DHSSPS - Omagh Enhanced Local Hospital 7/12

This case study details the considerations and actions taken during the construction of Omagh Enhanced Local Hospital in order to protect it from future flooding events as specified under PPS15. This case study sits within the 'flooding' action category of the Northern Ireland Climate Adaptation Programme.

The Omagh Enhanced Local Hospital is part of the Western Health and Social Care Trust and is located to the South East of Omagh with the Camowen River to the West. This is the main watercourse that is due to be affected by the building of the hospital. The project would significantly influence the existing hydrological and drainage regime of the site.

The team examined the original conditions of the site and also the potential impacts that construction and operation of the hospital would have on the area, identifying adaptive measures where required.

Key Points

Department of Health, Social Services and Public Safety required the analysis of the flood threat to new-build hospital.

Used steady flow analysis and modelling to assess risk.

Hospital sits well above PPS15 requirement.

Decided on SuDS in the form of an attenuation tank - to control surface run-off and as further flood mitigation.

Adaptation - Defined risk, found exact solutions appropriate to the situation.

Overview

This project involved the creation of detailed analysis of a new-build hospital development. The aims were to assess both the risk to the site based on projected flooding levels and what solutions were available to mitigate the threat.

Aims/objectives

To deliver detailed analysis of flooding in the area of a new hospital development, identifying risks as a result of climate change and adhering to PPS 15. It requires that development should be at least 600mm above predicted 1 in 100 year (Q100)* flood levels.

Consequences for water quality and drainage on the site were monitored based on baseline conditions for each. These were identified through desktop research and consultation with Rivers Agency, NI Water and NIEA.

Implementation

Location and designation of principle watercourses in the area.

Location of floodplains and other specific areas at particular risk, which involved assessing the threat for the proposed development from a Q100 event. This was done by carrying out a steady flow analysis on the Camowen River, from 180 m upstream to 1200m downstream of the site.

Location of sensitive areas in a Q100 event, such as potable water sources or fisheries. This was modelled by the use of a sensitivity analysis.

Determination of existing water quality.

Determined the extent of existing sewerage system and mains water.

Challenges

This analysis was carried out because during the planning for the development of the site, it was discovered that parts of the site already experience flooding and that other areas lie within the River Agency predicted Q100 flood plain.

This was a challenge to the development of the site in general, in turn leading to the analysis project to determine future and current flooding of the site.

In addition, storm-water run-off from the development into the Camowen River had to be attenuated and controlled to the site's pre-development levels.

*(Q=fluvial and 1 in 100)

"This project has been very successful in keeping adaptation at its core, saving major problems in future by investing time and planning ahead, in the present."

Successes

After investigation, the Q100 flood levels across the site have been predicted at 76.9m. This is unlikely to have an impact on the proposed hospital, which will have a finished ground floor of 82.0m and a lower ground floor of 78.5m; some 5.1 and 1.6m above the estimated affected area. The development has been successfully adapted to the standards required in PPS15 (planning and flood risk).

In agreement with the statutory authorities and relevant stakeholders, surface water flow rates discharged from the proposed site to the adjacent Camowen River will be no greater than those from the pre-development site.

Climate Adaptation

This project has been very successful in keeping adaptation at its core, saving major problems in future by investing time and planning ahead in the present.

The results of the modelling show that the increase in water surface levels as a result of climate change are in the order of 280 –320mm. This is well within the 600mm allowance made in order to meet the PPS15 requirement.

There has been a decision to integrate storm water attenuation into the development, through the use of modular cellular storage units; an example of SuDS.

The development's drainage systems have also been designed to accommodate a water level increase due to climate change. These include the proposed storm attenuation systems, which make an allowance of 20-30% for climate change effects, in accordance with current best practice and BREEAM (Building Research Establishment Environmental Assessment Methodology) guidelines.

Lessons learned

Consideration had been given at an early stage to additional water control adaptation methods, such as permeable surfacing, rain water harvesting, swales, ponds or infiltration systems. Unfortunately, many were found to be unsuitable for this project due to maintenance issues, lack of space, and health and safety concerns. Infiltration type systems were found not to be compatible with the ground conditions encountered onsite. Rainwater harvesting was considered not to be appropriate for the project due to the potential risk for infection.

In order to restrict the post development surface water run-off to that of the pre-development site, some 3500m3 of storm attenuation volume is to be provided with the use of modular cellular storage units. The attenuation system is designed to accommodate a 1 in 100 storm event with an allowance for climate change effects. In addition, all attenuation systems shall be located above the Q100 flood level, allowing undisturbed discharge from the site in periods of river flooding.

Case Study

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