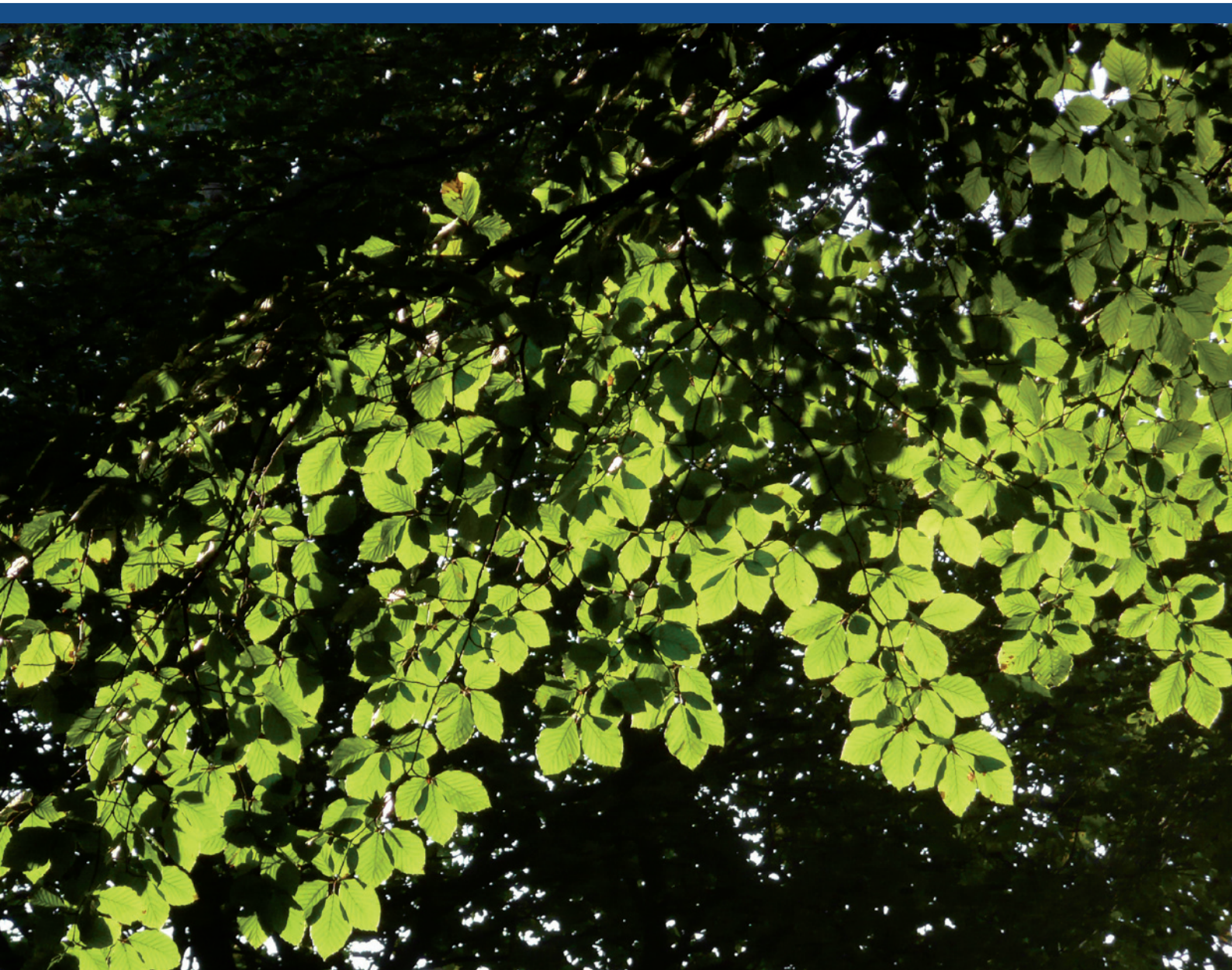
Indicative Economic Assessment

A quantification and valuation of the economic benefits of a proposed programme of improvements to the green infrastructure in the areas around the development at Wirral Waters

August 2011



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Executive Summary

The development of Wirral Waters is a programme of national significance in an area of high levels of deprivation and inequality; an area in need of investment for sustainable growth.

Green infrastructure will underpin the quality of place and life in and around Wirral Waters. The approach is not a panacea, but it can play an important part in ensuring that the development fulfils its potential and does not exacerbate current problems.

Initial proposals for a programme of green infrastructure creation and improvements in the areas surrounding Wirral Waters have been proposed. These are estimates, greater value will be gained by more ambitious programmes.

