LCQ16: Development of a “Sponge City”

â€‹Following is a question by the Hon Elizabeth Quat and a written reply by the Acting Secretary for Development, Mr Liu Chun-san, in the Legislative Council today (January 15):

Question:

It is learnt that "Sponge City" is a modern stormwater management approach which helps collect stormwater effectively, optimise the use of stormwater through the water recycling system and drain away stormwater timely to prevent the occurrence of flooding. At present, quite a number of countries and more than 30 Mainland cities have adopted the "Sponge City" concept, and Hong Kong has planned for many years to develop a "Sponge City". In this connection, will the Government inform this Council:

(1) of the works for stormwater harvesting and drainage systems carried out in the past three years which incorporated the concept of "Sponge City" at the design stage; the details of such type of works which are currently in progress;

(2) of the costs of "Sponge City"-related works in the past three years; whether it has evaluated the effectiveness of such works; if so, of the details; if not, the reasons for that;

(3) given that the Underground Stormwater Storage Scheme is a case that exemplifies the application of the "Sponge City" concept and the existing three underground stormwater storage tanks in Hong Kong are located at Tai Hang Tung, Sheung Wan and Happy Valley respectively, whether the authorities have plans to build underground stormwater storage tanks in other districts (e.g. the New Territories); if so, of the details; if not, the reasons for that;

(4) as the Drainage Services Department (DSD) indicated in its "Sustainability Report 2016-17" that it had, by making reference to the "Sponge City" concept, incorporated green roofs and vertical greening into its drainage facilities to reduce surface runoff, and would continue to build 4 000 additional square metres of such green facilities each year, of the additional square metres of green roofs and vertical greening built by the Government, as well as the costs of works incurred annually, since the financial year of 2016-2017;

(5) given that "Sponge City"-related works currently fall within the remit of different government departments (including the Water Supplies Department, DSD and Environmental Protection Department), while such type of works are overseen by one single department in Singapore (i.e. the Public Utilities Board), whether the authorities will follow such practice; if so, of the details; if not, the reasons for that; and

(6) as it is learnt that the Government is actively introducing design elements with "sponge" effects to new development projects, such as constructing the first flood retention lake in Hong Kong under the plan of the Development of Anderson Road Quarry Site and establishing the first river park in Hong Kong in the Tung Chung New Town Extension, how these two projects apply the concept of "Sponge City", and of their latest work progress and completion dates?

Reply:

President,

Global climate change leads to sea level rise as well as more extreme rainstorm and storm surge events, resulting in the higher risk of flooding. To combat climate change and improve the flood resilience of Hong Kong, the Drainage Services Department (DSD) strives hard to enhance its stormwater drainage system. Among different measures, the DSD will proactively promote adopting the design elements of the "Sponge City" concept in the planning of drainage improvement works and new development projects.

The "Sponge City" is a concept of modern stormwater management which simulates the natural water cycle based on the approach of "following the nature with resilience". It follows the integral flood prevention management of six principles, "infiltration, detention, storage, purification, reuse and discharge", with a view to making a city function like a sponge such that that it can infiltrate, absorb, store and purify stormwater during rainy days, and release the stored water for utilisation as needed. The design elements of the "Sponge City" concept include porous pavement, attenuation and treatment ponds, storage tanks, retention lakes and greening facilities.

We provide response to the various parts of the question raised by the Hon Elizabeth Quat as follows:

(1 and 2) In the past three years, public works projects with the "Sponge City" design elements and their costs are listed below.

Item No.	Project Title	Project Cost* (HK $)
Completed Projects		
1	Happy Valley Underground Stormwater Storage Scheme	Around $ 1.07B
2	Development at Anderson Road	Around $ 3.47B
Projects under Construction		
3	West Kowloon Drainage Improvement – Inter-reservoirs Transfer Scheme	Around $ 1.22B
4	Development of Anderson Road Quarry Site – Site Formation and Associated Infrastructure Works	Around $ 7.69B

*The figures shown above are approved project estimates of the projects. As the “Sponge City” concept is generally adopted for flood prevention and is embodied in the design of the projects, detailed breakdown of the respective cost is not available.

