

# **Hung Shui Kiu New Development Area**

## **Revised Project Profile**

(prepared in accordance with  
the Environmental Impact Assessment Ordinance (Cap. 499))

January 2011

Civil Engineering and Development Department

## Project Profile

### Table of Contents

<b>1.</b>	<b>BASIC INFORMATION.....</b>	<b>1</b>
1.1	Project Title.....	1
1.2	Purpose and Nature of Project.....	1
1.3	Name of Project Proponent.....	1
1.4	Location and Scale of Project and History of Site.....	2
1.5	Number and Types of Designated Projects to be Covered by the Project Profile.....	2
1.6	Name and Telephone Number of Contact Person.....	3
<b>2.</b>	<b>OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME.....</b>	<b>4</b>
2.1	Project Implementation.....	4
2.2	Project Time Table.....	4
2.3	Interactions with Other Projects.....	4
<b>3.</b>	<b>POSSIBLE IMPACTS ON THE ENVIRONMENT.....</b>	<b>6</b>
3.1	Air Quality.....	6
3.2	Noise.....	6
3.3	Water Quality.....	6
3.4	Solid Waste.....	7
3.5	Landfill Gas.....	7
3.6	Ecology.....	7
3.7	Cultural Heritage.....	8
3.8	Land Contamination.....	8
3.9	Landscape and Visual.....	8
<b>4.</b>	<b>MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT.....</b>	<b>10</b>
4.1	Air Quality.....	10
4.2	Noise.....	10
4.3	Water Quality.....	10
4.4	Solid Waste.....	11
4.5	Ecology.....	11
4.6	Cultural Heritage.....	11
4.7	Land Contamination.....	11
4.8	Landscape and Visual.....	12
<b>5.</b>	<b>ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS.....</b>	<b>13</b>
5.1	General.....	13
5.2	Air quality.....	13
5.3	Noise.....	15
5.4	Water Quality.....	16
5.5	Solid Waste.....	17
5.6	Ecology.....	18
5.7	Cultural Heritage.....	18
5.8	Land Contamination.....	18
5.9	Landscape and Visual.....	19
<b>6.</b>	<b>USE OF PREVIOUSLY APPROVED EIA REPORTS.....</b>	<b>21</b>

## List of Drawings

### Drawing No.

NTNZ 1604A	Study Area of Hung Shui Kiu New Development Area Planning and Engineering Study
NTNZ 1607	Hung Shui Kiu New Development Area – Locations of Air and Noise Sensitive Receivers

## **1. BASIC INFORMATION**

### **1.1 *Project Title***

1.1.1 Hung Shui Kiu New Development Area

### **1.2 *Purpose and Nature of Project***

- 1.2.1 The Project was formerly studied under "Planning and Development Study on North West New Territories" (the NWNT Study) from 1997 to 2003. The NWNT Study was an integrated planning and engineering study to identify new development areas (NDAs) in North West New Territories (NWNT) in response to projections of housing demand for Hong Kong arising from the Territorial Development Strategy Review in 1996. The NWNT Study identified Hung Shui Kiu (HSK) suitable as a NDA to accommodate a population of about 160,000 and to provide 48,000 jobs upon full development. Various land uses including residential, government, institution or community, education, recreation, business use, open spaces, container back-up, green belt, etc. were proposed.
- 1.2.2 The NDA proposals were subsequently shelved in 2003 in light of an anticipated slower population growth at that time. Under the study of Hong Kong 2030: Planning Vision and Strategy (the HK2030 Study) completed by Planning Department in 2007, the NDA identified in the NWNT Study was revisited and recommended for implementation.
- 1.2.3 The current alignment of the Kong Sham Western Highway (KSWH) has encroached onto the western boundary of the HSK NDA under the former NWNT Study. In addition, one of the proposed alignments of Tuen Mun Western Bypass being studied by the Highways Department may encroach into the south-western part of HSK NDA. Less land area would be made available to accommodate the various land uses originally envisaged in the NWNT Study. As such, the approximate NDA boundary is expanded to include the HSK North area and its vicinity while the exact boundary of the HSK NDA will need to be reviewed.
- 1.2.4 In view of the above, a comprehensive planning and engineering study on the NDA (the Study) will be conducted.
- 1.2.5 The Study is to revisit the findings and recommendations of the NWNT Study, to take into account changes in the latest circumstances and public aspiration since the completion of the NWNT Study so as to confirm the feasibility of the proposed developments to meet long-term housing, social, economic and environmental needs, and to prepare recommended outline development plan (RODP) and preliminary engineering design for the development. The scope of the Study will include a planning and engineering study and an environmental impact assessment (EIA) which is the subject EIA of this Project Profile.
- 1.2.6 The Project comprises the HSK NDA and the associated engineering infrastructure works to service the NDA. They are hereinafter collectively referred to as HSK NDA.

### **1.3 *Name of Project Proponent***

1.3.1 The Project Proponent is New Territories North and West Development Office (NTN&W DevO), Civil Engineering and Development Department (CEDD) of the Government of HKSAR.

## **1.4 Location and Scale of Project and History of Site**

1.4.1 The location of the Project is shown in *Drawing No. NTNZ 1604A*. The HSK NDA will comprise residential development with employment and community facilities. According to the former NWNT Study, Hung Shui Kiu was identified with an area of about 450 ha and had the potential to accommodate a population of about 160,000 and to provide about 48,000 jobs upon full development. For the reasons stated in paragraph 1.2.3, the approximate boundary of the NDA is extended and the total area is increased to about 790 ha. The exact scale of the Project has to be investigated under the subject Study. Brief description of the location of HSK NDA is given below :-

The HSK NDA is located in the Tuen Mun – Yuen Long Corridor. The NDA is bounded by Tin Ying Road, Kiu Hung Road on the east; Yuen Long Highway on the south; Lau Fau Shan Road, Deep Bay Road and hill slopes on the north; and Kong Sham Western Highway on the west.

The existing land use is generally of a mixed urban-rural nature typical of a developing rural area on the fringe of a growing urban environment. Most building land is occupied by low density residential development of not more than 3 storeys, with smaller number of higher density development. The agricultural land is generally occupied by cultivation, orchards and other farm uses, together with areas of mixed commercial/industrial uses, the majority of which are of a low intensity, local nature, many with temporary types of structures. There are also numerous business operations, including container yards, open storage and concrete batching.

The contribution of human occupation to the existing landscape is largely negative. The overall impression in the south is of urban sprawl, with more open agricultural land and some woodland further northwest. In the northeast, the area is dominated by the concentration of containers stacked alongside the western edge of Tin Shui Wai New Town.

## **1.5 Number and Types of Designated Projects to be Covered by the Project Profile**

1.5.1 The Project includes a planning and engineering feasibility study of the HSK NDA, with an area of about 790 ha, part of which was identified to have the potential to accommodate a population of about 160,000 under the former NWNT Study. Therefore, the Study falls within Item 1 under Schedule 3 of the Environmental Impact Assessment Ordinance (EIAO), i.e. "Engineering feasibility study of urban development projects with a study area covering more than 20 ha or involving a total population of more than 100,000". The Study is a Designated Project requiring an EIA report.

