Crossrail

Technical report

Assessment of socio-economic impacts

February 2005

COLIN BUCHANAN

DRIVERS JONAS

Crossrail: Socio-Economic Technical Report

Cross London Rail Links Ltd

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Prepared by: Approved by:

John Siraut, Paul Buchanan, Daniel Heuman, Ilias Drivylas, John Siraut

Stephanie Cesbron Kieron Arter, Rob Colley (Drivers Jonas), Tom Devine (Drivers Jonas)

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1. Introduction

1.1 Background

1.1.1 This report provides a socio-economic impact assessment for the proposed works. It provides an assessment of the route wide impacts of the scheme including the impact on employment within Central London and in key regeneration areas served by the scheme. It examines local impacts arising from the displacement of businesses to accommodate Crossrail. Local impacts are examined in four route sections: from Portobello Junction to Maidenhead and Heathrow in the west, the central tunnel from Paddington to the Isle of Dogs and Stratford and the two eastern sections to Shenfield and Abbey Wood. The ES records all significant impacts identified in this technical report.

1.2 Structure of the technical report

1.2.1 The remainder of the report covers:

- description of the project;
- the scope of the report and methodology used to reach the findings;
- the environmental baseline on which the evaluation is based;
- the route-wide impacts;
- the local impacts at route window level; and
- the appendices.

2. Project description

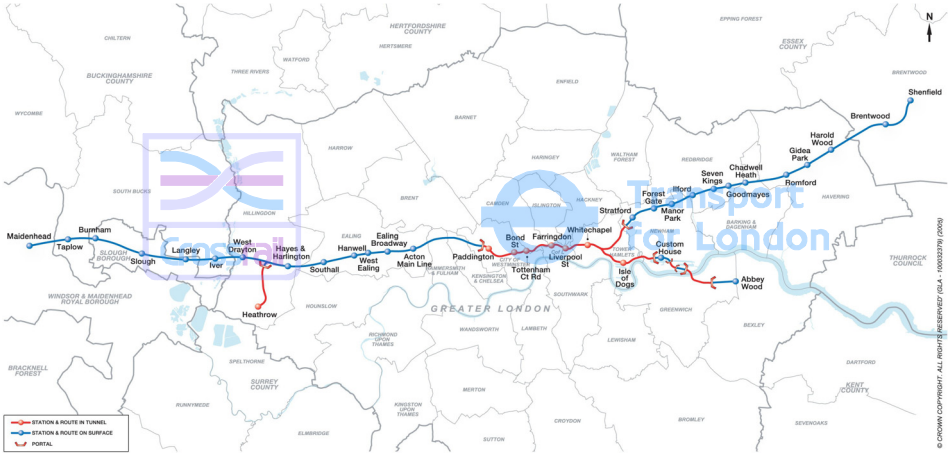
2.1 Introduction

2.1.1 This chapter provides a general introduction to Crossrail in terms of an overview of the permanent works that will be constructed as part of the project, information on the operation of Crossrail and a description of how the permanent works will be constructed.

2.2 Crossrail – a general introduction

2.2.1 Crossrail is a major new cross-London rail link project that has been developed to serve London and the southeast of England. Crossrail will support and maintain the status of London as a world city by providing a world class transport system. The project includes the construction of a twin-bore tunnel on an east-west alignment under central London and the upgrading of existing National Rail lines to the east and west of central London. The Crossrail route is shown in *Figure 2.1*.

FIGURE 2.1 OVERVIEW OF CROSSRAIL ROUTE



2.2.2 The project will enable the introduction of a range of new and improved rail journeys into and through London. It includes the construction of seven central area stations, providing interchange with London Underground, National Rail and London bus services, and the upgrading or renewal of existing stations outside central London. Crossrail will provide fast, efficient and convenient rail access to the West End and the City by linking existing routes from Shenfield and Abbey Wood in the east with Maidenhead and Heathrow in the west.

2.2.3 Crossrail will be a significant addition to the transport infrastructure of London and the southeast of England. It will

deliver improved services for rail users through the relief of crowding, faster journeys and the provision of a range of new direct journey opportunities. The project will also have wider social and economic benefits for London and the southeast of England.

2.3 Route overview

2.3.1 Crossrail's route has four distinct sections: a central section within central London and, outside central London, western, northeastern and southeastern sections.

2.3.2 In the west, Crossrail will use the Great Western Main Line between Maidenhead and Westbourne Park. The existing 25 kV overhead electrification between Paddington and Airport Junction will be extended to Maidenhead and bridge alterations will be undertaken as necessary. The main infrastructure changes are the construction of a flyover structure (the Stockley flyover) to allow Crossrail trains to access the existing tunnelled spur to Heathrow and the provision of a rail underpass (a dive-under) west of Acton Yard. A new line, within the existing railway corridor, will be provided between Langley and West Drayton. Enhancements will also be made to stations, with the most significant works being at Ealing Broadway, Southall, Hayes and Harlington, West Drayton, Slough and Maidenhead. New stabling sidings are also proposed at Old Oak Common, West Drayton and west of Maidenhead station.

2.3.3 The central route section will consist largely of a twin-bore tunnel beneath central London with portals at Royal Oak in the west, Pudding Mill Lane in the northeast and Victoria Dock Road in the southeast. The central route section extends from a point around 200m west of the A40 Westway to a point around 500m to the east of the portal at Pudding Mill Lane in the northeast and a point just to the east of Poplar Dock and the A1206 Prestons Road in the Isle of Dogs in the southeast. New stations and associated structures, such as ventilation shafts, will be provided along this part of the route.

2.3.4 On the northeast route section, Crossrail will use the existing Great Eastern Main Line between Pudding Mill Lane and Shenfield. The main infrastructure changes are a new train maintenance depot west of Romford station and the reinstatement of a track between Goodmayes and Chadwell Heath. Enhancements will also be made to stations, with the most significant works being proposed at Ilford and Romford. This route has existing 25kV overhead electrification. New stabling facilities will be provided at Gidea Park.

