

## **10.0 LANDSCAPE AND VISUAL**

### **10.1 Background**

10.1.1 The landscape and visual impact assessment has the broad objectives to outline the baseline conditions, identify sensitive receivers, assess impacts and recommend suitable mitigation measures during construction and operation of the proposed sewerage network.

10.1.2 The methodology for undertaking the landscape and visual impact assessment is in general accordance with Annexes 10 and 18 of the TMEIA and is discussed in detail in the following sections.

### **10.2 Landscape Impact Assessment Methodology**

10.2.1 The assessment of the potential landscape impacts of the proposed works on the existing landscape comprises two distinct sections as follows:

- baseline survey; and
- potential landscape impacts assessment.

10.2.2 A baseline survey of the existing landscape character and quality has been undertaken from a combination of site inspections and desktop surveys. The landscape elements considered during the baseline assessment include the following factors:

- local topography;
- woodland and other vegetation types;
- built form, land use and patterns of settlement;
- scenic spots;
- details of local materials, architectural styles and street scapes;
- prominent watercourses; and
- cultural and religious identity.

10.2.3 The baseline survey forms the basis of the landscape context by describing broadly homogenous units of similar character (Landscape Character Units). The landscape character is rated into low, medium or high depending, not only upon the quality of the landscape elements present, but also according to their sensitivity to change and local or regional importance.

10.2.4 The assessment of the potential landscape impacts of the proposed development will result from the identification of the sources and magnitude of impacts that would be generated during construction and operation of the sewerage works and the identification of the principal landscape impacts, primarily in consideration of the degree of change to the baseline conditions. The overall landscape impact is a product of the following factors:

- the landscape character and its sensitivity / quality;
- source and nature of potential impacts;
- the magnitude of change caused by each of the impacts to the existing landscape;

- tolerance of the landscape to absorb the change;
- significance of this change in consideration of the local and regional areas and other developments;
- cumulative effects on the landscape of this and neighbouring proposals; and
- identification of plant species of significant value which should be conserved.

10.2.5 The sensitivity / quality of the landscape is assessed as follows:

- (i) High: important components or landscape of particularly distinctive character susceptible to relatively small changes;
- (ii) Medium: a landscape or moderately valued characteristics reasonably tolerant to change; and
- (iii) Low: a relatively unimportant landscape able to absorb significant change.

10.2.6 The magnitude of the change in the landscape is classified as follows:

- (i) High: notable change in the landscape characteristics over an extensive area ranging to very intensive change over a more limited area;
- (ii) Moderate: moderate changes in a localised area; and
- (iii) Low: virtually imperceptible change in any components of the landscape.

10.2.7 The significance threshold is considered as follows:

- (i) Significant: adverse / beneficial impact where the proposal would cause significant deterioration or improvement in existing landscape quality;
- (ii) Moderate: adverse / beneficial impact where the proposal would cause a noticeable deterioration or improvement in existing landscape quality;
- (iii) Slight: adverse / beneficial impact where the proposal would cause a barely perceptible deterioration or improvement in the existing landscape quality; and
- (iv) Negligible: no discernible change in the existing landscape quality.

10.2.8 Based upon the definitions of the significance threshold, the analysis of the significance threshold in relation to the magnitude of change predicted is based on the matrix given in Table 10.1 below:

**Table 10.1 Impact Matrix**

Magnitude of Change	Sensitivity / Quality		
	Low	Medium	High
Low	Slight Impact	Slight/Moderate Impact	Moderate Impact
Moderate	Slight/Moderate Impact	Moderate Impact	Moderate/ Significant Impact
High	Moderate Impact	Moderate/ Significant Impact	Significant Impact

### 10.3 Visual Impact Assessment Methodology

10.3.1 Similar to the landscape impact assessment, the assessment of the potential visual impacts of the proposed works has two distinct stages as follows:

- baseline survey; and
- visual impact assessment.

10.3.2 The baseline survey of views towards the proposed development is carried out by identifying the following two key elements:

- (i) the visual envelope within which the proposed development may be contained either wholly or partially within views, including indirect effects such as temporary contractor's works areas; and
- (ii) the visually sensitive receivers (VSRs) within the visual envelope whose views will be affected by the scheme. The sensitivity of each VSR group is also influenced by the distance and direction of view to the proposed development.

10.3.3 The potential receivers are divided into three groups:

- views from residences. This group is the most sensitive due to the high potential intrusion on the visual amenity and quality of life;
- views from workplaces. This group including e.g. schools, institutions and factories are less sensitive than (i) since visual amenity is less important within the work environment; and
- views from public areas not included in (i) or (ii). This group includes, e.g., public parks, footpaths, roads etc. Sensitivity of this group is relatively low and will depend on the transitory nature of the receiver with views being typically glimpsed rather than sustained for long periods.

10.3.4 The baseline survey describes and records by photograph typical views from within each of the visual envelopes to form the basis of the visual character and quality of the sites and both present and future VSRs are considered. The sensitivity of each receiver group and quality of views is classed in accordance to the following criteria:

- (i) High - for example, residential properties;
- (ii) Medium - for example, recreational facilities or partially screened views; and,
- (iii) Low - for example, workplaces, schools etc.

10.3.5 The assessment of potential visual impacts results from the identification of the sources of visual impacts and their magnitude that would be generated during construction and operation of the sewerage improvement works and the identification of the principal visual impacts with particular consideration given to the degree of change to the baseline conditions.

10.3.6 The impact assessment comprises the comparison of the typical existing views identified in the baseline survey of the key receiver groups and the potential views after the sewerage works are complete. The visual impact results from the consideration of the following factors:

- character of existing view;
- quality of existing view;
- context, location and distance of the VSR;
- duration of the potential impacts;
- visual receiver group sensitivity;
- number of viewers at VSR group;
- degree of change to existing views; and
- other views available to visual receiver group and cumulative effects on views of this and other neighbouring developments.

10.3.7 The magnitude of change to the views is classified as follows:

- (i) High - for example, the majority of viewers affected / major changes in view;
- (ii) Moderate - for example, many viewers affected / moderate change in view; and,
- (iii) Low - for example, few viewers affected / minor change in view.

10.3.8 The visual significance threshold is rated in a similar fashion to the landscape impact described in 10.2.4 above, that is, significant, moderate, slight and negligible. The impacts may be beneficial or adverse. The analysis of the visual significance threshold, the correlation between magnitude of change and sensitivity / quality, is also based on the matrix detailed in Table 10.1.

#### **10.4 Methodology for the Determination of Mitigation Measures**

10.4.1 The identification of the landscape and visual impacts will highlight those sources of conflict requiring design solutions or modifications to reduce the impacts and, if possible, blend the development with the surrounding landscape. The proposed landscape mitigation measures are described and illustrated by means of site plans and simple photomontage and will take into account factors including;

- C new screen planting to pumping station compounds;
- C the feasibility of tree transplanting;
- C rerouting of sewerage mains away from woodland or areas with mature vegetation of important landscape and visual amenity; and
- C design of pumping station buildings and boundary walls/fences to reflect architectural features, colours etc. of adjoining village properties.

## **10.5 Methodology for the Determination of Residual Impacts**

10.5.1 Residual impacts are those impacts remaining after the proposed mitigation measures have been implemented. This is often 10 to 15 years after operation commences when the planting mitigation measures are deemed to have reached a level of maturity which allows them to perform their original design objectives.

10.5.2 The significance threshold is derived from the magnitude of change which the proposals will cause to the view which would have existed during this period if the proposed scheme had not been constructed, together with its ability to tolerate change. The ability to tolerate change is described as its quality and sensitivity, taking into account the beneficial effects of the proposed mitigation. Thus, the significance threshold can be derived from the matrix provided in Table 10.1 above.

10.5.3 The overall significance threshold for the proposed development is defined in accordance with the following criteria:

- (i) *Beneficial* - the project will complement the landscape and visual character of its setting, will follow the relevant planning objectives and will improve overall landscape and visual quality;
- (ii) *Acceptable* - there will be no significant effects on the landscape, no significant visual effects caused by the appearance of the project or no interference with key views;
- (iii) *Acceptable with mitigation measures* - there are some adverse effects, but these can be eliminated, reduced or offset to a large extent by specific measures;
- (iv) *Unacceptable* - the adverse effects are considered too excessive and would not be reduced to an acceptable level by mitigation; and
- (v) *Undetermined* - significant adverse effects are likely but the extent to which they may occur or may be mitigated cannot be determined from the study. Further detailed study will be required for the specific effects in question.

## **10.6 Baseline Conditions and Impacts**

10.6.1 For the purposes of survey and impact assessment, the Study Area has been divided into the four main portions comprising the following:

- C Area 1: Lok Chui Street and Pumping Station at Castle Peak Villas;

- C Area 2: Tai Lam Valley;
- C Area 3: Tai Lam Chung Correctional Institution, Tai Lam Chung Tsuen, Luen On San Tsuen, Wong Uk Tsuen and Wu Uk Tsuen; and
- C Area 4: So Kwun Wat Tsuen and So Kwun Wat San Tsuen.

10.6.2 These four areas, together with the boundaries of the Landscape Character Units (LCUs) and visual envelopes are shown in Drawings 10.1, 10.2 and 10.3 for Areas 1, 2 & 3 and 4 respectively.

10.6.3 Generally, the works will comprise laying of sewer mains and construction of sewage pumping stations. One feature common to all portions of the works is that the majority of the mains will be laid under existing roads or footpaths. Accordingly, with a few exceptions discussed separately below, pipe laying will only cause temporary impacts during construction and will not cause landscape or visual impacts upon completion unless tree felling is involved. The main landscape and visual impacts are expected to arise instead from the permanent intrusion of the pumping stations and compounds. For reference, the dimensions of the six proposed pumping stations are provided in Table 10.2 below.

**Table 10.2 Proposed Pumping Station Dimensions**

Location of proposed pumping station	Overall Height (m)	Overall Width (m)	Overall Length (m)
Tai Lam Correctional Institute	6.3	5.0	12.0
Luen On San Tsuen	6.7	7.0	10.5
Tai Lam Chung Tsuen	6.6	12.7	17.2
Tai Lam Valley	6.7	13.0	19.0
So Kwun Wat Tsuen	6.7	13.0	13.0
Castle Peak Villa	6.7	10.0	11.2

10.6.4 The baseline conditions, review of the planning and development control framework and assessment of the landscape and visual impacts associated with the project are discussed in the following sections.

## 10.7 Review of Planning and Development Control Framework

10.7.1 Area 1, comprising laying of sewer mains under Lok Chui Street footpath and construction of a pumping station opposite the Tsing Lai Wan Villas, is located in Planning Area 59 of the Tuen Mun OZP No. S/TM/11. The mains and pumping station lie within an area zoned ‘R(B)’, that is, a site predominantly intended for lower density residential developments on the periphery of the New Town. In addition, a small area zoned OU at the western end of Lok Chui Street is for supermarket, restaurant and other commercial and recreational facilities. As the proposed pumping station works do not encroach on to the ‘OU’ site or any proposed residential development, no planning conflict is foreseen.

10.7.2 Area 2 includes the construction of Tai Lam Valley pumping station and laying of sewer mains

along the western side of the Tai Lam Chung Nullah and under a section of Castle Peak Road footpath as far as Siu Lam. The majority of the pipe alignment lies within an area zoned Green Belt on the So Kwun Wat Draft OZP No. S/TM-SKW/3. There is a general presumption against development within the Green Belt. However, the proposed sewerage improvement works is concentrated on derelict land, under footpaths and on reclamation and should not conflict significantly with the natural setting. Furthermore, the works are consistent with the planning intention of stimulating physical upgrading of the area.

10.7.3 In Area 3 the sewerage improvement works connect the Tai Lam Correctional Institute and four villages, namely Tai Lam Chung Tsuen, Luen On San Tsuen, Wong Uk and Wu Uk. The Correctional Institute site is zoned 'G/IC' on the So Kwun Wat Draft OZP and as the pumping station is located in a car park / former workshop compound, it will not conflict with the planning intention for this area. The other two proposed pumping stations at Tai Lam Chung Tsuen and Luen On San Tsuen are located within the zoned village areas. The planning intention to concentrate development, including provision of infrastructure and services, within the 'V' zones is consistent with the proposed sewerage improvement works. The pumping station site at Luen On San Tsuen abuts the former container storage area, now zoned 'CDA' and a preliminary design for private housing development has been prepared for the CDA site. However, since the pumping station is located unobtrusively within the village and is required to support new sewerage demands from new development, it is not anticipated that there will be any planning conflict with the CDA development.

10.7.4 Area 4 comprises construction of a pumping station at So Kwun Wat village and laying of mains under So Kwun Wat Road and various existing footpaths connecting the satellite villages within the So Kwun Wat Valley. The pumping station site and the majority of the pipeline lie within an area zoned 'V' on the So Kwun Wat Draft OZP. As with Area 3 above, the planning intention to concentrate development, including provision of infrastructure and services, within the 'V' zones is consistent with the proposed sewerage improvement works. Short sections of the pipe alignment lie within areas zoned as Green Belt at the upper and lower ends of the route. No conflict with the planning intention is anticipated as the route is located under existing roads and paths and will not interfere with the natural setting.

