

Agreement No. HKR 9/2001

Junction Improvement to Chung Hom Kok Road and Stanley Gap Road Project Profile (Final)

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1. BASIC INFORMATION

Project Title

- 1.1 Junction Improvement to Chung Hom Kok Road and Stanley Gap Road.

Purpose and Nature of the Project

- 1.2 The Outline Zoning Plan gazetted in May 1988 proposed to develop Ma Hang Valley for public housing use. Subsequent to the gazetted development proposal, the Stanley Comprehensive Traffic Study in July 1990 identified the need to carry out junction improvement works to the existing T-shaped priority junction of Chung Hom Kok Road and Stanley Gap Road to accommodate the anticipated increase in traffic demand arising from, amongst others, the new public housing development in Ma Hang Valley.
- 1.3 In 1998, Transport Department conducted a traffic survey and a review/forecast to assess the existing traffic condition of the junction and the traffic situation for the area including the local growth after the opening of Cape Road extension and occupation of the Ma Hang Development Phases 2 and 3 with a population intake of 4320 up to the design year of 2006. The traffic review/forecast revealed that the traffic generated after the commissioning of Cape Road extension and the occupation of Ma Hang Development in December 1999 would increase the Design Flow/Capacity Ratio (DFC) of the junction from 56% to 92% in morning peak hours. Worst still, the junction was forecasted to be operating beyond its capacity in 2000, and up to 141% and 125% during the morning peak hours and evening peak hours in 2006 respectively. Another traffic survey was conducted in 2000 by TD, and the follow-up review reflected that the above traffic figures were still valid.
- 1.4 As the existing road networks would not be able to accommodate the additional traffic associated with the development, it is considered necessary to carry out junction improvement works through widening and signalisation works of Chung Hom Kok Road and Stanley Gap Road (hereinafter referred to as “the Project”). Apart from improving the operational capacity of the junction, the Project will also improve the safety, particularly for the turning of long vehicles from Stanley Gap Road to Chung Hom Kok Road and vice versa.
- 1.5 The Project is to carry out junction widening at the junction of Chung Hom Kok Road and Stanley Gap Road. The scope of the Project comprises the following key components:
- ? Widening of the section of Chung Hom Kok Road approaching the junction with Stanley Gap Road from 2 lanes to 3 lanes;
 - ? Widening of the approaches on Stanley Gap Road at its junction with Chung Hom Kok Road; and
 - ? Associated geotechnical works, modifications to footpath and pedestrian refuge islands.
- 1.6 The general layout plans for the proposed road improvement works and geotechnical works are shown in Figures 1.1 and 1.2 respectively. The area of the proposed Project site is about 1.7 ha.
- 1.7 In addition to other geotechnical works required for the widened road, the slope along northern side will be stabilized by trimming with soil nailing so as to improve the safety standard to the road users.

Name of Project Proponent

- 1.8 The name and address of the Project Proponent are as follows:

Highways Department
Hong Kong Region
7th & 8th floors,
North Point Government Offices,
333 Java Road, Hong Kong.

Location of Project

- 1.9 The proposed project site is located at the junction of Chung Hom Kok Road and Stanley Gap Road. The general layout of the Project is shown in Figure 1.1.

Name and Telephone Number of Contact Person(s)

- 1.10 All queries regarding the project can be addressed to:

Mr. Chi Ming TANG Senior Engineer/Capital Works (3)
Hong Kong Region
Highways Department
Tel No.: 2231 5729

Miss Suk Kwan LAI Engineer/Capital Works (12)
Hong Kong Region
Highways Department
Tel No. 2231 5766

Classification of Project under the Environmental Impact Assessment Ordinance

- 1.11 Stanley Gap Road is classified as a District Distributor. Under the Environmental Impact Assessment Ordinance (EIAO), it is an exempted Designated Project since the road has been in operation before the Ordinance came into operation on 1 April, 1998. As the proposed works would result in physical alteration to the existing Stanley Gap Road, and may cause adverse landscape and visual impacts if mitigation measures are not in place, the project will constitute a “material change” to an exempted Designated Project under the EIAO. The procedure under the EIAO are required to be followed and an environmental permit is required prior to the construction and operation of the Project.

Outline of Planning and Implementation Programme

- 1.12 The design of this Project will be finalized by the second quarter of 2003 and District Council will be consulted during the detailed design stage. Construction of the proposed works is scheduled to commence in December 2004, for completion in August 2007.

2. POSSIBLE IMPACT ON THE ENVIROMENT

Description of the Environment

- 2.1 The Project site, which is located in a rural area of Chung Hom Kok, is within an environmentally sensitive area zoned “Green Belt” designated as “Landscape Protective Area” in the Metroplan Landscape Strategy for the Urban Fringe and Coastal Areas. It is adjacent to Tai Tam Country Park and Site of Special Scientific Interest No.25 – Tai Tam Reservoir Catchment Area (Fig 2.1 refers). The existing T-shaped priority junction is surrounded by slopes of soil/ rock at various gradients. Only few domestic premises, mostly low-rise residential buildings, are found within 500m of the work site and the worst affected sensitive receiver is Miklagard House which is about 72m away from the construction site boundary.

Potential Impacts on the Environment and Community Due to the Project

Construction Noise Impact

- 2.2 The scale of the proposed construction works would be small. Adverse construction noise impact would not be expected as the noise emissions from construction works would be minimized through adopting quieter method, selecting quieter models of plant and restricting the number of noisy plant in operation on site.
- 2.3 Construction Noise Permit will be applied for the execution of construction works, if required, during restricted hours, i.e. 1900 to 0700 hours on weekdays and any time on public holidays including Sundays.

