

2. PROJECT DESCRIPTION

2.1 Introduction

2.1.1 In order to sustain the proposed development, it will be necessary to provide local infrastructure to serve the needs of the Preferred Development Option (as well as to interconnect with the strategic infrastructure). Timely provision of local infrastructure will be essential to serve the new population and employment. This section provides a broad description of the Project and the construction works associated with it.

2.2 Background and History of the Project

2.2.1 The main purpose of the Feasibility Study on Housing Development at Whitehead and Lee On in Ma On Shan, Sha Tin ("the Study") is to ascertain the feasibility of developing the Study Area for residential purpose and to examine the aspects on housing types, development parameters, site formation, and the potential impacts on transport and infrastructural capacities and environmental quality. According to the Study Brief, various technical papers are required to be prepared. The various development schemes considered during the course of the study are depicted below.

Base Scheme

2.2.2 The combined Technical Paper No. 1 and 2 (TR1 & 2) was submitted in January 2000. The main purpose of the technical paper was to examine the housing-led development scenario formulated in the MOSIP for the Study Area which the CPLD indicated preference in 1998 and was adopted in setting out the preliminary development parameters of this Study. A Base Scheme was prepared based on the preliminary development parameters outlined in the Study Brief (Table 2.1), taking into account the identified constraints and opportunities with a view to testing its technical feasibility. To serve the purpose for land use review and evaluation, a conceptual master layout plan was prepared to indicate broadly the disposition of blocks, the vehicular access and the proposed network and the location of open space and G/IC facilities. The proposed schedule of development and the conceptual Master Layout Plan are shown in Table 2.2 and Figure 2.1.

Table 2.1
Preliminary Development Parameters from the Study Brief

Site	Gross Site Area (ha.)	Housing Type	Plot Ratio	Flat Number	Population
Whitehead	21.7	R3/R4	2.17	4,704	13,171
North of Lee On #	13.55	R2/R3	4	5,420	15,176
Lee On Station ##	3.75	R1/R2	8	4,286	12,857
Total	39	--	--	14,410	41,204

renamed as Lok Wo Sha

renamed as Wu Kai Sha Station Development

Table 2.2
Schedule of Development for the Base Scheme

Site	Gross Site Area (sq.m.)	Housing Type	Plot Ratio	Domestic GFA (sq.m.)	Non-Domestic GFA (sq.m.)	No. of Flats	Average Flat Size (sq.m.)	No. of Blocks	No. of Storeys	Planned Population #	Local Open Space Provision (1 sq.m./person) ##
White-head	210,500	R3/4	2.24	470,933	--	640 4,064	120 97	41 20	6-10 22-29	1,626 10,323	--
Lok Wo Sha	122,000	R3/4	4.44	542,000	25,000	5,440	100	18	33-43	13,818	--
WKS Station Development	37,500	R1/2	8	300,000	--	4,286	70	10	54	10,886	--
Total	370,000	--	--	1,312,933	25,000	14,430	--	89	--	36,653	27,476

Based on the assumed PPOF of 2.54 as given by District Planning Office/Shan Tin, Tai Po & North District

The provision is made in accordance to the net increase in population of the Study Area (i.e. to deduct the planned population of 9,177 assumed in the Sha Tin Development Programme 1999/2000)

2.2.3 Based on the plot ratios of 2.24, 4.44 and 8 for the three sites, the Study Area could accommodate about 36,650 population in 14,430 housing units. This is based on a smaller PPOF in 1997. Medium to High-rise developments are proposed over the Study Area ranging from 6-10 storeys high at the sea front to 54 storeys at the Wu Kai Sha Station Development. Considering the ecological and conservation values of the coastal area, the two headlands of the Whitehead peninsula and the coastal area along Starfish Bay are preserved in the layout. Environmental-friendly concept is one of the design considerations. Travellator and a comprehensive pedestrian walkway/footpath system are proposed to link up the residential sites with the railway station and to discourage the use of air-polluted transportation. Also a continuous waterfront footpath system is planned along the coastline to link up the two preserved headlands and the proposed water recreation area at To Tau so that the public could enjoy the natural and ecological values of the site. In addition, two primary and two secondary schools as well as one Indoor Recreation Centre (IRC) are proposed within the Study Area to serve the proposed development.

2.2.4 There is no insurmountable problems on land use compatibility and the provision of G/IC and open space. Besides, the proposal generally meets the necessary engineering requirements with the identified infrastructural improvement works. However, the Base Scheme was considered undesirable in terms of development bulk, building heights, landscape and visual impacts.

2.2.5 The Base Scheme was considered by the Steering Group in February 2000. A number of departments were particularly concerned about the identified adverse visual impact of the Base Scheme. As a result, the Consultant was instructed by the Steering Group to look into an alternative development layout with an aim to mitigate the visual impact.

