

Decision making processes and institutional mapping for stormwater management in the city of Birmingham, UK

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Abstract

An Institutional Map (IM) for the City of Birmingham, UK, is developed to prepare a strategy for Integrated Urban Stormwater Management (IUSM). The map introduces the city's history and underlying social norms and conditions, its legislative and strategic structures, surface water management, drainage responsibilities and adoption. The IM identifies opportunities to install BMP/SUDS source control techniques into the current housing modernisation programme of Birmingham and the need for master-planning for a more integrated delivery of strategic plans. Consultation with representatives of stakeholder groups is required and a collaborative stakeholder process at the design stage. Barriers to stakeholder group communication and unclear boundaries of overlapping responsibilities require amendments to legislation, institutional and planning arrangements if Local Authorities in England are to be the responsible bodies for future surface water drainage management. The IM indicates that the major impediments and barriers to Integrated Urban Stormwater Management (IUSM) in Birmingham are not technology dependent but rather institutional and social, and provides a strategy for resolving these issues and facilitating decision making processes.

Keywords: Birmingham, UK, institutional mapping, stakeholders, stormwater management

1 Introduction

The city of Birmingham has a population of 1,001,200 (2005 estimate). Its reputation was forged as a powerhouse of the Industrial Revolution in Britain but its manufacturing base has declined enormously in the second half of the 20th century and today the economy is based on the service sector (www.birminghameconomy.org.uk). Sixty percent of the city council's housing stock and about one-third of the private sector housing stock has been assessed as being in need of modernisation and presents an important opportunity in the context of the SWITCH project (e.g. to fit water saving devices in homes). Over 15,000 new homes have been estimated to be needed in Birmingham over the five year period, 2006-2011, presenting a further significant opportunity for stormwater management by the introduction of source control methods such as rainwater harvesting, thus avoiding the need to retrofit sustainable water use technologies.

An Institutional Map (IM) for a city such as Birmingham is needed to give insight into institutional and governance structures for urban water management and its development requires details of the legislative and regulatory environment and a focus on statutory

instruments (da Silva et al., 2008). A protocol for Institutional Mapping developed in Task 6.1 by Green et al (2007) provides a guide and checklist to the questions which should be addressed when preparing an IM. An example of an IM for Integrated Urban Stormwater Management (IUSM) for the City of Birmingham, UK is described in Deliverable 2.2.3b and commences at the city level and moves upwards through the layers (Ellis et al, 2009b). The underlying social norms and conditions in Birmingham described by Green et al. (2007) are explained and the map sets out in detail the legislative and regulatory environment and names the players and their relative power. The range of stakeholders and 'action spaces' associated with BMPs/SUDS is discussed. The internal rules of organisations and their compliance with these rules are considered and behavioural changes in the operation of the organisations and institutions are proposed.

2 Legislation and Regulation of BMPs/SUDS in the UK

New development in England is controlled by local authority planning departments with allowable discharges and consents negotiated with the Environment Agency (EA) for England and Wales and the appropriate water company (sewerage undertaker). In addition, local authorities have the role of implementing Agenda 21 and developing strategies to secure sustainability at the local level. Consideration of sustainable drainage systems (SUDS) is thus being increasingly included and considered in local development plans and regional planning guidance. There are intentions to extend these planning arrangements for new developments to take into consideration the implications of climate change with water recycling and use of renewable resources. The EA, in developing proposals for flood protection/management schemes, requires a sensitivity allowance of 20% on design flood levels to accommodate climate changes.

A key characteristic of the institutional arrangements that characterise the regulatory and legislative environment for SUDS in England is that they are reliant on legislation designed and developed for other purposes, most notably legislation relating to traditional 'hard' engineering and piped systems and that relating to planning (Green et al, 2007). Unfortunately, this legislation does not make provision for the wider range of components associated with SUDS, leading to a lack of legislative clarity regarding both the ownership and responsibility for SUDS maintenance and a reduction in their uptake (Defra, 2005). This is further compounded by the fact that the sewerage system is not owned by any one stakeholder, nor is it in common ownership. Instead, a wide range of stakeholders have ownership and maintenance responsibilities for both public and private drainage systems, leading to further institutional complexity, confusion and the non-adoption of a number of SUDS (Defra, 2005). The end result is an institutional landscape which, arguably, in its present form is ill-equipped to deliver a sustainable system of integrated urban drainage management.