Traffic Noise Impact

- 2.4 The works proposed for the Project would involve local minor improvement works to the existing junction of Chung Hom Kok Road and Stanley Gap Road. This road improvement scheme includes widening of the section of Chung Hom Kok Road approaching the junction with Stanley Gap Road from 2 lanes to 3 lanes and widening of the approaches on Stanley Gap Road at its junction with Chung Hom Kok Road. It would not be a strategic improvement to increase the road capacity significantly. Hence, it would therefore be unlikely to attract significant amount of vehicles upon its completion. In this regard, it is not expected that the proposed works would impose adverse significant traffic noise impact on sensitive receivers nearby.

Construction Dust Impact

- 2.5 Dust arising from various construction activities would be controlled by implementing dust suppression measures as stipulated in the Air Pollution Control (Construction Dust) Regulation. Adverse construction dust impact would not be expected.

Vehicle Emissions Impact

- 2.6 Upon widening the junction of Chung Hom Kok Road and Stanley Gap Road, it would be anticipated that there would be less stopping, acceleration and deceleration of vehicles. As a result, air pollution in the adjoining areas would be reduced.

- 2.7 In view of the low traffic flow along the roads within the study area, adverse air quality impact arising from vehicle emissions would not be anticipated. This conclusion was further confirmed by quantitative assessment in accordance with the criteria stipulated in the EIAO-TM undertaken in the Environmental Study (ES) for this Project. The assessment results are presented in the Para. 2.26-2.28 and Tables 2.1-2.2 below.

Construction Phase Water Quality Impact

- 2.8 Water-bodies potentially affected by the proposed works includes a small seasonal stream running through a culvert under the existing road (Figure 1.1). During the construction phase, runoff and drainage from construction sites would be the main sources of potential water quality impacts to the nearby water bodies. Site runoff and drainage may contain increased loads of suspended solids and contaminants and may enter the associated drainage system if uncontrolled. Sewage arising from the on-site construction workforce would also have the potential to cause water pollution if it is discharged directly into adjacent waters without any appropriate treatment.

Operation Phase Water Quality Impact

- 2.9 No adverse water quality impact is expected during the operation stage of the Project

Construction Phase Waste Management Implications

- 2.10 Waste generated from the construction activities of the proposed works would mainly comprise excavated materials and construction materials. The quantity of excavated materials from earthworks to be disposed of would be about 2000-3000 m³. About 3000-4000m³ of earth materials will be re-used as fill materials. These quantities are only preliminary estimates and are subject to confirmation in detailed design stage. Provided that the construction wastes are handled, transported and disposed of using approved methods and that the recommended control measures in Section 3 are adhered to, adverse impacts and nuisance arising from the construction stage of the Project are not envisaged.

Operation Phase Waste Management Implications

- 2.11 No adverse impact is expected during the operation stage of the Project.

Construction Phase Ecological Impacts

- 2.12 As confirmed by Director of Agriculture, Fisheries and Conservation, the proposed project site would not fall into any designated areas of ecological significance. The proposed works area is adjacent to the southern boundary of Tai Tam Country Park and SSSI (Figure 2.1), but would not encroach upon this area.
- 2.13 In general three types of habitats were identified namely grassland/shrubland mosaic on the hillside, and plantation/mixed woodland covering the fill slope south of the existing road. It is anticipated that 0.59ha grassland/shrubland mosaic, 0.07ha plantation, and 0.1ha woodland would be affected by the proposed junction improvement works. The grassland/shrubland mosaic comprises of majority of *Gordonia axillaris* dotted with *Pinus* and *Ficus* spp. and other common scrubland species typical of the hillsides at the southern part of Hong Kong Island. The cut slopes were found to be newly formed and established with woodland mix planting of seedlings dominated by exotic species of *Acacia confusa* and native *Gordonia axillaries*. The fill slope to the south of the existing road consists of a small area of roadside plantation consisting of mature exotic and native trees. Further from the road is an area of

young mixed woodland comprising a mixture of native tree and exotic planting commonly found in Hong Kong namely:-

- *Acacia confusa*
- *Bombax malabaricum*
- *Celtis sinensis*
- *Delonix regia*
- *Ficus microcarpa*
- *Grevillea bansii*
- *Leucaena leucocephala*
- *Litsea glutinosa*
- *Macaranga tanarius*
- *Sapium discolor*

- 2.14 The wildlife found in the Project Area would consist of animals typically found in grassland/shrubland, plantation and mixed woodland habitats, although it also noted that existing noise and air pollution from Stanley Gap Road would discourage wildlife. Recent field checks confirmed this, with only a few common bird (Tree Sparrow *Passer montanus*, Black Kite *Milvus migrans*, Crested Myna *Acridotheres cristellus*, Spotted Dove *Streptopelia chinensis*, Crested Bulbul *Pycnonotus jocosus*) and butterfly (*Eurema hecabe*, *Zizeeria maha*) species recorded on-site.
- 2.15 In terms of low diversity and common species of flora and fauna found and expected (sections 2.12-2.13 refer), the ecological value of the grassland/shrubland mosaic and plantation habitats would be rated relatively low while the woodland would be considered moderate in ecological value due to the relatively diverse mix of species and maturity of vegetation.
- 2.16 The proposed slope reprofiling and road construction works would result in the loss of small areas of grassland/shrubland mosaic, plantation and mixed woodland habitats. The impacts of the proposed works on the grassland/shrubland mosaic and plantation habitats are considered minor, given the low ecological value and small size of the affected areas.
- 2.17 Annex 8 of the *EIAO-TM* describes **mature native** woodland larger than **1ha** as an important (and therefore potentially valuable) habitat type. The significance of direct impacts to such woodlands is therefore potentially high. However, in this instance, loss of woodland habitat is considered a minor impact for the following reasons:
- ? The affected area would be very small (only 0.1ha)
 - ? The affected area supports young mixed woodland, with few mature trees
 - ? Many of the trees in the affected area are exotic, non-native species
 - ? The affected area would be close to the busy Stanley Gap Road, and therefore would provide a poor habitat for wildlife.
- 2.18 Although ecological impacts resulting from this Project will be minimal, mitigation measures such as compensatory tree planting and hydorseeding of cut slopes with shrub/tree species should be implemented to compensate for the loss of woodland habitat. Residual ecological impacts resulting from the Project are therefore expected to be minor and acceptable.