Alternative Scheme

2.2.6 Subsequently, an Alternative Scheme reducing the heights of the proposed residential developments based on the plot ratios of 1.5, 3 and 6.5 for the three development sites was prepared taking into account the comments of various Government departments on the Base Scheme. The resultant Alternative Scheme presented a variation of building heights ranging from 3-storey at the sea front to a maximum of 48-storey at Wu Kai Sha Station Development with an overall reduction in building heights and hence visual impact. Similar to the Base Scheme, the environmental-friendly concept and the gradation height profile remain to be the main design considerations in the overall layout planning. More intensive developments are proposed further inland to capitalize on the proximity to mass transit and to optimize scarce land resources. The layout of the Alternative Scheme also incorporated two major view corridors, most visible from the Ma On Shan Town Park and Sai Sha Road, separating the three groups of residential developments in the Study Area. The view corridors would be very efficient in breaking up any possible wall effect of developments stretching out to Tolo Harbour especially when viewing from the town centre. The scheme would generate a total of 9,586 flats and a population of 24,348. The development parameters, the layout of the Alternative Scheme are presented respectively in Table 2.3 and Figure 2.2.

Table 2.3
Development Schedule of the Alternative Scheme

Site	Use	Gross Site Area (sq.m.)	Plot Ratio	GFA (sq.m.)	No. of Flats	No. of Storeys	No. of Blocks	Average Flat Size (sq.m.)	Population (PPO= 2.58)	
Whitehead	Site 1	R3/4	67,000	1.5	100,500	54 976	3 8-16	9 26	97.57	2,658
	Site 2	R3/4	83,710	1.5	125,565	120 1,112	3 8-16	20 27	101.92	3,179
Lok Wo Sha	R2/3	135,500	3	406,500	3,880 420	25-35 10	16 7	94.53	11,094	
Wu Kai Sha Station Development	R1/2	37,221	6.5	241,937	3,024	37-48	9	80.1	7,802	
	Total			874,502	9,586	--	--	--	24,733	

Further Alternative Schemes with Recreation

2.2.7 The Base and Alternative Schemes were subsequently submitted to the CPLD for consideration. The CPLD decided that the Consultant should explore the feasibility of retaining the Whitehead site for recreation purpose and increasing plot ratio at the hinterland thereof. Limited housing development, however, may be explored on the Whitehead site provided that they are compatible with the recreation uses. In response to the CPLD's decision, three alternative recreation layout options incorporating areas of 10 hectares, 15 hectares and 18 hectares for recreation uses at the waterfront location of the Whitehead site were prepared. The major planning principles and assumptions adopted in the Further Alternative Recreation layouts are summarized as follows:

- Overall layout design based on previous visual corridor and gradation concepts adopted in the Alternative Scheme;
- Total GFA of the Alternative Scheme maintained as much as possible;
- Intensity and tower height at Wu Kai Sha Station Development unchanged i.e. plot ratio 6.5 and 42-49 storeys (based on the scheme submitted by KCRC for land grant application in Mid June 2000);
- Intensity at the Whitehead site remains at PR 1.5, if residential use is proposed; and
- Necessary free-standing G/IC facilities reserved at similar locations.

2.2.8 The development schedules of the notional recreation schemes are shown in Tables 2.4 - 2.6 for easy reference. These schemes have demonstrated that the visual corridors and the height gradation concepts are possible even if the whole Whitehead site is left for recreation use with all development potential shifted to Lok Wo Sha, with plot ratio increased from 3 to 4.67. However, the schemes with 15 hectares and 18.5 hectares recreation areas are not recommended in view of the excessive development bulk at Lo Wo Sha from design point of view with respect to the existing town centre and Wu Kai Sha Station Development. In conclusion, the alternative scheme with 10 hectares recreation area presented a more desirable option with a more acceptable overall building profile while still allowing certain degree of height variations within individual sites.

Table 2.4
Development Schedule of the Further Alternative Scheme
with 10 hectares Recreation Area

Site		Use	Gross Site Area (sq.m.)	Plot Ratio	GFA (sq.m.)	No. of Flats	No. of Storeys	No. of Blocks	Average Flat Size (sq.m.)
Whitehead	Site 1	Recreation	100,040	-	-	-	-	-	-
	Site 2	R3/4	31,928	1.5	47,892	472	10-14	10	101.47
	Site 3	R3/4	41,682	1.5	62,523	612	11-14	12	102.16
Lok Wo Sha		R2/3	135,500	3.85	521,675	4,344 1,176	30-42 28	15 7	94.51
Wu Kai Sha Station Development		R1/2	37,221	6.5	241,937	3,024	42-49	9	80.1
		Total			874,027	9,628	--	--	--

Table 2.5
Development Schedule of the Further Alternative Scheme
with 15 hectares Recreation Area

Site		Use	Gross Site Area (sq.m.)	Plot Ratio	GFA (sq.m.)	No. of Flats	No. of Storeys	No. of Blocks	Average Flat Size (sq.m.)
Whitehead	Site 1	Recreation	150,007	-	-	-	-	-	-
	Site 2	R3/4	35,194	1.5	52,791	532	10-16	12	99.23
Lok Wo Sha		R2/3	135,500	4.28	579,940	4,920 1,248	35-45 28-32	15 7	94.02
Wu Kai Sha Station Development		R1/2	37,221	6.5	241,937	3,024	42-49	9	80.1
		Total			874,779	9,724	--	--	--

Table 2.6
Development Schedule of the Further Alternative Scheme
with 18.5 hectares Recreation Area