1.5.2 The Project also consists of various Schedule 2 Designated Projects under the EIAO that may be identified in the course of the Study. In particular, the following elements of the Project, which may be proposed under the Study for the NDA development and are identified as Schedule 2 Designated Projects, are also included in this Project Profile :-

- (i) Primary distributor roads and district distributor roads in HSK NDA [under Schedule 2, Part I, A.1]
- (ii) Road bridges, more than 100 m in length between abutments [under Schedule 2, Part I, A.8]
- (iii) Construction of Sewage Pumping Stations with capacity of more than 2000m<sup>3</sup>/d. [under Schedule 2, Part I, F.3]
- (iv) Proposed railway and/or railway stations, if required, for serving the HSK NDA [under Schedule 2, Part I. A.2]

## **1.6 *Name and Telephone Number of Contact Person***

All queries regarding the Project can be addressed to :

Mr LEE Yiu Wah, Edward (Chief Engineer/Project 1)  
New Territories North and West Development Office  
Civil Engineering and Development Department  
9/F Sha Tin Government Offices,  
1 Sheung Wo Che Road,  
Sha Tin, New Territories.  
Tel.: 2158 5610  
Fax.: 2693 2918

## **2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

### **2.1 *Project Implementation***

2.1.1 The Project Proponent, NTN&W DevO of CEDD subject to the final recommendation of the Study, will be responsible for implementing the proposed works, together with all the environmental mitigation measures, the environmental monitoring and audit requirements as specified in the approved Environmental Impact Assessment (EIA) Report of this Project.

Specialist Environmental Consultants will be employed by CEDD through the main Consultants of the Study and responsible for undertaking the EIA study according to the Study Brief to be issued by the Director of Environmental Protection and responding on behalf of the Project Proponent on issues related to the EIA.

The construction works of the proposed land formation and infrastructure works to serve the NDA will be carried out in phases by contractors to be appointed under various works contracts.

### **2.2 *Project Time Table***

2.2.1 The Study including the EIA study is anticipated to commence in August 2011 for completion with a study period of approximately 30 months. Detailed design of the Project will follow. The construction works of the Project will commence in around 2019. Outline implementation programme will be formulated under the Study.

### **2.3 *Interactions with Other Projects***

2.3.1 Potential projects that would interface with HSK NDA have been identified and are listed below. Implementation of some of these projects has yet to be approved. This list should be re-visited during the EIA study to ensure all the latest projects available from the respective stakeholders are incorporated.

- (i) Upgrading of San Wai Sewage Treatment Works
- (ii) Hung Shui Kiu Development Stage 2 – Widening of Tin Ha Road and Tan Kwai Tsuen Road
- (iii) Ping Ha Road Improvement – remaining works (Ha Tsuen Section)
- (iv) Water Supply to Hung Shui Kiu New Development Area
- (v) Salt Water Supply for North West New Territories
- (vi) Replacement and Rehabilitation of Watermains, Stage 3
- (vii) Yuen Long and Kam Tin Sewerage Stage 2 and Stage 3
- (viii) Drainage Improvement in Northern New Territories – Package B
- (ix) Hong Kong-Shenzhen Western Express Line
- (x) Tuen Mun Western Bypass
- (xi) Proposed Development under the Study on the Enhancement of the Lau Fau Shan Rural Township and Surrounding Areas
- (xii) Planning and Engineering Study for the Development at Lam Tei Quarry Site
- (xiii) Proposed incinerators for sludge treatment and municipal wastes in North West New Territories

2.3.2 The EIAs for the above projects, if required, will be conducted by their respective proponents. The NDA EIA study will consider the environmental effects of these projects on the NDA development.



### **3. POSSIBLE IMPACTS ON THE ENVIRONMENT**

#### **3.1 Air Quality**

##### Construction Impacts

- 3.1.1 Construction works include site clearance, site formation, the infrastructure provision and any other infrastructure activities. The major temporary air pollution will be dust generated as a result of these construction works and vehicle movement on unpaved haul roads. Due to the extent of the proposed development, extensive site formation works and subsequent construction works may have the potential to pose adverse air quality impacts on the nearby air sensitive receivers.

##### Operational Impacts

- 3.1.2 The major permanent sources of air pollutants are the vehicular emissions from traffic on major roads and the air pollutants emitted from the vicinity of the industrial stationary sources. There will be vehicular emissions from the roads surrounding the NDA, including the Kong Sham Western Highway, Yuen Long Highway and the proposed Tuen Mun Western Bypass, and all internal roads. There may be emissions from new ventilation shafts and station of the proposed railway. Chimney emissions associated with nearby industrial premises are the stationary air pollutant sources. Odour from the proposed sewage pumping station, expansion of sewage treatment plant, refuse transfer station and refuse collection points as well as the drainage channels and nullahs are other potential sources of air pollution. Also, the potential air quality impacts associated with the proposed container back-up site, public transport interchanges and carport have to be addressed.

#### **3.2 Noise**

##### Construction Impacts

- 3.2.1 The noise generated from construction activities, neighbouring concurrent construction works, piling works, construction plant, traffic along site access roads, and related powered mechanical equipment have the potential to pose adverse noise impacts to the surrounding sensitive receivers.

##### Operational Impacts

- 3.2.2 The future noise environment will be affected by road traffic noise, railway noise from West Rail and Light Rail and the proposed railway and fixed noise sources such as container back-up site, new sewage pumping stations and treatment facilities, electricity substations, industrial establishments, rail station and ventilation systems.

#### **3.3 Water Quality**

##### Construction Impacts

- 3.3.1 The NDA development and its associated container back-up area will involve various construction activities undertaken at various time durations. The activities, which will have likely impact on water quality, include site formation, sediment removal, re-alignment of streams and rivers, concrete washings, construction of bridges, bore piling, construction and upgrading of road network, site workshop or depot and sewage effluent from the workforce. The adverse impacts may comprise additional runoff, increase of suspended solids, pH value and turbidity levels, spillage of waste oils and generation of additional sewage and wastewater. The potential impacts on the nearby surface water associated with construction works in the pond areas, and Deep Bay will need to be addressed.

Operational Impacts

- 3.3.2 The operation of the proposed HSK NDA development will result in increases of generation of sewage, wastewater from commercial facilities and small businesses, runoff from roads, railways, pedestrians, business areas and open space as well as the changes to the hydrological regime of the drainage basins. The impact on Deep Bay has to be assessed.

**3.4 Solid Waste**

Construction Phase

- 3.4.1 Solid wastes will mainly be generated from a wide range of construction activities such as site formation, construction of roads and drains, and construction of the proposed development and infrastructure. The wastes arising from construction will largely consist of excavated and demolished C&D materials during earthworks and demolition works, chemical waste, and general refuse. The quantities of wastes to be generated during construction of the proposed NDA will largely depend on the programmes of various works packages and also require off-site disposal.

