overflow occurs. Disinfection of the extracted seawater can lower the *E. coli* levels during the period of emergency overflow and installation of silt curtains in front of the seawater intake points would reduce the SS to acceptable levels. The following measures should be incorporated to deal with emergency overflows from KTPTW and TKWPTW:

- For the emergency overflow from KTPTW, a by-pass pipe should be provided to convey the emergency overflow along the new breakwater (eastern arm of KTTS) and to discharge at the end of the breakwater to allow quick dispersion of the sewage plume; and
- For the emergency overflow from TKWPTW, an emergency bypass along the proposed box culvert (Outfall P1) plus a 150m submarine outfall should be provided to allow discharging into more open water.

4.6 Impact Summary

4.6.1.1 Implementation of mitigation measures reduces the water quality impacts arising from the construction and operational phases of the development. The remaining water quality impacts after implementation of mitigation measures are referred to as residual impacts.

4.6.1.2 The reduction in cross-sectional area in the harbour after reclamation would slightly increase the current speeds and reduce the quantity of flow passing through the harbour. Based on the model predictions, the resulting hydrodynamic and water quality would not be adversely affected by the SEKD.

4.6.1.3 The existing water quality in Victoria Harbour exceeds the WQO values for some parameters monitored by EPD. The background level of TIN is high. The predicted water quality condition also showed high TIN concentrations in the harbour. It is not likely that the SEKD would increase the exceedances of the WQO for TIN. In fact, the water quality in the harbour would be improved in 2016 as the pollution flows and loads entering the harbour would be reduced.

4.6.1.4 Diversion of flows from the KTAC to Kowloon Bay would increase the pollution loads in the Kowloon Bay area. Redistribution of pollutants from the low flushing capacity area at KTAC to the relatively high flushing capacity area at Kowloon Bay would enhance the dispersion and dilution of pollutants. The option of adopting the shortest route of the KTN diversion is not likely to cause unacceptable water quality changes in TKWTS. The proposed fall back option of diverting the flows away from TKWTS provides an alternative to further prevent deterioration of water quality in the typhoon shelter.

4.6.1.5 The cooling discharges would have little impact on the nearby sensitive receivers. The area of influence as a result of the increases in water temperature and concentrations of anti-fouling chemicals would be in the close proximity of the discharge point.

4.6.1.6 Implementation of mitigation measures would minimise the water quality impacts arising from the construction and operational phases of the SEKD. With the inclusion of suitable mitigation measures in the Environmental Monitoring and Audit programme, the potential water quality impacts are expected to be within acceptable levels. There would be no insurmountable water quality impacts to the environment due to the proposed development.

4.6.1.7 An impact summary for water quality impacts during the construction and operational phases of the proposed SEKD is included in **Table 4.58**.