## **10.8 Impact Assessment - Area 1 (LCU 1) : Lok Chui Street and Pumping Station at Castle Peak Villas**

10.8.1 The proposed pipe mains are located in footpaths leading from Lok Yi Street and Lok Chui Street and converging at the pumping station located adjacent to the middle of the road loop, opposite to Tsing Lai Wan Villas, as shown on the location plans Drawings 10.1 and 10.4. The landscape and visual character of LCU 1 is dominated by the line of low-rise villas and the continuous 3m high blank boundary walls to the north of Lok Chui Street (refer to Photograph A on Drawing 10.5). In contrast, the undeveloped area to the south between Lok Chui Street and the beach, proposed to accommodate the pumping station, is entirely vegetated by small copses, dominated by the species *Casuarina equisetifolia*, *Bridelia monoica*, *Macaranga tanarius* and *Leucena leucocephala*, with mainly tangled understorey of typical coastal scrub, vines and grass species.

### **Construction Stage Impacts**

10.8.2 During construction, approximately 400m<sup>2</sup> of scrub vegetation of low ecological importance will be lost within the pumping station 'footprint'. Trenching for the sewerage mains will be located in the footpath and will not require vegetation clearance. Upon completion the trenching works will not be visible.

### **Operational Impacts**

10.8.3 Unlike the trenching works, the new pumping station will be a permanent intrusion into the vegetated beach hinterland area. It will intrude into the seaward views of the Tsing Lai Wan Villas development, particularly residential block numbers E8 to E12 and C1, as well as landward views of beachgoers. However, since the proposed pumping station will be at a lower level than the villas to the north and partly screened from the beach by tall scrub vegetation, the actual obstruction of views should be limited, as shown in Photograph A in Drawing 10.5 and in the before and after photograph / photomontage in Drawing 10.6 and 10.6A.

### **Significance Threshold**

10.8.4 Based on the above, the landscape sensitivity / quality of the site is considered to be medium and the magnitude of change moderate. Accordingly, the landscape significance threshold within LCU 1 during construction and operation is moderate adverse. The visual sensitivity is considered to be high due to the proximity of VSRs in residential areas. Beachgoers are rated as having medium sensitivity. However, few viewers are affected by the change in view and the magnitude of change is, therefore, low for both residents and beachgoers. Accordingly, the visual significance threshold during construction and operation is moderate adverse for residents and slight to moderate adverse for beachgoers.

### **Impact Mitigation**

10.8.5 To help integrate the proposed pumping station into this environment as seen from the villas, roadside and beach, a number of impact mitigation measures are proposed:

- C use of a suitable colour scheme and external detailing to the pump station building to match the design of the adjacent villas;
- C construction of boundary wall similar to the adjacent housing instead of standard chain link and barbed wire fence;
- C planting of trees and shrubs to the boundary of the pumping station compound; and
- C any good excavated topsoil should be stored carefully on site and used for screen planting.

10.8.6 Specific reference is also made to the large tree, *Eucalyptus robusta*, shown in the Photograph B of Drawing 10.5 to the east of the pumping station site. Damaging to the rootball of the tree should be minimised during excavation works, as highlighted in Photograph B.

## **10.9 Impact Assessment - Area 2 (LCUs 2, 3, 4, 5 & 6) : Tai Lam Valley**

## **LCU 2 - River Crossing**

10.9.1 The sewer alignment from Tai Lam Chung Tsuen Pumping Station to Tai Lam Valley Pumping Station follows the existing road alignment and crosses the river via a pipebridge. The landscape character of the riverside is influenced mainly by concrete channel structures and bank reinforcement works and has lost much of its former natural appearance. The existing footbridge adjacent to the pipebridge alignment (refer Drawing 10.2) is currently being replaced under the RPIS Minor Rural Improvement Works Package 1 & 2, Project TM-068. To minimise the cumulative impacts the two bridges will be of simple and consistent design. Drawing 10.7 illustrates the before and after photograph / photomontage.

### **Construction Impacts**

10.9.2 Construction of the pipebridge will result in the loss of approximately 50m<sup>2</sup> of grass and scrub vegetation of low amenity value on the riverbank and temporary visual intrusion from formwork and building site activities.

### **Operational impacts**

10.9.3 Upon completion, the new pipebridge structure will be a permanent, although largely compatible intrusion, into the existing river channel environment.

### **Significance Threshold**

10.9.4 Based on the above, the landscape sensitivity / quality of the bridge site is considered to be low. As the pipebridge will not result in the loss of any existing landscape features, the magnitude of change is also low, resulting in a slight adverse landscape significance threshold during and after construction. Views of the pipebridge are largely screened from adjacent housing and road by vegetation on the riverbank and the visual sensitivity is, therefore, medium. As the pipebridge will be viewed by a small number of viewers in the context of an existing adjacent footbridge the magnitude of change is low. Accordingly, the visual significance threshold during and after construction is slight to moderate adverse.

### **Impact Mitigation**

10.9.5 In order to help blend the pipebridge into the surroundings a low key, simple design using neutral colours is proposed to match the style of the proposed adjacent replacement footbridge. Any good excavated topsoil should be stored carefully on site and used to complete grass reinstatement on the riverbank or screen planting in the nearby pumping station compound.

## **LCU 3 - Western Riverbank**

10.9.6 On the western bank, the sewer alignment turns south and runs roughly parallel to the river under a short section of existing concrete footpath and then through a strip of land already cleared of vegetation during the laying of the Tai Lam Chung water main. A number of scattered village properties and small mature copses line this section of the route. With care in preparing the detailed design of the sewer alignment, as indicated in Photographs A and B

on Drawing 10.8, it is unlikely that any mature trees would have to be felled.

### **Construction Impacts**

- 10.9.7 Approximately 900m<sup>2</sup> of recently hydroseeded landfill would be disturbed during construction but this could be readily reinstated to its current state by regrassing upon completion of the works.

### **Operational Impacts**

- 10.9.8 There will be no residual landscape or visual impacts in this area.

### **Significance Threshold**

- 10.9.9 The sensitivity of the landscape area affected in LUC3 is low and the magnitude of change is low. Accordingly, the landscape significance threshold during construction only is slight adverse. The visual sensitivity is considered to be low due to the partial screening of the pipe route from a small number of village properties by adjacent vegetation. Few viewers will be affected and the change is temporary during construction only. Accordingly, the visual significance threshold during construction only is negligible.

### **Impact Mitigation**

- 10.9.10 Any good existing excavated topsoil should be stored carefully on site and used to complete the pipe trench backfilling before hydroseeding is undertaken.

### **LCU 4- Ponds**

- 10.9.11 The proposed location for the Tai Lam Valley pumping station, as shown in Drawing 10.2, is partly on a derelict site, used for storage and lorry parking. The most significant landscape features in the vicinity of the pumping station site are the adjacent brackish fish pond with thicket vegetation on the banks, as shown in Photograph C on Drawing 10.8 and Drawing 10.10, as well as the short belt of mature trees bordering Castle Peak Road, shown in Drawing 10.9. The remainder of the surrounding area is dominated by lengths of unattractive chain link fences in various states of repair, including the chain link and barbed wire enclosure to WSD's recently constructed water mains. A small number of village houses are located on the lower hillside to the north overlooking the site.

### **Construction Impacts**

- 10.9.12 The construction of the pumping station will require the infilling of one of the disused brackish fish ponds. The adjacent larger pond was originally affected by the compound but the boundary has been amended and impacts on the large pond will now be avoided. The location and extent of the proposed pumping station can be seen in Drawing 10.9 and the before and after photographs/photomontage in Drawings 10.10 and 10.10A. In total, an area of approximately 360m<sup>2</sup> of pond habitat will be lost. Retention of the roadside trees will provide a strategic screen to the new development for the majority of road users, as shown

in Drawing 10.9 and Photograph A of Drawing 10.11. However, the construction work and the temporary works/storage area on the adjacent piece of cleared land (refer Drawing 10.9) will be clearly visible from the nearby village housing on the hillside directly opposite the site.

### **Operational Impacts**

10.9.13 Upon completion the temporary works area will be fully reinstated and will not cause any landscape or visual impacts. The pumping station will be a permanent change to the surroundings and intrusion into the views from a small number of village houses.

### **Significance Threshold**

10.9.14 Based on the above, the landscape sensitivity of the site is considered to be medium and the magnitude of change medium. Accordingly, the landscape significance threshold is moderate adverse. Some village houses overlook the pumping station and the visual sensitivity is, therefore, high. However, the magnitude of change is low due to the relatively small number of viewers and visual context of the surrounding derelict land. Accordingly, the visual significance threshold is moderate adverse.

### **Impact Mitigation**

10.9.15 As the site is overlooked by a number of village houses and dwellings near the ponds, it will be important to ensure the pumping station design complements the better features of the surrounding landscape. The cumulative effects of further chain link fencing and a utilitarian design for the pumping station should be avoided. Therefore, to help blend the pumping station into the surrounding environment a number of mitigation measures are proposed:

- use of a suitable colour scheme and simple highlight finishes to the pumping station building exterior to match the varied design of the nearby village houses;
- construction of a boundary wall/ railing rather than a standard chain link and barbed wire fence;
- planting of trees and shrubs to the boundary of the pumping station compound' and
- any good excavation topsoil should be stored on site and used for screen planting.

### **LCU 5 - Castle Peak Road / Hong Fai Road Corridor**

10.9.16 Downstream of the Tai Lam Valley pumping station, the sewer alignment follows the edge of the Castle Peak Road and Hong Fai Road. These roads are bordered by steep rock slopes and the sewer will be laid within the footpath or road area, as shown in Photograph B of Drawing 10.11.

### **Construction Impacts**

10.9.17 The pipe trenching works will not result in vegetation loss and will only be seen for a short period by occupants of passing vehicles and pedestrians.

### **Operation Impacts**

10.9.18 There will be no residual landscape or visual impacts upon reinstatement of the footpath.

#### **Significance Threshold**

10.9.19 Based on the above the landscape and visual impacts arising from the footpath pipe laying works are considered to be negligible and no mitigation is required.

### **LCU 6 - Tuen Mun Road / Siu Lam**

10.9.20 Similar to LCU 5 the final portion of the sewer will be laid under a footpath or road as shown in Photograph C of Drawing 10.11, parallel to Tuen Mun Road, in front of a new residential development and screened from view by an intervening noise barrier.

### **Construction Impacts**

10.9.21 The pipe trenching works will not result in vegetation loss and will only be seen for a short period by occupants of passing vehicles and pedestrians.

### **Operation Impacts**

10.9.22 There will be no residual landscape or visual impacts upon reinstatement of the footpath.

#### **Significance Threshold**

10.9.23 Based on the above the landscape and visual impacts arising from the footpath pipe laying works are considered to be negligible and no mitigation measures are required.

### **10.10 Impact Assessment - Area 3 (LCUs 7, 8, 9 & 10): Tai Lam Chung Correctional Institution, Tai Lam Chung Tsuen, Luen On San Tsuen, Wong Uk Tsuen and Wu Uk Tsuen**

10.10.1 East of the Tai Lam Chung main estuary, a sewerage network connecting four villages and the Tai Lam Chung Correctional Institution is proposed, as detailed in Drawing 10.2. The main landscape and visual impacts are expected to arise from construction of the three pumping stations to serve this network, as discussed below. The majority of the sewers are to be laid under footpaths or roads and will not have landscape or visual impacts upon completion. Certain sections of the sewer alignment are considered to require particular attention to avoid nearby mature trees, and these are discussed in more detail below.

### **LCU 7 - Tai Lam Correctional Institution Pumping Station**

10.10.2 The pumping station will be in the grounds of the Tai Lam Correctional Institution on land currently used as a car park, as shown in Drawing 10.12. The entrance to the Correctional Institution is dominated by high boundary walls, vehicle barriers, security fencing and a cluster of small to medium size low-rise buildings of plain design housing the clinic, residential block,

guard post, storage areas etc.

### **Construction Impacts**

- 10.10.3 The construction will not result in any vegetation loss. The surrounding compound walls will largely screen the works from the view of sensitive receivers such as the residential block and clinic on the opposite side of the road.

### **Operation Impacts**

- 10.10.4 As during construction, the pumping station will be largely screened from view by occupants of the residential block and clinic by the existing compound walls and mature trees bordering the entrance, as illustrated on the before and after photograph / photomontage on Drawing 10.13.

### **Significance Threshold**

- 10.10.5 Based on the above, the landscape sensitivity / quality of the site is considered to be low and the magnitude of change low. Accordingly, the landscape significance threshold is slight adverse during and after construction. The visual sensitivity is medium due to the partial screening effect of walls and trees from the residential block and the magnitude of change is low resulting in a slight/moderate visual significance threshold during and after construction.

