

# The ArcelorMittal Orbit Full Planning Application

## Transport Assessment

June 2010

>>The ArcelorMittal Orbit >>>



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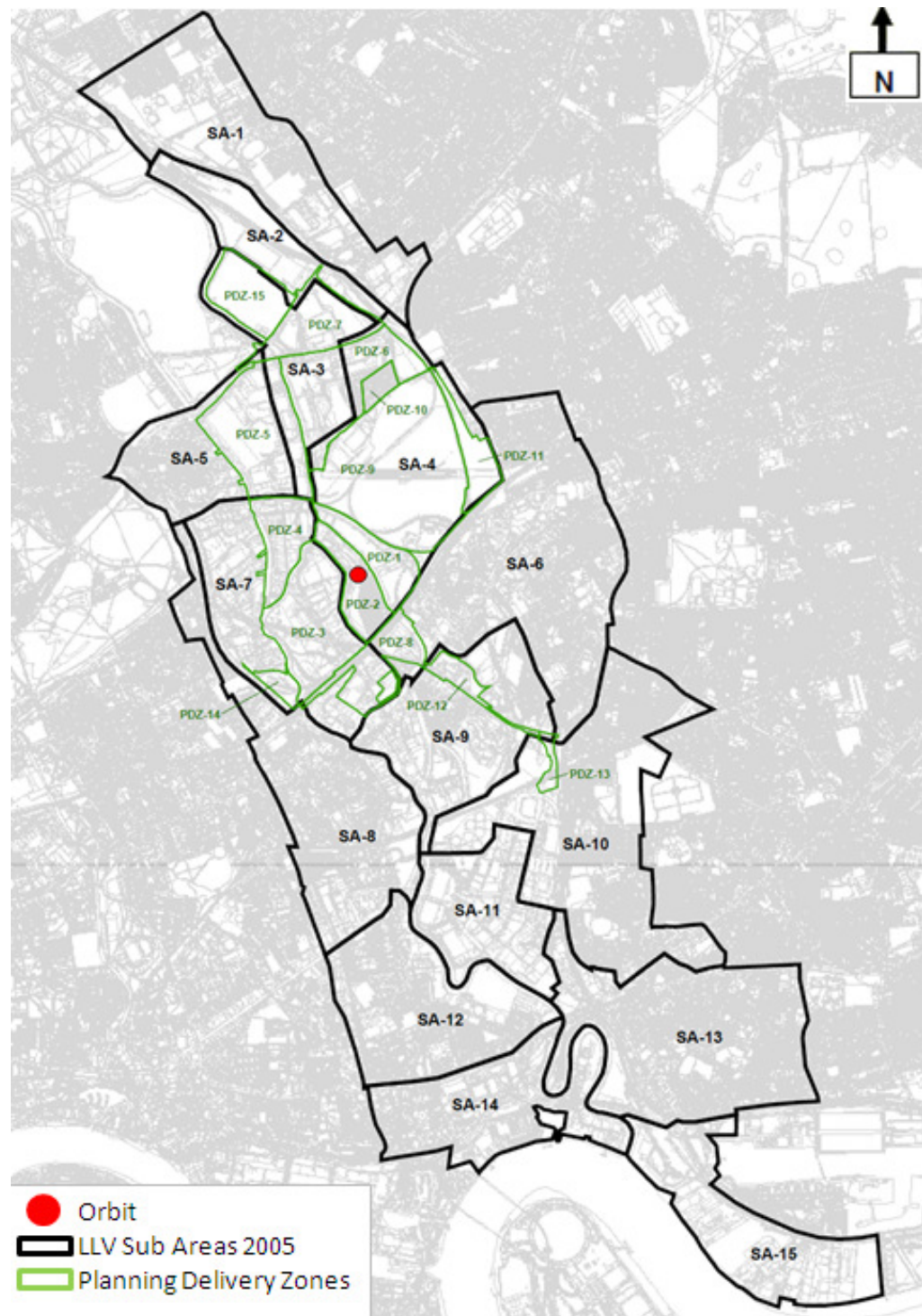
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# 1 Introduction

Arup has been commissioned by ArcelorMittal Orbit Ltd to investigate the transportation aspects of the proposed ArcelorMittal Orbit, located within the Olympic Park. To this end, a Transport Assessment (TA) has been prepared in accordance with Transport for London (TfL) Transport Assessment Best Practice guidance document (2006). This TA is submitted as part of the planning application documents for this proposal. The planning authority is the Olympic Delivery Authority Planning Decisions Team (ODA PDT).

The ArcelorMittal Orbit is situated in the Olympic Park, within Planning Delivery Zone (PDZ) 2, as can be seen in **Figure 1.1**. The site enjoys excellent access to public transport facilities, including national rail, London Underground, DLR, London Overground and bus.

**Figure 1.1: Location of Orbit within Planning Delivery Zone 2**



In preparing this TA, initial discussions took place with TfL to ensure that the proposed methodology of the assessment is acceptable. The TA has been prepared in accordance with these discussions. Similar discussions took place with the PDT's transport consultants.

To provide a basis for the assessment of the effects of The ArcelorMittal Orbit on the local transport infrastructure, a number of assumptions have been made with regard to visitor profiles. These are broadly based on a similar study of the London Eye, carried out by Arup in 2001.

This assessment relates principally to the movement of visitors to the Orbit and the effect they have on local public transport infrastructure. It covers the following key transport related aspects:

- The effect on the local public transport infrastructure;
- The split of visitors by mode;
- The presence of dedicated coach parking;
- Crowd management;
- The cumulative effects arising from relevant local developments; and
- The impact of vehicles on the local network.

The structure of this assessment is as follows:

- A description of the transport policies from a national, regional, and local perspective;
- A description of the baseline conditions within the local areas;
- Determination of the effects on the local transport networks, due to the Orbit;
- An assessment of any cumulative impacts arising from other developments in the area; and
- An identification of mitigating measures to address any identified impact on the local transport network.

## 2 Statutory and Policy Context

### 2.1 Introduction

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This section sets out the transport planning policy context of the proposed ArcelorMittal Orbit structure. It highlights the relevant policies that influence the transport planning context for the development. This section takes into account policy at national, regional and also policy pertaining to the local authority within which the Orbit is situated. In this case, the local authority is the London Borough of Newham.

A detailed summary of the relevant policy can be found in **Appendix A** of the TA.

### 2.2 Statutory Policy

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The Olympic Delivery Authority (ODA) was established by the London Olympic Games and Paralympic Games Act 2006. The Act requires the ODA to prepare an 'Olympic Transport Plan' for addressing transport matters relating to the London 2012 Olympic and Paralympic Games. The Olympic Transport Plan (OTP) must also be kept under review.

Consultation on the latest version of the Olympic Transport Plan closed in March 2010 and is expected to be published towards the end of 2010. The Transport Plan presents an overview of the proposed transport arrangements during the Games for spectators and public transport users and the Olympic Route and Paralympic Route Networks for the Games.

The ArcelorMittal Orbit was not considered as part of the Olympic Transport Plan since it is not being delivered by the ODA. However, as it is located within the Olympic Park and close to some of the London 2012 Games venues, the policies outlined in the Transport Plan are likely to be considered.

### 2.3 Government Policy

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#### 2.3.1 PPG 13 Transport

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Relevant government guidance is contained in *Planning Policy Guidance Note 13 – Transport (PPG 13)* issued in March 2001. This promotes development within urban areas and locations highly accessible by means other than the private car. It also seeks to limit parking provision for development and discourage reliance on the car for work and other journeys where there are effective alternatives.

The key objectives of the guidance (reference, Paragraph 4) are to:

- *Promote more sustainable travel choices for both people and for moving freight;*
- *Promote accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling; and*
- *Reduce the need to travel, especially by car.*

#### 2.3.2 PPG 17 Planning for Open Space, Sport and Recreation

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*Planning Policy Guidance Note 17 (PPG 17)* published in July 2002 documents policy guidance for open space, sport and recreation developments. With regards to the transport, the guidance states local authorities should “*promote accessibility by walking, cycling and public transport, and ensure that facilities are accessible for people with disabilities*”.

#### 2.3.3 Planning for Tourism

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The Good Practice Guide on Planning for Tourism, published in May 2006 by the Department for Communities and Local Government (DCLG) is to be considered in conjunction the National Planning Policies. The previous national policy, *PPG 21 – Planning Framework Tourism*, was cancelled by the Government in September 2006.

In terms of transport and accessibility, the *Good Practice Guide on Planning for Tourism* states that “*travel is an inherent element of tourism. Whilst recognising that it is a principle of the planning system to see to promote more sustainable transport choices, improve accessibility and reduce the need to travel, this may be particularly difficult for some types of tourism projects or for areas that are poorly served by public transport.*”

With regard to tourism and transport in urban areas, the guidance indicates that the advantages that tourism can bring to an area include *“improved access by sustainable modes of transport”*.