Table 1 Proposed projects

Project type	Measure	Description
Green Streets	35 km of road	A community led programme of urban tree planting along important road routes.
"Meanwhile" land treatment	11 ha	Planting of temporary, fast growing coppice or forest trees to produce a biomass crop in 3 – 5 years. May also include food growing or wildflower sowing.
Long term GI	18 ha	Design and implementation of new areas of woodland or other habitats that provide the types of functionality that have been identified as important.
Access improvement	1 new car park for Bidston Moss	Bidston Moss is an underutilised asset, one that becomes more even important as the new homes are created at Wirral Waters. Improved access to encourage greater use is critical to the long term success of the site.

It is estimated that implementation costs will be circa £2m, that a programme of Social Enterprise can be developed gain additional local benefit and that given support work could commence in late 2011, with some of the benefits immediately apparent.

Using the prototype Green Infrastructure Valuation Toolkit, this study provides a preliminary assessment of the economic value of the work undertaken.

Overall the toolkit shows a net present value for the project of **£29.5m.** Making the initial investment of £2m a sound one based on this assessment

Economic value is shown in the case study as one of two types:

1. Contribution to **GVA** – this is a contribution to the economy through increased profit, reduced costs, salary etc. for Wirral Waters the toolkit identified value of **£12.7m**

2. **Other economic benefit** - contribution to the broader economic context such as the value in terms of improved health, or the value that society puts on biodiversity – areas where there is no "market" that provides a pricing mechanism. For Wirral Waters the toolkit identified value of **£16.7m**

This significant economic return is due to;

Environmental Return:

- Brownfield converted to green space
- Filtered stormwater runoff to the river
- Return of wildlife to site
- Reduced air pollution
- Carbon locked up in trees and woodland
- Heat island impacts reduced across the area
- Noise reduction

Social and Cultural Return:

- 10,000 additional visitors per year[1]
- Venues for community festivals
- Enhanced community pride
- Opportunities for food growing
- Skills training and community enterprises linked to the development

[1] This is likely to be an underestimate, the improvements to Bidston alone could, based on new data from Sutton Manor, increase visits by 100,000 per year

- 400 additional volunteers

Quality of Place:

- Green routes throughout the area
- High quality spaces for leisure and recreation
- Enhanced key gateways into the area
- Image of riverfront edge changed from industrial to green
- Views of the river opened to local community and visitors

A range of potential partners, including The Mersey Forest, Groundwork and Faith4Change have been identified as being able to take forward aspects of the programme and engage effectively with local communities.

Funding sources have been identified, but will need development time to apply for and then initiate the projects.

Introduction

Increasingly project managers, funders and client teams have to provide evidence that environmental projects deliver economic benefits.

Whilst the intrinsic value of a rare species, a cultural landscape or a tranquil area in the heart of a town or city may be considered as “priceless”, there is a danger that priceless can be then lead to them being “valueless” in economic assessment.

There has been a great deal of work carried out to try to value the benefits of the natural environment, using a wide range of techniques. Many of these are academic and not accessible to project managers who need to be able to rely on sound data, from easily found sources, to provide a robust valuation that they can justify to funders and/or developers. However, to date there has not been a single comprehensive method that enables a valuation to be carried out.

Green Infrastructure Valuation Toolkit

Over the past six years there has been a great deal of work to develop a green infrastructure approach to embed the natural environment in decision making. This work has involved a wide range of organisations and has seen the rapid development of a range of policies, research projects, reports and a Green Infrastructure Valuation Toolkit.

The Natural Economy Northwest project developed this toolkit in conjunction with other regions across England and with national bodies such as DEFRA. For the first time organisations have pooled their expertise to develop an easily accessible toolkit to enable valuation. The toolkit and an explanatory guide can be downloaded from www.bit.ly/givaluationtoolkit. A network of users is also emerging. The network shares ideas and information about the development of the Toolkit. For information on how to join the network e-mail **givaluation.network@merseyforest.org.uk**.

The toolkit has been released as a prototype, in a “Creative Commons” format that can be accessed by all for free. The toolkit is not complete, there are areas for which there are no tools available and toolkit has a number of caveats to ensure that that information is used in the right way. The intention is that the toolkit is used to help show the value of projects, either pre or post project, and that it is improved and

shared with other project managers so that over time the toolkit becomes a robust model, recognised by decision makers and funders.

The toolkit cannot count everything. What it does count is designed to be robust enough for initial, indicative project appraisal, providing a range of figures indicating the potential impact of a green infrastructure intervention or even an existing green asset.

It is also important at the outset to highlight that valuations such as this also need to be seen as part of a much bigger picture. There are dangers of using “market mimicking” techniques as well as positive benefits that need to be kept in mind.

This report uses the toolkit to value a programme of green infrastructure improvements that have been identified in the areas surrounding the Wirral Waters development.

