Major Restoration to the Residence of Ip Ting-sz, Lin Ma Hang Tsuen, Sha Tau Kok, New Territories

Project Profile

Leisure and Cultural Services Department
The Government of the Hong Kong Special Administrative Region

AUGUST 2010

CONTENTS

1. BASIC INFORMATION

1.1 Project Title

Major Restoration to the Residence of Ip Ting-sz, Lin Ma Hang Tsuen, Sha Tau Kok, New Territories.

1.2 Purpose and Nature of the Project

1.2.1 The purpose of the project is to carry out major repair and restoration works which include the complete reconstruction of roof, internal and external redecorations of the Residence of Ip Ting-sz ("the Residence") (Location plan showing the project area and work boundary is at **Appendix I**).

1.2.2 The main roof and structural floor of the Main Building have been extensively and seriously affected by termite infestation. Temporary propping is already in place by the Antiquities and Monuments Office ("AMO"), to prevent it from collapse. (Photos showing the deteriorated components of the Residence are at **Appendix II**). AMO has been allocated Government funding and has been tasked with the job of carrying out a full restoration to the Residence, which was declared as a Monument in November 2009.

1.2.3 There is a small brick-built Annex attached to the Residence, which was used as a kitchen, it is <u>not within</u> the declared monument boundary. Emergency repair was carried out in 2005 to reconstruct the roof at the Annex and covered it with corrugated sheets, Minimum repair works will be carried out to the Annex, as part of this major renovation project.

1.2.4 A cartographic survey and conservation study for the restoration of the Residence of Ip Ting-sz have been arranged by the AMO, so as to ensure the cultural significance of the Residence of Ip Ting-sz will be retained and enhanced. The restoration mainly consists of the following items:

<u>Main Building</u>

(i) complete re-roofing, to reconstruct the original tiled roof;
(ii) repairing, patching and cleaning the external walls;
(iii) repairs to cracked brickwork;
(iv) reconstruction of structural floors;
(v) repairs to timber windows/doors;
(vi) provision of basic electrical installation and water supply;
(vii) internal and external repairs and redecoration;
(viii) termite treatment;
(ix) demolish the wall connecting the main building and the annex block;
(x) clearance of debris;

<u>Annex</u>

(xi) repairing, patching and cleaning the external walls;
(xii) replace the corrugated roof with tiles (the purlins will not be replaced); and

<u>Garden</u>

(xiii) restoration of the small garden at the front.

1.2.5 Drawings showing the proposed work are attached at **Appendix III**.

1.3 Name of Project Proponent

Antiquities and Monuments Office, Leisure and Cultural Services Department, HKSAR Government.

1.4 Location of Project

The Residence of Ip Ting-sz is located at Lot Nos 462, 467, 468 and Government Land in D.D.47, Lin Ma Hang Tsuen, Sha Tau Kok, New Territories, within the Closed Area.

1.5 History of Residence of Ip Ting-sz

1.5.1 The Residence of Ip Ting-sz, which was built around 1908, is modelled on Dr Sun Yat-sen's residence in Cuiheng Village, Zhongshan. Mr. Ip Ting-sz (1882-1943) was the eighth generation ancestor of the Ips in Lin Ma Hang, Sha Tau Kok. He went to Thailand at an early age to work as an apprentice tailor before setting up a garment factory manufacturing military uniforms later.

1.5.2 As one of the originators and co-founders, Mr. Ip Ting-sz was a key figure of the Chinese Association at its initial founding stage. In the year that followed Dr Sun went to Bangkok to form the Tong Meng Hui (United League), which recruited more than 30 members, and Mr. Ip was one of them and was nominated as the organiser. He was later assigned to take charge of the work involved in the recruitment of Hakka people. Mr. Ip Ting-sz and his family returned to settle in Lin Ma Hang Tsuen in 1936. He passed away in 1943.

1.5.3 The main building, which is made of green bricks and timber with a pitched Chinese tiled roof and external walls embellished with murals of auspicious motifs, is a blend of Chinese and Western architectural features. The façade of the building is simple and symmetrical and has three entrances. The house is divided into three bays and is fronted by a covered porch with four columns supporting the balcony of the first floor. The circulation between the two floors relies on two wooden staircases in the side bays.

1.5.4 The main bay on the ground floor is the main hall, where guests were received and daily household activities were carried out. The left side bay of the ground floor consists of a sitting room and a storeroom which are separated by wooden panels. The rooms at the right side bay on the ground floor and on the first floor were used as bedrooms.

1.6 Number and Type of Designated Project to be covered by the Project Profile

1.6.1 The proposed work is a designated project under Section Q.1, Part I of Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance because the project will involve building works wholly in an existing site of cultural heritage (namely a Declared Monument).

1.7 Contact Person(s)

Mr. Bill Greaves
Senior Project Manager
Antiquities and Monuments Office
Phone: 3910 6629
Fax: 3691 8185
Email: wdgreaves@lcsd.gov.hk

Ms Candy P.W. Chan
Senior Heritage Officer
Antiquities and Monuments Office
Phone: 3910 6608
Fax: 3691 8185
Email: cpwchan@lcsd.gov.hk

1.8 Estimated Cost

HK$ 5.2 million.

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Responsibilities of Parties

2.1.1 For this project, AMO is the Project Proponent and Works Coordinator who will be responsible for project funding, project management, contract preparation and site supervision.

2.1.2 The works will be undertaken by a specialist contractor ("the Contractor") on the List of Approved Specialist Contractors for Repair and Restoration of Historic Buildings provided by Development Bureau. In addition, the Contractor will be responsible in carrying out the mitigation measures for minimizing the environmental impacts induced by the project.

2.2 Site Survey

2.2.1 A cartographic survey and conservation study of the Residence have been carried out to assess the heritage significance, to identify intervened areas and to recommend necessary conservation measures. Specification for the proposed scope of works has been prepared to ensure the conservation works are to comply with international conservation principles and standards. Any further environmental requirements specified in the environmental permit would be incorporated into the final specification and tender documents prior to tender action.

2.3 Method of Construction

2.3.1 As the works involves a historic building, a high degree of care will be taken in all phases of the work. In particular, temporary scaffolding and supports will be provided to a high standard to ensure that all sections of the roof will be easily accessible for dismantling and no undue stress will be placed on any damaged materials.

2.4 Complete Reconstruction of the Chinese Tiled Roof

2.4.1 Most roofing tiles have fallen off and broken; the roof is currently covered by corrugated steel sheets. New tiles of matching size, quality and colour to original will be used for the retiling of the roof. Sample of tiles is to be approved before ordering.

2.4.2 All new timber is to be the best of its kind, free from worm holes or other defects such as cracks and will be pre-treated with anti-termite solution before fixing in the roof structure.

2.4.3 During taking down of rotten or broken timber for replacement or repair, great care is required to take out the built-in section so as not to damage the adjoining plaster work The Contractor may be required to cut the exposed part of the timber away first and carefully break down the built-in section into pieces by drilling (using only hand-held powered tools) before taking the section out.

2.4.4 All new timbers are pre-treated by the timber-suppliers in their own workshops with approved preservative. Termiticide will be carefully brushed on the existing and salvaged timbers to prevent termite infestation. The works will be conducted by a specialist termite contractor with great care to avoid any negative environmental impacts. No liquid termiticide is to remain on-site and all tins (empty and full) are to be cleared away as the work progresses.

2.5 Replacement of Deteriorated Bricks

2.5.1 Deteriorated bricks include those cracked, broken bricks, worn bricks for more than 3mm depth, and bricks with the hard surface skin worn away. Areas of missing or deteriorated bricks to be replaced by new or salvaged bricks shall be indicated on site to the Contractor by AMO.

2.5.2 Replacement of bricks shall be done by “piece-in” method as follows:

(i) Areas identified to be replaced including deteriorated bricks, mortar/cement fillings or plaster should be completely taken out without affecting the neighbouring sound bricks.

(ii) All existing mortar joint and pointing to be carefully removed to leave a tidy position to receive the piece in bricks.

(iii) Header and stretcher courses bricks adhered to both the inner and outer leave of the walls should be completely taken out even though only one side of it may be deteriorated or missing.

(iv) The final surface over the replaced area should be flat in relation to the existing surface of the wall.

(v) Bricks used for piece in repair should in one complete piece with similar colour and dimensions as the existing neighboring bricks and should be laid in the same pattern as the existing.

2.6 Aisle Connecting the Main Building and the Annex Block

2.6.1 The aisle connecting the main building and the annex block is found to be later addition from the conservation study. Its timber roof structure has collapsed and is temporarily covered by corrugated sheets. It has lower heritage value and in order to restore the Residence to its original status, the aisle will be demolished and the opening at the main building will be provided with wooden doors with materials matching the façade of the structures. For the opening at the annex block, it will be provided with a gate with horizontal bars which will control human access to the annex and at the same time to allow bat's flight.

2.7 Implementation Programme

The tentative implementation programme is as follows:

Pre-contract preparations (i.e. Design, Tender Documents, EIAO, etc.)	Apr./2010 to Oct./2010
On-site Construction Period	Nov./2010 to Mar./2011[#]

(Remarks: [#] Construction period may be extended to Nov./2011 to Mar./2012 if unexpected circumstances occur which delay the programme.)

3. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 The Residence is located near to the rural village of Lin Ma Hang Tsuen within the Closed Area. The building is remote from the main road to the village and there is no vehicular access. It is approximately 400 metres walk from the nearest vehicle parking space in the village. Along the footpath on the way to the Residence, is a granite footbridge across the stream (which is a proposed Grade 3 Historic Structure).

3.2 The Residence is surrounded by mature woodland, with a natural slope at the back of the Residence. Approx. 10m in front of the Residence is the Lin Ma Hang Stream, a Site of Special Scientific Interest (SSSI), which is a natural wooded lowland stream with slow water flow. Location of these major elements of the surrounding environment are shown in **Appendix I**.

4. POSSIBLE IMPACTS DURING CONSTRUCTION PHASE

4.1 Cultural Heritage

4.1.1 In this project, the temporary corrugated roof of the Residence will be carefully taken down and replaced by a traditional tiled roof, using compatible materials. Special care and attention will be paid for maintaining the heritage values of the Residence; therefore all building works are to be carried out in a careful and skilled manner by a specialized contractor, which will be subject to a high level supervision by staff of AMO to ensure that the works are of the highest standard and the materials are exactly as required.

4.1.2 There is no other declared monument located within 500 metres from the proposed work site and no graded historic structure within 100 metres from the project site. No direct physical impact to these is therefore expected during the works.

4.1.3 Three graded/proposed graded structures are found in Lin Ma Hang Tsuen and these are listed below (Location plan and photos are provided at **Appendix IV**):-

Coding	Address	Grading/ Proposed Grading	Approx. Distance from the proposed work site
LMH-01	Old Bridge, Lin Ma Hang, Sha Tau Kok, N.T.	Proposed grade 3	110 metres
LMH-02	Ip Ancestral Hall, Lin Ma Hang Tsuen, Sha Tau Kok, N.T.	Confirmed grade 3	200 metres
LMH-03	Koon Ancestral Hall, No. 149 Lin Ma Hang Tsuen, Sha Tau Kok, N.T.	Proposed grade 3	220 metres

4.1.4 The Contractor will be required to overlay plywood sheets of minimum 25mm thick onto the granite slabs surface of the bridge with flexible/elastic underlay (rubber, plastic, etc.), of minimum 20mm thick in-between as a temporary protection to the Old Bridge (LMH-01). The joints between the sheets shall be taped together by heavy-duty duct tape. An upskirt of minimum 150mm high should be provided on both sides of the plywood sheets. All cutting of the materials shall be undertaken off site, and caution to be made to avoid causing any disturbance to the stream. On completion of the Project, the Contractor will be responsible to remove all materials from the bridge for disposal carefully.

4.1.5 As the proposed works is mainly restoration and repairing work on the Residence and the proposed work site is over 200 metres away (by direct measurement) from the Ip Ancestral Hall (LMH-02) and Koon Ancestral Hall (LMH-03), no impacts are expected from the proposed works.

4.2 Noise

4.2.1 The nearest sensitive receivers will be the residences in Lin Ma Hang Tsuen. The direct distance between the site and the nearest Lin Ma Hang Tsuen is about 200 metres. The only construction noise to be generated will be that from hand-held power tools and hand-held manual tools, no heavy power-operated machinery will be involved in this project, so that only minor noise impacts are anticipated. As the proposed work site is surrounded by a tall tree buffer, it is believed that the noise impact on the surrounding sensitive receivers is negligible.

4.3 Air Quality

4.3.1 The problem of dust emission from construction work is expected to be minimal since the reconstruction of roof and brickwork repairs will be carried out using either hand-held power tools or hand-held manual tools. The amount of dust generated is expected

to be low and will be controlled with using good site management as well as dust reduction measures that are incorporated into the Specification.

4.4 Traffic Impacts

4.4.1 A goods vehicle will be needed to transport construction materials (including timber, bricks, builders waste, etc.) to and from Lin Ma Hang Tsuen, probably about two visits per week and hand-trolleys will be used to transfer the materials, from a parking space in the village to the proposed work site in phases. Traffic impacts on the Lin Ma Hang Road are considered to be insignificant, as the proposed work is of small scale, for only approx. 5 months duration.

4.5 Solid Waste

4.5.1 About 20 cubic meter C&D material would be produced from demolition works and site clearance, comprising broken clay tiles, roof timber, cement mortar, plaster, etc. After extracting salvageable material, all the unwanted C&D waste will be removed from the work site in sealed bags by hand-trolley, to the nearest vehicular access and then transported to statutory landfill sites. Any loose materials, sand, salvage, builders rubbish, etc., that needs to be transported across the bridge by the Contractor, must be first carefully wrapped up in heavy duty PVC sheeting, to avoid any spillage. No accumulation of waste will be allowed on site. Moreover, all the C&D waste will be handled and disposed off in accordance with the Waste Disposal Ordinance; as a result, the environmental impact from waste disposal is minimal.

4.5.2 Spent chemicals from any waste termiticide and normal domestic detergent will be handled, stored and disposed of in accordance with the Waste Disposal Ordinance. Where necessary, the hotline (2755 3554) for chemical waste control and chemical waste disposal will be contacted for enquiry on technical requirements for handling chemical wastes. Any waste termiticide should be carefully returned to its container and taken back to the contractor's workshop for filtering and future reuse. In view of the high cost of the termiticide, the waste chemical is not expected to exceed 1 litre in total.

4.6 Spoil Water

4.6.1 Spoil water is likely to be generated from washing down the brick walls, granite columns and the floors using a mild detergent and fresh water solution. No concrete mixing activities will be carried out on site. Such waste water will be no more harmful than normal domestic waste water. The waste water will be stored in plastic tanks and taken by hand trolley to the nearest drainage point after filtration. The works will be scheduled to take place in dry season (November to March) and the stockpiling of construction materials, if necessary will be properly covered and located away from the stream, impact from the waste water to the Lin Ma Hang Stream SSSI will be minimised.

4.6.2 Quantity of waste water generated during maximum use is not expected to exceed 1,000 litres per day for approx 15 days. Thereafter, the quantity is expected to drop to approx 200 litres per day only. Also, any effluent discharge from the site will be

subject to the Water Pollution Control Ordinance. Impact from waste water will be kept to minimum.

4.7 Dangerous Goods

4.7.1 No designated dangerous goods are involved in the project.

4.8 Ecology

4.8.1 As the Residence is located in the vicinity of an SSSI Stream and with evidence of habitation by Bats in the Annex Block, AMO has commissioned an Ecological Consultancy to prepare an Ecological Impact Assessment (EcoIA) (**Appendix V**). Key findings of the EcoIA is summarised as follows:

4.8.2 Recognised Sites of Conservation Importance
The scale of the renovation works is small and most of the major works will be conducted inside the Residence. No sites of conservation importance within and in the vicinity of the project area, including Lin Ma Hang Lead Mines SSSI, Lin Ma Hang Stream SSSI and the fung shui woodland behind Lin Ma Hang Village, are likely to be directly impacted by the Project.

4.8.3 Habitats
A total of 5 habitat types were identified within the Assessment Area, including bat habitat in the Main Building, bat habitat in the Kitchen Annex, stream, woodland, agriculture/abandoned land. The habitat quality for the two bat roosts, stream, and woodland are considered high quality and agriculture/abandoned land are considered low.

4.8.4 The overall ecological impacts to the bat habitats at the Residence (both the Main Building and Annex Block) and stream are considered moderate to low and low respectively. The ecological impacts to woodland and agriculture/abandoned land are considered very low.

4.8.5 Bat species are of conservation concern and are protected under Wild Animals Protection Ordinance (Cap. 170). Himalayan Leaf-nosed Bats were recorded roosting inside the Kitchen Annex of the Residence by AFCD during the bat roost census conducted by AFCD in September 2009. In mid April 2010, around 25 individuals of Himalayan Leaf-nosed Bat were found roosting in the Main Building of the Residence while only a few bats were observed in the Kitchen Annex. Between these two bat surveys, in February 2010, as the Main Building was structurally unstable and unsafe for visitors, the AMO arranged the site to be fenced off by chain-link fence (at about 1m height above ground) and blockage of the ground floor front doors and windows of the Residence by plywood to prevent trespass. Although all windows at the rear of the Residence were left undisturbed, the blockage of front window at the Kitchen Annex between these two bat surveys may have interrupted the bats' flight path and limited entry, and thus leading to the change in roosting location. As advised by AFCD, the AMO has immediately arranged the front window at the Kitchen Annex to be re-opened in late April 2010 to restore the habitability of the Kitchen Annex. Since then, about 50 individuals of bats were recorded in the Main Building and zero was observed in the Kitchen Annex in May and June 2010. In July

2010, similar number of bats was recorded in the Main Building and two were observed in the Kitchen Annex by the AMO.

4.8.6 Himalayan Leaf-nosed Bat is common and widespread throughout Hong Kong and impact from the proposed work is limited to the particular roosting sites in the Residence. No bats are found hibernating in the Residence (either Main Building or Kitchen Annex) during winter.

4.8.7 Around 50 numbers of individual of the Himalayan Leaf-nosed Bat was observed in the Main Building in the latest bat surveys in May to July 2010. There is potential disturbance during restoration works in the Main Building; however, direct disturbance will be avoided by renovating during dry season when bats are gone for hibernation. Without the restoration works, the Main Building is vulnerable to further disrepair or even collapse, which will in turn destroy this bat habitat. With the restoration works, although this bat habitat in the Main Building will no longer be available, the Kitchen Annex, with repair and enhancement, can serve as a compensatory habitat. Also, a number of abandoned houses can be found in Lin Ma Hang and these can be alternative roosting sites for the bats. Therefore, minimal impact during operation phase is expected.

4.8.8 Over 100 numbers of individual of the Himalayan Leaf-nosed Bat at the Kitchen Annex according to AFCD's bat survey in September 2009 and two were observed in the Kitchen Annex in the latest bat surveys in July 2010. There is potential disturbance during restoration works in the Kitchen Annex; however, direct disturbance will be avoided by renovating during dry season when bats are gone for hibernation. At the Kitchen Annex, minimum repairing works will be carried out at the external walls. Existing purlins will not be affected and the corrugated sheets at the roof will be replaced by Chinese tiles, which are original design of the building and will not affect its structural stability. In the long-term, the tiled roof should provide a better environment and ventilation for this habitat and it is considered as a beneficial improvement.

4.8.9 The demolition of wall connecting the Main Building and the Kitchen Annex will require the provision of entrance gate to this opening at the Kitchen Annex. Gate with horizontal bars will be installed to control human access to the Kitchen Annex and at the same time to allow bat's flight; therefore the potential flight paths at the Kitchen Annex will be maintained. Direct impact during the construction phase to the bat habitat inside the Kitchen Annex is not anticipated. When the Residence is restored to its existing use, human activities in the Main Building in the operation phase may cause indirect disturbance to this habitat but as the Residence is located in a remote countryside within the Closed Area, no significant increase in the number of visitors is anticipated.

4.8.10 Renovation works will be conducted mainly at the Residence which is about 10m away from the Stream. Garden improvement works is proposed but it only includes the removal of wildly growing plants and planting of new species. No renovation works will be conducted at or near the Stream in front of the Residence, therefore, no direct impact on this habitat type is expected. Indirect impacts may due to the surface

runoff under heavy rain or storm during construction phase but with the scale of work, the impact will be minimal.

4.8.11 For the woodland and agriculture/abandoned land no direct or indirect impact on species of conservation interest is anticipated during both construction and operation phases as renovation works will be small in scale and conducted mainly at the Residence.

4.8.12 Vegetation

No tree except for the gardening improvement works is required to be felled for the Project. For the garden improvement works, the scale of works is small with the removal of wildly growing plants and planting of new species. The vegetation survey results revealed that a total of 13 plant individuals, with 3 species of plants in front of the main building and annex block. None of these species are with high ecological or conservation value. Most of *Ficus hispida*, the most abundant species identified in the survey, are recommended to fell due to poor form and health condition. In addition, only 5 are considered mature trees (with tree trunk diameter >95mm at 1.2 m height), others are all immature trees/plants. Therefore, it is recommended to fell all trees except a *Mangifera indica* (Indicated as Tree no.4 in **Appendix V**), which is of better form and condition. No significant ecological impact and/or habitat loss due to the felling of these trees for the small-scale garden improvement works in the Project.

4.8.13 At the rear of the Main Building and Kitchen Annex, the survey results showed 2 *Cinnamomum camphora* growing adjacent to the Main Building, for which minimum pruning is required to prevent threats to the roof imposed by branches and to allow re-roofing. Impact to pruned trees will be low.

4.8.14 Apart from the above–said felling some trees/plants in front of the Main Building and Kitchen Annex for the gardening improvement works, no tree will be felled. As there will be no significant ecological impact and/or habitat loss due to the felling and pruning of these trees, no mitigation planting is proposed to compensate the anticipated loss of greenery including trees under the Project. However, details for any necessary compensation in the landscape aspect will be studied in the tree felling application process, if required.

4.8.15 Mammals

Large mammals and the bat habitat in the Lin Ma Hang Lead Mines will not be affected as the proposed renovation works would be restricted within the project site where direct impact on natural habitat or vegetation is not anticipated. Potential impact on mammals after the completion of works is unlikely to be appeared since the Residence will be kept for its existing use, thus the ecological impacts on the species are evaluated as low to very low. The bat habitat inside the Main Building and Kitchen Annex of the Residence will be affected by the renovation works. Bats entry to the Main Building will be blocked after renovation. Therefore this habitat will not be accessible by bats. This impact will be mitigated as suggested in Section 5.7. Although no bats were recorded in May and June 2010 in the Kitchen Annex and only two bats were found according to the bat survey in July 2010, impact to this bat residence cannot be ignored. As only minimum repairing works will be carried out at

the annex and the Residence will be kept for its existing use, in addition, the works should be carried out in dry season to minimize the potential impact on bats, no residual impact on mammals is anticipated after completion of the works.

4.8.16 Aquatic Habitat and Fauna

No direct impact on aquatic habitat and fauna due to the Project is anticipated as no renovation works will be conducted at or near the Stream in front of the Residence. In addition, waste water generated from the Project is insignificant and will not be discharged into the stream. Therefore, no direct impact on water quality is anticipated. Indirect impact may due to the surface runoff under heavy rain or storm during construction phase; but with the scale of work and precautionary measures, including scheduling of works in dry season and mitigation measures for water pollution control as describe in Section 5.6, impact on aquatic habitat and fauna will be minimal.

4.8.17 In view of the above, it is believed that ecological impacts from the proposed works will be kept within acceptable limits.

4.9 Landscape and Visual Impact

4.9.1 The nearest visual sensitive receivers will be the residences in Lin Ma Hang Tsuen. The direct distance between the site and the nearest house in Lin Ma Hang Tsuen is about 200 metres. The works site is small in scale and surrounded by mature woodland, with a natural slope at the back. It is believed that the Landscape and Visual Impact to the sensitive receivers is negligible.

5. ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN

5.1 Measures to Minimize Environmental Impacts

5.1.1 As described above, it is assessed that impacts related to cultural heritage, noise, air, traffic, solid waste, spoil water, dangerous goods, ecology, landscape and visual arising from the proposed works are considered acceptable if environmental protection measures are incorporated in the design stage. Details for respective protection measures are set out in this section and standard mitigation measures in accordance with the latest version of "Recommended Pollution Control Clauses for Construction Contracts" will be adopted to further reduce the environmental impacts.

5.2 Cultural Heritage

5.2.1 Antiquities and Monuments Ordinance

According to the Section 6(1) of the Antiquities and Monuments Ordinance (Cap. 53): “no person shall demolish, remove, conduct, deface or interfere with a monument, unless a permit is granted. As the Residence is a declared monument, the required permit will be obtained from the Antiquities Authority before any work may commence on-site. Any person who contravenes Section 6(1) shall be guilty of an

offence and shall be liable on conviction to a fine of $100,000 and imprisonment for 1 year."

A permit will be applied from the Antiquities Authiroty in the usual way and the contractor and all parties invloved will comply with any requirements made under the terms of the permit.

5.2.2 Standard of Workmanship

(i) All works to be carried out shall match the original design and care has to be taken to trace from the existing building what the original construction should be or should have been, including materials, dimensions and colours etc.