Site		Use	Gross Site Area (sq.m.)	Plot Ratio	GFA (sq.m.)	No. of Flats	No. of Storeys	No. of Blocks	Average Flat Size (sq.m.)
Whitehead	Site 1	Recreation	185,201	-	-	-	-	-	-
North of Lee On		R2/3	135,500	4.67	632,785	5,248 1,446	37-48 33-36	15 7	94.53
Lee On Station		R1/2	37,221	6.5	241,937	3,024	42-49	9	80.01
		Total			874,722	9,718	--	--	--

2.2.9 In August 2000, the CPLD advised to seek public views on the housing scheme and the three general layouts with recreation uses for the Study Area. These schemes were presented to the Sha Tin District Council (STDC) and the Town Planning Board (TPB) in March and May 2001 respectively. Both the STDC and TPB supported the concept for some recreation developments at the headland area, but considered that a proper balance should be achieved between the proposed development and the concerns over ecological, cultural/heritage, visual as well as transport and infrastructure capacities. The STDC preferred the option with 18.5 hectares reserved for recreational uses and opined that the proposed recreation uses should be affordable to the general public.

2.2.10 Taking into account the public views, in May 2001, the CPLD decided that the Consultant should prepare a detailed layout for the Study Area based on the scheme with about 10 hectares of recreation uses at the headland and to test the feasibility of such scheme by conducting various technical assessments. The layout would become the preliminary Preferred Development Option of the Study Area. In accordance with the revised scope of Technical Paper No. TR3, the guiding development concepts for the preparation of the detailed layout are summarized as follows:

- Whitehead headland should be earmarked primarily for conservation and recreational uses with limited low-density residential development. The proposed recreation uses at the headland area should not be less than 10 hectares with a variety of suitable recreation facilities;
- The recommended population should not exceed 18,700, with the development of about 7,300 residential flats, in order to strike a balance between different competing development and recreation needs;
- A maximum residential development intensity of plot ratios 6.5 and 3 should be adopted at Wu Kai Sha Station Development and Lok Wo Sha;
- A gradation height concept should be introduced with the development intensity decreasing from the south at the Wu Kai Sha Station Development to the north at the headland area;
- Due to the high educational and ecological values of the Starfish Bay and the existing mature woodland within the Study Area, they should be preserved in the proposed layout; and
- The actual number of schools to be provided within the Study Area should be reassessed with a reduced population for the Study Area and they should be designed at appropriate locations.

2.3 General Description of the Development

- 2.3.1 The preliminary Preferred Development Option is shown on Figure 2.3. The three development sites, Whitehead, Lok Wo Sha and Wu Kai Shai Station within the Study Area are mainly connected by a major N-S spine, measuring 900m in length approximately. The central spine will provide a pedestrian linking between the future Wu Kai Sha Station of the Ma On Shan Rail and the northern tip of Whitehead. At the northern end of the walkway, a waterfront plaza is planned to provide a good vantage point for the panoramic seaview of Tolo Harbour. Ample public open spaces are also designed alongside the spine to enhance the visual amenity of the walkway. The school sites are located at the centre of the Study Area along the spine. A commercial centre is planned near to the southern end of the spine in the Lok Wo Sha development to serve the local population.
- 2.3.2 The design of the layout has taken into consideration the disposition of residential blocks and the arrangement of open space so as to create a pleasant living environment. In terms of development density, building height and disposition, N-S stepping effect is achieved with building 42-50 storeys above podium at Wu Kai Sha Station Development to 10-32 storeys at Lok Wo Sha and down to 3 to 7 storeys at Whitehead. To enhance the living environment, ample local open space within the residential development will be provided in form of sitting out area, playground, and landscaped gardens for the enjoyment of local residents.
- 2.3.3 The two headlands of the Whitehead peninsula will be preserved. Lookout points are planned for visitors to capture its amenity values. In addition, considering the ecological and conservation values, the coastal area along Starfish Bay is retained in the layout in order to link up with the coastline of Nai Chung SSSI as a continuous conservation belt.
- 2.3.4 A continuous waterfront footpath is planned generally along the coastline of the peninsula. Starfish Bay, the two headlands and the proposed adventurous cycle park are linked up by the footpath system. Visitors can appreciate both ecological and recreational values of the peninsula as well as to enjoy the panoramic open view of Tolo Harbour along the footpath.
- 2.3.5 The Project includes site formation and engineering infrastructure works including provision of road and highway structures and provision of drainage, sewerage, water and utility systems to support the proposed development.
- 2.3.6 The development schedule of the preliminary Preferred Development Option is tabulated below in Tables 2.7 – 2.10.

Table 2.7
Development Schedule for the Preliminary Preferred Development Option
with 11-ha Recreation Development (plot ratio 6.5 at Wu Kai Sha Station Development)

Site	Proposed Use	Gross Site Area (sq.m.) (about)	Plot Ratio	Domestic GFA (sq.m.) (about)	Non-domestic GFA (sq.m.) (about)	No. of Flats	No. of Storeys	Average Flat Size (sq.m.) (about)	Estimated Population (PPOF = 2.54)
Whitehead	Site 1	Recreation	110,300	--	--	--	--	--	--
	Site 2	Residential	34,140	0.8	27,310	--	204	3-7	976
	Site 3	Residential	30,360	0.8	24,290	--	180		
Lok Wo Sha	Residential	126,800	3.0	380,400	10,000	3,940	10-32	96.5	10,008
Wu Kai Sha Station Development #	Residential	35,750	6.5	232,375	3,500	2,976	42-50	78	7,560
Total		337,350	--	664,375	13,500	7,300	--	--	18,544

The actual development parameters of Wu Kai Sha Station Development will be subject to the latest proposal prepared by KCRC.