Green Infrastructure Benefits

Green Infrastructure Benefits

A framework of 11 benefits has been found to be useful in describing and valuing green infrastructure, The list of 11 below are not perfect, there will be some who would split and some who would lump categories, but the framework is a good starting point and has been tested widely.

Figure1 11 Benefits of Green Infrastructure Interventions

The toolkit organises the calculator tools under each of the 11 benefits.

What does the toolkit do?

The toolkit provides a set of calculator tools, to help assess an existing green asset or proposed green investment.

Figure 2 Screen Shot from toolkit in the the website www.ginw.co.uk

It looks at how the range of green infrastructure benefits deriving from an asset or investment can be valued:

- **in monetary terms** - applying economic valuation techniques where possible
- **quantitatively** - for example with reference to jobs, hectares of land, visitors
- **qualitatively** – referencing case studies or important research where there appears to be a link between green infrastructure and economic,

societal or environmental benefit, but where the scientific basis for quantification and/or monetisation is not yet sufficiently robust.

The toolkit does not assess the quality of the design or detailed management requirements of green infrastructure.

Assessing the benefits

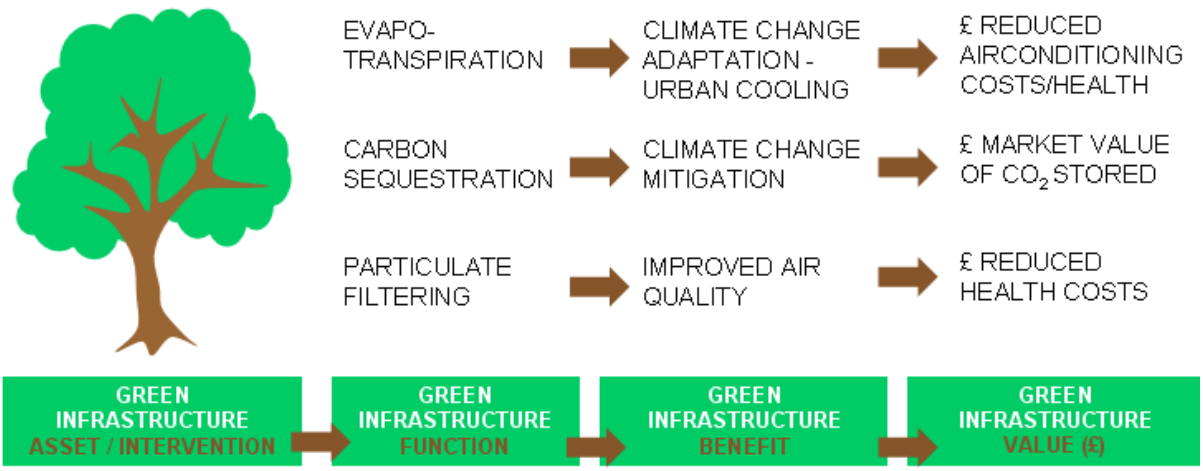
The toolkit uses standard valuation techniques to assess the potential benefits provided by green infrastructure within a defined project area. These benefits are assessed in terms of the functions the green infrastructure may perform, support or encourage, depending upon the type of project.

For example, Figure1 shows how an urban tree planting scheme can result in improved air quality, carbon sequestration and reduced health costs, thereby illustrating green infrastructure function, resultant benefit and potential monetisation.

(image of tree planting)

However, not all benefits can be given a monetary value. A rich body of evidence illustrates and demonstrates the different types of benefits deriving from quality green infrastructure. But for many, robust valuation techniques do not yet exist. For others, proving a direct causal link between green infrastructure and the potential benefits is not yet possible.

Figure 1Toolkit logic chain - an example



In using the toolkit it is important that it is only the net additional benefit, and therefore value, is assessed and also that there is no double counting of the benefits. For example, we should not count both the value of improved air quality and the value of improved health due to lower levels of PM_{10}. We should count one or the other benefit, not both as this would be to count it twice. The choice of which to count is most likely influenced by the target audience for the information.

Wirral Waters

See main report on GI Proposal

Figure 3 Project Location

Figure 4 Aerial view of the area (from Wirral Waters, Strategic Regeneration Framework, Waterfront & Public Realm, 11 December 2009)

Project data

The toolkit includes a data collection sheet into which the project manager adds information on the project and also on the numbers of people that the project may impact upon.

Wirral Waters is a development scheme of national importance and involves a wide range of different interventions. The toolkit looks only at the changes to the green infrastructure, and the use that is made of it by local communities. This exercise also only looks at the area outside of the development red line; the improvements that have been suggested in the areas around the proposed new development in areas that at present have a poor natural environment and severe socio-economic problems[2].