Table 4.58 Water Quality Impact Summary Table

Issue	Impact
CONSTRUCTION PHASE	
Potential Impacts	Changes in Coastline Configuration • The changes in coastline configurations as a result of the SEKD reclamation would potentially affect the hydrodynamic and water quality conditions in the harbour. • The predicted WQ at KTTS for 2002 (base year) wet season was poor with low DO levels. The TIN and UIA levels were predicted to be much higher than the WQO requirements. • The present Scheme of SEKD involves the reclamation in the KTAC, KTTS and Hoi Sham • Reclamation of the KTAC and KTTS areas is not expected to cause major changes in coastline configuration. • The model predicted that the average current speeds in the harbour were similar between 2002 and 2003, thus confirmed that the KTAC development would not cause significant changes in hydrodynamic condition in the harbour.
Mitigation Measures	The present scheme of SEKD involves the reclamation of KTAC, KTTS and Hoi Sham. After the completion of the SEKD, the smoothness of the future coastline in this region would be improved, cause less restriction to the flow movement in Kowloon Bay.
Potential Impacts	Nullah and Box Culvert Diversion Expected to cause water quality changes in Kowloon Bay. Water quality of KTTS is currently influenced by discharges from Kai Tak Nullah. The water quality in Kwun Tong is expected to improve after the diversion of Kai Tak Nullah The water quality in To Kwa Wan Typhoon Shelter (TKWTS) would be slightly affected by the discharges from the diverted nullahs but still within acceptable levels.
Mitigation Measures	Control site run-off from entering the diverted section. Provision of surface channels along the edge of the diverted section to intercept run-off. Stockpiles and construction and dusty materials should not be placed near the nullah / box culvert during construction. Construction activities that generate wastewater should be carried out outside the proximity of the diverted sections if practicable.
Potential Impacts	Dredging and Filling During dredging and filling, suspended solids levels in water would be increased and sediment plumes would be generated. Temporary deterioration of water quality in the vicinity of the proposed development is likely to occur, mainly due to increase in SS levels. The unmitigated dredging and filling scenarios showed adverse water quality impacts whilst the mitigated scenarios (filling behind sea wall and use of a pipe for sand filling at breakwater) were found to be acceptable with no significant impacts to the nearby sensitive receivers. During the dredging operation, except for elevated zinc levels at KB1 the release of heavy metals and metalloids into the receiving water was predicted to be in low concentrations based on results of the elutriate test, and it is not expected to have adverse impacts on the nearby aquatic environment. The release of organic micro-pollutants (PAHs, PCBs, TBTs) and nutrients (TKN, TP, NO_3 etc) would be high and mitigation measures are required to minimise the release of those contaminants.
Mitigation Measures	Installation of silt curtains to limit the release of sediments into the nearby water body. Seawall would be constructed in the early stage of the reclamation, and its presence would effectively confine the release of sediment during dredging and filling. Reduce the rate of dredging, the use of tightly closed grabs, and the descent speed of grabs should be controlled to minimise the disturbance to the seabed, reduce sediment loss during dredging and raising of grabs. Water quality monitoring should be included in the EM&A programme to detect if there are any elevated contaminant levels in nearby water body during dredging and filling. It is required to consult the mariculturists of the identified mariculture zones including Ma Wan and Tung Lung Chau Mariculture Zones before commencement of the marine works at SEKD. The project department should inform and update the mariculturists the tentative programme of the marine works in advance.
Potential Impacts	Construction Site Run-off Water quality impacts would arise during site formation. Site formation activities would expose topsoil, increasing the risk of runoff with a high SS concentration. Runoff into KTTS would deteriorate its water quality, increasing SS levels and turbidity of KTTS. Transport of polluted water out of KTTS would cause pollution in nearby Kwun Tong area. Release of untreated runoff into storm drains that discharge into Kowloon Bay would pollute water in the water body. The water quality of the diverted KTN and Jordan Valley box culvert would be significantly affected when receiving runoff from construction sites, and discharges to the Kowloon Bay area and TKWTS would affect the water quality in them. Dispersion of wind blown dust from exposed soil surfaces would increase the SS levels in surface runoff, and the dust would probably fall directly onto surface of nearby water bodies.

Issue	Impact
Mitigation Measures	Adopt practices outlined in *ProPECC PN 1/94 Construction Site Drainage* to minimise site run-off and potential water pollution. Perimeter channels should be provided in advance of site formation and earthworks to intercept run-off at site boundary. Construction works should be programmed to minimise soil excavation in rainy seasons. Good construction practice should be adopted to minimise runoff and soil erosion.
Potential Impacts	Wastewater generated from Construction Activities Wastewater would be generated from construction activities including excavation and filling, foundation construction, building construction, construction of roads and associated facilities, and utility installation. In general, wastewater generated from construction activities would contain high levels of SS. Wastewater generated from wheel washing, dust suppression, cleaning and polishing may have elevated pH. Accidental spillage of chemicals in construction site is likely to cause soil contamination, and may lead to water contamination if site runoff carried these contaminants. Sewage would be generated due to the presence of workforce during the construction phase of the development. Discharges of sewage are subjected to control and illegal discharge of untreated sewage is unacceptable.
Mitigation Measures	Wastewater generated from foundation construction, washing of concrete lorry and related activities should be collected and discharged into storm drains after removal of silt and sand in a sedimentation facility. Newly constructed manholes should be covered and temporarily sealed to prevent debris and wastewater from entering the drainage system. Good site arrangement and management should be adopted to minimise potential pollution. Sewage generated from workforce should be discharged into a foul sewer (or other suitable collection and storage system). Grease traps should be provided to reduce the oil and grease contents in wastewater prior to discharging into a foul sewer.
Potential Impacts	Groundwater Discharge During Dewatering Dewatering of groundwater would be required during the excavation and construction of foundation and below ground structures. Groundwater may contain contaminants, which would be originated from leakage of the underground aviation fuel pipes. The assessment has shown that the contaminant levels in terms of heavy metal, benzene, toluene and tetrachloroethylene were low.
Mitigation Measures	Measures can be adopted to minimise the potential effect from groundwater discharge and release of contaminants during excavation. These include: • Providing settling facilities to remove the SS in groundwater prior to final discharge; • Carrying out excavation during dry season wherever possible to minimise the potential water quality impacts resulting from contaminated runoff; • Covering the excavated material to minimise exposure of contaminated soil to rainwater; • Recharging the groundwater extracted from the excavation site back into the groundwater table through groundwater recharge wells, which could be built near the excavation site. This reduces the discharge of groundwater into the nearshore water; and • Monitoring the concentrations of benzene, toluene and tetrachlororethylene should groundwater discharge during dewatering be required. The groundwater should be collected and treated to the standards as recommended by the USEPA prior to final discharge.
OPERATIONAL PHASE	
Potential Impacts	Sewage generated from the SEKD The population in the area would increase upon completion of the development, and the amount of sewage generated would increase.
Mitigation Measures	Adequate sewers, rising mains and sewage pumping stations should be proposed in the design of sewerage systems for different phases of the SEKD.
Potential Impacts	Presence of the SEKD Reclamation The physical presence of the KTAC reclamation increases the land area within the Victoria Harbour. There would be no major changes in coastline configurations due to the reclamation in KTAC and KTTS. When the development is completed, there would be a slight reduction in average discharge (<3%) in the Victoria Harbour Channel. There would be a slight increase of current speed along the channel and dispersion of pollutants would be enhanced. Results from the model have predicted no adverse impacts to tidal flow conditions in the vicinity of the whole development as well as in the harbour. The slight increase in current speed would be the result of reduction in cross-sectional area of the harbour, and would enhance pollutants dispersion. A discharge reduction is predicted as a result of increase in flow resistance from the presence of SEKD, but this is not likely to cause a significant reduction in flushing capacity in the harbour. The nullah diversion works redistribute pollutants from the Kwun Tong area to the Kowloon Bay area. The new marina located at Kowloon Bay would have high *E.coli* concentration and exceedances of the WQO for TIN for