(ii) On completion of the works, the new building works and paintworks should not appear too obvious and for this reason all colours for painting and all materials employed must be approved by the AMO before use.

(iii) The Contractor is required to employ experienced craftsmen and artists to reconstruct missing or damaged or deteriorated elements of the building where no similar elements can be found.

(iv) The Contractor is required to keep a record of methods and materials adopted in this project while the format of the record should be accepted by the AMO. A copy of the record will be given to the AMO for future maintenance purpose.

(v) The record shall contain types of materials used (including common names and technical names), area of application, mix proportion, method of mix, method of application etc., to allow future maintenance with the same materials and methods.

5.2.3 The Contractor will be required to overlay plywood sheets with flexible/elastic underlay as a temporary protection to the Old Bridge (LMH-01). An upskirt of minimum 150mm high should be provided on both sides of the plywood sheets to avoid causing any disturbance to the Lin Ma Hang Stream.

5.3 Noise

5.3.1 Demolition of the existing roof by hand-held manual tools only to minimise the noise nuisance during the initial stage of the project.

5.3.2 No power-operated machinery or tools will be involved to minimise the noise generated.

5.3.3 No construction works will be carried out during 6 p.m. to 8 a.m. and any time on Sundays and General Holidays, as a result, there will not be any noise generated during these sensitive hours.

5.4 Air Quality

5.4.1 A small amount of dust will arise from the demolition works during the taking down of the roof and during brick wall repairs, the amount of dust generated is expected to be low. The Air Pollution Control (Construction Dust) Regulation will be strictly followed and monitored. In addition, the following mitigation measures will be carried out:

(i) Avoid free falling of debris while roof material is being removed and dismantled, baskets or similar containers shall be used to carry such material from the roof to ground level for disposal.

(ii) Regularly dampen the floor with clean water to avoid spread of dust during the hacking-up of and removing of existing floor finishing.

(iii) Spray the debris with clean water so that it remains damp before it is carted away. In addition, water will be continuously sprayed on the surface where any drilling, cutting or other small-scale breaking operation is carried out by using hand-held power tools.

5.5 Solid Waste

5.5.1 Building materials that can be re-used or repaired will be re-used in the Residence as far as possible. After sorting out those that can be re-used, all the unwanted C&D material will be removed from the site to the statutory land-fill sites. Any loose materials, sand, salvage, builders rubbish, etc., that needs to be transported across the bridge by the Contractor, must be first carefully wrapped up in heavy duty pvc sheeting, to avoid any spillage. Moreover, all the C&D material will be handled and disposed in accordance with the Waste Disposal Ordinance; as a result, the environmental impact from waste disposal is minimal. No accumulation of waste will be allowed on site.

5.6 Water Quality

5.6.1 When cleaning the brick walls, columns and the floor as well as carrying out small scale brickwork, waste water would be produced. Through placing sand bags along the edge of the hoardings, waste water generated from the works site will be prevented from discharging into the stream (**Appendix I** refers); also, the distance between the hoarding and the stream will be maximised. Any waste water will be stored and filtered before discharge into the nearest drains. Also, the Water Pollution Control Ordinance would be strictly monitored for discharging such waste water from the site.

5.6.2 Care will be taken to ensure that no waste water will be drained to the Lin Ma Hang Stream SSSI during renovation. During the construction phase, good site practice in accordance with the ProPECC PN 1/94 “Construction Site Drainage” issued by EPD, and the procedures in the Environment, Transport and Works Bureau (ETWB) Technical Circular (Works) (TCW) No. 5/2005 “Protection of Natural Stream /Rivers from adverse impact arising from construction works” are recommended to be adopted as mitigation measures to control potential water quality impact to the stream.

Recommended Pollution Mitigation Measures with reference to TC(works) No. 5/2005 should be provided as follows:

In Planning Stage

(i) The proposed works should preferably be carried out during the dry season where flow in the stream is low.
(ii) Proper locations well away from the stream for temporary storage of materials (e.g. equipment, filing materials and chemicals) and temporary stockpile of construction debris and spoil should be identified before commencement of the works.
(iii) The use of concrete or the like should be avoided or minimized. Unless there are restoration and other site constraints, more environmentally friendly alternatives should be considered.

In Construction Stage

(i) The proposed works site should be temporarily isolated, such as by placing of sandbags or silt curtains with lead edge at bottom and properly supported props, to prevent adverse impacts on the stream water qualities.
(ii) The natural bottom and existing flow in the river should not be disturbed.
(iii) Stockpiling of construction materials, if necessary, should be properly covered and located away from any natural stream.
(iv) Construction debris and spoil should be covered up and/or properly disposed of as soon as possible to avoid being washed into nearby streams by rain.
(v) Construction effluent, site run-off and sewage should be properly collected and/or treated and wastewater generation should be minimized.

5.7 Ecology

5.7.1 With the Ecological Impact Assessment (EcoIA) in **Appendix V**, the major proposed mitigation measures for the Project are summarized as follows:

(i) In order to avoid direct and indirect impacts on Lin Ma Hang Stream and its catchment and associated woodland habitats, no building works will be carried out near to the Lin Ma Hang Stream. Only renovation works within the Main Building of the Residence, minimum repair works at the Kitchen Annex and restoration of the garden in front of the Residence will be carried out. Pollutants generated will be minimal and restricted to the interior and brief peripheral of the building. No direct discharge or dumping activity will be carried out to the stream.

(ii) Although there is a need for the proposed renovation works, disturbance to the bat habitat inside the Residence would be avoided as far as possible. The works should be carried out in dry season (November to March inclusive) to minimize the potential impact on bats when these mammals leave the Residence for hibernation. Renovation work will only be commenced after confirming that all bats have left the Residence to avoid unrealized impact.

(iii) After restoration of the Main Building is completed, it will be enclosed by doors and windows that will not allow bat entry. The bat habitat in Kitchen Annex will be enhanced serving as a compensatory habitat to bats in the Main Building to mitigate this permanent impact. Existing purlins will not be affected and the corrugated sheets will be replaced by Chinese tiles, which are original design of the building and will not affect its structural stability. In the long-term, the tiled roof should provide a better environment and ventilation for this habitat. Furthermore, it will be separated from the Main Building to reduce potential disturbance from human activities inside the Main Building. This serves to compensate for the loss of bats habitat in the Main Building and to minimize the irreversible impact brought from renovation.

(iv) As over 100 numbers of individual of the Himalayan Leaf-nosed Bat were recorded roosting inside the Kitchen Annex of the Residence during the bat roost census conducted by AFCD in September 2009 and two bats were found in the latest bat survey in July 2010 by AMO, it is recommended to maintain the roosting site for bat at the Kitchen Annex. Minimum repairing works will be carried out in the Kitchen Annex in order to minimise impacts to the bats. The proposed repairing works at the annex include only repairing, patching and cleaning on the external wall and the replacement of the corrugated roof with tiles, no additional repairing works will be carried out inside the annex. Weekly site inspection will be carried out to ensure that the renovation of the Kitchen Annex follows the design that focuses on habitat improvement and remedial measures would be formulated and implemented as appropriate.

(v) The window at the front façade of the Kitchen Annex had been temporarily blocked in February 2010 as explained in Section 4.8.5. Apart from the seasonal and yearly changes of the roost selection, the blockage of windows and therefore the disturbed flight path of the bats might be one of the reasons for the reduced bat occupancy in the Kitchen Annex. The return of the bats in July 2010 suggested that the proposed enhanced Kitchen Annex has high potential to provide useful bat habitat. In addition, abandoned houses commonly found in Lin Ma Hang area may also serve as alternative to the bats. In view of the uncertainties in bat's preference on site selection, ecological monitoring and audit as proposed in Section 6 of the EcoIA (**Appendix V**) will be followed.

(vi) It is not recommended to put any furniture or precious materials inside the annex as the droppings from bats may pose damages to the interior of the annex. In addition, visitors are prohibited from entering the annex for hygienic reason and to minimise human disturbance to bat maternity roost, particularly during the breeding season.

(vii) Minimum repairing works will be carried out at the Kitchen Annex. The demolition of wall connecting the Main Building and the Kitchen Annex will not affect the opening at the Kitchen Annex. Gate with horizontal bars will be installed to control human access to the Kitchen Annex and at the same time

to allow bat's flight; therefore the potential flight paths at the Kitchen Annex will be maintained. No significant impact to the bat habitat inside the Kitchen Annex is anticipated. Detailed design, maintenance and monitoring requirements of the gate should be provided in a separate submission with advice from qualified personnel during the detailed design stage and be installed before the operational phase of the project. In addition, a post-construction monitoring and maintenance programme to the effectiveness of the gate is recommended as little is currently know about the acceptance of gating and the design by local bat species. Modification and refinement of the gate design might be required at the Kitchen Annex.

(viii) During the construction phase, there may be potential water quality impact arising from the construction works to the stream which falls approximately 10m away from the site. Good site practice in accordance with the ProPECC PN 1/94 "Construction Site Drainage" issued by EPD, and the procedures in the Environment, Transport and Works Bureau (ETWB) Technical Circular (Works) (TCW) No. 5/2005 "Protection of Natural Stream /Rivers from adverse impact arising from construction works" will be adopted as mitigation measures to control potential water quality impact to the stream. Monthly site inspection will be carried out to ensure that the good site practice will be followed.

5.8 Further Environmental Implications

5.8.1 The possible severity, distribution and duration of environmental effects and further implications are summarised below:

Impact	Effects	Severity	Distribution	Duration
Cultural Heritage	Enhance the condition and attractiveness of the Residence	Beneficial		Long-term
Noise	Noise nuisance from demolition, clearance and construction works	Minimal	At the proposed work site	About 5 months
Air Quality	Dust generated from demolition works and construction activities	Minimal	At the proposed work site	About 5 months
Traffic	1 x goods vehicle to and from Lin Ma Hang Tsuen	Minimal	Lin Ma Hang Road	About 5 months
Solid Waste	Handling and disposal of about $20m^3$ of demolished building materials	Minimal	At the proposed work site	About 2 months
Water Quality	Discharging approx. 200 litres of spoil water daily into drains with appropriate filtering process	Minimal	At the proposed work site and the nearest drain	About 2 months
Ecology	Disturbance to the habitat and countryside wildlife	Minimal	At the proposed work site	About 5 months

5.9 Public Consultation

5.9.1 AMO will inform and keep in touch with the owners of the Residence of Ip Ting-sz before the commencement of the proposed work.

.

5.9.2 As the Residence is located in a remote countryside within the Closed Area, no significant increase in the number of visitors is anticipated.

5.9.3 The owners of the Residence who are descendants of Ip Ting-sz have long urged the government to undertake this project and therefore strongly support its urgent completion.

5.9.4 The Antiquities Advisory Board have been informed of the proposed project and they strongly support the proposal.

5.10 History of Similar Project

5.10.1 From June 2009 to present, restoration to Tang Ancestral Hall and its adjoining buildings have been carried out at Ha Tsuen, Yuen Long, New Territories.

6 USE OF PREVIOUSLY APPROVED EIA REPORTS

6.1 There are no previously approved EIA reports of similar nature at the Residence that can be referred to. However, the Project Profile "Restoration to Tang Ancestral Hall and its adjoining buildings at Ha Tsuen, Yuen Long, New Territories" (Ref: DIR-091/2009) was approved and we were allowed to apply for an environmental permit directly. As both projects involve similar repair works to a traditional Chinese Declared Monument, the previously approved documentation was referred to in preparing the current Project Profile.

7 CONCLUSIONS

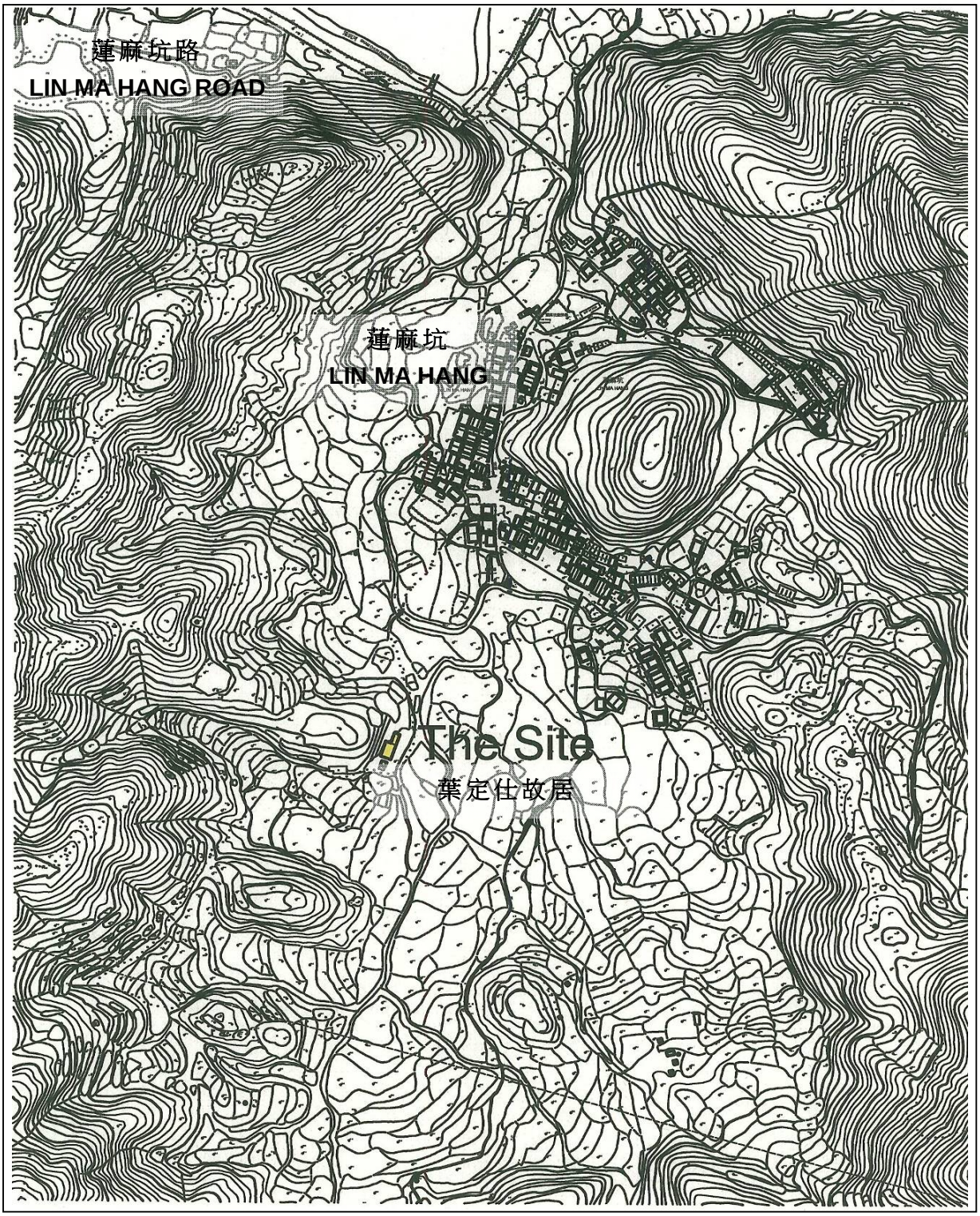
7.1. Noise, dust, traffic, solid waste, water quality, ecological, landscape and visual impacts will be minimal during the construction phase. Moreover, by adopting appropriate mitigation measures, no adverse impacts are anticipated. The recommended mitigation measures and respective implementation agents are summarized in **Appendix VI**. On-site environmental monitoring and audit will be carried out to ensure the proposed mitigation measures are properly implemented throughout all phases of the project.

7.2. The proposed works will repair the Residence, while preserving and enhancing the traditional features of the building. The Contractor will strictly comply with the requirements specified in the permit issued under Section 6 of the Antiquites and Monuments Ordinance by the Antiqities Authority. All the repair works will be carried out by experienced craftsman and workers. Experts from AMO will monitor and supervise the works in order to ensure the historic value and architectural features of the building would be kept intact.

7.3 This proposed works is intended to put the Residence back into good maintenance condition as an evidence to the history of Hong Kong.

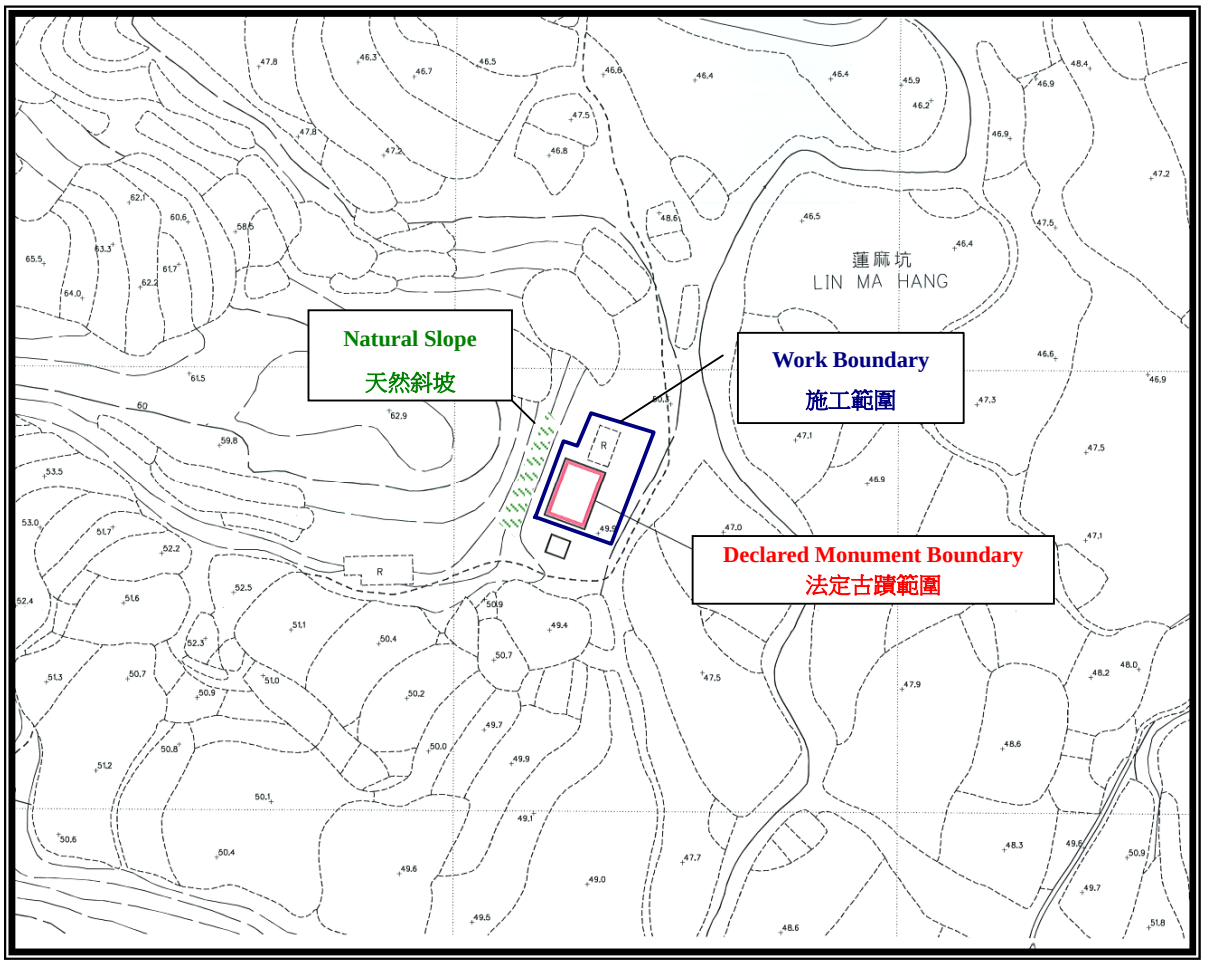
7.4 The environmental impacts arising from this project are not considered to be adverse, but on the contrary are considered to be overall beneficial. It is considered that this conservation project can benefit both the built heritage and the natural heritage. For this reason, an application for permission to apply directly for environmental permit under EIA Ordinance is therefore requested.

Appendix I | Location Plans & Work Boundary of the Project



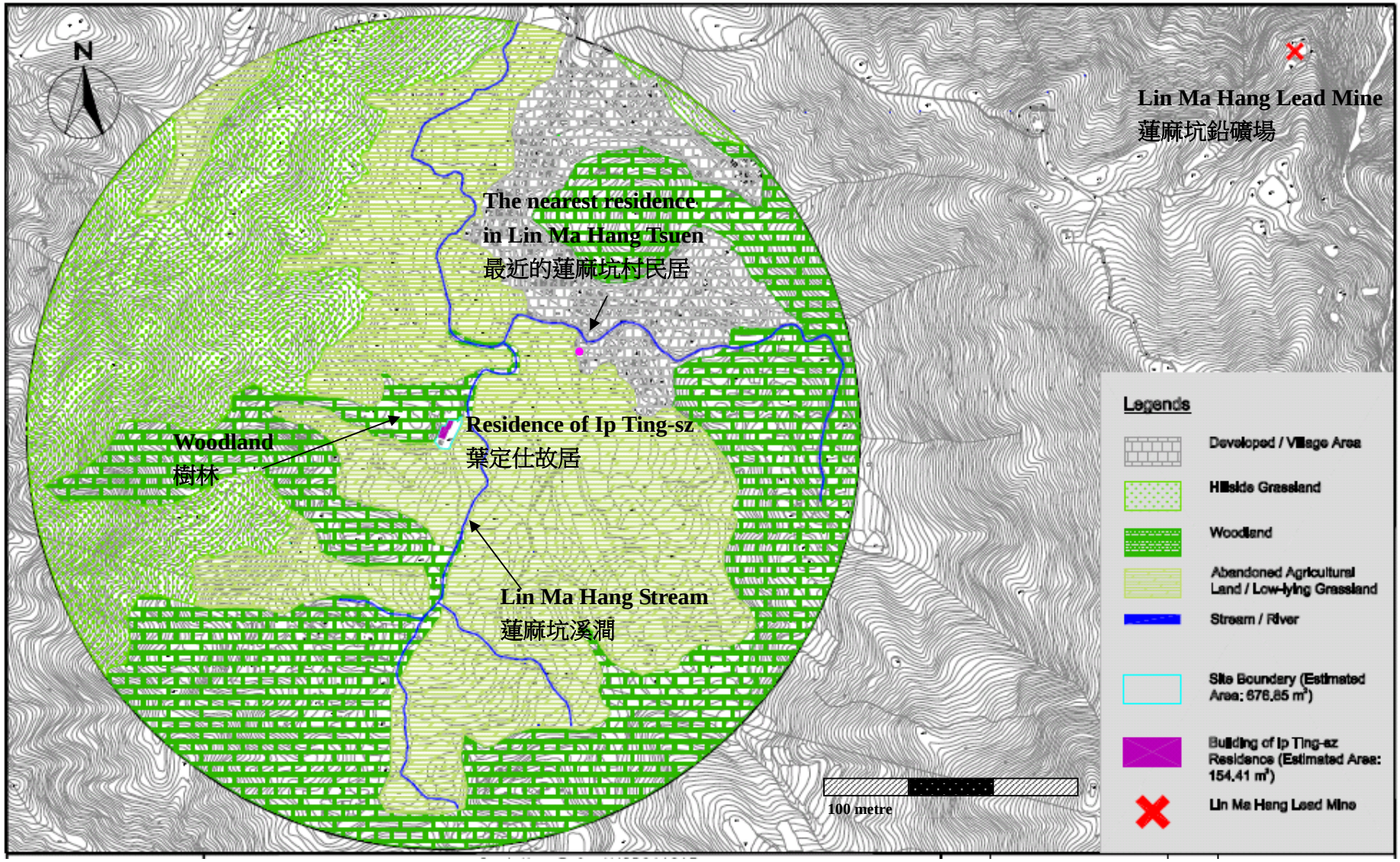
Scale 1:5000

Location Plan
位置圖

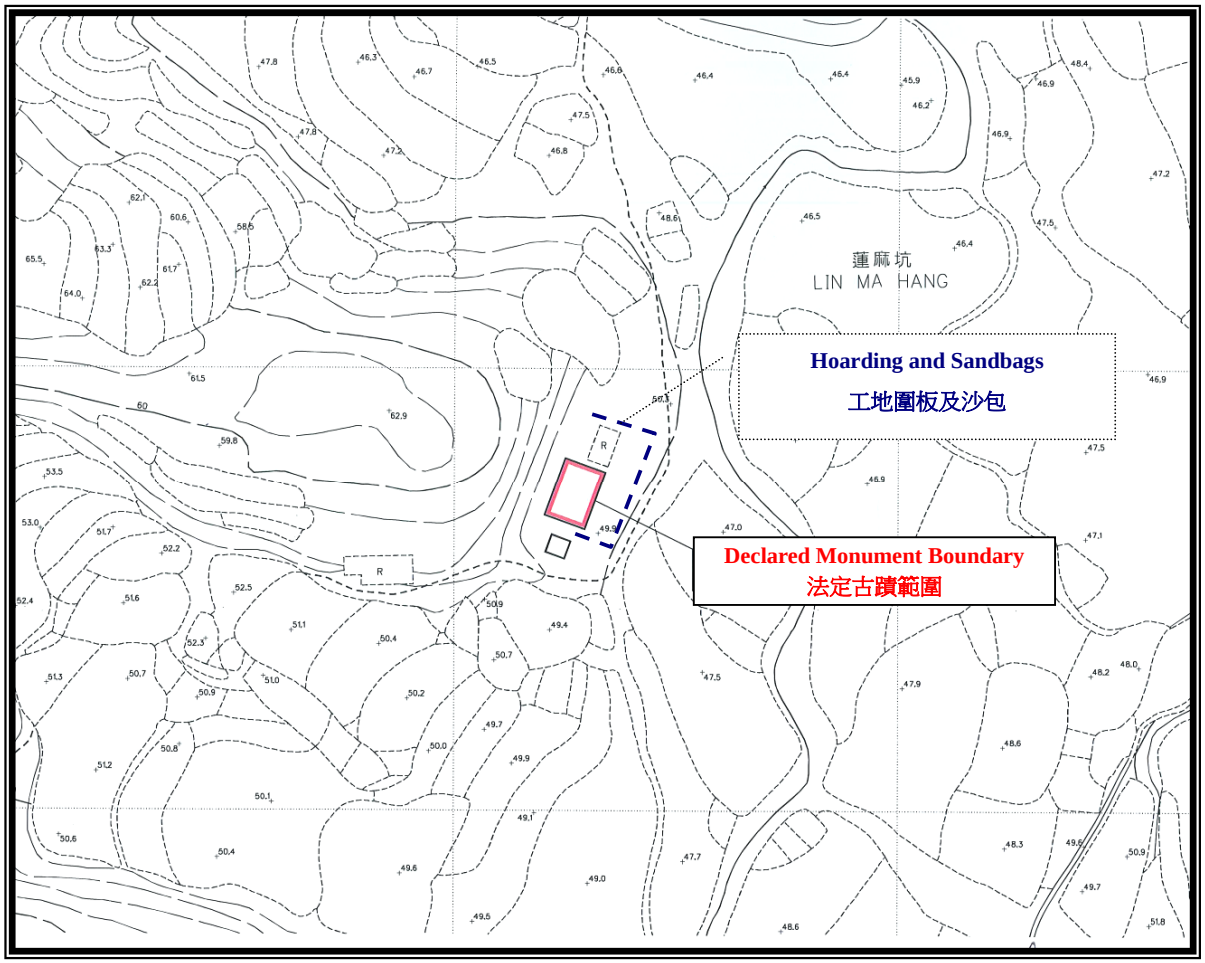


只作識別用 FOR IDENTIFICATION PURPOSE ONLY

Work Boundary of the Project
施工範圍



Major Elements of the Surrounding Environment
主要附近環境元素



只作識別用 FOR IDENTIFICATION PURPOSE ONLY

Set up of Hoardings and Sandbags
放置工地圍板及沙包

Appendix II | Photos Showing the Deterioating Components

Photo 1 Front Elevation of the Main Building
相片 1 主樓正面

Photo 2 Main Building Ground Floor (Side bay)
相片　2 主樓地下(次間)

