

12. SUMMARY OF THE ENVIRONMENTAL OUTCOMES AND RECOMMENDED MITIGATION MEASURES

Environmental Outcomes

12.1 This chapter presents the summary of the environmental outcomes for the Project. Details are tabulated in [Table 12.1](#).

Table 12.1 Summary of Key Environmental Outcomes / Benefits

Area/Issue	Environmental Outcomes / Benefits and Mitigation Measures
The Project	<p>The Project comprises the following key elements:</p> <ul style="list-style-type: none"> • A 1.2km railway section from the tunnel portal near Oi Man Estate (Portal 1A) to the new North Ventilation Building, Plant Rooms and Emergency Access (NOV) in Hung Hom • Construction of new platforms (at the existing HUH) • Construction of Noise Mitigation Measures at Portal 1A • Construction of North Side and South Side Ventilation Shafts at HUH • Construction of Cooling Tower • Construction of new realigned Cheong Wan Road • Operation of Hung Hom Freight Pier Barging Point (constructed by Kwun Tong Line Extension)
Environmental/Social Benefits of the Project	<ul style="list-style-type: none"> • Providing a fast, reliable and convenient mode of transport running through the northern New Territories, Kowloon and Hong Kong Island • Redistribution of railway passenger flows to relieve the congestion on existing railway lines in urban Kowloon and on Hong Kong Island • Relieving road-based public transport in the existing developed areas, and alleviation of the traffic congestion and environmental nuisance on existing road networks, including the demand on the Hung Hom Cross Harbour Tunnel; • Stimulation of the redevelopment of Hung Hom and Waterfront areas • Providing more environmentally friendly public transport in terms of energy conservation and gas emissions
Environmentally Friendly Design Considered and Recommended to Avoid Environmental Problems	<ul style="list-style-type: none"> • The Project alignment has been selected to minimize the extent and duration of construction activities such that environmental impacts and disturbances to the existing facilities, users and sensitive receivers could be minimized. • Locations and design of ventilation shafts have been carefully selected to minimize the impacts on sensitive receivers. Greening measures have been incorporated in the design as far as applicable. • Majority of the Project alignment will be constructed underground. For the at-grade section, suitable noise mitigation measures have been studied to minimize the potential airborne noise impact to the nearby sensitive receivers. • Suitable trackform has been proposed to minimize any potential ground-borne train noise impact to the nearby structures.

Area/Issue	Environmental Outcomes / Benefits and Mitigation Measures
	<ul style="list-style-type: none"> • Acoustic design specification for ventilation shafts has been identified such that the fixed noise source impact can be kept within the acceptable level. • Considerations have been given in the design to avoid the potential impact on the LCSD Registered Old and Valuable Trees. <p>Subjected to further agreement with CEDD, spoil generated from the Project may be transported by barges to other projects such as Hong Kong-Zhuhai-Macau Bridge (HZMB), Hong Kong Boundary Crossing Facilities (HKBCF) or Tuen Mun-Chek Lap Kok Link (TMCLKL) for reuse or as a last resort to the Mainland (Taishan) for disposal.</p>
Population and Environmentally Sensitive Areas Protected	With the adoption of environmentally friendly design mentioned above, major environmental sensitive receivers would be protected.
Landscape and Visual	<p>Environmental benefits of environmental protection measures recommended:</p> <p>The current and planned land uses in the vicinity of the Project have been taken into account during the railway development. In general, the proposed Project would fit in well with the current use as well as the urban design scheme under the Hung Hom District Study.</p> <p>The potential LVIA impacts have been minimized through careful consideration of alternatives, minimization of works areas, incorporation of aesthetic external designs and landscape treatments of proposed structures which include Noise Mitigation Measures at Portal 1A, Realigned Cheong Wan Road, North and South Sides Ventilation Shafts and the Cooling Tower.</p> <p>Approximately 640 existing trees will be affected by the proposed works, of which approximately 30 trees will be transplanted and 610 trees will be felled. None of the affected trees are Registered Old and Valuable Trees. There are no rare species or endangered species but only common species.</p> <p>After implementation of mitigation measures, there would be moderate landscape residual impact on LCA06 – Hung Hom Transportation Corridor LCA during construction phase and slight landscape residual impact during Day 1 and Year 10 of the operation phase.</p> <p>Slight residual visual impacts are anticipated on the adjacent VSRs who can see the proposed Noise Mitigation Structures at Portal 1A, Cooling Tower, North and South Sides Ventilation Shafts and Realignment of Cheong Wan Road.</p> <p>As a whole, it is considered that the residual landscape and visual impacts of the proposed project is considered acceptable with mitigation measures implemented during construction and operation phases.</p> <p>Compensation areas included:</p> <p>Under the proposed scheme for the Project, compensation for felled trees will be provided in accordance with ETWB TCW 3/2006 – Tree Preservation in the reinstated roadside amenity areas at Chatham Road Interchange and around Hong Kong Coliseum.</p>

