

**立法會**  
**Legislative Council**

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**Panel on Development**

**Meeting on 26 May 2020**

**Background brief on management of typhoon season flood risk**

**Purpose**

This paper provides background information on the management of typhoon season flood risk by the Administration and the major views and concerns expressed by Members of the Legislative Council on the subject.

**Background**

2. According to the Administration, Hong Kong's geographical position makes it susceptible to weather-related threats such as tropical cyclone, heavy rainstorm and storm surge. As climate change goes drastic, threats induced by extreme weather are expected to be more frequent and severe.

3. In August 2017, Super Typhoon HATO and Severe Tropical Storm PARKHAR came back-to-back within a week's time, causing high winds and serious storm surge in Hong Kong and the neighbouring regions. In Hong Kong, HATO caused serious inundation in low-lying areas. HATO hit Macao and neighbouring coastal areas of Guangdong particularly badly, causing serious flooding on its streets, and resulting in casualties. If HATO had taken on a track closer to Hong Kong, its impact could have been much greater.

4. In September 2018, Super Typhoon MANGKHUT battered Hong Kong, inflicting substantial and extensive damages across the territory. MANGKHUT brought severe storm surge to the territory. The increase in water level above the astronomical tide, as recorded at the tide stations in Quarry Bay ("QUB") and Tai Po Kau ("TPK"), reached 2.35 metres ("m") and 3.38 m respectively, which was the highest since automatic tidal records began at QUB and TPK. The maximum water level reached 3.88 m and 4.69 m (above Chart Datum) at QUB and TPK respectively, which was second to the

record high set by Super Typhoon WANDA in 1962. The storm surge led to inundation of many low-lying coastal areas. With global warming, sea level rise and the expected increase in extreme weather conditions, Hong Kong may be hit by typhoons of strengths and impact similar to or even stronger than MANGKHUT in future.

5. To step up climate actions and draw up long term policies, the Government established an inter-departmental Steering Committee on Climate Change ("SCCC") under the chairmanship of the Chief Secretary for Administration in April 2016 to steer and coordinate the climate actions of various bureaux and departments ("B/Ds"). Under the directive of SCCC, the Civil Engineering and Development Department ("CEDD") has established the Climate Change Working Group on Infrastructure ("CCWGI") to coordinate efforts among works departments to combat the adverse effects brought by climate change and extreme weather on government infrastructures. Apart from repair works, CEDD commissioned a consultancy study on "Coastal Hazards under Climate Change and Extreme Weather and Formulation of Improvement Measures" ("Consultancy Study on Coastal Hazards") in April 2019.

### **Major views and concerns expressed by Members**

6. Issues relating to the Government's preparedness for typhoons and related natural disasters, including management of flood risk, were discussed at a special meeting of the House Committee on 4 October 2018 and meetings of the Panel on Security and Panel on Development in the 2017-2018 and 2018-2019 sessions. Members' major concerns are summarized in the ensuing paragraphs.

#### Infrastructure improvement

7. Members were concerned about the flood prevention works and measures being carried out at low-lying areas vulnerable to inundation. According to the Administration, as revealed from previous severe or super typhoons, the Government had identified some low-lying locations vulnerable to seawater inundation (including Luen On San Tsuen, Kar Wo Lei, Sham Tseng San Tsuen, Lei Yue Mun Praya Road, Nam Wai in Sai Kung, Tai O, and low-lying areas along the seaside of Deep Bay in western Yuen Long) and some locations prone to wave impacts (such as Heng Fa Chuen, South Horizons and Tseung Kwan O South). The Drainage Services Department ("DSD"), the Home Affairs Department and Hong Kong Observatory ("HKO") had jointly established an early alert system to alleviate the impact of flooding on local residents in locations including Luen On San Tsuen, Kar Wo Lei, Sham Tseng San Tsuen, Lei Yue Mun Praya Road and Nam Wai. DSD's

Emergency Control Centre would be activated when Typhoon Signal No. 8 or above was issued. Actions to be taken included the deployment of contractors to handle blockage at drainage system and the provision of flood barriers and temporary pumping. A series of measures were also implemented to address the flooding problem in Tai O, including the completion of river walls by CEDD. When it was predicted by HKO that the sea level would reach a certain level during typhoon, DSD would erect flood barriers at key locations.

8. Expressing concern that some flood-prone areas (e.g. Siu Sai Wan, Heng Fa Cheun, Tseung Kwan O, South Horizons, etc.) had been heavily hit by Super Typhoon MANGKHUT, Members called on the Administration to adopt preventive and relief measures targeting flooding blackspots, and expedite the Consultancy Study on Coastal Hazards, so that necessary infrastructure improvement works could be taken forward as early as possible.

9. According to the Administration, immediately after MANGKHUT, relevant B/Ds had implemented various mitigating measures at coastal areas seriously affected by overtopping wave and storm surge to alleviate the adverse impact on nearby residents. Among others, CEDD had been assisting DSD in enhancing seawalls at Sai Kung Sewage Treatment Works and Ap Lei Chau Preliminary Treatment Works. CEDD also substantially completed the repair works of the Aberdeen Breakwater and Chai Wan Breakwater, and was deploying precast concrete units at the above repaired breakwaters to strengthen their structures. For the medium to long term, CEDD targeted to complete the Consultancy Study on Coastal Hazards in Q4 2020, with a view to identifying low-lying and exposed coastal areas subject to severe storm during extreme weather and devising enhancement plans. Meanwhile, CCWGI had been overseeing the revision of design standards, such as updating the Port Works Design Manual and Stormwater Drainage Manual in January 2018 and February 2018 respectively. Besides, CCWGI had been examining scope of enhancement works needed for strengthening the resilience of existing public critical infrastructures, and would undertake further studies to assess the effect of climate change.