### **Impact Mitigation**

- 10.10.6 In order to help blend the pumping station into its surroundings, the structure should be designed to compliment the style of the surroundings buildings.

### **LCU 8 - Eastern Riverbank / Tai Lam Chung Tsuen Pumping Station**

- 10.10.7 The sewer alignment immediately downstream of the Correctional Institution pumping station follows the road. However, a pinch point occurs near the refuse collection point (RCP) where the road narrows and the alignment must follow one of the roadside verges. In this location, mature trees border each side of the road (refer to Drawing 10.14). To the east is an area zoned Green Belt, comprising a steep sided hill with mature woodland. To the west, between the road and river channel, is a single line of mature trees, mainly comprising *Casuarina*, *Acacia* and *Celtis*. The western verge has been selected to avoid the natural hillside woodland. The Tai Lam Chung Tsuen pumping station is located 30m south of the RCP to the west of Tai Lam Chung Road. The site is presently occupied by a small semi-derelict village property with dilapidated structures and debris littering the overgrown garden. (refer Drawing 10.16).

### **Construction Impacts**

- 10.10.8 It is anticipated that six roadside trees on the western verge will be felled to accommodate the sewer mains alignment at the narrow portion of road, namely, three *Casuarina equisetifolia*,

two *Celtis sinensis* and one *Macaranga tanarius*, as shown in the photographs in Drawing 10.14. The trees are common species of fair to poor condition and are not considered suitable for transplanting. In addition to the trees, approximately 280m<sup>2</sup> of understorey grass and scrub would be cleared during the construction works which could be reinstated as a grass verge upon completion. The pumping station will require clearance of approximately 750m<sup>2</sup> of mainly bare ground and grass cover and a small group of approximately ten banana, papaya and longnan trees as shown in Drawing 10.15 and the photographs in Drawing 10.16. None of the trees is rare or of sufficiently good amenity value to justify transplanting.

### **Operation Impacts**

10.10.9 Upon completion, the pumping station will be a permanent feature of the roadside directly opposite a small number of village houses. Boundary fences / walls and mature trees growing in the grounds of the village properties partially screen views of the pumping station compound during construction and when in operation. The main sensitive receivers will be road users passing close by the compound. Although the western verge will be regrassed after the trenching works is complete clearance restrictions will prevent new tree planting over the pipe alignment. However, there is opportunity to provide tree planting around the perimeter of the adjacent pumping station which can help re-establish the existing avenue and landscape character of this portion of Tai Lam Chung Road.

### **Significance Threshold**

10.10.10 Based on the above both the landscape sensitivity/quality of the site and magnitude of change are considered to be medium and moderate respectively. Accordingly, the landscape significance threshold is moderate adverse during and after construction. The visual sensitivity is medium due to the partial screening of views from village houses. The magnitude of change is moderate resulting in a moderate adverse visual significance threshold during and after construction.

### **Impact Mitigation**

10.10.11 In order to help mitigate the anticipated landscape and visual impacts, the mitigation measures outlined below and illustrated in the photomontage in Drawing 10.16 and 10.16A are proposed:

- use of a suitable colour scheme and simple highlight features to the pumping station building exterior to match the design of the nearby village houses;
- construction of a boundary wall / railing rather than a standard chain link and barbed wire fence; and
- planting of trees and shrubs to the boundary of the pumping station compound, with particular emphasis on recreating a roadside avenue to Tai Lam Chung Road; and
- any good excavated topsoil should be stored carefully on site and used to complete screen planting works.

### **LCU 9 - Tai Lam Chung Tsuen**

10.10.12 Tai Lam Tsuen village comprises a fairly compact cluster of old and new village housing with some peripheral workshop industries set against the backdrop of an attractive wooded hill, (refer to photographs A, B & C in Drawing 10.17). Between the village and Tai Lam Chung Road is a substantial area of open, mainly concreted ground formerly used for container storage and lorry parking.

### **Construction Impacts**

10.10.13 The pipe trenching works within the village will be located in existing tracks and driveways and will not result in minor loss of an area of abandoned paddy/marsh (approximately 5m<sup>2</sup>) at the fringe of the village. The works will only be seen for a short period mainly by occupants of vehicles and pedestrians entering and leaving the village.

### **Operation Impacts**

10.10.14 There will be no residual landscape or visual impacts upon reinstatement of the tracks, driveways and marsh verge within the village area.

### **Significance Threshold**

10.10.15 Based on the above the landscape impacts arising from the footpath pipe laying works will be negligible and the visual sensitivity of the site is low. Thus, the magnitude of change is nil and will result in negligible visual impact upon completion and only minor mitigation of regrassing approximately 5m<sup>2</sup> is required.

### **LCU 10 - Luen On San Tsuen Pumping Station**

10.10.16 The proposed pumping station site is located at the junction of Luen Tai Street and Luen Hung Lane on land currently occupied by semi-derelict village properties with cleared land previously used for container storage to the rear. The landscape and visual character of the village area is shown in Drawings 10.19 and 10.20. Luen On San Tsuen has a more intimate scale and character than some of the more modern neighbouring village developments. Numerous mature trees line the road creating an attractive, shaded frontage to many of the older village houses. The associated mains alignment in Luen On San Tsuen, Wong Uk and Wu Uk villages are located under existing tracks and roads.

### **Construction Impacts**

10.10.17 No vegetation loss is anticipated during the construction of the scheme in this area. The existing mature trees bordering Luen Tai Street in front of the pumping station can be retained with careful detailed alignment of the sewers through the wider gaps between the trees (refer to Drawing 10.18). The pumping station construction site will be partly screened from residents and road users by adjacent village houses and the roadside trees. The school and Customs & Excise Training School on the opposite side of the road are well screened by high boundary walls to those properties. The pipe trenching works will create temporary visual intrusion within the villages and along access roads.

## **Operation Impacts**

10.10.18 The pumping station will be a permanent intrusion into the existing village fabric. However, the compatible scale of the structure and neat integration with the linear form of the village will greatly help reduce the potential landscape and visual impacts when viewed from within the village or from any future development in the adjoining CDA. Although no vegetation is lost during construction, there is opportunity to provide boundary tree screen planting to the compound upon completion, as shown in the photomontage in Drawing 10.20, to complement the existing streetscape. The completed pipe trenching works will have no residual landscape or visual impacts.

## **Significance Threshold**

10.10.19 Based on the above, the landscape sensitivity is medium and the magnitude of change is low, with the mature roadside trees being retained resulting in a slight to moderate adverse landscape significance threshold during and after construction of the pumping station. The visual sensitivity is medium due to the partial screening of the majority of views despite the proximity of a small number of village residents. Road users and more distant village houses and the future CDA development will have views mainly screened by trees or other village properties. Therefore, since only a few viewers are affected by the pumping station and the change in view is relatively minor the magnitude of change is low resulting in a slight to moderate adverse visual significance threshold during and after construction. For the pipe laying under roads and village paths the landscape and visual impacts will be negligible.

## **Impact Mitigation**

10.10.20 Due to the village context of the site, similar impact mitigation measures to those described for the Tai Lam Valley and Tai Lam Chung Tsuen pumping stations are recommended. That is, tree and shrub planting should be carried out to the boundary and the structure and boundary wall/railing should be designed to reflect the scale and general appearance of the adjacent buildings, as shown in the before and after photograph / photomontage illustrations in Drawing 10.20. The existing mature trees bordering Luen Tai Street in front of the pumping station shall be retained with careful detailed alignment of the sewers through the wider gaps between the trees. Any good excavated topsoil should be stored on site and used to complete the screen planting.

10.10.21 Generally, the sewerage system associated with the pumping station will follow the access routes and lanes through the village areas and will not require clearance of vegetation. One exception to this, identified during the initial impact assessment process, was the short portion of sewer originally proposed behind Wong Uk village. In this location, as detailed on the highlighted photographs on Drawing 10.21, the alignment conflicts with the fringe of hillside woodland and several mature trees of important landscape and visual amenity. To overcome this potential impact and conserve the woodland, the sewer alignment has been realigned, as shown in Drawing 8.10.

## **10.11 Impact Assessment - Area 4: (LCUs 11, 12 and 13) So Kwun Wat Tsuen and So Kwun Wat San Tsuen**

### **LCU 11 - So Kwun Wat Road and Pumping Station**

- 10.11.1 The sewer alignment in this area follows the So Kwun Wat Road to So Kwun Wat San Tsuen and branches off into the village of So Kwun Wat. This area as a whole has been subject to a considerable amount of new village development interspersed with large container storage areas and small industrial sites, as shown in the landscape / visual context in Drawing 10.24. Much of the natural vegetation along the road has been removed and the overall landscape character is dominated by the patchwork of village houses, unsightly containers in bare, concrete-surfaced storage areas and heavy vehicular traffic on the narrow access road. The sewer mains are aligned under the road.
- 10.11.2 The proposed pumping station, shown on Drawing 10.3, and in more detail in Drawing 10.22, is located close to a stream on land currently used for vehicle parking and storage. The banks of the stream have been shotcreted and are unattractive. Although the pumping station site is devoid of vegetation there are some nearby mature trees at the river and roadside. Since these trees are some of the last surviving specimens in the surrounding area it is of particular importance to protect them. Accordingly, the footprint of the proposed pumping station and sewer connections have been refined to avoid the need for any tree felling.

#### **Construction Impact**

- 10.11.3 The pumping station and sewer alignments will not result in any vegetation loss. The pumping station construction site will be clearly visible to road users and residents in adjacent village houses, as well as a number of others under construction nearby. The pipe trenching will also be visible along the length of So Kwun Wat Road to road users as well as adjacent village houses.

#### **Operation Impact**

- 10.11.4 There will be no residual landscape or visual impacts from the mains laying once the road is reinstated. The pumping station will be a permanent feature by the side of the main access road, visible to residents in adjacent village houses, road users and pedestrians. Due to the level topography within the valley floor and scale of the pumping station, these houses and the copse of mature trees to the south-west will largely screen longer views.

#### **Significance Threshold**

- 10.11.5 Based on the above, both the landscape sensitivity of the site and magnitude of change are low resulting in a slight adverse landscape significance threshold during and after construction. Due to the proximity of village houses to the pumping station site, the visual sensitivity is high. However, in the existing visual context of the on-going, surrounding village development the magnitude of change arising from the addition of a pumping station of a scale and design similar to that of a new village house is considered to be low. Therefore, the visual significance threshold is moderate adverse. The landscape and visual impacts arising from the pipe laying works are considered to be negligible.

### **Impact Mitigation**

10.11.6 In the absence of any natural screening to help mitigate the visual impacts, it is recommended that boundary tree and shrub planting is provided to the pumping station. Any good excavated topsoil should be stored on site and used to complete the screen planting. Furthermore, the building and perimeter wall/railing should be designed to reflect the general appearance of the nearby village houses as described for other pumping stations above and illustrated in the before and after photograph / photomontage in Drawing 10.23 and 10.23A, as well as the landscape / visual character photographs in Drawing 10.24.

#### **LCU 12 - So Kwun Wat Village**

10.11.7 So Kwun Wat village is a mixture of old and mainly new village houses, tightly clustered along the side of the valley with an attractive vegetated hillside and 'fung shui' woodland backdrop, as detailed in photograph LCU 12 in Drawing 10.24. The sewer alignments within the village are confined to the existing paved areas and lanes between village houses.

#### **Construction Impacts**

10.11.8 The pipe trenching works will not result in vegetation loss and will only be seen for a short period mainly by occupants of vehicles and pedestrians entering and leaving the village.

#### **Operation Impacts**

10.11.9 There will be no residual landscape or visual impacts upon reinstatement of the tracks and driveways within the village area.

#### **Significance Threshold**

10.11.10 Based on the above, the landscape significance threshold arising from the footpath pipe laying works will be negligible. The visual sensitivity of the site is low and as the magnitude of change is nil, the resulting visual significance threshold upon completion will be negligible. Thus, no mitigation measures are required.

#### **LCU 13 - So Kwun Wat San Tsuen**

10.11.11 The village areas at the head of the So Kwun Wat Valley contrast strongly with the new village development and large container storage areas to the west. The landscape is dominated instead by small-scale arable farming, abandoned fields now overgrown with grass and traditional, satellite village settlements in a more sheltered, wooded setting, as shown in photograph LCU 13 in Drawing 10.24. During the study, a conflict was identified with the sewer alignment and existing mature woodland to the east of So Kwun Wat Tsuen. Minor realignments to the proposed sewer have been adopted to the opposite side of the stream and no trees will now have to be felled. The alternative routing is indicated in Drawing 8.11 and in Photograph A in Drawing 10.25, via the existing weir and concrete track.