Table 2.8
G/C Facilities and Open Space Requirements for the Preliminary Preferred Development Option
with 11-ha Recreation Development

	HKPSG Standard/Land requirement	Required Provision for 18,544 population	Proposed Provision for 18,544 population (About)
Kindergarten	1 bi-sessional classroom for 67 persons aged 3-5	About 8 classrooms	8 classrooms *
Primary School	1 whole-day classroom per 32.5 persons aged 6-11 (6,200 sq.m. site area, min. width of 60 m)	About 35 classrooms	1 school
Secondary School	1 whole-day classroom per 45 person aged 12-18 (6,950 sq.m. site area, min. width of 60m)	About 33 classrooms	1 school
Indoor Recreation Centre (Type B)	1 per 25,000 – 49,999	0	0
Indoor Recreation Centre (Type C)	1 per 50,000 – 64,999 persons (6,000 sq.m. site area)	0	1

* Kindergarten will be provided within the commercial area of the residential development.

Table 2.9
Estimated Land Area, Facilities Sizes and Annual Attendance of the Proposed Recreation Uses

Uses/Facilities	Broad Development Parameters		Estimated Annual Attendance	Reference
	Land Area	Facility Size (sq.m.) (About)		
Botanical Garden	4.12 ha	<ul style="list-style-type: none"> N.A. 	450,000	<ul style="list-style-type: none"> The New York Botanical Garden, The Royal Botanical Garden, Sydney; Penang's Botanical Garden, Singapore Botanic Garden, Hong Kong Zoological and Botanical Garden
Visitor/ Heritage/ Ecological Centres	1 ha	<ul style="list-style-type: none"> Visitor Centre: 200 sq.m. Heritage Centre: 500 sq.m. Ecological Centre: 500 sq.m. 	150,000 to 200,000	<p><u>Heritage and Folk Museums managed by LCSD:</u></p> <ul style="list-style-type: none"> Sheung Yiu Folk Museum (GFA about: 500 sq.m.; annual attendance 2000/01: 60,000) Sam Tung Uk Museum (GFA: about 1,000 sq.m.; annual attendance 2000/01: 392,000) Hong Kong Railway Museum: (GFA: about 6,500 sq.m., annual attendance 2000/01: 356,000) Law Uk Museum : (Annual attendance 2000/01: 21,000) Lei Cheng Uk Han Tomb Museum: (Annual attendance 2000/01: 62,000) <p><u>Ecological centres:</u></p> <ul style="list-style-type: none"> Shell House (Annual attendance: 400,000 to 450,000) Lions Nature Education Centre Insect House
Water Recreation Centre	Land Based : 0.6 ha (for ancillary facilities & overnight accommodation) Shore-Based: 0.38 ha (for landing purpose and storage of boats)	<ul style="list-style-type: none"> Lecture/Administration/ Canteen/Changing Room/Storage building (1-2 storeys): 500 sq.m. Overnight accommodation building (1-2 storeys): 1,500 sq.m. 	35,000 to 40,000	<p><u>Water Recreation Centres managed by LCSD:</u></p> <ul style="list-style-type: none"> Tai Mei Tuk Water Sports Centre: (about 0.71 ha., GFA about 150 sq.m., Annual attendance: about 25,000) Chong Hing Water Sports Centre: (about 18.29 ha., Annual attendance: 35,000) Wong Shek Water Sports Centre: (Annual attendance: 30,000)
Themed dining	1.5 ha	<ul style="list-style-type: none"> 3,750 sq.m. (about 1,800 seats) 	1,200,000	--
Cycle Park	3 ha	<ul style="list-style-type: none"> N.A. 	--	<ul style="list-style-type: none"> The former cycle park at Tai Wai (about 3 ha.)
Open Carpark	0.16 ha (for 20 nos. coach parking)	<ul style="list-style-type: none"> N.A. 	--	--
Public Terminus	0.27 ha			
Total Area	11.03 ha	--	--	--

Table 2.10
Actual Patronage of the Proposed Recreation Uses

Uses/Facilities	Estimated Annual Attendance	Actual Patronage (Annual) *	Remarks
Botanical Garden	450,000	450,000 (Assume patrons will visit botanical garden and visitors/heritage/ecological centres simultaneously)	<ul style="list-style-type: none"> More patronage in Winter/Autumn (about 60% of the annual patronage) About 40% of the average weekly patronage during weekends and public holidays (i.e. about 1,800 visitors per day) About 60% of the average weekly patronage during weekdays (i.e. about 1,000 visitor per day)
Visitors'/ Heritage/ Ecological Centres	150,000 to 200,000		
Water Recreation Centre (including overnight accommodation)	35,000 to 40,000	40,000 (Assume patrons will visit the water recreation centre only)	<ul style="list-style-type: none"> Reference taken from Tai Mei Tuk Water Recreation Centre: More patronage in Summer (i.e. April to October, about 70% of the annual patronage) Most visitors will come during weekend or public holidays (about 60% of the average weekly patronage)
Themed dining	1,200,000	600,000 (Assume 50% of independent visitors and the remaining is the same patrons of other recreation facilities)	<ul style="list-style-type: none"> No seasonal variation. More patrons during weekend are expected.
Cycle Park	--	N.A. (Assume floating patrons)	--
Open Carpark	--	N.A.	--
Total		1,090,000	--

* Actual patronage excluding those patrons visiting other recreation facilities simultaneously.