#### Use of innovative technologies

10. Members were advised that CEDD had developed a new electronic platform, i.e. the Common Operational Picture ("COP"), as a common Geographic Information System platform for the real-time sharing by departments of "incident information" (e.g. landslides, flooding due to heavy rain, storm surge inundation and major road incidents) and "supporting information" (e.g. weather and traffic information, mapping data, etc.) in relation to natural disasters.

11. In response to Members' concern about the division of work among various government departments in relation to dissemination of information under COP, the Administration explained that COP sought to complement and enhance the sharing of emergency information among B/Ds. It would not replace the dissemination of emergency information by individual government departments. COP would be accessible through mobile and desktop applications in a reliable and secure manner by using cloud technology.

12. Members were also advised that COP would be launched by stages. The first stage was launched in early 2019 and would be fully implemented a year later. 12 government departments had agreed to share information.<sup>1</sup> COP would be extended to more government departments in the second or third stage.

13. Members noted that the Administration had earmarked \$300 million to develop a Common Spatial Data Infrastructure ("CSDI") and a three-dimensional digital map ("3D digital map") of the whole territory. As the project would be helpful in the prediction of areas to be affected by flooding as well as in other meaningful aspects, Members hoped that the Administration would expedite the development. Members also asked about the use of more innovative technologies in addressing the threats of inundation in various districts.

14. According to the Administration's reply to a Council question raised by a Member in December 2019, it was anticipated that spatial data could be released through CSDI after 2022, covering across different B/Ds. Relevant weather and flooding data, such as rainfall intensity and tidal data, could be consolidated and released through CSDI to facilitate relevant B/Ds to evaluate effect of flooding arising from weather change and formulate contingency measures. Other innovative technologies had also been introduced by the Administration to enhance the capability of infrastructure in coping with climate change and extreme weather, such as numerical hydraulic models adopted by DSD to review the existing drainage system under the Drainage Master Plan Review Studies to formulate drainage improvement measures, and the Flood Monitoring and Reporting System used by DSD to monitor water levels of major rivers and channels on a real-time basis.

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<sup>1</sup> Including DSD (on flooding); Highways Department (on major road incidents); CEDD, Lands Department and Housing Department (on landslides); Buildings Department (on building/structural incidents); plus HKO, Transport Department, Home Affairs Department and Census and Statistics Department (covering supporting information). Starting from the 2019 typhoon season, Hong Kong Police Force and Fire Services Department (on dangerous scaffolding and fallen tree, and other super typhoon-related data) had also been covered.

### **Latest development**

15. At the meeting of the Panel on Development on 26 May 2020, the Administration will brief the Panel on the management of typhoon season flood risk, the progress of the enhancement and repair works of seawalls and breakwaters, as well as the Consultancy Study on Coastal Hazards.

### **Council questions**

16. Three questions relating to management of typhoon season flood risks were raised at Council meetings of 6 June 2018, 24 October 2018 and 18 December 2019 respectively. The relevant hyperlinks are in the **Appendix**.

### **Relevant papers**

17. A list of relevant papers with their hyperlink is in the **Appendix**.

Council Business Division 1  
Legislative Council Secretariat  
19 May 2020

## Management of typhoon season flood risk

## List of relevant papers

Committee	Date of meeting	Paper
Panel on Security	5 June 2018	<p>Administration's paper on "Government's preparedness for the approach of typhoon season and related natural disasters and emergency response" [<a href="#">LC Paper No. CB(2)1480/17-18(07)</a>]</p> <p>Information note prepared by the Legislative Council Secretariat [<a href="#">LC Paper No. CB(2)1480/17-18(08)</a>]</p> <p>Minutes of meeting [<a href="#">LC Paper No. CB(2)1851/17-18</a>]</p>
House Committee	4 October 2018 (Special meeting)	<p>Administration's paper on "The Government's preparations, emergency response and recovery efforts arising from Super Typhoon Mangkhut" [<a href="#">LC Paper No. CB(2)2055/17-18(01)</a>]</p> <p>Verbatim record of the proceedings [<a href="#">LC Paper No. CB(2)358/18-19</a>]</p>
Panel on Security	7 May 2019	<p>Administration's paper on "Review of the Government's Handling of Super Typhoon" [<a href="#">LC Paper No. CB(2)1330/18-19(03)</a>]</p> <p>Background brief prepared by the Legislative Council Secretariat [<a href="#">LC Paper No. CB(2)1330/18-19(04)</a>]</p> <p>Minutes of meeting [<a href="#">LC Paper No. CB(2)1953/18-19</a>]</p>

Committee	Date of meeting	Paper
Panel on Development	25 June 2019	Administration's paper on "Development of Common Spatial Data Infrastructure and 3D Digital Map" [ <a href="#">LC Paper No. CB(1)1181/18-19(05)</a> ]  Minutes of meeting [ <a href="#">LC Paper No. CB(1)1356/18-19</a> ]

**Hyperlinks to relevant Council questions:**

Date	Council question
6 June 2018	Question raised by Hon James TO on " <a href="#">Government's emergency response and preparedness for typhoons and natural disasters</a> "
24 October 2018	Question raised by Hon Kwok Wai-keung on " <a href="#">Preventing coastal and low-lying locations from being affected by storm surges and flooding</a> "
18 December 2019	Question raised by Hon Kenneth LAU on " <a href="#">Addressing the threats of inundation</a> "