2.3.5 The southeast route section runs between a point to the east of the Isle of Dogs station and the eastern terminus at Abbey Wood,

where Crossrail will serve a reconstructed station. Crossrail will operate in a twin-bore tunnel to Victoria Dock portal where it will serve a reconstructed station at Custom House. The route will then follow the existing alignment currently used by the North London Line through the Connaught Tunnel to Silvertown. At North Woolwich, a new twin-bore tunnel to Plumstead, referred to as the Thames Tunnel, will pass beneath the River Thames. Two new tracks will be provided between Plumstead and a point east of Abbey Wood station to accommodate Crossrail services on the North Kent Line corridor. This route will be provided with 25kV overhead electrification on the Crossrail lines.

2.4 Permanent works

2.4.1 The permanent works required for the project are:

- twin-bore tunnels;
- stations;
- emergency intervention points, escape and ventilation shafts;
- train depot and stabling facilities;
- track works;
- traction power and signalling systems;
- communications systems; and
- a route control centre.

Twin-bore tunnels

2.4.2 Crossrail's twin-bore tunnels, which represent the largest scale engineering component of the project, will run through the central section and extend into the southeastern section of the route.

2.4.3 The twin-bore tunnels will run from Royal Oak, located to the west of Paddington, and will pass beneath Hyde Park, the West End, Holborn, Clerkenwell, Shoreditch and Stepney. At a point beneath Stepney Green, the route will fork. One set of tunnels will continue to the northeast before emerging at the surface at Pudding Mill Lane near Stratford, while the other set of tunnels will head southeastwards and emerge on Crossrail's southeastern section adjacent to Victoria Dock Road in the Royal Docks area. Twin-bore tunnels will be constructed between North Woolwich and Plumstead to take the southeastern section of the route under the River Thames. In total, 46 km of running tunnel will be constructed (equivalent to 23 km of twin-bore tunnel).

2.4.4 The tunnels will generally be constructed at approximately the same depth as London Underground's Central line, with the rail level being about 20 m to 25 m below street level, with low points at Hyde Park at 35 m and in the West End at 30 m. Through the City of London the tunnels would be constructed approximately 25 m to 35 m below street level, deepening to 40 m between Liverpool Street and Pudding Mill Lane and the Royal Docks with a low point of 50 m just east of Isle of Dogs.

2.4.5 The tunnels will be circular in cross-section. They will be larger than those of the existing deep-level London Underground lines. Crossrail tunnels will have an internal diameter of approximately 6 m compared with 4.35 m on the Jubilee line. This larger diameter is to accommodate the Crossrail main line rolling stock and overhead electrification equipment. At the location of the stations, the cross-section will be elliptical with a general width of 10 m.

2.4.6 The tunnels will include a walkway, approximately 1 m wide, for use by passengers in emergencies that necessitate the evacuation of trains between stations. A low-level walkway on the opposite side of the tunnel will be provided for maintenance and access by the emergency services.

Stations

2.4.7 Seven new stations will be located along the tunnelled section at Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street, Whitechapel and the Isle of Dogs. Stations will include 210 m long platforms and a step-free access route between the street and Crossrail platforms. Each station will have two ticket halls, with the exception of those at Whitechapel and the Isle of Dogs. At each station, the platform tunnels will be constructed to allow for a future upgrade of platforms to 245 m for the operation of 240 m long 12-car trains, should demand for Crossrail services necessitate this.

2.4.8 The provision of two ticket halls will provide alternative means of egress during emergencies, sufficient capacity for anticipated passenger movements within the station and a widened local catchment area for the station. At each end of the stations there will be emergency intervention points and escape and ventilation facilities. At Whitechapel station there will be two escape and ventilation facilities, one at the Durward Street shaft, located at the western end of the station and one at Cambridge Heath Road at the eastern end. It will also be possible to provide a second ticket hall at Cambridge Heath Road should the need arise. At the Isle of Dogs station, a second escape and ventilation facility will be provided within the shaft at the eastern end of the station. There will also be passive provision for a second ticket hall at this location.

2.4.9 At existing stations outside the central area, platforms will be extended where necessary to accommodate the length of Crossrail's trains. Other works include expanded ticket halls and enhanced passenger facilities.

Over-site development

2.4.10 Where the project will require new facilities at the surface, such as station ticket halls and shaft structures, there will be opportunities to carry out subsequent developments on many of sites additional to those needed to construct or operate Crossrail. These are known as over-site developments. They will usually replace development that existed on the site prior to the construction of Crossrail. Development proposals for each site could include retail, office, residential or community space, or any combination of these.

2.4.11 Powers to construct future over-site developments are not included in the Bill. However, Crossrail operational structures will be constructed to provide physical support for the type of future over-site development that is likely to be proposed for these sites. Proposals for over-site development will require separate planning permission.

Emergency intervention, escape and ventilation shafts

2.4.12 Throughout the tunnelled section of the route, where distances between stations exceed 1 km, intermediate shafts independent from stations and the tunnel portals will be constructed in accordance with safety standards. These are sub-surface facilities with surface level access structures. The shafts provide one or more of the following features:

- emergency intervention points (EIPs), located at a maximum spacing of approximately 1 km, to be used by the emergency services to access the tunnels – the shafts include lifts or hoists and stairs, with a parking area provided at the surface for emergency services;
- escape facilities, consisting of lifts and stairs to allow for passenger evacuation, with a place of safety provided at the surface; and
- ventilation facilities, containing ventilation fans used to reduce temperatures in the tunnel and to provide forced ventilation for smoke control during emergencies.