### **Construction Impacts**

- 10.11.12 The pipe laying will follow the existing concrete tracks crossing the grassland/arable areas. However, the tracks are narrow and trenching works will result in the temporary loss of adjacent vegetation; approximately 2,500m<sup>2</sup> of abandoned farmland/grassland/ruderal and 670m<sup>2</sup> of arable land. However, no trees would have to be felled but sewer trenching within the narrow, winding lanes of the older villages should be carefully supervised during construction to ensure, where practicable, the root systems of existing mature trees are not damaged (see Photograph B of Drawing 10.25). The works will only be seen for a short period mainly by pedestrians entering or leaving the village.

### **Operation Impacts**

- 10.11.13 There will be no residual landscape or visual impacts upon reinstatement of the footpaths and regrassing of adjacent areas of disturbed soil.

### **Significance Threshold**

- 10.11.14 The landscape sensitivity of the site is medium and the magnitude of change arising from the temporary disturbance of the pipe laying is low. Therefore, the landscape significance threshold during construction is slight/moderate adverse. The visual sensitivity is low. The magnitude of change is nil resulting in negligible visual significance threshold upon completion.

### **Impact Mitigation**

- 10.11.15 Excavated top soils should be retained and stockpiled close to the pipe trench and replaced upon completion of the works to permit regrassing and plant recolonisation. Sewer trenching within the narrow lanes should be carefully supervised during construction to ensure, where practicable, the root systems of existing mature trees are not damaged.

## **10.12 Residual Impacts**

- 10.12.1 All predicted impacts are either acceptable or acceptable with the recommended mitigation measures applied. As such no unacceptable residual impacts will arise as a result of the project.

## **10.13 Summary**

- 10.13.1 The anticipated landscape and visual impacts arising from the proposed sewerage extension works are considered to be acceptable with a number of mitigation measures.
- 10.13.2 The main sources of impacts will be the visual intrusion of the various pumping stations into the predominantly village environments. The pumping stations are typically box-like structures with a footprint and elevation not unlike that of a village property. Accordingly, the recommended method to blend the pumping stations into the surroundings is to design the façade of the structures and boundary wall/railing features to resemble the adjacent building types.

10.13.3 The proposed screen and amenity planting within the pumping station compounds is recommended to comprise primarily tree and shrub planting using standard size specimens. Typically, the trees and shrubs would be planted in the perimeter of the compounds to avoid conflict with underground pipes and pumping equipment. Suitable raised kerbs, walls and railings would be provided to protect the plants from damage by service vehicles and routine maintenance works within the pumping station compound. The trees selected would be preferably indigenous species of relatively compact form without vigorous, invasive root systems and requiring low maintenance. Root barriers would be provided between the planters and adjacent underground pipes. An indicative list of potential tree, bamboo and shrub species is as follows:

Trees and Bamboo

C *Aleurites moluccana*;  
C *Cassia spectabilis*;  
C *Cinnamomum burmanii*;  
C *Cinnamomum camphora*;  
C *Lagerstroemia speciosa*;  
C *Michalia alba*;  
C *Schima superba*;  
C *Syzygium jambos*; and  
C *Bambus ventricosa* 'McClure'.

Shrubs

C *Calliandra  
haematocephala*;  
C *Duranta repens*;  
C *Hibiscus roas-sinensis*; and  
C *Ligustrum sinense*;

10.13.4 Funding, implementation and management of the planting works, which form part of the impact mitigation measures, will be the responsibility of CE/PM, DSD.

10.13.5 The Contractor for the construction works is responsible for the short-term (1-year) maintenance of the landscape planting works during the maintenance period. It is proposed that, subject to formal agreement, LCSD would be responsible for the long-term maintenance of the landscape planting works.

10.13.6 It is intended that all landscape planting and restoration works such as tree and shrub planting to pumping station compounds and regrassing to areas disturbed during construction, for example pipe laying and temporary works areas, would be carried out during the last 3 months of the construction period.

10.13.7 The proposed sewerage works are located mainly within low-lying areas in the Tai Lam and So Kwun Wat valleys. The pipe alignments are typically located below existing roads and footpaths and avoid woodland. The pumping stations are either located in land that has been disturbed previously or in areas of relatively low ecological or landscape amenity value. Accordingly, there does not appear to be any conflict with existing traditional fung shui elements such as hillsides, ridges, knolls, woodland or religious buildings, temples or shrines within the study area.

10.13.8 Based upon the assessment of landscape and visual impacts, it is predicted that all impacts can be suitably mitigated and no unacceptable residual impacts will occur. A summary of the key issues of the landscape and visual impact assessment findings are presented in Tables 10.3 and

10.4 and summaries of the landscape and visual mitigation measures and residual impacts are provided in Tables 10.5 and 10.6 respectively. A summary of the overall quantitative landscape impacts is provided in Table 10.7. Drawings 10.1, 10.2 and 10.3 indicate the extent of the Landscape Character Units (LCUs) referred to in the tables.

#### **10.14 Environmental Monitoring and Audit**

- 10.14.1 In order to protect the landscape and visual resources and ensure that compensatory planting is undertaken in accordance with the recommendations of the EIA, EM&A during both the construction and operational phases has been recommended. EM&A will be restricted to audit procedures in the form of site inspection. Operational EM&A will be carried out during the first year of operation during the Contractor's maintenance period and LCSD will take over the maintenance and monitoring of the planting after this period. Further details are provided in Section 11.0 of this report and in the EM&A Manual.

**Table 10.3: Summary of Landscape Analysis and Impact Assessment**

<b>Landscape Character Unit (LCU)</b>	<b>Description</b>	<b>Magnitude of Change</b>	<b>Quality / Sensitivity</b>	<b>Impact</b>	<b>Significance threshold without mitigation</b>
<b>Area 1</b> LCU 1	Landscape character dominated by strip villa development north of Lok Chui Street and contrasting area of coastal vegetation to south behind beach	Moderate	Medium	Loss of some vegetation (mainly scrub) to accommodate pumping station and intrusion of new structure into beach hinterland area. Sewer in road / pavement – no loss of vegetation	Moderate adverse
<b>Area 2</b> LCU 2	Relatively tranquil river crossing point dominated by previous engineering works to banks, landfill and footbridge. Some riverbank trees and small village properties	Low	Low	New pipebridge to be constructed parallel to existing footbridge	Slight adverse
LCU3	Area of riverside reclamation with isolated small village properties, mature copses and cleared vegetation associated with WSD installations	Low	Low	Some loss of scrub and grass cover for pipe trenching	Slight adverse
LCU4	Semi-derelict ground bordered by village properties, some cultivated land and ponds. Mature roadside tree belt screens most views from Castle Peak Road.	Moderate	Medium	Pumping station located on derelict land with some loss of pond habitat.	Moderate adverse
LCU5	Public road bordered by steep rock slopes	Nil	Low	Temporary disturbance during trenching works in road / footpath for sewer. No loss of vegetation	Negligible
LCU6	Service/access road parallel to Tuen Mun Road and Gold Coast development noise barrier.	Nil	Low	Temporary disturbance during trenching works in road / footpath for sewer. No loss of vegetation	Negligible

**Table 10.3 Cont'd.....**

<b>Landscape Character Unit (LCU)</b>	<b>Description</b>	<b>Magnitude of Change</b>	<b>Quality / Sensitivity</b>	<b>Impact</b>	<b>Significance threshold without mitigation</b>
<b>Area 3</b> LCU7	Entrance to Correctional Institution dominated by security fencing, high walls and vehicle ingress/egress. Some attractive mature roadside trees	Low	Low	Pumping station to be built within Correctional Institution compound. No vegetation loss	Slight adverse
LCU8	Road corridor with mature stands of riverbank and roadside trees. Small village properties and cultivations, some derelict or cleared land on both sides of road	Moderate	Medium	Sewer alignment in narrow section of road requires small scale tree felling avoiding woodland. Pumping station site encroaches on small village property and some fruit trees in garden compound	Moderate adverse
LCU9	Village area with small industry and derelict land. Fung shui woodland and hillside backdrop	Low	Low	Sewer alignment within village lanes will have no impact on vegetation. minor loss of marshland by village land.	Slight adverse
LCU10	Clusters of old and new village properties surrounding a large concreted area formerly used for container storage. Some attractive, mature trees within villages and by roadside. Woodland backdrop to Wu Uk and Wong Uk	Low	Medium	Sewers generally within road with no vegetation loss. Pumping station within village requiring clearance of semi-derelict properties.	Slight/ Moderate adverse
<b>Area 4</b> LCU11	Landscape dominated by extensive new village development and areas of container storage. Little remaining vegetation by roadside	Low	Low	No vegetation loss. Sewers within road. Pumping station clearly visible to road users on vacant lot with lorry parking close to village houses	Slight adverse
LCU12	Densely developed village of varied age and house type with hillside and woodland backdrop	Nil	Low	Temporary disturbance during laying of sewers under access road and alleys within village. No vegetation loss	Negligible

**Table 10.3 Cont'd.....**

<b>Landscape Character Unit (LCU)</b>	<b>Description</b>	<b>Magnitude of Change</b>	<b>Quality / Sensitivity</b>	<b>Impact</b>	<b>Significance threshold without mitigation</b>
LCU13	Relatively peaceful village areas on fringe of main So Kwun Wat valley development. Many attractive mature trees within village areas and within Fung Shui woodland. Extensive areas of cultivated land, some still being worked	Low	Medium	Sewer alignment follows existing concrete tracks between and through villages. With care, no significant vegetation loss	Slight/ Moderate adverse

**Table 10.4: Analysis of Visually Sensitive Receivers and Impact Assessment**

Key Visually Sensitive Receivers	Typical Viewpoint	Magnitude of Change	Quality / Sensitivity	Impact	Significance threshold without mitigation
<p><b>Area 1 (within LCU 1)</b></p> <p>Residents of Tsing Lai Wan Villas (Distance from impact source: 20m)</p> <p>Beachgoers (Distance from impact source: 25m)</p>	<p>Long distance seaward views over Lok Chui Street, coastal strip vegetation and beach</p> <p>Attractive unobstructed seaward views with vegetated backdrop providing strategic landscape buffer between Lok Chui Street and beach</p>	<p>Low</p> <p>Low</p>	<p>High</p> <p>Medium</p>	<p>Existing foreground views towards beach will be partly obstructed by new pumping station structure. The pumping station will be located on land significantly lower in level than the villas and should not obstruct long distance views to the sea.</p> <p>Reduction in existing landscape buffer and encroachment of pumping station close to beach. Villa-style design and boundary planting can reduce overall impact to all VSRs.</p>	<p>Moderate adverse</p> <p>Slight/Moderate adverse</p>

**Table 10.4 Cont'd....**

Key Visually Sensitive Receivers	Typical Viewpoint	Magnitude of Change	Quality / Sensitivity	Impact	Significance threshold without mitigation
<p><b>Area 2 (within LCUs 2 to 6)</b></p> <p>Tai Lam Tsuen Village Communities (Distance from impact sources range from 20m to 50m for most village properties along the riverside)</p> <p>Castle Peak Road Users (Distance from impact source: 5 to 10m)</p>	<p>Riverside properties have open views along and across the river channel, enhanced by a few remaining cultivated areas and tree belts which partly screen the traffic on Tai Lam Chung Road and Castle Peak Road. The overall quality of views is declining due to the cumulative effects of utility development and riverbank reclamation.</p> <p>Elevated roadside viewpoint partly overlooks riverside area where pumping stations and temporary works area located.</p> <p>Views between Tai Lam and Siu Lam valleys enclosed by trees and steep rock face by roadside.</p>	<p>Low</p> <p>Nil</p> <p>Low</p> <p>Low</p> <p>Nil</p>	<p>Medium</p> <p>Low</p> <p>High</p> <p>Low</p> <p>Low</p>	<p>Construction of new pipebridge</p> <p>Sewer alignment follows tracks and crosses already disturbed land.</p> <p>The pumping station location is close to village properties on derelict land.</p> <p>Pumping station and adjacent temporary works area partly screened by roadside tree belt.</p> <p>Alignment of sewer under roadside footpath</p>	<p>Slight/ moderate adverse</p> <p>Negligible</p> <p>Moderate adverse</p> <p>Slight adverse</p> <p>Negligible</p>

**Table 10.4 Cont'd....**

Key Visually Sensitive Receivers	Typical Viewpoint	Magnitude of Change	Quality / Sensitivity	Impact	Significance threshold without mitigation
<p><b>Area 3</b>                      (within LCUs 7 to 10)                      Correctional Institution                      (Distance from impact source: 15m)</p> <p>Tai Lam Chung Tsuen Village Communities                      (Distance from impact source varies from 5m for pipe works through village to 20m for pumping station)</p>	<p>Institution buildings such as clinic, quarters, guardhouse have limited views, focused on immediate surroundings of security entrance.</p> <p>Most views from village houses partly screened by clusters of trees and other village houses. Woodland backdrop provides visual relief to built form. Longer views dominated by mainly derelict / semi-industrial land in areas between villages.</p>	<p>Low</p> <p>Nil</p> <p>Moderate</p>	<p>Medium</p> <p>Low</p> <p>Medium</p>	<p>Pumping station will be located within an existing walled compound and will be mainly screened from view.</p> <p>Sewer alignments under roads and village lanes not visible upon completion.</p> <p>Loss of roadside trees at narrow portion of Tai Lam Chung Road will reduce visual amenity. Pumping station visible beside Tai Lam Chung Road. Trees in adjacent village properties will partially screen views.</p>	<p>Slight/ moderate adverse</p> <p>Negligible</p> <p>Moderate adverse</p>



