DELIVERING SU DS AND BETTER WATER MANAGEMENT IN BICESTER ECO-TOWN

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Technical Director

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- Lead developer – A2Dominion
- Masterplanner - Farrells
- Wider project team – see website
  http://nwbicester.co.uk/

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Improving quality of life.
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Scene Setting

Exemplar Site and Masterplan Site Location

- 400 Ha, 6000 new homes
- 40% Green Space (at least half of this publically accessible)

Application Sites Overview
Key Concepts

- Enhance natural drainage, water quality and flood risk reduction
- Use water as a resource
- Maximise sustainability, water saving benefits
- Ability to cope with climate change and urban creep
- Promote exemplar design and best practice
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Sub- catchment Based Approach
Assessing storage volumes and flow patterns

<table>
<thead>
<tr>
<th>Catchment</th>
<th>Area (ha)</th>
<th>Storage (mm)</th>
<th>ZCP</th>
<th>Greenfield Rate (ha/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>76</td>
<td>11.47%</td>
<td>50%</td>
<td>2.25</td>
</tr>
<tr>
<td>B</td>
<td>93</td>
<td>13.63%</td>
<td>3.33%</td>
<td>(1 in 20)</td>
</tr>
<tr>
<td>C</td>
<td>228</td>
<td>14.65%</td>
<td>75%</td>
<td>(1 in 100)</td>
</tr>
<tr>
<td>Total</td>
<td>499</td>
<td>49.69%</td>
<td>75%</td>
<td></td>
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</tbody>
</table>

Landscaped Led Design
Integrating Green Infrastructure and Influencing Masterplan Development
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Exemplar Site/Elmsbrook

- Roof rainwater harvesting
- Permeable paving
- Interlinked with overflows to soakaways

Enhanced river corridor

Wetlands
Green roofs

Swales/ Rain gardens?

Exemplar Site/Elmsbrook

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Exemplar Site/Elmsbrook

- Swales
- Basins and ponds

Community RW harvesting, permeable paving & gravel soakaway

Masterplan Site
Capturing knowledge & Lessons Learned from Exemplar Phase
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Emerging SuDS Design & Phasing

Emerging Urban Design Framework
Bure Valley and SuDS

V1 - Neighbourhood Park
V2 - Local Park
V3 - Woodland Park

Road Types and SuDS

Strategic Link Road

Secondary Road
Water Efficiency and Re-use
Residential demand limited to 80 l/p/day and Non-residential demand reduced by 55% = 40% net reduction in total demand over standard approach

Property Level Rainwater Harvesting (Exemplar Site)
Treated Wastewater Reclamation? (Masterplan Site)

Engagement & Implementation

- Close collaboration and engagement - key to success from the outset
- Maintenance and adoption issues of SuDS and new technology - resolved by good design, engagement and collaborative working
- Development phasing – refinements to masterplan strategy
Wider Sustainability & Quality of Life Aims

• Design for comfort, manage water/ green landscape/ key infrastructure to reduce flood risk & enhance water conservation
• Local cycle routes & healthy lifestyles
• Zero carbon homes & cutting edge technology
• Zero waste to landfill during construction
• Reduce carbon by 30% during construction

ECONOMIC BENEFITS OF SUDS
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Exemplar Site (17.5ha) Example

1. Identify SuDS solutions
2. Determine natural capital values of SuDS (Qualify)
3. Measure changes in the state of natural capital (Quantify)
4. Monetise natural capital value of SuDS

SuDS features

<table>
<thead>
<tr>
<th>SuDS features</th>
<th>Size (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive Green Roof</td>
<td>3,490</td>
</tr>
<tr>
<td>Permeable paving</td>
<td>12,470</td>
</tr>
<tr>
<td>Swale</td>
<td>39,030</td>
</tr>
<tr>
<td>Attenuation Basin</td>
<td>20,000</td>
</tr>
<tr>
<td>Soakaways</td>
<td>36,000</td>
</tr>
<tr>
<td>Greenfield*</td>
<td>64,010</td>
</tr>
<tr>
<td><strong>Total Catchment area</strong></td>
<td><strong>175,000</strong></td>
</tr>
</tbody>
</table>

SuDS Benefits Summary

Further benefits were also qualified but not monetised

<table>
<thead>
<tr>
<th>Natural Capital benefits</th>
<th>Qualifiable</th>
<th>Quantifiable</th>
<th>Monetised</th>
<th>Total benefits (£/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in flooding</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction of water treatment needs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>6,340</td>
</tr>
<tr>
<td>Improvement in water quality</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in groundwater recharge</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in noise pollution</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvement in air quality</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>2,900</td>
</tr>
<tr>
<td>Reduction in energy use</td>
<td>X</td>
<td>X</td>
<td></td>
<td>15,930</td>
</tr>
<tr>
<td>Reduction in GHG emissions</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>3,770</td>
</tr>
<tr>
<td>Carbon sequestration</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>2,260</td>
</tr>
<tr>
<td>Reduction in urban heat island</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health and wellbeing</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvement in aesthetics/amenity</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>203,170</td>
</tr>
<tr>
<td>Increase in recreational opportunities</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>55,860</td>
</tr>
<tr>
<td>Provision of educational opportunities</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvement in habitat (biodiversity)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>17,320</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Grand Total</strong> 307,550</td>
</tr>
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Can SuDS enhance existing GI?
To what extent NW Bicester contribute delivering Bicester Urban GI benefits?

AIMS
1. Understand existing GI and the services it provides.
2. Identify spatial gaps in the services, taking account of connectivity for wildlife, accessibility for recreational use by people and interlinking of sustainable travel routes.
3. Identify opportunities for enhancing existing GI and creating new areas that fill spatial and functional gaps, (including by enhancing connectivity).
4. Evaluate the benefits of GI, in monetary terms where possible, so that different options can be compared and to support the business case for investment.
FINAL THOUGHTS

NW Bicester is a pioneering example

SuDS provides notable environmental & economic benefits

Addresses key barriers and inform future SuDS policy

Tackles resiliency, efficiency and quality priorities.

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