result of the THEES and future control of expedient connections discharged to Kai Tak Nullah, odour impacts from the proposed open sections of Kai Tak Nullah is not anticipated.

2.4.2.27 Water quality modeling was undertaken in this study to assess the future water quality, including DO level, in the Kai Tak Nullah (see Sections 4.4.3.24 to 4.4.3.39 of this report). The modeling results indicated that a reasonable DO level could be maintained in the water of the box culvert. The results showed that decking of the box culvert would not cause a significant decrease in DO in the flowing water and would not generate unacceptable conditions in the box culvert.

Air Quality Impacts from the Proposed Refuse Transfer Station (RTS) and Public Filling Barging Point (PFBP)

2.4.2.28 Major potential air quality impacts during the operational phase of the proposed RTS in Area 6C will be odour arising from the handling of refuse and wastewater within the facility, and the fugitive odour emissions from the vehicles transporting refuse to the RTS.

2.4.2.29 Potential air quality impacts during the operational phase of the proposed PFBP in Area 6C will be dust arising from the handling and fill materials within the facility, and the potential dust entrainment due to vehicle traffic on the access road and within the PFBP.

2.4.2.30 The proposed RTS and PFBP are both located at more than 300m away from the planned sensitive uses of SEKD. Both facilities are located at about 100m from the Kwun Tong industrial area and at more than 300m away from the nearest existing residential uses namely Laguna City. With the implementation of practicable and effective dust and odour mitigation measures, adverse dust and odour impacts are not expected.

Air Quality Impacts from the Proposed Cruise Terminal

2.4.2.31 The cruise terminal is located in Area 6 at the tourist node of the SEKD. Adjacent uses are all commercial uses with centralised air conditioning and are not susceptible to potential air quality impacts from vessels emissions. The nearest residential sensitive receivers are located at more than 500m away from the cruise terminal. Adverse air quality impact due to emissions from vessels berthing at the cruise terminal is therefore not expected. This should be confirmed by a detailed air quality impact assessment to be carried out at the detailed design stage of the cruise terminal.

2.5 Mitigation of Adverse Impacts

2.5.1 *Construction Phase*

Construction Dust Impact

2.5.1.1 In order to ensure that dust emission is minimised during the construction phase of the project, relevant dust control requirements set out in the *Air Pollution Control (Construction Dust) Regulation* should be met. The site agent is required to adopt dust reduction measures while carrying out construction works. In particular, the mitigation measures listed below should be adopted where applicable. With the implementation of effective dust control measures, adverse dust impacts from the construction works of the project is not expected.

Site clearance and demolition of existing structures

- The working area for the uprooting of trees, shrubs, or vegetation or for the removal of boulders, poles, pillars or temporary or permanent structures should be sprayed with water or a dust suppression chemical immediately before, during and immediately after the operation so as to maintain the entire surface wet; and

- All demolished items (including trees, shrubs, vegetation, boulders, poles, pillars, structures, debris, rubbish and other items arising from site clearance) that may dislodge dust particles should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides within a day of demolition.

Site boundary and entrance

- Vehicle washing facilities including a high pressure water jet should be provided at every discernible or designated vehicle exit point;
- The area where vehicle washing takes place and the section of the road between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; and
- Where a site boundary adjoins a road, street, service and or other area accessible to the public, hoarding of not less than 2.4m from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit.

Access road

- Every main haul road (i.e. any course inside a construction site having a vehicle passing rate of higher than 4 in any 30 minutes) should be paved with concrete, bituminous materials, hardcores or metal plates, and kept clear of dusty materials; or sprayed with water or a dust suppression chemical so as to maintain the entire road surface wet; and
- The portion of any road leading only to a construction site that is within 30m of a discernible or designated vehicle entrance or exit should be kept clear of dusty materials, say by means of suction sweepers.

Use of vehicle

- Immediately before leaving a construction site, every vehicle should be washed to remove any dusty materials from its body and wheels; and
- Where a vehicle leaving a construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.

Concrete production

- Cement delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line such that, in the event of the silo approaching an overfilling condition, an audible alarm is triggered and the material filling stops within one minute;
- Silo used for the storage of cement should not be overfilled;
- The loading, unloading, transfer, handling or storage of any cement should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system or equipment; and
- Cement collected by fabric filters or other pollution control system or equipment should be disposed of in a totally enclosed containers.

Excavation and earth moving

- The working area of any excavation or earth moving operation should be sprayed with water or a dusty suppression chemical immediately before, during and immediately after the operation so as the maintain the entire surface wet; and
- Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabilizer within 6 months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.

