



DESIGNING SUDS 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/>
- Arcadis.**
Improving quality of life.
- Renuka.Gunasekara@arcadis.com



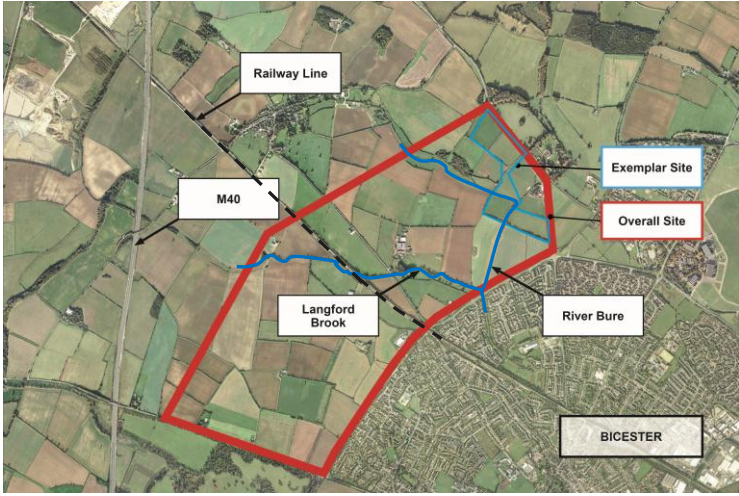
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Scene Setting

Exemplar Site and Masterplan Site Location



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

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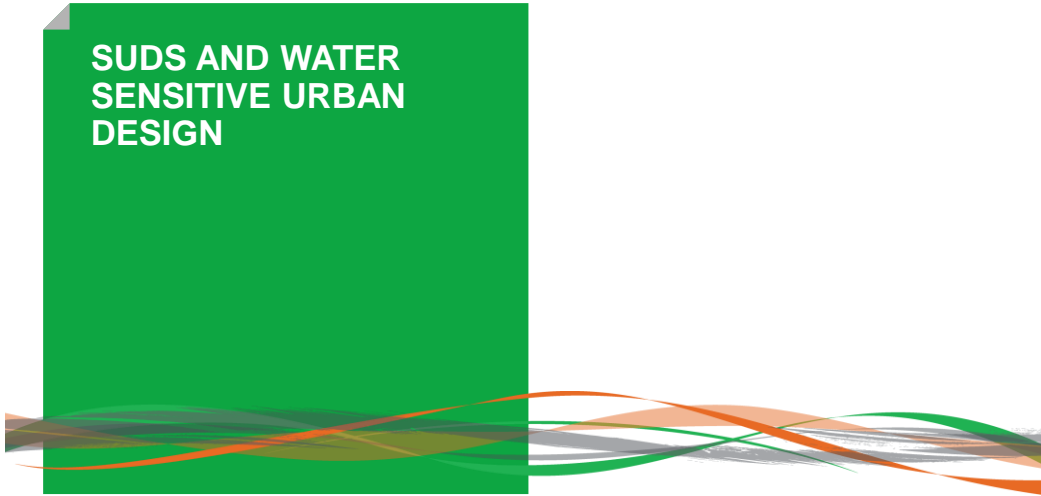


Application Sites Overview



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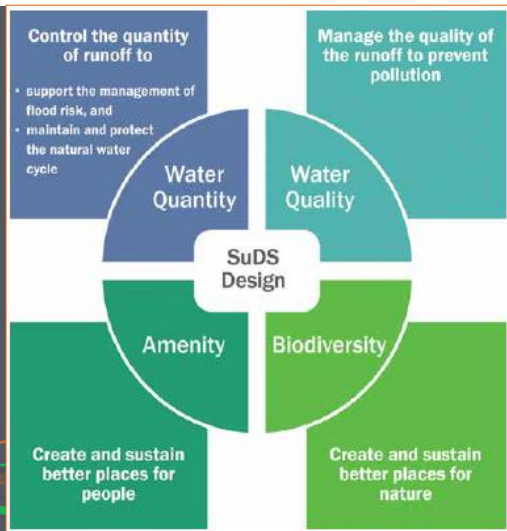


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Key Concepts

- 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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Exemplar Site/Elmsbrook



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

Swales/ Rain gardens?