Because SUDS do not have specific legislation as is the case for traditional end-of-pipe technologies, the institutional arrangements that form the structure of powers, duties and actions with respect to SUDS are taken from a range of linked legislation. This is recognised in the institutional mapping of SUDS in England which draws on the 'action spaces' associated with:

- The Government's sustainable communities programme which provides an opportunity to retrofit urban areas using SUDS;
- The water resource and planning 'action space' which provides the legislation for determining the rights and responsibilities of various stakeholders in the application, maintenance and adoption of SUDS as 'sewers'.
- The land use planning 'action space' which provides a pivotal role in ensuring that SUDS are incorporated into new developments and provides the strategic context

for the incorporation of SUDS into Regional Spatial Strategies (RSS) and Local Development Plans (LDPs).

- The development control ‘action space’ which, as evident in PPS25, not only embraces SUDS as important flood risk management technologies for Local Authorities to promote in relation to building regulations and new developments but also requires Local Authorities to prioritise their use in determining planning applications (DCLG, 2006).

The range of stakeholders and ‘action spaces’ associated with SUDS highlights a number of legal issues and regulation irregularities which can cause confusion for those trying to implement SUDS. As there is no legislation available to enforce the delivery of SUDS, this inevitably leads to their reduced inclusion in the management of water in urban areas (Pitt, 2008).

3 Birmingham City Council and Surface Water Management

As part of its responsibility for surface water and land drainage, Birmingham City Council provides a policy statement on its strategic approach to, and statutory responsibilities for, flood defence (www.birmingham.gov.uk). This public statement is part of the City Council’s responsibility for assessing flood risk within its area and the plans for reducing and managing such risks as are required under government targets. However, all flood defence work is undertaken under permissive powers which means that Birmingham City Council is not obliged to carry out such works on their 95 km of critical ordinary watercourses (COWs) or 45 km of “non-river” or less distinct ditch courses for which they have operating authority. The River Tame and River Cole (between Cole Hill Lane and the city boundary adjacent to Millfields) are designated “main” rivers and thus fall within the direct responsibility of the Environment Agency. The Water Framework Directive (WFD Article 5 risk assessment map for the Greater Birmingham region indicates that there are considerable lengths of receiving surface waters designated as being “at risk” or “probably at risk”. Some of the worst channel reaches may receive designation as “heavily modified” and seek some element of derogation from the WFD ecological criteria within the forthcoming River Basin Management Plans (RBMPs).

The Council Policy Statement (Section 4) recognises the “*need to work in partnership with central government and other operating authorities*” as well as interacting with the public to minimise flood risks and damage. The revised Local Development Plan (LDP) recognises the need for water minimisation techniques and states (Section 3.72) that the “*full potential of sustainable drainage systems (SUDS) must always be reviewed before any rainwater runoff is diverted into sewers or stormwater drains*”. It is expected that control devices will be required for new developments but there is a caveat in respect of direct discharges and infiltration to ground where there is the likelihood of a high water table and/or sensitive groundwater. Section 3.73 states that “*where feasible, surface runoff and contaminated water should be treated at source through the use of natural features such as reed beds*”. Storm attenuation will require (Section 3.74) the installation of “*pipes, tanks and balancing ponds*”.

The new planning framework allows flood risk and urban water quality management to be addressed at regional, area and local levels, although there are still issues remaining over catchment-scale planning. The new LDPs and accompanying action plans provide opportunities for encouraging early liaison and on-going dialogue between developers, local and regulatory authorities, water companies and communities concerning the design and implementation of new developments within a particular area. However, what is not yet clear is the relationship between these local framework and strategic development

plans and the RBMPs that will be developed within the context of the Water Framework Directive (WFD), and this may be an important issue for urban drainage planning.

An IM should present the type of behavioural changes that are required. Master-planning in Birmingham can provide the basis for a more holistic and integrated approach to deliver strategic plans at local, regional and catchment scales. Consultation will be a founding basis for the achievement on an acceptable and sustainable master planning process and a pro-active template is already emerging for the collaborative stakeholder design process. This involves planning consultants and facilitators drawn from stakeholder groups (led by the developer and local authority) developing the outline master plan through collaborative technical and community Workshops and Advisory Groups enabling integration of infrastructure with other areas of the development life cycle. Drainage issues can then become an integral component of the development process with building types/locations and site layout being appropriately amended to better manage flood and receiving water pollution risks.

