

Government and Public Sector

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# Olympic Games Impact Study

## Final report



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# Introduction

## Background

In May 2004, the International Olympic Committee (IOC) placed London on the shortlist of candidate cities to host the Olympic and Paralympic Games ('the Olympics') in 2012. London subsequently provided further information about its bid in response to the IOC's request and, in July 2005, the IOC announced that London's bid had been successful.

London's bid was being led by London 2012. A multi-agency stakeholder group comprising the British Olympic Association (BOA), Government (represented by the Department for Culture, Media & Sport (DCMS) and the Government Office for London (GoL)), the Greater London Authority (GLA) (including two 'London Family' bodies: the London Development Agency (LDA) and Transport for London (TfL)) and London 2012 set the overall vision and strategic direction for the bid.

Against this background, PricewaterhouseCoopers LLP (PwC) was commissioned by the DCMS, acting on behalf of the stakeholders, to undertake a multi-criteria analysis (MCA) as part of an Olympic Games Impact Study (OGIS) to assess the likely national, regional and local impacts of hosting the Olympics in London. The OGIS was expected to quantify as comprehensively, accurately and robustly as possible the net benefit streams that would arise from hosting the Olympics in 2012 in London based on a comparison of two scenarios: 'with' and 'without' the Olympics. It was also intended to inform the development of strategies to ensure that the full potential benefits of hosting the Olympics can potentially be realised and any

risks mitigated.

The OGIS was designed to generate some important benefits by:

- improving understanding of the potential benefits of hosting the Olympics in London in 2012;
- providing (as far as possible) consistent data/information which can be used by the stakeholders to communicate the benefits of hosting the Olympics in London in 2012;
- contributing to the development of a strategy/action plan for delivering the potential benefits of hosting the Olympics in London 2012; and
- demonstrating to the IOC London's commitment to maximising the potentially beneficial impacts of hosting the Olympics in London 2012.

This report defines the scope of the potential impacts which have been considered as part of the OGIS and summarises the key results which have emerged from the studies undertaken to support the OGIS.

## Potential impacts

The OGIS has used the framework of sustainable development to structure the analysis. Thus, it has examined three categories of impacts: economic, social and environmental. Within this categorisation, the impacts have been

grouped in six separate accounts. Table 1 summarises the structure of the accounts that have been examined in each category.

**Table 1: Sustainable development appraisal framework**

Sustainable development pillar					
Economic		Social		Environmental	
Account	Impact	Account	Impact	Account	Impact
1. Global economic profile	<ul style="list-style-type: none"> <li>• Macroeconomic impact</li> <li>• Infrastructure</li> <li>• Inward investment</li> <li>• Tourism</li> </ul>	3. People, skills and employment	<ul style="list-style-type: none"> <li>• Demographics</li> <li>• Skills</li> <li>• Jobs</li> </ul>	6. Environment	<ul style="list-style-type: none"> <li>• Land/water/air</li> <li>• Biodiversity/ecology</li> <li>• Energy</li> <li>• Waste</li> <li>• Culture/heritage/built form</li> <li>• Amenity</li> <li>• Transport</li> <li>• Housing</li> <li>• Support for environmental industries</li> </ul>
		4. Sporting and cultural legacy	<ul style="list-style-type: none"> <li>• Sporting and cultural facilities</li> <li>• 'Feel good factor'</li> </ul>		
2. Business support, innovation and diversification	<ul style="list-style-type: none"> <li>• New business creation</li> <li>• Supply chain opportunities</li> <li>• Cluster development</li> </ul>	5. Public health	<ul style="list-style-type: none"> <li>• Socio-economic health</li> <li>• Physical health</li> <li>• Mental health</li> <li>• Well-being health</li> </ul>		

The potential net economic, social and environmental impacts of hosting the Olympics in London in 2012 have been analysed by comparing the likely impacts under two scenarios:

- 'with the Olympics' - if London hosts the Olympics; and
- 'without the Olympics' – if London does not host the Olympics.

By highlighting the expected differences between these two scenarios, the aim is to identify the potential net additional impacts of hosting the Olympics.

The potential impacts have been examined across two dimensions:

- three geographies: the UK as a whole, London and North East London;

and,

- three time periods: the period before the Olympics (from the present until 2012), the period during the Olympics themselves (in the summer of 2012) and the period after the Olympics (from 2012 up to 2020).

### Approach to the OGIS

The approach to the OGIS has focused on drawing together information and analysis from a large number of different sources available in October 2004. These include other research specifically commissioned for the OGIS as well as existing studies prepared as part of the development of London's plans for hosting the Olympics in 2012. Consequently, the OGIS has relied upon numerous, diverse sources for its inputs. The sources used are

highlighted as appropriate in this summary report.

## Interpreting the results of the OGIS

The results of the OGIS need to be interpreted with caution for several reasons:

- the two scenarios (i.e. the 'with' and 'without' Olympics scenarios) used to underpin the assessment of the impacts in different accounts are not always consistent, in large part because the assessments were made at different points in time and by different researchers with the result that there is a significant risk that the analyses are based on different views of what hosting the Olympics in London will involve: for example, the public health and environmental impact assessments were both completed before the results of the economic impact analysis was complete and the expected impact on jobs and incomes known;
- there are important overlaps between some of the accounts (e.g. GDP and employment): care is needed to avoid double-counting the same impact;
- different geographical definitions have been used, especially for the local impact assessments within London: some focus on a narrowly defined area such as the proposed Olympic Zone whilst others look more broadly at East London, as defined by the LDA and GLA;
- different time periods have been analysed, especially in the legacy period (e.g. part of the economic analysis covers the period to 2016 whilst other analyses cover the period through to 2020); and
- some of the impacts have not been quantified (e.g. the cultural, the public health and the environmental impacts) and, even where quantitative assessments have been produced, the units of measurement are not always the same.

