8 IMPACT ON LANDSCAPE AND VISUAL

8.1 General

The methodology for undertaking the landscape and visual impact assessment is in accordance with Annexes 10 and 18 of the Technical Memorandum to the Environmental Impact Assessment Ordinance (EIAO). The assessment will be completed in accordance with the requirements stipulated in the EIA Study Brief.

Landscape impact assessment shall assess the source and magnitude of developmental effects on the existing landscape resources, character and quality in the context of the site and its environs; and visual impact assessment shall assess the source and magnitude of effects caused by the proposed development on the existing views, visual amenity, character and quality of views to the visually sensitive receptors within the context of the site and its environs. **Figure 8.1** shows the aerial photo within study boundary.

The significant thresholds for the landscape and visual impacts are assessed for the construction and operation phases both with and without mitigation measures.

These residual impacts are then evaluated in accordance with Annex 10 of the Technical Memorandum to the EIAO. In order to illustrate these landscape and visual impacts and to demonstrate the effectiveness of the proposed landscape and visual mitigation measures, photomontages (**Figures 8.5 to 8.11**) at selected representative viewpoints have been prepared to illustrate:

- existing baseline condition
- unmitigated impacts (day 1)
- mitigated impacts (day 1)
- mitigated impacts (year 10)

8.2 Environmental Legislation & Standards

Other relevant documents consulted in preparation of the LVIA include:

EIAO Guidance

- EIAO Guidance Notes 8/2002 on Preparation of Landscape and Visual Impact Assessment under the EIAO;

ETWB Technical Circulars

- ETWB TC(W) No. 3/2006 on Tree Preservation;
- ETWB TC(W) No. 10/2005 on Planting on Footbridges and Flyovers;
- ETWB TC(W) No. 36/2004 on The Advisory Committee on the Appearance of Bridges and Associated Structures (ACABAS);
- ETWB TC(W) No. 29/2004 on Registration of Old and Valuable Trees, and Guidelines for their Preservation;
- ETWB TC(W) No. 11/2004 on Cyber Manual for Greening;
- ETWB TC(W) No. 2/2004 on Maintenance of Vegetation and Hard Landscape Features;
- ETWB TC(W) No. 34/2003 on Community Involvement in Greening Works;

WBTC

- WBTC No. 7/2002 on Tree Planting in Public Works;

- WBTC No. 17/2000 Improvement to the Appearance of Slope;
- WBTC No. 25/1993 Control of Visual Impact of Slope;
- WBTC No. 25/1992 Allocation of Space for Urban Street Trees;

Highways Department Technical Circulars

- HyD TC No. 7/2006 on Independent Vetting of Tree Works under the Maintenance of Highways Department;
- HyD TC No. 10/2001 on Visibility of Directional Signs;
- HyD TC No. 5/2000 on Control in the Use of Shotcrete (Sprayed Concrete) in Slope Works;

GEO Guidelines

- GEO Publication No. 1/2000 on Technical Guidelines on Landscape Treatment and Bio-Engineering for Man-made Slope and Retaining Walls;

Planning Department Study and Guidelines

- Study of Landscape Value Mapping of Hong Kong, Planning Department of HKSAR; and
- Hong Kong Planning Standards and Guidelines (HKPSG).

8.3 Baseline Study Methodology

8.3.1 Landscape Baseline Study Methodology

In accordance with the EIA Study Brief, a baseline survey of the existing landscape character areas (LCAs) and landscape resources (LRs) within 500m from the proposed development will be undertaken by a combination of site inspections and desktop surveys. Planned developments for both within the study area and adjacent to it are also considered.

The baseline survey will form the basis of the landscape context by describing broadly homogenous units of similar character. Environmental capital approach is adopted to classify the landscape into distinct LCAs based on distinct patterns or combinations of landscape resources/ elements that occur consistently in a particular landscape. “Study of Landscape Value Mapping of Hong Kong” and “Map of Land Utilization in Hong Kong” by Planning Department would also be considered for the identification of LCAs and LRs. The landscape elements considered include:

- Local topography;
- Woodland and other vegetation types;
- Built form, land use and patterns of settlement;
- Scenic spots;
- Details of local materials;
- Natural coastline;
- Prominent watercourses; and
- Cultural and religious identity, including *fung shui* features.

8.3.1.1 Sensitivity of LCA and LR

The individual landscape character areas (LCAs) / landscape resources (LRs) are described qualitatively and quantitatively. Their sensitivities are then evaluated and rated as low, medium or high based on the following factors:

- Quality, condition and value of landscape character/ resources;
- Importance and rarity of special landscape resources;
- Ability of the landscape to accommodate change without compromising its essential nature;
- Significance of the change in local and regional context; and
- Maturity of the landscape.

The rating of the sensitivity of the LCAs / LRs is assessed as follows:

High	Important components of a landscape of particularly distinctive character susceptible to relatively small changes.
Medium	A landscape of moderately valued characteristics reasonable tolerant to change.
Low	Relatively unimportant landscape able to absorb significant change.

8.3.1.2 Magnitude of Change of LCA and LR

Some common factors that are considered in deriving the magnitude of change in assessing landscape impacts are as follows:

- Compatibility of the project with the surrounding landscape;
- Duration of impacts under construction and operation phases;
- Scale of development; and
- Reversibility of change.

The rating of the magnitude of change of the LCAs / LRs is assessed based on the above criteria as follows:

Large	LCA or LR will suffer a large change by the development.
Intermediate	LCA or LR will suffer a moderate change by the development.
Small	LCA or LR will suffer a perceptible change by the development.
Negligible	LCA or LR will suffer no discernible change by the development.

8.3.1.3 Impact Significance Threshold before Mitigation

The assessment of potential landscape impacts during construction and operation phases with or without the development is created by synthesizing the “Sensitivity to Change” and “Magnitude of Change” for the identified LCAs and LRs according to the Matrix of Impact Significance Threshold before Mitigation in Section 8.3.3.

8.3.2 Visual Baseline Study Methodology

The baseline survey of views towards the proposed development will be carried out by identifying:

The visual envelope (zone of visual influence) is, according to EIAO GN No. 8/2002, generally the viewshed formed by natural/man-made features such as ridgeline or building blocks. The visual envelope may contain areas, which are fully visible, partly visible and non-visible from the proposed development. The visual envelope of the project is presented

on relevant plans. The visually sensitive receivers (VSRs) are those within the visual envelope whose views will be affected by the development.

8.3.2.1 Sensitivity of VSRs

The baseline survey describes and records by taking photographs at typical views and its character and value from within visual envelopes for low-level viewpoints (street level) and high-level viewpoints (hillside vantage points). Both present and future VSRs are considered. Criteria for Ranking Sensitivity of VSRs are:

- Type of representative receiver population;
- Value and quality of existing views;
- Estimated number of representative receiver population;
- Availability and amenity of alternative views;
- Duration or frequency of views; and
- Degree of visibility.

The rating of the sensitivity of the VSRs is assessed as follows:

High	Important components of a VSR of particularly distinctive character susceptible to relatively small changes.
Medium	A VSR of moderately valued characteristics reasonable tolerant to change.
Low	A relatively unimportant VSR able to absorb significant change.

8.3.2.2 Magnitude of Change of VSR

Some common factors that are considered in deriving the magnitude of change in assessing visual impacts are as follows:

- Compatibility of the project with the surrounding landscape;
- Duration of impacts under construction and operation phases;
- Scale of development;
- Reversibility of change;
- Viewing distance; and
- Potential blockage of view.

The rating of the magnitude of change of the VSRs is assessed based on the above criteria as follows:

Large	VSR will suffer a large change in their views.
Intermediate	VSR will suffer a moderate change in their views.
Small	VSR will suffer a small change in their views.
Negligible	VSR will suffer no discernible change in their views.

8.3.2.3 Impact Significance Threshold before Mitigation

The assessment of potential landscape impacts during construction and operation phases with or without the development is created by synthesizing the “Sensitivity” and “Magnitude of Change” for the identified VSRs according to the Matrix of Impact Significance Threshold before Mitigation in Section 8.3.3.

8.3.3 Degree of Impact Significance Threshold before Mitigation

The degree of significance is categorized into four thresholds depending on the combination below:

Significant	Adverse / beneficial impact where the development would cause significant deterioration or improvement in the existing landscape / visual quality.
Moderate	Adverse / beneficial impact where the development would cause noticeable deterioration or improvement in the existing landscape / visual quality.
Slight	Adverse / beneficial impact where the development would cause barely perceptible deterioration or improvement in the existing landscape / visual quality.
Negligible	No discernible change in the existing landscape / visual quality.

Matrix for Impact Significance Threshold before Mitigation – Combination and Relationship between Sensitivity and Magnitude of Change

Magnitude of Change caused by development	**Large**	*Moderate*	*Moderate / Significant*	*Significant*
	Intermediate	*Slight / Moderate*	*Moderate*	*Moderate / Significant*
	Small	*Slight*	*Slight / Moderate*	*Moderate*
	Negligible	*Negligible*	*Negligible*	*Negligible*
		Low	**Medium**	**High**
		Sensitivity of Receivers		

8.4 Residual Impacts Assessment Methodology

Residual impacts are those impacts remaining after the proposed mitigation measures have been implemented. This is often 10 to 15 years after commissioning, when the planting mitigation measures are deemed to have reached a level of maturity, which allow them to perform their original design objectives.

The level of impact is derived from the magnitude of change which the development will cause to the existing view or landscape character and its ability to tolerate change, i.e. the quality and sensitivity of the view or landscape character taking into account the beneficial effects of the proposed mitigation measures. The significance threshold is derived from the matrix shown in Section 8.3.3.

The residual landscape impacts (with mitigation) for each LCA/LR and the residual visual impacts (with mitigation) for each VSR are presented in Table 8.10 of Section 8.8.4 and Table 8.14 of Section 8.9.4.

