

2 PROJECT DESCRIPTION

2.1 PROJECT REQUIREMENTS

2.1.1 The HK SAR Government has decided to support a development of a world-class international Theme Park, in two phases, which will include two theme parks that will combine attractions, shows and cutting-edge technology from theme parks around the world to create a unique mix of new and traditional entertainment experiences. A second world-class international theme park is also anticipated as Phase II of the work. Upon completion of the Theme Parks, Phase I and II, the Project will also include five individually themed resort hotels with up to 7,000 hotel rooms to be constructed adjacent to the Theme Parks. In addition, the Theme Park and associated developments will ultimately include approximately 74,400 m² rentable retail, dining and entertainment (RD&E) complex as part of the overall Theme Park experience.

2.1.2 The perceived benefits associated with the Project are expected to be cultural and educational, but primarily of an economic nature. The development of a Theme Park and associated hotels and RD&E facilities has the potential for the following key economic benefits:

- It would be expected to strengthen Hong Kong SAR's role as a major tourist destination in Asia and the world;
- The development would be expected to act as a catalyst in attracting further tourism, recreational and leisure investment (e.g. hotels, retail, tourism services, air line and transport activities);
- The development would be expected to generate economic benefit to the HK SAR via additional spending by existing tourists and local residents;
- It would be expected to provide significant additional market for the services and materials supply sector during both construction and operation; and
- The Theme Park and associated developments will be a potentially major employer generating direct and indirect employment opportunities during both construction and operation.

2.1.3 It is proposed that the Project will ultimately comprise two world-class international Theme Parks, retail, dining and entertainment complexes and individually themed hotels. It would also include supporting facilities such as private car and public bus parking areas, PTI, area development (hard and soft landscaping), back of house and service yards.

2.1.4 The first Theme Park would be a "Magic Kingdom" type park, and would:

- i) feature themed areas such as "Main Street," "Adventureland," "Fantasyland," "Frontierland" and "Tomorrowland" or similar lands, and would include attractions (for example, rides, shows, and parades), food and beverage locations, shops and service facilities;
- ii) have a Phase I - Opening Day capacity to accommodate an annual attendance of up to 7,500,000 visitors (daily attendance of approximately 39,000 visitors) rising to Phase II - Build Out capacity would accommodate an annual attendance of 20,000,000 visitors (daily attendance of approximately 84,100 visitors).

2.1.5 The Theme Parks would also include RD&E complex. The RD&E complex could be approximately 74,400 m² net in area and include a mix of:

- i) retail – shops selling unique merchandise;
- ii) dining – restaurants in a range of serving styles (mainly table service, but also including counter service, etc.) serving a variety of food and drink (including alcoholic beverages);
- iii) entertainment – including, for example, motion picture theaters and venues offering live entertainment;
- iv) area development, street furnishings and entertainment complementing the overall atmosphere of the RD&E complex.

2.1.6 The venues within the RD&E complex are contemplated to be operated in part by Hongkong International Theme Parks Limited (HKITP) (the company jointly owned by the HKSAR Government and the Walt Disney Company) and in part by third-party operators. In RD&E complexes typically found at other world-class international theme park locations, each venue has a theme and is carefully chosen from candidates identified world-wide to achieve an entertaining mix and meet the tastes of guests from the local and tourist markets.

2.1.7 Ultimately five or more individually themed hotels would be built with an aggregate of approximately 7,000 rooms in the economy to luxury categories, and would include convention facilities.

2.1.8 The Theme Park development concept is to transport guests into a world of imagination, fantasy and adventure bringing together the best of the rides, shows and attractions from major international theme parks around the world. The Theme Park supported by its associated infrastructures and facilities included in this Project is expected to become a core tourist attraction in the Hong Kong SAR.

2.2 PROJECT FACILITIES OVERVIEW

2.2.1 The proposed Project involves the construction of a two phase world-class international Theme Park together with its related developments and supporting infrastructure and services. The key elements of the Project are as follows:

Land Reclamation

- Reclamation of about 280 ha of land within Penny's Bay using marine sand fill and public filling materials and the construction of about 3.3 km of vertical and sloping seawall; this area will be primarily for the theme park and associated facilities and services;
- Reclamation of about 10 ha of land at Yam O, on North Lantau using public filling materials/ marine sand fill, and the construction of about 0.7 km seawall to retain the fill. This area will be required for the construction of part of the Road P2 and the temporary PTI at Yam O;

Theme Park, Retail, Dining and Entertainment and Hotels Development

- Phased development of a 180 ha Theme Park (including rides, shows and attractions) retail, dining and entertainment facilities (RD&E), and hotels up to 7,000 rooms by the built out of Phase II of the Theme Park; and

- An approximately 32 ha Water Recreation Centre with a 12 ha artificial lake and associated amenities (including car park, access roads, footpaths, trail and boating centre and landscaping) to provide both secondary contact water recreational activities and irrigation functions, together with de-silting and pumping facilities.

Permanent Transportation Infrastructure

- Permanent new roads comprising:
 - a) A section of Chok Ko Wan Link Road (Expressway Standard about 1.5 km long) dual three lanes from the existing Yam O Interchange to the proposed Penny's Bay roundabout (located to the west of the existing China Light and Power (CLP) Penny's Bay Gas Turbine Plant (GTP) (see *Section 1.4*);
 - b) Road P2 (Primary Distributor) together with an access road at Yam O to connect the proposed Yam O rail station to the Theme Park Phase II roundabout. The proposed Road P2 will be dual two lanes and of about 4 km long with 4 roundabouts (part of the proposed road works will be accommodated on the proposed reclamation of about 10 ha at Yam O);
 - c) A 3.5 km long Resort Road (District Distributor), namely D1 and D2, around the proposed Theme Park (*Figure 2.9b*); and
 - d) A central pedestrian walkway located between the two theme parks through the Retail, Dining and Entertainment complexes (about 800 m long).
- A new 3.6 km long rail line (Penny's Bay Rail Link) partly in a tunnel (850 m) from the Tung Chung Line at Yam O to the Theme Park (new stations at Yam O and the Theme Park (Penny's Bay Rail Station) will also be provided) (see *Annex M*);
- Two public parking areas at Penny's Bay;
- A Public Transport Interchange (PTI) for the Theme Park close to the Penny's Bay Rail Station and a temporary PTI at Yam O Rail Station;
- Two ferry piers on the southern waterfront to provide an alternative transport mode via direct marine access to the Theme Park. It is understood that CED, as an environmental initiative, have previously committed that the Theme Park ferry pier fenders will use fabric fenders instead of tropical hardwood fenders; and
- A separate service quay along the seawall to be used for service and deliverables, as described above, any fenders required will use fabric fenders instead of tropical hardwood fenders.

General Services Infrastructure and Associated Works

- An approximately 15 km long stormwater drainage system comprising an open channel of about 30 m width (west of the Theme Park and associated developments), box culverts and pipelines discharging to sea;
- A sewerage network including pumping station(s), sewage chamber(s) and wells together with the associated sewers and pumping mains;
- Essential facilities for the operation of the Theme Park including pipelines for fresh, salt and irrigation water supply and utility services;
- Road side buffers, berms, landscaping and slope stabilisation works; and
- Police, fire service and ambulance facilities.

2.3 EIA ORDINANCE REQUIREMENTS AND DESIGNATED PROJECTS

2.3.1 The proposed Project comprises a number of individual elements which are classified as Designated Projects (DPs) under Schedule 2, Part I of the EIAO; DPs require an EIA and Environmental Permit (EP) before their construction and operation. In accordance with Clause 3.8.11 of the Study Brief, the DPs that have been identified are presented in *Table 2.3a*.

Table 2.3a - Schedule 2 Designated Projects

Schedule 2, Part I Category	Description	Part I of Schedule 2 EIAO Reference
A - Roads, Railways and Depots	<ul style="list-style-type: none"> Approx 1.5 km section of Chok Ko Wan Link Road (Expressway Standard) Approx 4 km long Road P2 (Primary Distributor) Approx 3.5 km long Resort Road D1 and D2 (District Distributor) 	A.1 A.1 A.1
	<ul style="list-style-type: none"> Approx 3.6 km Penny's Bay Rail Link and its 2 associated stations (including 850 m of tunnel) 	A.2, A.4 and A.7
C - Reclamation, Hydraulic and Marine Facilities, Dredging and Dumping	<ul style="list-style-type: none"> Penny's Bay Reclamation (about 280 ha) using marine sand fill and public filling materials; A 10 ha reclamation at Yam O 	C.1, C.2, C.11 and C.12 C.1
I - Waterways and Drainage Works	<ul style="list-style-type: none"> Approx 12 ha artificial lake within the Water Recreation Centre Eastern stormwater drainage culvert (discharges within 300 m of the existing Pa Tau Kwu archaeological site). 	I.2 and O.8 I.1(b) (ii)
O - Tourist and Recreational Developments	<ul style="list-style-type: none"> The Theme Park (Phases I and II) and associated developments with an area of about 180 ha 	O.8

2.3.2 Therefore, the Project comprises of a total 9 Designated Projects, which are shown in *Figure 2.3a*.

2.4 SITE LOCATION AND HISTORY

SITE LOCATION

2.4.1 The proposed Theme Park development and its associated infrastructure will be located in and adjacent to Penny's Bay on North Lantau as shown on *Figure 2.4a*. The Project Boundary and location of key proposed facilities are also shown.

2.4.2 To the north of the site is Yam O Wan and the North Lantau Highway. To the south of the site is Peng Chau Island; Discovery Bay, a residential community on Lantau Island, is located to the west south-west of the boundary. The Hong Kong International Airport is approximately 11 km to the west and Hong Kong central is approximately 15 km to the east. *Figures 2.4b* shows the Theme Park location contextually.

SITE AND PROJECT HISTORY

2.4.3 The proposed Project site and its general environs fall within the Draft Northeast Lantau Outline Zoning Plan (OZP) (S/I-NEL/5) gazetted in August 1999. The majority of the Project site and its surroundings are currently undeveloped with no residential areas within 2 km of the nearest site boundary.