Finally, as previously noted, most of the data and information have been drawn from analyses which have been undertaken by other researchers and have not been 'validated' as part of this element of the OGIS.

## Report structure

The remainder of this report is set out in four further parts:

- Section 2 summarises the analysis of the economic impacts;
- Section 3 summarises the analysis of the social impacts;
- Section 4 summarises the analysis of the environmental impacts; and
- Section 5 draws together the key conclusions which have emerged from the OGIS.

A separate report contains a more detailed analysis and set of findings.

# Economic impacts

## Introduction

This section of the OGIS considers the potential economic impacts of London hosting the 2012 Olympics. It considers the impacts in two accounts:

- the global economic profile which includes the overall macroeconomic impact together with the impacts on infrastructure, inward investment and tourism; and
- business support, innovation and diversification which includes the effects on new business creation, supply chain opportunities and cluster development.

## Global economic profile

### Macroeconomic impact

Hosting the Olympic Games in 2012 might be expected to give rise to a tangible positive effect on:

- the overall level of economic activity (as measured by GDP);
- the level investment in (hard) infrastructure;
- the volume of inward investment; and

- the pattern of tourism.

The analysis of the likely impact on GDP 'with' and 'without' the Olympics the 2012 Olympics in London has been undertaken by Dr Adam Blake at the University of Nottingham using a computable general equilibrium model (CGEM) developed specifically for the purpose<sup>1</sup>. The CGEM differs in several important respects from the input-output based approaches more traditionally used for economic impact analysis. In particular, it allows more flexibility in the key economic relationships between different parts of the economy and it requires each sector to balance income and expenditure. As a result, an approach based on a CGEM is likely to incorporate more of the costs associated with projects and so the impacts that emerge tend to be smaller than those from input-output based analyses.

Table 2 summarises the expected economic impacts which have emerged from the modelling. It shows that total UK GDP in the period from 2005 to 2016 would be increased by £1.9 billion as a result of the Olympics. Over the same period, the increase in London's GDP is estimated at £5.9 billion and the increase in (North) East London's GDP is £0.5 billion.

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<sup>1</sup> 'The Economic Impact of the Olympics', Dr Adam Blake, University of Nottingham, 2005

**Table 2: Summary of expected macroeconomic impact (change in GDP, £ million)**

Spatial level	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2016)	Overall (2005-2016)
UK	248	1,067	622	1,936
London	3,362	925	1,613	5,900
North East London <sup>2</sup>	464	31	31	525

The results in Table 2 for London and North East London reflect the expected place of work (rather than residence) of those whose employment is expected to generate the increased level of GDP. In practice, a significant proportion of 'London's' GDP is generated by people who live outside London but who commute to work in London. Likewise, the nature of the London labour market means that many people move within the capital for work. This means that some of the GDP generated in London (or North East London) will be earned by workers who live in other regions of the country (or other parts of the capital). Their earnings and spending will, therefore, benefit the economies of these parts of the country with the result that residence base estimates of GDP could be significantly different from those cited in Table 2.

While the overall impact on GDP provides one monetary measure of the potential benefits of hosting the Olympics, it masks what are likely to be significant changes at a sector level which are considered further below.

In terms of how these impacts are spread over time it is apparent that the largest economic impact in GDP terms (£3.362 billion) would occur in London during the pre-Games construction period whereas, for the UK as a

<sup>2</sup> The economic modelling at sub-regional level has been undertaken for each of the five areas used in the London Plan (North, South, East West and Central): the figures quoted are those for East London.

whole, the impact on GDP would be greatest over the period of the Olympics (at a level £1.067 billion). These differences reflect the assumption – under the current model - that in the 'with Olympics' scenario resources will be displaced from the rest of the UK to London compared to the 'without Olympics' scenario (during both the pre- and post-event Games periods).

Many assumptions underpin the CGEM but two key ones are around:

- the expected pattern of spending associated with the development of the Olympics infrastructure and the organisation and delivery of the Olympics; and
- the expected pattern of visitor numbers and expenditure.

Some insight into the significance of the key assumptions can be gleaned from the analysis of the sensitivity of the results which has been undertaken for both the UK and London. The sensitivity analysis assesses the impact of different combinations of assumptions on the expected economic impact (i.e. on GDP) by repeatedly solving the models for different combinations of assumptions within the agreed parameters. It, therefore, generates a probability distribution which shows the likelihood that different levels of economic impact will be achieved.

Table 3 summarises some of the key results. It shows, for example, that there is an 84.4% chance that the Olympics will have a positive impact on UK GDP over the period 2005-2016: in London, the comparable probability is 95.3%. It also shows that there is a 10% chance that the UK will lose £517 million.

The CGEM approach has some important limitations which need to be borne in mind in interpreting the results:

- separate models have been developed and used to assess the UK and London impacts: the regional impacts do not come from a multi-region model;
- some of the parameters are fixed such that effects of supply side investments may not be fully captured in the results: for example, the impact of transport improvements in enabling people to get to and from

work more easily may not be fully incorporated; and

- the ‘without Olympics’ pattern of spending, especially on infrastructure, is less well defined than that ‘with the Olympics’.

**Table 3: Summary of sensitivity analysis around macroeconomic impact on GDP**

	UK			London		
	£ million	10% chance less than (£ million)	Probability positive (%)	£ million	10% chance less than (£ million)	Probability positive (%)
2005-2011	248	-204	75.9	3,362	-2,377	77.3
2012	1,067	513	99.3	925	665	100.0
2013-2016	622	-875	70.3	1,613	-1,169	77.1
2005-2016	1,936	-517	84.4	5,900	1,386	95.3

Finally, and reflecting the points above, the CGEM approach takes no account of the potential impact of specific public policy interventions designed to maximise the benefits and mitigate any negative impacts.