8.4.1 Photomontage Illustration for Selected Views

Representative views from VSRs are selected to illustrate the effectiveness of the proposed impact mitigation proposal and residual impacts of the development in both short and long term. Photomontages (**Figures 8.5 to 8.11**) of selected views are furnished for:

- Existing baseline condition (Day 1 of Construction and Operation phases)
- Development without mitigation (Day 1 of Restoration and Aftercare Phases)
- Development with mitigation (Day 1 of Restoration and Aftercare Phases)
- Development with mitigation (10 years of Restoration and Aftercare Phases)

8.4.2 Overall Result of Assessment

In accordance with Annex 10 of the EIAO TM, an overall assessment is also made of the residual landscape and visual impacts for the proposed development as follows:

Beneficial	Acceptable	Acceptable with mitigation measures	Unacceptable	Undetermined
If the project will complement the landscape and visual character of its setting, will follow the relevant planning objectives and will improve overall and visual quality.	If the assessment indicates that there will be no significant effects on the landscape, no significant visual effects caused by the appearance of the project, or no interference with key views.	If there will be some adverse effects, but these can be eliminated, reduced or offset to a large extent by specific measures.	If the adverse effects are considered too excessive and are unable to mitigate practically.	If significant adverse effects are likely, but the extent to which they may occur or may be mitigated cannot be determined from the study. Further detailed study will be required for the specific effects in question.

8.5 Baseline Condition

8.5.1 Identification of LCAs and LRs

Lists of the baseline condition of LCAs and LRs are proposed in the following tables, together with **Figure 8.2 and Figure 8.3** respectively.

Table 8.1 LCAs which are affected by the project and within 500m from the project

	Landscape Characters Areas (LCAs)	Quantity (Ha) (Within Project Site)	Description
LCA1	Landfill Landscape (Existing WENT Landfill Site)	84.04	• Comprises mainly the existing WENT landfill site under operation. • The landscape character is of typical degraded land made up of landfill site, together with their associated access haul roads, artificial cut and fill slopes, modified surface drainage system, waste reception area and leachate treatment system. • It is ready to absorb significant change. • The proposed extension is of the same nature and is considered compatible in terms of land use and landscape character.
LCA2	Inter-tidal Coast Landscape (Deep Bay)	149.26	• Lies between the high and low water tide levels at the coastal line of Deep Bay and Nim Wan. • This area is an open and expansive coastal landscape with mud flats, areas of salt marsh, mangrove and gei wai. • It is characterized by a certain simplicity, tranquillity and sense of remoteness.
LCA3	Industrial Urban Landscape (Black Point Power Station and Tsang Tsui Ash Lagoons)	127.43	• Lies on low-lying areas of reclaimed land (Tsang Tsui Ash Lagoons and Black Point Power Station) of the coastal line of Deep Bay. • Comprises industrial buildings with areas of vacant land at the same time. • It is characterized as large utilitarian buildings, limited coherence of spaces and features, and absence of significant vegetation cover.
LCA4	Upland and Hillside Landscape (Tsing Shan)	225.16	• Natural steep hillside slope covered by vegetation. • Comprises hillsides, knolls, ridges and spurs with rocky outcrops or boulder fields. • There are woodland areas on the lower slopes.
LCA5	Settled Valley Landscape (Tsang Tsui)	56.69	• The valley possesses a distinct valley floor with thickly woodland areas. • The valley floor contains abandoned agricultural lands. • The agricultural fields contain open storage or village houses. • The landscape presents a sense of enclosure.
LCA6	Coastal Upland and	48.22	• It is a large-scale upland and hillside landscape area adjacent to

	Landscape Characters Areas (LCAs)	Quantity (Ha) (Within Project Site)	Description
	Hillside Landscape (Lan Kok Tsui)		Urmston Road waterfront. • It contains hillsides, knolls, ridges and spurs covered by low scrub or grassland with rocky outcrops or boulder fields. • It also possesses a distinct remote and exposed character and provides views along the coastal line of Urmston Road waterfront.

Table 8.2 LRs which are affected by the project and within 500m from the project

	Landscape Resources (LRs)	Quantity (Ha) (Within Project Site/ Within Study Area)	Description
LR1	Built-up Land	62.96	• Built-up land area refers to the site of Tsang Tsui Ash Lagoons providing a dump site. • This site provides a temporary storage site for ash generated from the adjacent power plant. • Large shrubs and small trees – e.g. *Macaranga tanarius* are found at the edge of lagoon and seawalls. • Some portions of lagoon become marshy with water ponds and grasses.
LR2	Public Utilities	35.43	• Public utilities area refers to the site of Black Point Power Station containing buildings, access roads and open storage areas. • No amenity landscape is found.
LR3	Seawater	149.26	• Seawater area refers to the scenic coastal water facing Deep Bay. • This area covers the waterfront along existing WENT Landfill site, Tsang Tsui Ash Lagoon and Black Point Power Station.
LR4	Mangrove and Swamp	6.69	• Mangroves and swamps are found at some locations of the tidal streams where sediments have been stored there. • It forms the mixture of small mangrove plants and creepers.
LR5	Shrubland	96.85	• Shrubland areas appear at barren hillside areas of the study area. • Occasionally, small pioneer trees like *Macaranga tanarius* and *Leucaena leucocephala* are found.
LR6	Badland	50.51	• Badland area refers to the portion of hillside lands without vegetation cover. • Instead, bare outcrop or rocky surfaces are found there.
LR7	Agricultural	3.03	• There are some scattered village houses with nursery and agricultural site. • The small houses are for storage purpose.
LR8	Grassland	208.29	• Large portion of grassland covers the hillside lands within the study area. • Grassland areas are located at steeper slopes forming a sense of remoteness.
LR9	Government, Institution & Community Facilities (GIC)	0.79	• The area refers to the reception area of existing WENT Landfill site. • It contains site office buildings, entrance and so on.
LR10	Landfill (Construction in progress)	73.02	• The area refers to the existing WENT Landfill site containing industrial nature lands, construction plants and equipment, smells and so on.
LR11	Roads	Not applicable	• Nim Wan Road, Yung Long Road and Lung Kwu Tan Road form the road areas of the study area. • There is simple roadside planting adjacent to roads.
LR12	Woodland	4.03	• The area refers to woodland located along the tidal creek of stream A, at the foothill behind the Tang Clan grave site and at the edge of the east Tsang Tsui Ash Lagoon. • There are common nature trees, eg. Macaranga tanairus, Ficus microcarpa etc.
LR13	Stream	Not applicable	• The area refers to Tsang Kok Stream and Stream A linking to Tsang Tsui Ash Lagoons, and Stream B on Castle Peak adjacent to Nim Wan Road. The extent of these streams is also shown in **Figure 10.2** of Habitat Map and Species of Conservation Interest of ecological impact assessment is

	Landscape Resources (LRs)	Quantity (Ha) (Within Project Site/ Within Study Area)	Description
			detailed in Section 10.

8.5.2 Identification of VSRs

The existing views of the Project site affected mainly comprise the following visual elements:

- View of the existing WENT Landfill site and its associated buildings
- Typical upland landscape view (Castle Peak and Yuen Tau Shan)
- Typical traffic views (marine traffic, vehicular)
- Typical industrial view (Black Point Power Station)
- Typical residential view (village houses at Ha Pak Nai and Lung Kwu Tan)

The detailed description of these visual elements is shown in Table 8.3. The details and locations of VSRs are shown in Table 8.4 and **Figure 8.4** respectively.

Table 8.3 Description of general views

Visual Elements	Description
View of the existing WENT Landfill site and its associated buildings	• Comprises mainly the existing WENT landfill site under operation. • The view to it is of typical degraded land made up of landfill site, together with their associated access haul roads, artificial cut and fill slopes, modified surface drainage system, waste reception area and leachate treatment system. • The visual quality and value is medium.
Typical upland landscape view (Castle Peak and Yuen Tau Shan)	• Natural steep hillside slope covered by mainly grassland and shrubland. • The affected area is the northern part of Castle Peak. • The visual quality and value is medium.
Typical traffic views (marine traffic, vehicular)	• Typical views at Deep Bay and at Nim Wan Road. • The visual quality and value is medium.
Typical industrial view (Black Point Power Station)	• Typical views of workers and staff of Black Point Power Station. • The visual quality and value is medium.
Typical residential views	• Typical views of residents of Ha Pak Nai and Lung Kwu Tan. • The visual quality and value is medium.

Table 8.4 VSRs identified within the visual envelope

	VSR	Type of VSRs	Number of VSRs	Minimum Viewing Distance (km)	Description
VSR1	Black Point Power Station	Users / staff	Medium	0.1	• It is an infrastructure facility with no residents
VSR2	Existing WENT Landfill Site	Users / staff	Medium	0.1	• A glimpse to the Project site through a saddle located along a ridgeline to the north of the site. • The Project site will be seen between the natural ridge lines.
VSR3	Castle Peak	Hikers	Low	Within the site	• The Project site will be seen. • Very few hikers existed.
VSR4	Marine Traffic	Passengers	Medium	1.0 (typical)	• Partial view of the Project Site. • The project site is only partially visual prominent
VSR5	Nim Wan Road	Road users	Medium	0.4	• Similar to the view from VSR2 with a much longer viewing distance. • The Project site is less visual dominant
VSR6	Ha Pak Nai	Residents	Medium	1.6	• It is a village with residents at the eastern side of

	VSR	Type of VSRs	Number of VSRs	Minimum Viewing Distance (km)	Description
					the Project site.
VSR7 *	Lung Kwu Tan	Residents	Medium	0.4	• It is a village with residents at the southern side of the Project site.

Note: * VSR7 is outside the visual envelop so that it is not visible to the WENT Landfill Extension.

8.5.3 Source of Landscape and Visual Impacts

In normal situation, the nature of a landfill development is that formation works will be carried out at the same time as landfill operations in previously prepared areas. There are two main combined phases of the proposed development, which are "Construction & Operation Phases" and "Restoration & Aftercare Phases".