Operational Phase

- 3.4.2 The operation of the proposed NDA developments and associated infrastructure will generate a significant amount of municipal solid waste. The storage and handling of this waste will have the potential to cause adverse environment impact.

**3.5 Landfill Gas**

- 3.5.1 There is no landfill within or in the vicinity of the NDA boundary. Therefore, no qualitative assessment of landfill gas hazard will be necessary.

**3.6 Ecology**

- 3.6.1 Most of the habitats occurring within the Study Area are man-made or highly modified and relatively widespread and common in Hong Kong. Of these, watercourses, grassland, wasteland and developed areas are of low overall ecological value due to the fragmentation infillings and heavy disturbance prevalent in the area. However, several other habitats are of moderate ecological value, primarily because they regularly support a range of faunal species, some uncommon. Of these the low-lying wet agricultural habitats and marsh wetlands are of interest because they are capable of supporting a diverse range of flora and fauna.
- 3.6.2 The potential terrestrial ecological impact arising from the development of the proposed NDA will be associated with :-

Construction Phase

- (i) Direct habitat loss and habitat fragmentation;
- (ii) Disturbance to wildlife;
- (iii) Air pollution to vegetation;
- (iv) Increased sediment load;
- (v) Toxic pollutants from construction operations and
- (vi) Soil compaction.

Operational Phase

- (i) Ecological barrier;
- (ii) Disturbance to wildlife and
- (iii) Air pollution to vegetation.

### **3.7 Cultural Heritage**

3.7.1 Potential impacts on identified cultural heritage resources within the NDA and associated infrastructures may arise from the following :

- (i) Landtake for both temporary and permanent facilities which may result in damage to, or loss of, archaeological remains and deposits, culturally significant features and changes to the physical coherence of historic landscape; and
- (ii) Severance and islanding may result from permanent landtake required for the NDA and associated infrastructures construction; areas of historic and cultural interest may be severed, thereby altering or destroying their integrity.
- (iii) Construction works may result in damage to or loss of buried archaeological sites by:
  - Disturbance through excavation at or near an archaeological site, topsoil stripping and the passage of heavy machinery on exposed and buried deposits;
  - Change in the watertable due to construction and development activities;
  - The burial of sites resulting in limitation on accessibility for future archaeological investigations (including surface survey and remote sensing techniques) and obscuring visible surface evidence;
  - Ground compaction due to construction activities or the weight of permanent filled materials may cause damage or distortion to buried archaeological remains, especially in soft alluvial deposits.
  - indirect impacts such as visual, vibration and noise intrusion on the setting and amenity of historic and cultural resources (e.g. grave sites and monuments and culturally or historically significant landscape features).

3.7.2 Declared monuments, graded buildings and the potential archaeological sites within the NDA will be identified in a cultural heritage impact assessment to be conducted under the EIA study.

### **3.8 Land Contamination**

3.8.1 While there are no extensive areas of contaminated land such as landfills, chemical stores etc. in the NDA, there is potential for the presence of residues from small industries including small-scale vehicle repair workshops, metal scrap yards, waste recycling yards and storage sites to create an adverse impact that will need to be cleaned up during the site formation phase.

3.8.2 The contaminated land impacts are likely to be related to the following : health risks to site workers; disposal of contaminated soils, where encountered; and potential health risks to future users of the sites. The land contamination issue and its impact within the NDA will be identified and assessed.

### **3.9 Landscape and Visual**

3.9.1 The expected sources of landscape and visual impacts arising from the HSK NDA development are as follows:-

#### Construction Phase

- (i) Loss of landscape elements, e.g. trees, fishponds and natural topography;
- (ii) Loss of visual amenity through removal of landscape elements e.g. trees;
- (iii) Visual appearance of any temporary use prior to full development;
- (iv) Construction activities on newly formed areas and existing available land and

- (v) Obstruction of, or intrusion into views by the development.

Operational Phase

- (i) Visual intrusion and obstruction created by the development and
- (ii) Visual quality of the new development

## 4. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

### *Surrounding Environment including Existing and Planned Sensitive Receivers*

#### 4.1 Air Quality

- 4.1.1 HSK NDA is located in a meteorologically confined area, the Deep Bay Airshed and is situated in the north-western part of the New Territories. There are several hills higher than 400 m in Shenzhen area to the northeast (Wutung Shan and Jigong Tou Mountain) and a hill to the east (Kai Kung Leng).
- 4.1.2 Based on the prevailing air stream at Lau Fau Shan Station at the northern part of the Study Area, during the winter season, the dominant wind is north-easterly. For the rest of the year, 45-50% of the wind is from the east while about 15-20% comes from the south-westerly direction. The wind pattern discrepancy between the NWNT and the rest of Hong Kong is the result of the blocking effect of hills over the western part of the New Territories.
- 4.1.3 Based on the prevailing air stream at Siu Hong Station at the southern part of the Study Area, the predominant wind direction is north-easterly during winter and south-easterly during summer, indicating the channelling effects associated with the valley landscape in Tuen Mun.
- 4.1.4 In addition to the above wind patterns, the Study Area generally exhibits a limited dispersive capacity because of the occasional occurrence of an inversion layer in the morning and evening over this area. The representative Air Sensitive Receivers (ASRs) within the Study Area are selected to represent the future and existing sensitive receivers in HSK NDA, and some of the latter are indicated in *Drawing No. NTNZ 1607*.

#### 4.2 Noise

- 4.2.1 The existing noise environment within Hung Shui Kiu is dominated by the traffic on Castle Peak Road, Yuen Long Highway and Kong Sham Western Highway. Traffic noise from several other roads (Hung Tin Road, Ping Ha Road and Tin Ha Road) and the proposed Tuen Mun Western Bypass also dominate the noise environment of the area. Most of these roads carry a substantial amount of heavy vehicles which utilize the container storage yards scattered within the area.
- 4.2.2 Isolated industrial operations scattered throughout Hung Shui Kiu also contribute to the overall ambient noise levels. These operations include container storage yards, open storage facilities and car stripping/repair workshops.
- 4.2.3 The noise impact from the existing Light Rail and West Rail affect the HSK NDA. The noise impact from the proposed railway may also affect the HSK NDA.
- 4.2.4 Representative Noise Sensitive Receivers (NSRs) are selected to represent both existing and future land uses worst affected by the implementation of the NDA development. The existing NSRs are the same as the corresponding ASRs, as indicated in *Drawing No. NTNZ 1607*.

#### 4.3 Water Quality

- 4.3.1 HSK is located in Tin Shui Wai Nullah catchment, the rivers of which are historically of poor quality, although in recent years, conditions have improved through control measures. The streams of rivers of the NWNT encompass a wide range of flows and water quality. There are two main receiving water bodies for all NWNT watercourses: Inner Deep Bay and Outer Deep Bay. In addition, all waterbodies around the NDA, fishponds, lotus ponds,

duck ponds and other commercially used waterbodies and flood storage ponds, and the immediate inshore areas of Deep Bay are considered to be sensitive receivers.