### Infrastructure

Besides examining the expected overall impact on GDP, the University of Nottingham analysis enables the economic effects to be decomposed to their constituent parts. One important component is that expected to arise from expenditure on infrastructure enhancements. Table 4 summarises the results: they suggest that for the UK as a whole and for London between 11 and 12% of the effect on GDP is attributable to expenditure on infrastructure. No assessment has been undertaken at the local level and no breakdown of the impacts in different time periods is available.

**Table 4: Summary of expected impacts arising from infrastructure spending (impact on GDP, £ million)**

Spatial level	Overall (2005-2016)
UK	196
London	623

### Inward investment

Studies of the impact of previous Olympics have indicated that inward investment has been attracted by preparations for the Olympics which has increased the host cities global profile and by the legacy of the additional facilities afterwards. London is already an established global city and a prime destination for inward investment in the UK and Europe. London, however, faces competition from other established and emerging cities, so by raising the profile of London compared to its European competitors, the Olympics could be used to promote London internationally as a business destination and to attract additional investment into London beyond any linked directly to the Olympics. The largest opportunities are likely to be for East London itself to attract inward investment projects given the boost it will receive in awareness and infrastructure. In particular, it offers the opportunity for targeted campaigns for Thames Gateway to promote “new” London.

### Tourism

Hosting the Olympics in London offers the opportunity to attract more visitors to London and, potentially, to other parts of the UK. It also offers the opportunity to promote London as a more attractive international tourist destination and, so, to stimulate a more sustained impact on visitor numbers and/or spending. The University of Nottingham’s analysis of the potential economic impact of the Olympics includes an assessment of the tourism related benefits in terms of their contribution to GDP. The results are summarised in Table 5. They are all included within the overall assessment of the potential economic impact.

**Table 5: Summary of expected impacts on tourism (change in gross value added (£ million))**

Spatial level		Pre-event (2005-2011)	During event (2012)	Legacy /post-event (2013-2016)	Overall (2005-2016)
UK	Domestic-	-	-2	454	518
	Foreign	-	66		
London	Domestic-	-	1	162	244
	Foreign	-	81		

Besides the high-level assumptions and limitations associated with the Nottingham work, there are also some specific assumptions in relation to the analysis of the tourism impacts:

- visitor spending during the event is based on London 2012's ticket allocation model;
- the number of days that each visitor would spend in the UK is estimate based on various sources;
- spending per day by visitors is estimated based on latest data and assumptions regarding which type of visitor most closely resembles each category of Olympics visit category; and
- the extent to which the Olympics attract visitors to London in the long-term is assessed based on assumptions derived from the analysis of trends in visitor arrivals before and after recent Olympics.

### **Business support, innovation and diversification**

The second of the economic accounts is concerned with the potential

impacts arising from the Olympics in terms of business support, innovation and diversification. The rationale for inclusion of these impacts is recognition of the potential stimulus to economic regeneration of the Lower Lea Valley provided by the Olympics. As such, the key issues are as much around developing an understanding of the potential economic impacts of the Olympics as they are around identifying what can be done to secure the maximum benefit for the local area, for London and for the UK as a whole.

Table 6 summarises the expected impact of the Olympics on the number of firms in the UK and London: no results were provided for North East London. It shows that over the period from 2005 to 2016 there would be an average of 119 additional firms across the UK as a whole and 439 additional firms in London with the biggest impact arising during the period of the Olympics (i.e. 2012).

**Table 6: Summary of expected impacts on new business creation (average change in number of firms)**

Spatial level	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2016)	Overall (2005-2016)
UK	56	526	127	119
London	317	902	535	439

The major growth sectors in the UK would be construction and passenger land transport, reflecting the expected impacts during the period of the Olympics whilst the impacts in London would be concentrated in three sectors: passenger land transport, business services and sports facilities.

As a result, there are likely to be significant opportunities to support new firm development, supply chain improvements and cluster formation within the local North East area and wider London economy.

Whilst the economic analysis points to the Olympics having the potential to generate positive economic impacts, consideration has been given to what support would be appropriate to maximise these benefits, especially locally in one of London's most deprived areas. Various mechanisms have been identified to ensure that the potential economic (and social) benefits are

maximised. For example, consideration is being given by the LDA and other public sector bodies to examining how to maximise the creation of employment opportunities which can be filled by local people before, during and after the Olympics through, for example, setting up a 'New Olympics Club' of suppliers and ensuring relative wage levels for business products and services supplied to the Olympics are consistent with sustainable living standards within North East London.

# Social impacts

## Introduction

This section of the OGIS considers the potential social impacts of London hosting the 2012 Olympics. It examines the impacts on three accounts:

- people, skills and employment;
- the sporting and cultural legacy: this account includes the so-called ‘feel good factor’ although arguably this impact is also relevant to other accounts; and
- public health which includes socio-economic, physical, mental and well-being health.

## People, skills and employment

### Baseline position

In considering the potential impacts of the Olympics in terms of people, skills and employment, especially the local level impacts within the Lower Lea Valley and North East London more generally, it is important to have regard to the baseline conditions in the area. One way of doing this is by examining the results of the ODPM’s Index of Multiple Deprivation (IMD)<sup>3</sup>.

<sup>3</sup> The IMD is a Super Output Area level measure of multiple deprivation and is made up of seven domain indices which relate to income deprivation,

Table 7 shows the distribution of the ranking of the Super Output Areas (SOAs) in the Olympic Zone, the five Olympic Boroughs, London and England. It highlights very clearly the current level of income deprivation in and around the Olympic Zone: 42% of the SOAs in the Olympic Zone and 20% of those in the five Olympic Boroughs are amongst the 5% most deprived in England.