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Exemplar Site/Elmsbrook



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Exemplar Site/Elmsbrook



- Swales
- Basins and ponds



Community RW harvesting, permeable paving & gravel soakaway

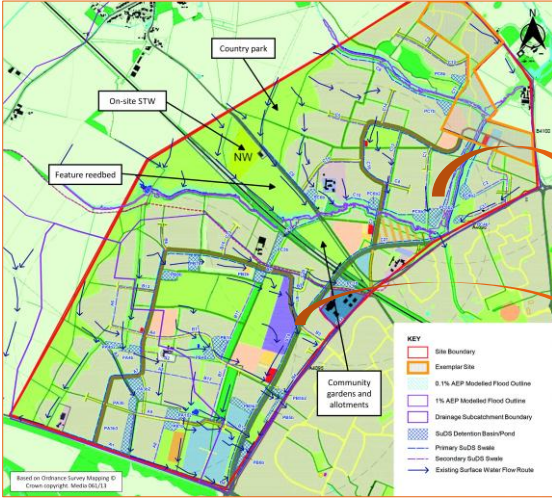
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Masterplan Site

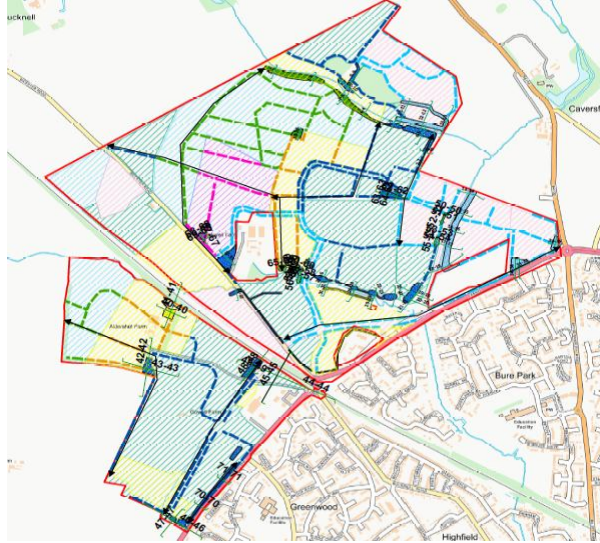
Capturing knowledge & Lessons Learned from Exemplar Phase



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Emerging SuDS Design & Phasing

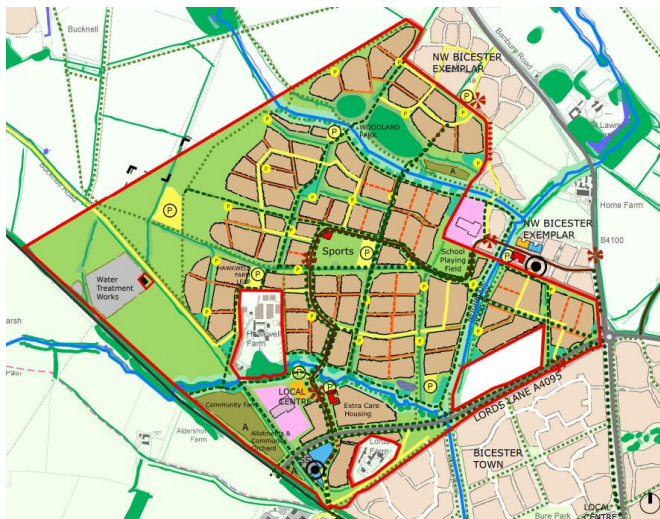


- Legend:**
- P1 - Boundary Area
 - P2 - Boundary Area
 - P3 - Boundary Area
 - P4 - Boundary Area
 - P5 - Boundary Area
 - P1 - Attenuation
 - P2 - Attenuation
 - P3 - Attenuation
 - P4 - Attenuation
 - P5 - Attenuation
 - P1 - Swales
 - P2 - Swales
 - P3 - Swales
 - P4 - Swales
 - P5 - Swales

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Emerging Urban Design Framework



