

MRT tunnel flooding: How it happened

A failure to properly maintain a storm water reservoir resulted in rainwater overflowing and flooding the tunnel between Bishan and Braddell MRT stations, causing services on a section of the North-South Line to be inoperable for 20 hours on Oct 7 and Oct 8.

THE STORM WATER PUMP SYSTEM

High water level switch

Sends an alarm to SMRT's Operation Command Centre (OCC) when submerged.

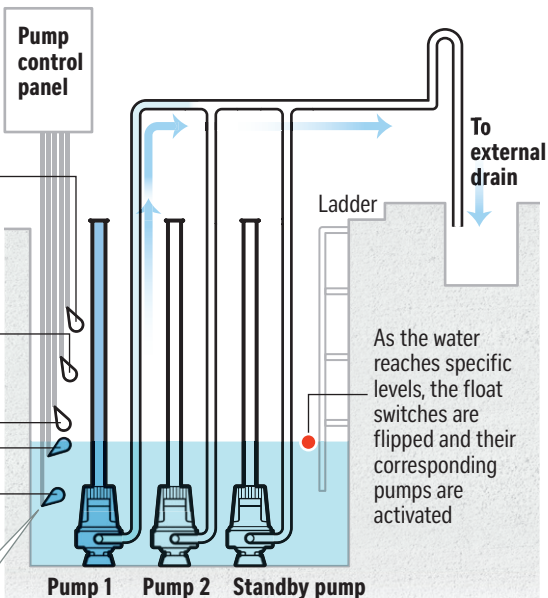
All-stop float switch

- When the water level is at its lowest, it keeps all the other switches on "pause".
- It acts as a safety feature to prevent the pumps from dry running, which can lead to overheating and damage.

Switch for standby pump

Switch for pump 2

Switch for pump 1



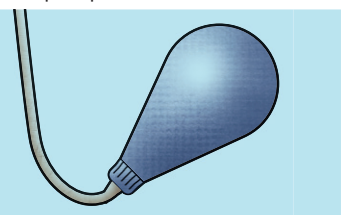
HOW THE FLOAT SWITCH WORKS

Float before it is fully submerged



Float when it is fully submerged

Cable is bent, signal is triggered and pump is activated

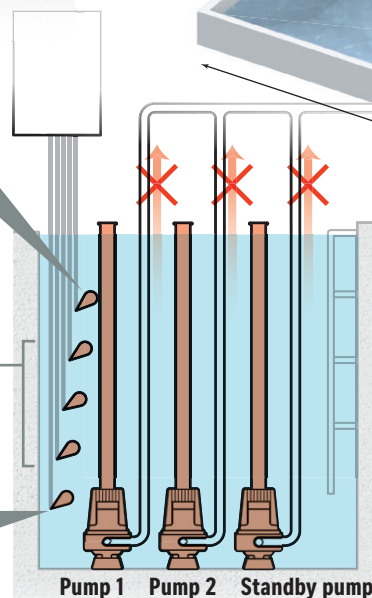


FAULTS DISCOVERED

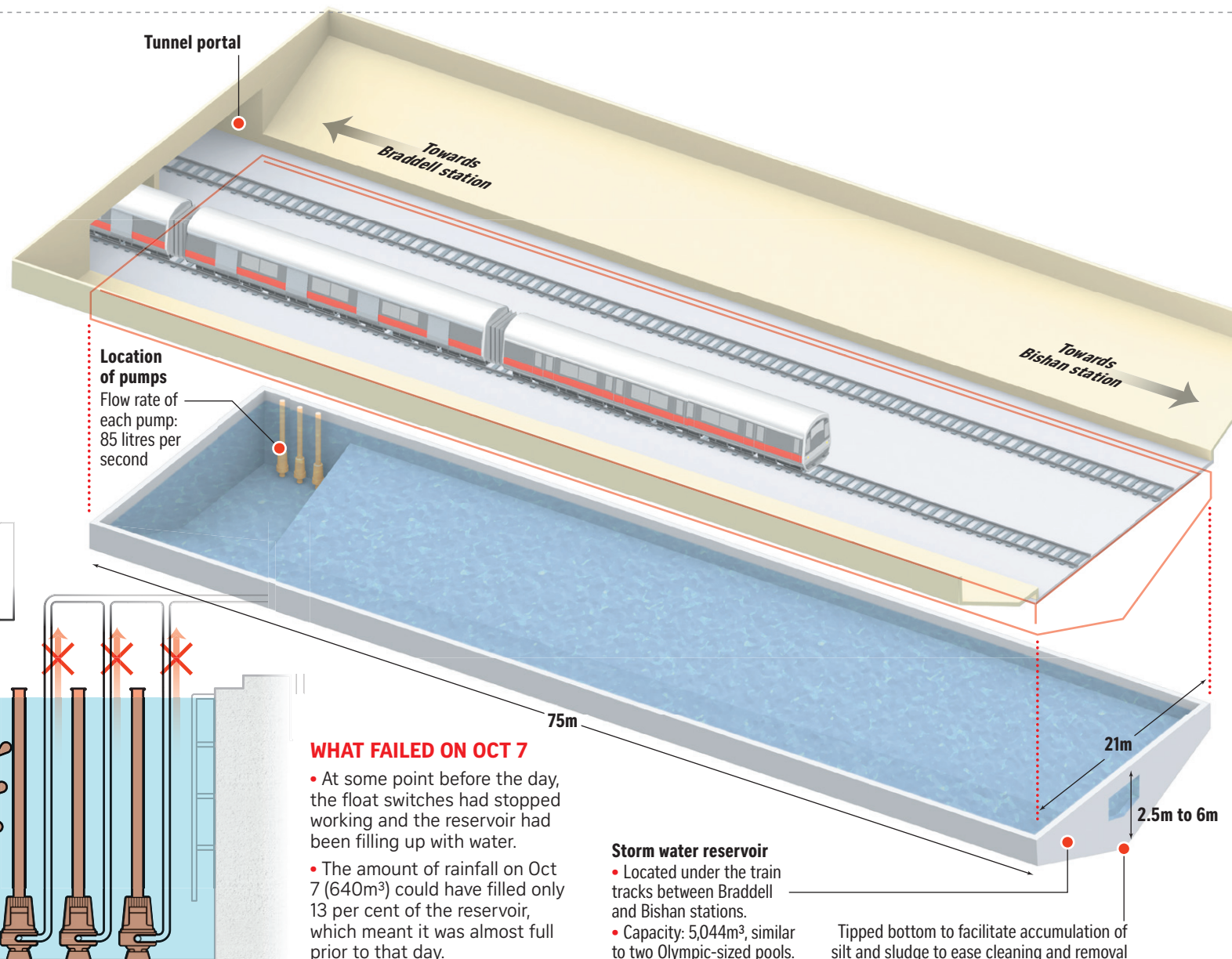
High water level switch was found to be faulty, failing to send an alarm to OCC when the water level became critical.

Pump float switches remained on "pause" and failed to activate the pumps.

Faulty all-stop switch kept all the other pump switches on "pause".



Pump 1 Pump 2 Standby pump



WHAT FAILED ON OCT 7

- At some point before the day, the float switches had stopped working and the reservoir had been filling up with water.
- The amount of rainfall on Oct 7 (640m³) could have filled only 13 per cent of the reservoir, which meant it was almost full prior to that day.