During the construction & operation phases of the WENT Landfill Extension, the construction works and operation works overlap with each other. After the completion of Construction & Operation Phases, Restoration & Aftercare Phases will be executed.

As a reference, the existing WENT Landfill is estimated to have a construction and operation phases of 20 years, depending on waste generation trends. To avoid discontinuous waste reception, it is expected that WENT Landfill Extension will be ready for use when the capacity of existing WENT Landfill is about to be reached.

The main sources of landscape and visual impact of the Project come from the construction & operation phases of WENT Landfill Extension. The construction & operation phases primarily involve large-scale excavation of soil, change in topography, construction of vehicular road access, operation of large vehicles and machineries and construction of any associated waste management ancillary facilities over a long period of time.

The daily operation of a landfill site is to spread and compact the waste after loading from vehicles by waste moving equipment. The waste is normally covered by another layer of waste or by a temporary cover soil of about 0.15m thick and compacted by compactors to maximize the landfill capacity.

A significant element of a landfill operation is the formation of a spoil mound where the excess arising from the excavation of the main landfill bowl are stored. This area is referred to as the Stockpile/ Borrow Area (SBA), and contains the spoil that will ultimately be returned to the landfill as daily cover, formation of haul roads and intermediate/ final capping. The stockpile is normally constructed abutting against the natural hillside. The SBA is normally constructed in a number of phases to match the programme of landfill earthworks.

These sources of impact will cause either change or loss of the LCAs and LRs. Landscape impact assessments are carried out in accordance with the format illustrated in Table 8.9 of Section 8.8.3 for each LCA and LR. Visual impact assessments are carried out in accordance with the format illustrated in Table 8.13 of Section 8.9.3 for each VSR.

After the capacity of a landfill is reached, the site will enter the Restoration & Aftercare Phases. Relatively, the restoration phase is much shorter than the aftercare phase. Restoration works include final cap construction, landscaping and treatment works within the site to restore the site to suit its designated afteruse. Aftercare phase works will start after the restoration phase works. The impact in these two phases will be assessed together.

The Restoration & Aftercare Phases could be considered as the mitigation measures of the proposed development. Most of the mitigation measures proposed during the construction and operation phases are temporary and limited. All the permanent and effective mitigation measures for the proposed development are implemented in the restoration and aftercare

phases. The aftercare phase mainly involves on-going monitoring of the environmental indicators, and carry out all necessary actions to prevent pollution of the environment and harm to human health.

It is envisaged that the WENT Landfill Extension will be restored to blend with the restored environment of the existing WENT Landfill, and that both should blend with the surrounding natural landscape. The restored landfill is intended for low intensity recreational use. Therefore, the landscape and visual impact during restoration and afteruse phases are considered minimum. The sources of impacts under Construction & Operation Phases and Restoration & Aftercare Phases are summarized in the below table:

Table 8.5 Sources of Impacts in Construction & Operation and Restoration & Afteruse Phases

Code	Sources of Impacts during Construction & Operation Phases
S1	• Large-scale excavation of soil, change in topography, construction of vehicular road access, operation of large vehicles and machineries, and erection of any associated waste management ancillary facilities during construction phase mainly. This source of impact will happen and complete phase by phase in between construction phase and operation phase.
S2	• Spread and compact the waste after loading from vehicles by waste moving equipment. • Formation of a spoil mound where the excess arising from the excavation of the main landfill bowl are stored to the Stockpile/ Borrow Area (SBA). • Spoil that will ultimately be returned to the landfill as daily cover, formation of haul roads and intermediate/ final capping. • The sources of impact for the above construction activities will happen and complete phase by phase in between construction phase and operation phase.
Code	**Source of Impacts during Restoration & Aftercare Phases**
S3	• Restoration works include final cap construction, landscaping and treatment works within the site to restore the site to suit its designated afteruse. • The sources of impact for restoration works, e.g. Landscape and rehabilitation works, will happen and complete phase by phase in between restoration phase and aftercare phase.

Note: **Figure 2.6** - Site Formation Phasing Plan shows the distribution of six phases of landfills, Nim Wan Road realignment and associated slope works, and infrastructure (waste reception area, leachate treatment plant etc).

8.5.4 Preliminary Tree Assessment

Tree surveys are conducted in 2008 and 2009. Reference has been made to the latest technical circulars related to tree preservation:

- ETWB TC(W) No. 3/2006 on Tree Preservation
- ETWB TC(W) No. 2/2004 on Maintenance of Vegetation and Hard Landscape Features.
- ETWB TC(W) No. 29/2004 on Registration of Old and Valuable Trees, and Guidelines for their Preservation.

There are total **38** species surveyed. 19 of 38 species are native species and the rest of species are exotic. 50% and 50% of existing tree species are native and exotic species respectively.

Based on the actual field works of tree group surveying, the calculation of tree loss surveyed and tree group survey methodology are based on the following assumptions:

(a) Extent of each tree group is demarcated under the following criteria:

- By natural geological features (e.g. slope extent);
- Existing trees of each tree group with similar age and natural conditions; and

- Existing trees of each tree group placing at a closed proximity.

(b) Categories of size of trees within tree group surveying extent:

- Large-sized trees (trunk diameter >= 700mm) surveyed in details with information of average trunk diameter, height and spread;
- Medium-sized trees (trunk diameter < 700mm and >= 500mm) surveyed in percentage of area within each tree group area; and
- Small-sized trees (trunk diameter < 500mm) surveyed in percentage of area within each tree group area.

(c) Approximate tree loss in quantity within the tree surveying area:

- No. of Small-sized Trees in each tree group:

  = [(Area of each tree group) – (Spread of Large-sized Trees in each tree group) – (Area of Medium-sized Trees in each tree group)] / (Typical spread of a Small-sized Tree)

- Total no. of Small-sized Trees (A):

  = Sum of No. of Small-sized Trees in each tree group

- No. of Medium-sized Trees in each tree group:

  = (Area of Medium-sized Trees in each tree group) / (Typical spread of a Medium-sized Tree)

- Total no. of Medium-sized Trees (B):

  = Sum of No. of Medium-sized Trees in each tree group

- Total no. of Large-sized Trees (C):

  = Sum of No. of Large-sized Trees in each tree group

- Total no. of existing trees surveyed:

  = A + B + C

Key Findings of the Preliminary Tree Survey Assessment:

- There are **48** nos. tree groups within the site had been surveyed.
- Tree loss quantity:

  Based on the above assumptions, the nos. of tree loss are summarised below:

  - **8** nos. of Large-sized Trees surveyed;
  - Approximate **23** nos. of Medium-sized Trees surveyed;
  - Approximate **6,000** nos. of Small-sized Trees surveyed.

  Among the above surveyed trees, there are total **38** tree species, which are shown below:

Botanical Name	Chinese Name
Eucalyptus Robusta	大葉桉
Acacia Confusa	台灣相思
Eucalyputus camaldulensis	赤桉
Eucalyputus citriodora	檸檬桉

Botanical Name	Chinese Name
Leucaena leucocephala	銀合歡
Ficus virens var.sublanceolata #	大葉榕
Schefflera Octophylla #	鴨腳木
Macaranga tanarius #	血桐
Pinus massoniana	馬尾松
Schima superba #	木荷
Pinus elliottii Engel.	愛氏松
Celtis sinensis #	朴樹
Ficus microcarpa #	細葉榕
Sapium discolour #	山烏桕
Tetradium glabrifolium #	楝葉吳茱萸
Lophostemon confertus	紅膠木
Litchi chinensis	荔枝
Cinnamomum camphora #	樟樹
Hibiscus tiliaceus #	黃槿
Sterculia lanceolata #	假蘋婆
Mallotus paniculatus #	白楸
Sapium sebiferum #	烏桕
Rhus succedanea #	野漆樹
Bridelia tomentosa #	土蜜樹
Dimocarpus longan	龍眼
Mangifera indica	杧果
Melia azedarach L.	苦楝 (森樹)
Cerbera manghas #	海芒果
Bauhinia variegata	宮粉羊蹄甲
India-charcoal trema	山黃麻
Microcos paniculata #	布渣葉
Casuarina equisetifolia	木麻黃
Acacia mangium	大葉相思
Bombax ceiba	木棉
Melaleuca quinquenervia	白千層
Litsea glutinosa #	潺槁樹
Gordonia axillaris #	大頭茶

Botanical Name	Chinese Name
Vernicia montana Lour.	木油樹
# native species	

Note: 50% (19 nos.) and 50% (19 nos.) of native and exotic tree species surveyed.

- **Details of Large-sized Trees surveyed**:

  The locations of the Large-sized Trees are shown in Figure 8.13. The tree schedule of these Large-sized Trees is shown below:

Table 8.6 Schedule of Large-sized Trees

Tree no.	Chinese Name	Botanical Name	Trunk diameter DBH (m)	Height (m)	Spread (m)	Form (Good / Fair / Poor)	Health (Good / Fair / Poor)	Amenity value (High / Medium / Low)	Survival rate after transplant (High / Medium / Low)	Survey date
T06	細葉榕	Ficus microcarpa	1.80	22	18	Good	Good	High	Low (1)	Apr 09
T07	細葉榕	Ficus microcarpa	1.52	15	20	Good	Good	High	Low (1)	Apr 09
T08	細葉榕	Ficus microcarpa	2.20	20	25	Good	Good	High	Low (1)	Apr 09
T09	細葉榕	Ficus microcarpa	1.03	17	20	Good	Good	High	Low (1)	Apr 09
T10	細葉榕	Ficus microcarpa	2.10	15	24	Good	Good	High	Low (1)	Apr 09
T11	細葉榕	Ficus microcarpa	1.30	10	10	Fair	Fair	Medium	Low (1)	May-09
T12	樟樹	Cinnamomum camphora	0.70	12	15	Fair	Fair	Medium	Medium (2)	May-09
T13	樟樹	Cinnamomum camphora	0.80	11	14	Fair	Fair	Medium	Medium (2)	May-09

Note:

(1) Tree transplanting for T06, T07, T08, T09, T10 and T11 are not feasible since lots of aerial root system and large size of *Ficus microcarpa* existed. Thus survival rate after transplanting is low. Felling of those trees is recommended.