Area/Issue	Environmental Outcomes / Benefits and Mitigation Measures
	<p>Population and environmental sensitive receivers protected: Hung Hom and Ho Man Tin areas</p>
<p>Air Quality</p>	<p>Environmental benefits of environmental protection measures recommended: <u>Construction Phase</u> Those air sensitive receivers (ASRs) located near the construction sites would be protected through the implementation of practicable dust suppression measures, including watering on active works areas, exposed areas and paved haul roads, enclosing the unloading process at barging point, good site practices and dust suppression measures specified in Air Pollution Control (Construction Dust) Regulation.</p> <p>With the implementation of the recommended dust mitigation measures, the predicted cumulative maximum hourly, daily and annual average TSP concentrations at all ASRs would comply with the criteria stipulated in EIAO-TM and AQO.</p> <p><u>Operation Phase</u> As the train will be electrically operated, air quality impact is therefore not anticipated during operational phase. Exhausts for general ventilation and smoke extraction facilities will also be carefully positioned to avoid nuisance to the surrounding environment.</p> <p>Compensation areas included: N/A</p> <p>Population and environmental sensitive receivers protected: Existing ASRs, including residential and commercial buildings located at Hung Hom and Ho Man Tin.</p>
<p>Airborne Noise</p>	<p>Environmental benefits of environmental protection measures recommended: <u>Construction Phase</u> All NSRs located near the construction sites, except Wing Fung Building (HH2) and Carmel Secondary School (South Block) (OM4a), are protected through implementation of recommended noise mitigation measures.</p> <p>As the Carmel Secondary School has been noise insulated with air conditioners and, by keeping the windows closed during construction activities, noise impacts at the indoor environment could be alleviated. Notwithstanding this, it is recommended that the particularly noisy construction activities be scheduled to avoid examination period as far as practicable.</p> <p>Residual construction noise impacts at Wing Fung Building would be due to concurrent works with SCL (TAW–HUH) and close proximity with the works area. Communication with the concerned parties on the residual impacts during construction and consideration of other initiatives, if required, will be undertaken.</p> <p>All practical direct mitigation measures have been exhaustively</p>

