Annex A: PUB's flood monitoring and response initiatives

No	Initiative
1.	**[New] Road Flood Sensor** The Road Flood Sensor (RFS) provides automated, real-time monitoring of road surface water levels. An initial 6-month trial with 30 sensors demonstrated encouraging results, with alerts of flooding on roads transmitted within one minute. Building on these results, PUB plans to extend the trial with 15 additional sensors deployed at roadsides in locations prone to flooding, including exploring deployment outside residential properties to provide earlier alerts for residents to safeguard their properties and vehicles. The extended trial will also validate the integration of water level sensors, RFS and CCTV Video Analytics (VA) into a single automated flood monitoring and alerting system. The integrated approach aims to improve the accuracy and timeliness of flood detection. This would provide better situational awareness for flood response operations, and facilitate earlier flood alerts to the public. The system would also reduce manpower-intensive manual CCTV monitoring, enabling more scalable and cost-effective monitoring across PUB's extensive monitoring network.  *Caption: A Road Flood Sensor installed in the storm water drainage system.*
2.	**[New] Remote-controlled Pump Vehicle** PUB has commenced a one-year pilot deployment of a Remote-Controlled Pump Vehicle (RPV) to support its flood response operations. Unlike conventional pumping arrangements that require large transport vehicles, bulky generators and substantial manpower, the RPV is a compact, tracked mobile pumping platform that is designed for rapid deployment with minimal setup. It can be remotely manoeuvred into flooded areas, navigate uneven terrain and staircases, and pump accumulated water into nearby drainage systems. With a minimum pumping capacity of 500m³/h (equivalent to one Olympic-sized swimming pool in five hours) and the ability to operate continuously for at least seven hours, the RPV can support water alleviation operations at roads, basements, carparks, tunnels and similar locations during and after flood events. While managing flooding within private premises remains the responsibility of property owners, the RPV

	can also be deployed to assist with flood recovery at private premises. In addition, the RPV can be used to accelerate the removal of floodwater at coastal areas during high tide coinciding with rainfall, when coastal tide gates are closed and storm water cannot be discharged directly to sea. Its remote-control capability, which allows operators to manoeuvre and operate it from up to 100 metres away, minimises the need for personnel to enter floodwaters. These features will enable PUB to respond more quickly, efficiently and safely to flooding incidents, particularly in areas that are difficult to access using conventional pumping equipment.  *Caption: Example of a Remote-Controlled Pump Vehicle.*
3.	**Island-wide water level sensor (WLS) and CCTV monitoring network** To date, PUB has deployed more than 1,200 WLS island-wide to monitor water levels in our drains and canals. Together with more than 700 CCTVs across the island, they provide 24/7 remote monitoring of real-time ground conditions. By end 2028, PUB aims to install about 500 additional WLS and 200 additional CCTVs to expand our monitoring coverage.
4.	**Rainfall monitoring and nowcasting system** This system combines X-band radar rainfall monitoring with a machine learning-based nowcast model that tracks and forecasts the movement, growth and decay of rainclouds. It provides rainfall forecasts up to 30 minutes in advance, enabling timely deployment of PUB's Quick Response Teams (QRTs) to flood risk areas during heavy rain events to manage flood situations, direct traffic, and deploy portable flood barriers where necessary. PUB is working with the Meteorological Services Singapore (MSS) to further improve the accuracy of rainfall nowcasting at longer lead time.
5.	**Flood alert dissemination through navigation and transport platforms** PUB continues to disseminate flood alerts via the Grab app, Google Maps and LTA's ERP on-board units (OBUs). These alerts provide motorists and commuters with timely information on flood-affected areas, helping them to make informed decisions and plan alternative routes during flood events.
6.	**Integrated Flood Monitoring Dashboard**

	PUB's flood response operations are centrally monitored through an integrated dashboard that brings together rainfall forecasts from MSS and X-band radars, data from more than 1,000 water level sensors in drains and canals, CCTV feeds, and QRT locations. The dashboard provides a comprehensive, real-time view of flood conditions and response operations, enabling more timely and coordinated response to flood incidents.