#### **4.4 Solid Waste**

4.4.1 The existing solid waste arising from the area within the proposed NDA include domestic waste from village houses, agricultural waste, commercial/industrial waste generated from open storage and informal industrial uses; and chemical waste from vehicle breaking and repair operations. The contribution of waste generated from these areas in the NWNT catchment is considered small.

#### **4.5 Ecology**

4.5.1 Much of the habitat within the NDA is currently urban, comprising mainly village areas. However, there are some areas of conservation and cultural importance. A container back-up area is located to the west of Tin Shui Wai Development Zone. This area contains significant numbers of containers and farm buildings.

4.5.2 An area of wet agricultural land covers approximately 20 ha in the southern part of the NDA. Although disturbed by farming activities and scattered buildings, the area provides a habitat for a number of bird and invertebrate species.

4.5.3 The ecological resources within the NDA are limited due to fragmentation and disturbance from surrounding village and container storage yards.

#### **4.6 Cultural Heritage**

4.6.1 The Study Area lies in a part of Hong Kong that possesses a long and relatively well documented history. A number of historically significant villages are located within or very near its boundaries. Settlement in this area has an extended history which dates back to the 14<sup>th</sup> century, when members of the Tang clan arrived and formed the first villages. Today, there are a number of Tang clan villages, and also other mixed clan or non-Tang villages, which have historically fallen within the Tang sphere of economic and social influence. A number of scattered houses and structures within the NDA development requires assessment to determine their heritage value and any necessary measures to mitigate adverse impact.

4.6.2 The Study Area has been substantially modified from a landscape of traditional villages surrounded by agricultural lands in recent years. The introduction of container storage and light industry combined with the decline in rice and other forms of farming has resulted in a pattern of renovated and abandoned old village areas mixed with other forms of land use.

4.6.3 Cultural and heritage resources in the vicinity of the Study Area will be identified in a cultural heritage impact assessment to be carried out under the EIA study.

#### **4.7 Land Contamination**

4.7.1 The existing environment in the NDA is mainly rural in character and comprises village and industrial land uses intermixed with active and inactive agricultural activities. The main expected contaminants from the land uses in the NDA are from by-products from small industries, container storage yards, vehicle and equipment storage and vehicle repair workshops.

Based upon the generally remote and undeveloped locations that comprise the Study Area, the number of sensitive receivers likely to be impacted by the identified contamination

concerns is expected to be limited to, current land users and future site workers employed during the construction phase of the project.

Land-based excavation and grading works will be required for the implementation of the NDA. These construction activities are cause for concern as they may interfere with potentially contaminated soil underlying the existing industrial uses, and hence creating the potential to impact sensitive receivers.

#### **4.8 *Landscape and Visual***

- 4.8.1 The composition of landscape elements within the Study Area is dominated by an urban/suburban land use consisting of existing villages, squatter areas, new residential areas, road, rail and drainage infrastructure, container back-up and open storage areas. The other dominant elements include agricultural land and tree cover. The landscape character varies from degraded container back-up areas to extensive foothills of high scenic value.
- 4.8.2 The proposed development has an extensive visual envelope or area which is expected to be inter-visible with the NDA proposals. Within this area, visual sensitive receivers will be able to view both the construction and operational phases of the NDA development. The visual envelope is defined by upland areas to the north at Lau Fau Shan, to the west by the hill range from Yuen Tau Shan to Castle Peak and to the southeast by the hills of Tai Lam Country Park. Tall residential buildings in Tin Shui Wai and Tuen Mun also contribute to forming the envelope in the north and south. Lower topography in the northern areas will allow long range views.
- 4.8.3 A series of receiver group areas can be identified within the visual envelope based on existing land use and physical conditions. Subject to the landscape and visual impact assessment, the following areas allow a breakdown of the large area covered by the visual envelope :-
- (i) Tin Shui Wai Area
  - (ii) Lau Fau Shan/Ha Tsuen/Ping Shan Area
  - (iii) NDA Area
  - (iv) Western Hills Area
  - (v) South Western Hills Area
  - (vi) Mid-Valley Area
  - (vii) South Eastern Foothills
  - (viii) Tai Lam Country Park
  - (ix) Tuen Mun Urban Area
- 4.8.4 Visual sensitive receivers (VSRs) can be located within the above receiver group areas and they may be classified into residential buildings, non-residential buildings, and public in external areas including travellers on transport routes.

## 5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

### 5.1 *General*

5.1.1 The EIA study will investigate those environmental impacts and propose the appropriate mitigation measures with the intention that all proposals would be environmentally acceptable and cost effective. The residual impacts, if any, would be confined within the allowable limits. Environmental monitoring and auditing of potential impacts that may arise from the works of the Project would be provided for the construction and operational phases. Subject to the findings of the EIA study, the following mitigation measures will be incorporated in the design and construction of the Project.

### 5.2 *Air quality*

#### Construction Phase

5.2.1 In order to prevent adverse impacts on air quality, the control measures stipulated in the Air Pollution Control (Construction Dust) Regulations should be implemented wherever applicable, to limit the dust emissions from the site. Mitigation measures, including but not limited to the following, will be put in place.

- Stockpiles of dusty material will not extend beyond site boundaries.
- In the process of material handling, any material which has the potential to create dust will be treated with water or sprayed with a wetting agent where practicable.
- Any vehicle with an open load compartment used for transferring dusty materials off-site will be properly fitted with side and tail boards and cover.
- Stockpiles of sand and aggregate will be enclosed on three sides and water sprays will be used to dampen stored materials and when receiving raw material.
- The site will be frequently cleaned and watered to minimise fugitive dust emissions.
- Motorised vehicles on site will be restricted to a maximum speed of 15 km/hr and shall be confined to designated haul routes which will be paved or surfaced with hardcore.

#### Operational Phase

5.2.2 The proposed mitigation measures to improve the air quality within the Study Area are to be considered as follows :-

##### (i) *Emissions from Chimneys*

- adequate buffer distances will be provided between the chimneys and the NDA to protect the development from emission of existing and proposed chimneys; and
- the EIA study will investigate into the rezoning of the industrial area within the Kiu Tau Wai area into non-industrial area in an effort to minimise any adverse environmental impacts associated with the existing industrial/residential interface.

