

Submission to Planning Department

Response to Draft Outline Zoning Plan for Hoi Ha No S/NE-HH/C

August 2013

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Executive Summary

On 28 June 2013, The Planning Department published its Draft Outline Zoning Plan (OZP) for Hoi Ha. Unfortunately many of the statements made in the Draft OZP do not match with the data collected by Professional Commons members during their studies of the area dating back nearly twenty years, and especially with the results of an intense two year study that has just been completed as part of a report on the integration of Country Park enclaves. This response to the Draft OZP includes much of the data collected over this period.

Section 10 details our recommendations. These can be summarised as:

- All areas of the Development Permission Area (the status of the enclave before an OZP is gazetted), except that zoned for village expansion, be designated as Country Park:
- That the zoned Village area be subject to further planning restrictions relating to environmental impact when applications for development are made;
- That villager owned land in the centre of the village be swapped for land in the extended village zone so that co-ordinated improvement of village facilities can be made.

We note that the draft OZP calls for a 'Balkanisation' of the village by dividing it into a number of different zones, none of which is supported by accurate scientific data, as well as opening it up to massive development by outside developers.

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1. Background

The Professional Commons has been working for some time on a report on the integration and development of village enclaves that are within the Country Parks. Whilst this report was being prepared, on 28 June 2013, The Planning Department published its Draft Outline Zoning Plan (OZP) for Hoi Ha, one of the enclaves in Sai Kung West Country Park that was chosen as one of the two case studies for the report.

Hoi Ha was chosen as a case study as it is one of the more dynamic Country Park village enclaves, as well as being one of the few villages with both a strong indigenous villager presence, thriving eco-tourism/ecological education enterprises, as well as being the stopping point for visitors to Hoi Ha Wan Marine Park. It also has a number of well-established small businesses and the potential for improvement.

Unfortunately many of the statements made in the Draft OZP do not match with the data collected by Professional Commons members during their two year study of the area. This response to the Draft OZP includes much of the data collected over this period as well as that previously analysed by team members over a 20 year period of research.

Consequently some of the proposals made at the end of this submission are very different from those made in the Draft OZP. However, we are confident that the science behind our proposals is more accurate and robust than that used by the Planning Department to justify their proposals to Town Planning Board.

The main report on the future of Country Park enclaves considers the following:

- The question of conservation and/or preservation.
- How to allow the growth of village enclaves without destroying the surrounding protected areas or the aesthetics of the village itself.
- How to cater for the increasing number of local and overseas tourists that are visiting the village enclaves and its environs?
- Deciding what should be allowed and not allowed in terms of improvement and village expansion development.
- How to speed up the integration of the enclaves into the Country Parks without over-riding the existing consultation procedures.

This report, to be published, recommends that all Country Park enclave areas be zoned as either Village (V zone) or Country Park (CP zone). In other words, all land not designated as V zone will be absorbed into the surrounding Country Park. It also proposes that limited land swaps be arranged so that fragmented land ownership in the villages can be consolidated under government ownership for facilities improvement where necessary. It also proposes that any planned development in the V zones be subject to a revised environmental impact assessment.

Figure 1.1 shows the Draft Outline Zoning Plan for Hoi Ha as proposed by Planning Department in their report to Town Planning Board No S/NE-HH/C. We consider this to be a

flawed plan, mainly because the science that supports it is not correct. There are many factual errors in the draft report. In this submission we do not address these errors individually, but present a correct and holistic assessment of the area so that an alternative OZP can be drawn up, one that fully recognises the uniqueness of the area and its important and sensitive ecological nature, as well as meeting the needs of both the local community and the wider Hong Kong community that not only funds the maintenance of the area to the tune of many millions of dollars each year, but also sustainably enjoy its natural amenities.

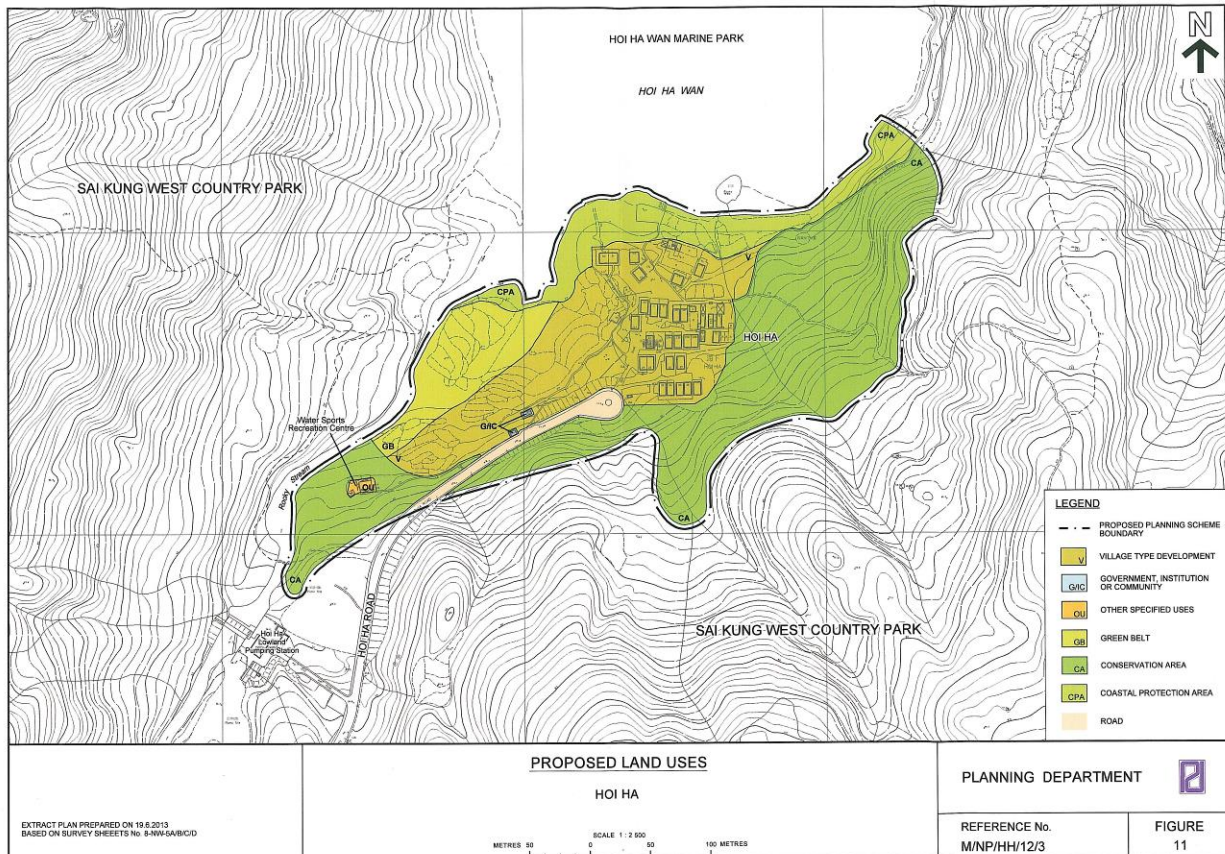


Figure 1.1 The draft Outline Zoning Plan map for Hoi Ha

As some examples of the errors in the draft OZP we highlight here the land usage map, Figure 1.2 below. We have overlaid this with scaled aerial photos of the same area. It can be seen that what Planning Department describe as mangrove in the north-east corner of the village is in fact river, and that what they describe as Fung Shui Forest is at least 1/3 cleared land – abandoned farmland.

The Country Park enclaves are unique and they all have individual needs. For Tai Long Wan the area is of outstanding beauty so the key consideration is the conservation of the landscape. Hoi Ha Wan is a marine area of high conservation value. It stands to reason (and can be shown scientifically) that the terrestrial area bordering it is also of high ecological value. This is especially true for the Pak Sha O River valley interface to the Hoi Ha Marine Park. For a gazetting as a Country Park an area needs to have either a high landscaping or ecological value or both.

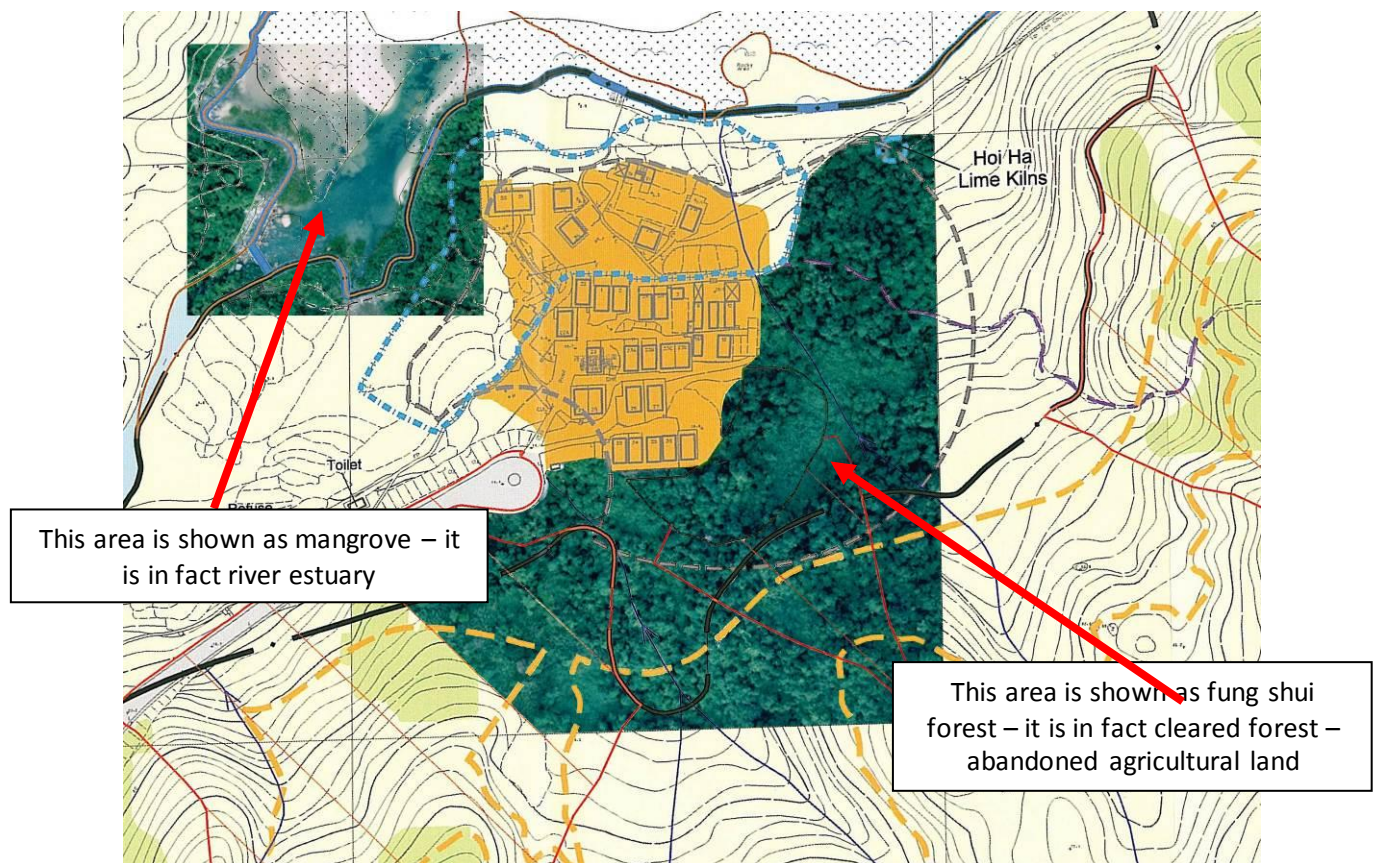


Figure 1.2 Overlay of aerial photos on to the Planning Department Land Usage map showing two major errors.

Pak Sha O is an abandoned village with high antiquities and heritage value, but the Pak Sha O River connection to the Hoi Ha Marine Park illustrates a connectivity that also needs to be considered. A development in the Pak Sha O village, would also impact the Hoi Ha Marine Park. The same is also true for the nearby village of Nam Shan Tung.

Any boundaries need to be carefully considered with regards to fixed assignments in an ever changing ecological area. Shorelines change, sometimes quickly, after a single severe weather event, sometimes slowly over time. Rivers change their banks over time. Rivers also deposit silt at their entrances, in the case of Hoi Ha, this is at the beach lagoon.

As Hong Kong wends its way through a period where its society is going through a "coming of age" process where democracy is being pushed, the action of its government is under increasing scrutiny, demands are being made to solve long outstanding social and structural issues like poverty, housing, etc., it is important that the new generations have the chance of a balanced education. This is a crucial factor to the political and economic survival of Hong Kong. Part of this education has to include nature, conservation, ecology etc. The introduction of Liberal Studies in the local education curricular adds significant value to the argument regarding the need for Country Parks in Hong Kong. The added value of a field trip over a class lecture is common knowledge. The WWF Marine Life Centre, at Hoi Ha, runs primary and secondary school education programmes for local schools. They receive more requests for bookings than they can cater for. There is a dire need for an

infrastructure improvement in the country parks to provide for a new increasing local trend - mainstream education. The provisions for this are either currently stalled or lacking.

A final overall consideration is the reason why the Country parks were established in the first place. These areas were set aside to establish and maintain areas of high ecological and landscaping values but mainly to protect these areas from future development. The basic argument was to allow local people, the basic right of enjoying and experiencing nature and natural places. With the increasing leisure time available to local people it is not surprising to know that there is a growing number of visitors to the country parks in Hong Kong. It is important that this healthy trend continues and is further encouraged.

2. Methodology of the research

This submission is based upon the standard IUCN Agenda 21 approaches to Sustainable Development. A detailed Environmental Impact Assessment has been conducted on the area regarding the current and proposed future activities suggested for Hoi Ha. This study has been carried out by a group of people who are connected to both the indigenous and non-indigenous communities within the village but do not have any investment within this village. This is to avoid conflict of interest and to produce a series of suggestions that contain no bias. The study also is based upon scientific data to allow a foundation to formulate a legal basis for the recommendations.

Hoi Ha is an example of the living, evolving New Territories village because:

- There is a substantial amount of peer reviewed science published on this area.
- Scientific data has been collected in this area by several sources since the late 1980's.
- There is an established tourist industry at this location.
- There is an established, very heavily utilised, marine education facility, bordering this village, run by WWF.
- There is a small contingent of local non-indigenous residents being very vocal about any village activity. They want to preserve the area. They have additionally amassed a reasonably large group of followers (~200) to support their demands.
- The indigenous villagers want to see the village develop in terms of size and economics.
- The village has protected Country Park on three sides, and a Marine Park on one side of its boundary.
- There is a river (by Hong Kong standards) and several streams that run through this enclave. So the hydrology has almost all of the possibilities of Hong Kong; rivers, streams, soaks, sandbars, beaches, rocky shore, etc.
- There are beaches with recreational facilities already in place that have the potential for further development.
- There are building applications for village houses currently pending.
- The current ambience of the village is "Third World" and the infrastructure needs improvement so that the area can reach its full potential as an educational and a sustainable ecological resource.

The research data shown in this submission has been collected under rigorous scientific methodology over a period of at least two years. Students from universities and schools in Hong Kong have been tasked with collecting data supervised by well-known academics and environmental professionals. Where conflict with published data has been found a second assessment by independent groups was made. Only data that is verifiable and replicable is shown. Where similar data has been published in refereed scientific publications and/or

reports from reputable organisations is available, we have cross-referenced our data against this. This follows standard scientific methodology.

3. An overview of the Hoi Ha area

Much has been published about the history of Hoi Ha, the marine Park and its environs. We will not repeat it here. This will only be a short overview to give context to the data that follows.

Hoi Ha village was established around 150 years ago. It was settled by two Hakka clans – the Tongs and the Yungs. The villagers are represented by two *tze tongs*. Until the development of the new towns and emigration to the UK in the 1960s much of the local population was engaged in farming and fishing. From the mid 1960s onwards the village effectively became depopulated by the indigenous villagers, although some remained, and some returned after retiring from their work overseas. Many of the existing houses in the village built under the Government's Small House Policy (SHP) are rented to non-indigenous residents, although a number of indigenous families run small businesses in the area.

The northern most part of the village has some ruined buildings, part of the original village. This area close to the beach has been designated a Site of Archaeological Interest, together with the lime kilns to the north east of the area.

Hoi Ha is at the northern end of the Sai Kung West Country Park. It is strategically located at the estuary of the small Pak Sha O River and Hoi Ha Wan. Its location and the unspoiled surroundings have made it a tourist destination as well as the jumping off point for hikers, campers and divers/water sports. Since the establishment of the Hoi Ha Wan Marine Park, and then the WWF Marine Education Centre, the village has become a centre for environmental and marine education, with many school and university parties visiting the area each day.

Hoi Ha is at the head of the Pak Sha O Valley. This valley is essentially a self-contained ecosystem that feeds into the Marine Park. The valley and the Marine Park should, ecologically, be considered as one whole area when planning, development or improvement is considered. Hoi Ha Village cannot be considered in isolation from its surroundings, and neither can its two adjacent villages of Pak Sha O and Nam Shan Tung, also both Country Park Enclaves – the former now under Development Permission Area (DPA) protection, the latter still unprotected from development and ecological disturbance. We consider that the three enclaves should be considered holistically, and fear that any criteria used to zone Hoi Ha will predicate what is zoned for Pak Sha O and Nam Shan Tung.

The extent of the Pak Sha O River Valley system is shown in Fig 3.1 below. It can be seen clearly that all the watershed rivers and stream feed directly into the Marine Park. Research (Bradbeer, Hodgson et al, 2008) has shown that fresh water springs in the Marine Park itself are fed by the water table supplied from wetlands in Pak Sha O. As will be shown in this report, recent re-instatement of abandoned agricultural land in Pak Sha O is already having an effect on the water quality entering the Marine Park.

A detailed analysis of the land usage, ecology and ownership is given in sections below.

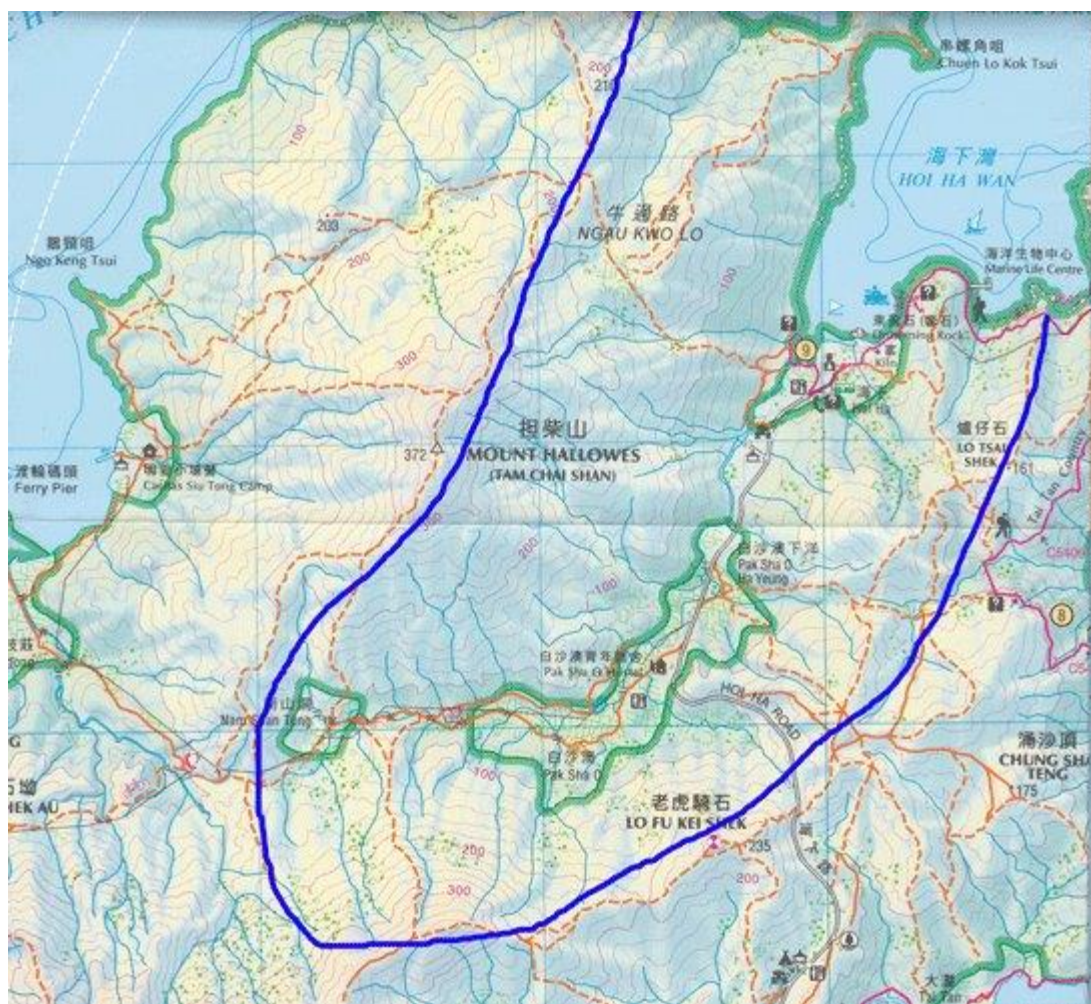


Figure 3.1 The Pak Sha O Valley

4. Laws and Ordinances

Many laws and ordinances apply to the area under discussion. These include the following:

- **Land (Miscellaneous Provisions) Ordinance (Cap. 28)**

This ordinance, enacted in 1972, makes it illegal for anyone to occupy or remove materials from unleased land without a license, and also provides control over the excavations in unleased land.

- **Waterworks Ordinance (Cap. 102)**

This ordinance, enacted in 1974, provides an overview of the duties and powers of the water authority over the use of the waterworks.