The input table for the proposed project around Wirral Waters is shown in Table 1:

Table 2 Proposed improvements Project Data

	Current	Proposed	
Project area	28	28	*ha*
Total area of greenspace	1	0	*ha*
New green space created	n.a.	11	*ha*
Area of greenspace enhanced	n.a.	17	*ha*
	Current	**Proposed**	
Trees/tree cover	0	1500	*number/ ha*
Additional tree cover	n.a.	3.9	*number/ ha*
Current land use	vacant land, treeless streets		
Land ownership?	Various		
What is the level of deprivation in the area? Refer to IMD data			
Is there currently a lack of green space in the area? Refer to local open space audit results and associated open space standards. Refer to national benchmarks such as ANGsT standards. How will this project help?			
Does the site have heritage value? What features are being enhanced/protected/ promoted through the project?			
	Current	**Proposed**	
Cycle routes	0	1	*km*

[2] See main report

Current cycle routes upgraded	n.a.	0	*km*
Footpaths	0	1	*km*
Footpaths upgraded	n.a.	0	*km*
Is the land publicly accessible?	Not at present		
Will the project improve green travel options?	Yes		
Links to existing networks	TBC		
	<300m	**<1200m**	**<450m**
Number of households within 300m, 1200m and 450m	10000	20000	2812.5
Number of businesses within 300m and 1200m	500	1500	
Number of residents within 300m and 1200m	20000	33000	
Other beneficiaries?			
	Current	**Proposed**	
Number of community groups involved	0	10	
Total number of users per year	0	0	
Of which number of local visitors (recreation)	0	15000	
Of which number of tourist visitors (tourism)	0	10000	
Number of people involved in physical activity	0	1500	
Estimate of working population	13000	21450	
Existing ecological quality?	Poor		
	Current	**Proposed**	
Area designated for nature and wildlife conservation (local designation)	0	0	*Ha*
Area designated for nature and wildlife conservation (national designation)	0	0	*Ha*
Area of woodland w/biodiversity value not captured above (i.e.: not protected through local or national designation)	0	0	*Ha*
Area of wetland w/biodiversity value not captured above (ie: not protected through local or national designation)	0	0	*Ha*
	Current	**Proposed**	
Number of construction jobs created as a result of scheme delivery	n.a.	0	
Number of jobs created/safeguarded for management/maintenance of site	n.a.	5	
Number of new businesses established	n.a.	0	
Average residential property price in the area	£110,000	n.a.	*£*

Describing value

The information entered for the proposed improvements around Wirral Waters generates values for many of the green infrastructure benefits. The toolkit identifies the marginal benefit[3], the additional value of the work proposed and also tries to ensure that there is no "double counting" of value.

The toolkit looks at both cost and benefit value, with cost including both the initial costs of the project and then the projected annual management and maintenance costs for 50[4] years into the future.

Due the nature of the benefits we are trying to value and the current state of our knowledge and research about the actual values and ways of identifying them, not every benefit can be valued.

For those that can the value can be one of two types:

- Contribution to GVA – this is a contribution to the economy through increased profit, reduced costs, salary etc.
- Other economic benefit - contribution to the broader economic context such as the value in terms of improved health, or the value that society puts on biodiversity – areas where there is no "market" that provides a pricing mechanism.

The monetisations are indicative only, sensitivities and ranges are not reflected in the single figure. Ranges have not proved possible to define for this toolkit and thus all values generated are subject to a +/- factor "*X*" which in future may be better understood.