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	<p>investigated and the construction noise criteria have been met as far as practicable. The residual impacts have been minimized and are only temporary, reversible and unlikely to induce public health concern and as such, are considered to be minor and acceptable.</p> <p><u>Operation Phase</u> In order to minimize the rail noise impact, 150m long natural ventilated noise enclosure are proposed at Portal 1A. With such enclosure, the cumulative contribution from the Project, SCL (TAW–HUH) and KTE at all NSRs are more than 10dB(A) below the noise criteria. Adverse impact is therefore not anticipated.</p> <p>Provided that the fixed plants are properly designed to meet the maximum allowable sound power levels (SWLs) recommended in this EIA Report, no adverse operation residual noise impact is envisaged.</p> <p>Compensation areas included: N/A</p> <p>Population and environmental sensitive receivers protected: Existing NSRs, including residential and educational institution located at Hung Hom and Ho Man Tin.</p>
Ground-borne Noise	<p>Environmental benefits of environmental protection measures recommended: <u>Construction Phase</u> Owing to the large setback distance of 90m from the nearest NSR, adverse impact is not anticipated.</p> <p><u>Operation Phase</u> The predicted noise contribution from the Project at all NSRs is <20dB(A), which is insignificant and down to the ambient level. Thus, adverse impact from the Project is not anticipated.</p> <p>Compensation areas included: N/A</p> <p>Population and environmental sensitive receivers protected: Existing NSRs, including residential and educational institution located at Hung Hom and Ho Man Tin.</p>
Water quality	<p>Environmental benefits of environmental protection measures recommended: <u>Construction Phase</u> The Project is confined to land-based construction activities, and the sources would be the potential release of sediment-laden water from surface works areas and open cut excavation. Minimisation of water quality deterioration could be achieved through implementing adequate mitigation measures. No unacceptable residual impact on water quality is anticipated.</p> <p><u>Operation Phase</u> The main operational impacts from the Project would come from foul water discharges (such as toilet sanitary wastewater, fire protection water discharges and washed water) generated at the railway tunnels, stations and plant building. With the implementation</p>

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	<p>of the practices outlined in ProPECC PN 5/93, adverse water quality impact due to tunnel / station effluent discharges is not anticipated.</p> <p>Compensation areas included: N/A</p> <p>Population and environmental sensitive receivers protected: The receiving marine water in the Victoria Harbour Water Control Zone.</p>
<p>Waste management implication</p>	<p>Environmental benefits of environmental protection measures recommended: Implementation of the proposed waste control and mitigation measures would avoid the potential water quality, dust, odour, and noise impacts associated with handling, transportation and disposal of the identified wastes arising from the construction phase of the Project.</p> <p>It is estimated that approximately 386,000m³ of inert C&D waste would be generated from the Project, which are proposed to be reused at other concurrent projects or local rock crushing facilities, or would be disposed at PFRFs. About 8,000m³ of non-inert C&D waste would be generated and disposed at landfill.</p> <p>The total volume of dredged/ excavated sediment generated from the Project is estimated to be approximately 139,500 m³ in which approximately 89,800 m³ sediment is suitable for Type 1 – Open Sea Disposal, and 49,700 m³ sediment requires Type 2 – Confined Marine Disposal in accordance with ETWB TC(W) No. 34/2002.</p> <p>With the implementation of the mitigation measures as described in Section 9 of this EIA report, no adverse environment impacts would be expected.</p> <p>Compensation areas included: N/A</p> <p>Population and environmental sensitive receivers protected: Water quality, air, and noise sensitive receivers in the vicinities of Project sites, the waste transportation routes and the waste disposal site.</p>
<p>Land contamination</p>	<p>Environmental benefits of environmental protection measures recommended: All SI works at the proposed sampling locations have been completed and no exceedances of the adopted RBRG guidelines were identified.</p> <p>For conservative purposes, visual inspection should be performed during construction for signs of soil and groundwater contamination. If contamination is suspected, further sampling and testing, and remediation (if contamination found) should be carried out. With implementation of such measures, the potential of land contamination due to the construction and operation of the project is expected to be minimal.</p>

Area/Issue	Environmental Outcomes / Benefits and Mitigation Measures
	<p>Compensation areas included: N/A</p> <p>Population and environmental sensitive receivers protected: Onsite construction workers during the construction phase.</p>

Summary of Measures Taken for Minimization of Environmental Impacts

12.2 The various chapters of this EIA report have presented the measures to minimize the potential environmental impacts associated with the Project in the planning, design, construction and operation stages. The key measures are summarized below for easy reference and they are not exhaustive. For details, please refer to the relevant chapters as appropriate.

