	37.7	31.25	71.57	81.18	108.70
Turbidity (NTU)	-	-	31.5	39.2	16.00	39.73	27.73	54.30
BOD5 (mg/L)	20	5	8	7	3	22	7	16
COD (mg/L)	80	30	20	20	24	97	39	116
Suspended Solids (mg/L)	30	20	34	44	19	68	44	81
Ammonia-nitrogen (mg/L)	10-20	0.021	6.15	6.36	3.80	6.70	1.00	0.08
E-coli (cfu/100 ml)	1,000	1,000	13,800	13,067	6,200	2,846	67,500	39

Remark:

Average levels based on the water sampling in August 2009 and March 2010. Please refer to **Appendix 5-1** for details of the results.

According to the standards stated in Section 5.2.2 above.

The original sampling location at W1 at NTMDC was not accessible during the sampling in March 2010. Thus, an alternative location W2 was selected for sampling.

E. coli stands for Escherichia coli.

** no measurement on flow rate in L/S was undertaken in the survey.

Table 5-6 Average Baseline Water Quality Monitoring Results During Wet Season in September 2012 and October 2012

Parameters	Effluent Discharge Std. (Gp. D)#	WQO #	NTMDC				Fairview Park Nullah		Existing Abandoned Pond Within Project Site
			W1	W2	W3	W4	WE1	WE2	WE3
Salinity (ppt)	-	-	1.1	5.4	5.9	6.3	7.7	8.9	9.5
Water flow (L/s)	-	-	128	269	183	175	<1.0 *	1.8	-
Water depth (m)	-	-	1.0	0.9	1.0	0.9	1.0	0.4	0.2
Water Temperature (°C)	30	-	27.8	27.8	27.1	26.7	26.6	27.2	27.2
pH Value	6-10	6-9	7.4	7.3	7.2	7.2	7.2	7.3	7.3
Dissolved Oxygen (mg/L)	-	4	6.6	4.7	2.9	2.9	2.6	4.0	5.3
Dissolved Oxygen Saturation (%)	-	-	85.2	60.8	38.2	39.0	34.0	52.6	70.9
Turbidity (NTU)	-	-	48	83	146	247	9	20	38
BOD5 (mg/L)	20	5	4	5	5	5	5	4	8
COD (mg O_2/L)	80	30	19	28	33	32	31	34	70
Total Phosphorous (mg/L)	5-10	-	0.5	0.7	0.8	1.1	1.0	1.0	1.5
Reactive-Phosphate (mg/L)	-	-	0.25	0.39	0.45	0.46	0.73	0.72	0.72
Oil and Grease (mg/L)	10		<5 *	<5 *	<5 *	<5 *	<5 *	<5 *	<5 *
Conductivity (mS/cm)	-	-	1998	8099	9003	9347	11827	14029	14382
Suspended Solids (mg/L)	30	20	45	67	82	70	8	17	38
Total Kjeldahl Nitrogen (mg/L)	-	-	3.4	5.2	5.7	5.7	6.4	4.1	4.8
Ammonia-nitrogen (mg/L)	10-20	0.021	1.86	3.35	3.73	3.74	3.73	2.40	1.52
E-coli (count/100 ml)	1,000	1,000	12450	10775	18517	24775	3041	5642	13293
F-coli (cfu/100 ml)	-	-	20042	16675	27950	35400	9601	7998	17020

Parameters	Effluent Discharge Std. (Gp. D)#	WQO #	NTMDC				Fairview Park Nullah		Existing Abandoned Pond Within Project Site
			W1	W2	W3	W4	WE1	WE2	WE3
Aluminum (mg/L)	-	Waste discharges shall not cause the toxins in water to attain such levels as to produce significant toxic carcinogenic, mutagenic or teratogenic effects in humans, fish or any other aquatic organisms, with due regard to biologically cumulative effects in food chain and to toxicant interactions with each other. Waste discharges shall not cause a risk to any beneficial uses of the aquatic environment	0.91	1.31	2.6	4.70	0.08	0.51	0.12
Copper (mg/L)	-		0.007	0.008	0.013	0.023	0.003	0.006	0.004
Chromium (mg/L)	-		<0.01 *	< 0.01 *	0.02	0.04	<0.01 *	<0.01 *	<0.01 *
Lead (mg/L)	-		0.006	0.006	0.010	0.017	<0.001 *	0.004	0.002
Zinc (mg/L)	-		0.07	0.11	0.16	0.24	0.02	0.08	0.03
Cadmium (mg/L)	0.001-0.1		0.0003	0.0003	0.0003	0.0008	<0.0002 *	0.0003	<0.0002 *
Sulphide as S2-	1	-	<0.1 *	<0.1 *	<0.1 *	<0.1 *	<0.1 *	<0.1 *	0.7
Nitrate as N	20-50 **	-	1.88	1.16	1.12	1.15	0.35	0.53	0.14
Nitrite as N	20-50 **	-	0.19	0.31	0.34	0.36	0.16	0.23	0.09

Remark:

* denotes that the measured concentration is below the laboratory's reporting limit.

** Effluent discharge standard for "Nitrate + nitrite nitrogen"

According to the standards stated in Section 5.2.2 above.

All sampling and measurements were undertaken by the laboratory, ALS Technichem (HK) Pty Ltd.

F. coli stands for Faecal coliforms.

E. coli stands for Escherichia coli.

Table 5-7 Average Baseline Water Quality Monitoring Results During Dry Season in December 2012 and January 2013

Parameters	Effluent Discharge Std. (Gp. D)#	WQO #	NTMDC				Fairview Park Nullah		Existing Abandoned Pond Within Project Site
			W1	W2	W3	W4	WE1	WE2	WE3
Salinity (ppt)	-	-	0.5	2.7	5.6	5.9	7.7	5.8	11.1
Water flow (L/s)	-	-	19	78	35	54	<1.0 *	<1.0 *	-
Water depth (m)	-	-	0.3	0.4	0.5	0.5	0.4	<0.1 *	0.1
Water Temperature (°C)	30	-	18.4	17.8	17.1	16.6	17.6	16.9	17.7
pH Value	6-10	6-9	7.3	7.2	7.3	7.3	7.6	7.8	7.5
Dissolved Oxygen (mg/L)	-	4	7.2	4.7	4.0	4.1	4.4	9.1	2.2
Dissolved Oxygen Saturation (%)	-	-	76.7	49.8	42.1	43.0	49.0	97.4	24.2
Turbidity (NTU)	-	-	30	201	149	619	17	6	70
BOD5 (mg/L)	20	5	5	10	9	12	13	3	39
COD (mg O_2/L)	80	30	16	36	39	80	33	21	168
Oil and Grease (mg/L)	10		<5 *	<5 *	<5 *	<5 *	<5 *	<5 *	<5 *
Suspended Solids (mg/L)	30	20	33	105	138	323	23	8	80
Total Kjeldahl Nitrogen (mg/L)	-	-	3.2	6.0	7.0	8.8	6.4	2.8	7.8
Ammonia-nitrogen (mg/L)	10-20	0.021	2.04	3.92	5.54	5.28	3.95	1.44	2.59
E-coli (count/100 ml)	1,000	1,000	11525	26550	51000	54000	23660	3873	1365
Nitrate as N	20-50 **	-	2.72	2.10	1.56	1.52	0.38	1.31	0.03
Nitrite as N	20-50 **	-	0.12	0.15	0.25	0.28	0.17	0.46	0.03

Remark:

* denotes that the measured concentration is below the laboratory's reporting limit.

** Effluent discharge standard for "Nitrate + nitrite nitrogen"

According to the standards stated in Section 5.2.2 above.

All sampling and measurements were undertaken by the laboratory, ALS Technichem (HK) Pty Ltd.

E. coli stands for Escherichia coli.

In addition to the water sampling, there is also an EPD's river water quality monitoring station at downstream location at Fairview Park Nullah. The Fairview Park Nullah is an engineering channel within the Fairview Park residential development to the west of the Project Site. Data of key water quality parameters measured at that station during year 2007 and year 2012 by EPD[4] was also summarised in **Table 5-8** for reference.

Table 5-8 Summary of River Water Quality at Nearby Fairview Park Nullah in the Deep Bay Water Control Zone between 2007 and 2012 by EPD

Parameters	*WQO	2007	2008	2009	2010	2011	2012
pH	6.0-9.0	7.7 (7.2-9.3)	7.4 (6.8-9.3)	7.8 (7.3-8.9)	7.8 (7.2–9.0)	7.8 (7.1-8.9)	7.5 (7.3-8.5)
BOD_5 (mg/L)	≤ 5	15 (4-21)	8 (3-19)	8 (4 – 26)	11 (3 - 37)	11 (4-20)	5 (3-14)
COD (mg/L)	≤ 30	40 (13-70)	30 (16-51)	33 (18 – 87)	28 (16 – 61)	30 (13-46)	22 (12-54)
SS (mg/L)	≤ 20	36 (16-62)	30 (6-64)	36 (14-64)	40 (11–150)	29 (6-49)	26 (11-56)
DO (mg/L)	≥ 4	7.7 (3.2-17.7)	6.7 (3.9-12.9)	7.3 (2.1-18.6)	7.5 (3.5-15.1)	9.2 (3.9-17.2)	5.5 (3.8-11.7)
E. coli) (count/100 ml)	≤ 1000	44,000 (2,200-900,000)	16,000 (2,200-75,000)	23,000 (4,400-1,000,000)	31,000 (4,600-220,000)	18,000 (4,200-97,000)	16,000 (2,800-330,000)
Ammonia-nitrogen (mg/L)	Annual average ≤0.021	4.35 (1.70-7.90)	3.45 (0.27-6.80)	2.90 (0.80-7.20)	4.30 (1.40-6.70)	4.55 (0.74-5.60)	4.15 (2.30-6.60)
Nitrate-nitrogen (mg/L)	--	0.52 (0.16-2.10)	1.10 (0.40-3.50)	0.45 (<0.01-1.20)	0.52 (0.31-0.89)	0.56 (0.10-1.00)	0.96 (0.35-1.30)
Total Kjeldahl nitrogen (mg/L)	-	6.90 (3.10-12.00)	5.35 (1.60-8.20)	5.70 (1.80-8.30)	6.10 (5.10-8.80)	6.15 (4.00-11.00)	5.85 (3.30-7.80)
Oil & grease (mg/L)	-	0.7 (0.5-1.7)	0.9 (<0.5-6.8)	<0.5 (<0.5-0.9)	<0.5 (<0.5-2.4)	0.7 (<0.5-2.0)	<0.5 (<0.5-0.7)
Aluminum (µg/L)	Waste discharges shall not cause the toxins in water to attain such levels as to produce significant toxic carcinogenic, mutagenic or teratogenic effects in humans, fish or any other aquatic organisms, with due regard to biologically cumulative effects in food chain and to toxicant interactions with each other. Waste discharges	170 (110-420)	225 (<50-350)	255 (160-610)	285 (100-750)	170 (60-400)	240 (110-470)
Cadmium (µg/L)		0.1 (0.1-0.1)	<0.1 (<0.1-0.2)	<0.1 (<0.1-0.1)	<0.1 (<0.1-0.3)	<0.1 (<0.1-<0.1)	<0.1 (<0.1-<0.1)
Chromium (µg/L)		1 (1-1)	1 (<1-2)	<1 (<1-2)	1 (<1-3)	<1 (<1-2)	1 (<1-3)
Copper (µg/L)		3 (2-6)	5 (3-27)	4 (3-8)	5 (2-17)	3 (2-5)	3 (2-7)
Lead (µg/L)		2 (1-7)	3 (<1-15)	4 (2-5)	4 (1-14)	2 (<1-4)	2 (1-7)
Zinc (µg/L)		30 (20-100)	45 (10-120)	45 (20-100)	35 (20-110)	35 (20-170)	30 (10-120)

4 River Water Quality In Hong Kong (various years), HKSAR Government Environmental Protection Department.

Parameters	*WQO	2007	2008	2009	2010	2011	2012
	shall not cause a risk to any beneficial uses of the aquatic environment.						

Remark: Data presented is based on River Water Quality in Hong Kong (various years), published by EPD.

Figures in brackets are annual ranges.

E. coli stands for Escherichia coli.

5.3.4 Summary of Baseline Water Quality within the Assessment Area

General speaking, water quality at the water sampling locations was found to be in poor condition. Based on the test results, water quality at NTMDC is generally poor. Based on the test results, lower levels of Dissolved Oxygen (DO), and higher concentrations of ammonia-nitrogen content, SS, BOD_5, COD, and *E. coli* were detected at most of the sampling locations .

According to the water quality data collected by EPD at Fairview Park Nullah (**Table 5-8** refers), the level of compliance of relevant river water quality objectives at the nullah, was generally low in the past few years. General speaking, the recorded levels of BOD_5, COD, SS, Ammonia-nitrogen, and E.coli had exceeded the WQOs. However, the river water quality in the Fairview Park Nullah is gradually improving over years.

Overall, pollution of the major rivers in the Northwest New Territories was still serious because of the remaining livestock farms and unsewered villages in the area. However, with the continued implementation of the Voluntary Surrender of Poultry and Pig Farm Licence Schemes, livestock waste pollution in the rivers should reduce significantly. The North District Sewerage Master Plan and Yuen Long & Kam Tin Sewerage Master Plan have included plans to provide public sewers to most of the unsewered villages, and the river water quality in the Northwest New Territories should gradually improve as these schemes are implemented (EPD 2009[5]).

It shall be noted that there will be no discharge of sewage due to the Project during operation as sewage generated will be discharged into the public sewerage system at Yau Pok Road. Thus, the nearby water bodies will not be affected due to discharge. Currently surface runoff from the Project Site will be discharged into the nearby existing drainage channels. There will be no additional discharge during the operation and the collected surface runoff from the Project Site will be discharged into nearby existing public stormwater drains after passing through sand traps. Thus, it is expected that there will be no significant water quality impact on nearby water bodies during operation of the Project.

5.4 Identification of Impacts

5.4.1 Existing Activities

During heavy rainfall, overflow of the nearby drainage channels and surface runoff carrying sediment laden could occur.

Livestock farms and unsewered village upstream of Ngau Tam Mei Drainage Channel generate particulates, BOD_5 and other pollutants, which result in poor water quality in the Inner Deep Bay area.

5 River Water Quality in Hong Kong in 2009, HKSAR Government Environmental Protection Department.

5.4.2 Planned Activities during Construction Phase

Construction of the Project includes site formation, superstructure works and construction of other associated facilities for the residential development. A landscape water pond and some passive recreational uses and supporting facilities will be provided in the Northern Portion of the Project Site. There is one small abandoned pond located in the Northern Portion of the Project Site (**Figure 9-1** refers) where the landscape water pond is proposed.

If not properly controlled, the stormwater runoff from construction site may bring along pollutants (e.g. sediment laden) and pollute the nearby water bodies depending upon the topography. Superstructure works are typical of many building construction works, which would generate insignificant impact on water quality.

Particulates as well as effluent, liquid spillage and the like will be generated during the construction works. Pollutants can runoff to nearby water bodies as non-point discharge if not properly controlled. Major potential sources of water pollution during the construction may include the followings:

- Runoff of sediment laden from exposed soil surface;
- Runoff from stockpiling area;
- Fuels and lubricants from machinery and trucks;
- Liquid spillage such as chemical, oil, diesel, and solvent; and
- General waste material;

Water pollution due to site facilities such as toilets could also be a source of pollution if appropriate measures are not implemented properly during construction in respect of storage and discharge.

Additional impacts would also arise from runoff that is contaminated by chemical, oil, diesel, lubricant, and solvent, etc. due to spillage or improper disposal. The implementation of Best Management Practices (BMPs) by the contractor during the project period is therefore important to control the release of these wastes. In addition, wastewater could also be generated from other phases of works such as site clearance, site preparation and completion of road construction.

5.4.3 Planned Activities During Operational Phase

5.4.3.1 Residential Development

The proposed residential development is remote from Mai Po Marshes and is physically separated by the existing Fairview Park. Thus, it has no direct disturbance to this natural habitat.

During the operational stage, the sewage generated by the proposed development (including residential development, club house and swimming pool in the Southern Portion as well as the food and beverage and public toilets in the Northern Portion of the Project Site) will be discharged to the public sewerage system at Yau Pok Road. A discharge licence under the WPCO will be applied and the discharge shall comply with the terms and conditions of the licence. There will be no population in-take of this Project until commissioning of the public sewerage system. Future management and maintenance issues will be further discussed with DSD. Details of the above are also discussed in **Chapter 6** of this report.

In addition, drainage system will be provided for the formed and paved road/areas in the proposed development to drain stormwater runoff into the NTMDC. Sand traps will also be provided at the discharge point before discharge.

5.4.3.2 Operation of the Passive Recreational Uses and Supporting Facilities

The maintenance during operation is mainly control of vegetation grown in the landscape pond and general maintenance works of the passive recreational and supporting facilities. The concerned

maintenance will not generate significant amount of wastewater or alter the surface material types, thus it would not generate any significant impact on water quality.

During operation, the landscape pond will be self-contained and pond water will not be discharged to the surrounding (see Section 5.6.2).

5.4.4 Identification of Alteration of Water Systems Arising from the Project

5.4.4.1 Natural/ Artificial Watercourse

There will be no alteration of any natural watercourse arising from implementation of the Project. Therefore, there will be no impact on natural water course.

5.5 Water Quality Impact Assessment Results

5.5.1 Possible Impact during the Construction of the Project

The major impacts due to construction works of this Project are surface runoff within the construction site and soil erosion due to exposed surfaces. As temporary drains, peripheral site drainage, sedimentation basins, sand traps and similar facilities will be provided during the construction works as per good practices, it is anticipated that the finally discharged water quality can comply with relevant criteria. Good practices to be adopted during construction phase are provided in Section 5.6.

Despite surface runoff from the Project Site is currently discharged into two nearby engineered channels, namely Fairview Park Nullah and NTMDC; during construction period, appropriate peripheral drainage system will be constructed within the site to divert surface runoff from the construction site away from the nearby Fairview Park Nullah, into the NTMDC only. To minimize impact on water quality, temporary drains, sedimentation basins, sand traps and similar facilities will be provided during the construction works in accordance with the Practice Notes for Professional Persons on “Construction Site Drainage” (ProPECC PN 1/94). Collected and treated surface runoff will be discharged into existing stormwater drains nearby Yau Pok Road and via which into the NTMDC following the existing flow regime. Together with the adoption of proposed good practices on-site in Section 5.6.1, adverse water quality impact is not expected. An indicative peripheral drainage system, which is subject to detailed design, is shown in **Figure 5-5**. The Contractor shall apply for a discharge licence under the WPCO and the discharge shall comply with the terms and conditions of the licence. Discharge of surface runoff from the Project Site should not be significant and is negligible when compared with the capacity of the channel (over 500 m^3/s for the trained NTMDC). Thus there will be no adverse water quality impact as a result.

As discussed in Section 5.3.2, there is one small abandoned pond located in the Northern Portion of the Project Site. The concerned water pond is shallow in depth and almost in drought condition, which will eventually dry out during the dry season. As a landscape water pond is also proposed at the same location where the abandoned pond is located and the bottom level of pond before and after the construction is about the same (~2mPD), no dredging of sediment or pond filling activities will be required at this location. Excavation will only be carried out in adjacent to the existing abandoned pond. Proper temporary drainage system will be constructed to divert surface runoff away from the concerned abandoned pond and discharge it to the nearby existing storm drains nearby Yau Pok Road into the NTMDC through sand traps. Thus, no adverse impact is expected. Site formation works near the existing pond can be arranged to be carried out during dry season as far as possible, and where necessary water at the existing abandoned pond can be temporarily drained to the nearby newly constructed pond. Thus, draining of pond water is not expected.

As discussed in Section 7.3, there is no historic and / or existing land uses at the Project Site that would result in potential contaminatation of soil and underground water, thus land contamination at the Project Site is not expected. As such, contaminated underground water is not anticipated at the Project Site.

5.5.2 Possible Impact during the Operation of the Project

Foul water will be discharged into the public sewers and would present no adverse impact. As the sewage generated from the Project will be properly collected and disposed of to planned public sewers, there will be no net increase in pollution loading to Deep Bay. The discharge requirement of the Project and the capacity of the sewerage system have been evaluated in **Chapter 6** of this report. The sewage generated by the proposed development (including residential development, club house, and swimming pool in the Southern Portion as well as the food and beverage and public toilets in the Northern Portion of the Project Site) is proposed to be discharged into the public sewerage system at Yau Pok Road. The discharge from the club house and swimming pool in the Southern Portion as well as the food and beverage and public toilets in the Northern Portion of the Project Site shall apply for a discharge licence under the WPCO, and the discharge shall comply with the terms and conditions of a licence as well as the standards for effluents specified in the TM-Effluents. Thus, there will be no discharge of sewage into nearby waterbodies during operational phase and no adverse impact is anticipated. Surface runoff from the proposed development will be drained to sand traps. The drainage outlet of the indoor car parks will be connected to foul sewers via oil interceptors or similar facilities.

With regard to the existing stormwater drainage condition before the proposed development, the Site is generally low-lying unpaved land at about +2mPD to about +4mPD, together with a paved area for open carpark at the southern end. The west end of the Site is bounded by a nullah which drains to the northwest through Fairview Park. A few short sections of existing drainage ditches are located at the Southern Portion of the Project Site, which collect surface runoff from the Project Site only and discharge it to the Fairview Park Nullah nearby. The concerned drainage ditch within the Project Site will be removed, however, appropriate new drainage system will be provided within the proposed residential development to collect surface runoff. Thus, no adverse water quality impact due to removal of the existing drainage channels is expected. The east end of the Site is bounded by Yau Pok Road, most of which is formed by embankment at +4.5mPD to +6.5mPD. There are also stormwater u-channels along roadside of Yau Pok Road with outfalls connected to the NTMDC. Thus, surface runoff within the Project Site is currently discharged into Fairview Park Nullah and the NTMDC. No flooding blackspot is located in the vicinity according to the information published by DSD.

The NTMDC is constructed by Drainage Services Department with a 200-year design return period to cater for the urbanization of the ultimate development scenario alongside. Stormwater in the roadside channel of Yau Pok Road is discharged into NTMDC through 450mm diameter pipes, installed with flap valves at the outfalls, across Yau Pok Road as shown in **Figure 5-3**.

The Project Site will have a mean site formation level of about +5.4mPD as a protection measure against flooding. Although the internal surface runoff may be increased due to additional paved area of the development, given the scale of this Project (for small house development) and that the net increase in surface runoff is negligible when compared with the capacity of NTMDC (over 500m^3/s), the increase in pollution loading due to the development is insignificant. Thus, there will be no adverse water quality impact due to the discharge. In addition, appropriate drainage system will be provided for the developable area and paved road/areas to collect stormwater runoff. Collected surface runoff will be discharged into existing stormwater drains nearby Yau Pok Raod through facilities such as sand traps and via which into the existing NTMDC (i.e. following the existing flow regime), which is designed to collect surface runoff. The proposed schematic drainage system is shown in **Figure 5-4**. Oil interceptor will also be provided to collect any grease and oil generated from car park and similar facilities. Moreover, regular cleaning and sweeping of the access road and other paved areas is suggested in order to minimize exposure of pollutants to stormwater. Stormwater gullies and ditches provided will also be regularly inspected and cleaned. With the proposed facilities and regular cleaning and removal of pollutants in the drainage system, the pollution levels from stormwater would be greatly reduced and minimized, thus there will be no increase in pollution loading to Deep Bay. The above measures are also summarised in Section 5.6.2.

For the existing channels within the Project Site, as mentioned above, are not receiving the runoff from the external area, therefore the removal of these channels will not affect the flow regime of the surrounding. New drainage channels and pipes will be provided surrounding the Project Site in order to replace the existing drainage channel (**Figure 5-4** refer), as such, there will be no adverse water quality impact arising. The roadside channel along Yau Pok Road will be retained and realigned as necessary to maintain the original flow path. Therefore, there will be no flooding or hydrology issue arising from the proposed development, nor any significant water quality impact on nearby water bodies during operation of the Project, is anticipated.

The proposed landscape pond has been designed so that water contained in the pond will be self-contained, and there is no outlet connecting to nearby channel/inland water. The concerned landscape pond will be water sealed so that there is no seepage of water into underground. During operation, pond water will be contained within the pond and there will be no discharge from the pond. Surface runoff from the adjacent area will be diverted away from the pond area by drainage channels in order to avoid overflow of the pond under extreme weather condition (e.g. heavy rainfall). There will be no chemicals/ pesticides to be applied during operation. Thus, no adverse water quality impact is anticipated.

Thus, adverse impact on WSRs due to operation of the Project is not expected. Drainage plan will be submitted to DSD and BD for approval during detailed design stage.

5.5.3 Potential Impacts Due to Concurrent Construction of Adjacent Approved EIA Projects

As discussed in Section 1.9, potential concurrent projects have been identified. There are two approved EIA projects in adjacent to the Project Site.

According to the approved EIA report, namely the "EIA and TIA Studies for the Stage 2 of PWP Item No. 215DS - Yuen Long and Kam Tin Sewerage and Sewage Disposal[2]", a sewage pumping station (SPS) (Ngau Tam Mei SPS), has been proposed at an offsite location about 345m northeast of the Project Site. Under the same project (current PWP Item 4235DS), a gravity trunk sewer will be constructed along Castle Peak Road between Ngau Tam Mei and San Tin, and a section of alignment will be constructed along the Ngau Tam Mei Channel in adjacent to this development Project. The location of the proposed sewage pumping station and the public sewers are also shown in **Figure 1-2**.

The construction of the above sewerage project has been assessed in the above-mentioned EIA report. Currently, there is no solid construction programme of the said sewage pumping system and the public sewers. According to the EIA report of the concerned sewerage project (Section 10.6 of the concerned EIA report refers), potential water quality impacts of the sewerage works could arise as a result of sediment laden carried by surface runoff and water pollution due to site facilities such as toilets.

The EIA report has stated that all the construction works will be carried out in small sections within a short period of time. It has also recommended in the same report that the construction works will be carried out in 50m segments (Section 8.5 of the same EIA report refers). Thus, the exposed surface in any one time that may carry sediment laden will be very small and controllable during the construction phase. In addition, the construction programme of that Project will also be arranged to minimize surface excavation during rainy seasons. Furthermore, various practicable mitigation measures have also been proposed in that EIA report to prevent the transportation of sediment laden away from the works area (section 10.6.2 of the same EIA report refers). The contractor is also obliged to follow the procedures and requirements given in the Practice Notes for Professional Persons on "Construction Site Drainage" (ProPECC PN 1/94). Efficient silt removal facilities will be installed, and channels, earth bunds or sand bag barriers will be installed to divert stormwater to silt removal facilities. For construction workforce sewage, portable chemical toilets or sewage holding tanks will be provided. With the proposed mitigation measures, impacts on the nearby water environment are not anticipated. Most importantly, respective project specific Environmental

Monitoring and Audit (EM&A) programme will be implemented for the sewerage project to ensure and review the effectiveness of the mitigation measures implemented.

Similarly, based on the information in a separate EIA report for "Construction of Cycle Tracks and the Associated Supporting Facilities From Sha Po Tsuen to Shek Sheung River" (EIA Application No. EIA-159/2008), a cycle track will also be provided along the Castle Peak Road and the Yau Pok Road as part of the cycle track project between Tuen Mun and Sheung Shui under PWP Item 7259RS.

According to the concerned cycle track EIA report, the identified primary potential impacts to water quality of the project will be from pollutants in site run-off (suspended solids). Measures have been proposed in that EIA to control/ prevent impacts to the water sensitive receivers (e.g. Sections 6.5 and 6.6 of the cycle track EIA report). In particular, the contractor is also obliged to follow the procedures and requirements given in the Practice Notes for Professional Persons on "Construction Site Drainage" (ProPECC PN 1/94). Surface run-off from the construction sites will be directed into storm drains via adequately designed wastewater treatment facilities such as sand traps, silt traps and sediment settling basins. Wastewater from temporary site facilities (such as toilets) will be discharged to foul sewer or chemical toilets will be provided.

In addition, according to the concerned EIA report, the cycle track project will be constructed in sections. Typically, the working area will be 40 m long by 4 m wide and no adjacent sections (200m between two neighbouring sections) will be constructed simultaneously. Thus, the exposed surface that may carry sediment laden will be very small and controllable during the construction phase. With the proposed control measures, stormwater runoff will be adequately controlled and the project will not cause unacceptable impact. Most importantly, respective project specific Environmental Monitoring and Audit (EM&A) programme will be implemented for the sewerage project to ensure and review the effectiveness of the mitigation measures implemented.

Given that the concerned construction works of the two approved EIA projects are relatively small in scale (i.e. laying sewers along existing road, and construction of a cycle track), and the construction will only be carried out in small sections (less than 50m for the public sewers, and 40m for the cycle track) with appropriate mitigation measures in place, the cumulative impact of runoff and polluting discharges from this Project will be controlled through implementation measures described in this report and those committed for the other projects. Thus, adverse cumulative water quality impacts due to concurrent construction works are not expected.

5.5.4 Potential Impacts Due to Concurrent Construction of the Nearby Planned Development Projects

As discussed in Section 1.9, there are two planned private residential development projects in adjacent to the Project Site that has been identified to overlap with this Project. They are:-

- Proposed Residential Development within "Residential (Group D)" zone at various lots in DD 104, Yuen Long, N.T. (Study Brief No. ESB - 204/2009) (hereinafter referred to as the "RD Site");

- Proposed Low-rise and Low-density Residential Development at Various Lots and their Adjoining Government Land in D.D. 104, East of Kam Pok Road, Mai Po, Yuen Long, N.T. (Study Brief No. ESB - 210/2009) (hereinafter referred to as the "Kam Pok Road Site"); and

The location of the concerned planned development sites are also shown in **Figure 1-2**. All of these concerned planned development projects will be subject to EIA study. According to the Study Brief issued for these projects, the nature of these development projects will be similar to this Project (i.e. for residential development).

Since all of these planned development projects are land-based development, their potential water quality impacts will be similar to this Project (i.e. surface runoff with sediment laden, sewage generated from construction workforce, etc. during construction; and discharge of surface runoff and

domestic sewage during operation). With the implementation of appropriate mitigation measures such as those stipulated in ProPECC PN 1/94 and proper design of drainage system, no adverse water quality impact or the respective cumulative impact from these EIA projects is anticipated. In addition, since appropriate Environmental Monitoring and Audit (EM&A) programme will need to be implemented to closely monitor the effectiveness of the proposed mitigation in accordance with the EP conditions of the respective EIA projects, cumulative impact of runoff and polluting discharges from these projects will be properly controlled. Thus, adverse cumulative water quality impacts due to concurrent construction works of these projects are not expected.

5.6 Summary of Mitigation Measures

5.6.1 Construction Phase Mitigation Measures

The following measures are proposed and also summarisd in Chapter 14 of this EIA.

Control of potential water quality impact arising from the construction works shall be affected based on the following principles:

- Minimisation of runoff;
- Prevention or minimisation of the likelihood of the identified pollutants being in contact with rainfall or runoff; and
- Measures to abate pollutants in the stormwater runoff.

During the construction of the landscape water pond in the Northern Portion of the Project Site, proper temporary drainage system (e.g. following those in the Practice Notes for Professional Persons on “Construction Site Drainage” (ProPECC PN 1/94)) shall be constructed to divert surface runoff away from the existing abandoned pond for discharge into the Fairview Nullah or NTMDC through sand traps.

Site formation works near the existing abandoned pond should be carried out during dry season as far as possible. Water contained at the existing abandoned pond shall be temporarily drained to the newly constructed pond.

Besides, Best Management Practices (BMPs) given in the ProPECC PN 1/94 shall be implemented in controlling water pollution during the whole construction phase. The main practices provided in the above-mentioned document (i.e. ProPECC PN 1/94) are also summarized in the following paragraphs which should be implemented by the contractor during the execution of the site formation and road works, where practicable.

5.6.1.1 Runoff from Construction Site

- High loading of suspended solids (SS) in construction site runoff shall be prevented through proper site management by the contractor;
- The boundary of critical work areas shall be surrounded by ditches or embankment. Accidental release of soil or refuse into the adjoining land should be prevented by the provision of site hoarding or earth bunds, etc. at the site boundary. These facilities should be constructed in advance of site formation works and roadworks;
- Consideration should be given to plan construction activities to allow the use of natural topography of the Project Site as a barrier to minimize uncontrolled non-point source discharge of construction site runoff;

- Temporary ditches, earth bunds should be provided to facilitate directed and controlled discharge of runoff into storm drains via sand/ silt removal facilities such as sand traps, silt traps and sediment retention basin. Oil and grease removal facilities should also be provided where appropriate, for example, in area near plant workshop/ maintenance areas;

- Sand and silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly by the contractor, and at the onset of and after each rainstorm to ensure that these facilities area functioning properly;

- Slope exposure should be minimized where practicable especially during the wet season. Exposed soil surfaces should be protected from rainfall through covering temporarily exposed slope surfaces or stockpiles with tarpaulin or the like;

- Haul roads should be protected by crushed rock, gravel or other granular materials to minimize discharge of contaminated runoff;

- Slow down water run-off flowing across exposed soil surfaces;

- Plant workshop/ maintenance areas should be bunded and constructed on a hard standing. Sediment traps and oil interceptors should be provided at appropriate locations;

- Manholes (including newly constructed ones) should be adequately covered or temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system;

- Construction works should be programmed to minimize soil excavation works where practicable during rainy conditions;

- Chemical stores should be contained (bunded) to prevent any spills from contact with water bodies. All fuel tanks and/ or storage areas should be provided with locks and be sited on hard surface;

- Chemical waste arising from the Project Site should be properly stored, handled, treated and disposed of in compliance with the requirements stipulated under the Waste Disposal (Chemical Waste) (General) Regulation;

- Drainage facilities must be adequate for the controlled release of storm flows;

- Appropriate peripheral drainage system shall be constructed along the Project Site boundary to divert away surface runoff in accordance with requirements stipulated in ProPECC PN 1/94 to collect surface runoff and discharge it into the nearby existing stormwater drains nearby roadside of Yau Pok Road, and via which into the existing NTMDC;

- Temporary drains, sedimentation basins, sand traps and similar facilities shall be provided during the construction works in accordance with the ProPECC PN 1/94; and

- The Contractor shall apply for a discharge licence under the WPCO and the discharge shall comply with the terms and conditions of the licence.

5.6.1.2 Wastewater from Construction Site

- Sewage generated from the construction workforce should be contained in chemical toilets before connection to public foul sewer becomes available. Chemical toilets should be provided at a minimum rate of about 1 per 50 workers. The facility should be serviced and cleaned by a specialist contractor at regular intervals;

- Vehicle wheel washing facilities should be provided at the site exit such that mud, debris, etc. deposited onto the vehicle wheels or body can be washed off before the vehicles are leaving the site area;

- Section of the road between the wheel washing bay and the public road should be paved with backfill to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains;

- Although use of bentonite in diaphragm wall and bore-pile construction is not expected, in case bentonite slurries is generated it should be reconditioned and reused as far as practicable. Spent bentonite should be kept in a separate slurry collection system for disposal at a marine spoil grounds subject to obtaining a marine dumping licence from EPD. If used bentonite slurry is to be disposed of through public drainage system, it should be treated to meet the respective applicable effluent standards for discharges into sewers, storm drains or the receiving waters.

5.6.1.3 Oils and Solvents

- Spillage of fuel oils or other polluting fluids should be prevented at source. It is recommended that all stocks should be stored inside proper containers and sited on sealed areas, preferably surrounded by bunds.

5.6.2 Operational Phase Mitigation Measures

The following measures are proposed and also summarisd in Chapter 14 of this EIA.

5.6.2.1 Residential and Passive Recreational Development

During the operation of the Project, all domestic sewage generated shall be discharged to the public sewerage at Yau Pok Road as the Project will not have population intake until the commissioning of the planned local public sewerage works. Details are provided in **Chapter 6** of this EIA Report.

The sewage generated by the club house and swimming pool in the Southern Portion as well as the food and beverage and public toilets in the Northern Portion of the Project Site is proposed to be discharged into the public sewerage system at Yau Pok Road. The discharge from these facilities is subject to issuance of a discharge licence under the WPCO, and the discharge shall comply with the terms and conditions of a licence as well as the standards for effluents specified in the TM-Effluents.

The drainage system shall be designed to avoid any case of flooding with provision of sand traps. The proposed schematic drainage system is shown in **Figure 5-4**. The proposed new drainage channels and pipes surrounding the Project Site shall collect surface runoff within the Site for direct discharge into the existing stormwater drains nearby Yau Pok Road and via which into Ngau Tam Mei Drainage Channel after passing through sand traps. The drainage outlet of the indoor car parks shall be connected to foul sewers via oil interceptors or similar facilities.

Regular cleaning and sweeping of the access road and other paved areas are suggested so as to minimize exposure of pollutants to stormwater. Stormwater gullies and ditches provided among the residential development will be regularly inspected to ensure these facilities function properly.

Soft landscaping will be provided around the residential development where practicable. In the event of emergency (e.g. car accident) where there is a major spillage of oil, chemical or fuel, dispersants or firefighting foam, etc., a system of contaminant bunding is recommended as far as practicable.

5.6.2.2 Proposed Landscape Pond

Water in the proposed landscape pond shall be self-contained with no outlet connecting to nearby channel/inland water. The concerned landscape pond will be water sealed so that there is no

seepage of water into underground. During operation, pond water will be contained within the pond and there shall be no discharge from the pond. Surface runoff from the adjacent area shall be diverted away from the pond area by drainage channels in order to avoid overflow of the pond under extreme weather condition (e.g. heavy rainfall). There will be no chemicals/ pesticides to be applied during operation. With these measures, no adverse impact on water quality is expected.

5.7 Environmental Monitoring and Audit

The water quality assessment in the EIA indicated that no adverse impacts on water quality would be expected from the construction phase, with proper implementation of the recommended environmental mitigation measures. However, in order to ensure proper implementation of mitigation measures, regular water quality monitoring and site auditing programme is proposed to ensure the effectiveness of the recommended mitigation measures. The monitoring and audit details are given in the EM&A Manual.

5.8 Conclusion

5.8.1 Summary of Impact Due to the Project

The major impact during construction works of this Project is surface runoff and soil erosion due to exposed surfaces. Peripheral drainage is proposed to divert surface runoff from the construction site away from the nearby Fairview Park Nullah, into the NTMDC only. Temporary drains, sedimentation basins, sand traps and similar facilities shall be provided during the construction works in accordance with the ProPECC PN 1/94. Collected and treated surface runoff will be discharged into existing stormwater drains nearby Yau Pok Road and via which into the NTMDC following the existing flow regime. With the adoption of proposed good practices on-site, adverse water quality impact is not expected. The Contractor shall apply for a discharge licence under the WPCO and the discharge shall comply with the terms and conditions of the licence.

The proposed landscape pond is self-contained and there will be no discharge from the pond. The concerned landscape pond will be water sealed so that there is no seepage of water into underground. Surface runoff from the adjacent area will be diverted away from the pond area by drainage channels. There will be no chemicals/ pesticides to be applied during operation.

During operation, no sewage from the proposed development will be discharged into nearby NTMDS as the Project will not have population intake until the commissioning of the planned local public sewerage works. The sewage generated by the proposed development (including residential development, club house, and swimming pool in the Southern Portion as well as the food and beverage and public toilets in the Northern Portion of the Project Site) will be discharged into the public sewerage system at Yau Pok Road. The discharge from club house and swimming pool in the Southern Portion as well as the food and beverage and public toilets in the Northern Portion of the Project Site shall apply for a discharge licence under the WPCO, and the discharge shall comply with the terms and conditions of a licence as well as the standards for effluents specified in the TM-Effluents.

Surface runoff will be discharged to the NTMDS if considered necessary, for instance during or after rainstorm. Pollutants, if any, is pre-treated and settled before discharge. There will be no direct influence to the water quality in the Deep Bay.

5.8.2 Cumulative Impacts

Potential cumulative impacts due to concurrent construction of nearby approved EIA projects as well as planned development sites have been assessed. Since both the projects will implement its own mitigation measures to ensure the discharge from construction site can comply with the relevant WQOs, it is expected that there will not be any unacceptable cumulative construction phase water quality impact.

Thus, no adverse cumulative impact during operational phase of the Project is expected.

5.8.3 Residual Impacts

All sewage generated from the development will be discharged to the public sewerage during operational phase as the Project will not have population intake until the commissioning of the planned local public sewerage works. Mitigation measures and best practices to control water quality during construction phase have been recommended. No adverse residual impact is anticipated during the construction and/ or operation of the Project.

6. SEWERAGE AND SEWAGE TREATMENT

6.1 Summary

The proposed development includes a number of houses (106 nos.) at the southern part of the Site. Apart from the residential houses, a landscaped open area, landscape pond and some passive recreational uses and supporting facilities, e.g. Food & Beverage (F&B) and public toilet, are proposed at the northern part of the Site. The general layout of the development is shown in **Figure 6-1**.

There is currently limited existing public sewerage system in vicinity of the Project Site as shown in **Figure 6-2.** Nam Sang Wai Pumping Station and the associated connection to Yuen Long Sewage Treatment Works (YLSTW) have already been completed in 2010 by Drainage Services Department (DSD) under PWP No. 4215DS, Yuen Long and Kam Tin Sewerage and Sewage Disposal – Kam Tin Trunk Sewerage Stage 1 and Au Tau Trunk Sewers. Meanwhile, the proposed Ngau Tam Mei Trunk Sewerage is being designed by DSD under PWP No. 4235DS. The implementation of the proposed sewerage project hinges on the availability of funding and support from local communities (such as Rural Committee and District Council).

6.2 Assessment Methodology and Assumptions

Capacity analysis of the sewage pipe, pumping station and sewage treatment plant was carried out to assess the adequacy of the proposed sewerage system. The design assumption and basis are shown in **Table 6-1**.

Table 6-1 Design Assumption and Basis

Design Standard	DSD Sewerage Design Manual, Part 1& 2
Flow Formula Used	Colebrook White Formula
Roughness Assumed, Ks	1.5mm
Unit Flow Factor	EPD Guideline for Estimating Sewage Flows for Sewage Infrastructure Planning: 0.37 m^3/day/head (Domestic, housing type specific for Private), 0.28 m^3/day/head ("Commercial Employee" plus "Community, Social & Personal Services") 1.58 m^3/day/head ("Commercial Employee" plus "Restaurants & Hotels") Assumption : 0.025m^3/day/head (Visitor to public toilet)
Backwash of swimming pool	6 litre/s or 10.8m^3/day for a daily operation of 30 minutes

6.3 Estimate of Sewage Flow

The estimated population and additional sewage flow from the Project Site are shown **Table 6-2**.

Table 6-2 Estimated Sewage Flow from Project Site

Population Type	No. of Population	Unit Flow Factor (m^3/d)	Dry Weather Flow (m^3/d)	Dry Weather Flow (l/s)
Southern Part:				
Residential [1]	287	0.37	106	1.229
Employee of Ancillary Recreational Activities (e.g. residents' club house)	27	0.28	8	0.088
Employee of F&B	12	1.58	19	0.219
Backwash of sw. pool	-	-	10.8	6
Sub-Total	326	-	144	7.536
Northern Part:				
Employee of Recreational & Supporting Uses	5	0.28	1	0.016
Employee of F&B	20	1.58	32	0.366
Visitors to Toilet	100	0.025	3	0.029
Sub-Total	125	-	36	0.411
Total (Southern and Northern Parts)	**451**	**-**	**180**	**7.95**

Notes:
1. Based on the person per flat ratio of 2.7 as adopted by the Government for private developments under the recently approved EIA for the NENT NDAs (EIA-213/2013).

The dry weather flow from the Site is 180 m^3/day, among which 144 m^3/day is from Southern Part and the remaining 36 m^3/day is from Northern Part. These flows will be used to calculate the adequacy of the proposed sewerage system.

6.4 Sewerage Conditions

Under PWP No. 4235DS, the following sewerage components as shown in **Figure 6-2** are being designed:

- Ngau Tam Mei Sewage Pumping Station and its associated rising main;
- 900mm diameter gravity sewer connecting the rising main to Nam Sang Wai Sewage Pumping Station.

Under PWP No. 4215DS, the construction of Nam Sang Wai Sewage Pumping Station and its associated rising main to the existing YLSTW as shown in **Figure 6-2** has been completed in 2010.

The sewage generated from the Southern Portion and Northern Portion of the Project Site will be separately conveyed to two terminal manholes located at the eastern boundary of the Site and it will further drain to the proposed trunk sewer at Yau Pok Road via two new 150mm gravity sewers. The tentative location of terminal manholes and the new 150mm gravity sewers are shown in **Figure 6-1**.

As shown in Table 6-3 additional flow from the Project Site will only occupy a very small proportion of the capacity of the public sewerage system. The design average dry weather flow (ADWF) of the existing YLSTW is 70,000m^3/day.

Table 6-3 Comparison of Additional Sewage Flow with Capacity of Public Sewerage

Location	Design Capacity [A]		Peaking Factor	Peak Flow from Project Site [B]		[B]/[A] (%)
	(m^3/day)	(l/s)		(m^3/day)	(l/s)	
525mm pipe	21,449	248	4	688	13.79	3.21
825mm pipe	70,675	818	4	688	13.79	0.97
Ngau Tam Mei SPS	48,902	566	3	518	11.84	1.06
900mm pipe	51,173	592	3.01	519	11.85	1.01
Nam Sang Wai SPS	127,526	1,476	2.85	493	11.54	0.39
YLSTW (existing)	70,000	810	-	-	-	0.26

Notes:
2. For pipe and SPS, the design capacity and flow comparison refer to peak flow; For YLSTW, the design capacity and flow comparison refer to ADWF.
3. ADWF from Project Site = 180m^3/day or 7.95 l/s.
4. For peaking factor refer to **Appendix 6-1**.

A hydraulic assessment is conducted in **Appendix 6-1** to assess the adequacy of the public sewerage network by combining the projected flow at Year 2030 from other areas and the additional flow from the Project Site. The projected sewage flow from other areas is based on the population projection in the interim version of the HK2030 Planning Data (reference Scenario), which is well beyond the population intake year of the project and is therefore considered as a very conservative approach. The result shows that the capacities of proposed sewers, pumping stations and sewage treatment plant are adequate to handle additional sewage generated from the Project Site.

Though the Project is planned for completion in 2020, the proposed development will not have population intake until the commissioning of all the aforesaid public sewerage works for connection.

In addition, discharge license under the Water Pollution Control Ordinance (WPCO) will be applied for the Food and Beverages facilities and public toilets in the Northern Portion as well as club house and swimming pool in the Southern Portion of the Project Site prior to its discharge into the planned public sewer and the discharge shall comply with the terms and conditions of a licence as well as the standards for effluents specified in the "Standards for Effluent Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters" issued undere the WPCO.

All the sewers and sewerage facilities within the proposed development before the terminal manholes will be constructed, operated and maintained by the owners of the Site. The maintenance responsibility of the sewers outside the development connecting the terminal manholes to the future public sewer works will subject to agreement with DSD in the detailed design stage.

As the sewage generated from the Project Site will be discharged into planned public sewers, no adverse impact is anticipated and no EM&A requirement is necessary.

6.5 Conclusion

The Project Site with population of 451 is estimated to generate an additional dry weather flow of 180 m^3/day to the newly completed and future public sewerage network under PWP Nos. 4215DS and 4235DS respectively. Hydraulic analysis shows that this public sewerage collection system has adequate spare capacity to convey the additional sewage from the Project Site. The future reduced capacity of the YLSTW is also capable of receiving the additional flow from the Project Site.

Lastly, the Project will not have population intake until the commissioning of the aforesaid public sewerage works for connection. Hence, it can be concluded that no adverse sewerage impact due to the development is anticipated.

7. WASTE MANAGEMENT

7.1 Summary

This Chapter identifies the quantity, quality and timing of wastes arising as a result of construction and operation of the Project. The waste management implications and the associated environmental impacts are evaluated and assessed in accordance with the criteria and guidelines given in Annexes 7 and 15 of the EIAO-TM. Clause 3.9.5 of the EIA Study Brief sets out the scope and requirement of the assessment.

No particular land contamination issue was identified in the area. There are no records of existing and/ or historic activities relating to chemicals and hazardous substances in the area. Thus, further assessment is not required.

As advised by the Project Engineer, the construction method mainly involve the following procedures: site clearance to remove the surface vegetation, construction of boundary wall with piling, installation of vertical drains, import of inert filling material, removal of the residual inert fill materials after completion of preloading, and construction of infrastructure and superstructure. Foundation of the superstructure will likely to be carried out through pilling.