Stockpiling of dusty materials

- Any stockpile of dusty material should be either covered entirely by impervious sheeting; placed in an area sheltered on the top and the 3 sides; or sprayed with water or a dust suppression chemical so as to maintain the entire surface wet.

Building construction

- Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or if a canopy is provided at the first floor level, from the first floor level, up to the highest level of the scaffolding; and
- Any skip hoist for material transport should be totally enclosed by impervious sheeting.

Odour Impact from Reclamation Activities

2.5.1.2 For no dredged option with *in-situ* treatment, no sediment dredging would be required. Spills and losses of the contaminated sediments can also be avoided because no sediment handling would be required and odour emission is not likely to be an important issue in this case. Details of the reclamation options and the associated recommended mitigation measures are presented in Sections 5.5.3 and 5.7 of this report.

2.5.1.3 For the fully dredged or minimum dredged option with *ex-situ* treatment, suction dredging would be used for sediment dredging. This serves as a mitigation measure to minimise the potential odour impacts since the dredging operation is under a submerged condition and would prevent the exposure of dredged sediments in the atmosphere. In additional, odour emission would be minimized by the addition of Fenton's reagent into the dredged sediments in the dredge pipeline, which would oxidize much of the AVS almost instantaneously and hence reduce the generation potential of odorous hydrogen sulphide gas.

2.5.1.4 Besides, to further limit odour emission during dredging operation, it is recommended to cover the dredged sediments after loaded into the dredger. Dispersion of odour would be minimised during the transport of the sediments to the disposal sites or treatment facilities. The treatment facility and the associated stockpiles should be suitably enclosed to minimise any odour emission.

2.5.1.5 The dredging activity is best to be carried out in winter where practicable. The wind direction is mostly from the northeast during this period. The wind would disperse the odour towards the Victoria Harbour and away from the residential and commercial buildings in the areas of Kowloon Bay, Ngau Tau Kok and Kwun Tong. The low temperature in winter would reduce the organic decomposition rate and hence minimising the odour impact.

2.5.1.6 For both the fully dredged and minimum dredged options, with the implementation of the above measures to be confirmed by field trials, odour impacts resulted from the dredging activities could be minimised and insurmountable odour impact is therefore not expected. For the no dredged option, no dredging activities would be involved and no odour impact is therefore expected.

2.5.2 *Operational Phase*

Traffic and Industrial Air Quality Impact

2.5.2.1 As discussed in Section 2.4.2 above, in order to avoid adverse air quality impacts from the traffic emissions of ventilation shafts and industrial stack emission plume impingement, it is proposed that:

- An environmental setback of 230m from the centre of the East Vent Building of CKR tunnel within Area 4A should be allowed;
- The exhaust height of the northern vent shaft of T2 tunnel should be designed to 24m above ground level to prevent adverse air quality at the planned schools sites in Area 4N; and
- A buffer distance of 60m should be allowed at the western portion of Area 3V to avoid potential plume impingement from Ma Tau Kok Gas Works.

Odour Impact from Maintenance of Drainage Channel

2.5.2.2 Two desilting methods have been proposed: the winching method and the man-entry method. The winching method has been recommended for routine maintenance, whereas the man-entry method should only be adopted for emergency events such as when shock loadings occur and also for those sections around bends and junctions where winching could not be deployed.

2.5.2.3 Both methods have the potential for short-term release of odorous gas when the sediments are disturbed during the desilting process. It should be recognised that the odour problem is inherent in this type of maintenance work and some odour will always be present to some extent. This issue is not uncommon to some of the current box culvert maintenance practices at other locations in the territory, where sufficient measures were not or could not be provided. Although this problem cannot be totally eliminated, the aim is to adopt the best practicable means to minimise odour impact as much as possible.

2.5.2.4 Two options are available for adoption and their practicability and effectiveness should be confirmed by field trials at the detailed design stage:

Option 1: Apply odour mist over the desilting openings

Option 2: Use "mobile" enclosures with odour control system over the downstream desilting openings

2.5.2.5 Based on the information currently available, Option 2 is a more well-established technology and thus a preferred option to control the odour. For both options, some form of forced ventilation should be applied to the access point so that the air (and thus odour) could be forced through the length of the culvert to the odour control system. This system could be a portable unit consisting of extraction fans, particulate filters and activated carbon filters.

2.5.2.6 It is easier to deploy odour mitigation measures to the winching method because of the fewer desilting openings (and thus easier to force ventilate and to apply odour mist). The man-entry method would require more desilting openings and the opening of smaller access manholes to provide sufficient light to men working in the box culvert. As such, it would be more difficult to force ventilate. However the man-entry method should be used infrequently (during shock loading and for areas not accessible to the winching method) and potential odour impact should be infrequent and short-term.