- **Building Ordinance (Cap. 123)**

This ordinance, enacted in 1955, specifies the appointments of professionals to commence work as well as both the specified requirements for building structures and the action taken against buildings that may be dangerous or defective etc.

- **Foreshore and Sea-Bed (Reclamations) Ordinance (Cap. 127)**

This ordinance, enacted in 1985, specifies the control over reclamations upon the foreshore and sea-bed.

- **Town Planning Ordinance (Cap. 131)**

This ordinance, enacted in 1950, provides the control over the town planning board, including possible refusal of approved plans.

- **Public Health and Municipal Services Ordinance (Cap. 132)**

This ordinance, enacted in 1935, provides control over the sanitation and cleanliness within sewers, drains and bathhouses.

- **Summary Offences Ordinance (Cap. 228)**

This ordinance, enacted in 1932, makes it illegal for marine littering, lion dances with exception from Chief of Executive, and offences relating to vessels, seamen and merchandise.

- **Air Pollution Control Ordinance (Cap. 311)**

This ordinance, enacted in 1983, regulates the air quality and pollution.

- **Water Pollution Control Ordinance (Cap. 358)**

This ordinance, enacted in 1980, controls the water quality in water control zones and makes illegal for any persons to pollute the waters of Hong Kong.

- **Road Traffic Ordinance (Cap. 374)**

This ordinance, enacted in 1982, is a safety ordinance that regulates what vehicles and traffic can do.

- Noise Control Ordinance (Cap. 400)

This ordinance, enacted in 1988, controls the noise level of daily activities and construction sites.

- Dumping at Sea Ordinance (Cap. 466)

This ordinance, enacted in 1995, regulates marine dumping areas, marine pollution control at sea.

- Marine Parks Ordinance (Cap. 476)

This ordinance, enacted in 1995, specifies the duties of the Marine Parks Authority and the functions of the Marine Park Board. Repair works and new developments need approval for the project to proceed.

- Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586)

This ordinance is mainly the local implementation of the CITES Convention regarding the trade of endangered species, with reference to requiring a licence to possess endangered species locally.

5. Existing Village Business

Hoi Ha is a relatively flourishing small village, at least compared to most of the other villages in the Sai Kung Country Park. Whereas the others are basically dormitory villages for non-indigenous villagers (NIVs), Hoi Ha has a number of small enterprises centred on its residents, both indigenous (IV) and non-indigenous. Coupled with its popularity and beautiful surroundings, Hoi Ha should be a poster child for ecological and environmental based education and science.

The major business in the village is a small general store cum restaurant run by two IVs. This is the only such business now left in the village. This is down from a total of three restaurants in the past. Although some IVs wish to complement the existing restaurant with another. As can be seen from the tourist loading of the village in peak times (Section 9 below) there is enough potential business to accommodate another food outlet. Unfortunately some antagonism from a few NIVs in the village has stopped this initiative.

There is a small boat/kayak rental business also run by a resident IV from temporary structures near the boat ramp in the middle of the village. This business is very popular with visitors all through the year.

Many residents use their houses for either telecommuting and/or office/workshops, many also focused on ecologically based activities. For example, Oceanway uses a ground floor flat to provide facilities for its diving activities and research work, and Dragonfly one of the houses for its Hoi Ha based outward bound type activities as well as temporary accommodation for its staff. Other businesses include NIRs running dog kennels, carpet cleaning business, engineering consultancy and some other small hobby businesses.

Of course, the major business in the village is the rental of housing to NIVs. Of the 30 houses providing 40 dwellings, only five are occupied by their IV owners. Available Land Department records (2012) show three of the houses and one land lot are owned by NIVs. Thirteen houses and/or lots are owned by companies. In this Hoi Ha is like other Country Park villages. However it being a base for so many enterprises is quite unusual.

There are also a number of voluntary Christian based groups using facilities within the village. The main one occupies a small holiday camp within the DPA higher up Hoi Ha Road from the village, but they do store much of their boating equipment on one of the two beaches within the DPA.

Finally, The World Wide Fund for nature, WWF, is based just outside the village in the WWF HSBC Jockey Club Marine education Centre.

6. Land Use Classification and Usage

6.1 Overview

Landscaping and aesthetics are an important consideration. The Town Planning Department of Hong Kong has adopted a hybrid standard for this purpose, merging the applicable categories from several systems currently in use around the world. It is very important that any detailed landscaping data be collected and presented in the adopted format for clarity and to ensure that the area can fit into the standard established models that already exist in Hong Kong. It is also important that the actual existing land usage also be determined and shown separately.

6.2 Hong Kong's Landscaping Classification System

The area of Hoi Ha Wan is listed as Up-land and Low-land Countryside by the Town Planning Department. The full list of classified landscaping categories is included in Table 6.1. It is interesting to note that there is no protection categories listed, so the status of the land classification is not separated in the Hong Kong Landscaping classification system.

6.3 The Whole of Hong Kong

Figure 6.2 shows the result of the 2005 landscaping study carried out by the Town Planning Department using the classifications shown in Table 6.1.

6.4 Hoi Ha

The Hoi Ha DPA and surrounding area contains Local Level Classifications from all three Regional Level Classification categories. Table 6.3 lists the category classifications applicable to the Hoi Ha and the surrounding areas.

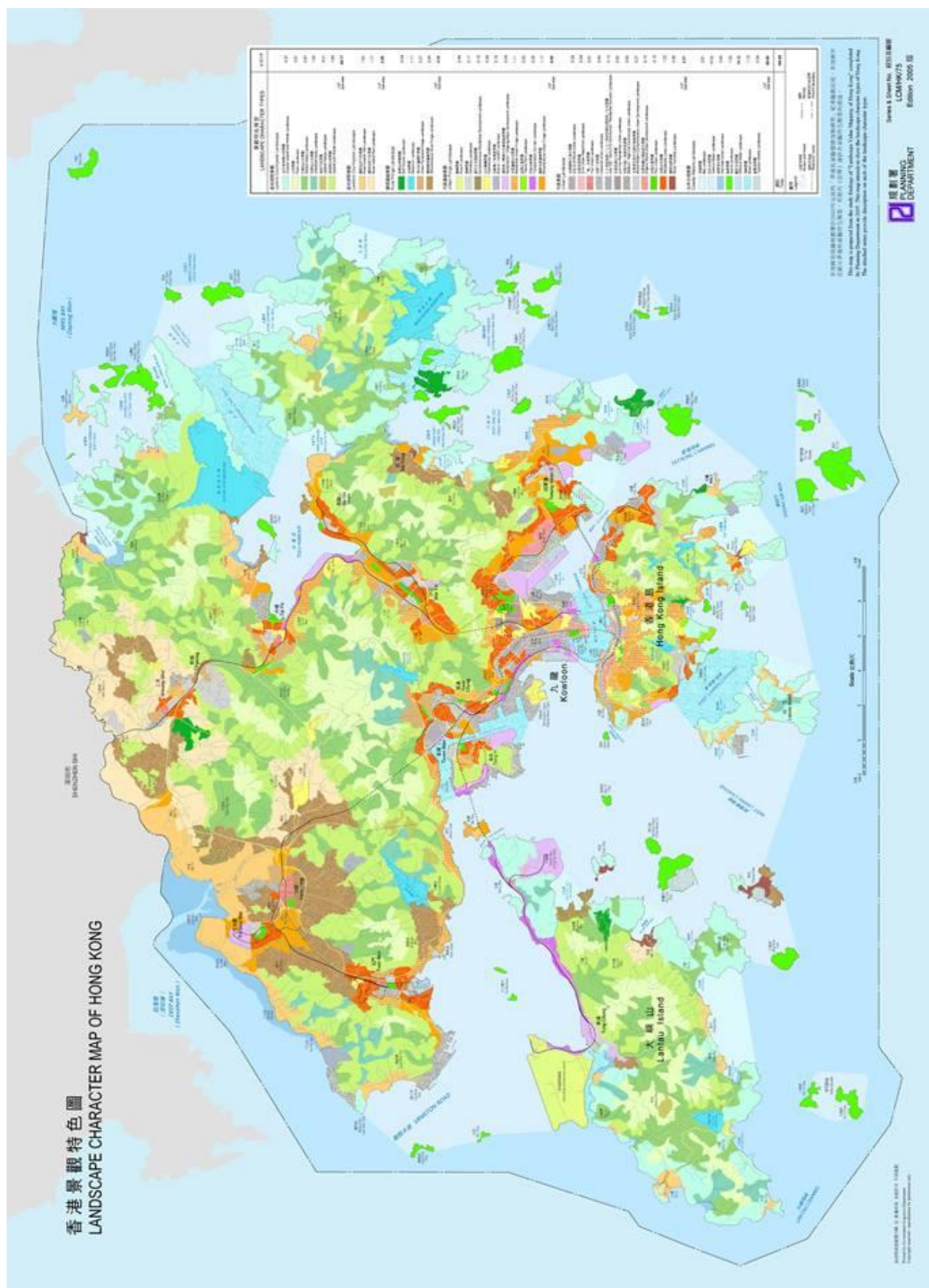
Figure 6.4 is the result of applying these standard classifications for landscaping to the Hoi Ha area at a higher resolution. The data was collected from site visits and the most recent 2012 aerial photograph of the area.

6.5 Existing Land Usage at Hoi Ha Wan.

There is a distinction between the landscape data and the land use data, particularly with regards to the village area. This land has zoned uses, like dwellings, roads and footpaths. Other land uses include car parks, orchards, gardens, storage of boats, tables for the restaurant, outdoor showers, outdoor changing rooms, temporary structures, etc. Some of the buildings have specific uses as well. Typically these are used for refuse collection, public toilets, outdoor activities, etc. Some structures are vacant. This data is very useful when deciding upon future land use for specific areas.

REGIONAL LEVEL	SUB-REGIONAL LEVEL	DISTRICT LEVEL	LOCAL LEVEL
Countryside - R	Upland Countryside - Rh	Peaks - Rh(k)	Grassy peaks and ridges - Rh(k)1
			Scrub-covered peaks and ridges - Rh(k)2
		Undulating Uplands and Hillsides - Rh(b)	Grassy undulating uplands and hillsides - Rh(b)1
			Scrub-covered undulating uplands and hillsides - Rh(b)2
			Wooded undulating uplands and hillsides - Rh(b)3
		Miscellaneous Uplands - Rh(y)	Boulder field - Rh(y)1
			Former upland agriculture - Rh(y)2
			Badlands - Rh(y)3
		Upland Valleys - Rh(a)	Scrub-covered upland valley - Rh(a)1
			Wooded upland valley - Rh(a)2
			Plains and isolated hills - Rh(a)3
	Lowland Countryside - Rl	Lowland Plains - Rl(p)	Plains and isolated hills - Rl(p)1
			Coastal plain farmland - Rl(p)2
			Coastal plain farmland with other uses - Rl(p)3
			Disused coastal plain farmland - Rl(p)4
			Fish ponds - Rl(p)5
			Salt pans - Rl(p)6
		Lowland Valleys - Rl(a)	Lowland valley farmland - Rl(a)1
			Lowland valley farmland with other uses - Rl(a)2
			Scrub-covered lowland valley sides - Rl(a)3
			Wooded lowland valley sides - Rl(a)4
			Lowland valley floor farmland - Rl(a)5
			Lowland valley floor farmland with other uses - Rl(a)6
Development - D	Urban Landscapes - Du	Commercial Urban Landscapes - Du(c)	High-rise commercial urban landscape - Du(c)1
			Medium-rise commercial urban landscape - Du(c)2
			Retail mall - Du(c)3
			Historic institutional urban landscape - Du(x)1
			High-rise housing estate - Du(r)1
			Intermittent high-rise residential urban landscape - Du(r)2
			Low-rise residential urban landscape - Du(r)3
			Low-density mixed urban landscape - Du(m)1
			High-density mixed urban landscape - Du(m)2
			Historic mixed urban landscape - Du(m)3
			Reclaimed mixed urban landscape - Du(m)4
		Park Urban Landscapes - Du(o)	Urban park - Du(o)1
			Warehousing and factories - Du(i)1
		Industrial Urban Landscapes - Du(i)	Industrial estate - Du(i)2
			Institutional/commercial waterfront - Du(w)1
		Urban Waterfront Landscapes - Du(w)	High-rise waterfront housing - Du(w)2
			Docklands/container terminal - Du(w)3
			Waterfront park - Du(w)4
			Marina - Du(w)5
			Typhoon shelter - Du(w)6
			Undeveloped and ongoing reclamation - Du(w)7
	Urban Fringe Landscapes - Df	Residential Urban Fringe Landscapes - Df(r)	Low-rise residential suburb - Df(r)1
			Low-rise suburban housing estates - Df(r)2
			Mixed urban fringe landscape - Df(y)1
		Miscellaneous Urban Fringe Landscapes - Df(y)	Transportation corridor - Df(y)2
			Rail depot - Df(y)3
			Institutions in vegetated settings - Df(x)1
		Institutional Urban Fringe Landscapes - Df(x)	Cemetery - Df(x)2
			Airport - Df(w)1
			Scattered developments and countryside - Dg(r)1
	Rural Fringe Landscapes - Dg	Residential Rural Fringe Landscapes - Dg(r)	Resort-type development - Dg(r)2
			Consolidated village - Dg(v)1
			Expanded village - Dg(v)2
		Village Landscapes - Dg(v)	Historic villages and environs - Dg(v)3
			Walled village - Dg(v)4
			Squatter settlement - Dg(v)5
		Waterfront Rural Fringe Landscapes - Dg(w)	Waterfront village - Dg(v)6
			Power station - Dg(w)1
			Ash lagoon - Dg(w)2
		Miscellaneous Rural Fringe Landscapes - Dg(y)	Quarry - Dg(y)1
			Landfill - Dg(y)2
			Military Camp - Dg(y)3
Coasts - C	Natural and Semi-natural Coastlines - Cn	Inter-tidal Coastlines - Cn(t)	Golf Course - Dg(y)4
			Reservoir - Dg(y)5
			Salt marsh - Cn(t)1
			Mud flat - Cn(t)2
			Mangrove - Cn(t)3
			Gei wai - Cn(t)4
		Islands - Cn(d)	Rocky island - Cn(d)1
			Isolated island group - Cn(d)2
		Natural Shorelines - Cn(s)	Cliff - Cn(s)1
			Rocky shoreline - Cn(s)2
	Coastal Waters - Cw	Urban Coastal Waters - Cw(u)	Beach - Cn(s)3
			Urban harbour - Cw(u)1
			Anchorage - Cw(q)1
		Maritime Offshore Waters - Cw(q)	Shipping lane - Cw(q)2
			Tranquil coastal waters - Cw(y)1
			Fish farm - Cw(y)2
		Miscellaneous Coastal Waters - Cw(y)	

Table 6.1. The Landscape category classifications used in Hong Kong



REGIONAL LEVEL	SUB-REGIONAL LEVEL	DISTRICT LEVEL	LOCAL LEVEL
Countryside - R	Lowland Countryside - RI	Lowland Planes RI(p)	Plains and isolated hills - RI(p)1
			Coastal plain farmland - RI(p)2
			Coastal plain farmland with other uses - RI(p)3
			Disused coastal plain farmland - RI(p)4
		Lowland Valleys RI(a)	Lowland valley farmland - RI(a)1
			Lowland valley farmland with other uses - RI(a)2
			Scrub-covered lowland valley sides - RI(a)3
			Wooded lowland valley sides - RI(a)4
			Lowland valley floor farmland - RI(a)5
			Lowland valley floor farmland with other uses - RI(a)6
Development - D	Rural Fringe Landscapes - Dg	Residential Rural Fringe Landscapes - D(r)	Scattered Developments and countryside Dg(r)1
		Village Landscapes - Dg(v)	Consolidated Village - Dg(v)1
			Expanded village - Dg(v)2
			Historic villages and environs Dg(v)3
Coasts - C	Natural and semi-natural coastlines - C(n)	Inter-tidal Coastlines - Cn(t)	Mangrove - Cn(t)3
		Natural shorelines - Cn(s)	Rocky shoreline - Cn(s)2
			Beach - Cn(s)3

Table 6.3. Landscaping classifications applicable to the Hoi Ha DPA and environs.

Details of the key fixed existing land use are shown in Figure 6.4 below. This figure also shows the location of the special areas around the village like the Fung Shui Forest and the location of known endangered flora in the enclave.

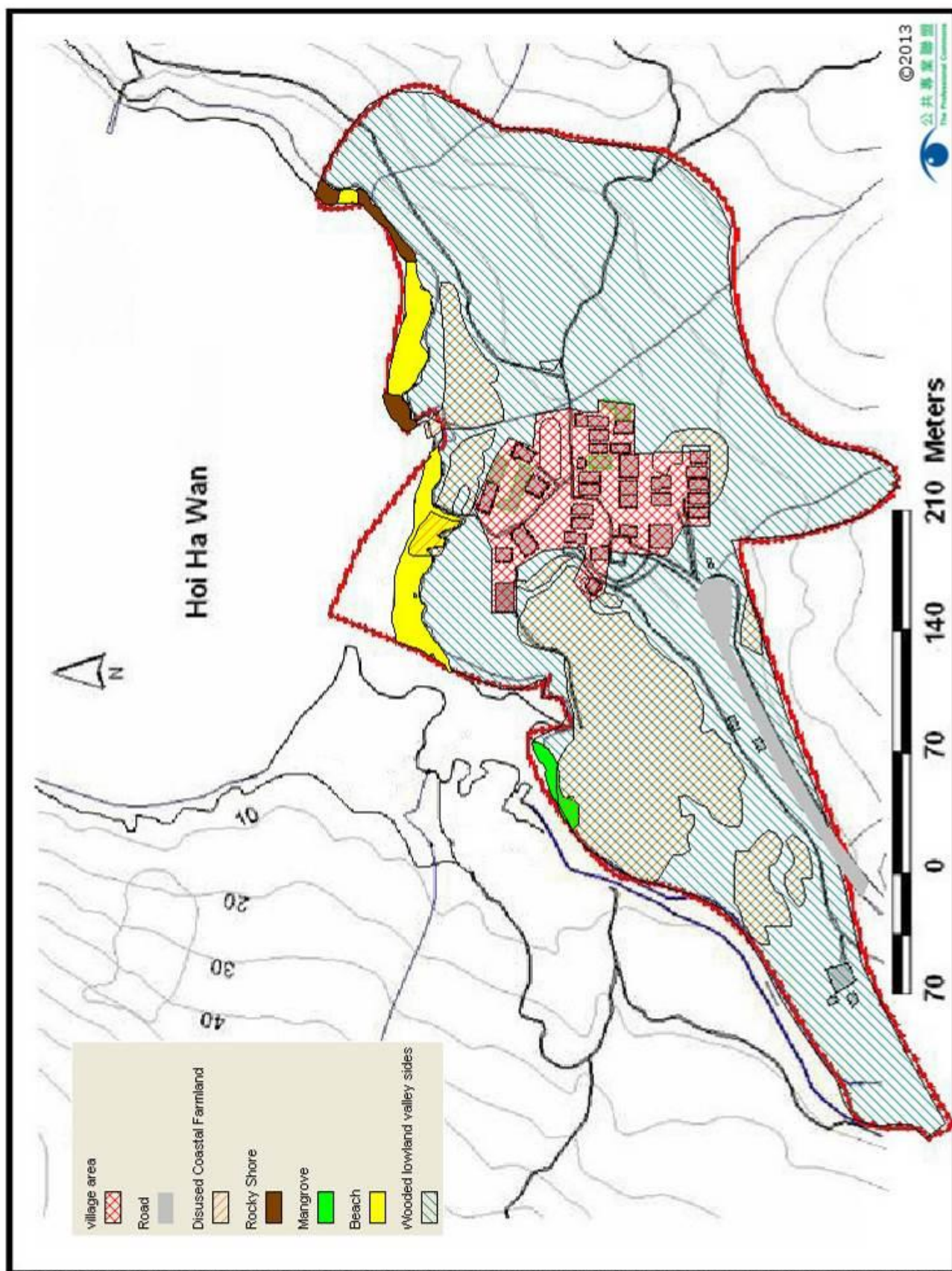


Figure 6.4. The Landscape Character Map of the Hoi Ha area based upon Standard Categories

7. Land ownership

One of the major problems identified is a conflict of interests between those who want to develop an area (usually indigenous residents) with those who want to preserve it (usually non-indigenous residents). Other complications involve the large scale developers trying to take advantage of the increasing number of people wanting to live away from the city. There are also groups who want the area further developed for recreation and education and require proper facilities to do this.

A survey of the Land Registry for the central part of the DPA shows clearly the interests of outside developers in the village. We estimate that 95% of the non Government land outside the current V area is either owned outright, or controlled via Agreement to Sell encumbrances, by five major developers. These are Vantix Ltd., Group Wise Investment Development Ltd., Eastern Island Land Development Co. Ltd., Xinhua Bookshop Xiang Jiang Group Ltd., Sino Joint Ltd., and Ever Luck Development Ltd. The majority of this land is currently abandoned agricultural land and can be cleared for reinstatement at any time by the owners. This is happening in Pak Sha O now. As we will show below, in Hoi Ha much of this abandoned farmland is ecologically highly sensitive. It is imperative that this area be monitored for any attempt to do this.

A similar search through Companies House register of companies shows that at least three of these developers share either the same registered offices or have directors in common. We suspect that all five are connected behind the scenes, especially as lots have been, and continue to be, traded between them.

Some indication of the increasing value of the land can be seen from the rapid increase in price for a group of lots recently traded by developers amongst themselves. Sold by IVs in 2008 for around \$600,000, they sold for around \$1,800,000 in 2010, then \$7,800,000 in 2012.