The appropriate disposal method for each type of waste generated from the above-mentioned construction method was identified. Opportunities for reducing construction waste generation and maximizing re-use on-site were evaluated. The potential impacts arising from handling, collection, and disposal of wastes and the environmental mitigation measures required to mitigate these environmental impacts were identified and recommended.

As the development density of the proposed residential use within the Project Site is not high, the operation of the development will generate limited amount of domestic waste. Waste may also be generated from the passive recreational and supporting uses in the Northern Site mainly due to visitors. However, the quantity is expected to be small given that only some passive recreational uses and ancillary facilities are proposed in the Project. Standard approach that is widely adopted in other parts of Hong Kong shall be adopted for the handling and disposal of this small quantity of waste during the operational phase. Waste generated will be collected and disposed of properly by a licensed contractor using refuse collection vehicles (RCV). It is unlikely that there will be any significant residual environmental impact. Therefore, the waste management implication during the operation of the residential development is not evaluated further in this EIA study.

7.2 Environmental Legislation and Standards

The principle legislation governing waste management in Hong Kong is the Waste Disposal Ordinance (Cap. 354) (WDO), and its subsidiary regulations. The Ordinance, enacted in 1980, generally encompasses all stages of waste management, from place of arising to final disposal point of waste. The Waste Disposal (Chemical Waste) (General) Regulation, enacted under the WDO in 1992, provides controls on all aspects of chemical waste disposal, including storage, collection, transport, treatment and final disposal.

In addition to the WDO and its subsidiary regulation, the following legislations have some bearing on the handling, treatment and disposal of wastes in Hong Kong, viz.:

- Dumping at Sea Ordinance (1995);
- Land (Miscellaneous Provisions) Ordinance (Cap. 28);
- Public Health and Municipal Services Ordinance (Cap. 132) Public Cleansing and Prevention of Nuisances Regulation;
- Dangerous Goods Ordinance (Cap. 295); and
- Air Pollution Control (Open Burning) Regulation (Cap. 311O).

There are also various guidelines which are relevant to waste management in Hong Kong such as:

- Waste Disposal Plan for Hong Kong (December 1989), Planning, Environmental and Lands Branch Government Secretariat;
- New Disposal Arrangements for Construction Waste (1992), Environmental Protection Department & Civil Engineering Department;
- A Guide to the Registration of Chemical Waste Producers, Environmental Protection Department, Hong Kong;
- A Guide to the Chemical Waste Control Scheme, Environmental Protection Department, Hong Kong;
- Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes (1992), Environmental Protection Department;
- Works Bureau Technical Circular No. 12/2000, Fill Management;
- Works Bureau Technical Circular No. 2/93, Public Dumps;
- Works Bureau Technical Circular No. 2/93B, Public Filling Facilities;
- Work Bureau Technical circular No. 16/96, Wet Soil in Public Dumps;
- Works Bureau Technical Circular No. 25/99, Incorporation of Information on Construction and Demolition Material Management in Public Works Subcommittee Papers;
- Works Bureau Technical Circular No. 4/98, Use of Public Fill in Reclamation & Earth Filling Projects;
- Works Bureau Technical Circular No.19/2001, Metallic Site Hoardings and Signboards; and
- ETWB TC(W) No. 33/2002, Management of Construction/Demolition Materials including Rocks;
- ETWB TC(W) No. 31/2004, Trip-ticket System for Disposal of Construction and Demolition Materials; and
- ETWB TC(W) No. 19/2005, Environmental Management on Construction Sites
- ADV 21, Management Framework for Disposal of Dredged/ Excavated Sediment, published by Buildings Department (Note: there is also the ETWB TC(W) No. 34/2002, Management of Dredged/Excavated Sediment)

7.3 Potential Land Contamination Due to Historic Land Use

7.3.1 Approach and Scope of Assessment

The following approach was used for the land contamination assessment:

- Desktop study to review the current and historical land uses. The objective is to identify any potential contaminative land uses within the Study Area; and
- Site reconnaissance to identify the existing land uses and to confirm the general environmental conditions associated with each of the identified sites. This is a non-intrusive approach for making an initial determination of the likely nature of any potential contamination, and, where identified, to evaluate whether there were any significant land contamination concerns associated with these properties.

In addition, other sources of information such as historical aerial photos, historical Hong Kong survey maps, previous applications for planning permission at the Town Planning Board, records and photographs taken from site visits, have also been collated and reviewed.

There are also previously approved EIA projects in adjacent to the Project Site. This include the construction of public sewers and a pumping station along the existing Ngau Tam Mei Drainage

Channel (NTMDC)[6] and construction of a cycle track[7] immediately adjacent to the Project Site. Information in these approved EIA reports was also reviewed.

7.3.2 Potential Impacts

According to the Study Brief, if any contaminated land uses as stated in Sections 3.1 and 3.2 of Annex 19 in the EIAO-TM is identified, the Applicant shall carry out a land contamination assessment as detailed from sub-section 3.9.5.2 (iv) (a) to (f) of the Study Brief and propose measures to avoid disposal.

According to Section 3.1 of the EIAO-TM, consideration shall be given to historic land uses which have the potential to cause or have caused land contamination such as oil installations, gas works; power plants; shipyards/ boatyards; chemical manufacturing/ processing plants; steel mills/ metal workshops; car repairing and dismantling workshops; and dumping ground and landfill.

If any potential contaminated soil is identified within the Project boundary due to either current or historic land uses, further investigation in accordance with sub-section 3.9.5.2 of the Study Brief will be required. The major potential impacts from contaminated soil are considered to be the following:

- health risks to site workers;
- disposal of contaminated soils, where encountered; and
- potential health risks to future users of the cycle tracks.

7.3.3 Historic and Current Land Uses

Historic Land Uses

The Project Site was zoned “REC” and “R(C)” in the Draft Mai Po and Fairview Park OZP No. S/YL-MP/1. There was no known historic land uses such as factory or any industrial operations which may result in potential land contamination. In addition, there were no historic activities relating to chemicals and hazardous substances in the area. According to the HKSAR Fire Services Department (FSD), neither records of dangerous goods licence nor incidents of spillage/ leakage were found within or immediate adjacent to the Project Site (**Appendix 7-1** refers).

It is understood that lands near Fairview Park was previously farmland before the construction of residential development at Fairview Park. Historic TPB records of the Project Site have been reviewed, according to the record there was no record of historic planning application approved by the TPB at the Project Site except a golf driving range and related uses at the Southern Portion of the Project Site (under planning application no. A/YL-MP/57), which was approved by TPB in 1999 on a temporary basis. Application for further extension of the planning permission for this active recreational use was subsequently rejected by TPB in 2001 under application no. A/YL-MP/74. In addition, historic aerial photos show that the Project Site was previously farmland. Change of land use status in the area was only observed around year 2001/2002 due to commencement of construction of the existing Ngau Tam Mei Drainage Channel. As such, land use status since year 2002 has been selected for further review. Historic aerial photos taken in 2002, 2005 and 2010 were presented in **Appendix 7-2** with legends showing the land use status. There was no historic land contamination issues identified.

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6 Agreement No. CE 66/2001(EP), EIA and TIA Studies for the Stage 2 of PWP Item No. 215DS - Yuen Long and Kam Tin Sewerage and Sewage Disposal (YLKTSSD), Environmental Impact Assessment (Final), March 2004 (EIA Application No. 094/2004). Sections 12.4 and 12.5 and Figures 12.9 and 12.10.

7 Construction of Cycle Tracks and the Associated Supporting Facilities From Sha Po Tsuen to Shek Sheung River, December 2008 (EIA Application No. EIA-159/2008). Section 8.6 and Figures 2-1, 8-1 to 8-3.

Asides from the above information, information from the nearby approved EIA projects have also been reviewed. They concern a proposed cycle track project and a public sewer project along the existing Ngau Tam Mei Drainage Channel (Section 1.9 of this report refers). The Project Site is immediately adjacent to a section of the proposed public sewer as well as the proposed cycle track alignment. The locations of the concerned nearby planned projects are also shown in **Figure 1-2**. The EIA reports[6 & 7] of both the proposed public sewer project as well as the proposed cycle track project have already obtained approval under the EIAO.

The approved public sewer EIA report[6] has identified potential land contamination sites on both sides of the proposed sewers through site reconnaissance visits and review of historic land use information including aerial photos in 1990s' and in early 2000s'. A section of the proposed public sewer is immediately adjacent to the Project Site. According to the concerned EIA report, there was no site of potential land contamination identified within or immediate adjacent to the Project Site (Please refer to **Appendix 7-3** for details of information extracted from the above-mentioned public sewer project EIA report).

In addition, according to findings in the approved cycle track EIA report[7], the reported land uses along the Ngau Tam Mei Drainage Channel (where the Project Site is located immediately adjacent to a section of the proposed cycle track) was mainly farmland with scattered village houses. There was also low density residential areas such as Fairview Park and Man Yuen Chuen located in the middle section of Ngau Tam Mei Drainage Channel. Other than that, the approved cycle track EIA report did not identify any site of potential land contamination within or immediately adjacent to the Project Site (Please refer to **Appendix 7-3** for details of information extracted from the above-mentioned public sewer project EIA report).

Based on the information reviewed, the Project Site was previously farmland and has never been used by land uses that may result in potential land contamination. According to the EIA report of nearby approved EIA projects, which cover historic land use information before year 2002, there was no site of potential land contamination within or immediate adjacent to the Project Site. Thus, there is no concern of land contamination issue at the Project Site. Change of land use status near the Project Site was observed around year 2001/2002 due to commencement of construction of the existing Ngau Tam Mei Drainage Channel, thus historic aerial photos since year 2002 have been reviewed. Since no historic land contamination uses were identified at the Project Site, potential land contamination issue due to historic land uses is not expected.

Current Land Uses

A preliminary desktop review and site reconnaissance have identified the various current land uses within and adjacent to the Project Site. Currently, the majority of the Project Site is vacant. The Southern Portion of the Project Site has been largely paved for the previously approved golf driving range and related uses. Site reconnaissance visit was undertaken in February 2009 and May 2009 to identify existing land uses. Project Site was found to be vacant during the visit, and no particularly building structures were identified. No vehicle repairing activity or any activity stated in Sections 3.1 and 3.2 of Annex 19 of the EIAO-TM, that would likely result in land contamination has been identified on-site. The land use status was found to be same during the subsequent visit undertaken in October 2011. These findings support the desktop review mentioned above that the Project Site was not developed previously. No trace of potential land contamination was identified during the site reconnaissance visit.

A further site visit was undertaken in December 2013 (site photos are provided in **Appendix 7-2**). The Project Site is a green field site currently vacant and there is no change in land use status at the Project Site to date.

The surrounding area of the Project Site is characterized by a mixture of rural landscape and low-rise residential developments. There are no factories or industrial operations that are likely to result in land contamination in close vicinity to the Project Site. The western boundary of the Project Site is

occupied by the large-scale residential development known as Fairview Park and the existing Fairview Park Nullah. The Project Site is also bounded by the existing Ngau Tam Mei Drainage Channel and Yau Pok Road to the east. A small existing petrol filling station is also located to the south-west of the Project Site outside the Project boundary and is within the Fairview Park (**Figure 7-1** refers). This petrol filling station serves Fairview Park and is physically separated from the Project Site by the existing Fairview Park Nullah, which is an engineering concrete channel (about 6m wide) along the boundary of Fairview Park. Given the identified petrol filling station is outside the Project boundary which is physically separated from the Project Site by the existing Fairview Park Nullah, it is not further assessed.

There is one small abandoned pond located in the Northern Portion of the Project Site (**Figure 7-2** refers). The concerned water pond is shallow in depth and almost in drought condition, which will eventually dry out during the dry season. As the landscape water pond is also proposed at the same location where the abandoned pond is located and the bottom level of pond before and after the construction is about the same (~2mPD), which is about the same level of the proposed landscape pond (see **Figure 11-24**), no dredging of sediment or pond filling activities will be required at this location. During the construction of the remaining area of the proposed landscape water pond at the Northern Portion, excavation of soil will be carried out in adjacent to the existing abandoned pond. Properly temporary drainage system will be constructed to divert surface runoff away from the concerned abandoned pond and discharge it to the nearby existing drainage system such as the Fairview Nullah or NTMDC through sand traps.

Since there is no historic and/ or existing land uses at the Project Site that would result in potential contamination of soil and underground water, land contamination at the Project Site is not expected. Thus, further assessment on this aspect is not required.

7.4 Waste Generation during Construction Phase

Construction of the proposed development mainly involves construction of the proposed residential development and associated infrastructures and facilities as described in Section 1.3.

The majority of waste to be generated as a result of the proposed development would be excavated materials during site formation and filling. Handling, transportation and storage of excavated materials will likely be involved at this stage. Construction of buildings, associated infrastructures and facilities would also generate waste, but the quantity will be in small amount through the adoption of standard construction methods and use of pre-fabricated materials as much as practicable. The production of construction waste due to over-ordering or as “side-products” of construction activities should be minimized by the Contractor(s) through careful design, planning, good site management, control of ordering procedures, segregation and reuse of materials.

The varieties of waste that may arise due to the construction activities mainly include the followings:

- Waste due to site clearance
- Construction and Demolition (C&D) materials;
- Chemical waste; and
- General refuse.

The potential environmental impact arising from the handling, storage, transport and disposal of these different categories of wastes are described below. The nature of each of these wastes and the recommended waste management measures are identified.

In any case, landfill disposal shall only be considered as a last resort of waste management for the non-inert portion of the excavated materials.

7.4.1 Site Clearance Waste

The Project Site is currently vacant. Surface vegetation with the Project Site will be removed at the start of the Project and set aside for reuse, if necessary.

The amount of site clearance works within the Developable Area will be limited to the removal of a thin layer of vegetation and top soil. Based on initial estimation, about 16,800m^3 of materials would be generated during site clearance. Among which, about 13,440m^3 of inert top soil is intended to be sorted on-site and re-used at landscaping areas subject to the satisfaction of engineering requirements (see **Table 7-1**). Any surplus inert materials will be disposed of at public fill facility. It is estimated that about 3,360m^3 of non-insert materials (e.g. vegetation) will be disposed of at landfill site. The above figures are based on preliminary estimation and the exact quantity will be provided during the detailed design stage later on. In any case, landfill disposal shall only be considered as a last resort of waste management.

7.4.2 Excavated Materials / Imported Filling Material

For the Developable Area, excavated materials will be generated during the site formation of the Project site. General speaking, the Project Site is topographically flat, rural in character. The existing average ground level at the Project Site is about +3mPD, which will be leveled up to the proposed site formation level of +5.4mPD.

Inert materials excavated from one location will be used as filling materials at another location during Site leveling, thus stockpiling of large amount of excavated materials is not expected. In case stockpiling of small amount of materials is required, the stockpiling location will be covered by tarpaulin sheets and backfilled as soon as possible.

Based on initial estimation, approximately 55,300m^3 of excavated C&D material would be generated due to excavation. The exact figure will be provided during the detailed design stage later on. As mentioned above, the existing ground level of the Project Site will need to be raised to the required site formation level. Thus, these excavated C&D materials will be re-used on-site as fill materials wherever possible subject to the satisfaction of engineering requirements.

Asides from reusing excavated materials, it is also expected that additional import fill materials (approximately 42,300m^3) would be required for the site formation works in question. For this reason, there is an initiative for the Contractor(s) to re-use excavated materials on site as fill materials as much as possible in order to minimize associated construction costs.

The Project Engineer shall also ensure excavated materials from the Project Site are re-used on-site as much as practicable. Any surplus materials that are not suitable for filling shall be disposed of at public fill facilities. In any case, landfill disposal shall only be considered as a last resort of waste management for the non-inert portion of the excavated materials.

The estimated amount of materials to be generated, re-used, and disposed of from the Project construction works is summarized in **Table 7-1**.

7.4.3 Construction and Demolition Waste

Construction waste may comprise unwanted materials generated during construction, including rejected structures/ materials which have been over ordered or are surplus to requirements, and used materials. Generally speaking, construction waste mainly arise from the construction of earth retaining structures and other maintenance activities carried out by the Contractor, which may include the followings:

- Wood from formwork and falsework;
- Equipment and vehicle maintenance parts;

- Materials and equipment wrappings;
- Unusable/surplus concrete/grouting mixes; and
- Damaged/contaminated/surplus construction materials.

Since the Project Site is currently vacant and no major demolition works will be required, the volume of demolition waste involved would be very minimum.

The concerned Project construction works do not involve construction of any high-density residential development, thus construction works would unlikely involve any deep excavation or significant piling activities that would generate significant amount of waste. It is expected the building construction will use standard construction practices, thus significant amount of construction waste during building construction is not expected.

The amount of construction waste to be generated from this Project will be subject to contractor(s)' operating procedure and site practices, however, the contractor(s) will be required to reuse materials on site as far as practicable and minimize waste arising. The generation of wastes could be minimized through recovery, reuse and/ or recycling. Whenever practicable, the production of construction waste due to over-ordering or as "side-products" of construction activities should be minimized by the contractor through careful design, planning, good site management, control of ordering procedures, segregation and reuse of materials. These measures will also assist the contractor in minimising costs associated with the construction works. Prefabricated building construction elements could also be used as appropriate to avoid generation of surplus construction materials.

Wooden boards can be reused on-site or off-site, though the reusability and quantity of final waste will be subject to the quality, size and shape of the boards proposed by the contractor(s). Timbers which cannot be reused shall be sorted and stored separately from all other inert waste before disposal.

Should construction site hoarding be erected, metal fencing or building panels, which are more durable than wooden panels, are recommended to be used as far as practicable. Opportunity shall also be sought to re-use any wooden boards used in site fencing on-site or off-site. Concrete and masonry can be crushed and used as fill material if practicable. On-site incineration of wooden waste is prohibited.

Cross contamination of inert C&D materials by other waste categories shall be minimized as far as practicable through provision of storage facilities for storage of different categories of waste. Inert materials including soil, rock, concrete, brick, cement plaster/ mortar, inert building debris, aggregates and asphalt should be segregated from and stored separately from other waste categories to ensure proper handling and reuse. The on-site temporary facilities should be equipped with dust control measures where necessary.

By reducing the quantity of C&D materials requiring off-site disposal through reuse on-site, the potential traffic impacts due to transportation of materials can be reduced. Thus, additional traffic flow generated from transportation of construction materials due to movement of vehicles in and out of the Project Site is considered to be insignificant.

Spent bentonite slurries, if any, will be handled and disposed of properly in accordance with the requirements set out in the Practice Note for Professional Persons (PN1/94) Construction Site Drainage.

In order to avoid dust, odour and erosion impacts, all stockpile areas within the Project Site should be covered with tarpaulin or impermeable sheeting. Any vehicle carrying C&D waste should have their load covered when leaving the works area. Vehicles should be routed as far as possible to avoid sensitive receivers in the area. Potential air and surface runoff impacts and mitigation measures due to handling of excavated materials are presented in the **Sections 3.6, 3.9, 5.5 and 5.6**, respectively.

7.4.4 Chemical Waste

As defined under the Waste Disposal (Chemical Waste) (General) Regulation, chemical waste includes any substance being scrap material or unwanted substances specified under Schedule 1 of the Regulation.

Chemical waste that could be generated from construction works would primarily arise from chemicals used in operation and maintenance of on-site equipment. These may include fuel, oil, lubricants, cleaning fluids, and solvents arising from leakage or maintenance of on-site equipment and vehicles. Chemical generated from daily operation of the construction works shall be recycled/ reused on-site as far as practicable.

The amount of chemical waste that will be generated from the construction works will depend on the contractor's on-site maintenance intention, age and number of plant and vehicles used. Nevertheless, chemical wastes such as lubricating oil or solvent generated by workers are not expected to be in large quantity. The likely chemical waste types are readily accepted at the chemical waste treatment centre at Tsing Yi or other licensed waste oil recycling facilities in Hong Kong.

If off-site disposal of chemical waste is required, they should be collected and delivered by a licensed contractor, and disposed of strictly following the Waste Disposal (Chemical Waste) (General) Regulation.

The contractors shall register with EPD as chemical waste producers when disposal of chemical waste is anticipated to be required.

Chemical waste generated has to be stored in suitable containers and away from water bodies so that leakage or spillage is prevented during the handling, storage, and subsequent transportation.

Handling, storage and disposal of chemical wastes shall be in accordance with the Waste Disposal (Chemical Waste) (General) Regulation and the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, thus this will unlikely cause an unacceptable environmental impact.

Fossil fuel and used lubricants from trucks and machinery are classified as chemical waste. The Contractor shall register with EPD as a chemical waste producer and observe all the requirements under the storage, labelling, transportation and disposal of chemical waste.

The Contractor shall prevent fuel and lubricating oil leakage from plant and storage sites from contaminating the construction site. All compounds in work areas shall be positioned on areas with hard paving and served by drainage facility. Sand/ silt traps and oil interceptors shall be provided at appropriate locations prior to the discharge points.

7.4.5 General Refuse

Throughout the construction phase, the workforce on the construction site will generate a variety of general refuse requiring disposal. These refuse will mainly consist of food wastes, aluminum cans, empty plastic bottles and waste paper, etc. Nevertheless, estimates of general refuse generated from the Site Formation works are dependent on the number of workers. As no information regarding the number of workers on-site is available at this early project stage, it has been assumed that about 180 workers in average will work on the Developable Area during site formation at any one time. Based on a generation rate of 0.65 kg per worker per day, the daily arising of general refuse during site formation would be approximately 117 kg/ day.

General refuse generated at the construction site should be stored separately from construction and chemical wastes to avoid cross contamination. A reliable waste collector shall be employed by the Contractor to remove general refuse from the construction site on a daily basis where appropriate to minimize the potential odour, pest and litter impacts.

Open burning for the disposal of construction waste or the clearance of the Project Site in preparation for construction work is prohibited under the Air Pollution Control (Open Burning) Regulation.

Table 7-1 Summary Table of Estimated Materials to be Generated, Re-used and Disposed of

Waste Material Type	Generated from works item	Total Quantity Generated	Quantity to be disposed of off-site	Disposal Route
C&D Material	Site clearance	~16,800m^3 of excavated top soil	3,360m^3 (non-inert C&D waste)	Inert portion of top soil to be reused at landscaping area as much as possible (about 13,440m^3). Non-inert C&D waste of approximate 3,360m^3 that cannot be reused or recycled, to be disposed of at NENT landfill as last resort (subject to confirmation).
C&D Material	Site formation and filling, etc.	~97,600 m^3 (about 55,300m^3 during excavation; and additional 42,300m^3 of imported fill materials)	-	It is expected that all C&D materials will be reused on-site for site formation. Any surplus inert C&D materials to be disposed of at public filling area in Tuen Mun Area 38 (subject to confirmation).
General Refuse	Food waste, waste paper, empty container generated from workforce	117kg/day (preliminary estimate)	117kg per day	Refuse station for compaction and containerisation and then dispose of at NENT landfill.
Chemical Waste	Cleansing fluids, solvent, lubrication oil and fuel from construction plants and equipment	Less than few cubic meters/month (preliminary estimate)	Less than few cubic meters/month	To be collected by licensed chemical waste collector.

7.5 Construction Waste Management Measures

To ensure the appropriate handling of the C&D materials, it is recommended that a Waste Management Plan (WMP) shall be developed by the contractor and incorporated in the Environmental Management Plan (EMP) in accordance with ETWB TCW No. 19/2005 – Environmental Management on Construction Sites at the commencement of the construction works.

In formulating the EMP in respect to waste management, the following hierarchy should be considered:

- Avoidance and minimization to reduce the potential quantity of C&D materials generated;
- Reuse of materials as practical as possible;

- Recovery and Recycling as practical as possible; and
- Proper treatment and disposal in respect to relevant laws, guidelines and good practice.

Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP shall be submitted to the Engineers' Representative (RE) and the Project Environmental Team Leader (ETL) for approval before commencement of construction, and shall be implemented throughout the Project. The EMP shall cover the followings and developed taking into account the recommended control measures given in this Chapter where appropriate:

- A waste management policy, organization chart, and responsibility;
- An estimation on the location, type, nature, quality and quantity of different waste streams to be generated from the Project works, and the corresponding waste management methodology;
- A method statement for demolition and transportation of the excavated materials and other construction wastes;
- Potential for recycling or reuse should be explored and opportunities taken if waste generation is unavoidable;
- Recommendations for appropriate disposal routes if waste cannot be recycled;
- A system to control the disposal of C&D materials and C&D waste to public fill reception facilities, sorting facilities and landfills respectively through a trip-ticket system in accordance with the ETWB TC(W) No. 31/2004; and
- A system to record the C&D materials/ C&D waste to be generated, disposed of, reused, and recycled, respectively.

The Project Proponent/ RE will ensure that the day-to-day operations comply with the approved EMP. The Project Proponent/ RE shall require the contractor to separate public fill from C&D waste for disposal at appropriate facilities. In addition, the Project Proponent/ RE shall regularly audit Contractor(s)' records for the disposal, reuse and recycling of C&D materials for monitoring purposes.

Based on the above waste management recommendations, a detailed management and control plan shall be formulated during the detailed design stage. A good management and control can prevent the generation of significant amount of waste. On-site sorting of construction wastes will be recommended. Secondary on-site sorting can be achieved by avoiding the generation of "mixed waste" through good site control. Construction wastes shall be sorted to remove contaminants, with the inert materials broken up into small pieces before being transported to Refuse Transfer Station (RTS) for subsequent delivery to landfill sites.

Chemical and oily wastes generated from the construction activities, vehicle and plant maintenance and oil interceptors should be disposed of as chemical waste in strict compliance with the Waste Disposal (Chemical Waste) (General) Regulations.

The demolition and construction work shall be considered in the planning and design stages to reduce the generation of C&D waste where possible. Landfill disposal shall only be considered as the last resort.

Construction methods with minimum waste generation quantity and other environmental impacts shall be considered in the detailed design.

In addition, the Project Proponent shall require the contractor to reuse inert C&D materials (e.g. excavated soil) on-site or in other suitable construction sites as far as possible, in order to minimize the disposal of C&D materials to public fill reception facilities.

The Project Proponent shall encourage the contractor to maximize the use of recycled or recyclable C&D materials, as well as the use of non-timber formwork to further minimize the generation of construction waste.

The following additional control/ mitigation measures are recommended to be followed by the Contractor:

- Storage of different waste types – different types of waste should be segregated and stored in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. An on-site temporary storage area equipped with required control measures (e.g. dust control) should be provided;

- Trip-ticket system – in order to monitor the proper disposal of non-inert C&D waste to landfills and to control fly-tipping, a trip-ticket system should be included as one of the contractual requirements and audited by the Environmental Team;

- Records of Wastes – a recording system should be proposed to record the amount of wastes generated, recycled and disposed of (including the location of disposal sites);

- Training – The contractor should provide his workers with proper training of appropriate waste management procedure to achieve waste reduction as far as practicable and cost-effective through recovery, reuse and recycling and avoid contamination of reusable C&D materials;

- Incorporate good practice in “Recommended Pollution Control Clauses for Construction Contracts” published by EPD in respect to removal of waste material from the construction site into the contract of the contractor.

In additional to the above, the relevant construction waste pollution clauses to be included in construction contracts are summarized in the Sections 7.5.1 to 7.5.3:

7.5.1 Waste Minimisation

The Contractor shall submit to the Engineer for approval a waste management plan with appropriate mitigation measures including the allocation of an area for waste segregation and shall ensure that the day-to-day site operations comply with the approved waste management plan.

The Contractor shall minimize the generation of waste from his work. Avoidance and minimisation of waste generation can be achieved through changing or improving design and practices, careful planning and good site management.

The Contractor shall ensure that different types of wastes are segregated on-site and stored in different containers, skips or stockpiles to facilitate reuse/recycling of waste and, as the last resort, disposal at different outlets as appropriate.

The reuse and recycling of waste shall be practised as far as possible. The recycled materials shall include paper/cardboard, timber and metal etc.

The Contractor shall ensure that Construction and Demolition (C&D) materials are sorted into public fill (inert portion) and C&D waste (non-inert portion). The public fill which comprises soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt shall be reused in earth filling, reclamation or site formation works. The C&D waste which comprises metal, timber,

paper, glass, junk and general garbage shall be reused or recycled and, as the last resort, disposal of at landfills.

The Contractor shall record the amount of wastes generated, recycled and disposed of (including the disposal sites).

The Contractor shall implement a trip ticket system in accordance with the ETWB TC(W) No. 31/2004 for public fill, C&D materials and C&D waste to public fill reception facilities, sorting facilities and landfills respectively.

Training shall be provided for workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.

7.5.2 Waste Nuisance Control

The Contractor shall not permit any sewage, wastewater or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Project Site onto any adjoining land or allow any waste matter [or refuse] which is not part of the final product from waste processing plants to be deposited anywhere within the Project Site [or onto any adjoining land. He shall arrange removal of such matter from the Project Site [or any building erected or to be erected thereon] in a proper manner to the satisfaction of the Engineer in consultation with the Director of Environmental Protection.

7.5.3 Chemical Waste Control

The Contractor shall observe and comply with the Waste Disposal (Chemical Waste) (General) Regulation.

The Contractor shall apply for registration as chemical waste producer under the Waste Disposal (Chemical Waste) (General) Regulation when chemical waste is produced. All chemical waste shall be properly stored, labelled, packaged and collected in accordance with the Regulation.

7.6 Waste Generation during Operational Phase

The proposed residential development will accommodate a residential population of about 287 after full occupation. With reference to the Data from Monitoring in Solid Waste in Hong Kong 1999, the capita generation rates of domestic waste will be 1.48 kg/day in 2016. Based on the above assumptions, the estimated quantity of wastes to be generated from this Development during the operation will be about 424 kg/day. There will also be waste generation (mainly by visitors and employees) from the passive recreational and ancillary facilities in the Northern Portion of the Project Site. However, the quantity of waste generated will not be significant.

Refuse collection chambers (RCC) will be provided for the residential development as well as the passive recreational facilities in the Northern Portion of the Project Site. A licensed waste collector shall be employed to collect domestic waste on daily basis. In order to comply with Building Regulation, mechanical ventilation will be provided. The odour nuisance to the public can be minimized by incorporating the odour absorption system. With proper management and maintenance of the waste facilities, possible leachate impact from the RCC is not anticipated.

It is also recommended that separate collection bins for used aluminum cans, waste paper and plastic bottles should be provided at strategic locations within the residential development area and adjacent to the passive recreational facilities in order to promote and encourage recycling during the operational phase.

7.7 Conclusion

The waste streams that would be generated during the construction phase of the Project include site clearance, excavated soil, C&D materials, and chemical waste from the maintenance of construction plant and equipment and general refuse from the workforce. Opportunities for reduction in waste generation through recovery, reuse or recycling have been identified in the assessment.

Provided that the recommendations set out in this Chapter are implemented, no waste related regulatory non-compliance and unacceptable environmental impacts are expected as a result of handling, storage, transportation and disposal of construction waste arising from the proposed residential development.

Domestic waste may be generated during the operational phase of this Project. Waste may also be generated from the passive recreational and supporting uses in the Northern Portion of the Project Site. However, given the scale of this Project the quantity of waste is expected to be small. Standard approach that is widely adopted in other parts of Hong Kong for handling and disposal of waste shall be adopted. Refuse collection chambers shall be provided and a licensed waste collector will be employed to collect domestic waste on daily basis. With these measures in place, it is unlikely that there will be any significant residual environmental impact.

8. ECOLOGY

8.1 Introduction

An Ecological Survey and Ecological Impact Assessment was conducted in an area that mostly, currently zoned as "Recreation", with another portion zoned as "R(C)", located at various lots in D.D. 104 (see **Figure 8-1**).

The Project Site (hereafter the PS) lies between Fairview Park on the west and Yau Pok Road on the east. The PS comprises two portions, the Northern Portion, which also abuts an area zoned as OU (CDWPA) in the northeast, and the Southern Portion. The entire western boundary of the PS is bordered by the Fairview Park Drainage Channel which eventually leads into Deep Bay. The PS is mostly zoned as "Recreation" ("REC"), with another portion zoned as "R(C)". According to the prevailing Mai Po and Fairview Park Outline Zoning Plan (OZP No.S/YL-MP/6), the planning intention of the "REC" zone is to encourage the development of active and/or passive recreation and tourism/eco-tourism for the general use of the public. The PS mainly comprises grassland/shrubland, a small pond, a small area of inactive agriculture and a small area of reed. The PS falls within Deep Bay Buffer Zone 2 (DBBZ 2) and a 12-month ecological baseline survey for the PS and habitats within 500 m of it was required.

8.2 Legislation and Standards

The Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO), particularly Annexes 8 and 16 of the TM, has been used as a guideline for ecological impact assessment of the project. Other relevant environmental legislation, guidelines and references include:

- Environmental Impact Assessment Ordinance (Cap. 499);
- Environmental Impact Assessment Study Brief No. ESB-207/2009;
- Ecological Baseline Survey for Ecological Assessment (EIAO Guidance Notes No. 7/2010);
- EIAO Guidance Note No. 6/2010 and 10/2010;
- Wild Animals Protection Ordinance (Cap. 170);
- Forestry Regulations (subsidiary legislation of the Forests and Countryside Ordinance, Cap. 96);
- Town Planning Ordinance (Cap. 131);
- Approved Mai Po and Fairview Park Outline Zoning Plan No. S/YL-MP/6;
- Town Planning Board Guidelines for Application for Developments within Deep Bay Area under Section 16 of the Town Planning Ordinance (TPB PG-No. 12B)

8.3 Baseline Conditions

8.3.1 Project Site and Assessment Area

In accordance with Section 3.9.6.2 of the Study Brief No.ESB-207/2009, the Assessment Area (AA) for the purpose of ecological impact assessment of the project includes all areas within 500 m distance from the boundary of the PS (see **Figure 8-2**) and any area likely to be impacted by the Project. In this context, PS in the report refers to the area within the PS Boundary, whereas AA refers to the area within the 500 m radius but excluding the PS.

More than half of the AA comprises highly urbanized and disturbed environment (67.66%), including extensive areas of low-rise residential development (Fairview Park to the west and Palm Springs to the north), villages along Fairview Park Boulevard, Ha Chuk Yuen Road and Castle Peak Road.

Two areas of ponds are located within the AA: ponds at the northwestern periphery of the AA, which extends to Deep Bay, and several isolated ponds southeast of Man Yuen Tsuen. However, most of these ponds are degraded through abandonment and some have undergone habitat conversion through natural vegetation colonization. Some of the ponds are also fragmentized by the existing roads / residential developments. It should also be noted that a water retention pond on the eastern

side of Ngau Tam Mei Main Drainage Channel (the one to the immediate north of Fung Chuk Road) is concreted and for floodwater storage only.

The PS comprises an extensive area of grassland/shrubland (67.03%), a pond (5.49%), a small area of reed (2.42%), urbanised area (22.424%) and other miscellaneous areas such as agricultural land, seasonally wet grassland and an abandoned irrigation ditch (total 2.64%).

8.3.2 Recognized Sites of Conservation Importance

Mai Po Inner Deep Bay Ramsar Site

The Mai Po Inner Deep Bay Ramsar Site lies about 500 m away from the closest point of the PS. The Ramsar Site is of particular significance for migratory waterbird species including a number of globally-threatened species and was recognized as such in 1995 through the designation as a Ramsar Site. The core area of the Ramsar Site comprises Mai Po Nature Reserve and much of the intertidal mudflats which are protected further by being included in the Mai Po Marshes and Inner Deep Bay Sites of Special Scientific Interest (SSSIs).

Wetland Conservation Area (WCA)

Ponds continuous and adjoining to the Ramsar Site are designated by TPB PG-No. 12B as the Wetland Conservation Area (WCA); the aim of this is to protect the integrity of the Deep Bay ecosystem. The WCA includes a strip of ponds southeast of the Mai Po Nature Reserve, in-between two extensive low-rise residential developments, namely Palm Springs and Fairview Park.

The WCA extends within the northern part of the AA (excluding PS) for the current project, but no part of the PS falls within the WCA.

Wetland Buffer Area (WBA)

The Wetland Buffer Area (WBA) is also designated under TPB PG-No. 12B to include a buffer area of about 500 m landward from the WCA boundary. Any development within the WBA is required to demonstrate that ecological impacts to the WCA will be minimized and any negative ecological impacts will be fully mitigated through positive measures. Residential development which seeks to replace existing open storage area and/or include pond restoration projects may be given sympathetic consideration by the Board subject to satisfactory ecological and other impact assessments. The Northern Portion of the PS falls within this area.

Site of Special Scientific Interest (SSSI) and Egretry

No SSSI or Egretry is located within the AA. All of the SSSIs or Egretries are relatively far away from the PS. There are three SSSIs lie in the range of about 1000 m to 1900 m away from the PS: the Mai Po Marshes SSSI, the Inner Deep Bay SSSI and the Mai Po Village SSSI. For the egretries, there are two active egretries which lie within the potential foraging distance of breeding egrets (Anon 2009); these are Mai Po Village egretry (1,800 m from the PS) and Mai Po Lung egretry (2,300 m).

8.4 Assessment Methodology

8.4.1 Literature Review

A literature review based on existing reports from the Government and private sectors, and known literature on different faunal and floral groups; these are outlined below:

- Relevant past Environmental Impact Assessment Reports;
- Porcupine! (Newsletter of Department of Ecology & Biodiversity, University of Hong Kong);
- Hong Kong Biodiversity (AFCD publication);

- Hong Kong Bird Watching Society (HKBWS) study reports;
- Memoirs of Hong Kong Natural History Society;
- Various natural history field guides for Hong Kong.

According to the EIA website of EPD (www.epd.gov.hk/eia), there are two approved EIAs covering the PS. These are EIA 159/2008 (Cycle Track EIA) and EIA 094/2004 (Sewerage EIA). Approved EIA for the development at Wo Shang Wai (EIA 144/2008) was also reviewed as this EIA also presents information relevant to the ecological evaluation of the present Project.

8.4.2 Ecological Evaluation of the present PS from other Projects (EIA 159/2008 and EIA 094/2004)

Below are the ecological values of the present PS assessed in relevant EIAs.

Table 8-1 Ecological Values of the PS Assessed in Relevant EIAs

	Cycle Track EIA (159/2008)	**Sewerage EIA (094/2004)**
Survey period	Nov 2006 to Apr 2007.	June 2002 to January 2003.
Habitat category for the present PS	Wasteland and Built Areas (no other habitat/ wetland identified within the PS).	Cultivated land and urbanised/ disturbed area (no other habitat/ wetland identified within the PS).
Habitat value concluded for the present PS	Both habitats were considered to be of "Low to Negligible" value.	Both habitats were considered to be of "Low" value.
No. of species of conservation concern recorded within the PS	No record.	No record.

The PS now contains no active agricultural land. The agricultural activities have been abandoned and now the PS is mainly covered with grassland/ shrubland through occupation of weedy species (most of them are exotic; see Section 8.6 below). As compared to active agricultural land, which would be continuously filled with water artificially, grassland/ shrubland is drier and provides less feeding opportunities for wetland bird species (further details will be discussed below).

8.4.3 Ecological Evaluation of Wo Shang Wai EIA (EIA 144/2008)

Neither the Project Area nor the Study Area of Wo Shang Wai EIA covers the PS, but it is located in the same region (next to Palm Springs) and is also within WBA. It also contains habitats similar to the present PS. Thus the evaluation of its ecological value can be used as a reference for the present Project.

Table 8-2 Ecological Information on Wo Shang Wai (based on EIA 144/2008)

	Ecological Information
Wetland area	4.69 ha (22% of the Project Area), including a large (~ 4 ha) and continuous piece of freshwater marsh, which was considered to be a large area for this habitat type in Hong Kong.
Dry area	15.86 ha (74% of the Project Area).
Ecological linkage	The site abuts the WCA and has direct linkage with the fish ponds of "moderate to high" ecological value.
Overall value	Ranged from low to moderate.

The wetland habitats of the project area were considered to be of 'low to moderate' and 'moderate' value due to the size and rarity of these habitats (0.69 ha of seasonally wet grassland and 4.0 ha of freshwater marsh/reedbed). These two habitats were found to be supporting moderate diversity of wildlife. Other key impacts of the project include loss of feeding ground for ardeids (species and

number of wetland birds foraging within the Wo Shang Wai Project Area: Little Egret (maximum 48), Cattle Egret (maximum 14) and Chinese Pond Heron (maximum 7)). The loss of the roosting habitat for wetland birds was considered to be of low significance despite a loss of 11.05 ha of roosting area (i.e. grassland) as alternative roosting sites were available nearby.

8.4.4 Field Survey

A 7-month field survey has been undertaken from January to July 2009 to cover the bird migratory season and the ardeid breeding season. The survey also included bird flight line surveys in March and July 2009. In accordance with the Study Brief, a 12-month ecological survey is required to accompany an EIAO submission; hence, an additional 5-month survey was undertaken between August and December 2010. In addition to these surveys, one habitat survey and one vegetation survey were conducted in January 2011, and an extra habitat and botanical survey for only the PS was conducted in July 2011. **Table 8-3** below outlines the surveys undertaken in these periods. Survey findings are included in **Appendices 8-1 to 8-6**. The methodologies used in these surveys are in line with normal EIA practices and are described below.

Table 8-3 Schedules for floral and faunal group surveys undertaken between January and July 2009 and between August 2010 and January 2011 within the AA and the PS

	Jan 09	Feb 09	Mar 09	Apr 09	May 09	Jun 09	Jul 09	Aug10	Sep 10	Oct 10	Nov 10	Dec 10	Jan & Jul 11
Botanical													
Habitat													
Mammal													
Bird													
Bird Flight Line													
Herpetofauna (day time)													
Herpetofauna (night time)													
Butterfly & Dragonfly													

8.4.4.1 Habitat Mapping

A habitat map for the AA and the PS was prepared based on recent aerial photograph and detailed ground-truthing. This map is provided in **Figure 8-2**. From this, the area of each habitat was calculated, and these are presented in **Table 8-4**.

8.4.4.2 Mammal Survey

Transect surveys for mammals were conducted in conjunction with other faunal groups (between March and May 2009, August and October 2010). In addition to any observations of mammals, suitable locations were searched for evidence of mammal activity (footprints, scats, burrows or food remains). However, any mammal sightings/ signs observed during other visits would also be recorded.

8.4.4.3 Avifauna Survey

Monthly surveys were undertaken in the AA and the PS between January and July 2009 and between August and December 2010. All bird surveys commenced within one hour of sunrise to coincide with peak bird activity, and the methodology followed that of Bibby et al. (1998). All bird species seen or

heard during the survey were noted. Bird species of conservation concern/wetland-dependent species (hereafter called "bird species of interest") were enumerated and details of the habitat in which these were observed was recorded. Special attention was paid to disturbance-sensitive birds within the PS and in areas where disturbance impacts may be predicted. Special attention was also paid to the presence of any potential roosting, breeding and foraging habitats to bird species of conservation importance. A standard transect route as shown in **Figure 8-3** was followed.

8.4.4.4 *Bird Flight Line Survey*

Bird flight line surveys were conducted in March and in July 2009. A surveyor was positioned at a vantage point (**Figure 8-3** refers) and any bird species of interest flying over the PS were recorded. The birds were identified, enumerated and recorded. Observations of any obvious flight line during monthly bird surveys were noted.

8.4.4.5 *Herpetofauna Survey*

Herpetofauna (reptiles and amphibians) transect surveys were conducted between March and May 2009 and between August and October 2010. In total, six day-time reptilian surveys and six night-time amphibian surveys were undertaken (refer also to **Table 8-3**). A transect route which covered all major habitat types present was followed through the PS and the AA (as shown in **Figure 8-3**). In addition, active searching was conducted in micro-habitats (such as under wooden boards or among piled material) where reptiles/amphibians might be expected to take refuge. Any reptiles and amphibians observed or heard (for amphibians) were identified, counted (or estimated in the case of heard amphibians) and their location and habitat were noted as well.

8.4.4.6 *Butterfly and Dragonfly Survey*

Butterfly and dragonfly surveys were conducted between March and May 2009 and between August and October 2010. In total, six butterfly and dragonfly surveys were undertaken. A transect route (the same as that used for other faunal surveys, **Figure 8-3** refers) was walked and all adult butterflies and dragonflies encountered were identified and enumerated, and their individual pond/habitat were recorded as well.

8.5 Survey Findings

8.5.1 Habitats

Discussion of the ecological value of each habitat types is presented in Section 8.6 below. Detailed lists of plant species recorded within each habitat type are provided in **Appendix 8-1**. An overview of the habitats is given below.

8.5.1.1 *Habitats in the Project Site*

The PS comprises about 9.1 ha in total. Three major habitats are identified (**Table 8-4**, see **Figure 8-2**). Grassland/shrubland (6.1 ha, 67.03%) and urbanised area (2.04 ha, 22.42%) are the dominant habitat types on-site. Other habitats within the PS include a small pond, a small area of inactive agricultural land, a small piece of seasonally wet grassland, a small area of reed and an abandoned irrigation ditch.

Grassland/shrubland is a very common habitat type in the New Territories. In low-lying areas it is often found on land which has been relatively recently disturbed, and is usually dominated by exotic, invasive species which can easily colonize such areas. Grassland/shrubland in the PS is believed to have been formed from abandoned agricultural land over the past 10-15 years following colonization of ruderal and invasive species.

An abandoned pond (0.50 ha, 5.49%) adjoins Fairview Park in the northwestern portion of the PS. Scattered, isolated and abandoned ponds are not uncommon on the landward fringe of the Deep Bay area. The pond on-site is largely dominated by exotic, invasive species such as *Ipomoea cairica* and *Brachiaria mutica*.

Small, scattered and isolated patches of reed are common in the northwest New Territories. Reeds (especially *Phragmites australis*) can easily colonize and spread in shallow water and are tolerant of periodic droughts. Reed habitat (totaling 0.22 ha, 2.42%) is located in the northeastern portion of the PS (adjacent to Fairview Park); *Phragmites australis* is the dominant vegetation in this habitat, and this patch is surrounded by exotic grass species such as *Panicum maximum* and *Mikania macrantha*.

Slightly above 22% (2.04 ha) of the PS comprised of urbanised area (i.e. paved waste ground); these areas are characterized by concreted ground, heavy anthropogenic disturbance and generally supported low faunal or floral diversity and usage.

A very small piece of seasonally wet grassland was found in the narrow portion of the site between the Northern Portion and the Southern Portion. It was about 0.1 ha in size and dominated by exotic herbs such as *Panicum maximum* and *Brachiaria mutica*. Such small areas of this habitat are not uncommon in northwestern New Territories.

8.5.1.2 *Habitats in the Assessment Area*

Eleven major habitat types are identified in the AA. These include an extensive urbanised area (123.64 ha, 67.42%), which is mainly low-rise residential areas, Fairview Park, and to a lesser extent, Palm Springs. Other dominant habitat types in the AA include ponds (19.22 ha, 10.48%; including the floodwater storage pond to the north of Fung Chuk Road: 0.92 ha) and grassland/shrubland (9.17 ha, 5.0%). Habitats (other than ponds) which are permanently or seasonally flooded within the AA comprise drainage channel (10.15 ha, 5.53%), active/inactive agricultural land (7.28 ha, 3.96%), scattered patches of seasonally wet grassland (4.17 ha, 2.28%), reed (3.43 ha, 1.87%), reed/marsh mosaic (1.33 ha, 0.73%), marsh (1.31 ha, 0.71%) and small watercourses (0.47 ha, 0.26%). The AA also includes plantation along roadsides and around villages, amounting to a total of 3.23 ha (1.76%).

Urbanised areas are subject to high or very high levels of anthropogenic disturbance such as human access, active management regime, traffic and noise. These areas generally support lower floral and habitat diversity. Fauna utilizing these areas are in general commensal and tolerant of such activities. Of these, extensive low-rise residential developments (developed area) and roads are predominantly concreted areas where habitat diversity is particularly impoverished. Fairview Park and Palm Springs are the largest long-established low-rise residential complexes situated in the Deep Bay Area which result in some fragmentation and disturbance to adjacent habitats. Likewise, linear structures such as roads fragment habitats and provide some disturbance to nearby habitats. Trees planted along these roads largely comprise fast-growing exotic species which serve landscape purposes but offer little habitat for wildlife.

Village area and agricultural land are also habitats under constant human disturbance and management, and vegetation in these areas is generally planted for ornamental, commercial or fruit production purposes. On the western side of the San Tin Highway, a number of villages are located along the Castle Peak Road; these include three villages to the east of Ha Chuk Yuen Road, and one to the north of Yau Pok Road. Northeast of the PS is a larger area of agricultural land, which is planted with mostly *Lactuca sativa*, *Brassica chinensis* and *Ipomoea batatas*. Some agricultural lands inside, however, were found to be inactive.