(2) Tree transplanting for T12 and T13 are considerable. Thus proper preparation works and temporary haul road are required prior to actual transplantation works.

For the trees within the Project area, they will be affected by phases (total six phases plus the realignment of Nim Wan Road) due to progressive change in topography of the site during the construction and operation phases of the WENT Landfill Extension development. Due to the fact that most of existing trees are located at slopes, which are inaccessible by vehicles and machineries, the majority of them could not be preserved by transplanting. Based on the preliminary tree assessment, only T12 and T13 are suitable for transplanting. Other than T12 and T13, only part of existing trees along Nim Wan Road at flatted land profile could be transplanted (location of transplanting area shown in **Figure 8.12**).

Nevertheless, feasibility of transplantation of existing trees can only fulfil the following criteria that can be considered during detailed design stage:

- Locations of existing trees that are accessible for machinery for transplanting;
- Inclined and unbalanced tree form is not feasible for transplanting;
- Species of existing trees that are not suitable for transplanting, e.g. Acacia confusa.

In conclusion, it is observed that there are no rare and precious species within the surveyed tree groups within the study area. All the surveyed trees are in common species with low landscape value.

According to ETWB TC(W) No. 29/2004 Para. 7, only trees on unleased Government land within built-up areas or tourist attraction spots in village areas are eligible for inclusion in the Register of Old and Valuable Trees (OVT). Upon checking against Appendix A (Location of Built-up Areas) of the technical circular, it is verified that the Project area does not fall into the designated built-up areas. Nevertheless, surveyed trees, which are under the list of rare and precious trees are highlighted. Thus no surveyed trees fulfil the criteria of potentially registrable OVT within built-up areas or tourist attraction spots in village areas within the proposed development. However, based on the results of tree survey, it is confirmed that there are 8 trees of species – *Ficus microcarpa* (細葉榕) and *Cinnamomum camphora* (樟樹) with a DBH (trunk diameter) exceeding 700mm, which are classified as large-sized trees (for T06-T11 with trunk diameter greater than 1000mm under Appendix A of ETWB TCW No. 29/2004, these surveyed trees are not within built-up area, which would not be classified as 'potentially registrable OVT').

The majority of the trees surveyed are young at age and small at size (equals to 0.35m or below). All the restored landfill site area would be planted with tree seedlings at 1.5m spacing in stagger pattern by phases to compensate the loss of existing trees.

8.6 Planning and Development Control Review

A review of the relevant planning and development control framework is carried out to ascertain the current and future committed development and associated sensitive receiver groups within the Project Area.

8.6.1 Existence of Statutory Plans

After the investigation, there are no statutory plans (e.g. Outline Zoning Plan – OZP) covering the Project area directly. There is only an OZP ref. S/YL-PN/9 - Sheung Pak Nai & Ha Pak Nai which is near the Project area. However, the proposed development will not affect the planned land use within this OZP.

8.6.2 Existing Land Use Conditions

For existing land use conditions of the Project area, there exist three settled land use areas - built-up land for Tsang Tsui Ash Lagoons, public utilities area for Black Point Power Station and G.I.C. for office of existing WENT Landfill site. The rest of area mainly contains natural land use areas – seawater, mangrove & swamp, shrubland and grassland. Besides, relatively small portion is composed of land use areas with human activities - agricultural land.

8.6.3 Possible Affected Existing Land Use

The following existing land uses within the site boundary of the proposed development will be affected:

- shrubland;
- grassland;

- badland; and
- built-up land for Tsang Tsui Ash Lagoons

The future appearance of the affected land uses will be changed during construction and operation phases. Mitigation with compensatory planting will improve the appearance of restored landfill site.

8.7 Mitigation Measures

8.7.1 Mitigation Measures Approaches

The identification of the landscape and visual impacts highlights the potential primary sources of impacts and their magnitude of change caused to sensitive receivers. Corresponding mitigation measures are proposed to avoid and reduce the identified sources of impacts. Furthermore, mitigation measures to remedy and compensate unavoidable impact are proposed to minimise the magnitude of change caused to sensitive receivers.

8.7.1.1 General Mitigation Measures/ Strategies

It is envisaged that the WENT Landfill Extension will be restored to blend in with the restored existing WENT Landfill, and both will blend in with the surrounding natural landscape. The restored landfill will be used for low intensity recreational purpose. Therefore, the landscape and visual impact during restoration and aftercare phases are considered as minimum.

Mitigation Measures to be applied during construction and operation phases, restoration and aftercare phases are listed below and **Figure 8.12**:

Mitigation measures in construction and operation phases

Strategies	Mitigation Measures in Construction and Operation Phases
MM1	**Advanced screening tree planting** • Early planting using fast growing trees and tall shrubs at strategic locations within site to block major view corridors to the site from the VSRs, and to locally screen haul roads, excavation works and site preparation works. • Advanced woodland mix planting (5 ha) at existing WENT Landfill for advanced screening effect. • Roadside planter and shrub planting design in front of existing WENT Landfill or adjacent to the access road for the afteruses of the existing WENT Landfill and new Nim Wan Road. • Tree planting in standard tree size along the slope toe of WENT Landfill Extension.
MM2	**Boundary Green Belt planting** • Considerable planting belts proposed around the site perimeter and the construction of temporary soil bunds would screen the landfill operations to a certain degree. Fast growing and fire resistant plant species will be used.
MM3	**Temporary landscape treatment as green surface cover** • For certain areas where landfilling operations would have to be suspended temporarily for a certain period of time, simple temporary landscape treatment such as temporary green colour slope cover should be considered. The period of temporary suspended operation should be sufficiently explicit in order to undertake appropriate temporary landscape treatment. During construction and operation phases, synthetic covering material of green colour should also be used as a temporary slope cover where applicable. Given the extensive area of the proposed extension, development of the site should be divided into phases to minimize the visual impact.
MM4	**Existing tree preservation** • No trees should be felled or transplanted unless they are inevitably affected by the Project. Affected trees should be transplanted under circumstances where technically feasible. A tree survey report should be prepared and a tree felling application should be submitted to government during the detailed design stage for approval before site formation works commence. The numbers, locations, species and sizes of the trees to be transplanted or felled should be clearly addressed.

Mitigation measures in restoration and aftercare phases

Strategies	Mitigation Measures in Restoration and Afteruse Phases
MM5	**Sensible final contour grading** • The final landfill will provide a structurally stable and visually interesting landform, which is visually compatible with surrounding landscape and contoured to simulate adjacent undeveloped area. Introduction and continuation of natural features such as spurs, ridges and valleys will be considered where appropriate.
MM6	**Sufficient cover soil of landfill final capping** • Sufficient cover soil of landfill final capping will be placed above the low-permeable layer and drainage layer, so as to sustain the proposed planting. The cover soil layer should be a minimum of 500mm in thickness for grassland, a minimum of 700mm for shrubland and 1000mm for woodland. Immediately after the completion of localized earthworks for the cover soil layer, the soil surface should be stabilized and greened by grass hydroseeding prior to subsequent landscape planting.
MM7	**Landscape planting and maintenance** • Planting and maintenance to allow vegetation establishment to match the natural vegetation of the surroundings. • Seedlings of native tree species will be planted in the second phase. • Reprovision of mangroves in some suitable locations inside the project boundary for compensation. • Planting layout to establish a coherent pattern of woodland, shrubland and grassland vegetation. • To compensate for the loss of existing trees, 107,100 nos. of tree seedlings / whips planting at 1500mm spacing are proposed to be planted in 21.0 ha. The number of compensated tree seedlings / whips can provide more than 1:1 compensation ratio in terms of actual loss to compensated aggregate trunk diameter, assuming tree seedlings/whips (approximate 35mm trunk diameter under GS of Civil Engineering Works – 2006 edition by CEDD) planting at 1.5m spacing in staggered pattern. For woodland mix planting, some portions of landfill slope area with gentle gradient would be applied "light standard trees" for better initial greening effect. Approximate 10% of quantity of woodland mix planting would be of light standard trees.
MM8	**Woodland vegetation management** • Thinning of pioneer trees to be carried out in the period of 5-8 years after the establishment period for each phase of works. • It includes the selective removal of pioneer trees to provide more light and space between trees that is beneficial for growth and natural regeneration of native trees in the woodland planting mix. • Proper maintenance and management for woodland planting is required to provide good quality of compensatory planting. During establishment period of the woodland planting, proper inspection of the death rate of each species in terms of quantity shall be provided and stated in Environmental Permit that forms part of DBO contract.

8.7.1.2 Landscaping on Restored Landfill Site

A landfill site is closed upon completion of the operation phase when its filling capacity is reached. When a landfill site is closed, the landfill site will be capped with a low-permeable material. Normally, capping involves the very top of the landfill cells to be covered by a thick layer of inert soil, usually about 1m to 1.5m thick, and compacted by machinery up to 1.2 tonnes per cubic meter. To further prohibit gas migration and infiltration of rainwater into the landfill, a synthetic impermeable layer will be laid underneath this layer of compacted soil cover. Restoration of a closed landfill site involves the laying of cover soil and re-vegetation, together with on going maintenance.

Landfill cover soil is normally nutrient deficiency, especially nitrogen. Application of fertilizer is therefore necessary. Planting of N-fixing plants can also increase the nutrient level of cover soil. Another feature of landfill cover soil is that the soil is highly compacted. The level of CO_2 in cover soil is also relatively high.

Due to the presence of the impermeable cap, the moisture retained inside the landfill cannot reach the cover soil by capillary action. Therefore, water supply for plants is generally inadequate, especially in dry season. Plants should be drought resistant.