Operation Phase Ecological Impact

- 2.19 No adverse impact is expected during the operation stage of the Project.

Landscape and Visual Impacts

- 2.20 The road junction is situated in a natural setting and sitting on an open ground overlooking a valley which can be viewed from a far distance. Clearance of the existing mature trees and the erection of the retaining structure has potential landscape and visual impacts on the road users and the residents in the vicinity.
- 2.21 The proposed junction improvement works would inevitably cause disturbance to adjacent slopes that have previously been disturbed, some with re-established vegetation, weathered rockface or concrete finish. The most significant landscape impact anticipated would be the loss of trees and scrub on the natural slope above the existing cut slope and adjacent to Chung Hom Kok Road and Stanley Gap Road. Initial field observation and tree survey revealed that approx. 340 Nos of existing mature trees are within the site area and about 250 Nos of them would be required to be cleared. Most of the potentially affected trees are exotic species of fair health, poor to fair form, and low to medium amenity value. The loss of trees would result in the exposure of newly disturbed slopes to views in the short and medium term. The visual impact of the works can be mitigated with planting of additional trees adjacent to the road and the establishment of vegetation on the soil slopes.
- 2.22 The landscape and visual impacts during the construction and operation stages of the Project were assessed in detail in an Environmental Study conducted in October 2002. Findings and recommended mitigation measures are detailed in Para. 2.29-2.63 and Tables 2.3-2.8, and Para. 3.6-3.7 respectively.

Findings and Recommendations of Previous Environmental Studies***General***

- 2.23 A Preliminary Project Feasibility Study (PPFS) was completed by Highways Department in September 2000. Potential environmental impacts in respects of noise, air, and landscape, visual and ecology associated with the implementation of the Project were reviewed. Air quality impact during the operation stage of the Project as well as landscape and visual impacts arising from the construction and operation phases of the Project were identified as key environmental issues requiring further detail assessment.
- 2.24 In October 2002, an Environmental Study (ES) was conducted for the Project. In the ES, air quality impact due to vehicular emissions was assessed quantitatively with reference to the criteria stipulated in the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). Moreover, landscape and visual impacts were assessed in detail, and necessary mitigation measures were recommended in the ES. The findings and recommendations of the ES are discussed below.

Air Quality

- 2.25 The air quality in the study area is primarily affected by traffic emissions from the existing Stanley Gap Road, Chung Hom Kok Road, Headland Road and other local access roads. Given the low traffic flow of these roads, high levels of air pollutants, such as nitrogen dioxide (NO₂) and respirable suspended particulates (RSP) would not be expected.

- 2.26 Twenty-six representative air sensitive receivers (ASRs) were identified close to the Project site in accordance with the EIAO-TM. Locations of representative ASRs are shown in Figure 2.2. Based on the traffic flows and emission factor in 2022 which represent the worst and long-term scenario in terms of air pollution from the road, the worst-case 1-hour and 24-hour average NO₂, and 24-hour average RSP levels were predicted at the representative ASRs by using the USEPA CALINE4 model, with reference to the assessment criteria as stipulated in the EIAO-TM (Table 2.1 refers). The assessment results are shown in Table 2.2. Sample CALINE4 output files are given in Appendix 2.1.

Table 2.1 Hong Kong Air Quality Objectives

Parameter	Maximum Average Concentration (ppm ⁻³) ^[1]		
	1-Hour ^[2]	24-Hour ^[3]	Annual ^[4]
NO ₂	300	150	80
RSP	-	180	55

Note: [1] Measured at 298 K and 101.325 kPa.
 [2] Not to be exceeded more than three times per year.
 [3] Not to be exceeded more than once per year.
 [4] Arithmetic mean.

