LCQ4: Preventing coastal and low-lying locations from being affected by storm surges and flooding

Following is a question by the Hon Kwok Wai-keung and a reply by the Secretary for Development, Mr Michael Wong, in the Legislative Council today (October 24):

Question:

Super typhoons Hato and Mangkhut hit Hong Kong respectively in August last year and September this year, with the concomitant storm surges and rainstorms causing severe flooding in a number of coastal and low-lying locations and inflicting serious damages. The affected locations included Heng Fa Chuen, Tseung Kwan O South and Lei Yue Mun. Some scientists have pointed out that global warming has resulted in the sea level rising continuously and extreme weather conditions being increasingly common. As a result, occasions of coastal and low-lying locations being affected by storm surges and flooding will become increasingly frequent. In this connection, will the Government inform this Council:

(1) of the respective locations which were affected by storm surges and flooding during the periods when Hato and Mangkhut hit Hong Kong, and set out by location the names of those affected public housing developments, private housing estates and villages;

(2) whether the Drainage Services Department will examine placing the locations mentioned in (1) onto its List of Flooding Blackspots, and carry out improvement works thereat; and

(3) whether it has plans to carry out flood prevention works such as constructing breakwaters, floodwater storage tanks and seawalls, placing dolosse, and undertaking dredging works, at the aforesaid locations which are susceptible to storm surges and flooding; if so, of the details of such plans; if not, the reasons for that?

Reply:

Acting Madam President,

The geographical position of Hong Kong makes it susceptible to weather-related threats such as tropical cyclone, rainstorm and storm surge. In particular, some low-lying coastal or windy locations are vulnerable to seawater inundation caused by extreme storm surges and/or huge waves.

After the passage of severe typhoon Hagupit in 2008, the Government has identified several locations vulnerable to serious seawater inundation and established an early alert system with a view to alleviating their impact on

the local residents. The Drainage Services Department (DSD) has formulated action plans for these locations, which mainly involve deployment of contingency response teams to handle flooding, provision of temporary pumping facilities and carrying out temporary flood-proofing measures. Besides, the Government has installed rock-armoured bund, concrete walls, gabion walls and water-stop boards in some low-lying areas. After the super typhoon Hato last year, the DSD has reviewed the action plans and enhanced them as necessary. In response to the extreme storm surge caused by the Super Typhoon Mangkhut, the DSD and the Home Affairs Department kept close liaison with the affected residents to understand how they were affected by the flooding, and to review and enhance the existing flood-relief measures as necessary.

As climate change goes drastic, threats induced by extreme weathers are expected to be more frequent and severe. The Government takes the topic of climate change seriously, and established in April 2016 the Steering Committee on Climate Change under the chairmanship of the Chief Secretary for Administration. Besides, the Civil Engineering and Development Department (CEDD) has established the Climate Change Working Group on Infrastructure to co-ordinate the work among various works departments on tackling climate change, actively conduct relevant studies, align design standards, and uplift the resilience of major public infrastructures.

Having consulted relevant departments, I provide a consolidated reply to the three parts of the Hon Kwok's question as follows:

(1) During the passage of typhoon Hato last year, some low-lying coastal or windy locations were exposed to the threat of seawater inundation caused by extreme storm surges and/or strong waves. Under typhoon Mangkhut, many places experienced their record-high water levels (e.g. 3.88 metres and 4.69m above the Chart Datum at Quarry Bay and Tai Po Kau respectively), which are even higher than the records set by typhoon Hato (3.57m and 4.09m above the Chart Datum at Quarry Bay and Tai Po Kau respectively). Besides, during the passage of a typhoon, waves approaching shores may even overtop seawalls (in particular vertical seawalls). The wind speed of Mangkhut was higher than that of Hato (Note), intensifying the severity of overtopping waves. As a result, the number of areas affected by storm surges during the passage of Mangkhut is more than that of typhoon Hato. Locations where flooding reports were received during the passages of the aforementioned two typhoons are listed in Annex.

(2) The DSD's list of flooding blackspots is maintained for monitoring locations vulnerable to flooding during heavy rainstorms. This list facilitates formulation of improvement measures and strengthening of routine inspections and maintenance of the drainage systems. Before the onset of rainy season, the DSD will complete the clearance of drainage system at the locations concerned to ensure the drains be free from blockage. During heavy rainstorms, the DSD will deploy contingency teams to carry out inspections of flooding blackspots and standby thereat to ensure swift clearance of any blockage, hence reducing flooding risk. After each rainstorm, the DSD will ensure the proper functioning of drainage system at flooding blackspots to prepare for the next rainstorm. Regarding the areas that are prone to

seawater influx, they are mostly low-lying coastal areas, where seawater infusion and inundation may occur when the sea level rises. In view of the difference in their causes of flooding, the location of storm surge spots at low-lying coastal areas should not be confused with that of flooding blackspots under heavy rainstorms.

As revealed from previous severe or super typhoons, the Government has 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 Government is reviewing relevant data collected during the passage of Mangkhut, with a view to identifying further low-lying locations vulnerable to seawater inundation.

(3) Generally speaking, provisioning of flood walls and demountable flood barriers or installation of flap valves at the drainage outlet are able to prevent seawater from flowing into the low-lying coastal areas, and construction of such marine structures as breakwaters and dolosse can reduce the intensity of waves, thus lowering the risk of flooding. Apart from the above preventive and relief measures, the Government implements other non-structural measures, including establishment of flood alert system, formulation of emergency and evacuation plans, enhancement of publicity and public education to heighten public awareness of flood prevention and staying away from floods. Besides, the Government has set up storm-surge warning systems at various low-lying areas that are vulnerable to seawater inundation. Upon the issuance of warning on storm surge by the Hong Kong Observatory, the DSD will, at the relevant locations, deploy pumping facilities, install water-stop boards, or provide sandbags for the residents' and shop operators' use, in order to minimise the flooding risk arising from storm surge.

The CEDD will commission a consultancy study for a period of 18 to 24 months to conduct a comprehensive review of the low-lying coastal and windy locations, and to carry out relevant investigations on storm surge and wave, so as to assess the impacts of extreme weather. Based on the outcomes of the study, the Government will formulate appropriate protection measures, including options of improvement works and management measures, to strengthen the resilience to wave impacts at the coastal areas. The Government will carry out a multi-pronged assessment on the suggestions of flood prevention strategy to identify long term solutions to the flooding problem caused by huge waves.

Note: When the Hong Kong Observatory issued the No. 8 storm signal in the early morning of September 16, the maximum sustained winds near the centre of Mangkhut was 195 kilometres per hour, higher than the same of 1962's Wanda, 1971's Rose and last year's Hato (which were all 185 km/hr).