With more than 300 lots in the DPA it is difficult to understand who owns what. Figure 7.1 is a graphical representation of the lot ownership in the main part of the area. Similar patterns can be seen in the lot ownership outside of the map below.

Comparing the Figure 7.1 with Figure 6.4 shows that some of the developer owned lots are currently beach or under water. However, as shown below, sand accreted from the Pak Sha O River, means that much of the land, that is currently underwater, will be totally uncovered some time in the not too distant future. This will shift the high tide mark further out into the Marine Park area affording this "new" unprotected area no protection from any ecological harmful activities. It is clear that some protection must be given to this area to stop any future development from being carried out there.

We should also consider that much of the land zoned as either Green Belt or Coastal Protection Area in the draft OZP is in fact owned or controlled by developers and is abandoned agricultural land. Reinstatement of this for agriculture is a permitted activity under the relevant ordinances. Thus, there is no adequate protection for these areas in the draft OZP.

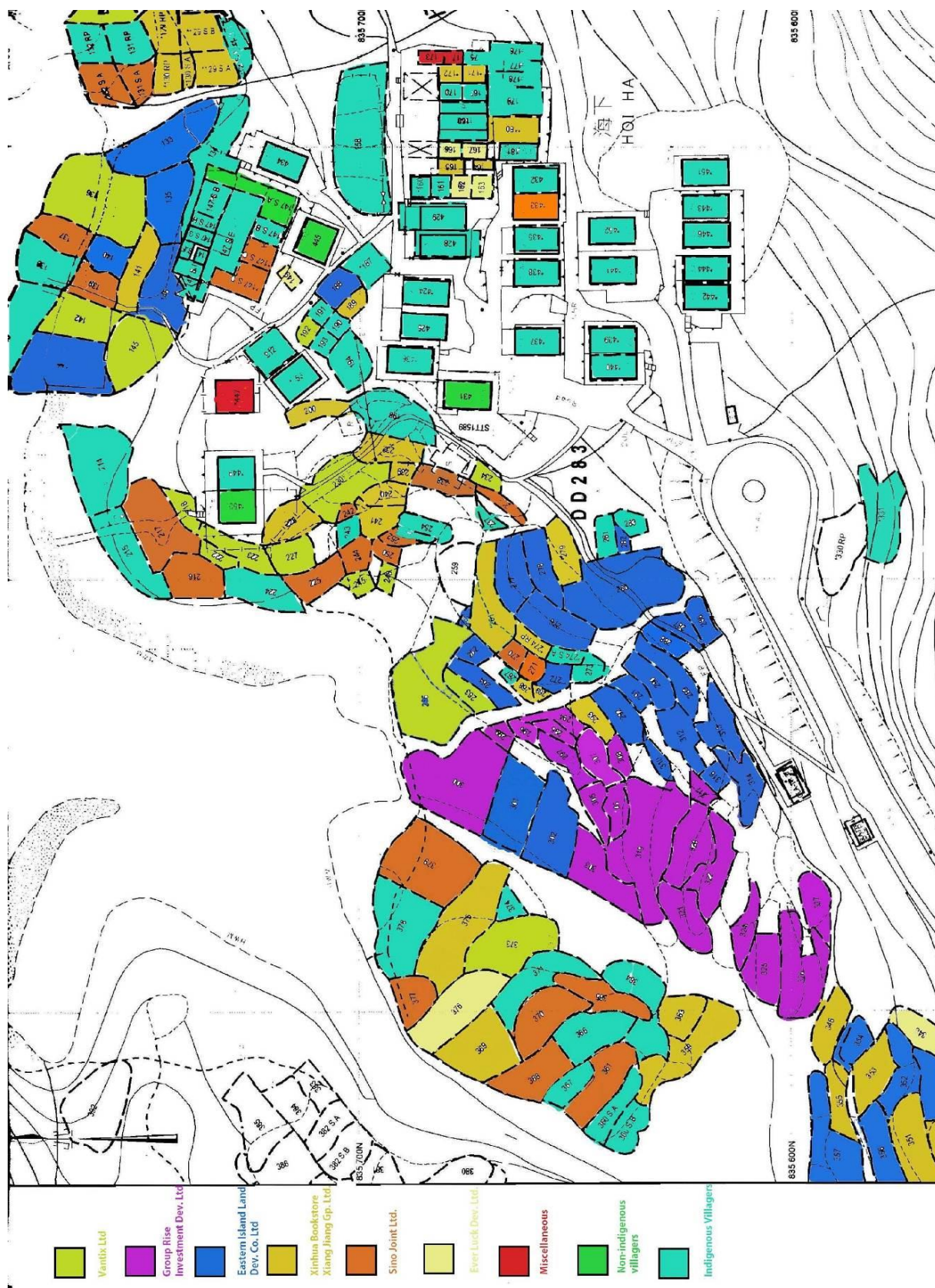


Figure 7.1 Lot ownership for centre of Hoi Ha

8. Ecology

The ecology at Hoi Ha is multifaceted; there are wooded areas, mangrove, coastal forest, estuarine, marine, orchard, farmland, grassland, and beach areas within the DPA or immediately outside it. All of the areas outside the DPA are in the Sai Kung Country Park or the Hoi Ha Wan Marine Park are protected. This report concerns the woodland areas within the DPA zone and the surrounding Sai Kung Country Park area. The land use within the area is shown in Figure 8.1. For the DPA the area breakdown, in terms of square metre is shown in Table 8.2

Area Type	Area (m ²)	Ratio (%)
Forest	61,081	1.6%
Beach	2,131	7.8%
Mangrove	286	1.0%
Coastal Forest	7,046	25.8%
Swamp	713	2.6%
Degraded Forest	870	3.2%
Village	9,191	24.8%
Road	938	24.8%
Fung Shui Forest	2,706	8.3%
	84,962	100.0%

**Table 8.2 The size and ratios of the areas within the DPA for
Hoi Ha**

8.1 Wooded Area

8.1.1 Overview

One important factor regarding the wooded and forested areas of Hoi Ha is the lack of large mature trees. Long before the Second World War, the village had a thriving lime manufacturing facility that burned coral in four kilns (Morton 1992a). Almost all of the trees in the OZP and areas surrounding the village were burnt in these kilns to cater for this industry (Morton 1992a). Furthermore extensive parts of the Pak Sha O river valley, within the OZP, were cleared for agriculture. These activities raise questions concerning the existence of any real primary woodland in any part of the DPA. Aerial photographs of Hoi Ha taken in 1961 show very little wooded area in and around the village (sortie No. :F43/81A/RAF/625). From these early photographs even the survival of the Fung Shui Forest is questionable. Field work carried out in that area did not locate any large mature trees in the area reported to be the Fung Shui Forest of Hoi Ha. The low diversity, small reported size (3177m²) and even smaller surveyed size (2706m²) suggest that more work needs to be done to confirm the details and state of this area.

There is substantial re-growth of the forest into the areas that were once cleared for agriculture. It is difficult to distinguish many of these cleared areas given the more than 40 years recovery time. Whilst past records show extensive clearing was carried out within the valley area in the DPA, early aerial photographs clearly show patches of forest that were never cleared (Morton and Ong 1992). Anyhow, the recovery was natural.

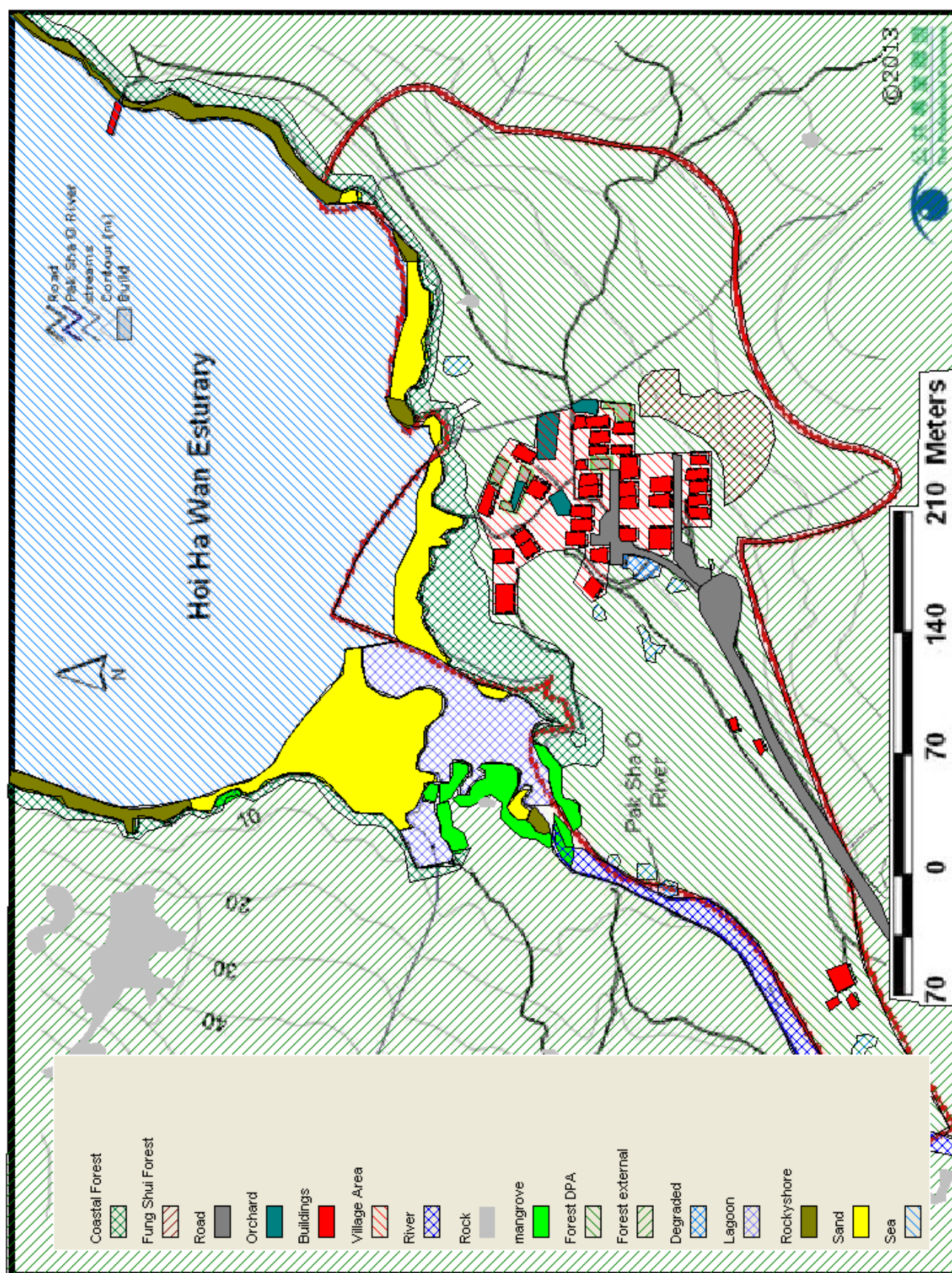


Figure 8.1. The land use in and around the area

In order to determine the quality of the wooded areas within the DPA, standard forest canopy surveys were carried out within the boundary of the DPA and the results were compared with equivalent surveys carried in nearby country park areas. In all 10 numbers of 100m random transect surveys were carried out under the forest canopy in each area. Points of 5m distance were chosen. The results are shown in Table 8.3.

During the forest surveys carried out for this report, it was noted that, as with the surrounding country park area, there is a need to carry out some reforestation work in within the OZP area. Areas identified for this need were areas of the coastal forest along the foreshore in front of the village, the Fung Shui Forest and several degraded areas shown in Figure 8.1. It is important that suitable species and tree density be maintained.

Area	uEinsteins (m-2sec-1)	Standard Error	Standard Deviation	Range
Inside the DPA Area				
Mean Light Flux Density - Under the Canopy	44.9	1.9	26.2	93.5
In the Country Park				
Mean Light Flux Density - Under the Canopy	43.3	1.7	24.2	91.4

Table 8.3. The result of the Forest Canopy Surveys for Hoi Ha Wan (n=400)

Irrespective of the origin or the age of the forest within the DPA Area, the area is equivalent to the surrounding forest in canopy parameters. This has implications with regards to carbon absorption, aesthetics and general quality. The area's species makeup is complicated, with dominant species decided by macro conditions occurring in the forest floor. A two day survey recorded 96 species of common Hong Kong plants and trees in the DPA.

Of the protected species recorded within both areas, mainly *Aquilaria sinensis*, *Gnetum luofuense*, *Neottopteris nidus*, *Pavetta hongkongensis* and *Sargentodoxa cuneata* were present. These are listed under IUCN, Mainland Chinese or local Hong Kong endangered species protection lists. However, all of the protected species recorded were not along the coast and away from the beach area or rocky shore.

8.2 Mangrove Community

8.2.1 Overview

There has been a lot of controversy regarding the extent of the mangrove community at Hoi Ha. It is very important that all forest areas are correctly described and delineated in order to consider protect and restore them properly. Different forest types have different flora and fauna associated with them. To protect an area of coastal forest/beach forest as a mangrove area is not correct and would not allow proper consideration for the fauna that would and could exist there. Consequently we will take a closer look at the scientific definitions as well as the results of a number of surveys carried out along the coastal area.

In the wildlife surveys carried out in this report, there was an obvious lack of animals recorded around the immediate village area. Key identified reasons include the lack of food and suitable forest habitat. It is possible to mitigate this and make areas more attractive for

specific suitable species to re-occupy these areas. For this to happen, for the forest to be properly protected and any forest improvement to be successful, the forest community must be identified and described correctly.

The definition of a mangrove area is clear and is quoted below verbatim below the expert authority Dr. Peter J. Hogarth in his 2012 book *The biology of Mangroves and Sea grasses* (p2):

“Mangroves are defined as woody trees and shrubs which flourish in mangrove habitats (or mangals), which is almost, but not quite, a tautology. True, or exclusive, mangroves are those which occur only in such habitats or only rarely elsewhere. There is in addition a loosely defined group of species often described as mangrove associates, or non-exclusive mangrove species. These comprise a large number of species typically occurring on the landward margin of the mangal, and often in non-mangal habitats such as rainforest, salt marsh, or lowland fresh water swamps.”(Page 2).

“Typical mangrove habitats are periodically inundated by the tides. Mangrove trees therefore grow in soil that is more or less permanently waterlogged, and in water whose salinity fluctuates and, with evaporation may be even higher than that of the open sea.” (Page 8).

Mangal areas also have associated plant and animal species associated with it. This can also be used to confirm an area. Again from Dr Peter Hogarth’s book:

“A mangrove community is more than just an assemblage of trees physiologically adapted to living in brackish water. Living in, on or around the mangrove trees is a heterogeneous community of organisms, which depend on them for attachment, shelter or nutrients. The mangrove trees may suffer or benefit from their presence. They may be permanent residents or occupy a mangal temporary, either seasonally or for part of their life cycles.” (page 71).

This mangrove area is contained within and surrounded by coastal forest that contains tree species typically associated with mangroves like *Hibiscus tiliaceus*, but the forest area is not intertidal, nor is it periodically flooded with salt water and so also contains species that are not associated with mangrove communities as well like *Ficus microcarpa*. Further along the beach at the rocky outcrop that divides the beach, there have been efforts by a local environmental group to change this environs’ ecology by planting *Kandelia obovata* mangroves in front of the coastal forest assemblage. This was to make a typical mangrove ecosystem with a back mangrove area out of the existing coastal forest. This type of activity should be discouraged. It is important that the original composition and structure of an ecologically sensitive area in terms of species distribution and spacing between trees should be considered before any restoration work is carried out.

The main mangrove area at Hoi Ha Wan is located in the intertidal mud and sand around the back of a lagoon formed as a result of the Pak Sha O river crossing the beach. This mangrove community consists of five species, *Aegiceras corniculatum*, *Avicenna marina*, *Bruguiera gymnorhiza*, *Excoecaria agallocha* and *Kandelia obovata*. It is non-zonal and

does not have the usually associated back mangrove area (Chan 1992; Tam 2012); this feature was a key deciding factor to make it SSSI number 48 in 1989. A detailed study of the mangrove area was carried out by K. Y. Chan in 1992 and by Oceanway in 2009 and 2012. The latter two surveys were to look at reinforcing the area with reforestation. The results of these surveys are shown in Table 8.4.

Species / Year	1992	2009	2012
<i>Aegiceras corniculatum</i>	833	831	842
<i>Kandelia obovata</i>	125	129	134
<i>Avicenna marina</i>	1	3	3
<i>Bruguiera gymnorhiza</i>	83	85	85
<i>Excoecaria agallocha</i>	26	28	28
Unidentified seedlings	0	0	17
Total :	1068	1076	1109

Table 8.4. The number of mangroves near Hoi Ha Village

Note that *Acanthus ilicifolus* of the 1992 survey was identified as *Bruguiera gymnorhiza* in later surveys.

Four other mangrove areas have been identified within the bay, but these are smaller, e.g. Lan Lo Au. All of the mangrove areas in Hoi Ha fall within the Marine Park Boundary and are thus protected under the Marine Park Ordinance.

8.2.2 Makeup of the Mangrove Community in the DPA

The area of mangrove within the DPA is only 398m² (1% of the total area). The number of mangrove trees in the area is shown in Table 8.5.

Species / Year	1992	2009	2012
<i>Aegiceras corniculatum</i>	298	271	306
<i>Kandelia obovata</i>	2	3	3
<i>Avicenna marina</i>	0	0	0
<i>Bruguiera gymnorhiza</i>	75	85	85
<i>Excoecaria agallocha</i>	5	3	8
Unidentified seedlings	0	0	0
Total :	380	362	402

Table 8.5. The number of mangroves in the DPA at Hoi Ha

8.3 Coastal Forest

8.3.1 Overview

The total Coastal Forest Area also known as Beach Forest (under IUCN guidelines), within the DPA constitutes almost 25% of the total DPA; this is very typical of coastal areas in Hong Kong. It comprises two main assemblages, one associated with rocky shores and another associated with sandy beaches. There were no protected species recorded in a survey of the shoreline extending into and away from Hoi Ha village. The coastal forest community at Hoi Ha is not intertidal and only experiences salt water ingress during severe weather conditions. Large areas do experience periodic flooding by fresh water runoff during heavy rainfall or from the Pak Sha O river overflow.

One tree species is missing from the sandy beach, the she-oak pine *Casuarina equisetifolia*. Most nearby beaches have this species as part of their coastal forest assemblage. It is likely the wood from any such species was used by the village for building in the past. The Coastal Forest assemblage on the west side of the village is quite developed with a significant canopy. Other areas are severely degraded and in need of restoration.

Some of this area is currently being mistakenly referred to as a mangrove area. However, it is not intertidal and lacks the associated indicator species. This is clearly demonstrated by the non-salt tolerant flora species present in the area and the lack of bivalves (Lam and Morton 2004) and gastropods on the root structure of the trees and shrubs of the area. There is also a lack crustacean species associated with Hoi Ha mangroves (Choi 1992) and other nearby mangrove areas. This area does flood during storm surges however the salinity of the water during such occasions is very low indicating that the source of flooding is in fact the river and not the sea. One solitary specimen of the species *Agiceras coniculatus* on the beach and several species of *Oligochaeta* in the beach sand in this area indicates that the area is being flooded with fresh water (Chan 1992; Erseus 1992).).

We can definitely state that based on the science outlined above, the coastal strip along the beach north of the village is not a mangrove area but is clearly beach/coastal forest.

8.4 Fung Shui Forest

8.4.1 Overview

In Hong Kong, a Fung Shui Forest is an area of forest that was preserved by village settlers for reasons of Fung Shui and good prosperity. These forests are located at the back of the villages, are mature, consist of a dense and tall canopy structure with dense undergrowth. These areas are made up of native shade tolerant old trees and vines. Fruit trees and other useful plants were also planted along the edge to maximize the benefits of these areas. Today, these forests are still seen behind some villages. Hoi Ha is reported as one such village. The Fung Shui Forest at Hoi Ha Wan is quoted as being 3,177m² in size (AFCD 2002). Fieldwork carried out as part of this report recorded an area of only 2706m² of wooded area within the boundary shown as Fung Shui Forest. This corresponded to recent aerial photograph images of the area. The main characteristic of this forest, dense and tall canopy structure, is also lacking. This suggests that this area of forest may not have survived the wood demands of the lime industry, or it has been degraded in some way over time. The area of Fung Shui Forest takes up 2.2% of the DPA.

Environmental Protection Department records show it has a species richness of only 13 (EPD 2006). Given the size of the area, such species diversity indicates that this area is the same as the surrounding areas of forest. Out of the 116 Fung Shui Forests remaining in Hong Kong, the Hoi Ha Fung Shui Forest is not rated very highly (AFCD 2002). Especially when compared with the Fung Shui Forest at Nam Fung Road, which has a species richness of 156 with an area of 38,346m². In reality, the Fung Shui Forest at Hoi Ha is not a protected area, nor does it contain any protected or endangered flora. However, it should be noted that some seedlings have been planted in the area supposed to be Fung Shui Forest. We can only guess who by and for what reason.

8.5 Swamp Areas

8.5.1 Overview

Several small areas within the DPA are waterlogged for most of year. These are all fed from small streams with the largest being supplied water from a small flood plain tributary of the Pak Sha O river. The total area comprises approximately 2.6%, but this increases during times of heavy rain. It is common to see birds, other animals and insects around the edges of these areas during daytime especially the Asian Porcupine (*Hystrix branchyura*), and the common Reeves' Turtle (*Chinemys reevesii*). These areas also provide suitable habitat for species of dragon flies and butterflies to congregate.

8.6 Area Flora

8.6.1 Overview

A list of the flora recorded in the area is in Appendix A. This includes all areas within the DPA (wooded or not) in and around the village. Table 8.6 shows a summary of the different species recorded in Appendix A separated in the main areas within the DPA.