- 2.4.4 An existing shipyard (Cheoy Lee Shipyard) currently occupies a 19 ha plot of land within the proposed Project site in inner Penny's Bay (see *Figure 2.4a*). The shipyard commenced operations in the 1960's and is primarily involved in the construction and repair of glass fibre reinforced plastic yachts, boats and steel ships (the decommissioning of this shipyard will be the subject of a separate future Schedule 2 EIA study to be commissioned by CED).
- 2.4.5 An existing CLP GTP is located on the eastern shore of Penny's Bay (*Figure 2.4c*). This GTP was commissioned in 1992 with a generating capacity of 300 MW which serves as a peak load and emergency back-up facility for the airport, Tung Chung and the future developments along NLH and the Project Area. There are three chimneys with a stack height of 50 m at the GTP.
- 2.4.6 There are two known archaeological sites within the Project Boundary: the Ta Shui Wan - Wan Tuk and Chok Ko Wan sites. The Ta Shui Wan - Wan Tuk site was partially modified by the construction of the Cheoy Lee Shipyard and the Yam O Interchange. The Chok Ko Wan site has been modified by construction of the Penny's Bay GTP (see *Section 11*).
- 2.4.7 The proposed Theme Park Development will be located in Penny's Bay which was originally earmarked for container terminals (CT10 and CT11) under the Lantau Port and Western Harbour Development Studies conducted in 1993.
- 2.4.8 A number of EIA Studies have confirmed the feasibility of the Penny's Bay reclamation and devised mitigation measures. The EIA reports that have been previously endorsed by Environmental Pollution Advisory Committee (EPCOM) and Advisory Council on the Environment (ACE) are as follows:
- i. *Lantau Port and Western Harbour Development (LAPH) Studies (1993) Final Report, Volume III, EIA Report*, CED, (EIA-021/BC) endorsed by the EPCOM on 7 June 1993;
 - ii. *Lantau Port Development Stage 1 - Container Terminals 10 and 11 Ancillary Works (Design) EIA Final Report*, CED, 1994 (EIA-049BC) endorsed by the ACE with conditions on 20 February 1995;
 - iii. *Lantau Port Development Stage 1 - Container Terminals 10 and 11 Preliminary Design, Final Report, Volume 2, Container Terminal EIA*, CED 1995 (EIA-057BC) endorsed by ACE with conditions on 20 February 1995; and
 - iv. *Lantau Port Development Stage 1 - Design of Reclamation and Edge Structures for Container Terminals 10 and 11 and Back-up Areas*, EIA Final Report, CED, 1995 (EIA-073/BC) endorsed by ACE with conditions on 18 December 1995.
- 2.4.9 The subsequent LAPH studies confirmed the feasibility of North-East Lantau for port development as recommended in PADS. Based on the findings and recommendations of LAPH, the first version of an outline zoning plan (OZP) with port development as the main development theme for North-East Lantau was gazetted under the Town Planning Ordinance in March 1995 with subsequent minor amendments carried out in 1996 and 1998 (North-East Lantau Port OZP), as shown in *Figure 2.4d*.

- 2.4.10 The 1995 Visitor and Tourism Study commissioned by the Hong Kong Tourist Association in conjunction with the Planning Department identified the potential for a tourism corridor along the north shore of Lantau Island.
- 2.4.11 The 1997/98 Port Cargo Forecast (PCF) indicated that there is a general slowdown of the growth rate of cargo throughput in Hong Kong. On the basis of such findings, the planned development programme for port facilities has been subsequently reviewed.
- 2.4.12 The 1998 Territorial Development Strategy Review (TDSR) identified North-East Lantau as having potential for a range of other land uses, such as tourism/recreation, housing, business estate and major transport interchange. As a follow up to the TDSR, an integrated planning and engineering feasibility study was initiated by the CED in June 1998 known as the Northshore Lantau Development Feasibility Study (NLDFS); see *Section 1.4* of this EIA Report.
- 2.4.13 In March 1999, the Financial Secretary announced that the Administration was in the process of negotiation with The Walt Disney Company with a view to determining whether a Disney project could be brought to fruition in Hong Kong.
- 2.4.14 The Committee on Planning and Land Development (CPLD), after considering initial findings of the NLDFS, agreed that the land use proposals for North-East Lantau should be drawn up on the basis of the tourism/ recreation development theme, with an intention to translate North-East Lantau into a “Tourist Paradise” comprising a world-class theme park and a range of other compatible tourist attractions.
- 2.4.15 The findings of NLDFS and a preliminary outline development plan (PODP) were presented to the Town Planning Board in July 1999 and it was agreed that the PODP was a suitable basis for the revision of the previous North-East Lantau Port OZP.
- 2.4.16 The land use of the proposed Project site was thus revised to include a theme park and related resort development in accordance with the draft North-East Lantau OZP (S/I-NEL/5) which was gazetted in August 1999 (see *Figure 2.4e*). In parallel, the Penny’s Bay reclamation was gazetted under the Foreshore and Seabed Ordinance with a view to commencing reclamation works in May 2000.
- 2.4.17 The other main land uses proposed under the draft OZP includes sites for container terminals. Sites for two container terminals (CT12 and CT13) are retained to cater for long term port expansion in Hong Kong have been reserved to the south-southeast of the Theme Park (see *Figure 2.4e*), pending further studies on the alternative location for port development .
- 2.4.18 CED submitted an application for an Environmental Impact Assessment (EIA) Study Brief for the Project (*Project Profile No. PP066/1999*) under Section 5(1) of the EIA Ordinance (EIAO) on 3 November 1999. An EIA Study Brief (No. ESB-043/1999) was subsequently issued on 6 December 1999 (*Annex L*).

PROPOSED LAND USES OF NORTHSHORE LANTAU

- 2.4.19 As described in *Section 1.4* of this EIA, the Northshore Lantau Development Feasibility Study (NLDFS) is a concurrent planning and engineering feasibility consultancy also undertaken by CED

since June 1998. The NLDFS covers the north-eastern part of Lantau Island which comprises generally three portions:

- Northshore Lantau which stretches along the northern shoreline of Lantau Island between Tai Ho and Kwai Shek;
- Tsing Chau Tsai which is an upland area at North Lantau; and
- Reclamation which includes the broader Penny's Bay area stretching between Sze Pak Tsui and Pa Tau Kwu, Northeast Lantau between Pa Tau Kwu and Tso Wan, and the section of Chok Ko Wan Link Road stretching between Yam O Interchange and the Route 10 - North Lantau to Yuen Long Highway toll plaza at Fa Peng.

2.4.20 A draft Recommended Outline Development Plan (RODP) has been prepared in February 2000 (P188/D2/D) and has been used throughout this EIA, *Figure 2.4f*.

EIA STUDY ASSESSMENT AREAS

2.4.21 Various boundary conditions for assessing the environmental consequences of the developments included within the scope of this EIA have been specified under the Study Brief; these are summarised below.

Air Quality Impact and Terrestrial Ecology Assessment Areas

2.4.22 The “Assessment Area” for air quality impacts and terrestrial ecology impacts as defined by the Study Brief is as follows:

“.....shall be nominally defined as a distance of 500 m from the boundary of the scope of the EIA study...”

Noise Impact Assessment Area

2.4.23 The “Assessment Area” for noise impacts as defined by the Study Brief is as follows:

“.....shall include all areas within 300 m from the boundary of the scope of the EIA study...”

Water Quality and Marine Ecology Assessment Areas

2.4.24 The “Assessment Area” for water quality impacts and marine ecology impacts as defined by the Study Brief is as follows:

“.....shall cover all relevant sensitive receivers in North Western, Western Buffer and Southern Water Control Zones”.

Fisheries Assessment Area

2.4.25 The “Assessment Area” for fisheries impacts as defined by the Study Brief is as follows:

“.....shall include the scope of the EIA as defined in Section 3.2 (Study Brief) and its adjacent area of potential impact”.

Landscape Impact Assessment Area

2.4.26 The “Assessment Area” for landscape impacts as defined by the Study Brief is as follows:

“.....shall include all areas within 300 m from the proposed project”.

Visual Impact Assessment Area

2.4.27 The “Assessment Area” for visual impacts as defined by the Study Brief is as follows:

“.....shall be defined by the 8 km radius visual envelope from the proposed project”.

Additional Considerations

2.4.28 Where sensitive receptors that may be potentially affected by Project activities have been identified beyond the above boundary conditions, the assessment areas will be extended to cover such areas. Such assessment areas are described in relevant technical sections.

2.5 PROJECT DESIGN, CONSTRUCTION AND IMPLEMENTATION

2.5.1 CED will be the overall Project applicant and will undertake the Project reclamation and construction of essential infrastructures related to the Theme Park development. All Penny’s Bay Rail Link works will be undertaken by the intended railway operator, MTRC; whilst the design and construction of the Theme Park, hotels, retail, dining and entertainment elements will be carried out by the Theme Park operator, Hong Kong International Theme Parks Limited (HKITP).

2.5.2 Since this Project comprises a wide range of inter-related development proposals, the presentation of details of Project design, construction and implementation/ operation has been sub-divided into the following categories:

- Land reclamation/site formation;
- Theme Park and associated developments;
- Water Recreation Centre;
- Road transportation;
- Rail transportation (Penny’s Bay Rail Link); and
- Sewerage, drainage and other services.

