Relational Complexity of SuDS/GI

Non-Flood and Flood Conditions

FACTSHEET

Project area: *System interactions of SuDS and Green Infrastructure (GI)*
Intended readership: *Practitioners, academics and other interest groups*

The 3-Point Approach[1] highlighted the functioning of stormwater management within the urban space both in the flood condition and during day-to-day performance when there is little or no rain (non-flood condition). This factsheet identifies examples of key interdependencies and governance linkages required for joined-up management of SuDS/GI multifunctionality in both these conditions.

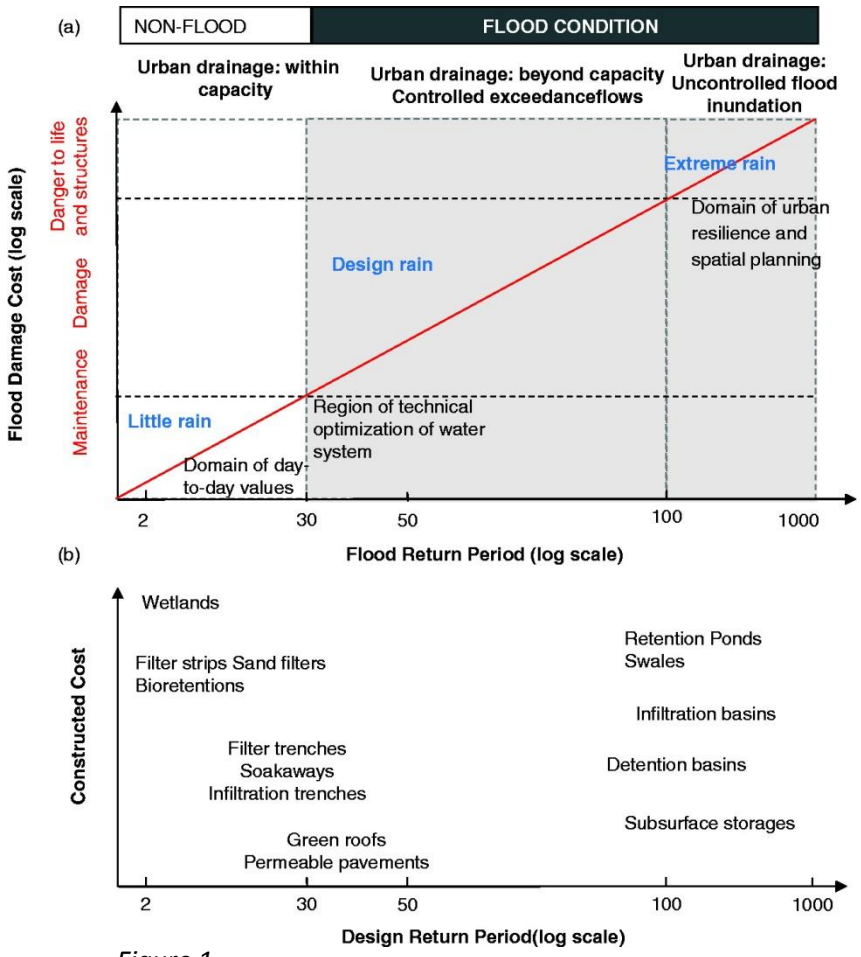

Figure 1.

Based on the ***3-Point Approach*** (developed by Fratini et al. 2012[1]), Figure 1a shows three domains. The **first domain** refers to the non-flood condition state, reflecting day-to-day performance when there is little or no rain. This involves the daily functioning of stormwater management within the urban space, with systems operating within their design capacity. Many SuDS/GI contribute a range of benefits in this domain. In the flood condition there are 2 more domains. The **middle domain** occurs beyond the exceedance point, when coping strategies are shifted toward improving urban resilience and mitigating flood impacts through control of surface flows. The **third domain** occurs under extreme rain when flooding becomes uncontrolled inundation.

SuDS/GI solutions vary in their design capacities and therefore fit into different places along the urban drainage non-flood – flood spectrum (Figure 1b). This shows that SuDS/GI components can form a port-folio of options that contribute to the management of storm water in both the non-flood and flood condition states.

Relational Complexity

Relational complexity is related to humans and in particular to the different views and perspectives of actors involved in the decision making process. The diagrams below show the key interdependencies of SuDS/GI in the **non-flood** and **flood** conditions. Cyber interdependency is when one component needs information from another system or organisation. Logical interdependency is the close link between two systems with a prior event or action determining the subsequent level of performance.