2.4.13 The shafts and facilities provided are listed in *Table 2.1*.

TABLE 2.1 INTERMEDIATE SHAFT LOCATIONS AND KEY FEATURES

Location	EIP	Escape	Ventilation
Westbourne Bridge	✓		✓
Hyde Park	✓		✓
Park Lane	✓		✓
Fisher Street	✓		✓
Hanbury Street	✓		✓
Stepney Green	✓	✓	✓
Mile End Park	✓	✓	✓
Eleanor Street	✓		✓
Lowell Street	✓	✓	✓
Hertsmere Road	✓		
Blackwall Way	✓		
Limmo Peninsular	✓	✓	✓
Warren Lane	✓		✓
Arsenal Way	✓	✓	✓

2.4.14 EIP and escape facilities will also be provided at the Pudding Mill Lane, Victoria Dock, North Woolwich and Plumstead portals. Escape facilities will be provided at the Royal Oak portal.

Depots and stabling

2.4.15 Crossrail trains will be maintained at a new depot that will be located at the Railway Goods Yard and Gasworks site to the west of Romford station. Trains will also be stabled at other locations at the start and end of the day and between the peak periods, as listed in *Table 2.2*.

TABLE 2.2 MAINTENANCE AND STABLING FACILITIES

Location	Facilities	Capacity (number of trains)
Romford	New maintenance, train washing and stabling facility	15
Gidea Park	Existing stabling extended	8
Old Oak Common	Existing stabling modified, train washing	12
West Drayton	New stabling facility	22
Maidenhead	New stabling facility	6

2.4.16 In addition, sidings at Abbey Wood and Shenfield may be used for stabling during certain periods of the day.

Track works

2.4.17 New rail tracks will be provided in the Crossrail tunnels and at certain locations on the outer route sections, either to accommodate Crossrail services or to accommodate other

services and so free up capacity for Crossrail. These are described in detail in the relevant route windows.

2.4.18 On the western route section, a new line of about 1 km in length will be constructed within the existing railway corridor between Langley and West Drayton, which will link existing (but upgraded) freight lines to its east and west so providing increased track capacity. New track will be provided in connection with the new flyover at Stockley and the new rail underpass at Acton.

2.4.19 On the northeastern route section, a freight loop (a single rail line for freight trains) will be provided between Goodmayes and Chadwell Heath to replace an existing loop at Manor Park, which will be removed to accommodate Crossrail.

2.4.20 Two new tracks will be provided on the southeastern route section between White Hart Road in Plumstead and a point about 1,200 m east of Abbey Wood station, to accommodate Crossrail services on the North Kent Line corridor.

2.4.21 Track works will also take place in connection with new or remodelled sidings and stabling facilities.

2.4.22 The tunnel trackform will be designed to provide an appropriate level of resilience to mitigate the potential adverse impacts from vibration and groundborne noise. Where there are particularly sensitive receptors, such as theatres, above the route of the tunnels, increased resilience will be provided with floating slab track or similar technology. In addition, all new sections of track will be constructed of continuously welded rail.

Traction power and signalling

2.4.23 Traction power will be provided by an overhead line electrification system operating at 25 kV alternating current. Power will be fed to the overhead wires from feeder stations, which in turn take power from the National Grid.

2.4.24 New overhead line equipment will be provided on part of the western route section and along the southeastern route section. Overhead electrification equipment will comprise steel gantries with suspended catenary wires and contact wires which will deliver power to the trains. The gantries themselves will consist of portal frames spanning each side of the four-track rail corridor which will support the catenary. The gantries will be positioned every 50 m or so, although variations to this will be used in order to avoid structures such as bridges. The height of the gantries will be about 6 m above rail level and the contact wires will normally be positioned just over 4 m above the rail.

2.4.25 The signalling system on the new sections of line will be designed to provide Automatic Train Protection, which is a system that

supervises the driver's actions. It will check that the train stays within a braking trajectory when a caution signal has been passed, ensuring that the train will come to a stand at the stop signal. In the central tunnels and at points within the vicinity of the tunnel portals, Automatic Train Operation will automate the driver's function. It will control train stopping at stations, control speed between stations, ensure that only the doors on the correct side can be opened at each station, ensure trains stop in line with platform edge doors and initiate door closing. The tunnels will be bi-directionally signalled for use during disrupted operations (eg if a tunnel is blocked due to a train failure). On existing lines, the current signalling system will be used. Traction power and signalling in the central area will be controlled from a dedicated Crossrail Route Control Centre located to the west of Romford station.

2.4.26 The signalling and electrification works have been designed for staged installation to suit the commissioning of Crossrail services.

Communications

2.4.27 It is envisaged that by the time Crossrail begins operations, Network Rail will be equipped with the new 'Global Standards Mobile – Railways' system for voice and data communications on the railway network. It is intended that Crossrail will use this national system.

2.4.28 The tunnels in the central route section will be equipped with a cable (known as a 'leaky feeder' cable) running along the tunnels to act as a transmitter and receiver of signals. This system will permit continuous railway and emergency services communications.

Route control centre

2.4.29 The central section will be controlled by the Route Control Centre, which will be located on the depot site to the west of Romford station. The outer surface sections will be controlled from existing local control centres. The Route Control Centre will be capable of monitoring all Crossrail train movements, including those on the outer sections.

2.5 Crossrail operations

2.5.1 This section describes the normal operation of Crossrail and the services on existing lines that are assumed will change as a result of the introduction of Crossrail. The section includes a description of:

- interchanges;
- daily operations;
- changes to other services;
- predicted passenger numbers;
- rolling stock specification and performance;
- train servicing and stabling locations and activities;
- safety;
- employment; and
- operational waste.

Interchanges

2.5.2 Crossrail will interchange with other services across the network.

Daily operations

2.5.3 Crossrail services will call at all stations with a peak frequency between Whitechapel and Paddington of:

- 24 trains per hour (tph) from 07:45 to 09:15 and 16:45 to 18:15;
- 20 tph from 07:00 to 07:45, 09:15 to 10:00, 16:00 to 16:45 and 18:15 to 19:00; and
- 16 tph for much of the daytime, evening and weekend periods.

2.5.4 Services will operate at hours similar to the Underground, with the first trains due to arrive at Tottenham Court Road at 05:45 and the last trains at 00:30 Mondays to Saturdays. On Sundays, services will start later at 06:30, also finishing at 00:30.