Application of the “Sponge City” concept can effectively reduce the risk of flooding. For example, the Happy Valley Underground Stormwater Storage Scheme, the tank with a volume reaching 60 000 cubic metres (equivalent to the total volume of 24 standard swimming pools) is capable of handling a heavy rainstorms with a 50-year return period. It can further increase the flood protection level of Happy Valley and the Wan Chai area. During the black rainstorm warning was in force on May 24, 2017, the Happy Valley Underground Stormwater Storage Tank drained and temporarily stored 12 000 cubic metres of rainwater (i.e. equivalent to the total volume of about five standard swimming pools), which greatly reduced the surface runoff to the downstream during the rainstorm and protected the citizens from the threat of flooding.

(3) Currently, there are four stormwater storage tanks in Hong Kong locating at Tai Hang Tung, Sheung Wan, Happy Valley and On Sau Road. DSD will consider the need and feasibility of constructing underground stormwater storage tanks under its stormwater drainage improvement projects.

(4) In 2016-2018, the total area of greening works implemented on government buildings was about 100 000 square metres. As the relevant expenditure is generally merged in individual projects, detailed breakdown of the annual expenditure is not available.

(5) In Hong Kong, DSD is the responsible department taking the lead to promulgate the incorporation of the "Sponge City" elements in drainage-related works projects. In the "Stormwater Drainage Manual" updated in 2018, DSD encourages the industry to adopt the "Sponge City" concept in works projects. In vetting drainage impact assessment submitted under both public and private projects, DSD will demand the designers to consider adopting the "Sponge City" concept. In addition, the BEAM Plus issued by the Hong Kong Green Building Council has incorporated the "Sponge City" design elements as creditable items in accordance with DSD’s suggestions. Noting that the certification of BEAM Plus will render granting of Gross Floor Area concession to certain designated facilities of private development projects, this move can effectively foster the use of "Sponge City" design elements in private development projects.

(6) The Development of Anderson Road Quarry Site and the Tung Chung New Town Extension include a variety of design elements embodied with the "Sponge City" concept, as detailed below.

The Development of Anderson Road Quarry Site

The development of the Anderson Road Quarry site has adopted a variety of the "Sponge City" design elements, including underground stormwater storage tank, green roof, porous pavement, etc. The underground stormwater

storage tank can temporarily store rainwater, and the porous pavements can reduce the surface runoff generated during rainy days. The lake park in the project is Hong Kong's first park with both flood prevention and recreational functions. The artificial flood attenuation lake located in the park will be operated as a flood prevention facility and can temporarily store rainwater to reduce the burden of the downstream drainage system. In normal days, the artificial lake can be used by the public for recreation and it can also promote water-friendly culture. In addition, the rainwater collected in the artificial lake will be reused for irrigation to preserve water resources.

The project is currently in the construction stage and is anticipated to be completed in tandem with the population intake in 2023-2024.

The Tung Chung New Town Extension

The Tung Chung New Town Extension has also adopted a number of the "Sponge City" design elements, including river revitalisation, attenuation and treatment ponds, and porous pavements.

Under the Tung Chung New Town Extension, the drainage capacity of Tung Chung River, a major river channel in Tung Chung West, will be increased. Tung Chung River Park will be built on both sides of the river to protect the ecology of the Tung Chung River and to revitalise the engineered channel section of the Tung Chung River, so as to restore the ecological connection between its upstream and downstream. Further, the works could improve the environment, provide the public with more recreation and outing space, and promote water-friendly culture and ecological education. The revitalisation of Tung Chung River will simulate natural river courses and adopt natural river bed substrate to facilitate infiltration of river water. A series of attenuation and treatment ponds will be built along Tung Chung River to collect and filter surface runoff from adjacent roads and developments before discharging to Tung Chung River. Porous pavements will also be adopted in some new pavement sections to reduce surface runoff.

Under severe weather such as heavy rainstorm, the future River Park will be closed and it will become part of the river channel to drain away stormwater.

The Tung Chung New Town Extension will be constructed in phases. The project is now in the detailed design stage, and the timeline of the relevant works is now under review.