#### 2.3.4 PPS 1

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In relation to transport, *Planning Policy Statement 1 (PPS1) - Delivering Sustainable Development* (issued in January 2005) emphasises that Local Authorities should integrate their transport programmes and land use policies in ways which assist in the reduction of emissions through the encouragement of development which reduces the need for private car travel. The policy indicates that development plans should support development that creates socially inclusive communities. Policies should *“address accessibility (both in terms of location and physical access for all members of the community to jobs... leisure and community facilities.”*

### 2.4 Regional Policy

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#### 2.4.1 The London Plan (GLA, 2008)

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The Mayor of London’s London Plan was produced by the Greater London Authority (GLA) in February 2004 and provides the strategic framework for the future development of London over a 15 to 20 year timeframe. The London Plan was revised in February 2008 as The London Plan – Spatial Development Strategy for Greater London Consolidated with Alterations since 2004. This document combines all alterations to the original London Plan since 2004.

The London Plan aims to achieve the integration of transport and development through:

- *The encouragement of patterns and forms of development that reduce the need to travel, specifically travel by car;*
- *Aiming to improve public transport, walking and cycling capacity and accessibility in areas of greatest demand where it is needed; and*
- *The support of high generating development at locations with both high levels of public transport accessibility and capacity, sufficient to meet the transport requirements of the development.*

In October 2009, *The London Plan – Spatial Development Strategy for Greater London* was published for consultation as the draft replacement of the London Plan. This draft document sets out draft policies and explanatory supporting material and is intended in part to be *“the overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20 to 25 years”*.

In terms of transport, the draft London Plan sets out policies primarily intended to support delivery of the objective that London should be *“a city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities with an efficient and effective transport system which actively encouraged more walking and cycling.....and supports the delivery of all the objectives of this Plan.”*

#### 2.4.2 London Plan Sub-regional Development Framework – East London

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The sub regional development framework for East London covers nine Boroughs, including the London Borough of Newham. The framework provides guidance on the implementation of policies within the London Plan for sub region of East London. It sets out guiding principles to deliver a sustainable and prosperous future for the sub region.

#### 2.4.3 Mayor’s Transport Strategy (May 2010)

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Published by the GLA in July 2001 and updated in August 2004, July 2006 and May 2010, the Mayor’s Transport Strategy (MTS) envisages the London transport system excelling among that of global cities, providing access to opportunities for all people and enterprises while achieving the highest environmental standards and leading the world in its move towards tackling the urban transport challenges of the 21<sup>st</sup> century.

There are six underlying goals set out in the MTS:

- *To support economic development and population growth;*
- *Enhance the quality of life for all Londoners;*



- *Improved the safety and security of all Londoners;*
- *Improve transport opportunities for all Londoners;*
- *Reduce transport's contribution to climate change and improve its resilience; and*
- *Support the delivery of the London 2012 Olympic and Paralympic Games and its Legacy*

The MTS sets out a number of policy commitments or requirements which have implications for TfL and a range of other delivery partners including the GLA and the London Boroughs.

#### 2.4.4 The Lower Lea Valley Opportunity Area Planning Framework 2007 (LLV OAPF) (2007)

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The Lower Lea Valley (LLV) Opportunity Area Planning Framework (OAPF) provides Mayoral planning guidance for the Lower Lea Valley and was prepared by the GLA in consultation with the London Development Agency (LDA), TfL and the four LLV boroughs of Hackney, Newham, Tower Hamlets and Waltham Forest, the London Thames Gateway Development Corporation (LTGDC) and the Olympic Delivery Authority (ODA). It covers the period up to 2016.

The framework identifies the improvement of connectivity in the LLV as *“integral to facilitating development and enhancing the sustainability of existing and future communities. The aim is to achieve a series of transport hubs or nodes, including those that currently exist at Canning Town, Bromley-by-Bow, Blackwall, West Ham and Stratford, incorporating several forms of mainly public transport. Proposed improvements to the local movement network will address the issues of local severance and inhospitable routes which currently reinforce the fragmented character of LLV. The local movement network will link open spaces and other amenities with surrounding communities”*.

#### 2.5 London Borough of Newham Unitary Development Plan

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The London Borough of Newham Unitary Development Plan (UDP) was adopted in June 2001. Chapter 7 of the UDP sets out policies for the integration of land-use and transport; major improvements to the public transport and road networks, a parking strategy, walking and cycling, freight and air transport. All policies relating to transport, apart from those pertaining to parking standards for new developments and the protection of river freight transport facilities, were saved as part of the UDP, when it was reviewed in September 2007.

This section of the UDP encourages the use of public transport and other sustainable modes of transport as alternatives to car travel. The UDP states that *“policies promoting alternative modes of travel to the motor car will improve the quality of the Borough's environment and make it more desirable as a place to live and work. Efficient access between home, work, leisure, education and other destinations will help to bring about other aims of the Vision”*.

The UDP will eventually be replaced by the emerging Local Development Framework (LDF), which will aim to meet the local community's future economic, environmental and social needs through the spatial planning system.

#### 2.6 Parking Standards

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Current national and local policy generally set the maximum standards for parking provision. However, it is recognised that these standards should also be responsive to local levels of public transport accessibility.

PPG 13 identifies that for leisure uses other than cinemas, conference facilities and stadia, 1 car parking space should be provided per 22m<sup>2</sup> Gross Floor Area (GFA) when the development has a GFA greater than 1000m<sup>2</sup>. PPG 13 also requires safe and secure cycle parking to be provided in developments at least at levels consistent with the cycle strategy in the local transport plan; and also to consider appropriate provision for motorcycle parking. Specific advice on numbers of spaces is not provided.

The London Plan advises that the level of car parking for leisure land uses should be assessed individually for each development. For developments with higher PTALs, a lower number of car parking spaces should be provided. The London Plan and Mayor's Transport Plan do not stipulate provisions for cycle parking but refer to PPG 13 and TfL guidance on London Cycle Design



Standards. No clear or consistent standards for cycle parking are set out in this guidance. However, it does state the boroughs' UDPs usually set out minimum cycle parking standards for new developments.

The London Borough of Newham has outlined no specific standards in the UDP for leisure uses. The level of parking to be provided is a matter of negotiation between the applicant and the Council.

# 3 Baseline Conditions

## 3.1 Introduction

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This section describes the existing traffic and transport conditions in the local area in relation to the highway network, public transport, coaches and pedestrian and cycle facilities.

## 3.2 Existing Transport Context

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The proposed site of the ArcelorMittal Orbit is located with the Olympic Park, to the south of the Main Stadium and west of the Aquatics Centre. As part of the construction phase of the Park, the site was closed and cleared in July 2007 and since then, public access has been restricted. As such, it is not appropriate to use the existing situation as a base scenario for this study as it is not representative of the likely base conditions when to the Orbit commences operation at the beginning of 2015. The timing of the opening of the Orbit is discussed in further detail in **Sections 3.3 and 3.4**.

However, an understanding of the existing transport infrastructure in the vicinity of The ArcelorMittal Orbit is important in order to determine the likely travel patterns to the Orbit. The public transport infrastructure includes rail, London Underground, DLR and London Overground, which all operate to and from Stratford Regional Station. London Buses also have numerous routes in the vicinity of the Olympic Park with Stratford Bus Station providing adequate bus stop and set-down facilities. Coach services, operated by National Express also operate within the Stratford area.

In addition to the public transport facilities currently in the vicinity of the Orbit, there are also a number of important walking and cycling routes, not least the Greenway which traverses the southern section of the Olympic Park.

A full description of the existing transport facilities in the locality of the Orbit can be seen in **Appendix B**.

## 3.3 Games Phase

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Although the Orbit will be operational during the London 2012 Games, it will only be open to spectators who are already attending the London 2012 Games including managed VIP pre-organised tours. Therefore, no additional visitors to the Olympic Park are expected. As such, any trips to the Orbit will come from within the Olympic Park and thus, no new trips to the area will be generated. At the end of the London 2012 Games, the Orbit will be closed and reopened as part of the Legacy Transformation Phase.

The TA submitted as part of the Olympic, Paralympic and Legacy Transformation Planning Applications in 2007 analysed the effect of the development on the public transport network in the vicinity of the Park. The Olympic Park and Legacy (OPAL) Railplan model, used to analyse the effect of spectators travelling to the London 2012 Games, indicates that it *“should be possible to accommodate demand on the public transport network when enhanced by ‘the schemes’.* Any hotspots in terms of crowding will need to be addressed by detailed train planning and *Gamestime travel management...*” The schemes, referred to in the 2007 TA, are described as follows:

- **Do Minimum:** The schemes consented and/or committed at July 2006 for the Lea Valley Opportunity Area Planning Framework (OAPF);
- **Without Scheme:** The OAPF development that would have been planned for the Olympics Site if the Olympics had not gone ahead, set in the context of a reduced OAPF development; and
- **With Scheme:** Commitments and developments which can reasonably be expected to have been completed by the year modelled.