As discussed in Section 8.5.1.1 above, grassland/shrubland is formed after vegetation colonization and succession in abandoned areas of pond, agricultural land or newly disturbed/filled areas. In the absence of active human intervention, these habitats will eventually undergo further successional maturation.

At the northern periphery of the AA, further away from the PS, are several abandoned ponds which are contiguous and continuous with the ponds of the Deep Bay Area. These ponds are believed to have been abandoned for a long period of time; hence, vegetative encroachment by reed *Phragmites australis* and other exotics such as *Ipomoea aquatica* (which may eventually colonize the entire pond and change the habitat type) is apparent. Due to increased human disturbance from the adjacent areas and their location at the landward side of the Deep Bay Area, ponds within the AA generally support a lower abundance and diversity of wildlife than ponds in the Deep Bay Area. The ponds between Palm Springs and Fairview Park show signs of vegetation encroachment from the edges by common and/or exotic species such as *Ipomoea aquatica* and *Eichhornia crassipes*. Bunds surrounding these ponds support trees/shrubs such as *Macaranga tanarius* and *Leucaena leucocephala*. Isolated ponds within the AA are likewise dominated by common and widespread exotic species such as *Eichhornia crassipes*, *Ipomoea aquatica* and *Leucaena leucocephala*.

Drainage channels occupy a total area of 10.15 ha (5.53%). These include the Fairview Park Drainage Channel, which is tidal and highly polluted, the tidal Ngau Tam Mei Main Drainage Channel and several small, scattered and concrete-lined drainage channels. While most drainage channels are entirely or partly concreted, and therefore provide very little habitat for floral or faunal use, tidal drainage channels may provide foraging opportunities for birds during favourable tides. The banks of Ngau Tam Mei Main Drainage Channel have cellular concrete blocks which allow some vegetation establishment (subject to routine management), and species such as *Ophiopogon japonicas* and *Echinochloa crusgalli* are commonly found. Ha Chuk Yuen Drainage Channel is dominated by *Ludwigia perennis* and some exotic invasive herbs. Watercourses are also located within the AA, but they are all heavily polluted.

Habitats are discussed in more details with regard to floral and faunal diversity, and their respective ecological value for wildlife in Section 8.6 below.

Table 8-4 Habitats in PS and AA (ha)

Habitat	Project Site		Assessment Area		Total	
	(ha)	%	(ha)	%	(ha)	%
Agricultural land	0.12	1.32	7.28	3.96	7.40	3.84
Drainage Channel			10.15	5.53	10.15	5.27
Pond	0.50	5.49	19.22	10.48	19.72	10.24
Marsh			1.31	0.71	1.31	0.68
Plantation			3.23	1.76	3.23	1.68
Reed	0.22	2.42	3.43	1.87	3.65	1.90
Reed/Marsh			1.33	0.73	1.33	0.69
Seasonally Wet Grassland	0.10	1.10	4.17	2.28	4.27	2.22
Grassland/Shrubland	6.10	67.03	9.17	5.00	15.27	7.93
Abandoned Irrigation Ditch/ Watercourse	0.02	0.22	0.47	0.26	0.49	0.25
Urbanised Area	2.04	22.42	123.64	67.42	125.68	65.29
TOTAL	**9.10**	**100**	**183.40**	**100**	**192.5**	**100**

8.5.2 Faunal Survey Findings

8.5.2.1 Mammal

Two mammal species were recorded in the PS: Small Asian Mongoose *Herpestes javanicus* and Japanese Pipistrelle *Pipistrellus abramus*. These two species are common and widespread in the territory (Shek 2006). One individual of the former species was observed during a site visit in the

grassland/shrubland at the PS in August 2010. The second species was regularly seen flying over the PS and the AA.

8.5.2.2 Avifauna

A total of 77 bird species were recorded between January and July 2009 and between August and December 2010. Forty-five of which were recorded in the PS, 17 of which are bird species of interest. The number of individuals present was comparatively low in the context of Deep Bay Area. Bird species of interest recorded in the PS and the AA are detailed in **Table 8-5**. The respective conservation status follows that in Fellowes *et al.* (2002), IUCN Red List of Threatened Species and Wang (1998). All birds recorded from the monthly surveys and the habitats in which they were recorded are listed in **Appendix 8-2**.

No bird species of interest were recorded regularly within the PS in numbers potentially significant to the Deep Bay population. Within the PS, a higher diversity of birds was recorded in grassland/shrubland, but these comprise mainly common and widespread species, with 15 bird species of interest recorded, all of which from the Northern Portion, in very low numbers. A few ardeids were observed using the Northern Portion of the PS; these include (max in parentheses): Grey Heron (4), Great Egret (1), Intermediate Egret (1), Little Egret (3) and Chinese Pond Heron (8). Most of these birds were observed either in the pond or recorded perching on the overhead wire/trees, presumably to be birds disturbed either from the adjacent agricultural land or the NTM MDC.

Habitats in the wider AA support a slightly more diverse bird community. A total of 70 bird species was recorded in the AA, of which 32 are bird species of interest. Of the bird species of interest recorded, the Ngau Tam Mei Main Drainage Channel was shown to support a number of ardeids, including Little Egret (high count of 101 individuals was recorded in January 2009), Grey Heron (80) and Great Egret (65), both recorded in December 2010, Chinese Pond Heron (five recorded in August 2010) and Black-faced Spoonbill (up to six recorded in December 2010). Low numbers of Great Cormorant and other waders were also occasionally recorded in the channel. The diversity of other bird species is low compared to other drainage channels such as Yuen Long Bypass Floodway, and San Tin Main Drainage Channel. Other habitats with similar bird diversities include agricultural land, grassland/shrubland, and pond. However, most species present are common and widespread and are not of conservation importance. The channel, despite its concreted bottom and regular human disturbance, supports a moderate number of foraging ardeids, particularly in winter when high numbers of ardeids congregate at favourable foraging sites. Food items are brought in by tides and the channel offers such a site for opportunistic birds like Little Egrets.

Table 8-5 Mean number of individuals, number of surveys and maximum count of bird species of interest recorded in the PS and the AA during January to July 2009 & August to December 2010, and their conservation status

Species Name	Level of Concern	Project Site			Assessment Area		
		Survey*	Mean	Max	Survey*	Mean	Max
Little Grebe *Tachybaptus ruficollis*	Local Concern (Fellowes *et al*. 2002), (1)				2	0.17	1
Great Cormorant *Phalacrocorax carbo*	Potential Regional Concern (Fellowes *et al.* 2002) , (1)				5	2.17	16
Grey Heron *Ardea cinerea*	Potential Regional Concern (Fellowes *et al.* 2002) , (1)	3	0.50	4	4	14.67	91
Purple Heron *Ardea purpurea*	Regional Concern (Fellowes *et al*. 2002), (1)				1	0.17	2
Great Egret *Ardea alba*	Potential Regional Concern (Fellowes *et al.* 2002) , (1)	1	0.08	1	8	12.00	65
Intermediate Egret *Egretta intermedia*	Regional Concern (Fellowes *et al.* 2002), (1)	1	0.08	1			

Species Name	Level of Concern	Project Site			Assessment Area		
		Survey*	Mean	Max	Survey*	Mean	Max
Little Egret *Egretta garzetta*	Potential Regional Concern (Fellowes *et al.* 2002) , (1)	5	0.67	3	8	28.67	160
Chinese Pond Heron *Ardeola bacchus*	Potential Regional Concern (Fellowes *et al.* 2002) , (1)	5	1.00	8	9	4.84	13
Black-crowned Night Heron *Nycticorax nycticorax*	Local Concern (Fellowes *et al*. 2002) , (1)	1	0.08	1	1	0.08	1
Black-faced Spoonbill *Platalea minor*	Potential Global Concern (Fellowes *et al.* 2002), Endangered (IUCN 2010), (1)				2	0.67	6
Common Teal *Anas crecca*	Regional Concern (Fellowes *et al*. 2002) , (1)				1	0.42	5
White-breasted Waterhen *Amaurornis phoenicurus*	(1)	4	0.42	2	9	1.59	5
Common Moorhen *Gallinula chloropus*	(1)				2	0.58	4
Greater Painted Snipe *Rostratula benghalensis*	Local Concern (Fellowes *et al*. 2002) , (1)				3	0.67	6
Black-winged Stilt Himantopus himantopus	Regional Concern (Fellowes *et al*. 2002) , (1)				1	0.08	1
Little Ringed Plover Charadrius dubius	Local Concern (Fellowes *et al*. 2002) , (1)	1	0.08	1	6	2.42	10
Common Greensheak *Tringa nebularia*	Regional Concern (Fellowes *et al*. 2002) , (1)				1	0.17	1
Pintail Snipe/ Swinhoe's Snipe [(2)] *Gallinago stenura* / *G. megala*	Swinhoe's Snipe: Local Concern (Fellowes *et al*. 2002); both: (1)	2	0.33	3	2	0.83	6
Green Sandpiper *Tringa ochropus*	(1)				6	1.09	6
Wood Sandpiper *Tringa glareola*	Local Concern (Fellowes *et al*. 2002) , (1)				2	0.25	2
Common Sandpiper *Actitis hypoleucos*	(1)				4	0.42	2
Greater Coucal *Centropus sinensis*	Vulnerable (Wang 1998a)[(3)]	4	0.50	2	11	1.34	3
Common Kingfisher *Alcedo atthis*	(1)	1	0.08	1	7	1.34	4
White-throated Kingfisher *Halcyon smyrnensis*	Local Concern (Fellowes *et al*. 2002) , (1)	3	0.25	1	5	0.42	1
Yellow Wagtail *Motacilla flava*	(1)	2	0.33	3	4	0.91	3
Grey Wagtail *Motacilla cinerea*	(1)				2	0.17	1
Red-throated Pipit *Anthus cervinus*	Local Concern (Fellowes *et al*. 2002) , (1)				3	0.83	7
Pallas's Grasshopper Warbler *Locustella certhiola*	Local Concern (Fellowes *et al*. 2002) , (1)				1	0.08	1

Species Name	Level of Concern	Project Site			Assessment Area		
		Survey*	Mean	Max	Survey*	Mean	Max
Blunt-winged Warbler *Acrocephalus concinens*	(1)	1	0.08	1			
Zitting Cisticola *Cisticola juncidis*	Local Concern (Fellowes *et al*. 2002), (1)	4	0.92	4	4	0.75	4
Bright-capped Cisticola *Cisticola exilis*	Local Concern (Fellowes *et al*. 2002)				1	0.08	1
Yellow-billed Grosbeak Eophona migratoria	Local Concern (Fellowes *et al*. 2002)				1	0.08	1
Red-billed Starling *Sturnus sericeus*	Global Concern [(4)] (Fellowes *et al*. 2002)	4	1.00	6	4	8.58	64
White-shouldered Starling *Sturnus sinensis*	(Local Concern) (Fellowes *et al*. 2002)	1	0.17	2			
Collared Crow *Corvus torquatus*	Local Concern (Fellowes *et al*. 2002), (1)				2	0.17	1

* Number of surveys recorded

(1) indicates *wetland-dependent species*.

(2) Pintail Snipe (which is of no conservation concern) and Swinhoe's Snipe (which is a species of Local concern) are not distinguishable in the field.

(3) Greater Coucal is listed as 'Vulnerable' in China Red Data Book of Endangered Animals and is protected as national second-grade wildlife of China.

(4) Red-billed Starling is considered by Fellowes *et al*. (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is no longer considered globally threatened. (BirdLife International 2010). A listing of Regional Concern (RC), based on the importance of the large roost present near Deep Bay, is considered to be more appropriate.

8.5.2.3 Bird Flight Line

For the survey conducted in March 2009, a total of 15 observations (20 birds in total) were recorded. One more survey was conducted in July 2009 and 21 observations (73 birds in total) were recorded. Details of the findings are given in **Appendix 8-3**.

A flight line is defined here as a pathway used regularly by one or more individuals of bird or bat over a period of time between a breeding ground to a foraging area (such as during egretry breeding season) and/or between a foraging area and a roosting site (such as cormorant roost in winter). Based on observations during the two periods, we found that the number of observations is low and no obvious direction was observed. It is concluded that there were no such flights lines over the PS. The observed birds in flight were mainly over the Ngau Tam Mei Main Drainage Channel and the northern part of the PS; few observations were made over the southern part. Birds in flight were mainly observed from the developed area on the eastern side of Ngau Tam Mei Channel to the ponds on the northwestern side of the AA, and most of them passed through Fairview Park.

8.5.2.4 Egrets Recorded During Breeding Season

The breeding season of egrets in Deep Bay generally falls within the months of March to August but the exact period varies slightly from year to year (primarily due to variation in rainfall). In the surveying period, egretry breeding season was reported to fall between April and July (Anon 2010).

The Project Site lies within the potential foraging distance of two active egretries at Mai Po Village (1,800 m from the Site) and Mai Po Lung (2,300 m). Ardieds known to breed in these two egretries include Little Egret and Chinese Pond Heron.

Very low numbers of Little Egret (max 1) and Chinese Pond Heron were recorded between April and July 2009. **Table 8-6** below outlines the number of birds of these two species recorded during the egret breeding season.

Table 8-6 Number of Little Egret and Chinese Pond Heron recorded on-site during the breeding season 2009

Species \ Habitat	Apr	May	Jun	Jul
Little Egret	-	-		1
Chinese Pond Heron	1	-	1	-

8.5.2.5 Herpetofauna (Amphibian)

A total of eight amphibian species were recorded between March and May 2009 and between August and October 2010, of which five were recorded in the PS. Summary of the survey findings is outlined in **Table 8-7** below, while details of these findings are provided in **Appendix 8-4**.

All species recorded are common and widespread in Hong Kong (Chan et al. 2005) and no species of conservation importance were observed; all species were recorded in low to very low numbers.

Table 8-7 Amphibian species recorded in the PS and the AA during March - May 2009 & Aug – Oct 2010 and their conservation status

Species Name	Level of Concern	Project Site	Assessment Area
		Mean*	Mean*
Asian Common Toad *Bufo melanostictus*	-		3.50
Spotted Narrow-mouthed Frog Kalophrynus interlineatus	-	0.17	
Asiatic Painted Frog *Kaloula pulchra*	-	0.34	0.50
Ornate Pigmy Frog *Microhyla ornata*	-	0.50	13.33
Marbled Pigmy Frog *Microhyla pulchra*	-		0.67
Paddy Frog *Fejervarya limnocharis*	-		3.67
Günther's Frog *Rana guentheri*	-	1	3.50
Brown Tree Frog *Polypedates megacephalus*	-	0.50	4.50

* mean number recorded out of six surveys.

8.5.2.6 Herpetofauna (Reptile)

Four reptile species were recorded between March and May 2009 and between August and October 2010. These species are widespread and common in Hong Kong (Karsen *et al*. 1998) and of no conservation concern. A summary of the survey findings is outlined in

Table 8-8 below, while details of these findings are provided in **Appendix 8-4**.

Table 8-8 Reptilian species recorded in the PS and the AA during March - May 2009 & Aug – Oct 2010 and their conservation status

Common Name	Species Name	Level of Concern	Project Site	Assessment Area
			Mean*	Mean*
Chinese Gecko	*Gekko chinensis*	-	-	0.33
Bowring's Gecko	*Hemidactylus bowringii*	-	-	0.67
Chinese Skink	*Eumeces chinensis*	-	-	0.17
Reeves' Smooth Skink	*Scincella reevesii*	-	0.17	0.17

* mean number recorded out of six surveys.

8.5.2.7 Butterfly

A total of 34 butterfly species were recorded between March and May 2009 and between August and October 2010; of which 13 were recorded in the PS. Two species of conservation concern were recorded – Pale Palm Dart *Telicota colon* and Danaid Egg-fly *Hypolimnas misippus*; both are listed as 'Local Concern' by Fellowes *et al*. (2002). The former was recorded once at a marsh next to Palm Springs (within AA, but outside PS) and the latter was also recorded once in a plantation (also within AA, not PS). More recent research into the local restrictedness of the butterflies in Hong Kong indicated that Pale Palm Dart is considered locally rare (Chan *et al.* 2011). Both species are considered widespread in Hong Kong by Lo (2004). All species were recorded in low to very low numbers. Summary of the survey findings are outlined in **Table 8-9** below, while details of these findings are provided in **Appendix 8-5**.

Table 8-9 Butterfly species recorded in the PS and the AA during March - May 2009 & Aug – Oct 2010 and their conservation status

Common Name	Species Name	Level of Concern	Project Site	Assessment Area
			Mean*	Mean*
Pale Palm Dart	*Telicota colon*	Local Concern (Fellowes *et al*. 2002)		0.17
Greenish Palm Dart	*Telicota ancilla*	-		0.33
Common Straight Swift	*Parnara guttata*	-		0.17
Common Bluebottle	*Graphium sarpedon*	-		1.17
Common Jay	*Graphium doson*	-		0.17
Tailed Jay	*Graphium agamemnon*	-		0.17
Common Mime	*Chilasa clytia*	-		0.17
Red Helen	*Papilio helenus*	-		0.17
Common Mormon	*Papilio polytes*	-	0.33	2.00
Great Mormon	*Papilio memnon*	-		0.17
Spangle	*Papilio protenor*	-		0.50
Paris Peacock	*Papilio paris*	-		0.17
Indian Cabbage White	*Pieris canidia*	-	0.50	3.50
Great Orange Tip	*Hebomoia glaucippe*	-		0.17
Mottled Emigrant	*Catopsilia pyranthe*	-		0.50
Lemon Emigrant	*Catopsilia pomona*	-		0.17
Common Gull	*Cepora nerissa*	-	3.34	0.17
Common Grass Yellow	*Eurema hecabe*	-	2.00	6.50
Three-spot Grass Yellow	*Eurema blanda*	-	0.34	

Common Name	Species Name	Level of Concern	Project Site	Assessment Area
			Mean*	Mean*
Pale Grass Blue	*Zizeeria maha*	-	0.67	5.17
Tailed Cupid	*Everes lacturnus*	-		0.17
Quaker	*Neopithecops zalmora*	-	1.00	
Common Hedge Blue	*Acytolepis puspa*	-		0.17
Dark-brand Bush Brown	*Mycalesis mineus*	-	0.67	2.67
Common Five-ring	*Ypthima baldus*	-		0.17
Angled Castor	*Ariadne ariadne*	-	0.83	1.33
Peacock Pansy	*Junonia almana*	-	0.67	
Grey Pansy	*Junonia atlites*	-	0.33	2.17
Great Egg-fly	*Hypolimnas bolina*	-		0.33
Danaid Egg-fly	*Hypolimnas misippus*	Local Concern (Fellowes *et al*. 2002)		0.17
Common Sailer	*Neptis hylas*	-	0.17	0.17
Red-ring Skirt	*Hestina assimilis*	-		0.17
Common Tiger	*Danaus genutia*	-		0.50
Blue Admiral	*Kaniska canace*	-	1.50	

* mean number recorded out of six surveys.

8.5.2.8 Dragonfly

A total of 22 dragonfly species was recorded between March and May 2009 and between August and October 2010, of which 12 were recorded in the PS. Two species, Coastal Glider *Macrodiplax cora* and Scarlet Basker *Urothemis signata*, are considered to be of "Local Concern" by Fellowes *et al*. (2002). The former species, however, is one of the most abundant and widespread species globally and the latter is now considered to be common in Hong Kong (Wilson 2004), while the latter has increased considerably in recent years and is also considered to be common and widespread in overgrown pond areas in Deep Bay Area (Wilson 2004). These two species were not recorded inside the PS. It should also be noted that, except Wandering Glider *Pantala flavescens*, all species were recorded in low numbers. Summary of the survey findings are outlined in **Table 8-10** below, while details of these findings are provided in **Appendix 8-6**.

Table 8-10 Dragonfly species recorded in the PS and the AA during March - May 2009 & Aug – Oct 2010 and their conservation status

Common Name	Species Name	Level of Concern	Project Site	Assessment Area
			Mean*	Mean*
Wandering Midget	*Agriocnemis pygmaea*	-	0.17	
Orange-tailed Sprite	*Agriocnemis femina*	-	0.17	0.17
Common Bluetail	*Ischnura senegalensis*	-	1.67	0.33
Pale-spotted Emperor	*Anax guttatus*	-		0.33
Common Flangetail	*Ictinogomphus pertinax*	-		0.67
Asian Pintail	*Acisoma panorpoides*	-		0.17
Blue Dasher	*Brachydiplax chalybea*	-	1.00	1.00
Asian Amberwing	*Brachythemis contaminata*	-	0.50	3.67

Common Name	Species Name	Level of Concern	Project Site	Assessment Area
			Mean*	Mean*
Crimson Darter	*Crocothemis servilia*	-	0.50	4.00
Blue Percher	*Diplacodes trivialis*	-		0.17
Amber-winged Glider	*Hydrobasileus croceus*	-	0.17	0.34
Coastal Glider	*Macrodiplax cora*	Local Concern (Fellowes *et al*. 2002)		0.33
Pied Percher	*Neurothemis tullia*	-	1.84	4.50
Common Red Skimmer	*Orthetrum pruinosum*	-		0.67
Green Skimmer	*Orthetrum sabina*	-	0.17	5.84
Wandering Glider	*Pantala flavescens*	-	28.00	77.17
Pied Skimmer	*Pseudothemis zonata*	-		0.83
Variegated Flutterer	*Rhyothemis variegata*	-	0.50	4.50
Evening Skimmer	*Tholymis tillarga*	-		0.50
Saddlebag Glider	*Tramea virginia*	-	0.17	0.50
Crimson Dropwing	*Trithemis aurora*	-		0.33
Scarlet Basker	*Urothemis signata*	Local Concern (Fellowes *et al*. 2002)		1.00

* mean number recorded out of six surveys.

8.6 Evaluation of Habitat Value

8.6.1 Habitats in the PS

8.6.1.1 Reed

A small piece of reed (0.22ha; 2.42-6% of PS in total) was found within the PS. Two bird species, one herpetofauna species, five butterfly species and six dragonfly species were recorded. Bird species of interest recorded in this habitat was one Blunt-winged Warbler *Acrocephalus concinens.* This species is an occasional visitor to Hong Kong and thus has even not been assessed in Fellowes *et al.* (2002). Other fauna species recorded are all of no conservation concern.

Table 8-11 Ecological evaluation of reed within the PS

Criteria	Reed
Naturalness	Natural habitat through succession of abandoned agricultural land.
Size	Very small within the PS and negligible in a Hong Kong context.
Diversity	Very low.
Rarity	A fairly common habitat in the New Territories. Plants species recorded are mainly common/ very common species. 1 Blunt-winged Warbler *Acrocephalus concinens* was recorded. This species is an occasional visitor to Hong Kong and thus has even not been assessed in Fellowes *et al.* (2002). Other fauna species are of no conservation concern.
Re-creatability	Readily re-creatable.
Fragmentation	Fragmented.

Criteria	Reed
Ecological linkage	No significant functional linkages with habitats of ecological significance.
Potential value	Limited due to the isolated nature.
Nursery /breeding ground	No known significant nursery or breeding ground.
Age	Within the past few years.
Abundance /Richness of wildlife	Very low.
Ecological value	**Low.**

8.6.1.2 Grassland/Shrubland

Grassland/shrubland is the predominant habitat type within the PS, comprising 6.10 ha (67.03%). The PS comprised agricultural fields and aquaculture in the early 1990s, but has been colonized by natural succession of native and exotic species after site abandonment. Vegetation comprised of exotic species, including *Brachiaria mutica, Bidens alba*, *Panicum maximum, Mimosa pudica*, and *Wedelia trilobata*, and a few scattered tree species, including exotic *Leucaena leucocephala* and native *Macaranga tanarius* and *Celtis sinensis*.

Fauna recorded using this habitat were generally widespread and common species favouring open habitats. Forty-one bird species were recorded at the Northern Portion, including 15 bird species of interest (max. counts: three Grey Heron, one Intermediate Egret, three Little Egret, eight Chinese Pond Heron, one Black-crowned Night Heron, two White-breasted Waterhen, one Little Ringed Plover, three Pintail Snipe/Swinhoe's Snipe, two Greater Coucal, one Common Kingfisher, one White-throated Kingfisher, three Yellow Wagtail, four Zitting Cisticola, six Red-billed Starling and two White-shouldered Starling), while 22 bird species were recorded at the Southern Portion, including five bird species of interest (max counts: one Grey Heron, One Little Egret, One Little Ringed Plover, two Zitting Cisticola and four Red-billed Starling).It should be noted that, Pintail Snipe (which is of no conservation concern) and Swinhole Snipe are not distinguishable in the field. Most of the ardieds recorded on-site were recorded perching on the overhead wire and/or isolated trees; these were presumed to be birds temporarily disturbed from either the adjacent agricultural land or the NTM MDC. All these bird species are common and widespread in the Deep Bay Area, and they are all recorded in low to very low numbers in a Deep Bay context. Six herpetofauna, 11 butterfly and eight dragonfly species were recorded. One Small Asian Mongoose was also observed. All these faunas, however, are common and widespread and of no conservation importance.

An additional site visit was conducted on 27 July 2011. Most of the PS, which was covered with Grassland/ Shrubland, was found to be completely dry, despite the fact that a heavy rainstorm had occurred in the previous week. The vegetation composition of this habitat within the PS was still dominated by exotic and weedy species, such as grass *Brachiaria mutica* and *Panicum maximum*, and other herbs such as *Bidens alba* and *Wedelia trilobata.*

Table 8-12 Ecological evaluation of grassland/shrubland within the PS

Criteria	Grassland/shrubland	
	Southern Portion	**Northern Portion**
Naturalness	Natural habitat through succession of abandoned agricultural land.	Natural habitat through succession of abandoned pond and agricultural land.
Size	Large within the PS but small in a Hong Kong context.	Large within the PS but small in a Hong Kong context.
Diversity	Low bird diversity (22 species comprising of mainly common birds and 5 bird species of interest). No other faunas were recorded.	Low to moderate bird diversity (41 species) (comprising of mainly common birds and 15 bird species of interest). Diversities of other fauna were very low: 6 herpetofauna, 11 butterfly and 8 dragonfly species were recorded. Invasive and ruderal species dominated the plant community with 50 species recorded.
Rarity	A common habitat in the New Territories. Flora community was dominated by invasive and ruderal species. Five bird species of interest observed; all re common and widespread in the Deep Bay Area and are all recorded in very low numbers.	A common habitat in the New Territories. Flora community was dominated by invasive and ruderal species. 15 bird species of interest observed; all are common and widespread in the Deep Bay Area, and are all recorded in low to very low numbers in a Deep Bay context. Other faunas recorded are common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.	Readily re-creatable.
Fragmentation	Fragmented by road networks and developed areas.	Fragmented by road networks and developed areas.
Ecological linkage	No significant functional linkages with habitats of ecological significance.	No significant functional linkages with habitats of ecological significance.
Potential value	Very limited due to the isolated nature.	Limited due to the isolated nature.
Nursery /breeding ground	No known significant nursery or breeding ground.	No known significant nursery or breeding ground.
Age	Within the past decades.	Within the past few years.
Abundance /Richness of wildlife	Low bird diversity (mainly consisted of common species), but abundance was very low. Diversities and abundances of other groups are very low.	Low to moderate bird diversity (mainly consisted of common species), but abundance was very low. Diversities and abundances of other groups are very low.
Ecological value	**Low.**	**Low to Moderate.**

8.6.1.3 Urbanised Area

Urbanised area within the PS included mainly waste ground. It is largely concrete-paved and is not of high ecological value. Eleven bird, three butterfly and one dragonfly species were observed; all of them are common and of no conservation importance. No other fauna were recorded.

Table 8-13 Ecological evaluation of urbanised area within the PS

Criteria	Urbanised Area
Naturalness	Derived from abandonment of man-made habitats.
Size	Moderate in size within the PS (2.04 ha).
Diversity	Low plant diversity (30 species) and structural complexity; low faunal diversity: 11 bird, 3 butterfly and 1 dragonfly species.
Rarity	A very common habitat in Hong Kong and edge of the Deep Bay wetlands. Plants species recorded are mainly common/ very common species. All fauna species recorded are common and of no conservation concern.
Re-creatability	Readily re-creatable.
Fragmentation	Fragmented.
Ecological linkage	No significant linkages with habitats of ecological significance.
Potential value	Limited potential in its current form.
Nursery /breeding ground	No known significant nursery or breeding grounds.
Age	Unknown.
Abundance /Richness of wildlife	Low abundance and diversity of wildlife commensal with human activity.
Ecological value	**Very Low.**

8.6.1.4 Pond

There is one small pond in the PS (0.5 ha), with very poor plant diversity. Two bird species were observed and they are of interest (max counts: one White-breasted Waterhen and one Grey Heron). One butterfly and four dragonfly species were also recorded, but they are all common and of no conservation concern. No other fauna were recorded.

Table 8-14 Ecological evaluation of pond within the PS

Criteria	Pond
Naturalness	The habitat is originally man made.
Size	Small in size within the PS (0.50 ha) and very small in a Hong Kong context.
Diversity	Very low plant species diversity (3 species) and structural complexity. Very low faunal diversity: 2 bird, 1 butterfly and 4 dragonfly species.
Rarity	A common habitat type particularly in Deep Bay Area. Plants species recorded are mainly common/ very common species. Although 2 bird species of interest observed, they are common and widespread in the Deep Bay Area, and are all recorded in very low numbers in a Deep Bay context. Other faunas recorded are common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.
Fragmentation	Highly fragmented.
Ecological linkage	Limited linkages with adjacent habitats.
Potential value	Limited potential value due to small size and its isolated nature.

Criteria	Pond
Nursery /breeding ground	No significant nursery or breeding ground known.
Age	Unknown.
Abundance /Richness of wildlife	Low abundance and diversity of wildlife.
Ecological value	**Low.**

8.6.1.5 Agricultural Land

A small area of inactive dry agricultural land (0.12 ha, 1.32%) is situated in the northeast corner of the PS. This small area is dominated by exotic weedy grasses *Brachiaria mutica* and *Paspalum conjugatum*, and a few isolated patches of weedy herbs such as *Ageratum conyzoides* and *Conyza canadensis*. A few stems of reed *Phragmites australis* were recorded in this dry habitat. Due to its past management regime and small size, this habitat has limited ecological value for wildlife, although the area is used by small numbers of migratory birds when the fields are temporarily flooded. Ten bird species were recorded and three are species of interest (max. counts: one Little Egret, one Great Egret and one Chinese Pond Heron). No other fauna species were recorded in this small agricultural land.

Table 8-15 Ecological evaluation of agricultural land within the PS

Criteria	Agricultural Land
Naturalness	Anthropogenic.
Size	Very small in size within the PS (0.12 ha) and in a Hong Kong context.
Diversity	Very low plant species diversity (14 species) and structural complexity. Very low faunal species diversity: only 10 bird species.
Rarity	A common but decreasing habitat in the New Territories. Plants species recorded are mainly common/ very common species. Although 3 bird species of interest observed, they are common and widespread and are all recorded in very low numbers in a Deep Bay context. No other faunas were recorded.
Re-creatability	Readily re-creatable.
Fragmentation	Somewhat fragmented by the drainage channel/road network.
Ecological linkage	Not much functional linkages.
Potential value	Low due to small size, frequent disturbance and management regime.
Nursery /breeding ground	Not suitable as a nursery or breeding ground.
Age	Within the last few decades.
Abundance /Richness of wildlife	Low abundance and diversity of wildlife.
Ecological value	**Low.**

8.6.1.6 Seasonally Wet Grassland

A small piece of seasonally wet grassland (0.1 ha, 1.10%) is situated in the middle portion of the PS. Although it is called “seasonally” wet, we consider that it would only be wet for a very short period of time (i.e. only shortly after very heavy rain). Indeed, during our site visit on 27 July 2011, this piece of

seasonally wet grassland was largely dry (only a small portion remained wet), despite the fact that a heavy rainstorm had occurred in the previous week. This piece of seasonally wet habitat is dominated by common grass species (such as *Panicum maximum* and *Pennisetum alopecurodies*). Only a few individuals of wetland plants, including *Commelina diffusa* and *Cyperus exaltatus,* which are tolerant to periodic drought condition, were recorded. No fauna were recorded in this habitat.

Table 8-16 Ecological evaluation of seasonally wet grassland within the PS

Criteria	Seasonally wet grassland
Naturalness	Natural habitat through succession of abandoned agricultural land.
Size	Very small in size within the PS (0.1 ha) and in a Hong Kong context.
Diversity	Very low plant species diversity (8 species), no fauna recorded.
Rarity	A common habitat in the New Territories. Plants species recorded are mainly common/ very common species.
Re-creatability	Readily re-creatable.
Fragmentation	Somewhat fragmented by the drainage channel/road network.
Ecological linkage	Not much functional linkages.
Potential value	Low due to small size, frequent disturbance and management regime.
Nursery /breeding ground	Not suitable as a nursery or breeding ground.
Age	Within the last few months.
Abundance /Richness of wildlife	Very low abundance and diversity of wildlife.
Ecological value	**Very low.**

8.6.1.7 Abandoned Irrigation Ditch

A very small ditch (0.02 ha, 205 m in length) lies in the northern part of the PS. This is likely to be an abandoned irrigation ditch and is largely polluted; as such it is not favoured by wildlife. Only three bird species were recorded, including two bird species of interest (one Chinese Pond Heron and two Little Egrets (max. counts)). No other fauna species were recorded. This habitat is dominated by common grasses *Brachiaria mutica* and *Cynodon dactylon* along the banks of the ditch. A few small isolated patches of wetland herb *Alternanthera sessilis* and *Commelina diffusa*, and other weedy herbs including *Bidens alba* and *Mimosa pudica* were also recorded.

Table 8-17 Ecological evaluation of abandoned irrigation ditch within the PS

Criteria	Abandoned Irrigation Ditch
Naturalness	Semi-natural.
Size	Small (0.02 ha).
Diversity	Low plant (16 species) and very low fauna species (3 bird species only) diversity and structural complexity.
Rarity	Small ditches are common in Hong Kong. Plants species recorded are mainly common/ very common species. Although 2 bird species of interest observed, they are common and widespread in the Deep Bay Area, and are all recorded in low to very low numbers in a Deep Bay context. No other faunas were recorded.
Re-creatability	Readily re-creatable.
Fragmentation	Isolated.

Criteria	Abandoned Irrigation Ditch
Ecological linkage	Limited linkages with the adjacent habitats.
Potential value	Negligible as it is isolated.
Nursery /breeding ground	No significant nursery or breeding ground known.
Age	Within the last few decades.
Abundance /Richness of wildlife	Very low abundance and diversity of wildlife.
Ecological value	**Very low.**

8.6.2 Habitats within the Assessment Area

8.6.2.1 Reed

Reed habitats (3.43 ha) are presented in the AA and most of them have developed from abandoned ponds in between Fairview Park and Palm Springs. They are not close to the PS, and are separated from the PS by developed areas such as Fairview Park and the Main Drainage Channel. Fifteen bird species were recorded and six are species of interest (max. counts: two Great Cormorant, one Grey Heron, one Purple Heron, one Little Egret, four White-breasted Waterhen and 13 Red-billed Starling). It should be noted however, that most of the sightings for this habitat came from one reed area developed from an abandoned pond located between Palm Springs and Fairview Park. This reed is separated completely from the PS by Fairview Park and is relatively far away from the PS (i.e. about 300 m). Other reed habitats did not support high bird diversity. Six herpetofauna, one butterfly and four dragonfly species were recorded. They are all of no conservation concern. No other fauna were recorded.

Table 8-18 Ecological evaluation of reed within the AA

Criteria	Reed
Naturalness	Natural habitat through succession of abandoned agricultural land/ponds.
Size	Small within the AA and in a Hong Kong context.
Diversity	Low: 13 flora, 15 bird, 6 herpetofauna, 1 butterfly and 4 dragonfly species.
Rarity	A fairly common habitat in the New Territories. Plants species recorded are mainly common/ very common species. Although 6 bird species of interest observed, they are common and widespread in the Deep Bay Area, and are all recorded in low to very low numbers in a Deep Bay context. Other faunas recorded are common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.
Fragmentation	Reed in between Fairview Park and Palm Springs would have some linkage to the Deep Bay Area. Others are largely isolated.
Ecological linkage	Reed in between Fairview Park and Palm Springs would have some linkage to the Deep Bay Area.
Potential value	Reed in between Fairview Park and Palm Springs would have some value due to their linkage to the Deep Bay Area. Others are low.
Nursery /breeding ground	No known significant nursery or breeding ground.
Age	Within the past few decades.
Abundance /Richness of wildlife	Low abundance and diversity of wildlife.

Criteria	Reed
Ecological value	Reed in between Fairview Park and Palm Springs would be **low to moderate**. Others are **low**.

8.6.2.2 Reed/Marsh

A single area of reed/marsh habitat (1.33 ha) is present in the AA. Although it qualifies as reed/marsh due to its plant community, its ecological function is highly compromised by human activities which includes dumping and burning of garbage by local villagers. This is reflected in the low species diversity and abundance recorded: only 12 bird species were recorded, including three bird species of interest: Zitting Cisticola (maximum count, 1), Grey Heron (1) and White-breasted Waterhens (2) were observed. Other fauna observed included two butterfly and four dragonfly species. They are all of no conservation concern.

Table 8-19 Ecological evaluation of reed/marsh within the AA

Criteria	Reed/Marsh
Naturalness	Natural habitat through succession of abandoned pond.
Size	Very small within the AA and negligible in a Hong Kong context.
Diversity	Low: 17 plant, 12 bird, 2 butterfly and 4 dragonfly species recorded.
Rarity	A fairly common habitat in the New Territories. Plants species recorded are mainly exotic/ common/ very common species. Although 3 bird species of interest observed, they are common and widespread in the Deep Bay Area, and are all recorded in low to very low numbers in a Deep Bay context. Other faunas recorded are common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.
Fragmentation	Fragmented.
Ecological linkage	Limited linkages with habitats of ecological significance.
Potential value	Limited due to the relatively isolated nature.
Nursery /breeding ground	No known significant nursery or breeding ground.
Age	Within the past few years.
Abundance /Richness of wildlife	Very low.
Ecological value	**Low.**

8.6.2.3 Urbanised Area

The road network, developed area and open storage within the AA are extensive, comprising 67.42% of the AA (123.64 ha). These areas are characterized by high levels of disturbance by anthropogenic factors and a low plant diversity containing a large number of exotic species.

Fauna diversity found in these highly disturbed, largely anthropogenic habitats is low. Only 13 bird species were recorded within this area. Of these, two birds (max. counts: five Greater Coucal and 43 Red-billed Starling) are species of interest. One frog, six butterfly and three dragonfly species were observed. All of them are of no conservation concern.

Table 8-20 Ecological Evaluation of Urbanised Area within the AA

Criteria	Urbanised Area
Naturalness	Entirely man-made.
Size	Large within the AA 123.64 ha but small in a Hong Kong context.
Diversity	Low habitat heterogeneity. plant diversity moderate (156 species), but most are common/ very common species; low fauna diversity: 13 bird, 1 frog, 6 butterfly and 3 dragonfly species recorded.
Rarity	A common habitat in Hong Kong. Plants species recorded are mainly common/ very common species. Although 2 bird species of interest observed, they are common and widespread in the Deep Bay Area, and are all recorded in low to very low numbers in a Deep Bay context. Other faunas recorded are common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.
Fragmentation	Fragmented.
Ecological linkage	No significant linkages with habitats of ecological significance.
Potential value	Low.
Nursery /breeding ground	No known significant nursery or breeding grounds.
Age	Within the last few decades.
Abundance /Richness of wildlife	Low abundance and diversity of wildlife commensal with human activity.
Ecological value	**Very Low.**

8.6.2.4 Pond

Pond areas comprise 10.48% of the AA (19.22 ha), and comprise an extensive area between Palm Springs and Fairview Park, a concreted floodwater storage pond north of Fung Chuk Road and other isolated ponds. Mainly situated northward between Palm Springs and Fairview Park, this area lies on the landward side of the Deep Bay pond complex. Apart from a footpath, which is used by a small number of villagers, the ponds are otherwise undisturbed. During the survey period, 34 bird species were recorded and 16 of them were species of interest (max. counts: one Little Grebe, 16 Great Cormorant, four Grey Heron, one Purple heron, 12 Great Egret, 73 Little Egret, 12 Chinese Pond Heron, four White-breasted Waterhen, three Common Moorhen, one Common Sandpiper, six Common Kingfisher, 34 Red-billed Starling, one Wood Sandpiper, one White-throated Kingfisher, one Green Sandpiper and one Yellow Wagtail). It should be noted however, that these species were mainly recorded in ponds closer to the Deep Bay Area (those near the northwestern boundary of the AA between Fairview Park and Palm Springs), and these ponds are largely separated from the PS by Fairview Park. Five herpetofauna, 13 butterfly and 16 dragonfly species were also recorded. One dragonfly, Scarlet Basker, is considered to be of conservation concern. However, the abundance of this species was very low (max count: 3) and it was mainly observed in a pond close to Palm Springs. Other isolated ponds such as those on the eastern side of the Ngau Tam Mei Main Drainage Channel are too disturbed and fragmented to be of significant value to wildlife.

Table 8-21 Ecological Evaluation of Pond within the AA

Criteria	Pond
Naturalness	The habitat is originally man-made.
Size	Relatively large within the AA (19.22 ha) but small in a Hong Kong context.
Diversity	Moderate plant species diversity (87 species), but most are common/ very common species; moderate bird diversity (34) but other fauna low to moderate: 5 herpetofauna, 13 butterfly and 16 dragonfly.
Rarity	A common habitat in Hong Kong but area is decreasing due to development. 16 bird species of interest and 1 dragonfly species of conservation concern were recorded, but in low numbers as compared to the Deep Bay populations. Plant species are mainly common/ very common.
Re-creatability	Readily re-creatable.
Fragmentation	Ponds in between Palm Springs and Fairview Park would be fragmented but may still have some linkages with Deep Bay Area. Ponds to the east of the Ngau Tam Mei Channel can be considered as isolated.
Ecological linkage	Ponds in between Palm Springs and Fairview Park would have some linkages with Deep Bay Area. Ponds to the east of the Ngau Tam Mei Channel are considered to have little linkages with other high-valued habitats.
Potential value	Ponds in between Palm Springs and Fairview Park would have higher potential. Ponds to the east of the Ngau Tam Mei Channel are considered to have low potential.
Nursery /breeding ground	No significant nursery or breeding ground known.
Age	Unknown.
Abundance /Richness of wildlife	Moderate.
Ecological value	Ponds in between Palm Springs and Fairview Park would have **moderate** value. Ponds to the east of the Ngau Tam Mei Channel are considered to have **low** value.

8.6.2.5 Grassland/shrubland

Several patches of grassland/shrubland (totaling 9.17 ha, 5.0%) were found within the AA. Grassland/shrubland is a common habitat type in the New Territories, as abandoned pond, marsh, agricultural land or wasteground are abandoned long enough for natural succession. Vegetation in this kind of habitat within the AA is mostly comprised of exotic weed species, including *Panicum maximum*, *Brachiaria mutica*, and *Bidens alba*, and a few scattered tree species, including exotic *Leucaena leucocephala, Khaya senegalensis, Carica papaya* and native *Macaranga tanarius, Ficus microcarpa* and *Celtis sinensis*.

Fauna recorded using this habitat type were generally widespread and common species favouring open habitats. 43 bird species were recorded, and 16 of them are species of interest (max. counts: 29 Grey Heron, two Little Egret, three Great Egret, four Chinese Pond Heron, one White-breasted Waterhen, five Little Ringed Plover, five Green Sandpiper, three Greater Coucal, one Greater Painted-snipe, four Pintail Snipe/ Swinhoe's Snipe, three Zitting Cisticola, one Pallas's Grasshpper Warbler, two White-throated Kingfisher, two Yellow Wagtail, one Yellow-billed Grosbeak and one Red-throated Pipit). Two frog, eight butterfly and 10 dragonfly species were recorded. One Coastal Glider, a dragonfly species of conservation concern, was observed in a shrub to the east of the Ngau

Tam Mei Main Drainage Channel. Other fauna species recorded are all of no conservation concern. All bird species of interest were recorded in low to very low numbers, indicating the habitat within AA was not of high ecological importance to these species. Most of the ardeids recorded on-site were observed perching on overheaded wires or perching in trees.

Table 8-22 Ecological evaluation of grassland /shrubland within the AA

Criteria	Grassland/Shrubland
Naturalness	Natural habitat through succession of abandoned agricultural land.
Size	Moderate within the AA but small in a Hong Kong context.
Diversity	Bird diversity (43) can be considered as moderate (but mainly consisted of common birds). Diversities of other fauna were very low: 2 frog, 8 butterfly and 10 dragonfly). Plant diversity moderate: 124, but dominated by invasive and ruderal species.
Rarity	A common habitat in the New Territories. Plants species recorded are mainly common/ very common species. Although 16 bird species of interest and 1 dragonfly of conservation concern observed, they are usually common and widespread in the Deep Bay Area, and are all recorded in low to very low numbers in a Deep Bay context. Other faunas recorded are common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.
Fragmentation	Fragmented by road networks and developed areas.
Ecological linkage	No significant functional linkages with habitats of ecological significance.
Potential value	Limited due to the isolated nature.
Nursery /breeding ground	No known significant nursery or breeding ground.
Age	Within the past few years.
Abundance /Richness of wildlife	Bird diversity was moderate (mainly consisted of common species), but abundance was low. Diversities and abundances of other groups are very low.
Ecological value	**Low to moderate.**

8.6.2.6 Agricultural land

An area of active/ inactive agricultural land is situated adjacent to the PS in the northeast, and occupies about 3.96% (7.28 ha) of the AA. Apart from a small field of wet agriculture (Water spinach *Ipomoea aquatica*) the principal crop grown is lettuce *Lactuca sativa*. However, based on the latest site observation, some of the area was found inactive. This habitat has limited ecological value for wildlife due to its management regime and small size. However, when the fields are temporarily flooded and after rainy days, the area is used by small numbers of wetland-dependent birds and amphibians.

Forty-three bird species were recorded and 22 of them are species of interest; these were recorded in low abundance (max. counts: one Great Egret, one Black-crowned Night Heron, two Little Egret, one Grey Heron, five Chinese Pond Heron, one White-breasted Waterhen, four Common Moorhen, five Common Teal, three Yellow Wagtail, seven Red-throated Pipit, two Green Sandpiper, one Wood Sandpiper, four Common Sandpiper, four Pintail Snipe/ Swinhoe's Snipe, one Bright-capped Cisticola, one White-throated kingfisher, three Greater Painted-snipe, five Little Ringed Plover, three Greater

Coucal, four Common Kingfisher, one Collared Crow and one Zitting Cisticola). Ten herpetofauna, 12 butterfly and 11 dragonfly species were observed. Two dragonfly species are considered to be of conservation concern: Coastal Glider and Scarlet Basker. However, again, the abundances were very low (max. count for both: 1). Other fauna species recorded are all common and widespread species of no conservation concern.

Agricultural areas within the AA, especially those to the north of the Ngau Tam Mei Main Drainage Channel, contained some inactive wet agricultural land. Other dry agricultural land would also be temporarily flooded through normal farming practices. This could encourage feeding activities of some wetland bird species (such as sandpipers). Thus it could provide comparatively more diverse ecological function than other dry habitats (i.e. Grassland/ Shrubland). On the other hand, the ecological linkage of the agricultural land (those to the north of the Ngau Tam Mei Main Drainage Channel) with the Deep Bay Wetland System is also likely to be stronger than other habitats fragmented by concreted structure (i.e. the PS).

Table 8-23 Ecological Evaluation of Agricultural Land within the AA

Criteria	**Agricultural Land**
Naturalness	Anthropogenic.
Size	Moderate in size within the AA (7.28 ha) but small in a Hong Kong context.
Diversity	Low to moderate plant diversity (58 species). Moderate bird diversity: 43 species; Low to moderate fauna diversities for others: 10 herpetofauna, 12 butterfly and 11 dragonfly species.
Rarity	A common but decreasing habitat in the New Territories. Plants species recorded are mainly common/ very common species. Although 22 bird species of interest and 2 dragonfly of conservation concern observed, they are usually common and widespread in the Deep Bay Area, and are all recorded in low to very low numbers in a Deep Bay context. Other faunas recorded are common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.
Fragmentation	Somewhat fragmented by the drainage channel/road network.
Ecological linkage	Not much functional linkages.
Potential value	Low due to small size, frequent disturbance and management regime.
Nursery /breeding ground	Not suitable as a nursery or breeding ground.
Age	Within the last few decades.
Abundance /Richness of wildlife	Low abundance and diversity of wildlife.
Ecological value	**Low to moderate.**

8.6.2.7 Seasonally Wet Grassland

In the AA, this habitat is fragmented and disturbed by nearby villages. Dumping in this habitat was frequently seen. Only three bird, two herpetofauna, nine butterfly and six dragonfly species were recorded in this habitat. All of them are common and widespread and of no conservation concern.