2.5.3 The master construction programme and phasing drawings are presented in *Annex A*.

2.6 LAND RECLAMATION / SITE FORMATION CONSTRUCTION

2.6.1 The land reclamation, infrastructure and berm formation will be undertaken by CED. The reclamation will be formed using dredged and drained methods of reclamation. The drained method will be used at the head of Penny’s Bay (adjacent to the Cheoy Lee shipyard), Penny’s Bay Stage II reclamation and Yam O. Dredged reclamation will be adopted in the Penny’s Bay Stage I reclamation, except at the head of Penny’s Bay and the interface area with Stage II reclamation (approximately 28 ha). Reclamation activities for the Project will include the construction of an approximately 3.3 km seawall at Penny’s Bay and a 0.7 km seawall at Yam O which will involve:

- Dredging of sediments in the area below the reclamation and where the seawall will be located;

- Placement of sand material in the dredged area for construction of seawall;
- Placement of rock material and concreting works to construct the seawall;
- Infill of the area behind the seawall with marine sand fill and public filling materials to create the formed site;
- Surcharge of the filled site with marine sand/public filling materials to assist settlement; and
- Removal of surcharge material and completion of formed site.

Penny's Bay

- 2.6.2 A permanent 3.3 km seawall comprising sloping and vertical blockwork will be constructed around the seaward boundary of the reclamation to protect the reclamation site from wave and tidal action. The seawall will be constructed to achieve a minimum height of +6.5 m mPD (after settlement). A wave return structure (approx. 0.5 m high) will be provided on top of the seawall to protect against overtopping.
- 2.6.3 The site formation for Penny's Bay Stage II reclamation will include the construction of a 2.5 km of permanent seawall and a 0.8 km of temporary seawall.

Yam O

- 2.6.4 An approximately 0.7 km long seawall rubble mound will be constructed for the 10 ha Yam O reclamation which comprises an *EIAO, Schedule 2* designed project, *Table 2.3a*.

LAND RECLAMATION / SITE FORMATION PHASING SCHEDULE

Penny's Bay

- 2.6.5 A summary programme for the Penny's Bay reclamation is presented in *Annex A*.
- 2.6.6 The proposed Theme Park Developments will be situated on land reclaimed from the sea. The reclamation will be undertaken in a two-stage reclamation programme (Penny's Bay Reclamation Stages I and II). Penny's Bay Reclamation Stage I (approx. 200 ha) will cover the Theme Park Phase I area, area north of the Theme Park Phase I (area for the WRC) and part of the Theme Park Phase II area. Penny's Bay Reclamation Stage II will cover the remaining Theme Park Phase II area and area for its associated infrastructure.
- 2.6.7 Reclamation works are expected to commence Q2 2000 with completion and handover of the formed Theme Park Phase I site in about 22 months. For the purposes of this EIA, the programme for the reclamation works is assumed as a fast track programme to ascertain the worst possible adverse environmental impact.

Yam O

- 2.6.8 Works for the 10 ha reclamation and a 0.7 km seawall for the construction of the temporary PTI at Yam O and for part of the Road P2 are expected to commence in Q4 2001 and to be completed within about 22 months.
- 2.6.9 The currently proposed programme for reclamation works is summarised in *Table 2.6a*; *Table A1 in Annex A* shows the reclamation elements. The Penny's Bay Stage I and II Reclamation areas are shown on *Figure 2.9a*.

Table 2.6a - Land Reclamation Schedule (Reclamation Construction)

Activity	Start	Finish
<i>Penny's Bay Reclamation (Stage I)</i>		
Dredging	Q2 2000	Q4 2001
Seawall construction	Q3 2000	Q2 2002
Filling	Q4 2000	Q2 2002
Surcharge	Q1 2001	Q3 2002
<i>Yam O Reclamation (10 ha)</i>		
Dredging	Q4 2001	Q4 2002
Seawall construction	Q3 2002	Q1 2003
Filling	Q4 2002	Q2 2003
Surcharge	Q1 2003	Q3 2003
<i>Penny's Bay Reclamation (Stage II)</i>		
Dredging	Q3 2001	Q1 2005
Seawall construction	Q4 2001	Q3 2005
Filling	Q2 2003	Q2 2007
Surcharge	Q3 2003	Q4 2008
Note: Q1 represents first quarter etc.		

DREDGING REQUIREMENTS AND METHODS***Penny's Bay***

2.6.10 Dredging in Penny's Bay reclamation is expected to be carried out using a combination of Trailing Suction Hopper Dredgers (TSHDs), commonly referred to as a trailer dredger, and grab dredgers. The maximum cumulative dredging rate for the equipment spread will be about 634,000 m³ week⁻¹. Additional details on the dredging programme are provided in *Section 5*.

Yam O

2.6.11 Dredging at Yam O is expected to be carried out using a single grab dredger working at a rate of about 2,000 m³ day⁻¹.

2.6.12 A summary of the total quantities of dredged material for the Penny's Bay Stage I, Stage II and Yam O reclamations is provided in *Table 2.6b*.

Table 2.6b - Estimation of Sediment Requiring Disposal

Area	Dredged material (Million m ³)
Penny's Bay Stage I Reclamation	40
Penny's Bay Stage II Reclamation	5
Yam O Temporary PTI Reclamation	0.3
Water Recreation Centre	1
CKWLR Section	0.002

2.6.13 Details on the disposal of dredged materials are provided in *Section 6*.

FILLING AND FILL MATERIAL SOURCES

2.6.14 The final method of filling will depend on the contractors plant and resources. However, the process will typically involve the following stages:

- Placement of a geotextile on top of the marine mud to reduce mud waves during reclamation (for drained reclamation);
- Place a 3 m capping layer of marine sand (typically by bottom dump barges) in successive layers of about 0.5 m over geotextile layer (for drained reclamation);
- Install vertical drains through the capping layer into the soft marine clay;
- Place fill material (public fill and marine sand) in layers of +2.2 mPD;
- Carry out deep vibro-compaction/ground treatment;
- Continue filling marine sand to the final formation level plus 0.5 m; and
- Surcharge (with public fill or marine sand) for later removal as fill.

Maximising Use of Public Filling Materials in the Project

- 2.6.15 Public fill as a source of fill for Penny's Bay Stage I and Stage II reclamation has been included in the construction programme. The material that will be accepted at the site will be public fill in accordance with the conditions of Dumping Licence. Acceptable materials will include earth, building debris, broken rock and concrete.
- 2.6.16 Penny's Bay Reclamation requires a large amount of fill material (about 85 Mm³) and therefore offers a very good opportunity to utilise the public fill generated in the SAR. The use of public fill will not only alleviate the demand for virgin fill material but also reduce the pressure of disposing inert Construction and Demolition Material (C&DM) at the strategic landfills. Section 6 details the intention to maximise the use of good quality public filling material within the Penny's Bay Reclamation Stage I and II whilst ensuring that Project programme is not adversely affected. As can be seen below this allows about 13 million m³ of public filling material in the reclamation.
- 2.6.17 Stage II of the Penny's Bay reclamation requires 18.4 Mm³ of fill material from Q2 2003. Again, public fill will be used as far as practical for the reclamation. The public fill should be in accordance with the conditions as stated in the Dumping Licence. It is estimated that about 11 Mm³ of public fill (almost all the public fill that can be assigned to the reclamation to be generated during the reclamation period) can be used for the reclamation and the balance will be sand fill (about 7.4 Mm³). The Stage II reclamation adopts maximum use of public fill given the available geometry of the reclamation (53% of the reclamation volume).
- 2.6.18 The Yam O reclamation requires approximately 1.7 Mm³ of fill material between Q4 2002 and Q2 2003. Public fill will be used as far as practical for the reclamation. It is estimated that about 1.2 M m³ of public fill (about 70 % of the total fill requirement) will be used for the reclamation and the balance will be sand fill (about 0.5M m³ which will mainly used for the construction of the seawall and the sand blanket laid on top of the marine mud left in place). The supply of public fill is co-ordinated by Public Filling Sub-committee (PFSC).

Penny's Bay

- 2.6.19 Sand fill is likely to be delivered to the site by THSDs; the maximum anticipated filling rate will be 994,800 m³ week⁻¹. It is understood that part Penny's Bay sand fill material will be placed within a

rehandling basin and will be transferred to the fill face by cutter suction dredger. Additional details on the filling programme are provided in *Section 5*.

2.6.20 Marine sand and public fill will be used for both the Stage I and Stage II reclamations; though public fill will only be utilised in Penny's Bay Reclamation Stage I area outside the Theme Park Phase I area.

2.6.21 It is estimated that some 65 Mm³ of sand, 2 Mm³ of public fill will be required for Stage I reclamation. Rockfill for seawall construction is estimated to be about 1 million m³.

2.6.22 Stage II reclamation is expected to require some 7.4 Mm³ of sand, 11 Mm³ of public fill. Rockfill for seawall construction is estimated to be about 0.6 Mm³.

Yam O

2.6.23 The volumes of public fill and marine sand are described above and it is currently envisaged that 0.6 Mm³ of rock fill will be required for the 10 ha Yam O reclamation.

2.6.24 It is currently envisaged that the majority of Project fill material will be sourced from the Wailingding Marine Borrow Area which is in Mainland waters. A small portion of the sand fill is likely to be obtained from the East Lamma Channel Marine Borrow Area allocated by the Fill Management Committee (FMC).

2.6.25 It is understood that CED have previously committed that the use of wooden construction site hoarding would not be allowed and metal (aluminium, alloy etc.) would be recommended as this would reduce the volume of construction and demolition waste for the Project.

2.7 THEME PARK AND ASSOCIATED DEVELOPMENTS

THEME PARK CONSTRUCTION WORKS

2.7.1 Following the completion of the Theme Park Phase I Penny's Bay reclamation and basic infrastructure by CED in Q3 2002, the formed Stage I Site will be handed over to the HKITP for Theme Park construction.

2.7.2 The required works for the construction of the Theme Park, RD&E, hotels and associated facilities include the use of heavy plant for excavation, piling, filling, concreting and building/ structures construction. Key activities will include:

- Foundation works for Theme Park buildings, attractions etc;
- Construction of Theme Park buildings, attractions etc;
- Theme Park surfacing, landscaping and berms;
- Foundation works for hotels;
- Hotel superstructure construction;
- Ferry pier substructure and buildings (piling/ foundations) to be built by Government;
- Ferry pier superstructure construction to be built by Government;
- Construction and surfacing of central pedestrian walkway to be built by Government; and
- Associated infrastructure and underground utilities.