##### (ii) *Vehicle Emissions from Open Roads*

- in order to further reduce the impacts from open roads, the use of railway will be given higher priority to roads within the NDA;



- the peripheral strategic roads, including Kong Sham Western Highway, Yuen Long Highway and the proposed Tuen Mun Western Bypass will provide direct access to and from the urban Kowloon and New Territories area, thus minimising heavy vehicle movements within the NDA,
  - a truck route proposal will be planned to protect the residents at the NDA by restricting as far as practicable the access of heavy vehicles to local roads within the NDA, and
  - adequate buffer distance, tree planting and dense shrub plantation are recommended to separate the pedestrian and heavily trafficked roads.
- (iii) *Impacts inside Underpasses*
- the air quality inside underpasses would follow the air quality guideline stated in the Practice Note on Control of Air Pollution in Vehicle Tunnels.
- (iv) *Odour Impact from Sewage Treatment Works (STW) and Sewage Pumping Stations (SPS)*
- San Wai STW and Ha Tsuen SPS (EIA for these facilities will be conducted separately by DSD) -
- provision of adequate buffer distances – for San Wai STW, the distance to the closest sensitive receiver would be 300 m while for Ha Tsuen SPS, the distance would be 500 m.
- Proposed SPS for development of the NDA -
- design would be in accordance with DSD's Standard Design on Sewage Pumping Station, with all pumps located underground and enclosed within a structure/building; and
  - deodorization system would be installed and good housekeeping practice would be adopted.
- (v) *Impact from Public Transport Interchanges (PTI)*
- the design of the PTI would follow the design consideration recommended in the Control of Air Pollution in Semi-Confined Public Transport Interchanges (ProPECC PN 1/98);
  - adequate ventilation and dilution of vehicle exhaust should be provided; and
  - ventilation exhaust, if any, would be directed away from the nearest ASRs.
- (vi) *Odour Impact from Refuse Transfer Station (RTS) and Refuse Collection Points (RCPs)*
- for the RTS, a dust extraction and detection system would be installed in the ventilation system for the tipping hall and an odour control system would be installed at the discharge outlets of the ventilation system for the tipping hall, the compactor area and the wastewater treatment plant;
  - for the RCPs, proper waste management system would be adopted.
- (vii) *Odour Impact from Nullahs and Rivers*
- It is anticipated that after implementation and enforcement of the third stage of the Livestock Waste Control Scheme, substantial reduction in pollutant levels in Tin Shui Wai Nullah and its branches should occur. If necessary, the odour problem can be minimised by dredging the river bed or other appropriate measures so as to remove the odorous sediments.

### 5.3 **Noise**

#### Construction Noise

5.3.1 In order to mitigate adverse noise impacts, the following general mitigation measures will be put in place.

- Quiet plant will be used to reduce noise generated.
- Movable and temporary barriers will be provided to screen NSRs from particular items of plant or noisy operations.
- Noise screening structures or purpose-built noise barriers will be provided along the site boundary to provide additional protection to NSRs nearby.
- Good site practices will be implemented as effective noise mitigation measures. These will include, but not limited to, locating noisy equipment and activities as far from NSRs as practical, scheduling noisy activities to minimise exposure of nearby NSRs to high levels of construction noise, proper maintenance of construction plant and devising methods of working to minimise noise impacts on the surrounding environment.

#### Operational Phase

5.3.2 For road traffic noise, a number of noise mitigation designs, namely traffic management measures, environmentally friendly layout design and where necessary, noise barriers, should be incorporated in the layout plan of the NDA.

5.3.3 Subject to the EIA study, the proposed traffic management measures may include the provision of a railway and its associated stations at Hung Shui Kiu to serve the population of the NDA and the design of the transport network to improve the environmental quality of the Study Area whilst maintaining a sufficient level of accessibility by both public and private transport modes. The major highways, including Yuen Long Highway, Kong Sham Western Highway and the proposed Tuen Mun Western Bypass along the periphery of the NDA will provide direct access to and from the urban Kowloon and New Territories area, thus minimizing heavy vehicle movements within the NDA. Moreover, a truck route will be investigated with a view to diverting heavy vehicles away from the local roads within the NDA.

5.3.4 Environmentally friendly layout designs may include depressing sections of the district distributor road, locating buildings to avoid exposure to traffic noise, providing comprehensive pedestrian and cycle track network throughout the NDA to minimize the generation of road traffic. Other designs may include the use of non-noise sensitive structures such as podium to shield traffic noise and adequate setback distance away from noisy roads.

5.3.5 Should residual impacts be identified at the existing NSRs where the use of direct mitigation measures on the roads has been exhausted, these NSRs would then be eligible for indirect technical remedies.

5.3.6 The potential noise impacts from the existing Light Rail and West Rail, and the proposed railway will need to be investigated and mitigation measures will be provided, as necessary.

5.3.7 For the potential impacts arising from the proposed container back-up site, the following mitigation measures should be provided to reduce noise impacts on the NSRs:-

- adequate buffer zones with the NSRs;
- screening using purpose-built noise barrier;
- speed control outside and within the facilities;
- smooth road paving to reduce bumps; and

- proper control of container handling to reduce noise.

5.3.8 For the potential impacts arising from other fixed noise sources including utility services, ventilation system from the proposed buildings and existing industrial establishment, the following mitigation measures and appropriate building design should be adopted.

- For the NSRs, proper arrangement of housing blocks and the use of special block design.
- For the noise sources, careful siting of noisy machinery within the site; by enclosing the noisy machinery within building structures; by use of acoustic louver, silencer for ventilating fan, acoustic door and absorptive wall lining; and any opening of the building to be located facing away from any NSRs.

## 5.4 **Water Quality**

### Construction Phase

5.4.1 In order to prevent adverse impacts on water quality, the following general mitigation measures will be put in place.

- Site run-off should be reduced and will be directed into temporary sand traps or other silt removal facilities before discharging into the outlets.
- Silt removal facilities will be maintained regularly.
- Open stockpiles of materials on site will be avoided or where unavoidable covered with tarpaulin or similar fabric during rainstorms.
- Silt curtains or sand bag barriers will be used to confine the disturbed area during sediment removal activities.
- Where possible, works entailing soil excavation will be minimised during the rainy season (April to September).
- To minimize the impacts of concrete washings, infiltration/sedimentation pits will be used to settle out the washings before treatment/re-use/discharge. If necessary, treatment units with pH adjustment will be adopted.
- Oil interceptors will be provided and properly maintained for collecting spillage or leakages from site workshops. The waste oil removed will be collected by licensed collectors.
- Mobile toilets or other appropriate means will be provided to store sewage before disposal through licensed collection agent or discharging to main sewerage system.
- For bore piling operations, the resulting suspension will be settled in sedimentation/infiltration pit until supernatant is clear and the bentonite solids will be disposed appropriately.

### Operational Phase

5.4.2 The following general mitigation measures are to be considered:

- provision of sand/silt and oil/grease traps, porous pavements and detention ponds at suitable locations to prevent ingress of pollutants to the stormwater system, which would serve to reduce the loading from the storm drains to the inland waters of the Deep Bay Water Control Zone compared to the existing situation;
- construction of drainage works to prevent increased risk of flooding;
- construction of wetland systems for both flow reduction and clean-up;

- upgrading the sewerage system and the capacity of San Wai STW or providing other sewage treatment/disposal facilities to ensure that there is sufficient capacity to cater for increased sewage effluent flows from the developments; and
- provision of suitable measures to minimise the risk of emergency discharges of untreated sewage effluent and to ensure timely repair.