Table 8-24 Ecological Evaluation of Seasonally Wet Grassland within the AA

Criteria	Seasonally Wet Grassland
Naturalness	Developed from anthropogenic habitat.
Size	Small in size (4.17 ha) and in a Hong Kong context.
Diversity	Low to moderate plant diversity: 44 species; very low fauna diversity: 3 bird, 2 herpetofauna, 9 butterfly and 6 dragonfly species.
Rarity	A common and widespread habitat in the New Territories in Hong Kong. Plant species are usually common/ very common. Fauna species are all common and widespread.
Re-creatability	Readily re-creatable.
Fragmentation	Fragmented by developed areas.
Ecological linkage	No significant linkages with habitats of ecological significance.
Potential value	Very limited potential due to disturbance.
Nursery /breeding ground	No significant known nursery/breeding ground.
Age	Within the last few decades.
Abundance /Richness of wildlife	Low abundance and diversity of wildlife.
Ecological value	**Very low.**

8.6.2.8 Drainage Channel

Drainage channels refer to artificial drains designed to facilitate the removal of excess surface water to prevent flooding. These are usually constructed with steep (or vertical) concrete sides and bottoms. Within the AA, there are several drainage channels, including a section of the Ngau Tam Mei Main Drainage Channel between Kam Pok Road and Yau Pok Road, a drainage channel through Fairview Park, and a smaller channel east of Kam Pok Road. All these lead into Deep Bay. This habitat makes up 5. 51% of the AA (10.18 ha, approximately 3 km in aggregate length).

Due to the concreted banks, high level of anthropogenic disturbance and adjacent landuse (public roads), ecological value of this habitat to wildlife is compromised. Habitat complexity is low due to periodic weeding measures. Bird abundance in Ngau Tam Mei Main Drainage Channel was, however, relatively higher compared to other habitats, and supported high numbers of ardeids occasionally during favourable tide conditions. During the survey period, 101 Little Egrets (in January 2009), 80 Grey Herons (in December 2010) and 65 Great Egrets (in December 2010), and up to six Black-faced Spoonbills (November and December 2010) were recorded in this channel. According to survey data, the number of foraging ardeids using this channel during the egret breeding season was very low. Other channels are mostly highly polluted and supported very few fauna.

Overall, 28 bird species were recorded and 17 are bird species of interest (max. counts: one Great Cormorant, 81 Grey Heron, 65 Great Egret, 161 Little Egret, five Chinese Pond Heron, two White-breasted Waterhen, three Little Ringed Plover, one Green Sandpiper, one Grey Wagtail, one Zitting Cisticola, two Common Sandpiper, six Black-faced Spoonbill, one Black-winged Stilt, two Common

Greenshank, one Common Kingfisher, four Red-billed Starling and one Collared Crow). Seven butterfly and seven dragonfly species were recorded but all of them are common species. No other fauna species were observed.

Table 8-25 Ecological Evaluation of Drainage Channels within the AA

Criteria	Drainage channel
Naturalness	Man-made habitat but with natural tidal flow.
Size	Moderate in size within the AA (10.15 ha).
Diversity	Moderate plant species diversity (88) but very low structural complexity. Low to moderate bird diversity (28); other fauna diversity is low: 7 butterfly and 7 dragonfly.
Rarity	Channelised and concreted drainage channels are a common habitat type in Hong Kong. Some bird species of interest observed (17, mainly in Ngau Tam Mei Main Drainage Channel) and certain were in moderate abundances. Other faunas recorded are common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.
Fragmentation	Somewhat fragmented from the Deep Bay wetland system by adjacent landuse.
Ecological linkage	Some functional linkages with the Deep Bay area.
Potential value	Limited potential for increase in value due to constraints imposed by artificial banks and management regime.
Nursery /breeding ground	Not a significant nursery or breeding ground but used as a feeding area by some wetland species.
Age	Within the last decade.
Abundance /Richness of wildlife	High abundance of certain bird species of interest in Ngau Tam Mei Main Drainage Channel (during favourable tides); others: low.
Ecological value	Ngau Tam Mei Main Drainage Channel: **Moderate**; Others: **Low.**

8.6.2.9 Marsh

Two areas of marsh were found between Palm Springs and Fairview Park. These are developed from abandoned ponds through natural succession. Within the AA, *Cyclosorus interruptus*, *Phragmites australis*, *Wedelia trilobata* and *Brachiaria mutica* are the dominant species in this habitat, and occupies a small area (1.31 ha, 0. 71%). Species diversity and abundance recorded were very low. Only six bird species were recorded; two of them are species of interest (max. counts: one Chinese Pond Heron and one Greater Coucal) but are also widespread in Hong Kong. Two butterfly and one dragonfly species were observed, with one butterfly of conservation concern: Pale Palm Dart. It is listed as 'Local Concern' by Fellowes *et al.* (2002) and one individual was recorded in the marsh next to Palm Springs. This species is also considered to be common in Hong Kong by Young and Yiu (2002). Other species are common and widespread and of no conservation concern.

Table 8-26 Ecological evaluation of marsh within the AA

Criteria	Marsh
Naturalness	Derived from abandonment of man-made habitats.
Size	Small within the AA (1.31 ha).
Diversity	Low plant and faunal species diversity: 27 plant, 6 bird, 2 butterfly and 1 dragonfly species.
Rarity	A common habitat in the New Territories. Plant species are mainly common/ very common. Although 2 bird species of interest observed, they are usually common and widespread in the Deep Bay Area, and are all recorded in low to very low numbers in a Deep Bay context. The butterfly species of conservation concern observed is also considered to be common in Hong Kong. Other faunas recorded are common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.
Fragmentation	Fragmented.
Ecological linkage	May have some linkages with nearby habitats.
Potential value	Limited potential value if not managed.
Nursery /breeding ground	No known significant nursery or breeding grounds.
Age	Possibly within the recent decade.
Abundance /Richness of wildlife	Low abundance and diversity
Ecological value	**Low.**

8.6.2.10 Plantation

Plantation within the AA is found along San Tin Highway and adjacent to village areas, totalling 3.23 ha (1.76%). Plantations are generally low in ecological value due to early preference for planting exotic species, including *Acacia auriculiformis*, *Casuarina equisetifolia* and *Albizia lebbeck*, and fruit and ornamental tree species including Longan (*Dimocarpus longan*), Mango (*Mangifera indica*), White Jade Orchid Tree (*Michelia x alba*) and Rose Apple (*Syzygium jambos*).

Fauna recorded in this habitat type is very limited. Only 10 bird species were recorded; all are common species of no interest. One herpetofauna, six butterfly and one dragonfly species were recorded; one of the butterfly species recorded, Danaid Egg-fly, was species of conservation concern and the single individual was observed in a plantation to the east of Ngau Tam Mei Main Drainage Channel. No other species of conservation concern were observed.

Table 8-27 Ecological Evaluation of Plantation within the AA

Criteria	Plantation
Naturalness	Anthropogenic habitat with a high proportion of exotic species.
Size	Small in size within the AA (3.23 ha).
Diversity	Moderate plant diversity: 74 species. Low fauna diversity: 10 bird, 1 herpetofauna, 6 butterfly and 1 dragonfly recorded.
Rarity	A common habitat in Hong Kong. Plant species are mainly common/ very common. 1 Danaid Egg-fly was observed. Other faunas recorded are

Criteria	Plantation
	common and widespread and of no conservation importance.
Re-creatability	Readily re-creatable.
Fragmentation	Highly fragmented by developed areas and roads.
Ecological linkage	No significant linkages with habitats of ecological significance.
Potential value	Limited potential due to disturbance and high proportion of exotic species.
Nursery /breeding ground	Not a nursery or breeding ground of significance.
Age	Formed within the last few decades.
Abundance /Richness of wildlife	Low abundance and diversity of wildlife comprising widespread and disturbance-tolerant species.
Ecological value	**Very low.**

8.6.2.11 Watercourse

Small and scattered watercourses are present in the AA (totaling 0.47ha). These watercourses are largely polluted, some with partly-concreted banks and/or bottom, and are disturbed by adjacent anthropogenic activities, such as farming or public roads. Fourteen bird species common in the region were recorded; two of them are species of interest but were recorded in low numbers (max. counts: three Chinese Pond Heron and nine Red-billed Starling). No other fauna species were recorded.

Table 8-28 Ecological Evaluation of Watercourse within the AA

Criterion	Watercourse
Naturalness	Semi-natural.
Size	Very small in size within the AA (0.47 ha)
Diversity	Low plant diversity (46) and very low fauna species diversity: only 14 bird species.
Rarity	This kind of polluted lowland watercourse is common in Hong Kong. Plant species recorded are mainly common/ very common. Only 2 bird of interest recorded; they are common in Hong Kong.
Re-creatability	Readily re-creatable.
Fragmentation	Fragmented
Ecological linkage	Some linkages with the adjacent habitats.
Potential value	Low in view of their small sizes and nearby landuse.
Nursery /breeding ground	No significant nursery or breeding ground known
Age	N/A
Abundance /Richness of wildlife	Low abundance and diversity of wildlife.
Ecological value	**Very low.**

8.7 Potential Ecological Impacts

8.7.1 Assessment methodology

Assessment of potential ecological impacts of the development proposals used the following protocol. The Master Layout Plan and development proposal occupying the PS as described in Section 2 of the current report were reviewed, which stated that the Southern Portion of the site will be developed into a residential area while the Northern Portion will be developed into an area with the provision of a 0.6 ha landscape pond, landscaped open area, and some passive recreational and supporting uses. Based on these and the findings presented in Sections 8.5 and 8.6 above, potential ecological impacts in the absence of ecologically-driven design changes or mitigation measures were identified, quantified where possible and assessed. Ecological Impacts were categorized as follows:

- Direct loss of habitats of ecological importance (permanent and temporary) due to construction works;
- Direct mortality due to construction works (primarily affecting some non-vagile animal groups);
- Direct impact to fauna of conservation importance;
- Indirect loss of habitats of ecological importance (permanent and temporary) through disturbance;
- Indirect impacts to fauna of conservation importance;
- Indirect impact to habitats close to/watercourses connected to Deep Bay;
- Cumulative and fragmentation impacts.

The potential to reduce adverse ecological impacts by design changes following the principle of Avoidance elucidated in EIAO Technical Memorandum Annex 8 was then considered with respect to (a) their technical feasibility and (b) their necessity, given the extent of the predicted impacts.

Additional measures for Minimization and Compensation of remaining ecological impacts are then described. Finally, predicted unavoidable residual impacts, assuming implementation of all proposed mitigation measures are detailed and quantified.

8.7.2 Identification of impacts

8.7.2.1 Construction Phase

Direct Habitat Loss

The PS occupies about 9.1 ha. No direct habitat loss will result in the broader AA (excluding PS) outside of the PS.

Seven habitats that are identified in the PS comprise: agricultural land, pond, reed, grassland/shrubland, seasonally wet grassland, abandoned irrigation ditch and urbanised area. The majority of the PS is dominated by grassland/shrubland which supports relatively few bird species of interest in low abundances. As aforementioned, this habitat is predominately dry and unlikely to provide feeding and breeding habitat for wetland species. Based on survey findings, bird species of conservation interest observed were largely roosting on-site. Although reed and pond provide important habitats for species of conservation importance elsewhere in Hong Kong, the reed and pond inside the PS are small, highly fragmented and were not found to be ecologically important.

Ecological surveys have indicated that the habitats reed, pond, agricultural land, abandoned irrigation ditch and seasonally wet grassland are generally used by low number and diversity of fauna, while grassland/shrubland in the south portion and that in the Northern Portion of the PS respectively supported low diversity and low to moderate diversity of bird species, number of bird species recorded were 22 and 41 respectively. Despite the low and low to moderate diversity of bird species, birds recorded using both Southern and Northern Portions of the site were very low in a Deep Bay context. Further, habitats on-site are not expected to be of high significance to wetland fauna due to location and floral composition, though some birds used the site as a roosting ground. Based on the survey findings and experience and knowledge of the PS, the impacts to these habitats are anticipated to be of low to very low significance.

Table 8-29 outlines the Assessment Criteria and Discussion for each of the Potentially Impacted Habitats in the Absence of Mitigation Measures.

Table 8-29 Potential Direct Ecological Impacts to Existing Habitats within the PS

Habitat Type / Criteria	Reed	Pond	Grassland/Shrubland	Agricultural Land	Abandoned Irrigation Ditch	Seasonally Wet Grassland	Urbanised Area
Habitat Quality	Low	Low	Southern Portion: Low Northern Portion: Low to moderate	Low	Very low	Very low	Very low
Species	Very low diversity; only 10 flora, 2 bird, 1 herpetofauna, 5 butterfly and 6 dragonfly species were recorded. Plants species recorded are mainly common/ very common species. 1 Blunt-winged Warbler was recorded. This species is an occasional visitor to Hong Kong and thus has even not been assessed in Fellowes *et al.* (2002). Other fauna species are of no conservation concern.	Very low fauna diversity: 2 bird species were observed and they are of interest species (max counts: 1 each). 1 butterfly and 4 dragonfly species were also recorded; they are all common and of no conservation concern. Very low plant species diversity (13 species).	Southern Portion: Low faunal and floral diversity (22 birds including 5 species of interest). Northern Portion: Low to moderate bird diversity (41 birds including 15 of interest). Diversities of other fauna were low: 6 herpetofauna, 11 butterfly and 8 dragonfly species were recorded; and none of them are of conservation concern. Invasive and ruderal species dominated the plant community with 50 species recorded.	Very low plant species diversity (14 species). Very low faunal species diversity: only 10 bird species, 3 are of interest (max. counts: 1 each). No other fauna species were recorded. Plants species recorded are mainly common/ very common species.	Only 3 bird species were recorded which included two bird of interest. No other fauna species were recorded. Very low plant species diversity: 16 and plants species recorded are mainly common/ very common species.	Only 8 common/ very common and/ or exotic plant species were found. No fauna was recorded.	Low plant diversity (32 species); Plants species recorded are mainly common/ very common species. Low faunal diversity: 11 bird, 3 butterfly and 1 dragonfly species. All fauna species recorded are common and of no conservation concern.
Size/ Abundance	Very small within the PS (0.22 ha) and very small in a Hong Kong context. Very low faunal	Small in size within the PS (0.50 ha) and very small in a Hong Kong context. Fauna abundance low.	Relatively large in size within the PS (6.1 ha) but very small in a Hong Kong context. Fauna abundance low.	Very small in size within the PS (0.12 ha) and in a Hong Kong context. Fauna abundance low	Very small (0.02 ha). Fauna abundance low.	Very small (0.1 ha).	Moderate in size within the PS (2.04 ha). Fauna abundance low.

Habitat Type / Criteria	Reed	Pond	Grassland/Shrubland	Agricultural Land	Abandoned Irrigation Ditch	Seasonally Wet Grassland	Urbanised Area
	abundance.						
Duration	Permanent loss of existing habitat.	Existing habitat will be temporarily lost during the re-profiling, but will be retained and slightly enlarged to serve as a landscape feature for visual enhancement.	Permanent loss of existing habitat in the Southern Portion; temporary loss of the habitat in the Northern Portion during the enhancement work of landscaped open area.	Permanent loss of existing habitat.	Permanent loss of existing habitat.	Permanent loss of existing habitat.	Permanent loss of existing habitat.
Reversibility	Habitat loss would be permanent and irreversible.	No irreversible loss is anticipated under the current scheme	Some of the habitat loss would be permanent and irreversible.	Habitat loss would be permanent and irreversible.	Habitat loss would be permanent and irreversible.	Habitat loss would be permanent and irreversible.	Habitat loss would be permanent and irreversible.
Magnitude	Existing habitat would be completely lost.	Existing habitat will be slightly enlarged under the current scheme.	Existing habitat would be lost but some of the habitat in the Northern Portion would be replaced with a landscaped open area with a mixture of native/exotic tree and shrub flowering and fruiting species. .	Existing habitat would be completely lost.	Existing habitat would be completely lost.	Existing habitat would be completely lost.	Existing habitat would be completely lost.
Overall Impact Severity	Impacts to reed of **Very Low Significance.**	Impacts to pond of **Very Low Significance**.	Impacts to Southern Portion of grassland/shrubland **Very Low Significance** and to Northern Portion of **Low Significance** to very low abundance of fauna to be impacted and	Impacts to agricultural land of **Low Significance.**	Impacts to this ditch of **Very Low Significance**.	Impacts to this grassland of **Very Low Significance**.	Impacts to urbanized area of **Very Low to Negligible Significance**.

Habitat Type / Criteria	Reed	Pond	Grassland/Shrubland	Agricultural Land	Abandoned Irrigation Ditch	Seasonally Wet Grassland	Urbanised Area
			replacement of landscape open area with tree/shrub planting in the Northern Portion.				

Direct mortality

Birds and mammals are highly mobile and will not be significantly impacted by direct mortality. Less vagile animals may be impacted, including herpetofauna (reptiles and amphibians). No herpetofauna and insect species of conservation importance were recorded within the PS, and all recorded species were in very low to low numbers. A total of 77 plant species would be directly impacted but none of the species were species of conservation importance. Based on these findings, there is no evidence for significant impacts to any species of conservation importance.

Direct impacts to fauna of conservation importance

Seventeen bird species of interest were recorded within the PS (Pintail Snipe/ Swinhoe's Snipe was recorded; they are undistinguishable on field, and Pintail Snipe is of no conservation concern). Potential direct impacts to these species are discussed in details below.

Recorded Species of Conservation Importance

The Project will result in direct loss of habitats. Some bird species of interest were observed inhabiting some of these habitats. However, none of the species were recorded in significant numbers (i.e. in relation to the Deep Bay population). In view of the small size of the habitats in the PS (as compared with similar habitats elsewhere in Hong Kong), the abundance of these species observed and the disturbance in surroundings, the impacts on these species of concern are not considered to be significant.

Table 8-30 Potential Direct Ecological Impacts to Species of Interest within the PS

Impact Type / Criteria	Direct ecological impacts to birds of Conservation Importance	Impacts to Foraging Ardeids During Breeding Season	Impacts to Roosting Waterbirds
Species	17 bird species of interest recorded within the PS. Details of the species recorded are provided in **Table 8-5**.	2 ardeid species known to breed in the nearby egretries (i.e. Little Egret and Chinese Pond Heron). Details provided in **Table 8-5**.	5 waterbird species are recorded using the overhead wire/trees within the PS as a temporary roosting site. Details in Section 8.5.2.2.
Protection Status	All wild birds are protected under Cap 170 in Hong Kong.		
Distribution	None of the species are considered to be restricted in range.	Both species are known to breed in a number of egretries in the New Territories, while Little Egrets are also known to breed on the Hong Kong Island.	None of the species are considered to be restricted in range.
Rarity	Most of the species are common and widespread in the northwest New Territories and/or Hong Kong. Respective conservation status are presented in **Table 8-3**	None of the species are particularly rare. For species conservation status, refer to column under "Impacts to birds of conservation importance".	None of the species are particularly rare. For species conservation status, refer to column under "Impacts to birds of conservation importance".

Impact Type / Criteria	Direct ecological impacts to birds of Conservation Importance	Impacts to Foraging Ardeids During Breeding Season	Impacts to Roosting Waterbirds
	.		
Abundance	Numbers present in the PS are very small in comparison to the Deep Bay population.	Very low numbers were recorded (max count 1 for both species).	Numbers very low in comparison to the Deep Bay population.
Duration	Impacts would be temporary and restricted to the construction of the landscape pond, landscaped open area and the passive recreational and supporting uses.	Impacts would be temporary and restricted to the construction phase of the landscape pond, landscaped open area and the passive recreational and supporting uses.	Impacts would be temporary and restricted to the construction phase of the landscape pond, landscaped open area and the passive recreational and supporting uses..
Reversibility	No irreversible loss is anticipated under the current scheme.	No irreversible loss is anticipated under the current scheme.	No irreversible loss is anticipated under the current scheme.
Magnitude	Magnitude to ardeids (Grey Heron, Great Egret, Little Egret, Intermediate Egret, Black-crowned Night Heron) using the site as a temporary roosting area would be low due to the small numbers recorded. Magnitude to potential foraging ardeids (Chinese Pond Heron and Black-crowned Night Heron) would be low due to the small numbers recorded. Magnitude to other bird species of interest would be very low due to the small numbers of individuals recorded, in particular in comparison to the populations in Deep Bay, and the availability of similar and/or higher quality habitats in Northwestern New Territories.	Magnitude would be very low due to the very small numbers of individuals recorded compared to the egretry size.	Magnitude would be low due to the small numbers of individuals recorded compared to the maximum number of birds of the species recorded using the environ and also to the Deep Bay population.
Overall Impact Severity	Impacts are of **Negligible to Very Low Significance** due to very small number recorded and temporary nature of the impact.	Impact to foraging egrets during the breeding season of **Negligible to Very Low Significance** given the small number recorded.	Impacts to roosting waterbirds of **Low Significance** given the small number recorded relative to the Deep Bay population.

* Red-billed Starling is considered by Fellowes *et al*. (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is no longer considered globally threatened. (BirdLife International 2010). A listing of Regional Concern (RC), based on the importance of the large roost present near Deep Bay, is considered to be more appropriate.

Indirect habitat loss through disturbance (through construction and related activities)

Certain disturbance-sensitive species could be impacted by a development as a result of increased disturbance to nearby habitats, making the habitat less suitable for use by that species. The significance of these impacts depends upon the distance from the source of disturbance, the type and frequency of disturbance and the tolerance of species to disturbance. In general, large waterbirds are the most disturbance-sensitive species in the Deep Bay Area due to the open habitat preference, the large size of the species and the large numbers present in Deep Bay (open country and large bird and larger mammal species are generally more sensitive to disturbance than smaller species or those utilizing closed habitats). Generally speaking, potential impacts to the areas outside of a development site include indirect impacts due to increased disturbance leading to a reduction in habitat value, pollution of downstream watercourses and changes to the hydrology and/or construction runoff. With regard to the current Project, only open habitats that are adjacent to the PS within the AA (excluding PS) would potentially be subject to increased disturbance from the development. This is due to the presence of certain anthropogenic features providing a barrier between the source of disturbance and the receptor site; these include existing large residential areas and the road network (Yau Pok Road, Kam Pok Road, Castle Peak Road and San Tin Highway). Potential areas where disturbance may arise from the proposed development therefore only include the agricultural land immediately northeast of the PS and Ngau Tam Mei Drainage Channel.

The PS is, in general, surrounded by urbanized areas (basically Fairview Park and Ngau Tam Mei Main Drainage Channel). It is considered that, even in the absence of any mitigation measures, construction conducted within the PS will not create any significant adverse ecological impacts (i.e. through disturbance such as noise, and dust).

There are ponds and wetlands between Fairview Park and Palm Springs, located within WCA, which are close to the Project Site. Disturbance (such as noise and visual) and dust during the construction phase may affect these habitats. However, they are well-separated from the Site by Fairview Park, a large existing residential area. According to the survey findings, 16 bird species of interest were recorded in the adjacent ponds, but only 9 species are considered disturbance-sensitive. These include (max count in paranthesis) Great Cormorant (16), Grey Heron (4), Purple Heron (1), Great Egret (12), Little Egret (73), Chinese Pond Heron (12), Common Sandpiper (1), Wood Sandpiper (1), and Green Sandpiper (1). Based on the current proposal, though no ecological mitigation measure is required, the existing pond in the Northern Portion of the Site, which is closest to these habitats, would be retained and slightly enlarged to serve as a landscape feature. No large-scale construction activities will be carried out in the pond area. In view of this situation, these habitats are unlikely to be significantly impacted (**Table 8-31a**).

Other habitats which might be impacted indirectly through disturbance included three habitats between Fairview Park and Palm Springs: reed (3 bird species of disturbance sensitive: Grey Heron (1), Purple Heron (1), Little Egret (1)), marsh (1 bird species of disturbance sensitive: Chinese Pond Heron (1)) and reed/marsh (1 bird species of disturbance sensitive: Grey Heron (1)).

Table 8-31a Potential Indirect Habitat Loss through disturbance within the AA

Habitat Type Criteria / Criteria	Potential indirect impacts to habitats			
	Ponds in between Fariview Park and Palm Springs	**Reed in between Fariview Park and Palm Springs**	**Marsh in between Fariview Park and Palm Springs**	**Reed/ Marsh in between Fariview Park and Palm Springs**
Habitat Quality	Moderate	Low to moderate	Low	Low
Species	16 bird species of interest and 9 are disturbance-sensitive.	6 bird species of interest and 4 are disturbance-sensitive	2 bird species of interest and only 1 is disturbance-sensitive.	3 bird species of interest and 1 is disturbance-sensitive.
Size/ Abundance	Small in size within the AA and in a Hong Kong context. Fauna number low.	Small in size within the AA and in a Hong Kong context. Fauna number low.	Very small in size within the AA and in a Hong Kong context. Fauna number low.	Very small in size within the AA and in a Hong Kong context. Fauna number low.
Duration	Short-term.	Short-term.	Short-term.	Short-term.
Reversibility	Reversible.	Reversible.	Reversible.	Reversible.
Magnitude	Low even no mitigation measures are implemented as this habitat is well-separated from the Site by Fairview Park.	Low even no mitigation measures are implemented as this habitat is well-separated from the Site by Fairview Park.	Low even no mitigation measures are implemented as this habitat is well-separated from the Site by Fairview Park.	Low even no mitigation measures are implemented as the main construction area (the southern portion, the residential area) is well-separated by urban areas. Disturbance-sensitive fauna's abundance and diversity are very low.
Overall Impact Severity	**Very Low.**	**Very Low.**	**Very Low.**	**Very Low.**

^ Numbers in parentheses mean maximum counts within all habitats mentioned in each column at the same time interval.

Ngau Tam Mei Main Drainage Channel next to the PS, however, is considered to have some ecological value (as feeding ground for ardeids). Although the level of the PS is lower than the bund of this channel (i.e. level of Yau Pok Road is higher than the level of PS) and thus the disturbance created within the PS will be partially screened off, some bird species inside this channel are considered to be disturbance-sensitive (such as large waterbirds). Disturbance-sensitive species recorded included 11 species (max count in paranthesis): Great Cormorant (1), Grey Heron (80), Great Egret (65), Little Egret (101), Chinese Pond Heron (5), Green Sandpiper (1), Common Sandpiper (2) Black-faced Spoonbill (6), Black-winged Stilt (1), Common Greenshank (2) and Collared Crow (1).These species are generally sensitive to human presence and movement. Therefore, it is still considered that appropriate measures to mitigate disturbance effect such as from noise and visual should be

adopted, e.g. the erection of a site hoarding before the peak wintering period, the use of quiet type construction equipments, scheduling of construction programme to avoid concurrent works.

Apart from the NTMMDC, the agricultural land to the immediate northeast of the PS will also receive disturbance impact. Unlike the Ngau Tam Mei Main Drainage Channel, the fauna abundance of this agricultural land was much lower; however, its bird diversity was relatively higher which included some disturbance-sensitive species. Also, since it is adjacent to the PS, construction workers can easily visit this habitat and cause additional disturbance to disturbance-sensitive fauna. Aforestated m-easures should thus be applied to prevent this habitat to be disturbed. Nine disturbance-sensitive species were recorded, which include (max count in paranthesis): Black-crowned Night Heron (1), Little Egret (1), Grey Heron (1), Chinese Pond Heron (5), Common Teal (5), Green Sandpiper (2), Wood Sandpiper (1), Common Sandpiper (4) and Collared Crow (1).

Dust and runoff would also become potential disturbance and if not mitigated, can create impact on nearby habitats. Again, the channel in the close vicinity (i.e. Ngau Tam Mei Main Drainage Channel) and the agricultural land to the immediate northeast will be relatively prone to the concerned impact and preventive measures would be proposed.

Except the two habitats mentioned above, others are unlikely to be significantly impacted because: (1) they are well separated from the PS by urbanized/ developed areas such as roads, residential areas and villages, (2) the habitat value of some of these habitats are very low (i.e. urbanised areas such as Fairview Park) and (3) fauna species recorded were usually in relatively low to very low abundances.

Discussion on the potential disturbance impacts during the construction phase is given in **Table 8-**.

Table 8-31b Potential Indirect Habitat Loss through disturbance within the AA (during Construction Phase)

Habitat Type / Criteria	Potential indirect impacts to habitats During Construction Phase	
	Adjacent Agricultural Land	**Ngau Tam Mei Drainage Channel**
Habitat Quality	Low to Moderate.	Moderate.
Species	18 bird species of interest and 9 are considered to be sensitive to disturbance. Other bird species of interest would also be affected by construction runoff and dust.	15 bird species of interest were recorded and 11 species are considered to be sensitive to disturbance. Other bird species of interest would also be affected by construction runoff and dust.
Size/ Abundance	Small in size within the AA and in a Hong Kong context. Fauna number low.	Small in size (5.52 ha, ~1,500 m in length) within the AA and very small in a Hong Kong context. Occasionally supports moderate abundance of Ardeids.
Duration	Short-term.	Short-term.
Reversibility	Reversible.	Reversible.
Magnitude	Would be moderate before the implementation of mitigation measures.	Would be moderate before the implementation of mitigation measures.
Overall Impact Severity	**Moderate Significance**.	**Moderate Significance**.

8.7.2.2 Operational Phase

Indirect habitat loss through disturbance (through human activities in future development)

With regard to the current Project, only open habitats that are adjacent to the PS within the AA (excluding PS) would potentially be subject to increased disturbance from the development. This is due to the presence of certain anthropogenic features providing a barrier between the source of disturbance and the receptor site; these include existing large residential areas and the road network (Yau Pok Road, Kam Pok Road, Castle Peak Road and San Tin Highway). Potential areas where disturbance may arise from the proposed development therefore only include the agricultural land immediately northeast of the PS and Ngau Tam Mei Drainage Channel.

As noted above, the Ngau Tam Mei Main Drainage Channel could potentially be impacted due to the known importance of the site for foraging ardeids, but the Channel is separated from the PS by Yau Pok Road and has already been disturbed significantly by Kam Pok Road (through the noise from heavy vehicles commuting between Castle Peak Road and open storage areas close to Fairview Park). As compared to this existing impact, disturbance associated with the proposed development (i.e. increased passage of small vehicles on Yau Pok Road) is considered to be much less in scale. Agricultural land to the immediate northeast of the PS may be impacted in the form of increased human disturbance during the operational phase; however, in view of the present landuse (i.e. urbanized areas including houses and vehicle roads) in the close vicinity of this agricultural land, the proposed development is unlikely to impose significant additional disturbance impacts. Furthermore, under the current proposal, the existing pond in the Northern Portion of the site, which is of very low ecological significance at present due to very low fauna and plant species diversity and abundance (refer to **Table 8-29**), will be retained and slightly enlarged to about 0.6 ha to serve as a landscape feature for enhancement of the visual value of the site [refer to **Chapter 11** (Visual & Landscape) of the EIA Report for details]. Though the landscape area will enhance the amenity and landscape value as proposed under the LVIA, the pond and the landscape area may be utilized by some freshwater and terrestrial fauna at the landward periphery of Deep Bay. Furthermore, a mixture of native/exotic tree and shrub flowering and fruiting species will be planted at the interface between the landscaped open area and the adjacent agricultural land, which would act as a buffer against any potential disturbance. In view of this situation, the agricultural land to the immediate northeast of the PS is unlikely to be impacted. Discussion on these potential impacts is given in the table below.

Table 8-32 Potential Indirect Habitat Loss through disturbance within the AA (during Operational Phase)

Habitat Type / Criteria	Potential indirect impacts to habitats during Operational Phase	
	Adjacent Agricultural Land	**Ngau Tam Mei Drainage Channel**
Habitat Quality	Low to Moderate.	Moderate.
Species	18 bird species of interest and 9 are considered to be sensitive to disturbance. Other bird species of interest would also be affected by construction runoff and dust.	15 bird species of interest were recorded and 11 species are considered to be sensitive to disturbance (species name and count are provided in Para. 8.7.2.1 under "Indirect Habitat Loss Through Disturbance Within the AA During the Construction Phase).
Size/ Abundance	Small in size within the AA and in a Hong Kong context. Fauna number low.	Small in size (5.52 ha, ~1,500 m in length) within the AA and very small in a Hong

Habitat Type / Criteria	Potential indirect impacts to habitats during Operational Phase	
	Adjacent Agricultural Land	Ngau Tam Mei Drainage Channel
		Kong context. Support moderate abundance of Ardeids occasionally.
Duration	Permanent.	Permanent.
Reversibility	Irreversible.	Irreversible.
Magnitude	Degree of disturbance would be low due to limited human access to the habitat.	Some additional disturbance is expected due to potentially more pedestrian/cyclist usage of the public roads.
Overall Impact Severity	**Low Significance**.	**Low Significance**.

^ Numbers in parentheses mean maximum counts within all habitats mentioned in each column at the same time interval.

Indirect impacts on fauna of conservation importance

Impacts to Birds

With regards to potential indirect impacts (disturbance) to bird species, only bird species of interest recorded in adjacent areas are potentially impacted by the proposed development. Thirty-two bird of interest were recorded in the AA (excluding PS).

Table 8-33 Potential indirect ecological impacts to birds of conservation importance within the AA

Habitat Type / Criteria	Bird
Species	32 bird species of interest were recorded within the AA (Details of the species recorded are provided in **Table 8.3**.) .
Protection Status	All wild birds are protected under Cap. 170 in Hong Kong.
Distribution	None of the species are particularly restricted in range.
Rarity	All of the species are common and widespread in the northwest New Territories and/or Hong Kong. Respective conservation status are presented in **Table 8-3**
Abundance	Numbers present in the AA (excl. PS) are very small in comparison to the Deep Bay population.
Duration	Impacts would be permanent as the area is developed.
Reversibility	Irreversible once the area is developed.
Magnitude	Magnitude on adjacent habitats such as the agricultural land would be low due to the small numbers of individuals recorded, in particular in comparison to the populations in Deep Bay, and the availability of similar and/or higher quality habitats nearby; while magnitude to Ngau Tam Mei Drainage Channel would be low due to existing anthropogenic barrier and existing disturbance.
Overall Impact Severity	Impacts to species listed above are of **Low Significance** due to small numbers present within the AA (excl. PS).

. . (1) Red-billed Starling is considered by Fellowes *et al*. (2002) to be of Global Concern. Since publication, however, the global population estimate has been revised and the species is no longer considered globally

threatened. (BirdLife International 2007). A listing of Regional Concern (RC), based on the importance of the large roost present near Deep Bay, is considered to be more appropriate.

(2) Assessment based on restrictedness in breeding and/or roosting sites rather than in general occurrence.

Impacts to Flight Lines

Although birds were recorded in flight over the PS, no flight lines were detected. Birds in flight were observed mainly on the northern part of the PS and on the Main Drainage Channel.

In the current proposed development, houses will be built and their heights will be similar to those currently existing in the region. Also, a large portion of the northern part of the PS will be maintained as an amenity pond.

The birds observed in the present surveys were found flying over Fairview Park and other developed areas like Palm Springs, Royal Palms, and nearby village house developments. Thus it is believed that they can also fly over the future development within the PS, especially that the PS will be developed into structures with heights (i.e. 6.6m) lower than existing buildings in the vicinity (i.e. about 8.23m - 9m). Thus, no significant impact on bird flight lines is expected.

Bird Collision Impact

The proposed Project involves the provision of low-rise residential development and ancillary passive recreational facilities. To mitigate potential construction noise during construction phase, as well as traffic noise and noise from industrial activities in the vicinity during the operation phase, Temporary and permanent noise barriers are proposed as noise mitigation measures of the Project. These barriers are at a height lower than the buildings nearby (Details please refer to Chapter 4 of the report).

The design of these barriers have incorporated elements which will reduce visual impact and the risk of bird collision impacts by selecting materials which are opaque, non-reflective with colour that would blend in with the environment. In addition, landscaping treatment will be introduced in the landscape buffers in front the noise barrier to further reduce the visual impact and the risk of bird collision (**Figure 11-41**). These measures will reduce the potential of creating an impression for birds that a passageway exists.

Given the relative heights of the existing buildings, and the design and landscape measures adopted for the noise barriers, the indirect impact of bird collision during construction are considered to be low significance during the construction phase. Due to disturbed nature of the area, the relative low height and extent of the permanent noise barrier, as well as the design and landscape measures adopted for the noise barrier, the risk of bird collision is very low. Significant bird collision impact is not anticipated.

Indirect Impacts to Insects (Dragonfly/ Butterfly)

Only Low numbers of two butterfly and two dragonfly species of conservation concern were recorded; none of them were recorded within PS. In view of the high mobility of these species and the low abundances observed, these species are highly unlikely to receive any adverse impacts due to the development.

Indirect Impacts to habitats close to Mai Po and Deep Bay

The entire PS is largely separated from habitats close to Mai Po (such as those ponds and reed between Fairview Park and Palm Springs) by the presence of Fairview Park. In view of the development scale and nature and most development is in the southern part, which is already surrounded by developed areas. It is concluded that the proposed development is unlikely to result in any indirect habitat loss on habitats close to Mai Po and Deep Bay.

Indirect impact on watercourses connected to Deep Bay

The proposed development will not have population intake until the commissioning of the planned local public sewerage works, and all the sewage generated from the PS will be conveyed to public sewerage. Therefore no sewerage pollution from the PS during operational phase is envisaged. However, increased water flow as a result of increased surface runoff after heavy rainfall during operational phase is envisaged, and it may potentially impact these downstream habitats. Water from these channels may also be used at times for irrigation of adjacent agricultural land.

Given the fact that the proposed developments (i.e. residential houses, a landscape pond, landscaped open area and some passive recreational uses and supporting facilities) are unlikely to create in-situ pollution, the amount of the increased surface runoff from the PS is expected to be small, and the existing watercourse within AA is already moderately polluted, major pollution on the Deep Bay system is not envisaged from the proposed development.

8.7.2.3 Cumulative and Fragmentation Impacts

Cumulative Impact from other Proposed Projects

Relevant concurrent major projects in the adjacent area include:

- Hong Kong Section of Guangzhou – Shenzhen – Hong Kong Express Rail Link (EIA 169-2009); (construction period 2010 to 2015)
- Construction of cycle track and associated supporting facilities from Sha Po Tsuen to Shek Sheung River (EIA 159-2008); (construction period 2009 to 2012)
- Comprehensive Development at Wo Shang Wai, Yuen Long (EIA 144/2008); (construction period 2008-2012)
- Proposed comprehensive development and wetland protection near Yau Mei San Tsuen, Yuen Long (ESB-182/2008)
- Proposed residential development within Residential (Group D) Zone at various lots in DD104, Yuen Long, N.T. (ESB-204/2009)
- Proposed low-density residential development at various lots and their adjoining government land in D.D. 104, east of Kam Pok Road, Mai Po, Yuen Long (ESB-210/2009)

Of these proposed developments, EIA reports are available for the public for the first three projects, while only SB are available for the latter three. Therefore, anticipated cumulative impacts of these projects are evaluated based on available information on these sites.

According to the two EIA reports that are available for public review, direct impact of both the Express Rail Link and the Cycle Track involve mainly non-wetland habitats such as grassland/shrubland, wasteground and existing road networks, which are of low ecological significance for wildlife and do not contribute to the cumulative loss of wetland habitats in the Deep Bay area. Only a very minor loss (two patches of seasonal marsh of approximately 0.07 ha) of wetland habitats is predicted at Hip Shing Wai, Mai Po and partial loss of 0.02 ha

along the edge of a marsh behind Mai Po Village under the Cycle Track. But findings indicate that the impacted marshes are of low ecological value due to location, adjacent land use and dumping by people from adjacent villages, while the affected marsh area concerned an edge of stone-faced embankment. Thus, the cumulative impacts of these two proposed developments are anticipated to be minimal.

The proposed comprehensive development at Wo Shang Wai, Yuen Long involves the development of 171 numbers of detached and semi-detached houses and 180 duplex units in 4-storey buildings on 21.6 ha site within the Wetland Buffer Area close to adjoining fish ponds in Mai Po Area. The proposed development would result in a loss of 4.69 ha of wetland habitats for local fauna, especially foraging egrets, but will be fully compensated by provision of 4.74 ha of wetland habitat within the Wetland Restoration Area. Indirect impacts from disturbance to water birds in adjacent pond habitats and impedance of flight paths for birds flying over the development area would be minimized and mitigated by reduction of building height, erection of site hoarding, good construction site practices.

For the potential cumulative impacts from the proposed developments for which only a Study Brief are available for public review (i.e. proposed development at Yau Mei San Tsuen, ESB-182/2008, at various lots in Residential (Group D) Zone, ESB-204/2009 and at various lots east of Kam Pok Road, ESB-210/2009), assessment is undertaken based on information from the Study Briefs and survey findings. All these project sites are within the AA of the present study. As revealed from findings of the current survey, the site of the proposed project, ESB-204/2009, contained mainly grassland/ shrubland. The ecological value of the aforesaid site is considered to be low to moderate as all species recorded inside, including some bird species of interest, are usually common in the Deep Bay region and are all recorded in low to very low numbers in a Deep Bay context. . The site of the proposed development, ESB-210/2009, has been largely urbanised. Currently, it is mainly a paved ground for parking heavy vehicles. Although a pond is present, it is isolated and disturbed heavily by illegal dumping and surrounding human activities (i.e. flea market, parking spaces for heavy vehicles). The ecological value of this site is considered to be very low. Also, both sites are fragmented from the larger Deep Bay area by the presence of Kam Pok Road, Yau Pok Road, other villages and residential areas and Castle Peak Road. In view of their habitat quality, isolated nature and the existing disturbance, these two sites are unlikely to provide habitats which could support significant populations of species of high conservation concern. Thus no cumulative impacts are likely to be associated with these two projects.

Project area of ESB-182/2008, although retains some ecological linkages with the Deep Bay area, it is surrounded by two large residential areas, Palm Springs and Fairview Park, and fragmented by roads on the east. Some habitats within, as revealed from the results of the current study, are of certain value and the loss of these habitats could have an ecological impact. However, development projects in the area are regulated by relevant guidelines and requirements in the respective zonings in the OZPs, hence, loss of important habitats should be fully compensated / mitigated. As such, the cumulative impacts associated with this project are not expected to be severe.

Permanent freshwater habitats within the current PS are all very small and highly fragmented. Survey findings indicated that the site supported low to moderate diversity of bird species but none of them were recorded in any significant numbers. In view of all the above, it is concluded that the potential cumulative loss of habitats and ecological linkages with existing wetlands related to the current Project, is considered to be insignificant.

Potential Fragmentation Impact from Current Project

The current PS is nearly completely enclosed by developed areas on the north and west by Fairview Park, and to a certain extent on the south and east by Fairview Park Boulevard and Yau Pok Road, respectively. Habitats east of PS are considered to be of low ecological importance for the protection and conservation of ecological integrity of the Deep Bay Area; while the habitats west of PS are existing residential developments (i.e. Fairview Park). Consequently, the current Project is unlikely to result in fragmentation impact on the Deep Bay wetland ecosystem.

8.7.2.4 Summary of Predicted Impacts

Predicted potential ecological impacts in the absence of mitigation measures are summarized in below table.

Table 8-34 Summary of predicted potential ecological impacts in the absence of mitigation measures

Description of Impact	Significance of Impact
Construction Phase	
Direct habitat loss of reed	Impacts to reed of **Low Significance.**
Direct habitat loss of pond	Impacts to pond of **Very Low Significance**.
Direct habitat loss of grassland/shrubland	Impacts to Southern Portion of grassland/shrubland of **Very Low Significance**. Impacts to Northern Portion of grassland/shrubland of **Low Significance**.
Direct habitat loss of agricultural land	Impacts to grassland/shrubland of **Low Significance**.
Direct habitat loss of abandoned irrigation ditch	Impacts to grassland/shrubland of **Very Low Significance**.
Direct habitat loss of urbanized area	Impacts to grassland/shrubland of **Very Low to Negligible Significance**.
Direct mortality of species of conservation importance	Impacts to species of conservation importance of **Negligible Significance**
Direct impact on fauna of conservation importance	Impacts are of **Negligible to Very Low Significance** due to very small number recorded.
Indirect habitat loss through disturbance from construction-related activities)	Impacts on Ngau Tam Mei Main Drainage Channel and adjacent agricultural land would be **Moderate**. Impacts on other habitats: **Very Low**.
Operational Phase	
Indirect habitat loss through disturbance from human activities in future development	Impacts on Ngau Tam Mei Main Drainage Channel and adjacent agricultural land would be **Low**. Impacts on other habitats: **Negligible**.
Indirect impact on birds of interest	Impacts are of **Low Significance** due to small numbers present within the AA (excl. PS).
Impact on egretries	No impacts are predicted.
Indirect impact on flight line	No impacts are predicted as no major flight line is identified over the PS.
Indirect impact on dragonflies/butterflies of conservation importance	Impacts are **Negligible**.
Indirect impacts to habitats close to Deep Bay	No impacts are predicted.
Indirect impacts to watercourses connected to Deep Bay	No impacts are predicted.
Cumulative impacts	No impacts are predicted.

Description of Impact	Significance of Impact
Fragmentation impacts	No impacts are predicted.

8.8 Mitigation Measures

8.8.1 Identification of Impacts Which Require Mitigation Measures

Table 8-35 above summarises the findings of the potential impacts identified in Section 8.7. Impacts identified with a Moderate or High Significance would require mitigation measures to be carried out in order to bring these impacts to acceptable levels.

From the above table, only indirect habitat loss through disturbance due to construction activities is considered to be an impact with a moderate significance. Hence, with regard to this project, only the potential indirect habitat loss through disturbance from construction-related activities, particularly that on the adjacent Ngau Tam Mei Drainage Channel and the adjacent agricultural land, requires mitigation measures.Therefore, this impact would have to be mitigated.

8.8.2 Proposed Mitigation Measures

8.8.2.1 Potential Indirect Habitat Loss Through Disturbance During Construction Phase

Potential Disturbance Through Direct Disstrubance From Construction Workers/Works

In general, as stated in above sections, the disturbance can be in the form of noise, runoff, dust and direct disturbance from construction workers. In order to prevent noise and visual impact, the use of screening materials during the construction will be adopted. A site hoarding will be in place before the peak winter bird season between October and March to ensure that disturbance from the proposed development is minimized. The workers should also be briefed regarding the sensitivity of the areas before the commencement of the works, and they should be requested not to disturb any areas nearby. Furthermore, the site boundary should be clearly defined (i.e. fenced with the screening materials mentioned above) and any works beyond the boundary would be strictly prohibited.

Potential Disturbance Through Noise

In addition, other source reduction mitigation measures such as the use of quiet type construction equipments, use of movable noise barriers, scheduling of construction programme to avoid concurrent works, and the provision of fixed temporary noise barrier will also be implemented to reduce construction noise and disturbances. Other measures proposed in compliance with the Noise Control Ordinance and general good site practices would be enforced and monitored as a mitigation measure under the Noise Impact Assessment (details see Chapter 4 of this report); these all contribute to the minimization of potential disturbance (through noise) to the adjacent habitats. With these measures and other mitigation measures regarding construction noise issues stated in **Table 14-1** (of the submitted EIA report), noise and direct disturbance impact would be mitigated to an acceptable level and no residual impact is anticipated.

Potential Disturbance Through Site Runoff

It is proposed that a properly designed temporary drainage system within the site will be implemented and direct discharge away from watercourses downstream to existing stormdrain nearby. The drainage system will be equipped with sand/silt removal facilities to treat the surface runoff. The properly designed temporary drainage system together with standard site practices deployed during the construction phase will will minimize the chance of site run-off and the chance of pollution to watercourses downstream. Further, mitigation measures proposed under the Water Quality Impact Assessment (see Chapter 5 of this report for details) contribute to the minimization of potential disturbance (through impact to water quality downstream) to the adjacent habitats.

Potential Disturbance Through Dust

In addition, all the dust control measures e.g. hard paving of the haul road, frequent watering, covering dusty materials, careful site formation scheduling etc. (details see Chapter 3 of this report) will reduce dust impact to an acceptable level and minimize disturbance too the adjacent habitats.

A summary of the proposed mitigation measures are described in **Table 14-1** (of the submitted EIA report) for air quality, noise, and water quality. With these measures, these impacts will be fully mitigated to acceptable levels and no residual impact is anticipated.