2.7.3 It is understood that CED have committed that the use of wooden construction site hoarding would not be allowed and metal (aluminium, alloy etc.) would be recommended as this would reduce the volume of construction and demolition waste for the Project.

THEME PARK CONSTRUCTION PHASING SCHEDULE

2.7.4 The proposed Theme Park will be constructed on land reclaimed by CED in phases; once reclamation and basic infrastructure is completed, the site will be handed over to the HKITP for construction of Theme Park superstructures, hotels, RD&E elements together with the associated infrastructures. The Theme Park will be developed in three milestones as follows:

- Phase I - Opening Day;
- Phase I - Build Out; and
- Phase II - Build Out.

2.7.5 Theme Park (Phase I) development will occupy the western portion of the proposed site and will comprise the provision of an Opening Day Theme Park and related hotel and RD&E elements. Construction duration for Phase I is anticipated to be approximately 36 months for the Opening Day Theme Park and related hotel and RD&E elements. This HKITP construction duration does not include CED's construction of related infrastructure and land reclamation (see *Section 2.6*).

2.7.6 The Theme Park (Phase I) development will then be expanded over a ten year period to achieve the finalised Phase I Theme Park (Phase I - Build Out).

2.7.7 The Theme Park (Phase II) - Build Out is estimated to be completed in 2024 and will mirror the development of Phase I - Build Out.

2.7.8 *Figure 2.7a* shows Theme Park Phase I and Phase II conceptual layout locations and *Table 2.7a* provides the approximate schedule for development of the Theme Park, RD&E and hotels.

Table 2.7a - Approximate Schedule for Theme Park Development Assumed in the EIA Analysis

Activity	Start	Finish
<i>Phase I</i>		
Foundations for Theme Park & attractions	Q2 2002	Q2 2003
Construction of Theme Park buildings & attractions	Q3 2002	Q1 2005
Theme Park surfacing, landscaping etc.	Q2 2004	Q2 2005
Hotel foundations	Q4 2002	Q2 2003
Hotel superstructures	Q1 2003	Q2 2005
Ferry pier	Q2 2002	Q2 2005
Pedestrian walkway	Q2 2004	Q12 2005
Phase I - Opening Day	Q2 2005	-
Phase I - Build Out	-	2014
<i>Phase II</i>		
Theme Park & attractions	Q3 2008	Q2 2011
Hotels	Q1 2009	Q2 2011
Phase II - Build Out	2007	2024

THEME PARK OPERATIONAL FACILITIES

- 2.7.9 The Theme Park and associated and developments comprises an *EIAO Schedule 2* designated Project, *Table 2.3a*.
- 2.7.10 The Theme Park (about 180 ha) is intended to be a comprehensively planned, low density and generally low to medium rise environment, providing a range of attractions. Key attractions and facilities to be provided will include amphitheatres, amusement devices and rides, theme attractions and ancillary restaurants, retail shops, and servicing facilities. The majority of buildings and structures within the Theme Park will be low to medium rise; the maximum height of structures will be limited to 100 m although it is understood that structures within 500 m from the Penny's Bay GTP will be maintained within 50 m.
- 2.7.11 A approximately 800 m long central pedestrian spine (walkway) will be provided to connect the railway station, public coach/car park and Public Transport Interchange at the northern entrance to the Theme Park down to the two ferry piers on the southern coast.
- 2.7.12 The coastal area to the south of the Theme Park is designated for five or more hotels (about 53 ha), *Figure 2.7a*, although layout of hotels is still to be determined with an initial capacity of about 1,400 guests (2 hotels open on Phase I - Opening Day) (Phase I) and up to 7,000 guests when fully developed (Phase II). Most hotels will be between 5 and 7 storeys and will not exceed 40 m height. Landscaped berms will separate most of the hotels from each other to maintain independent themes for each hotel. The location of the berms is shown in *Figure 2.7b*.
- 2.7.13 Two ferry piers (about 0.8 ha) will be located on the southern waterfront of Penny's Bay to provide visitors with direct marine access (for both staff and guests) to the Theme Park and associated developments. Subject to demand, licensed ferry services will be provided through commercial tender. It is presently envisaged the vessels used will have a speed between 24 to 33 knots and capacity of about 300 to 500 passengers. Kiosks not greater than 20 m² each and 10 in number as service trades have been considered ancillary to the "Pier" zone on the Draft OZP. It is understood that CED, as an environmental initiative, have previously committed that the Theme Park ferry piers fenders will use fabric fenders instead of tropical hardwood fenders.
- 2.7.14 A general plan of the Penny's Bay Development Area is included in *Figure 2.7a*. This plan identifies the location of the Phases I and II Theme Parks, hotels, and RD&E elements. Support facilities such as back of house, utility yard, public service, parking areas, public transport interchange, ferry piers, service quay and transportation routes/roads are also shown on the figure.
- 2.7.15 A back of house area (described in Section 2.7.33) includes the storage, maintenance, office, shops, and wardrobe facilities etc used to support the operations of the Theme Park development. The public will not have access to the back of house area. There will be two parking areas, one for private cars and one for coaches, for each phases of the Theme Park development. These are further described in *Section 2.12*.
- 2.7.16 Further details of construction of the Theme Park are provided in *Sections 3 and 4*.

THEME PARK OPERATIONAL CONCEPT

Theme Park Attendance and Staffing

2.7.17 A summary of the operational programme assumptions for each phase of the Theme Park, RD&E and hotel development assumed in this EIA is provided in *Table 2.7b*. Additionally, *Table 2.7b* presents total (Theme Park, RD&E and hotel) employment assumptions, although numbers of staff will depend on attendance and hours of operation.

Table 2.7b - Key Operational Assumptions

Aspects	Phase I - Opening	Phase I - Build Out	Phase II - Build Out
Theme Park Attendance (Annual)	7.5 million	10.0 million	17.1 million
Theme Park Reference Day Attendance (Per Day)	39,000	44,000	84,000
RD&E Attendance (Annual)	6.6 million	10.1 million	17.1 million
RD&E Reference Day Attendance (Per Day)	27,100	41,500	70,200
Rentable areas (m ²)	27,907	41,860	74,419
Daily Employment	5,300	8,600	17,100
Total Employment	7,400	12,100	23,900
On-site Hotel Guests	4,100	9,100	20,600
On-site Hotel Rooms	1,400	3,100	7,000

Theme Park and RD&E Area Operating Hours

2.7.18 The hours of Theme Park and RD&E areas operation will be dependent upon the demand for the facilities and therefore may fluctuate throughout the year. EIA worst-case assumptions anticipate that the Theme Park and RD&E areas would be open from 8.00 am to midnight and 9.00 am to 2.00 am, respectively; although actual operation hours for both Theme Park Phases will likely to be less.

Overview of Phase I Themes

2.7.19 The Phase I Theme Park will be a “Magic Kingdom” type park with themed areas such as “Main Street”, “Adventureland”, Fantasyland”, “Frontierland”, “Tomorrowland” or similar. Specific “themes” of each land will be determined during the design process but will include attractions (amusement ride/device, exhibit, game arcade, or others in a combination to be determined), places of public entertainment (show, parade, theatre, performance areas), restaurants/dining areas, retail shops, and related support facilities (kitchens, storage, restrooms, photographic studios, bank services areas). The above list aims to provide a general understanding of the uses planned for Phase I Theme Park. A specific layout plan for the Theme Park would be developed by HKITP and completed after actual design takes place (about two years after Project approval). However, a tentative conceptual layout indicating broad height bands and development bulk has been drawn up for the purposes of this EIA (see *Figure 2.7c*).

Theme Park Phase I: Preliminary Themed Concepts

2.7.20 The Theme Park Phases I and II will be designed to transport guests into a world of imagination, fantasy and adventure. The Theme Parks will bring together the best of the rides, shows and attractions from operating theme parks around the world to create a mix of new and traditional theme park entertainment experiences.

2.7.21 Like other world-class international theme parks, the proposed Theme Park (Phase I) will be a “Magic Kingdom” type park and would consist of several “lands”, each offering unique experiences. Each land might include the entertainment ‘themed’ concepts, such as the following, and would include attractions (for example rides, shows, and parades), food and beverage locations, shops and service facilities either at opening or as additions in future years:

- Main Street Concept - Main Street may serve as the dramatic entryway to the Theme Park. Here guests could enter a Main Street, an area that will capture the excitement, friendliness and energy of a community - gathering place. Designed after an old-fashion small town USA, this concept would include a stage for live entertainment and parades as well as special events;
- Fantasyland Concept - Fantasyland may comprises a magical home of animated characters and stories. Here guests can ride on themed attractions (both indoor and outdoor) and enjoy retail and dining opportunities;
- Toontown Concept - Toontown may comprise a world where the beloved cartoon entertainment characters live and play. Here guests may ride on cartoon themed attractions and meet one-on-one with cartoon entertainment characters. They might visit the “houses” of many cartoon entertainment characters or ride on a roller-coaster;
- Adventureland Concept - Adventureland may comprise a “journey” to exotic regions of exploration, adventure and discovery. Here guests may enjoy retail and dining opportunities, ride a roller coaster through a dark jungle themed area. They could explore a themed archaeological site in search of “artefacts”, ride on indoor themed virtually reality attraction, or experience a live show featuring the music and characters from cartoon entertainment classics;
- Frontierland Concept - Frontierland may comprise a walk right into an American Old West of the 1880’s themed area. Here park guests may explore a frontier outpost a mythical American fort. They might also enjoy a haunted mansion attraction; shoot the rapids on a river raft ride, or watch a film in a theatre; and
- Tomorrowland Concept - Tomorrowland may comprise a world of the future, filled with sci-fi fantasies and adventures. Here guests can join cartoon entertainment characters as they pilot their own spinning “spacecraft”. They might also take a drive through the landscape of tomorrow and frolic in a futuristic water fountain.