- LAND USES**
- HOUSING
 - SCHOOL
 - COMMUNITY
 - BUSINESS
 - RETAIL
 - FIELDS
- INFRASTRUCTURE**
- ENERGY CENTRE
 - LARGE AREAS FOR PLAY
 - SMALL AREAS FOR PLAY
 - GREEN INFRASTRUCTURE
 - WOODS & HEDGES WITH BUFFER
 - RIVER & CORRIDOR
 - SUDS
 - WATER TREATMENT
 - SUGGESTED BOUNDARY CHANGE
 - EXISTING WATER
 - POTENTIAL WATER
- ROUTES**
- BUS ONLY ROUTE
 - BUS STOP
 - STRATEGIC ROAD
 - PRIMARY ROAD
 - SECONDARY ROAD
 - TERTIARY ROAD
 - GREEN LANE
 - MEWS SHARED
 - RAILWAY LINE
 - BRIDLE PATH
- FOOT AND CYCLE PATH**
- PRIMARY ROUTES
 - SECONDARY ROUTES
 - TERTIARY ROUTES

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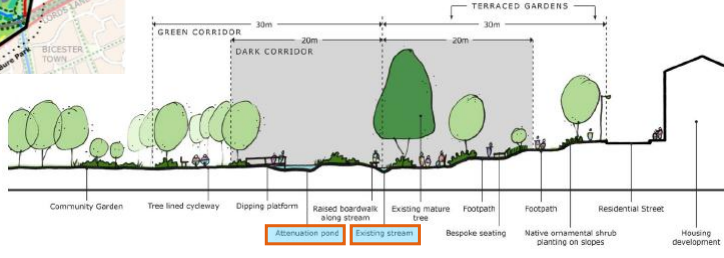
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Bure Valley and SuDS



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

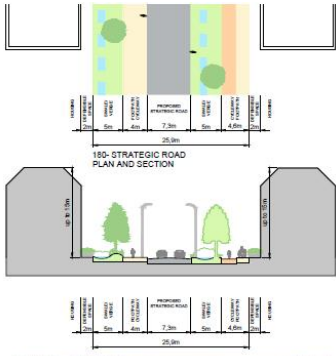


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Road Types and SuDS



Strategic Link Road



Secondary Road



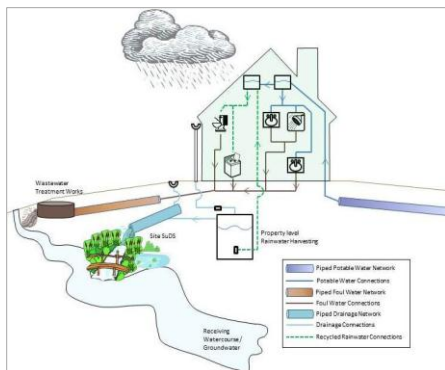
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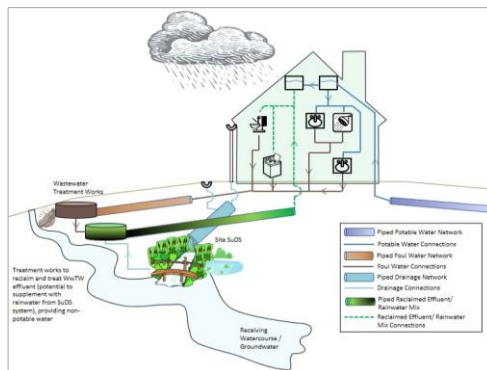


Water Efficiency and Re-use

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)

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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



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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**



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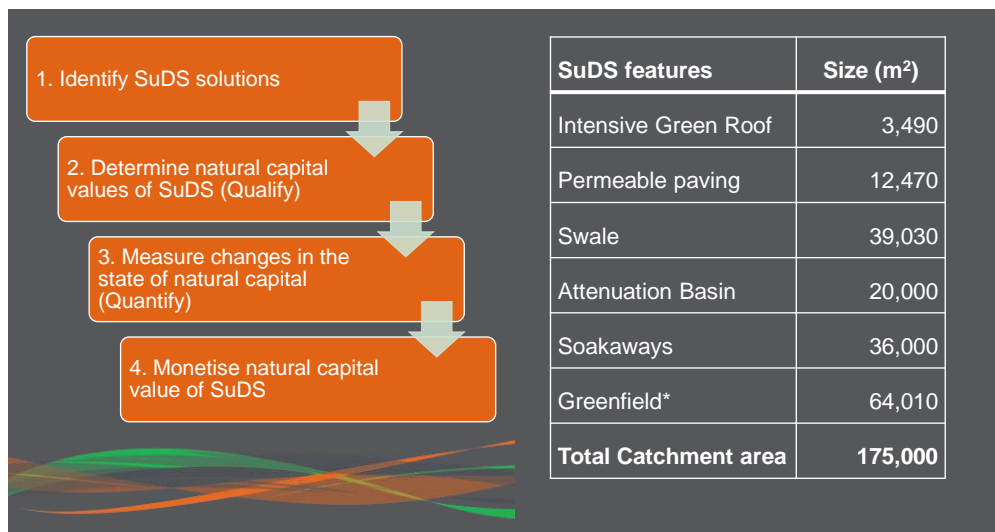