2.5.5 During weekday peak hours, it has been assumed that Crossrail will operate 10 tph from the Great Western Line (four from Maidenhead, four from Heathrow and two from West Drayton) with 14 tph starting at Paddington, travelling east. To the east of central London, 12 tph will operate from Shenfield and 12 tph from Abbey Wood.

2.5.6 Dwell times (that is, the time allowed for passengers to alight and board trains) of 45 seconds are proposed at each station, with the exception of Paddington and Liverpool Street where the high number of interchange movements to and from national rail terminals will require 60 seconds.

Changes to other services

2.5.7 Where Crossrail services operate on the existing rail network, a number of existing services will be replaced or amended.

2.5.8 *Table 2.3* describes the changes to existing services during the peak periods assumed for the purposes of project appraisal. The precise changes made will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.

TABLE 2.3 CHANGES TO EXISTING SERVICES RESULTING FROM THE INTRODUCTION OF CROSSRAIL

Branch	Key changes
Maidenhead (Great Western Main Line)	The majority of services that start at, or to the east of, Reading will be replaced by Crossrail. Some services that start west of Reading will be amended to operate fast between Reading and Paddington, with station calls at Maidenhead, Slough, Hayes & Ealing Broadway removed.
Shenfield (Great Eastern Main Line)	'Metro' services will be replaced by Crossrail, apart from the peak hours only service between Gidea Park and Liverpool Street. Additional services provided from the Lea Valley and/or London Stansted Airport.
North London Line	Custom House, Silvertown and North Woolwich services withdrawn.
Abbey Wood	No changes.

2.5.9 No changes are proposed to the Heathrow Express or longer distance services on the Great Western Main Line through Maidenhead to the West of England, Wales and the Cotswolds, or on the Great Eastern Main Line through Shenfield to destinations such as Norwich, Ipswich and Southend. On the North Kent Line, no changes will be made to existing services.

Disrupted operations

2.5.10 In the event of a section of one of the tunnels being closed for maintenance or other reasons, a limited Crossrail service can still operate using cross-overs that will be provided at Westbourne Park, to the east of Farringdon, to the west of the Isle of Dogs and on the tunnel approach at Pudding Mill Lane.

Predicted passenger numbers

2.5.11 Around 160,000 passengers are forecast to use Crossrail in 2016 during the three hour morning peak period between 07:00 and 10:00. Services will be most heavily used between Whitechapel and Liverpool Street (forecast to carry 55,000 passengers),

Liverpool Street and Farringdon (49,000 passengers), and Paddington and Bond Street (35,000 passengers).

Rolling stock specification and performance

2.5.12 The trains used for Crossrail will be 200 m long, formed from 10 cars of 20 m in length. The trains will be made up of two five-car units and will have a top speed of 160 km/h. The trains will draw power from overhead line systems. Their performance will be compatible with the project's requirement to operate 24 trains per hour (tph) through the central London stations.

2.5.13 The layout of each carriage will be designed to assist rapid boarding and alighting in the central area in order to minimise dwell times. Each carriage will have at least two sets of double doorways per side with wide set-backs and a combination of four abreast (as two plus two) and inward-facing seating. The trains will be air-conditioned.

2.5.14 The Crossrail peak service pattern requires 58 trains of 10 cars each formed from 116 five car units. This assumes 90% availability from an overall fleet size of 129 five-car units.

Train servicing and stabling locations and activities

2.5.15 Stabling will be undertaken at a number of locations across the Crossrail network as listed in *Table 2.2* previously in this chapter.

Safety

2.5.16 The project includes specific features for safe operation, including its signalling and communication systems, described above. It also includes features within the design of its tunnels, shafts and stations to aid efficient emergency access and escape, also described above. Like any new railway infrastructure, the project will be required to obtain approval of a safety case under the Railways (Safety Case) Regulations 2000. This will include approval of the design and management of the tunnel and station features that aid efficient emergency access and escape together with railway signalling and communications systems.

Employment

2.5.17 Approximately 1,360 full time equivalent jobs will be required to operate Crossrail in order to operate and maintain the trains, stations and tracks. It is estimated that approximately 990 of these full time positions will be new jobs, while the remainder will be taken up by staff transferring from existing rail operations. The range of skills employed will include train drivers, on-train revenue protection staff, station staff, head office functions and maintenance staff at the depot.

Operational waste

2.5.18 Crossrail will generate limited quantities of waste through station operation, maintenance, train washing and the disposal of litter collected from trains. This waste will be disposed of appropriately.

2.6 Project description – construction

2.6.1 This section describes the principles that will be adopted for the construction of Crossrail and the controls that will be implemented to avoid, reduce and, if possible, remedy the significant adverse environmental effects arising from the construction works. This section covers the following topics:

- construction strategy;
- mitigation measures;
- project programme;
- construction workforce;
- working hours;
- tunnelling strategy;
- station construction;
- rail services during construction;
- access arrangements;
- quantities of materials; and
- excavated material and waste management.

Construction strategy

2.6.2 A construction strategy has been developed with the following objectives:

- to meet the requirements of all relevant statutory legislation, codes of practice and standards;
- to limit adverse impacts upon local communities and the environment so far as reasonably practicable;
- to carry out the planning and delivery of the project in the most cost effective manner;

- to limit impacts on the operations of Network Rail, London Underground and other rail companies;
- to implement a community liaison plan including a complaints help-line and an independently appointed Complaints Commissioner;
- to remove, where reasonably practicable, excavated material by rail and water transport, and import construction materials by rail; and
- to implement a travel plan for construction workers.

Construction mitigation measures

2.6.3 The mitigation measures, as presented in *Appendix B1* of the ES, describe how the construction of the project will be managed to ensure that the impacts are controlled and mitigated. The mitigation measures represent a minimum level of mitigation that the project will be committed to providing. Physical mitigation measures that are integral to the project design are included in the scope of powers sought by the Bill.