Area Type	Area (m ²)	Plant Species
Forest	61081	149
Beach	2131	7
Mangrove	286	5
Coastal Forest	7046	83
Swamp	713	43
Degraded Forest	870	47
Village	9191	31
Road	938	0
Fung Shui Forest	2706	86

Table 8.6 The number of flora species recorded in the different areas of Hoi Ha

It is important to note that the classifications of primary and secondary forests is not totally applicable to the wooded areas within the DPA. Areas within the farmland area, on the perimeter and edges of the farming plots, were never cleared and therefore still are primary forest. To apply a blanket category of "Secondary Woodland" for this area is, therefore, not correct. Since the farming stopped, most of the once cleared land has naturally re-seeded back to natural forest. This process started fifty years ago. There are many very mature trees in this area. The farmland was originally cleared because of its high productivity value as well as its proximity to the village and water. The fact that it was determined as high productivity places it in a category above normal woodland. The land in the river valley is part of a small but effective flood plain. Hence the lack of indigenous built residences in the past. Flood plains are the most productive botanical areas in the world. This makes there areas very suitable habitats for animals. The botanical productivity equates to a good reliable source of food and water. The animal distribution sighting records for Hoi Ha clearly show this. See Figure 8.10 and 8.11 below for details.

Based on this science, there is nothing special or particular about this area that would not make it suitable for a Country Park Assignment. This is particularly the case given that protected animal species regularly visit the area for food and possibly water. Any human disturbance allowed to occur here would directly impact endangered species.

8.7 The Marine Park

8.7.1 Overview

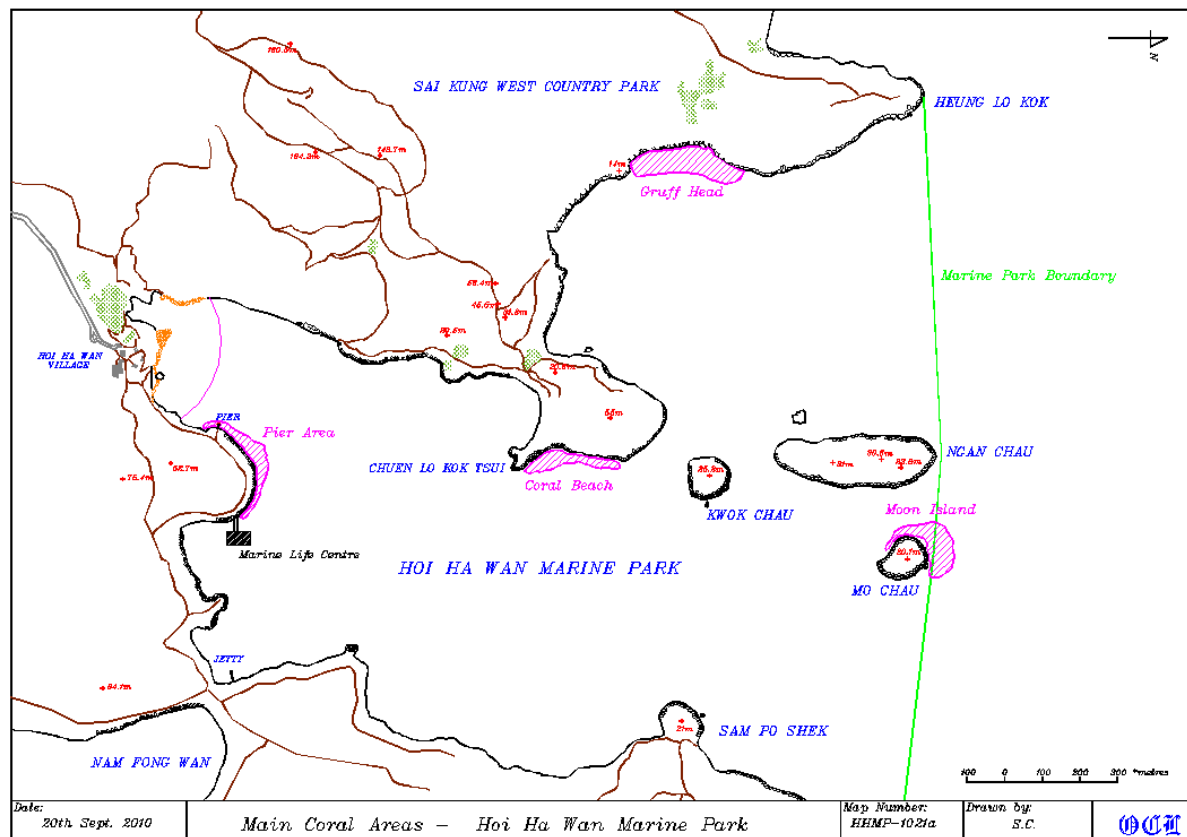


Figure 8.7. Map showing the location of the four main coral areas of Hoi Ha Wan

The Hoi Ha Wan Marine Park is a sheltered bay comprising 260Ha of sea surface area. It is formally known as Site of Special Scientific Interest (SSSI) No. 48 and Marine Park No. 2. Physically, it is located in the Northwest of the Sai Kung Country Park. The bay contains ecologically significant incipient coral areas scattered around its periphery (Cope and Morton 1988; Zou et al. 1992; Oceanway 2002, 2005, 2010, 2013) as well as several undersea areas populated with *Antipathes* spp. There are also several small non-zoned mangrove areas (Chan 1992; Tam 2012) and a small lagoon kept in place by a dynamic beach and a series of sand bars and spits (Morton et al. 1992) directly in front of a small village. Figure 8.7 show the location of the four main coral areas of Hoi Ha Wan. These are Pier Area, Coral Beach, Moon Island and Gruff Head.

The World Wide Fund for Nature runs and maintains an Education Centre in a small bay on the western side of the park. This centre is primarily used for primary and secondary school education with students receiving marine conservation and awareness education. On

average 7,000 students attend this facility each year. It is currently running at maximum student capacity, with a waiting list of schools trying to visit the centre.

The Marine Park area receives impact from the bordering Hoi Ha Village primarily in the form of rubbish and water pollution. The main areas impacted are the beach, coastal and marine area immediately out from the village. We are considering the Marine Park in some detail as any zoning planned for the village area will have a high degree of impact.

8.7.2 Coral Health

The general health of a coral area is a very good indicator of the level of impact in that area. A total of 64 coral species are represented within the park, out of a possible 84 locally recorded species. The hard coral areas in the Hoi Ha Wan Marine Park are classified as "B" class areas. The Coral Beach area has the highest recorded density of coral cover in Hong Kong making this area a local ecologically important area. A total of 64 coral species are represented within the park, out of a possible 84 locally recorded species. Coral Watch has been carried out as a coral health monitoring tool at Hoi Ha Wan since 2005. It follows an ordinate scale of 0 to 5, with 0 (white) representing totally bleached and 5 (dark green) representing no bleaching. Graph bars are scaled to show the combined ordinate Cumulative Average. The Cumulative Average result for Hong Kong corals normally ranges from 3.2 to 4.1, for areas with mediocre areas to the best. Areas with values recorded below 3.2 are considered to be overstressed. Figure 8.8 shows the result of the Coral Watch Surveys of the corals in Hoi Ha Wan.

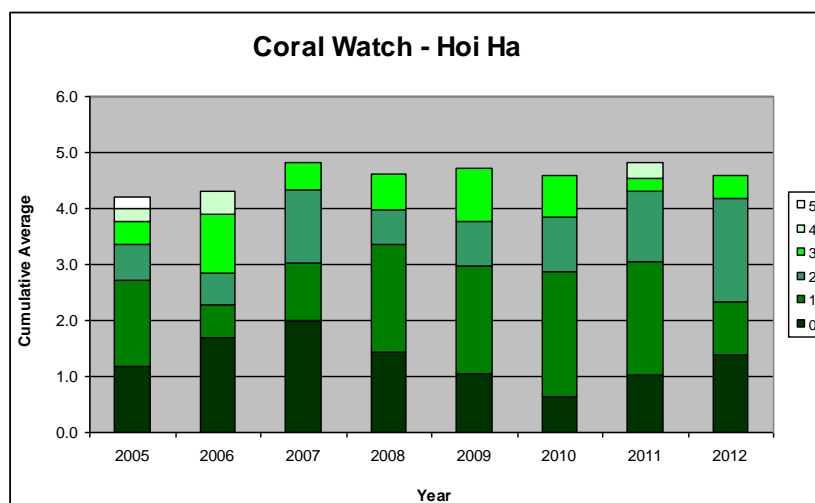


Figure 8.8. Ordinate Coral Health (Coral Watch) for all of the main coral areas at Hoi Ha Wan.

Of the four coral areas within the Marine park, the Pier Coral Area, by virtue of its proximity, is the most likely to be impacted by the Hoi Ha Village. The Coral Watch data for the Pier Area is presented in Figure 8.9. Since 2009, the coral health at the Pier Area has been less than the average for all areas. Furthermore the ratio of unbleached coral at the Pier Area has been less than the average since 2007. The low value in 2005 was due to an abnormal hypoxic event that impacted the whole of Mirs Bay.

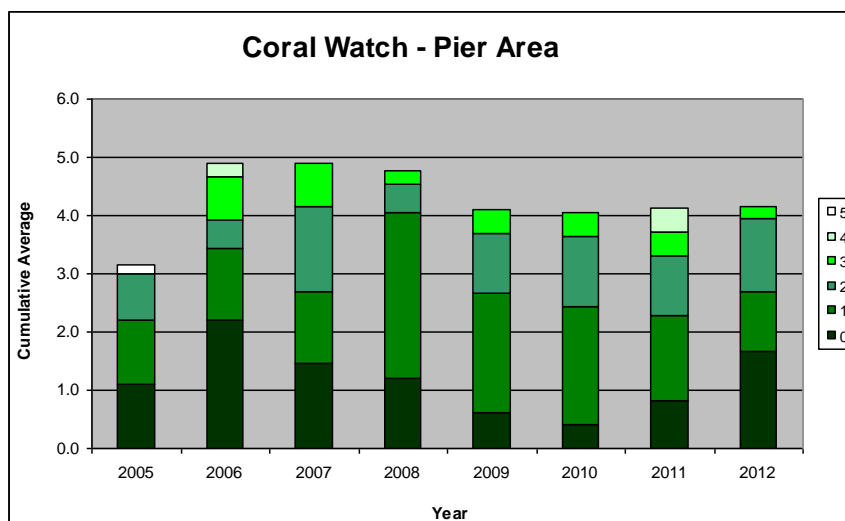


Figure 8.9. The Cumulative Average Value for the Pier Area near Hoi Ha Wan Marine Park.

8.7.3 Anthropogenic coral damage.

All of these coral areas are frequently visited by divers and snorkelers, raising the issue of visitor damage. This in turn relates to acceptable number of people in an area. Almost one third of the visitors to Hoi Ha Village visit the marine park (Table 9.2a). The average anthropogenic damage to the four main coral areas at Hoi Ha Wan are given in Table 8.10.

Area	2010	2011	2012
Pier Area	2.10%	2.00%	2.10%
Gruff Head	2.30%	2.40%	2.20%
Moon Island	2.10%	2.10%	2.00%
Coral Beach	5.10%	4.85%	5.00%

Table 8.10. Measured Anthropogenic coral damage in the 4 main coral areas of Hoi Ha Wan.

These figures are consistent with figures measured in other protected areas in Thailand and Malaysia, some receiving far fewer visitors than the coral areas at Hoi Ha Wan. The higher value at Coral Beach is due to the fragile nature of the dominant species, *Pavona decussata*, at that location, the average yearly coral growth rate over the past eight years has been measured to exceed, match or double these damage figures.

8.7.4 Fish Populations

The reef fish populations within the Marine Park have been increasing over the past two years. This trend was the result of two separate surveys; WWF (Cornish 2009) and Oceanway (Oceanway 2013) The Oceanway data is in Figure 8.11. The number of reef fish recorded has almost doubled year on year.

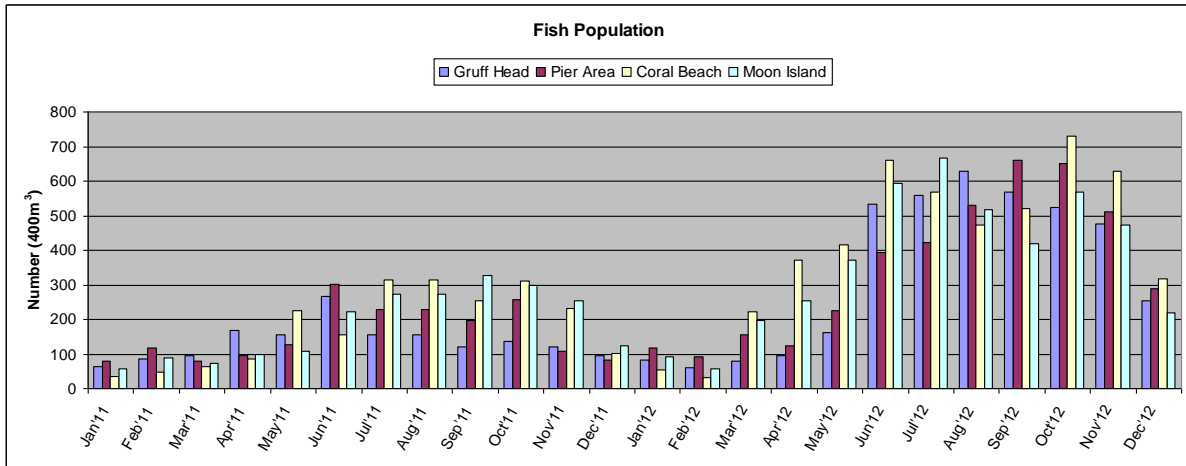


Figure 8.11. The fish population in the four coral areas of Hoi Ha Wan.

It is expected that the population of reef fish will increase further given that there has been a ban on inshore trawling and the number of valid commercial fishing permits for the Hoi Ha Wan Marine Park decreases further. The reef fish populations within the bay indicate general trends about the general ecology of the bay.

8.7.5 Water Quality

The water quality in the Hoi Ha Wan Marine Park is moderate, compared to other areas of Hong Kong. Currently water quality parameters are measured by AFCD on a quarterly basis at three locations. There are several important indicators of pollution by human habitation. One of these is the amount of faecal coliform measured in the water column on the surface and just above the seabed. Typical faecal coliform figures for Hoi Ha Wan are in Figure 8.12. See Figure 8.7 for locations of the measuring locations.

A faecal coliform gradient from the village to the outer regions of the marine park would indicate a strong impact of sewage originating from the village area. During measured peaks and recently this has been the case with regards to the Annual Bottom Faecal Coliform. See Figure 8.2 for details. However it is likely that this issue may also involve pollution in the Pak Sha O River as well.

For Hoi Ha Wan, the Water Quality Objectives set the levels of *E. coli* at a maximum level of 180 per 100mL calculated as the mean for all samples collected from March to October inclusive. This is set by the Water Pollution Control Ordinance (WPCO). From the measured results, the amount was below set limits for most of the time. The peak in the second quarter of 2012 is not explained.

The amount of chlorophyll-a in the water column is an indirect indicator of the plant nutrients in the water. An excess of chlorophyll-a indicates an algal bloom that may reduce water clarity and deplete dissolved oxygen levels. The locations of the measurements taken are the same as those measured for Faecal Coliform. The results are in Figure 8.13.

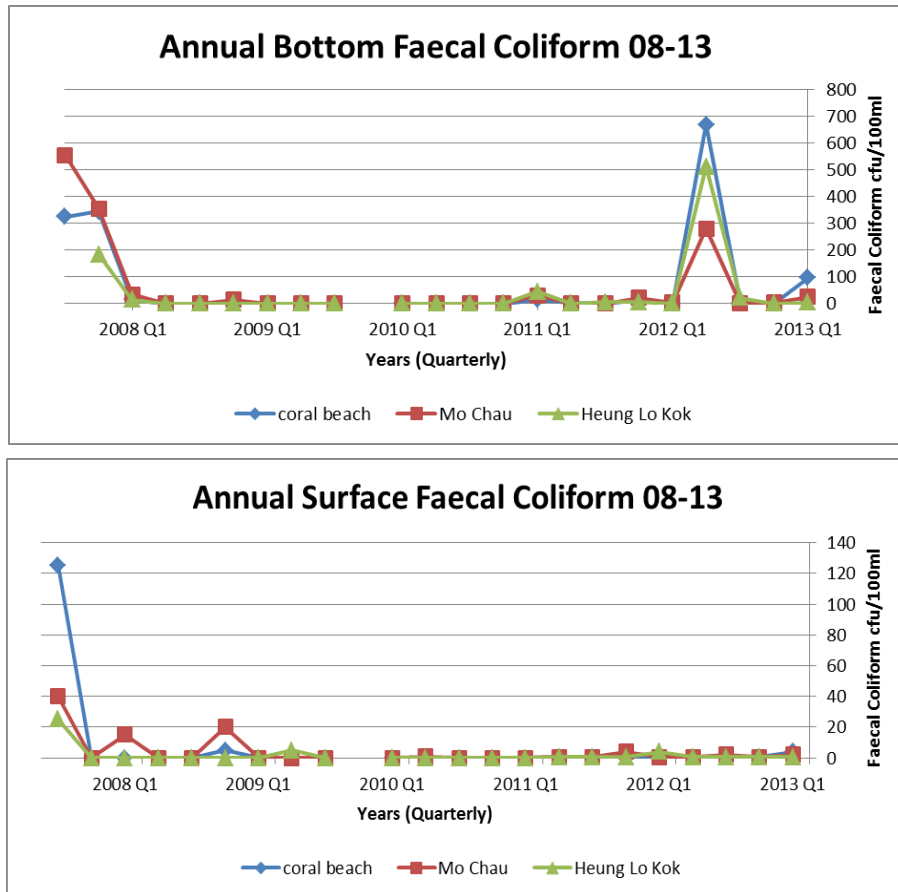
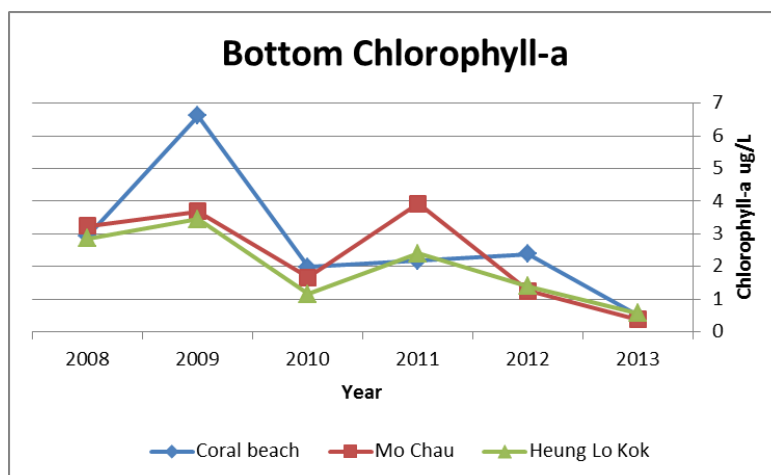


Figure 8.12 Typical faecal coliform parameters of Hoi Ha Wan.

For the values obtained from Hoi Ha we can see that the innermost station at coral beach is shown to be higher than the values measured in other areas; further away from Hoi Ha. It is likely that this indicates a possible pollution source from the village. Typically this pollution originates from agriculture activity and the recent farming activities at Pak Sha O are implicated as a possible source. . However the overall decrease in overall values is suggestive of an overall reduction of the total chlorophyll-a pollution.



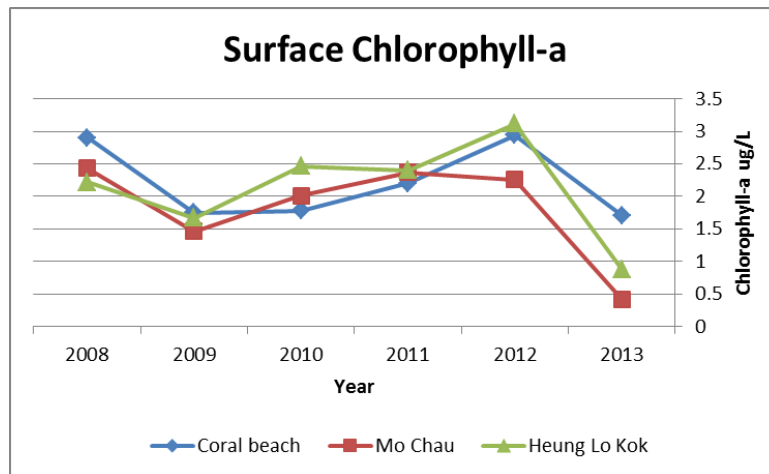


Figure 8.13 Typical chlorophyll-a parameters of Hoi Ha Wan.

8.7.6 Identified Pollution Sources

One of the direct impacts on any Marine Protected Area, such as the Hoi Ha Wan Marine Park, is the water pollution entering the area. For Hoi Ha Wan two key potential sources of water pollution have been identified:

- Water pollution from the village (grey, runoff and sewage).
- Water pollution entering Hoi Ha Wan from the Pak Sha O River (total dissolved solids, grey water, sewage).

The influence of the Tolo Channel and the outer marine areas can be separated by considering the concentration gradient of the substance being measured to see the directional flow. There are other sources of anthropogenic pollution but these can be considered as being associated with the *E. coli* being measured. Figures 8.14 indicates a gradient extending out from Coral Beach. Since the nearest settlement to this is Hoi Ha then it is logical to assume that the source is either from the village, the Pak Sha O River or both.