Tree planting has not been recommended in closed landfill sites previously as trees were suspected to damage the landfill top liner. However, evidence indicated that tree roots will not penetrate deep into the top cover soil which had a high compaction and a high level of CO_2. A study on the root growth patterns of *Acacia confusa* and *Casuarina equisetifolia* in two local completed landfill sites revealed that their roots were mostly confined to the upper 15 cm of topsoil and did not penetrate further down (G Y S Chan 1997). The at least 1 m thick landfill cap is unlikely to be damaged by the growth of tree roots.

With high quality of composite cap, leachate contamination and landfill gas migration to cover soil is critical. Thus the physical and chemical characteristics of cover soil as discussed above are unfavourable to most plants. Field observation and experiments have confirmed that there are some trees suitable to grow satisfactorily on closed landfill sites. Most of these trees are legumes which are N-fixing, tolerant to landfill gas and/or leachate and drought resistant.

Reference is made to many local researches carried out on revegetation of landfill sites, which are listed below:

- G Y S Chan and M H Wong, 2002. Revegetation of Landfill Sites. In: Encyclopedia of Soil Science, p. 1161 -1166.
- G Y S Chan, 1997. Root Growth Patterns of Two Nitrogen-fixing Trees Under Landfill Conditions. In: Land Contamination and Reclamation 5:55-62.
- G Y S Chan, M H Wong and B.A. Whitton, 1996. Effects of Landfill Factors on Tree Cover – A Field Survey at 13 Landfill Sites in Hong Kong. In: Land Contamination and Reclamation 4: 115-128.

The superior performance of *Acacia confusa*, *Acacia magium* and *Acacia auriculiformis* on landfill sites was mainly due to its high drought tolerance and being N-fixing. Due to their high drought tolerance, *Lophostemon confertus*, which is one of the nonlegumes, also shows superior performance in landfill sites.

However, most native trees had extremely high mortalities on the local test site in the first few years after the capping of landfill. After several years, the pioneer species provide shelter for the native species and the survival rate and growth of native species will improve. The shelter effect of pioneer species provides nursery coverage for the growth of native species. Natural ecological succession also takes place as the pioneer species establishes. Therefore, planting of tree seedlings is preferable to be carried out in two phases. The first phase involves planting of landfill pioneers exotic tree species. The second phase, 3 – 5 years after the completion of first phase, involves the planting of seedlings of native tree species of higher ecological values. During these phases, “thinning” for the exotic species should be carried out in the period of 5 to 8 years after the establishment period. If thinning is not carried out, the exotic species will dominate the site, providing conditions that are not conductive to the growth of native species and their natural regeneration (GEO Publications No. 1/2000 – Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls).

In order to provide better enhancement on the tree compensation, it is assumed to compensate 120% of estimated tree loss (i.e. **7,200** nos. of existing trees as 20% addition of originally estimated tree loss – 6,000 nos.). To compensate for the loss of existing trees, approximate 107,100(note) nos. of tree seedlings / whips planting at 1500mm spacing are proposed to be planted in 21(note) ha. The number of compensated tree seedlings / whips can provide at least 1:1 compensation ratio in terms of actual loss to compensated

aggregate trunk diameter. In fact, the ratio of quantities of compensatory planting to that of loss is more than 1:1 in terms of aggregate trunk diameter. The following table shows the trees suggested for initial woodland establishment in subtropical landfill site by G Y S Chan (2002).

Note:

Total aggregate trunk diameter of tree loss =

7,200 nos. of small-sized trees with aggregate trunk diameter = 7200 x 0.5m = 3600m (assume 0.5m trunk diameter for a small-sized tree) + sum of trunk diameter of large-sized trees T6, T7, T8, T9, T10, T11, T12 and T13 = 30.75m + sum of trunk diameter of approximate 23 nos. of medium-sized trees = 23 x 0.7m = 16.1m

= 3600m + 30.75m + 16.1m

= 3647m (approx.)

Compensatory quantities of tree seedlings / whips planting at 1500mm spacing

= 210,000m^2 x 0.51 (quantities of plants in staggered pattern /m^2) = 107,100 nos.

Assume trunk diameter of a whip tree = 35mm approx.

Total compensated aggregate trunk diameter of woodland mix planting in 21 ha = 107,100 x 0.035 = 3749m

This is only the preliminary estimate for the compensatory planting and should be confirmed during the future detailed design stage. In any case, greater than 1:1 compensation ratio in terms of actual loss to compensated aggregate trunk diameter should be provided.

Tree species for woodland mix planting on restored landfill site

Landfill pioneer tree species for woodland mix planting (1st phase planting – immediately after final capping of landfill)		
Acacia auriculiformis *	*Cassia siamea**	*Machilus spp. Schima superba*
*Acacia confusa**	*Casuarina equisetifolia**	*Peltophorum pterocarpum**
*Acacia mangium**	*Cassia spectabilis**	
*Albizia lebbek**	*Castanopsis fissa*	
Aleurites moluccana	*Lophostemon confertus*	
Native tree species with high ecological value for woodland mix planting (2nd phase – 3 to 5 years after the completion of first phase planting) Note: Trimming or thinning of pioneer trees in the established 1st phase planting is required after 5 to 8 years from completion of the establishment period of 1st phase planting.		
Aquilaria sinensis#	*Garcinia oblongifolia#*	*Myrica rubra#*
Antidesma microphyllum#	*Gordonia axillaries#*	*Reevesia thyroidea#*
Ardisia quinquegona#	*Ilex spp.#*	*Sapium discolor#*
Bridelia tomentosa#	*Lithocarpus spp#*	*Schefflera octophylla#*
Castanopsis spp.#	*Litsea glutinosa#*	*Schima superba#*
Choerospondias axillaries#	*Liquidamber formosana#*	*Sterculia lanceolata#*
Cinnamomum spp.#	*Machilus breviflora#*	*Syzygium hancei#*
Cyclobalanopsis edithiae#	*Machilus chekiangensis#*	*Tutcheria championi#*
Cyclobalanopsis neglecta#	*Machilus chinensis#*	*Ixonanthes reticulate#*
Ficus spp.#	*Machilus kwangtungensis#*	
	Machilus wangchiana#	
	Microcos paniculata#	
For woodland mix planting, some portions of landfill slope area with gentle gradient would be applied "light standard trees" for better initial greening effect. Approximate 10% of quantity of woodland mix planting would be of light standard trees.		

Remark: "*" marks N-fixing species. "#" marks native species.

8.7.1.3 Programme of Woodland Mix Planting

Among the woodland mix planting proposal shown in Section 8.7.1.2, the following table shows the tentative programme of the compensatory planting works:

Construction Phasing of WENT Landfill Extension (Tentative construction starting year)	Approximate no. of trees affected	Programme of Mitigation measures	Remarks
Phase 1 (2016)	700	Advanced 5 ha planting at existing WENT Landfill. Planting schedule: • Phase 1 (Year 1 to 2 – Exotic species planting); • Phase 2 (Year 3 to 4 – Native species planting).	Planting starts upon the completion of restoration of existing WENT Landfill.
Phase 2 (2017)	100		
Phase 3 (2018)	0		
Realignment of Nim Wan Road (2018)	2,400		
Phase 4 (2020)	1,400	Remaining 16 ha planting at WENT Landfill Extension. Planting schedule: • Phase 1 (Year 1 to 3 – Exotic species planting); • Phase 2 (Year 3 to 5 – Native species planting).	Planting starts upon the completion of restoration of WENT Landfill Extension.
Phase 5 (2021)	500		
Phase 6 (2022)	900		
Total	**6,000**	**21 ha of compensatory planting**	

Note: Trimming or thinning of pioneer trees in the established 1st phase planting is required after 5 to 8 years from completion of the establishment period of 1st phase planting.

8.7.1.4 Particular Mitigation Measures / Strategies

Notwithstanding the fact that the potentially affected tress are generally of common species without high value, compensatory measure will be implemented in the form of compensatory planting at a minimum ratio of 1 : 1 in terms of actual loss to compensated aggregate trunk diameter under the estimation of conservative approach, i.e. 107,100 no. trees (whip size) will be planted in 1500mm spacing within 21 ha for felling of existing trees.

To enhance the effectiveness of the compensatory planting measure, the following special steps will be taken:

- *Transplanting:*

  Restoration works could not be advanced for a special portion of the WENT Landfill Extension as the restoration works could only commence upon the filling of all the phases of WENT Landfill Extension. Nevertheless, a peripheral area of New Leachate Treatment Facilities could be made available earlier for compensatory planting. Portion of existing trees at the peripheral of ash lagoons could be transplanted to the peripheral area of New Leachate Treatment Facilities. As a result of such a special arrangement, trees transplanting could be implemented earlier in such a sub-area within the WENT Landfill Extension site. The remaining existing trees at ash lagoons (i.e. tree group no. TG31, TG32, TG33 and TG34), which are of higher survival rate after transplanting, could be considered to be transplanted to existing WENT Landfill at later stage, if possible.

- *Advanced planting:*

  Compensatory planting are also recommended to be planted at the Existing WENT Landfill, if possible, for earlier achievement of greenery effect.

- *Roadside planting:*

  The compensatory planting (heavy standard size trees) could be planted in 5m spacing along two sides of the realigned Nim Wan Road which is a peripheral zone independent of the site-formation and landfilling activities of WENT Landfill Extension, and hence could be implemented at an earlier stage.

On the other hand, transplanting of existing trees at areas other than the ash lagoons (ie slope areas) is not feasible due to the following reasons:

- Difficult to transplant the trees at slope areas due to no access for machinery for transplanting works;
- The sizes of trees' rootballs at slope areas are not balanced, which cannot grow up after transplanting.