Project programme

2.6.4 It is anticipated that the programme for the construction of Crossrail will start in 2007 and that the main construction works will take place over a six year period. It is intended that much of the main works will generally be completed within five years, followed by a period of testing, commissioning and preparation for operational readiness. The assessment assumes that the first train service is operational from 2013. Some work will be undertaken in advance of the start of the main construction period. This work will consist of the relocation of various facilities, the diversion of utility services and other minor works to facilitate the construction of Crossrail in a timely manner.

Construction workforce

2.6.5 The numbers and profile over time of workers have been assessed by examining the cash flow, determining the proportion of cost attributable to the labour element and then dividing by the average labour cost. Labour requirements for the construction of Crossrail are estimated at 87,000 employment-years.

Working hours

2.6.6 Normal working hours are assessed as being from 07:00 to 19:00 on weekdays and from 07:00 to 14:00 on Saturdays. Only non-disruptive preparatory work, repairs or maintenance will be carried out on Saturday afternoons or Sunday between 08:00 and 17:00. There are certain general exceptions to these hours, which

are described below. In addition, it may be necessary in exceptional cases of urgency to depart from these normal hours.

2.6.7 Tunnelling works together with directly associated activities (such as installation and maintenance of tunnelling equipment, construction of cross passages, installation of tunnel linings and transportation, storage and removal of excavated material) will normally be carried out on a 24 hour per day, seven days per week basis. Track laying and internal fit out works within the stations and tunnels may also be carried out on a 24 hour per day, seven days per week basis.

2.6.8 Where reasonably practicable, night time surface working will be kept to a minimum. However, certain works requiring temporary possession of roads and railways for safety or operational requirements, to limit disruption to the travelling public, and works in connection with utilities when demand is low will need to be undertaken outside normal working hours. This will include Saturday afternoon, night-time, Sunday and/or bank holiday working from time to time. Longer term possessions (in excess of one week) will be required for more major works.

2.6.9 Deliveries will be arranged to minimise impacts on the road system as far as reasonably practicable. Deliveries may extend beyond the normal working hours up to 22:00 from Monday to Friday. Abnormal loads may also be delivered or removed outside normal working hours subject to the requirements and approval of the relevant authorities.

Tunnelling strategy

2.6.10 The tunnelling will be carried out by tunnel boring machines (TBMs) in 16 separate driven lengths. There will be one additional tunnel built for construction purposes only. This tunnel will be 500 m long and will run between Hanbury Street and Pedley Street. Its purpose is to provide an underground route to move excavated material by conveyor to a railhead to reduce the need to use lorries.

2.6.11 The tunnels will lie in London Clay for two thirds of their length and the remainder will generally be within, or at, the interface with the Lambeth Group, which is essentially clay with sand layers. The Thames tunnel will be predominantly in chalk. The type of TBM that will be used will be suited to the ground conditions and the average rate of tunnel drive will be of the order of 65 to 75 m per week. The tunnelling operation will be undertaken on a 24 hour day, seven day per week basis and it is planned that up to 13 TBMs will be operating simultaneously.

2.6.12 The TBMs will be installed and removed through access shafts, which will become the permanent shafts used for emergency intervention/ escape/ventilation, or via temporary shafts

constructed at the portals. Pre-cast concrete segments will be erected from the TBM. The TBM will be propelled forwards by hydraulic jacks pushing on the previously erected tunnel lining ring. Gaps between the excavated tunnel wall and the tunnel lining will be filled with grout.

2.6.13 Excavated material from the tunnels will be removed by conveyor to handling facilities at worksites. The material will then be removed from the worksites by rail, river barge or road.

2.6.14 The station tunnels for five of the stations in the central area will be constructed using sprayed concrete lining, with spheroidal graphite iron and pre-cast concrete linings used in addition for certain escalator shafts, ventilation tunnels and adits. The stations at Paddington and the Isle of Dogs will be constructed from the surface as concrete boxes. Excavated material from the construction of the stations will be removed by road.

Construction of below ground stations

2.6.15 The construction of the below ground stations will consist of the following typical sequence of activities:

- works prior to the start of main construction, consisting of diversion of utility services and other preliminary works to enable construction;
- contractor mobilisation of labour and plant, followed by clearance of the site, including demolitions and setting up offices and welfare facilities;
- excavation and piled walls in concrete, reinforced concrete or steel;
- construction in reinforced concrete and sprayed concrete lining of shafts, underground tunnels and ticket halls;
- installation of mechanical and electrical equipment and distribution services, including ventilation and computer systems, together with installation of architectural finishes;
- completion of above ground station works;
- commissioning and testing of equipment and systems to provide a functioning facility; and
- a period of operational readiness to ensure that the trains and systems operate effectively prior to the start of the first revenue service.

Rail services during construction

2.6.16 The works will be planned to minimise disruption to the existing railway services during construction. It is intended that line closures will generally be restricted to over-night or weekend 'possessions' of the railway, allowing services to run as normal during weekdays. Some longer possessions may be required, but they will generally be planned so that they take place over public holiday or Christmas periods. Where possible, possessions will be linked with other works requiring rail lines to be closed. There will be a two week period where all mainline services into Paddington station will be stopped to allow the Crossrail works to take place, with a period of reduced services before and after this period.

Access arrangements

2.6.17 Access arrangements for the construction sites will be discussed and agreed with the relevant local authorities and other statutory bodies.

2.6.18 Traffic management plans will be developed which will include details of access arrangements, temporary and permanent closures and diversions, time restrictions on use and traffic signage.

Quantities of materials

2.6.19 The construction of Crossrail will require the use of many different materials. The principal items are detailed below:

- 1.1 million m^3 of concrete;
- 140,000 tonnes of steel reinforcement; and
- 140 km of steel rails.

Excavated material and waste management

2.6.20 The construction of Crossrail is expected to generate approximately 8 million m^3 of excavated materials and demolition and construction wastes. This figure represents the bulked volume of excavated material allowing for the increase in volume of material following excavation.