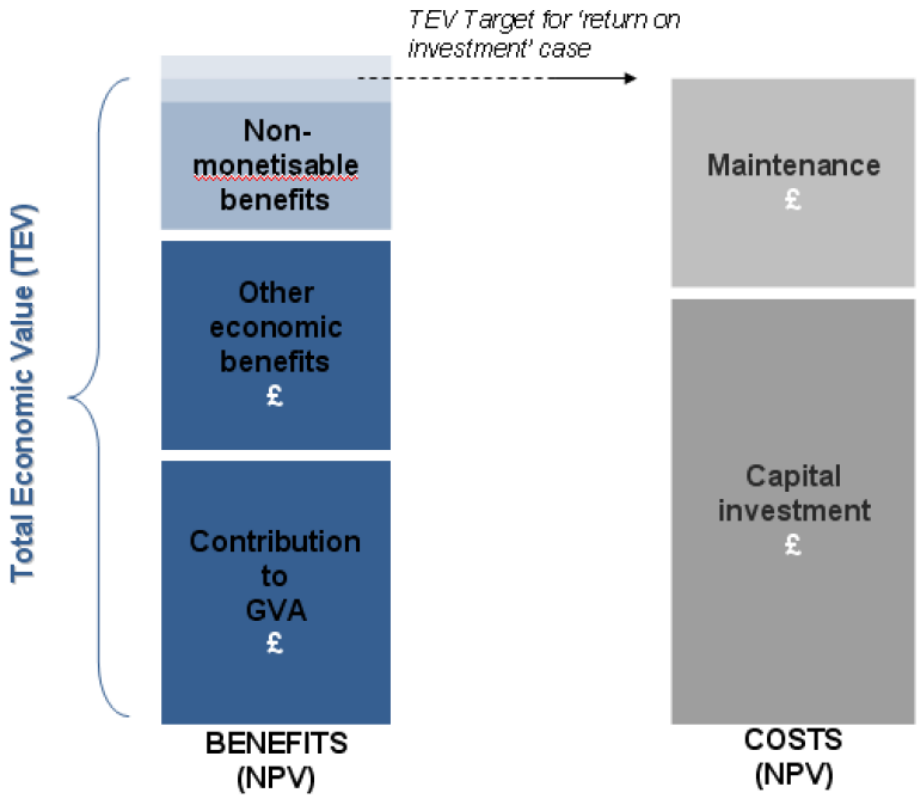
For benefits that we are unable to provide a monetary value and can simply identify the amount of benefit in non monetary terms.

The aim of any project will be to balance these benefits with the capital, revenue and maintenance costs (see Figure 3)

[3] **Marginal benefit**: this is a way to measure change in benefits over the change in quantity. For example, it could refer to the value of the benefits of an additional recreational visit for a tourist site.

[4] The development horizon for Wirral Waters is 30 years - a 20 year post project assessment seems reasonable.

Figure 5


TEV Target for 'return on investment' case
Total Economic Value (TEV)
Non-monetisable benefits
Other economic benefits £
Contribution to GVA £
BENEFITS (NPV)
Maintenance £
Capital investment £
COSTS (NPV)

Results

Table 3 shows the data from the toolkit on the “quantities” of benefit. These have been used as the basis for the economic valuations shown in Table 4. However. as there is not always a valuation model available, for some benefits the quantified information is the best that we are able to achieve at present. Future iterations of the toolkit will improve the range of valuation tools as data and knowledge develop.

For instance, there is no tool in the toolkit to capture the recreational value of the projected 15,000 additional visits that may result from the improvements, nor the estimated 400 additional volunteers. However, it is useful to have this additional quantified data as a rich source of information to help promote and sell the wider benefits of the investment.

Table 3

BENEFIT QUANTIFICATION

Benefits groups	Functions	Tools		
Climate Change Adaptation & Mitigation	Shelter from wind	1.1 Reduced building energy consumption for heating	480000	kWh/yr energy saved
		1.2 Avoided carbon emissions from building energy saving for heating	97440	kgCO2/yr not emitted
	Reduction of urban heat island effect	1.4 Reduced peak summer surface temperatures	25.30	Co in surf. temperature reduction
	Cooling through shading and evapo-transpiration	1.5 Reduced building energy consumption for cooling	0	kWh/yr energy saved
		1.6 Avoided carbon emissions from building energy saving for cooling	0	kgCO2 not emitted
	Carbon storage and sequestration	1.7 Carbon stored and sequestered in woodland and forests	9.36	kgCO2 sequestered
Water management & Flood Alleviation	Interception, storage and infiltration of rainwater	2.1 Energy and carbon emissions savings from reduced storm water volume entering combined sewers	168000000	L/yr water diverted from sewers
Places and communities		3.2 Increase in volunteering	400	new volunteers
Health and Wellbeing		4.2 Reduced mortality from increased walking and cycling	0.717025216	lives saved per yr
		4.6 Avoided costs for air pollution control measures	0.052628641	t/yr of carbon monoxide removed
			0.186199273	t/yr of sulphur dioxide removed
			0.168326266	t/yr of nitrogen dioxide removed
			0.422219506	t/yr of PM10 removed
			0.475575067	t/yr of ozone removed
Land & Property Values	Setting for higher value residential and commercial properties	5.1 Residential land and property values uplift		n.a.
		5.2 Commercial land and property values uplift		n.a.

Labour and productivity	Attraction and retention of high quality staff	7.3 Savings from reduced absenteeism from work	Between	0
			83.1402	and
			443.4144	work days lost avoided per yr
Tourism	Tourism attraction	8.1 Tourism expenditure	10000	Visitor days
		8.2 Employment supported by tourism	4.55	FTE jobs
Recreation & leisure	Provision of recreation opportunities	9.1 Recreational value for use by local population	15000	Local users
Biodiversity	Provision of recreation opportunities	10.1 Willingness to pay for protection or enhancement of biodiversity	10	Ha of land w/ biodiversity value added
Land management	Land management	11.2 Employment supported by land management	5	FTE jobs

Value for Money

The Green Infrastructure Toolkit produced the following results for the proposed improvements around the main development site at Wirral Waters.

