




Business Continuity Manual

Business Continuity Plan: E7

Water & Sewage Systems

		Signature	Revision	Effective Date
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A. System Description

1.0 Water Systems

- 1.1 There are sixteen water supply zones in HKIA.
 1. Nine water supply zones are in Terminal 1; and
 2. One single water supply zone in each of the following buildings:
 - a. HKIA Tower;
 - b. HKIA Tower 2;
 - c. HKIA Commercial Building;
 - d. HKIA Community Building;
 - e. T1 Satellite Concourse;
 - f. SkyPier Terminal; and
 - g. T1 Midfield Concourse.
- 1.2 Our water supply systems include potable, flushing and cleansing water supply.
- 1.3 The main potable and cleansing supply source is from Water Supplies Department (WSD);
 1. Dual feed from the distribution mains of Tung Chung Fresh Water Service Reservoir (TCFWSR) through 600mm diameter mains which is provided by WSD via the North Lantau Expressway Bridge and the Second Sea Channel Bridge.
 2. WSD feeds their potable water supplies to the boundary of HKIA and distributes into storage tanks inside our buildings via underground distribution mains.
- 1.4 The main flushing water supply sources are from Sea Water Pump Houses SWPH-1, SWPH-1b and SWPH-5 and distribute into storage tanks inside our buildings via underground distribution mains.
- 1.5 All types of water supplies distribute to all levels of each building from water storage tanks via booster pumps.

2.0 Sewage Systems

- 2.1 Due to the nature of large and relatively flat site, sewage collected from the various buildings and the aprons within the HKIA is transferred via a network of gravity mains and pumped / rising mains to a Drainage Services Department's (DSD) manhole at Tung Chung.
- 2.2 To facilitate the transfer, a total of 12 numbers of major sewage pumping stations (2 numbers are combined Sewage & Grey Water Pumping Stations) are installed.

- 2.3 Most of the rising mains are connected directly to an adjacent manhole with a short distance to provide flushing of the next downstream gravity catchment.
 1. Gravity sewers range in size from 150mm diameter connections to a 1,050 mm diameter main sewer.
 2. Rising mains range in size from 100mm diameter to 800mm diameter for the transfer main across the North Lantau Expressway Bridge to Lantau.
- 2.4 The sewage network is further sub-divided into two sub-systems, being the foul sewerage system and the grey water system.
- 2.5 The grey water system collects the grey water from:
 1. Wash water from the aircraft wash at the apron
 2. Condensate drains, kitchen wastes, wash basins from Terminal 1 and T1 Midfield Concourse
 3. Kitchen waste water from aircraft caterers
- 2.6 Grey water that has been treated at the Wastewater Treatment Plant for irrigation purpose and excessive treated grey water will be diverted to the foul sewerage system for ultimate discharge to the DSD manhole at Tung Chung.
- 2.7 Power supply to the major sewage pump stations are fed from the essential boards; each of them is also equipped with a socket cubicle for ready connection to the mobile generator as necessary.
- 2.8 Each of the major sewage pump stations is equipped with duty and standby pumps for the effective transfer of sewage.
- 2.9 In case of major breakdown in the sewage system that caused the continuous built up of collected sewage within the sewage system, a suction tanker will be deployed for emergency use.

B. Physical System Risks

Risks for Water Systems	Description	Mitigation
1. Failure of potable water feeds from Water Supplies Department	Interruption of potable water supply	Inform Water Supplies Department for arrangement of mobile water tanks for transporting potable water from nearest available water point.
2. Failure of underground potable or flushing water distribution main	Interruption of potable or flushing water supply	Inform Water Supplies Department for arrangement of mobile water tanks for transporting potable water from nearest available water point.