Development Option Adopted for Technical Assessments

- 2.3.7 Technical assessments were carried out on the preliminary Preferred Development Option (see Table 2.7) and presented in Technical Paper No. TR3 (TR3) dated October 2001 and Draft Final Report dated December 2001. The technical assessments included the environmental impact assessment, traffic impact assessment, drainage impact assessment, sewerage impact assessment, water supply impact assessment, utility assessment and geotechnical assessment.
- 2.3.8 The preliminary Preferred Development Option, the results of the technical assessments and the public views collected from STDC in November 2001 were then considered by the Study Steering Group and CPLD in January 2002. Whilst it is fully appreciated from the STDC and TPB consultations that there is a strong desire to limit the total population and the development intensity of the Study Area, it is equally important to capitalize on the mass transportation system to achieve the best integration of transport and land use planning for the Study Area. To strike a balance, both the Study Steering Group and the CPLD considered more appropriate to limit the development intensity of Wu Kai Sha Station Development to a plot ratio of 5 which is in line with the general development intensity for high density residential developments in Sha Tin New Town. In this context, the Consultant then revised the development parameters of Wu Kai Sha Station Development to a plot ratio of 5.
- 2.3.9 Subsequently, the Sha Tin Planning Area 108 Layout Plan was revised and circulated by Planning Department for Government departmental comment in June 2002. While the maximum plot ratio for the Wu Kai Sha Station Development was 5.0, the height restriction for the Wu Kai Sha Station Development was revised to 183mPD. The concerned Layout Plan was approved by the CPLD in July 2002 and adopted by the Permanent Secretary for Housing, Planning and Lands (Planning and Lands) in September 2002. According to latest development proposal by KCRC, the prospective developer, circulated for Governmental departmental comment on 3 April 2002, the proposed development at the Wu Kai Sha Station Development would have a plot ratio of 5 and would comprise 7 towers of 40 to 48 storeys (maximum height 183 mPD). In this context, the Consultant then further revised the development parameters of Wu Kai Sha Station Development, and the revised scheme (based on KCRC's proposal circulated on 3 April 2002) became the Preferred Development Option of the Study and served as the basis for the preparation of the final layout plan and its explanatory statement.
- 2.3.10 The schedule of development (plot ratio 5 at Wu Kai Sha Station Development) for the Preferred Development Option is shown in Table 2.11. The corresponding master layout plan (based on KCRC's proposal circulated on 3 April 2002 for the Wu Kai Sha Station Development) is shown on Figure 2.4.

Table 2.11
Development Schedule for the Preferred Development Option
with 11-ha Recreation Development (plot ratio 5 at Wu Kai Sha Station Development)

Site	Proposed Use	Gross Site Area (sq.m.) (about)	Max. Domestic Plot Ratio	Domestic GFA (sq.m.) (about)	Non-domestic GFA (sq.m.) (about)	No. of Flats	No. of Storeys	Average Flat Size (sq.m.) (about)	Estimated Population (PPOF = 2.54)
Whitehead	Site 1	Recreation	110,300	--	--	--	--	--	--
	Site 2	Residential	34,140	0.8	27,310	--	204	134.4	976
	Site 3	Residential	30,360	0.8	24,290	--	180		
Lok Wo Sha	Residential	126,800	3.0	380,400	10,000	3,940	10-32	96.5	10,008
Wu Kai Sha Station Development #	Residential	34,100	5.0	168,395	4,000	2,528	40-48	67	6,421
Total		335,700	--	600,395	14,000	6,852	--	--	17,405

Based on KCRC's proposal circulated for Government departmental comment on 3 April 2002. Composite plot ratio of 5/9.5 for domestic/non-domestic use has been applied.

2.3.11 The technical assessments, including those presented in this EIA, were carried out based on the preliminary Preferred Development Option which is more intensive in terms of development density than the Preferred Development Option. The preliminary Preferred Development Option and the Preferred Development Option are identical except that the plot ratio for the Wu Kai Sha Station Development is lowered from the preliminary figure of 6.5 to 5.0. The impacts generated by the Preferred Development Option would be less significant and the mitigation measures proposed for the preliminary Preferred Development Option are considered sufficient to cover the Preferred Development Option. As such, it is considered that the technical assessments including this EIA carried out for the preliminary Preferred Development Option have adequately cover the Preferred Development Option.

2.4 Nature, Scope and Benefits of the Project

2.4.1 The benefit of this Project is:

- to provide the added recreational facilities in particular the water-related ones for the area;
- to provide comprehensive cycle tracks connecting to the rest of Ma On Shan;
- to preserve the natural woodland as much as possible;
- to preserve the coastline of the Whitehead;
- to preserve the Starfish Bay;
- to preserve the archaeological resources;
- to preserve and enhance the landscape value of the Whitehead Area as far as practicable;

- to increase the patronage for the Ma On Shan Rail;
- to provide low - to medium - rise housing units; and
- to connect Whitehead and Lok Wo Sha to Road T7.