**Table 7: Ranking of Super Output Areas on Income Deprivation Domain of Index of Multiple Deprivation (% of SOAs, 2004)**

Ranking on IMD (% of all SOAs)	Olympic Zone	Five Olympic Boroughs	London	England
> 10 – 15	13%	17%	8%	5%
> 5 – 10	20%	19%	9%	5%
> 1 – 5	38%	18%	6%	4%
Up to 1	4%	2%	1%	1%

employment deprivation, health deprivation and disability, education, skills and training deprivation, barriers to housing and services, living environment deprivation and crime. Two supplementary indices consider income deprivation affecting children and income deprivation affecting older people.

Table 8 shows less marked levels of deprivation in relation to employment in and around the Olympic Zone: 20% of the SOAs in the Olympic Zone and 10% of those in the five Olympic Boroughs are amongst the 10% most deprived in England.

**Table 8: Ranking of Super Output Areas on Employment Deprivation Domain in Index of Multiple Deprivation (% of SOAs, 2004)**

Ranking on IMD (% of all SOAs)	Olympic Zone	Five Olympic Boroughs	London	England
> 10 – 15	25%	15%	6%	5%
> 5 – 10	16%	9%	4%	5%
> 1 – 5	4%	1%	1%	4%
Up to 1	0%	0%	0%	1%

Table 9 shows a more positive position in relation to education, skills & training deprivation in and around the Olympic Zone: 5% of the SOAs in the Olympic Zone and 2% of those in the five Olympic Boroughs are amongst the 10% most deprived in England.

**Table 9: Ranking of Super Output Areas in Education, Skills & Training Deprivation Domain on Index of Multiple Deprivation (% of SOAs, 2004)**

Ranking on IMD (% of all SOAs)	Olympic Zone	Five Olympic Boroughs	London	England
> 10 – 15	9%	5%	3%	5%
> 5 – 10	5%	2%	1%	5%
> 1 – 5	0%	0%	0%	4%
Up to 1	0%	0%	0%	1%

## Employment

Staging the Olympic Games in the Lower Lea Valley will stimulate a vital economic regeneration programme in London's poorest and most disadvantaged area. The Olympic Park will provide local people with significant improvements in job opportunities, education and skills and training.

The University of Nottingham's analysis of the economic impact of hosting the Olympics in London has estimated the potential impact on employment in the UK, London and East London. Table 10 summarises the key results<sup>4</sup>. The number of full time equivalent ('fte') jobs likely to be created or supported by the anticipated increases in expenditure and investment between 2005 and 2016 ranges from 38,000 ftes in London and 8,000 ftes in the UK as a whole. In interpreting these results, it is important to recognise that they effectively double-count the impact on GDP.

**Table 10: Summary of expected impacts on employment**

Spatial level	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2016)	Overall (2005-2016)
UK	2,955	3,261	1,948	8,164
London	25,824	3,724	9,327	38,875
North East London <sup>5</sup>	7,344	311	311	7,966

The role of the Olympics in supporting regeneration of North East London and ensuring a sustainable legacy from hosting the Olympics is apparent from the types of social impacts that could be generated as a result of

<sup>4</sup> The employment estimates are derived using the same assumptions as underpin the macroeconomic impact.

<sup>5</sup> The economic modelling at sub-regional level has been undertaken for each of the five areas used in the London Plan.

hosting the Olympics (compared to a 'without Olympics' scenario). Evidence of the social benefits from various sports-related initiatives across the UK suggests that the Olympics could be instrumental in supporting wider regeneration policies, for example by:

- empowering disadvantaged groups through employment opportunities related to the Olympics;
- improving employment prospects through experience gained before and during the Olympics; and,
- increasing social integration and co-operation through development of local enterprise and other initiatives focussed on the Olympics.

Such effects could also influence crime rates, educational attainment and overall community well-being and sense of place.

## **Sporting and cultural legacy**

As a result of hosting the Olympics in 2012, London is expected to benefit from a significant sporting and cultural legacy.

### **Sporting legacy**

The sporting legacy would take a number of forms:

- it would enhance and/or accelerate investment in sporting facilities not only within the Olympic Zone (and the areas immediately surrounding it) but also in other parts of the UK, for example where training facilities are provided; and
- it would contribute to increased participation in sport, and this would be expected to lead to knock-on social and physical impacts, for example in terms of health and well-being.

The potential physical legacy of the Olympics is evident from London's candidate file which identifies the additional venues which will be either constructed or refurbished specifically for the Olympics. It shows that the

Olympics will provide an opportunity to enhance the sports infrastructure of the UK, and London in particular. The cluster of sport venues in the Lea Valley retained after the Games will form The London Olympic Institute. Specific plans for the facilities to be retained in the Park include:

- the Olympic Stadium which will be converted to a 25,000 seat multipurpose venue with athletics at its core and which will offer training facilities, offices and sports science and sports medicine facilities;
- an aquatics centre with two 50m pools, a 25m diving pool and fitness centre which will accommodate elite, development, local club and community users and will have a permanent capacity for 3,500 spectators;
- a velopark, a multi-discipline cycling centre, that includes a 3,000 seat velodrome, a road track, competition and recreational BMX tracks and a mountain biking course for use by all levels of cyclists;
- a hockey centre providing training and competition facilities for hockey at all levels; and
- an indoor sport centre which will be converted from one of the sports arenas to become a training and competition venue and a regional home for a range of indoor sports, with flexible seating for up to 10,000.

The London Olympic Institute will be accessible for all levels of ability and blend sport, culture and the environment in a way that makes sports an integral part of the community.

The social and economic value of these facilities has not been directly assessed.