Table 2.2 Predicted NO₂ and RSP Concentrations at the Representative ASRs

ASR Ref.	Location	Level (meter above ground)	NO ₂		RSP
			1-Hour	24-Hour	24-Hour
A1	Grand Garden	1.5	65	59	44
		10	65	59	44
A2	South Bay Towers	1.5	63	58	43
		10	63	58	43
A3	Belgravia	1.5	61	58	43
		10	61	58	43
A4	Twin Bay	1.5	64	58	44
		10	63	58	43
A5	14 Headland Road	1.5	63	58	43
		10	62	58	43
A6	13 Headland Road	1.5	62	58	43
		10	62	58	43
A7	Vista Headland	1.5	61	57	43
		10	61	57	43
A8	Monte Villa	1.5	63	58	43
		10	62	58	43
A9	2 Headland Road	1.5	62	58	43
		10	62	58	43
A10	3 Headland Road	1.5	63	58	43
		10	62	58	43
A11	South Bay Hall	1.5	62	58	43
		10	62	58	43
A12	5 Headland Road	1.5	62	58	43
		10	61	58	43
A13	6 Headland Road	1.5	61	58	43
		10	61	57	43
A14	7 Headland Road	1.5	61	57	43
		10	61	57	43
A15	Miklagard	1.5	92	70	48
		10	61	57	43
A16	No. 33 Horizon Lodge	1.5	67	60	44
		10	66	59	44
A17	Horizon Lodge	1.5	69	61	45
		10	67	60	44
A18	30 – 36 Horizon Drive	1.5	77	64	46
		10	71	61	45
A19	Low Wood	1.5	101	73	50
		10	74	63	45
A20	Sea View Garden	1.5	79	65	46
		10	72	62	45
A21	Sea Branch	1.5	65	59	44
		10	64	59	44
A22	34 – 38 Chung Hom Kok Road (Under Construction)	1.5	81	65	47
		10	73	62	45
A23	29 Horizon Drive	1.5	70	61	45
		10	68	60	44
A24	Lung Yan Court	1.5	73	62	45
		10	63	58	43
A25	Ma Hang Estate	1.5	68	60	44
		10	63	58	43
A26	Ma Hand Prison Staff Canteen	1.5	65	59	44
		10	64	59	44

- 2.27 The modelling results showed that no exceedance of the Air Quality Objectives for NO₂ and RSP would be expected at the existing and planned sensitive receivers. Mitigation measures for operational phase air quality impacts would be therefore not required.

Visual and Landscape Impacts

Description of the Environment

- 2.28 Stanley Gap Road fringes the Tai Tam Country Park and the intersection where the works are proposed is located on the cusp of the view shed between the Repulse Bay and Stanley Village areas. The principal physical landscape resources within these sensitive landscapes are discussed below.

Topography and Land Form

- 2.29 The intersection is located on the 'neck/ridge' between two significant landforms. These features form the backdrop to the Stanley Village west and the eastern most portion of Repulse Bay and contribute significantly to its identity. The area comprise slopes that are generally steeper (slopes varies from 1:1 to 1:1.5) and more spectacular than the lower slopes, comprising scrub/woodland covered hillsides resulting in an often dramatic and rugged appearance. The ridgelines and peaks are particularly significant topographic elements of this landscape adding to its distinctiveness. Given that the both topographic elements and land forms contribute significantly to the study, their sensitivity to change is considered to be high.

Vegetation

- 2.30 Due to the disturbed nature of the road corridor, the visual quality of the existing plant material is low. However the existing trees adjacent to the road are effective in screening the existing cut slopes and traffic from distant views. Where vegetation exists on the cut slopes that have been concreted, it softens and reduces the overall visual impact of the slopes.

Streams

- 2.31 The study area contains an existing stream running through a culvert under the existing road. The stream is seasonal and is not considered to be a significant feature within the landscape

Landscape Character Zones

- 2.32 The landscape of the site area comprise a high mountainous ridge running in a North-southerly direction. Repulse Bay road and Stanley Gap Road rises from the urban areas to meet the low point or gap within the mountainous ridge. The topography of the ridge is further divided into smaller ridges that define the two valleys on either side.
- 2.33 In the broader landscape following these valleys there is a transition from the coast to the lower slopes and upper slopes. The valleys and ridges to the east and west are extensively developed with low rise and high-rise residential units/apartments. The existing road transitions from the lower to the upper slopes and road cuttings become increasingly evident as the road rises to the ridge.

Baseline Visual Conditions

- 2.34 Due to the elevated position, Stanley Gap/Repulse Bay road is highly visible. As part of the original road construction, the slopes were extensively cut to accommodate the road. Soil slopes have subsequently been treated with concrete to prevent erosion and slippage. The existing cut rock and concrete slopes have however matured substantially. To the point where it is becoming integrated with the mountain face. At the intersection with Chung Hom Kok road there are four distinct slope features ie:
- ? the existing south facing cut slope (partial concrete and exposed weathered rock face with scrubby vegetation cover)
 - ? existing north facing slope (concrete finish)
 - ? retaining wall on Chung Hom Kok Road (Reinforced concrete)
 - ? low retaining wall along Stanley Gap Road
- 2.35 The existing cut slopes and road is well screened by a mix of existing exotic and native scrub/tall vegetation. The baseline visual envelope of the existing Chung Hom Kok and Stanley Gap Road Intersection is shown on Figure 2.2.
- 2.36 A water main (concrete slope with blue/green metal staircase) has been constructed on the north facing slope. This structure is very visible due to the linear nature of the structure and the adjacent clearing/concrete treatment.

Sensitive Receivers

- 2.37 Locations of Visually Sensitive Receivers are shown on Figure 2.3. The visual catchment of the existing road is contained by the mountainous ridge adjacent to the coastline. This catchment is further constrained by the southern extrusion of the ridge, forming a screen of the proposed works to the coast, limiting extensive views and effectively narrowing the catchment to a cone on either side.
- 2.38 The locations of key views of the site are identified below and in Figure 2.4. On the whole key views include views of the coast, urban areas, mountainous ridges and are notable for their 'scenic' qualities. Views are experienced by recreational receivers who deliberately go to a specific location in order to take in the view. The identity and characteristics of the key visual sensitive receivers are provided in Table 2.3 and data on key views is set out in Table 2.4 below.