Environmentally Friendly Design Options

12.3 Various options and alternatives of the Project design have been reviewed and considered in the course of development and selection of the preferred scheme for the SCL, taking into account of engineering feasibility, site constraints, programme and environmental aspects. The selected alignment is regarded as the most appropriate and balanced scheme, which can minimize the potential environmental impacts associated with the Project and achieve the needs of the SCL project and benefit to the public:

Project Design

- The Project alignment has been selected to minimize the extent and duration of construction activities such that environmental impacts and disturbances to the existing facilities, users and sensitive receivers could be minimized.
- The number, locations and design of ventilation shafts have been carefully selected to minimize the impacts on sensitive receivers. Greening measures have been incorporated in the design as far as applicable.
- Majority of the Project alignment will be constructed underground. For the at-grade section, suitable noise mitigation measures have been proposed to minimize the potential airborne rail noise impact to the nearby sensitive receivers.
- Suitable trackform has been proposed to minimize any potential ground-borne train noise impact to the nearby structures.
- Acoustic design specification for ventilation shafts has been identified such that the fixed noise source impact can be kept within the acceptable level.
- Considerations have been given in the design to avoid the potential impact on the LCSD Registered Old and Valuable Trees.
- Subjected to further agreement with the relevant project offices or facility operators, spoil generated from the Project may be transported by barges to other projects such as Hong Kong-Zhuhai-Macau Bridge (HZMB), Hong Kong Boundary Crossing Facilities (HKBCF) or Tuen Mun-Chek Lap Kok Link (TMCLKL) for reuse.
- Provision of ventilation shafts within the station footprints to minimize the impacts to the public and environment.

12.4 The population and environmentally sensitive areas are protected with adaptation of above mentioned environmentally friendly design.

Mitigation Measures for Environmental Impacts

12.5 Key mitigation measures specified for various environmental aspects are summarized below.

Landscape and Visual Impact

Construction Phase

- Transplantation of trees unavoidably affected by the works in accordance with ETWB TC(W) 3/2006 – Tree Preservation as far as possible.
- Compensatory planting for the affected trees and shrubs in accordance with ETWB TC(W) 3/2006 – Tree Preservation.
- Control of night-time lighting glare to minimize the potential visual impact.
- Erection of decorative screen hoarding such that it will be compatible with the surrounding setting.
- Control of height and disposition/ arrangement of temporary work site facilities to minimize visual impact to adjacent VSRs.
- Reinstatement of temporarily disturbed hard and soft landscape areas on like-to-like basis to the satisfaction of the relevant Government Departments.

Operation Phase

- Aesthetically pleasing design for above ground structures so as to blend in the structures to the adjacent landscape and visual context.
- Incorporation of climbers to the ventilation shafts and cooling tower to soften the proposed structures.
- Tree and shrub planting to enhance the landscape and visual amenity value of the area.
- Green planting to screen views to the Cooling Tower from future Hung Hom Promenade.
- Incorporation of roof greening to Cooling Tower.
- Implementation of good site practice to retain any reusable landscape resources.

Air Quality

Construction Phase

- Implementation of mitigation measures stated in the Air Pollution Control (Construction Dust) Regulation to minimize dust impacts during construction phase.
- Watering on the active works areas, exposed areas and paved haul roads to reduce dust emission.
- Enclosed unloading processes at barging facilities.

Operation Phase

- Carefully positioned exhausts for general ventilation and smoke extraction facilities to avoid nuisance to the surrounding environment.

Airborne Noise

Construction Phase

- Implementation of good site practice to minimize airborne noise impacts during construction phase.
- Adoption of quiet PME and direct mitigation measures, such as movable/temporary noise barriers, noise insulating fabric and noise enclosure, for certain PME to further reduce the noise level.
- Avoidance of particularly noisy construction activities during examination period to minimize noise impact to nearby school.