## 5.5 **Solid Waste**

### Construction Phase

- 5.5.1 Solid waste arising from construction will largely consist of spoil generated during earthworks, and general construction waste/surplus materials (such as C&D material from demolition works, chemical waste and general refuse).
- 5.5.2 As the NDA development would require the import of a large amount of fill material, the C&D material will be stored separately and reused in the works.
- 5.5.3 The following measures will be implemented to reduce the quantities of C&D material for disposal off site:
- All C&D material will be sorted and re-used wherever possible;
  - Waste haulier should obtain the necessary registration and licences under the Waste Disposal Ordinance and the Waste Disposal (Chemical Waste) (General) Regulation from the Environmental Protection Department;
  - Nomination of an approved person to be responsible for good site practice, arrangements for collection and effective disposal to an appropriate facility, of all waste generated at the site;
  - Separation of chemical wastes for special handling and appropriate treatment at a licensed facility;
  - A recording system for the amount of wastes generated, recycled and disposed of (including the disposal sites);
  - In order to monitor the disposal of C&D material and solid wastes at public filling facilities and landfills, and control fly-tipping, a trip-ticket system shall be implemented by the Contractor, in accordance with the contract and the requirements of DEVB No. 6/2010 "Trip Ticket System for Disposal of Construction and Demolition Materials".
  - A Waste Management Plan (WMP) shall be prepared and this WMP shall be submitted to the Engineer for approval. The WMP will be in accordance with ETWB TC(W) No. 19/2005 "Environmental Management on Construction Sites".
  - Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse of recycling of materials and their proper disposal.
  - Any unused chemicals or those with remaining functional capacity shall be recycled;
  - Use of reusable non-timber formwork to reduce the amount of C&D material; and
  - Proper storage and site practices to minimize the potential for damage or contamination of construction materials.

### Operational Phase

- 5.5.4 The following mitigation measures are to be considered:
- Modern waste management facilities would be investigated for the developments in the NDA. The facilities have potential enhancement of sanitary and environmental conditions over the conventional refuse collection points (RCP).

- The RCP should be enclosed to minimize noise, odour and visual nuisance, and it should be fitted with a deodourizing unit and ventilation system to remove odour. Each RCP should be fitted with a water point and high pressure hose for cleansing operations, with connection to the foul sewerage system.
- Domestic waste recycling should be encouraged, with provision of collection bins at appropriate locations in all housing estates and promotion campaigns for waste paper recovery, plastic bag collection and “sort and recovery” of waste materials.

## **5.6 Ecology**

- 5.6.1 The mitigation measures that are to be implemented to minimize the impacts on air quality, noise and water quality will also help to minimize any impacts on ecological resources.
- 5.6.2 As regards habitat loss, the best mitigation is avoidance and will be used wherever possible. For loss which is considered unavoidable, compensation will be provided, with the following features :-
- a variety of habitat types;
  - linkage with other wetland areas and other ecological resources; and
  - an acceptable size for creation of habitats and to minimize disturbance to fauna utilizing the habitat

## **5.7 Cultural Heritage**

- 5.7.1 A cultural heritage impact assessment will be carried out under the EIA study. Impacts on cultural heritage sites will be avoided as far as practicable, by amending layout plan to allow preservation of the heritage resources in-situ. If unavoidable, mitigation measures to the direct impact on built heritage resources will be implemented. The sites with cultural heritage interest will be preserved by record (a full cartographic and photographic record) before removal when preservation in-situ is not possible.
- 5.7.2 Mitigation measures to avoid impact on archaeological deposits include rescue excavation prior to the commencement of construction work and archaeological monitoring during construction to preserve the deposits by record.

## **5.8 Land Contamination**

- 5.8.1 The following mitigation measures will be implemented during the construction phase to minimise any potential exposure to contaminated soils or groundwater:
- Site workers should wear gloves, masks and other protective clothing where exposure to vapour or contaminated soil may be encountered;
  - Contaminated materials should be removed with bulk earth movers to prevent human contact;
  - Adequate washing facilities should be provided and smoking/eating should be prohibited in the area;
  - Contaminated sediments which have been stockpiled or are being transported should be covered with tarpaulin;
  - Leakage of pollutants or leaching from excavated soil should be prevented by storing on an impermeable surface;

- Only licensed waste haulers should be used to collect and transport any contaminated material to an appropriate disposal site and procedures should be developed to ensure that illegal disposal of wastes does not occur; and
- The necessary waste disposal permits should be obtained, as required, from the appropriate authorities, in accordance with the *Waste Disposal Ordinance (Cap 354)*, *Waste Disposal (Chemical Waste) (General) Regulation (Cap 354)*, as required:

5.8.2 Mitigation measures will also be determined with reference to EPD's documents such as "The Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management (Dec 2007)", "The Guidance Notes for Contaminated Land Assessment Remediation (Aug 2007)", and "The Guidance Notes for Investigation and Remediation of Contaminated Sites of Petrol Filling Stations, Boatyards, and Car Repair/Dismantling Workshops (May 1999)".

## 5.9 ***Landscape and Visual***

### Mitigation Measures to be Incorporated in the Design Layouts of the NDA

5.9.1 The following measures will be adopted to minimize the landscape and visual impacts during the design stage.

- the urban design principles such as the density of the development and focusing the development around certain functions;
- controlling building height profiles and providing stepped building heights;
- responsive building massing;
- controlling the walling effect;
- preserving and establishing visual and open space links, including provision of view and breeze corridors; and
- landscape design principles.

### Construction Phase

5.9.2 The following general mitigation measures will be implemented to alleviate the impacts for the construction phase.

- Erosion control measures should be implemented for protection of construction works and the landscape if heavy rains occur.
- Measures should be taken to store and use construction equipment and building materials where they are not visually intrusive, or easily washed away or where they produce less dust.
- Damaged vegetation and trees, not earmarked for removal, should be rectified, repaired or replaced, using the same species, size and form, to the original condition as far as possible.
- Minimization of light pollution techniques to be implemented. This includes having more lights with focused beams rather than energy wasting, floodlighting which might impact on the nighttime character of the area.
- Exposed slopes should be hydroseeded as soon as grading works are completed to prevent erosion and subsequent loss of landscape resources and character; and
- Haul roads should be rehabilitated at the earliest opportunity to be compatible with their existing surrounding landscape or planned surrounding landscape.

---

Operational Phase

- 5.9.3 The following general mitigation measures are to be considered for the operational phase.
- Topsoil conservation will be practised where soil stripping is due to occur. Soil of appropriate quality will be removed and stored in an appropriate manner for reuse within the same site or in alternative locations.
  - Tree transplanting and compensatory planting will mitigate the impact on the existing tree/woodland.
  - Roadside planting is proposed alongside all roads within the development. It will enhance local identity, if theme planting is used, and reduce visual impact through screening.
  - Amenity strips will be provided to roads, wherever practicable, to mitigate their visual appearance.
  - Road structures, such as pedestrian bridges, will be designed to improve the visual appearance of the road corridor.
  - The visual impact of noise barriers will be mitigated by appropriate detailed design, including use of transparent panels, provision of planting on and adjacent to the barriers, appropriate colour selection of panels and supporting structure as well as design of supporting structures to incorporate a high level of quality and aesthetics.
  - The landscape treatment of road embankments and soil slopes will be provided to enhance their visual appearance.
  - Landscape treatment will be provided to open drainage channels, where practicable, to enhance their visual appearance.