8.9 Residual Impact

With the implementation of the mitigation measures as mentioned in Section 8.8, no residual impact is anticipated.

8.10 Ecological Monitoring EM&A Programme

8.10.1 Baseline Ecological Monitoring

The ecological data obtained during the EIA process will provide the baseline for the evaluation of effectiveness of the proposed mitigation measures. However, prior to any site clearance and construction activities, a four-month survey is proposed to identify (if any) site condition changes which would affect the reliability of data obtained during the EIA process as a baseline.

Table 8-35 Summary of Ecological Baseline Update for Current Project (before site clearance and construction)

Group	Ecological Baseline Update
Bird	Monthly for four months including the peak bird season (October to March)
Dragonfly & Butterfly	Monthly for any four months in the period between March and November
Herpetofauna	Monthly for any four months in the period between March and November

Survey area should follow that of the current submission, with emphasis placed on the immediate surrounding habitat which could be impacted during the construction phase. These include but not limited to:

- Ngau Tam Mei Drainage Channel; and
- Agricultural land to the northeast of the Project Site

Surveys should be undertaken by qualified ecologists and/or professionals in the respective fauna group to be surveyed. Survey methodology should follow that of the current submission and in compliance with the relevant Government technical memorandums.

8.10.2 Construction Phase Ecological Monitoring

As a precautionary measure to verify the accuracy of impact assessment and detect any unpredictable impact arising from the proposed development, regular site visit and faunal survey should be undertaken at the immediate surrounding habitats and identified habitats downstream which might be affected; these should include but not limited to:

- Ngau Tam Mei Drainage Channel; and
- Agricultural land to the northeast of the Project Site

Surveys should be undertaken by qualified ecologists and/or professionals in the respective fauna group to be surveyed. Survey methodology should follow that of the current submission and in compliance with the relevant Government technical memorandums.

The survey shall cover the items listed in table below. Survey findings should be evaluated against the pre-construction baseline. Any adverse ecological impacts not addressed should be identified, if considered relevant to the current Project, remedial actions should be formulated and undertaken as appropriate. Findings of the surveys, evaluation of the effectiveness of the mitigation measures and/or report on any unforeseen ecological impacts and remedial actions taken should be submitted as part of the EM&A requirement.

8.10.3 Operational Phase Ecological Monitoring

No significant impact is anticipated and thus no operational phase ecological monitoring will be required.

Table 8-36 Summary of Ecological Baseline Update for Current Project (during construction stage)

Group	Construction Phase Ecological Monitoring	Operational Phase Ecological Monitoring
Bird	Weekly	Not required.
Dragonfly & Butterfly	Once per month between March and November	Not required.
Herpetofauna	Once per month between March and November	Not required.
Site Inspection	Weekly	Not required.

8.11 Conclusion

Existing habitats (pond, reed, agricultural land, grassland/shrubland, abandoned irrigation ditch, seasonally wet grassland and urbanized area), despite their ecological values ranging from “very low” to “low to moderate”, will be lost permanently or temporarily. However, as shown in survey findings, evaluation of the ecological value of each habitat and evaluation of potential ecological impacts outlined above, this area is not considered to be of sufficient ecological value that it should be avoided and retained in its present form. Furthermore, as demonstrated above, the predicted impacts from the proposed development are low. Therefore no mitigation measures for habitat loss are required.

Disturbance impact to the adjacent habitat is anticipated during the construction phase of the project. A site hoarding to be erected prior to the peak winter bird season between October and March is required. The workers should be briefed regarding the sensitivity of the areas. Screening and phasing of construction activities would be applied during construction, as mitigation measures for noise, air and other environmental aspects. Standard practices to control site runoff and other construction phase impacts will also be implemented. Further, design elements (by means of opaque, non-reflective materials) to the noise barriers in order to reduce bird collision impact with these structures will be in place. With these, no further mitigation measures during construction phase are necessary.

During the operational phase, the design elements required to reduce bird collision impact with noise barriers during the construction phase will also be adopted. As such there is no need for further mitigation measure especially given that adjacent habitats are already subject to existing disturbance due to the urbanized nature of the area (houses and roads). The Northern Portion of the PS will be developed as an area comprising a landscape pond, landscaped open area and some passive recreational uses and supporting facilities. Planting between this portion of the site and the adjacent agricultural land will be provided as part of the landscape enhancement measures. This landscape buffer will have the additional benefit of screening human activities and is anticipated to assist in further minimizing potential impact to adjacent habitats. Overall, no residual impacts are predicted.

8.12 References

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9. FISHERIES

9.1 Introduction

This Chapter presents the fisheries impact assessment for the Project. Baseline information on the fish ponds within the AA (area within 500m radius but excluding the PS), assessment methodology, impact prediction and evaluation and mitigation measures (if any) are included.

9.2 Legislation and Standards

The following legislation and guidance notes are applicable to the evaluation of fisheries impact related to the Project:

- Environmental Impact Assessment Ordinance (Cap. 499), Technical Memorandum on Environmental Impact Assessment Process (TM-EIAO), Annexes 9 and 17;
- Hong Kong Planning Standards and Guidelines, Chapter 10;
- Mai Po and Fairview Park Outline Zoning Plan; and
- Fisheries Protection Ordinance (Cap. 171).

9.3 Assessment Methodology

Literature review has been conducted to assess the baseline status of pond fish culture activity within the territory as well as the Project Site and the Assessment Area. Literatures and information reviewed include:

- AFCD's annual reports (1997-2011);
- AFCD's website; (http://www.afcd.gov.hk/english/fisheries/fish_aqu/fish_aqu.html);
- Mott Connell (2008) EIA report for the Proposed Comprehensive Development at Wo Shang Wai, Yuen Long. An EIA report submitted to the EPD; and
- CEDD (2008) EIA report for the Construction of Cycle Tracks and the Associated Supporting Facilities from Sha Po Tsuen to Shek Sheung River. An EIA report submitted to the EPD.

Site visits have also been undertaken to investigate the actual fisheries status within the Project Site and the Assessment Area from June to August 2009; meanwhile, local people, fish farmers and pond owners were also interviewed. Ponds observed were categorized as follows:

- **Active** (which shows commercial aquaculture activities)
- **Inactive** (which does not show any commercial aquaculture activities, but there are no major physical constraints to its resumption, including ponds with fish present in non-commercial quantities and ponds for casual sport fishing or water sports)
- **Abandoned** (which there is physical evidence that aquaculture has not taken place for many years (i.e. overgrown) and/or where there are obvious physical constraints to its resumption (i.e. fenced); concreted ornamental ponds are also included in this category)

9.4 Baseline Condition

9.4.1 Literature Review

Pond fish culture has been practiced in Northwestern Hong Kong for a long period of time. Traditionally, only primary freshwater fishes and several brackish species, such as Bighead Carp *Aristichthys nobilis*, Edible Goldfish *Carassius auratus*, Grass Carp *Ctenopharyngodon idellus*, Mud Carp *Cirrhinus chinensis*, Grey Mullet *Mugil cephalus* and Tilapia *Oreochromis niloticus* were farmed. However, in recent years, certain marine species such as Giant Grouper *Epinephelus lanceolatus*, Yellowfin Seabream *Acanthopagrus latus* and Scat *Scatophagus argus* have also been cultured in diluted seawater by fish farms close to the shoreline (e.g. at Mai Po). In addition, AFCD has introduced some exotic aquaculture species (e.g. Jade Perch Scortum barcoo) to Hong Kong.

Annual pond fish production and fish pond area in the territory are listed in the following table.

Table 9-1 Annual pond fish production and fish pond area.

Year	Pond Fish Production (tonne)	Fish Pond Area (ha)
1997	5000	1125
1998	4900	1110
1999	4500	1094
2000	2817	1060
2001	2550	1059
2002	1989	1030
2003	2114	1029
2004	1977	1026
2005	1897	1026
2006	1943	1024
2007	1927	1160
2008	2266	1160
2009	2105	1160
2010	2190	1109
2011	2315	1130
2012	2306	1150

On the other hand, based on the information from the AFCD, local pond fish production accounted for only 5% of local freshwater and brackish fish consumption in 2012. And most pond fishes consumed in the territory are imported from the Mainland.

9.4.2 Site Investigation

No active fish pond was observed within the PS; only one pond is present (Photo 6 of **Appendix 8-7**). Throughout the survey period, no normal aquaculture practice (i.e. drying, liming, re-profiling, fish fry releasing and large-scale harvesting using seine nets) were observed within the whole AA. However, some fish ponds within the AA were found to be managed for/ associated with the cultivation of ornamental carp, and some were believed (by the survey team)/ claimed (by the pond owners) to be commercially active in producing edible fishes (see **Figure 9-1**). Besides these ponds, most ponds inside the AA are considered to be inactive or abandoned. It should also be noted that a floodwater storage pond is located within the AA (to the north of Fung Chuk Road) and this pond is not included

in the present assessment. Sizes of different types of fish ponds within the PS and AA are listed in **Table 9-2**.

Table 9-2 Sizes of different types of fish ponds.

Type of Fish Pond	Project Site (ha)	Outside Project Site, Within Assessment Area (ha)	Overall (ha)
Active (including ponds for ornamental carp)	0	3.89	3.89
Inactive	0	5.74	5.74
Abandoned	0.50	7.89	8.39

There are two channels, the Ngau Tam Mei Main Drainage Channel and the one surrounding the Fairview Park, in the close vicinity of the PS. They, however, always receive polluted sewage from nearby villages, and their water qualities were very poor. The watercourse within the PS is only an abandoned irrigation ditch. It would not be used by fish farmers as water source.

9.5 Prediction and Evaluation of Impact

9.5.1 Construction Phase

There is no access to the existing pond inside the PS, and the pond is 0.5 ha in size only. It is further considered that due to accessibility issue (no vehicular access), the pond will have very limited capacity to be used as an active commercial fish pond.

The existing pond on the Northern Portion of the PS will be retained and slightly enlarged from 0.5 ha. to 0.6 ha. to serve as a landscape feature under the present Project. The proposal will unlikely cause any significant fisheries impact as the present pond is not producing any fishes and it is very difficult to be reactivated (i.e. very low potential to be reactivated).

The Ngau Tam Mei Main Drainage Channel and the channel of the Fairview Park are watercourses closest to the PS. Some farmers have been observed abstracting water from the Ngau Tam Mei Main Drainage Channel to irrigate their farmlands. Thus, if pollutants arising from the construction works like construction runoff are not properly treated, it may have a possibility to impose off-site impacts on active fish ponds.

Nevertheless, standard mitigation measures to control site runoff and other pollutants caused by construction activities and good site practices will be implemented during the construction phase of the Project. Excavated material and other construction wastes produced will be transferred to proper recipients. With these measures, offsite impacts on fisheries due to the construction activities will be controlled.

9.5.2 Operational Phase

During the operational phase, sewage from the residential area may cause impacts on nearby water bodies. However, the proposed development will not have population intake until the commissioning of the planned local public sewerage works, and all the sewage generated from the PS will be conveyed to public sewerage. Therefore no sewerage pollution from the PS during operational phase is envisaged.

Increased water flow as a result of increased surface runoff after heavy rainfall during operational phase is envisaged, and it may potentially impact nearby channels. Water from these channels may be used at times for filling of fish ponds downstream; thus this runoff may cause fisheries impacts. Nevertheless, as the proposed developments are unlikely to create in-situ pollution (i.e. low-density residential house / landscaped open area), the existing watercourse within AA is already largely polluted, and the amount of the increased surface runoff from the PS is expected to be small, major pollution on the channels is not envisaged.

It is expected that the water quality of the landscape pond in the northern part of the PS will be similar to those existing ponds within the AA. As compared with the ponds currently appearing in the AA, the landscape pond is unlikely to create additional wastewater discharge, and may even possess a better water quality than those existing ponds within the AA, and thus its operation would not cause any additional adverse impact on nearby water bodies. Therefore, there will be no fisheries impact arising from the landscape pond. Overall, during the operational phase, no fisheries impact is anticipated.

9.5.3 Evaluation of Fisheries Impact

Impact evaluation based on the criteria set in Annex 9 of TM-EIAO is listed in **Table 9-3** and **Table 9-4**.

Table 9-3 Evaluation of fisheries impact

Criteria	
Nature of impact	Indirect impact arising from construction activities (i.e. site runoff) and operation of the residential area and amenity pond (i.e. site runoff only).
Size of affected area	No active fish ponds would be directly affected.
Loss of fisheries resources/ production	No active commercial fish ponds will be directly impacted. With standard mitigation measures and good site practices, impacts arising from construction activities will be insignificant. No significant operational phase impact is predicted.
Destruction and disturbance of nursery and spawning grounds	NA
Impact on fishing activity	NA
Impact on aquaculture activity	Insignificant.

Table 9-4 Evaluation of fisheries impact due to the loss of the existing pond residue within PS

Criteria	
Nature of impact	The existing pond residue is abandoned and not for producing fishes. Although landscape pond will be created, it will not be used for producing fishes commercially.
Size of affected area	0.5 ha.
Loss of fisheries resources/ production	The potential for the pond residue to be converted to active pond will be lost. This accounts for only < 0.05% of the overall fish production. However, as mentioned in Section 9.5.1 above, the potential for this pond residue to be converted into an active pond is very low.
Destruction and disturbance of nursery and spawning grounds	No.
Impact on fishing activity	No.
Impact on aquaculture activity	Negligible.

9.6 Cumulative Impact

Since no significant fisheries impact would be arisen due to the present project, no significant cumulative impact is predicted.

9.7 Mitigation Measures

With the measures for mitigating the impacts from construction activities (as described in **Table 14-1** of the submitted EIA report), indirect impacts during the construction phase would be insignificant. During the operational phase, no significant impact is anticipated and thus no specific measure for fisheries impact has to be implemented.

9.8 EM&A Requirements

No significant fisheries impacts are predicted as a result of the proposed Project; hence the development and implementation of a monitoring and audit programme for assessing the effects on fisheries resources and operations is not considered necessary. However, an emergency response plan for any water pollution in the water bodies surrounding the Project Area will be implemented. Also, good site practices will be implemented during the construction phase of the Project. Excavated material and other inert construction wastes produced will be transferred to proper recipients (i.e. public fill or landfill site where appropriate.

During the operational phase, no significant impact is anticipated and thus no specific measure for fisheries impacts has to be implemented.

9.9 Conclusion

No active fish pond would be directly impacted due to this project. Indirect impacts during construction and operational phases would also be insignificant given that appropriate mitigation measures (i.e. measures for water quality impact) are implemented. Therefore, no significant fisheries impact is anticipated.

10. CULTURAL HERITAGE

10.1 Summary

A Cultural Heritage Impact Assessment (CHIA) has been carried out for the Project, which comprises an Archaeological Impact Assessment (AIA) and a Built Heritage Impact Assessment (BHIA). The assessment has been undertaken according to *Technical Memorandum on the Environmental Impact Assessment Process* (EIAO-TM) and Appendix 4 of the EIA Study Brief (i.e. Guidelines for Cultural Heritage Impact Assessment). The assessment covers the Project Site and an Assessment Area of 500m from the boundary of the Project.

There is no known of site of archaeological interest located within Assessment Area (including Project Site). Thus, no direct and indirect impacts to any terrestrial archaeology are anticipated during the construction of the Project. In addition, no land use features that may carry specific cultural meanings were identified, thus there is no cultural element concerned. The Antiquities and Monuments Office should be informed immediately in case of discovery of antiquities or supposed antiquities in the course of construction work.

10.2 Relevant Legislation & Guidelines

The following legislation and guidelines are relevant to the cultural heritage impact assessment (CHIA) in Hong Kong:

- Environmental Impact Assessment Ordinance (Cap. 499);
- Technical Memorandum on EIA Process (Annex 10 and 19, EIAO-TM);
- Guidelines for Cultural Heritage Impact Assessment;
- Hong Kong Planning Standards and Guidelines (HKPSG); and
- Antiquities and Monuments Ordinance (AM Ordinance) (Cap. 53);

Further details of the relevant legislation and guidelines are provided in the CHIA report in **Appendix 10-1**.

10.3 Assessment Results of the CHIA

A CHIA has been undertaken for the Project by a qualified professional and followed the criteria and guidelines for CHIA as set out in Annexes 10 and 19 of the TM. A report detailing the assessment methodology and results is also provided in **Appendix 10-1**.

Based on the findings of desktop review and field scanning, it was found that a temple constructed in the 1980s is located at Chuk Yuen Tsuen. However, it is about 300 m from the Project Site to the east of existing Ngau Tam Mei Drainage Channel. It was found that the Assessment Area (incl. Project Site) contains no archaeological potential, and there is no declared monuments/ historic buildings within or in adjacent to the Project Site. There is also no cultural element such as fung shui pond identified. Therefore, there are no direct or indirect impacts on any terrestrial archaeology or heritage resources that may arise as a result of the construction and operation of this Project.

10.4 EM&A Requirements

As there are no associated impacts identified, no mitigation measure is therefore required. No specific EM&A requirements would be required for the terrestrial archaeology and heritage resources during construction and operational phases of the Project.

10.5 Conclusion

Cultural heritage resources within Assessment Area have been reviewed through literature review and field surveys. From the surveys and examination of records it has been identified that a temple built in the 1980s is located at Chuk Yuen Tsuen, other than that no archaeological potential, declared or deemed monuments or graded historic buildings or other cultural elements such as fung shui ponds are located within the Project Site and Assessment Area. Given that the temple at Chuk Yuen Tsuen is about 300 m away from the Project Site, green field would act as soft buffers, and no substantial pilling works will be adopted in construction phase, potential indirect impacts including vibration and temporary visual impacts are therefore not anticipated during construction phase. The construction activity wouldn't result in vibration and visual effect on this temple. It is therefore concluded that there is no anticipated effect on cultural heritage resources as a result of this Project.

11. LANDSCAPE AND VISUAL

11.1 Summary

This section of the report outlines the landscape and visual impacts associated with the Proposed Residential cum Passive Recreational Development at Various Lots in DD104 near Fairview Park, Yuen Long, N.T. in accordance with the Environmental Impact Assessment Ordinance (EIAO) which became law in Hong Kong on 1st April 1998. Both construction and operation phase impacts are assessed in accordance with the requirements of the Study Brief Section 3.9.9.

This assessment includes the following items:

- A listing of the relevant environmental legislation and guidelines;
- A definition of the scope and contents of the study, including a description of the assessment methodology;
- A review of the relevant planning and development control framework;
- A review of comments on landscape and visual issues received during previous consultation with the public and/or advisory bodies and how these have been addressed in the design;
- A baseline study providing a comprehensive and accurate description of the baseline landscape and visual character;
- Identification of the potential landscape and visual impacts and prediction of their magnitude and potential significance, with and without the mitigation measures; and
- Recommendation of appropriate mitigation measures and associated implementation programmes.

All potential impacts and proposed mitigation measures are mapped in colour and illustrated with clear annotation and cross-referencing between text, tables and illustrations. Colour photographs showing baseline conditions, and photomontages and illustrative materials supporting conclusions are provided and the locations of all viewpoints are clearly mapped. Photomontages at representative locations provide comparison between existing views; proposals on day 1 of operation without mitigation; on day 1 with mitigation; and after year 10 with mitigation.

During construction the impacts on the nearby visually sensitive receivers in Fairview Park are assessed as Slight Adverse. However, the creation of a recreational area in the northern portion of the site and its related landscape and pond creation, substantial new tree planting and the coherent development of the currently derelict site will result in a Slight Positive impact on the landscape resources (or character) within the Project Site, once operational and when mitigation planting has had time to mature. The landscape and visual impacts of this proposal are considered to be acceptable with the implementation of mitigation measures.

11.2 Alternative Layout Options Considered During Design Process

A variety of alternative development scenarios and layout options have been evaluated as part of the design process and are presented in **Section 2** of the Report. The development options were further evaluated in terms of landscape and visual impact in order to arrive at a preferred layout with the lowest possible level of adverse impact. A tabulation of their performance is provided in **Table 11-1**. It should be noted that this evaluation considers only landscape and visual issues with regard to the different options, and no other factors which are detailed elsewhere in this Report. Three layout options were considered:

Option 1 –This option was considered to evaluate the effect of implementing a similar model of suburban development as seen in neighbouring developments (see **Section 2**), with residential / recreational development and restored ponds split equally between the northern and southern portions of the Project Site. Overall, this option was considered to have the greatest potential for adverse landscape and visual impacts because of residential development along much of the Project boundary and smaller, less effective landscape areas.

Option 2 –This option inverts the layout of Option 3, by placing the residential development in the northern portion of the Project Site and the landscape pond and recreational areas in the south. This option was not taken forward for a number of reasons. The northern portion is subject to a greater number of residential VSRs, and thus would result in greater visual impacts due to the villa development. It is also considered more appropriate to maintain direct links to the ponds and wetland areas to the north of the Project by placing the landscape pond adjacent to the northern boundary.

Option 3 –This option concentrates the residential development in the southern portion of the Project Site. The northern portion is entirely given over to recreational uses and a landscape pond area in the approximate location of the existing degraded pond. This option was considered the most favourable in terms of landscape and visual impact because it concentrated development in the southern portion of the Project site, which is subject to fewer and less sensitive VSRs than the northern portion. In landscape terms it is also preferable to provide an opportunity to link the landscape pond to the pond areas further north.

In terms of their effects on landscape character, landscape resources (particularly their mitigation effects) and on the views of VSRs, the above options were evaluated in terms of performance (Good / Medium / Poor) against a series of landscape and visual criteria, as follows:

- Visual impact of the completed Project;
- Location of built structures in relation to neighbouring VSRs;
- Building height, spacing and layout;
- Pond re-provision/ retention;
- Impact upon existing landscape resources;
- Provision of landscape buffer outside boundary walls and noise barriers;
- Provision of amenity landscape within the Project;
- Compliance with OZP layout requirements and relevant guidelines.

Table 11-1 Assessment of Layout Options against Landscape / Visual Criteria

Landscape / Visual Factor	Metrics (Good / Medium / Poor)		
	Option 1	Option 2	Option 3 (Preferred Scenario)
Location of houses relative to boundary	P	P	M
Building height	G	G	G
Spacing & layout	P	M	M
Pond re-provision/retention	M	G	G
Impact upon existing landscape resources	M	M	G
Provision of landscape buffer	M	G	G
Amenity landscape	M	G	G
Compliance with OZP requirements	M	M	G

11.2.1 Preferred Development Option

Generally, it can be seen from **Table 11-1** that the Option 3 was considered the most appropriate option given that:

- It scored more 'Good' performances than the other two options;
- It did not score 'Poor' against any criterion;
- It scored at least 'Moderate' against every criterion.

Option 3 is shown in **Figure 11-16**.

11.3 Environmental Legislation and Guidelines

The following legislation, standards and guidelines are applicable to the evaluation of landscape and visual impacts associated with the construction and operation of the proposed Residential and Passive Recreational Development Project:

- Environmental Impact Assessment Ordinance (Cap. 499, section 16) and the Technical Memorandum on EIA Process (EIAO-TM), particularly Annexes 10, 11, 18, 20 and 21;
- Environmental Impact Assessment Ordinance Guidance Note (EIAO GN) 8/2010;
- ETWB TC No. 29/2004 – Registration of Old & Valuable Trees and Guidelines for their Preservation;
- ETWB TC No.3/2006 – Tree Preservation;
- LAO PN No.7/2007 – Tree Preservation and Tree Removal Application for Building Development in Private Projects;
- Forests and Countryside Ordinance (Cap. 96) and its subsidiary legislation the Forestry Regulations;
- Mai Po and Fairview Park Outline Zoning Plan No. S/YL-MP/6, and
- Town Planning Board Guideline No. 12B – Application for Developments within Deep Bay Area.

11.4 Scope and Content of the Study

The study makes reference to the Approved Mai Po and Fairview Park Outline Zoning Plan No. S/YL-MP/6, an extract of which is shown in **Figure 11-01**. The limit of the landscape impact assessment area is 500m beyond the boundary of the site as shown in **Figures 11-**

02 and **11-06**. The limit of the visual impact study is the Zone of Visual Influence (ZVI), i.e. Visual Envelope of the Project, which is illustrated in **Figure 11-09**.

11.5 Methodology for Assessment of Landscape and Visual Impacts

Landscape and visual impacts have been assessed separately for the construction and operation phases, following the methodology set out in EIAO GN 8/2010 and as detailed below.

11.5.1 Assessment of Landscape Impacts

The assessment of landscape impacts has involved the following procedures:

Identification of the baseline physical and cultural landscape resources (LRs) and landscape character areas (LCAs) found within the assessment area: This is achieved by site visits and desk-top study of topographical maps, and other information databases and photographs.

Assessment of the degree of sensitivity 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 LR or LCA of particularly distinctive character or high importance, sensitive to relatively small changes.

Medium: LR or LCA of moderately valued landscape characteristics reasonably tolerant to change.

Low: LR or LCA, 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 will generate landscape impacts.

Identification of the magnitude of change: The 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.

The magnitude of landscape changes is classified as follows:

Large: The LR or LCA would undergo a major change.

Intermediate: The LR or LCA would undergo a moderate change.

Small: The LR or LCA would undergo slight or barely perceptible changes.

Negligible: The LR or LCA would undergo no discernible change.

Prediction of Acceptability of Landscape Impacts: Landscape impacts are products of magnitude of change and the relative sensitivity of the landscape sensitive receiver. Ultimately, the acceptability of the Project is dependent upon the significance of the residual impacts in accordance with the five criteria set out in Annex 10 of the EIAO-TM, namely 'beneficial', 'acceptable', ' acceptable with mitigation measures', 'unacceptable' and 'undetermined'.

Prediction of the significance of landscape impacts before the implementation of the mitigation measures: By synthesising the magnitude of the various impacts and the sensitivity of the various landscape resources it is possible to categorise impacts in a logical, well-reasoned and consistent fashion. **Table 11-2** 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 change and a low-medium-high degree of sensitivity of landscape resource/character. Impact significant is taken to be adverse unless stated otherwise as beneficial.

Table 11-2 Evaluation of Significance of Landscape and Visual Impacts

Magnitude of Change	Low	Medium	High
Large	Moderate	Moderate / Substantial	Substantial
Intermediate	Slight / Moderate	Moderate	Moderate / Substantial
Small	Slight	Slight / Moderate	Moderate
Negligible	Insubstantial	Insubstantial	Insubstantial

Sensitivity
(of Landscape Resource, Landscape Character Area or VSR)

The degree of Impact significant thresholds are defined as follows:

Substantial: Adverse / positive impact where the proposal would cause significant deterioration or improvement in existing landscape quality.

Moderate: Adverse / positive impact where the proposal would cause a noticeable deterioration or improvement in existing landscape quality.

Slight: Adverse / positive impact where the proposal would cause a barely perceptible deterioration or improvement in existing landscape quality.

Insubstantial: No discernible change in the existing landscape quality.

11.5.2 Assessment of Visual Impacts

The assessment of visual impacts has involved the following procedures:

Identification of the Zone of Visual Influence (ZVI) during the construction and operation phases of the Project: This is achieved by site visit and desk-top 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 ZVI at construction and operation phases: These are the people who would reside within, work within, play within, or travel through, the ZVI.

Assessment of the degree of sensitivity of the VSRs: This includes a consideration of the following factors:

- Value and quality of existing views;
- Availability and amenity of alternative views;
- Type and estimated number of receiver population;
- Duration or frequency of view; and
- Degree of visibility.

The type of VSR, 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 of low sensitivity 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 may vary depending 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. The degree to which this applies is also influenced by the value and quality of existing views; the availability and amenity of alternative views; the duration or frequency of view, the degree of visibility and the numbers of receivers. The sensitivity of each VSR is classified as follows:

This is influenced by the type of VSRs, which is classified according to whether the person is at home, at work, at play, or travelling. The sensitivity of each VSR 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 potential sources of visual impacts: These are the various elements of the construction works and operational procedures that would generate visual impacts.

Assessment of the potential magnitude of change: This includes consideration of the following factors:

- the compatibility with the visual character of the surrounding landscape;
- the duration of the impact;
- scale of the development in the view;
- the reversibility of the impact;

- the distance of the source of impact from the viewer; and
- the change / blockage to the character of existing views.

The magnitude of change is classified as follows:

Large: The VSRs would experience a major change in the character of their viewing experience.

Intermediate: The VSRs would experience a moderate change in the character of their viewing experience.

Small: The VSRs would experience a small change in the character of their viewing experience.

Negligible: The VSRs would experience no discernible change in the character of their viewing experience.

Identification of potential sources of visual impacts: These are the various elements of the construction works and operational procedures that would generate visual impacts.

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 minimise 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 positive 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 and their approval-in-principle has been sought. **Tables 11-7A** and **11-7B** identify these mitigation measures and they are illustrated in **Figures 11-16** to **11-26**.

Prediction of Acceptability of Visual Impacts: Visual impacts are products of magnitude of change and the relative sensitivity of the visual sensitive receiver. Ultimately, the acceptability of the Project is dependent upon the significance of the residual impacts in accordance with the five criteria set out in Annex 10 of the EIAO-TM, namely 'beneficial', 'acceptable', ' acceptable with mitigation measures', 'unacceptable' and 'undetermined'.

Prediction of the significance of visual impacts before the implementation of the mitigation measures: By synthesising the magnitude of the various visual impacts, the sensitivity of the VSRs and the numbers of VSRs that are affected, it is possible to categorise the degree of significance of the impacts in a logical, well-reasoned and consistent fashion. **Table 11-1** 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 change 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 11-1**. Photomontages showing views of the Project from key VSRs at day 1 without mitigation, and at day 1 and year 10 with mitigation, are shown in **Figures 11-35** to **11-40**. Impact significant is taken to be adverse unless stated otherwise as beneficial.

The significance of the visual impacts is categorised as follows:

Substantial: Adverse / positive impact where the proposal would cause significant deterioration or improvement in existing visual character.

Moderate: Adverse / positive impact where the proposal would cause a noticeable deterioration or improvement in existing visual character.

Slight: Adverse / positive impact where the proposal would cause a barely perceptible deterioration or improvement in existing visual character.

Insubstantial: No discernible change in the existing visual character.

11.6 Planning and Development Control Framework

A review has been undertaken of the current planning goals and objectives, statutory land-use and landscape planning designations for the assessment area.

11.6.1 Outline Zoning Plan

The relevant OZP is the Mai Po and Fairview Park Outline Zoning Plan No. S/YL-MP/6, an extract of which is shown in **Figure 11-01**. Under this Plan the Project Site is largely zoned as "Recreation" with a small portion of the site zoned "R(C)". The planning intention of the "REC" zone is primarily for recreational developments for the use of the general public. It encourages the development of active and/or passive recreation and tourism/eco-tourism. Uses in support of the recreational development may be permitted subject to planning permission.

11.6.2 Town Planning Board Guidelines

The Project Site falls outside the Wetland Conservation Area (WCA), but the northern portion lies within the Wetland Buffer Zone (WBA). Accordingly, reference has been made to the Town Planning Board Guidelines for Application for Developments within Deep Bay Area under Section 16 of the Town Planning Ordinance (TPB PG-No.12B). The layout of the Project provides a landscape pond area and outdoor recreational facilities in the northern portion of the Project. Consideration has also been given to minimising any potentially adverse impacts on the visual amenity of the area, and it is expected that the Project will result in an overall enhancement of landscape amenity.

11.6.3 Compatibility of the Project

The Project Site is surrounded by a number of low-rise residential developments and village settlements, these include Fairview Park to the west, southwest and northwest; two R(D) sites (with planning permissions for residential developments) and a number of existing villages to the east; and Palm Springs, Royal Palms, Yau Mei San Tsuen and Wo Shang Wai to further north. It is therefore considered that the Project would be compatible with the residential developments in the locality. The Project would also be in accordance with the "Town Planning Board Guidelines for Application for Developments within Deep Bay Area" (TPB PG-No.12B) in that the Project provides for landscape pond creation within the WBA portion of the site. The Project would be carefully designed to minimise any potentially adverse impacts on the landscape and the visual amenity of the area. A separate planning application for the Project will be submitted to the Town Planning Board for approval.

11.7 Consideration of Concurrent Projects

A review of concurrent projects in the area indicates that the Construction of Cycle Tracks and the Associated Supporting Facilities from Sha Po Tsuen to Shek Sheung River (EIA-159/2008) will have some impact on the landscape and visual assessment of this Project. Another project in the area is described under Yuen Long and Kam Tin Sewerage and Sewage Disposal Stage 2 (EIA-094/2004). However, this is not expected to affect this LVIA. Furthermore, there are a number of other residential projects in planning within the immediate area which will be considered as future VSRs (Approved Application Nos. A/YL-MP/170 and A/YL-MP/205). In the longer term, the character of the area is likely to become more residential than rural as a result of these other residential projects, a change with which the Project will be compatible.

11.7.1 Other Planned Residential Developments

Approved Planning Application Nos. A/YL-MP/170 and A/YL-MP/205 lie within the "Residential (Group D)" ("R (D)") zone to the east of the Ngau Tam Mei Channel. Residents in these developments will constitute potential VSRs for the project. However, the developments will also block some existing views of the Project from other existing VSRs. Over time these developments will collectively contribute to a transition towards a more suburban residential landscape character for the area with which the Project would be compatible.

11.7.2 Proposed Cycle Track from Sha Po Tsuen to Shek Sheung River

The cycle track project forms part of the New Territories Cycle Track Network which connects local cycle track networks in various new towns and is primarily intended for recreational purposes. The implementation programme for the cycle track has yet to be confirmed. However, this study is based on the assumption that the cycle track will be implemented and that cyclists will constitute VSRs.

11.7.3 Yuen Long and Kam Tin Sewage Disposal Stage 2

It is not considered that the public sewerage works, (PWP No. 4235DS), located along Yau Pok Road outside the Project boundary, would be affected by the proposed Project in terms of landscape and visual impacts, and has therefore not been included in this assessment.

11.8 Landscape and Visual Baseline Study

The existing landscape and visual resources and sensitive receivers are detailed below.

11.8.1 Physical, Human and Cultural Landscape Resources

The baseline physical, human and cultural landscape resources that will be affected during the construction phase and operation phase, together with their sensitivity are described below. The locations of the landscape resources are mapped in **Figure 11-02**. Photographic views illustrating the landscape resources are illustrated in **Figures 11-03** to **11-05** inclusive. Broad brush tree survey plans and schedules for each landscape resource are provided in **Appendix 11-1**. For ease of reference and co-ordination between text, tables and figures, each landscape resource is given an identity number.

11.8.2 Broad Brush Tree Survey

A broad brush tree survey has been undertaken within the Project Site and surrounding assessment boundary and has identified the following;

Within the Project Site – **Five (5)** tree groups (namely TG1 to TG5, approximately 148 nos. of trees in total) are identified within the Project Site. Although all identified as groups, some exhibit strong pattern of grouping while others are rather randomly scattered throughout the site. The tree locations and the species distribution reflect the mixed-use nature of the Project Site. A significant portion of the existing trees are of self-seeded species, such as *Macaranga tanarius* (31%) and *Melia azedarach* (11%) that are typical of disturbed land. *Cinnamomum camphora* (19.6%) typical of mature woodland are also found in significant numbers but appear to have been planted (rather than self-seeded) along the boundary of a previous informal golf driving range which is now vacant. Others consist of a mix of amenity trees planted by the Government, ornamental trees by previous lot owners, some fruit trees planted by villagers, and some individual self-seeded trees between previous agricultural fields or open yards. ***[Refer to TSP-01 and Schedule 1 in Appendix 11-1 for broad brush tree survey plan and broad brush tree survey schedule within Project Site]***

Table 11-3 Summary of existing trees within the Project Site (in order of decreasing abundance)

Botanical Name	**Quantity**	**Percentage** *(rounded to 1 decimal place)*
Macaranga tanarius	46	31.1%
Cinnamomum camphora	29	19.6%
Melia azedarach	16	10.8%
Celtis sinensis	12	8.1%
Dimocarpus longan	8	5.4%
Ficus microcarpa	6	4.1%
Albizia lebbeck	5	3.4%
Ficus benjamina	5	3.4%
Bauhinia purpurea	3	2.0%
Clausena lansium	3	2.0%
Leucaena leucocephala	3	2.0%
Mangifera indica	3	2.0%
Sapium sebiferum	3	2.0%
Archontophoenix alexandrae	1	0.7%
Artocarpus macrocarpa	1	0.7%
Bombax ceiba	1	0.7%
Ficus virens var. sublanceolata	1	0.7%
Morus alba	1	0.7%
Syzygium jambos	1	0.7%
GRAND TOTAL	**148**	**100.0%**

Except for TG1, the trees are generally in poor condition with low amenity. TG1 which is located at the south of the Project Site, contains some trees in relatively better condition with higher amenity value, such as *Cinnamomum camphora*, *Celtis sinensis* and *Ficus benjamina*.

Within the Project Site, no protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found within the Project Site. No "Old and Valuable Trees" or "Champion Trees", defined respectively in "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) and in the book "Champion Trees in Urban Hong Kong", were found.

Outside the Project Site but within the Assessment Area - Approximately **4,350 nos.** of existing trees lie outside the Project Site but within the Assessment Area. Most of them are found along major roads and highways, residential and village settlements, and surrounding areas of ponds. The tree's condition is mostly poor with some fair and they have low amenity value. **One (1) no.** "Old and Valuable Tree" (OVT), as defined under the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004), is found on Castle Peak Road. The tree (no. LCSD YL/7) is a *Melaleuca cajuputi* subsp. *cumingiana* and has a height of 17m and spread of 13m. ***[Refer to TSP-02 and Schedule 2 in Appendix 11-1 respectively for broad brush tree survey plan and broadbrush tree survey schedule outside Project Site but within Assessment Area].***

No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found within Assessment Area outside the Project Site.

11.8.3 Landscape Resources within Project Site

Several landscape resources (LRs) are identified within the Project Site and will potentially be affected by the proposed development. ***[Refer to Figure 11-02A for map of the LRs within Project Site, and Figures 11-03 for photos of the LRs within the Project Site. Refer to TSP-01 and Schedule 1 in Appendix 11-1 for broad brush tree survey information within Project Site].***

LR3.A – Open Storage/Vacant Lot (within Project Site): This LR consists of 1.8 ha of mostly hard-paved area at the southern part of the Project Site. There is no other vegetation other than existing trees within this LR. Most of the existing trees within this LR are grouped into TG1 which has a total of around **59 nos.** of trees, with heights of 3-11m and spread of 3-11m and are generally in poor to fair condition with only a few good specimens. The area was once used as a golf driving range and ancillary facilities. Ornamental tree species such as *Archontophoenix alexandrae*, *Bauhinia purpurea*, *Bombax ceiba*, *Cinnamomum camphora*, *Crateva unilocularis*, and *Ficus* species are found and are believed to have been planted by the owner of the golf driving range. After the golf driving range closed down and the area became abandoned, invasive species started to grow in the area, and today some *Leucaena leucocephala*, *Macaranga tanarius* var. *tomentosa* and *Melia azedarach* that are commonly found on disturbed land, can be found.

Although this LR has a fair number of ornamental trees, this LR is considered to have low landscape quality. Vacant lots are commonly found in Hong Kong, particularly in the New Territories, and are not of particular landscape importance. Therefore, changing this LR into a residential use will not cause significant change in both the local and regional contexts. As noted above, the existing trees are generally of only poor to fair condition and contain many invasive species. The trees can be easily replaced by compensatory planting. The sensitivity of this LR is considered to be **low**.

LR6.A – Grassland/shrubland (within Project Site): Much of the land inside the Project Site covering of 6.3ha was previously cultivated fields. With the discontinuation of

agricultural activities, these fields became abandoned and tall grass and weeds have colonized comprised of exotic species, including *Brachiaria mutica, Bidens alba*, *Panicum maximum, Mimosa pudica*, and *Wedelia trilobata* that are generally in poor condition, and a few scattered tree species with a total of approximately **45 nos.** of trees within this LR and are grouped into TG2, TG3, and TG4. TG2 consist approximately **8 nos.** of trees that are part of a larger group of trees planted by the government as roadside amenity landscape. Tree species include *Albizia lebbeck*, *Ficus microcarpa*, and *Syzygium jambos* of 3-6m height and 2-5m spread that are in fair to good condition. TG3 and TG4 together consist of a total of approximately **37 nos.** of trees (24 nos. in TG3 and 13 nos. in TG4), of 3-15m height and 3-15m spread and generally poor to fair condition. They include some fruit tree species such as *Dimocarpus longan, Mangifera indica* and *Artocarpus heterophyllus*, as well as species that are commonly found on cultivated fields, like *Bombax ceiba, Morus alba* and *Ficus microcarpa*. Over time, some weedy and invasive species have grown in this area, including, and *Macaranga tanarius* var. *tomentosa* and *Melia azedarach*. During the site maintenance period, the undesirable planting species of *Leucaena leucophelala* within this LR has been removed.

This type of rural landscape resource is fairly common in the New Territories, and has no particular significance in a local or regional context. Furthermore, this LR has a high tolerance to change due to its abandoned and unkempt nature. Therefore, this LR is considered to have **low** sensitivity.

LR7.A – Ponds and Pond Edge (within Project Site): This LR at the northern part of the Project Site includes an abandoned pond of around 0.5ha and 0.2ha of other vegetation located along the pond edge. Within this 0.2ha comprised common grass/shrub species, including *Brachiaria mutica, Bidens alba*, *Panicum maximum, Mimosa pudica*, and *Wedelia trilobata* that are generally in poor condition and a few scattered tree species comprise some fruit trees, such as *Clausena lansium*, *Dimocarpus longan* and *Mangifera indica*, left by villagers can still be found on the edge of the pond. Alongside these trees are also pioneer species *Macaranga tanarius* var. *tomentosa* and *Melia azedarach*, as the area has long been abandoned. All these trees are within TG5 which has approximately **44 nos.** of medium to large sized trees with generally in poor to fair condition with only a few good specimens.

The pond and its surroundings offer certain degree of landscape amenity. Although freshwater ponds are in general intolerant to change, this particular pond within the Project Site is has been abandoned by villagers, unlike the active, well-maintained fish ponds outside the Project Site (LR7.B). The dominance of fruit trees and invasive tree species with generally poor to fair form and health and low to medium amenity value gives this LR a medium landscape quality. This LR is considered to have **medium** sensitivity.

For all LRs within the Project Site, no protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No “Old and Valuable Trees” as defined in the “Registration of Old and Valuable Trees” (ETWB TC(W) No. 29/2004) were found. No “Champion Trees” as defined in the book “Champion Trees in Urban Hong Kong” were found.

11.8.4 Landscape Resources outside Project Site but within Assessment Area

The following LRs are located outside the Project Site but within the Assessment Area. They will not be affected by the proposed development.

[Refer to Figure 11-02B for map of the LRs outside the Project Site, and Figures 11-03 and 11-05 for photos of the LRs. Refer to TSP-02 and Schedule 2 in Appendix 11-1 for broad brush tree survey information outside Project Site but within Assessment Area].

LR1.B – Local Roads: Major roads outside the Project Site but within the Assessment Area include Yau Pok Road, Kam Pok Road, and Castle Peak Road. Approximately **500 nos.** of existing trees were identified with average 3-12m height and 2-10m spread with generally Poor form, Poor to Fair health and have Low amenity value. These trees comprise mostly ornamental species like *Bauhinia spp., Bischofia javanica, Bombax ceiba, Cassia fistula, Cleistocalyx nervosum, Delonix regia, Eucalyptus citiodora, Ficus microcarpa, Hibiscus tiliaceus, Lagerstroemia speciosa, Leucaena leucocephala, Macaranga tanarius var. tomentosa, Melia azedarach, Melaleuca cajuputi subsp. cumingiana, Peltophorum pterocarpum, Pterocarpus indicus, Spathodea campanulata,* and *Syzygium jambos.* Several large mature *Melaleuca cajuputi* subsp. *cumingiana* were found along Castle Peak Road (one of which is identified as "Old and Valuable Trees" (OVT) (registration no. LCSD YL/7) as defined in ETWB TC (W) No. 29/2004 - "Registration of Old and Valuable Trees") ***[refer to Schedule 2 in Appendix 11-1 for information on this OVT]***. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong" were found. Overall, this landscape resource has relatively low landscape and amenity value and is able to accommodate extensive change. Moreover, considering the presence of a large amount of roadside vegetation of common species in the vicinity, the existence of only one roadside OVT will not significantly raise the overall landscape and amenity value of the LR. Therefore, overall this LR is considered to have a **medium** sensitivity.

LR2.B1 – Comprehensive Residential Settlements (outside Project Site): This LR has a total of around **1,500 nos.** of trees, in various comprehensive residential developments as described below.

Planting located outside the Project Site to the north within the southern portion of Palm Springs and Royal Palms residential developments: approximately **600** nos. of existing trees with an average 3-10m height and 4-8m spread, Poor form, Poor to Fair health and with Low amenity value. The planting comprises *Aleurites moluccana, Araucaria heterophylla, Archontophoenix alexandrae, Bauhinia spp., Ficus benjamina, Ficus microcarpa, Hibiscus tiliaceus, Macaranga tanarius* var. *tomentosa, Melaleuca cajuputi* subsp. *cumingiana, Michelia* x *alba*, *Musa spp.* and *Roystonea regia*. All the species are exotic except for *Bauhinia spp., Ficus microcarpa, Hibiscus tiliaceus***,** and *Macaranga tanarius* var. *tomentosa* which are native to Hong Kong.

Planting located within Fairview Park residential development including approximately **700** nos. of roadside trees comprising mainly *Aleurites moluccana*, *Bauhinia spp.*, *Cinnamomum burmannii*, *Delonix regia*, *Juniperus chinensis, Grevillea robusta* and *Melalueca cajuputi* subsp. *cumingiana* and approximately **150** other trees in the school and pocket parks which comprise: *Acacia confusa*, *Albizia lebbeck, Araucaria heterophylla, Archontophoenix alexandrae, Bauhinia spp., Bombax ceiba, Callistemon viminalis, Celtis sinensis*, *Chrysalidocarpus lutescens, Delonix regia, Ficus microcarpa, Ficus virens var. sublanceolata, Hibiscus tiliaceus, Juniperus chinensis, Khaya senegalensis, Lagestromia*

speciosa, Macaranga tanarius var. *tomentosa*, *Melaleuca cajuputi* subsp. *cumingiana, Melia azedarach*, *Phoenix roebelenii, Roystonea regia, Salix babylonica, Sapium sebiferum* and *Taxodium distichum.* The trees have an average height of 3-13m and 3-10m spread, Poor form, Poor to Fair health and have low amenity value.

Additionally, there are approximately **50** nos. of trees scattered around Man Yuen Chuen, Helene Terrace, Villa Camellia, Royal Camellia, Greenery Garden, Kamease Garden and Meistar House, with an average 4-13m height and 3-10m spread, comprising: *Araucaria heterophylla, Archontophoenix alexandrae*, *Bauhinia spp., Bischofia javanica*, *Bombax ceiba*, *Cinnamomum camphora*, *Ficus benjamina*, *Ficus microcarpa, Hibiscus tiliaceus, Juniperus chinensis* var. *Kaizuca, Lagerstroemia speciosa*, *Livistona chinensis Mangifera indica*, *Melaleuca cajuputi* subsp. *cumingiana, Michelia* x *alba*, and *Terminalia mantaly*.

All trees within these residential developments were planted for amenity purposes and are maintained by the private residential management. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Tree" as defined in the book "Champion Trees in Urban Hong Kong" were found. No trees are affected by the proposed development. Overall, this landscape resource has a relatively medium landscape and amenity value and is considered to have **medium** sensitivity.

LR2.B2 – Village Settlements (outside Project Site): Village settlements comprising clusters of two to three-storey houses in organic, ad-hoc layouts are scattered along the edge of eastern and southern portions of the assessment area. There are approximately **180 nos.** trees scattered around the village at Chuk Yuen Tsuen (Hang Fok Garden and Ha San Wai) comprising *Averrhoa carambola*, *Bombax ceiba*, *Celtis sinensis*, *Citrus maxima*, *Clausena lansium*, *Delonix regia*, *Dimocarpus longan*, *Dracontomelon duperreanum*, *Ficus microcarpa*, *Hibiscus tiliaceus*, *Litchi chinensis, Macaranga tanarius* var. *tomentosa*, *Mangifera indica*, *Melaleuca cajuputi* subsp. *cumingiana, Melia azedarach*, *Michelia* x *alba*, *Morus alba, Psidium guajava*, *Sapium sebiferum* and *Syzygium jambos* between 3-10m height and 4-8m spread. Planting within this village area is predominantly of fruit trees and indigenous vegetation. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong" were found. No trees are affected by the proposed development and this landscape resource comprises common species and is considered to have **low** sensitivity.