## 3.4 Legacy Transformation – Base Case

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### 3.4.1 Introduction

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Once the Olympic and Paralympic Games have been completed, the Olympic Park will be closed and the transformation for Legacy use will commence. This period, known as Legacy Transformation, will last for 18 to 24 months after the completion of the Games and will involve the removal of temporary Games facilities and transforming the remaining venues for use in Legacy. The Transport Statement submitted in December 2009 as part of the Legacy Transformation Highways planning application, which was approved at Committee on 26 May 2010, assesses a scenario where the retained venues are operational in 2013/14. During this period, the Olympic Park will be re-opened in phases and will be completely operational in Legacy by the 1 January 2015. For this reason, the base conditions for this study have been assumed to be those at the completion of Legacy Transformation. It is understood that the Orbit may open earlier than 1 January 2015. However, as the detailed programme for the Legacy Transformation works are not defined as yet, it is unclear when the Park or sections of the Park including the Orbit might re-open to the public. It is proposed that the Park, and as such the Orbit, will open to the public as a visitor attraction as soon as possible after the completion of the London 2012 Games.

In the event that the Orbit does open prior to the 1 January 2015, the trips generated to the Orbit will not have an adverse effect on the local transport network, as demonstrated in **Section 4**. However, construction may still be ongoing and restrictions still in place on the highway networks. However, as discussed in **Section 4.12.1**, the only parking provided will be blue badge parking at the Orbit, which can be located at a temporary convenient location until such time that the highway restrictions are lifted.

The venues retained for Legacy will have varying uses. The venues to be retained are as follows:

- Aquatics;
- Multi Use Sports Venue (MUSV);
- Eton Manor (Hockey, Tennis and 5-a-side football);
- Main Stadium;
- Tennis; and
- Velopark.

The venues will be used on a daily basis and also to hold sporting and concert events with the exceptions of the BMX Track (which is included as part of the Velopark) and Tennis Centre which are not expected to host such events. Park demand depends on which venues are being utilised in conjunction with one another. The operational variations of the venues present the opportunity for many different combinations of demand.

The estimated trips demands for each of the venues, when used for events are shown in **Table 3.3**. These are based on estimates from the 2007 Transport Assessment submitted as part of the Olympic, Paralympic and Legacy Transformation planning applications as well as subsequent revisions of the venue capacities.

Table 3.3: Event venue capacities in Legacy

Venue	No of Visitors
Aquatics	3,500
Eton Manor	3,000
Velopark	6,000
Main Stadium	25,000
MUSV	6,000
Total	43,500

The annual number of trips to the retained venues for daily use in Legacy, as outlined in the 2007 TA, is expected to be of the order of 650,000.

There are also a number of 'future development platforms' outlined as part of the Transformation proposals. The potential uses for each of these platforms may vary between commercial, residential, retail, educational and leisure uses and will have an important role in defining the overall footprint of the Legacy Park. However, the use of the individual platforms has not been defined at this point. This will be carried out as part of the Legacy Masterplan Framework (LMF) which will include a requirement for any potential developer to assess any effect their development may have on the transport infrastructure.

The public transport infrastructure and the proposed walking and cycling, and the highway networks in Transformation are discussed in the following sections.

#### 3.4.2 Future Public Transport Proposals

A number of schemes relating to public transport and the development of the Olympic Park have been committed which are currently under construction and will be implemented in time for the London 2012 Games. These will be retained in Transformation and Legacy and are outlined as follows.

##### International Rail

International Rail services, calling at Stratford International, will run between St. Pancras International and cities in continental Europe such as Paris and Lille in France and Brussels in Belgium. These services are operated by Eurostar. **Table 3.4** shows the current number of Eurostar Services operating each day.

Table 3.4: Eurostar Services at St. Pancras International

Location	Daily Arrivals from:		Daily Departures to:	
	Weekday	Weekend	Weekday	Weekend
Paris	16	13	16	16
Lille	10	10	9	7
Brussels	10	8	10	8
Disneyland Paris	1	1	1	1
Bourg St Maurice	2	2	2	2
Avignon	1	1	1	1

Eurostar services currently do not stop at Stratford International and it is not known if they will operate to and from Stratford International in the future. This is to be reviewed after the London 2012 Olympic and Paralympic Games.

## **London Underground**

Improvements to the London Underground network are ongoing and will continue across the network up to and beyond the Olympic and Paralympic Games in 2012. Included in the improvements is a state-of-the-art signalling system and improvements to the trains, tracks and control centre on the Jubilee Line, which will be a vital transport link to many Games venues. The line will be upgraded to run more trains, increase capacity by 33% and cut journey times by approximately 22%. It has been indicated that the likely finish of the Jubilee line improvements will be in the autumn of 2010.

Improvements are also planned for the Hammersmith and City Line. From 2011, 53 new seven-car trains will be introduced, which provides an increase in capacity of 17%. By 2013 all new trains will be introduced and once the enhanced signalling system is introduced by 2016, capacity on the line will have increased by 65%.

Similar improvements are intended on the District Line. However, these are not expected to begin until 2013 with 80 new trains in operation by 2015. Capacity increases of 24% will be implemented by 2018.

## **London Overground**

London Overground services operating on the North London Line (NLL) are currently undergoing improvements including a new signal system, moving track, lengthening platforms and refurbishing stations. Services are operating between Stratford Regional station and Richmond via Clapham Junction. The improvements will result in longer more frequent trains along the line, resulting in a more efficient rail link across north London.

## **DLR**

A number of improvements to the DLR have been implemented in 2009. The first of 22 new railcars co-funded by the ODA are now in service. In total, 55 additional railcars will increase the capacity by running three-car trains across the network instead of two-car trains. These are expected to arrive by the summer of 2010. The line extension between King George V and Woolwich Arsenal, incorporating the second crossing under the Thames, opened in January 2009.

The second new line extension from Canning Town to Stratford International Station is due to open in mid 2010. The route extends from Canning Town north to Stratford, with new DLR stations at West Ham and Abbey Road. The terminus of these services will be Stratford International.

### **Stratford Regional Station**

Improvements to Stratford station are aimed to increase the capacity of the station to accommodate the predicted rise in the number of passengers using the station each morning. These improvements include:

- New lifts and staircases;
- Wider, and clearer platforms;
- A new westbound Central Line platform;
- A second upper-level entrance; and
- A re-opened subway.

Some of the work has already been completed with the rest of the improvements expected to be provided by the commencement of the London 2012 Games.

Stratford Regional Station will also be linked to Stratford City and Westfield by the new Town Centre Link Bridge between the station and the Stratford City Development. This new bridge is at a height of 14.5m and will also provide a connection to the Olympic Park from Stratford Regional station.

## **Bus Services**

As part of the Section 106 Agreement (S106) which accompanied the 2007 Olympic, Paralympic and Legacy Transformation planning applications, four indicative Legacy Transformation bus service enhancements were outlined. These are Services 262, 308, 388 and D8 which were included in the PTAL assessments for the Olympic, Paralympic and Legacy Transformation Applications, February 2007. The details of each of these services are outlined in **Table 3.5**. The service changes outlined in **Table 3.5** are subject to further analysis and approval processes. The frequencies shown were agreed in meetings during August 2007 as the basis of the S106 contributions. A review of the Public Transport Accessibility Levels (PTALs) of the Olympic Park, carried out in September 2009, found that the 2009 frequencies of these services are unchanged from 2007. The routes are illustrated in **Figure 3.1**.