Photo 3 Main Building Ground Floor (Main bay)
相片 3 主樓地下(明間)

Photo 4 Annex Block (Kitchen Annex)
相片 4 附建物 (附建廚房)

Photo 5 Aisle Connecting the Main Building and the Annex Block
相片 5 連接主樓和附建物之通道

Appendix III | Drawings Showing the Proposed Works

工程範圍:

室外工程
1. 重新建造故居屋頂 , 恢復原有屋頂瓦面
2. 修復及清潔外牆
3. 修復木作門窗
4. 拆除連接主樓及附建物之間的磚牆
5. 按原樣修復主樓及附建物的木門
6. 修復故居前的花園
7. 室外維修及粉飾

室內工程
1. 重新建造故居樓板
2. 室內維修及粉飾
3. 清理瓦礫

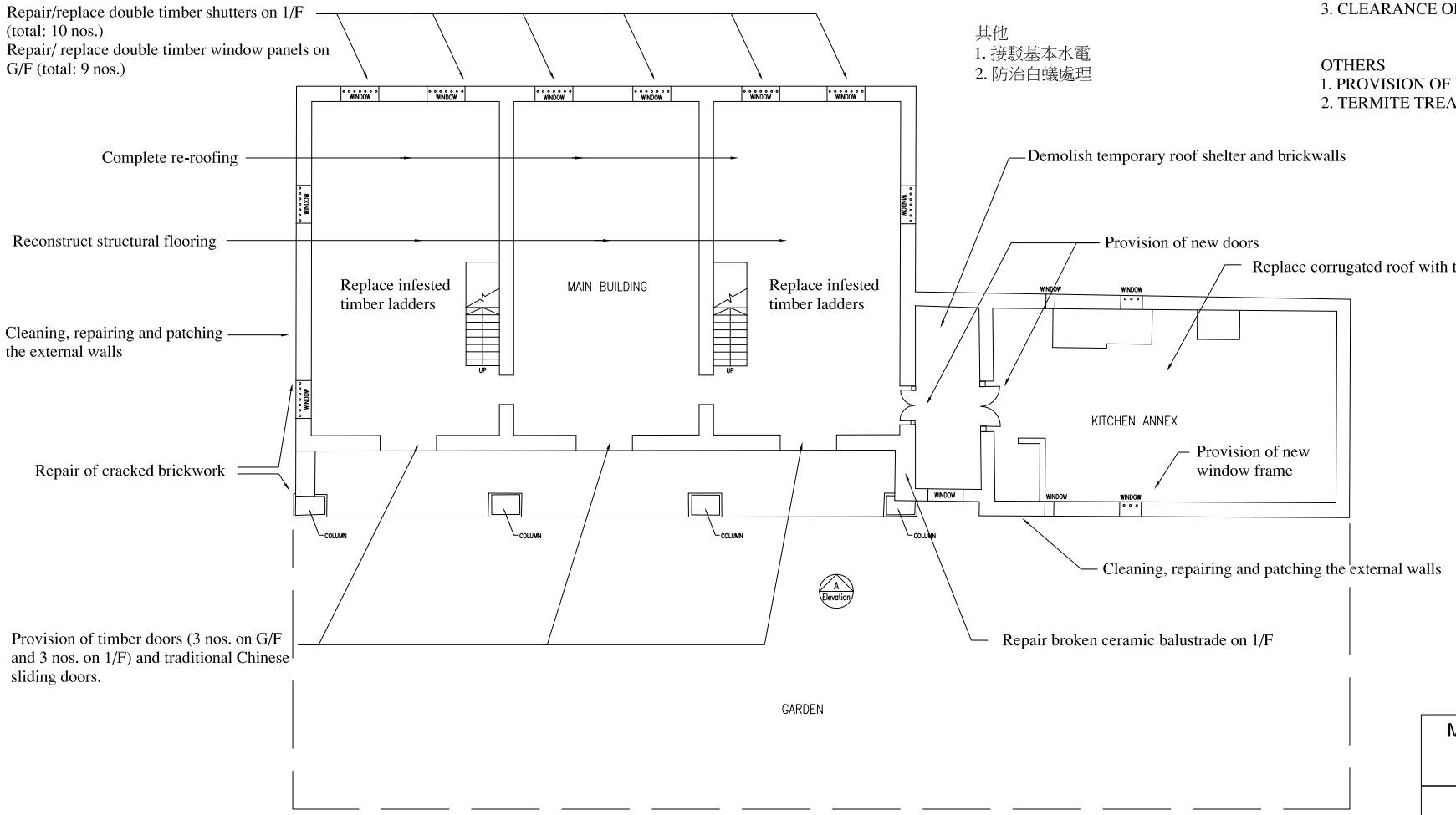
其他
1. 接駁基本水電
2. 防治白蟻處理

SCOPE OF WORKS:

EXTERNAL WORKS
1. COMPLETE RE-ROOFING.
2. CLEANING, REPAIRING AND PATCHING THE EXTERNAL WALLS.
3. REPAIRS TO TIMBER WINDOWS AND DOORS.
4. DEMOLISH THE WALL CONNECTING THE MAIN BUILDING AND THE ANNEX BLOCK.
5. PROVIDE DOORS TO THE MAIN BUILDING AND THE ANNEX BLOCK.
6. GARDENING IMPROVEMENT WORKS.
7. EXTERNAL REPAIRS AND REDECORATIONS.

INTERNAL WORKS
1. RECONSTRUCTION OF STRUCTURAL FLOORS.
2. INTERNAL REPAIRS AND REDECORATIONS.
3. CLEARANCE OF DEBRIS.

OTHERS
1. PROVISION OF ELECTRICAL AND WATER SUPPLY.
2. TERMITE TREATMENT.



GENERAL LAYOUT PLAN 平面圖

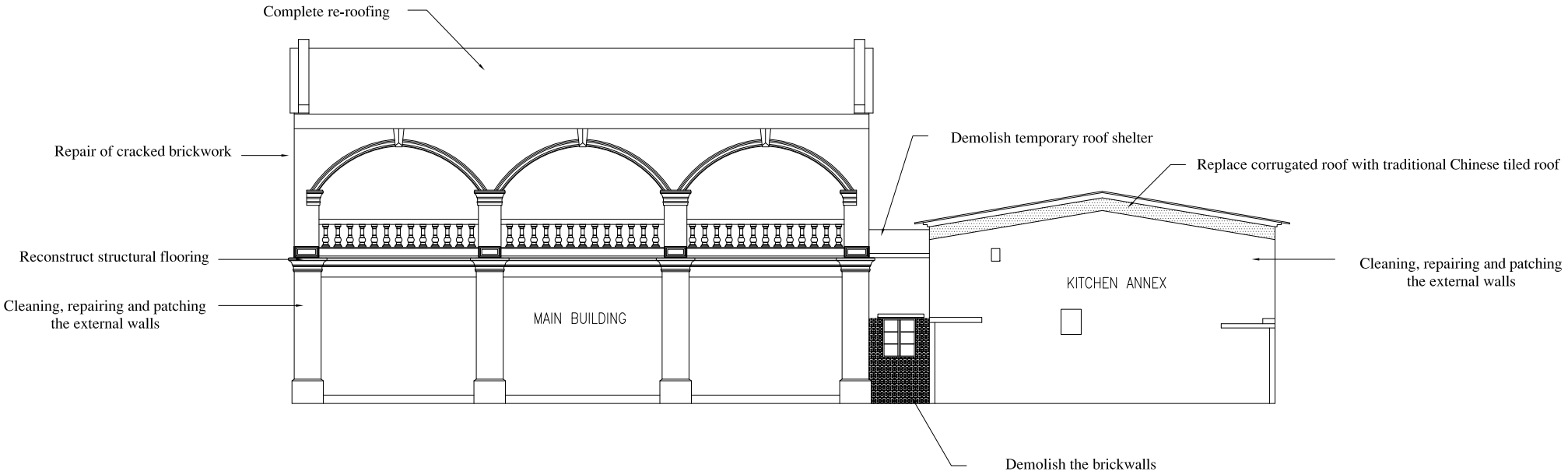
FOR INDICATION PURPOSE ONLY 只供參考

Major Restoration of the Residence of Ip Ting-sz, Lin Ma Hang Tsuen, Sha Tau Kok, NT

沙頭角蓮麻坑村葉定仕故居修復工程
古物古蹟辦事處

圖則編號. IPS-001

比例: - (A4)



ELEVATION A

正立面

FOR INDICATION PURPOSE ONLY 只供參考

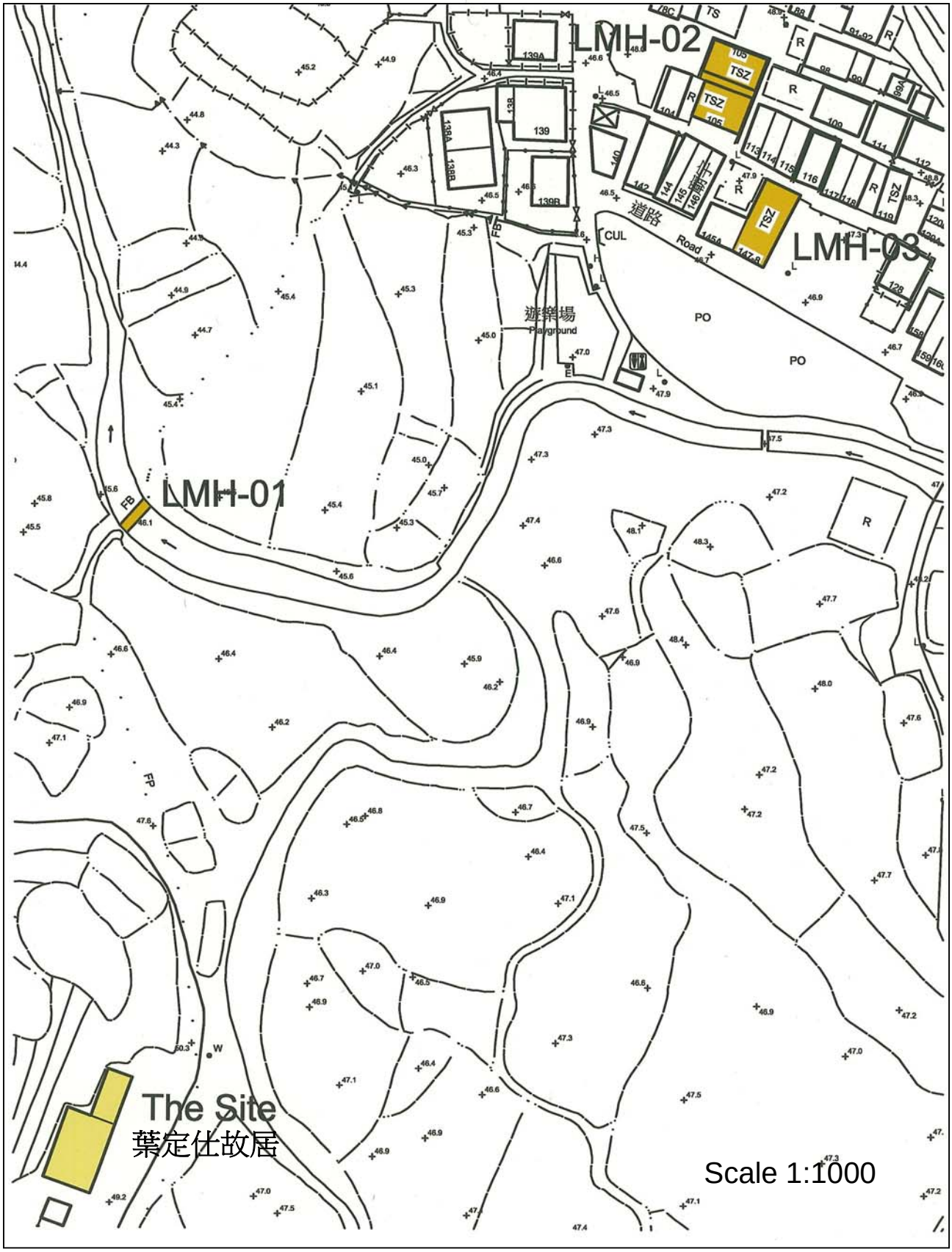
Major Restoration of the Residence of Ip Ting-sz, Lin Ma Hang Tsuen, Sha Tau Kok, NT

沙頭角蓮麻坑村葉定仕故居修復工程

古物古蹟辦事處

圖則編號. IPS-002	比例: - (A4)

Appendix IV | Location Plan of Graded Buildings



Graded Building near to the Residence of Ip Ting-sz
鄰近葉定仕故居已評級之歷史建築

LMH-01 Old Bridge, Lin Ma Hang, Sha Tau Kok, N.T.
LMH-01 新界沙頭角蓮麻坑古橋

LMH-02 Ip Ancestral Hall, Lin Ma Hang Tsuen, Sha Tau Kok, N.T.
LMH-02 新界沙頭角蓮麻坑村葉氏宗祠

LMH-03 Koon Ancestral Hall, No. 149 Lin Ma Hang Tsuen, Sha Tau Kok, N.T.
LMH-03 新界沙頭角蓮麻坑村 149 號官氏宗祠

Appendix V | Ecological Impact Assessment

Antiquities and Monuments Office

Quotation Ref.: AMO0911013

Consultancy for Ecological Study at the Residence of Ip Ting-sz, Lin Ma Hang, Closed Area

Ecological Impact Assessment

(Version 7.0)

Aug 2010

Approved By

Dr. Priscilla Choy
(Project Director)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

Cinotech accepts no responsibility for changes made to this report by third parties

CINOTECH CONSULTANTS LTD
Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong
Tel: (852) 2151 2083 Fax: (852) 3107 1388
Email: info@cinotech.com.hk

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1 INTRODUCTION

Background

1.1 Cinotech Consultant Limited (CINOTECH) was commissioned by Antiquities and Monuments Office (AMO) to undertake a baseline ecological review and impact assessment for the project "Consultancy for Ecological Study at the Residence of Ip Ting-sz, Lin Ma Hang, Closed Area".

1.2 The Residence of Ip Ting-sz (hereinafter called "the Residence") was built in 1908. The building was modelled on Dr Sun Yat-sen's residence in Cuiheng Village, Zhongshan. Mr. Ip Ting-sz (1882-1943) was the eighth generation ancestor of the Ip's clan in Lin Ma Hang, Sha Tau Kok.

1.3 Mr. Ip Ting-sz was one of the co-founders of the Chinese Association in Bangkok, which was founded by Dr Sun Yat-sen in 1907. In the following year, he became one of the members of the Tong Meng Hui formed by Dr Sun in Bangkok. Ip and his family returned to settle in Lin Ma Hang Tsuen in 1936, where he passed away in 1943.

1.4 The Residence of Ip Ting-sz, which is made of green bricks and timber with a pitched Chinese tiled roof and external walls embellished with murals of auspicious motifs, is a blend of Chinese and Western architectural features. The building is built in a symmetrical layout and is fronted by a covered porchway with columns supporting the balcony and ceramic vase-shaped balusters on the first floor.

1.5 The Residence of Ip Ting-sz at Lin Ma Hang Tsuen, Sha Tau Kok, has been declared a monument under the Antiquities and Monuments Ordinance in November 2009. Following the declaration, the Antiquities and Monuments Office will carry out restoration works (hereinafter called "the Project"). The building will be kept for existing use after completion of the restoration works by 2011.

1.6 This Ecological Impact Assessment Report is prepared by CINOTECH to present the likely ecological impact associated with the restoration works.

Purpose and Objective of the Ecological Impact Assessment (EcoIA) Study

1.7 The purpose of this EcoIA study is to provide information on the nature and extent of ecological impacts arising from the construction and operation of the proposed Project and related activities taking place concurrently. This information will contribute to decisions by the Director of Environmental Protection on:

(i) The overall acceptability of any adverse ecological consequences that is likely to arise as a result of the proposed Project.
(ii) The conditions and requirements for the design and construction and operation of the proposed Project to mitigate against adverse ecological consequences wherever practicable and reasonable.
(iii) The acceptability of residual impacts, after the proposed mitigation measures are implemented.

1.8 The objectives of the EcoIA study are as follows:

(i) To describe the proposed Project and associated works together with the requirements for carrying out the proposed Project.
(ii) To identify and describe the elements of natural community and habitats likely to be

affected by the proposed Project and/or likely to cause adverse impacts to the proposed Project.

(iii) To identify any potential impacts from point and non-point pollution sources on the identified water systems and sensitive receivers during the construction and operation stages.

(iv) To identify and quantify any potential losses and damage to flora, fauna and wildlife habitats.

(v) To propose the provision of mitigation measures so as to minimize ecological impacts during construction and operation of the proposed Project.

(vi) To identify, predict and evaluate the residual (i.e. after practicable mitigation) ecological impacts and the cumulative effects expected to arise during the construction and operation phases of the proposed Project.

(vii) To identify, assess and specify methods, measures and standards, to be included in the detailed design, construction and operation of the proposed Project, which are necessary to mitigate these ecological impacts and reducing them to acceptable levels.

(viii) To design and specify the environmental monitoring and audit requirements, if required, to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted.

Approach of the EcoIA Study

1.9 The EcoIA study is conducted in accordance with the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM) as well as other relevant Ordinances, Legislation and guidelines.

1.10 Known areas of conservation importance, such as Lin Ma Hang Stream SSSI which is in the vicinity of the Residence and Lin Ma Hang Lead Mine SSSI which lie outside the 500m boundary, were covered adequately by literature review. For completeness, this report reviews also the ecological values of these important areas.

Structure of the EcoIA Report

1.11 The background, descriptions and justifications of this Project are provided in Chapter 2. For each of the ecological parameters that have been identified, assessment results and mitigation measures are presented in the following sections.

2 DESCRIPTION OF THE PROJECT

2.1 The residence of Ip Ting-sz (hereinafter called "the Residence") is located at Lin Ma Hang Tsuen, Sha Tau Kok, New Territories, within the Closed Area. The location of the Residence is shown in **Figure 1**.

2.2 The Residence is approximately 200m direct and 400m walk from the nearest village at Lin Ma Hang. There is no vehicular access. The main vehicular access road is Lin Ma Hang Road which runs at least over 500m from the site.

2.3 The Residence consists of a pitched-roof, 2-storey Main Building with a balcony on the upper floor and a single-storey annex building, which probably served as a kitchen. A single-storey detached house owned by another party is located at 5m to the south of the building.

2.4 It is the intent of AMO to preserve the heritage of the Residence for the benefit of the public to understand the history of the building and the legend of Ip Ting-sz. The major restoration will be carried out to the Main Building. The restoration works for the Main Building of the Residence (hereafter called the "Project") include, mainly:-

- complete re-roofing;
- repair of cracked brickwork;
- reconstruction of structural floors;
- repair of timber windows/doors;
- demolish the wall connecting the Main Building and the annex block;
- provision of basic electrical installation and water supply;
- internal and external decoration;
- termite treatment; and
- gardening improvement works.

Appendix A gives the cartographic drawings for which the Main Building of the Residence is to be restored to.

2.5 Only minimum repair works will be carried out to the Kitchen Annex. The restoration works include:

- Repairing, patching and cleaning on the external wall; and
- Replace the corrugated roof with tiles (the purlins will not be replaced).

2.6 The Project is expected to complete in around 6 months. The tentative programme is to commence the Project at the end of 2010 for completion in early 2011 to avoid the breeding season of bats. Once restored, the Residence will be kept for existing use as an iconic cultural heritage in Lin Ma Hang.

2.7 According to the Environmental Impact Assessment Ordinance, the above restoration works are classified as Designated Project under Schedule 2, Part I, Category Q and an Environmental Permit is required for the construction and operation of the Project.

3 ECOLOGICAL ASSESSMENT METHODOLOGY

The Study Area

3.1 According to the Technical Memorandum on Environmental Impact Process (TM-EIAO), the study area should cover an area of 500m from site boundary. **Figure 2** shows the Study Area of this Project.

Ecological Baseline Information

3.2 A literature review was conducted to determine the existing conditions within the Study Area and to identify habitats and species of potential importance that may be affected by the Project. Relevant ecological literature covering the proposed works areas are listed in the Reference section at the end of this report and have been reviewed. Field visits were made in February 2010. According to the field visits, no major data gap on habitats between the field visit and literature study was identified. Therefore the baseline conditions and habitat mappings are done according to literature reviews and previous studies. The habitat map is shown in **Figure 2**.

3.3 In April 2010, bats were found returning to the Residence by the AMO, further bat surveys were therefore carried out in April to July 2010 to verify and supplement the information gap regarding this bat habitat. More details are provided in Section 3.19.

Baseline Conditions

Sites of Conservation Importance in the Area

3.4 There are three sites of known conservation importance within the area: the Lin Ma Hang Lead Mines SSSI, Lin Ma Hang Stream SSSI which is listed as an Ecologically Important Stream (EIS) in the ETWB Technical Circular No. 5/2005, and the fung shui woodland behind Lin Ma Hang village.

Sites of Special Scientific Interest (SSSI)

Lin Ma Hang Lead Mine

3.5 The Lin Ma Hang Lead Mine, situated on a hillside near San Kwai Tin northeast of the Lin Ma Hang, and the nearby area were designated as SSSI on 13 August 1994. The Lin Ma Hang Lead Mine is the only SSSI designated for the protection of bats in Hong Kong. Lin Ma Hang Lead mine, which holds one of the most important bat colonies in Hong Kong, is in the Frontier Closed Area, and has an area of about 10 ha. The Lin Ma Hang Lead Mine is located about 1 km away from the Site.

3.6 The Lin Ma Hang Lead Mines SSSI is the most important resting and breeding roost site for Greater Bent-winged Bat *Miniopterus magnater* and Lesser Bent-winged Bat *Miniopterus pusillus*. The endangered species Common Bent-winged Bat *Miniopterus schreibersii*, as listed in IUCN and China Red Data Book, was recorded during the bat survey conducted by AFCD (Shek and Chan, 2005). Other uncommon species, including Intermediate Horseshoe Bat *Rhinolophus affinus*, Least Horseshoe Bat *Rhinolophus*

pusillus, Rickett's Big-footed Bat *Myotis ricketti* and Chinese Myotis *Myotis chinensis* were also recorded (Shek and Chan, 2005) in the area.

