

## 12. Summary Information

### 12.1 Introduction

In accordance with the EIA Study Brief issued under the Environmental Impact Assessment Ordinance (EIAO) for this Project, an assessment of the potential environmental impacts associated with the proposed Alternative Decontamination Works at the Kennedy Town CDA site, which are planned to take place from 2015. Environmental issues covered in this EIA include:

- Air Quality and Health Impact
- Noise Impact
- Water Quality Impact
- Waste Management Implications
- Land Contamination
- Ecological Impact
- Fisheries Impact
- Landscape Impact

The findings of this EIA study has determined the likely nature and extent of environmental impacts and identified environmental control measures for incorporation into the planning and design of the Project to ensure compliance with environmental legislation and standards during the carrying out of the Project. The implementation schedule for the recommended mitigation measures are presented in **Section 13**.

### 12.2 Summary of Environmental Outcomes

The EIA study for the proposed Alternative Decontamination Works at the Kennedy Town CDA site has predicted that the Project, with implementation of the recommended mitigation measures, would be environmentally acceptable to the surrounding population and environmental sensitive receivers. The key environmental outcomes from the environmental considerations and analysis during the EIA process and the implementation of environmental control measures of the Project are summarised in the following sections.

#### 12.2.1 Estimated Population Protected from Various Environmental Impacts

It is recognised that the Project site is situated in a densely populated area and hence avoidance and/or minimisation of environmental impacts due to the Project was a key consideration in the Project's planning and design development. As a result of careful planning, design and proposals for mitigation measures, the following populations have been protected from adverse environmental impacts during the carrying out of the Project:

- Occupants of existing residences and users of other mixed use premises along Victoria Road to the west of the Project site and Cadogan Street to the east and south east of the Project site.
- Future occupants of residential development at the corner of Victoria Road and Cadogan Street (under construction), and at the Ka Wai Man Road and Ex-Mount Davis Cottage Area.
- Future occupants/users of potential development within the Kennedy Town CDA site (Applicable to Re-provisioning Option A only).

- Users of the Cadogan Street Temporary Garden, the public car park, and Refuse Collection Point (RCP) within the Kennedy Town CDA (Applicable to Re-provisioning Options A and B).

The decontaminated site will be handed over to Lands Department for redevelopment. Therefore, in addition to the abovementioned populations, the Project will protect the future resident population and other future users of the entire Kennedy Town CDA site from adverse impacts associated with contamination of the soil at the site.

### **12.2.2 Environmentally Sensitive Areas Protected**

The Kennedy Town CDA site is located on reclaimed land, currently occupied by MTRCL WIL works area, Cadogan Street Temporary Garden, a public car park, a refuse collection point, a Highways Department maintenance depot, and a bus depot. The Kennedy Town CDA site is located adjacent to the environmentally sensitive Victoria Harbour. In decontaminating the Kennedy Town CDA site, Victoria harbour will be protected from future risk of pollution from accidental leaching of contaminated soil from the Project site.

### **12.2.3 Environmentally Friendly Options Considered and Incorporated in the Preferred Option and their benefits**

The environmentally friendly options considered and incorporated in the Preferred Option include the following elements:

- *Low waste to landfill Option* – the preferred decontamination and remediation processes (biopiling and cement solidification) involve treating the contaminated soil on-site, without the need to transfer large amounts of material to landfill or other special waste facility for disposal. This serves to reduce the potential impacts to Hong Kong's already constrained waste disposal facilities, compared to other potential options.
- *Low energy use option* – the preferred decontamination and remediation processes require relatively minimal energy inputs, compared to other decontamination options, such as thermal desorption.
- *Low chemical use option* – As the preferred decontamination processes involve immobilisation and/or biological treatment of contaminated soils, few chemicals are required compared to other decontamination options such as chemical method.
- *Low water use option* – The preferred decontamination methods should require minimal water inputs, compared to other decontamination options such as soil washing.

### **12.2.4 Environmental Designs Recommended and Their Benefits**

The EIA recommends the following environmental design measures to be implemented on the Project for all the proposed decontamination works as much as reasonably practicable:

- Re-use of construction and demolition (C&D) waste - C&D waste arising at the site, e.g. from removal of the concrete ground layer, will be used on site as far as reasonably possible. Where appropriate the material will be used as aggregate fill for temporary haul roads or backfilled with decontaminated/remediated materials.

- Water conservation – It is proposed to reuse water runoff and groundwater arising at the site whenever possible in order to minimise fresh-water demand and wastewater treatment and disposal requirements.