Regarding the *E. coli* data for the beach at Hoi Ha, points C, D and E have the most likely source from the village. The dips are probably due to drops in leakage after septic tank clearing, ground water flushing, or times when residents leave the area for holidays overseas.

International standards put the safe beach levels of *E. coli* at 400 per 100mL of water. Hong Kong Water Quality Standards allocates a maximum average of 180 per 100mL, for multiple testing. The measurements taken at Hoi Ha are single measurements, so it is best to apply international standards for analysis. This is currently exceeded at points C, D & E. The source of the *E. coli* at G is from the river valley and maybe up as far as Pak Sha O, and is just under the 400 limit. An inspection of Pak Sha O revealed several septic tanks within 10m of the river. The building near the existing BBQ area, and the BBQ areas themselves may also be a source of this pollution. But neither has been checked for confirmation of this.

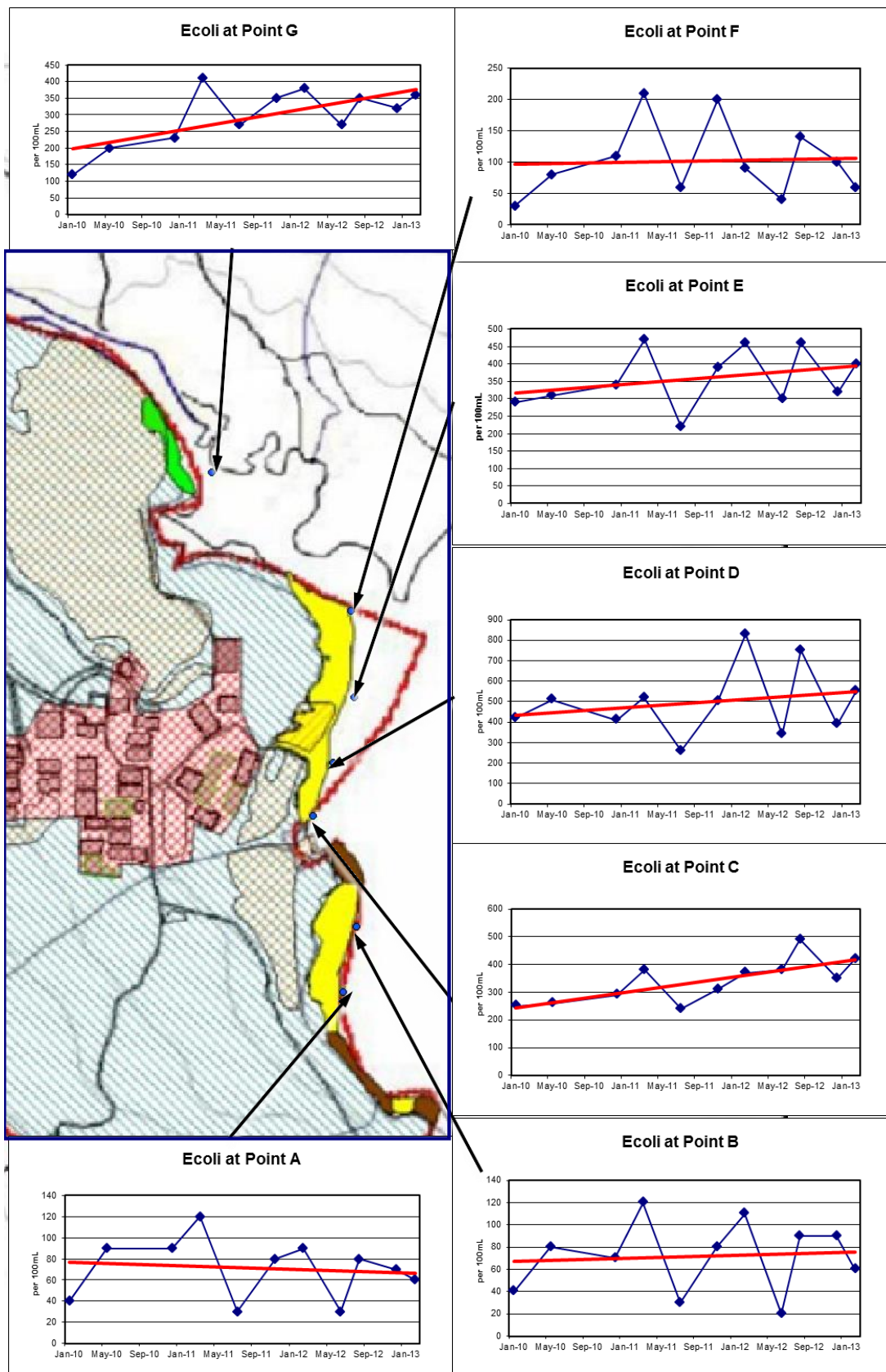


Figure 8.14. The levels of *E. coli* measured at low tide from ground water seepage at the beach

Village houses are designed with wastewater systems that require both water conservation and maintenance to work properly. The systems rely on an anaerobic process (hypoxic) meaning faecal matter and waste water needs to remain inside until bacteria can process it before discharge through an overflow pipe. Household disinfectants like chlorine bleach should not be mixed with any waste water entering a septic tank as this also kills off the bacteria within the tank, effectively rendering the process ineffective for a period of time. Bacteria friendly sterilizers should be used instead. Observations at Hoi Ha suggest that chlorine bleach is being used for household disinfecting.

However, the biggest problem is the seemingly infinite source of available water now available to households. In the past, the limited supply of village water meant that washing machine, and shower use was somewhat restricted. That changed when the Water Supplies Department connected to the houses at Hoi Ha. Now the volume of waste water requiring processing from houses has exceeded the design capacity of the tanks in many cases. The extra water from water from dishwashers, increased daily washing machine loads, even a Jacuzzi means that the septic tank systems overflow before processing more frequently.

With an increase in houses planned for the area, either by the developers or by the SHP, there will be a time when a central sewage system will be practical. Until then there needs to be some sort of revamp using bacterial additives or aerobic conversions for sewage processing to minimize the *E. coli* recorded at the beaches. It is possible that self control regarding the use of water may be sufficient to stop the increasing trends.

8.8 The Beach

8.8.1 Overview

Hoi Ha Wan is a protected bay, opening in a northerly direction into Mirs Bay. The opening faces the coast of Mainland China, some 12km away. The beach at Hoi-Ha is a mobile estuarine beach, typical of other estuarine beaches in Hong Kong. The majority of the movement is a resultant of fluvial flow, wave action and typhoons have much less of an impact on the beach (Morton, and Ong Che 1992). The two islands, Moon Island (Mo Chau) and Flat Island (Ngan Chau) protect the entrance of the bay; they refract waves entering the bay, dissipating most of the wave energy. Tide-Pole Point and the Hoi Ha Pier also protect the main beach from wave energy.

The waves that do enter the bay are reflected from the eastern rocky shore towards the west. This sets up a weak long-shore current flow across the beach, subjecting it to low energy constructional waves, moving material in an east-west direction and the influence of the stream cutting through the sand spit causing fluvial deposition (Morton, and Ong Che 1992). These two forces sustained and maintained the beach at Hoi-Ha in a very mobile fashion. The result of this is the accumulation of sand on the western section of the beach the sand on the western side of the bay the eastern side accumulation is from the sand sediment washed down from the Pak Sha O River. Water data from the river indicate that in 2011 the beach accreted at least 7 cubic meters of sand in 2012 the amount was estimated at 11 cubic meters. Aerial photographs of the beach indicate an increase in the water flow

from the river from 1954 – now. They cannot however, be used to estimate the size and sand movement at the beach mainly because the profile of the sand areas cannot be determined from an aerial photograph. In addition, non-consistent tide and visibility data mean that, only the general shape of the beach is successive years can be determined from this data. The beach has an overall mean particle size of 0.14mm, fairly typical of Hong Kong beaches (Morton, and Ong Che 1992).

There has been a lot of scientific controversy regarding the stabilization role the mangroves and Coastal Forest play in this and some other areas as well. It is known that mangrove and coastal forests reduce water flow energy behind them during periods of high wave action. However such periods are very short at Hoi Ha and the wave action is not that significant. Waves of 9m were recorded at Nine Pins during the passage of Vicente (Chiu-Leung 2013). The corresponding height at Hoi ha was only 2.1m for just over 2 hours. Typhoon Vicente was a statistically once in ten year occurrence. It is therefore doubtful that beach is being shaped by the flora present. The lack of back mangroves (Chan 1992, Tam 2013) also indicate that the normal stabilization via successive flora processes is not occurring along the beach at Hoi Ha. This means that there are other factors controlling the beach structure. Experts suggest that the river plays a far more important role in providing a constant source of sand for beach accretion and the river flow changing the shape of the beach (Morton and Ong Che 1992). This means that the flow rate of the river is a critical factor in determining the shape of the beach. It can be observed from past aerial photographs that the beach underwent two significant shape changes in recent time. One was the building of the road in and the dredging of the bay the 1980s (Chan 1992). It has been accepted that the change caused by the road was due to the increase in water flow caused by the change in surface hydrology brought about by the drainage of the road (Morton 1992). This corresponded to an increase in the rate of water flowing from the river during periods of heavy rain.



Figure 8.15 The beach at Hoi Ha at low tide. (PH 2013)

The result of this is that the hydrology of the river valley is crucial in maintaining the beach. Any changes in the river valley will change the flow rate of the river. If the change is significant, then the lagoon will wash out, the beach will decrease in size, the mangrove community will thin and the ecology of the area will change. It is also highly likely that the current coastal forest area will decrease in size.



Figure 8.16. A photo of the beach area and an aerial photograph showing the accretion material washed down by the Pak Sha O River. (Google Earth 2012)

8.8.2 - Wave Action

Hoi Ha Wan is a protected bay (Morton 1983). Wave data for Mirs Bay was collected during the entire of 2012 by Teledyne ADCP's. This data is shown in Figure 8.17. The northward facing entrance to the bay and the barrier islands excludes much of the wave action present in Mirs Bay, but certain directions will pass the barrier islands. From this data the majority of the wave direction in Mirs Bay is from the west, south-west direction (Yamamoto 2012). Internal reflections from the rocky shore would restrict the wave directional spread to 90 degrees centred on the north direction. Wave data recorded for Mir's Bay in 2012 shows that less than 1% of the time the recorded significant wave height in the 0.3m band originating at an angle that could enter the bay and strike the beach (Figure 8.18). From this data the majority of the wave action in Mirs Bay is mainly from the south-east direction. Hoi Ha Wan is naturally protected from these waves first by Tap Mun (Grass Island) and the Wan Chai Peninsula.

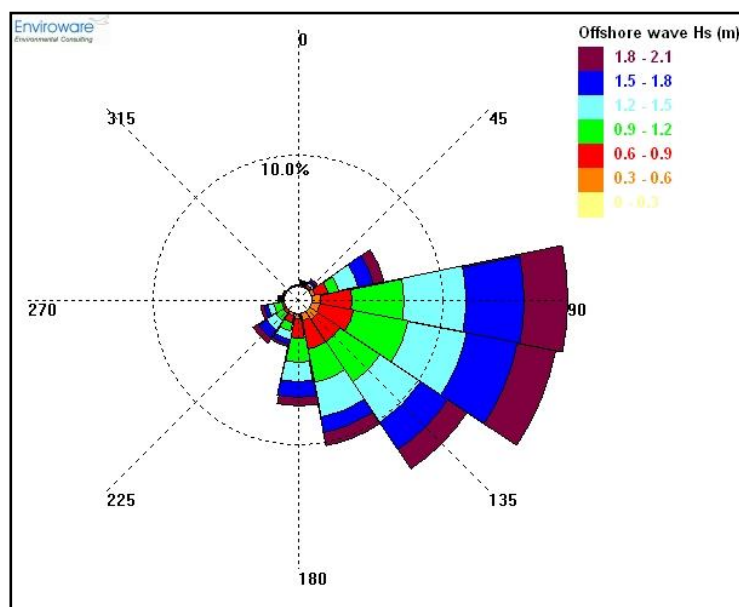


Figure 8.17 The Significant Wave Height Data for Mirs Bay during 2012.

Considering Hoi Ha Wan itself, Table 8.18 contains the data recorded during 2012 for the bay. A maximum significant wave height of 2.18m was measured during a force 10 typhoon. The average wave in the bay is only 1.76 cm. Further analysis of that specific wave spread from 315 to 45 degrees, basically the wave spread that could enter the bay, allows a more detailed analysis and this is shown in Table 8.19.

Description	Value
Average Significant Wave Height	17.63 centimeter
Percentage with Significant Waves >1metre	0.58 %
Total time with Significant Waves >1metre	50.9 Hours
Maximum Significant Wave Height (Hs)	2.18 Metre
Duration of maximum Significant Waves	1.1 Hours
Maximum Significant Wave Period	10.2 Seconds
Average Significant Wave Period	7.0 Seconds

Table 8.18. Significant Wave Height results for Hoi Ha during 2012.

The maximum values were measured during the Typhoon Vicente in June 2012. Whilst these conditions can be considered extreme and occurring once every 10 years (HKO 2011), the result is significant and shows the worst case situation. The maximum significant wave height recorded, excluding the data from Typhoon Vicente, was 1.47m. The duration for this maximum was 3.2 hours.

The function of the waves striking the beach at Hoi Ha is to reconstruct the beach after the rain water runoff has washed some of the sand from the beach to the sand bar immediately in front of the beach. These waves also set up the mild long-shore current that moves the sand washed down by the Pak Sha O River to the eastern beach, increasing the sand at this location.

The wave data for Hoi Ha is shown graphically in Figure 8.19. This clearly shows that for 98.8% of 2012, the wave size in Hoi Ha Wan was less than 0.5m. The bar chart breakdown of the remaining 1.2% of the time details the period of time that the beach is subject to a wave action that can cause impact. Such data is fairly typical of sheltered, protected bays in Hong Kong.

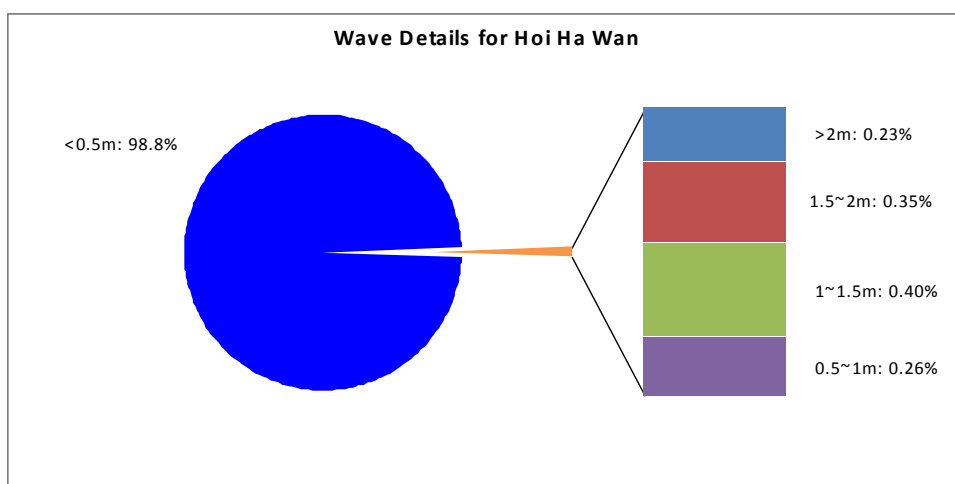


Figure 8.19 General wave data for Hoi Ha Wan (2012)

8.8.2 Tides

Hoi Ha Wan is impacted by normal Hong Kong mixed tides. These are sometimes called micro-tides and are mainly semi-diurnal. This means that there are two high and two low tides a day, with two maximum high and minimum low tide heights each month. The nearest Hong Kong Observatory tide gauge is located 4km east at Kau Lo Wan, in the adjacent Long Harbour area. Tide data is collected every 10 minutes. Long Harbour is a semi-protected bay.

The WWF Hoi Ha Wan Marine Life Centre has a Teledyne OPM tide gauge fitted with all data streamed to the internet as part of the DataBuoy Project. Data is collected every 5 minutes. Typical tide data collected is shown in Figure 8.20. There is a slight time lag in terms of maximum times and heights when compared to more exposed areas of Hong Kong. This is to be expected. Yearly tide gauge summary data for 2012 is shown in Table 8.21 below.

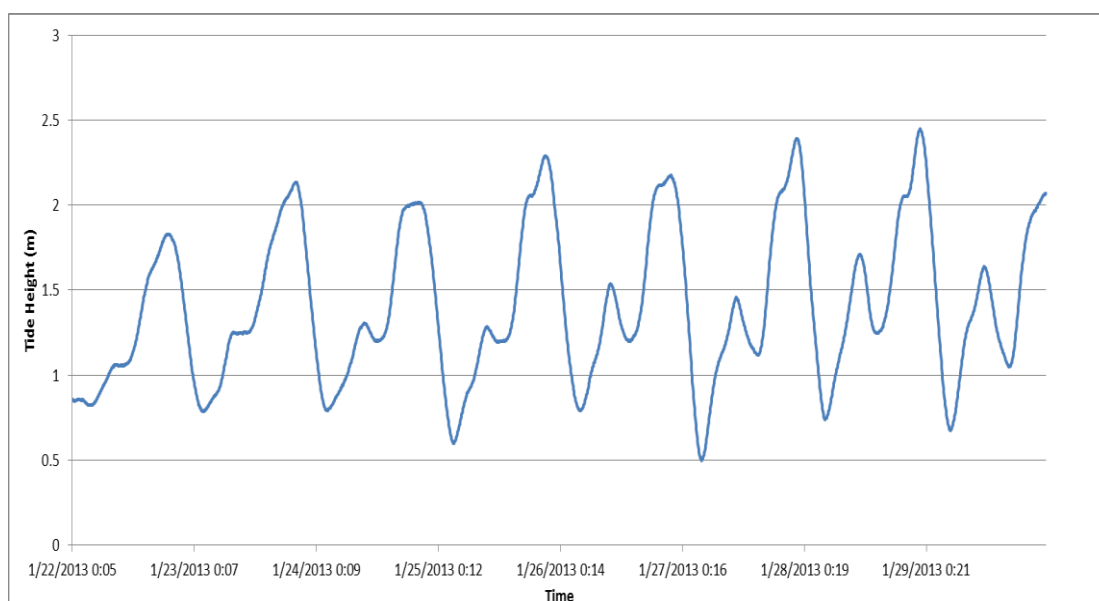


Figure 8.20. Typical tide data for Hoi Ha Wan (22nd ~ 29th January 2013).

Annual Tide data for HHW (2012)

Tide figures (m)	
Max	2.512
Min	0.211
Average	1.323

Tide data during typhoon Vicente in HHW

Tide figures (m)	
Max	2.402
Min	0.516
Average	1.452

Table 8.21 Tide gauge data for Hoi Ha Wan - 2012.

8.8.3 Storm Surges

A storm surge is defined as the increase above the calculated tide in a given area. These phenomena are always associated with a storm, typically a typhoon. During 2012, Typhoon Vicente created the largest storm surge recorded in Hong Kong in 10 years. The tide gauge measured the maximum deviation from the calculated tide height as 1.197m. Figure 8.22 shows a graph of the predicted tide height compared with the measured height. This was

slightly less than the levels measured in other areas of Hong Kong. For example the surge was measured at 1.47m at Shek Pik on Lantau. See Table 8.23 for more locations.

The storm surge data for Hoi Ha suggests that the area receives less impact than many other areas of Hong Kong. This is probably due to the sheltered nature of the bay. The storm surge condition can be exacerbated by high waves. Again the sheltered position of Hoi Ha suggests that the impacts would be far less than other areas like Big Wave Bay for example.

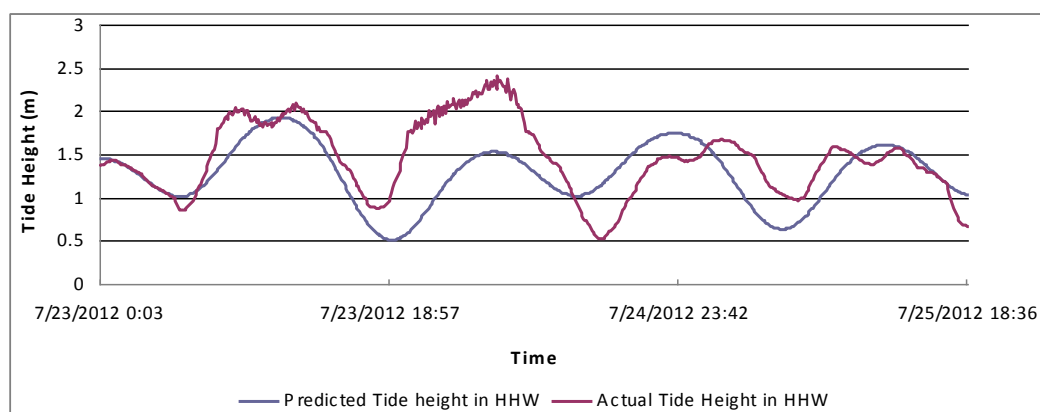


Table 8.22 Typhoon Vicente Storm Surge Data for Hoi Ha Wan - 2012.

Station	Maximum sea level (above chart datum)			Maximum storm surge (above astronomical tide)		
	Height (m)	Date/Month	Time	Height (m)	Date/Month	Time
Shek Pik	3.19	24/7	2:08	1.47	24/7	2:08
Tai Miu Wan	2.78	24/7	1:45	1.19	24/7	1:45

Table 8.23 Typhoon Vicente Storm Surge Data for other areas of Hong Kong - 2012.

8.9 Pak Sha O River

8.9.1 Overview

The Pak Sha O River has a significant impact on the Hoi Ha Wan Marine Park. It is a source of fresh water, sand and pollution. It also is the major architect of the beach on the western side of the village. The hydrology of this system is a balance of forces between the stability of the beach and the energy of the water during and after periods of heavy rains. Typical river water parameters are shown in Figure 8.24.