3. Power Supply Failure from China Light and Power Co. Ltd (CLP)	Interruption of water supply to all levels of affected building	Normal resumption within 90 seconds upon the operation of the Emergency Generator to fully start up.
4. Failure of duty booster pumps	Interruption of water supply to all levels of affected zone	A standby pump will be started up within fifteen minutes.
5. Failure of booster pump system	Interruption of water supply to all levels of affected zone	<p>Resumption time depends on the severity of the failure.</p> <p>For minor system faults, it will be rectified / repaired within thirty minutes.</p> <p>For major failure, inform Water Supplies Department for arrangement of mobile water tanks for transporting potable water from nearest available water point.</p>
6. Temporary Power Supply Failure	Interruption of sewage transfer due to minor suspension of power (< 0.2 sec with reasonable remaining power on all phases)	Automatic resumption of the operation upon power resumption
7. Power Supply Failure (i.e. failure of primary power supply, back-up generator or the power supply cable)	Interruption of sewage transfer due to suspension of power (more than 0.2 second)	<p>Normal resumption within 30 seconds upon the operation of the generator to back up the upstream essential board.</p> <p>In case of simultaneous failure of the primary power supply and back-up generator or the failure of the power supply cable, resumption can be made within 90 minutes upon the deployment of the mobile generator and connection</p>
8. Failure of duty and standby sewage pumps	Interruption of sewage transfer due to suspension of duty and standby sewage pumps	<p>Resumption time depends on the location of the failure.</p> <p>Operation impacts will be minimized by means of:</p> <ul style="list-style-type: none"> a) use mobile pumps and tankers; b) swap the defective pumps with compatible standby pumps from other sewage pump stations (e.g. sewage pumps at SPS 12F are similar to SPS 12G and vice versa)
9. Failure of Sewage Pipes	Interruption of sewage transfer due to suspension of pipe work	<p>Resumption time depends on the location of the failure.</p> <p>Minimize the overflow into the storm drains by deploying tankers and / or temporary pumps to bypass the defective pipe section and transfer the sewage to downstream manhole.</p> <p>Close the penstock(s) at the associated outfall(s) to prevent spillage of contaminated storm water into the nearby sea. Inject chemical where possible onto the storm water system to reduce the bacterial growth.</p>

C. Contingency Planning

In accordance with the Contingency Procedures for Sewage System, the volume of spillage of contaminated waste water into the nearby sea shall be minimized as far as possible.

D. Contingency Procedures

FRT Handbook shall be referred for the handling of incidents on the water system and sewage system, as well as the responsibilities of the concerned parties and the activities associated with the handling of incidents related to water and sewage systems.

E. Cyber Security

System cyber security threat level based on the following risk rating:

Threat Level	System
Low	System uses no IT-based systems.
Medium	System uses some closed data-collection and/or alarm systems based on sensors or IoT devices.
High	System uses integrated SCADA systems, cloud-based data collections systems, or IP-based monitoring and control systems.

- Water Systems – Threat Level: Low

Rationale for threat level

Although the real-time condition data is uploaded to the cloud, this is an isolated system with no control function. The data collected is not critical and has no personal data.

Mitigation actions taken

In case of suspected cyber attack, Risk & Cybersecurity Team of ITD shall be informed for further investigation.

- Sewage Pumping Systems – Threat Level: Low

Rationale for threat level

The sewage pumping system is being controlled and monitored by the local control consoles and being monitored by the Airfield SCADA System. The Central Control Consoles/Airfield SCADA System are a data-collection system and alarm system based on sensors, so as to monitor the status of the general pumping systems in a closed and controlled network.

Mitigation actions taken

The Unidirectional Security Gateway of the general pumping system creates a fully functional replica server in the local control consoles/ Airfield SCADA System. It allows 100% visibility of the general pumping system CS network while providing 100% protection from IT-based threats.

In case of suspected cyber attack, Risk & Cybersecurity Team of ITD shall be informed for further investigation.

F. Interface with Other Operational Organizations during Contingency

1. Relevant Maintenance Contractors
2. AA IAC
3. AA TSI
4. EPD
5. DSD
6. WSD

G. Drill Plan

Drills by Maintenance Contractors and TSI on handling of incidents of water and sewage systems are conducted on an annual basis.

End of BCP - E7