4 Risks and Barriers to Current IUD Management

An IM should indicate how far the formal rules operate in practice. The more specific identification of delivery responsibilities and the difficulties of achieving a fully integrated approach to urban runoff drainage for the River Rea catchment, has been explored in the context of the UK Department of Environment, Food & Rural Affairs (Defra) Integrated Urban Drainage (IUD) Pilot Study (Birmingham City Council, 2008). The IUD study concluded that the complex organisational arrangements lack clarity and lead to inefficient and piecemeal investment decisions leaving the urban area less able to cope with the flooding and pollution risks associated with future climate change and urban creep.

Figure 1 highlights the variety of stakeholders involved in the urban drainage decision-making process in the Rea catchment and some of the issues which require multi-stakeholder consultation and interactive participation.

The tenuous and sometimes ineffective lines of communication between the various stakeholders and the unclear boundaries of overlapping responsibilities can only be addressed through amendments to legislation, institutional and planning arrangements, some of which are being currently reviewed at central government level (Defra, 2008). Surface water flooding control has evolved organically and there is a history of cooperation and joint action between BCC, STW and EA in dealing reactively with emergency events. However, under current legislative and regulatory frameworks, the boundaries of responsibility and leadership lack clarity which gives rise to clear risks in achieving fully effective and efficient surface water drainage management.

Figure 2 illustrates the principal barriers and difficulties to achieving an integrated stakeholder consultation process for strategic urban drainage management. There is currently little basis for a structured and systematic adoption and management of surface water facilities within an urban catchment. The various stakeholder organisations and agencies have differing incentives, accountabilities and investment planning horizons, with responsibility for urban pluvial flooding lacking both strategic direction and legislative clarity. There are also clear tensions between the need for promoting urban growth point initiatives and the realisation of capital receipts against the need to achieve effective sustainable drainage and the minimisation of surface flooding risk. Currently, large scale development proposals such as the Eastside regeneration area of 170 ha with 3500 new dwellings and, business premises planned as themes of learning, technology and

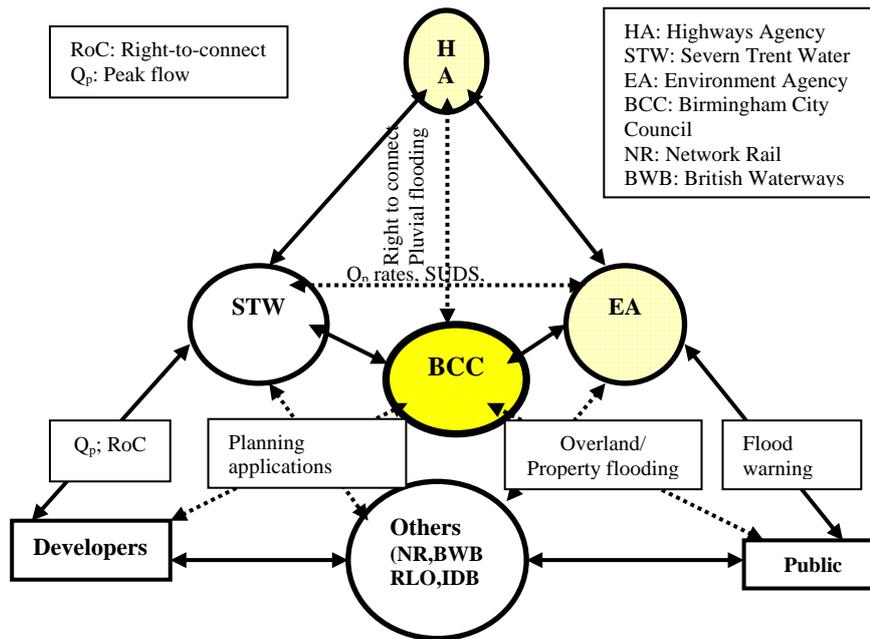


Figure 1. Stakeholders in Surface Water Drainage in the River Rea catchment, Birmingham (After: Birmingham City Council, 2008)