Phase II Theme Park: Preliminary Concepts

2.7.22 The Phase II Theme Park will complement the Phase I Theme Park but will likely to have a different theme and design. Although attractions have not yet been determined by the HKITP, the uses, in general, will be consistent with those listed for the Phase I Theme Park.

2.7.23 The tentative conceptual plan for themed areas for EIA assessment is provided in *Figure 2.7c*; where necessary for the purposes of this assessment, assumptions have been made regarding the indicative location and placement of major attractions within the Theme Park Phase II area. Such assumptions are identified in appropriate technical sections of this EIA Study.

Fireworks

2.7.24 The Theme Park will provide a nightly fireworks show which is expected to include low-level and mid-level fireworks only. There are two types of shows that may be incorporated into the entertainment programme.

2.7.25 The first type of show uses fireworks in conjunction with theatrical presentations such as lights, lasers, music, Audio-Animatronics[®], video displays, stage settings and performers; such a show only uses fireworks or pyrotechnics as show effects and does not use substantial amount of

fireworks per show. The duration of each whole show will be approximately 20 minutes with approximately 5 minutes of fireworks display only. The maximum display height will be limited to 30 m; such a show is considered to be a low-level show. Due to the theatrical nature of the show it could be located within any of the various lands within each Theme Park. A low-level show would not be visible outside the specific land.

2.7.26 A mid-level show will include launched shells and other fireworks from a secure back of house launch site (as shown in *Figure 10.3a*). The maximum display height will be limited to approximately 100 m and will be visible from many locations within the Theme Park. The duration of a mid-level fireworks display would be approximately five minutes, depending on the show design.

2.7.27 A summary of the principal features of the two types of shows is provided in *Table 2.7c*

Table 2.7c - Indicative Fireworks Show Details

Item	Low-level Show	Mid-level Show
Description	Small effects to accent theatrical performances	3, 4, and 5 inch shells, brocades, dumps, whistles, screamers, candles, gerbs and mines
Number of shows per year	485	365
Approximate shell burst height	30 m	100 m
Approximate fireworks show duration	Approx. 5 minutes	Approx. 5 minutes

2.7.28 It is anticipated that Phase I and Phase II Theme Parks will each comprise low-level and mid-level fireworks shows. It is assumed that a maximum of two low-level and one mid-level show will be presented each day. *Figure 2.7a* shows the location of firework launch sites for each Theme Park Phase. It is assumed that the Phase I fireworks shows will commence at 9 pm and Phase II fireworks show will commence at 9.30 pm and the two fireworks shows will not be underway concurrently.

2.7.29 Additionally, stage shows of 15-30 minutes duration at various indoor and outdoor venues are proposed but would not be visible, outside the viewing theatre areas. Such shows would only use approved pyrotechnics in small amounts for individual effects as part of the show.

2.7.30 The expected characteristics and storage requirements for the fireworks necessary for the proposed Theme Park shows, including stage shows, are provided *Section 10* and *Annex I*.

2.7.31 Laser effects used in the shows are expected to utilise lasers in the 20 to 30 watt power range. All laser effects will be “terminated” against fixed non-reflective objects within the Theme Park to prevent any impact to guests or staff inside the Theme Park, or outside the Theme Park to terrestrial faunal resources.

2.7.32 Additionally, as regards the impact of fireworks display on aircraft operations, the projection height (the maximum design height is 100 m) plus the vertical spread and the safety margin of any fireworks used in the displays will not exceed 430 mPD. Also, as described above the laser beams used in the displays will terminate at fixed non-reflective objects within the Theme Park. Therefore the hazards due to fireworks display and laser beams on aircraft operations are envisaged to be insignificant.

BACK OF HOUSE AREA

2.7.33 The back of house areas (approximately 15 ha) in each Theme Park (Phase I and II) will provide the essential facilities and functions required to support Theme Park operations and will include:

- Storage areas and warehouses (including dangerous goods storage and storage for fireworks) (further details provided in *Section 10*);
- Fabrication and maintenance workshops (fabricating and maintaining attractions, costumes, displays, painting, backdrops etc) in support of various Theme Park attractions;
- Boilers for space heating and domestic hot water production (further details provided in *Section 3*);
- Food preparation building, administrative offices, shops, employee lounge, laundry and wardrobe facilities and dressing rooms;
- Vehicle storage and services, fuel and emergency generator storage;
- Mid-level fireworks launch areas (further details provided in *Section 10*);
- Plant nursery and possible animal care facilities;
- Fire station operated by HKITP; and
- Waste storage and handling: an area of about 0.3 ha will be designated within each of the back of house service areas (Theme Park Phase I and Phase II) for solid waste storage and recyclables recovery/ waste reduction initiatives, including solid waste sorting and compaction. It is assumed that there will be five hotel refuse collection points (RCPs), two RCPs for each Theme Park phase (ie four total) and two RCPs for the RD&E area. The RCPs in the Phase I and II Theme Park will be located away from public areas in back of house service facilities. Further details pertaining to solid waste management and recycling area provided in *Section 6*.

RD&E AREAS

2.7.34 The RD&E area will border the government landscape district to the east and west. It will link the PTI and rail station(s) from the north of the ferry pier from the south. Access to the Theme Park will be provided from the RD&E area. Most of the building in the area will be one or two storeys with building heights occasionally rising above 20 m. The primary uses may include retail shops, dining/restaurants and places of entertainment. Secondary uses may include storage, administrative offices, solid waste management installation, utility services, kitchens and food preparations areas, and other uses to support the RD&E concept.

2.7.35 The layout and the venue mix have yet to be determined. Area development including landscaping, lighting and fixtures that complement the overall atmosphere of the complex will also be a key component of the RD&E area.

2.8 WATER RECREATION CENTRE

2.8.1 The Water Recreation Centre (about 32 ha) to the north-west of the Theme Park includes an artificial lake (about 12 ha) and associated amenities (car park, access roads, footpaths, trail and boat store and landscaping). This public element comprises an EIAO Schedule 2 Designated Project, *Table 2.3a*.

- 2.8.2 It is intended that the lake will be multi-functional providing:
- A landscape feature;
 - A source of freshwater for irrigation;
 - Reduced required volume of reclamation filling; and
 - Scope for public (secondary contact only) water sport recreational activities (boating, sailing, canoeing etc.).
- 2.8.3 Planned uses for the Water Recreation Centre may include a boating facility, changing rooms, restaurant/dining, refreshment kiosk, canteen, and place of recreation. Secondary uses may include storage, kitchens and food preparation areas, administrative offices, car and coach parking, and utility installation. A small building to serve the public will be located on site in order to house water recreation uses. The number of buildings and structures around the lake will be minimised and will be low-density and low-rise (6 m maximum height) in nature.
- 2.8.4 The building design will be themed appropriately for a water recreation centre. The majority of the remaining area of the water recreation centre will include the lake as well as landscaping and sitting areas to serve the public.
- 2.8.5 The lake will be filled primarily from run-off from the surrounding slopes (with a connection to the freshwater supply network for topping off to maintain the level of the lake); there will be a gate system to divert stormwater and prevent silt-filled stormwater from entering the lake after storm. De-silting facilities comprising sediment traps will be provided along the catchwaters to assist in sediment entrapment and removal. Protection systems will be provided to prevent stormwater run-off from hard surfaces (eg. roadways) and built-up areas from entering the lake under normal weather conditions. It should be noted that the lake does not form part of the primary drainage system.
- 2.8.6 The proposed water level in the lake will be limited to 1 m from the nominal level of +7.5 mPD. The lake is expected to be lined with a geosynthetic liner system including a high density polyethylene (HDPE) membrane sandwiched between protective geotextiles. The area of the lake is 12 ha and volume is expected to be about 600,000 - 700,000 m³.
- 2.8.7 Automatic penstocks are to be provided to control the flow of water from the catchwaters to the lake (based on lake water level). An overflow weir will be provided to allow surplus water (eg direct rainfall on the lake surface) to flow into the western drainage channel which discharges to the sea.
- 2.8.8 A back-up raw water supply system (or alternative fresh water supply from the proposed planned fresh water service reservoir at Yam O Tuk) will be provided to allow lake topping-up during the dry season (as required), as detailed in *Section 5*. A dedicated piping system and pump station (located in the utility yard) will be provided to extract and distribute lake water for irrigation purposes throughout the Theme Park development.

WATER RECREATION CENTRE CONSTRUCTION WORKS

- 2.8.9 The required works for the construction of the Water Recreation Centre facilities will include the use of heavy plant for excavation, piling, landscaping, concreting and building/ structures construction. Key activities will include:

- Lake excavation and dredging of marine sediment;
- Placement of lake membrane plus associated works/ tie-ins to drainage system;
- Construction of lake desilting and pumping facilities;
- Construction of Water Recreation Centre foundations; and
- Construction of Water Recreation Centre superstructure.

2.8.10 It is understood that CED has previously committed that the use of wooden construction site hoarding would not be allowed and metal (aluminium, alloy etc.) would be recommended as this would reduce the volume of construction and demolition waste for the Project.

WATER RECREATION CENTRE CONSTRUCTION PHASING AND SCHEDULE

2.8.11 A tentative schedule for development of the Water Recreation Centre is provided in *Table 2.8a*

Table 2.8a - Water Recreation Centre Construction Schedule

Activity	Start	Finish
Lake excavation	Q2 2001	Q4 2002
Liner placement	Q1 2002	Q4 2002
Lake supporting facilities	Q3 2002	Q1 2003
Water Recreation Centre foundations	Q3 2003	Q2 2004
Water Recreation Centre superstructure	Q2 2004	Q4 2004

2.9 ROAD TRANSPORTATION

2.9.1 The primary temporary and permanent new roads associated with the Project outlined in *Section 2.2* are detailed in the following sections.