Table 2.3 Identity and Characteristics of the Key Visual Receivers

No.	Location	Type of Visual receivers	Type of View	Approximate Distance to Works (m)
1	Repulse Bay	Residential, Recreational, Traveling	Panorama	1500
2	Stanley Gap Road	Recreational, Traveling	Panorama	0 - 1000
3	Chung Hom Kok Rd	Residential, Traveling	Vista	0 -50
4	Stanley Village	Residential, Recreational	Panorama	1000

Table 2.4 Characteristics of Key Views

Ref	Location of Receiver	Number of Viewers	Type of view	Duration of view	Approximate Distance to site (m)
Residential Receivers					
	<i>Repulse Bay</i>				
	Royal cliff	Few	Panorama	Constant	1500
	Area around Belview drive	Few	Panorama	Constant	1550
	Belgravia, Ruby Court Headlands, Crows nest The Topmast, South Bay Hall	Many	Vista	Constant	300
	<i>Stanley Area</i>				
	Miklagard (CHK road near)	Very Few	Vista	Constant	70
	Hillgrove, Casa Del Sol, Ma Hang Estate, Lung Yan Court	Many	Panorama	Constant	250
	Stanley Village	Many	Panorama	Constant	1000
	St Stephens Beach Stanley Peninsula	Few	Panorama	Constant	1500 - 2000
Recreational Receivers					
	Seaview promenade: Repulse Bay	Few	Panorama	Constant	1500
	Wilson Trail Section 1	Very Few	Panorama	Periodic	500 - 1000
Traveling Receivers					
	Commuters	Many	Vista	Periodic	0 -200
	Bus Route	Many	Vista	Periodic	0 -200
	Tourism	Many	Vista	Periodic	0 -2000

- 2.39 Due to the small scale of development, it is not envisaged that views beyond 1000m will be prominent.

Potential Sources of Impact

- 2.40 The proposed works would create varying levels of impact on the physical landscape and on the visual amenity of the surrounding areas during the construction stage. Potential impacts would result from the following activities:

- ? site clearance works involving the removal of existing vegetation
- ? formation of construction accesses and temporary works area
- ? excavation works for road carriageway, slopes and structures
- ? haulage off-site of some excavated materials
- ? importation and storage of construction equipment and materials (including storage of existing topsoil for reinstatement works); and
- ? construction of roads, slopes, utilities and drainage

Physical Landscape Impacts

Cut slopes

- 2.41 The proposed improvement works will double the width of the road intersection with a substantial increase in road surface. This extension requires additional space for slip lanes on the southern side resulting in a requirement to widen the existing cut slope. The proposal is to leave the rock exposed and stabilize the soil slope with hydroseeding. The works will result in the loss of vegetation (approximately 0.14 ha - mixture of individual woodland trees and scrub) above the existing concrete slope and the increase of the height and extent of the existing cut slope.
- 2.42 The surface (approximately 0.45 ha) of the opposite slope would be cleared of vegetation, trimmed to remove loose material and soil nailed to ensure stability. There would be direct loss of vegetation (mixture of some native trees and scrub) covering the existing slope. The new slope would comprise fresh rock and soil slope. Depending on the extent of clearing on the soil areas some existing vegetation with exposed areas would be stabilized with hydro seeding treatment.

Fill slopes

- 2.43 Trees on the slope below the road would be felled to allow for the construction of a retaining wall to support the additional slope required to support the increased width on the south side of the road. There would be direct loss of vegetation screening the existing road (approximately 0.17 ha). The new retaining wall would be a reinforced concrete wall that would be, due to the removal of the trees, exposed to long distance views.
- 2.44 The majority of the trees affected are considered to be of fair health, poor to fair in form and low to medium in amenity value. The value of the trees however is in their capacity to screen the road traffic and the existing slopes with the majority tree heights ranging from 5 – 15m. The tree species are generally exotic.
- 2.45 Approximately 512 trees have been surveyed within the site boundary. It is envisaged that a maximum (worst case) of about 340 nos trees within the site area will be affected through transplanting and/or felling. At location where the slopes are cleared for the trimming, soil nailing and construction of the retaining wall, about 250 nos trees are required to be cleared.

A detailed tree survey would be carried out during the detail design to determine the exact number of trees affected, the amenity value and the feasibility (geotechnical , suitability) for transplantation to site or elsewhere.

Retaining wall

- 2.46 A retaining wall is proposed on the slopes below the road to support the road widening which would be exposed to long distance views. The retaining wall is approximately 110m long and its height varies between 3 and 7meters. Proposed geotechnical works typical section is shown in Figure 1.3.
- 2.47 As landscape and visual impacts are envisaged, mitigation measures are considered necessary. Landscape works design that would help ameliorate the possible environmental impacts resulting from the operation of the Project are therefore proposed in this section.

Nature and Magnitude of Visual Impacts during the Construction Stage

Residents

Repulse Bay Area

- 2.48 Residents of Royal cliff, Area around Bellevue drive (Repulse Bay) would have long distance panoramic views, while some residents in the upper floors of the high rise blocks Belgravia, Ruby Court would have oblique short range views of the construction. Given the panoramic nature of alternative views and the distance of the latter views available from these properties the magnitude of change is considered to be small.