Based on an anticipated capital investment of £2million and an annual maintenance budget of £60,000 delivering a range of benefits the Net Present Value is £29.4m, a significant return on the investment made.

VALUE FOR MONEY TEST: NPV of overall net benefit or cost	**£29.4m**

The toolkit discounts costs and the value of benefits for a period of up to 50 years depending on the benefit type. Over a 50 year period the total value of the benefits in real terms is over 14 times the estimated the green infrastructure investment. This value includes that for both the GVA and other economic benefits described in more detail below.

Table 5 provides the data on monetisation of the benefits, using the best available economic valuation data. The full details of the models used, the basis and limitations of the tools are provided in the toolkit guide. The data is split between the GVA and other economic value for each of the benefits that are assessed in the toolkit.

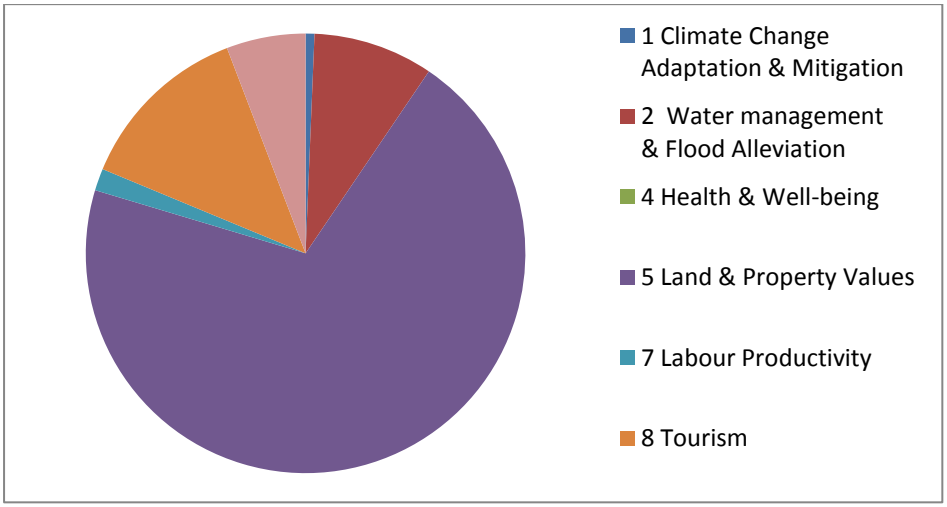
Table 4 Net present value of the marginal benefits of the proposed projects at Wirral Waters

Benefit	GVA (million)	Other Economic Value (million)	Total Economic Value (million)
1 Climate Change Adaptation & Mitigation	£ 0.90	£ 0.06	£ 0.16
2 Water management & Flood Alleviation	£ 1.10	£ -	£ 1.10
4 Health & Well-being	£ -	£16.20	£ 16,.20
5 Land & Property Values	£10.70		£ 10.70
7 Labour Productivity	£ 0.24	£ -	£ 0.24
8 Tourism	£ 1.90	£ -	£ 1.90
10 Biodiversity	£ -	£ 0.40	£ 0.42
11 Land management	£ 0 .88	£ -	£ 0.88
Total	£ 12,.70	£ 16,.70	£ 29.40

Analysis of Results

GVA is delivered through six benefits, with that for **Land and Property Value** providing the greatest value. This is not surprising nor out of step with similar reports of uplift to property value after improvement to green infrastructure. The work carried out by the Independent Valuation Office on the creation of the Community Woodland at Bold Moss found a similar significant increase in property values[5].

Figure 6 Distribution of GVA Benefits for improvements around Wirral Waters



The **Climate Change** benefit is due to reduced heating and cooling requirements in nearby areas, whilst the **Water Management** benefit comes from a reduction in the amount of runoff from the area and therefore a reduced need to treat the water. Table 6 shows how this additional benefit for water management is valued.