2.6.21 Where practicable, excavated material will be removed by rail and water transport. It is estimated that 30% of excavated material would be removed by train, 15% by barge and 55% by road.

2.6.22 The Secretary of State will take steps to ensure that any nominated undertaker's strategy will be to seek to dispose of

excavated materials and construction and demolition waste for beneficial re-use in preference to landfill disposal. However, it has been established, as a robust case, that there will be sufficient and available licensed landfill capacity within reasonable distance of Crossrail worksites to accept all of the excavated materials and wastes that will be generated, should the need arise. Suitable projects or other opportunities for re-use will be identified as the detailed construction planning is completed. A small proportion of the material will be contaminated and will need to be landfilled at licensed sites.

2.6.23 A hierarchical approach to waste management will be applied in accordance with the following principles:

- minimise generation of excavated materials and wastes;
- re-use and recycle excavated materials and waste within the Crossrail project;
- re-use and recycle excavated materials and waste through environmental beneficial use (eg at registered exempt sites or as landfill restoration cover); and
- dispose of surplus excavated materials and waste at licensed landfill sites.

3. Scope and methodology

3.1 Introduction

3.1.1 A Hybrid Bill has been submitted to Parliament seeking powers to construct Crossrail Line 1. An Environmental Statement (ES) has been deposited with the Hybrid Bill in accordance with the provisions of Parliamentary Standing Order 27A. The ES documents the results of the Environmental Impact Assessment (EIA).

3.1.2 The EIA process was undertaken in accordance with the Scoping and Methodology Report (Appendix A2 of the Crossrail ES) that set out the approach to be used by all technical disciplines.

3.1.3 This Technical Report provides the detailed methodology, assumptions, baseline, analysis and assessments for the socio-economic elements of the EIA in accordance with the Scoping and Methodology Report and that are reported in the ES.

3.2 Approach to the EIA

Basis of the assessment

3.2.1 The socio-economic impacts of the scheme have been estimated by comparing the predicted baseline conditions at the start of construction (that is, the situation without the proposed scheme) with the conditions that would prevail were the scheme to be constructed and operated. The assessment was carried out in the following stages:

- identification of potential impacts;
- definition of the temporal and spatial scope;
- identification of resources and receptors;
- establishment of baseline;
- prediction of impacts;
- evaluation of impacts;
- mitigation of impacts; and
- consultation.

Identification of potential impacts

3.2.2 The ES, in relation to the socio-economic impacts, describes the likely significant impacts of the project on people. It considers

- **positive impacts** that have a beneficial influence;
- **negative impacts** that have an adverse influence;
- **temporary impacts** that persist for a limited period only, due, for example, to particular construction activities;
- **permanent impacts** that result from an irreversible change to the baseline environment (e.g. land take) or which persist as a result of the operation of the scheme;
- **direct impacts** that arise from activities that form an integral part of the project (e.g. new infrastructure);
- **indirect impacts** that arise from activities not explicitly forming part of the project (e.g. agglomeration benefits); and
- **secondary impacts** that arise as a result of an initial effect of the scheme (e.g. improved employment opportunities for those in regeneration areas).

3.2.3 Potential impacts during construction may comprise:

- the loss of jobs due to temporary displacement or disruption of businesses resulting from temporary land take or other construction impacts;
- risk of indirect loss of jobs due to a reduction in spending associated with the temporary displacement of businesses and jobs by the project;
- direct creation of construction jobs; and
- indirect creation of jobs, due to the purchase of materials and services and the spending of incomes associated with construction of the project.

3.2.4 Any indirect loss of jobs due to a reduction in spending associated with the temporary displacement of businesses and jobs has not been assessed. This is due to the nature of London's economy (for example, the extent of commuting so that any employment impacts are dissipated throughout the wider South East) and the potential for businesses to relocate within the area.

3.2.5 Permanent employment impacts may comprise:

- increase in employment in Central London as a result of an increase in commercial and residential development due to increased transport capacity;
- direct creation of jobs due to the operation of the project;
- indirect creation of jobs and consequential changes to employment markets, due to the purchase of materials and services and the spending of income associated with the operation of the new service;
- risk of direct loss of jobs due to the permanent displacement of businesses; and
- risk of indirect loss of jobs due to a reduction in spending associated with the permanent displacement of businesses and jobs by the project.

3.2.6 The latter indirect impacts have not been assessed. This is due to the nature of the scheme in that spending will be global rather than local and London's economy in that employment impacts are dissipated throughout the wider South East.

3.2.7 Property and regeneration impacts may comprise:

- increase in commercial and residential development as a result of improved public transport accessibility;
- take up of employment as a result of Crossrail by those who are currently unemployed or economically inactive; and
- other social inclusion benefits.

Temporal scope

3.2.8 The EIA addresses the construction phase, currently anticipated to take place between 2007 and 2012. The duration of works at specific sites will vary and will normally be less than the whole of this period.

3.2.9 The temporal scope also considers the operational phase. This currently assumes scheme opening in 2013. Where impacts are dependent on longer-term considerations such as traffic growth or future development (which affects the socio-economic impacts) the operational phase extends beyond the scheme opening to take account of the longer-term nature of impacts which might occur.

3.2.10 Socio-economic impacts are identified for construction and operation. Those impacts that occur in advance of construction have also been taken into account (for example, development decisions made in anticipation of the project). The long-term

socio-economic impacts of the project extend well beyond the opening of the scheme.

Spatial scope

3.2.11 The geographical coverage of the EIA takes into account the:

- physical extent of the proposed works, defined by the limits of land to be acquired or used (LLAU), temporarily or permanently;
- nature of the baseline environment and the manner in which impacts are likely to be distributed; and
- pattern of government administrative boundaries, which provide the planning and policy context for the project and dictate data availability.