Stanley Village Area

- 2.49 Residents of Miklagard, being in closest proximity to the project (50m) and exposed to the major works on the southern side of the road (slope cutting excepted) will have short range views of the construction activities. The magnitude of change during the construction stage is considered to be moderate and slight after mitigation.
- 2.50 Residents of the of the residential blocks Hillgrove, Casa Del Sol, Ma Hang Estate and Lung Yan Court would have medium range panoramic views of the construction. Given the panoramic nature and distance of the views available from these properties the magnitude of change is considered to be moderate.
- 2.51 Views from Stanley Village, St Stephens Beach and Stanley Peninsula are mainly panoramic but due to the viewing distance, isolated nature and the scale of the proposed works against the mountainous backdrop, the magnitude of change is considered to be negligible.

Recreational Users

- 2.52 The main recreational viewers comprise those using the seaview promenade: Repulse Bay and Stanley Village Area. Due to the viewing distance, isolated nature and the scale of the proposed works against the mountainous backdrop, the magnitude of change is considered to be negligible.
- 2.53 Hikers on the Wilson Trail Section 1 of Tai Tam Country Park walk along the ridge a distance from the proposed works. Views are occasional, oblique, panoramic and within a

medium range distance. Considering however the extent of urban development viewed from this area, the magnitude of change is considered negligible.

- 2.54 There would be very long range views of the proposed works from marine vessels. Most clearly visible would be the new road in the southern section, with the excavation being in sharp contrast with the colour of the natural hillside above and below. Given the panoramic and scenic quality of views generally available from this coast, the proposed improvement works would result in only a small magnitude of change.

Travellers

- 2.55 Travellers/motorists on Stanley Gap Road would have brief, but direct views of the construction of the new intersection. Given the sequential and varied quality of the visual experience for motorists and travellers along Stanley Gap/Repulse Bay Road the construction works are likely to result in only an intermediate magnitude of change.
- 2.56 With the removal of the tall vegetation on the south side of the road, it opens up a panoramic view of Stanley Peninsula and the coastline as travellers/motorists clear the ridge. The positive change would however be outweighed by the lack of screening to the newly exposed northern slope.

Nature and Magnitude of Visual Impacts during the Operational Stage

Residential

Repulse Bay Area

- 2.57 The magnitude of change would very much depend on the extent of clearing and trimming in of the northern slope in the project area. If clearing and trimming takes place across the full extent of the slope then the magnitude of change would be moderate to substantial. Selective clearing and trimming could see the magnitude of change reduced substantially

Stanley Village Area

- 2.58 Architectural treatment of retaining walls, shrub and grass hydroseeding of newly formed slopes above the retaining walls would help to reduce the magnitude of change of views and the planting reducing the visual contrast of the newly formed slopes with surrounding natural hill slopes from Stanley Village to moderate levels. The planting of semi mature trees to screen the carriageway and the traffic would be considered in the mitigation measures. Adequate space provision should be made as far as possible in the detail design process to accommodate tree planting adjacent to the road. If these measures are implemented the magnitude of change would be reduced to negligible levels.
- 2.59 The magnitude of change would very much depend on the extent of clearing and trimming in of the northern slope in the project area. If clearing and trimming takes place across the full extent of the slope then the magnitude of change would be moderate to substantial. Selective clearing and trimming could see the magnitude of change reduced substantially.

Recreational Users

- 2.60 Since hydroseeding would substitute existing shotcreting for slopes at southwest corner, the magnitude of change in views of users of Wilson Trail Section 1 at Tai Tam Country Park would be small.

- 2.61 Architectural treatment of retaining walls, shrub and grass hydroseeding of newly formed slopes above the retaining walls would help to reduce the magnitude of change of views and the planting reducing the visual contrast of the newly formed slopes with surrounding natural hill slopes from Stanley Village to moderate levels. The planting of semi matures trees to screen the carriageway and the traffic would be considered in the mitigation measures. Adequate space provision should be made as far as possible in the detail design process to accommodate tree planting adjacent to the road. If these measures are implemented the magnitude of change would be reduced to negligible levels.

Travellers

- 2.62 As travellers are exposed to the full view of the slope cuttings, the magnitude of change will be substantial, especially without mitigation measures. Due to the scale of the cut slopes, mitigation measures will only reduce the magnitude of change to moderate/ substantial. The exposure to travellers is however only for a short duration and therefore the magnitude of change is only moderate. On the other hand, the shrub and grass hydroseeding on new slopes are considered as improvement to the visual performance of the existing slopes covered with shotcreting.
- 2.63 An assessment of the potential significance of the landscape and visual impacts during the construction and operational stages, before and after mitigation is provided in Table 2.5 to 2.8. In general terms, the landscape and visual impacts are moderate but can be successfully mitigated by good aesthetic design of the retaining walls and slopes. Extensive tree shrub and hydroseeding planting in the roadside and slopes can also largely mitigate the moderate impacts to adjacent VSRs. Also, the planting on existing shotcreted slopes is beneficial.