TEMPORARY ACCESS ROAD

Alignment

2.9.2 A temporary access road will be constructed from Yam O to Penny's Bay to enable construction access to the Project area. The proposed route is shown on *Figure 2.9a*.

Construction Phasing Schedule

2.9.3 Construction of the temporary access road to Penny's Bay is envisaged to commence in Q3 2000 with construction works completed within about 3 months.

CHOK KO WAN LINK ROAD (CKWLR)

2.9.4 The CKWLR comprises an *EIAO Schedule 2* Designated Project, *Table 2.3.a*. The detailed EIA of CLWLR is presented in the NLDFS EIA. Pertinent details of the 1.5 km CKWLR section of this project are described herein.

CKWLR Alignment

2.9.5 The CKWLR will be designed as an Expressway Standard route serving traffic from Yam O Interchange to link up with R10. It will incorporate a roundabout at Penny's Bay to serve the Theme Park (see *Figure 2.9b*).

- 2.9.6 In the west the CKWLR will connect to the existing Yam O Interchange and on the eastern side to the R10-NLYLH toll plaza; and in the long run to the conceptual R10 - Hong Kong - Lantau Link (R10-HKLL) at the Pa Tau Kwu Interchange. The alignment of the CKWLR begins at about +33 mPD/ +26 mPD from Yam O and gradually descends to a level of about +15 mPD at the Penny's Bay roundabout. The Penny's Bay roundabout will be located to the north-west of the Penny's Bay GTP to provide local access via Road P2 to the Theme Park and the Water Recreation Centre. Access will be via an at-grade roundabout located below the CKWLR mainline.
- 2.9.7 The CKWLR is expected to be in the form of a dual 3 lane carriageway with a design speed of 100 km hr⁻¹.

CLWLR Constraints

- 2.9.8 Key identified constraints for the alignment of the western section of the CKWLR include the Yam O Interchange, the Penny's Bay Rail Link, the GTP, the need to provide a drainage reserve, and the need for Road P2 connection.

CKWLR Construction

- 2.9.9 The required works for the construction of the CKWLR will include the use of heavy plant for excavation, drilling, piling, concreting, surfacing and structures construction. Key activities will include:

- Demolition of Cheoy Lee Shipyard;
- Excavation works for the Yam O tie-in;
- Blasting works;
- Slope protection works;
- Construction of road foundations and superstructures from Yam O to Penny's Bay;
- Road surfacing and construction of road sections at grade from Yam O to Penny's Bay; and
- Road surfacing and construction of elevated road sections from Yam O to Penny's Bay.

- 2.9.10 It is understood that CED have previously committed that the use of wooden construction site hoarding would not be allowed and metal (aluminium, alloy etc.) would be recommended as this would reduce the volume of construction and demolition waste for the Project.

CKWLR Construction Phasing Schedule

- 2.9.11 Construction of the CKWLR from Yam O Interchange to Penny's Bay roundabout is envisaged to commence in Q3 2002 for completion in Q1 2005.

CKWLR Traffic Forecasts

- 2.9.12 The design traffic conditions and the percentage of heavy goods vehicles assumed in the air and noise impact assessments are summarised in *Figure 2.9b*.

ROAD P2

- 2.9.13 The approximately 4 km Road P2 (Primary Distributor) comprises an *EIAO Schedule 2* Designated Project, *Table 2.3a*.

Road P2 Alignment

- 2.9.14 Road P2 commences from the proposed development at Yam O and extends the existing Cheung Tung Road at Yam O interchange from P1 Junction and then connect to Penny's Bay Roundabout, provides a link from North Lantau to CKWLR and the Theme Park, and continuous along the southern coastal line to the Pa Tau Kwu roundabout (see *Figure 2.9b*). Road P2 will descend from a level of about +31 mPD at Yam O with an average gradient of +1.5% to the proposed Penny's Bay roundabout. It will run primarily on an elevated structure to connect to the Penny's Bay roundabout.
- 2.9.15 Road P2 is assumed to comprise a dual 2 lane arrangement and of about 4 km length. For EIA assessment purposes a design speed of 70 km hr⁻¹ is assumed.

Road P2 Construction Phasing Schedule

- 2.9.16 Construction of Road P2 from Yam O to the Penny's Bay roundabout is envisaged to commence in Q1 2003 with construction works completed within about 28 months. It is understood that CED have previously committed that the use of wooden construction site hoarding would not be allowed and metal (aluminium, alloy etc.) would be recommended as this would reduce the volume of construction and demolition waste for the Project.

Road P2 Traffic Forecasts

- 2.9.17 The design traffic conditions (design flow, percentage heavy goods vehicles and design speed) for the above road, which have been used in the air and noise impact assessments, are summarised in *Figure 2.9b*.

RESORT ROAD

Resort Road Alignment

- 2.9.18 The proposed Resort Road (D1 and D2 for Phases I and II of the Theme Park, respectively) will be about 3.5 km long of District Distributor standard around the proposed Theme Park connected to Road P2 in the east and west via roundabouts (see *Figure 2.9b*). The Resort Road comprises an EIAO Schedule 2 Designated Project as described in *Table 2.3a*. The assumed design speed for EIA assessment purpose is 70 km hr⁻¹.

Resort Road Construction Phasing Schedule

- 2.9.19 Construction of the Resort Road from the Penny's Bay roundabout is envisaged to commence in early 2003 with construction works for the western section completed within about 15 months. It is understood that CED have previously committed that the use of wooden construction site hoarding would not be allowed and metal (aluminium, alloy etc.) would be recommended as this would reduce the volume of construction and demolition waste for the Project.

Resort Road Traffic Forecasts

2.9.20 The design traffic conditions (design flow, percentage heavy goods vehicles and design speed) for the Resort Road, which have been used in the air and noise impact assessments, are summarised in *Figure 2.9b*.

PROJECT ROAD CONSTRUCTION WORKS SCHEDULE

2.9.21 A tentative schedule for all temporary and permanent road construction works for the Project is provided in *Table 2.9a*.

Table 2.9a - Tentative Schedule for Project Road Construction Works

Activity	Start	Finish
<i>Temporary Access Road</i>		
Surfacing and construction of road at grade	Q3 2000	Q4 2000
<i>CKWLR</i>		
Site formation and road works at Ngong Shuen Au	Q4 2001	Q4 2002
Piling, foundations and superstructure (Yam O Interchange to Penny's Bay roundabout)	Q4 2002	Q1 2005
Surfacing and construction of at grade and elevated sections	Q1 2003	Q1 2005
<i>Road P2</i>		
Construction of at grade and elevated sections(North Lantau to Theme Park west)	Q1 2003	Q1 2005
Road surfacing	Q2 2004	Q1 2005
<i>Resort Road</i>		
Western Resort Road (Road D1) construction and surfacing	Q1 2003	Q1 2004
Eastern Resort Road (Road D2) construction and surfacing	Q1 2007	Q1 2008

2.10 PENNY'S BAY RAIL LINK (PBRL)

2.10.1 This section provides a summary of the key elements of the proposed Penny's Bay Rail Link (PBRL), which with its two stations and tunnel element comprises an *EIAO Schedule 2* Designated Project, *Table 2.3a*. Full details are given in the separate PBRL EIA study which is appended to this report as *Annex M*

PBRL ALIGNMENT DESCRIPTION

2.10.2 The proposed Penny's Bay Rail Link comprises a new 3.6 km link from the existing Tung Chung Line at Yam O to Penny's Bay (see *Figure 2.1a* of *Annex M*).

2.10.3 A new Yam O Rail Station will be constructed along the existing Tung Chung Line and will have two platforms, for the Tung Chung Line services between Hong Kong and Tung Chung, and an additional, third platform dedicated to the PBRL service. Concourses will be constructed above the three platforms and connected by overhead link bridges.

2.10.4 The PBRL will comprise a single track which departs from the Up Tung Chung line track west of Yam O before passing under the existing North Lantau Highway and into a 100 m length of cut and cover tunnel. The PBRL then enters the 850 m single cell tunnel to pass below the central hills of Lantau to emerge to the north of Penny's Bay. A passing loop will be constructed to the south of the portal before the PBRL enters the new station at Penny's Bay, hereafter referred to as the

Penny's Bay Rail Station¹. The Penny's Bay Rail Station will be located to the north of the Theme Park and will comprise a single platform with cleaning facilities and a light workshop area.

2.10.5 Much of the PBRL is to be constructed at grade. However, portions of the track will be in cutting in the vicinity of Penny's Bay Rail Station and will be depressed shielded from the Theme Park by earth bunding alongside the PBRL alignment. At Yam O, the alignment is at-grade, situated on the existing reclamation level as it passes under the roads of the North Lantau Highway.

IDENTIFICATION OF PBRL ALIGNMENT CONSTRAINTS

2.10.6 Within the Yam O site, the alignment is constrained by the existing and proposed highways, the existing Lantau Airport Railway (LAR), an existing MTR traction substation and the close proximity of the sea wall. Together with the need for the PBRL platform to be parallel with the existing LAR lines, the alignment is essentially engineered to fit the existing infrastructure. Other options have been examined but these involve only minor deviation in the vicinity of Yam O Rail Station according to platform and connection details.

2.10.7 These constraints determine the alignment to the east and then south, in tunnel through the hill to Penny's Bay, continuing towards the Theme Park site on land to be reclaimed in Penny's Bay by CED. The layout within the Penny's Bay reclamation is determined by the planning layout of the intended land uses for the platform.

2.10.8 The existing LAR tracks at Yam O are at approximately +6.2 mPD and the PBRL will be at the same level with a horizontal profile extending from the LAR tracks to the tunnel portal. Throughout the tunnel section, the vertical alignment follows a slight up gradient towards the Penny's Bay reclamation, designed to closely parallel with the Government's highway proposals at that portal, then trending downwards to Penny's Bay Station, where it is at a level of approximately +2.0 mPD, which in conjunction with earth bunds, serves to mask train operations from the Theme Park.