**Figure 3.1: Indicative Bus Routes for Legacy Transformation**

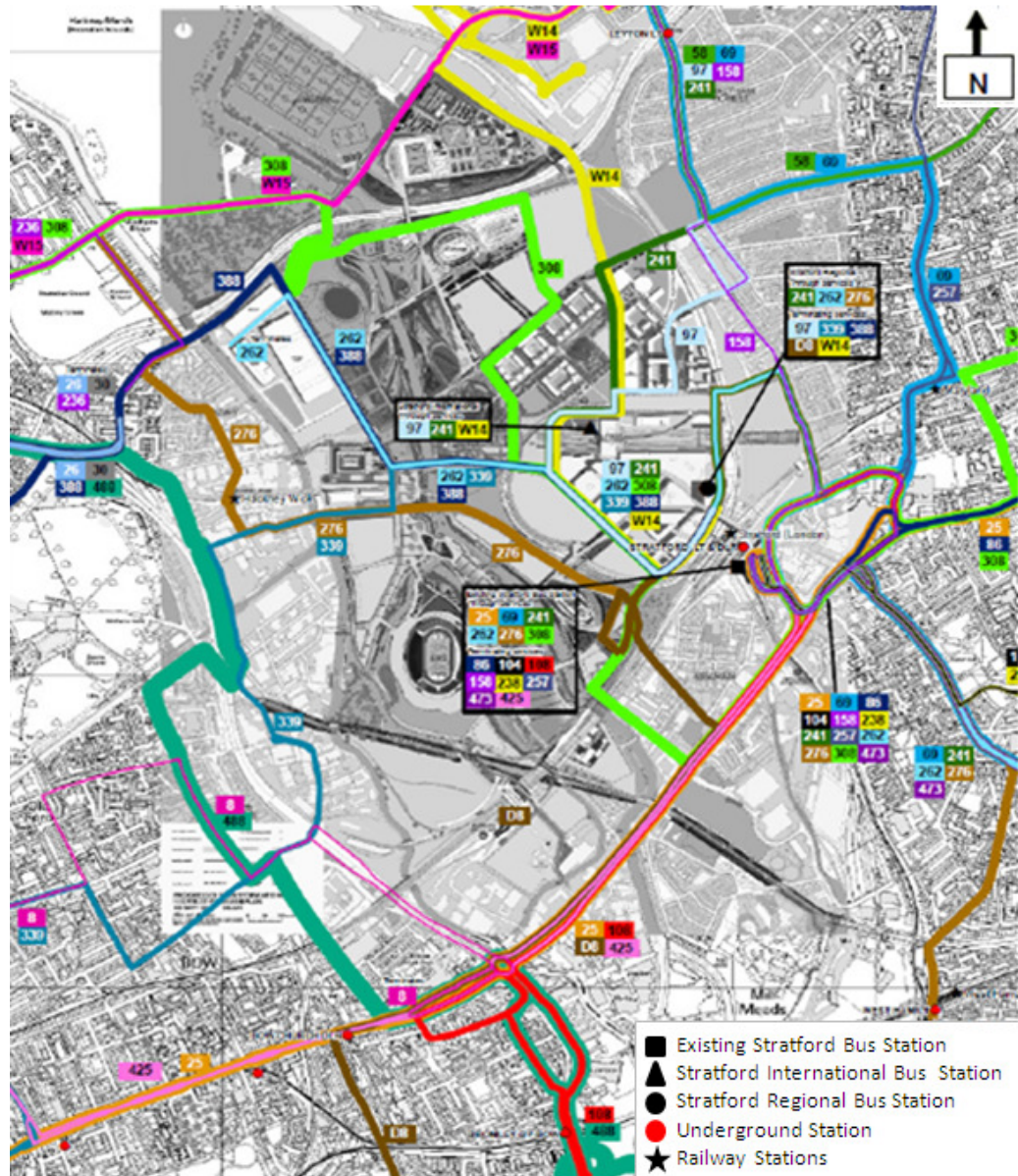


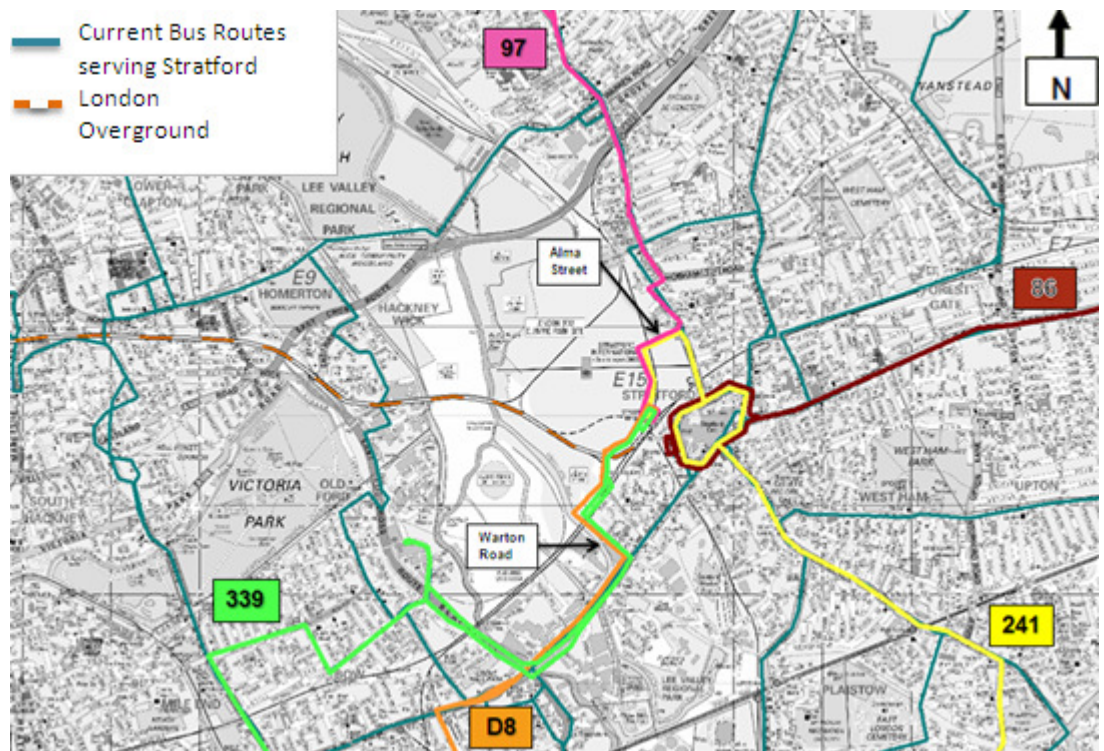


Table 3.5: Indicative Bus Service Enhancements for Olympic Park Transformation

Route	Service Change	Details	Frequency
262	Extension	Extension from Stratford Bus Station to a new stand at the northern end of the IBC/MPC, with a frequency increase	7.5 bph
308	Diversion	Enter the site at Waterden Road, then via northern loop road – Olympic Village – Stratford City Retail Area – Stratford City Southern Access Road – Warton Road, then to Wanstead	4 bph
388	Diversion	Routed from Hackney Wick via Eastway – Waterden Road – Stratford City Western Access – Stratford City Retail Area – Stratford Regional Bus Station	6 bph
D8	Diversion	Diverted from Stratford High Street at Marshgate Lane – Southern Loop Road – Stratford City Southern Access Road – Stratford Regional Bus Station	5 bph

Five other bus services were identified in the indicative bus service enhancements included in the Stratford City S106 Agreement. These are Services 86, 97, 241, 339 and D8. The assumed routes of these service extensions / diversions are shown in **Figure 3.2**.

**Figure 3.2: Proposed Stratford City Bus Network 2011**



All of the routes, except for Route 97, currently exist and will be enhanced through Section 106 funding. The current frequencies (projected for Route 97) are shown in **Table 3.6**.



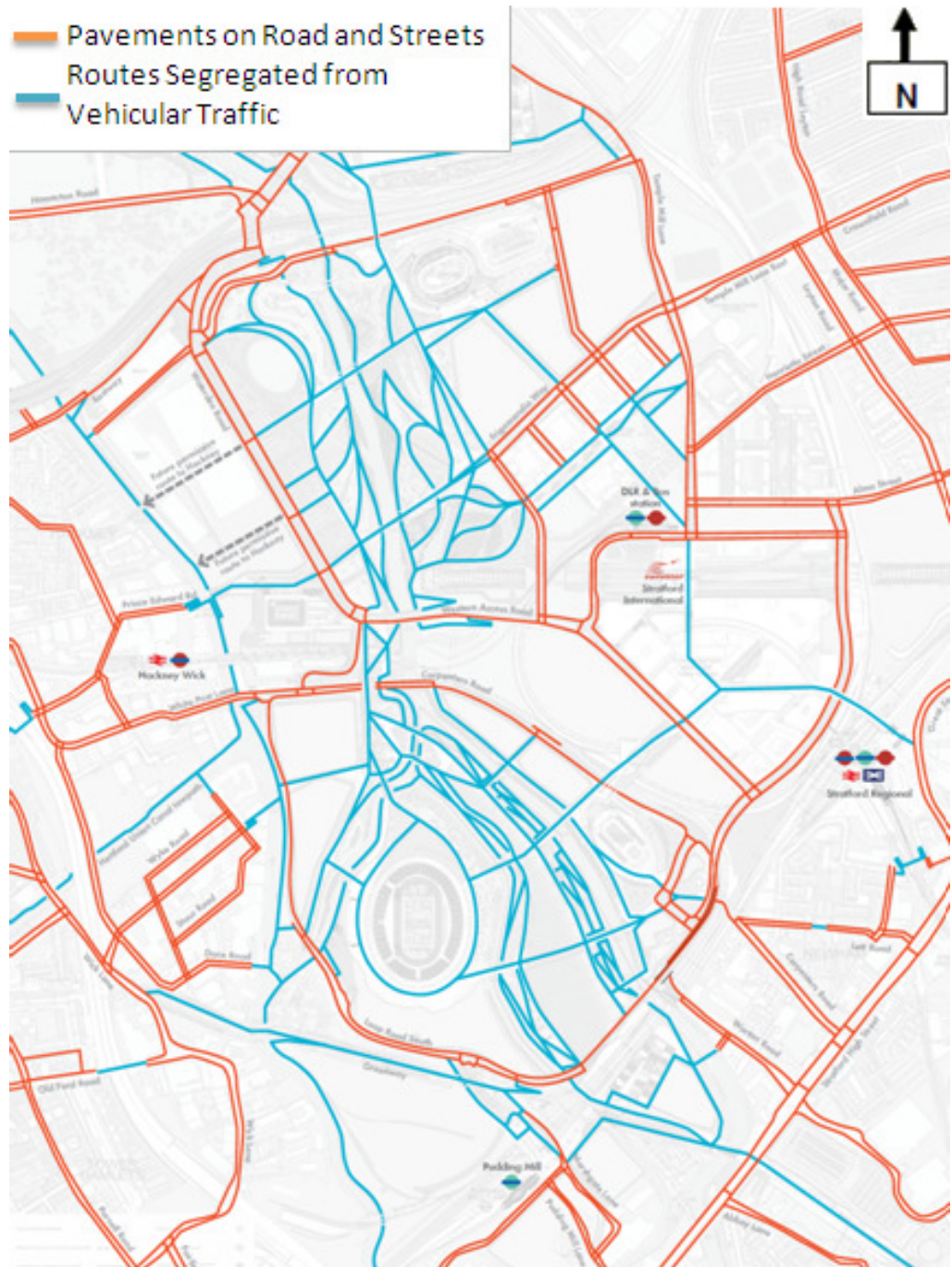
**Table 3.6: Stratford City bus frequencies**