Table 2.5 Summary of Significance of Landscape Impacts During the Construction Stage

Landscape Receiver	Sensitivity to Change	Magnitude of Change before Mitigation	Magnitude of Change After Mitigation	Impact Significance before Mitigation	Impact Significance After Mitigation
LANDSCAPE RESOURCES					
Trees and shrub	High	Large	Intermediate	Moderate	Slight
Topography and Landform	High	Large	Intermediate	Moderate	Slight/Moderate
LANDSCAPE CHARACTER					
Mountain Range/Ridge	High	Intermediate	Small	Moderate	Slight

Table 2.6 Summary of Significance of Visual Impacts During Construction Stage

	Key Visually Sensitive Receiver (VSR)	Source(s) of Impacts	Distance Between VSR and Source	Receptor sensitivity	Magnitude of Change		Impact Significance	
					Before Mitigation Measures	after Mitigation Measures	before Mitigation Measures	after Mitigation Measures
RECREATIONAL								
	Seaview promenade: Repulse Bay and Stanley Village Area	slopeworks	1.5km	Low	Small, adverse, direct, long term, reversible	Small, adverse, direct, short term, reversible	Slight, adverse, direct, short term, reversible	Slight, adverse, direct, short term, reversible
	Wilson Trail Section 1 of Tai Tam Country Park	slopeworks	500 – 1000m	High	Small, adverse, direct, short term, reversible	Small, adverse, direct, short term, reversible	Slight, adverse, direct, short term, reversible	Slight, adverse, direct, short term, reversible
RESIDENTIAL								
	Royal cliff, Area around Belleview drive (Repulse Bay)	Slope works	1.5km	Medium	Small, adverse, direct, long term, reversible	Small, adverse, direct, long term, reversible	Slight, adverse, direct, long term, reversible	Slight, adverse, direct, long term, reversible
	Belgravia, Ruby Court	Slopedworks	300m	High	Intermediate, adverse, direct, long term, reversible	Intermediate, adverse, direct, long term, reversible	Moderate, adverse, direct, long term, reversible	Moderate, adverse, direct, long term, reversible
	Miklagard	Slopedworks Retaining wall	50m	High	Intermediate, adverse, direct, short term, reversible	Small, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible	Slight, adverse, direct, short term, reversible
	Hillgrove, Casa Del Sol, Ma Hang Estate and Lung Yan Court	Slopedworks Retaining wall	400 – 500m	High	Intermediate, adverse, direct, short term, reversible	Intermediate, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible
	Stanley Village, St Stephens Beach and Stanley Peninsula	Slopedworks Retaining wall	1000m	Low	Small, adverse, direct, short term, reversible	Small, adverse, direct, short term, reversible	Slight, adverse, direct, short term, reversible	Slight, adverse, direct, short term, reversible
TRAVELLERS								
	Stanley Gap Road	Road widening New road Slope works	0 –1000m	Medium	Intermediate, adverse, direct, short term, reversible	Intermediate, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible

Table 2.7 Summary of Significance of Landscape Impacts in Operational Stage

Landscape Receiver	Sensitivity to Change	Magnitude of Change before Mitigation	Magnitude of Change After Mitigation	Impact Significance before Mitigation	Impact Significance After Mitigation
LANDSCAPE RESOURCES					
Trees and shrub	High	Large	Intermediate	Moderate	Slight
Topography and Landform	High	Large	Intermediate	Moderate/Substantial	Moderate
LANDSCAPE CHARACTER					
Mountain Range/Ridge	High	Intermediate	Small	Moderate	Slight

Table 2.8 Summary of Significance of Visual Impacts in Operational Stage

	Key Visually Sensitive Receiver (VSR)	Source(s) of Impacts	Distance Between VSR and Source	Receptor sensitivity	Magnitude of Change		Impact Significance	
					before Mitigation Measures	after Mitigation Measures	before Mitigation Measures	after Mitigation Measures
RECREATIONAL								
	Seaview promenade: Repulse Bay and Stanley Village Area	slopeworks	1.5km	Low	Small, adverse, direct, long term, reversible	Small, adverse, direct, long term, reversible	Slight, adverse, direct, long term, reversible	Slight, adverse, direct, long term, reversible
	Wilson Trail Section 1 of Tai Tam Country Park	slopeworks	500 – 1000m	High	Small, adverse, direct, long term, reversible	Small, adverse, direct, long term, reversible	Slight, adverse, direct, long term, reversible	Slight, adverse, direct, long term, reversible
RESIDENTIAL								
	Royal cliff, Area around Belleview drive (Repulse Bay)	Slope works	1.5km	Medium	Small, adverse, direct, long term, reversible	Small, adverse, direct, long term, reversible	Slight, adverse, direct, long term, reversible	Slight, adverse, direct, long term, reversible
	Belgravia, Ruby Court	Slopeworks	300m	High	Intermediate, adverse, direct, long term, reversible	Intermediate, adverse, direct, long term, reversible	Moderate, adverse, direct, long term, reversible	Moderate, adverse, direct, long term, reversible
	Miklagard	Slopeworks Retaining wall	50m	High	Intermediate, adverse, direct, short term, reversible	Small, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible	Slight, adverse, direct, short term, reversible
	Hillgrove, Casa Del Sol, Ma Hang Estate and Lung Yan Court	Slopeworks Retaining wall	400 – 500m	High	Intermediate, adverse, direct, short term, reversible	Intermediate, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible
	Stanley Village, St Stephens Beach and Stanley Peninsula	Slopeworks Retaining wall	1000m	Low	Small, adverse, direct, short term, reversible	Small, adverse, direct, short term, reversible	Slight/Moderate, adverse, direct, short term, reversible	Slight/Moderate, adverse, direct, short term, reversible
TRAVELLERS								
	Stanley Gap Road	Road widening New road Slope works	0 -1000m	Low	Intermediate, adverse, direct, short term, reversible	Intermediate, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible	Moderate, adverse, direct, short term, reversible

3. DESCRIPTION OF MITIGATION MEASURES

General

- 3.1 As discussed in the previous section, the Project would result in minor construction noise, dust, water quality, waste management and ecological impacts in light of the limited scale of the proposed construction works. To ensure that these impacts are controlled to minimal, standard construction phase mitigation measures are provided below.
- 3.2 Given there would be no air quality, noise and ecological impacts arising from the implementation stage of the Project, mitigation measures would therefore be considered not necessary.
- 3.3 Landscape and visual impacts arising from the construction and operation stages of the Project would be considered significant. Mitigation measures specifically designed for this Project are thus discussed in details in this section.