3.2.12 The significance of impacts can vary spatially. For example, some may be confided to a single work site whilst others may be at a project-wide or regional level. Socio-economic impacts are addressed at the local and sub-regional levels. Local impacts are identified in the context of station catchment areas, district and or boroughs through which Crossrail passes. Sub-regional impacts are identified in the context of the relevant policy.

Identification of resources and receptors

3.2.13 For the socio-economic assessment *environmental resources* are effectively places of employment while *environmental receptors* are defined as people.

3.2.14 Effects on the following resources and receptors have been considered:

- individual businesses and properties;
- the employment market;
- the housing market; and
- the commercial property market.

3.2.15 The latter two are considered in relation to new developments that result from the wider impacts of the scheme and their resulting employment impacts. That is, as a consequence of improved accessibility and image of locations served by Crossrail.

Establishment of baseline

3.2.16 The extent of the baseline assessment was determined using both professional judgement and industry best practice. The

collection of baseline data was achieved through desk study, consultation, field survey and monitoring. Account was taken of market conditions and employment patterns prevailing during the assessment. These were identified from the most recently available data.

3.2.17 Sources of information included:

- London Plan including employment forecasts to 2016;
- Railplan outputs on levels of crowding and accessibility;
- CAPITAL outputs on accessibility changes to key centres, regeneration areas and areas of deprivation;
- construction costs, data on output per worker and regional employment multipliers;
- surveys of commercial premises affected by demolition or land take;
- regeneration strategies of local authorities and other agencies affected by the project, including the identification of development sites;
- forecasts and proposals for the provision of housing and commercial development held by local authorities and strategic authorities including the regional development agencies;
- strategic and local authority research and policies relating to employment and housing land development densities;
- data on the number of businesses, employment levels, skills and travel-to-work patterns from official sources such as the Office for National Statistics; and
- commercial floorspace data from the Valuation Office, property reports from commercial agents and reports from the GLA on office, industrial, warehousing and retail demand in London.

Prediction of impacts

3.2.18 The prediction of impacts examines the change to the baseline environment that could result from the construction and operation of Crossrail. Impacts are classified into one or more of the following: positive, negative, temporary, permanent, direct, indirect, secondary or cumulative.

3.2.19 Impacts are predicted through an examination of the interaction between the:

- known or likely presence of an environmental receptor or resource;
- value of those resources, reflecting for instance their designated status as well as their qualitative criteria such as rarity, extent and condition;
- vulnerability or sensitivity of affected resources;
- number and sensitivity of affected receptors;
- extent, nature and duration of physical change resulting from the construction or operation of Crossrail;
- ability of the resource/receptor to absorb change; and
- effectiveness of incorporated mitigation.

3.2.20 The following prediction methods were used:

- the loss of employment in business displaced by construction of the project has been estimated from surveys of businesses affected. Where current job numbers could not be obtained from such surveys, standard employment densities for the relevant type and location of development were used based on floorspace data from the Valuation Office or site surveys to assess floorspace/employment;
- employment created directly by the construction of the project was assessed by detailed analysis of the scheme's construction cost, the split between labour and capital components and average employment costs;
- employment created directly by the operation of Crossrail was derived from project and rail industry sources;
- indirect employment was estimated by the application of an appropriate employment multiplier to the calculations of direct employment creation;
- transport modelling was used to measure improved accessibility to and from key development sites and regeneration areas. The increase in development resulting from improved accessibility was estimated on the basis of professional judgement and opinion on the current markets for commercial and residential development, market weaknesses and likely impact on image and developer confidence; and
- transport modelling was used to assess levels of crowding and congested links within central London and thereafter the implications of the lessening of transport constraints on employment growth.

3.2.21 The timescales involved with the project will undoubtedly mean that there will be some changes in occupancy between the time when the assessment was undertaken and when properties are acquired. In addition some properties are presently vacant. The approach taken, therefore, has been to assess job displacement in terms of the loss of employment space and hence the potential number of jobs that could be accommodated.

Evaluation of impacts

3.2.22 The ES identifies all environmental impacts that are considered to be "significant". There is no statutory definition of what constitutes a significant impact. For the purposes of this project, a significant impact has been defined as an impact which, either in isolation or combination with others, should (in the opinion of the Crossrail EIA team) be taken into account in the decision making process. This definition is consistent with what has been adopted for EIAs of other major rail schemes in the UK.

3.2.23 The evaluation of impacts takes account of incorporated mitigation. If significant impacts are identified once this mitigation has been applied, these are termed residual impacts. The 'Residual Significant Impacts' are reported in the main body of the ES.

3.2.24 Significant impacts were evaluated based on the following criteria:

- **magnitude of change** considers the absolute number of people or businesses affected and the nature of the area in which effects are experienced;
- **scale of the effect** considers the relative magnitude of each effect in its relevant market context (for example, the effects on local employment was considered in the context of the overall size of the local labour market);
- **distribution of the effect** takes account of the spatial distribution of the employment and regeneration impacts;
- **timing of change**, since more weight is given to long-term, permanent changes than to short-term, temporary effects; and
- **scope for adjustment or mitigation.** The socio-economic study is concerned in part with markets. Markets adjust themselves continually to changes in supply and demand. This adjustment was a criterion in assessing significance.

Mitigation of impacts

3.2.25 The Secretary of State will seek powers to compulsorily acquire the freehold interest of land required for the Crossrail works.

These powers are contained in the Bill. Powers to acquire land for the relocation of businesses are generally not contained in the Bill. Instead, impacts will be mitigated through the payment of compensation for land compulsory acquired in accordance with the general statutory framework incorporated within the Bill, the Crossrail Land Acquisition Policy and the Crossrail Disposal Policy.

Consultation

3.2.26 For the socio-economic assessment the principal consultees were local authorities and strategic authorities (including the regional development agencies). Where appropriate, landowners, businesses, private developers and local agents were also consulted regarding potential effects on the property market.

Limitations

3.2.27 The time scale of the project is a major limitation to assessing its impact with certainty. Potential changes in the property and labour markets and the economy amongst others mean any projections have to rely on assumptions about future prospects. These are based on past experience and relationships between economic variables. These past relationships and performances are not necessarily indicative of future prospects.