In addition, the Olympics will potentially provide a focus for achieving wider Government targets in relation to improved health through sporting activity. For example, as indicated in the 'London Plan for Sport and Physical Activity 2004 to 2008', it is hoped that the Olympics will act as an 'inspiration' to people increasing their participation in sport and, subsequently, maintaining this interest with resultant benefits in terms of productivity, health and

community engagement. No substantive work has, however, been done to quantify the potential legacy impacts on sporting participation.

### Cultural legacy

The Olympic Park will provide local people with significant improvements in cultural entitlements and social integration. The Olympics will also promote accessibility and inclusion, important objectives in such a diverse city as London. In particular, it will accelerate the development of accessible facilities for disabled people. The Olympics will also strengthen and enrich cultural activity, building on the rich heritage of east London and providing new opportunities and facilities for the creative industries.

### 'Willingness to pay'

One important input to the OGIS has been a study designed to assess people's 'willingness to pay' for the intangible benefits associated with hosting the Olympics in London<sup>6</sup>. The key results of the study are summarised in Table 11. For the UK as a whole, the value of the intangible benefits of hosting the Olympics are estimated to be £3.2 billion, with approaching 80% of this benefit accruing to households living outside London. This implies that, on average, London households are willing to pay £22 each per annum for 10 years in order to host the Olympics whereas households in Glasgow and Manchester, the two other locations where fieldwork was undertaken besides London, are willing to pay £12 per household per year over the same period.

**Table 11: Willingness to pay for the intangible benefits of the Olympics (£ million)**

Spatial level	Overall
UK	3,209
London	687

<sup>6</sup> 'Olympic Games Impact Study – Stated Preference Analysis', eftec, 2005

This positive valuation of the intangible benefits is consistent with other results emerging from the study:

- attitudes towards the Olympics are very positive with 79% of Londoners supporting the bid ('strongly support' or just 'support') and 81% of those outside London supporting the bid; and
- the vast majority of respondents (72% in London and 78% in Manchester and Glasgow) think that intangible benefits are the most important or, at least, as equally important as the tangible benefits.

The most important intangible benefits identified in the research are those which have the broadest appeal (i.e. the uniting of people, the creation of a 'feel good factor', enhanced national pride, motivating/inspiring children and the legacy of sports facilities). In contrast, less importance was attached to the expected impacts on the physical environment and the promotion of healthy living. Analysis of the perceived intangible disbenefits suggests that the most important are those which are expected to be relatively short-lived (i.e. they will arise during the Olympics and in the immediate period before and after the Olympics).

The significance of these results lies in their interpretation. On the one hand, the monetary value attached to the intangible benefits of hosting the Olympics can effectively be regarded as additional to the impacts on GDP discussed in the previous section. On the other hand, many of the benefits which individuals are expressing the willingness to pay for correspond to the types of benefits being covered in a number of the non-economic accounts used to structure the OGIS.

### Public health

The potential impacts of the Olympics on public health have been assessed qualitatively using a Rapid Health Impact Assessment<sup>7</sup>. This reflects the dearth of relevant quantitative data.

<sup>7</sup> The research was undertaken by ERM.

The research examined four categories of impact largely based on a literature review and a series of consultations and workshops with key stakeholders, especially within London:

- the socio-economic health impact which takes into account how potential socio-economic developments affect public health through their effects, for example, on levels of income and job security, on social cohesion and on access to housing and education;
- the physical health impact which traces the effects of changes in the quality of the physical environment, the amenity and the transport system;
- the mental health impact which reflects individuals' ability to balance all aspects of life arising from their social, economical, physical and emotional interactions by managing their surroundings and making choices throughout their lives; and
- the well-being health impact which reflects the extent to which individuals (expect to) feel contented (i.e. happy, healthy and prosperous): a negative impact can be reflected in depression, anxiety and stress.

By its very nature, the scope of the public health impact assessment is broad and there are strong links and interdependencies with other dimensions of the framework used for the OGIS. Consequently, care is needed to check for consistency between the impacts and to avoid double counting.

### Baseline conditions

As context for considering the potential impacts of the Olympics on public health, especially the local level impacts within the Lower Lea Valley and North East London more generally, it is useful to look at the evidence from the ODPM's IMD. Table 12 shows the marked levels of deprivation in relation to health in and around the Olympic Zone: 32% of the SOAs in the Olympic Zone and 14% of those in the five Olympic Boroughs are amongst the 10% most deprived in England.

**Table 12: Ranking of Super Output Areas on Health Deprivation Domain Index of Multiple Deprivation (% of SOAs, 2004)**

Ranking on IMD (% of all SOAs)	Olympic Zone	Five Olympic Boroughs	London	England
> 10 – 15	23%	18%	5%	5%
> 5 – 10	26%	12%	3%	5%
> 1 – 5	6%	2%	1%	4%
Up to 1	0%	0%	0%	1%

### UK level impacts

As Table 13 shows, the UK level public health outcomes are expected to be largely beneficial reflecting the expected positive impact of the Olympics on the promotion of healthier living including increased physical activity, improved dietary intake, improved provision and enhanced access to sports facilities and increased social interactions. These positive health effects reflect a range of known physical, social and mental benefits associated with hosting the Olympics. These include a contribution towards preventing and lowering levels of overweight and obese individuals, promoting healthier beginnings for children and engaging communities in social and recreational events.

**Table 13: Summary of expected public health impacts across the UK**

Impact	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2020)
Socio-economic health	Slightly positive	Positive	Slightly positive
Physical health	Neutral	Very positive	Positive
Mental health	Neutral	Slightly positive	Slightly positive

Impact	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2020)
Well-being health	Neutral	Positive	Slightly positive

### London level impacts

The expected London level public health benefits are similar to those of the UK (see Table 14). They are, however, heightened by the local development and enhancement of facilities, amenities and the opportunities presented by the need to meet the demand from Olympic related tourism activities. The additional health benefits, therefore, reflect:

- the enhancement of London's transport system which improves access to employment, education, housing, recreation, social networks and health care;
- increased access to the Olympic sporting facilities before and after the Olympics which promotes physical activity and healthier lifestyles; and
- increased promotion of disability awareness and improvement to London wide access through the Paralympics.