Table 5 Water management valuation

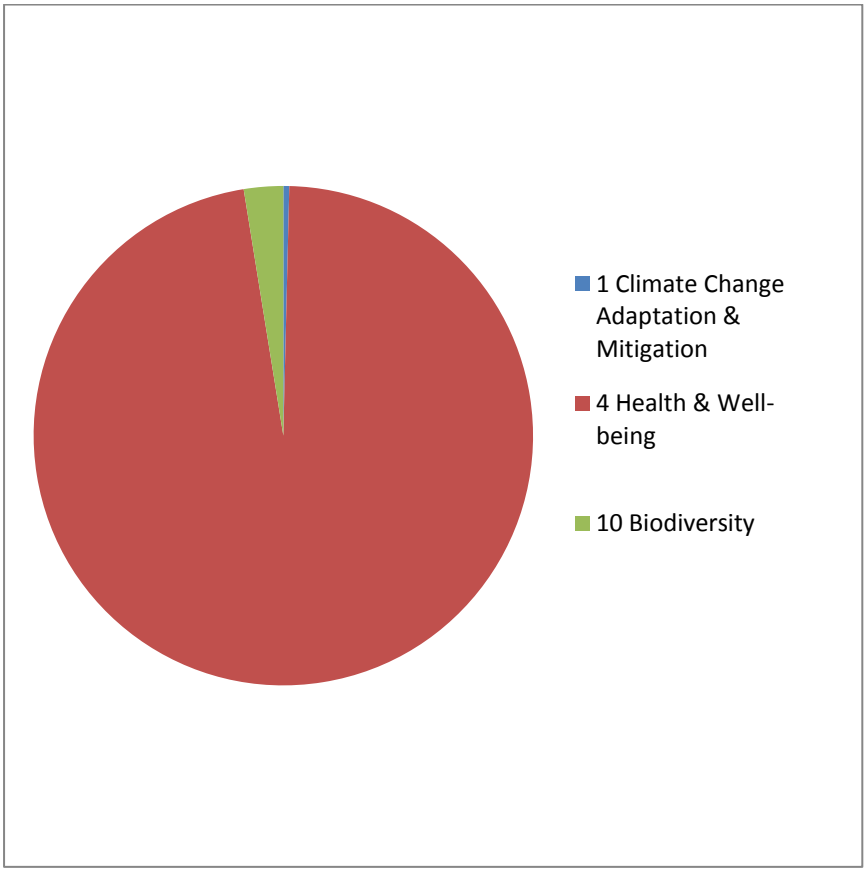
Water diverted from sewers	201,600,000	l/yr
Equivalent energy saving (water treatment)	1,300,320	kWhr/yr
Equivalent carbon saving	698.27	tCO2/yr
Tool 2.1 output	**18,853**	**£/yr value of carbon**
Tool 2.1 output	**52,013**	**£/yr value of energy**

Labour productivity value is derived from data on improved health and a reduction in absenteeism based on well documented research. **Tourism** value is the

[5]Case study report commissioned by Natural Economy Northwest
June 2008; http://www.naturaleconomynorthwest.co.uk/resources+case+studies.php

anticipated additional spend from visitors to the area. Finally **Land Management** value is derived from the presence of additional jobs created in the management and maintenance of the areas proposed for improvement. However, this value does assume that the posts continue into the long term and are not seen as “project posts” but as a necessary part of ensuring high quality green infrastructure that can underpin the wider investment in Wirral Waters.

Figure 7 Other Economic Values



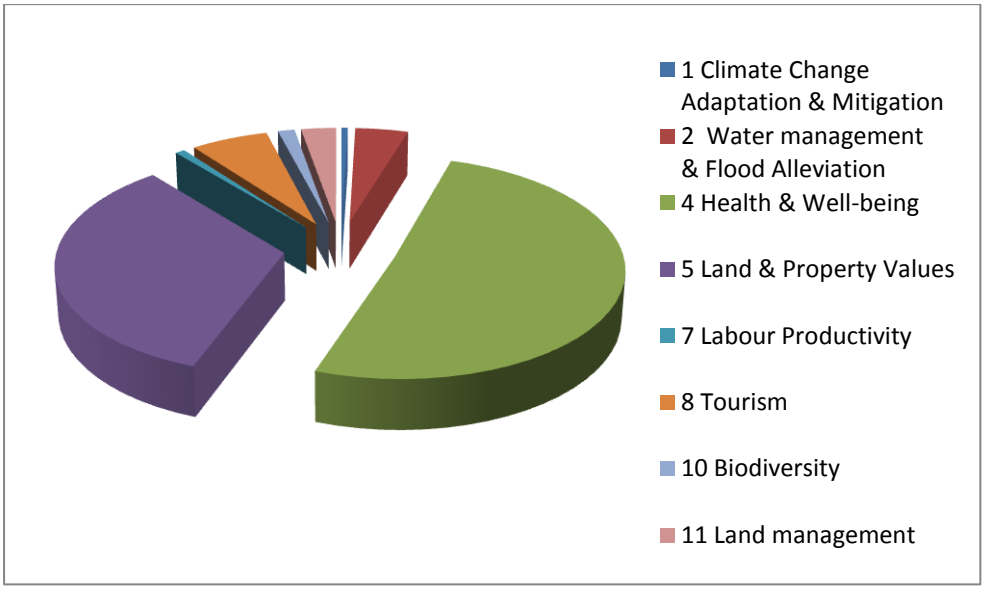
For “other economic benefits” we get values from a different range of benefits. By far the greatest benefit value is seen from improved **Health and Well-being**. From the data gathered for the toolkit and using a conservative estimate of the likely increase in usage of the site due to the improvements the toolkit calculates reduced mortality of one person per year, the NHS “value” on a life is £1.6m. Over a long time period this can give a high value for improved health and wellbeing.