## **6. USE OF PREVIOUSLY APPROVED EIA REPORTS**

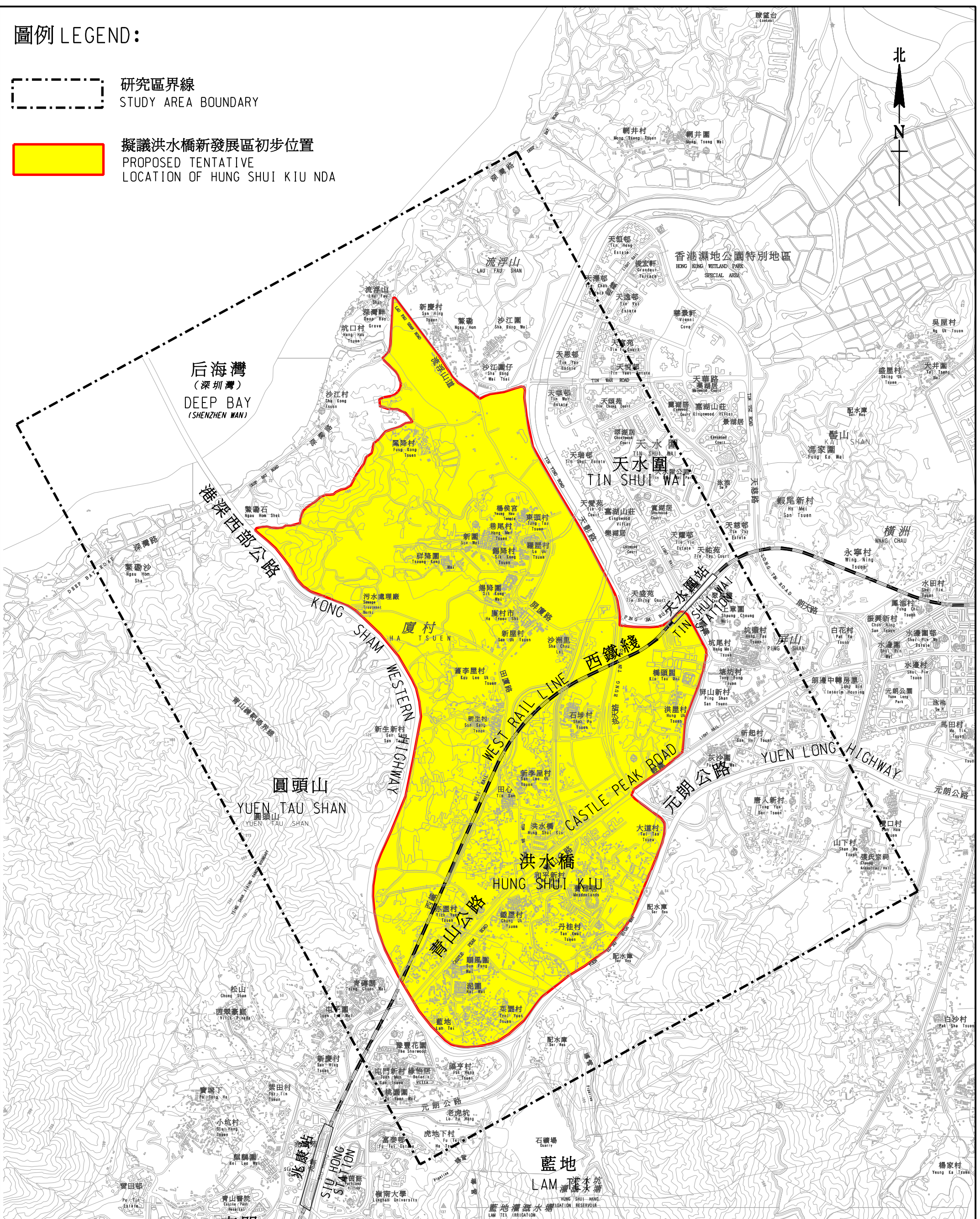
- 6.1.1 EIA Report on Upgrading and Expansion of San Wai Sewage Treatment Works and Expansion of Ha Tsuen Pumping Station (2003)
  
- 6.1.2 EIA Report on Deep Bay Link (2002)



圖例 LEGEND:

 研究區界線  
STUDY AREA BOUNDARY

 擬議洪水橋新發展區初步位置  
PROPOSED TENTATIVE  
LOCATION OF HUNG SHUI KIU NDA



A	17.11.2010	STUDY AREA BOUNDARY REVISED	SIGNED	SIGNED
編號 no.	日期 date	內容摘要 description	核對 checked	核准 approved