### 12.2.5 Compensation Areas Included

Temporary compensation areas will be provided within the site for the RCP and public car park reprovisioning (by others) under Reprovisioning Options A and B during the course of decontamination works. The proposed future waterfront promenade will be constructed (by others) prior to removal of existing temporary garden for Stage 2 decontamination works under Reprovisioning Option A. The whole Project site after decontamination will be handed over to Lands Department for future development.

The landscape impact assessment has identified that all identified trees are in direct conflict with the proposed decontamination works. Therefore, 196 trees identified within or in close proximity to the proposed Project area are recommended to be felled for the implementation of the proposed decontamination works. All trees in conflict with the proposed works are not suitable to be transplanted as they grow in contaminated soil. Therefore, no tree transplantation is proposed. Compensatory planting will be provided as far as practicable as greening measures in the proposed future waterfront promenade.

## 12.3 Summary of Environmental Impacts

A summary of Environmental Impacts for each assessment described in this EIA Report is provided in the following sections and relevant information, including assessment points, results of impact prediction, relevant standards / criteria, extent of exceedances predicted, impact avoidance measures considered, mitigation measures proposed, and residual impacts after mitigation, is presented in **Appendix 12.1**.

### 12.3.1 Air Quality and Health Impact

The effects to air quality from Project activities were assessed under three Reprovisioning Options. Total Suspended Particulate (TSP), Respirable Suspended Particulates (RSP), Fine Suspended Particles (FSP), Heavy Metals (HM) and Hydrocarbon (HC) concentrations were modelled using the Fugitive Dust Model (FDM) and ISCST3 models. For fugitive dust impact assessment, the hypothetical Tier 1 screening scenario (for hourly TSP, daily RSP/FSP and annual RSP/FSP) with the assumption of 100% active area at all times and the Tier 2 modelling scenario (for annual RSP) which also had conservative assumptions, e.g. active areas are located closest to ASR assessed for annual RSP averages, are very conservative approaches, the results of which can represent any of three Reprovisioning Options for different sequencing and phasing of the works. With implementation of the recommended mitigation measures, i.e. dust suppression by regular water spraying as well as the relevant control requirement as stipulated in *Air Pollution Control (Construction Dust) Regulation*, it has been assessed that even under the very conservative modelling approach there would not be non-compliance at the ASRs with any of the Air Quality Objectives for RSP/ FSP or the TSP criterion for any of three Reprovisioning Options.

In addition, the cumulative maximum concentrations of all identified TAPs (hydrocarbon and heavy metals) have been assessed for different modelling scenarios that represent different excavation rates under the three Reprovisioning options. The predicted cumulative maximum concentrations for all non-criteria pollutants under each of the three Reprovisioning Options are lower than their corresponding reference values and therefore the associated non-carcinogenic health risks are considered to be acceptable. The total incremental lifetime cancer risks associated with the KTCDA ground decontamination works have been estimated as  $3.14 \times 10^{-7}$  to  $3.99 \times 10^{-7}$  for the three Reprovisioning options. In other words, there would be

less than four in ten million cancer risks associated with the heavy metal and hydrocarbon emissions from the Project, which is well below the risk guideline value of one in million. Hence, the incremental cancer risks due to the Project are considered to be negligible.

### **12.3.2 Noise Impact**

The noise impact assessment has been made based on the best available information, taking into account other expected concurrent projects. Having exhausted practicable mitigation measures in the form of quiet plant, movable noise barrier and insulating fabric, the construction noise levels at most of the representative Noise Sensitive Receivers (NSRs) are predicted to comply with the noise standards stipulated in the EIAO-TM. Residual construction noise impact was predicted at one representative NSR of educational use. However, this NSR has already been implemented with noise insulation works and therefore significant noise impact is not anticipated during the carrying out of the Project. Notwithstanding this, it is recommended that particularly noisy activities should be scheduled to avoid examination periods of the educational NSR as far as practicable.

### **12.3.3 Water Quality Impact**

Potential water quality impact would be generated from site run-off, sewage from workforce, and generation of wastewater from various Project activities. With the implementation of the recommended mitigation measures, no adverse water quality impact from the Project works is anticipated.

### **12.3.4 Waste Management Implications**

Wastes generated by the Project are likely to include C&D material from site clearance within the Project boundary, chemical waste from the maintenance of plant and equipment and from the decontamination process, as well as general refuse from the workforce. Provided that these identified waste arisings are handled, transported and disposed of using approved methods, and that the recommended good site practices are strictly followed, significant adverse environmental impacts would not be expected during the Project works.