Unsurprisingly, **biodiversity** also contributes value too. This valuation is based on data that estimates people's "willingness to pay" for biodiversity. Bringing wildlife into urban areas is likely to be a key strand of the forthcoming Environment White Paper. The Lawton Report[6], likely to be a key point of reference for the White Paper has identified this issue as a key one for action.

> *Responsible authorities should take greater steps to reconnect people to nature by enhancing ecological networks within urban environments, including wildlife-friendly management of green spaces, and by embedding biodiversity considerations in the need to adapt to climate change.*
>
> *Lawton Report 2010*

Adding the GVA and Other Economic Benefits together provides the overall economic value (Figure 8). As discussed; this is likely to be an underestimate as we are not as yet able to assess all of the benefits. The Health and Well-being value is the highest, at around 50% of the total followed by the increase in land property value of the areas close to the areas of improvement. Overall values have been provided for eight of the 11 benefits.

Figure 8 Overall Economic Value



[6] Making Space for Nature, The Lawton report, Sept 2010, DEFRA. (http://archive.defra.gov.uk/environment/biodiversity/index.htm)

Conclusion

The proposed green infrastructure improvements at Wirral Waters can be shown to have a significant economic impact.

The results suggest that overall economic impact is;

- **£29.4m, 14 times the capital and revenue costs of implementation and management.**
- **GVA alone at £12m is 6 times the costs.**
- **An opportunity to provide training and develop social enterprises linked to implementation, management and use of the green infrastructure assets.**

In addition the investment can be looked at in terms of environmental, social/cultural and quality of place returns

Environmental Return:

- Brownfield converted to green space
- Filtered stormwater runoff to the river
- Return of wildlife to the area
- Reduced air pollution
- Carbon locked up in trees and woodland
- Heat island impacts reduced across the area
- Noise reduction

Social and Cultural Return:

- 10,000 additional visitors per year[7]
- Venues for community festivals
- Enhanced community pride
- Opportunities for food growing
- Skills training and community enterprises linked to the development

[7] This is likely to be an underestimate, the improvements to Bidston alone could, based on new data from Sutton Manor, increase visits by 100,000 per year

- 400 additional volunteers

Quality of Place:

- Green routes throughout the area
- High quality spaces for leisure and recreation
- Enhanced key gateways into the area
- Image of riverfront edge changed from industrial to green
- Views of the river opened to local community and visitors

The **health benefits** are significant, in an area of high health deprivation and some of the worst statistics for child poverty in the country. Improving health and wellbeing will increase the life chances of many people in the areas surrounding the development and reduce costs to the health authorities.

The toolkit also shows that **land and property** value will increase, there is good evidence that people choose to live in attractive settings. The Green Streets programme in The Mersey and Red Rose Forests has demonstrated this time and time again. This is also good news for the development at Wirral Waters, having a thriving area on the doorstep will be important in ensuring that inequalities in wealth and well being are not exacerbated, but are reduced through a long term, well planned and holistic approach to the new development that looks beyond the red line.

The proposals will help the area to adapt to projected **climate change**, **manage surface water** and improve **biodiversity**.

The toolkit also suggests that the investment will also be beneficial for **tourism**.

As ever, the key issue is who pays? There is no simple answer but it does need to be a mix of private, public and importantly community investment, with a focus on ensuring equity of benefit and high quality design and long term management in order to realise the return on each investment.

The benefits that are valued in this report are often benefits that accrue to organisations who may not traditionally see their role as dealing with green

infrastructure, or to a large number of individuals, who each benefit, but again may not wish (or be able) to pay for the benefit. These are the traditional public goods for which we need to find ways to raise the capital and the long term investment to ensure that they are delivered.

The valuation provided does show however that the return on this investment for community and businesses is very significant.

Wirral Waters is a project of national significance, it can lead the way in developing a new way of thinking about how green infrastructure as a key component of development can yield significant, long lasting, surprising and diverse benefits that underpin and add value for the investor and society.