Issue	Impact
	both dry and wet season.
Mitigation Measures	The hydrodynamic and water quality condition in the harbour would not be adversely affected by the presence of the SEKD. New discharges into the Kowloon Bay water should be away from the marina.
Potential Impacts	Discharges from Storm Drains and Sewage Outfalls / Nullahs Diversion of Kai Tak Nullah and Jordan Valley box culvert from the KTAC to Kowloon Bay and the implementation of KTAC reclamation would eliminate the odour problem at KTAC. Dispersion and dilution of pollutants in Kowloon Bay are expected to be better, and water quality condition is expected to improve compared to the condition at the interim development stage.
Mitigation Measures	Implementation of the Environmental Monitoring and Auditing programme during the operational phase could monitor the actual changes of water quality as a result of the nullah and box culvert diversion. Effective controls on illegal discharge of wastewater into the nullahs would be required to minimise the water quality impacts.
Potential Impacts	Water Quality in the Extended Sections of Diverted Nullahs The model predicted that the water quality in extended sections of Kai Tak Nullah and Tsui Ping Nullah would be within acceptable levels. However, suspended particles would have a higher potential to settle on the channel bottom. There is a potential for release of hydrogen sulphide from the deposited sediment, which also causes odour.
Mitigation Measures	Deposition of debris and silt in the extended sections of nullahs and box culverts could be avoided by undertaking regular maintenance work such as desilting. Forced ventilation should be continuously maintained during desilting and maintenance works. The use of sealed suction hose and enclosed tanker / container would reduce the odour impact.
Potential Impacts	Cooling Water Discharges Potential impacts due to cooling water discharges from DCS include elevation in temperature, chemical and biological effects as a result of discharge of biocide and chlorine. There would be no significant impacts to the nearby water quality sensitive receivers. However, the distance between the intake and discharge points of DCS should be reviewed and assessed using a near-field model during the detailed design stage.
Mitigation Measures	The concentrations of chlorine and biocide should be suitably controlled to avoid release of excess chemicals into the receiving water body. Maintenance of DCS should be implemented on a regular basis to ensure the normal operation of the system.
Potential Impacts	Storm and Emergency Overflows Stormwater overflow into the KTTS would affect the confined water body in the typhoon shelter. Emergency overflows from TKWPTW and KTPTW would cause water quality impacts to the nearby sensitive receivers. The seawater intakes at Tai Wan and Cha Kwo Ling are the nearest sensitive receivers and would be influenced by the emergency overflows. The modelling results showed periodic exceedances of WSD's WQOs for SS and E. coli at Tai Wan Seawater Intake and some exceedances of WSD's WQO for E. coli at Cha Kwo Ling Seawater Intake.
Mitigation Measures	Mitigation measures to minimise the impacts to the new KTTS and marina include: • Stormdrains should be diverted away from the typhoon shelter and the marina; and • For the storm overflows into the KTTS, the overflow weirs should be set at a level of 2.5 mPD or above. The overflow structure should be so designed to avoid, during dry weather condition, the overflow of the dry weather flows, which tends to form a thin surface layer on top of the seawater due to the lower density, into the typhoon shelter. Mitigation measures to minimise the potential impacts arising from emergency overflows would include disinfection of the extracted seawater to lower the E. coli levels. Provision of silt curtain in front of the seawater intake points would reduce the SS to acceptable levels. For the emergency overflow from KTPTW, a by-pass pipe should be provided to convey the emergency overflow along the new breakwater (eastern arm of KTTS) and to discharge at the end of the breakwater to allow quick dispersion of the sewage plume; and ?For the emergency overflow from TKWPTW, an emergency bypass along the proposed box culvert (Outfall P1) plus a 150m submarine outfall should be provided to allow discharging into more open water.