PBRL OPERATING CONCEPT

2.10.9 The PBRL will be fully integrated with the MTRC's existing Tung Chung Line through a new interchange station at Yam O. From Yam O Station, the train will travel to a new station in Penny's Bay, with direct pedestrian access to the Theme Park site.

2.10.10 The new rail link will have the following operating characteristics:

- A shuttle service between the new Yam O Station on the Tung Chung Line and a new Penny's Bay Rail Station at Penny's Bay to be operated by the railway intended operator of MTRC.
- Fully integrated with the wider MTR network in terms of ticketing and service connections.
- Upon commissioning in 2005, urban line type train with at least three cars would operate a shuttle service from Yam O to the Theme Park. Train service interval would be subject to discussion and demand estimates, but are currently assumed to be between 5 and 10 minute

(1) Penny's Bay Rail Station is referred to as "Disneyland Station" in Annex M. These are only working names. The formal name of the station will be determined in due course.

headway in each direction.

- In the longer term, eight-car trains may be employed to meet increased demand.
- The train journey time from Yam O Station to Penny's Bay Rail Station would be about 3.5 minutes.
- Cross platform interchange, without ticket barriers and similar to the existing MTR network, would be provided at Yam O Rail Station for visitors travelling to Penny's Bay Rail Station from the main urban areas. These include visitors from the Tung Chung Line rail interchanges at Lai King and Nam Cheong. Their return journeys would be via convenient overhead passenger connections from the PBRL platform to the Hong Kong bound platform, also without ticket barriers.
- Customers originating in Tung Chung would interchange with the Penny's Bay Rail Link service by using the overhead pedestrian connections at Yam O Rail Station. Travellers returning to Tung Chung would take the mainline Tung Chung Line service, by cross-platform interchange, from Yam O Rail Station to Tung Chung.
- The Penny's Bay Rail Station will have a single platform. All trains would terminate and reverse at Penny's Bay Rail Station.
- The shuttle service would be integrated with the existing MTR lines and stabling, maintenance, etc. would be provided at the MTRC's existing facilities at nearby Siu Ho Wan Depot. This depot would also provide support and train substitution in the event of equipment failure.
- Light train cleaning at Penny's Bay Station.

METHOD OF PBRL CONSTRUCTION

2.10.11 Both station sites will be principal areas of construction, as shown by *Figure 2.4a* of *Annex M*, supplemented by a temporary depot near Penny's Bay Rail Station and sites at the tunnel portals.

2.10.12 The required works for the construction of PBRL include the use of heavy plant for excavation, filling, concreting, tunnelling and station construction. The key construction stages and activities of the Project are outlined below:

- Yam O Rail Station construction;
- Tunnel portal works;
- Tunnel works
- Track construction; and
- Penny's Bay Rail Station construction.

PBRL CONSTRUCTION PHASING SCHEDULE

2.10.13 Yam O Rail Station and the Penny's Bay Rail Link are expected to be opened for passenger service in early 2005, which will be approximately 36 months from the date of construction commencement. The presently envisaged programme milestones are shown in *Table 2.10a* assuming Government land at Penny's Bay will be available in early 2003.

Table 2.10a - Tentative Schedule for PBRL Construction and Implementation

Activity	Start	Finish
Yam O station and adjacent works	Q4 2002	Q2 2004
Tunnel	Q2 2002 (north) Q1 2003 (south)	Q2 2004 (north and south)
Penny's Bay Rail Station and open cut section of alignment	Q1 2003	Q2 2004
Track turn out and related works	Q2 2003	Q1 2005
Track works and overhead lines	Q2 2004	Q3 2004
Station fitting out, commissioning, trial and test runs	-	Q4 2004
PBRL operational (open to public)	Feb 2005	-

2.11 STORMWATER DRAINAGE, SEWERAGE AND OTHER UTILITIES

STORMWATER DRAINAGE SYSTEM

- 2.11.1 The currently proposed urban trunk drainage system (with the exception of the CLP site) will flow towards the east and discharge to the Kap Shui Mun Channel. This drainage structure is expected to comprise of a two to three cell box culvert (approximately 3.5 m wide and 3.5 m height each) arrangement with a length of about 1.7 km, the eastern stormwater drainage culvert comprises an EIAO Schedule 2 Designated Project, *Table 2.3a*, as it discharges within 300 m of the Pa Tau Kwu archaeological site.
- 2.11.2 Stormwater runoff from natural hill slopes surrounding Penny's Bay, landscaped areas of the new reclamation will be collected into a separate catchwater system for discharge to the sea via an open channel of about 2.2 km in length at the southwest corner of the reclamation.
- 2.11.3 It is proposed that drainage from the Theme Park and hotel areas will discharge to the sea via a number of 1-3 cell box culverts on the southern shoreline of the Penny's Bay reclamation.
- 2.11.4 A conceptual drainage layout plan for the Project is provided in *Figure 2.11a*, the provisional drainage layout for the Theme Park and associated facilities is also shown. See also *Section 2.12* concerning drainage of vehicle parking areas.
- 2.11.5 CED will be responsible for the provision of stormwater drainage systems.

SEWERAGE SYSTEM

- 2.11.6 The provisional sewerage plan for the Theme Park and associated developments comprises two principal sewers:
- One principal sewer would follow the route of the Resort Road to collect sewage from all areas to the south of the PBRL. The sewer will convey flows from east to west and would be expected to comprise a combination of gravity and pressurised systems. This sewer would discharge to a pumping station (nominal capacity of 112,320 m³/day in the north-west corner of the Theme Park in the area designated as a utility yard; and
 - A second principal sewer following Road P2 on the northern boundary of the Theme Park would collect flows from the north of PBRL. The sewer would conduct flows from east to west to the above pumping station.

2.11.7 The pumping station would convey flows via twin rising mains northwards to a previously constructed gravity main which will conduct flows to the Yam O Sewage Pumping Station. This pumping station will convey flows to the Siu Ho Wan Sewerage Treatment Works (SHWSTW).

2.11.8 The arrangement of sewerage within the Project site is shown in *Figure 2.11b*, and their construction will be the responsibility of CED. Further details are provided in *Section 5* of this EIA Report.

OTHER UTILITY AND SERVICE SYSTEMS

2.11.9 Other utility and service systems required for the Project will be provided and installed by CED and relevant utility service providers, as necessary, and will include:

- Water supply (fresh and probably salt water supply from planned/ proposed service reservoirs at Yam O Tuk and salt water may be supplied from Siu Ho Wan);
- Electricity supply;
- Town gas; and
- Telecommunications.

UTILITY AND SERVICES CONSTRUCTION PHASING SCHEDULE

2.11.10A tentative schedule for construction and installation of utility and services (for Theme Park Phase I development) is provided in *Table 2.11a*.

Table 2.11a - Tentative Schedule for Utilities and Services Installation

Activity	Start	Finish
Installation of sewerage mains, pumping station etc.	Q3 2000	Q1 2005
Installation of stormwater drainage, open channels and culverts	Q3 2000	Q1 2005
Installation of water mains, freshwater and saltwater systems	Q3 2000	Q1 2005
Installation of utilities and services	Q3 2000	Q1 2005

2.11.11 It is understood that CED have previously committed that the use of wooden construction site hoarding would not be allowed and metal (aluminium, alloy etc.) would be recommended as this would reduce the volume of construction and demolition waste for the Project.

2.12 OTHER ASSOCIATED THEME PARK DEVELOPMENTS

Government, Institution or Community (G/IC) Facilities

2.12.1 A strip of land of about 23 ha to the north of the Theme Park boundary has been assigned for supporting G/IC facilities related to security, rescue, parking and public transport. It will include the Penny's Bay Rail Station and the following facilities will be provided :

- divisional police station,
- divisional fire station (including an ambulance station),
- bus terminus,
- car park,
- coach park,
- petrol filling/ service station,
- telephone exchange, and

- other utility services.

Vehicle Parking Areas

- 2.12.2 Two vehicle parking areas located to the north of the Theme Park will be provided by HKITP one for coach and one for car parking: East Public Carpark and West Public Carpark. The parking areas will be located adjacent to the northern boundary of the Theme Park, to the south of Road P2 and on either side of the PTI (see *Figure 2.7a*). These parking areas will have a total combined area of about 11 ha and will provide parking for 300 to 600 tour coaches and 1,000 to 2,000 (Phase I - Opening Day - Phase II- Build Out, respectively) private cars. The maximum height of the parking structure is 15 m. Due to the nature of the parking areas, landscaping will be primarily on the perimeter of the parking areas.
- 2.12.3 Vehicle parking areas will include oil/grease/fuel interceptors/traps/ separators to prevent such discharges to stormwater drainage systems during routine operation.

Public Transport Interchanges (PTI)

- 2.12.4 Two Public Transport Interchanges will be provided by HKITP. One will be located to the north of the Theme Park between the Penny's Bay Rail Station and Road P2. This PTI will provide general drop off and pick up access for guests and employees. Permanent PTI related buildings will be a maximum 10 m tall. The second PTI will comprise a temporary facility located on the 10 ha reclamation at Yam O (see *Figure 2.4a*).

Roadside Buffers, Berms and Landscaping Features

- 2.12.5 Roadside buffers, berms and landscaping features will be provided by CED and HKITP. Full details of proposed screening and landscaping measures are provided in the landscape and visual impact assessment (see *Annex K*) and are shown in *Figure 2.7b*. It is understood that CED have previously committed that the use of wooden construction site hoarding would not be allowed and metal (aluminium, alloy etc.) would be recommended as this would reduce the volume of construction and demolition waste for the Project.

Slope Stabilisation

- 2.12.6 Slope stabilisation measures will be provided by CED for adjacent slopes in the Penny's Bay development area and adjacent to all infrastructure and related works. Provided measures will include slope formation and treatment, landslide prevention and remedial works as necessary. It is understood that CED have previously committed that the use of wooden construction site hoarding would not be allowed and metal (aluminium, alloy etc.) would be recommended as this would reduce the volume of construction and demolition waste for the Project.