ECONOMIC BENEFITS OF SUDS

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Exemplar Site (17.5ha) Example



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SuDS Benefits Summary

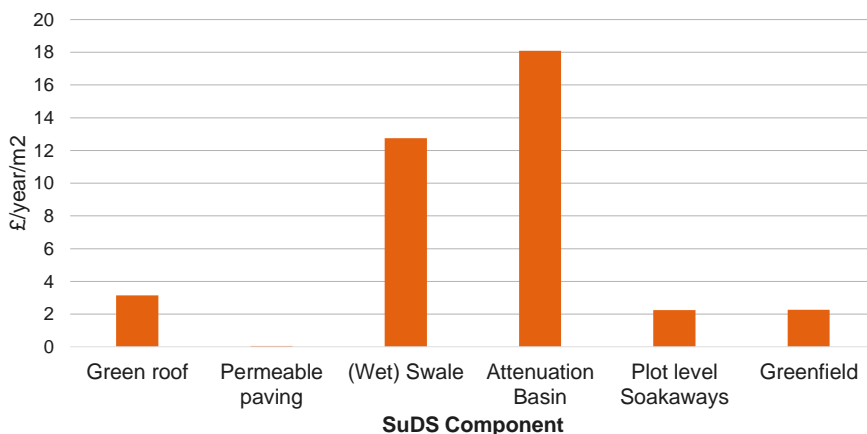
Further benefits were also qualified but not monetised

Natural Capital benefits	Qualifiable	Quantifiable	Monetised	Total benefits (£/year)
Reduction in flooding	X	X		
Reduction of water treatment needs	X	X	X	6,340
Improvement in water quality	X			
Increase in groundwater recharge	X	X		
Reduction in noise pollution	X			
Improvement in air quality	X	X	X	2,900
Reduction in energy use	X	X	X	15,930
Reduction in GHG emissions	X	X	X	3,770
Carbon sequestration	X	X	X	2,260
Reduction in urban heat island	X			
Health and wellbeing	X			
Improvement in aesthetics/amenity	X	X	X	203,170
Increase in recreational opportunities	X	X	X	55,860
Provision of educational opportunities	X			
Improvement in habitat (biodiversity)	X	X	X	17,320
			Grand Total	307,550

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Annual Benefits per SuDS Feature



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Can SuDS enhance existing GI?

To what extent NW Bicester contribute delivering Bicester Urban GI benefits?

- AIMS**
- Understand existing GI** and the services it provides.
 - Identify spatial gaps** in the services, taking account of connectivity for wildlife, accessibility for recreational use by people and interlinking of sustainable travel routes.
 - Identify opportunities for enhancing existing GI and creating new areas** that fill spatial and functional gaps, (including by enhancing connectivity).
 - 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.



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FINAL THOUGHTS

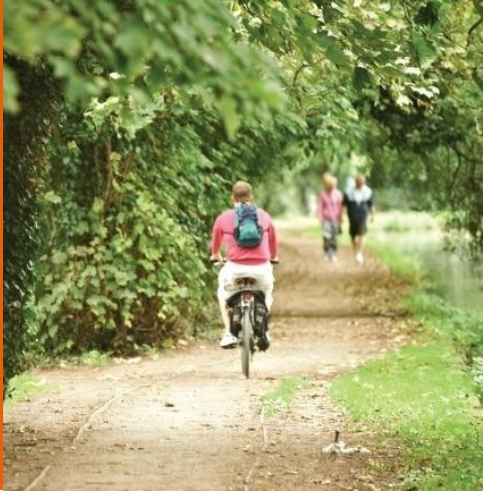
NW Bicester is a pioneering example

SuDS provides notable environmental & economic benefits

Addresses key barriers and inform future SuDS policy

Tackles resiliency, efficiency and quality priorities.

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