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CAPACITY BUILDING FOR WATER SENSITIVE URBAN DESIGN (WSUD) IN CITY OF SYDNEY COUNCIL

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Abstract

The paper discusses the importance of capacity building of Council staff in achieving integration of WSUD elements into its capital works projects. A case study is presented in which the staff capacity building of the City of Sydney Council was integrated within a major infrastructure upgrade program involving reworking and landscaping of footpaths in the LGA.

City of Sydney Council has a program of greening footpaths which involves replacing strips of asphalt or concrete footpaths with small landscape areas (nature strips) . There are over 300 sites scheduled for greening. The project aims to provide visual amenity to the streetscape as well as other benefits of biodiversity improvements, air pollution and heat island effect reductions. Council also aims to incorporate water sensitive urban design into the footpath greening to both use stormwater runoff to irrigate the gardens and to use the soil profiles in the gardens to treat stormwater runoff.

In order to achieve this, the various staff and contractors involved in the project were made aware of the principles and objectives of WSUD and how it could practically be applied to footpath greening. The Council staff involved in the project came from following departments:

- Parks and Gardens
- Stormwater
- Traffic Engineering and Transport Planning
- Community Gardens
- Civil and Construction Works
- Contractors
- Street Trees
- Strategic Planning and Sustainability
- WSUD Consultant (BMT WBM)

Engaging this number of people with such a wide variety of backgrounds had to be done in a number of ways as each group had different interests, abilities, and areas of responsibility. The capacity building program therefore involved four components.

1. Site visits

Council staff members from various departments and disciplines were invited to a site meeting to discuss selection of appropriate site for the raingarden and in developing the conceptual design that addressed various concerns from different perspectives. The discussions at these site visits was enthusiastic and many issues were raised which were either answered by another stakeholder or left for the consultant to resolve through improved design.

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2. Development of standard designs

A consultant was commissioned to undertake a desktop analysis involving catchment analysis to help identify raingarden sites that would provide value for money from a list of sites that had been short listed for landscaping feasibility perspective. 75 sites had the potential for WSUD integration and 5 distinct typologies were defined with standard drawings for each.

3. Construction of a trial raingarden by Council works crew

The construction of a trial raingarden gave everyone an opportunity to see the issues in practice and test solutions. The selection and availability of plant species, the sourcing of the correct specification of bio-filtration media and mulch as well as constraints specific to the sites such as services, levels, traffic and access all became apparent. A heavy rain event occurred just after completing the trial and this helped to test how the system responded.

4. Workshop

The workshop allowed all the stakeholders to question and respond to issues raised during the project and overall the interaction was very positive. Solutions were found and design ideas generated which were immediately applied to the next sites on the program. The workshops are to be continued as the outcomes of the first one were so successful.

The process continues as those who took part in the capacity building aspects of the project are passing that understanding onto others. For example, the Council contract supervisors and the consultant are taking contractors for tours of successful and not so successful raingarden installations to present the issues and solutions found.

Introduction

It is well recognized that widespread integration and implementation of water sensitive urban design (WSUD) by local councils is constrained by capacity of council staff in:

- Understanding and appreciating the significance and purpose of water sensitive urban design within the context of the Council's role and responsibility with respect to its infrastructure.
- Being able to plan, locate, design, construct and maintain the WSUD elements.
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This paper outlines the journey that the Council of the City of Sydney took in building capacity of staff and organization with respect to water sensitive urban design (WSUD).

In 2008, the Council of the City of Sydney identified in its sustainability vision document (Sustainable Sydney 2030) water sensitive urban design (WSUD) as one of the key means of achieving 50% reduction in pollution discharged to waterways while also enhancing liveability of urban built forms. However, in the absence of a WSUD policy, in early 2009, integration of WSUD within capital works, upgrades and renewals involving Council infrastructure had been ad hoc and not strategic and systematic. Some bio-retention units and water sensitive tree pits that were built as part of some major capital works projects had been reflective of the capacity of external consultants working on the capital works projects. A knowledge gap existed within the

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Council staff with respect to WSUD, which meant that a need for WSUD policy was not recognized, thus, perpetuating the lack of strategic integration of WSUD in Council infrastructure.