2.5 Site Formation

2.5.1 The main geotechnical works to be involved is the cutting of the relatively highland at the southern part of Sites 2 and 3 and the school sites and the redistribution of the cut material to form the site platforms and roads. A balanced cut and fill approach is adopted to minimise the volume of importation or exportation of material as far as practicable thus reducing the construction traffic that would be generated. The building platforms at Whitehead would be generally flat with levels ranging between 6 to 13 mPD. Ecologically sensitive areas are identified and will be preserved as far as practicable.

2.5.2 Part of slope at the western Whitehead will be flattened to form the water recreation centre and the adventurous cycle park. Ground investigation will be required to collect the necessary geotechnical information for the design of the new slopes and retaining walls.

2.5.3 The plantation to the east of botanical garden will be preserved. Only minor cutting of this sloping area will be carried out for the formation of the botanical garden site. Ground investigation will be carried out at the slope facing the Whitehead development to facilitate the checking of the stability of existing slopes and the design of stabilization works, if necessary.

2.5.4 The proposed Road D1 will be formed by filling above the flooding level and to match the existing road levels. For the section of Road D1 along the Starfish Bay, the proposed road level will be designed to approximately match the level of the adjacent woodland, in order to minimise the impact due to the road construction. Only minor filling will be carried out close to the woodland.

2.6 Road Networks and Highway Structures

2.6.1 In view of the anticipated increase in traffic demand in the area, it is proposed that an external route is to be provided for the development, linking it directly with the Road T7 currently under construction at its interchange nearby. This connection provides a direct access for the development traffic to/from Whitehead and Lok Wo Sha to Road T7. In fact, two openings have already been reserved at the Road T7 Interchange to allow for this possible connection. With the provision of the two direct slip road connections, accessibility to the development can be greatly improved, getting access to strategic external route directly without the need to pass through the key access

- junction at Sai Sha Road/Sho On Street.
- 2.6.2 Within the development, Roads D1(N), D1(E), D1(W) and Roads L1 and L2 are the new roads proposed to provide access for the development to/from the existing and planned road networks.
- 2.6.3 The proposed Road D1(N) of single-4 lane standard would be the main traffic corridor separating the Lok Wo Sha and Whitehead sites. The proposed Road D1(N) connects to the proposed Road D1(W) which extends to the Sai Sha Road/Sho On Street roundabout. Road D1(E) links up with the proposed slip roads to Road T7 and access to Nin Wah Road fronting Symphony Bay at the other end. Two local roads of wide single 2-lane standard, L1 and L2, off from Road D1(N) are proposed to serve Whitehead. Access to Wu Kai Sha Station Development will be via Sho On Street. Access to individual developments will be via internal roads of single 2-lane standard which serve individual building blocks. Figure 2.5 shows the conceptual layout of highway structures.

Public Transport

- 2.6.4 For Lok Wo Sha and Whitehead, a public transport terminus (PTT) is proposed in Site 1 near Site 2 to serve the population and recreation facilities. The public transport interchange (PTI) has been planned under the Wu Kai Sha Station Development.

2.7 Pedestrian and Cyclist Facilities

Pedestrian Facilities

- 2.7.1 Since the Study Area is currently undeveloped, there are no proper pedestrian facilities within the site. At present, connection between Wu Kai Sha Station Development and Lok Wo Sha is only via an at-grade pedestrian crossing on Sai Sha Road near to its junction with Sho On Street.
- 2.7.2 The pedestrian strategy is to ensure that the proposed pedestrian system is both convenient and safe for pedestrians.
- 2.7.3 Pedestrian movements within the development is anticipated to be mainly to/from the MOS Rail Wu Kai Sha Station or the associated PTI (in an north-south direction) for the ultimate commuting purpose. Although feeder services to the Wu Kai Sha Station PTI would be provided, some residents may choose to walk from individual sites to the Wu Kai Sha Station. Therefore, a segregated pedestrian walkway corridor would be provided on site stretching from Wu Kai Sha Station to the northern edge of Whitehead, providing a direct access route for individual sites.

2.7.4 The advantages of a grade-separated pedestrian link across the development are that it could minimise vehicular/pedestrian conflicts on Sai Sha Road, encourage the use of walking mode and then rail services, and hence alleviate the traffic pressure on local road network and ultimately maximise the development potential of the Study Area. It can also provide a more environmental-friendly environment for residents.

2.7.5 In addition to the above pedestrian linkage, footpaths would be provided on both sides of all the internal roads to facilitate pedestrians within the development to get access to the adjoining public roads. As a result, the proposed pedestrian network forms an integral part of the area footway system, linking the development to a wider pattern of the pedestrian walkway, public transport facilities, open space and recreational areas.

Cyclist Facilities

2.7.6 Ma On Shan New Town has an extensive cycle track network. There are continuous provision of cycle track inside Ma On Shan Town, which provides connection to Sha Tin and Sai Sha.