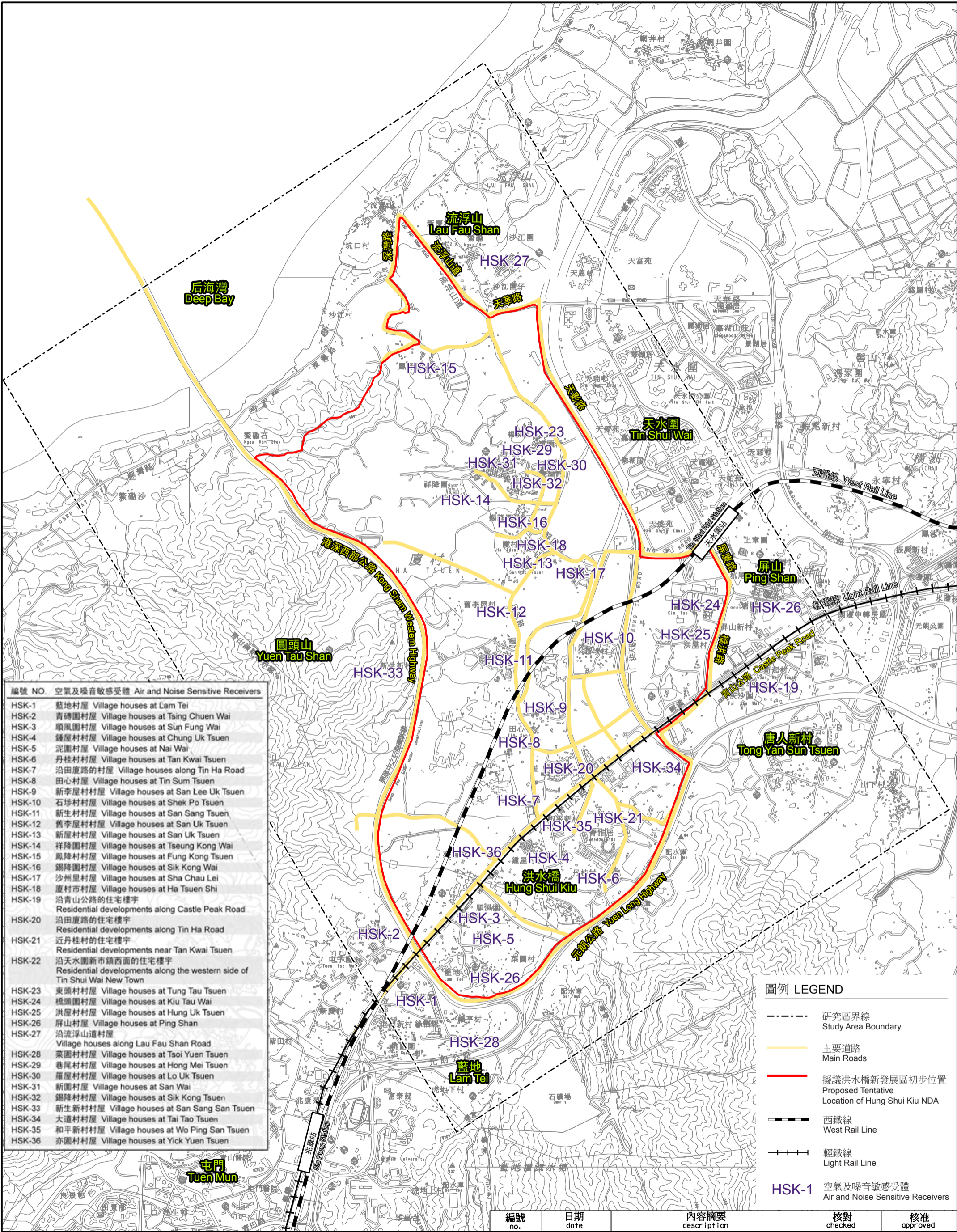
修訂 REVISION

繪圖 drawn	簽署 initial	日期 date	項目編號 item no.
S M CHU	SIGNED	19.06.09	733CL
核對 checked	簽署 initial	日期 date	比例 scale
Y F TANG	SIGNED	22.06.09	1:25 000
核准 approved	簽署 initial	日期 date	
C S LIU	SIGNED	03.07.09	NTNZ 1604A

辦事處 office  
新界西及北拓展處  
NEW TERRITORIES NORTH AND  
WEST DEVELOPMENT OFFICE

 土木工程拓展署  
CIVIL ENGINEERING AND  
DEVELOPMENT DEPARTMENT

圖則名稱 drawing title  
洪水橋新發展區規劃及工程研究 - 研究區位置圖  
HUNG SHUI KIU NEW DEVELOPMENT AREA  
PLANNING AND ENGINEERING STUDY - STUDY AREA LOCATION PLAN



編號 NO.	空氣及噪音敏感受體 Air and Noise Sensitive Receivers
HSK-1	藍地村屋 Village houses at Lam Tei
HSK-2	青磚圍村屋 Village houses at Tsing Chuen Wai
HSK-3	順風圍村屋 Village houses at Sun Fung Wai
HSK-4	鐘屋村屋 Village houses at Chung Uk Tsuen
HSK-5	泥圍村屋 Village houses at Nai Wai
HSK-6	丹桂村屋 Village houses at Tan Kwai Tsuen
HSK-7	沿田廈路的村屋 Village houses along Tin Ha Road
HSK-8	田心村屋 Village houses at Tin Sum Tsuen
HSK-9	新李屋村村屋 Village houses at San Lee Uk Tsuen
HSK-10	石步村村屋 Village houses at Shek Po Tsuen
HSK-11	新生村村屋 Village houses at San Sang Tsuen
HSK-12	舊李屋村村屋 Village houses at San Uk Tsuen
HSK-13	新屋村村屋 Village houses at San Uk Tsuen
HSK-14	祥降圍村屋 Village houses at Tseung Kong Wai
HSK-15	鳳降村村屋 Village houses at Fung Kong Tsuen
HSK-16	錫降圍村屋 Village houses at Sik Kong Wai
HSK-17	沙洲里村屋 Village houses at Sha Chau Lei
HSK-18	廈村市村屋 Village houses at Ha Tsuen Shi
HSK-19	沿青山公路的住宅樓宇 Residential developments along Castle Peak Road
HSK-20	沿田廈路的住宅樓宇 Residential developments along Tin Ha Road
HSK-21	近丹桂村的住宅樓宇 Residential developments near Tan Kwai Tsuen
HSK-22	沿天水圍新市鎮西面的住宅樓宇 Residential developments along the western side of Tin Shui Wai New Town
HSK-23	東頭村村屋 Village houses at Tung Tau Tsuen
HSK-24	橋頭圍村屋 Village houses at Kiu Tau Wai
HSK-25	洪屋村村屋 Village houses at Hung Uk Tsuen
HSK-26	屏山村屋 Village houses at Ping Shan
HSK-27	沿流浮山道村屋 Village houses along Lau Fau Shan Road
HSK-28	菜園村村屋 Village houses at Tsoi Yuen Tsuen
HSK-29	巷尾村村屋 Village houses at Hong Mei Tsuen
HSK-30	羅屋村村屋 Village houses at Lo Uk Tsuen
HSK-31	新圍村村屋 Village houses at San Wai
HSK-32	錫降村村屋 Village houses at Sik Kong Tsuen
HSK-33	新生新村村屋 Village houses at San Sang San Tsuen
HSK-34	大道村村屋 Village houses at Tai Tao Tsuen
HSK-35	和平新村村屋 Village houses at Wo Ping San Tsuen
HSK-36	亦圍村村屋 Village houses at Yick Yuen Tsuen

圖例 LEGEND	
	研究區界線 Study Area Boundary
	主要道路 Main Roads
	擬議洪水橋新發展區初步位置 Location of Hung Shui Kiu NDA
	西鐵線 West Rail Line
	輕鐵線 Light Rail Line
	HSK-1 空氣及噪音敏感受體 Air and Noise Sensitive Receivers

編號 no.	日期 date	內容摘要 description	核對 checked	核准 approved
修訂 REVISION				
繪圖 drawn	簽署 initial	日期 date	項目編號 item no.	辦事處 office
Y C LAM	SIGNED	07.12.10	733CL	新界西及北拓展處 NEW TERRITORIES NORTH AND WEST DEVELOPMENT OFFICE
核對 checked	簽署 initial	日期 date	比例 scale	
LY CHAN	SIGNED	07.12.10	N.A.	土木工程拓展署 CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
核准 approved	簽署 initial	日期 date	圖則編號 drawing no.	
C S LIU	SIGNED	07.12.10	NTNZ 1607	

圖則名稱 drawing title

洪水橋新發展區 - 空氣及噪音敏感受體位置圖  
Hung Shui Kiu New Development Area  
Location of Air and Noise Sensitive Receivers