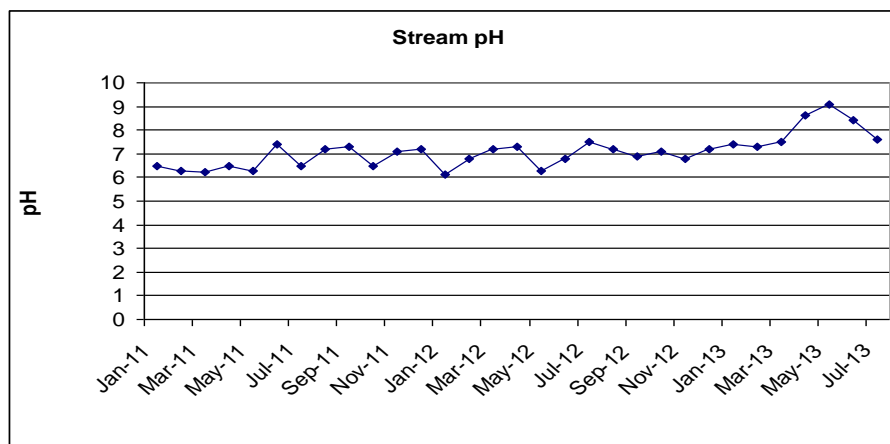
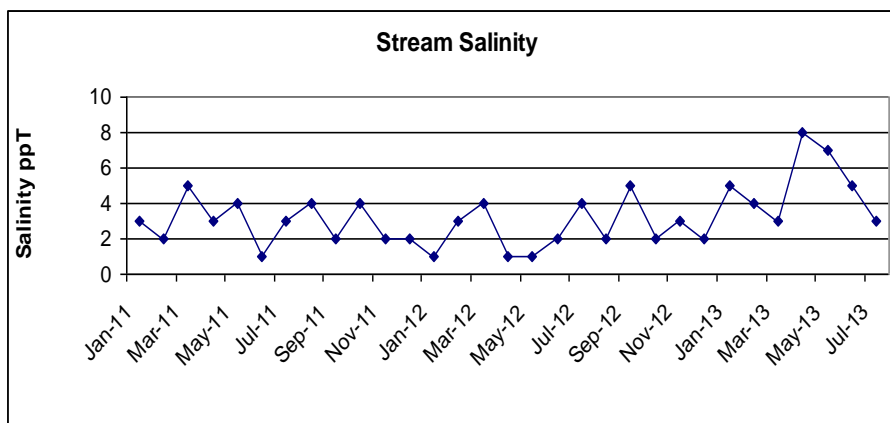
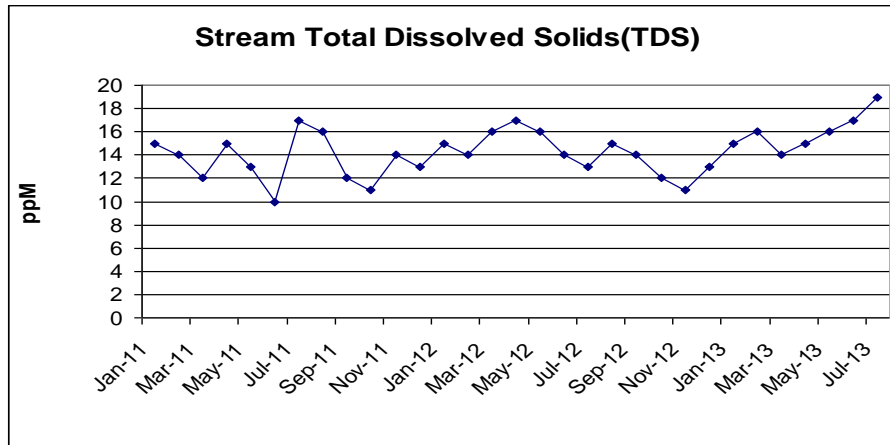


Figure 8.24 Typical water parameters of the Pak Sha O River

Other parameters measured included *E. coli* measured twice every year. Five measurements were recorded and the average determined from the results. This was deemed as being the minimum data needed to pick up a gradual change

The trend line shows an increase from January 2011 of just over 35%.

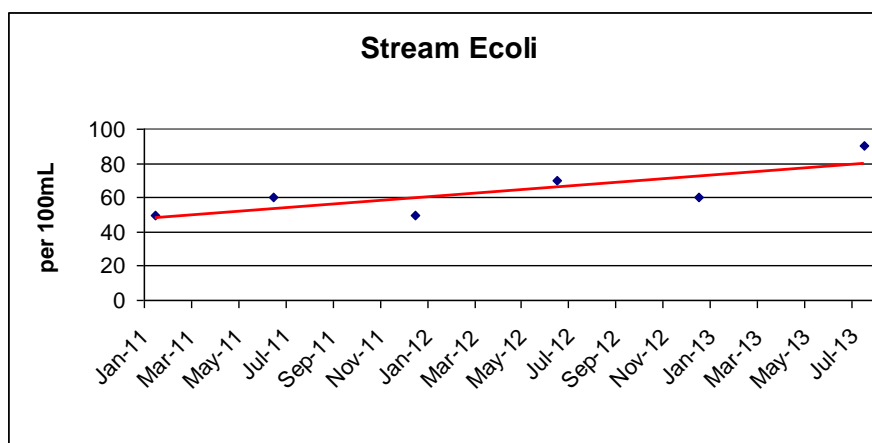


Figure 8.25. The Ecoli results for the Pak Sha O River at the Hoi Ha Estuary

8.10 Animal Encroachment.

8.10.1 Overview

Animals do not recognize boundaries and always utilize areas as they require. For this reason any area proposed as possible receivers for village houses need to consider sites of frequent visitation as well as animal corridors. From 2010 and 2013 a total of 182 camera surveys of two months each were conducted in areas that had shown some evidence of animal visitation. This consisted of scat, ground scratching or food remains. Twenty Doppler Radar movement activated cameras were ever in the field at the same time, and all were fitted with lights for night time recording as well. The units were configured to detect movement within 5m of the units and all units were aimed at the ground with a 10 second recording period and a 5 minute hysteresis set.

The data was divided into 5 categories. The data is shown in Table 8.26, with a breakdown to species level in Table 8.27. All mammals, with the exception of the wild boar (*Sus scrofa*) are protected species in Hong Kong.

Category	Records	Percent (%)
Mammals	265	12.6%
Rodents	694	33.0%
Snakes	8	0.4%
Birds	718	34.1%
Misc	419	19.9%
Total :	2104	100.0%

Table 8.26 Total results of the camera survey.

This data represents visitation data rather than population data. It is highly likely that repeat records were taken of the same animal. Birds made up the majority of the records. These animals were foraging in front of the cameras.

Protected mammal data were separated from the records. A total of 265 records were extracted. A total of 12 species of mammal were recorded. The majority of the sightings were *Macaca mulatta* with these animals frequently seen foraging around the rubbish bins in the area.

Species	Sightings	Percent (%)
<i>Melogale moschata</i>	33	12.5%
<i>Hystrix brachyura</i>	58	21.9%
<i>Crocidura attenuata</i>	12	4.5%
<i>Niviventer fulvescens</i>	39	14.7%
<i>Macaca mulatta</i>	79	29.8%
<i>Viverricula indica</i>	15	5.7%
<i>Sus scrofa</i>	12	4.5%
<i>Muntiacus muntjak</i>	2	0.8%
<i>Herpestes javanicus</i>	4	1.5%
<i>Prionailurus bengalensis</i>	1	0.4%
<i>Paguma larvata</i>	9	3.4%
<i>Herpestes urva</i>	1	0.4%
Total :	265	100.0%

Table 8.27 Breakdown of the Mammals recorded by the Camera Survey.

The sightings were concentrated around water sources. Previously, before the back row of houses were constructed, animals were frequently seen around areas near the Fung Shui Forest. The water sources in this area are either filled in to stop mosquito breeding or changes in the hydrology in this area have removed the water. This in turn has led to a shift in the location of animals to the valley of the Pak Sha O river. It is now common to see foraging marks and scat of mammals in the valley area.

Birds and flying animals are also frequently sighted in the area. Bats are probably originating from the nearby disused mines at Pak Sha O.



Figure 8.28. Photographs of a foraging area and associated scat taken in the DPA near the stream.

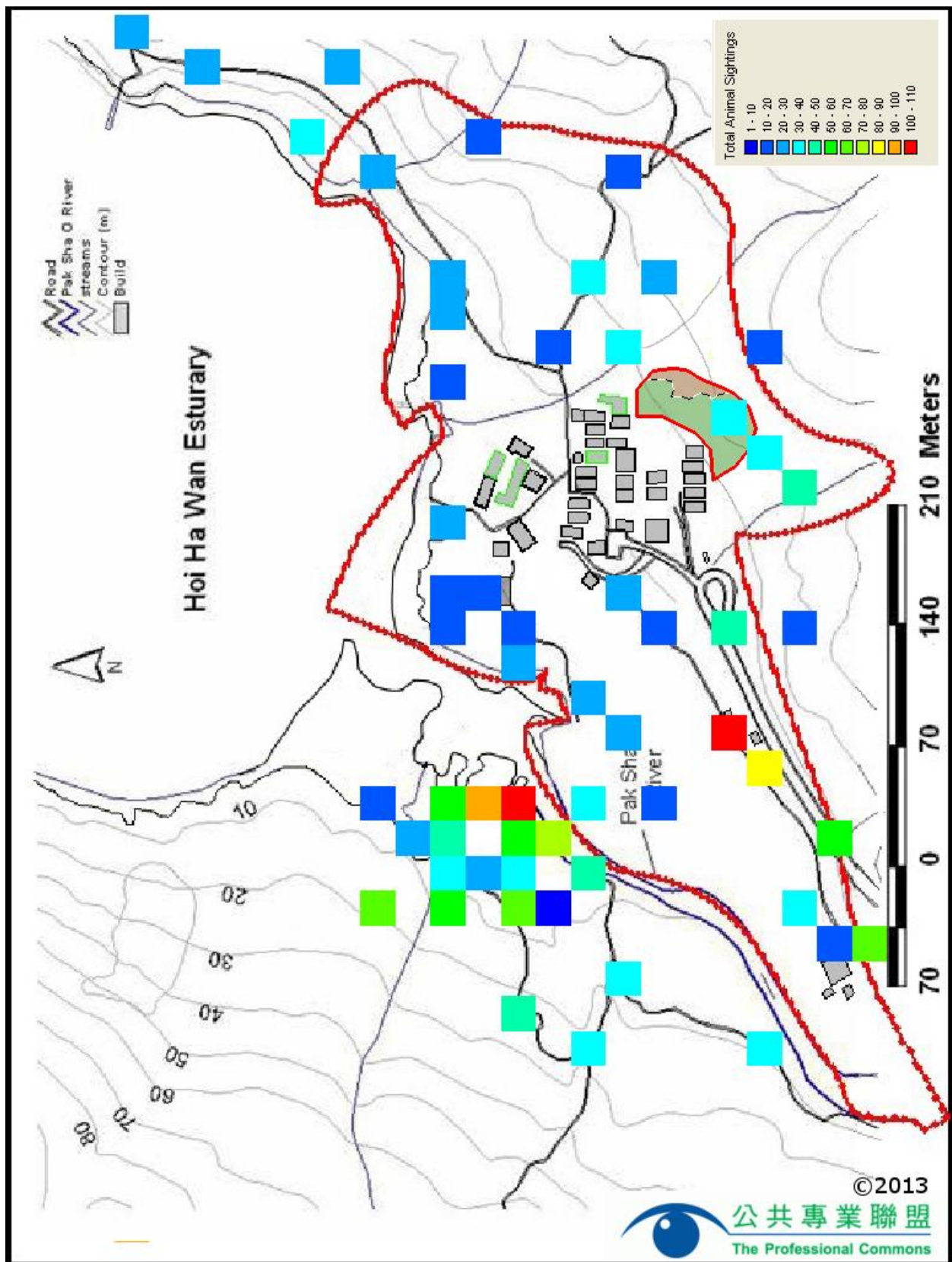


Figure 8.29. Photo records of animals taken over a two month period at Hoi Ha Wan

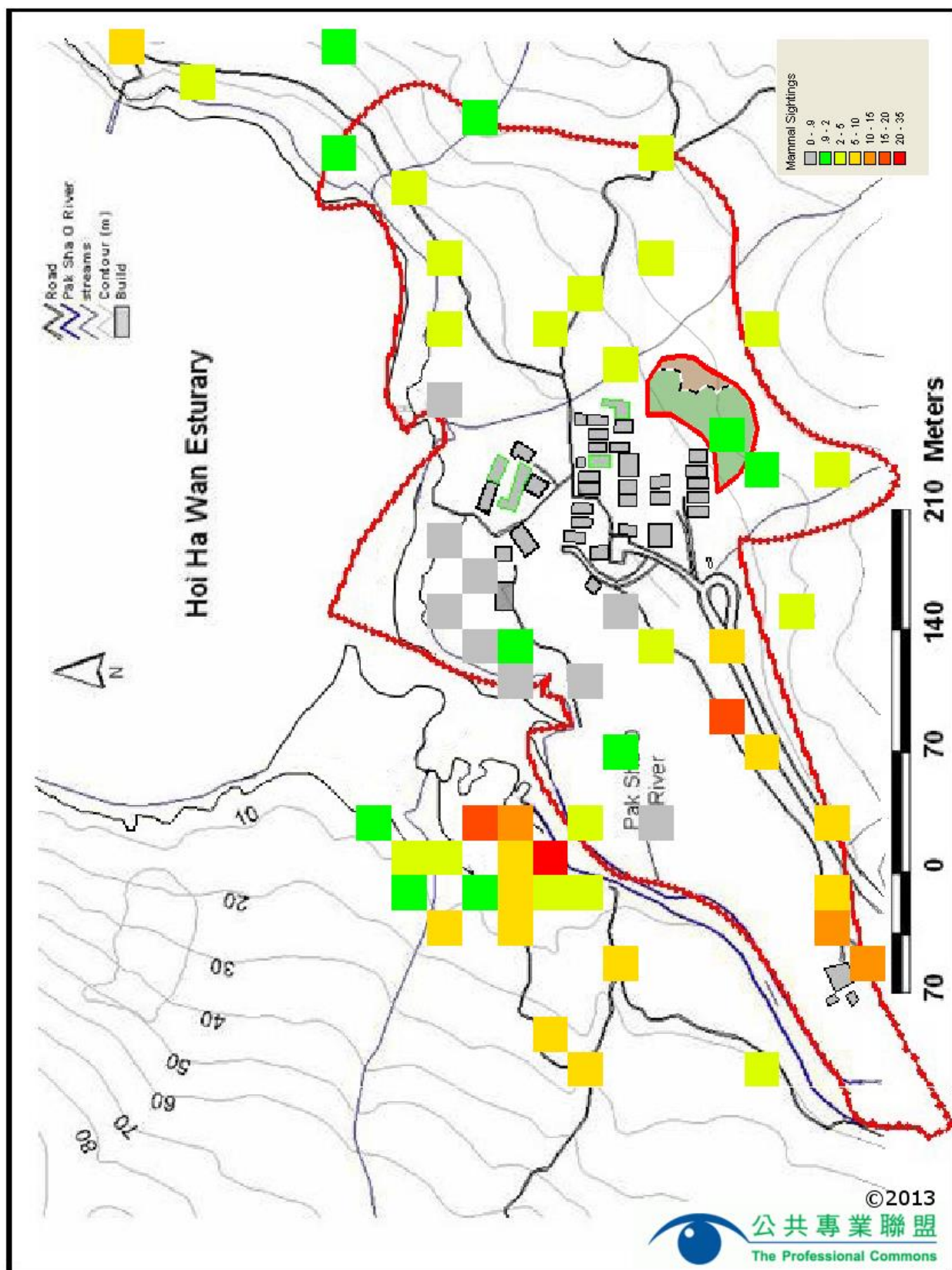


Figure 8.30. Photo records of protected mammals taken over a two month period at Hoi Ha Wan

9. Hoi Ha Visitor Loadings

9.1 Overview

Hoi Ha is a tourist area; visitors are attracted to the village for numerous reasons. Table 9.1 shows a general breakdown based upon statistics collected from 580 people over a week period in July 2012.

Destination	Ratio (%)
Hoi Ha Wan Marine Park	32.0%
Wan Chai Camping Ground	43.0%
Hiking in the area	18.0%
Misc	7.0%
Total :	100.0%

Table 9.1. Visitor intended destination for Hoi Ha Village. (n=980).

AFCD Statistics estimated that approximately 90,000 people visited Hoi Ha in 2012. This figure is based upon many factors and is an indication only. Some of the visitors do not actually enter Hoi Ha Village and have destinations that include the BBQ and camping areas along the Hoi Ha Road, or are visiting Pak Sha O. Others were residents seeking temporary permits for access to the Hoi Ha Road.

There has been considerable concern about acceptable visitor loading for the village. Visitor data has been collected by Doppler Occupancy Meters over a period of 24 months. Ten units were installed for 12 months, with the remaining 10 units installed for multiple periods of 2 months. A total of 91 key facility and resource locations were investigated. Data was divided into two main groups, public holidays (including weekends) and weekdays. Each of these categories was further sub-divided into categories based upon weather. In all cases the period of data used was between 8:00am to 6:00pm. This is the period when the bulk of the visitations occurred. Table 9.2 summarises the data collected.

Area Condition	60min Maximum Average	Daily Average
Holiday Fine Weather	0.481	0.101
Holiday Overcast (>6 Octets)	0.291	0.053
Holiday Wet	0.21	0.036
Holiday temp <20C	0.121	0.012
Totals	0.141	0.051
Weekday Fine Weather	0.266	0.005
Weekday Overcast (>6 Octets)	0.053	0.003
Holiday Wet	0.038	0.005
Weekday temp <20C	0.006	0.001
Totals	0.091	0.004

Table 9.2. Visitor Usage of Infrastructure and Facilities for Hoi Ha Village between 8:00am to 6:00pm.

There are several ways of interpreting this data. The most holistic is perhaps the old notion of Carrying Capacity, and the more applicable to Hoi Ha is the Visitor Impact Assessment

(Ceballos-Lascurain 1996). Using the IUCN specification of an acceptable maximum total average area facility loading not exceeding 0.85 as the sustainable and enjoyable limit, it is clear that most of the Hoi Ha Village areas and facilities are currently underutilized. There are also no exceedances of any of the natural resources in the area. This can be determined by the beach peak usage (~22%) the yearly damage to the nearby coral area, measured as 5%. This figure is less than the growth rate of the coral in the area. Needless to say, there are some hot spots with regards to facilities that may be improved with by adding to, or increasing access to, these resources

The distribution of this fine weather infrastructure and facility loading over the points investigated are in Figure 9.3 (Holiday Period) and Figure 9.4 (Weekday). The facility usage values can be determined from the results and from Figures 9.3 and 9.4. The facilities that can be improved are listed below:

- The toilet facility
- The minibus facility
- The area notice board facility
- The AFCD Centre facility
- The single restaurant facility

It should also be mentioned that when considering the ecological loading of an area, due consideration should also be given to any ecologically sensitive receivers. Hoi Ha Wan was set up to protect the coral and mangrove communities within the bay. Currently the damage, impact and pollution levels associated with visitors to the area do not show exceedances in either area or even an increasing trend as would be expected if the area was overloaded.

In terms of the old carrying capacity figures and notion, the visitors to the area, during the peak times (weekends/holidays with good weather) could increase by about 20% at peak times before maximum limits would be reached. During weekdays, this figure increases to 40% more loading. This report does not suggest that this area be further exploited; however, it is worthwhile to show that the area is currently being underutilized. Needless to say an EIA on the current visitation and its impact on the area would be necessary to determining more detailed information.