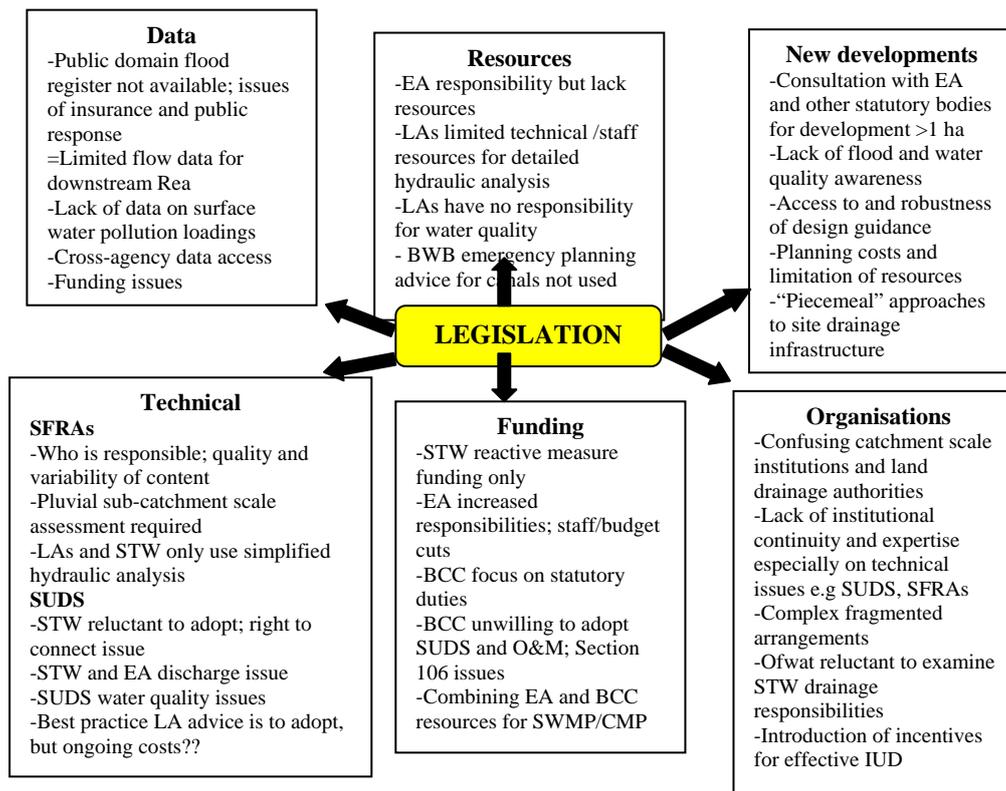


Figure 2. Barriers to Stakeholder IUD within the Rea Catchment. (After: Birmingham City Council, 2008)

industrial heritage, are dealt with on a “piecemeal” or “parcel” basis with drainage essentially addressed at the site/local level with little if any consideration of the accumulative effect of development streaming on the wider long term, strategic catchment level impacts. The streaming of Eastside proposals over a 5 to 10 year period

also causes difficulties in ensuring a progressive, consistent and integrated policy for the differing spatial and temporal development elements. City Park is being developed separately from Eastside and there is no overall holistic masterplan for integrating the Park within the surrounding individual development parcels. This reduces the opportunities for introducing an integrated surface water drainage programme. It is intended for example, to supply two of the three water feature areas in the proposed City Park either from potable water or pumped groundwater rather than seeking to re-use stormwater. An attenuation basin fed from surface water drainage could supply all water features in the Park, but it could be difficult to obtain agreement, funding or long term maintenance for this solution. Consultation and advice is therefore typically uncoordinated until the final planning submission stage is reached (and the EA risk assessment matrix completed), by which time modifications and alterations to infrastructure can become difficult and costly.

5 Future IUSM Management and Risks

The most recent Defra (2008) consultation document on surface water drainage has outlined proposals for Surface Water Management Plans (SWMPs) and SUDS responsibilities which could designate local authorities as the lead agency in the delivery and management of effective urban surface water drainage. However, a proliferation of plans will not on their own result in an integrated solution, even if delivered through cooperative action. In particular, SWMPs can either be read as being a required component of CMPs or as a required component of SFRAs, where the EA has responsibility for the former and the LA for the latter. The SWMPs will also need to be related to the River Basin Management Plans (RBMPs) being prepared by the EA. It is clear that the lines of powers and responsibilities, particularly at the boundaries will need to be carefully clarified together with the supporting income streams to underpin these responsibilities and their ongoing delivery and maintenance. The Defra (2008) surface water consultation document links the development of SWMPs with the new requirements of PPS25, which would further favour future surface water responsibility to be aligned with the LAs. The establishment and implementation of a formal joint liaison group for flood management for SWMP purposes would provide a major step towards the achievement of holistic, integrated surface water management. If LAs are to be the responsible bodies for future surface water drainage management, their resources and capabilities to do the job will need to be ensured. This will require a secure revenue stream, so the obvious logic would be to introduce a specific charge for surface water runoff; removing that element from the “bundle” of charges under the existing sewer charge, and including one for highway drainage.