Route Number	Route	Buses Per Hour		
		Monday to Friday		Saturday
		Peak Hour	Daytime	Daytime
86	Romford to Stratford Bus Station	13	10	7.5
97	Chingford Station to Stratford City	7.5	7.5	7.5
241	Stratford Station to Hermit Road	5.5	5.5	5
339	Fish Island to Shadwell Station	4	4	4
D8	As in Table 3.5			

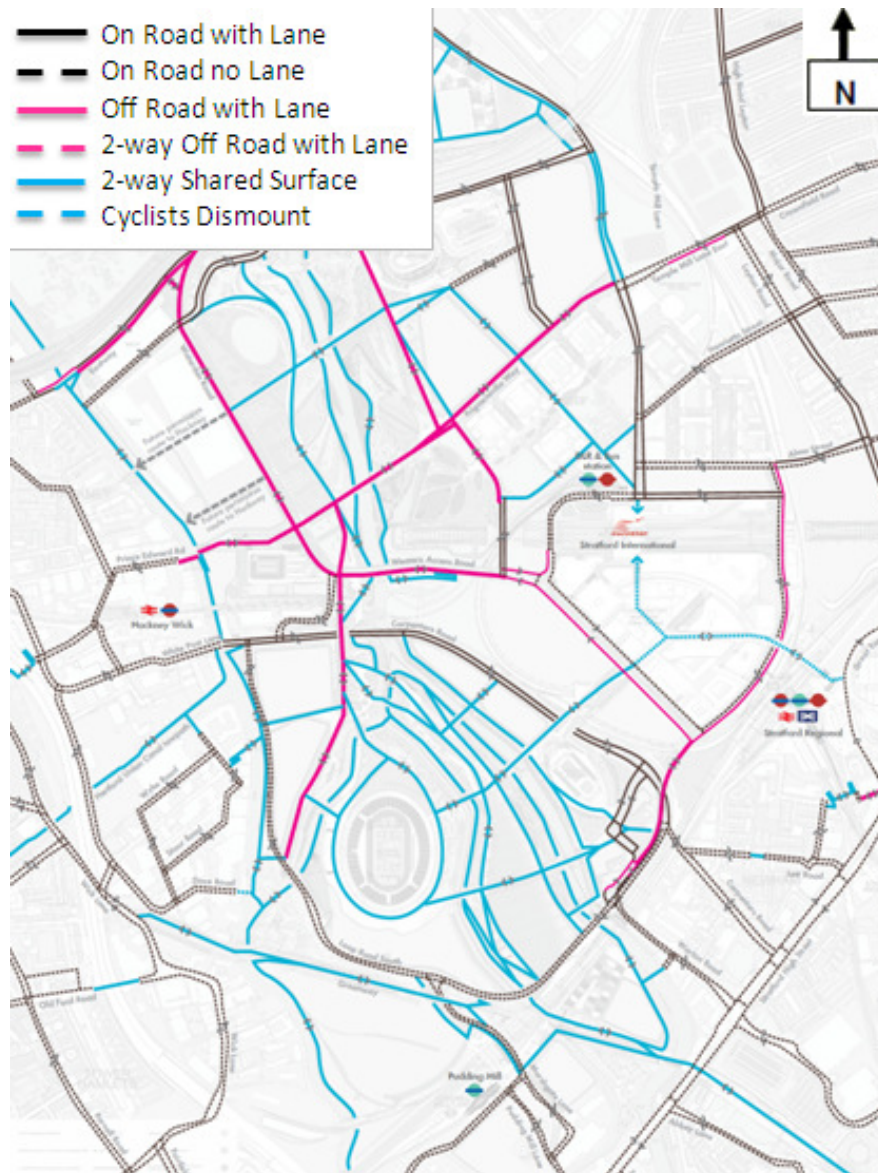
### 3.4.3 Pedestrian and Cycle Facilities

As part of the Legacy Transformation Highways Transport Statement, a number of proposals have been outlined to provide excellent pedestrian infrastructure and cycle connections. These can be seen in Figures 3.3 and 3.4 respectively.

Figure 3.3: Proposed Legacy Transformation pedestrian infrastructure



**Figure 3.4: Proposed Legacy Transformation cycle infrastructure**



The site-wide cycle connections will utilise the highway infrastructure as well as dedicated cycle paths/shared pedestrian routes to be provided as part of the Park and Public Realm Post Games Transformation proposals. The pedestrian routes permeate the development site and will promote major east-west and north-south connectors via ‘stitches’ linking the Park to neighbouring communities. Connections will also be provided to the public transport facilities and major commercial and residential centres.

A number of enhancements to the pedestrian and cycle facilities in the vicinity of the Olympic Park are also proposed to benefit people expected to walk or cycle to the Olympic and Paralympic Games and provide a useful travel option after the Games in Legacy Transformation and Legacy. The main routes to the Olympic Park that are being enhanced are as follows:

- Lea Valley North: Route to the north of the Olympic Park through the Lea Valley Regional Park;
- Epping Forest: A new route from the northeast of the Olympic Park through Wanstead and Epping Forest;
- Greenway: Follows the route of the northern outfall sewer east from the Olympic Park to Beckton;
- Lower Lea and the Royal Docks: From the south of the Olympic Park to the Isle of Dogs, and on to Maritime Greenwich and other River Zone areas via the Thames Path;

- Limehouse Cut: From Limehouse Basin to the Olympic Park along the Limehouse Cut;
- Victoria Park and Stepney: Connects the Olympic Park to Islington and Limehouse Basin along the Regent's and Hertford Canals;
- Hackney Parks: Connects green spaces in Hackney from Finsbury Park to the western entrance of the Olympic Park; and
- Greenwich: Follow the route of the Thames Path connecting Maritime Greenwich with the North Greenwich Peninsular and Woolwich.

In addition to the eight routes outlined above, TfL have outlined plans to create 12 'Cycle Superhighways', on routes radiating from Central London. The first two of these routes will be operational by summer 2010 with the other ten being introduced by 2015. Two of the routes run towards the east of London and will pass through the London Borough of Newham. These are:

- Ilford to Aldgate; and
- Barking to Tower Gateway.

These two routes could potentially provide a link between the eight routes to the Olympic Park, enhancing the connectivity of the Park and the Orbit to areas to the east and in Central London.