2.13 CONCURRENT PROJECTS

- 2.13.1 Concurrent ongoing projects in the vicinity of this Project considered in impact assessments for cumulative purposes are described below:
- 2.13.2 The Route 10 - North Lantau to Yuen Long Highway (Route 10 - NLYLH) southern section comprises the link between the toll plaza at Fa Peng and the interchange to the south of So Kwun

Wat. The alignment connects to the Chok Ko Wan Link Road at Fa Peng. The construction work is scheduled to commence in 2002 for completion in 2007. An EIA has been completed in July 1999 for the Route 10-NLYLH southern section and has been approved under the EIAO.

- 2.13.3 The Remaining Development in Tung Chung and Tai Ho Comprehensive Feasibility Study covers four major development areas in Tung Chung (Center, Valley and East) and four in Tai Ho (West, Central, East and Bay). A Recommended Outline Development Plan has been produced for North Lantau with an ultimate target population of 320,000 for North Lantau at year 2011.
- 2.13.4 The proposed Dangerous Goods Anchorage (DGA) at Tang Lung Chau provides a total of 72 moorings and has a gross area of 67.5 ha, which is bounded by the centre lines of the surrounding breakwater. According to the Tsuen Wan Bay Further Reclamation, Area 35 Engineering, Planning and Environmental Investigation (TDD, 1999), the latest estimate on the programme for was for commencement of the works in late 2000 for completion in mid 2003.
- 2.13.5 The proposed reclamation at Sham Tseng covers an area of 16.3 ha located between Ting Kau and Sham Tseng Sewage Treatment Works and Tsing Lung Tau. The dredging and reclamation work was proposed to commence in 2002 for completion in 2004 and the construction of the entire project will complete by 2008.
- 2.13.6 In addition, a number of possible concurrent projects have been taken into consideration in this EIA. These include dredging and filling at the Container Terminal No. 9 (CT9) reclamation which the construction work was commenced in 1999 for completion (first berth operational) in 2001. Associated with construction of CT9 will be sand borrowing at the West of Sulphur Channel Marine Borrow Area (MBA) and dumping of dredged sediments at the South Tsing Yi MBA and/or the South Cheung Chau marine disposal ground. Contaminated mud dredged from the CT9 will be disposed at the East Sha Chau Contaminated Mud Pits.
- 2.13.7 Other reclamation projects considered including Tsuen Wan Bay Reclamation, sand winning at East Lamma Channel Marine Borrow Area, and Lamma Extension power station reclamation. Details of the assumptions adopted are presented in Section 5.

2.14 BENEFITS AND DISBENEFITS OF THE PROJECT

2.14.1 *Section 2.1* of this EIA summarised the principal reasons why the Theme Park and associated developments were being implemented. The perceived benefits associated with the Project are expected to be primarily of an economic nature. The development of a Theme Park and associated hotels and RD&E facilities has the potential for the following key benefits:

- It would be expected to strengthen Hong Kong SAR's role as a major tourist destination in Asia and the world;
- The development would be expected to act as a catalyst in attracting further tourism, recreational and leisure investment (e.g. hotels, retail, tourism services, air line and transport activities);
- The development would be expected to generate economic benefit to the HK SAR via additional spending by existing tourists and local residents;
- It would be expected to provide significant additional market for the services and materials supply sector during both construction and operation; and

- The Theme Park and associated developments would be a major employer generating direct and indirect employment opportunities during both construction and operation.

2.14.2 In addition, environmental benefits, designs, key protection measures, and enhancements arising from the Project include the following:

- HKITP has committed to exclude the purchase of any fireworks that contain Chromium, Lead, Mercury, Arsenic, Manganese, Nickel or Zinc in their formulation. This minimises the use of products containing potentially harmful heavy metals and reduces possible impacts to the surrounding environment.
- Noise created by the evening fireworks displays at the Theme Park is restricted to comply with the $L_{eq, 15min}$ 55 dB(A) limit at the relevant NSRs.
- Water quality mitigation measures for the construction of the Theme Park reclamations were specified in terms of operational constraints (eg limiting the rate of working, defining the construction sequence for the reclamations and recommending certain methods of construction) and 'best practice' working methods. The implementation of these measures would prevent adverse impacts to water quality.
- The Project's reclamations will require a large amount of fill material and therefore offer a very good opportunity to utilise the public fill generated in the SAR. The use of public fill will not only alleviate the demand for virgin fill material but also reduce the pressure of disposing inert Construction and Demolition Material (C&DM) at the strategic landfills.
- HKITP will implement waste reduction initiatives intended to divert material away from disposal at the strategic landfills. The initiatives will centre around the introduction of waste segregation and materials recovery measures.
- The use of fabric (plastic) fenders instead of tropical hardwood fenders has been recommended for the proposed Theme Park Ferry Pier and service quay construction.
- The use of wooden hoardings in the Project construction period will not be allowed and metal (aluminium, alloy, etc.) has been recommended to help reduce the quantity of construction and demolition (C&D) wastes.
- Secondary woodland planting will be undertaken to compensate for the loss of approximately 1.8 ha of the woodland at Ngong Shuen Au. As considerable areas, of not less than 6 ha, of woodland planting are proposed as landscape and visual impact mitigation on the adjacent hillside to the east of Ngong Shuen Au, sufficient compensatory woodland will be provided. Species used for planting should be similar to the species identified in the Tree Survey and be native to the Hong Kong or South China regions. The trees should bear fruit preferred by birds, and/or larval and/or adult butterfly food plants to maintain the ecological function of the existing secondary woodland.
- Laser effects used in the shows are expected to utilise lasers in the 20 to 30 Watt power range. All laser effects will also be "terminated" against fixed, non-reflective, objects within the Theme Park to prevent any impact to guests or staff inside the Theme Park, or to terrestrial faunal resources outside the Theme Park.
- Conservation of the natural coastline of western Penny's Bay by the recommendation of an open channel form rather than a box culvert in this area.
- Protection of pitcher plants by restricting access during construction works, even though the works area will not encroach upon their current habitat.
- As an additional habitat enhancement measure, the Project proponent has undertaken to deploy 4,350 m³ Artificial Reefs (ARs) in Hong Kong waters at a site (or sites) to be decided upon in consultation with the DAFC. ARs act as fish aggregation devices and provide hard bottom, high profile habitat in areas without natural cover. The ARs subsequently will provide food, shelter and a nursery ground for

commercial fish and, over the long term, enhance fishery stocks. Enhanced fish stocks in the area will not only benefit local fishermen but will also increase the availability of prey items for the seasonal population of marine mammals that uses the area.

- The sloping armour rock/concrete seawalls proposed for the Penny's Bay and Yam O reclamations have been demonstrated to become colonised by subtidal hard surface assemblages, such as soft corals, gorgonians and hard corals. Thus the potential habitat provided by the greater than 4.3 ha total surface is expected to mitigate for the loss of approximately 0.298 ha of high ecological value assemblages of hard corals within the reclamation sites.
- Environmental benefits arising from the conversion of land uses from port developments to tourism recreation purposes as the change from the originally planned port uses provides an opportunity to reduce the potential environmental impacts associated with port operation, including more heavy good vehicles in the Study Area causing noise and air pollution, hydrodynamic and water quality impacts, visual and glare impacts from 24 hour port operations.
- The public modes of transport to and from the Theme Park are expected to dominate the travel market, accounting for about 95% of all travel. Of the public modes, the rail mode will be dominant and will be complemented by other transport modes and the provision of integrated transport facilities (ie the PTIs at Yam O and the Theme Park) to improve accessibility by rail.

2.14.3 Potential disbenefits associated with the proposed Project may include:

- Loss of natural shoreline and associated inter-tidal habitats;
- Loss of natural shallow coastal marine habitats;
- Potential impact to natural terrestrial habitats and fauna;
- Increased solid waste generation;
- Potential noise impacts;
- Potential air quality impact;
- Potential risk on storage and handling of fireworks;
- Potential water quality impacts; and
- Potential landscape, visual and cultural heritage impacts.

2.14.4 Other cumulative environmental impacts arising as a result of the Project at a territory-wide level may possibly include increased solid waste generation, air emissions and wastewater discharges associated with additional visitors associated with the Project (see *Section 15*).

2.14.5 The actual scope for adverse environmental impact of these potential disbenefits will be examined in this EIA relative to the assessment criteria laid down in the EIAO TM. Where appropriate, this EIA will identify conditions and requirements for the detailed design, construction and operation of the Project to mitigate against adverse environmental consequence, and will report on the overall environmental acceptability of residual impacts after proposed mitigation measures are implemented.

2.15 SCENARIOS WITH AND WITHOUT THE PROJECT

2.15.1 A key development objective of the Project is to provide a world-class International Theme Park together with its related developments which is intended to transport guests into a world of imagination, fantasy and adventure. The Theme Park is also expected to become a core tourist attraction in the HK SAR.

2.15.2 Without the Project, the perceived benefits identified in *Section 2.14* will not be realised and environmental impacts described in this EIA will not arise.

- 2.15.3 It should also be noted that prior to the amendment of the North-East Lantau Port OZP and rezoning of part of the Penny's Bay area for theme park and related recreational usage, Penny's Bay had been designated for the development of CT10 and CT11. Without the Theme Park and associated developments, rezoning of the Project area for container terminals and port related uses, including container back-up areas, business park and industrial uses could not be precluded. Such container port and associated developments would likely involve 24 hour working leading to associated noise impacts, a higher percentage of heavy good vehicles in the Study Area with air and noise impacts plus hydrodynamic and water quality impacts, visual and glare impacts from 24-hour port operation lighting requirements.
- 2.15.4 On balance, it is considered that the consequences to the environment and adjacent environmental sensitive receivers arising from both the construction and operation of the previously proposed container ports (CT10 and CT11) would be greater than those predicted to arise for the construction and operation of the Theme Park and associated developments.