**Table 10.4 Cont'd....**

Key Visually Sensitive Receivers	Typical Viewpoint	Magnitude of Change	Quality / Sensitivity	Impact	Significance threshold without mitigation
<p><b>Area 4</b>  <b>(within LCUs 11 to 13)</b>                      So Kwun Wat Village Communities:                      So Kwun Wat Road</p> <p>So Kwun Wat Tsuen</p> <p>So Kwun Wat San Tsuen</p> <p>(Distances from impact sources vary from 5m for pipeworks in villages to 20m for pumping station.)</p>	<p>Unsightly container storage and intensive village house building along So Kwun Wat Road dominates and obstructs the majority of views</p> <p>So Kwun Wat Tsuen expansion areas and derelict land. Most views are partially screened by existing village houses and new construction sites</p> <p>Satellite communities at the head of the valley to the east in relatively tranquil agricultural and woodland settings.</p>	<p>Low</p> <p>Nil</p> <p>Nil</p>	<p>High</p> <p>Low</p> <p>Low</p>	<p>Pumping station visible in roadside location by adjacent village expansion areas and road users.</p> <p>Sewer alignments under roads, village lanes and footpaths will not be visible upon completion.</p> <p>Sewer alignments under roads, village lanes and footpaths will not be visible upon completion.</p>	<p>Moderate adverse</p> <p>Negligible</p> <p>Negligible</p>

**Table 10.5: Summary of Landscape Mitigation Measures and Residual Impacts**

Landscape Character Unit	Sources of Impact	Magnitude of Change		Landscape Quality/	Mitigation measures	Residual impact after implementation of mitigation measures	
		Construction	Operation			Construction	Operation
<b>Area 1</b>							
LCU 1	Loss of coastal scrub vegetation to accommodate pumping station	Moderate	Moderate	Medium	Pumping station design to complement adjacent villa architecture with boundary tree planting. Protect existing scrub in adjacent areas	Moderate adverse	Moderate adverse
<b>Area 2</b>							
LCU 2	Permanent intrusion of new pipebridge across river channel	Low	Low	Low	Low key design in scale with surroundings and adjacent footbridge	Slight adverse	Slight adverse
LCU 3	Temporary loss of scrub and grass cover in landfill area to accommodate pipe laying	Low	Low	Low	Stockpile topsoil and regrass upon completion	Slight adverse	Slight adverse
LCU 4	Permanent intrusion of pumping station into area of derelict land	Moderate	Moderate	Medium	Pumping station design to complement adjacent village house architecture with boundary tree planting.	Moderate adverse	Moderate adverse
LCU 5	Temporary disturbance of footpath between rock face and highway for pipe laying	Low	Nil	Low	Reinstate footpath upon completion	Slight adverse	Negligible

**Table 10.5 Cont'd.....**

Landscape Character Unit	Sources of Impact	Magnitude of Change		Landscape Quality/	Mitigation measures	Residual impact after implementation of mitigation measures	
		Construction	Operation			Construction	Operation
LCU 6	Temporary disturbance of service road for pipe laying	Low	Nil	Low	Reinstate service road upon completion	Slight adverse	Negligible
<b>Area 3</b>							
LCU 7	Permanent intrusion of pumping station into Correctional Institution compound	Low	Low	Low	Pumping station design to complement adjacent building architecture	Slight adverse	Slight adverse
LCU 8	Permanent loss of roadside trees for sewer alignment and felling of some fruit trees to accommodate pumping station	Moderate	Moderate	Medium	Avoid woodland at expense of smaller number of roadside trees. Pumping station design to complement adjacent village house architecture with boundary tree planting for screening and compensation for felled roadside trees	Moderate adverse	Moderate adverse
LCU 9	Temporary disturbance of village footpaths and small area of marshland for pipe laying	Low	Nil	Low	Reinstate footpaths and regrass verge of marsh upon completion. Fine tune works area to boundary to minimise impact on marsh.	Slight adverse	Negligible

**Table 10.5 Cont'd.....**

Landscape Character Unit	Sources of Impact	Magnitude of Change		Landscape Quality/	Mitigation measures	Residual impact after implementation of mitigation measures	
		Construction	Operation			Construction	Operation
LCU 10	Temporary disturbance of road for pipe laying and clearance of some semi-derelict village properties to accommodate pumping station	Low	Low	Medium	Reinstate road upon completion. Fine-tune sewer alignment to avoid mature roadside trees. Pumping station design to reflect architecture of adjacent village houses.	Slight / moderate adverse	Slight / moderate adverse
<b>Area 4</b>							
LCU 11	Temporary disturbance of road for pipe laying and permanent intrusion of pumping station into lorry parking area by roadside.	Low	Low	Low	Reinstate road upon completion Pumping station design to reflect architecture of adjacent village houses	Slight adverse	Slight adverse
LCU 12	Temporary disturbance of village footpaths for pipe laying	Low	Nil	Low	Reinstate footpaths upon completion	Slight adverse	Negligible
LCU 13	Temporary disturbance of village footpaths for pipe laying	Low	Low	Medium	Realign portion of pipeline out of woodland fringe and bamboo grove to follow concrete track to avoid tree felling. Stockpile topsoil where route crosses field paths and regrass upon completion. Care during pipe laying through village to avoid damage to trees.	Slight / moderate adverse	Slight / moderate adverse

**Table 10.5 Cont'd.....**

**Table 10.6: Summary of Visual Mitigation Measures and Residual Visual Impacts**

Visually Sensitive Receivers	Sources of Impact	Magnitude of change		Visual Quality/ Sensitivity	Mitigation measures	Residual impact after implementation of mitigation measures	
		Construction	Operation			Construction	Operation
<b>Area 1</b>							
Residents of Tsing Lai Wan Villas	Partial obstruction of foreground views by Lok Chui Street pumping station. Long seaward views retained	Low	Low	High	Locate pumping station on low ground below main sightline of residents in adjacent properties. Tree screen planting. Use villa style architecture for pumping station	Moderate adverse	Moderate adverse
Beachgoers	Partial intrusion of pumping station into beach scrub hinterland	Low	Low	Medium	Retain surrounding scrub as landscape buffer	Slight / moderate adverse	Slight / moderate adverse
<b>Area 2</b>							
Tai Lam Tsuen communities	Construction of new pipebridge across river channel	Low	Low	Medium	Simple low key design similar to adjacent footbridge to avoid visual clutter	Slight / moderate adverse	Slight / moderate adverse
	Sewer alignment follows tracks and disturbed ground	Low	Nil	Low	Avoid mature vegetation and regrass upon completion	Slight adverse	Negligible
	Pumping station on derelict land intrudes into views from small village settlement	Low	Low	High	Use village house style architecture for pumping station and include tree screen planting to perimeter	Moderate adverse	Moderate adverse

**Table 10.6 Cont'd....**

Visually Sensitive Receivers	Sources of Impact	Magnitude of change		Visual Quality/ Sensitivity	Mitigation measures	Residual impact after implementation of mitigation measures	
		Construction	Operation			Construction	Operation
Castle Peak Road users	Tai Lam pumping station and adjacent temporary works area partly screened by roadside trees	Low	Low	Low	Retain tree belt screen	Slight adverse	Slight adverse
	Sewer alignment under roadside footpath	Low	Nil	Low	Reinstate footpath upon completion	Slight adverse	Negligible
<b>Area 3</b>							
Correctional Institution	Pumping station located within existing walled compound. Views from quarters and clinic mainly screened by walls and trees	Low	Low	Medium	Retain tree screen Use similar architectural style to blend with Institution buildings	Slight / moderate adverse	Slight / moderate adverse

**Table 10.6 Cont'd....**

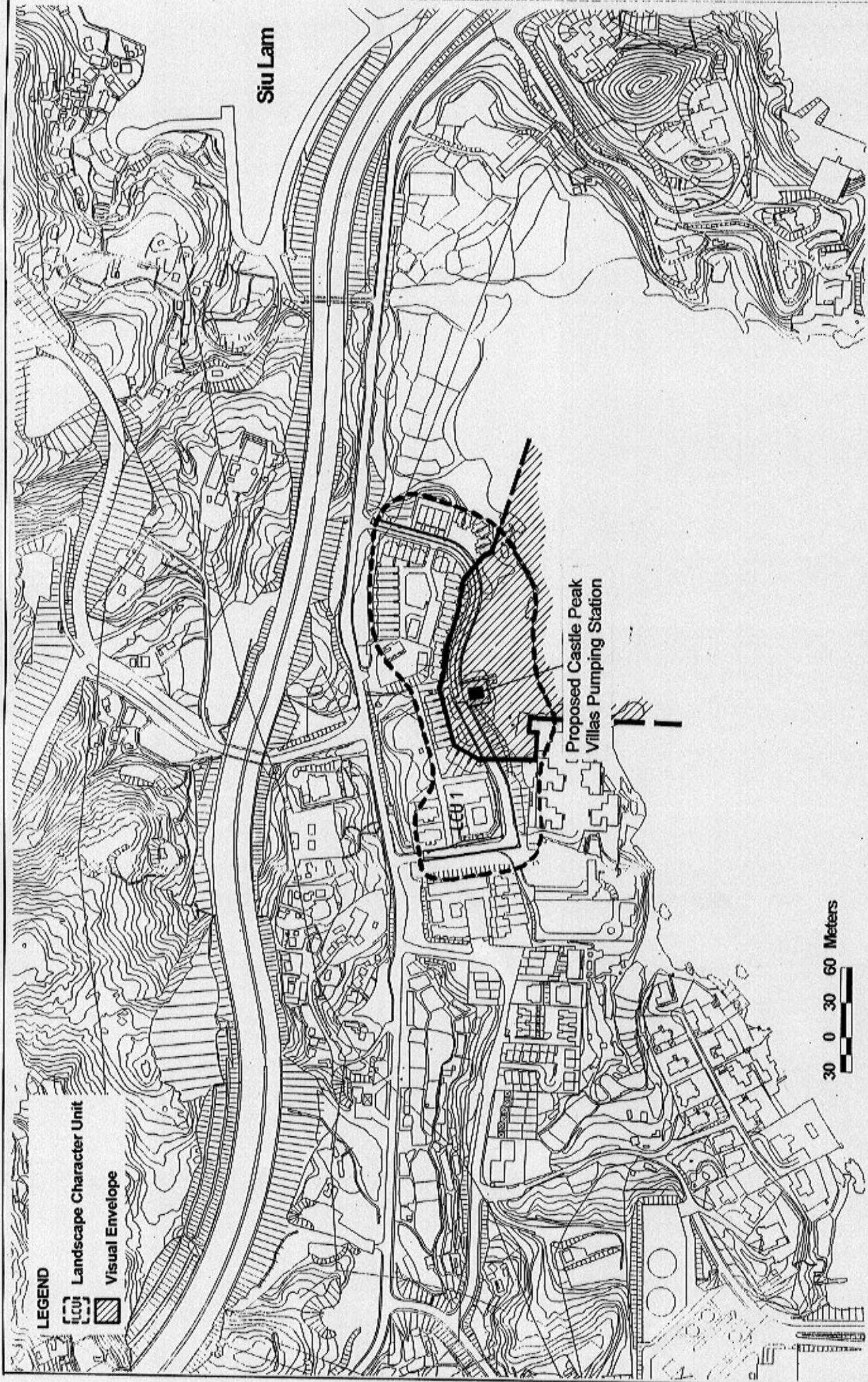
Visually Sensitive Receivers	Sources of Impact	Magnitude of change		Visual Quality/ Sensitivity	Mitigation measures	Residual impact after implementation of mitigation measures	
		Construction	Operation			Construction	Operation
Tai Lam Chung Tsuen communities	Sewer alignment under village paths	Low	Nil	Low	Reinstate footpaths upon completion	Slight adverse	Negligible
	Pumping station located by roadside. Views from adjacent village houses partly screened trees	Moderate	Moderate	Medium	Use village house style architecture for pumping station design and provide tree planting to perimeter to establish screen	Moderate adverse	Moderate adverse
Luen On San Tsuen communities	Sewer alignment under village paths	Low	Nil	Low	Reinstate footpaths upon completion	Slight adverse	Negligible
	Pumping station located within row of village housing	Low	Low	Medium	Use village house style architecture for pumping station design and retain existing mature trees for screening	Slight/moderate adverse	Slight/moderate adverse
<b>Area 4</b>							
So Kwun Wat village communities	Pumping station visible from adjacent village houses in roadside location on lorry park amidst on-going village house construction	Low	Low	High	Use village house style architecture for pumping station design and provide perimeter tree planting screen	Moderate adverse	Moderate adverse
So Kwun Wat Tsuen	Sewer alignments under village paths	Low	Nil	Low	Reinstate paths upon completion	Slight adverse	Negligible