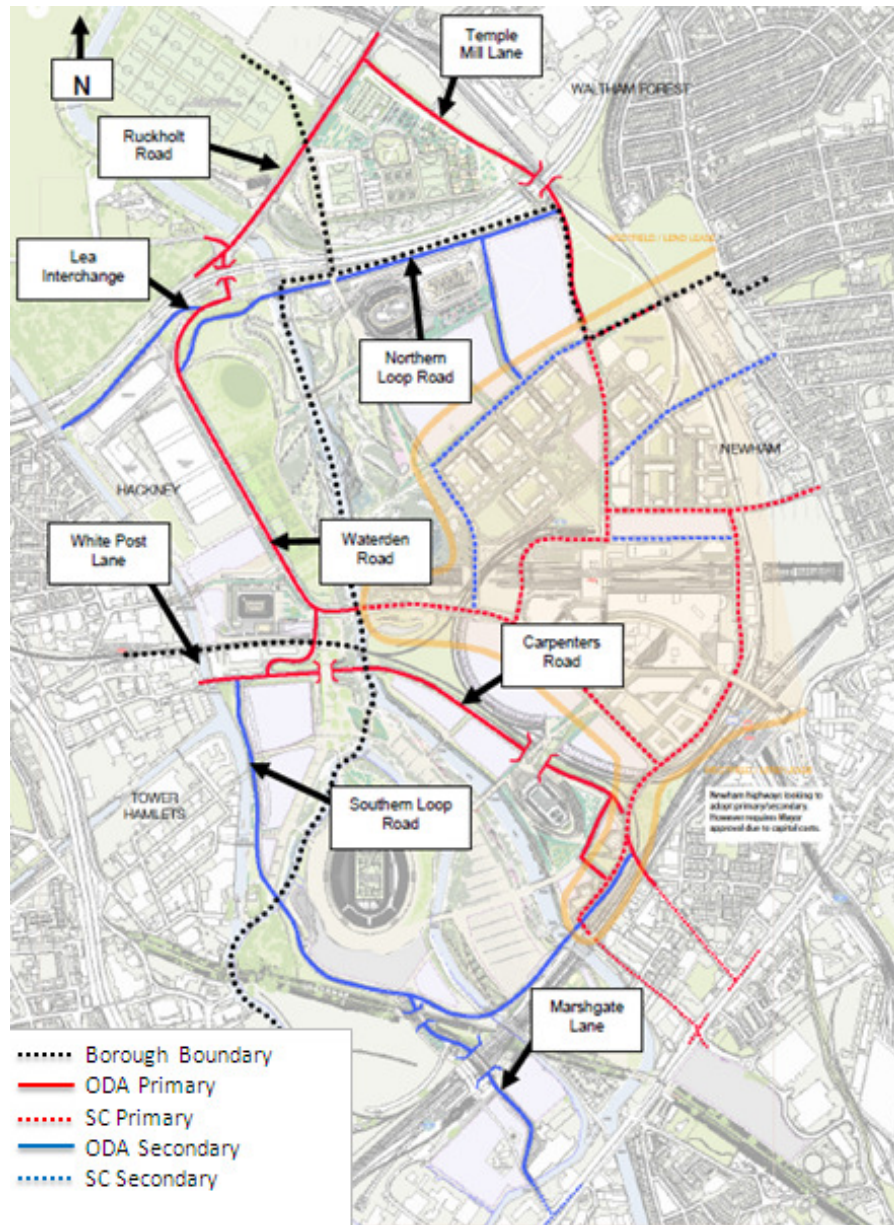
#### 3.4.4 Highway Network

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The highway network, as planned at the completion of Transformation is shown in **Figure 3.5**.



Figure 3.5: Proposed Legacy Transformation highway network



The network consists of the following main roads and junctions:

*Primary Routes:*

- White Post Lane/Kings Road Link, Waterden Road/Carpenters Road connection;
- Highway in the vicinity of Aquatics/Stratford City Southern Access Road;
- Lea Interchange/Waterden Road; and
- Ruckholt Road.

*Secondary Routes:*

- Marshgate Lane/Southern Loop Road;
- Park Street/Velodrome Link; and
- North Loop Road/Temple Mill Lane.

The Transport Statement produced to support the Legacy Transformation Highways planning application concluded that the highway design for the Legacy Transformation phase of the Olympic Park development will operate effectively in 2014, with additional capacity to accommodate future development. The junction review indicated that the internal road

network will operate well within capacity during the morning and evening highway peak periods with minimal queuing predicted on junction approaches.

### 3.5 Public Transport Accessibility Level (PTAL)

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#### 3.5.1 Introduction

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Public Transport Accessibility Level (PTAL) is a measure of the accessibility of a point of interest (POI) to the public transport network, taking into account walk access time and services availability. National Rail, London Underground, DLR, Bus and Tram services are included and, for each of these modes, the PTAL reflects the service frequency and the number of different routes and stopping patterns available within the walking catchment of 640m (a 8 minute walk) for bus and 960m (a 12 minute walk) for National Rail, assuming a 4.8km/h walking speed. As service patterns change at different times of the day, the PTAL measure is normally calculated for the morning peak period of 08:15 to 09:15. Accessibility is measured on a scale of 1a to 6b, with one indicating very poor access to public transport and 6b signifying excellent accessibility.

A PTAL assessment of the entire Olympic Park was undertaken as part of the TA submitted along with the original planning application in 2007. The PTAL assessment was repeated for the construction phase (2008), for Transformation (2013/14) and Legacy (2021).

A PTAL assessment has not been carried out for the ArcelorMittal Orbit during Games phase. However, for this study, it is not relevant no additional spectators are expected to the Park as a result of the Orbit.

#### 3.5.2 Legacy Transformation

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The PTAL assessment for Legacy Transformation was reviewed in September 2009 as part in a study carried out to assess the changes to PTALs in the Olympic Park, resulting from a number of infrastructure design changes proposed since the approval of the Olympic, Paralympic and Legacy Transformation Planning Applications in September 2007. These changes comprised of the following:

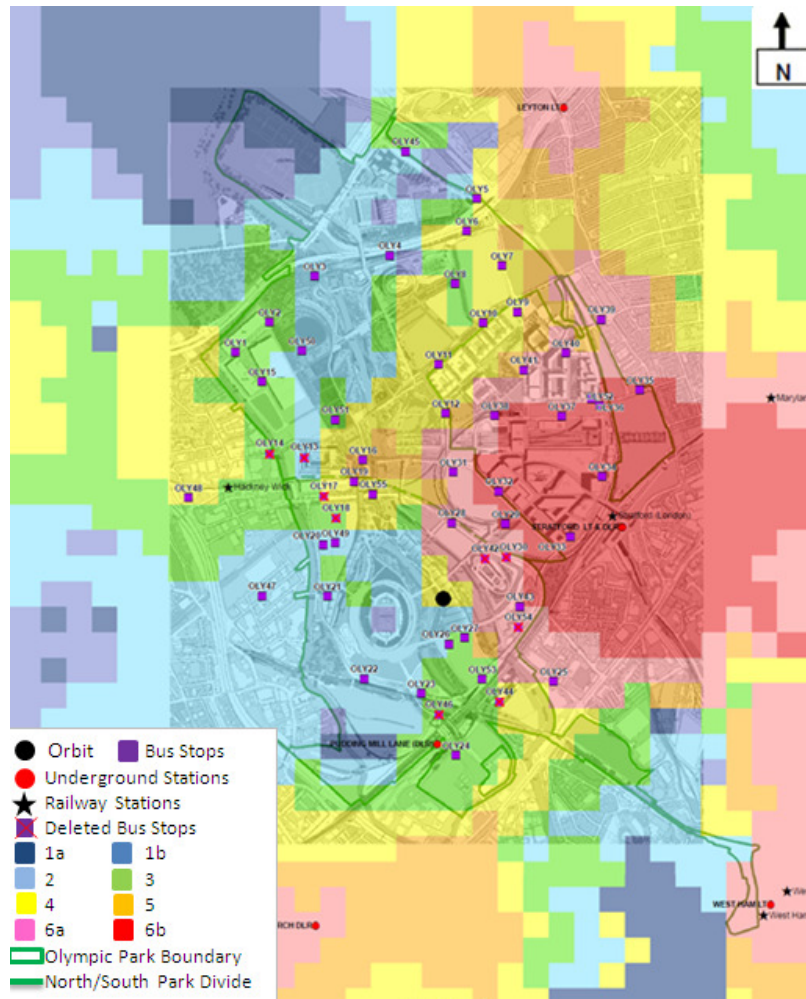
- Changes to the highway and pedestrian networks in Transformation arising due to ongoing design of structures, bridges and highways; and
- Modifications to proposed bus stop provision resulting from constraints identified during ongoing design of structures, bridges and highways.

The updated PTAL assessment also reflects changes to 'background' bus services in the vicinity of the Olympic Park which have been implemented by TfL between 2006 and 2009, since the original PTAL assessment was undertaken in 2007.

**Figure 3.6** indicates the PTALs during Legacy Transformation. This shows the effect of the planned public transport enhancements and the pedestrian networks that will be available from 12 to 18 months after the Olympic and Paralympic Games. The average PTAL will be higher in 2013/14 than in 2006 and 2008 for all areas of the Olympic Park except for one area (Planning Delivery Zone (PDZ) 7) to the north of the Olympic Park. Changes in PTALs will be as a result of the following:

- The operation by 2013/14 of Stratford International and enhanced rail and DLR services at Stratford Regional, and the bus service enhancements as discussed in **Section 3.4.2**;
- Increases to PTALs around the Aquatics Centre reflect the enhanced rail services at Stratford International and Stratford Regional, and the bus services 276 and 388 on Carpenters Road and services 262 and D8 which are proposed to use the Stratford City Southern access;
- PTALs around the IBC / MPC site increase due to the proposed routing of service 276 along the realigned Waterden Road; and
- There is an enhancement to PTALs around new stations, Stratford High Street and Abbey Road, on the Stratford to Canning Town DLR extension and around West Ham.

**Figure 3.6: PTAL Assessment for Olympic Park in Legacy Transformation**



The PTAL in **Figure 3.7** shows a number of bus stops that have been removed from the original proposals for bus stops when the original TA was completed in 2007. In addition, the above PTAL does not account for the Stratford City bus services that were outlined in **Section 3.4.3**.