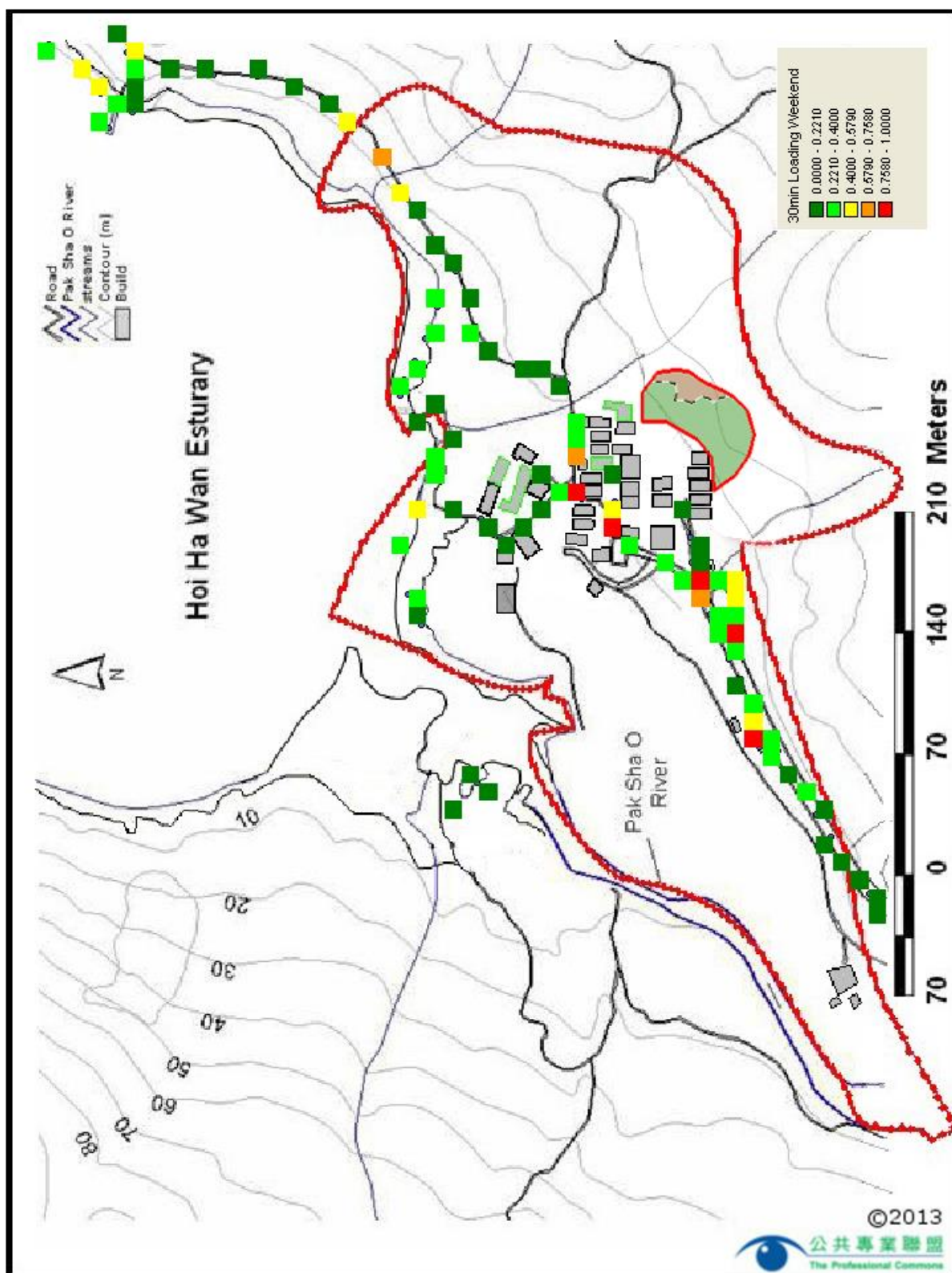


Figure 9.3. 60 Minute Infrastructure and Facility Loading, Fine Holiday, for Hoi Ha Village.

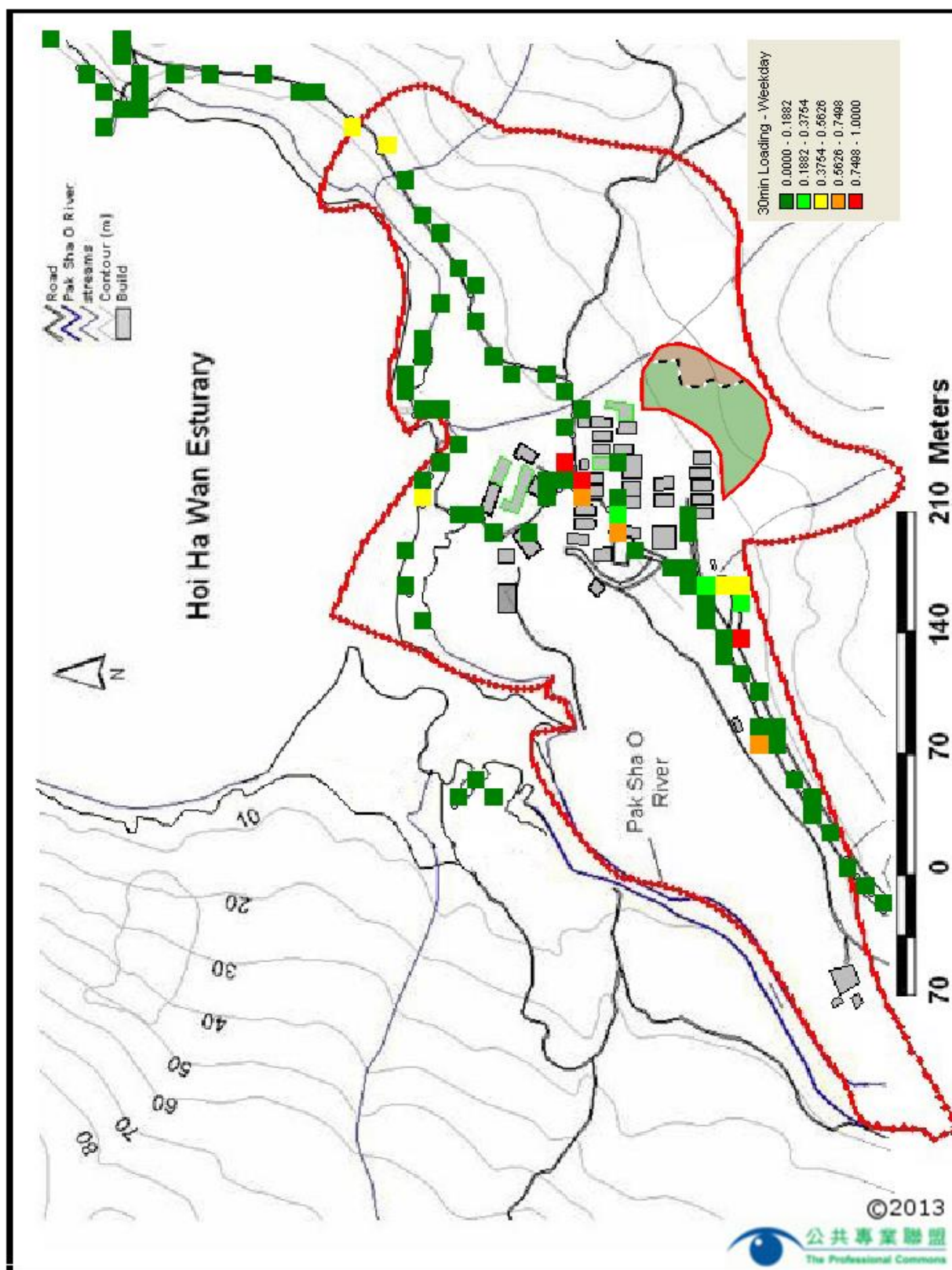


Figure 9.4. 60 Minute Infrastructure and Facility Loading, Fine Weekday, for Hoi Ha Village.

10. Proposals

10.1 Proposed OZP Overview

A key consideration with the future planning and allocation of areas within the DPA is the intended use. There must be a balance established between the preservation, conservation and advance of the village and environs. Hong Kong does not have a lot of areas like Hoi Ha Village so maximum sustainable use needs to be the prime directive of any such recommendation. It is also very important that all aspects of the village and the village needs be considered. This not only includes the landscaping, the aesthetics, but also the livelihood of the residents who rely on the area for income. As well as these considerations, whatever is proposed will have to be a compromise, a balance between the three major issues that must be balanced for a practical and workable result. It therefore must be based upon fact, science, follow local standards and be able to be justified in a court of law.

Property development for profit must be prevented. Any building must be restricted to necessary village expansion by the local resident population only. For the IV residents, this should be by the Small House Policy (SHP). There is no area available in the least sensitive areas for development of IV resident owned land.

Given the data presented, the key deciding factors are the protection of the sensitive habitats in the area and the protection of the marine park. This protection needs to be complete and not subject to the issues that shifting coastlines and whole ecosystems present. It is pointless marking lines on paper without considering ecosystems, macro-ecosystems and habitats. Wildlife corridors are also a key consideration.

Given that reports already submitted clearly show the areas that need protection from an ecological perspective, the landscaping value of the area is basically ensured, since any expansion of the village will be small, given that only the future needs of the village need to be accommodated. Discussions with the IV representatives indicate that it is expected that an area that will accommodate a maximum of 30 additional houses needs to be reserved for this purpose (the figure of 94 quoted in the draft OZP report is clearly a fiction). This will satisfy the needs of SHP applications until 2047 when it is generally accepted that the SHP will expire. This puts a cap on the number of successful applications that can ever be accommodated.

Another key issue is the need to cater for the visitors to this village. Given the increasing leisure time of Hong Kong people, areas like Hoi Ha will become more important. At this time there is an increasing trend towards the area being suitable for education and recreation. Both of these activities can be instilled into this area in a form that is both sustainable and eco-friendly. If this is to be promoted then some support infrastructure needs to be confirmed and expanded as necessary. From the area carrying capacity figures measured so far, the area is currently underutilized as a whole, with some facility bottlenecks that need to be addressed. It should be fairly obvious that the village livelihood issues that exist need to be directed towards sustainable activities. This means that the local residents who are currently deriving their income from the area, need to be given incentive and encouragement to either remain or become environmentally sustainable.

10.1.1 Land usage

Referring to Figure 7.1, the land ownership map above, it is clear that any improvements to the village are made more difficult by the fractured ownership of the land. For example, the village currently has many young children, but there are no facilities for play, other than the car parks or the beach. The owners of one of the larger lots in the centre of the village has, for example, offered the land as a playground/village open area. However this is near impossible to put into practice owing to the fragmented ownership of the land adjacent to it. Similarly, development and improvement of the ruined buildings in the centre of the village is also made more difficult by the fragmented ownership.

We therefore propose that there be a limited land swap, if possible, so that the government resumes the land in the centre of the village so that it can be used for improved facilities. The IV owners would then be given some government land in the expanded V zone area to the south east. The ruined buildings could then be rebuilt in their original style, for example, and used as an Information Centre for the village and the area, maybe even housing an AFCD Wardens Post. Proper shower facilities and toilets could also be accommodated (as long as they are not the usual LSD block houses). However, no co-ordinated improvements in the village can even be contemplated whilst so many different owners have so many different vested interests.

We also support the building of the AFCD Education Centre on part of the under-used barbecue area along the Hoi Ha Road.

Furthermore we also need to consider road access to the village, and the control of cars, buses, minivans etc. At the moment this is also under fragmented jurisdiction, as some of Hoi Ha Road is in Country Park, and thus under AFCD control, and the rest is in the enclave and under Police control. This needs to be regularised so that proper planning and control of access, parking and permits is achieved. Zoning the entire road issues and parking within the Country Park will allow resident AFCD wardens to monitor the area.

10.1.2 Access to the village

One benefit of zoning the area to the south west of the village as Country Park is that negotiating with the owners of the land for alternative footpath access to the village becomes possible. Currently, the original pedestrian access to the village, as shown on all Lands Department maps, is blocked as it traverses privately owned land. When this was owned by the IV residents there was no problem, but since it was sold to outside developers no access has been allowed and the footpath finishes halfway from the road to the village. It is clear for Figures 9.3 and 9.4 that access to the village needs improvement.

10.2 Outline Zoning Plan Proposals

There are two proposed OZP designs. These are shown in Figure 10.0 and 10.1. Each has its merit with regards to the spacing between the houses that may be approved for building in this area. OZP proposal 1 has closer house spacing than OZP Proposal 2. With regards to

the inclusion of SHP areas within the OZP, there would need to be a restructure of the application approval criteria.

The least sensitive area to allow for village expansion is in the south-east area of the DPA. The area includes the remnant Fung Shui Forest area, an area that needs to be preserved, and is woodland. The notion that it is primary woodland is not correct. The whole of the wooded area around the village was cut down for use in making lime. This activity only stopped after the Japanese Invasion of Hong Kong. So great was the demand for wood, it is recorded that the indigenous villagers (Yungs) had to rent more forested hillside land from the Tongs in order to keep the production going (Morton 1992a).

The area fringes, but does not totally occupy on an occasionally used wildlife corridor that extends from the pier along the southern section of the village. This corridor would have to remain. Note that protected species were recorded along the southern edge of the DPA boundary.

To allow the village to expand along the Pak Sha O river valley would be ecologically disastrous to the fauna in the area. A small, but significant population of protected animal species use this area for foraging and are frequent visitors to this area. It is highly likely that the reliable supply of fresh water and the very diverse ecology of the area provides for the needs of these animals. Data suggests that this is the termination of a wildlife corridor so plays a significant role in the life cycle of the animals present in the Pak Sha O River valley area. Note that some of the habitats in the Pak Sha O river valley, and inside the DPA are unique to the area. The flood plain and the permanent marsh area are clear examples of this. The mangrove area on the eastern side of the estuary is not common with the mangrove community on the opposite side of the river. This is in terms of species make-up and structure. Furthermore, the soil substratum in these areas is also very different, with the eastern side comprising of mud and the western area comprising of sand.

The river provides a convenient vehicle for silt and pollution to travel to the Hoi Ha Marine Park. The hydrology of this low lying area would allow for a very short soil hydrological barrier between anthropogenic pollution sources and the river leading straight to the Marine Park. The proposed village expansion area on the southern side of the DPA would present a much greater hydrological barrier to similar sources of pollution provided due consideration was given to the possibility of polluting streams in the area.

Finally, the change in surface run-off rate during periods of heavy rainfall would change the hydrology of the river. Morton and Che (1992) showed that the paved road connecting Hoi Ha Village to the Pak Tam Chung Road impacted the river flow rate and thus changed the shape of the estuary. Currently the mangrove community within the Pak Sha O River estuary relies on the lagoon to control the salinity, water outflow rate and for protection from wave action. An increase in maximum flow rate may remove the lagoon structure and thus cause a severe impact to this community and the shape of the beach.

Typically the law would have to change with regards to SHP being granted in the Country Parks. The key changes include eligibility and a removal of the "1 hectare rule" for EIA requirements. One way would be to include the following criteria:

:

- IV residents who were given government land grants previously are not eligible.
- IV residents who sold land inherited from relatives are not eligible.
- IV residents who have not resided in the village for a continuous period of 7 years are not eligible.
- IV residents with any property ownership that would be suitable for building a house are not eligible.
- All successful applicants must carry out an EIA with regards to the impacts that a house would have on the land granted to them and their proposed mitigation before building permission can be granted.

Since the process of the SHP is an application process only, and not law, it is possible for the CE to carry out the necessary amendments.

10.3 Proposal Rational

There are several key environmental factors, regarding the DPA, that need to be considered. One key objective here is the conservation of the village and its surrounding areas to give the best possible chance for a modernized but traditional village atmosphere to have a chance and to be encouraged. The alternative would be a drift towards the dead and abandoned villages we see scattered throughout the New Territories. The key factors for the proposed OZP are:

- The protection of a major ecologically sensitive area i.e. the section of the Pak Sha O River valley that falls within the DPA boundary. This area recorded the highest levels of sightings and species diversity of protected animals within the whole area. Furthermore, the data suggest that the wildlife corridor terminates at the opposite estuary. This indicates that an easy animal passage is required.
- There are some scattered endangered plant species recorded in the DPA. Some are seedlings recently planted. An effort should be made to protect these or relocate these to a more suitable location.
- The extended village area contains an intermittent flowing stream as well as some protected species and established trees. The proposed village area was sized to cater for this and to allow for sufficient infrastructure to be installed into the area for successful SHP applicants. The concept here is to avoid the indiscriminate cramming of houses into an area and opt for a more planned approach to the extended village area. Overseas data indicates that clusters of five houses are an appropriate size for minimization of land needed for domestic infrastructure needs.
- The extended village area was also sized to cater for limited land swap for IV resident land that is located in key areas within the village area proper. Hoi Ha Village needs to have some village common areas established. There should also be some restoration of the crumbling masses of falling down rubble that were once proud

traditional village houses. These need to be rebuilt to serve as village facilities, including a possible Marine Park Warden's sub-post.

- The area and possibly the exact position of the Fung Shui Forest is undetermined. It is shown in different places and as different sizes on several of the maps from different authorities. Previous deforestation, mainly as a result of the lime industry, impacted all of the forested areas around the village. The low recorded species richness (13), suggests that this forest is a much degraded forest area as well. Early aerial photographs of the village confirm extensive deforestation with only small clumps of trees at the back of the village. It is highly likely that the Fung Shui Forest of Hoi Ha was mostly cut down. It is expected that it will become a restoration project for the village and/or eco-tourist visitors, once the real boundary and extent is determined. This will not impact the novelty of such an area however, since it was common for villagers, in the past, to plant trees in this area to sustain this special area forest.
- Currently, the village part of the road is in the village area. Inclusion into the country park will allow Country and Marine Park Warden's to police this area in terms of traffic and pedestrian control.

10.4 Suggested procedure for achieving the zoning suggested.

There is a legal and political process involved in carrying out the recommended zoning. There are several considerations to this process that need to be considered.

- The Town Planning Board (TPB) cannot zone Country Park into an area. They can only make a strong recommendation that this be done. The TPB can zone the Village Zone (V-zone) and a Comprehensive Development Area (CDA) as recommended by this report.
- It is the responsibility of the Agriculture, Fisheries and Conservation Department (AFCD) to do the applications for gazettment and present these for further government approval.
- There is some concern regarding the protection of the area whilst this process is occurring. It is possible that the TPB and the AFCD to issue a stay on all building/improvement activities until this is done. This was the case at Tai Long Wan, and to some extent it worked. The success of such hold of work, depends upon public support for the conservation of the area. This is especially true with regard to developers using any interim zoning as an excuse to 'rehabilitate' abandoned agricultural land, this laying waste to a highly sensitive ecological area, as they have done at Pak Sha O.
- There is also the problematic issue of an incomplete OZP if the recommendation of proposing all of the unassigned area, within the OZP, to CP is not deemed as a

proper land use. This should only be a technicality, however since actually there was a recommended zoning.

10.5 Suggested future development of Hoi Ha

Any planning recommendation needs to cater for future use. This report recommends that the area of Hoi Ha and Hoi Ha Wan only be allowed to be exploited in a sustainable way for either recreation, educational, nature-tourism or eco-tourism resource. The current bus loads of local, mainland and overseas tourists should be discouraged, mainly because the area is not set up to cater for them, nor does it have anything to offer them in terms of value for money.

However in order to cater for a future sustainable use future, some key infrastructure is required. This is listed below:

10.5.1 For recreation:

- The old boat ramp needs attention and stabilization.
- The village footpaths need to be made more wheelchair friendly.
- Another mooring buoy needs to be added to the single one in front of the second beach.
- A proper toilet block and changing area needs to be built near the main beach at Hoi Ha. This could be in traditional Hakka village house style, or inside one of a restored village house.
- A pathway to the second BBQ site needs to be opened up in front of the existing water works pumping station at Hoi Ha.

10.5.2 For education:

- The long overdue AFCD Education Facility needs to be finalized and construction begun immediately.
- A proper reserve for the Asian porcupine needs to be established near the AFCD Centre.
- A proper set of Educational nature trails needs to be set up to support this facility.

10.5.3 For nature-tourism:

- A planned set of nature trails need suitable for this need. These should extend the whole length of the Pak Sha O River valley
- Training should be provided so that local residents can be informed about the area and they should be encouraged to act as nature tour guides; after all they probably know more about the area than those not born there. This would also encourage further development of locally based, resident run, small eco-tourism based enterprises. (See below).

10.5.4 For eco-tourism:

- A series of proper eco based projects need to be established in this area. These should be supported by the government and run by the local villagers and other green NGOs. Typically such activities as bird watching, rubbish collection, re-forestation of damaged areas, etc.

10.5.5 For village infrastructure:

- An alternative footpath access to the village.
- Additional fire hydrants need to be added to this village.
- A proper waste water system should be designed and installed for this village.
- A more village-centric public transport schedule for the minibus to the village.
- The parking situation at the village, especially during times of peak visitation should be resolved by using half of the road for parallel parking.