2.5.2.7 The silt from the box culverts should be directly transferred to a lorry using mechanical grabs. The sealed tray should then be covered either with purpose-designed lids or tight fitting polypropylene tarpaulin or equivalent to minimise the escape of odour. Dewatering of the silty sediments should be at the centralised dewatering facility that is completely enclosed and ventilated to an odour control system such as a wet chemical scrubber. With the installation of practicable and effective odour control system, adverse odour impact from the centralised dewatering system is not anticipated. This should be further investigated and developed in the detailed design stage.

2.5.2.8 With the detailed consideration and proper application of best practicable mitigation measures such as those described above, there should be considerable reduction in odour problem from maintaining the SEKD box culverts compared to the conventional practice of desilting box culverts.

2.5.2.9 The practicability and effectiveness of the proposed odour mitigation measures should be confirmed by field trial at the detailed design stage. During the operational stage, an odour monitoring program in accordance with the Environmental Monitoring and Audit Manual should be implemented to check that the odour reduction measures are effective in preventing adverse odour impacts to nearby sensitive receivers.

Odour Impact from Sewage Pumping Stations

2.5.2.10 The proposed sewage pumping stations in SEKD would be located within enclosed building structures. With proper enclosure and ventilation system to divert the odour emissions to odour scrubbing device as implemented in other sewage pumping station in other urban areas

in the territory, odour impacts could be mitigated to an acceptable level and no insurmountable environmental impact is therefore expected.

Air Quality Impacts from the Proposed Refuse Transfer Station (RTS) and Public Filling Barging Point (PFBP)

2.5.2.11 For the RTS planned in Area 6C, the reception hall and the major refuse handling activities will be undertaken within an enclosed structure (see **Drawing No. 22936/MS/205** in Section 7 of this report). It is expected that with the implementation of ventilation system with effective odour removal equipment similar to those implemented in other newly built RTS in the territory, odour impact on nearby sensitive receivers is not anticipated. The proposed RTS is a Designated Project under Schedule 2 Part I:G.2 of the EIAO, a detailed EIA should be carried out by the future project proponent and approved under the EIAO to confirm that there will be no insurmountable environmental impacts associated with the construction and operation of the RTS.

2.5.2.12 For the PFBP, the tipping activities of filling material from the trucks to the barges should be carried out in an enclosed structure. All dust-laden air generated from the tipping operation should be properly suppressed by watering or extracted and vented to fabric filtering system before exhaust to the atmosphere. All practicable measures should be taken to prevent or minimise the dust emission caused by vehicle movement. All access and route roads within the facility should be paved and adequately wetted. Vehicle cleaning facilities should be provided and used by all vehicles leaving the facility to wash off any dust and/or mud deposited on the wheels and/or vehicle body. A high standard of housekeeping should be maintained. All spillages or deposits of materials on ground should be cleaned up promptly and dumping of materials at open area should be prohibited. With the implementation of practicable and effective dust mitigation measures, adverse dust impact from the operation of the PFBP on nearby sensitive receivers is not expected.

2.6 Impacts Summary

2.6.1 Landuse and transport planning has provided a proactive approach in minimising the likely air quality impacts from road traffic and other sources. The approach included environmentally friendly public transportation, environmental friendly shuttle service, discourage through traffic movements, reducing traffic at local levels, reducing demand for through traffic, underground road design, and planning design. The amount of vehicular traffic in SEKD has been much reduced with traffic flow on most of the planned distributor roads being less than 1000 vehicles per hour. It is estimated that the total daily car trips and bus trips to and from SEKD would be reduced by 20,000 veh-km and 22,000 veh-km respectively. This would accordingly reduce the daily nitrogen oxides and RSP emissions from SEKD by about 160 kg and 16 kg respectively based on 2011 vehicle emission factors. However, the SEKD would still be bounded by heavily trafficked existing trunk roads namely Prince Edward Road East and Kwun Tong Bypass which contribute to the poorer air quality at the periphery of SEKD.

2.6.2 The Outline Master Layout Plan provided the basis for air quality assessment. Air quality sensitive receivers were identified and air quality impacts assessed. The main impact would be from traffic emissions of open roads and vent shafts of vehicle tunnels. The modeling results showed that the levels of impact within SEKD were generally within the respective AQOs. However, exceedances were predicted at close proximity of tunnel vent shafts. Mitigation measures in the form of environmental setback and higher vent shaft exhaust height should be allowed to avoid adverse air quality impact at nearby sensitive receivers. With the implementation of the recommended mitigation measures, the air quality impact will be acceptable at all sensitive uses.