Lin Ma Hang Stream

3.7 Lin Ma Hang Stream was designated as the SSSI on 6 July 2007 and is one of the Ecologically Important Stream (EIS) as listed in the ETWB Technical Circular No. 5/2005. The Stream, of about 2 km long and 1.5-4 m wide, is recognized as one of the most important lowland streams due to its nurturing of very high diversity of primary freshwater fish species there. Freshwater species with high ecological conservation value including *Rasbora steineri* (斯氏波魚), *Rasborinus lineatus* (線細鯝), *Mastacembelus armatus* (大刺鰍) and *Channa asiatica* (月鱧) were recorded (DSD, 2007).

3.8 Around the Stream were recorded some of the common but locally important dragonflies such as Sapphire Flutterer (*Rhyothemis triangularis* 三角麗翅蜻) and Dancing Shadow-emerald (*Idionyx victor* 威異偽蜻) (Fellowes et al., 2002). Butterflies of conservation value, including Glassy Bluebottle (*Graphium cloanthus* 寬帶青鳳蝶), Small Grass Yellow (*Eurema brigitta* 無標黃粉蝶) and Centaur Oak Blue (*Arhopala pseudocentaurus* 銀鏈嬈灰蝶) (KFBG, 2004) were recorded. Wetland-dependent herpetofauna species, e.g. Chinese Waterside Skink (*Tropidophorus sinicus* 棱蜥) was also reported to be foraging in the stream.

Habitats in the Study Area

Woodlands

3.9 The Site is within an area surrounded with mature woodland. Mature trees were found in the vicinity of the Site, especially on the hill slope just behind the Residence and at the stream banks in front of the Site. The woodland canopy is mainly composed of mature native tree species, including *Litsea monopetala* (假柿樹), *Ficus microcarpa* (細葉榕), *Cinnamomum camphora* (樟樹), *Mangifera indica* (芒果), *Ficus hispida* (對葉榕), *Melia azedarach* (苦楝), *Cratoxylum cochinchinense* (黃牛木), *Celtis sinensis* (朴樹), *Ficus benjamina* (垂葉榕), *Schima superba* (木荷), *Syzygium hancei* (韓氏蒲桃) *Sterculia lanceolata* (假蘋婆), *Dimocarpus longan* (龍眼), *Bridelia tomentosa* (土密樹) and *Ficus virens var. sublanceolata* (黃葛樹). The shrubs include *Litsea rotundifolia* (豺皮樟), *Psychotria rubra* (九節) and *Sarcandra glabra* (草珊瑚), as well as the climbers *Gnetum luofuense* (羅浮買麻藤), *Uvaria microcarpa* and *Desmos chinensis*. No locally protected plant species were found within the woodland.

Abandoned Agricultural Land

3.10 Abandoned agricultural land is the most dominant lowland habitat type within the Study Area. Plant species commonly found on the abandoned agricultural land include *Hedychium coronarium* (薑花), *Neyraudia arundinacea* (望冬草), *Panicum maximum*, *Bothriochloa ischaemum*, *Apluda mutica*, *Brachiaria mutica, Conyza bonariensis* (野茼蒿), *Bidens alba* (白花鬼針草), *Amaranthus viridis* (野莧菜), *Emilia sonchifolia* (一點紅), *Youngia japonica* (黃鵪菜), weedy climbers (such as *Mikania micrantha*, *Ipomoea aquatica* and *Ipomoea cairica*) and ferns (*Lygodium japonica* and *Cyclosorus interruptus*).

Stream / River

3.11 The ecologically important Lin Ma Hang Stream runs in front of the Site. Dominant plant species along the stream are common riparian vegetation such as *Brachiaria mutica* (茅膏/ 馬蹄), *Commelina diffusa* (節節草), *Pennisetum purpureum* (紫狼尾草), *Alocasia odora* (海芋) and *Rumex trisetifer* (長刺酸模) (ASD 2009).

3.12 During the site visit, no freshwater or any other organisms were observed due to the cold weather (around 6 to 8°C). Common lowland fish species were recorded in stream by others, including Chinese Barb *Puntius semifasciolatus*, Gupy *Poecilia reticulata* and the exotic species Mosquito Fish *Gambusia affinis* and Nile Tilapia *Oreochromis niloticus* (ASD 2009).

Flora

3.13 The incense tree *Aquilaria sinensis,* the wild species of which is protected in China (Wild Plants under State Protection Category II) and listed as vulnerable in the China Plant Red Data Book, was recorded in the upper part of the woodland to the north of the stream (DSD 2007). This species is common in Hong Kong and widely planted around rural villages.

Water-course and Riparian Vegetation

3.14 The stream running near the Site, belongs to the lower part of the Lin Ma Hang Stream, and is about 0.5 to 1m in depth and 1m to 2m in width. The upper stream has an earthed bank bordered with agricultural habitat on both sides, with no riparian vegetation except those herbaceous plants established along the water edge. The middle stream is shaded by the trees from the woodland on the west of the stream, with most of its southern bank strengthened by stone-wall. The lower stream is partially shaded by the woodland and has already been channelized and lined with concrete. Water flow in dry season was found to be slow and small along the stream.

3.15 Tree species found in the riparian zone in the middle stream are *Cinnamomum camphora*, *Cleistocalyx operculata*, *Ilex rotunda* and *Syzygium jambos*; whereas species commonly found along the edge of the stream and along the bank are the herbs *Polygonum barbatum*, *Ranunculus scleratus, Rorippa nasturtium-aquaticum, Lindernia crustacean, Gamochaeta purpurea* and *Ageratum conyzoides*, the creepers *Ludwigia adscendens, Commelina diffusa* and *Alternanthera sessilis*, the grasses *Paspalum districhum* and *Echinochloa crusgalli*, well as the fern *Cyclosorus interruptus* (DSD 2007). Several patches of the herbaceous plant *Polygonum japonicum* which is categorized as "rare" by Xing et al. (2000) were found along the edge on the upper part of the stream, but this species is not listed in "Rare and Previous Plants of Hong Kong" (AFCD 2003).

Fauna

Mammals

3.16 Diverse species of bats were recorded at Lin Ma Hang Lead Mines SSSI, which is the most important resting and breeding roost site for Greater Bent-winged Bat *Miniopterus magnater* and Lesser Bent-winged Bat *Miniopterus pusillus*. The endangered species Common Bent-winged Bat *Miniopterus schreibersii*, as listed in IUCN and China Red

Data Book, was recorded during the bat survey conducted by AFCD (Shek and Chan, 2005). Other uncommon species, including Intermediate Horseshoe Bat *Rhinolophus affinus*, Least Horseshoe Bat *Rhinolophus pusillus*, Rickett's Big-footed Bat *Myotis ricketti* and Chinese Myotis *Myotis chinensis* were also recorded in the area (Shek and Chan, 2005) in the area.

3.17 Five species of large land mammals, including Wild Boar (野豬) *Sus scrofa*, Red Muntjac *Muntiacus sp.*, East Asian Porcupine *Hystrix brachyura*, Small Indian Civet (小靈貓) *Viverricula indica* and Small-toothed Ferret Badger (水獺鼬) *Melogale moschata* were recorded in the survey of land mammals, utilising infrared-triggered cameras, by Kadoorie Farm & Botanic Garden in July 2003 (KFBG 2004). In addition, burrows of Chinese Pangolin (穿山甲) *Manis pentadactyla* were also recorded by KFBG in the study.

3.18 Using camera trapping for large mammals at the woodland behind the Residence between 2003 and 2004, AFCD recorded a total of 10 species of mammals, including Crab-eating Mongoose (食蟹獴) *Herpestes urva* and the Yellow-bellied Weasel (黃腹鼬) *Mustela kathiah*.

3.19 In addition, over 100 numbers of individuals of the Himalayan Leaf-nosed Bat (大蹄蝠) *Hipposideros armiger* were recorded roosting inside the Kitchen Annex of the Residence by AFCD during the bat roost census conducted by AFCD in September 2009. As advised by the AMO, in mid April 2010, around 25 individuals of Himalayan Leaf-nosed Bat were found roosting in the Main Building of the Residence while only a few bats were observed in the Kitchen Annex. Between these two bat surveys, in February 2010, as the Main Building was structurally unstable and unsafe for visitors, the AMO arranged the site to be fenced off by chain-link fence (at about 1m height above ground) and blockage of the ground floor front doors and windows of the Residence by plywood to prevent trespass. Although all windows at the rear of the Residence were left undisturbed, the blockage of front window at the Kitchen Annex between these two bat surveys may have interrupted the bats' flight path and limited entry, and thus leading to the change in roosting location. As advised by AFCD, the AMO has immediately arranged the front window at the Kitchen Annex to be re-opened in late April to restore the habitability of the Kitchen Annex. Since then, about 50 individuals of bats were recorded in the Main Building and zero was observed in the Kitchen Annex in May and June 2010. In July 2010, similar number of bats was recorded in the Main Building and two were observed in the Kitchen Annex according to the AMO.

Avifauna

3.20 The Study area was considered a moderately species-rich area, with 43 species recorded during daytime surveys in this relatively small area (DSD 2007). This may be due to a certain degree of habitat variety and low levels of human disturbance. Waterbird species were recorded in the stream. Little Egret *Egretta garzetta* was recorded in six months of the survey, Green Sandpiper *Tringa ochropus* in two months of the survey and Eurasian Woodcock *Scolopax rusticola* in one month of the survey (DSD 2007). Little Egret is a species of conservation concern as listed in Fellowes et al. (2002). However no breeding sites for this species are recorded in the vicinity of the Stream. Other species recorded using the stream were Common Kingfisher *Alcedo atthis* and Grey Wagtail *Motacilla cinerea* (DSD 2007). Both species are widespread in Hong Kong but Common Kingfisher is wholly and Grey Wagtail is largely wetland dependent.

3.21 However, the woodlands in Lin Ma Hang are considered of high ecological value in the Survey Study conducted by KFBG in 2003 (KFBG 2004). As reported in the Study, a

total of 48 bird species were recorded in the visual surveys and camera trapping, with four species of conservation concern. Orange-headed Thrush *Zoothera citrina*, a scarce migrant as well as local breeder with limited distribution in Hong Kong woodland, was the major species recorded by camera trapping in July 2003 (KFBG 2004).

3.22 Eurasian Woodcock *Scolopax rusticola* was observed foraging in the stream at Lin Ma Hang in the daytime on 29 January 2004 (DSD 2007). Eurasian Woodcock is considered a scarce winter visitor and passage migrant to wooded areas (Carey et al., 2001). There is no close correlation with the presence or otherwise of streams, though it is likely that lower-lying damp area close to streams are favoured.

3.23 The only other species of conservation significance recorded was Crested Serpent Eagle *Spilornis cheela*, a forest raptor (DSD 2007). However, this species is not anticipated to be affected by the Project.

Herpetofauna

3.24 A total of seven wetland-dependent amphibian species and eight reptile species were recorded at Lin Ma Hang during the survey conducted between October 2003 and September 2004 (DSD 2007). Two reptile species, namely Indo-Chinese Rat Snake *Ptyas korros* and Common Rat Snake *Ptyas mucosus*, which are of conservation interest were recorded. During the survey conducted by KFBG (2004), Chinese Waterside Skink *Tropidophorus sinicus,* a wetland-dependent species, was recorded at the Lin Ma Hang stream.

Butterflies and Dragonflies

3.25 A total of 52 butterfly species was recorded (DSD, 2007). This includes one wetland dependent species and two species of conservation interest. In addition, a further eight butterfly species were reported at Lin Ma Hang by KFBG (2004), including one species of conservation interest.

3.26 The rare species, including Glassy Bluebottle *Graphium cloanthus* and Centaur Oak Blue *Arhopala pseudocentauru* were recorded (DSD 2007). Three uncommon species in the Study area include Short-banded Sailer *Phaedyma columella*, Chocolate Royal *Remelana jangala* and Grass Demon *Udaspes folus* were reported by DSD (2007). Another 3 uncommon species (Young & Yiu, 2002), including Gaudy Baron *Euthalia lubentina*, Quaker *Neopithecops zalmora* and Rare Swift *Parnara bada* were also reported by KFBG (2004).

3.27 A total of 25 dragonfly species was recorded during the surveys conducted by DSD (2007). Three species reported, including Blue Sprite *Pseudagrion microcephalum*, Club-tailed Cruiser *Macromia urania* and Emerald Cascader *Zygonyx iris*, are of conservation significance (DSD 2007). In addition, KFBG (2004) also reported another species (Dancing Shadow-emerald *Idionyx victor*) of conservation significance from Lin Ma Hang stream.

Aquatic Fauna

Fish

3.28 A total of 18 species of freshwater fishes were recorded in Lin Ma Hang Stream (Chan 2001, KFBG 2004, DSD 2007). Out of the 18 species recorded, four species of conservation interest and one further species, the Striped Loach *Schistura fasciolata*,

was listed in the EIA Study Brief (DSD 2007). Chinese Rasbora *Rasbora steineri* and Spiny Eel *Mastacembelus armatus* are very rare in Hong Kong (KFBG 2004), while Small Snakehead *Channa asiatica* and Snakehead Murrel *Channa striata* are uncommon (Lee et al. 2004).

3.29 The most ecologically important aquatic fauna were recorded in Lin Ma Hang Stream SSSI. The stream supports 15 species of primary freshwater fishes including several species of conservation concern *Channa asiatica, Mastacembelus armatus, Rasbora steineri and Rasborinus lineatus* (DSD, 2007). The ecological baseline survey in this study recorded another three species of conservation concern including Chinese Rasbora *Rasbora steineri*, Predaceous Chub *Parazacco spilurus* and Topmouth Gudgeon P*seudorasbora parva* were recorded during the baseline study by ASD (2009).They are considered as Global Concern, Vulnerable in China and Local Concern (Fellowes et al., 2002 and Lee et al., 2004) respectively.

3.30 Both juvenile and adult of Chinese Rasbora, a rare species only recorded in North District and Kam Tin (Lee et al., 2004), were recorded in Lin Ma Hang Stream (ASD 2009). Predaceous chub, a common species, widely distributed and occurs in most unpolluted hill streams in both upper and lower courses (Lee et al 2004), was recorded in abundant in Lin Ma Hang Stream (ASD 2009). However, this species is considered as 'Vulnerable' in China Red Data Book since the population in China decreases due to habitat loss. Topmouth Gudgeon was recorded at downstream of Lin Ma Hang Stream (ASD 2009). This species is uncommon in Hong Kong mainly distributed in several streams in North District (Lee et al., 2004).

Aquatic Invertebrates

3.31 A total of 18 species of aquatic invertebrates was recorded at 2 sampling locations in Lin Ma Hang Stream. The reported species were from different groups, including the fly family Simuliidae and the caddisfly families Calamoceratidae and Hydropsychidae. The families are typically found in clean and undegraded streams (DSD 2007).

3.32 No aquatic invertebrates' species of conservation concern were identified depending on this habitat. Hence, the overall conservation value for local aquatic invertebrates is considered as low.

4 EVALUATION OF ECOLOGICAL IMPACT

Evaluation of Impacts on Habitats and Species

4.1 The ecological importance of the habitats within the study area was evaluated in accordance with the criteria stipulated in Annex 8 of EIAO TM.

Impacts to Habitats

4.2 Potential ecological impacts on habitats have been evaluated according to Table 1 of Annex 8 of the EIAO TM, and are summarised in **Tables 4.1a-4.1e** below.

Table 4.1a Ecological Impact Evaluation of Bat Habitat (Main Building)

Evaluation Criteria	**Bat Habitat**
Habitat quality	High
Species	Bat species are of conservation concern and are protected under Wild Animals Protection Ordinance (Cap. 170). Himalayan Leaf-nosed Bat (大蹄蝠) found inside this bat habitat is common and widespread throughout Hong Kong. Potential disturbance limited to restoration works in the Main Building.
Size/Abundance	No bats are found hibernating in this habitat during winter. Around 50 numbers of individual of the Himalayan Leaf-nosed Bat (大蹄蝠) was observed in the Main Building in the latest bat surveys in May to July 2010.
Duration	Potential disturbance during restoration works in the Main Building is expected; however, direct disturbance will be avoided by renovating during dry season when bats are gone for hibernation. This bat habitat in the Main Building will no longer be available after restoration and installation of doors and windows. Nevertheless, habitat in the Kitchen Annex will be restored to provide an undisturbed roosting site. Also, a number of abandoned houses can be found in Lin Ma Hang and these can be alternative roosting sites for the bats. Minimal impact during operation phase is expected. Indirect impact during the construction phase and operation phase are not anticipated.
Reversibility	Direct impact during construction phase will be limited. Direct impact during operation phase will be permanent and irreversible. However, compensatory habitat will be provided in the Kitchen Annex to mitigate this impact.
Magnitude	The scale of the impacts is considered moderate.
Significance of unmitigated impact	**Moderate to Low**

Table 4.1b Ecological Impact Evaluation of Bat Habitat (Kitchen Annex)

Evaluation Criteria	**Bat Habitat**
Habitat quality	High

Species	Bat species are of conservation concern and are protected under Wild Animals Protection Ordinance (Cap. 170). Himalayan Leaf-nosed Bat (大蹄蝠) found inside this bat habitat is common and widespread throughout Hong Kong. Potential disturbance limited to minimum repairing works at the external walls and corrugated roof of the Kitchen Annex and human activities in the Main Building in the operation phase when the Residence is restored to its existing use.
Size/Abundance	No bats are found hibernating in this habitat during winter. Over 100 numbers of individual of the Himalayan Leaf-nosed Bat (大蹄蝠) at the Kitchen Annex according to AFCD's bat survey in September 2009 and two were observed in the Kitchen Annex in the latest bat surveys in July 2010.
Duration	Potential disturbance during restoration works in the Kitchen Annex is expected; however, direct disturbance will be avoided by renovating during dry season when bats are gone for hibernation. No major repairing work will be carried out inside the Kitchen Annex. The demolition of wall connecting the Main Building and the Kitchen Annex will require the provision of entrance gate to this opening at the Kitchen Annex. Bat-friendly gate will be installed to control human access to the Kitchen Annex and at the same time to allow bat's flight; therefore the potential flight paths at the Kitchen Annex will be maintained. Since the opening is kept at its existing location and the space between the Main Building and the Kitchen Annex is small, limited effect on microclimate and lighting is anticipated. Thus, no long-term direct impact is expected. Indirect impact during the construction phase is not anticipated. Indirect disturbance may occur during the operation phase by human activities in the Main Building.
Reversibility	Direct impact during construction phase will be avoided. Indirect disturbance impacts would be permanent and irreversible. However, the Kitchen Annex will be separated from the Main Building and have separate entrance to minimise the possible disturbance from any human activities in the Main Building.
Magnitude	The scale of the impacts is considered low.
Significance of unmitigated impact	**Moderate to Low**

Himalayan Leaf-nosed Bat is common and widespread throughout Hong Kong and impact from the proposed work is limited to the particular roosting sites in the Residence. Without the restoration works, the Main Building is vulnerable to further disrepair or even collapse, which will in turn destroy this bat habitat. With the restoration works, although this bat habitat in the Main Building will no longer be available, the Kitchen Annex, with repair and enhancement, can serve as a compensatory habitat.

At the Kitchen Annex, minimum repairing works will be carried out at the external walls. Existing purlins will not be affected and the corrugated sheets at the roof will be replaced by Chinese tiles, which are original design of the building and will not affect its structural stability. In long-term, the tiled roof should provide a better environment and ventilation for this habitat and it is considered as a beneficial improvement. When the Residence is restored to its existing use, human activities in the Main Building in the operation phase may cause indirect disturbance to this habitat but as the Residence is located in a remote countryside within the Closed Area, no significant increase in the number of visitors is anticipated.

Table 4.1c Ecological Impact Evaluation of Stream in the vicinity of the Residence

Evaluation Criteria	**Stream**
Habitat quality	High
Species	Diverse species of freshwater species are of conservation concern at Lin Ma Hang Stream SSSI. However, no direct impact on species of conservation interest is anticipated and indirect impact will be limited.
Size/Abundance	Small in area and length (<5m) of the Stream in the vicinity of the Residence.
Duration	No direct impact on this habitat type during both construction and operation phases. Indirect impacts may due to the surface runoff under heavy rain or storm during construction phase. With the Residence restored to its existing use, indirect impact during operation phase is not anticipated.
Reversibility	Indirect disturbance impacts during construction phase would be within short period and reversible.
Magnitude	The scale of the impacts is considered low.
Significance of unmitigated impact	**Low**

Renovation works will be conducted mainly at the Residence which is about 10m away from the Stream. Garden improvement works is proposed but it only includes the removal of wildly growing plants and planting of new species. No renovation works will be conducted at or near the Stream in front of the Residence, therefore, no direct impact on this habitat type is expected. Indirect impacts may due to the surface runoff under heavy rain or storm during construction phase but with the scale of work, the impact will be minimal.

Table 4.1d Ecological Impact Evaluation of Secondary Woodland and Fung Shui Woodland

Evaluation Criteria	**Secondary Woodland and *Fung Shui* Woodland**
Habitat quality	High.
Species	The incense tree *Aquilaria sinensis,* is protected in China (Wild Plants under State Protection Category II) and listed as vulnerable in the China Plant Red Data Book, was recorded in the upper part of the woodland to the north of the stream. No direct or indirect impact on species of conservation interest.
Size/Abundance	Secondary Woodland and Fung Shui Woodland were found in the Study area. However, no direct or indirect impact on species of conservation interest is anticipated during both construction and operation phases.
Duration	No direct or indirect impact on this habitat type during both construction and operation phases.
Reversibility	Reversible.
Magnitude	The scale of the impact is considered low.
Significance of unmitigated impact	**Very Low**

Renovation works will be small in scale and conducted mainly at the Residence and will not affect the secondary woodland and fung shui woodland in the surroundings.

Table 4.1e Ecological Impact Evaluation of Agriculture/Abandoned Land

Evaluation Criteria	**Agriculture/Abandoned Land**
Habitat quality	Low.
Species	No rare or protected species were identified and no direct or indirect impact on species of conservation interest is anticipated.
Size/Abundance	No direct or indirect impact on this habitat type during both construction and operation phases.
Duration	No direct or indirect impact on this habitat type during both construction and operation phases.
Reversibility	Reversible.
Magnitude	The scale of the impact is considered low.
Significance of unmitigated impact	**Very Low**

Renovation works will be small in scale and conducted mainly at the Residence and will not affect the agriculture/abandoned land in the surroundings.

4.3 The Project will not cause any significant net loss in foraging or roosting habitats. In addition, the Project will not have any direct impact on the Lin Ma Hang Lead Mine SSSI. No impact on bats roosting in the Lead mine is anticipated. The bat inside the Residence will be directly affected by the renovation works for the Residence but the mitigated impact will be minimised.

Evaluation of impacts on Recognised Sites of Conservation Importance

4.4 Due to the small scale of restoration works for the Residence, no sites of conservation importance within and in the vicinity of the Study Area are likely to be directly impacted. Lin Ma Hang Lead Mines SSSI is located at about 1km from the Site and therefore will not be affected by the Project. The downstream section of Lin Ma Hang Stream SSSI is passing at about 10 m away from the Residence. The scale of the renovation works is small and most of the major works will be conducted inside the Residence. For the garden improvement works, the scale of works is small with the removal of wildly growing plants and planting of new species. No wastewater discharge from the Site is anticipated since there is no drainage or public sewerage on site. The source of wastewater is likely to be generated from washing down the brick walls, granite columns and the floors using mild detergent and freshwater solution. The amount of wastewater is small and the works are carried out inside the Residence, no significant impact to the water quality is anticipated. In addition, the surface runoff due to the front yard of the Residence is also insignificant.

4.5 Along the footpath on the way to the Residence, is a granite footbridge across the Lin Ma Hang Stream SSSI (which is a proposed Grade 3 Historic Structure). Hand-trolleys will be used to transfer construction materials (including timber, bricks, builders waste, etc.), from a parking space in the village, across the bridge and to the proposed work site in phases. The footbridge will be overlaid with plywood sheets with an upskirt of minimum 150mm high provided on both sides of the plywood sheets. All cutting of the materials shall be undertaken off site, and any loose materials, sand, salvage, builders rubbish, etc., that needs to be transported across the bridge by the Contractor, must be first carefully wrapped up in heavy duty PVC sheeting, to avoid causing any disturbance to the stream. On completion of the Project, the Contractor will be responsible to remove all materials from the bridge for disposal carefully. No direct impact on the stream is anticipated in the course of transportation.

4.6 In addition, no heavy power-operated machinery but only hand-held power tools and hand-held

manual tools will be used for the restoration works. The impact arising from the operation of these hand-held tools is considered minimal.

Evaluation of Impacts on Vegetation

4.7 As only renovation works for the Residence will be conducted, no tree except for the gardening improvement works is required to be felled for the Project. A vegetation survey was conducted on 28 April 2010 in front and at the rear of the Main Building and Kitchen Annex. **Figure 3** shows the locations of the surveyed trees. The photographic records and survey results for the vegetation survey are provided in **Appendix B and C** respectively.