Operation Phase

- Proposed 150m long naturally ventilated noise enclosure with absorptive treatment to minimize the rail noise impact.
- Proper selection of plant and provision of acoustic treatments to reduce the fixed plant noise impacts.

Water Quality

Construction Phase

- Implementation of mitigation measures and site practices outlined in ProPECC PN 1/94 “Construction Site Drainage” to minimize the water quality impacts.
- The Waste Disposal (Chemical Waste) (General) Regulation under the Waste Disposal Ordinance (Cap 354) should be observed and complied with for control of chemical wastes.
- All the sewage generated from the workforce should be discharged into the public foul sewers. If disposal of sewage to public sewerage system is not feasible, appropriate numbers of portable toilets shall be provided by a licensed contractor to serve the construction workers over the construction site.
- Minimize soil excavation in rainy seasons with properly planned construction programme and implementation of good site practices.
- A cofferdam wall should be built as necessary, to limit groundwater inflow to the excavation works areas. Groundwater pumped out from the works areas or from dewatering process should be discharged into the storm system via silt removal facilities.
- Toe grouting should be applied beneath the toe level of the temporary/permanent cofferdam walls as necessary to lengthen the effective flow path of groundwater from outside and thus control the amount of water inflow to the excavation.
- Recharge wells should be installed as necessary outside the excavation areas. Water pumped from the excavation areas should be recharge back into the ground.
- Suitable water control strategies should initially adopt as far as practicable while undertaking the excavation works.
- In the event of excessive drawdown being observed within the ground water table, post-grouting should be applied as far as practicable.
- Implementation of good site practice at barging point to minimize water quality impacts.

Operation Phase

- Track drainage channels discharge should pass through oil/grit interceptors/chambers to remove oil, grease and sediment before discharging into public storm drainage / foul sewerage systems.
- The silt traps and oil interceptors should be cleaned and maintained regularly.
- Oily contents of the oil interceptors should be transferred to an appropriate disposal facility, or to be collected for reuse, if possible.
- Connection of domestic sewage generated from the Project should be diverted to the foul sewer. All the discharge should comply with the requirements stipulated in the TM-DSS.
- For handling, treatment and disposal of other operational stage effluent, the practices outlined in ProPECC PN 5/93 should be adopted where applicable.

Waste Management

Construction Phase

- Implementation of mitigation measures and good site practices outlined in ETWB TCW No. 19/2005 on construction waste management.

- Implementation of standard good practices for sorting, storage, collection and transportation of and C&D wastes and materials.
- Implementation of the measures outlined in ETWB TC(W) No. 34/2002 on management of excavated sediments.
- Chemical waste should be handled, stored and disposed of in accordance with the Waste Disposal (Chemical Waste) (General) Regulations.

Operation Phase

- Implementation of waste reduction measures and good site practices on various types of wastes as discussed in Section 9.

Land Contamination Issue

- Although no land contamination was identified in the site investigation (SI), for conservative purposes, visual inspection should be performed during construction for signs of soil and groundwater contamination. If contamination is suspected, further sampling and testing, and remediation (if contamination found) should be carried out.

Environmental Monitoring and Auditing

- In addition to the mitigation measures as described above (see more details in the Environmental Mitigation Implementation Schedule), a comprehensive environmental monitoring and auditing programme would be implemented to cover various aspects of concern. An independent environmental checker would also be employed to ensure that all the necessary mitigation measures are implemented in a timely and orderly manner.

Overall

- Mitigation measures and good site practices to minimize the environmental impacts were recommended throughout the impact assessments of cultural heritage, ecology, fisheries, landscape and visual, construction dust, noise, water quality, waste management, land contamination and hazard to life. These measures were consolidated in an Implementation Schedule which specifies the responsibility, methodology and timing of implementation, such that effective and appropriate implementation of the measures can be assured.