**Table 10.6 Cont'd....**

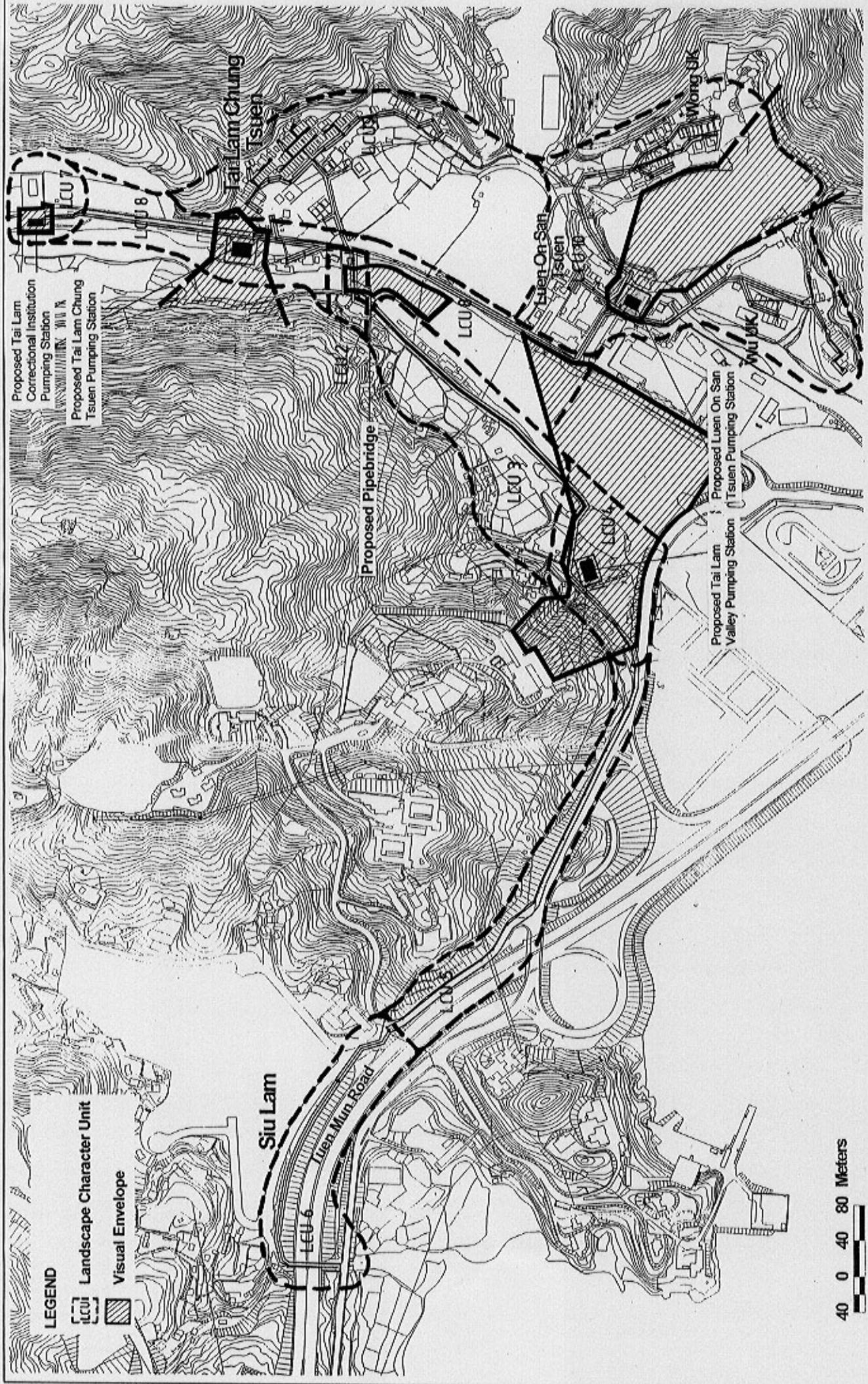
Visually Sensitive Receivers	Sources of Impact	Magnitude of change		Visual Quality/Sensitivity	Mitigation measures	Residual impact after implementation of mitigation measures	
		Construction	Operation			Construction	Operation
So Kwun Wat San Tsuen	Sewer alignments under village paths and field footpaths	Low	Nil	Low	Reinstate paths upon completion	Slight adverse	Negligible

**Table 10.7 Summary of Overall Quantitative Landscape Impacts**

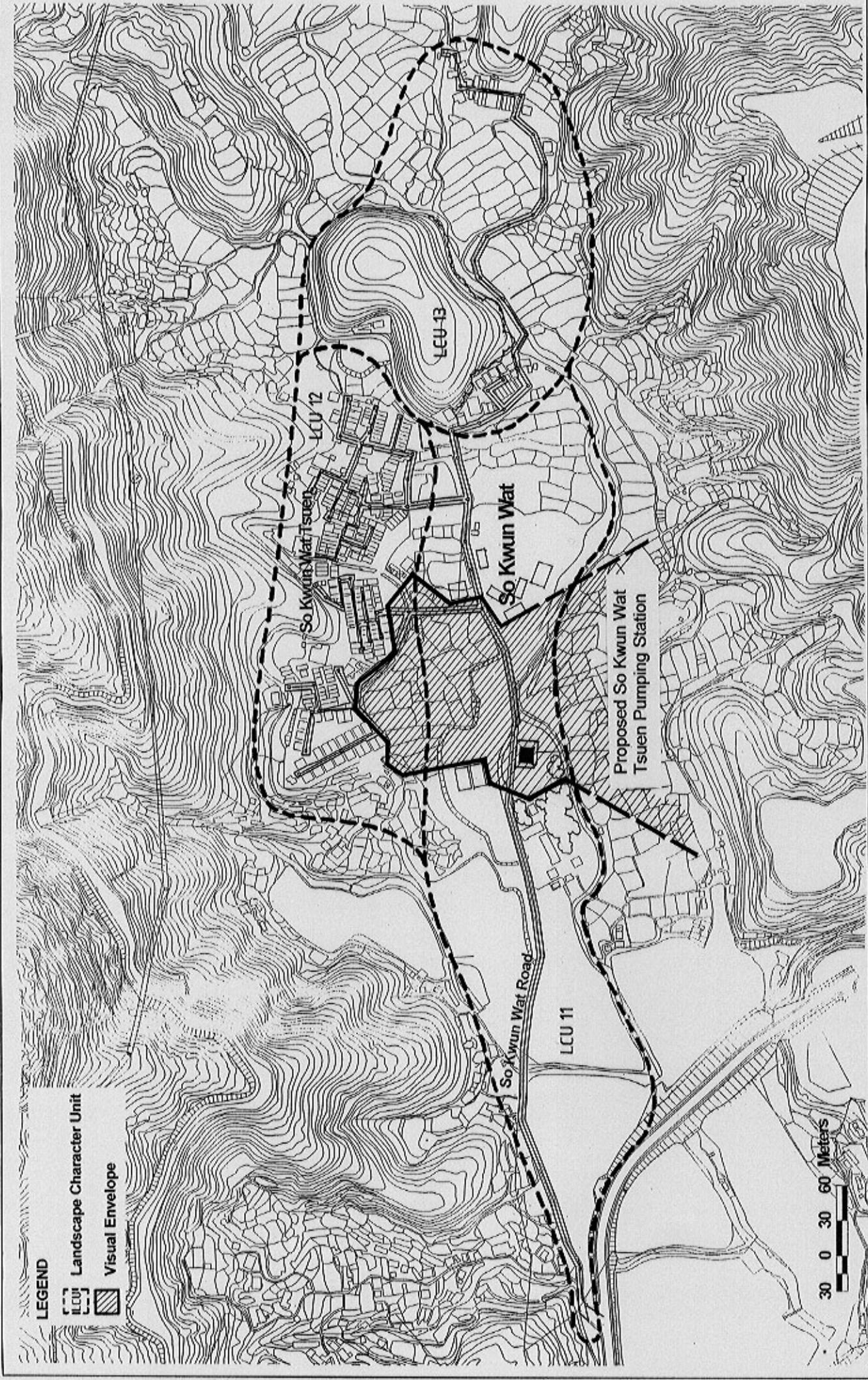
Landscape Character Unit	Loss of Existing Landscape Resources	Compensatory Planting
LCU1: Pumping Station at Catle Peak Villas	400m <sup>2</sup> scrub vegetation in pumping station compound	Tree and shrub planting to perimeter of compound
LCU2: Pipebridge	50 m <sup>2</sup> grass and scrub on river bank	All disturbed areas regrassed upon completion
LCU3: Western riverbank	900m <sup>2</sup> hydrseeded landfill	All disturbed areas regrassed upon completion
LCU4: Pond Area	360m <sup>2</sup> of pond habitat	Tree and shrub planting to perimeter of compound
LCU5: Catle Peak Road	Nil	Nil
LCU6: Tuen Mun Road	Nil	Nil
LCU7: Tai Lam Chung Correctional Institute Pumping Station	Nil	Nil
LCU8: Tai Lam Chung Tsuen Pumping Station	6 nos roadside trees, 10 nos fruit trees within compound area 280m <sup>2</sup> grass / scrub on verge	Tree and shrub planting to perimeter of compound
LCU9: Tai Lam Chung Tsuen pipe laying	5m <sup>2</sup> of abandoned paddy / marsh	All disturbed areas regrassed upon completion
LCU10: Luen On San Tsuen Pumping Station	Nil	Tree and shrub planting to perimeter of compound
LCU11: So Kwun Wat Road and Pumping Station	Nil	Tree and shrub planting to perimeter of compound
LCU12: So Kwun Wat Village	Nil	Nil
LCU13: So Kwun Wat San Tsuen	2,500m <sup>2</sup> of abandoned farmland /grassland / ruderal 670m <sup>2</sup> of arable land	All disturbed areas regrassed upon completion



**Landscape and Visual Impact Assessment  
Survey Plan (Sheet 1 of 3)**



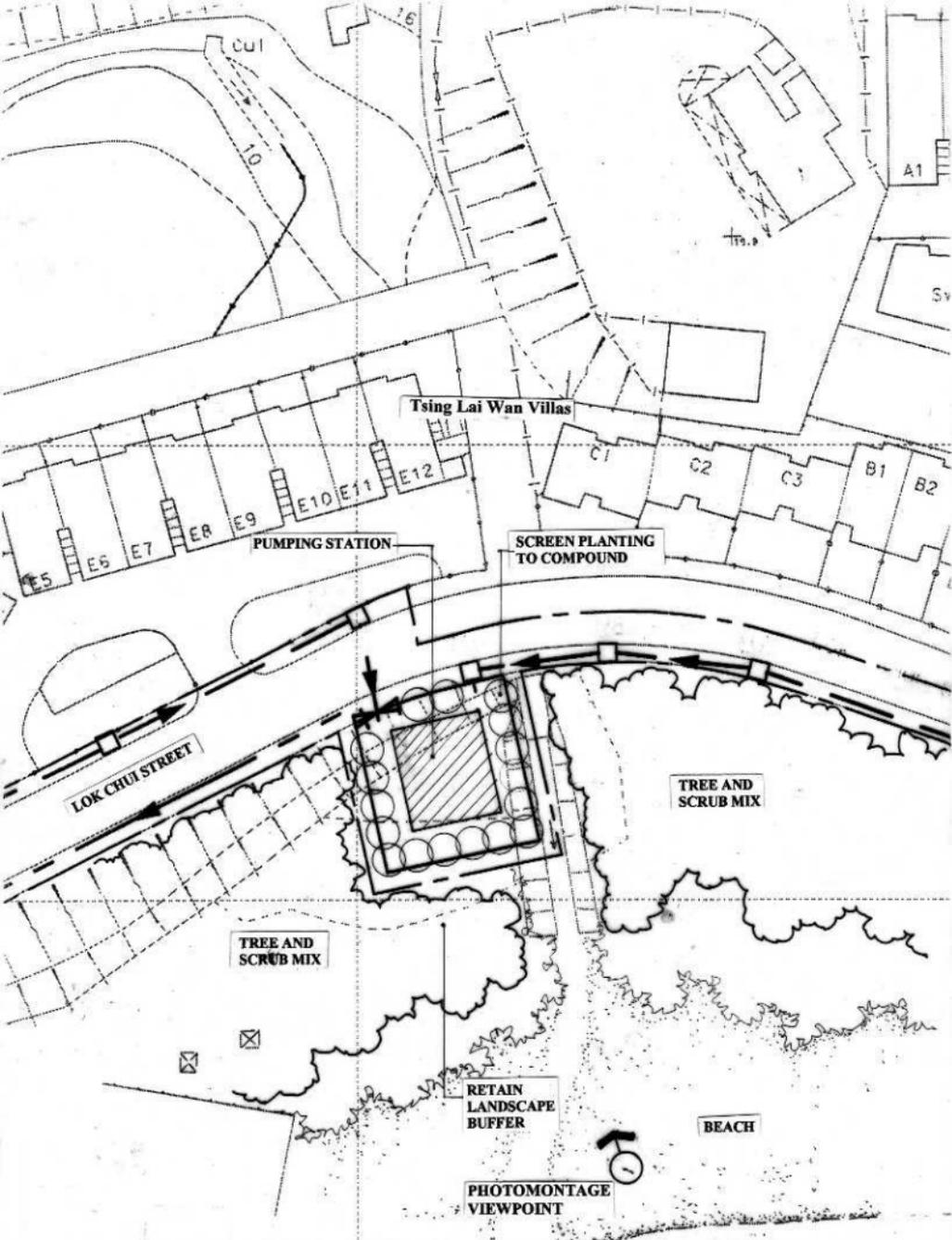
Landscape and Visual Impact Assessment  
 Survey Plan (Sheet 2 of 3)