Opportunity Identified

An opportunity to introduce the council staff to WSUD and build organization capacity in this critical area arose in October 2009 when Council embarked on a Greening Plan. As part of its Greening Plan, Council identified the need to integrate nature strips and vegetation in a major infrastructure renewal program that involved improving and replacing ageing footpaths with new ones. Consequently, the 2009-10 Footway Improvement program was re-named the Greening Footpath program.

While the Council staff involved in the Greening Footpath program recognized the value and need for introducing a conventional nature strip in the form of a turf or garden bed in the footpath, incorporating a bio-retention unit or raingarden did not form part of the Greening Plan. This was more due to lack of knowledge in the staff involved about WSUD and raingardens rather than lack of intention to integrate WSUD.

The Greening Footpath program became the perfect opportunity to introduce relevant Council staff to the concept of WSUD along with a way of constructing several raingardens in suitable locations. Seeing how the raingardens by virtue of being self-watering and filtering stormwater runoff had the potential to add significant value to the project, the Project Manager in-charge of Greening Footpath program wholeheartedly accepted and supported the proposal. This opened up doors for further dissemination of water sensitive urban design to the entire project team and other Council staff along with opportunities for further capacity building.

Capacity Building Process

To make the most of this new opportunity, instead of getting the consultant to develop and supply custom-made concept drawings of the raingardens to the project team, the specification for developing concept designs required the consultant to facilitate development of concept designs seeking input from Council staff who would be invited to participate in site visits and workshops. Council staff invited to these facilitated sessions included those with responsibilities in design, operation and maintenance of stormwater & drainage, traffic, parks, trees, public domain, construction and maintenance.

Site Visits

The initial facilitated sessions were designed as an introduction to WSUD along with hands-on training in master planning and designing various elements of a raingarden that could be retrofitted in the streetscape as part of the Greening Footpath program. This involved visiting potential raingarden sites. These sites had been screened from the sites that the project team had earlier identified worthy for putting nature strips on. At the site visits, the staff from various operation units of Council had the opportunity to discuss the issues that would need to be addressed if a raingarden were to be built. The issues that were discussed included:

- Potential sources of stormwater flows that could be diverted to the raingarden to help rule in or out the site. Stormwater and drainage engineers provided most input and insights.
- Inlet section design to divert the stormwater flow to the raingarden and to dissipate the high energy of incoming flow. Inputs for this were received from stormwater engineers and construction staff.
- Design considerations to address the hazards and risks to pedestrians, cyclists and motorists. Transport planners and traffic engineers participated and contributed to this.

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- Design considerations to facilitate maintenance of the raingardens. Valuable inputs were received from the maintenance staff.
- Selection of suitable plants and opportunity for any street trees to benefit from the raingarden location. Input to this was provided by parks and trees staff.

Standard Designs

From these initial comments, the consultant prepared a set of standard drawings of WSUD elements which could be applied to a range of different sites. These addressed the inlet structures, biofilter depths and designs as well as planting types, maintenance and access issues. Each site chosen for raingarden installation could then be specified according to set of standard drawings, rather than a new design done for each location. As the Council staff and contractors became more familiar with the installation, ideas for alternate ways to address site specific issues were conceived and the drawings were amended accordingly.

Trial Raingarden

The facilitated site visits were followed by a trial construction of the first raingarden. The construction of a trial raingarden gave everyone an opportunity to see the issues in practice and test solutions. Parks staff gained further knowledge about availability of plant species that were suitable for raingardens along with information on sourcing of the correct specification of bio-filtration media and mulch. Construction staff began to learn more about the constraints specific to the selected sites such as existing services, constraints and opportunities provided by levels and topography of the site, traffic and access. A heavy rain event in February 2010 occurred just after completing the trial. This helped the staff to see how the raingarden responded and what to consider in future designs.



Figure 1: Before and after installation of the first raingarden

Workshop

Following the trial construction, with the view to further consolidate the knowledge that was being built, a workshop was organized. The workshop allowed staff to discuss issues that had been encountered during the trial. As the learning was happening around a live project, it created a high level of interest and interaction amongst the staff. Consequently, a learning environment prevailed throughout the workshop and other facilitated sessions which contributed positively to the capacity building objective. Evidence of growing capacity of staff in raingarden began to surface in the form of solutions that were being found and design ideas that were being generated and implemented by staff to subsequent raingarden sites on the program. This was enhanced by the staff being able to apply this learning directly to the next project.