[1] developed by Fratini et al., 2012

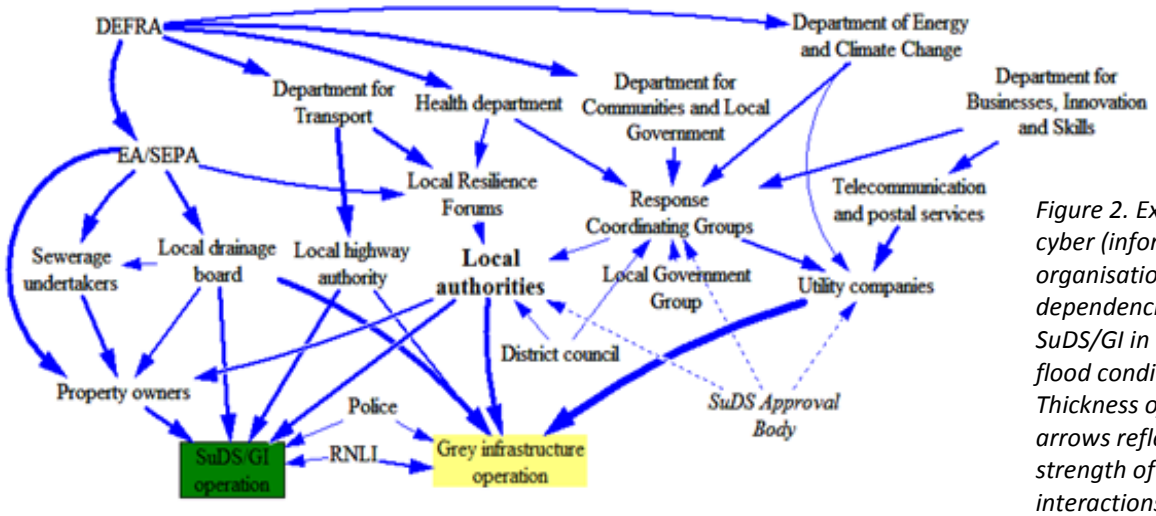

Figure 2. Example of cyber (information) organisational dependencies' for SuDS/GI in the non-flood condition. Thickness of the arrows reflect the strength of the interactions

The interdependencies shown in Figure 2 require new governance linkages regarding making space for ecology and water. This lack of collaboration and involvement across respective managing agencies can be a barrier toward effective management of potential SUDS/GI benefits regarding their integrated nature and the diversity of related stakeholders.

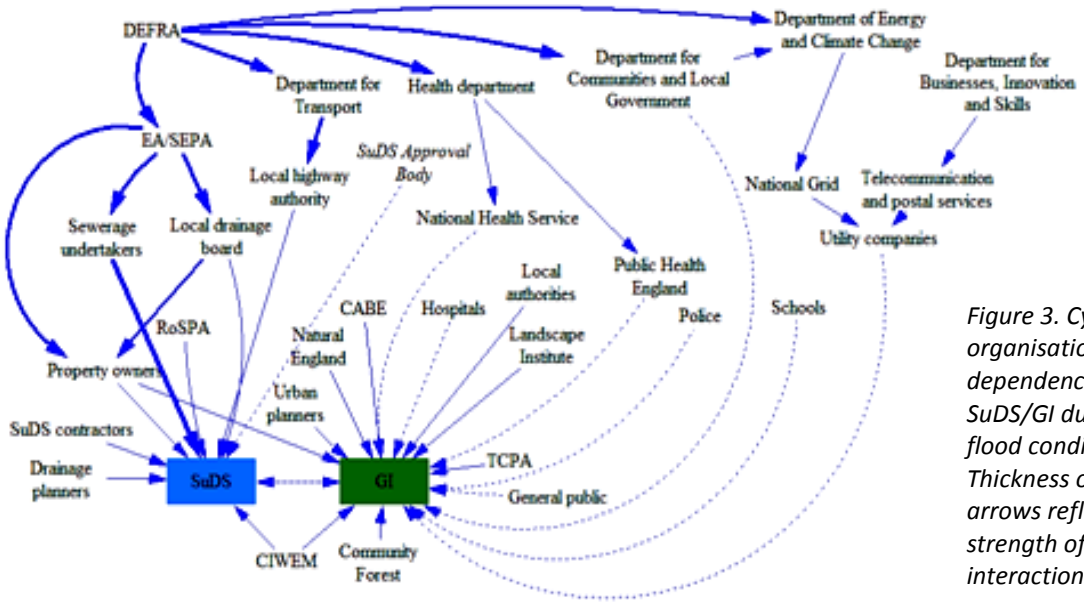

Figure 3. Cyber organisational dependencies for SuDS/GI during the flood condition. Thickness of the arrows reflect the strength of the interactions

Figure 3 highlights the different linkages of SUDS/GI under flood conditions, showing the operational and management structure, communication flows and flood risk information. Since SuDS/GI utilises various components from other urban systems, such as transportation, it is highly dependent on managerial decisions affecting those systems, such as which sites and roads could be used as flow pathways and for flood attenuation sites. As such, SuDS/GI strategies need information from various agencies, including local highway authorities, property owners, police and emergency services.

For Further information see: *Hoang & Fenner (2015) System interactions of stormwater management using sustainable urban drainage systems and green infrastructure, Urban Water Journal,* DOI:10.1080*/1573062X.2015.1036083.*

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