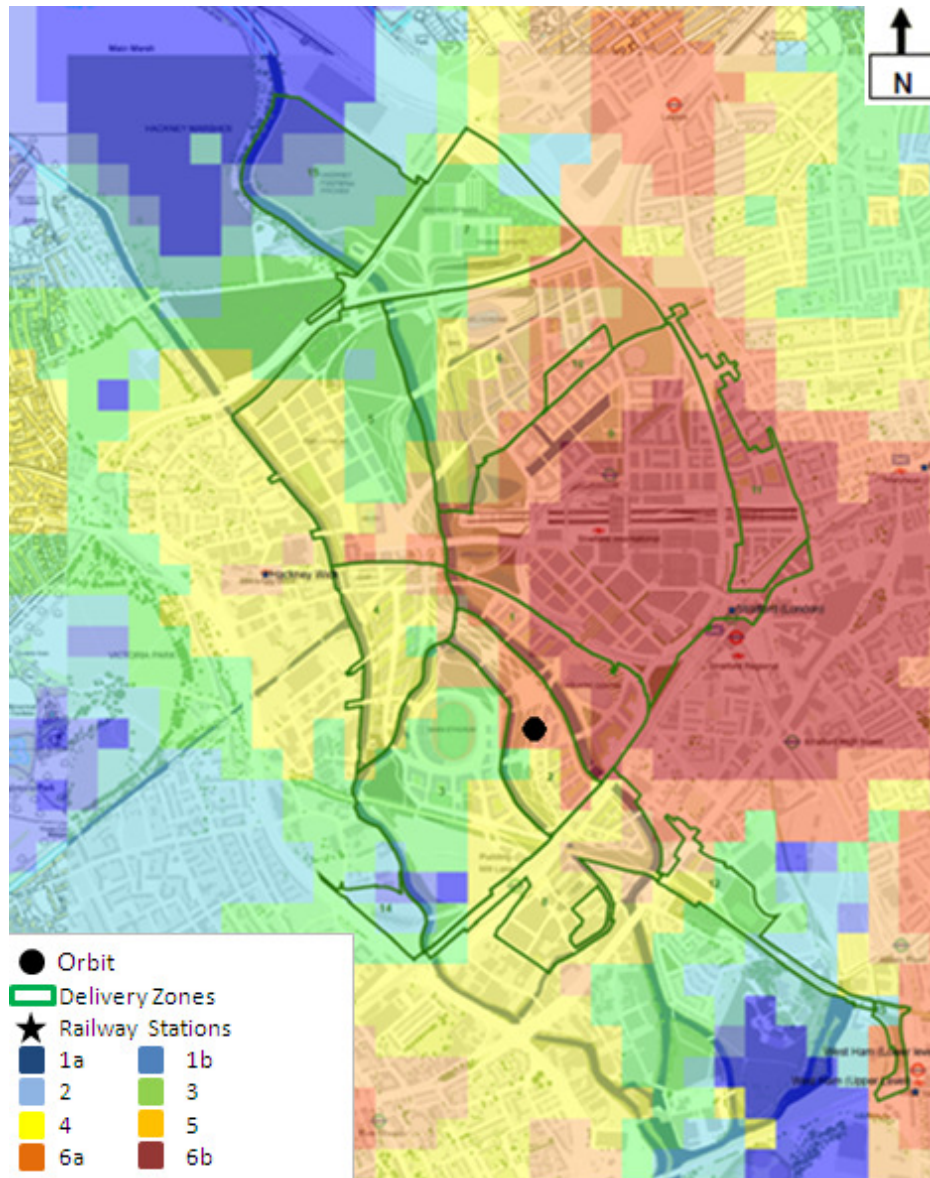
### 3.5.3 Legacy

A PTAL assessment was carried out for Legacy as part of the TA submitted and approved Olympic, Paralympic and Legacy Transformation Planning Applications in September 2007. **Figure 3.7** shows the PTALs in 2021, demonstrating the effect of the enhanced public transport services and the improved pedestrian permeability through the Olympic Park site. The average PTAL will be higher in 2021 than in 2006 for all Delivery Zones, and will be higher in 2021 than in 2013/14 for 13 of the 15 Delivery Zones. Changes in PTALs will be as a result of the following:

- Increases in PTAL in Stratford City Phase 1 will be as a result of bus service extensions into Stratford City from the north and west and enhanced bus frequencies on a number of routes;
- PTALs increases due to the proposed extension of service 145 and the re-routing of services 339 and 288 around the main stadium (indicative at this stage);
- PTAL at the south of the Olympic Park would increase due to DLR frequency enhancements at Pudding Mill Lane and the re-routing of service 262 and a frequency enhancement on service D8; and
- PTALs in the Hackney Wick and Fish Island areas increase due to the routing of bus services 8 and 330 via Monier Road (Fish Island) and the extension of service 30 via Hackney Wick. For both areas, the provision of new bridges at Wallis Road, Monier Road and Stour Road will improve PTALs by reducing walk access distance.



Figure 3.7: PTAL Assessment for Olympic Park in Transformation



## 4 Description of Effects and Evaluation

### 4.1 Introduction

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This section provides a description and an analysis of the potential effects of The ArcelorMittal Orbit on the local transport networks.

In computing the trips generated by a development, it is common practice to use the TRAVL and TRICS databases for developments within and outside London respectively. Both TRAVL and TRICS are systems that challenge and validate assumptions about the transport impacts of new developments.

However, it is not possible to use these databases to predict the likely trips for some types of developments, such as The ArcelorMittal Orbit, due to a lack of information on the databases. In this event, it is possible to analyse a similar development, and draw on the conclusions and assumptions from that.

Therefore, as part of the analysis of the potential effects of The ArcelorMittal Orbit on the local transport network, assumptions have been drawn from analysis of the London Eye, carried out by Arup in 2001 (*“British Airways London Eye – Environmental Statement, Technical Studies, Volume 2”*). An explanation of these and other principle assumptions made for the purpose of this appraisal is also included. A full list of these assumptions can be seen in **Appendix C**.

This section covers the following topics:

- An analysis of the visitor numbers and pattern of visits including hourly variations;
- An appraisal of the practical capacity of the Orbit;
- The visitor peak periods and assessment flows, including visitors and sightseers;
- Distribution of visitors to the Orbit and evaluation of their impacts on the relevant local transport network and facilities, in particular:
  - Public transport, including rail, London Underground, DLR and London Bus services;
  - Pedestrian and Cycle infrastructure;
  - Coach drop-off / pick-up facilities;
  - Blue badge car parking and servicing; and
  - The impact on the local highway network.
- An appraisal of crowd management measures.

### 4.2 Numbers and Visitors and Sightseers to The ArcelorMittal Orbit

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The ArcelorMittal Orbit has the potential, in conjunction with Olympic Park, to be a major tourist attraction in East London. Market research carried out on behalf of the Olympic Park Legacy Company (OPLC) indicates the following projected visitor numbers.

- 1,000,000 visitors in the first year after opening;
- 900,000 visitors in the second year after opening; and
- 800,000 visitors in the third year after opening.

The third year figure of 800,000 visits is taken as the basis for the transport evaluation and for setting out the design requirements (including the numbers of blue badge parking, cycle stands and coach facilities). If the number of visitors in the first year was used as a basis of for calculation in the long term it would lead to overprovision of services.

Surveys carried out by Strategic Planning Advice (SPA) as part of the London Eye study in 2001 established that the London Eye attracted 0.6 sightseers for every paying rider. This is attributed to the presence of other important tourist attractions in the area, including the London Aquarium, the Dali Exhibition, the Hall of Fame, the Imax Cinema and the Thames Path, an

attractive riverfront promenade which links other major places of interest of South Bank and Bankside.

While it is likely that there will be some sightseers to The ArcelorMittal Orbit, it is unlikely that there will be as many as to the London Eye due to a much lower level of tourist activity in the Stratford area. However, for the purposes of this assessment, some of these trips are assumed to be linked trips from within the Park. While some of the sightseeing trips are likely to be new trips, these may be predominately local leisure trips and are likely to occur outside of the peak commuter periods. Therefore, the new, sightseeing trips would utilise spare capacity on the local transport network.

#### 4.3 Linked Trips

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Of the 800,000 visitors projected to visit The ArcelorMittal Orbit in the third year after opening, not all will be new trips to the area. Given the location of the Orbit within the Olympic Park, and its proximity to the Stratford City development, it is likely that some trips to the Orbit will be linked to these attractions.

For the purposes of this assessment, it is assumed that 10% of the total The ArcelorMittal Orbit annual visits (80,000) will be linked to Stratford City. This represents approximately 0.5% of the 16.4m total annual external visits to Westfield meaning that 1 in 200 visitors to Westfield will visit the Orbit.

While it is acknowledged that there will be some linked trips from within the Park in Legacy/Legacy Transformation, it is difficult at this point to estimate the total number of linked trips from within the Park. As there is no defined programme for events at the various venues, it is not possible at this stage to estimate these trips with any degree of certainty. In addition, any linked trips from the daily use of venues have been discounted as it is unlikely that The ArcelorMittal Orbit would generate significant repeat visits for this potential market sector.

Thus, for the purposes of this study, it is assumed that there are no linked trips to The ArcelorMittal Orbit from within the Park. By not taking account of this aspect, this TA therefore represents a very robust case.

#### 4.4 The ArcelorMittal Orbit Practical Capacity

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The ArcelorMittal Orbit is capable of accommodating:

- A maximum of 636 visitors per hour (lifts are designed to carry a maximum of 636 visitors up and down the Orbit each hour and consist of two 1600kg, 21 person cars with a speed of 2.5m/s);
- A maximum of 300 visitors on two decks of the platform at one time (based on maximum toilet capacity for an assembly building where WC use is not concentrated in intervals); and
- A maximum of 180 visitors on each of the two decks at one time, 360 for both decks (based on the fire strategy report).