2.7.7 It is proposed that the existing cycle track system would be further extended to Whitehead and Lok Wo Sha connecting the development to the wider area of Ma On Shan and even Sha Tin. As such, the proposed cycle track network would form an integral part of the whole cycle track system in Ma On Shan.

2.7.8 Cycle link with Wu Kai Sha Station Development is important as residents from nearby developments can ride to Wu Kai Sha Station for transfer to MOS Rail.

2.7.9 All cycle tracks are proposed for 2-way traffic with a minimum width of 3.5m. They will be provided on one side of Road D1 and Roads L1 and L2.

2.7.10 To avoid casual parking of cycles at railings near Wu Kai Sha Station site causing obstruction, cycle parking areas will be provided in the future MOS Rail Station to suit the park-and-ride need.

2.8 Drainage

2.8.1 The Study Area covers the Whitehead, the areas between Sai Sha Road and Whitehead, and the future Wu Kai Sha Station Development to the south of Sai Sha Road. There are two major tributaries conveying runoff from the upstream hilly catchment. Their flow paths will be maintained by drains and box culverts (under construction under Road T7 project) when they pass through Road T7 and the proposed development site within the Study Area. They convey the runoff northwards and eventually discharge into Starfish Bay.

- 2.8.2 Another streamcourse located to the east of the Study Area also passes through the proposed development site and Road T7. Similarly, the flow in the streamcourse will be maintained following the existing flow path. The streamcourse convey the runoff northwards and discharges into the existing drainage system to the north of Sai Sha Road.
- 2.8.3 All stormwater runoff from the proposed development north of Sai Sha Road will be collected and discharged at the outfalls at the northern and western coast of Whitehead. No stormwater runoff due to the development to the north of Sai Sha Road will be discharged to Starfish Bay.
- 2.8.4 The box culvert being constructed under the Road T7 project will receive stormwater runoff from the areas south of Sai Sha Road and upstream in Ma On Shan Country Park. It will discharge to Starfish Bay. Stormwater runoff collected from the proposed Wu Kai Sha Station Development's residential development above the PTI will also be discharged via the box culvert to Starfish Bay.
- 2.8.5 A peripheral channel will be provided along the southwest boundary of the Study Area to intercept the surface runoff from the Lok Wo Sha area outside the Study Area. The intercepted surface runoff will be discharged into Tolo Harbour at the west of the Whitehead.
- 2.8.6 Part of the flat area between Whitehead and Sai Sha Road will need to be filled to above the minimum site formation level for flood protection. A proper drainage system is proposed to convey the runoff from the proposed development and upstream area (i.e. the Lok Wo Sha area outside the Study Area) to the Tolo Harbour in order to provide adequate flood protection level to the development and its adjacent areas.
- 2.8.7 In addition, to ensure that the drainage condition in the vicinity of the Site is not worsened during the construction stage, proper control and monitoring of an appropriate temporary drainage arrangement during the construction stage will be necessary.
- 2.9 **Sewerage**
- 2.9.1 Two medium size gravity sewers are proposed from the north of Whitehead running along the Roads L1 & L2, Road D1(W) and Road D1(E) to collect sewage generated from proposed developments. A stretch of footpath along Sai Sha Road adjacent to Lok Wo Sha development will be widened to accommodate the proposed sewer by constructing a retaining wall along the roadside slope. The proposed gravity sewers will be implemented in conjunction with the roadworks.

2.9.2 The sewage collected will be conveyed to the Ma On Shan Area 108 Sewage Pumping Station and then discharged via the Ma On Shan sewerage network to the Shatin STW. The Ma On Shan sewerage network including the Area 108 Sewage Pumping Station has been planned for upgrading under separate projects. The capacity already reserved for the proposed development is sufficient.

2.10 **Water Supply**

2.10.1 A network of distribution water mains will be constructed along Roads D1(N), D1(E), D1(W), L1, L2 and Sai Sha Road in conjunction with the roadworks.

2.10.2 The distribution water mains will be connected to the trunk water mains along Sai Sha Road which WSD is planning to implement.

2.11 **Utilities**

2.11.1 The Hong Kong and China Gas Company Limited has advised that it has a trunk medium pressure gas main along Sai Sha Road and Lok Wo Sha Lane and no major technical difficulties are envisaged to cater for the development. The trunk main is extended from the network in Ma On Shan New Town.

2.11.2 Both China Light & Power Limited and PCCW-HKT Ltd have trunk cables extended to the vicinity of the Study Area. No major difficulties are envisaged in providing service to the development.

2.11.3 Within the Study Area, there are existing networks of power cables, telephone lines and gas mains. They will need to be decommissioned or diverted before construction of the development. A lead time of about 6 months would be required and it can take place concurrent with other construction activities.