**LEGEND**

-  Landscape Character Unit
-  Visual Envelope

**Landscape and Visual Impact Assessment  
Survey Plan (Sheet 3 of 3)**





Photograph A LANDSCAPE AND VISUAL CONTEXT

LCU 1: VIEWS FROM EAST AND WEST ENDS OF LOK CHUI STREET  
ILLUSTRATING VISUAL CONTRAST AND LEVEL DIFFERENCE  
BETWEEN VILLAS AND VEGETATED PUMPING STATION SITE



Photograph B RECOMMENDED REALIGNMENT OF SEWER INTO STREET  
TO AVOID DAMAGING ROOTBALL OF MATURE ROADSIDE TREE



**BEFORE AND AFTER VIEWS OF LOK CHUI STREET  
PUMPING STATION VIEWED FROM BEACH**



**VIEW WITHOUT LANDSCAPE MITIGATION**



**VIEW WITH LANDSCAPE MITIGATION AT COMPLETION**

**MODERN VILLA ARCHITECTURE AND BOUNDARY PLANTING  
PROPOSED TO BLEND STRUCTURE WITH SURROUNDINGS**



**VIEW AFTER 10 YEARS OPERATION**



**BEFORE AND AFTER VIEW OF PIPEBRIDGE**

**FOOTBRIDGE IN BACKGROUND TO BE REPROVISIONED BY OTHERS AS CONCRETE STRUCTURE. PIPEBRIDGE TO BE GENERALLY SIMILAR, SIMPLE DESIGN WITH COMPATIBLE COLOUR SCHEME AND HANDRAIL DETAILING. SECURITY GATES AT EACH END TO AVOID 'BOX' PROFILE AND ADOPT MORE ELEGANT FORM AS SHOWN.**



LANDSCAPE AND VISUAL CONTEXT  
WEST BANK OF TAI LAM CHUNG RIVER.



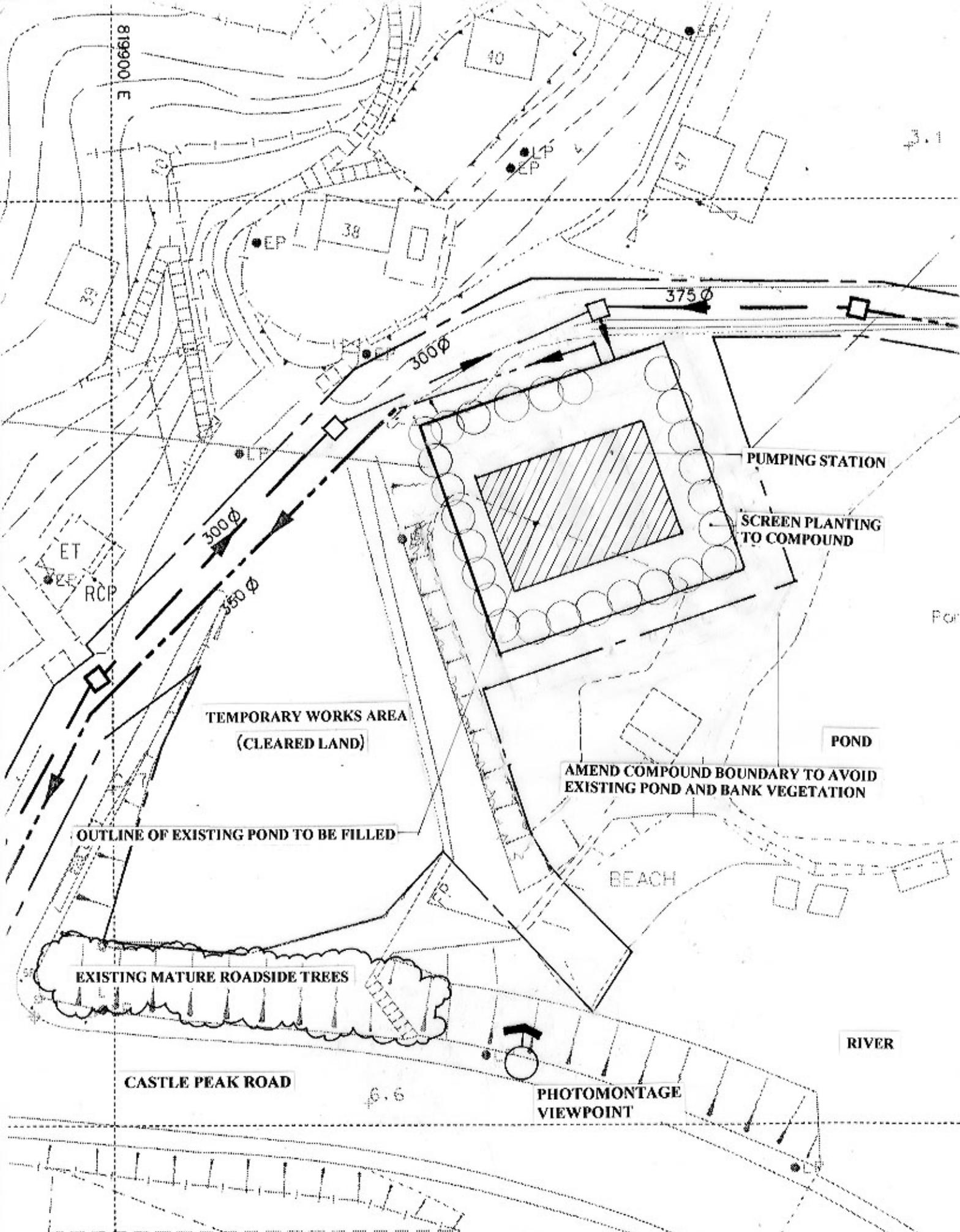
Photograph A CARE REQUIRED TO ENSURE SEWER ALIGNMENT  
AVOIDS MATURE TREES



Photograph B LCU 3: AREA OF RECLAMATION PREVIOUSLY  
DISTURBED FOR WSD PIPELINE



Photograph C LCU 4: POND AND RIVERBANK



**AREA 2: TAILAM VALLEY PUMPING STATION** SCALE 1:500

**Drawing 10.9**



BEFORE AND AFTER VIEW OF TAI LAM VALLEY  
PUMPING STATION VIEWED FROM CASTLE PEAK ROAD



VIEW WITHOUT LANDSCAPE MITIGATION



VIEW WITH LANDSCAPE MITIGATION AT COMPLETION

MODERN VILLAGE HOUSE ARCHITECTURE AND BOUNDARY PLANTING  
PROPOSED TO BLEND STRUCTURE WITH SURROUNDINGS



VIEW AFTER 10 YEARS OPERATION

LANDSCAPE AND VISUAL CONTEXT  
TYPICAL VIEWS ALONG CASTLE PEAK ROAD CORRIDOR



Photograph A LCU 4: ROADSIDE TREES PARTLY SCREEN PUMPING STATION AND TEMPORARY WORKS AREA



Photograph B LCU 5: SEWERS ALIGNED UNDER ROADS / FOOTPATHS ADJACENT TO ROCKFACE



Photograph C LCU 6: SEWERS ALIGNED UNDER ROADS / FOOTPATHS ADJACENT TO NEW RESIDENTIAL DEVELOPMENT

PUMPING STATION

Clinic

STORAGE AREA

SECURITY ENTRANCE

EXISTING MATURE ROADSIDE TREES

RIVER

EXISTING MATURE TREES TO RIVERBANK

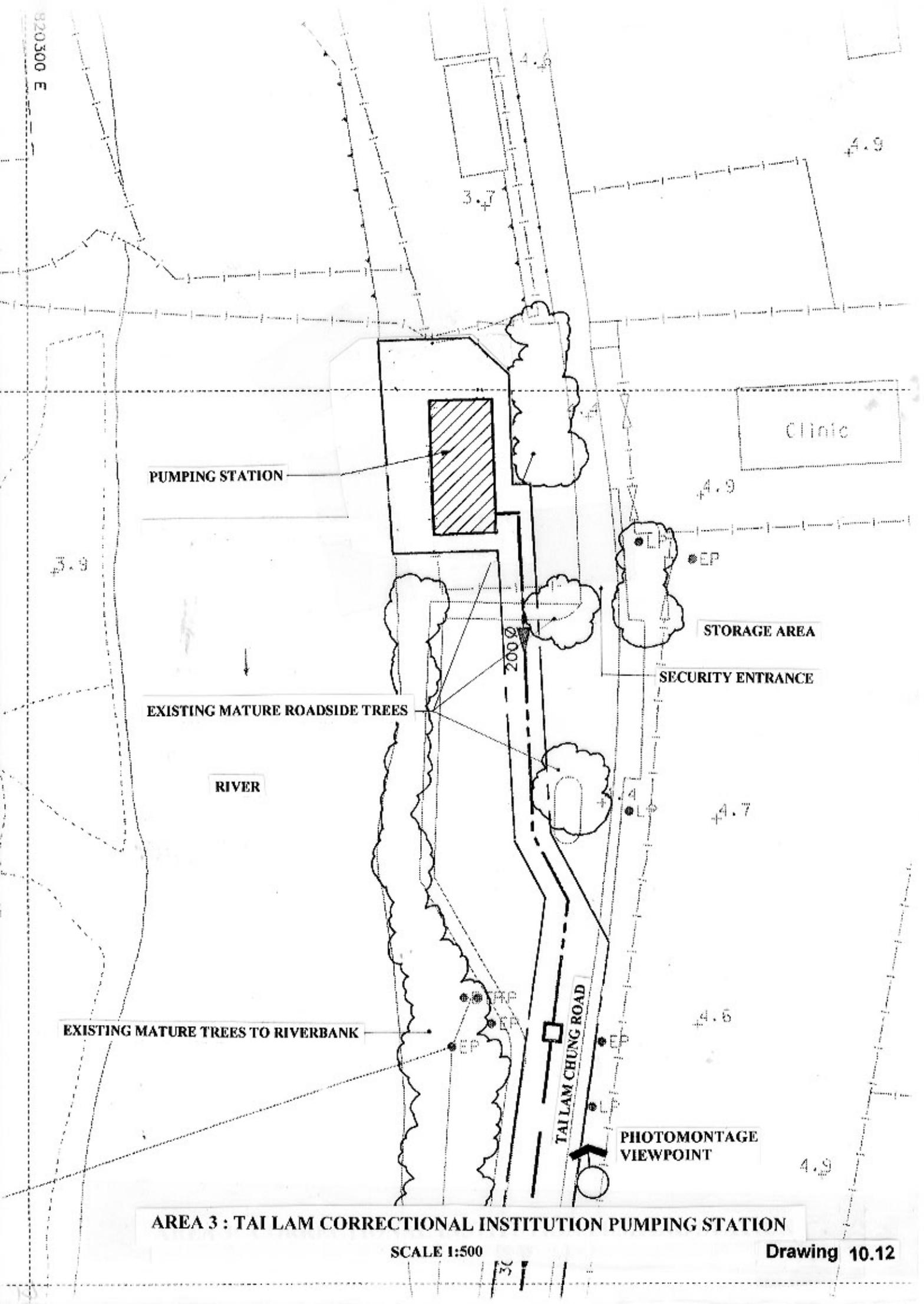
TAILAM CHUNG ROAD

PHOTOMONTAGE VIEWPOINT

AREA 3 : TAI LAM CORRECTIONAL INSTITUTION PUMPING STATION

SCALE 1:500

Drawing 10.12





BEFORE AND AFTER VIEW OF TAI LAM CORRECTIONAL INSTITUTION  
PUMPING STATION VIEW FROM ROADSIDE.