4.8 In front of the Main Building and Kitchen Annex, the survey results showed a total of 13 plant individuals, with 3 species of plants (including *Dracaena marginata, Mangifera indica, Ficus hispida.)* None of these species are with high ecological or conservation value. The most abundant species is *Ficus hispida,* with 9 out of 13 totals. Most of *Ficus hispida* are with poor form and health condition. In addition, only 5 are considered mature trees (with tree trunk diameter >95mm at 1.2 m height), others are all immature trees/plants. Therefore, it is recommended to fell all trees except Tree no.4 *Mangifera indica,* which is of better form and condition. No significant ecological impact and/or habitat loss due to the felling of these trees for the small-scale garden improvement works (removal of wildly growing plants and planting of new species) in the Project.

4.9 At the rear of the Main Building and Kitchen Annex, the survey results showed 2 *Cinnamomum camphora* growing adjacent to the Main Building, for which minimum pruning is required to prevent threats to the roof imposed by branches and to allow re-roofing. Impact to pruned trees will be low.

4.10 Apart from the above–said felling some trees/plants in front of the Main Building and Kitchen Annex for the gardening improvement works, no tree will be felled. As floral species of conservation importance identified within the study area as shown in Table 4.2 would not be affected under the project, ecological impacts on the species are evaluated as very low. As there will be no significant ecological impact and/or habitat loss due to the felling and pruning of these trees, no mitigation planting is proposed to compensate the anticipated loss of greenery including trees under the Project. However, details for any necessary compensation in the landscape aspect will be studied in the tree felling application process, if required.

Table 4.2 Evaluation of Floral Species of Conservation Importance within the Study Area

Common Name	Locations	Protection Status	Distribution	Rarity
Aquilaria sinensis	Secondary forest on the hillsides and *feng shui* woodlands behind the villages	Scheduled under *Protection of Endangered Species of Animals and Plants Ordinance* (Cap 586); Protected in China (*Wild Plants under State Protection* Category II) and considered globally Vulnerable (IUCN 2010).	Common in Hong Kong (Corlett *et al.* 2000)	Common
Alsophila spinulosa	The hillsides secondary forest.	A Restricted fern in Hong Kong (Wu and Lee, 2000) Protected in China (*Wild Plants under State Protection* Category II) and Hong Kong (Cap 96, 586).	Hong Kong Island, Lantau, Tai Mo Shan.	Common
Brainea insignis	*Feng shui*	A Restricted fern in Hong	Common in	Common

Common Name	Locations	Protection Status	Distribution	Rarity
	woodland behind the Residence	Kong (Wu and Lee, 2000) Protected in China (Wild Plants under State Protection Category II).	Hong Kong	
Gymnosphaera metteniana	The hillsides secondary forest.	Protected in China (*Wild Plants under State Protection* Category II) and Hong Kong (Cap 96, 586).	Lin Ma Hang	Very Rare
Gymnosphaera podophylla	The hillsides secondary forest.	A Restricted fern in Hong Kong (Wu and Lee, 2000)Protected in China (*Wild Plants under State Protection* Category II) and Hong Kong (Cap 96, 586).	Hong Kong Island, Shing Mun and Kowloon Peak (Fei Ngo Shan)	Rare

Evaluation of Impacts on Mammals

4.11 Mammals of conservation importance identified within the study area are shown in Table 4.3. Large mammals and the bat habitat in the Lin Ma Hang Lead Mines will not be affected as the proposed renovation works would be restricted within the project site where direct impact on natural habitat or vegetation is not anticipated. Potential impact on mammals after the completion of works is unlikely to be appeared since the Residence will be kept for its existing use, thus the ecological impacts on the species are evaluated as low to very low (Table 4.3 refers). The bat habitat inside the Main Building and Kitchen Annex of the Residence will be affected by the renovation works. Bats' entry to the Main Building will be blocked after renovation. Therefore this habitat will not be accessible by bats. This impact will be mitigated as suggested in Section 5.4. Although no bats were recorded in May and June 2010 in the Kitchen Annex and only two bats were found according to the bat survey in July 2010, impact to this bat residence cannot be ignored. As only minimum repairing works will be carried out at the Kitchen Annex and the Residence will be kept for its existing use, no residual impact on mammals is anticipated after completion of the works.

Table 4.3 Evaluation of Mammals of Conservation Importance within the Study Area

Common Name	Locations	Protection Status	Distribution	Rarity	Impact on the species from the proposed work
Large Mammals					
Red Muntjac *Muntiacus muntjak*	Forest behind the Residence	Potential Regional Concern	Widespread throughout Hong Kong	Abundant	Very Low
East Asian Porcupine *Hystrix Brachyura*		Listed in Wild Animals Protection Ordinance (Cap. 170), IUCN	Widespread throughout Hong Kong	Abundant	Very Low
Crab-eating Mongoose *Herpestes urva*		Local Concern, Listed in Wild Animals Protection Ordinance (Cap. 170)	Restricted to Northern part of Hong Kong	Rare	Low
Small-toothed Ferret Badger *Melogale*		Listed in Wild Animals Protection	Widespread throughout Hong Kong	Common	Very Low

Common Name	Locations	Protection Status	Distribution	Rarity	Impact on the species from the proposed work
moschata		Ordinance (Cap. 170)			
Yellow-bellied Weasel *Mustela kathiah*		Local Concern	Recent records have been found at Pat Sin Leng, Plover Cove, Lin Ma Hang and Sha Tau Kok	Rare	Low
Chinese Pangolin *Manis pentadactyla*		Listed in Protection of Endangered Species of Animals and Plants Ordinance (Cap. 586), Wild Animals Protection Ordinance (Cap. 170), IUCN, China Red Data Book	Thinly distributed in forested areas throughout Hong Kong	Rare	Low
Bats					
Greater Bent-winged Bat *Miniopterus magnater*	Lin Ma Hang Lead Mines	Listed in Wild Animals Protection Ordinance (Cap. 170)	Widespread throughout Hong Kong	Common	Very Low
Lesser Bent-winged Bat *Miniopterus pusillus*			Widely distributed in forested areas throughout Hong Kong.	Common	Very Low
Common Bent-winged Bat *Miniopterus schreibersii*		Listed in Wild Animals Protection Ordinance (Cap. 170) and IUCN and China Red Data Book		Rare	Very Low
Intermediate Horseshoe Bat *Rhinolophus affinus*		Listed in Wild Animals Protection Ordinance (Cap. 170)		Uncommon	Very Low
Least Horseshoe Bat *Rhinolophus pusillus*				Uncommon	Very Low
Rickett's Big-footed Bat *Myotis ricketti*			Fairly widely distributed in forested areas throughout Hong Kong	Uncommon	Very Low
Chinese Myotis			Fairly widely	Uncommon	Very Low

Common Name	Locations	Protection Status	Distribution	Rarity	Impact on the species from the proposed work
Myotis chinensis			distributed in forested areas throughout Hong Kong. Records found in Lin Ma Hang, Nam Chung, Tai Lam Chung, Shek Kong, Sai Kung, Shek Pik and Tung Chung		
Himalayan Leaf-nosed Bat *Hipposideros armiger*	Inside the Residence of Residence of Ip Ting-sz		Widespread throughout Hong Kong	Common	Low

Evaluation of Impacts on Aquatic Habitat and Fauna

4.12 Aquatic and faunal species of conservation importance identified within the study area is shown in Table 4.4. No renovation works will be conducted at or near the Stream in front of the Residence. No impact on aquatic habitat and fauna due to the Project is anticipated and ecological impacts on the species are evaluated as very low. In addition, waste water generated from the Project is insignificant and will not be discharged into the stream. Therefore, no direct impact on water quality is anticipated. Indirect impact may due to the surface runoff under heavy rain or storm during construction phase; but with the scale of work and precautionary measures, including scheduling of works in dry season and mitigation measures for water pollution control as describe in Section 5, impact on aquatic habitat and fauna will be minimal. However, good site practice in accordance with the ProPECC PN 1/94 "Construction Site Drainage" issued by EPD, and the procedures in the Environment, Transport and Works Bureau (ETWB) Technical Circular (Works) (TCW) No. 5/2005 "Protection of Natural Stream /Rivers from adverse impact arising from construction works" are recommended to be adopted as mitigation measures to control water quality impact.

Table 4.4 Evaluation of Aquatic and Faunal Species of Conservation Importance within the Study Area

Common Name	Locations	Protection Status	Distribution	Rarity
Avifauna				
Chinese Pond Heron *Ardeola bacchus*	Lin Ma Hang	Potential Regional Concern	Resident in Hong Kong	Uncommon
Crested Serpent Eagle *Spilornis cheela*		Class II China National Protected Species		
Crested Goshawk *Accipiter trivirgatus*		Class II China National Protected Species	Resident in Hong Kong	Uncommon
Greater Coucal *Centropus*		Class II China National Protected Species	Widespread residents in Hong	Common

Common Name	Locations	Protection Status	Distribution	Rarity
sinensis			Kong	
Lesser Coucal *Centropus bengalensis*		Class II China National Protected Species	Widespread residents in Hong Kong	Common
Grey Bushchat *Saxicola ferrea*		Local Concern	Widespread residents in Hong Kong	Common
Orange headed Thrush *Zoothera citrinus*	Abandoned house at Lin Ma Hang	Local Concern	Tai Po Kau and Lin Ma Hang	Rare
Herpetofauna				
Chinese Bullfrog *Hoplobatrachus chinensis*	Lowland section of Lin Ma Hang Stream	Class II China National Protected Species	Widely distributed in Hong Kong, occurs in lowland wetlands	Common
Common Rat Snake *Ptyas mucosus*	Lin Ma Hang	Listed in Protection of Endangered Species of Animals and Plants Ordinance (Cap.586) Endangered in China Red Data Book	Widely distributed in Hong Kong	Common
Freshwater Fish Species				
Chinese Rasbora *Rasbora steineri*	Lin Ma Hang Stream	Global Concern	North District and Kam Tin	Rare
Spiny eel *Mastacembelus armatus*		Local Concern	Restricted in Hong Kong	Rare
Predaceous Chub *Parazacco spilurus*		Vulnerable in China Red Data Book	Most unpolluted hill streams in both upper and lower courses	Common
Small Snakehead *Channa asiatica*		Local Concern	North District and Lantau Island	Uncommon

5 MITIGATION OF IMPACT

5.1 Following EIAO-TM Annex 16 guidelines, mitigation measures are discussed in this section to avoid, minimise and compensate for identified ecological impacts.

Impact Avoidance

5.2 As described in Chapter 2, only renovation works within the Main Building of the Residence, minimum repair works at the Kitchen Annex and restoration of the garden in front of the Residence will be carried out. Pollutants generated will be minimal and restricted to the interior and brief peripheral of the building. No direct discharge or dumping activity will be carried out to the stream. Therefore, direct and indirect impacts on Lin Ma Hang Stream and its catchment and associated woodland habitats are therefore completely avoided.

5.3 Although there is a need for the proposed renovation works, disturbance to the bat habitat inside the Residence would be avoided as far as possible. It is recommended that the works should be carried out in dry season (November to March inclusive) to minimize the potential impact on bats when these mammals leave the Residence for hibernation. Renovation work will only be commenced after confirming that all bats have left the Residence to avoid unrealized impact.

Impact Minimisation and Compensation

5.4 After restoration of the Main Building is completed, it will be enclosed by doors and windows that will not allow bat entry. The bat habitat in Kitchen Annex will be enhanced serving as a compensatory habitat to bats in the Main Building to mitigate this permanent impact. Existing purlins will not be affected and the corrugated sheets will be replaced by Chinese tiles, which are original design of the building and will not affect its structural stability. In long-term, the tiled roof should provide a better environment and ventilation for this habitat. Furthermore, it will be separated from the Main Building to reduce potential disturbance from human activities inside the Main Building.

5.5 As over 100 numbers of individual of the Himalayan Leaf-nosed Bat were recorded roosting inside the Kitchen Annex of the Residence during the bat roost census conducted by AFCD in September 2009 and two bats were found in the latest bat survey in July 2010 by AMO, it is recommended to maintain the roosting site for bat at the Kitchen Annex. In order to minimise impacts to the bats, the recommended mitigation measures include minimum repairing works in the Kitchen Annex, keeping the existing purlins, keeping the disposition of the entrances and flight paths of the Kitchen Annex; and avoid future disturbance to the roost in-situ with reference to the Guideline in **Appendix D**.

5.6 The window at the front façade of the Kitchen Annex had been temporarily blocked in February 2010 as explained in Section 3.19. Apart from the seasonal and yearly changes of the roost selection, the blockage of windows and therefore the disturbed flight path of the bats might be one of the reasons for the reduced bat occupancy in the Kitchen Annex. The return of the bats in July 2010 suggested that the proposed enhanced Kitchen Annex has high potential to provide useful bat habitat. In addition, abandoned houses commonly found in Lin Ma Hang area may also serve as alternative to the bats.

5.7 As the droppings from bats may pose damages to the interior of the Kitchen Annex, it is not recommended to put any furniture or precious materials inside the Kitchen Annex. It is also recommended to prohibit people from entering the Kitchen Annex for hygienic reason and to

minimise human disturbance to bat maternity roost, particularly during the breeding season.

5.8 The proposed repairing works at the Kitchen Annex include only repairing, patching and cleaning on the external wall and the replacement of the corrugated roof with tiles, no additional repairing works will be carried out inside the Kitchen Annex. The demolition of wall connecting the Main Building and the Kitchen Annex will require the provision of entrance gate to this opening at the Kitchen Annex. Gate with horizontal bars will be installed to control human access to the Kitchen Annex and at the same time to allow bat's flight; therefore the potential flight paths at the Kitchen Annex will be maintained. No significant impact to the bat habitat inside the Kitchen Annex is anticipated. Detailed design, maintenance and monitoring requirements of the gate should be provided in a separate submission with advice from qualified personnel during the detailed design stage and be installed before the operational phase of the project. In addition, a post-construction monitoring and maintenance programme to the effectiveness of the gate is recommended as little is currently know about the acceptance of gating and the design by local bat species. Modification and refinement of the gate design might be required at the Kitchen Annex.

5.9 During the construction phase, there may be potential water quality impact arising from the construction works to the stream which falls only 10 m away from the site. Good site practice in accordance with the ProPECC PN 1/94 "Construction Site Drainage" issued by EPD, and the procedures in the Environment, Transport and Works Bureau (ETWB) Technical Circular (Works) (TCW) No. 5/2005 "Protection of Natural Stream /Rivers from adverse impact arising from construction works" are recommended to be adopted as mitigation measures to control potential water quality impact to the stream. Recommended Pollution Mitigation Measures with reference to TC(works) No. 5/2005 should be provided as follows:

In Planning Stage

- The proposed works should preferably be carried out during the dry season where flow in the stream is low.
- Proper locations well away from the stream for temporary storage of materials (e.g. equipment, filing materials and chemicals) and temporary stockpile of construction debris and spoil should be identified before commencement of the works.
- The use of concrete or the like should be avoided or minimized. Unless there are restoration and other site constraints, more environmentally friendly alternatives should be considered.

In Construction Stage

- The proposed works site should be temporarily isolated, such as by placing of sandbags or silt curtains with lead edge at bottom and properly supported props, to prevent adverse impacts on the stream water qualities.
- The natural bottom and existing flow in the river should not be disturbed.
- Stockpiling of construction materials, if necessary, should be properly covered and located away from any natural stream.
- Construction debris and spoil should be covered up and/or properly disposed of as soon as possible to avoid being washed into nearby streams by rain.
- Construction effluent, site run-off and sewage should be properly collected and/or treated and wastewater generation should be minimized.

Residual Impact

5.10 No residual ecological impact is anticipated if the proposed mitigation measures are implemented properly. Other impact such as the indirect impact associated with the construction phases is considered to be negligible because the habitat is already disturbed by the existing villages which are only 200m away. Indirect impact during the operation phase is also considered to be negligible as the Residence will be kept for existing use after completion of the restoration works.

6 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENT

6.1 As bats are found in the Residence, renovation work will only be commenced after confirming that all bats have left the Residence to avoid unrealized impact. During the construction stage, monthly site inspection will be carried out to ensure that the good site practice to avoid water quality impact will be followed. During the repairing works at the Kitchen Annex, remedial measures would be formulated and implemented as appropriate. Weekly site inspection will be carried out to ensure that the renovation of the Kitchen Annex follows the design that focuses on habitat improvement

6.2 As moderate to low ecological impact is anticipated to bats residing in the Main Building of the Residence, mitigation by providing a compensatory habitat in the previously inhabited Kitchen Annex is proposed. Since there are still uncertainties in bat's preference on site selection, ecological monitoring and audit is proposed to investigate the effectiveness of the enhanced habitat in attracting and accommodating bats in the Kitchen Annex.

6.3 Monthly bat survey will be conducted during March to November inclusive in the first year after renovation (subject to review if needed) to record the number of bats returning from hibernation to roost and breed after the works. The effectiveness of the bat-friendly gate at the Kitchen Annex will also be checked at the Kitchen Annex. Should the enhanced habitat fail to attract bats or there is incompatibility in the gate design, remedial measures will be carried out if required.

6.4 The above monitoring works will be carried out by qualified personnel and be reported to the authority under the EIAO.

7 CONCLUSION

7.1 Lin Ma Hang is rural area of significant ecological interest and conservation value due to the low human disturbance. The Lin Ma Hang Lead Mine and Lin Ma Hang Stream in the village are Sites of Special Scientific Interest and conservation value. In spite of these areas of known ecological importance, the restoration works for Ip Ting-sz residence are not considered to cause any ecological impact on the stream and the Lead Mine due to the scale and nature of the works and the scheduling of works in dry season and the implementation of proposed mitigation measures. Impacts on the woodland habitat and mammals in the neighbourhood of the Residence are also highly unlikely.

7.2 However, there may be impact on the bats which use the dilapidated house as a roost in summer. This usage, however, is compatible with the intended preservation of the building as a significant heritage if mitigation measures are taken to avoid disturbance to bats. In order to avoid the impacts, it has been recommended that the renovation works of the Residence be carried out between November and March when the Main Building and the Kitchen Annex are not occupied by bats, Kitchen Annex of the Residence would be enhanced serving as a potential roosting site to mitigate the direct loss of bat habitat in the Main Building. With the implementation of the proposed mitigation measures, no residual impact is anticipated under the project.

7.3 Impact monitoring would be conducted during both the construction and operational phases to monitor and review the effectiveness of the mitigation measures proposed. As bats are found in the Residence, renovation work will only be commenced after confirming that all bats have left the Residence to avoid unrealized impact. During the construction stage, monthly site inspection will be carried out to ensure that the good site practice to avoid water quality impact will be followed. During the repairing works at the Kitchen Annex, remedial measures would be formulated and implemented as appropriate. Weekly site inspection will be carried out to ensure that the renovation of the Kitchen Annex follows the design that focuses on habitat improvement.

8 REFERENCE

- Agriculture, Fisheries and Conservation Department, Search Hong Kong Biodiversity Database (http://www.afcd.gov.hk/english/conservation/hkbiodiversity/hkbiodiversity.html)

- Black & Veatch Hong Kong Limited. 2007. Agreement No. CE 6/2002 (DS) Drainage Improvement in Northern New Territories – Package C: Investigation, Design and Construction. Environmental Impact Assessment Report. Drainage Services Department, Hong Kong.

- Fellowes, J.R., Lau, M.W.N., Dudgeon, D., Reels, G.T., Ades, G.W.J., Carey, G.J., Chan, B.P.L., Kendrick, R.C., Lee, K.S., Leven, M.R., Wilson, K.D.P and Yu, Y.T. 2002. Wild Animals to Watch: Terrestrial and Freshwater Fauna of Conservation Concern in Hong Kong. Memoirs of the Hong Kong Natural History Society, 25, 123-160.

- Kadoorie Farm and Botanic Garden. 2004. A Pilot Biodiversity Study of the eastern Frontier Closed Area and North East New Territories, Hong Kong, June-December 2003. Kadoorie Farm and Botanic Garden Publication Series No.1. Kadoorie Farm and Botanic Garden, Hong Kong Special Administrative Region.

- Mott MacDonald Hong Kong Ltd. 2009. Construction of a Secondary Boundary Fence and New Sections of Primary Boundary Fence and Boundary Patrol Road. Environmental Impact Assessment Report. Secretary for Security, Hong Kong.

- Ove Arup & Partners Hong Kong Ltd. 2007. North East New Territories (NENT) Landfill Extension. Environmental Impact Assessment Report. Environmental Protection Department, Hong Kong.

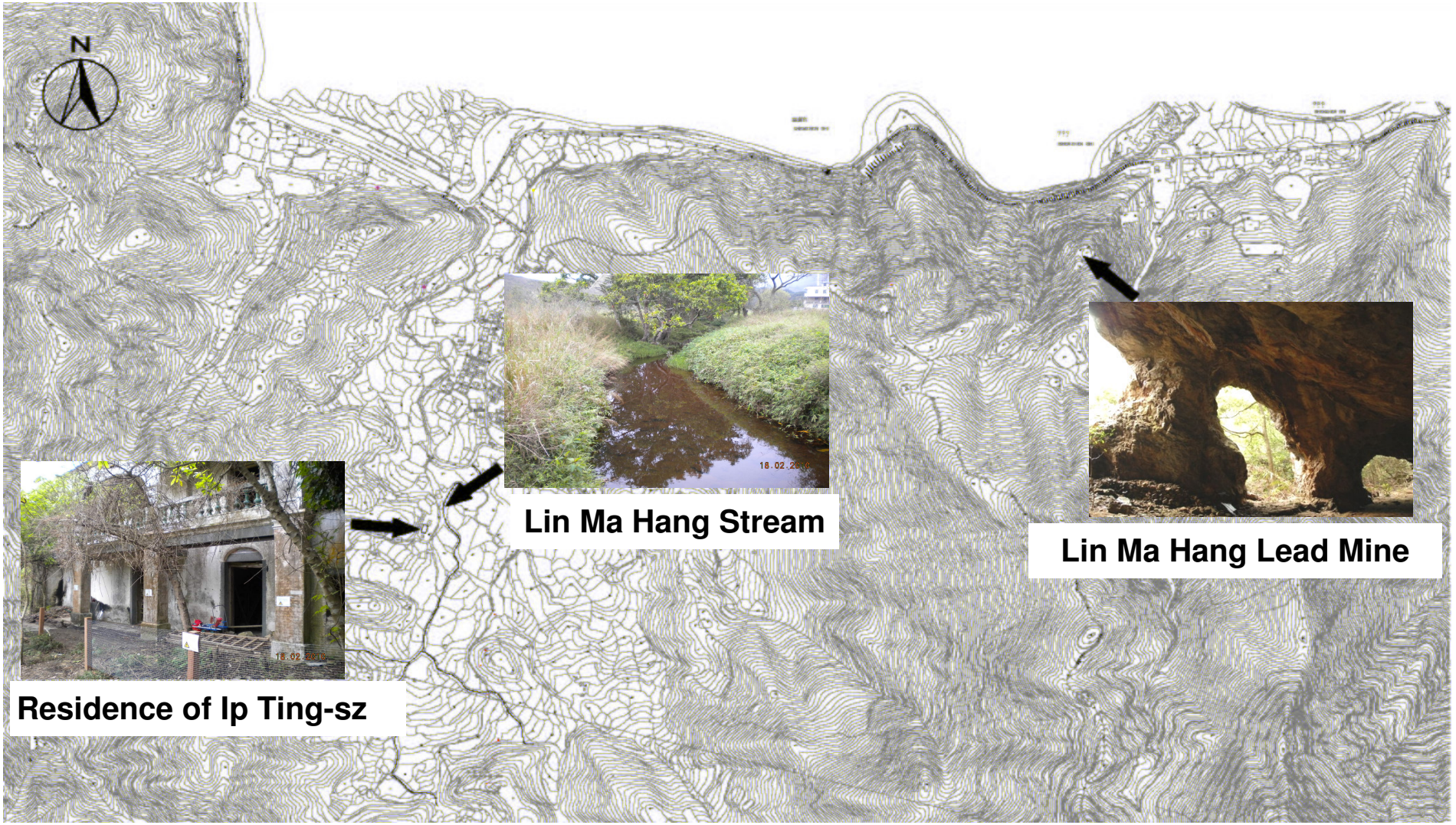
- Shek, C.T. 2004. Bats of Hong Kong: An Introduction of Hong Kong Bats, with an Illustrative Identification Key. Hong Kong Biodiversity 7: 1-9.

- Shek, C.T. and Chan, C.S.M. 2005. Roost censuses of cave dwelling bats of Hong Kong. Hong Kong Biodiversity 10: 1-8.

- Shek, C.T. and Chan, C.S.M. 2006. Mist net survey of bats with three new bat species recorded for Hong Kong. Hong Kong Biodiversity 11: 1-7.