### **12.3.5 Land Contamination Impact**

The land contamination assessment has been carried out which included a review of historical/current land uses, desktop review and site inspection. Other relevant information was also collected from related Government Departments during this assessment.

Based on the findings of the site appraisal on the existing and historical land uses in the EIA Study Area, the presence of potential land contamination and groundwater impacts associated with the proposed Project works has been identified and assessed. Areas within the Study Area with contaminated soil exceeding certain Risk-Based Remediation Goals (RBRGs) have been identified. Additional Site Investigation (SI) has been conducted, and the laboratory results are provided. The estimated volumes of soil to be excavated and decontaminated are calculated based on an evaluation of the results of the original EIA study SI, previous SI and additional SI. Treatment of contaminated soil by cement solidification and/or biopiling has been recommended, depending on the types of contaminants found in the soil in each designated grid.

Sensitive receivers, health and safety risks and migration pathways associated with the proposed decontamination works have been identified, and mitigation measures for handling of contaminated materials and regular site audits are recommended to minimise the potential adverse impacts on sensitive receivers' health and safety.

### **12.3.6 Ecological Impact**

Evaluations of ecological impacts addressed have confirmed there are no adverse ecological impacts resulting from the Project under any of the three Re-provisioning Options. According to EIAO-TM and clause 3.4.8.1 of the EIA Study Brief, detailed ecological impact assessment is deemed not necessary for the Project. Nevertheless, recommendation concerning the inspection of the possibility of active bird nest and bat roost present within the Project site prior to site clearance works has been made as ecological precautionary measure.

### **12.3.7 Fisheries Impact**

Evaluation of fisheries impact addressed has confirmed there is no adverse fisheries impact resulting from the Project under the three Re-provisioning Options. According to EIAO-TM and clause 3.4.9.1 of the EIA Study Brief, no fisheries impact assessment is deemed necessary for the Project.

### **12.3.8 Landscape Impacts**

With the implementation of proposed mitigation measures, the anticipated landscape impacts are generally slight negative under Re-provisioning Option A, and moderate negative under Re-provisioning Options B and C during the carrying out of the Project due to the unavoidable removal of the existing Cadogan Street Temporary Garden (Landscape Resource R1) and removal of roadside vegetation (Landscape Resource 2) for the proposed decontamination works within the Project site. However, the predicted impact will be temporary. Compensatory tree planting with a minimum ratio of 1:1 in terms of quantity will be provided in the proposed future waterfront promenade.

The Project site after decontamination will be handed over to Lands Department for future development with potential overall landscape improvement. The overall residual landscape impact in year 10 following completion of the Project is therefore considered to be insubstantial under Re-provisioning Option A when the proposed future waterfront promenade will have been re-provisioned before the removal of the existing Cadogan Street Temporary Garden and the compensatory tree planting in the proposed future waterfront promenade will have already reached a size that could largely compensate for the loss of the felled trees, and slight negative under Re-provisioning Options B and C when compensatory tree planting in the proposed future waterfront promenade will have become mature. Overall, in terms of Annex 10, Clause 1.1 (c) of the EIAO – TM, the landscape impacts are acceptable with implementation of the proposed mitigation measures.

## 12.4 Summary of Key Environmental Outcomes

A summary of key environmental outcomes for Re-provisioning Options A, B and C is presented in **Table 12.1** below.

Table 12.1: Summary of Key Environmental Outcomes for Re-provisioning Options A, B and C