Figure 2: Pictures from facilitated workshop and design sessions

Results

The facilitated sessions were successful on two counts - one, they helped develop a shared knowledge and understanding about raingardens across all staff; two, they also helped build a rapport and camaraderie between staff from different divisions bringing about the much needed co-ordination that is critical for integration of WSUD that cuts across different disciplines.

The process continues as those who took part in the capacity building aspects of the project are passing that understanding onto others. For example, the Council contract supervisors and the consultant are taking contractors for tours of successful and not so successful raingarden installations to present the issues and solutions found.

As the raingarden trials were more focused on capacity building of staff and were initiated opportunistically, it did not provide ample time to engage the community in an extensive manner. However, a multi-coloured signage using corflute material showing a simple schematic of raingarden was immediately designed and installed soon after planting of raingarden. As the signages started going up on newly built raingardens, they began to create a buzz amongst community as well as staff.

With growing interest and capacity in planning and designing raingardens, staff who were working on "Pedestrian Crossing and Traffic Calming (PCTC)", another civil works project, felt confident integrating

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raingardens as and when there were opportunities to do so. The staff from Trees who were embarking on a large-scale tree planting program began investigations into designing of water sensitive tree pits that could potentially save volumes of potable mains water that the new trees have to be supplied with in the initial two years of their establishment and also had the potential to provide the trees with some groundwater reserve that could be helpful to the trees in long periods of drought.

As the raingardens began to spring up across the City, maintenance and street cleansing staff flagged concerns about long-term maintenance of the raingardens. This was addressed by organising another cross-divisional workshop with the purpose of developing a maintenance plan that responded to concerns of maintenance staff from drainage, parks and street cleansing.

Looking Ahead

Having built capacity in Council staff through raingarden trials built opportunistically within 2009-10 Greening Footpath program, it was now time to get more strategic in the selection of raingarden sites for the 2010-2011 Greening Footpath. On the advice from water strategy, the project plan for Greening Footpath 2010-2011 allowed time for undertaking a desktop analysis of the footpath sites included in the 2010-11 program for identifying sites ordered by their potential capacity for pollution removal thus providing maximum value for the investment. This analysis was performed on sites that were screened for feasibility of building a nature strip. In estimating the potential for pollution removal capacity, the analysis considered the impervious area that drained and could be diverted to the footpath site along with the area available for a raingarden to be built.

During this time, an opportunity arose from Botany Bay Water Quality Improvement Program (BBWQIP) that announced funding for catchment areas draining to Botany Bay for projects and actions that would lead to reduction in pollution discharged by stormwater run-off to Botany Bay. As the Greening Footpath 2010-11 included sites in the south of the City LGA that drains to Cooks River and eventually to Botany Bay, the Council equipped with capacity of staff in building raingardens and its plan for strategically locating the raingardens in the Greening Footpath 2010-11, put in a funding application. The funding application highlighted the innovative advantage that integration of raingardens with an existing capital works project provided in the form of building cost-effective raingardens that also added value to the project while achieving the outcomes desired by the BBWQIP and Sustainable Sydney 2030. The funding application was successful and Council was awarded \$100K in June 2010, providing a financial boost to the Greening Footpath 2010-11 program and a moral boost to the project team.

Recognition

As the integration of raingardens in its infrastructure through Greening Footpath and PCTC projects marched ahead, Council took the opportunity to submit a nomination for 2010 Excellence in Infrastructure Award with the NSW Stormwater Industry Association. For nomination purposes, the project was titled "Integration of WSUD in Major Infrastructure Upgrades and Renewals - Turning the problem (of highly urbanized catchments) into opportunity (for building WSUD)." The City of Sydney was announced the proud winner of the award. Since receiving the Award, the Council is in the process of drafting a WSUD Policy that sets out broad guidelines and design considerations for integration of WSUDs in major capital works projects and infrastructure upgrades and renewals. The policy also would allow for engaging with the community prior to the construction of the WSUDs along with providing them the opportunity to participate in the planting and caring for the WSUDs once they are planted.

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Conclusions

This journey by the Council of the City of Sydney that began with building capacity for water sensitive urban design through a major infrastructure renewal project has resulted in a WSUD policy that will ensure that integration of WSUD into Council's infrastructure happens in a consistent and sustainable manner. Without the capacity building of staff, it is doubtful that the WSUD policy alone could have guaranteed this outcome.