The special steps as described above will thus enable part of the compensatory planting to be effected earlier, instead of waiting until restoration of the entire WENT Landfill Extension site. The exact number and the exact implementation timing for each of the foregoing special steps will be subject to detailed design work on the WENT Landfill Extension project. The number of planting and the timings stated above are therefore broad estimates at this stage.

As explained in the above compensatory planting section, special steps have been put forward so that part of the compensatory planting will take effect earlier instead of leaving until the entire WENT Landfill Extension site is ready for restoration. The above is beneficial not only from landscaping point of view, but also from visual point of view as the greenery effect of the compensatory planting will come into visualization earlier.

8.7.1.5 Implementation Programming/ Sequencing

An implementation programme will be prepared as required by the TM of the EIAO. Reference will be made to the *ETWB TC(W) No. 2/2004 on Maintenance of Vegetation and Hard Landscape Features* which defines the management and maintenance responsibilities for natural vegetation and landscape works, including both softworks and hardworks, and the authorities for tree preservation and felling. The funding, implementation, management and maintenance arrangement is listed in below table.

Preliminary funding, implementation, management and maintenance proposal

	Mitigation items	Funding & Implementation unit	Management and maintenance unit
Mitigation Measures in Construction and Operation Phases			
MM1	Advanced screening tree planting	DBO Contractor	DBO Contractor
MM2	Boundary Green Belt planting	DBO Contractor	DBO Contractor
MM3	Temporary landscape treatment as green surface cover	DBO Contractor	DBO Contractor
MM4	Existing tree preservation	DBO Contractor	DBO Contractor
Mitigation Measures in Restoration and Aftercare Phases			
MM5	Sensible final contour grading	DBO Contractor	DBO Contractor

	Mitigation items	Funding & Implementation unit	Management and maintenance unit
MM6	Sufficient cover soil of landfill final capping	DBO Contractor	DBO Contractor
MM7	Landscape planting and maintenance	DBO Contractor	DBO Contractor
MM8	Woodland vegetation management	DBO Contractor	DBO Contractor

Note: Details of the mitigation measures are given in Section 8.7.1.1. The mitigation measures shall be stipulated in the Employer's Requirements and Environmental Permits when tendering the Design-Build-Operating Contract to ensure that the mitigation measures will be implemented by the DBO Contractor.

8.8 Landscape Impact Assessment

8.8.1 Sensitivity of LCA and LR

The sensitivity of each LCA and LR is summarized in the below table:

Table 8.7 Sensitivity of Identified LCAs / LRs:

	LCAs / LRs name Size (ha)	Description	Sensitivity
LCA1	Existing WENT Landfill Site 84.04	• Landfill Landscape comprises mainly the existing WENT landfill site under operation and its associated stockpile and borrow area (SBA).	**Low**
LCA2	Deep Bay 149.26	• Inter-tidal Coast Landscape lies between the high and low water tide levels at the coastal line of Deep Bay and Nim Wan.	**High**
LCA3	Black Point Power Station and Tsang Tsui Ash Lagoons 127.43	• Industrial Urban Landscape lies on low-lying areas of reclaimed land (Tsang Tsui Ash Lagoons and Black Point Power Station) of the coastal line of Deep Bay.	**Low**
LCA4	Tsing Shan 225.16	• Upland and Hillside Landscape contains natural steep hillside slope covered by vegetation.	**High**
LCA5	Tsang Tsui 56.69	• Settled Valley Landscape possesses a distinct valley floor with thickly woodland areas and abandoned agricultural lands.	**Medium**
LCA6	Lan Kok Tsui 48.22	• Coastal Upland and Hillside Landscape contains a large-scale upland and hillside landscape area adjacent to Urmston Road waterfront.	**Medium**
LR1	Built-up Land 62.96	• Built-up land area refers to the site of Tsang Tsui Ash Lagoons providing a dump site with temporary storage site for ash generated from the adjacent power plant.	**Low**
LR2	Public Utilities 35.43	• Public Utilities refer to the site of Black Point Power Station containing buildings, access roads and open storage areas without amenity landscape.	**Low**
LR3	Seawater 149.26	• Seawater area refers to the scenic coastal water facing Deep Bay	**High**
LR4	Mangrove and Swamp 6.69	• Mangroves and swamps are found at some locations of the tidal streams where sediments have been stored there.	**High**
LR5	Shrubland 96.85	• Shrubland areas appear at barren hillside areas of the study area.	**Medium**
LR6	Badland 50.51	• Badland area refers to the portion of hillside lands without vegetation cover.	**Low**
LR7	Agricultural 3.03	• Agricultural contains some scattered village houses with nursery and agricultural site.	**Medium**

	LCAs / LRs name Size (ha)	Description	Sensitivity
LR8	Grassland 208.29	• Large portion of grassland covers the hillside lands within the study area.	**Medium**
LR9	Government, Institution & Community Facilities (GIC) 0.79	• GIC refers to the reception area of existing WENT Landfill site.	**Low**
LR10	Landfill (Construction in progress) 73.02	• The area refers to the existing WENT Landfill site.	**Low**
LR11	Roads Not applicable	• Roads contains Nim Wan Road, Yung Long Road and Lung Kwu Tan Road form the road areas of the study area.	**Low**
LR12	Woodland 4.03	• Woodland located along the tidal creek of Stream A, at the foothill behind the Tang clan grave site, and at the edge of east Tsang Tsui Ash Lagoon.	**High**
LR13	Streams Not applicable	• The area refers to Tsang Kok Stream and Stream A linking to Tsang Tsui Ash Lagoons, and Stream B on Castle Peak adjacent to Nim Wan Road. The extent of these streams is also shown in **Figure 10.2** of Habitat Map and Species of Conservation Interest of ecological impact assessment is detailed in Section 10.	**High**

8.8.2 Magnitude of Change of LCA and LR

The magnitude of change of each LCA and LR is summarized in the below table:

Table 8.8 Magnitude of Change of Identified LCAs / LRs:

LCA / LR no.	Compatibility of the project with the surrounding landscape (H / M / L)	Reversibility (H / M / L)	Scale of development (L / M / S)	Duration of impacts under construction & operation phase and restoration & aftercare phase (L / S)	Magnitude of change	
					Construction and Operation Phases	Restoration and Aftercare Phases
LCA1	H	H	S	L	Small	Negligible
LCA2	L	L	M	L	Intermediate	Small
LCA3	M	H	L	L	Intermediate	Small
LCA4	L	M	L	L	Large	Intermediate
LCA5	L	M	L	L	Large	Intermediate
LCA6	L	L	L	L	Small	Negligible
LR1	H	H	L	L	Intermediate	Small
LR2	H	H	S	L	Negligible	Negligible
LR3	L	L	S	L	Small	Negligible
LR4	L	L	L	L	Large	Intermediate
LR5	M	M	L	L	Large	Intermediate
LR6	M	M	L	L	Intermediate	Small
LR7	L	M	L	L	Intermediate	Small
LR8	M	M	L	L	Large	Intermediate
LR9	H	H	L	L	Small	Negligible
LR10	H	H	L	L	Small	Negligible
LR11	H	H	L	L	Small	Negligible
LR12	L	M	L	L	Large	Intermediate
LR13	L	M	L	L	Large	Intermediate

Note:

- Compatibility of the project with the surrounding landscape (H: High / M: Medium / L: Low);
- Reversibility (H: High / M: Medium / L: Low);
- Scale of development (L: Large / M: Medium / S: Small);
- Duration of impacts under construction & operation phases and restoration & aftercare phases (L: Long / S: Short).

8.8.3 Significance Threshold of LCA and LR

The significance threshold regarding the sensitivity and magnitude of change of each LCA and LR is summarized in the below table:

Table 8.9 Significance Threshold of Identified LCAs / LRs (without mitigation)

LCAs/ LRs	Type of LCAs / LRs	Sensitivity	Source of Impact		Magnitude of Change		Significance threshold without mitigation	
			During Construction and Operation Phases	During Restoration and Aftercare Phases	During Construction and Operation Phases	During Restoration and Aftercare Phases	During Construction and Operation Phases	During Restoration and Aftercare Phases
LCA1	Landfill Landscape	Low	S1, S2	S3	Small	Negligible	**Slight**	**Negligible**
LCA2	Inter-tidal Coast Landscape	High	S1, S2	S3	Intermediate	Small	**Moderate**	**Moderate**
LCA3	Industrial Urban Landscape	Low	S1, S2	S3	Intermediate	Small	**Moderate**	**Slight**
LCA4	Upland and Hillside Landscape	High	S1, S2	S3	Large	Intermediate	**Significant**	**Moderate**
LCA5	Settled Valley Landscape	Medium	S1, S2	S3	Large	Intermediate	**Significant**	**Moderate**
LCA6	Coastal Upland and Hillside Landscape	Medium	S1, S2	S3	Small	Negligible	**Negligible**	**Negligible**
LR1	Built-up land area	Low	S1, S2	S3	Intermediate	Small	**Moderate**	**Slight**
LR2	Public Utilities	Low	S1, S2	S3	Negligible	Negligible	**Negligible**	**Negligible**
LR3	Seawater	High	S1, S2	S3	Small	Negligible	**Moderate**	**Negligible**
LR4	Mangroves and swamps	High	S1, S2	S3	Intermediate	Small	**Significant**	**Moderate**
LR5	Shrubland	Medium	S1, S2	S3	Large	Intermediate	**Significant**	**Moderate**
LR6	Badland	Low	S1, S2	S3	Intermediate	Small	**Slight**	**Slight**
LR7	Agricultural	Medium	S1, S2	S3	Intermediate	Small	**Moderate**	**Slight**
LR8	Grassland	Medium	S1, S2	S3	Large	Intermediate	**Significant**	**Moderate**
LR9	Government, Institution & Community Facilities (GIC)	Low	S1, S2	S3	Small	Negligible	**Slight**	**Negligible**
LR10	Landfill (Construction in progress)	Low	S1, S2	S3	Small	Negligible	**Slight**	**Negligible**
LR11	Roads	Low	S1, S2	S3	Small	Negligible	**Slight**	**Negligible**
LR12	Woodland	High	S1, S2	S3	Large	Intermediate	**Significant**	**Moderate**
LR13	Streams	High	S1, S2	S3	Large	Intermediate	**Significant**	**Moderate**