Issue	Environmental Impact for Re-provisioning Option A	Environmental Impact for Re-provisioning Option B	Environmental Impact for Re-provisioning Option C
Air Quality and Health Impact	<p>Hydrocarbon emissions show the worst case pollutant to be Benzo(a)pyrene which is predicted to be up to 82% of the relevant criteria for the conservative worst case at external ASRs in Stage 1. Benzo(a)pyrene which is predicted to be up to 77% of the relevant criteria for the conservative worst case for internal planned ASRs in Stage 2.</p> <p>It has been assessed that there would be no exceedance of any of the relevant criteria for dust, heavy metals or hydrocarbons.</p> <p>With implementation of the recommended mitigation measures as well as the relevant control requirement as stipulated in Air Pollution Control (Construction Dust) Regulation, it has been assessed that there would not be non-compliance with any of the relevant criteria for dust, heavy metals or hydrocarbons. The human health risks at the identified sensitive receivers were also assessed to be acceptable under the three Re-provisioning Options.</p>	<p>Hydrocarbon emissions show the worst case pollutant to be Benzo(a)pyrene which is predicted to be up to 82% of the relevant criteria for the conservative worst case at external ASRs.</p> <p>It has been assessed that there would be no exceedance of any of the relevant criteria for dust, heavy metals or hydrocarbons.</p>	<p>Hydrocarbon emissions show the worst case pollutant to be Benzo(a)pyrene which is predicted to be up to 92% of the relevant criteria for the conservative worst case at external ASRs.</p> <p>It has been assessed that there would be no exceedance of any of the relevant criteria for dust, heavy metals or hydrocarbons.</p>
Noise Impact	<p>Residual noise impact was predicted at one educational NSR (KT-N7), namely "SKH Lui Ming Choi Memorial Primary School" during examination periods. The predicted exceedance for NSR KT-N7 during examination periods is 1-4 dB(A) for a duration of 44 weeks within the 13 years construction period.</p> <p>All practicable mitigation measures including movable barrier, insulating fabric and quiet plants have been proposed and exhausted to minimise the noise impact. In addition, it is noted that noise insulation works have been installed at this school. Therefore, significant noise impact would not be anticipated.</p>	<p>Residual noise impact was predicted at one educational NSR (KT-N7), namely "SKH Lui Ming Choi Memorial Primary School" during examination periods. The predicted exceedance for NSR KT-N7 during examination periods is 1-4 dB(A) for a duration of 19 weeks within the 7 years construction period.</p>	<p>Residual noise impact was predicted at one educational NSR (KT-N7), namely "SKH Lui Ming Choi Memorial Primary School" during examination periods. The predicted exceedances for NSR KT-N7 during examination periods is 1-5 dB(A) for a duration of 13 weeks within the 4.5 years construction period.</p>
Water Impact	<p>With the implementation of the recommended mitigation measures, no adverse water quality impact from the Project works is anticipated for all three Re-provisioning Options.</p>		
Waste Management Implications	<p>Provided that the identified waste arisings are handled, transported and disposed of using approved methods, and that the recommended good site practices are strictly followed, significant adverse environmental impacts would not be expected during the Project works of three Re-provisioning Options.</p>		
Land Contamination	<p>Mitigation measures for handling of contaminated materials and regular site audits are recommended to minimise the potential adverse impacts on workers' health and safety and disposal of potential contaminated materials for the three Re-provisioning Options.</p>		
Ecological Impact	<p>Evaluations of ecological impacts addressed have confirmed there are no adverse ecological impacts resulting from the Project under any of the three Re-provisioning Options.</p>		
Fisheries Impact	<p>Evaluation of fisheries impact addressed has confirmed there is no adverse fisheries impact resulting from the Project under the three Re-provisioning Options.</p>		



Issue	Environmental Impact for Re-provisioning Option A	Environmental Impact for Re-provisioning Option B	Environmental Impact for Re-provisioning Option C
Landscape Impact	<p>With the implementation of proposed mitigation measures including the provision of the proposed future waterfront promenade (by others) prior to the removal of the existing Cadogan Street Temporary Garden, the anticipated landscape impacts are generally slight negative during the carrying out of the Project due to the unavoidable removal of the existing Cadogan Street Temporary Garden (LR1) and removal of roadside vegetation (LR2) for the proposed decontamination works.</p> <p>The overall residual landscape impact in year 10 following completion of the Project is considered to be insubstantial when the compensatory tree planting in the proposed future waterfront promenade will have already reached a size that could largely compensate for the loss of the felled trees.</p>	<p>With the implementation of proposed mitigation measures, the anticipated landscape impacts are generally moderate negative during the carrying out of the Project due to the unavoidable removal of the existing Cadogan Street Temporary Garden (LR1) and removal of roadside vegetation (LR2) for the proposed decontamination works.</p> <p>The overall residual landscape impact is slight negative when compensatory tree planting in the future waterfront promenade will have become mature.</p>	<p>With the implementation of proposed mitigation measures, the anticipated landscape impacts are generally moderate negative during the carrying out of the Project due to the unavoidable removal of the existing Cadogan Street Temporary Garden (LR1) and removal of roadside vegetation (LR2) for the proposed decontamination works.</p> <p>The overall residual landscape impact is slight negative when compensatory tree planting in the future waterfront promenade will have become mature.</p>

Notwithstanding that all three re-provisioning options have been assessed and confirmed to be environmentally acceptable, Re-provisioning Option A is not quite as environmentally friendly as Options B and C in view of the substantially longer exposure period of potential environmental impacts (such as air quality, noise and health risk) on local residents. Moreover, Re-provisioning Option A would result in a long lead time of site availability for redevelopment there (such as future waterfront promenade). Overall, a re-provisioning option with a shorter programme is more desirable and should be pursued subject to local responses.