In calculating the capacity of The ArcelorMittal Orbit lifts, it was assumed that each would operate at 60% of the theoretical capacity. Thus, the 636 visitors that the lifts can carry each hour represent the practical capacity of the lifts. This accounts for the needs to cater the disabled and those with mobility impairments.

#### 4.5 Monthly Variations in Visitors

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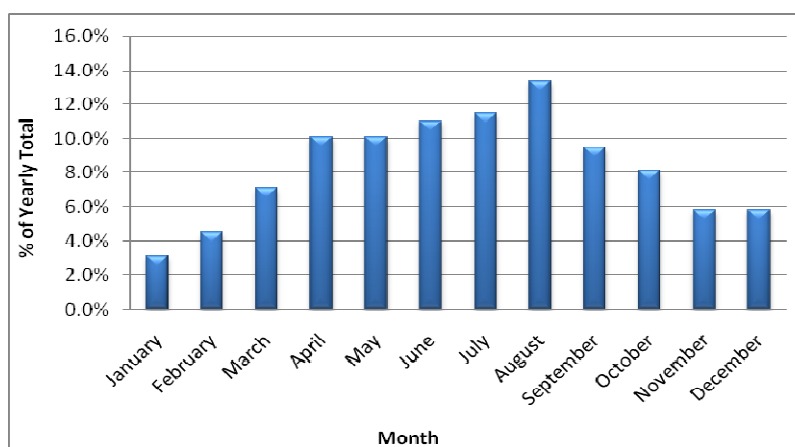
The monthly variation for visitors to The ArcelorMittal Orbit has been based on the monthly ridership figures of the London Eye. These figures are shown in **Table 4.1**, along with the monthly visitors to the Orbit for three years after opening. The percentage per month of the yearly total visitors is illustrated in **Figure 4.1**.

**Table 4.1: Visitors to the Orbit in the first and third years after opening**

Month	% Annual Visitors *	Number of Visitors (Orbit Forecast)		
		Year 1	Year 2	Year 3
January	3.1%	31,000	27,900	24,800
February	4.5%	45,000	40,500	36,000
March	7.1%	71,000	63,900	56,800
April	10.1%	101,000	90,900	80,800
May	10.1%	101,000	90,900	80,800
June	11.0%	110,000	99,000	88,000
<b>July</b>	<b>11.5%</b>	<b>115,000</b>	<b>103,500</b>	<b>92,000</b>
<b>August</b>	<b>13.4%</b>	<b>134,000</b>	<b>120,600</b>	<b>107,200</b>
September	9.5%	95,000	85,500	76,000
October	8.1%	81,000	72,900	64,800
November	5.8%	58,000	52,200	46,400
December	5.8%	58,000	52,200	46,400
<b>Total</b>	<b>100%</b>	<b>1,000,000</b>	<b>900,000</b>	<b>800,000</b>

\* Based on London Eye Arrival Profile

**Figure 4.1: Percentage of yearly visitors to the Orbit by month**



Based on the data provided from the London Eye and from **Table 4.1** and **Figure 4.1**, the following conclusions can be drawn:

- The highest peak month for visits occurs in August, accounting for 13.4% of the yearly total;
- A significant proportion of the visits (35.9%) occur within three consecutive months of the year in June, July and August; and
- The spring and summer periods, from April through to September inclusive, account for nearly two thirds (65.6%) of the total visits. The split in the visitor numbers between spring and summer periods are 48% and 52% respectively. This split would vary depending on the actual month when the Easter Holidays occur. This difference would be more pronounced when the Easter Holidays occur in March.

For assessment purposes, the monthly variation of visitors has been calculated based on an average month. Assuming that the percentage of yearly visitors in a peak month (August) is 13.4%, a 'normal' month will attract 7.87% of the total yearly visitors, assuming all visitors

throughout the year, excluding the peak month are evenly distributed. The numbers of visitors to The ArcelorMittal Orbit in a typical month in the first three years after opening are shown in **Table 4.2**. The numbers of visitors expected in the peak month are also shown for comparative purposes.

**Table 4.2: Normal and peak month visitors to the Orbit**

Month	% Annual Visitors	Number of Visitors		
		Year 1	Year 2	Year 3
Typical Month	7.87%	78,727	70,855	62,982
Peak Month	13.4%	134,000	120,600	107,200

#### 4.6 Hourly Distribution of Visitors

It is envisaged that the opening hours of The ArcelorMittal Orbit would be from 10:00 to 22:00 hours. However, for an attraction of this type, opening times can vary seasonally, as is the case for the London Eye. Throughout the entire year, the London Eye opens no earlier than 10:00 hours. The closing times do vary seasonally, as shown below:

20:00 hours from October to March;

21:00 hours in April;

21:00 hours in May and June from Sunday to Thursday;

21:30 hours in May and June on Friday and Saturday;

21:30 hours in July and August; and

21:00 hours in September.

Thus, in practice, The ArcelorMittal Orbit could open later than 22:00 hours, potentially until midnight to cater for special occasions or private parties. On such occasions, other visitors are unlikely to be permitted on the Orbit after a particular time in the late afternoon/evening.

When later opening times are in operation, the effect of The ArcelorMittal Orbit on the local transport network would not be discernable as the network would have considerably more spare capacity than during commuter peak periods. For this reason, there should be no justifiable reason for unduly restricting the closing time of the Orbit.

However, it is intended that The ArcelorMittal Orbit will open, on occasions, as early as 07:00 hours to cater for corporate hospitality groups of up to 75 people. This would occur predominately on weekdays and is unlikely to occur more than once a week. As such, the additional trips generated from corporate hospitality at the Orbit have not been considered as part of the hourly distribution of visitors. Instead, a separate assessment of the effect of the Orbit on the local transport infrastructure in the AM peak, including visitor arrivals between 09:00 and 10:00 hours and corporate events commencing at 07:00 hours, has been undertaken and is presented in **Section 4.14**.

The methodology for calculating the hourly distribution of visitors between 10:00 and 22:00 hours is as follows:

- The average number of visitors to the Orbit per week was calculated based the average number of weeks in a month (4.33);
- The number of visitors on a weekday is assumed to be 11% of the total number of visitors per week; the average number of visitors on a weekend day is assumed to be 25% of the total weekly visitors; and
- The hourly distribution of visitor arrival to the Orbit is based on the hourly distributions of visitor attendance in terms of actual ridership of the London Eye.

The percentage of hourly distribution for The ArcelorMittal Orbit, for a weekday and weekend day in a normal and peak month, as assumed from the London Eye study, is shown in **Tables 4.3** and **4.4**.

**Table 4.3: Percentage hourly distribution for a weekday**

Time of Day	Weekday	Normal Month			Peak Month		
		Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
09:00 – 10:00	4%	80	72	64	136	123	109
10:00 – 11:00	7%	140	126	112	238	214	191
11:00 – 12:00	11%	220	198	176	374	337	300
12:00 – 13:00	8%	160	144	128	272	245	218
13:00 – 14:00	7%	140	126	112	238	214	191
14:00 – 15:00	9%	180	162	144	306	276	245
15:00 – 16:00	12%	240	216	192	408	368	327
16:00 – 17:00	8%	160	144	128	272	245	218
17:00 – 18:00	7%	140	126	112	238	214	191
18:00 – 19:00	9%	180	162	144	306	276	245
19:00 – 20:00	8%	160	144	128	272	245	218
20:00 – 21:00	6%	120	108	96	204	184	163
21:00 – 22:00	4%	80	72	64	136	123	109
<b>Total</b>	<b>100%</b>	<b>2000</b>	<b>1800</b>	<b>1600</b>	<b>3404</b>	<b>3064</b>	<b>2723</b>

**Table 4.4: Percentage hourly distribution for a weekend day**

Time of Day	Weekend Day	Normal Month			Peak Month		
		Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
09:00 – 10:00	7%	318	286	255	542	487	433
10:00 – 11:00	8%	364	327	291	619	557	495
11:00 – 12:00	9%	409	368	327	696	627	557
12:00 – 13:00	9%	409	368	327	696	627	557
13:00 – 14:00	8%	364	327	291	619	557	495
14:00 – 15:00	8%	364	327	291	619	557	495
15:00 – 16:00	8%	364	327	291	619	557	495
16:00 – 17:00	8%	364	327	291	619	557	495
17:00 – 18:00	7%	318	286	255	542	487	433
18:00 – 19:00	7%	318	286	255	542	487	433
19:00 – 20:00	8%	364	327	291	619	557	495
20:00 – 21:00	7%	318	286	255	542	487	433
21:00 – 22:00	6%	273	245	218	464	418	371
<b>Total</b>	<b>100%</b>	<b>4545</b>	<b>4091</b>	<b>3636</b>	<b>7737</b>	<b>6963</b>	<b>6189</b>