LR3.B – Open Storage/Vacant Lot (outside Project Site): While these areas are largely hard-paved open storage / vacant sites outside the Project Site, parts of them are covered with grass and naturally seeded vegetation. Approximately **650 nos.** existing trees were identified with an average 4-12m height and 3-8m spread, Poor form, Poor to Fair health and Low amenity value. Planting species comprise *Archontophoenix alexandrae, Artocarpus heterophylla, Bauhinia spp., Bombax ceiba, Casuarina equisetifolia, Ficus microcarpa, Leucaena leucocephala, Macaranga tanarius* var. *tomentosa and Melaleuca cajuputi* subsp. *cumingiana*. Trees, mainly *Bombax ceiba* and *Ficus microcarpa* are in a degraded condition, condition, having been persistently disturbed by human activities. Self-seeded *Macaranga tanarius* var. *tomentosa* and *Leucaena leucocephala* are also occasionally found at the fringe of these areas. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong"

were found. As planting lies within an area of temporary storage use, it is considered that this landscape resource has a **low** sensitivity.

LR4.B – Agricultural Fields (outside Project Site): Agricultural fields lie in the north-eastern portion of the assessment area and are cultivated with common fruit trees and vegetable crops. The fields contain approximately **350 nos.** of existing trees with an average height of 4-6m and 5-7m spread with Poor to Fair form, Poor to Fair health and Low amenity value. The dominant species are fruit trees such as *Litchi chinensis* and *Dimocarpus longan* planted by local villagers. Some self-seeded species like *Macaranga tanarius* var. *tomentosa* and *Leucaena leucocephala* can also be found. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong" were found.

The landscape quality of this LR is considered to be medium due to the expansive, rural and open environment. However, abandoned and active agricultural lands are in fact fairly common in New Territories, and so changes to this LR will not be of any significance in a regional context. Furthermore, agricultural lands are reasonably easy to re-establish, and have a high ability to accommodate changes. Given these factors, this LR is considered to have **medium** sensitivity.

LR5.B – Plantation (outside Project Site): This takes the form of buffer planting between village settlements and major corridors such as Kam Pok Road, Castle Peak Road, and San Tin Highway. The arrangement of this planting contributes to the local landscape by providing green edges and buffers. Approximately **250 nos.** of existing trees were surveyed with an average height of 3-12m, 3-13m spread and generally Poor form, Poor to Fair health and Low amenity value. The planting comprises *Averrhoa carambola, Bombax ceiba, Celtis sinensis, Clausena lansium, Cleistocalyx nervosum, Delonix regia, Eucalyptus spp., Ficus altissima, Ficus benjamina, Ficus binnendijkii, Ficus microcarpa, Hibiscus tiliaceus, Lagestromia speciosa, Leucaena leucocephala, Litchi chinensiss, Macaranga tanarius var.tomentosa, Melaleuca cajuputi* subsp. *Cumingiana, Spathodea campanulata*, and *Syzygium jambos*. The predominant species are *Bombax ceiba*, *Eucalyptus spp.*, *Ficus benjamina*, *Hibiscus tiliaceus, Lagerstroemia speciosa* and *Melaleuca cajuputi* subsp. *cumingiana*. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong" were found. This landscape resource is considered to have a **medium** sensitivity as it comprises common species that could easily be reinstated.

LR6.B – Grassland/Shrubland (outside Project Site): The grassland area located outside the Project Site to the east of the nullah channel comprises disturbed former agricultural land which has been colonised by common grass species such as *Panicum maximum* and *Pennisetum purpureum*, with some shrubs and trees, mainly the invasive *Leucaena leucocephala*, growing around the margins. Approximately **150 nos.** of trees with an average height of 3-5m height and 5-6m spread have generally Poor form, Poor health and Low amenity value. These comprise mainly *Leucaena leucocephala,* and *Macaranga tanarius* var. *tomentosa*. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong" were found. The resource has a relatively low amenity value and its disturbed and incidental

nature makes it reasonably tolerant to change and hence, is considered to have *a* **low** sensitivity.

LR7.B – Ponds and Pond Edge (outside Project Site): Ponds including fishponds were once commonplace in the Northwest New Territories and are now becoming significant landscape resources due to their increasing loss. There are several areas of existing ponds within the assessment area. Most of them are abandoned and are colonized by local vegetation. There are approximately **420 nos.** of trees surrounding the ponds with an average 2-10m height and 3-9m spread and generally Poor form, Poor to Fair health and Low amenity value. Approximately 26 species were surveyed:- *Acacia auriculiformis, Albizia lebbeck, Aleurites moluccana, Annona squamosa, Artocarpus heterophyllus, Bauhinia spp., Bombax ceiba, Callistemon viminalis, Carica papaya, Casuarina equisetifolia, Celtis sinensis, Cinnamomum camphora, Citrus maxima, Clausena lansium, Dimocarpus longan, Diospyros kaki, Ficus hispida, Ficus microcarpa, Khaya senegalensis, Litchi chinensis, Macaranga tanarius* var. *tomentosa, Mangifera indica, Melia azedarach, Peltophorum pterocarpum, Syzgium cumini,* and *Syzgium jambos*. All the trees are exotic except for *Celtis sinensis, Cinnamomum camphora, Ficus microcarpa and Macaranga tanarius* var. *tomentosa* which are native to Hong Kong. All the trees are on embankment environments and have been planted for quite some time. *Macaranga tanarius* var. *tomentosa* can be found at the fringe of the ponds, while pond embankments are used by local villagers as spaces for cultivating fruit trees, predominantly *Litchi chinensis* and *Dimocarpus longan*. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong" were found.

Freshwater ponds are often associated with agricultural lands and are used for irrigation. Although most of the trees of this LR are common fruit trees that are in poor conditions, the landscape quality of this LR is considered to be high due to the relationship of pond and planting. Its aquatic nature also makes this LR very intolerant to change despite being largely manmade. Given these factors, this LR's sensitivity is considered to be **high**.

LR8.B – Modified Watercourse (outside Project Site): Three watercourses, namely a channel flowing through the area (about 35m wide and 1000m length), a nullah cutting through Fairview Park (about 20m wide and 700m length), and a nullah along Ha San Wai Road, are former natural watercourses that were modified to reduce flooding hazards in the low-lying district. They are now essentially man-made channels which vary in width and edge treatment. Banks of the channel flowing through the area are largely covered with grass and understory shrubs, with the weedy *Leucaena leucocephala* found. Meanwhile, *Macaranga tanarius* var. *tomentosa* and *Leucaena leucocephala* are found banks of the nullah along Ha San Wai Road. In total, within this LR, there are approximately **140 nos.** of trees with an average height of 2-3m height and 3-4m spread with generally Poor form, Poor health and Low amenity value, consisting mainly of *Leucaena leucocephala*. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong" were found.

Although artificial in nature, this LR is largely considered to have medium landscape quality due to the pleasant environment created by the combination of water and edge planting along the channels. Its quality is also augmented by the growth of grass and weeds which have naturalized the artificial banks of the channels. However, such landscape is not of any particular importance and is fairly commonly seen in Hong Kong. Furthermore, the artificial

nature of the water channels can be easily reinstated. Therefore, this LR is considered to have a **medium** sensitivity.

LR9.B – Public Amenity Area (outside Project Site): There is a public amenity area located at the corner between the Kam Pok Road and the nullah watercourse channel in the north-eastern portion of the assessment area. This public amenity area is maintained by the District Office and has been planted for quite some time. There are approximately **60 nos.** of trees in this area. The predominant species comprise *Cassia fistula, Melaleuca cajuputi* subsp*. cumingiana* and *Peltophorum pterocarpum* with an average height of 3-5m height and 2-4m spread with generally Good form, Good health and Medium amenity value. No protected species listed under Forestry Regulations (Cap. 96 Forestry and Countryside Ordinance sub. leg.) were found. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong" were found. The area and associated planting are considered to have a **medium** sensitivity due to its amenity value within the landscape.

LR10.B – Highway (outside Project Site): The only feature of this LR outside the Project Site is the San Tin Highway and the associated slip roads and roundabouts. There are approximately **150 nos.** of existing trees in this LR, with the majority of them being *Eucalyptus* spp. of around 15m height and 6-8m spread that are densely planted along both sides of San Tin Highway. There are also a few *Lagerstoremia speciosa* and *Bombax ceiba* that are planted as ornamental trees at the slip road area. No "Old and Valuable Trees" as defined in the "Registration of Old and Valuable Trees" (ETWB TC(W) No. 29/2004) were found. No "Champion Trees" as defined in the book "Champion Trees in Urban Hong Kong" were found.

Although the existing trees in this LR are generally large, the vast majority of them are *Eucalyptus* species which are fast-growing and short lived species. The generally large size of these trees indicates that they have already reached maturity. They are mostly in generally poor condition with low amenity value and are an exotic species that can be replaced relatively easily. Therefore this LR is considered to have a **low** sensitivity.

11.8.5 Landscape Character Areas

Several landscape character areas (LCAs) have been identified within the assessment area which will potentially be affected by the Project. These areas and their sensitivity to change are described below. ***[Refer to Figure 11-06 for map of the LCAs. Refer to Figures 11-07 and 11-08 for photographs of the LCAs].***

LCA1 – Rural Open Landscape at Active / Abandoned Agricultural Lands / Fish Ponds: This LCA, which occupies a total area of approximately 55 ha, is characterized by a combination of active and inactive agricultural lands, including cultivated fields and fish ponds. Crops, ponds, grasses, trees, and a few temporary structures/ shelters are found on flat, open areas. Some areas that have been long abandoned have been heavily invaded by tall grasses, shrubs and weeds, concealing much of the traces of previous agricultural activities. This rural landscape character is relatively common in New Territories nowadays.

7 ha out of the total 55 ha of this LCA will be affected by the proposed development. Due to the high percentage of abandoned and generally unkempt areas found in this LCA, the landscape quality of this LCA is considered to be medium and it is largely tolerant to changes. Overall, the sensitivity of this LCA is assessed as **medium**.

LCA2 – Semi-Rural Open Landscape along Manmade Water Channels: This LCA has a total area of approximately 14 ha and is characterized by open landscape along major water

channels (or nullahs). Although manmade in nature, grasses and weeds have colonized some of the dry banks and on some of the wetted areas inside the water channels where sufficient silt has deposited. Roadways with low traffic flow and amenity planting are often found along both sides of the water channels, providing a pleasant landscape experience when travelling (whether on foot, on bicycle or in cars) through the semi-rural space.

Although this LCA is artificial in nature, this LCA is considered to have medium to high landscape quality due to the pleasant environment created by the vast and open landscape and predominance of roadside amenity planting in a semi-rural setting. Its quality is also augmented by the growth of grass and weeds which have naturalized the artificial banks of the water channels. Despite its qualities, the artificial water channels and the roadways and the associated amenity plantations can be reinstated easily. This LCA is therefore assessed as having a **medium** sensitivity.

LCA3 – Comprehensive Low Density Residential Areas: This LCA is approximately 78 ha in total and is characterized by built structures and residential landscape in major low-rise residential developments, such as Fairview Park and Palm Springs. Similar low-rise residential developments can also be found in Villa Camellia, Villa Camellia, Royal Camellia, Man Yuen Chuen, and Greenery Gardens, although they appear to be less well managed and maintained than Palm Springs and Fairview Park. But in any case, residential dwellings of similar architectural design, colour scheme and building height lie within a rectilinear network of roadways creating a well-defined and structured character area. Common facilities such as schools, shops and clubhouses within these developments create a self-contained community. Roadways of low vehicular and pedestrian usage are landscaped with amenity planting such as palm and ornamental tree species, creating a sense of tranquillity.

As this LCA is not particularly unique and is entirely man-made, its sensitivity is assessed as **medium**.

LCA4 – Village House Areas: This LCA, which has a total area of approximately 7 ha, consists of various small to medium scale village settlements commonly seen in New Territories. The buildings are typically two to three storeys, varying in height, architecture, colour and age, and are arranged in an irregular form. Village houses and temporary (some possibly illegal) structures, alongside other structures such as temples and schools, are built along rather random footpaths or lanes of varying widths. Small informal restaurants, stores, car parks and sitting areas with temporary structures are occasionally found at the edge of the village facing public roads.

Unlike some historical villages found in other places of the New Territories, this kind of relatively recent disorganized village development is very common, and thus it is not of any particular landscape significance in the local and regional context. Therefore, this LCA is assessed as having a **low** sensitivity

LCA5 – Major Transportation Corridors: This LCA is defined by the San Tin Highway and associated slip roads and roundabouts, occupying a total of approximately 4 ha. Although fairly large amenity and screen tree plantings are found, extensive road surfaces and the high volume of vehicular traffic flow make the space rather unpleasant and unfriendly for pedestrians and cyclists.

The unpleasant, noisy, dusty environment along the roads significantly reduces the overall landscape quality. Also, given the generally urbanized environment of Hong Kong, major transportation corridors with associated planting on both sides are common and not of any particular significance in both local and regional contexts. Therefore, this LCA is assessed as having a **low** sensitivity.

LCA6 – Open Storage / Workshops / Utility Areas: This LCA is approximately 37 ha and is characterized by hard-paved areas and disorganized temporary structures that are used as open storage, workshops, and parking lots. It also includes public service facilities, most notably the Chuk Yuen Floodwater Pumping Station, which has a rather dull, utilitarian design. The LCA is mostly disturbed, with little planting, and the fringes are occasionally invaded by grasses, weeds and weedy tree species.

The disjointed mix of industrial and human activities, together with the overall greyish tone and general lack of greenery, give this LCA a low landscape quality. Thus this LCA is assessed as having a **low** sensitivity.

11.8.6 Zone of Visual Influence (ZVI)

The ZVI for the Works will be similar during the construction phase and operation phase. The ZVI is described below:-

To the south of the Site, the ZVI is defined by the buildings of the residential and commercial developments along Fairview Park Boulevard.

To the west, the edge of the ZVI is largely defined by the 2 and 3-storey houses of Fairview Park.

To the north, the ZVI is defined by the residential developments of Palm Springs and Royal Palms.

To the east, the ZVI is contained by dense, tall roadside tree planting along Castle Peak Road and the San Tin Highway. This means that there are no significant views of the Project Area from the San Tin Highway or from the developments and villages east of the San Tin Highway.

11.8.7 Visually Sensitive Receivers (VSR)

Within the ZVI key Visually Sensitive Receivers (VSRs) have been identified for the construction and operation phases. For ease of reference, each VSR is given an identity number, which is used in the text tables and figures in this assessment. These VSRs are mapped in **Figure 11-09** while the section showing the derivation of ZVI is illustrated in **Figure 11-10**. They are listed below, together with their sensitivity in views as a result of the Project, in **Table 11-4**.

11.8.8 Photomontages

Photomontages have been prepared from 6 viewpoints to illustrate a range of scenarios from key VSR's. The six photomontage viewpoints are mapped in **Figure 11-09**.

The viewpoints include public/ local vantage points for both kinetic and static VSR's. The viewpoints also include a representative range of distances within the ZVI. The views currently experienced by VSRs are shown in **Figures 11-35** to **11-40**.

Table 11-4 Sensitivity of VSRs

ID No.	Visually Sensitive Receiver	VSR Type & Number (Very Few, Few, Many, Very Many)	Quality of Existing Views (Good, Fair, Poor)	Alternate Views & Amenity (Poor, Fair, Good)	Frequency of View (Very Frequent, Frequent, Occasional, Rare)	Degree of Visibility (Full, Partial, Glimpse)	Sensitivity (Low, Medium, High)
R1a & R1b	Residents of Fairview Park	Residential (Few)	Good	Yes (Few)	Very Frequent	Full	High
R2	Residents of Palm Springs and Royal Palms	Residential (Few)	Good	Yes (Few)	Frequent	Partial	High
R3	Residents of Yau Mei San Tsuen	Residential (Very Few)	Fair	Yes (Fair)	Frequent	Partial	Medium
R4	Residents of Chuk Yuen Tsuen, Tai Yuen Villa and Hang Fook Garden	Residential (Few)	Fair	Yes (Fair)	Occasional	Glimpse	Medium
R5	Residents of Ha San Wai	Residential (Few)	Fair	Yes (Fair)	Rare	Glimpse	Medium
R6	Residents of Helene Terrace and Villa Camellia	Residential (Very Few)	Fair	Yes (Fair)	Frequent	Partial	Medium
R7	Future Residents under Approved Planning Application A/YL-MP/205	Residential (Very Few)	Fair	Yes (Fair)	Frequent	Full	High
R8	Future Residents under Planning Application A/YL-MP/170	Residential (Very Few)	Fair	Yes (Fair)	Frequent	Full	High
T1	Travellers on Ha Chuk Yuen Road and Fung Chuk Road	Travelling (Very Few)	Fair	Yes (Fair)	Rare	Glimpse	Low
T2	Travellers on Yau Pok Road, Kam Pok	Travelling	Fair	Yes	Very Frequent	Full	Low

	Road and Proposed Cycle Track	**(Few)**		**(Fair)**			
ID No.	**Visually Sensitive Receiver**	**VSR Type & Number (Very Few, Few, Many, Very Many)**	**Quality of Existing Views (Good, Fair, Poor)**	**Alternate Views & Amenity (Poor, Fair, Good)**	**Frequency of View (Very Frequent, Frequent, Occasional, Rare)**	**Degree of Visibility (Full, Partial, Glimpse)**	**Sensitivity (Low, Medium, High)**
T3	**Travellers on Castle Peak Road and San Tin Highway**	**Travelling (Very Many)**	**Fair**	**Yes (Fair)**	**Rare**	**Glimpse**	**Low**
T4	**Pedestrians on Footbridges over San Tin Highway**	**Travelling (Very Few)**	**Fair**	**Yes (Fair)**	**Rare**	**Glimpse**	**Low**
T5	**Travellers on Fairview Park Boulevard**	**Travelling (Very Few)**	**Fair**	**Yes (Fair)**	**Frequent**	**Partial**	**Low**
O1	**Staff and Pupils at Wong Chan Sook Ying Memorial School and Commercial Premises**	**Occupational (Very Few)**	**Fair**	**Yes (Fair)**	**Frequent**	**Partial**	**Low**
O2	**Staff and Pupils at Bethel High School**	**Occupational (Very Few)**	**Good**	**Yes (Fair)**	**Frequent**	**Full**	**Medium**
O3	**Workers on Commercial Farmland and Fish Ponds**	**Occupational (Very Few)**	**Fair**	**Yes (Fair)**	**Frequent**	**Partial**	**Low**
O4	**Workers at Chuk Yuen Floodwater Pumping Station**	**Occupational (Very Few)**	**Fair**	**Yes (Fair)**	**Very Frequent**	**Full**	**Low**
O5	**Workers in Yau Mei San Tsuen**	**Occupational (Very Few)**	**Fair**	**Yes (Fair)**	**Occasional**	**Glimpse**	**Low**
O6	**Workers in Open Storage and Other Premises east of Castle Peak Road**	**Occupational (Very Few)**	**Fair**	**Yes (Fair)**	**Occasional**	**Glimpse**	**Low**

11.9 Potential Sources of Landscape and Visual Impact

The proposed development will be the source of impacts inducing adverse landscape and visual impacts during the construction phase and the operation phase. It should be noted that some sources may actually induce positive impact.

11.9.1 Potential Sources of Construction Impact

The proposed Project will involve the following sources of construction impacts:

- Presence of the construction sites and the commencement of construction activities (e.g. site clearance/ removal of existing vegetation/ vegetated surface and conversion to bare soil, gravel or hard paved surface, site formation works/ excavation works/ basement works, presence of construction equipment, machinery and plant, temporary storage of construction materials, setting up of construction site offices, parking and yards, and night-time security lighting etc.);
- Erection of temporary 3m high hoarding and 5.5m and 9m high temporary noise barrier. Whilst the barriers will create temporary visual obstruction, they will effectively screen adverse views of the construction activity. Provided the barriers are sensitivity designed, the overall visual benefit should be positive (refer to **Figure 11-33**).
- Potential damage to existing trees to be retained due to construction activities;
- Presence of incomplete structures and;
- Slightly enlargement of existing pond by excavation at the edge of the existing pond and impact on the surrounding soil.

11.9.2 Potential Sources of Operational Impact

Sources of operation phase impact will be:

- Slight enlargement of existing abandoned pond into a Landscaped Pond;
- Presence of permanent noise barrier along part of the development boundaries; located along the southern portion of the proposed development with varies high and length of noise barrier of 2.5m (H) with approx.88m (L); 4m (H) with approx.142m (L); and 4.5m (H) with approx.49m (L). Please refer to **Figure 11-34**.
- Presence of new building structures (e.g. residential houses, residents' communal clubhouse) and roads in the southern portion of the site;
- Presence of new landscape features and associated facilities in the recreational grounds in the northern portion of the site; and
- Night-time domestic and street lighting.

11.10 Landscape Impact Assessment

11.10.1 Landscape Impacts before Mitigation

There will be a number of impacts on LRs during the construction and operation phases. However, these impacts will be confined to areas within the Project Site. They are described below and are tabulated in **Table 11-6:**

LR3.A – Open Storage/Vacant Lot (within Project Site): This LR has low sensitivity. The proposed development will result in the permanent loss of all (approx. 1.8 ha) open storage/ vacant lots. No other vegetation (e.g. shrub/grass) other than existing trees is found within this LR.

All 59 nos. of the existing trees within tree group TG1 will be affected by the proposed development and need to be removed, either by felling or transplanting.

During construction before mitigation, the entire area of the LR will become part of the construction site when site formation and building works commence. The existing open storage/ vacant lot have a low sensitivity. Its conversion to a construction site will result in **Intermediate** Magnitude of Change, producing a **Slight** Impact Significance before mitigation.

During operation before mitigation, the entire area of the LR will have been converted from open storage/ vacant lot to a residential house development with private gardens and communal landscape areas. The Magnitude of Change is considered to be **Intermediate**, and the resulting Impact Significance is considered to be **Slight**.

LR6.A – Grassland/Shrubland (within Project Site)**:** The sensitivity for this LR is low. The proposed development will cause permanent loss of all (approx. 6.3 ha) of this LR comprised of common grass/shrub species.

Out of the 45 nos. of trees within this LR, a total of 29 nos. of trees (1 no. in TG2 + 24 nos. in TG3 + 4 nos. in TG4) will be directly affected by the proposed development (partly due to the proposed houses and the basement carpark in southern portion of the site and partly due to the proposed recreational facilities in the northern portion of the site), and will need to be removed, either by felling or transplanting.

During construction before mitigation, the entire 6.3 ha area of the LR will be converted from grassland/ shrubland to a construction site with some existing retained trees when site formation/ building works for the proposed houses in the southern portion of the site and landscape works for the recreational ground in the northern portion of the Project Site commence. The Magnitude of Change is considered to be **Large** and the resulting Impact Significance before mitigation is considered to be **Moderate**.

During operation before mitigation, the entire area of the LR will have been converted from grassland/ shrubland to a residential house development in the southern portion of the site and a recreational ground to the northern portion of the site. Although there will be a reduction of total vegetated surface due to the hard paving of the proposed internal roads and footpath, it is believed that proposed trees and shrubs of better health and higher amenity value within the recreational ground will to some extent offset the negative effects of the loss of existing vegetation, although some of the grassland cannot be compensated. Therefore, the Magnitude of Change is considered to be **Intermediate**, and the Impact Significance before mitigation is considered to be **Moderate.**

LR7.A – Ponds and Pond Edge (within Project Site): This LR has medium sensitivity. Works in this area will involve enlarging the existing abandoned pond (approx. from 0.5 ha) and pond edge (approx. from 0.2ha) and it causes permanent loss of 0.2ha of the pond edge which comprises common grass/shrub species. However, this loss is offset by the creation of new pond edge for the expanded pond.

All 44 nos. of existing trees within this LR are grouped within TG5. Most of these trees are growing by the concrete wall of the existing nullah and the enhanced landscape pond will not affect these trees. A central island within the enhanced pond area will allow further preservation of existing trees.

During construction before mitigation, the excavation work for enlarging the pond will adversely affect the water quality of the existing abandoned pond. The Magnitude of impact is considered to be **Intermediate**, and the Impact Significance before mitigation is considered to be **Moderate**.

During operation before mitigation, the enlarged pond will have a greater water capacity than the existing abandoned pond, which will be managed and circulated suitably, enhancing the water quality and the amenity and wildlife value of the pond. The Magnitude of Change is considered to be **Intermediate**, and the resulting Impact Significance before mitigation is considered to be **Moderate.**

Unaffected LRs: All other LRs inside the Assessment Area (i.e. LR1.B, LR2.B1, LR2.B2, LR3.B, LR4.B, LR5.B, LR6.B, LR7.B, LR8.B, LR9.B, and LR10.B) are located entirely outside the Project Site and will not be affected by the works. The magnitude of change for these LRs is therefore **Negligible**, and the resulting impact significance is thus **Insubstantial** during the construction and operation phases.

The impacts on LCAs as a result of the proposed development are assessed as follows and are tabulated in **Table 11-6**.

LCA1 – Rural Open Landscape at Active / Abandoned Agricultural Lands / Fish Ponds – This LCA has medium sensitivity and occupies a total of around 55 ha within the Assessment Area. Approximately 7 ha of this LCA lies within the Project Site and will be permanently converted to residential development with houses, private communal landscape areas, and internal roads in the southern portion of the Project Site. Part of it will also be converted to an extensive recreation/ open space in the northern portion.

During construction before mitigation, the entire area of the LCA within the Project Site will be converted to a construction site where site formation/ building works for the proposed houses in the southern portion of the site and landscape works for the recreational ground in the northern portion of the site commence. This represents approximately 13% of the LCA as a whole. Therefore, the Magnitude of Change is considered to be **Intermediate**, and the Impact Significance before mitigation is considered to be **Moderate.**

During operation before mitigation, the entire area of the LCA will have been converted to Comprehensive Low Density Residential Area in the southern portion of the site and to extensive recreation/ open space in the northern portion of the site. Although the new landscape character will be substantially different from the existing one, it is compatible with the landscape character of adjacent Comprehensive Low Density Residential Areas (LCA3) which forms a large part of the Assessment Area (and beyond). Therefore, the Magnitude of Change is considered to be **Intermediate**, and the Impact Significance before mitigation is considered to be **Moderate.**

LCA6 – Open Storage / Workshops / Utility Areas – This LCA has a low sensitivity and occupies a total of around 37 ha within the Assessment Area. Approximately 2 ha of this LCA (approximately 5% of the LCA area as a whole) lies within the Project Site and will be permanently changed from relatively unpleasant open storage/ workshops/ utility areas to a residential development with houses, private communal landscape areas, and internal roads.

During construction before mitigation, the portion of the LCA within the Project Site which is not of much inferior quality than storage/ workshop/ utility areas will be converted to a construction site. Therefore, the Magnitude of Change is considered to be **Small**, and the Impact Significance before mitigation is considered to be **Slight**.

During operation before mitigation, the portion of the LCA within the Project Site will be converted to a residential development with houses, private communal landscape areas, and internal roads. Therefore, overall the Magnitude of Change to the LCA as a whole is

considered to be **Small**, and the Impact Significance before mitigation is considered to be **Slight.**

Unaffected LCAs: All other LCAs (i.e. LCA2, LCA3, LCA4, and LCA5) within the Assessment Area are entirely outside the Project Site and therefore will not be affected by the works. The magnitude of construction and operation phase impacts for these LCAs is therefore **Negligible**, and the resulting impact significance is thus **Insubstantial** during the construction and operation phases.

11.10.2 Landscape Mitigation Measures

To minimise impacts on landscape resources, a number of measures are proposed to be implemented including consideration of different design options and the provision of mitigation measures to directly offset unavoidable impacts associated with the construction and operation phases. These are discussed further below.

Mitigation measures including strategies for reducing, offsetting and compensating impacts are proposed to be implemented during construction and operation phases. These are identified in **Tables 11-5A and 11-5B** below and are illustrated in **Figures 11-16** to **11-26**.

The assumption has been made in the assessment that 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 also indicated in **Tables 11-5A and 11-5B.**

Table 11-5A Proposed Landscape Enhancement / Mitigation Measures – Construction Phase

ID No.	Landscape Mitigation Measures	Funding Agency	Implementation Agency
CM1	**Proper protection of existing trees designated to be retained in-situ** **Existing trees designated to be retained in-situ will be properly protected. This may include the clear demarcation and fencing-off of tree protection zones, tight site supervision and monitoring to prevent tree damage by construction activities, and periodic arboricultural inspection and maintenance to uphold tree health. A total of around 60 nos. of trees will be retained in-situ.**	**Project proponent**	**Project proponent** **(via Contractor)**
CM2	**'One-go' Tree Transplanting within Site** **Affected existing trees designated to be transplanted will be transplanted 'one-go' within the Site instead to an offsite holding nursery as is typically done. The transplanted trees will provide some instant greenery during construction. In total, around 8 nos. of trees will be transplanted.**	**Project proponent**	**Project proponent** **(via Contractor)**
CM3	**Innovative Construction Method of Pond Expansion** **Existing abandoned pond (approx. 0.5ha) with pond edge (approx. 0.2ha) will be slightly expanded and enhanced into a larger landscape pond (0.6ha pond and 0.3ha pond edge). Conventional method of pond expansion by excavating at the existing pond edge will substantially pollute the existing pond. An innovative design and construction method will be employed in this project: *(1) excavating a new pond at a slightly higher elevation adjacent to the existing pond without breaking the existing pond edge, (2) suitably prepare the surface of the new***	**Project proponent**	**Project proponent** **(via Contractor)**

ID No.	Landscape Mitigation Measures	Funding Agency	Implementation Agency
	pond bottom, (3) fill the new pond with water and let it stabilized for several weeks, (4) connect the recirculation system to the existing pond, (5) create a gentle water cascade between the existing pond and the new pond by increasing the new pond water level to flood over and water will be circulated between these two ponds. **As a result, two ponds functionally and aesthetically appear as one will be created. (The gentle water cascade will also provide aeration to ensure water quality and details of the construction method of pond will be subject to detailed design).**		
CM4	**Early Commencement & Completion of the Recreational Area** **The proposed basements and houses in the southern portion of the site will require an extensive construction period while the proposed works for the landscape pond, landscape open area and recreational area in the northern portion of the site is relatively simpler. Upon possession of the site, the proposed works in the recreational area will be fast-tracked. It is expected that the recreational area will be properly vegetated within a short period, offsetting the negative impact arising from the construction works in the rest of the Project Site. Approximately 200 nos. of heavy-standard to semi-mature size trees will be planted in the northern site. Moreover, there will be around 2 ha of lawn area.**	**Project proponent**	**Project proponent** **(via Contractor)**

Table 11-5B Proposed Landscape Enhancement / Mitigation Measures – Operation Phase

ID No.	Landscape Mitigation Measures	Funding Agency	Implementa-tion Agency	Manageme nt Agency	Maintenance Agency
OM1	**Maximizing Tree Preservation Effort** **Healthy existing trees that are not affected by the proposed development will be retained in-situ. Affected existing trees that are of high to medium amenity value and high to medium survival rate after transplanting will be transplanted.**	**Project proponen t**	**Project proponent**	**Project Proponent**	**Project Proponent**
OM2	**Provision of New Trees and Mass Planting** **Compensatory tree and shrub planting shall be provided for soft landscape in the proposed development. The tree compensation to tree loss ratio shall be at least 1:1 in term of quantity and quality within the Project Site. Furthermore, a continuous belt of landscape planting, featuring trees and shrubs will be provided along the boundary of the development.**	**Project proponen t**	**Project proponent**	**Project Proponent**	**Project Proponent**
OM3	**Suitable Design for Recreational Area** **The landscape design for the recreational area in the northern portion of the Site will adopt a rural, naturalistic approach with vast open space to match**	**Project proponen t**	**Project proponent**	**Owners Committee**	**Management Company**

ID No.	Landscape Mitigation Measures	Funding Agency	Implementa-tion Agency	Manageme nt Agency	Maintenance Agency
	the original landscape character. Emphasis will be placed on a balanced approach between trees and grass/herbs. Use of native species will be the planting design theme. Natural materials, such as timbers, will be mostly used for landscape hardworks.				

Programme of Implementation of Landscape Enhancement & Mitigation Measures

The construction phase measures listed in **Table 11-5A** shall be adopted from the commencement of construction and shall be in place throughout the entire construction period. The operation phase measures listed in **Table 11-5B** shall 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 will not be realised for several years until planting matures.

Mitigation Planting

A list of species appropriate for mitigation planting is provided in **Appendix 11-2**. The list is not intended to be exhaustive or exclusive, but is indicative of the type of planting which would be provided subject to detailed design.

Landscape Pond Design

The existing pond in the north of the site will be enhanced to compliment proposed passive recreational facilities to the south of the area. It will consist of open water and a central island, planted with *Nymphea* spp. (water lily) and fringed by emergent vegetation, tree and shrub planting.

Project Funding

The Project Proponent will be responsible for the creation, enhancement and management of the landscape pond area and other landscape features as well as associated facilities during the construction phase. During the operation phase, a separate organization will be set up, with the backing of the Project Proponent, to manage and maintain the landscape areas, including the landscape pond, and associated facilities such as communal landscape area, plaza, sitting area, walking/jogging trail and children's play areas.

11.10.3 Residual Landscape Impacts After Mitigation

The significance of residual landscape impacts after mitigation is evaluated below. All impacts are Adverse unless otherwise specified.

Proposed landscape enhancement / mitigation measures during construction and operation phases are identified in **Tables 11-5A and 11-5B**. The potential significance of the impacts on landscape resources and landscape character areas during the construction and operation phases, before and after mitigation, are provided in **Table 11-6** and mapped in **Figures 11-27 to 11-32**.

11.10.3.1 Residual Landscape Impacts During Construction

Proposed landscape enhancement / mitigation measures during construction are listed in **Table 11-5A**. Residual impacts on the LRs are mapped in **Figures 11-27**. Residual impacts on the LCAs are mapped in **Figure 11-30**.

LR3.A – Open Storage/Vacant Lot *(within Project Site):* Since there is no other vegetation (e.g. grass/shrub) beside existing trees found within this LR, proposed treatments to existing trees within LR3.A are describe as follows:

Retain	0 nos.
Transplant	7 nos.
Fell	52 nos.
Total	59 nos.

All 59 nos. of existing trees in TG1 of this LR will be affected by the proposed development, particularly by a proposed noise barrier along the southern boundary of the Project Site. Of these trees, **7 nos.** will be transplanted, while **52 nos.** will be felled. Those affected trees that are designated for transplanting will be transplanted "one-go" to recipient locations within the Project Site (CM2).

Feasibility of transplanting trees has been assessed. Potentially transplantable trees in this LR are *Ficus benjamina*, *Celtis sinensis*, *Archontophoenix alexandrae*, *Cinnamomum camphora*, and *Bombax ceiba*. Out of the many *Cinnamomum camphora* trees found in this LR, only 3 no. them are expected to be transplantable, with the others spaced very close to each other, which makes them difficult to transplant because of severe overlapping of tree crowns and difficulties in formation of rootball for transplantation. Some of them are also growing at the edge of the paving area which also makes them difficult to transplant. Similarly, only 1 no. of *Ficus benjamina* and 1 no. of *Celtis sinensis* are expected to be transplantable, with the others growing at or near hard pavement which makes them difficult to form a rootball for transplanting. Alongside 1 no. of *Archontophoenix alexandrae* and 1 no. of *Bombax ceiba*, a total of 7 nos. are therefore proposed to be transplanted.

The impact significance for this LR will remain to be **Slight** after mitigation measures as compensatory planting will have a limited effect due to lack of maturity during the construction phase.

LR6.A – Grassland/shrubland (within Project Site): Proposed treatments to existing trees and shrub/grass within LR6.A are as follows:

Retain	16 nos.
Transplant	2 nos.
Fell	27 nos.
Total	45nos.

Of the 45 nos. of existing trees in TG2, TG3 and TG4 of this LR, unaffected **16 nos.** of existing trees will be unaffected and retained in-situ. Only **2 nos.** of trees within this LR will be suitable for transplanting and will be transplanted "one-go" to recipient locations within the Project Site (CM2). The remaining **27 nos.** will be felled and will be replaced by compensatory planting. Approx. 6.3 ha of the existing grass/shrub within this LR will be affected by the proposed development and replace by lawn/grass and shrub planting.

Trees that are designated for retention will be properly protected by means of demarcation and fencing off of tree protection zones, tight site supervision and monitoring to prevent tree

damage by construction activities, and periodic arboricultural inspection and maintenance to uphold tree health (CM1).

Feasibility of transplanting trees has been assessed, with potentially transplantable species in this LR being *Ficus microcarpa* and *Celtis sinensis*. There is a total of 5 nos. of *Ficus microcarpa* in this area. One of them is found to be transplantable. The others found growing very close to adjacent existing trees with crown overlapping. Transplanting them will require substantial pruning of the crown and roots, thus adversely affecting the long term health of the tree after transplantation. As for *Celtis sinensis*, only one of the total of 7 nos. is expected to be transplantable. The others are growing in the concrete wall of the existing nullah, posing great difficulties in formation of rootball for transplantation and given their existing poor condition, it will not be worthwhile transplanting them. Therefore, only 2 nos. of tree within this LR will be suitable for transplanting.

Apart from preserving and transplanting trees, a recreational ground is proposed in the northern portion of the Project Site. Proposed works in this recreational ground will be fast-tracked and properly vegetated within a short period, so that impacts arising from the construction works in the southern portion of the Project Site will be somewhat offset by the vegetation plantation inside the recreation ground (CM4). Within the recreational ground, around 200 nos. of trees are proposed, and around 2 ha of lawn/shrub area to compensate for the loss of grassland/shrubland.

Furthermore, the northernmost part of this LR will be the area for enhancing an existing abandoned pond (in the adjacent LR7.A) into a landscape pond of high amenity value. Instead of using the conventional excavation method, the pond will be enhanced by adopting an innovative approach which will minimize pollution the existing pond. Enhancement works will result in an increase of the pond area from the current 0.5ha to around 0.6ha.

With these mitigation measures implemented, the Moderate impact significance of this LR before mitigation will be remain **Slight** after mitigation measures as compensatory planting will have a limited effect due to lack of maturity during the construction phase.

***LR7.A – Pond and Pond Edge (within Project Site*)**: Proposed treatments to existing trees within LR7.A are as follows:

Retain	44 nos.
Transplant	0 nos.
Fell	0 nos.
Total	**44 nos.**

The existing abandoned pond (approx. 0.5ha) and pond edge (approx. 0.2ha) will be enhanced. The pond will be slightly enlarged to 0.6ha and the pond edge to 0.3ha into a high visual amenity landscape pond (although the enhancement works will be carried out within LR6.A). The enhancement of the pond area causes permanent loss of 0.2ha of the existing pond edge which is comprised of existing shrub/grass. However, this loss is offset by the creation of new pond edge for the expanded pond. All **44 nos.** of the existing trees within tree group TG5, located mostly near the concrete wall of the existing nullah, will be unaffected and will be retained in-situ. These trees will be properly protected by means of fenced off tree protection zones, tight site supervision and monitoring to prevent tree damage by construction activities, and periodic arboricultural inspection and maintenance to uphold tree health (CM1).

An innovative design and construction method on enlarging the existing pond area (CM3) will be engaged in this project: *(1) excavating a new pond at a slightly higher elevation adjacent to the existing pond without breaking the existing pond edge, (2) suitably prepare the surface of the new pond bottom, (3) fill the new pond with water and let it stabilized for*

several weeks, (4) connect the recirculation system to the existing pond, (5) create a gentle water cascade between the existing pond and the new pond by increasing the new pond water level to flood over and water will be circulated between these two ponds. As a result, two ponds functionally and aesthetically appear as one will be created. (The gentle water cascade will also provide aeration to ensure water quality and details of the construction method of pond will be subject to detailed design).

The Moderate unmitigated impact significance during construction phase will be reduced to **Slight** after mitigation.

Unaffected LRs: All the other Landscape Resources (i.e. LR1.B, LR2.B1, LR2.B2, LR3.B, LR4.B, LR5.B, LR6.B, LR7.B, LR8.B, LR9.B, and LR10.B) are outside the Project Site and thus will not be affected by the works. Therefore, these LRs will experience **Insubstantial** residual impacts during construction as noted in **Table 11-6 note [4]**.

Residual impacts on LCAs during the construction phase will be as follows:-

LCA1 – Rural Open Landscape at Active / Abandoned Agricultural Lands / Fish Ponds: The proposed development will cause irreversible changes to approximately 13% of this LCA. However, part of this loss will be replaced by the recreational ground at the northern portion of the Project Site. Works on the recreational ground will commence and be completed early. The recreational ground will be properly vegetated early, such that impacts arising from the construction works in other parts of the Project Site will be somewhat offset (CM4). The recreational ground will incorporate an amenity landscape pond, around 200 nos. of proposed trees, and around 2 ha of lawn/shrub area to compensate for the loss of grassland/shrubland with emphasis placed on a balance approach between trees and grass/herbs.

Apart from provision of the recreational ground, some trees of this LCA will be unaffected and will be retained in-situ. These trees will be properly protected by tree protection zones; tight site supervision and monitoring, and periodic arboricultural inspection and maintenance (CM1). Affected trees that are proposed for transplantation will be transplanted “one-go” to recipient locations within the Project Site, to maximise survival rates and to maintain good form and high value after transplanting (CM2).

It is expected that the recreational ground, retained existing trees and transplanted trees will provide some greenery and positive landscape character enhancement during the construction period, and so the Moderate impact significance before mitigation will be reduced to **Slight** after mitigation.

LCA6 – Open Storage / Workshops / Utility Areas: Affected trees that are designated for transplanting will be transplanted “one-go” to recipient locations within the Project Site (CM2), to maximise survival rate within the Project Site Area after transplanting. As the proposed transplanted trees constitute only a small proportion of the affected trees and as the effects of compensatory planting will only be experienced right at the end of the construction period, the impact significance for this LR will remain as **Slight** after mitigation during the construction phase.

Unaffected LCAs: All the other LCAs (i.e. LCA2, LCA3, LCA4, and LCA5) are entirely outside the Project Site and are therefore not affected by the works. Therefore they will experience **Insubstantial** residual impacts during construction phase as noted in **Table 11-6 note [4]**.

11.10.3.2 Residual Landscape Impacts During Operation

Proposed landscape enhancement / mitigation measures during operation are listed in **Table 11-5B**. Residual impacts on the LRs are mapped in **Figures 11-28 and 11-29**. Residual impacts on the LCAs are mapped in **Figures 11-31 and 11-32**.

LR3.A – Open Storage/Vacant Lot (within Project Site): Approximately 7 nos. of existing trees within this LR are proposed to be transplanted within the site (OM1). The 52 nos. of felled trees will be compensated by the provision of new tree planting, with compensatory ratio being no less than 1:1 in terms of quantity and quality (OM2). Residual impact significance will become **Slight** on day 1 and **Slight (beneficial)** at year 10 during the operation phase as the compensatory planting matures.

LR6.A – Grassland/shrubland (within Project Site): Approximately 2 nos. of existing trees within this LR will be transplanted within the site (OM1) and approximately 27 nos. of felled trees will be compensated by the provision of new tree planting. New trees and shrub planting will be planted to provide soft landscape within the proposed development to compensate the loss of tree and shrub. The tree compensation ratio will be provided no less than 1:1 in terms of quantity and quality (OM2).

Apart from maximizing the tree preservation effort, the recreational ground will adopt a rural, naturalistic landscape design with native species, natural hardworks materials and vast open space, to match the original landscape character (OM3). Emphasis will be placed on a balanced approach between trees and grass/herbs. With these mitigation measures in place, the residual impact significance will remain **Slight** on day 1 and become **Slight (beneficial)** in year 10 of the operation phase as the compensatory planting matures.

LR7.A – Ponds and Pond Edge (within Project Site): The overall amenity landscape value of this LR will be enhanced by the aesthetically pleasing and enlarged landscape pond. The 44 nos. of existing trees within this LR will be unaffected and will be retained in-situ (OM1). New trees and shrub planting will be planted within this enlargement of the pond and pond edge area to provide soft landscape and to compensate the loss of existing tree and shrub/grass (OM2). Residual impact after implementation of this mitigation measure is expected to be **Slight** on day 1 and **Slight (beneficial)** in year 10 of the operation phase with the maturing of the compensatory tree planting.

Unaffected LRs: All other LRs within the Assessment Area (i.e. LR1.B, LR2.B1, LR2.B2, LR3.B, LR4.B, LR5.B, LR6.B, LR7.B, LR8.B, LR9.B, and LR10.B) are entirely outside the Project Site and thus will not be affected by the works. Therefore, these LRs will experience **Insubstantial** residual impacts on day 1 and year 10 respectively as noted in **Table 11-6 note [4]**.

Residual impacts on LCAs during the operation phase following the implementation of the proposed mitigation measures will be as follows:-

***LCA1 – Rural Open Landscape at Active / Abandoned Agricultural Lands / Fish Ponds*:** The impacted portion of this LCA within the Project Site will be replaced with the recreational ground and expanded landscape pond in the north, and low density residential development in the south. The design in the north will adopt a rural, naturalistic landscape design with native species (emphasis on planting will be placed on a balanced approach between trees and grass/herbs), natural hardworks materials and vast open space, to match the original landscape character (OM3). Together with the tree preservation measure to retain and transplant existing trees where practicable (OM1) and the planting of new trees to compensate for the loss of existing trees (OM2), the Moderate residual impacts before mitigation during the operation phase will become **Slight** on day 1. By year 10 of operation, the residual impacts will become **Slight (beneficial)** due to the maturing existing trees within

the proposed development and maturing vegetation in the recreational ground and planting in and around the residential area, providing established greenery.

LCA6 – Open Storage / Workshops / Utility Areas: Some of the trees of this LCA will be affected, particularly by the proposed noise barrier along the southern boundary of the Project Site. Those affected trees that are of high to medium value and survival rate will be transplanted (OM1). Trees that are lost within this LCA will be compensated by planting new trees for soft landscape in the proposed development, with the compensation-to-tree loss ratio being no less than 1:1 in terms of quantity and quality (OM2). Residual impacts on this LCA will be **Slight** on day 1 and **Slight (beneficial)** at year 10 as the compensatory planting matures and integrates the new development into the landscape.

Unaffected LCAs*:* All the other LCAs within the Assessment Area (i.e. LCA2, LCA3, LCA4, and LCA5) are entirely outside the Project Site and are therefore not affected by the works. Therefore these LCAs will experience Insubstantial residual impacts during operation phase as noted in Table 11-6 note [4].