8.8.4 Residual Impact of LCA and LR

The residual impact of each LCA and LR regarding the significance threshold after mitigation is summarized in the below table:

Table 8.10 Residual Impact of Identified LCAs / LRs (with mitigation)

LCAs/ LRs	Significance threshold without mitigation		Recommended mitigation measures		Residual impact after implementation of mitigation measures	
	During Construction and Operation	During Restoration and Aftercare	During Construction and Operation	During Restoration and Aftercare	During Construction and Operation	During Restoration and Aftercare
LCA1	Slight	Negligible	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Slight	Negligible
LCA2	Moderate	Moderate	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Moderate	Moderate
LCA3	Moderate	Slight	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Slight	Negligible
LCA4	Significant	Moderate	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Moderate	Slight
LCA5	Significant	Moderate	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Moderate	Slight
LCA6	Negligible	Negligible	-	-	Negligible	Negligible
LR1	Moderate	Slight	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Slight	Negligible
LR2	Negligible	Negligible	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Negligible	Negligible
LR3	Moderate	Negligible	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Negligible	Negligible
LR4	Significant	Moderate	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Moderate	Slight
LR5	Significant	Moderate	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Moderate	Slight
LR6	Slight	Slight	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Negligible	Negligible
LR7	Moderate	Slight	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Slight	Negligible
LR8	Significant	Moderate	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Moderate	Slight
LR9	Slight	Negligible	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Slight	Negligible
LR10	Slight	Negligible	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Slight	Negligible
LR11	Slight	Negligible	-	-	Slight	Negligible
LR12	Significant	Moderate	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Significant	Moderate
LR13	Significant	Moderate	MM1, MM2, MM3, MM4	MM5, MM6, MM7, MM8	Moderate	Slight

8.9 Visual Impact Assessment

8.9.1 Sensitivity of VSR

The sensitivity of each VSR is summarized in the below table:

Table 8.11 Sensitivity of Identified VSRs:

VSRs	Degree of visibility (OV:Overview / PV:Partial view / FV:Fully blocked view)	Description on criteria of sensitivity:	Availability (Yes / No) of Amenity value (H:High / M:Medium / L:Low) of alternative view	Quality of existing view (H:High / M:Medium / L:Low)	Duration or frequency of view (L:Long / S:Short)	No. of VSRs	Type of VSRs	Sensitivity
VSR1 (Users of Black Point Power Station)	FV	• The view to existing WENT landfill site is blocked by the proposed development partially. • Existing view of Black Point Power Station is without other development	Yes M	M	L	Medium	Users / Staff	**Medium**
VSR2 (Users of Existing WENT Landfill Site)	FV	• The view to Lung Kwu Tan is blocked by the proposed development fully. • Existing view of existing WENT landfill site is with other development – Tsang Tsui Ash Lagoons.	Yes M	L	L	Medium	Users / Staff	**Low**
VSR3 (Hikers of Castle Peak)	PV	• The view to Deep Bay is partially blocked by the proposed development. • Existing view of Castle Peak is with other development – Tsang Tsui Ash Lagoons, existing WENT landfill site and Black Point Power Station.	Yes H	M	L	Low	Hikers	**Medium**
VSR4 (Passengers of Ferry Services)	OV	• The view to Tsing Shan Firing Range of Castle Peak is blocked by the proposed development partially. • Existing view of Ferry Services is with other development – Tsang Tsui Ash Lagoons, existing WENT landfill site and Black Point Power Station.	Yes H	M	L	Medium	Passengers on ferry	**Medium**
VSR5 (Road Users of Nim Wan Road)	OV	• The view to Tsang Tsui Ash Lagoons, Black Point Power Station and existing WENT landfill site is blocked by the proposed development fully. • Existing view of Nim Wan Road is with other development – Tsang Tsui Ash Lagoons, existing WENT landfill site and Black Point Power Station.	Yes L	M	L	Medium	Road users	**Low**

VSRs	Degree of visibility (OV:Overview / PV:Partial view / FV:Fully blocked view)	Description on criteria of sensitivity:	Availability (Yes / No) of Amenity value (H:High / M:Medium / L:Low) of alternative view	Quality of existing view (H:High / M:Medium / L:Low)	Duration or frequency of view (L:Long / S:Short)	No. of VSRs	Type of VSRs	Sensitivity
VSR6 (Residents of Ha Pak Nai)	PV	• The view to Tsang Tsui Ash Lagoons and Black Point Power Station is blocked by the proposed development fully. • Existing view of Ha Pak Nai is with other development – Tsang Tsui Ash Lagoons and existing WENT landfill site.	Yes M	M	L	Medium	Residents	**Medium**
VSR7 (Residents of Lung Kwu Tan)	FV	• The view to Tsang Tsui Ash Lagoons and Black Point Power Station is blocked by the proposed development fully and partially respectively. • Existing view of Lung Kwu Tan is with other development – Tsang Tsui Ash Lagoons and Black Point Power Station.	Yes M	M	L	Medium	Residents	**Medium**

8.9.2 Magnitude of Change of VSR

The magnitude of change of each VSR is summarized in the below table:

Table 8.12 Magnitude of Change of Identified VSRs:

VSRs	Blockage of View (F:Full / P:Partial / S:Small)	Min. Viewing Distance (km)	Reversibility (Y / N)	Compatibility of the project with the surrounding landscape (H:High / M:Medium / L:Low)	Scale of development (L:Large / M:Medium / S:Small)	Duration of impacts under construction & operation phases and restoration & afteruse phases (L:Long / S:Short)	Magnitude of Change	
							During Construction and Operation phases	During Restoration and Aftercare phases
VSR1 (Users of Black Point Power Station)	F	0.1	N	M	L	L	**Small**	**Negligible**
VSR2 (Users of Existing WENT Landfill Site)	F	0.1	N	M	L	L	**Large**	**Intermediate**
VSR3 (Hikers of Castle Peak)	S	Within the site	N	M	L	L	**Intermediate**	**Small**
VSR4 (Passengers of Ferry Services)	P	1.0 (typical)	N	M	L	L	**Large**	**Intermediate**
VSR5 (Road Users of Nim Wan Road)	P	0.4	N	M	L	L	**Large**	**Intermediate**

VSRs	Blockage of View (F:Full / P:Partial / S:Small)	Min. Viewing Distance (km)	Reversibility (Y / N)	Compatibility of the project with the surrounding landscape (H:High / M:Medium / L:Low)	Scale of development (L:Large / M:Medium / S:Small)	Duration of impacts under construction & operation phases and restoration & afteruse phases (L:Long / S:Short)	Magnitude of Change	
							During Construction and Operation phases	During Restoration and Aftercare phases
VSR6 (Residents of Ha Pak Nai)	S	1.6	N	M	L	L	**Small**	**Negligible**
VSR7 (Residents of Lung Kwu Tan)	S	0.4	N	M	L	L	**Small**	**Negligible**

8.9.3 Significance of VSR

The significance threshold regarding the sensitivity and magnitude of change of each VSR is summarized in the below table:

Table 8.13 Significance Threshold of Identified VSRs (without mitigation)

VSRs	Type of VSRs	Sensitivity	Source of Impact		Magnitude of Change		Significance threshold without mitigation	
			During Construction and Operation	During Restoration and Aftercare	During Construction and Operation	During Restoration and Aftercare	During Construction and Operation	During Restoration and Aftercare
VSR1	Users of Black Point Power Station	Medium	S1, S2	S3	Small	Negligible	**Slight**	**Negligible**
VSR2	Users of Existing WENT Landfill Site	Low	S1, S2	S3	Large	Intermediate	**Moderate**	**Slight**
VSR3	Hikers of Castle Peak	Medium	S1, S2	S3	Intermediate	Small	**Moderate**	**Slight**
VSR4	Passengers of Ferry Services	Medium	S1, S2	S3	Large	Intermediate	**Moderate**	**Moderate**
VSR5	Road Users of Nim Wan Road	Low	S1, S2	S3	Large	Intermediate	**Moderate**	**Slight**
VSR6	Residents of Ha Pak Nai	Medium	S1, S2	S3	Small	Negligible	**Moderate**	**Negligible**
VSR7	Residents of Lung Kwu Tan	Medium	S1, S2	S3	Small	Negligible	**Moderate**	**Negligible**

8.9.4 Residual Impact of VSR

The residual impact of each VSR regarding the significance threshold after mitigation is summarized in the below table:

Table 8.14 Residual Impact of Identified VSRs (with mitigation)

VSRs	Significance threshold without mitigation		Recommended mitigation measures		Residual impact after implementation of mitigation measures	
	During Construction and Operation	During Restoration and Aftercare	During Construction and Operation	During Restoration and Aftercare	During Construction and Operation	During Restoration and Aftercare
VSR1	**Slight**	**Negligible**	M1, M2, M3, M4	M5, M6, M7, M8	**Negligible**	**Negligible**
VSR2	**Moderate**	**Slight**	M1, M2, M3, M4	M5, M6, M7, M8	**Slight**	**Negligible**

VSRs	Significance threshold without mitigation		Recommended mitigation measures		Residual impact after implementation of mitigation measures	
	During Construction and Operation	During Restoration and Aftercare	During Construction and Operation	During Restoration and Aftercare	During Construction and Operation	During Restoration and Aftercare
VSR3	Moderate	Slight	M1, M2, M3, M4	M5, M6, M7, M8	Slight	Negligible
VSR4	Moderate	Moderate	M1, M2, M3, M4	M5, M6, M7, M8	Slight	Slight
VSR5	Moderate	Slight	M1, M2, M3, M4	M5, M6, M7, M8	Slight	Negligible
VSR6	Moderate	Negligible	M1, M2, M3, M4	M5, M6, M7, M8	Slight	Negligible
VSR7	Moderate	Negligible	M1, M2, M3, M4	M5, M6, M7, M8	Slight	Negligible