**Table 14: Summary of expected public health impacts in London**

Impact	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2020)
Socio-economic health	Very positive	Positive	Very positive
Physical health	Negative	Positive	Very positive
Mental health	Negative	Slightly negative	Positive
Well-being health	Negative	Positive	Positive

### North East London impacts

The most positive health impacts are potentially to be experienced in the Lower Lea Valley (see Table 15). As previously noted, this area is currently characterised by poor health arising from a combination of a poor environment, high unemployment, low educational attainment and poor housing. Local communities are, therefore, expected to benefit from the economic and environmental improvements (which are discussed further in other sections). These include the employment opportunities that will arise, improved community involvement and volunteer programmes which enable and promote interaction, foster a shared sense of belonging and develop links within and between local communities and cultures. They also include replacement of contaminated brownfield sites and derelict buildings with high quality areas of open space and parkland. Potentially, the impacts could have positive impacts on many aspects of life including the quality of the environment, lifestyles, security, recreation and personal development skills and coping skills.

During the period of preparation for the Olympics, however, local communities in proximity to the site are expected to experience up to five years of intensive development. The intensive level of construction required to transform the Lower Lea Valley into a renewed, healthy and desirable location and so deliver the Olympics has both costs and benefits. The costs reflect prolonged exposure to construction activities, potentially aggravating existing levels of poor health. However, intensive construction may provide a health benefit which could potentially outweigh such impacts by delivering significant environmental improvements, employment and education opportunities contributing to improving physical, mental and social health. Other negative health impacts arise from an increase in visitation during the Olympics which would potentially disrupt services, access to facilities and social networks, with increased risk from communicable disease and traffic related accidents.

**Table 15: Summary of expected public health impacts in North East London**

Impact	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2020)
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Impact	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2020)
Socio-economic health	Very positive	Positive	Very positive
Physical health	Negative	Positive	Very positive
Mental health	Negative	Slightly negative	Positive
Well-being health	Negative	Positive	Positive

### Summary

Overall, the public health impacts appear to be significantly positive, particularly during the Olympics and the legacy phase. These benefits are experienced most strongly in the Lower Lea Valley as a result of improved access to new sporting and health care facilities. The health benefits are, however, anticipated to extend to London and across the UK as a whole due to the general promotion of physical and sporting activity.

# Environmental impacts

## Introduction

This section of the OGIS considers the potential environmental impacts of London hosting the 2012 Olympics. It considers the impacts on land/water/air, biodiversity/ecology, energy use, waste, culture/heritage/built form, amenity, transport, housing and support for environmental industries.

## Approach

Like the public health impacts, the environmental impacts of the Olympics have been assessed largely qualitatively as part of the Lower Lea Valley Olympic and Legacy Planning Applications submitted by the LDA in January 2004. This largely reflects the absence of relevant quantitative data. Moreover, the assessments which have been undertaken have been derived by reference to a baseline position for the Lower Lea Valley in North East London (i.e. a 'do nothing' option<sup>8</sup>). This means that they will tend to overstate the potential environmental impacts, especially locally, since, even without the Olympics, the Lower Lea Valley is expected to be subject to a major programme of regeneration that will transform the area in physical and

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<sup>8</sup> Although the Lower Lea Valley Regeneration Masterplan sets out a 'without Olympics' regeneration strategy for the Lower Lea Valley and identifies the associated physical environmental impacts, this Masterplan had not been formally approved at the time of the OGIS and no environmental or sustainability appraisal of the Masterplan had been undertaken.

socio-economic terms. Furthermore, London plans for the Olympics have developed significantly since the planning application and this means that the assumptions about development which underpin the different scenarios are not necessarily consistent with those used in other parts of the OGIS.

Furthermore, no formal assessment of the environmental impacts of the Olympics has been undertaken either at the London or the UK level. Instead, the potential impacts have been developed primarily on the basis of consultations with both the LDA and London 2012. In addition, the GLA's Economy and Environment model (for London) has been run using the results emerging from the University of Nottingham's economic analysis.

## Baseline conditions

In considering the potential environmental impacts of the Olympics, especially the local level impacts within the Lower Lea Valley and North East London more generally, it is important to have regard to the baseline conditions in the area. One point of reference is the ODPM's IMD.

Table 16 shows the distribution of the ranking of the Super Output Areas (SOAs) in the Olympic Zone, the five Olympic Boroughs, London and England in relation to access to housing. It highlights very clearly the current level of housing deprivation in and around the Olympic Zone: 83% of the SOAs in the Olympic Zone and 60% of those in the five Olympic Boroughs are amongst the 10% most deprived in England.

**Table 16: Ranking of Super Output Areas on Barriers to Housing Deprivation Domain Index of Multiple Deprivation (% of SOAs, 2004)**

Ranking on IMD (% of all SOAs)	Olympic Zone	Five Olympic Boroughs	London	England
> 10 – 15	12%	23%	13%	5%
> 5 – 10	43%	34%	15%	5%
> 1 – 5	32%	22%	13%	4%
Up to 1	10%	4%	2%	1%

Table 17 shows the distribution of the ranking of the SOAs in the Olympic Zone, the five Olympic Boroughs, London and England in relation to the crime domain. It highlights very clearly the current level of deprivation in and around the Olympic Zone: 47% of the SOAs in the Olympic Zone and 33% of those in the five Olympic Boroughs are amongst the 10% most deprived in England.