SIMPLE STRUCTURE AND LIGHT COLOURING TO  
BLEND STRUCTURE WITH SURROUNDING BUILDINGS

NOTE: No tree planting proposed due to screening effect of existing  
Compound. Same view for years 1 and 10 of operation

TAI LAM CORRECTIONAL INSTITUTION



LANDSCAPE AND VISUAL CONTEXT OF TAI LAM  
CHUNG ROAD

ROADSIDE TREES AT NARROW PORTION OF ROAD,  
WITHIN SEWER WORKS AREA, TO BE FELLED.  
WOODLAND OPPOSITE TO BE RETAINED



LOCATION OF TAI LAM CHUNG TSUEN  
PUMPING STATION

3 NOS. CASUARINA EQUISETIFOLIA  
2 NOS. CELTIS SINENSIS  
1 NO. MACARANGA TANARIUS  
LIKELY FELLED TO  
ACCOMMODATE PIPE ALIGNMENT

RIVER

0300 E

TAI LAM CHUNG ROAD

EXISTING WOODLAND RETAINED

EXISTING MATURE ROADSIDE TREES

VILLAGE HOUSES

SCREEN PLANTING  
TO COMPOUND

PUMPING STATION

CLEARED LAND

TAI LAM CHUNG TSUE

PHOTOMONTAGE  
VIEWPOINT

AREA 3: TAI LAM CHUNG TSUEN PUMPING STATION SCALE 1:500

Drawing 10.15

225



**BEFORE AND AFTER VIEW OF TAI LAM CHUNG TSUEN  
PUMPING STATION VIEWED FROM ROADSIDE**



**VIEW WITHOUT LANDSCAPE MITIGATION**



**VIEW WITH LANDSCAPE MITIGATION AT COMPLETION**

**MODERN VILLAGE HOUSE ARCHITECTURE AND BOUNDARY PLANTING  
PROPOSED TO BLEND STRUCTURE WITH SURROUNDINGS**



**VIEW AFTER 10 YEARS OPERATION**

Photograph A



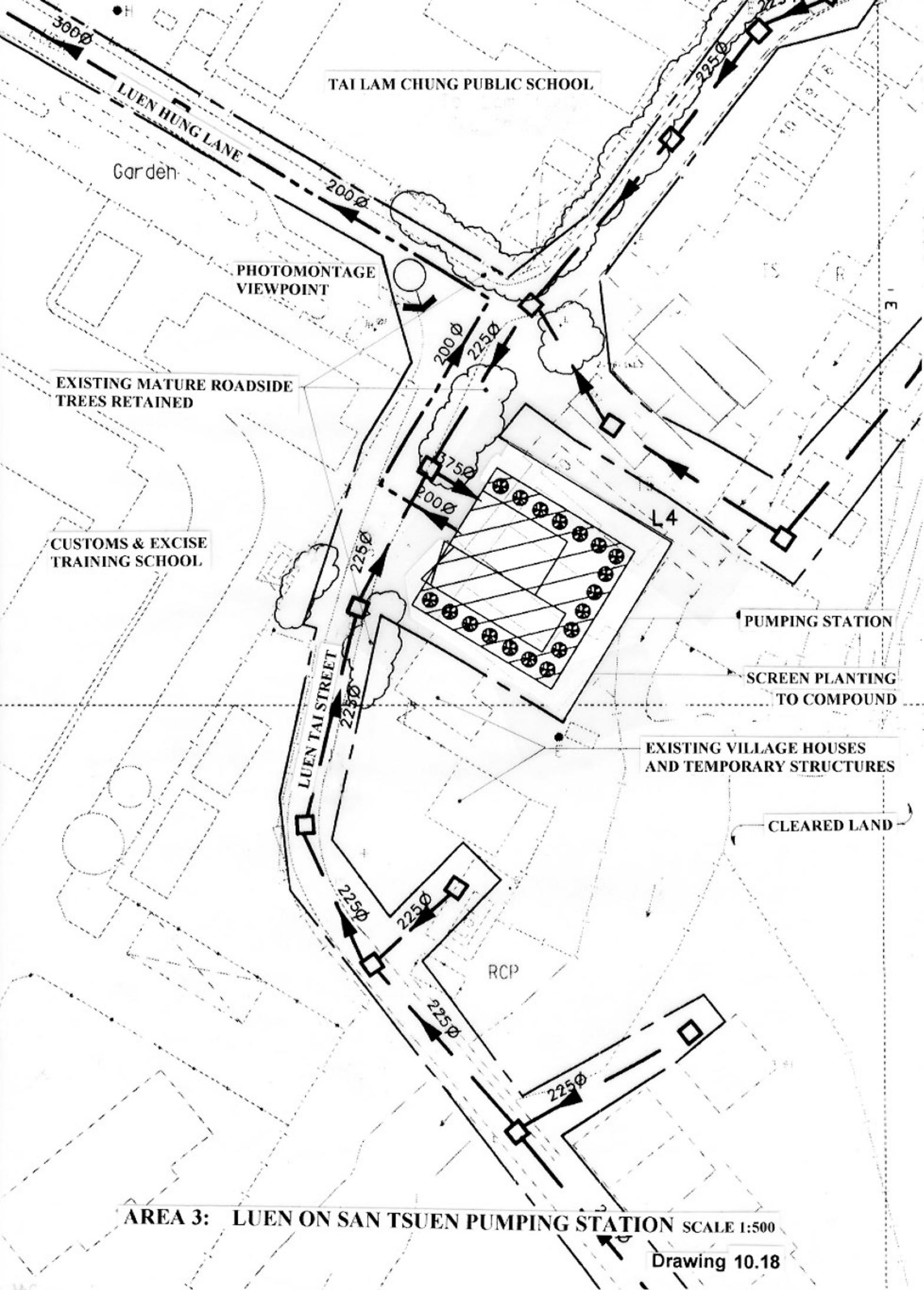
Photograph B



LANDSCAPE AND VISUAL CONTEXT  
TYPICAL VIEWS WITHIN TAI LAM CHUNG VILLAGE.  
SEWERS ALIGNED MAINLY UNDER STREETS

Photograph C





TAI LAM CHUNG PUBLIC SCHOOL

Garden

PHOTOMONTAGE VIEWPOINT

EXISTING MATURE ROADSIDE TREES RETAINED

CUSTOMS & EXCISE TRAINING SCHOOL

PUMPING STATION

SCREEN PLANTING TO COMPOUND

EXISTING VILLAGE HOUSES AND TEMPORARY STRUCTURES

CLEARED LAND

AREA 3: LUEN ON SAN TSUEN PUMPING STATION SCALE 1:500

Drawing 10.18



LANDSCAPE AND VISUAL CONTEXT  
TYPICAL VIEWS WITHIN LUEN ON SAN VILLAGE.  
MATURE ROADSIDE TREES NOT AFFECTED BY  
ALIGNMENT OF SEWERS UNDER ROADS



**BEFORE AND AFTER VIEWS OF LUEN ON SAN TSUEN  
PUMPING STATION VIEWED FROM ROADSIDE**



**VILLAGE HOUSE ARCHITECTURE WITH BOUNDARY PLANTING  
PROPOSED TO BLEND STRUCTURE WITH SURROUNDINGS.**

**NOTE:** Existing roadside trees provide effective screen during construction and operation. Same view for years 1 and 10 of operation.



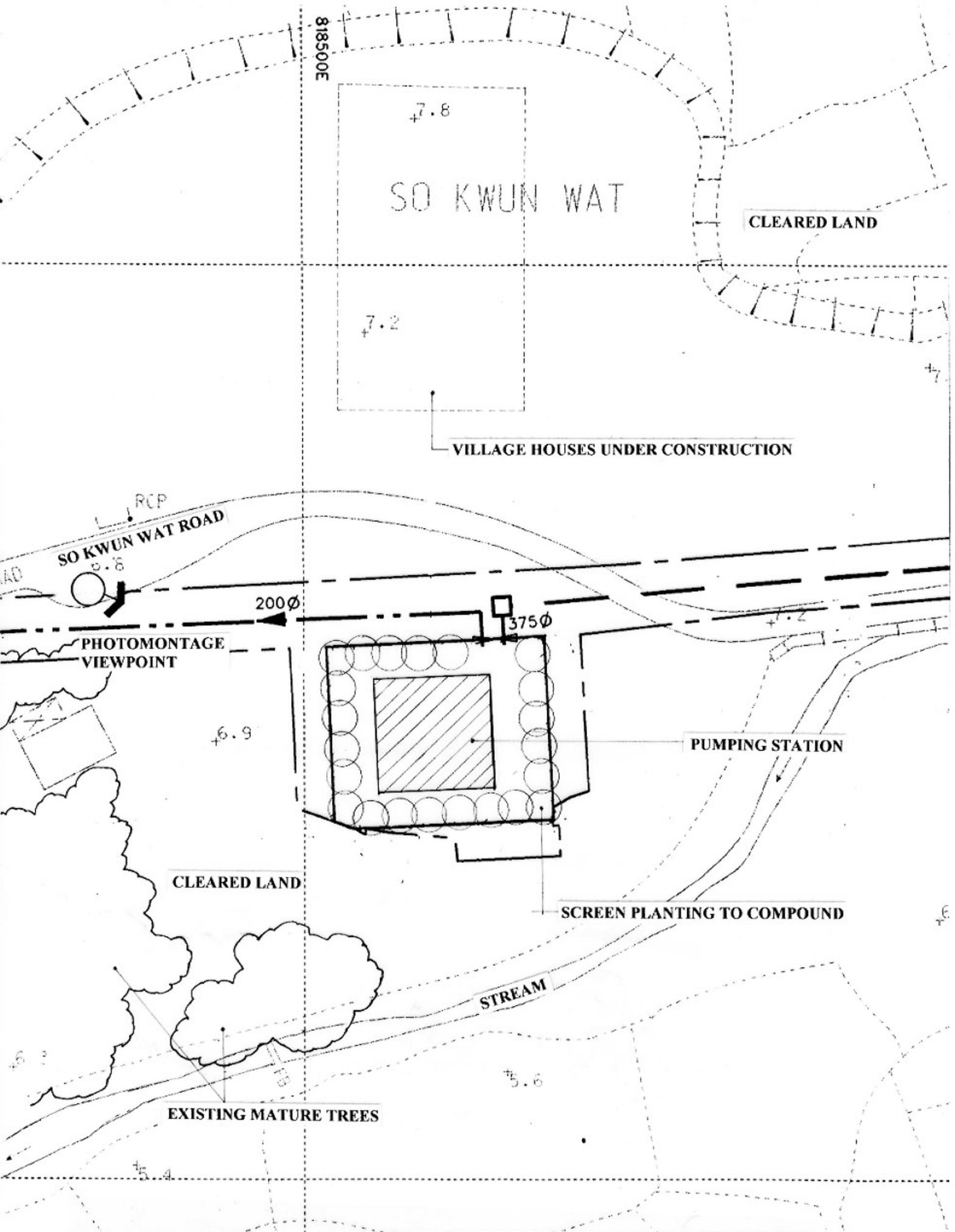
WU UK VILLAGE



LANDSCAPE AND VISUAL CONTEXT  
TYPICAL VIEWS WITHIN WU UK AND WONG UK VILLAGES  
WHERE SEWERS ALIGNED MAINLY UNDER STREETS. CARE  
REQUIRED TO AVOID MATURE TREES DURING CONSTRUCTION



ORIGINAL SEWER ALIGNMENT BEHIND WONG UK VILLAGE  
RELOCATED INTO PARALLEL VILLAGE LANE AS  
RECOMMENDED TO AVOID TREE FELLING (REFER DWG. 10.2)



AREA 4 : SO KWUN WAT TSUEN PUMPING STATION SCALE 1:500

Drawing 10.22



**BEFORE AND AFTER VIEWS OF SO KWUN WAT  
PUMPING STATION VIEWED FROM ROADSIDE**



**VIEW WITHOUT LANDSCAPE MITIGATION**



VIEW WITH LANDSCAPE MITIGATION AT COMPLETION

MODERN VILLAGE HOUSE ARCHITECTURE AND BOUNDARY PLANTING  
PROPOSED TO BLEND STRUCTURE WITH SURROUNDINGS



VIEW AFTER 10 YEARS OPERATION

LANDSCAPE AND VISUAL CONTEXT  
TYPICAL VIEWS WITHIN SO KWUN WAT VALLEY



LCU 11: CONTAINER STORAGE AREAS



LCU 12: SO KWUN WAT VILLAGE



LCU 13: SATELLITE VILLAGES WITH REMNANTS  
OF CULTIVATED AREAS



Photograph A **ADOPTED REALIGNMENT OF SEWER TO AVOID WOODLAND FRINGE AND FOLLOW EXISTING CONCRETE TRACK (REFER DWG. 10.3)**



Photograph B **CARE REQUIRED WITHIN VILLAGE TO ENSURE SEWER AVOIDS MATURE TREES IN NARROW LANES**