2.12 **Works to be Implemented by Government**

2.12.1 The works to be implemented by Government are summarised in Table 2.12.

Table 2.12
Works to be Implemented by Government for Preferred Development Option

Works	Local	Regional
Site formation	The Whitehead site including Road D1(N)	N/A
Junction improvement	Nil	Junction of Ma On Shan Road / Hang Hong Street; Cheung Muk Tau Roundabout
Road	Construction of Roads D1(N), D1(E), D1(W), L1 and L2 within the development, and two slip roads connecting to Road T7	Construction of Road T7; and Sai Sha Road Widening
Sewerage	Construction of gravity sewers beneath public roads and drainage reserves within and near the development to connect to Area 108 Sewage Pumping Station	Upgrading of the Ma On Shan sewerage network including Area 108 Sewage Pumping Station; Construction of Stage III Extension to ShaTin Sewage Treatment Works
Drainage	Construction of a new drainage network beneath public roads and drainage reserves within the development for discharge to the north and west coast of Whitehead	Nil
Water supply	Construction of distribution water mains beneath public roads within the development	Provision of a fresh water service reservoir and a salt water service reservoir and associated water mains; Provision of a new sea water intake pumping station
Utilities	Extension of networks by utility undertaking	Nil (subject to further liaison with utility undertakings)

2.13 Implementation

- 2.13.1 For the Wu Kai Sha Station, with the commissioning of the railway by 2004, it is understood that the KCRC has planned to complete the property development at the site by 2006.
- 2.13.2 The majority of the Lo Wo Sha site is under single ownership. The proposed development at this site could be completed by the developer by 2008 taking into account the required statutory procedures for the proposed CDA zoning.
- 2.13.3 The residential development and recreational development at Whitehead is scheduled for completion in 2008. Implementation is currently proposed to be undertaken by a private developer as one project.
- 2.13.4 The development programme is shown in Table 2.13 below.

Table 2.13
Tentative Development Programme

Development	Start	Finish
Wu Kai Sha Station development	2002	2006
Lok Wo Sha development (site formation)	2003	2004
Lok Wo Sha development (infrastructure and building works)	2004	2008
Whitehead Sites 2, 3 and recreational centres (site formation)	2003	2004
Whitehead Sites 2, 3 and recreational centres (infrastructure and building works)	2005	2008
	Occupation Date	
Wu Kai Sha Station development	2006	
Lok Wo Sha and Whitehead development	2008	

2.14 Designated Projects

2.14.1 This Project is a planning and engineering feasibility study of Whitehead, Lok Wo Sha with a project area covering more than 20 ha and is, therefore, considered by EPD as a Designated Project (DP) under Item 1 of Schedule 3 of the *Environmental Impact Assessment Ordinance* (EIAO) [Cap 499]. The Project contains various Schedule 2 DPs which under the EIAO require Environmental Permits (EPs) to be granted by EPD before they can be constructed and operated. Individual works that are considered as DP under Schedule 2 of the EIAO may directly apply for EPs by referring to this Schedule 3 EIA subject to the satisfaction and agreement from EPD. Table 2.14 summarises the list of DPs and non-DPs under this Project. Figure 2.6 shows the extent of the one DP and one likely DP identified.

Table 2.14
Designated Projects under this Study

Works under this Project	EIAO Schedule 2 Part I Category Reference	Designated Project	Remarks
Construction of district distributor roads D1	A.1	Yes	District distributor road
Construction of drainage works	I.1	Likely*	Discharges into an area which is less than 300 m from the nearest boundary of an existing or planned site of cultural heritage and Conservation Area (CA)*
Construction of local roads L1 and L2	A	No	Local roads
Construction of Comprehensive Recreation Development (Botanical Garden, Themed Restaurant Park, Heritage / Ecological Centre, Visitor Information Centre, Adventurous Cycle Park, Water Recreation Centre) with a total area of 11 ha	O.8	No	Less than 20 ha in size

Works under this Project	EIAO Schedule 2 Part I Category Reference	Designated Project	Remarks
Site formation of Whitehead site	C	No	Dredging or reclamation will not be involved
Construction of gravity sewers beneath public roads and drainage reserves within and near the development to connect to the existing Area 108 Sewage Pumping Station	F	No	Does not meet category
Construction of distribution water mains beneath public roads within the development	E	No	Does not meet category
Extension of networks by utility undertaking	H	No	Does not meet category
Construction of indoor recreational centre	N	No	Does not meet category
Construction of salt water pumping station	E	No	Does not meet category

* It is proposed in this Study that the To Tau Tsuen area be zoned to "CA" in the Ma On Shan OZP. According to PlanD's memo (Ref. (44) in PD/ST 4/9/2 (VI)) dated 24 July 2002, the preserved plantations at the eastern and western ends of the Whitehead headland are proposed to be zoned "CA".

2.14.2 In view of the potential site of archaeological interest identified at Lok Wo Sha and the current inaccessibility of the site, an archaeological site investigation is recommended to be carried out prior to development. Subject to the findings of the archaeological site investigation, some of the proposed development may be potentially DPs. In the event that the proposed development works are confirmed as DPs, the EIAO procedure will be carried out by the relevant project proponent.

2.15 Concurrent Projects

2.15.1 Several other projects are in progress which will overlap with the time frame to the proposed development. Impact from these projects will result in cumulative impacts on the environment which need to be considered in the environmental impact assessment and in formulating suitable mitigation measures. The tentative construction period of each project is summarised in Table 2.15.

Table 2.15
Concurrent Projects

Projects	Anticipated Dates
Road T7	2001 – 2004
KCRC MOS Rail	2001 – 2004
Residential development along the MOS Rail	2002 – 2006
Sai Sha Road Widening	2002 – 2004