The experience of stakeholder participation forums such as those involved in the previous Defra IUD pilots in Birmingham and Leeds/Bradford, would suggest their value perhaps lies less with identifying and implementing “solutions”, than in the benefits gained from the exploration of the processes and barriers to collaboration. Thus the major impediments and barriers to IUSM are not technology dependent but rather institutional and social, neither of which have been well addressed to date given the emphasis on technology and planning issues within the water industry which are frequently driven by legal and market-led targets.

6 Conclusion

The Institutional Map has identified opportunities to install BMP/SUDS source control techniques in the current housing modernisation programme in Birmingham. However, it notes that legislation relating to SUDS in England & Wales is designed and developed for other purposes and a wide range of stakeholders have ownership and maintenance responsibilities for SUDS institutional arrangements. Master-planning is needed for more integrated delivery of strategic plans. Consultation with representatives of stakeholder groups is required and a collaborative stakeholder process at the design stage. Barriers to stakeholder group communication and unclear boundaries of overlapping responsibilities require amendments to legislation, institutional and planning arrangements if Local Authorities in England are to be the responsible bodies for future surface water drainage management. The Institutional Map identifies major impediments and barriers to Integrated Urban Stormwater Management (IUSM) in Birmingham that are not technology dependent but rather institutional and social and provides a strategy for resolving these issues and facilitating decision making processes.

References

- Birmingham City Council. 2008. *IUD Pilot Study, Upper River Rea*. Volume 1. Pilot Report 5011-BM0 1320- BMR-00. Report by Hyder Consulting, Birmingham, UK.
- DCLG. 2006. *Planning Policy Statement 25: Development and flood risk*. Department for Communities and Local Government, London, UK.
- DCLG. 2007. *Development and Flood Risk: A Practice Guide Companion to PPS25*. Consultation Paper, February 2007. Department for Communities and Local Government. London, UK.
- Da Silva, C., Sutherland, A. and Green, C. 2008. Learning Alliance Briefing note 15: Institutional mapping (draft). EU 6th Framework SWITCH Project, Sustainable Water Management in the City of the Future. www.switchurbanwater.eu
- Defra. 2005. *Sustainable drainage systems: summary of issues, consultation responses and proposed next steps. Making space for water background paper: Developing a new Government strategy for flood and coastal erosion risk management in England*. Department for Environment, Food and Rural Affairs, London, UK.
- Defra. 2008. *Improving Surface Water Drainage*. Consultation document to accompany proposals set out in the Government's water strategy, *Future Water*. February 2008. Department for Environment, Food and Rural Affairs, London, UK.
- Ellis, J. B., Scholes, L and Revitt, D.M. 2009. *Evaluation of decision-making processes in urban stormwater management*. Deliverable Task 2.2.3a, February 2009. EU 6th Framework SWITCH Project, Sustainable Water Management in the City of the Future. www.switchurbanwater.eu
- Ellis, J. B., Scholes, L, Shutes, B. and Revitt, D.M.. *Guidelines for the preparation of an institutional map for cities identifying areas which currently lack power and/or funding with regard to stormwater management*. Deliverable Task 2.2.3b, September 2009. EU 6th Framework SWITCH Project, Sustainable Water Management in the City of the Future. www.switchurbanwater.eu

Green, C., Johnson, C. and Parker, D. 2007. *Institutional arrangements and mapping for the governance of sustainable urban water management technologies. Mapping protocol and case study of Birmingham, England*. Deliverable Task 6.1, May 2007. EU 6th Framework SWITCH Project, Sustainable Water Management in the City of the Future. www.switchurbanwater.eu

Pitt, M. 2008. *Learning Lessons from the 2007 Floods*. Final Report. The Cabinet Office, London, UK.