Table 11-6 Significance of Landscape Impacts in Construction and Operational Phases

ID	Landscape Resource / Landscape Character Area	Sensitivity (Low, Medium, High) [1]	Total Area of LR/LCA (Approx. ha)	Affected Area (Approx. ha) (Affected %)	Magnitude of Change BEFORE Mitigation (Negligible, Small, Intermediate, Large) [1][4]		Impact Significance BEFORE Mitigation (Insubstantial, Slight, Moderate, Substantial) [2][4]		Recommended Mitigation Measures [5]	Residual Impact Significance AFTER Mitigation (Insubstantial, Slight, Moderate, Substantial) [3][4]		
										Construction	Operation	
					Construction	Operation	Construction	Operation			DAY 1	YEAR 10
Part 1 – Landscape Resources												
LR1.B	Local Roads (outside Project Site)	Medium	8.9 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR2.B1	Comprehensive Residential Settlements (outside Project Site)	Medium	78.8 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR2.B2	Village Settlements (outside Project Site)	Low	5.8 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR3.A	Open Storage/Vacant Lot (within Project Site)	Low	1.8 ha	1.8 ha (100%)	Intermediate	Intermediate	Slight	Slight	CM2, OM1, OM2	Slight	Slight	Slight Beneficial
LR3.B	Open Storage/Vacant Lot (outside Project Site)	Low	30.8 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR4.B	Agricultural Field (ouside Project Site)	Medium	8.8 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR5.B	Plantation (outside Project Site)	Medium	2.0 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR6.A	Grassland/Shrubland (within Project Site)	Low	6.3 ha	6.3 ha (100%)	Large	Intermediate	Moderate	Moderate	CM1, CM2, CM4 OM1, OM2, OM3	Slight	Slight	Slight Beneficial
LR6.B	Grassland/Shrubland (outside Project Site)	Low	9.0 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR7.A	Ponds and Pond Edge (within Project Site)	Medium	0.7 ha	0.2ha (29%)	Intermediate	Intermediate	Moderate	Moderate	CM1, CM3 OM1, OM2	Slight	Slight	Slight Beneficial
LR7.B	Ponds and Pond Edge (outside Project Site)	High	27.3 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR8.B	Modified Watercourse (outsite Project Site)	Medium	10.5 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR9.B	Public Amenity Area (outsite Project Site)	Medium	0.8 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LR10.B	Highways (outside Project Site)	Low	2.0 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial

Table 11-6 Significance of Landscape Impacts in Construction and Operational Phases

ID	Landscape Resource / Landscape Character Area	Sensitivity (Low, Medium, High) [1]	Total Area of LR/LCA (Approx. ha)	Affected Area (Approx. ha) (Affected %)	Magnitude of Change BEFORE Mitigation (Negligible, Small, Intermediate, Large) [1][4]		Impact Significance BEFORE Mitigation (Insubstantial, Slight, Moderate, Substantial) [2][4]		Recommended Mitigation Measures [5]	Residual Impact Significance AFTER Mitigation (Insubstantial, Slight, Moderate, Substantial) [3][4]		
										Construction	Operation	
					Construction	Operation	Construction	Operation			DAY 1	YEAR 10
Part 2 – Landscape Character Areas												
LCA1	Rural Open Landscape at Active / Abandoned Agricultural Lands / Fish Ponds	Medium	55 ha	7 ha (13%)	Intermediate	Intermediate	Moderate	Moderate	CM1, CM2, CM3, CM4 OM1, OM2, OM3	Slight	Slight	Slight Beneficial
LCA2	Semi-rural Open Landscape along Manmade Water Channels	Medium	14 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LCA3	Comprehensive Low Density Residential Areas	Medium	78 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LCA4	Village House Areas	Low	7 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LCA5	Major Transportation Corridors	Low	4 ha	0 ha (0%)	Negligible	Negligible	Insubstantial	Insubstantial	N/A	Insubstantial	Insubstantial	Insubstantial
LCA6	Open Storage / Workshops / Utility Areas	Low	37 ha	2 ha (5%)	Small	Small	Slight	Slight	CM2, OM1, OM2	Slight	Slight	Slight Beneficial

[1] Detailed description of the other key aspects of the Project contributing to the Magnitude of Change are provided in the written descriptions of impacts for each LR and LCA

[2] Detailed description of the other key aspects of the Project contributing to LR and LCA sensitivity are provided in the written descriptions of impacts for each LR and LCA

[3] All impacts are adverse unless otherwise stated

[4] Not applicable to LRs and LCAs that are entirely outside the Project Site.

[5] Recommended Landscape Mitigation Measures: Refer to Table 11-5A and Table 11-6A.

11.11 Visual Impact Assessment

An assessment of the potential significance of the visual impacts during the construction and operation phases, before and after mitigation, is briefly described below, and listed in detail in **Table 11-9**. This follows the methodology outlined above and assumes that the appropriate visual landscape measures identified in **Tables 11-7A** and **11-7B** will be implemented, and that the full effect of the soft landscape mitigation measures will be realised after ten years. Photomontages of the proposed development before and after mitigation are illustrated in **Figures 11-35** to **11-40** inclusive.

All impacts are Adverse unless otherwise specified.

11.11.1 Visual Mitigation Measures

To minimise impacts on visual resources, a number of measures are proposed to be implemented including consideration of different design options and the provision of mitigation measures to directly offset unavoidable impacts associated with the construction and operation phases. These are discussed further below.

Mitigation measures including strategies for reducing, offsetting and compensating impacts are proposed to be implemented during construction and operation phases. These are identified in **Tables 11-7A** and **11-7B** below and are illustrated in **Figures 11-16** to **11-26**.

The assumption has been made in the assessment that 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 also indicated in **Tables 11-7A** and **11-7B**.

Table 11- 7A Proposed Visual Enhancement / Mitigation Measures – Construction Phase

ID No.	Visual Mitigation Measures	Funding Agency	Implementation Agency
CM5	Height of temporary noise barriers along boundary facing Bethel High School and some residences in Fairview Park be to minimum required. Barrier finishes be sensitively selecting and designing to reduce visual impact. Materials to be opaque and non-reflective material with colour blending in with the environment to minimize visual impact and to avoid bird strike.	Project proponent	Project proponent (via Contractor)
CM6	Advance screen planting of fast growing tree and shrub species to temporary noise barriers and hoardings. Trees shall be capable of reaching a height >10m within 10 years.	Project proponent	Project proponent (via Contractor)
CM7	Control of night-time lighting by hooding all lights.	Project proponent	Project proponent (via Contractor)
CM8	Reduction of construction period to practical minimum.	Project proponent	Project proponent (via Contractor)

Table 11-7B Proposed Visual Enhancement / Mitigation Measures – Operation Phase

ID No.	Visual Mitigation Measures	Funding Agency	Implementa-tion Agency	Management Agency	Maintenance Agency
OM4	**Use appropriate (visually unobtrusive and non-reflective) building materials and colours in built structures.**	**Project proponent**	**Project proponent**	**Private Owners**	**Private Owners**
OM5	**Streetscape elements (e.g. paving, signage, street furniture, lighting etc.) sensitively designed in a manner that responds to the local context, and minimizes potential negative landscape and visual impacts. Lighting units to be directional and minimizing unnecessary light spill.**	**Project proponent**	**Project proponent**	**Owners Committee**	**Management Company**
OM6	**Suitable Design and Landscape Treatment of Noise Barrier and Along Boundary** Height of permanent noise barriers along boundary be to minimum required. Barrier finishes be sensitively selecting and designing to reduce visual impact. Materials to be opaque and non-reflective material with colour blending in with the environment to minimize visual impact and to avoid bird strike. Screen tree, shrub and climber planting to be provided in front of permanent noise barrier to minimise visual intrusion.	Project proponent	Project proponent	Owners Committee	Management Company

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The construction phase measures listed in **Table 11-7A** shall be adopted from the commencement of construction and shall be in place throughout the entire construction period. The operation phase measures listed in **Table 11-7B** shall 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 will not be realised for several years until planting matures.

11.11.2 Significance of Residual Visual Impacts during Construction

Proposed visual enhancement / mitigation measures during construction are listed in **Table 11-7A**. Residual visual impacts in the construction phase are mapped in **Figure 11-33**. After all visual mitigation measures are implemented; there will be no adverse residual visual impacts of Substantial significance.

Key issues determining the magnitude of change on existing views will be the proximity of the VSRs to the works, the degree of visibility of the site and changes to the character of the existing views of a largely derelict, open and vegetated rural fringe area with village type developments. Rural fringe features include an agglomeration of visually unrelated structures and landscape elements such as village houses, residential development, utilities, tree clumps, etc. Construction work will introduce artificial construction features such as

construction machinery, temporary noise barriers, site clearance, site formation and partially completed buildings, as listed in **Table 11-8.**

The proposed temporary noise barriers will be provided along a short section of the western boundary of the southern site of the Project facing the Bethel High School and some of the houses in Fairview Park to mitigate the construction noise from project site (refer to Figure 4-6 in Chapter 4). This short of section of the temporary noise barrier will be 9m in height with approx. 337m in length and will be designed using an opaque and non-reflective material with colour blending in with the environment to minimize visual impact and to avoid bird strike to be determined at the detailed design stage (to be determined at the detailed design stage).

During construction, no VSR will be subject to Substantial residual impacts. Residual visual impacts of ***Moderate*** significance will be experienced by only one VSR group after mitigation:

R1(a) – Residents of Fairview Park – Only the residents of approximately 40 properties along the south-western boundary of the development will experience views from short distances of buffer planting, completed 2-storey buildings and temporary noise barrier. Other residents further away from the boundary may experience more distant, oblique glimpses of the construction works, although these will be largely obscured by the intervening buildings. There will be a 9m high of temporary noise barrier provided facing the Bethel High School and its adjacent houses (about 20 nos) using an opaque and non-reflective material with colour blending in with the environment (CM5). Changes from existing open views in the foreground with rural fringe features including village housing and open storage in the middle distance, to relatively close views of construction elements will constitute an *Intermediate* magnitude of change, resulting in ***Moderate*** residual impacts for the most seriously affected VSRs within this group. Residents in properties further away from the boundary will be unaffected.

During construction, residual visual impacts of ***Slight*** significance will be experienced by the following VSRs after mitigation:

R1(b) –Residents of Fairview Park – Residents in approximately 75 properties along the north-eastern boundary of the development will experience views from short distances of the enhanced pond area (CM3) and passive recreational facilities (CM4); erection of the temporary site hoarding (CM5) with buffer planting at the boundary and within the site along the western edge of the pond (CM6), further screening the leisure facilities. Other residents further away from the boundary may experience more distant, oblique glimpses of the construction works, although these will be largely obscured by the intervening buildings. Changes will result from existing open views in the foreground with rural fringe features including village housing and open storage in the middle distance to relatively close views of the landscape amenity features which will create a *Moderate* magnitude of change, resulting in ***Slight*** residual impacts.

R2 – Residents of Palm Springs and Royal Palms – Residents in the upper floors of houses along the southern boundary of these two developments will potentially experience views from a moderate distance of enlargement work for the pond (CM3), erection of temporary site hoardings (CM5) with buffer planting at the boundary and within the site along the northern edge of the pond (CM6), partially completed 2-storey buildings. Key issues affecting visual impacts include the panoramic quality of existing views in which the Project Site is only one element, as well as intervening rural fringe features such as fish ponds, commercial farmland and temporary structures. Given the above and the fact that most views will be of the less visually-intrusive pond slightly enlargement works, the magnitude of change resulting from construction elements will be *Small.* Residual impacts after

implementation of mitigation including visual treatment of noise barriers and buffer planting at the site perimeter will be ***Slight*****.**

R3 – Residents of Yau Mei San Tsuen – Residents in the upper floors of houses along the south-western boundary of this village will potentially experience views from a moderate distance of erection of temporary site hoarding (CM5) with buffer planting along the eastern site boundary (CM6), site clearance and formation works, construction machinery and partially completed 2-storey buildings. To the extent that the Project Site is currently visible through intervening rural fringe features such as fish ponds, commercial farmland and temporary structures, and given the fact that most views will be of the less visually-intrusive pond creation works, the magnitude of change resulting from construction elements will be *Small* for this VSR group. Residual impacts after implementation of visual mitigation measures will be ***Slight.***

R4 – Residents of Chuk Yuen Tsuen, Tai Yuen Villa and Hang Fook Garden – Residents in the upper floors of houses along the western boundary of this village will potentially experience views from a moderate distance of erection of temporary site hoarding (CM5) with buffer planting along the eastern site boundary (CM6), site clearance and formation works, construction machinery and partially completed 2-storey buildings. There are no views of the Project Site from the temple or ground floor flats located on the village due to intervening vegetation, temporary structures and future residential buildings (under Approved Planning Applications A/YL-MP/205). The Project Site is currently visible through intervening rural fringe features such as abandoned farmland and temporary structures, the magnitude of change resulting from construction elements will be *Small* for this VSR group. Residual impacts after implementation of visual mitigation measures will be ***Slight.***

R5 – Residents of Han San Wai Village – Residents in the upper floors of houses along the western boundary of this village will potentially experience views from a moderate distance of erection of temporary site hoarding (CM5) with buffer planting along the eastern site boundary (CM6), site clearance and formation works, construction machinery and partially completed 2-storey buildings. There are no views of the Project Site from the temple or ground floor flats located on the village due to intervening vegetation, temporary structures and future residential buildings (under Approved Planning Applications A/YL-MP/205). The Project Site is currently visible through intervening rural fringe features such as abandoned farmland and temporary structures, the magnitude of change resulting from construction elements will be *Small* for this VSR group. Residual impacts after implementation of visual mitigation measures will be ***Slight.***

R6 – Residents of Helene Terrace and Villa Camellia – Residents in the upper floors of houses along the western boundary of this development will experience views from short distances across Ngau Tam Mei Channel of temporary site hoarding erection (CM5) with buffer planting along the eastern site boundary (CM6), site clearance and formation works, construction machinery and partially completed 2-storey buildings. Other residents further away from the boundary are unlikely to have clear views of the Project. Changes from existing views of the vacant Project site in the foreground with the Fairview Park development directly behind, to relatively close views of construction elements will constitute an *Intermediate* magnitude of change, resulting in ***Slight*** residual impacts after mitigation for the most seriously affected VSRs within this group.

R7 – Future Residents under Approved Planning Applications A/YL-MP/205 – Future residents in properties along the western boundary of this planned development will experience views from short distances across Ngau Tam Mei Channel of temporary site hoarding erection (CM5) with buffer planting along the eastern site boundary (CM6), site clearance and formation works, construction machinery and partially completed 2-storey buildings. Other residents further away from the boundary are unlikely to have clear views of the Project. Changes from existing views of the vacant Project site in the foreground with the

Fairview Park development directly behind, to relatively close views of construction elements will constitute an *Intermediate* magnitude of change, resulting in ***Slight*** residual impacts after mitigation for the most seriously affected VSRs within this group.

R8 – Future Residents under Planning Applications A/YL-MP/170 – Future residents in properties along the western boundary of this planned development will experience views from short distances across Ngau Tam Mei Channel of temporary site hoarding erection (CM5) with buffer planting along the eastern site boundary (CM6), site clearance and formation works, construction machinery and partially completed 2-storey buildings. Other residents further away from the boundary are unlikely to have clear views of the Project. Changes from existing views of the vacant Project site in the foreground with the Fairview Park development directly behind, to relatively close views of construction elements will constitute an *Intermediate* magnitude of change, resulting in ***Slight*** residual impacts after mitigation for the most seriously affected VSRs within this group.

T2 – Travellers on Yau Pok Road, Kam Pok Road and Proposed Cycle Track – These travelling VSRs will experience visual impacts of an *Intermediate* magnitude due to their close proximity to the source of impacts. However, the indifferent quality of existing views in which the Project Site is a relatively small feature set against the existing Fairview Park development in the background, and the fact that for the most part the VSRs are travelling parallel to the site rather than towards it, as well as the transient nature of views mean that residual visual impacts will be ***Slight*** on this low number of VSRs of generally low sensitivity.

T5 – Travellers on Fairview Park Boulevard – Travellers along the portion of this road near the junction with Yau Pok Road and Kam Pok Road will experience impacts of a *Small* magnitude due to the small portion of the Project Site which is visible from the road and the existing intervening features such as the petrol station. The fact that motorists are travelling parallel to the site rather than towards it, and the generally low sensitivity of motorists mean that residual impacts will be ***Slight.***

O1 – Staff and Pupils at Wong Chan Sook Ying Memorial School and Commercial Premises – Those VSRs facing the Project Site will experience views from relatively short distances of temporary site hoardings (CM5) with buffer planting along the eastern site boundary (CM6), site clearance and formation works, construction machinery and partially completed structures. Because only a limited number of VSRs within this group of relatively Low sensitivity have direct views of the Project, this *Small* magnitude of change will result in ***Slight*** residual impacts.

O2 – Staff and Pupils at Bethel High School – Those VSRs in rooms facing the Project Site will experience views from short distances of temporary noise barrier erection, site clearance and formation works, construction machinery and partially completed 2-storey buildings. There will be a 9m high of temporary noise barrier provided facing the Bethel High School by using an opaque and non-reflective material with colour blending in with the environment (CM5). Changes from existing open views in the foreground with rural fringe features including village housing and open storage in the middle distance, to views of construction elements will constitute an *Intermediate* magnitude of change. Mitigation measures and the fact that most VSRs in this group only experience oblique views of the site will reduce this somewhat, resulting in ***Slight*** residual impacts.

O3 – Workers on Commercial Farmland and Fish Ponds – These workers will potentially experience views from close distance of enlargement work for the pond (CM3), erection of temporary site hoardings (CM5) with buffer planting at the boundary and within the site along the northern edge of the pond (CM6). To the extent that the Project Site is currently visible through intervening rural fringe features such as fish ponds, commercial farmland and temporary structures, the magnitude of change resulting from construction elements will be *Small* for this VSR group. Given the low sensitivity of these VSRs and the fact that most

views will be of the less visually-intrusive pond creation works, the residual impact significance resulting from construction elements after mitigation will be ***Slight.***

O4 – Workers at Chuk Yuen Floodwater Pumping Station – Workers will potentially experience views from across Ngau Tam Mei Channel of the erection of temporary site hoarding (CM5) with buffer planting along the eastern site boundary (CM6), site clearance and formation works, construction machinery and partially completed 2-storey buildings. The magnitude of change resulting from construction elements will be Intermediate for this very small and low-sensitivity VSR group. Residual impacts after implementation of visual mitigation measures will be ***Slight.***

During construction, residual visual impacts after mitigation for all other VSRs will be ***Insubstantial***.

11.11.3 Significance of Residual Visual Impacts during Operation

Proposed visual enhancement / mitigation measures during operation are listed in **Table 11-6B**. Residual visual impacts during the operation phase are mapped in **Figure 11-34**. Due to the difference in visual impact between the northern and the southern portions of the Project Site, R1 has been divided to allow this to be reflected in the results for its Residual Visual Impact during operation.

The proposed noise barriers that will be provided along the southern boundary of the Project Site to mitigate the traffic noise from Fairview Park Boulevard and Yau Pok Road and operational noise from the PFS within the Fairview Park will be approximately 2.5m, 4m and 4.5m in height with approx. 88m, 142m and 49m in length respectively. It will be designed to have a solid barrier to the bottom 1.5m of this barrier with the remaining height constructed of an opaque and non-reflective material with colour blending in with the environment. When mitigation buffer planting has matured, they will be substantially obscured by vegetation and it is illustrated in **Figure 11-41**.

At Day 1 of operation, mitigation planting will still be relatively small and there will be visual impacts on a number of VSRs. With the maturing of landscape planting and screening trees, residual impacts will tend to diminish further by Year 10 of operation.

There will be no Substantial residual visual impacts during operation. Residual visual impacts of ***Moderate*** significance will be experienced by only one VSR group at Day 1 after mitigation, reducing to ***Slight*** after Year 10:

R1(a) – Residents of Fairview Park – Only the residents of approximately 40 properties along the south-eastern boundary of the development will experience views from short distances of proposed buffer planting (OM6) and completed 2-storey buildings using appropriate (visually unobtrusive and non-reflective) building material and colours in building structure (OM4). Other residents of this visual zone, who are further away from the Project Site boundary, have their view impeded to a great extent by the intervening buildings. They may experience more distant, oblique glimpses of the proposed green buffer and buildings beyond. This will greatly reduce the effect on them by the proposed development. Key issues determining the magnitude of change for these VSRs include the relative proximity of the Project and the somewhat incoherent character of existing views of rural fringe features including derelict land, low-rise residential development and village housing which will be partly replaced by views of the more coherent residential character and landscape elements of the completed Project. Rural fringe features include an agglomeration of visually unrelated structures and landscape elements such as village houses, low-rise residential development, utilities, tree clumps, derelict land, etc. At night, residential and street lighting may also be

visible, but this will not significantly change views which are already characterised by residential lighting at Fairview Park itself as well as other nearby developments. This will constitute an Intermediate magnitude of change, resulting in ***Moderate*** residual impacts for the affected VSRs within this group at Day 1 of operation. As mitigation and amenity landscaping matures and buffer trees along the boundary grow to form an effective visual screen, residual impacts will reduced to ***Slight*** at Year 10.

At Day 1 of operation, when mitigation planting is not yet mature, residual visual impacts of ***Slight*** significance will be experienced by the VSRs within this group after mitigation. This will reduced to ***Slight (beneficial)*** after Year 10 as buffer and landscape planting matures for the following groups:

R1(b) – Residents of Fairview Park – Residents in approximately 75 properties along the north eastern boundary of the development will experience views from short distances of the enhanced pond area and passive recreational facilities (OM3), with buffer planting at the boundary and within the site along the eastern edge of the pond (OM6), further screening the leisure facilities. Other residents further away from the boundary may experience more distant, oblique glimpses. Key issues determining the magnitude of change for these VSRs include the relative proximity of the Project and the somewhat incoherent character of existing views of rural fringe features including derelict land, low-rise residential development and village housing which will be partly replaced by views of the more coherent residential character and landscape elements of the completed Project. Rural fringe features include an agglomeration of visually unrelated structures and landscape elements such as village houses, low-rise residential development, utilities, tree clumps, derelict land, etc. At night, street lighting may also be visible, but this will not significantly change views which are already characterised by residential lighting at Fairview Park itself as well as other nearby developments. This will constitute a small magnitude of change. There would be a ***Slight*** residual impacts for the affected VSRs within this group at Day 1 of operation. As the amenity landscaping and landscape pond matures, and buffer trees along the boundary grow, there would be a ***Slight (beneficial)*** visual gain for this visual zone.

Residual visual impacts of ***Slight*** significance will be experienced by this VSR group at Day 1 after mitigation, reducing to ***Insubstantial*** after Year 10.

R6 – Residents of Helene Terrace and Villa Camellia – Only residents along the western boundary of this development will experience views from short distances across Ngau Tam Mei Channel of proposed streetscape elements design (OM5) with buffer planting along the eastern edge of the site boundary (OM6), and partially completed 2-storey buildings using appropriate (visually unobtrusive and non-reflective) building material and colours in building structure (OM4). This VSR located relatively proximity of the Project site and unlikely have clear view of incoherent character of rural fringe features including degraded open storage/vacant lot, in active agricultural land and abandoned grassland land which will be replaced by views of the more coherent residential character and landscape elements of the completed Project, and the fact that the Project will be viewed across the bunds of the Ngau Tam Mei Channel against the backdrop of the Fairview Park Development. Changes from existing views of the vacant Project site in the foreground with the Fairview Park development directly behind, to relatively close views of the completed Project will constitute an *Intermediate* magnitude of change. This will resulting in ***Slight*** residual impacts on Day 1 operation after mitigation and gradually reduces to ***Insubstantial*** after Year 10.

R7 – Future Residents under Approved Planning Application A/YL-MP/205 and
R8 – Future Residents under Planning Application A/YL-MP/170 -

Future residents in properties along the western boundary of this planned development will experience views from short distances across Ngau Tam Mei Channel of proposed streetscape elements design (OM5) with buffer planting along the eastern edge of the site

boundary (OM6), and a completed 2-storey buildings using appropriate (visually unobtrusive and non-reflective) building material and colours in building structure (OM4). Other residents further away from the boundary are unlikely to have clear views of the Project. Key issues determining the magnitude of change for these VSRs include the relative proximity of the Project and the somewhat incoherent character of existing views of rural fringe features including derelict land, low-rise residential development and village housing which will be partly replaced by views of the more coherent residential character and landscape elements of the completed Project, and the fact that the Project will be viewed across the bunds of the Ngau Tam Mei Channel against the backdrop of the Fairview Park Development. Changes from existing views of the vacant Project site in the foreground with the Fairview Park development directly behind, to relatively close views of the completed Project will constitute an Intermediate magnitude of change, resulting in ***Slight*** residual impacts on Day 1 operation after mitigation and gradually reduce to ***Insubstantial*** after Year 10.

O2 – Staff and Pupils at Bethel High School – Those VSRs in portions of the school directly facing the Project Site will experience a change in views from existing rural fringe features including derelict land, low-rise residential development and village housing, to views, broken by buffer planting at the boundary (OM6) and more coherent residential character comprising completed 2-storey buildings using appropriate (visually unobtrusive and non-reflective) building material and colours in building structure (OM4), and landscape elements (OM5) of the completed Project. Key issues determining the magnitude of change to these VSRs will be the relatively close proximity of the Project and changes to the rural fringe character of the area. These VSRs will not be affected. The Project will introduce new development features into the foreground of these views. This will constitute an Intermediate magnitude of change, resulting in Slight residual impacts for the most affected VSRs within this group. However, all residual visual impacts experienced by the concerned VSRs after mitigation will be ***Slight*** at Day 1 during operation and gradually reduce to ***Insubstantial*** by Year 10 of operation.

O4 – Workers at Chuk Yuen Floodwater Pumping Station – Workers will potentially experience views from a relatively close distance of completed 2-storey buildings using appropriate (visually unobtrusive and non-reflective) building material and colours in building structure (OM4) and proposed streetscape elements design (OM5) with buffer planting along the eastern edge of the site boundary (OM6), as well as residential traffic on Yau Pok Road and Kam Pok Road. The magnitude of change resulting from the completed Project will be Intermediate for this very small and low-sensitivity VSR group. Residual impacts after implementation of visual mitigation measures will be ***Slight*** at Day 1 of operation phase and these will gradually reduce to ***Insubstantial*** by Year 10.

All other residual visual impacts experienced by concerned VSRs after mitigation at Day 1 of operation and after Year 10 of operation will be ***Insubstantial***.

Table 11-8 Magnitude of Change in Views for VSRs

ID No.	Visually Sensitive Receiver	Compatibility of Project with Surroundings (High, Medium, Low)	Scale of Development (Large, Medium, Small)	Reversibility of Change (Yes, No)	Minimum Viewing Distance (Meters)	Blockage of View (Small, Partial, Major)	Duration of Impacts (Short, Long)		Magnitude of change (Negligible, Small, Intermediate, Large)	
							Construction	Operation	Construction	Operation
R1a & R1b	Residents of Fairview Park	High	Large	No	5	Partial	Short	Long	Intermediate	Intermediate
R2	Residents of Palm Springs and Royal Palms	High	Large	No	330	Small	Short	Long	Small	Small
R3	Residents of Yau Mei San Tsuen	High	Large	No	200	Small	Short	Long	Small	Small
R4	Residents of Chuk Yuen Tsuen, Tai Yuen Villa and Hang Fook Garden	High	Large	No	300	Small	Short	Long	Small	Small
R5	Residents of Ha San Wai	High	Large	No	350	Small	Short	Long	Small	Small
R6	Residents of Helene Terrace and Villa Camellia	High	Large	No	100	Partial	Short	Long	Intermediate	Intermediate
R7	Future Residents under Approved Planning Applications A/YL-MP/205	High	Large	No	70	Partial	Short	Long	Intermediate	Intermediate
R8	Future Residents under Planning Application A/YL-MP/170	High	Large	No	60	Partial	Short	Long	Intermediate	Intermediate
T1	Travellers on Ha Chuk Yuen Road and Fung Chuk Road	Medium	Small	No	60	Small	Short	Long	Negligible	Negligible
T2	Travellers on Yau Pok Road, Kam Pok Road and Proposed Cycle Track	Medium	Small	No	10	Major	Short	Long	Intermediate	Intermediate
T3	Travellers on Castle Peak Road and San Tin Highway	Medium	Small	No	350	Small	Short	Long	Negligible	Negligible
T4	Pedestrians on Footbridges over San Tin HighwayMedium	Medium	Small	No	500	Small	Short	Long	Negligible	Negligible

ID No.	Visually Sensitive Receiver	Compatibility of Project with Surroundings (High, Medium, Low)	Scale of Development (Large, Medium, Small)	Reversibility of Change (Yes, No)	Minimum Viewing Distance (Meters)	Blockage of View (Small, Partial, Major)	Duration of Impacts (Short, Long)		Magnitude of change (Negligible, Small, Intermediate, Large)	
							Construction	Operation	Construction	Operation
T5	Travellers on Fairview Park Boulevard	Medium	Small	No	10	Partial	Short	Long	Small	Small
O1	Staff and Pupils at Wong Chan Sook Ying Memorial School and Commercial Premises	Medium	Small	No	20	Small	Short	Long	Small	Small
O2	Staff and Pupils at Bethel High School	Medium	Small	No	10	Small	Short	Long	Intermediate	Intermediate
O3	Workers on Commercial Farmland and Fish Ponds west of Yau Mei San Tsuen	Medium	Small	No	0	Partial	Short	Long	Small	Small
O4	Workers at Chuk Yuen Floodwater Pumping Station	Medium	Small	No	60	Major	Short	Long	Intermediate	Intermediate
O5	Workers in Yau Mei San Tsuen	Medium	Small	No	300	Small	Short	Long	Negligible	Negligible
O6	Workers in Open Storage and Other Premises east of Castle Peak Road	Medium	Small	No	370	Small	Short	Long	Negligible	Negligible
O7	Workers in Open Storage / Godowns west of Castle Peak Road	Medium	Small	No	70	Small	Short	Long	Small	Small

Table 11-9 Significance of Visual Impacts in Construction and Operational Phases

VSR Type & ID	Key Visually Sensitive Receiver (VSR)	Degree of Visibility of Source(s) of Visual Impact (Full, Partial, Glimpse) & Min Distance Between VSR & Nearest Source(s) of Impact [1]		Magnitude of Change before Mitigation (Negligible, Small, Intermediate, Large) [1]		Receptor Sensitivity (Low, Medium, High) [2]		Impact Significance BEFORE Mitigation (Insubstantial, Slight, Moderate, Substantial) [3]		Recommended Mitigation Measures	Residual Impact Significance AFTER Mitigation (Insubstantial, Slight, Moderate, Substantial) [3]		
											Construction	Operation	
		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation			DAY 1	YEAR 10
Residential VSRs													
R1(a)	Residents of Fairview Park	Full 5m	Full 5m	Intermediate	Intermediate	High	High	Moderate	Moderate	CM1 – CM2, CM5 – CM6, OM1 – OM2 OM4, OM6	Moderate	Moderate	Slight
R1(b)	Residents of Fairview Park	Full 5m	Full 5m	Small	Small	High	High	Moderate	Moderate	CM1 – CM2, CM5 – CM6, OM1 – OM4, OM6	Slight	Slight	Slight (beneficial)
R2	Residents of Palm Springs and Royal Palms	Partial 330m	Partial 330m	Small	Small	High	High	Moderate	Moderate	CM3 – CM8, OM1 – OM4, OM6	Slight	Insubstantial	Insubstantial
R3	Residents of Yau Mei San Tsuen	Partial 200m	Partial 200m	Small	Small	Medium	Medium	Moderate	Moderate	CM3 – CM8, OM1 – OM4, OM6	Slight	Insubstantial	Insubstantial
R4	Residents of Chuk Yuen Tsuen, Tai Yuen Villa and Hang Fook Garden	Glimpse 300m	Glimpse 300m	Small	Small	Medium	Medium	Moderate	Moderate	CM3 – CM8, OM1 – OM4, OM6	Slight	Insubstantial	Insubstantial
R5	Residents of Ha San Wai	Glimpse 350m	Glimpse 350m	Small	Small	Medium	Medium	Moderate	Moderate	CM3 – CM8, OM1 – OM4, OM6	Slight	Insubstantial	Insubstantial

VSR Type & ID	Key Visually Sensitive Receiver (VSR)	Degree of Visibility of Source(s) of Visual Impact (Full, Partial, Glimpse) & Min Distance Between VSR & Nearest Source(s) of Impact [1]		Magnitude of Change before Mitigation (Negligible, Small, Intermediate, Large) [1]		Receptor Sensitivity (Low, Medium, High) [2]		Impact Significance BEFORE Mitigation (Insubstantial, Slight, Moderate, Substantial) [3]		Recommended Mitigation Measures	Residual Impact Significance AFTER Mitigation (Insubstantial, Slight, Moderate, Substantial) [3]		
											Construction	Operation	
		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation			DAY 1	YEAR 10
R6	Residents of Helene Terrace and Villa Camellia	Partial 100m	Partial 100m	Intermediate	Intermediate	Medium	Medium	Moderate	Moderate	CM5 – CM8, OM1 – OM3, OM4 – OM6	Slight	Slight	Insubstantial
R7	Future Residents under Approved Planning Applications A/YL-MP/205	Full 70m	Full 70m	Intermediate	Intermediate	High	High	Moderate	Moderate	CM3 – CM8, OM1 – OM3, OM4 – OM6	Slight	Slight	Insubstantial
R8	Future Residents under Planning Application A/YL-MP/170	Full 60m	Full 60m	Intermediate	Intermediate	High	High	Moderate	Moderate	CM3 – CM8, OM1 – OM3, OM4 – OM6	Slight	Slight	Insubstantial
Travelling VSRs													
T1	Travellers on Ha Chuk Yuen Road and Fung Chuk Road	Glimpse 60m	Glimpse 60m	Negligible	Negligible	Low	Low	Insubstantial	Insubstantial	None	Insubstantial	Insubstantial	Insubstantial
T2	Travellers on Yau Pok Road, Kam Pok Road and Proposed Cycle Track	Full 10m	Full 10m	Intermediate	Intermediate	Low	Low	Moderate	Moderate	CM3 – CM8, OM1 – OM3, OM4 – OM6	Slight	Insubstantial	Insubstantial

VSR Type & ID	Key Visually Sensitive Receiver (VSR)	Degree of Visibility of Source(s) of Visual Impact (Full, Partial, Glimpse) & Min Distance Between VSR & Nearest Source(s) of Impact [1]		Magnitude of Change before Mitigation (Negligible, Small, Intermediate, Large) [1]		Receptor Sensitivity (Low, Medium, High) [2]		Impact Significance BEFORE Mitigation (Insubstantial, Slight, Moderate, Substantial) [3]		Recommended Mitigation Measures	Residual Impact Significance AFTER Mitigation (Insubstantial, Slight, Moderate, Substantial) [3]		
											Construction	Operation	
		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation			DAY 1	YEAR 10
T3	Travellers on Castle Peak Road and San Tin Highway	Glimpse 350m	Glimpse 350m	Negligible	Negligible	Low	Low	Insubstantial	Insubstantial	None	Insubstantial	Insubstantial	Insubstantial
T4	Pedestrians on Foot-bridges over San Tin Highway	Glimpse 500m	Glimpse 500m	Negligible	Negligible	Medium	Medium	Insubstantial	Insubstantial	None	Insubstantial	Insubstantial	Insubstantial
T5	Travellers on Fairview Park Boulevard	Partial 10m	Partial 10m	Small	Small	Low	Low	Slight	Slight	CM3 – CM8, OM1 – OM3, OM4 – OM6	Slight	Insubstantial	Insubstantial
Occupational VSRs													
O1	Staff and Pupils at Wong Chan Sook Ying Memorial School and Commercial Premises	Partial 20m	Partial 20m	Small	Small	Low	Low	Slight	Slight	CM1 – CM2, CM5 – CM6, OM1 – OM2, OM4, OM6	Slight	Insubstantial	Insubstantial
O2	Staff and Pupils at Bethel High School	Full 10m	Full 10m	Intermediate	Intermediate	Low	Low	Moderate	Moderate	CM1 – CM2, CM5 – CM6, OM1 – OM2, OM4, OM6	Slight	Slight	Insubstantial

VSR Type & ID	Key Visually Sensitive Receiver (VSR)	Degree of Visibility of Source(s) of Visual Impact (Full, Partial, Glimpse) & Min Distance Between VSR & Nearest Source(s) of Impact [1]		Magnitude of Change before Mitigation (Negligible, Small, Intermediate, Large) [1]		Receptor Sensitivity (Low, Medium, High) [2]		Impact Significance BEFORE Mitigation (Insubstantial, Slight, Moderate, Substantial) [3]		Recommended Mitigation Measures	Residual Impact Significance AFTER Mitigation (Insubstantial, Slight, Moderate, Substantial) [3]		
											Construction	Operation	
		Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation			DAY 1	YEAR 10
O3	Workers on Commercial Farmland and Fish Ponds	Partial 0m	Partial 0m	Small	Small	Low	Low	Slight	Slight	CM1 – CM2, CM5 – CM6, OM1 – OM2, OM4 –OM6	Slight	Insubstantial	Insubstantial
O4	Workers at Chuk Yuen Floodwater Pumping Station	Full 60m	Full 60m	Intermediate	Intermediate	Low	Low	Moderate	Moderate	CM3 – CM8, OM1 – OM6	Slight	Slight	Insubstantial
O5	Workers in Yau Mei San Tsuen	Glimpse 300m	Glimpse 300m	Negligible	Negligible	Low	Low	Insubstantial	Insubstantial	None	Insubstantial	Insubstantial	Insubstantial
O6	Workers in Open Storage and Other Premises east of Castle Peak Road	Glimpse 370m	Glimpse 370m	Negligible	Negligible	Low	Low	Insubstantial	Insubstantial	None	Insubstantial	Insubstantial	Insubstantial
O7	Workers in Open Storage/ Godowns west of Castle Peak Road	Partial 70m	Partial 70m	Small	Small	Low	Low	Slight	Slight	CM3 – CM8, OM1 – OM2, OM4, OM6	Insubstantial	Insubstantial	Insubstantial

11.12 Summary of Landscape and Visual Assessment

The detailed landscape and visual assessment above is briefly summarised below:

11.12.1 Summary of Landscape and Visual Impacts during Construction

Residual landscape impacts in the construction phase are listed in **Table 11-6** and mapped in **Figures 11-27 and 11-30**. Residual visual impacts in the construction phase are listed in **Table 11-9** and mapped in **Figure 11-33**.

During the construction phase, there will be **Slight** residual landscape impacts for **LR3.A** (Open Storage/Vacant Lot), **LR6.A** (Grassland/Shrubland), **LR7.A** (Ponds and Pond Edge), **LCA1** (Rural Open Landscape at Active / Abandoned Agricultural Lands / Fish Ponds) and **LCA6** (Open Storage / Workshops / Utility Areas). All others LRs and LCAs are entirely outside the Project Site and will experience **Insubstantial** residual landscape impacts during the construction phase.

Potentially the most significant visual impacts during the construction phase will be *Moderate* impacts on **R1(a)** – Residents of Fairview Park.

In addition, there will be impacts of *Slight* significance on **R1(b)** – Residents of Fairview Park; **R2** – Residents of Palm Springs and Royal Palms; **R3** – Residents of Yau Mei San Tsuen; **R4** – Residents of Chuk Yuen Tsuen, Tai Yuen Villa and Hang Fook Garden; **R5** – Residents of Ha San Wai; **R7 R6** – Residents of Helene Terrace and Villa Camellia; **R7** – Future Residents under Approved Planning Application A/YL-MP/205; **R8** – Future Residents under Planning Applications A/YL-MP/156 and A/YL-MP/170; **T2** – Travellers on Yau Pok Road, Kam Pok Road and Proposed Cycle Track; **T5** – Travellers on Fairview park Boulevard; **O1** – Staff and Pupils at Wong Chan Sook Ying Memorial School and Commercial Premises; **O2** – Staff and pupils at Bethel High School; **O3** – Workers on Commercial Farmland and Fish Ponds and **O4** – Workers at Chuk Yuen Floodwater Pumping Station.

All other visual impacts will be *Insubstantial*.

11.12.2 Summary of Landscape and Visual Impacts during Operation

Residual landscape impacts in the operation phase are listed in **Table 11-6** and mapped in **Figures 11-28 to 11-29** and **11-31 to 11-32**. Residual visual impacts in the operation phase are listed in **Table 11-9** and mapped in **Figure 11-34**.

Within the Project Site, residual impacts after 10 years of operation will be **Slight *(beneficial)*** for **LR3.A** (Open Storage/Vacant Lot); **LR6.A** (Grassland/shrubland) and **LR7.A** (Ponds and Pond Edge). **LCA6** (Open Storage / Workshops / Utility Areas) within the Project Site and **LCA1** (Rural Open Landscape at Active / Abandoned Agricultural Lands / Fish Ponds), which is partially inside the Project Site, will experience **Slight *(beneficial)*** residual impacts during operation. All other LCAs lie entirely outside the Project Site and will experience ***Insubstantial*** residual impacts during operation.

Residual visual impacts after year 10 of operation on almost all receivers will be Insubstantial. For more distant VSRs, this will be because their oblique or distant views of the Projects will be largely screened by a belt of trees or because the Project will appear generally in keeping with the existing residential character of existing views and will not represent a significant change to their character. There will be ***Slight*** visual impacts on a

small number of VSRs within **R1(a) –** Residents of Fairview Park, who look directly onto the site from close proximity. Impacts to all other VSRs, except R1(b), will be ***Insubstantial.*** For certain VSRs at **R1(b) –** Residents of Fairview Park, as they are facing directly to the proposed landscaped pond with landscape amenity, there would be a ***Slight (beneficial)*** visual gain for this group.

11.13 Conclusion

The landscaped pond area, recreational landscape facilities, substantial new tree planting and the coherent development of the currently derelict site will result in *a Slight Beneficial* impact on the landscape resources within the Project Site, once operational and once proposed landscape planting has had time to mature. The overall conclusion is therefore that the landscape and visual impacts are acceptable and may contribute a small landscape / visual enhancement effect to the neighbourhood with the implementation of landscape improvement measures as detailed above.

In accordance with the criteria and guidelines for evaluating and assessing impacts as state in Annex 10, Clause 1.1(c) of the EIAO-TM, overall, it is considered that the residual landscape and visual impacts of the proposed development are **Acceptable with Mitigation** during the construction and operation phases: "*there will be some adverse effects, but these can be eliminated, reduced or offset to a large extent by specific measures*".

12. SUMMARY OF ENVIRONMENTAL OUTCOMES

12.1 Air Quality

Through implementation of dust control measures required under the Air Pollution Control (Construction Dust) Regulation; recommended specific measures in this EIA report; and good housekeeping practices by the works contractors, construction dust impacts can be controlled to an acceptable level. Practical mitigation measures have already been proposed for this Project to alleviate potential impacts. The concerned site formation works will only be short-term and potential air quality impacts have been reduced to a minimal through recommended mitigation measures and can comply with the relevant air quality criteria/ AQOs. Thus, no adverse impact is anticipated. As a result, there is no residual impact.

Appropriate precautionary measures (e.g. peripheral setback from the site boundaries) have been incorporated in the layout, which can satisfy the buffer distance requirements stated in the HKPSG for both active and passive recreational uses. No unacceptable air quality impacts due to industrial emissions are expected as no industrial emission sources were identified within the Assessment Area. During the operational stage, the sewage generated by the proposed development will be discharged to the planned public sewers at Yau Pok Road. As such, no operational air quality impacts are anticipated.

12.2 Noise

The Noise Control Ordinance will be complied with throughout the Project. With the proposed noise mitigation measures, the predicted noise levels due to industrial noise sources and that of road traffic noise at the proposed development can fully comply with the noise criteria.

12.3 Water Quality

The major impact during construction of this Project will be surface runoff and soil erosion due to exposed surfaces. Peripheral drainage, temporary drains, sedimentation basins, sand traps and similar facilities will be provided during the construction works in accordance with the ProPECC PN 1/94. Surface runoff from the construction site will be diverted away from the nearby Fairview Park Nullah, thus there will be no discharge into the nullah. Together with the adoption of proposed good practices on-site, adverse water quality impact is not expected. The Contractor will be required to apply for a discharge licence under the WPCO and the discharge shall comply with the terms and conditions of the licence.

During operation, there is no adverse impact on nearby WSRs expected as effluent during operation of the Project will be discharged into public sewerage system. Discharge from the Project Site shall apply for a discharge licence under the WPCO, and the discharge shall comply with the terms of conditions of the licence as well as the standards for effluents specified in the relevant TM under the WPCO. Drainage system of the Project Site will be properly designed so that surface runoff from the Project Site will be collected by the proposed new drainage channels and pipes surrounding the Project Site. The proposed landscape pond will be self-contained and there is will be no discharge from pond. Surface runoff from the adjacent area will be diverted away from the pond area by drainage channels.

The water quality assessment in the EIA indicated that with proper implementation of the recommended environmental mitigation measures, no adverse impacts on water quality would be expected from the construction and operational phase of the Project.

12.4 Sewerage and Sewage Treatment

All sewage generated will be discharged to the public sewerage system. The proposed development will not have population intake until the commissioning of all the planned local public sewerage works mentioned in **Chapter 6**.

12.5 Waste Management

No waste related regulatory non-compliance and unacceptable environmental impacts are expected to arise from the proposed residential.

12.6 Ecology

The Project will result in permanent or temporary loss of 9.1 ha of habitats which are currently “very low” to “low to moderate” ecological value for wildlife. No residual ecological impacts are expected to arise from the proposed development after the implementation of the recommended measures.

12.7 Fisheries

No active fish pond would be directly impacted due to this project. Indirect impacts during construction and operation phases would also be insignificant given that appropriate mitigation measures (i.e. measures for water quality impact) are implemented. Therefore, no significant fisheries impact is anticipated.

12.8 Cultural Heritage

There is no anticipated effect on cultural heritage resources as a result of the Project.

12.9 Landscape and Visual

The landscape pond area, passive recreational and supporting uses, substantial new tree planting and the coherent development of the currently derelict site will result in a *Slight Positive* impact on the landscape resources within the Project Site, once operational and once proposed landscape planting has had time to mature. The overall conclusion is therefore that the landscape and visual impacts are acceptable and may contribute a small landscape / visual enhancement effect to the neighbourhood with the implementation of landscape improvement measures as detailed above.

In accordance with the criteria and guidelines for evaluating and assessing impacts as state in Annex 10, Clause 1.1(c) of the EIAO-TM, Overall, it is considered that the residual landscape and visual impacts of the proposed development are **acceptable with mitigation** during the construction and operation phases: “*there will be some adverse effects, but these can be eliminated, reduced or offset to a large extent by specific measures*”.

13. ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

13.1 Overview

A detailed EM&A Manual has been prepared for this project as required under the Study Brief and the requirements as stipulated in Annex 21 of the TM. The following Chapters provide a summary of the need for monitoring and auditing of the individual environmental aspects.

13.2 Air Quality

Although the Project is not expected to generate excessive dust, an EM&A program is recommended to demonstrate compliance with relevant air quality criteria/ AQOs during the Project construction phase, and the proper implementation of mitigation measures. The corresponding implementation schedule is tabulated in **Table 14-1**.

The EM&A program will include monitoring the air quality during the Project construction phase, and the implementation of good practices by the works contractor. Details of the EM&A requirements are provided in the Project EM&A Manual.

No particular monitoring is required during the Project operational phase.

13.3 Noise

Construction noise

Based on the results of noise assessment, implementation of noise mitigation measures and good practices will be necessary in order to make sure the construction noise levels can comply with the relevant noise criteria. With implementation of proper noise mitigation measures, no residual noise impact is expected. The type of noise mitigation measures and their implementation schedule are tabulated in **Table 14-1**. EM&A programme would be required for the Project construction works, which is detailed in the Project EM&A Manual.

Operational Noise

Operational phase noise impacts due to road traffic noise levels and that due to fixed noise sources have been examined. Noise mitigation measures have also been proposed accordingly. As the predicted mitigated noise levels can comply with the relevant noise criteria, no further noise mitigation measures are considered to be necessary and no residual noise impact is anticipated. The concerned precautionary measures that need to be considered during the detailed design are tabulated in **Table 14-1**.

13.4 Water Quality

No adverse residual impact is anticipated during the construction and/ or operation of the Project. The required precautionary/ mitigation measures during from design, to construction and operation of the Project is tabulated in **Table 14-1**.

A water quality monitoring and site auditing programme is proposed, to ensure implementation of mitigation measures during construction phase to protect the nearby sensitive water bodies from being degraded.

Details of the water quality impact mitigation measures are tabulated in **Table 14-1**.

13.5 Sewerage and Sewage Treatment

There is currently limited existing public sewerage system in vicinity of the Project Site. However, the proposed development will not have population intake until the commissioning of all the planned local public sewerage works mentioned in **Chapter 6**. Therefore, no EM&A requirements are considered to be necessary.

13.6 Waste Management

According to the waste impact assessment results, no unacceptable environmental impacts are expected as a result of handling, storage, transportation and disposal of construction waste arising from the proposed development or due to operation of the Project. Details of the recommended mitigation measures are tabulated in **Table 14-1**.

An EM&A programme is recommended to be in place to check that the waste generated from the construction site are being managed in the accordance with the recommended procedures. The programme is detailed in the Project EM&A Manual.

13.7 Ecology

As no significant ecological impact is anticipated, operational phase ecological monitoring is not required. However, as a precautionary measure to verify the accuracy of impact assessment and detect any unpredictable impact arising from the proposed development, construction phase ecological monitoring is proposed in Section 8.10 and in **Table 14-1**.

13.8 Fisheries

As no significant fisheries impact is anticipated, monitoring for fisheries is not required.

13.9 Cultural Heritage

As there are no direct or indirect impacts on any terrestrial archaeology or heritage resources that may arise as a result of the construction and operation of this Project, no monitoring is necessary.

13.10 Landscape and Visual

It is recommended that EM&A for landscape and visual resources is undertaken during the design, construction and operational phases of the project. The design, implementation and maintenance of landscape mitigation measures should be monitored to ensure that they are fully realised and that potential conflicts between the proposed landscape mitigation measures and any other project works and operational requirements are resolved at the earliest possible stage without compromise to the intent of the mitigation measures. Implementation management and maintenance of the mitigation measures recommended by the EIA will be monitored through the site audit programme. Audits shall be carried out by a Registered Landscape Architect as detailed in the EM&A Manual.