**Table 17: Ranking of Super Output Areas on Crime Domain Index of Multiple Deprivation (% of SOAs, 2004)**

Ranking on IMD (% of all SOAs)	Olympic Zone	Five Olympic Boroughs	London	England
> 10 – 15	10%	11%	8%	5%
> 5 – 10	17%	14%	8%	5%
> 1 – 5	17%	14%	7%	4%
Up to 1	13%	5%	2%	1%

Table 18 shows the distribution of the ranking of the SOAs in the Olympic

Zone, the five Olympic Boroughs, London and England in relation to access to the living environment. It highlights the level of deprivation in and around the Olympic Zone: 13% of the SOAs in the Olympic Zone and 23% of those in the five Olympic Boroughs are amongst the 10% most deprived in England.

**Table 18: Ranking of Super Output Areas on Living Environment Domain Index of Multiple Deprivation (% of SOAs, 2004)**

Ranking on IMD (% of all SOAs)	Olympic Zone	Five Olympic Boroughs	London	England
> 10 – 15	20%	17%	11%	5%
> 5 – 10	10%	15%	10%	5%
> 1 – 5	2%	7%	5%	4%
Up to 1	1%	1%	1%	1%

## Impact on the Lower Lea Valley

In the Lower Lea Valley the scale and pace of regeneration following the Olympics are expected to generate substantial environmental benefits as Table 19 illustrates. These benefits are anticipated to be seen in terms of remediation of contaminated sites, redevelopment of brownfield land, restoration of river corridors, improvements to water quality, investment in low carbon energy infrastructure, undergrounding of electricity pylons, creation of a major urban green space and upgrading of other amenity areas. Without the Olympics there will be a certain amount of environmental improvement driven by limited 'make good' principles but this would fall well short of the standards under the 'with Olympics' scenario and would also be likely to occur later. Importantly, the Olympic Village will become a new, desirable and sustainable residential community with 3,600 new housing units.

**Table 19: Summary of expected environmental impacts in the Lower Lea Valley**

Impact	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2020)
Land/water/air	Very negative	Positive	Very positive
Biodiversity/ecology	Negative	Very negative	Very positive
Energy	Slightly positive	Very positive	Very positive
Waste	Negative	Slightly positive	Positive
Culture/heritage/built form	Very negative	Negative	Negative
Amenity	Slightly negative	Positive	Very positive
Transport	Slightly negative	Slightly negative	Positive
Housing	Slightly negative	Neutral	Positive
Support for environmental industries	Neutral	Neutral	Positive

The main negative impacts of the Olympics on the environment will be concentrated during the limited pre-event, construction phase. They will affect the Lower Lea Valley in particular since it will be the primary focus of the intensive construction programme. It is anticipated that there will be a temporary deterioration of air quality due to the dust nuisance arising from the construction and demolition activities. There will also be an inevitable increase in road transport for movement of materials and waste (despite efforts to use rail and water transport to the extent possible). Other negative environmental impacts concern increased soil and groundwater contamination related to the disturbance effects of the construction activities, disruption to existing eco-systems from relocation/loss of habitats, loss of waste management infrastructure and damage to the built environment and cultural heritage from the demolition process.

## Impact on London and the UK

At the London and UK wide levels, the main impacts are expected to arise as a result of the showcasing effect of staging a ‘Sustainable Games’. This is anticipated to generate significant interest in applying new approaches to sustainable event management and the creation of new sustainable communities. These impacts, which are expected to be strongest in the areas of land/water/air, energy, waste and housing, could last well beyond the hosting of the Olympics. If there is effective awareness raising and education during the course of the development programme, they could also exert a positive influence on the implementation of other sporting events and regeneration schemes across the country.

During the Olympics, London as a whole and those UK sites hosting training camps and Olympic events can expect a temporary deterioration in environmental quality associated with the increased volume of people attending/participating in the Olympics and their related transport movements. Mitigation measures to minimise the negative impact of the construction activity and the hosting of the Olympics will be critical (e.g. adopting zero waste emission standards and encouraging international visitor arrivals by rail rather than air).

Table 20 shows the expected impacts at the London level and Table 21 summarises the expected impacts at the UK level.

**Table 20: Summary of expected environmental impacts in London**

Impact	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2020)
Land/water/air	Negative	Positive	Positive
Biodiversity/ecology	Negative	Negative	Positive
Energy	Neutral	Positive	Positive
Waste	Negative	Negative	Positive
Culture/heritage/built form	Neutral	Positive	Neutral

Impact	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2020)
Amenity	Neutral	Neutral	Positive
Transport	Slightly negative	Neutral	Positive
Housing	Neutral	Neutral	Positive
Support for environmental industries	Neutral	Neutral	Neutral

**Table 21: Summary of expected environmental impacts across the UK**

Impact	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2020)
Land/water/air	Slightly negative	Positive	Positive
Biodiversity/ecology	Negative	Neutral	Neutral
Energy	Neutral	Positive	Positive
Waste	Neutral	Neutral	Positive
Culture/heritage/built form	Neutral	Positive	Neutral
Amenity	Neutral	Neutral	Neutral
Transport	Slightly negative	Neutral	Neutral
Housing	Neutral	Neutral	Positive
Support for environmental industries	Neutral	Neutral	Neutral

### GLA Economy and Environment model

The GLA's Economy and Environment model has also been used to

estimate the potential impacts in London on CO<sub>2</sub> and air quality impacts (PM and NO<sub>x</sub>), water consumption and waste under both a 'with' and 'without' Olympics scenario. The model, which is driven by the employment projections arising from the economic analysis undertaken by the University of Nottingham, predicts that there will be a very small environmental impact. In most cases, the cumulative impact of the Olympics (over the 'without Olympics' scenario) is less than 0.2% except for construction and demolition waste and reuse where the additional impacts are 0.28% and 0.21% respectively. This is consistent with the modest employment impacts emerging from the economic analysis.