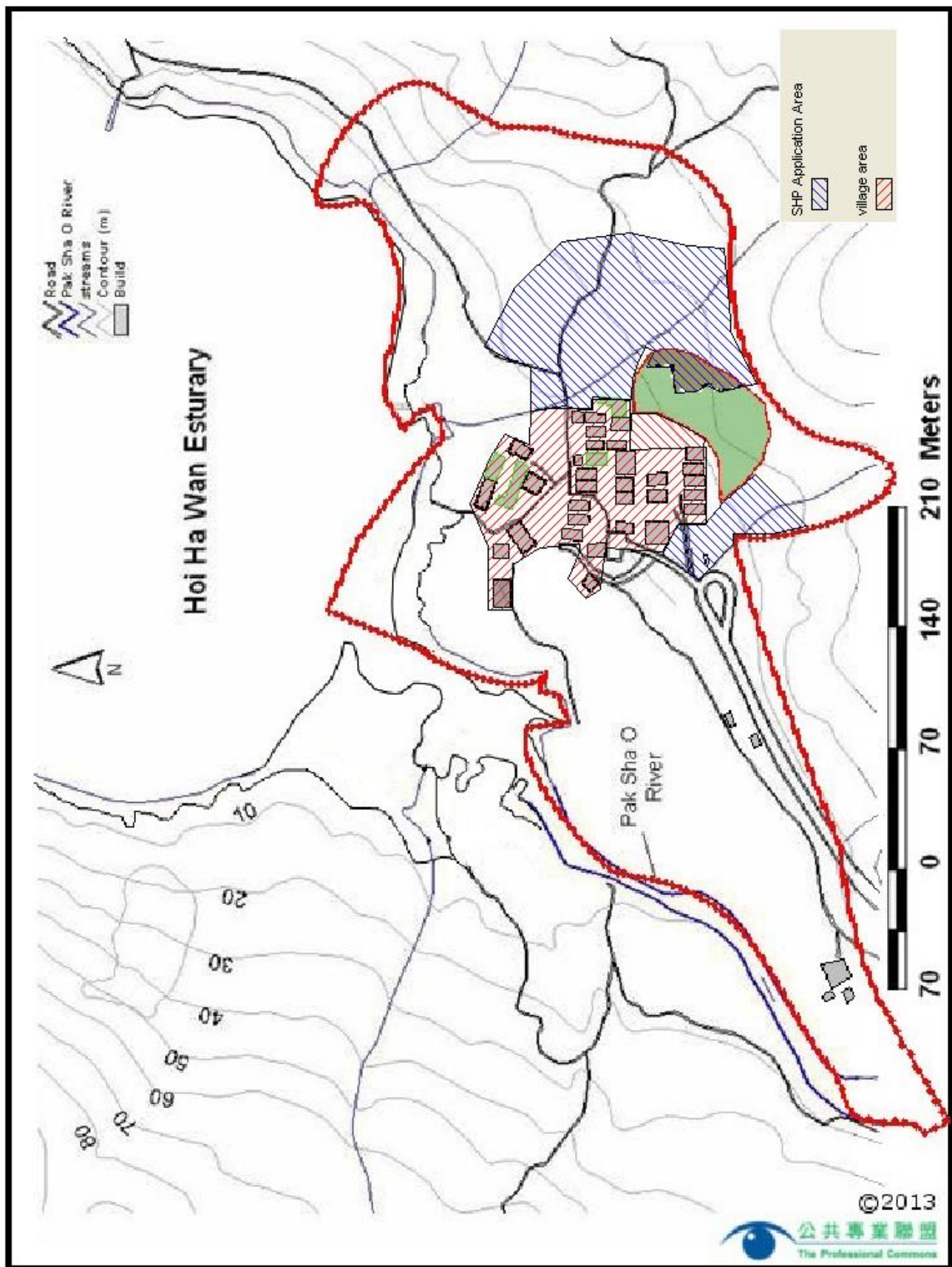


Figure 10.1 OZP proposal #1

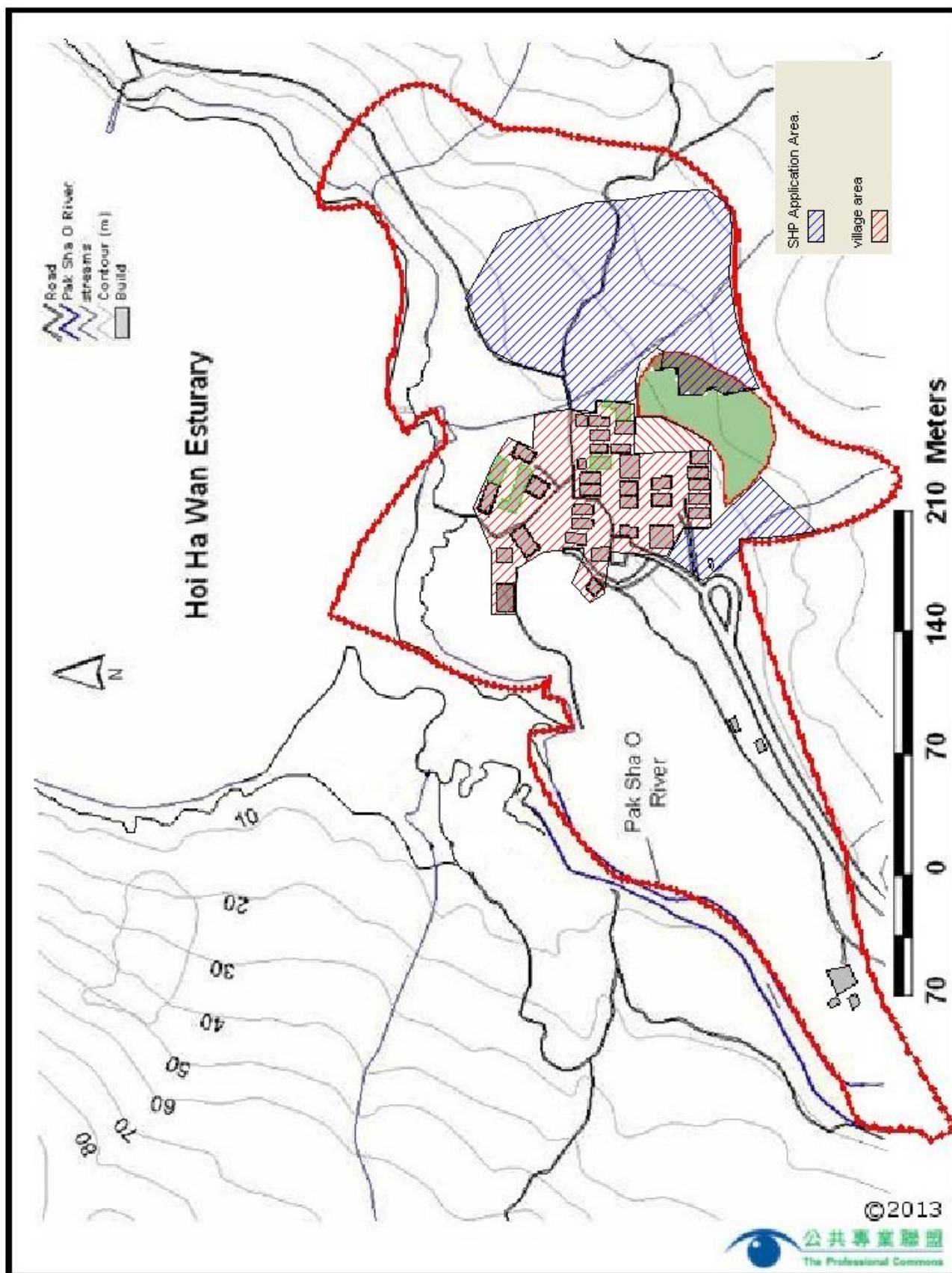


Figure 10.2 OZP Proposal #2

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Appendix A - Plant Species Recorded in the Hoi Ha Area

Scientific Name	Chinese Common Name	Growth Form	Distribution and status in HK	Abundance
<i>Abrus mollis</i>	毛相思子	Climber	Restricted	1
<i>Acacia confusa</i>	台灣相思	Tree	Exotic, Common	1
<i>Achyranthes aspera</i>	土牛膝	Herb	Common	1
<i>Acorus gramineus</i>	石菖蒲	Herb	Very common	1
<i>Adiantum flabellulatum</i>	扇葉鐵線蕨	Herb	Very common	1
<i>Aegiceras corniculatum</i>	桐花樹	Shrub	Commonnn	2
<i>Ageratum conyzoides</i>	藿香薷, 勝紅薷	Herb	Exotic, very common	1
<i>Alangium chinense</i>	八角楓	Tree	Common	2
<i>Albizia lebbek</i>	大葉合歡	Tree	Exotic, Common	1
<i>Alchornea trewioides</i>	紅背山麻桿	Shrub	Common	1
<i>Alocasia cucullata</i>	尖尾芋	Herb	Restricted	1
<i>Alocasia macrorrhizos</i>	海芋	Herb	Very common	1
<i>Alternanthera philoxeroides</i>	空心蓮子草	Herb	Exotic, Common	1
<i>Antidesma bunius</i>	五月茶, 五味子	Tree	Common	1
<i>Aporosa dioica</i>	銀柴	Tree	Very common	3
<i>Aquilaria sinensis</i>	土沉香	Tree	Common, Protected under Cap. 586	2
<i>Archidendron clypearia</i>	猴耳環	Tree	Common	1
<i>Ardisia crenata</i>	大羅傘	Shrub	Common	1
<i>Ardisia lindleyana</i>	山血丹	Shrub	Common	1
<i>Ardisia quinqueгона</i>	羅傘	Small tree	Very common	1
<i>Asclepias curassavica</i>	馬利筋	Herb	Exotic, Common	1
<i>Asparagus cochinchinensis</i>	天門冬	Shrub	Common	1
<i>Atalantia buxifolia</i>	酒藥筋	Shrub	Common	1
<i>Axonopus compressus</i>	地錢草	Herb	Exotic, Common	1
<i>Bambusa spp.</i>	竹屬	Bamboo	Common	1
<i>Bauhinia championii</i>	缺葉絨毛	Climber	Common	1
<i>Bauhinia glauca</i>	粉葉羊蹄甲, 羊蹄甲藤	Climber	Very common	3
<i>Blechnum orientale</i>	烏毛蕨	Herb	Very common	1
<i>Breynia fruticosa</i>	黑面神	Shrub	Very common	1
<i>Bridelia tomentosa</i>	土蜜樹	Tree	Very common	2
<i>Brucea javanica</i>	羅漢參, 苦參子	Tree	Common	1
<i>Byttneria aspera</i>	刺果藤	Climber	Very common	3
<i>Callicarpa kochiana</i>	枇杷葉梅珠	Shrub	Common	1
<i>Canavalia lineata</i>	狹刀豆	Climber	Common	1
<i>Carica papaya</i>	番木瓜	Tree	Exotic, Planted	1
<i>Cayratia corniculata</i>	角化黑絨蕨	Climber	Very common	1
<i>Celtis timorensis</i>	假玉桂, 楊葉朴	Tree	Restricted	1
<i>Centella asiatica</i>	前大碗	Herb	Very common	1
<i>Centotheca lappacea</i>	假淡竹葉	Herb	Common	1
<i>Cerbera manghas</i>	海芒果	Tree	Common	1
<i>Chrysopogon aciculatus</i>	竹節草, 假雀麥	Herb	Very common	3
<i>Cleistocalyx nervosum</i>	水翁	Tree	Common	3
<i>Clerodendrum inerme</i>	苦郎樹, 假茉莉	Shrub	Common	1
<i>Colocasia esculenta</i>	芋	Herb	Cultivated	1
<i>Commelina diffusa</i>	節節草	Herb	Common	2
<i>Cratoxylum cochinchinense</i>	黃牛木	Tree	Very common	1
<i>Crinum asiaticum var. sinicum</i>	文殊蘭	Herb	Exotic, Common	1
<i>Cyclosorus interruptus</i>	間斷毛蕨	Herb	Common	1
<i>Cyclosorus parasiticus</i>	華南毛蕨	Herb	Very common	1
<i>Cyperus difformis</i>	異型莎草	Herb	Very common	1
<i>Cyperus haspan</i>	腫腳莎草	Herb	Common	1
<i>Cyrtococcum patens</i>	弓果黍	Herb	Very common	1
<i>Dalbergia benthamii</i>	兩廣黃檀	Climber	Common	1
<i>Daphniphyllum calycinum</i>	牛耳楓	Tree	Common	1
<i>Dendrotrophe varians</i>	寄生藤	Parasite	Very common	1
<i>Derris trifoliata</i>	魚藤	Climber	Common	1
<i>Desmodium triflorum</i>	三黑金	Herb	Very common	1
<i>Desmos chinensis</i>	假槐爪	Climber	Common	2
<i>Dicranopteris pedata</i>	芒萁	Herb	Very common	1
<i>Digitaria ciliaris</i>	升馬唐	Herb	Very common	1
<i>Dimocarpus longan</i>	龍眼, 桂圆	Tree	Exotic, Restricted	1
<i>Dioscorea bulbifera</i>	黃獨	Climber	Common	1
<i>Diploclisia glaucescens</i>	蒼白藤, 防己	Climber	Common	1
<i>Dischidia chinensis</i>	眼鏡蓮, 瓜子金	Climber	Restricted	1
<i>Ehretia longiflora</i>	長花象樹	Tree	Restricted	1
<i>Elaeagnus loureirii</i>	雞心銀葉, 羅氏銀葉子	Climber	Common	2
<i>Eleocharis ochrostachys</i>	假荸薺, 假黑節	Herb	Restricted	2
<i>Elephantopus scaber</i>	地膽草	Herb	Common	1
<i>Elephantopus tomentosus</i>	白花地膽草	Herb	Common	1
<i>Eleusine indica</i>	牛筋草	Herb	Exotic, very common	1
<i>Eleutherococcus trifoliatus</i>	白筋	Climber	Restricted	1
<i>Emilia sonchifolia</i>	一黑紅	Herb	Very common	1
<i>Entada phaseoloides</i>	楊藤	Climber	Very rare	2
<i>Eriocaulon truncatum</i>	羽扇豆	Herb	Common	1
<i>Excoecaria agallocha</i>	海漆	Tree	Common	2
<i>Ficus hirta</i>	粗葉榕	Shrub	Common	1

Scientific Name	Chinese Common Name	Growth Form	Distribution and status in HK	Abundance
<i>Ficus hispida</i>	對樹容	Tree	Very common	2
<i>Ficus microcarpa</i>	細樹容	Tree	Common	1
<i>Ficus pumila</i>	藤荔	Climber	Very common	1
<i>Ficus pyriformis</i>	船樹容	Shrub	Common	1
<i>Ficus tinctoria</i>	斜樹容	Tree	Restricted	1
<i>Fimbristylis nutans</i>	點垂扇排草	Herb	Restricted	1
<i>Fimbristylis sieboldii</i>	絲垂扇排草	Herb	Common	1
<i>Floscopa scandens</i>	聚花草	Herb	Common	1
<i>Gardenia jasminoides</i>	梔子	Shrub	Common	1
<i>Glochidion eriocarpum</i>	毛果算盤子	Tree	Very common	1
<i>Glochidion hirsutum</i>	厚葉算盤子	Tree	Common	1
<i>Gnetum luofuense</i>	羅浮角麻藤	Climber	Common, IUCN Near Threatened	2
<i>Gymnanthera oblonga</i>	海島藤	Climber	Widely established	1
<i>Gynura bicolor</i>	兩色三七草	Herb	Exotic, Common	1
<i>Hedyotis diffusa</i>	白花地黃草	Herb	Very common	1
<i>Hibiscus tiliaceus</i>	薔薇	Tree	Common	4
<i>Hypericum japonicum</i>	地耳草	Herb	Very common	1
<i>Hypserpa nitida</i>	夜花藤	Climber	Very common	1
<i>Ilex asprella</i>	梅葉冬青	Shrub	Very common	1
<i>Impatiens chinensis</i>	華南山	Herb	Common	3
<i>Ipomoea triloba</i>	三裂葉薯	Climber	Exotic, Common	1
<i>Kyllinga brevifolia</i>	短葉水蜈蚣	Herb	Common	1
<i>Kyllinga nemoralis</i>	單葉水蜈蚣	Herb	Very common	1
<i>Kyllinga polyphylla</i>	香根水蜈蚣	Herb	Exotic, Common	1
<i>Lantana camara</i>	馬纓丹	Shrub	Exotic, very common	1
<i>Leucaena leucocephala</i>	銀合歡	Tree	Exotic, very common	1
<i>Ligustrum sinense</i>	山指甲	Shrub	Common	1
<i>Lindernia crustacea</i>	母草	Herb	Restricted	1
<i>Lindernia rotundifolia</i>	迷你虎耳草	Herb	Restricted	1
<i>Lindsaea orbiculata</i>	圓葉鐵線蕨	Herb	Very common	1
<i>Liriope spicata</i>	山蔞冬, 麥門冬	Herb	Very common	1
<i>Litsea glutinosa</i>	潺樹	Tree	Very common	1
<i>Litsea monopetala</i>	假柿木薑子	Tree	Restricted	1
<i>Lonicera macrantha</i>	大花忍冬	Climber	Common	1
<i>Ludwigia adscendens</i>	水龍	Herb	Common	1
<i>Lygodium japonicum</i>	海金沙	Climber	Very common	1
<i>Lygodium scandens</i>	小葉海金沙	Climber	Common	1
<i>Macaranga tanarius</i> var. <i>tomentosa</i>	血桐	Tree	Common	1
<i>Machilus chekiangensis</i>	浙江潤楠	Tree	Very common	1
<i>Maesa perularius</i>	鮑魚藤	Shrub	Common	1
<i>Mallotus paniculatus</i>	白楸	Tree	Very common	1
<i>Melastoma malabathricum</i>	野牡丹	Shrub	Common	2
<i>Melastoma sanguineum</i>	毛蕊	Shrub	Common	1
<i>Melodinus suaveolens</i>	山橙	Climber	Common	1
<i>Microcos nervosa</i>	破布葉, 布渣葉	Tree	Common	1
<i>Microstegium ciliatum</i>	剛鬚竹	Herb	Very common	1
<i>Mikania micrantha</i>	微甘菊	Climber	Exotic, very common	1
<i>Mimosa pudica</i>	含羞草	Herb	Exotic, very common	1
<i>Miscanthus sinensis</i>	芒	Herb	Very common	1
<i>Morinda cochinchinensis</i>	大果巴戟	Shrub	Rare	2
<i>Morinda parvifolia</i>	雞眼藤	Shrub	Very common	1
<i>Mussaenda erosa</i>	棉藤	Shrub	Common	2
<i>Musa x paradisiaca</i>	大蕉	Herb	Commonly cultivated	1
<i>Neottopteris nidus</i>	巢蕨	Herb	Restricted, protected under Cap.96	1
<i>Paederia scandens</i>	雞矢藤	Climber	Very common	1
<i>Pandanus austrosinensis</i>	露兜草	Herb	Common	1
<i>Pandanus tectorius</i>	露兜樹	Small tree	Very common	1
<i>Panicum brevifolium</i>	短葉黍	Herb	Very common	1
<i>Panicum dichotomiflorum</i>	水生黍	Herb	Common	2
<i>Paspalum distichum</i>	雙穗雀稗	Herb	Common	2
<i>Pavetta hongkongensis</i>	香港大沙葉	Shrub	Common, Protected under Cap. 96	1
<i>Perilla frutescens</i>	紫蘇	Herb	Restricted	1
<i>Philydium lanuginosum</i>	田蔥	Herb	Common	1
<i>Phoenix loureiroi</i>	刺葵	Shrub	Common	1
<i>Phyllanthus emblica</i>	餘甘子, 油甘子	Tree	Very common	1
<i>Phyllanthus urinaria</i>	葉下珠	Herb	Common	1
<i>Pilea microphylla</i>	小葉冷水花	Herb	Exotic, very common	1
<i>Piper sarmentosum</i>	假蒟	Herb	Restricted	1
<i>Polygonum chinense</i>	火炭母	Herb	Very common	1
<i>Polyspora axillaris</i>	大頭茶	Tree	Very common	1
<i>Pothos chinensis</i>	石柑	Climber	Very common	1
<i>Praxelis clematidea</i>	假黃草	Herb	Exotic, very common	1
<i>Psidium guajava</i>	番石榴	Tree	Exotic, Common	1
<i>Psychotria asiatica</i>	九節	Shrub	Very common	2
<i>Pteris semipinnata</i>	半翅蕨	Herb	Very common	2

Scientific Name	Chinese Common Name	Growth Form	Distribution and status in HK	Abundance
<i>Pueraria lobata</i>	野葛	Climber	Very common	2
<i>Pyrrosia adnascens</i>	貼生石草	Herb	Common	1
<i>Rhaphiolepis indica</i>	華倫梅	Shrub	Very common	1
<i>Rhus hypoleuca</i>	白背鹽樹	Tree	Common	1
<i>Rhus succedanea</i>	野漆樹	Tree	Common	1
<i>Ricinus communis</i>	蓖麻	Shrub	Exotic, Restricted	1
<i>Rourea microphylla</i>	小葉紅葉藤 紅葉藤	Climber	Common	1
<i>Rubus reflexus</i>	蛇泡筋	Shrub	Very common	1
<i>Ruellia coerulea</i>	蘭花草	Herb	Exotic, Common	1
<i>Sageretia thea</i>	雀梅藤	Shrub	Common	1
<i>Sapium discolor</i>	山烏臼	Tree	Very common	1
<i>Sapium sebiferum</i>	烏臼	Tree	Common	1
<i>Sarcandra glabra</i>	草珊瑚	Shrub	Common	1
<i>Sargentodoxa cuneata</i>	大血藤	Climber	Very rare	1
<i>Schefflera heptaphylla</i>	鴨腳木	Tree	Very common	2
<i>Scolopia chinensis</i>	刺楸	Tree	Common	1
<i>Scutellaria indica</i>	韓香草	Herb	Common	1
<i>Senecio scandens</i>	千里光	Climber	Common	1
<i>Senna alata</i>	翅莢決明	Shrub	Exotic, Common	1
<i>Sida acuta</i>	黃花捻	Shrub	Common	1
<i>Smilax glabra</i>	土茯苓	Shrub	Very common	1
<i>Solanum torvum</i>	水茄	Shrub	Exotic, Common	1
<i>Spermacoce stricta</i>	豐花草	Herb	Restricted	1
<i>Sphaerocaryum malaccense</i>	稔藤	Herb	Common	1
<i>Sphenomeris chinensis</i>	烏韭	Herb	Common	1
<i>Sporobolus fertilis</i>	顯尾粟	Herb	Very common	1
<i>Stephania longa</i>	千金藤	Climber	Common	1
<i>Sterculia lanceolata</i>	假刺楸	Tree	Very common	3
<i>Symplocos cochinchinensis</i> var. <i>laurina</i>	黃牛奶樹	Tree	Common	3
<i>Syzygium hancei</i>	紅邊蒲桃	Tree	Common	1
<i>Syzygium jambos</i>	蒲桃	Tree	Exotic, Common	1
<i>Syzygium levinei</i>	山蒲桃	Tree	Common	1
<i>Tetracera asiatica</i>	錫藥藤	Climber	Very common	3
<i>Tetradium glabrifolium</i>	樟葉吳茱萸	Tree	Common	1
<i>Teucrium viscidum</i>	血見愁 山羅香	Herb	Common	1
<i>Tibouchina semidecandra</i>	巴西羅漢丹	Shrub	Exotic, Common	1
<i>Toona rubriflora</i>	紅花香椿	Tree	Restricted	1
<i>Urena lobata</i>	肖葵 天花	Shrub	Common	1
<i>Urena procumbens</i>	梵天花	Shrub	Common	1
<i>Utricularia bifida</i>	挖耳草	Herb	Common	1
<i>Uvaria macrophylla</i>	紫玉盤	Climber	Common	1
<i>Vernonia cinerea</i>	夜香牛	Herb	Very common	1
<i>Viburnum odoratissimum</i>	珊瑚樹	Tree	Very common	3
<i>Wikstroemia indica</i>	了哥王	Shrub	Common	1
<i>Zanthoxylum nitidum</i>	兩面針	Shrub	Very common	2