Construction Phase Environmental Impacts

- 3.4 As the scale of the Project is small, construction phase environmental impacts, except landscape and visual impacts, are considered to be minimal and short-term. However, good site management practices to minimize the potential construction noise and dust impacts would be considered necessary to ensure that the impacts on sensitive receivers would be well controlled and minimized. It would be recommended that the following measures be implemented during the construction phase:

Construction Noise Control Measures

- ? Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction program;
- ? Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction program;
- ? Mobile plant, if any, should be sited as far from NSRs as possible;
- ? Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum;
- ? Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and
- ? Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.

Construction Dust Control Measures

- ? Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved road, with complete coverage, particularly during dry weather;
- ? Use of frequent watering for particularly dusty static construction areas and areas close to ASRs;

- ? Tarpaulin covering of all dusty vehicle loads transported to, from and between site location;
- ? Establishment and use of vehicle wheel and body washing facilities at the exit points of the site;
- ? Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.
- ? Stockpiled excavated materials should be covered with tarpaulin, and should be removed off-site within 24 hours to avoid any odour nuisance arising.

Construction Water Quality Impact Mitigation Measures

- ? The Contractors should comply with the Water Pollution Control Ordinance (WPCO) and its subsidiary regulation.
- ? The Contractors should ensure that all runoffs arising from the work site are properly treated, e.g. by the use of sedimentation tank or silt trap, and that the discharge standards as stipulated in WPCO are met. Any trade effluent or foul or contaminated or cooling or hot water should not be discharged into any public sewer, stormwater drain, channel, stream course or the sea. If site toilet facilities are erected, foul water effluent should be directed to a foul sewer or to a sewage treatment and disposal facility.
- ? The Contractor should be responsible for the design, construction, operation and maintenance of all the mitigation measures and practices specified in the Professional Persons Environmental Consultative Committee Practice Note (ProPECC PN) 1/94 "Construction Site Drainage" issued by the Director of Environmental Protection.

Construction Waste Management Measures

- ? The Contractor should comply with the Waste Disposal (Chemical Waste) (General) Regulation, the Waste Disposal Ordinance and its subsidiary regulations and the Dumping at Sea Ordinance.
- ? The Contractor should not permit any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from site onto any adjoining land or allow any waste matter which is not part of the final product from waste processing plants to be deposited anywhere within any site or onto any adjoining land.
- ? The Contractor should prepare and implement a Waste Management Plan to reduce re-use or recycle in order to keep waste arisings to a minimum and to ensure that waste is handled, transported and disposed of in a suitable manner.
- ? The construction waste generated by the Contractor on site should be transported to the designated EPD waste transfer facilities. The Contractor shall use a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill. Independent audits of the Contractor from the consultant to ensure that the correct procedures are being followed at all times.

Construction Ecological Impact Mitigation Measures

- ? Construction ecological impact should be mitigated by compensatory planting (Figure 2.5 refers)

Construction Landscape and Visual Impact Mitigation Measures

- ? Selective trimming of slopes to remove loose/unstable features to minimize removal of vegetation
- ? Identification of trees to be retained on site and implementation of proper tree protective measures on site
- ? Topsoil stripped and stored for re-use in the construction of the soft landscape works

- 3.5 With the above measures in place, noise, dust, ecological, landscape and visual impacts arising from the construction of the Project would be minimized to an acceptable level.

Operation Phase Landscape and Visual Impact Mitigation Measures

- 3.6 Extensive mitigation measures will be required to ameliorate the landscape and visual impacts during the operation stage. Mitigation measures should incorporate design, remedial and compensatory measures. These include:

- ? As mentioned in Para. 2.21 and 2.45, about 250 Nos of existing trees would unavoidably be affected. However, most of the potentially affected trees are exotic species of fair health, poor to fair form, and low to medium amenity value. Moreover, the sloping terrain may render the tree preservation, transportation and transplanting difficult. Nevertheless, where practical, tree transplanting at locations within the works limit should be seriously considered to minimize impact to existing trees.
- ? Planting of native trees to screen exposed slopes and reduce visibility of vehicles and compensate for the loss of woodland habitat.
- ? Selective planting infill to slopes.
- ? Detailed tree survey should be carried out during detailed design stage to determine the exact number of trees affected, the amenity value and the feasibility (geotechnical, suitability) for transplantation to site or elsewhere.
- ? Treatment on retaining wall finishes should be provided to achieve an aesthetically acceptable appearance in compatible with surrounding landscape. For example, finishing materials of different thickness and pattern could cast shadows and reduce the massive scale of walls.
- ? Rough exposed rock surfaces to encourage plant growth.
- ? Replacement of existing unsightly treatments and structures (e.g. water main staircase and surface) with more integrated treatments (e.g. colour pigmented concrete, on grade steps).

- 3.7 The preliminary planting plan and proposed visual impact mitigation measures are shown in Figures 2.5 and 2.6. With the sensitive design of the proposed improvement works, the extent of disturbance could be reduced to an acceptable level.

4. USE OF PREVIOUSLY APPROVED EIA REPORTS

- 4.1 No previous EIA report prepared for the project or a project of similar nature has been approved by the Director of Environmental Protection (DEP) and deposited in the register.