Details of the recommended mitigation measures are tabulated in **Table 14-1**.

14. PROJECT IMPLEMENTATION SCHEDULE

14.1 Proposed Infrastructure and Mitigation Measures

Based on the findings of this EIA, boundary noise barriers have been proposed in order to alleviate road traffic noise and potential noise impact due to nearby fixed noise sources (Sections 4.7.2 and 4.7.3 refer). Various noise mitigation measures have been proposed for different noise sources and representing different scenarios, noise mitigation measures proposed have also been summarised and presented in **Figure 4-7**.

During operational phase, sewage generated from the development will be discharged to the public sewerage as the Project will not have population intake until the commissioning of the planned local public sewerage works.

In addition, other mitigation measures have also been proposed for both the construction and operational phase of the Project and are presented in the respective Chapters of this EIA report. The implementation schedules for the recommended mitigation measures for each environmental aspect covered in this EIA are given in **Table 14-1** as appropriate.

Table 14-1 Implementation Schedule of Recommended Mitigation Measures

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Air Quality						
During Detailed Design:						
3.6.2.1	4.9.1	During the operational phase, the sewage generated by the proposed development will be discharged to the planned public sewerage system at Yau Pok Road, which is to be constructed under PWP No. 4235DS by Hong Kong SAR Government Drainage Services Department (DSD). The Project will not have population intake until the commissioning of the planned local public sewerage works.	Odour control during operation	Project architect and Project Proponent	During detailed design stage	EIA
3.6.2.1	4.9.2	The layout of the facilities for the proposed development will be carefully planned such that the refuse collection point (a potential odour source) will be away from the residential area but will be close to the main access area connecting the main road. During the detailed design phase, the minimisation of odour at the refuse collection point will be considered to further reduce any localized impact.	Odour control during operation	Project architect and Project Proponent	During detailed design stage	EIA
During Construction Phase:						

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
3.9.1	4.10.2	Good site management practices are important in reducing potential air quality impacts. As a general guidance, the contractor shall maintain high standard of housekeeping to prevent emission of fugitive dust emission. Loading, unloading, handling and storage of fuel, raw materials, products, wastes or by-products should be carried out in a manner so as to minimize the release of visible dust emission.	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
3.9.1	4.10.3	The speed of the trucks travelling on haul roads within the Project Site will be controlled at 10 kph or below in order to reduce dust impact and for safe movement around the Project Site. Any piles of materials accumulated on or around the work areas shall be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas shall be carried out in a manner without generating fugitive dust emissions. The material shall be handled properly to prevent fugitive dust emission before cleaning.	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
3.9.1	4.10.5	All the relevant dust control measures stipulated in the *Air Pollution Control*	Air Quality (fugitive dust) Control during	Contractors	At all construction areas of the site	Annex 4 and Annex 12 of EIAO

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		(Construction Dust) Regulation would be fully implemented:	Construction Phase		during the entire construction period	-TM, Air Pollution Control (Construction Dust) Regulation
3.9.1	4.10.5	• The designated haul road should be hard paved to minimize fugitive dust emission; • During the site formation works, the active works areas should be water sprayed with water browser or sprayed manually eight times during day-time from 0800 to 1800 hours including holidays. The Contractor(s) should ensure that the amount of water spraying is just enough to dampen the exposed surfaces without over-watering which could result in surface water runoff; • Dump trucks for material transport should be totally enclosed using impervious sheeting; • Any excavated dusty materials or stockpile of dusty materials should be covered entirely by impervious sheeting or sprayed with water so as to maintain the entire surface wet, and recovered or backfilled or reinstated as soon as possible; • Dusty materials remaining after a stockpile is removed should be wetted with water; • The area where vehicle washing	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		takes place and the section of the road between the washing facilities and the exit point should be paved with e.g. concrete, bituminous materials or hardcore or similar; • The Contractor(s) shall only transport adequate amount of fill materials to the Project Site to minimize stockpiling of fill materials on-site, thus reducing fugitive dust emission due to wind erosion; • Should temporary stockpiling of dusty materials be required, it shall be either covered entirely by impervious sheeting, placed in an area sheltered on the top and the 3 sides; or sprayed with water so as to maintain the entire surface wet;				
3.9.1	4.10.5	• All dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty material wet; • Vehicle speed to be limited to 10 kph except on completed access roads; • The portion of road leading only to a construction site that is within 30 m of a designated vehicle entrance or exit should be kept clear of dusty materials; • Every vehicle should be washed to remove any dusty materials from its body and wheels before leaving the construction sites;	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		• The load of dusty materials carried by vehicle leaving a construction site should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • The working area of excavation should be sprayed with water immediately before, during and immediately after (as necessary) the operations so as to maintain the entire surface wet;				
3.9.1	4.10.5	• Use of effective dust screens, sheeting or netting to be provided to enclose dry scaffolding which may be provided from the ground floor level of the building or if a canopy is provided at the first floor level, from the first floor level, up to the highest level (maximum three floors high for this Project) of the scaffolding where scaffolding is erected around the perimeter of a building under construction.	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation
3.9.1	4.10.6	In order to minimize potential cumulative dust impacts, the Contractor(s) shall carry out site formation works for the Northern Portion and Southern Portion of the Project Site separately without overlapping in construction programme. In addition, to minimize dust emission, the site formation works is expected to carry out in phases and there will be only one zone under construction in any one	Air Quality (fugitive dust) Control during Construction Phase	Contractors	At all construction areas of the site during the entire construction period	Annex 4 and Annex 12 of EIAO -TM, Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		time. Once construction for a zone is completed, the works area will be compacted, covered by tarpaulin sheet and hydroseeded before construction of another zone. Watering will also be applied on regular basis. Works area shall be properly covered at the end of working day to minimize wind erosion.				
3.9.1	4.10.8	No excavation of pond sediment is expected during the construction and no significant odour impact due to excavation of sediment is therefore anticipated. However, as a precautionary measure, should any excavation of sediment be required during the construction the followings measures shall be implemented:	Odour control during construction	Contractors	During excavation of sediment in the Northern Portion of the Project Site	EIA
3.9.1	4.10.8	• Exposed surface shall be immediately filled by filling materials; • All malodorous excavated material, if any, should be placed as far as possible from any ASRs; • The stockpiled malodorous materials should be removed from Project Area within 24 hours or as soon as practicable; • The stockpiled malodorous materials should be covered entirely by plastic tarpaulin sheets; and • Odour patrol during excavation of pond sediments to examine the effectiveness of the above control measures.	Odour control during construction	Contractors	During excavation of pond sediment in the Northern Portion of the Project Site	EIA

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		• Should disposal of excavated sediment be required, it shall follow the requirements stated in Buildings Department's PNAP No. 252 for "Management Framework for Disposal of Dredged/ Excavated Sediment".				
During Operational Phase:						
nil	nil	nil	nil	nil	nil	nil
Noise Quality						
During Detailed Design						
4.7.4	5.8.4	To summarise the findings, **Figure 4-7** summarises the proposed noise mitigation measures during operational phase.	Noise control during operation	Project architect and Project Proponent	During detailed design stage	EIA, Noise Control Ordinance
During Construction Phase						
4.8.1	5.7.3	EPD's quality powered mechanical equipment (QPME) inventory is proposed to be used wherever possible as a noise mitigation measure. The Contractor of this Project should diligently seek equivalent models of quiet/ silenced PMEs.	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.2	5.7.5 & 5.7.6	Asides from QPMEs, additional noise mitigation measures in terms of movable noise barriers are also proposed to shield	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		construction plants from NSRs (see plant inventory in **Appendix 4-4**). The movable noise barriers should have sufficient surface density of at least 10 kg/m^2 or material providing equivalent acoustic performance to block the line of sight from the sensitive receivers. There should not be any gaps and openings at the noise barriers and site hoardings to avoid noise leakage. The design of the noise barriers shall be proposed by the work contractor(s), and approved by the Engineers Representative (RE) and the Environmental Team.				Annex 13 of EIAO-TM.
4.8.3	5.7.7 & 5.7.8	In addition to the above-mentioned noise mitigation measures, fixed temporary noise barrier is also proposed in adjacent to the school (i.e. NSR N10) in order to alleviate the elevated construction noise level over there. The existing NSR N3, N4 nearby will also be benefited by the proposed fixed temporary noise barrier. In order to ensure construction noise is controlled throughout the construction period, fixed noise barriers shall be erected before the commencement of	Noise control during construction	Contractors, ER	Construction areas near the specified locations during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		construction works. It is estimated that 9m high temporary fixed noise barriers (with top level at 14.4mPD level) shall be sufficient to shield the concerned school from construction activities within the Project Site. Temporary fixed noise barrier (5.5m tall and with top level at 10.9mPD) can also provide additional noise shielding to adjacent NSRs such as N3 and N4.Also, standard site hoarding of 3m tall will also be erected along the site boundary. Since site hoarding will be erected along the site boundary, the concerned noise barrier may be combined with the site hoarding.				
4.8.3	5.7.9	**Figure 4-6** shows the indicative location of the proposed temporary noise barriers. Since site hoarding will be erected along the site boundary, the concerned noise barrier may be combined with the site hoarding. The exact alignment and design is subject to the contractor(s) and the prior approval from the Resident Engineer (RE). As the proposed temporary fixed noise barrier will be 9m tall, there will be excavation and filling activities to level up the existing ground level for the foundation of the noise barrier. To minimize potential impact, erection of	Noise control during construction	Contractors, ER	Construction areas near the specified locations during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		temporary fixed noise barriers will be carried out section by section and precast units will be used for the foundation of the noise barrier. These noise barriers shall be erected before the commencement of construction works.				
4.8.3	5.7.9	To minimize potential impact, erection of temporary fixed noise barriers will be carried out by section, and precast units will be used for the foundation of the noise barrier. These noise barriers shall be erected before the commencement of construction works and prior to any site formation works.	Noise control during construction	Contractors, ER	Construction areas near the specified locations during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.3	5.7.11	The temporary fixed noise barriers should have sufficient surface density of at least 10 kg/m^2 or material providing equivalent acoustic performance. There should not be any gaps and openings at the noise barriers and site hoardings to avoid noise leakage. The design of the noise barriers shall be proposed by the work contractor(s), and approved by the Engineers Representative (RE) and the Environmental Team in accordance with the Project EM&A Manual.	Noise control during construction	Contractors, ER	Construction areas near the specified locations during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	It is also recommended that good housekeeping activities shall also be carried out to further minimize the potential construction noise impact, and these are summarised below. The following good site practices are also recommended for incorporation into the contractual requirements:	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
4.8.4	5.7.12	• Contractor shall comply with and observe the Noise Control Ordinance (NCO) and its current subsidiary regulations;	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Before the commencement of any work, the Contractor shall submit to the Engineer for approval the method of working, equipment and sound-reducing measures intended to be used at the Project Site;	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Contractor shall devise and execute working methods that will minimize the noise impact on the surrounding environment; and shall provide experienced personnel with suitable training to ensure that these methods are implemented;	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Only well-maintained plants should be operated on-site;	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Plants should be serviced regularly during the construction programme;	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Machines that may be in intermittent	Noise control during	Contractors, ER	Construction areas	EIA, Contractual

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		use should be shut down or throttled down to a minimum between work periods;	construction		during the construction period	requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Silencer and mufflers on construction equipment should be utilised and should be properly maintained during the construction programme;	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Noisy activities can be scheduled to minimize exposure of nearby NSRs to high levels of construction noise. For example, noisy activities can be scheduled for midday or at times coinciding with periods of high background noise (such as during peak traffic hours);	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Noisy equipment such as emergency generators shall always be sited as far away as possible from noise sensitive receivers;	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Provision of mobile noise barriers in adjacent to construction plants (e.g. Continuous Flight Auger) shall also be considered by the Contractor(s) where necessary;	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Mobile plants should be sited as far	Noise control during	Contractors, ER	Constructi	EIA, Contractual

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		away from NSRs as possible; and	construction		on areas during the construction period	requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• Material stockpiles and other structures should be effectively utilised as noise barrier, where practicable.	Noise control during construction	Contractors, ER	Constructi on areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.8.4	5.7.12	• The contractor(s) is also encouraged to arrange construction activities with care so that concurrent construction activities are avoided as much as possible. The contractor(s) should closely liaise with the school so that noisy activities are not undertaken during school's examination period.	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.
4.9.4	5.7.12	• during the construction the Contractor will be required to avoid noisy works near N4 when there is any known concurrent construction due to the approved public sewer project. The Project Environmental Team shall closely monitor contractor(s)' performance and residual noise level at nearby sensitive receivers. Should unacceptable construction noise level be identified during the construction, the concerned construction works shall be stopped temporarily and necessary actions following the	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		standard Event and Action Plan specified in the Project EM&A Manual, shall be implemented. The above requirement will be included in the EM&A manual of this Project for implementation.				
4.9.4	5.7.10	A short section of fixed temporary noise barrier (5.5m tall above a site formation level of 5.4mPD) (i.e. dotted green line as shown in **Figure 4-6** of EIA), is also proposed in adjacent to N4 in order to alleviate cumulative noise impact due to the approved projects of public sewer and cycle track. The temporary fixed noise barriers should have sufficient surface density of at least 10 kg/m^2 or material providing equivalent acoustic performance. There should not be any gaps and openings at the noise barriers to avoid noise leakage and can be combined with the site hoarding of Project Site. The design of the noise barriers shall be proposed by the work contractor(s), and approved by the Engineers Representative (RE) and the Environmental Team in accordance with the Project EM&A Manual. It shall be noted that the concerned noise barrier will only be required should there be concurrent construction activities with the approved projects of public sewer and cycle track. This is also stated in **Figure**	Noise control during construction	Contractors, ER	Construction areas during the construction period	EIA, Contractual requirements, Annex 5 and Annex 13 of EIAO-TM.

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		4-6 of EIA as well.				
During Operational Phase:						
4.7.4	5.8.5	To summarise the findings, **Figure 4-7** summarises the proposed noise mitigation measures during operational phase.	Noise control during operation	Project Proponent	During operational stage	EIA, Noise Control Ordinance
Water Quality						
During Design Stage:						
5.6.2.1	6.3.2	The drainage system shall be designed to avoid any case of flooding with provision of sand traps. The proposed schematic drainage system is shown in **Figure 5-4**. The proposed new drainage channels and pipes surrounding the Project Site shall collect surface runoff within the Site for direct discharge into the Ngau Tam Mei Drainage Channel and Fairview Park Nullah after passing through sand traps. The drainage outlet of the indoor car parks shall be connected to foul sewers via petrol interceptors or similar facilities.	Drainage system during operation	Project architect and Project Proponent	During detailed design stage	EIA, WPCO, Contractual requirements,
5.6.2.2	6.3.2	Water in the proposed landscape pond shall be self-contained with no outlet connecting to nearby channel/inland water. During operation, pond water will be contained within the pond and there	Drainage system during operation	Project architect and Project Proponent	During detailed design stage	EIA, WPCO, Contractual requirements,

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		shall be no discharge from the pond. Surface runoff from the adjacent area shall be diverted away from the pond area by drainage channels in order to avoid overflow of the pond under extreme weather condition (e.g. heavy rainfall).				
During Construction Phase						
5.6.1	6.3.5	During the construction of the landscape water pond in the Northern Portion of the Project Site, proper temporary drainage system (e.g. following those in the Practice Notes for Professional Persons on "Construction Site Drainage" (ProPECC PN 1/94)) shall be constructed to divert surface runoff away from the existing abandoned pond for discharge into the Fairview Nullah or NTMDC through sand traps	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.6	Site formation works at the existing abandoned pond should be carried out during dry season as far as possible. Water contained at the existing abandoned pond shall be temporarily drained to the newly constructed pond	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	Best Management Practices (BMPs) given in the ProPECC PN 1/94 shall be	Stormwater and Non-point Source Pollution	Contractors	At all construction areas of the site	ProPECC PN1/94, WPCO, EIA,

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		implemented in controlling water pollution during the construction phase. The main practices provided in the above-mentioned document (i.e. ProPECC PN 1/94) are also summarized in the following paragraphs which should be implemented by the contractor during the execution of the site formation and road works, where practicable :	Control		during the entire construction period	Contractual requirements
5.6.1	6.3.7	• High loading of suspended solids (SS) in construction site runoff shall be prevented through proper site management by the contractor;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• The boundary of critical work areas shall be surrounded by ditches or embankment. Accidental release of soil or refuse into the adjoining land should be prevented by the provision of site hoarding or earth bunds, etc. at the site boundary. These facilities should be constructed in advance of site formation works and roadworks;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Consideration should be given to plan construction activities to allow the use of natural topography of the Project Site as a barrier to minimize uncontrolled non-point source discharge of construction site runoff;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Temporary ditches, earth bunds should be provided to facilitate	Stormwater and Non-	Contractors	At all construction	ProPECC PN1/94,

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		directed and controlled discharge of runoff into storm drains via sand/ silt removal facilities such as sand traps, silt traps and sediment retention basin. Oil and grease removal facilities should also be provided where appropriate, for example, in area near plant workshop/ maintenance areas;	point Source Pollution Control		areas of the site during the entire construction period	WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Sand and silt removal facilities, channels and manholes should be maintained and the deposited silt and grit should be removed regularly by the contractor, and at the onset of and after each rainstorm to ensure that these facilities area functioning properly;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Slope exposure should be minimized where practicable especially during the wet season. Exposed soil surfaces should be protected from rainfall through covering temporarily exposed slope surfaces or stockpiles with tarpaulin or the like;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Haul roads should be protected by crushed rock, gravel or other granular materials to minimize discharge of contaminated runoff;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Slow down water run-off flowing across exposed soil surfaces;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire	ProPECC PN1/94, WPCO, EIA, Contractual

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
					construction period	requirements
5.6.1	6.3.7	• Plant workshop/ maintenance areas should be bunded and constructed on a hard standing. Sediment traps and oil interceptors should be provided at appropriate locations;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Manholes (including newly constructed ones) should be adequately covered or temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Construction works should be programmed to minimize soil excavation works where practicable during rainy conditions;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Chemical stores should be contained (bunded) to prevent any spills from contact with water bodies. All fuel tanks and/ or storage areas should be provided with locks and be sited on hard surface;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Chemical waste arising from the Project Site should be properly stored, handled, treated and disposed of in compliance with the requirements stipulated under the Waste Disposal (Chemical Waste) (General) Regulation;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Drainage facilities must be adequate for the controlled release of storm	Stormwater and Non-point Source Pollution	Contractors	At all construction areas of the site	ProPECC PN1/94, WPCO, EIA,

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		flows.	Control		during the entire construction period	Contractual requirements
5.6.1	6.3.7	• Appropriate peripheral drainage system shall be constructed along the Project Site boundary to divert away surface runoff in accordance with requirements stipulated in ProPECC PN 1/94 to collect surface runoff and discharge it into the nearby existing stormwater drains near roadside of Yau Pok Road, and via which into the existing NTMDC.	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Temporary drains, sedimentation basins, sand traps and similar facilities shall be provided during the construction works in accordance with the ProPECC PN 1/94.	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• The Contractor shall apply for a discharge licence under the WPCO and the discharge shall comply with the terms and conditions of the licence.	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Sewage generated from the construction workforce should be contained in chemical toilets before connection to public foul sewer becomes available. Chemical toilets should be provided at a minimum rate of about 1 per 50 workers. The facility should be serviced and cleaned by a specialist contractor at regular intervals;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
5.6.1	6.3.7	• Vehicle wheel washing facilities should be provided at the site exit such that mud, debris, etc. deposited onto the vehicle wheels or body can be washed off before the vehicles are leaving the site area;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Section of the road between the wheel washing bay and the public road should be paved with backfill to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains;	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Although use of bentonite in diaphragm wall and bore-pile construction is not expected, in case bentonite slurries is generated it should be reconditioned and reused as far as practicable. Spent bentonite should be kept in a separate slurry collection system for disposal at a marine spoil grounds subject to obtaining a marine dumping licence from EPD. If used bentonite slurry is to be disposed of through public drainage system, it should be treated to meet the respective applicable effluent standards for discharges into sewers, storm drains or the receiving waters.	Stormwater and Non-point Source Pollution Control	Contractors	At all construction areas of the site during the entire construction period	ProPECC PN1/94, WPCO, EIA, Contractual requirements
5.6.1	6.3.7	• Spillage of fuel oils or other polluting fluids should be prevented at	Stormwater and Non-point Source Pollution	Contractors	At all construction areas of the site	ProPECC PN1/94, WPCO, EIA,

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		source. It is recommended that all stocks should be stored inside proper containers and sited on sealed areas, preferably surrounded by bunds.	Control		during the entire construction period	Contractual requirements
During Operational Phase:						
5.6.2	6.3.8, 6.3.13	During the operation of the Project, all sewage generated shall be discharged to the public sewerage at Yau Pok Road as the Project will not have population intake until the commissioning of the planned local public sewerage works. The sewage generated by the club house and swimming pool in the Southern Portion as well as the food and beverage and public toilets in the Northern Portion of the Project Site is proposed to be discharged into the public sewerage system at Yau Pok Road. The discharge from these facilities shall apply for a discharge licence under the WPCO, and the discharge shall comply with the terms and conditions of a licence as well as the standards for effluents specified in the TM-Effluents.	Stormwater and Non-point Source Pollution Control	Project Proponent	During operation	EIA, WPCO, Contractual requirements
5.6.2	6.3.9	The proposed new drainage channels and pipes surrounding the Project Site shall collect surface runoff within the Site for direct discharge into the Ngau Tam Mei Drainage Channel and Fairview Park Nullah after passing through sand traps. The drainage outlet of the indoor car	Stormwater and Non-point Source Pollution Control	Project Proponent	During operation	EIA, WPCO, Contractual requirements

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		parks shall be connected to foul sewers via petrol interceptors or similar facilities				
5.6.2	6.3.10	Regular cleaning and sweeping of the access road and other paved areas are suggested so as to minimize exposure of pollutants to stormwater	Stormwater and Non-point Source Pollution Control	Project Proponent	During operation	EIA, WPCO, Contractual requirements
5.6.2	6.3.11	Stormwater gullies and ditches provided among the residential development will be regularly inspected to ensure these facilities function properly.	Stormwater and Non-point Source Pollution Control	Project Proponent	During operation	EIA, WPCO, Contractual requirements
5.6.2	6.3.12	Soft landscaping will be provided around the residential development where practicable. In the event of emergency (e.g. car accident) where there is a major spillage of oil, chemical or fuel, dispersants or fire fighting foam, etc., a system of contaminant bunding is recommended as far as practicable	Stormwater and Non-point Source Pollution Control	Project Proponent	During operation	EIA, WPCO, Contractual requirements
5.6.2.2	6.3.14	Water in the proposed landscape pond shall be self-contained with no outlet connecting to nearby channel/inland water. The concerned landscape pond will be water sealed so that there is no seepage of water into underground. During operation, pond water will be contained within the pond and there shall be no discharge from the pond. Surface runoff from the adjacent area shall be diverted away from the pond area by drainage channels in order to avoid overflow of the pond under extreme weather condition (e.g. heavy rainfall). There will be no chemicals/ pesticides to	Stormwater and Non-point Source Pollution Control	Project Proponent	During operation	EIA, WPCO, Contractual requirements

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		be applied during operation.				
Waste Management						
During Detailed Design:						
7.5	8.2.1	The demolition and construction work shall be considered in the planning and design stages to reduce the generation of C&D waste where possible. Landfill disposal shall only be considered as the last resort.	Waste management during construction	Project architect/ engineer, Project Proponent	During detailed design stage	EIA, Contractual requirements
7.5	8.2.2	Construction methods with minimum waste generation quantity and other environmental impacts shall be considered in the detailed design	Waste management during construction	Project architect/ engineer, Project Proponent	During detailed design stage	EIA, Contractual requirements
7.6	8.2.3	Refuse collection chambers (RCC) will be provided for the residential development as well as the passive recreational facilities in the Northern Portion of the Project Site. A licensed waste collector shall be employed to collect domestic waste on daily basis. In order to comply with Building Regulation, mechanical ventilation will be provided. The odour nuisance to the public can be minimized by incorporating the odour absorption system.	Waste management during construction	Project architect/ engineer, Project Proponent	During detailed design stage	EIA, Contractual requirements
During Construction Phase:						

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
7.4.4.	8.3.31	Chemical waste that could be generated from construction works would primarily arise from chemicals used in operation and maintenance of on-site equipment. These may include fuel, oil, lubricants, cleaning fluids, and solvents arising from leakage or maintenance of on-site equipment and vehicles. Chemical generated from daily operation of the construction works shall be recycled/ reused on-site as far as practicable	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal (Chemical Waste) (General) Regulation
7.4.4.	8.3.32	If off-site disposal of chemical waste is required, they should be collected and delivered by a licensed contractor, and disposed of strictly following the Waste Disposal (Chemical Waste) (General) Regulation	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal (Chemical Waste) (General) Regulation
7.4.4.	8.3.33	The contractors shall register with EPD as chemical waste producers when disposal of chemical waste is anticipated to be required	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal (Chemical Waste) (General) Regulation
7.4.4.	8.3.34	Chemical waste generated has to be stored in suitable containers and away from water bodies so that leakage or spillage is prevented during the handling, storage, and subsequent transportation	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal (Chemical Waste) (General) Regulation

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
7.4.4.	8.3.35	The Contractor shall prevent fuel and lubricating oil leakage from plant and storage sites from contaminating the construction site. All compounds in work areas shall be positioned on areas with hard paving and served by drainage facility. Sand/ silt traps and oil interceptors shall be provided at appropriate locations prior to the discharge points	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal (Chemical Waste) (General) Regulation
7.4.4.	8.3.36	Fossil fuel and used lubricants from trucks and machinery are classified as chemical waste. The Contractor shall register with EPD as a chemical waste producer and observe all the requirements under the storage, labelling, transportation and disposal of chemical waste	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal (Chemical Waste) (General) Regulation
7.4.4.	8.3.37	The Contractor shall prevent fuel and lubricating oil leakage from plant and storage sites from contaminating the construction site. All compounds in work areas shall be positioned on areas with hard paving and served by drainage facility. Sand/ silt traps and oil interceptors shall be provided at appropriate locations prior to the	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal (Chemical Waste) (General) Regulation

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		discharge points				
7.4.5	8.3.9	General refuse generated at the construction site should be stored separately from construction and chemical wastes to avoid cross contamination. A reliable waste collector shall be employed by the Contractor to remove general refuse from the construction site on a daily basis where appropriate to minimize the potential odour, pest and litter impacts	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal Ordinance, Air Pollution Control (Open Burning) Regulation
7.4.5	8.3.10	Open burning for the disposal of construction waste or the clearance of the Project Site in preparation for construction work is prohibited under the Air Pollution Control (Open Burning) Regulation	Waste management during construction	Contractors	At all construction areas of the site during the entire construction period	Waste Disposal Ordinance, Air Pollution Control (Open Burning) Regulation
7.5	8.3.11	To ensure the appropriate handling of the C&D materials, it is recommended that a Waste Management Plan (WMP) shall be developed by the contractor and incorporated in the Environmental Management Plan (EMP) in accordance with ETWB TCW No. 19/2005 – Environmental Management on Construction Sites at the commencement of the construction works.	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 “Trip Ticket System for Disposal of Construction and Demolition Material

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
7.5	8.3.12	The EMP shall be submitted to the Engineers' Representative (RE) and the Project Environmental Team Leader (ETL) for approval, and shall be implemented throughout the Project.	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.14	Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP shall be submitted to the Engineers' Representative (RE) and the Project Environmental Team Leader (ETL) for approval before commencement of construction, and shall be implemented throughout the Project. The EMP shall cover the followings and developed taking into account the recommended control measures given in this Chapter where appropriate:	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.14	• A waste management policy, organization chart, and responsibility	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.14	• An estimation on the location, type,	Waste management	ER, Project	Throughout the	WBTC 31/2004

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		nature, quality and quantity of different waste streams to be generated from the Project works, and the corresponding waste management methodology.	during construction	Proponent	entire construction period	"Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.14	• A method statement for demolition and transportation of the excavated materials and other construction wastes.	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.14	• Potential for recycling or reuse should be explored and opportunities taken if waste generation is unavoidable.	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.14	• Recommendations for appropriate disposal routes if waste cannot be recycled.	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
						Material
7.5	8.3.14	• A system to control the disposal of C&D materials and C&D waste to public fill reception facilities, sorting facilities and landfills respectively through a trip-ticket system in accordance with the ETWB TC(W) No. 31/2004.	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.15	• The Project Proponent/ RE will ensure that the day-to-day operations comply with the approved EMP. The Project Proponent/ RE shall require the contractor to separate public fill from C&D waste for disposal at appropriate facilities. In addition, the Project Proponent/ RE shall regularly audit Contractor(s)' records for the disposal, reuse and recycling of C&D materials for monitoring purposes	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.16	• Based on the above waste management recommendations, a detailed management and control plan shall be formulated during the detailed design stage. A good management and control can prevent the generation of significant amount of waste. On-site sorting of construction wastes will be recommended. Secondary on-site sorting can be achieved by avoiding the generation of "mixed waste"	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		through good site control. Construction wastes shall be sorted to remove contaminants, with the inert materials broken up into small pieces before being transported to Refuse Transfer Station (RTS) for subsequent delivery to landfill sites				
7.5	8.3.17	In addition, the contractor(s) shall be required to reuse inert C&D materials (e.g. excavated soil) or in other suitable construction sites as far as possible, in order to minimize the disposal of C&D materials to public fill reception facilities	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.18	The project proponent shall encourage the contractor to maximize the use of recycled or recyclable C&D materials, as well as the use of non-timber formwork to further minimize the generation of construction waste	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.38	Chemical and oily wastes generated from the construction activities, vehicle and plant maintenance and oil interceptors should be disposed of as chemical waste in strict compliance with the Waste Disposal (Chemical Waste) (General) Regulations	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
7.5	8.3.13	In formulating the EMP in respect to waste management, the following hierarchy should be considered: • Avoidance and minimization to reduce the potential quantity of C&D materials generated; • Reuse of materials as practical as possible; • Recovery and Recycling as practical as possible; and • Proper treatment and disposal in respect to relevant laws, guidelines and good practice.	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.19	The following additional control/ mitigation measures are recommended to be followed by the Contractor	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.19	• Storage of different waste types – different types of waste should be segregated and stored in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. An on-site temporary storage area equipped with required control measures (e.g. dust control) should	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		be provided;				
7.5	8.3.19	• Trip-ticket system – in order to monitor the proper disposal of non-inert C&D waste to landfills and to control fly-tipping, a trip-ticket system should be included as one of the contractual requirements and audited by the Environmental Team;	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.19	• Records of Wastes – a recording system should be proposed to record the amount of wastes generated, recycled and disposed of (including the location of disposal sites);	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.19	• Training – The contractor should provide his workers with proper training of appropriate waste management procedure to achieve waste reduction as far as practicable and cost-effective through recovery, reuse and recycling and avoid contamination of reusable C&D materials;	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for Disposal of Construction and Demolition Material
7.5	8.3.19	• Incorporate good practice in "Recommended Pollution Control Clauses for Construction Contracts" published by EPD in respect to	Waste management during construction	ER, Project Proponent	Throughout the entire construction period	WBTC 31/2004 "Trip Ticket System for

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		removal of waste material from the construction site into the contract of the contractor.				Disposal of Construction and Demolition Material
7.5	8.3.20 – 8.3.27	In additional to the above, the following construction waste pollution clauses shall be included in construction contracts:	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
7.5.1	8.3.20	• The Contractor shall submit to the Engineer for approval a waste management plan with appropriate mitigation measures including the allocation of an area for waste segregation and shall ensure that the day-to-day site operations comply with the approved waste management plan.	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
7.5.1	8.3.21	• The Contractor shall minimize the generation of waste from his work. Avoidance and minimisation of waste generation can be achieved through changing or improving design and practices, careful planning and good site management.	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
7.5.1	8.3.22	• The Contractor shall ensure that different types of wastes are segregated on-site and stored in different containers, skips or	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		stockpiles to facilitate reuse/recycling of waste and, as the last resort, disposal at different outlets as appropriate				ETWB TC(W) No. 19/2005.
7.5.1	8.3.23	• The reuse and recycling of waste shall be practised as far as possible. The recycled materials shall include paper/cardboard, timber and metal etc.	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
7.5.1	8.3.24	• The Contractor shall ensure that Construction and Demolition (C&D) materials are sorted into public fill (inert portion) and C&D waste (non-inert portion). The public fill which comprises soil, rock, concrete, brick, cement plaster/mortar, inert building debris, aggregates and asphalt shall be reused in earth filling, reclamation or site formation works. The C&D waste which comprises metal, timber, paper, glass, junk and general garbage shall be reused or recycled and, as the last resort, disposal of at landfills.	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
7.5.1	8.3.25	• The Contractor shall record the amount of wastes generated, recycled and disposed of (including the disposal sites)	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
7.5.1	8.3.26	• The Contractor shall implement a trip ticket system in accordance with the	Waste management	Contractor	Throughout the	Waste Disposal

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		ETWB TC(W) No. 31/2004 for public fill, C&D materials and C&D waste to public fill reception facilities, sorting facilities and landfills respectively	during construction		entire construction period	Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
7.5.1	8.3.27	• Training shall be provided for workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
7.5.2	8.3.28	• The Contractor shall not permit any sewage, wastewater or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Project Site onto any adjoining land or allow any waste matter [or refuse] which is not part of the final product from waste processing plants to be deposited anywhere within the Project Site [or onto any adjoining land]. He shall arrange removal of such matter from the Project Site [or any building erected or to be erected thereon] in a proper manner to the satisfaction of the Engineer in consultation with the Director of Environmental Protection	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
7.5.3	8.3.29	• The Contractor shall observe and comply with the Waste Disposal (Chemical Waste) (General) Regulation	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No.

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
						19/2005.
7.5.3	8.3.30	• The Contractor shall apply for registration as chemical waste producer under the Waste Disposal (Chemical Waste) (General) Regulation when chemical waste is produced. All chemical waste shall be properly stored, labelled, packaged and collected in accordance with the Regulation	Waste management during construction	Contractor	Throughout the entire construction period	Waste Disposal Ordinance, WBTC 31/2004, and ETWB TC(W) No. 19/2005.
During Operational Phase:						
7.6	8.4.1	Refuse collection chambers (RCC) will be provided for the residential development as well as the passive recreational facilities in the Northern Portion of the Project Site. A licensed waste collector shall be employed to collect domestic waste on daily basis. In order to comply with Building Regulation, mechanical ventilation will be provided. The odour nuisance to the public can be minimized by incorporating the odour absorption system.	Waste management during operation	Project Proponent	During operation	EIA, Waste Disposal Ordinance
7.6	8.4.2	separate collection bins for used aluminum cans, waste paper and plastic bottles should be provided at strategic locations within the residential development area and adjacent to the passive recreational facilities in order to promote and encourage recycling during the operational phase	Waste management during operation	Project Proponent	During operation	EIA, Waste Disposal Ordinance

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
Ecology						
During Construction Phase:						
8.8	10.1	In order to prevent noise and visual impact, the use of screening materials during the construction will be adopted. A site hoarding will be in place before the peak winter bird season between October and March to ensure that disturbance from the proposed development is minimized. The workers should also be briefed, before the commencement of the works, the sensitivity of the areas, and they should be requested not to disturb any areas nearby Furthermore, the site boundary should be clearly defined (i.e. fenced with the screening materials mentioned above) and any works beyond the boundary should be strictly prohibited.	To further mitigate construction noise impact.	The Contractor	Within the PS, during the construction phase.	EIA
8.8	10.1	Standard site practice during the construction phase shall be deployed, which will minimize the chance of site run-off and the chance of pollution to watercourses downstream.	To further mitigate construction noise impact.	The Contractor	Within the PS, during the construction phase.	EIA
8.9	10.1	Undertake baseline ecological monitoring prior to site clearance.	Update faunal usage of	Project Proponent	Four months prior to site clearance	EIA

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
			the site.		and construction.	
8.9	10.1	Undertake ecological monitoring	A precautionary measure and also to verify the accuracy of impact assessment and detect any unpredictable impact arising from the proposed development.	Project Proponent	Adjacent habitats of high ecological value including but not limited to the Ngau Tam Mei Drainage Channel and the adjacent agricultural land.	EIA
During Operational Phase:						
Nil	Nil	Nil	Nil	Nil	Nil	Nil
Fisheries						
During Construction Phase:						
9.7	10.5	With the measures for mitigating the impacts from construction activities (as described in **Table 14-1** of the submitted EIA report), indirect impacts during the construction phase would be insignificant.	To prevent runoff and other water quality impacts affecting surrounding watercourses and ponds downstream.	The Contractor	Within the PS, during the construction phase.	EIA
During Operational Phase:						
Nil	Nil	Nil	Nil	Nil	Nil	Nil
Cultural Heritage						
During Construction Phase:						
Nil	Nil	Nil	Nil	Nil	Nil	Nil

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
During Operational Phase:						
Nil	Nil	Nil	Nil	Nil	Nil	Nil
Landscape and Visual						
During Detailed Design						
11.10.2 to 11.11.1	9.2	The landscape and visual mitigation measures listed in **Tables 11-5A**, **11-5B**, **11-7A** and **11-7B** of the EIA shall 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.	Avoid impacts on adjacent landscape and visual.	Project architect and Project Proponent	During detailed design stage	EIA
During Construction Phase:						
11.10.2 and 11.11.1	9.2	Mitigation measures including strategies for reducing, offsetting and compensating for impacts have been designed into the Project, to be implemented during construction and operation phases, and are also included in **Tables 11-5A**, **11-5B**, (landscape mitigation measure) and Table **11-7A** and **11-7B** of the EIA report as followings:	Avoid landscape and visual impacts	Project Proponent (via Contractor)	At all construction areas of the site during the entire construction period.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM
11.10.2	9.2	**CM1- Proper protection of existing trees designated to be retained in-situ** Existing trees designated to be retained in-situ will be properly protected. This may include the clear demarcation and fencing-off of tree protection zones, tight site supervision and monitoring to prevent	Avoid impacts on adjacent existing trees.	Project Proponent (via Contractor)	At boundary of the site during the entire construction period. CM1 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM ETWB TC 3/2006 LAO GN 7/2007

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		tree damage by construction activities, and periodic arboricultural inspection and maintenance to uphold tree health. A total of 60 nos. of trees will be retained in-situ.				
11. 10.2	9.2	**CM2 - 'One-go' Tree Transplanting within Site** Affected existing trees designated to be transplanted will be transplanted 'one-go' within the Site instead of typically to an offsite holding nursery. The transplanted trees will provide some instant greenery during construction. In total, 8 nos. of trees will be transplanted.	Avoid impacts on trees.	Project Proponent (via Contractor)	Within boundary of the site during the entire construction period. CM2 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM ETWB TC 3/2006 LAO GN 7/2007
11. 10.2	9.2	**CM3 - Innovative Construction Method of Pond Expansion** Existing abandoned pond (approx. 0.5ha) with pond edge (approx. 0.2ha) will be slightly expanded and enhanced into a larger landscape pond (0.6ha pond and 0.3ha pond edge). Conventional method of pond expansion by excavating at the existing pond edge will substantially pollute the existing pond. An innovative design and construction method will be employed in this project: *(1) excavating a new pond at a slightly higher elevation adjacent to the existing pond without breaking the existing pond edge, (2) suitably prepare the surface of the new pond bottom, (3) fill the new pond with water and let it stabilized for several*	Avoid impacts on adjacent water bodies	Project Proponent (via Contractor)	At boundary of the site during the entire construction period. CM3 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		weeks, (4) connect the recirculation system to the existing pond, (5) create a gentle water cascade between the existing pond and the new pond by increasing the new pond water level to flood over and water will be circulated between these two ponds. As a result, two ponds functionally and aesthetically appear as one will be created. (The gentle water cascade will also provide aeration to ensure water quality and details of the construction method of pond will be subject to detailed design).				
11. 10.2	9.2	**CM4 - Early Commencement & Completion of the Recreational Ground** The proposed basements and houses in the southern portion of the site will require an extensive construction period while the proposed works in the recreational ground in the northern portion of the site is relatively simpler. Upon possession of the site, the proposed works in the recreational ground will be fast-tracked. It is expected that the recreational ground will be properly vegetated within a short period, offsetting the negative impact arising from the construction works in the rest of the Project Site. Approximately 200 nos. of heavy-standard to semi-mature size trees will be planted in the recreational ground. Moreover, there will	Avoid impacts on trees.	Project Proponent (via Contractor)	Within boundary of the site during the entire construction period. CM4 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM ETWB TC 3/2006 LAO GN 7/2007

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		be around 2 ha of lawn area.				
11. 11.1	9.2	**CM5** - Height of temporary noise barriers along boundary facing Bethel High School and some residences in Fairview Park be to minimum required. Barrier finishes be sensitively selecting and designing to reduce visual impact. Materials to be opaque and non-reflective material with colour blending in with the environment to minimize visual impact and to avoid bird strike..	Minimise visual impacts of works area.	Project Proponent (via Contractor)	At boundary of the site during the entire construction period. CM5 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM
11. 11.1	9.2	**CM6** - Advance screen planting of fast growing tree and shrub species to noise barriers and hoardings. Trees shall be capable of reaching a height >10m within 10 years.	Minimise visual impacts of works area.	Project Proponent (via Contractor)	At boundary of the site during the entire construction period. CM6 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM ETWB TC 3/2006 LAO GN 7/2007
11. 11.1	9.2	**CM7** - Control night-time lighting by hooding all lights.	Minimise night-time visual impacts.	Project Proponent (via Contractor)	At all construction areas of the site during the entire construction period. CM8 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM
11. 11.1	9.2	**CM8** - Reduction of construction period to practical minimum.	Minimise duration of landscape and visual impacts.	Project Proponent (via Contractor)	At all construction areas of the site during the entire construction period. CM9 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM
During Operational Phase:						

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
11. 10.2	9.2	**OM1 - Maximizing Tree Preservation Effort** Healthy existing trees that are not affected by the proposed development will be retained in-situ. Affected existing trees that are of high to medium amenity value and high to medium survival rate after transplanting will be transplanted.	Enhance landscape and visual resources of the site.	Project Proponent	Whole site, implemented at beginning of construction and maintained throughout operation period. OM1 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM ETWB TC 3/2006 LAO GN 7/2007
11. 10.2	9.2	**OM2 – Provision of New Trees** Compensatory tree planting shall be provided for soft landscape in the proposed development. The tree compensation to tree loss ratio shall be at least 1:1 in term of quantity and quality within the Project Site. Furthermore, a continuous belt of landscape planting, featuring trees and shrubs, will be provided along the boundary of the development.	Compensate for loss of existing trees.	Project Proponent	Site boundary, implemented at early stage of operation period and maintained throughout operation period. OM2 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM ETWB TC 3/2006 LAO GN 7/2007
11. 10.2	9.2	**OM3 – Suitable Design for Recreational Ground** The landscape design for the recreational area in the northern portion of the Site will adopt a rural, naturalistic approach with vast open space to match the original landscape character. Emphasis will be placed on a balanced approach between trees and grass/herbs. Use of native species will be the planting design theme. Natural materials, such as timbers, will be	Minimise visual impact of the Project and enhance landscape and visual resources of the site	Project Proponent	Site boundary, implemented at early stage of operation period and maintained throughout operation period. OM3 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM ETWB TC 3/2006 LAO GN 7/2007

EIA Ref.	EM&A Manual Ref.	Recommended Environmental Protection Measures/ Mitigation Measures	Objectives of the recommended measures & main concerns to address	Who to implement the measures?	Location / Timing of implementation of Measures	What requirements or standards for the measures to achieve?
		mostly used for landscape hardworks.				
11. 11.1	9.2	**OM4** - Use appropriate (visually unobtrusive and non-reflective) building materials and colours in built structures.	Minimise visual impact of the Project.	Project Proponent	Whole site, during detailed design. OM5 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM HKPSG
11. 11.1	9.2	**OM5** - Streetscape elements (e.g. paving, signage, street furniture, lighting etc.) sensitively designed in a manner that responds to the local context, and minimises potential negative landscape and visual impacts. Lighting units to be directional and minimising unnecessary light spill.	Minimise visual impact of the Project, including night-time impacts.	Project Proponent	Whole site, implemented during detailed design. OM6 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM HKPSG
11.11.1	9.2	**OM6 – Suitable Design and Landscape Treatment of Noise Barrier and Along Boundary** Height of permanent noise barriers along boundary be to minimum required. Barrier finishes be sensitively selecting and designing to reduce visual impact. Materials to be opaque and non-reflective material with colour blending in with the environment to minimize visual impact and to avoid bird strike. Screen tree, shrub and climber planting to be provided in front of permanent noise barrier to minimise visual intrusion.	Minimise visual impact of the Project .	Project Proponent	Site boundary, implemented at early stage of operation period and maintained throughout operation period. OM6 in **Figures 11-16** to **11-18**.	EIAO & Annex 10, 11, 18, 20 and 21 of EIAO-TM HKPSG

15. CONCLUSIONS

15.1 Air Quality

Through proper implementation of dust control measures required under the applicable regulations and good site practices, construction dust impacts can be controlled to acceptable level.

Practical mitigation measures have already been proposed for this Project to alleviate potential impacts during construction. The concerned site formation works will only be short-term and potential air quality impacts have been reduced to a minimal through recommended mitigation measures and can comply with the relevant air quality criteria/ AQOs. Thus, no adverse impact is anticipated. As a result, there is no residual impact.

There will be no unacceptable operational phase impacts due to this Project.

15.2 Noise

With the implementation of noise mitigation measures, construction noise levels at the NSRs can comply with the noise standard.

Compliance with the noise standard during the operational phase is predicted with the implementation of precautionary measures in the design.

15.3 Water Quality

The water quality assessment in the EIA indicated that with proper implementation of the recommended environmental mitigation measures, no adverse impacts on water quality would be expected from the construction and operational phase of the Project. Adverse residual impact is not anticipated during the construction or operation of the Project.

15.4 Sewerage and Sewage Treatment

The future public sewerage and pumping stations have adequate spare capacity for conveying the overall sewage generated (including the additional sewage from the Project Site). It is concluded that no adverse sewerage impact due to the development is anticipated.

15.5 Waste Management

With the implementation of recommended measures, no waste related regulatory non-compliance and unacceptable environmental impacts are expected to arise during the construction phase.

Opportunities for reduction in waste generation through recovery, reuse or recycling are also identified.

15.6 Ecology

No major ecological impacts are expected of the current project. Although some habitats would be directly affected, they are of “very low” to “low to moderate” ecological value to

wildlife based on survey findings and direct impacts due to habitat loss from the proposed development are predicted to be insignifanct. Erection of site hoarding prior to the peak winter bird season between October and March as well as screening and phasing of construction activities as mitigation measures for noise, air and other environmental aspects would be applied to ensure that no adverse impact would be resulted. Standard practices to control site runoff and other construction phase impacts will also be implemented. The temporary and permanent noise barrier will include design elements to minimize bird collision potential such as by use of non-reflective and non-transparent materials and shrub planting. With these, no further mitigation measures during construction phase are necessary. No mitigation measure during operation is required.

15.7 Fisheries

No active fish pond would be directly impacted due to this project. Indirect impacts during construction and operation phases would also be insignificant given that appropriate mitigation measures (as described in **Table 14-1** of the submitted EIA report) are implemented. Therefore, no significant fisheries impact is anticipated.

15.8 Cultural Heritage

Cultural heritage resources within Assessment Area have been reviewed through literature review and field surveys. From the surveys and examination of records it has been identified that a temple built in the 1980s is located at Chuk Yuen Tsuen. Other than that no archaeological potential, declared or deemed monuments or graded historical buildings or other cultural elements such as fung shui pond are located within the Project Site and Assessment Area. Potential indirect impacts due to vibration and temporary visual impacts are not anticipated during construction phase given the distance (>300m) between a temple at Chuk Yuen Tsuen and the Project Site. Therefore, it is concluded that there is no anticipated effect on cultural heritage resources as a result of this Project.

15.9 Landscape and Visual

Overall, it is considered that, in the terms of Annex 10, Clause 1.1(c) of the EIAO-TM, the landscape and visual impacts are acceptable with mitigation measures: "*there will be some adverse effects, but these can be eliminated, reduced or offset to a large extent by specific measures*". There will in fact be a ***Slight Beneficial*** impact to the landscape resources within the Project Site itself, once operational and when proposed landscape planting has had time to mature. The overall conclusion is therefore that the landscape and visual impacts are **Acceptable** with the implementation of proposed landscape measures.