### Summary

In summary, the overall environmental impact is expected to be significantly positive in the Lower Lea Valley during and after hosting the Olympics although there are some negative environmental impacts to be managed during the construction process. At the London and UK wide levels the impacts are generally positive and driven primarily by the showcasing effects of hosting the Olympics (e.g. in the Thames Gateway).

# Conclusions

This final section summarises the key conclusions which emerge from the OGIS.

## Baseline conditions

The Olympics will be focused on an area which is amongst the most deprived in England: 24% of the SOAs in the Olympic Zone were in the worst 5% of areas across England whereas only 3% of those in London fell into this category (and 11% of the five boroughs<sup>9</sup>). This highlights the potential for the Olympics to contribute to regeneration.

## Economic impacts

The Olympics is expected to raise UK GDP in the period from 2005 to 2016 by £1.9 billion. Over the same period, the expected increase in London's GDP (on a workplace base) is £5.9 billion and the increase in (North) East London's GDP (on a similar basis) is £0.5 billion. In practice, some of this benefit is likely to accrue to non-London residents. Table 22 summarises the key results.

<sup>9</sup> The five boroughs are Greenwich, Hackney, Newham, Tower Hamlets and Waltham Forest

**Table 22: Summary of expected macroeconomic impact (change in GDP, £ million)**

Spatial level	Pre-event (2005-2011)	During event (2012)	Legacy/post-event (2013-2016)	Overall (2005-2016)
UK	248	1,067	622	1,936
London	3,362	925	1,613	5,900
North East London <sup>10</sup>	464	31	31	525

The greatest economic impact in GDP terms would occur in London during the pre-Games construction period whereas, for the UK as a whole, the impact on GDP would be greatest over the period of the Olympics (at a level £1.067 billion). These differences reflect the assumption that in the 'with Olympics' scenario resources will be displaced from the rest of the UK to London compared to the 'without Olympics' scenario (during both the pre- and post-event Games periods).

The overall impact on GDP masks significant changes at a sector level.

<sup>10</sup> The economic modelling at sub-regional level has been undertaken for each of the five areas used in the London Plan.

## Social impacts

Staging the Olympic Games in the Lower Lea Valley will stimulate a vital economic regeneration programme in London's poorest and most disadvantaged area. In total, the number of full time equivalent ('fte') jobs likely to be created or supported by the Olympics between 2005 and 2016 is 38,000 ftes in London and 8,000 ftes in the whole of the UK. In interpreting these results, it is important to recognise that they effectively double-count the impact on GDP.

The Olympics may also create sustainable social impacts, for example by empowering disadvantaged groups through employment opportunities, improving employment prospects through experience gained before and during the Olympics and increasing social integration and co-operation through development of local enterprise and other initiatives focussed on the Olympics. Such effects could also influence crime rates, educational attainment and overall community well-being and sense of place.

By hosting the Olympics in 2012, London expects to achieve a significant sporting and cultural legacy.

The sporting legacy would take a number of forms:

- it would enhance and/or accelerate investment in sporting facilities not only within the Olympic Zone but also in other parts of the UK; and
- it would contribute to increased participation in sport.

The potential physical legacy of the Olympics is evident from London's candidate file which identifies the additional venues which would be either constructed or refurbished specifically for the Olympics. It shows that the Olympics will provide an opportunity to enhance the sports infrastructure of the UK, and London in particular.

Analysis of individuals 'willingness to pay' for the intangible benefits associated with hosting the Olympics in London indicates that for the UK as a whole, the value of the benefits is £3.2 billion, with approaching 80% of this benefit accruing to households living outside London. This implies that,

on average, London households are willing to pay £22 each per annum for 10 years in order to host the Olympics whereas households in Glasgow and Manchester, the two other locations where fieldwork was undertaken besides London, are willing to pay £12 per household per year over the same period.

These intangible benefits are effectively additional to the impacts on GDP although they double-count some of the other impacts assessed in the OGIS.

The most important intangible benefits identified in the research are those which have the broadest appeal (i.e. the uniting of people, the creation of a 'feel good factor', enhanced national pride, motivating/inspiring children and the legacy of sports facilities). Analysis of the perceived intangible disbenefits suggests that the most important are those which are expected to be relatively short-lived (i.e. they will arise during the Olympics and in the immediate period before and after the Olympics).

Overall, the public health impacts appear to be significantly positive, particularly during the Olympics and the legacy phase. These benefits are experienced most strongly in the Lower Lea Valley as a result of improved access to new sporting and health care facilities. The health benefits are, however, anticipated to extend to London and across the UK as a whole due to the general promotion of physical and sporting activity.

## Environmental impacts

In summary, the overall environmental impact is expected to be significantly positive in the Lower Lea Valley during and after hosting the Olympics although there are some negative environmental impacts to be managed during the construction process. At the London and UK wide levels the impacts are generally positive and driven primarily by the showcasing effects of hosting the Olympics (e.g. in the Thames Gateway).

## Overall conclusion

In summary, the OGIS has drawn together the available evidence as to the potential economic, social, environmental impacts that could arise as a

result of London's successful bid to host the Olympics in 2012. It has shown that there would appear to be significant potential benefits from hosting the Games. Moreover, the OGIS has also contributed to highlighting those key areas where public policy/intervention can contribute to realising these benefits for the whole country and mitigating any potential disbenefits.

*“PricewaterhouseCoopers” refers to the PricewaterhouseCoopers LLP (a limited liability partnership in the United Kingdom) or, as the context requires, other member firms of PricewaterhouseCoopers International Limited, each of which is a separate and independent legal entity.*

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