8.9.5 Photomontages of Residual Impact of VSRs

In terms of geological point of views, the below table showing the visibility of each VSR to the proposed development of WENT Landfill Extension:

VSRs	Visibility of VSR to WENT Landfill Extension
VSR1 - Refer to **Figure 8.5** (Users of Black Point Power Station)	Not visible.
	The view to WENT Landfill Extension of VSR1 is blocked by the slopes along Nim Wan Road and Tsing Shan Firing Range.
VSR2 - Refer to **Figure 8.6** (Users of Existing WENT Landfill Site)	Not visible.
	VSR2 is near WENT Landfill Extension without blockage during baseline condition. However, VSR2 will be demolished and blocked by the proposed development after commencement of WENT Landfill Extension. Thus VSR2 will not be existed during construction & operation phase and restoration & aftercare phase. No photomontage can be provided in this case.
VSR3 - Refer to **Figures 8.7 and 8.7a** (Hikers of Tsing Shan)	Visible.
	VSR3 provides overview to WENT Landfill Extension without blockage.
VSR4 - Refer to **Figures 8.8, 8.8a and 8.8b** (Passengers of Ferry Services)	Visible.
	VSR4 provides overview to WENT Landfill Extension without blockage.
VSR5 - Refer to **Figures 8.9 and 8.9a** (Road Users of Nim Wan Road)	Visible.
	VSR5 is near WENT Landfill Extension with slight blockage of the existing WENT Landfill.
VSR6 - Refer to **Figures 8.10 and 8.10a** (Residents of Ha Pak Nai)	Visible
	The view to WENT Landfill Extension of VSR6 is partially blocked by the existing WENT Landfill.
VSR7 - Refer to **Figure 8.11** (Residents of Lung Kwu Tan)	Not visible.
	The view to WENT Landfill Extension of VSR7 is blocked by Castle Peak.

Thus, VSR3, VSR4, VSR5 and VSR6 are selected viewpoints to provide photomontages for illustration accordingly.

8.10 Cumulative Impacts

The potential concurrent project and anticipated cumulative impact relevant to Landscape and Visual Impact Assessment of the Project is the existing WENT Landfill and Sludge Treatment Facilities (STF) site.

The Project site of the WENT Landfill Extension is mainly made up largely by the Stockpile, Borrow Area (SBA) and haul roads. Furthermore, the existing WENT Landfill is located immediately adjoining to the east of the WENT Landfill Extension. The existing WENT landfill is essentially with the same nature with the Project. Therefore, both the existing WENT Landfill and the proposed development of WENT Landfill Extension would be carrying out the same nature of landscape and visual impact permanently. It is predicted that shortly after the commencement of the construction & operation phases of WENT Landfill Extension, the existing WENT Landfill will be close to its capacity and will approach towards its restoration & aftercare phases. It is noted that the site formation works of WENT Landfill Extension will be carried out while the construction & operation phases of existing WENT Landfill will come to the final stage. After the final stage of construction & operation phases of existing WENT Landfill, the restoration & aftercare phases of existing WENT Landfill would start. Thus, the construction & operation phases of WENT Landfill Extension and the restoration & aftercare phases of existing WENT Landfill will take place at the same time.

Besides, the construction phase of STF site will be prior to the site formation works of WENT Landfill Extension. Thus the operation phase of STF will happen during the construction & operation phases of WENT Landfill Extension and restoration & aftercare phases of existing WENT Landfill. At that moment, the cumulative landscape and visual impact should be quite significant. The residual impact of WENT Landfill Extension during construction & operation phases should be significant.

However, after the completion of restoration & aftercare phases of existing WENT Landfill, and construction phase of STF site, the cumulative impacts of the proposed development would not be increased. The residual impact of WENT Landfill Extension during restoration & aftercare phases should not be significant since the portion of existing WENT Landfill and STF site would have been mitigated at the same time. Finally, the residual impacts among existing WENT Landfill, STF site and WENT Landfill Extension would be merged as a whole and no significant cumulative impact is anticipated.

Note: For STF site under EIA-155/2008, the residual landscape and visual impacts after implementing the proposed mitigation measures, e.g. aesthetic design of the proposed STF matching with adjacent landscape setting of the site, greening along the site boundary to provide screening and enhance the waterfront area, would be acceptable with mitigation measures during construction and operation phases. The appearance of STF site would be merged with the existing WENT office building as a whole. The mitigation measures of STF can also enhance the cohesiveness of WENT Landfill Extensions in long term.

8.11 "What If IWMF not proceed"

If the northern half of the middle ash lagoon is selected as the final location of IWMF, the northern half of the middle ash lagoon would be lost possibly prior to commencement of WENT Landfill Extension. If Shek Kwu Chau instead of the middle lagoon is selected as the final location of IWMF, the remaining middle ash lagoon would be included in and

incorporated into part of the WENT Landfill Extension, and therefore the magnitude of cumulative impacts would remain the same in both cases. The impact identification and evaluation process has taken into account the potential impacts on loss of the middle lagoon regardless of their recorded location (on northern half or southern half of the ash lagoon). Up to this stage, IWMF is not included in WENT Landfill Extension project. In addition, the location of IWMF is the flatted land of ash lagoon that contains no existing trees. If IWMF exists on the ash lagoons, it is anticipated that no existing tree resources will be loss in this scenario. Thus the potential landscape impact would not be significant. In terms of visual impact, similar mitigation measures, such as compensatory planting as screen planting buffer, can be applied to the affected portion of the ash lagoon. It is anticipated the potential visual impact would not be significant. Therefore, the potential cumulative landscape and visual impacts caused by either scenario (with or without IWMF on northern ash lagoon) would not be significant, and the mitigation measures proposed have addressed impacts to loss of the middle ash lagoon as a whole.

8.12 Conclusion

In this Section, the assessment results of potential landscape and visual impacts due to the WENT Landfill Extension has been carried out under the methodology of EIAO Guidance Notes 8/2002 – Preparation of Landscape and Visual Impact Assessment under EIAO. For the identified landscape and visual sensitive receivers, such as their sensitivities, magnitude of change, significances of impacts, mitigation measures and residual impacts have also been assessed.

The Project site of the WENT Landfill Extension is mainly made up largely by the Stockpile and Borrow Area (SBA) and haul roads, in terms of area. Furthermore, the existing WENT Landfill Site is located immediately adjoining to the east of the WENT Landfill Extension. It is noted the landscape resources and landscape characters of the Project site of the WENT Landfill Extension have already largely deteriorated by the SBA of the existing WENT landfill site. Due to their proximity, the existing WENT Landfill site, its SBA and the WENT Landfill Extension will affect the similar group of visually sensitive receivers. It is noted that the existing WENT landfill site and its associated SBA have altogether also deteriorated the existing views of the Project site.

The existing landscape resources and landscape characters to be affected by the WENT Landfill Extension are mainly those of disturbed land associated with the SBA and haul roads. The landscape value of the disturbed land is low and its sensitivity is low too. Yet, it is noted that natural vegetation on the hillside to the periphery of the SBA will the affected by the WENT Landfill Extension. It is noted that some valuable LCA and LRs, such as LCA2 – Inter-tidal Coast Landscape, LCA4 – Upland and Hillside Landscape, LCA5 – Settled Valley Landscape, LCA6 – Coastal Upland and Hillside Landscape, LR2 – agricultural land, LR4 – mangrove and swamp, LR5 – shrubland, LR8 – grassland, LR12 – woodland and LR13 – Streams, will be affected in terms of permanent change and loss. The residual impact during construction & operation phases is still significant.

The existing visual quality of the majority of the WENT Landfill Extension is that of the disturbed land associated with the SBA. The visual quality is considered poor. Relatively, the key visual impact during the construction & operation phases is arising from the loss of the natural vegetation on hillside outside the existing landfill boundary. The loss of the natural vegetation on hillside will be carried out phase by phase in line with the operation of WENT Landfill Extension. Thus the visual obstruction caused by the loss of natural vegetation will be changed phase by phase. It is also presumed that the higher the final level of landfill, the larger the visual impact near the end of construction & operation phases.

The WENT Landfill Extension will be restored and vegetated to match with its surroundings in terms of landform and vegetation patterns in restoration and aftercare phases. Loss of

landscape resources and change in landscape characters in construction & operation phases will be compensated and enhanced. Visual impact in construction & operation phases will be eliminated with provision of vegetation all over the final surface. Visual intrusion of new visual element (the final landform of the WENT Landfill Extension) would be minimized by careful design of the final level and final landform to match the surroundings.

In summary, the potential impact during construction and operation phase shall be significant due to large scale of site formation phase by phase in terms of site area. Within this period, the natural vegetation will be portionally loss for each phase of site formation works and advanced planting will be provided as mitigation measures. During restoration phase, the mature advanced planting can act as screening effect for the proposed development in human eye level. During aftercare phase, the compensatory planting as mitigation shall be under germination, which provides preliminary vegetation cover for site area of the proposed development. At that time, the potential impact shall be marginally acceptable with mitigation measures. Finally after the whole period of restoration and aftercare phases, the potential impact would be greatly mitigated by semi-mature compensatory woodland, shrubland and grassland with the proper mitigation maintenance, e.g. thinning of pioneer trees and enhancement planting of native tree species. Although there will be permanent loss of some LCAs and LRs, the residual impact would be mitigated during restoration & aftercare phases in long run. It is anticipated the residual landscape and visual impact during the restoration & aftercare phases would not be significant.

In conclusion, the particular impacts can be reduced to a large extent by implementing the proposed mitigation measures during construction & operation phases and restoration & aftercare phases. The overall residual impacts would be treated as “acceptable with mitigation measures” after implementing the mitigation measures.