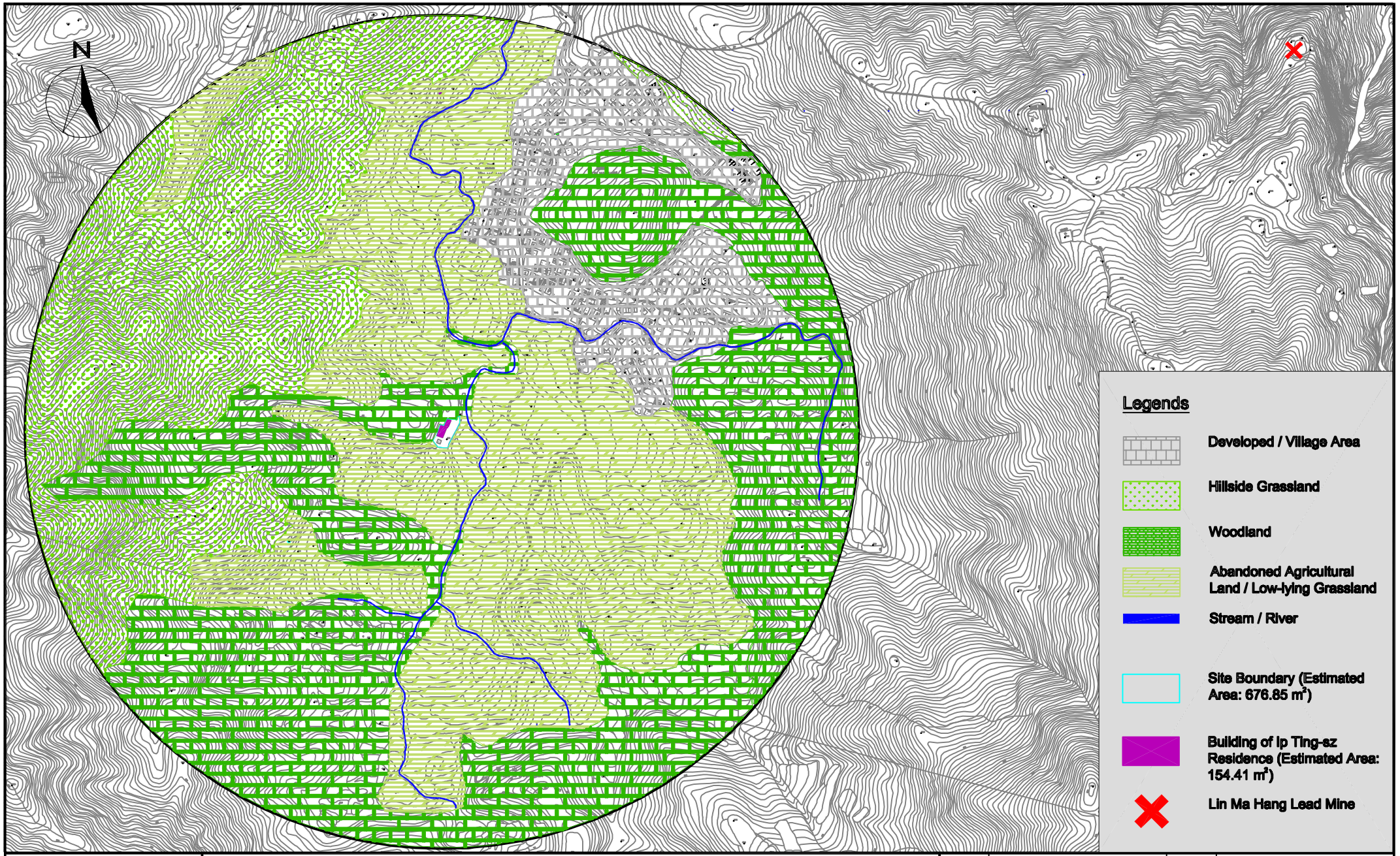
- Wu, S.H. and Lee W.T.C.. 2000. Pteridophytes of Hong Kong. Memoirs of the Hong Kong Natural History Society 23: 5-20.

FIGURES



Title	Quotation Ref.: AMO0911013 Consultancy for Ecological Study at the Residence of Ip Ting-sz, Lin Ma Hang, Closed Area Site Layout Plan	Scale: N.T.S Date: Feb 2010	Project No.: IA0004 Figure: 1

CINOTECH

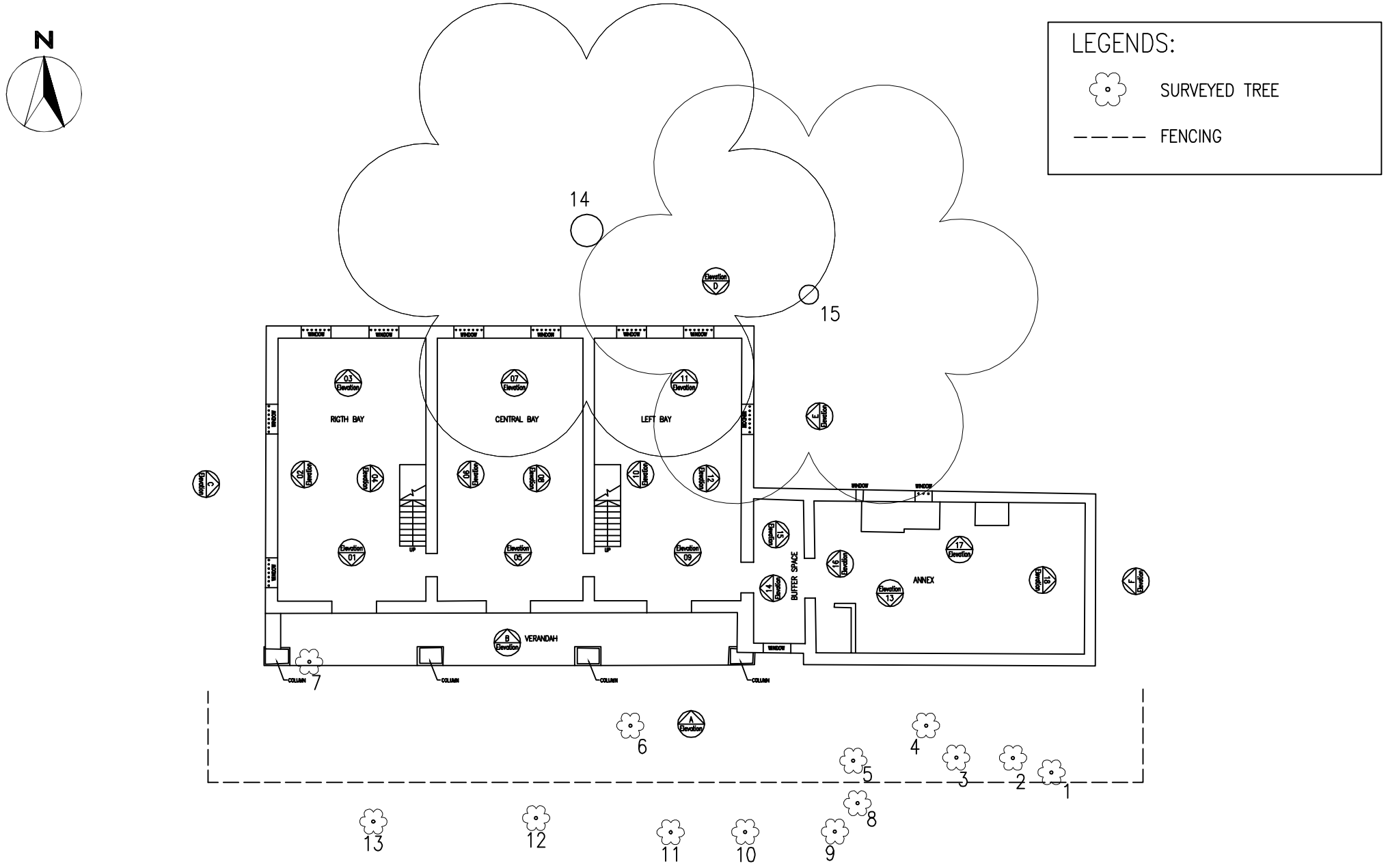


CINOTECH
Cinotech Consultants Limited

Quotation Ref.: AMOD911013
Consultancy for Ecological Study at the Residence of Ip Ting-sz, Lin Ma Hang, Closed Area

Habitat Map within 500m Radius of Ip Ting-sz Residence

SCALE	NTS	DATE	MAR 2010
CHECK	PC	DRAWN	AL
JOB No.	IA0004	FIGURE NO. 2	REV -



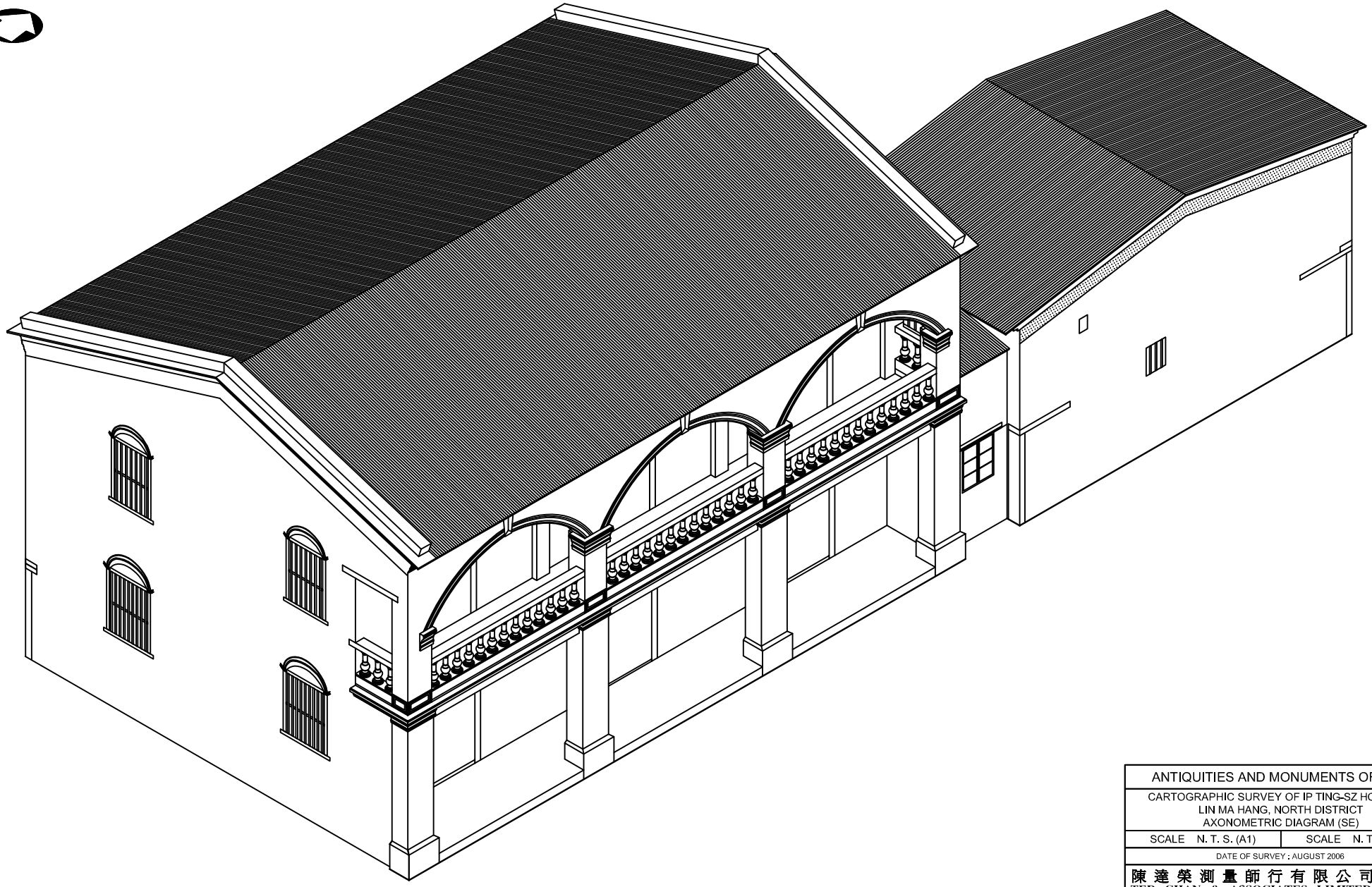
CINOTECH
Cinotech Consultants Limited

CONSULTANCY FOR ECOLOGICAL STUDY AT THE RESIDENCE OF
IP TING-SZ, LIN MA HANG, CLOSED AREA

LOCATIONS OF SURVEYED TREES

SCALE	NTS	DATE	JUL 2010
CHECK	PC	DRAWN	BC
JOB No.	IA0004	FIGURE NO. 3	REV —

APPENDIX A
CARTOGRAPHIC DRAWINGS OF THE RESIDENCE



ANTIQUITIES AND MONUMENTS OFFICE

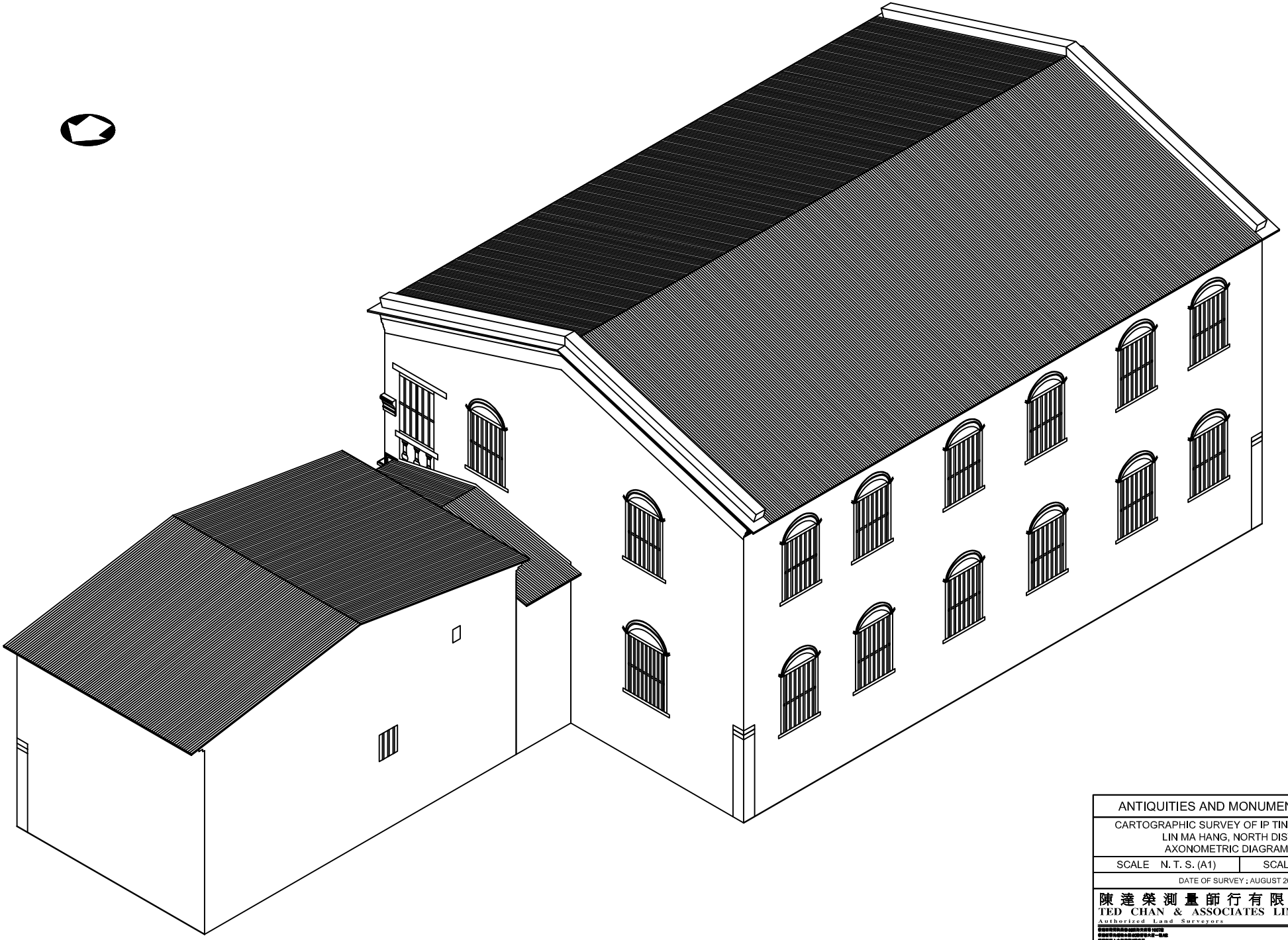
CARTOGRAPHIC SURVEY OF IP TING-SZ HOUSE AT
LIN MA HANG, NORTH DISTRICT
AXONOMETRIC DIAGRAM (SE)

SCALE N. T. S. (A1)	SCALE N. T. S. (A3)

DATE OF SURVEY : AUGUST 2006

陳達榮測量師行有限公司
TED CHAN & ASSOCIATES LIMITED
Authorized Land Surveyors

PLAN NO.:	
TCHK4455/AD/01	



ANTIQUITIES AND MONUMENTS OFFICE

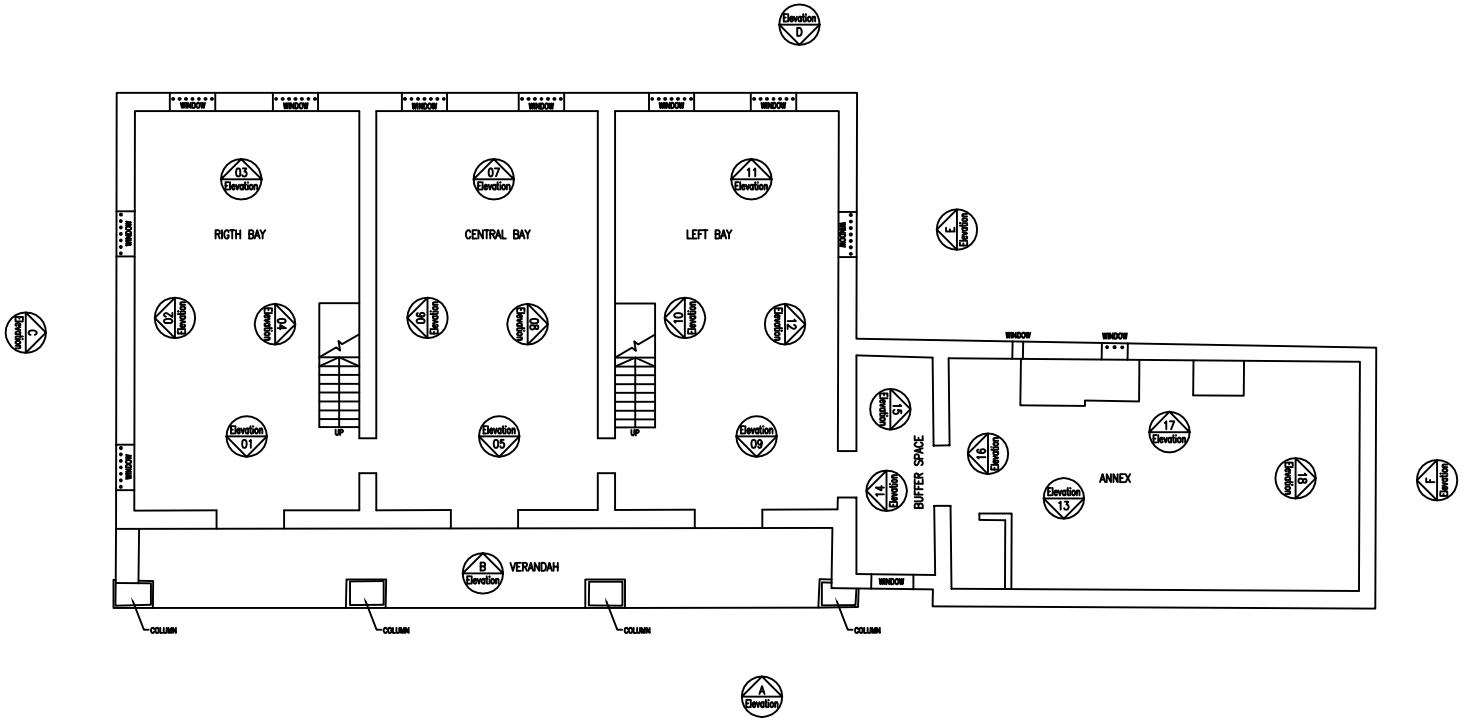
CARTOGRAPHIC SURVEY OF IP TING-SZ HOUSE AT
LIN MA HANG, NORTH DISTRICT
AXONOMETRIC DIAGRAM (NW)

SCALE N. T. S. (A1)	SCALE N. T. S. (A3)

DATE OF SURVEY : AUGUST 2006

陳達榮測量師行有限公司
TED CHAN & ASSOCIATES LIMITED
Authorized Land Surveyors

PLAN NO.:	
TCHK4455/AD/02	



REMARK :

ALL UNITS ARE IN METERS

ANTIQUITIES AND MONUMENTS OFFICE

CARTOGRAPHIC SURVEY OF IP TING-SZ HOUSE AT
LIN MA HANG, NORTH DISTRICT
ELEVATION INDEX

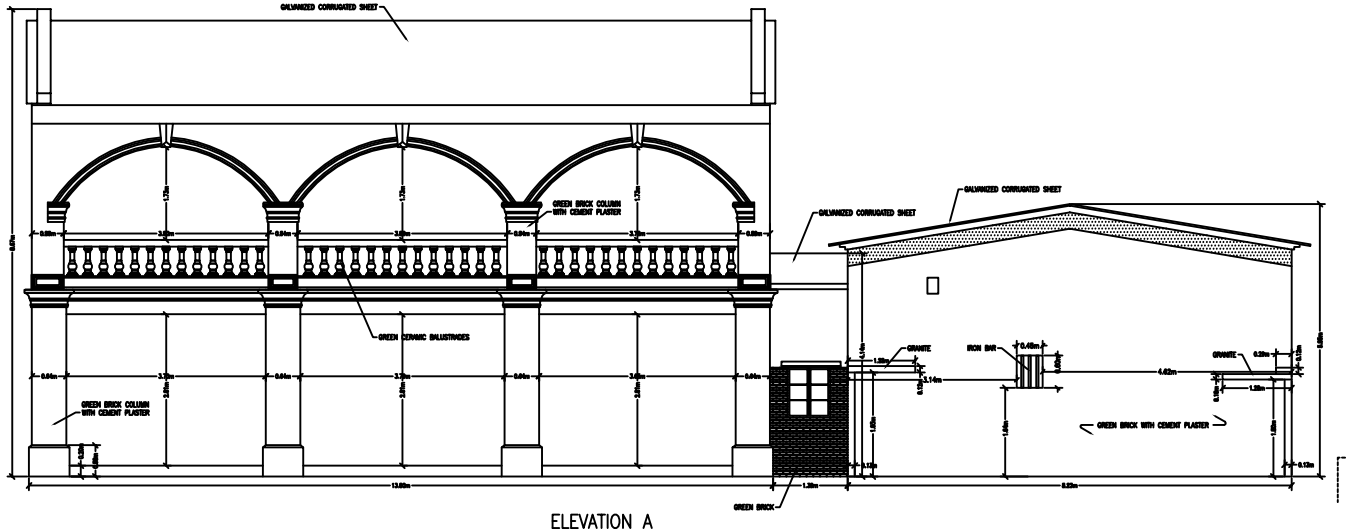
SCALE 1 : 50 (A1)	SCALE 1 : 100 (A3)

DATE OF SURVEY : AUGUST 2006

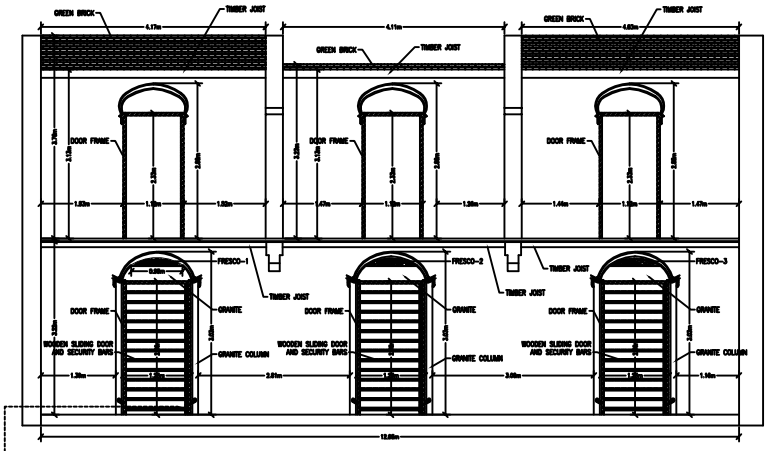
陳達榮測量師行有限公司
TED CHAN & ASSOCIATES LIMITED
Authorized Land Surveyors

PLAN NO.:

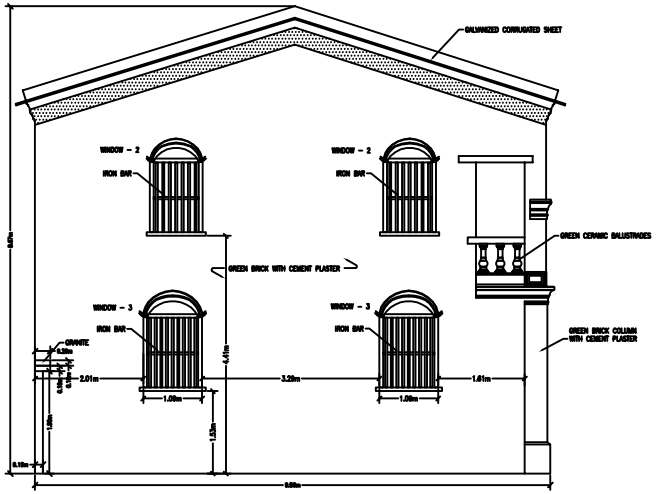
TCHK4455/EV/01



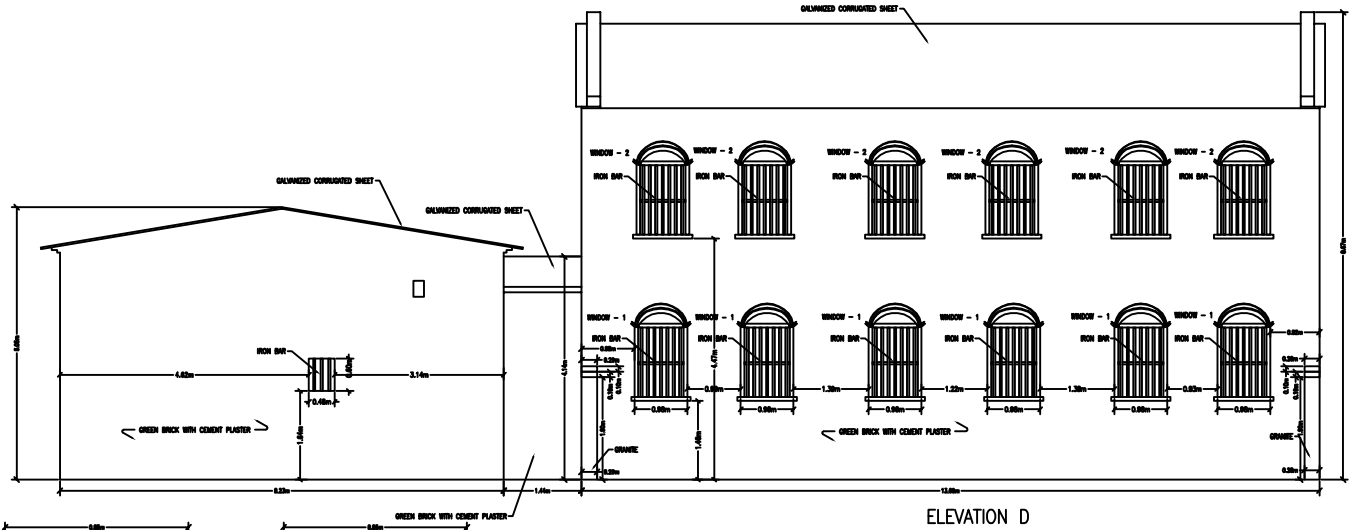
ELEVATION A



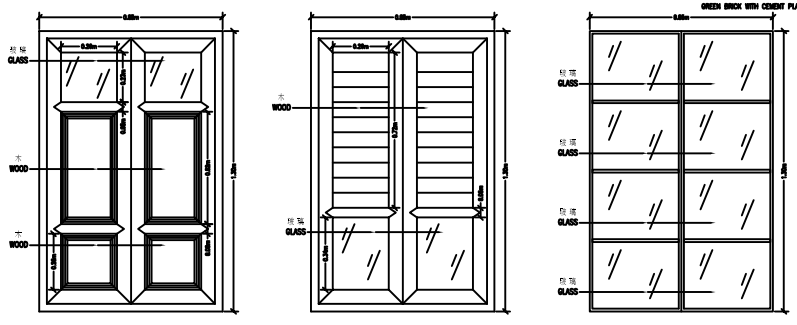
ELEVATION B



ELEVATION C



ELEVATION D



REMARK :

ALL UNITS ARE IN METERS

ANTIQUITIES AND MONUMENTS OFFICE

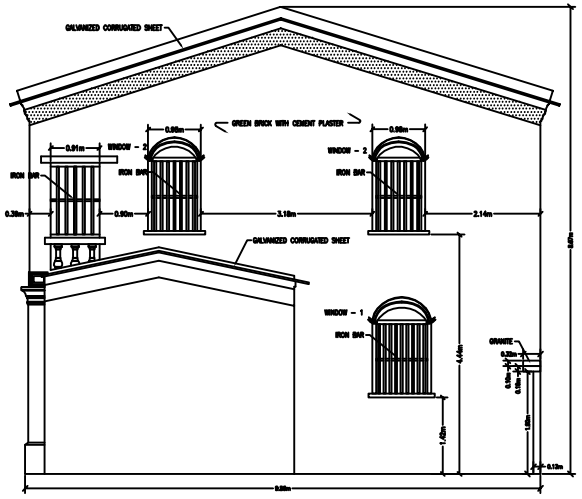
CARTOGRAPHIC SURVEY OF IP TING-SZ HOUSE AT LIN MA HANG, NORTH DISTRICT
ELEVATIONS I

SCALE 1 : 50 (A1)	SCALE 1 : 100 (A3)

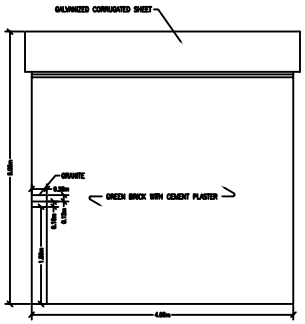
DATE OF SURVEY : AUGUST 2006

陳達榮測量師行有限公司
TED CHAN & ASSOCIATES LIMITED
Authorized Land Surveyors

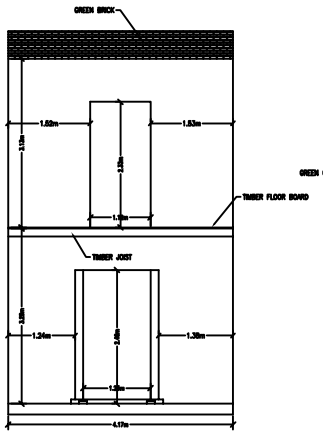
PLAN NO.:	
TCHK4455/EV/02	



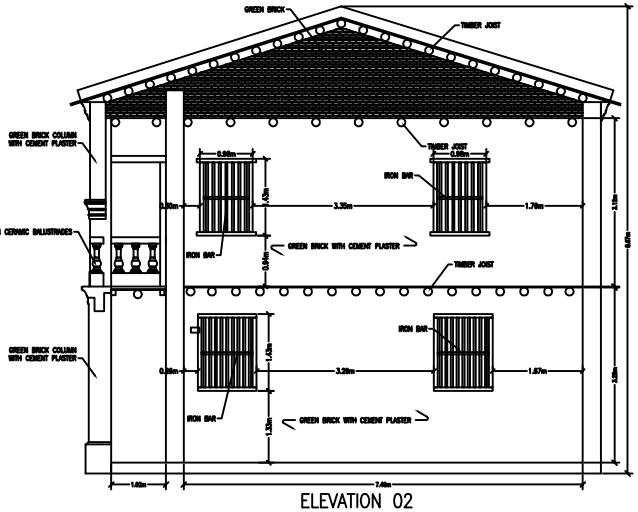
ELEVATION E



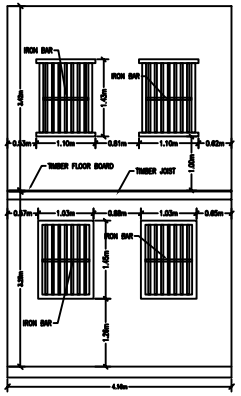
ELEVATION F



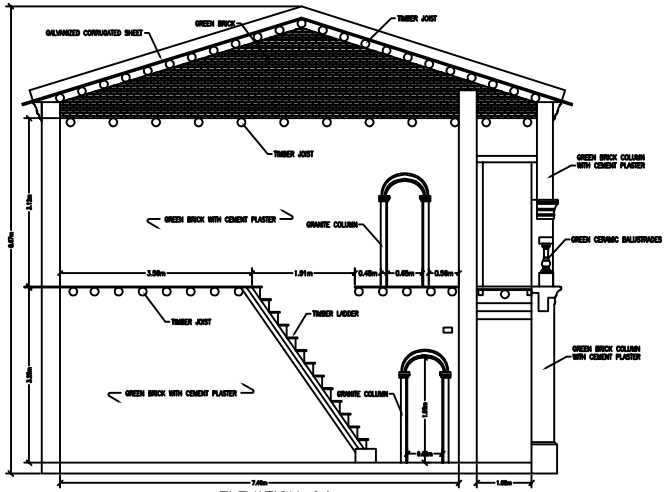
ELEVATION 01



ELEVATION 02



ELEVATION 03



ELEVATION 04

REMARK :

ALL UNITS ARE IN METERS

ANTIQUITIES AND MONUMENTS OFFICE

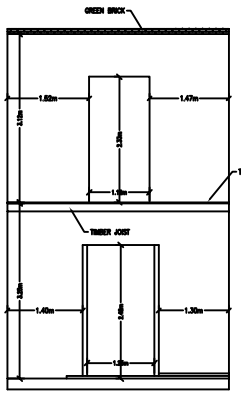
CARTOGRAPHIC SURVEY OF IP TING-SZ HOUSE AT
LIN MA HANG, NORTH DISTRICT
ELEVATIONS II

SCALE 1 : 50 (A1)	SCALE 1 : 100 (A3)

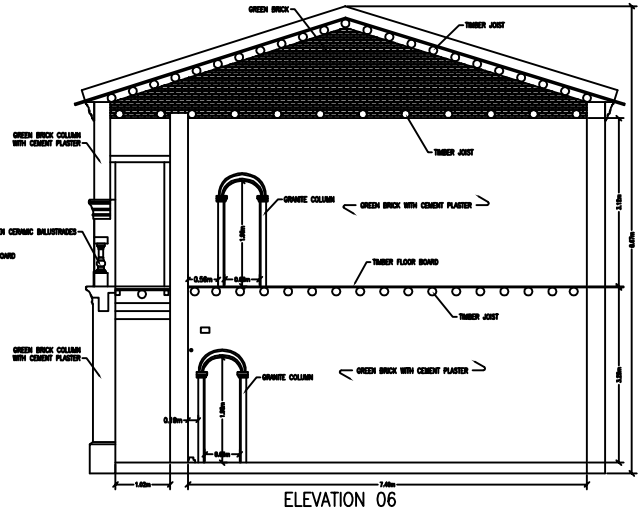
DATE OF SURVEY : AUGUST 2006

陳達榮測量師行有限公司
TED CHAN & ASSOCIATES LIMITED
Authorized Land Surveyors

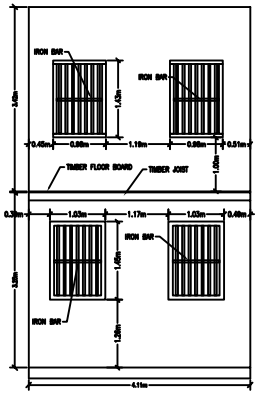
PLAN NO.:	
TCHK4455/EV/03	



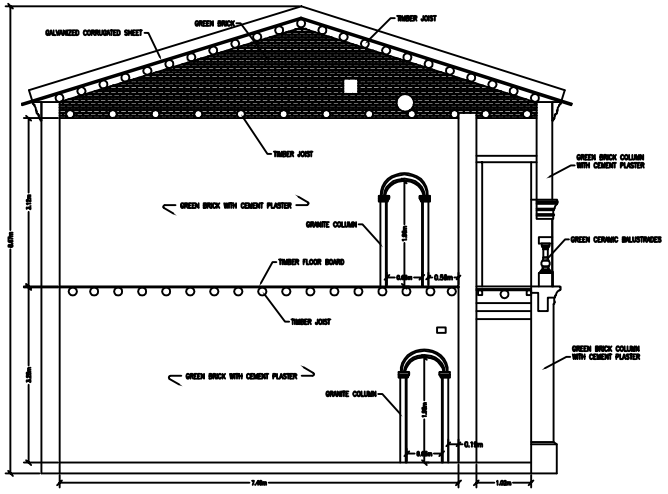
ELEVATION 05



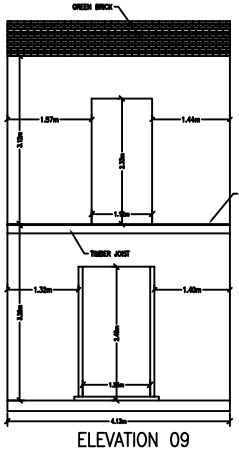
ELEVATION 06



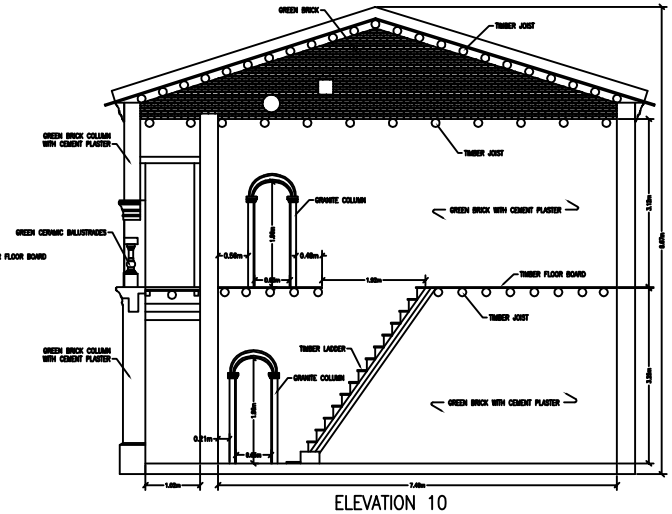
ELEVATION 07



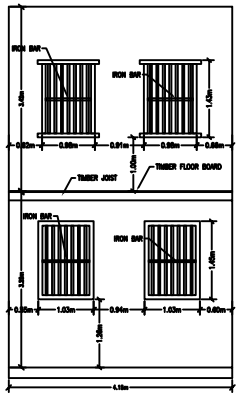
ELEVATION 08



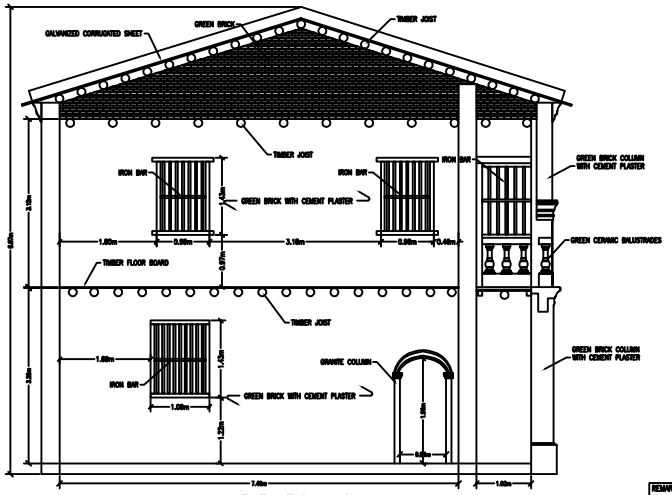
ELEVATION 09



ELEVATION 10



ELEVATION 11



ELEVATION 12

REMARK :

ALL UNITS ARE IN METERS

ANTIQUITIES AND MONUMENTS OFFICE

CARTOGRAPHIC SURVEY OF IP TING-SZ HOUSE AT
LIN MA HANG, NORTH DISTRICT
ELEVATIONS III

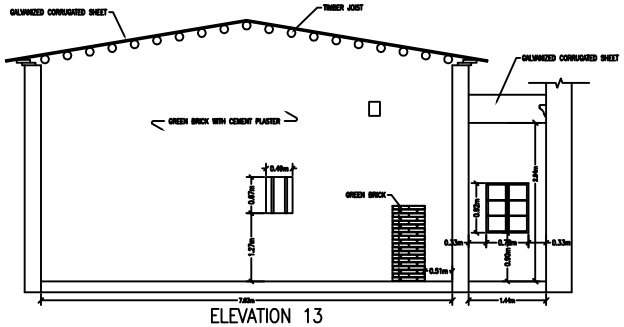
SCALE 1 : 50 (A1)	SCALE 1 : 100 (A3)

DATE OF SURVEY : AUGUST 2006

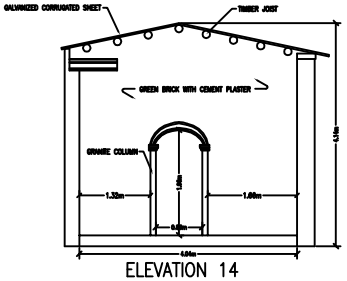
陳達榮測量師行有限公司
TED CHAN & ASSOCIATES LIMITED
Authorized Land Surveyors

PLAN NO.:

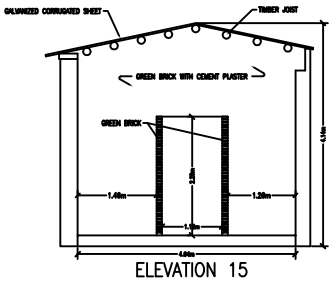
TCHK4455/EV/04



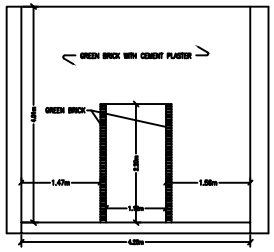
ELEVATION 13



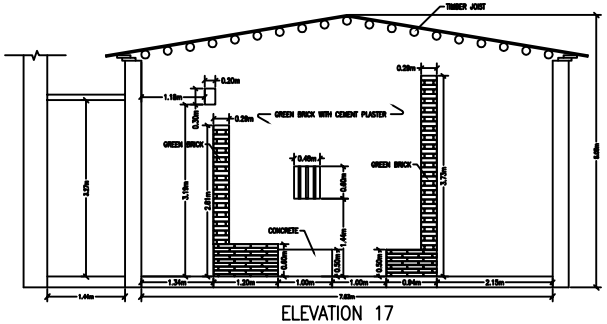
ELEVATION 14



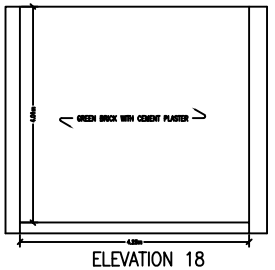
ELEVATION 15



ELEVATION 16



ELEVATION 17



ELEVATION 18

REMARK :

ALL UNITS ARE IN METERS

ANTIQUITIES AND MONUMENTS OFFICE

CARTOGRAPHIC SURVEY OF IP TING-SZ HOUSE AT
LIN MA HANG, NORTH DISTRICT
BUILDING SECTIONS

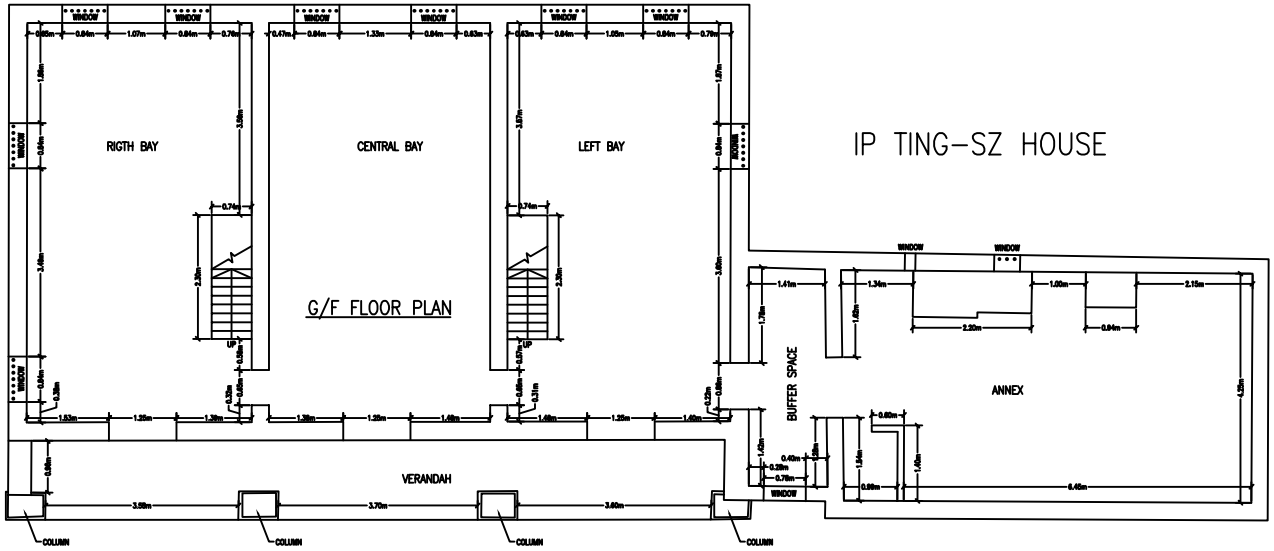
SCALE 1 : 50 (A1) | SCALE 1 : 100 (A3)

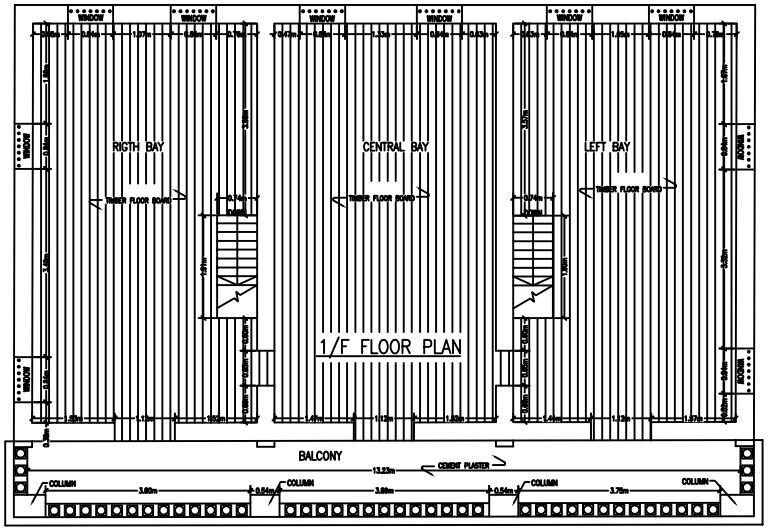
DATE OF SURVEY : AUGUST 2006

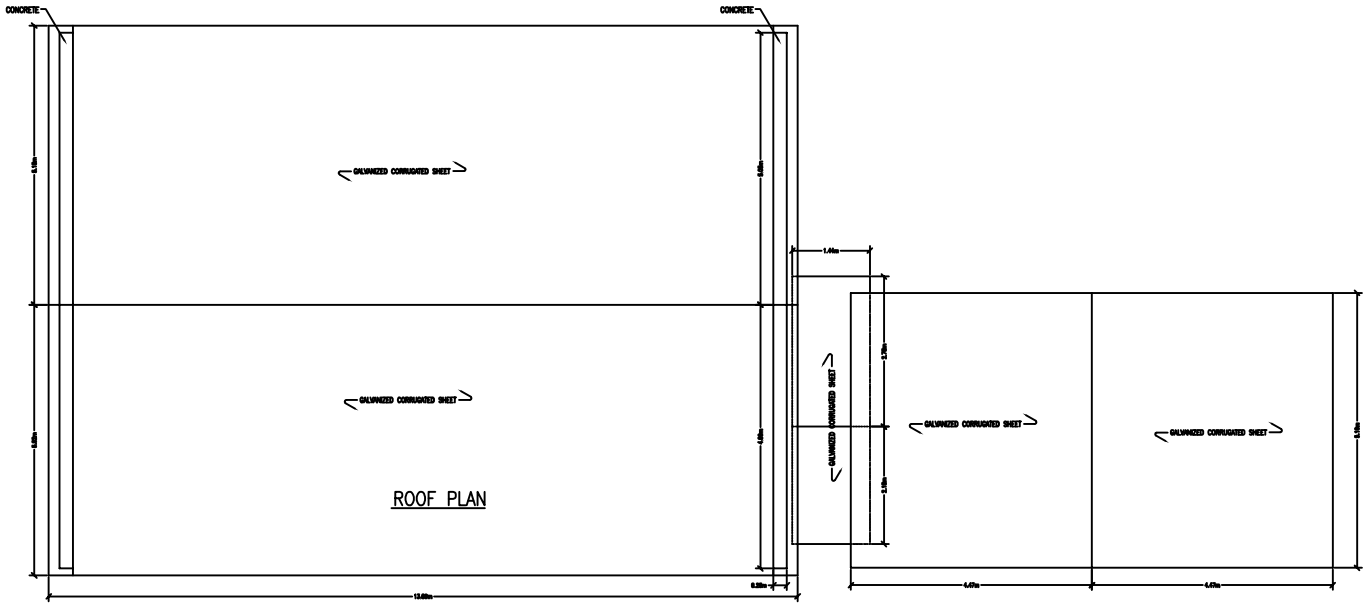
陳達榮測量師行有限公司
TED CHAN & ASSOCIATES LIMITED
Authorized Land Surveyors

PLAN NO.:
TCHK4455/EV/05

IP TING-SZ HOUSE







REMARK :

ALL UNITS ARE IN METERS

ANTIQUITIES AND MONUMENTS OFFICE

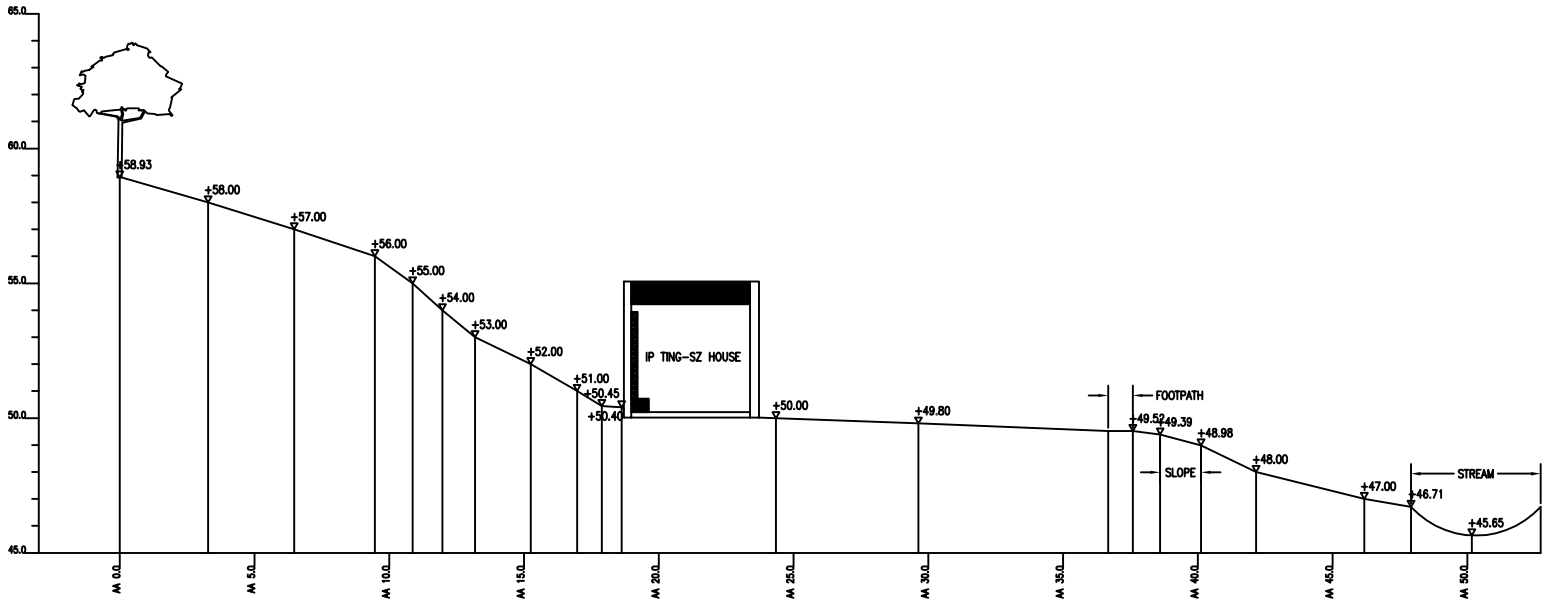
CARTOGRAPHIC SURVEY OF IP TING-SZ HOUSE AT
LIN MA HANG, NORTH DISTRICT
BUILDING PLANS I

SCALE 1 : 50 (A1)	SCALE 1 : 100 (A3)

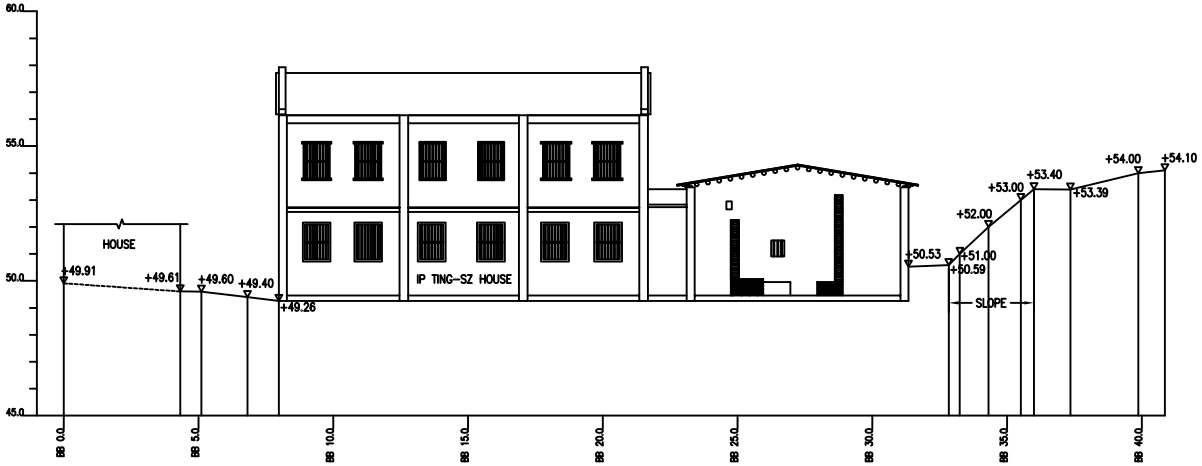
DATE OF SURVEY : AUGUST 2006

陳達榮測量師行有限公司
TED CHAN & ASSOCIATES LIMITED
Authorized Land Surveyors

PLAN NO.:
TCHK4455/FP/01



SECTION A–A



SECTION B–B

REMARK :
PRINCIPAL DATUM HONG KONG
ALL UNITS ARE IN METERS

ANTIQUITIES AND MONUMENTS OFFICE

CARTOGRAPHIC SURVEY OF IP TING-SZ HOUSE AT
LIN MA HANG, NORTH DISTRICT
SITE SECTIONS

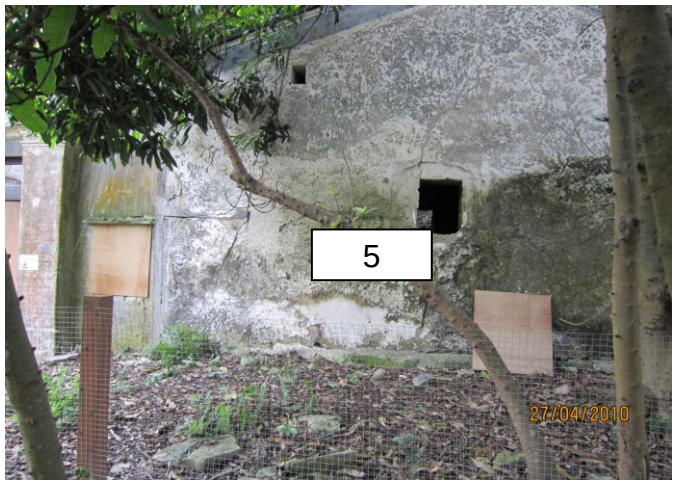
SCALE 1 : 100 (A1) | SCALE 1 : 200 (A3)

DATE OF SURVEY : AUGUST 2006

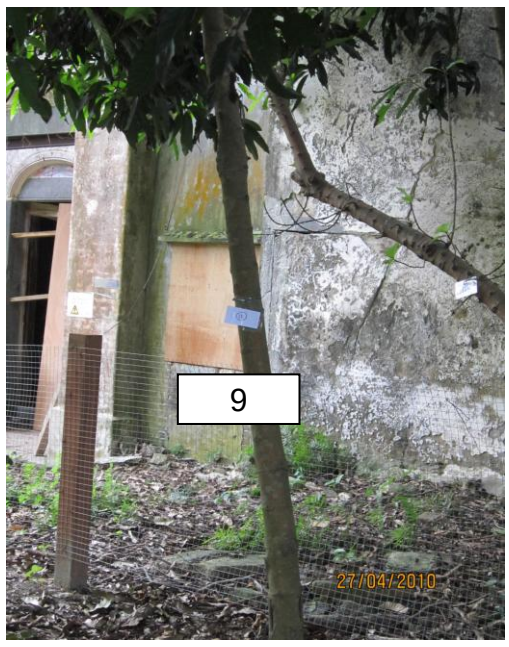
陳達榮測量師行有限公司
TED CHAN & ASSOCIATES LIMITED
Authorized Land Surveyors

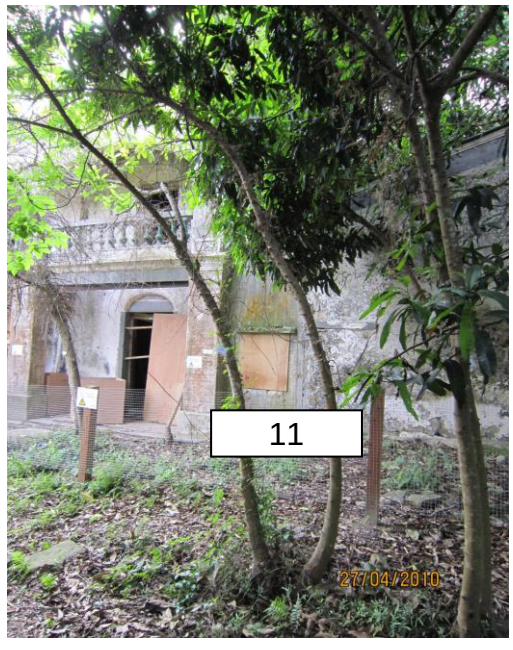
PLAN NO.:
TCHK4455/SE/01

APPENDIX B
PHOTOGRAPHIC RECORDS OF VEGETATION

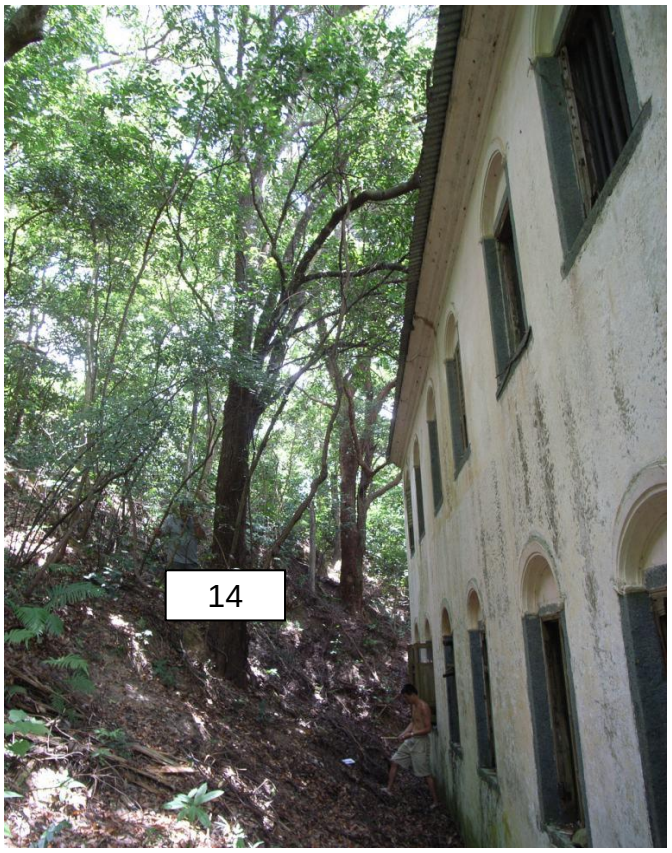


CINOTECH 漢臻 consultants limited	Quotation Ref.: AMO0911013 Consultancy for Ecological Study at the Residence of Ip Ting-sz, Lin Ma Hang, Closed Area Photographic Records of Surveyed Plants	SCALE N.T.S.	DATE July 2010
		Project No. IA0004	Appendix B-1





CINOTECH 漢臻 consultants limited	Quotation Ref.: AMO0911013 Consultancy for Ecological Study at the Residence of Ip Ting-sz, Lin Ma Hang, Closed Area Photographic Records of Surveyed Plants	SCALE N.T.S. Project No. IA0004	DATE July 2010 Appendix B-2



CINOTECH 漢臻 consultants limited	Quotation Ref.: AMO0911013 Consultancy for Ecological Study at the Residence of Ip Ting-sz, Lin Ma Hang, Closed Area Photographic Records of Surveyed Plants	SCALE N.T.S. Project No. IA0004	DATE July 2010 Appendix B-3

APPENDIX C
SURVEY RESULTS OF VEGETATION

Consultancy for Ecological Study at the Residence of Ip Ting-sz, Lin Ma Hang, Closed Area

Appendix C - Survey Results of Vegetation

Tree No.	Tree species		Tree Size			Form	Health Condition	Amenity Value	Survival Rate after Transplanting	Recommendation (Retain/Transplant/ Fell)	Remark
	Botanical Name	Chinese Name	Overall Height (m)	Trunk Diameter (cm)	Average Crown Spread (m)						
1	*Dracaena marginata*	紅邊鐵樹	2.0	3.0	1.1	Good	Medium	Low	High	Fell	
2	*Dracaena marginata*	紅邊鐵樹	3.6	1.5	2.0	Good	Medium	Low	High	Fell	
3	*Mangifera indica*	芒果	5.8	9.5	3.8	Medium	Medium	Medium	Medium	Fell	
4	*Mangifera indica*	芒果	10.9	12.4	6.5	Good	Medium	Medium	Medium	Retain	
5	*Ficus hispida*	對葉榕	6.0	8.5	2.9	Poor	Poor	Low	Low	Fell	
6	*Ficus hispida*	對葉榕	8.1	16.0	4.0	Poor	Poor	Low	Low	Fell	
7	*Ficus hispida*	對葉榕	5.5	10.0	2.8	Medium	Poor	Low	Low	Fell	
8	*Ficus hispida*	對葉榕	5.5	7.0	2.9	Poor	Poor	Low	Low	Fell	
9	*Ficus hispida*	對葉榕	5.5	6.0	3.0	Poor	Poor	Low	Low	Fell	
10	*Ficus hispida*	對葉榕	5.3	6.0	2.5	Poor	Poor	Low	Low	Fell	
11	*Ficus hispida*	對葉榕	4.9	6.0	2.5	Poor	Poor	Low	Low	Fell	
12	*Ficus hispida*	對葉榕	4.2	5.0	1.6	Poor	Poor	Low	Low	Fell	
13	*Ficus hispida*	對葉榕	4.3	14.0	4.7	Poor	Poor	Low	Low	Fell	
14	*Cinnamomum camphora*	樟	13.5	46.0	14.0	Good	Good	Medium	Low	Retain	Pruning required
15	*Cinnamomum camphora*	樟	12.6	54.0	13.0	Good	Good	Medium	Low	Retain	Pruning required

APPENDIX D
MITIGATION AND COMPENSATION MEASURES

APPENDIX D: MITIGATION AND COMPENSATION MEASURES

Preservation of Existing Roosts – Guidelines for Bat Habitat at the Kitchen Annex of the Ip Ting-sz Residence

Purposed preservation of Kitchen Annex of the Residence as a bat habitat may be considered as an environmental conservation measure for bats to roost inside. In Europe, a high percentage of bat species roost for at least part of each year in buildings. Buildings of cultural heritage importance are often of particular importance for bats. These structures, like the Residence, may be protected in their own right leading to conflict between building conservation work and bat conservation.

In view of the experience of compromise between human development and survival right of bats in Europe, it is essential that the requirement of bats and their potential nuisance to human are considered thoughtfully in project design. Monitoring of success should be built into the method statement and is important because it contributes to our understanding of the factors that determine success or failure.

The information presented in this Appendix are summarised from documents published by English Nature, UNEP/EUROBATS and Kadoorie Farm and Botanic Garden (KFBG), in order to offer the project proponent with sufficient information for preserving the Kitchen Annex as a bat habitat. The followings are the design principles need to be considered when developing a proposal for in-situ roost conservation:

Roost Requirements

- Apart from the timing of the works, the two most critical issues in maintaining a roost in-situ are the size and suitability of the final roost and the disposition of the entrances and flight paths, including the location of any exterior lighting. Bats have regular flight path that they will use for travelling between roosting and foraging site. Since only minimum repairing works at the external wall and corrugated roof will be carried out at the Kitchen Annex, window openings will be kept and door opening will be provided with bat-friendly gating system, a stable internal and external layout would be retained so the bats can continue to follow any potential flight paths entering this habitat.
- Bats prefer to fly in dark areas straight into vegetation, so external lighting on the site should be minimised. Any lighting equipment in the Main Building should be turned off after each day of work.
- Bats are known to change their position within the roost during the day for a preferred roosting/breeding condition. Commodious roof with sufficient flying space is preferred. Structure/texture of the roof should provide the bats with adequate foothold/landing surface (e.g. rough timber surface).
- While human are prohibited to enter the Kitchen Annex, possible access of the bats including windows and doors at the Kitchen Annex should be maintained.
- No lighting at the Kitchen Annex is proposed for this project, both during construction period or during the management phase, so that no lighting will affect the bats roosting in the kitchen.
- Any paint or material used (including Synthetic lacquers proposed) in the Kitchen Annex should be non-toxic and odour free and anti-termite liquid will be used to treat structural

timbers in the Main House only.

Avoidance of Damage to Interior Structure

- Bats flying around within an occupied building can sometimes be a cause of nuisance or concern. Furthermore, bat excreta may cause damage to vulnerable objects and furnishings in building.
- The most vulnerable structure to be damaged by the bats is the floor in the Kitchen Annex. Droppings, over a protracted period of time, may cause pitting, long-term staining and etching to the floor surface. A polythene sheet covering the floor surface may be used to fix this problem. Covers need only be used during the period when bats are present and can be removed for easy cleaning. Alternatively, synthetic lacquers can be used to coat on the surface below the roost as it offer some protection against bat damage and may be acceptable on historically insignificant objects.

Concern of Hygiene to the User in the Main Building

- Bats are considered a hygiene issue when large piles of bat droppings (guano) accumulate. However, it is suggested by KFBG that good ventilation will prevent a build up of bacteria and fungi. A layer of plastic sheeting below the roost site will allow the guano to be safely removed from the building. Nevertheless, reports of human contracting bat-associated disease are very rare.

Avoidance of Direct Human Disturbance

- Although conservationists in general often prefer to keep the location of important, unprotected sites secret, sensible use of site notices can be an effective way of alerting developers and local community to the importance of the building. The notice may usefully state the legal provisions under which bats are protected and provide contact details for the relevant statutory nature conservation authority. If the site is only important for bats for part of the year, the notice could explain this as well.
- Consideration should be given to making the building as resistant to damage by vandalism as possible. At the entrance opening to the Kitchen Annex, gate with horizontal bars will be installed to restrict human entry. Spaces between bars will be large enough to allow bat's flight; rainwater goods can be carried internally; flammable materials that can be reached from ground level should be avoided. Planting thorny shrubs around the building may help to discourage trespass by making access difficult.

Reference

Fauna Conservation Department, KFBG 2006. Focus on Hong Kong bats: their conservation and the law. 2nd edition. Fauna Conservation Department, Kadoorie Farm & Botanic Garden Corporation, Tai Po, Hong Kong.

Phil Richardson. 2003. Bats and Wildlife Corridors. The National Trust. (http://www.nationaltrust.org.uk/main/w-bat08_wildlifecorridors.pdf)

Marnell, F. & P. Presetnik 2010. Protection of overground roosts for bats (particularly roosts in buildings of cultural heritage importance). EUROBATS Publication Series No.4 (English version). UNEP/EUROBATS Secretariat, Bonn, Germany, 57pp.

Mitchell-Jones, A. J. 2004. Bat mitigation guidelines. English Nature, Peterborough, UK, 74pp.

Appendix VI | Summary of Mitigation Measures

Summary of Mitigation Measures

Major Restoration to the Residence of Ip Ting-sz

Project Profile Sections	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the Measure(s)?	Location of the Measure	When to implement the measure?	What requirements or standards of ordinance/ guidelines for the measure to achieve?
5.2.1	Apply the Section 6 Permit of the Antiquities and Monuments Ordinance (Cap.53)	As the Residence of Ip Ting-sz is a declared monument, permit will be obtained from the Antiquities Authority before any work may commence on-site	AMO	Residence of Ip Ting-sz	Before the commencement of the project	Antiquities and Monuments Ordinance (Cap.53)
5.2.2 (i)	Works carried out shall match the original design	To preserve the historical and architectural significance of the Residence	Contractor	Site area	During the construction period	---
5.2.2 (ii)	All colours for painting and materials employed must be approved by the AMO	To preserve the historical and architectural significance of the Residence	Contractor and AMO	Site area	During the construction period	---
5.2.2 (iii)	Employ experienced craftsmen and artists	To preserve the historical and architectural significance of the Residence	Contractor	Site area	During the construction period	---
5.2.2 (iv) & (v)	Keep record of material and means adopted in the project	For future maintenance purpose	Contractor and AMO	Site area	During and after the construction period	---
5.2.3	Overlay plywood sheets with flexible/elastic underlay as a temporary protection to the Old Bridge	To protect the Old Bridge (proposed grade 3 historic structure) across the Lin Ma Hang Stream	Contractor	The Bridge	During the construction period	---

Project Profile Sections	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the Measure(s)?	Location of the Measure	When to implement the measure?	What requirements or standards of ordinance/ guidelines for the measure to achieve?
5.3.1	Use of hand-held tools	To minimize noise impact due to demolition	Contractor	Site area	During the construction period	---
5.3.2	Implement noise mitigation measures (e.g. use quieter tools)	To minimize noise impact due to demolition and construction	Contractor	Site area	During the construction period	Noise Control Ordinance
5.3.3	No works will be carried out during 6 p.m. to 8 a.m. and any time on Sundays and General Holidays	To minimize the noise impacts at sensitive hours	Contractor	Site area	During the construction period	Noise Control Ordinance
5.4.1 (i)	Use basket and the like to carry debris from the roof to ground level for disposal	To minimize the dust problem created by the demolishing works	Contractor	Site area	During the construction period	Air Pollution Control (Construction Dust) Regulations
5.4.1 (ii)	Regularly dampen the floor	To avoid spread of dust during the hacking-up of and removing of floor finishes	Contractor	Site area	During the construction period	Air Pollution Control (Construction Dust) Regulations
5.4.1 (iii)	Water spray	To minimize the dust problem caused by the demolishing works, drilling, cutting polishing or other small-scaled mechanical breaking	Contractor	Site area	During the construction period	Air Pollution Control (Construction Dust) Regulations
5.5.1	Construction and demolition material would transport to the landfill site	To minimize the impacts from waste disposal	Contractor	Site area	During the construction period	Waste Disposal Ordinance

Project Profile Sections	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the Measure(s)?	Location of the Measure	When to implement the measure?	What requirements or standards of ordinance/ guidelines for the measure to achieve?
5.5.1	Any loose materials, sand, salvage, builders rubbish, etc , acrossing the bridge must be first carefully wrapped up in heavy duty PVC sheeting	To minimize the impacts of waste disposal and to avoid causing any disturbance to the Lin Ma Hang Stream SSSI	Contractor	The Bridge	During the construction period	----
5.6.1	Waste water would be stored and filtered before discharge into drains	To minimize the impacts of waste water and to avoid waste water drained to the Lin Ma Hang Stream SSSI	Contractor	Site area	During the construction period	Water Pollution Control Ordinance
5.6.1	Placing sand bags along the edge of the hoardings	To prevent waste water generated from the works site from discharging into the SSSI Stream	Contractor	Site area	During the construction period	ETWB TC No. 5/2005 “Protection of Natural Stream/Rivers from adverse impact arising from construction works”
5.6.1	Maximise the distance between the hoarding and the stream	To prevent waste water generated from the works site from discharging into the SSSI Stream	Contractor	Site area	During the construction period	---
5.6.2	Stockpiling of construction materials will be minimised and properly covered and located away from the SSSI Stream	To prevent any surface run-off from discharging directly into the SSSI Stream	Contractor	Site area	During the construction period	ETWB TC No. 5/2005 “Protection of Natural Stream/Rivers from adverse impact arising from construction works”
5.6.2	Construction debris and spoil will be covered up and/ or properly disposed of as soon as possible	To avoid construction debris and spoil being washed into the SSSI Stream	Contractor	Site area	During the construction period	ETWB TC No. 5/2005 “Protection of Natural Stream/Rivers from adverse impact arising from construction works”

Project Profile Sections	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the Measure(s)?	Location of the Measure	When to implement the measure?	What requirements or standards of ordinance/ guidelines for the measure to achieve?
5.7.1 (i)	Renovation works mainly within the Residence	Avoid direct and indirect impacts on the stream, its catchment and associated woodland habitats	Contractor and AMO	Site area	During the design and construction period	---
5.7.1 (ii)	The proposed works will be scheduled during dry season when bats leave the Residence for hibernation	To minimize potential impact on bats	Contractor and AMO	Site area	During the planning and construction period	---
5.7.1 (iii) and (iv)	Maintain the roosting site for bat at the Kitchen Annex	To provide improved roosting site for bats to compensate for the impacts to the bat's habitat in the Main Building	Contractor and AMO	Site area	During the design and construction period	---
5.7.1 (iv)	Minimum repairing works in the Kitchen Annex	To minimize potential impact to the habitat of bats	Contractor and AMO	Site area	During the design and construction period	---
5.7.1 (vi)	Do not put any furniture inside the annex block	To prevent damages to the interior of the annex	AMO	Site area	After the construction period	---
5.7.1 (vi)	Visitors are prohibited from entering the annex	For hygienic reason and to minimise human disturbance to bat maternity roost	AMO	Site area	After the construction period	---
5.7.1 (vii)	Provide the opening at Kitchen Annex with a bat-friendly gate	To control human access and at the same time to allow bat's flight	Contractor and AMO	Site area	During the design and construction period	---