3.2.28 The majority of the work for this assessment was undertaken in 2004 using the latest available data including detailed local area statistics from the 2001 Population Census. The timeliness and availability of data will always be a limiting factor in assessments of this nature.

3.2.29 The uncertainty regarding the timing of some other major projects, which will affect land take required as well as the development of an area, add to the difficulty of quantifying the marginal employment impact of Crossrail alone.

4. Route wide environmental baseline

4.1 Introduction

4.1.1 This section provides the baseline assessment of the route. This is done at two main levels, firstly at the route wide or one of the four sub sections of the route and secondly at a station or local area encompassing a number of stations in a defined geographical area.

4.2 London's economy

4.2.1 While Crossrail serves areas both to the east and west of Greater London its main impact will be felt within the capital itself and this section highlights a few key points about London and its economy.

4.2.2 London is home to 7.2 million inhabitants split between 2.8m in Inner London and 4.4m in Outer London, (source: 2001 Population Census). This represents 12% of the UK population. The city's population grew by 5% between 1991 and 2001 which was twice as fast as the country as a whole. The two main distinctive features of London's population are its youth and its ethnic diversity. With regard to the former 46% of London's workforce is under 34 compared to 39% nationally. Furthermore, only 60% of the population is defined as "White British" (Census category) whereas the respective figure for England and Wales is 87%.

4.2.3 The capital is a highly specialised and productive economy. Inner London has the highest GDP per head in Europe almost 2.5 times the European Union average (excluding the recent accession states). Overall, Gross Value Added is 50% higher than the UK average although this hides stark disparities between areas of extreme deprivation and economic decline and areas of tremendous wealth and productivity.

4.2.4 At the end of 2003 there were around 287,000 VAT registered businesses in London with a disproportionate number operating in Financial and Business Services: 41.3% of total compared to 27.5% at UK level. The other traditionally large sector in London is Public Administration and Other Services, 13.3% of the total against 8.7% for the UK. The manufacturing, construction and transport sectors are under-represented.

4.2.5 There are 3.4m London residents in employment but over 4 million jobs within the city highlighting the importance of commuting to the London economy. However, the city's economic

activity rate of 75.8% is below the UK average of 78.5%. London also fares worse than the nation in terms of unemployment with a rate of 3.2% against 2.2% for the UK at the end of 2004.

4.2.6 Incomes in London are on average 20-25% higher than in the rest of the UK. This hides a picture of stark differences between some of the richest and poorest areas in the land. London is a region of considerable deprivation with almost 20% of its wards ranked amongst the 10% most deprived wards in the country in 2000.

4.2.7 London is a major international tourist destination with 26.0 million visits in 2003 (that is, visitors staying one night or more), 11.7 million of whom came from overseas. These visitors represent a considerable source of income for the local economy.

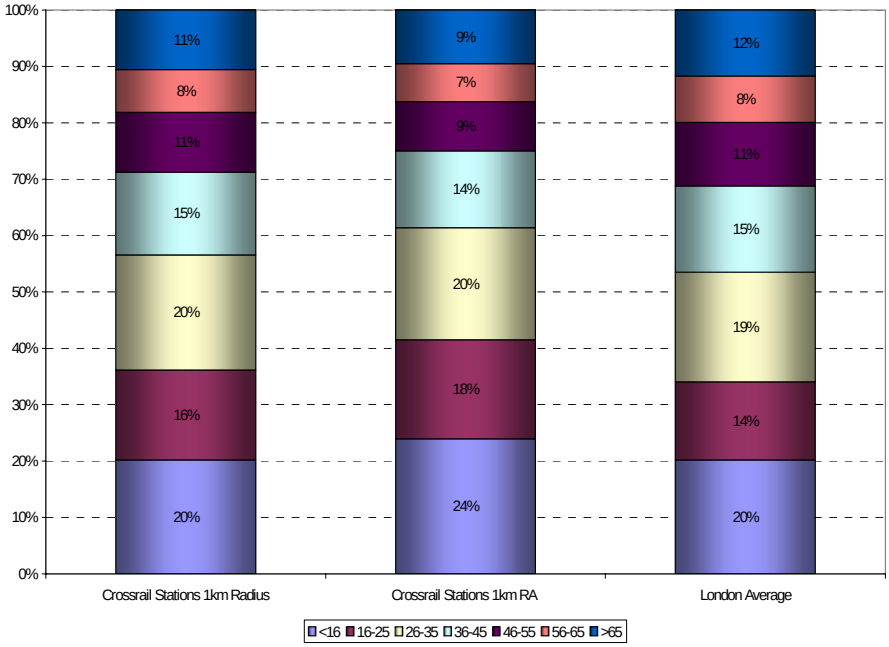
4.2.8 Transport is a major issue for any one living and/or working in London. Londoners rely on public transport more than residents elsewhere in the UK. A higher proportion has no car and fewer have 2 cars although there is a marked split between Inner and Outer London. The number of people entering London during the morning peak has remained relatively stable over the last 20 years but there has been a significant modal shift from car to rail and underground which has put pressure on the system. As an illustration, passenger journeys on London Underground have increased by 76% between 1981-2001 and passenger kilometres by 82%. In the same period train kilometres have risen by 30%.

4.3 Route wide baseline

4.3.1 This section provides an overview of the socio-economic characteristics along the Crossrail route. Data is presented for London as a whole and the one kilometre catchment area of Crossrail stations including separately for regeneration areas within that catchment area.

4.3.2 The combined population living within a one kilometre radius of stations on the Crossrail route is around 600,000, according to the 2001 Census. Of this number approximately 90% live within Greater London and 10% outside. The combined population living within a two kilometre radius is approximately 1.6 million representing over one fifth of London's population. The age structure of the people living along the route is very similar to that of the London average, *Chart 4.1*, and reflects London's younger than average age structure compared with the UK. For example, only 11% of the population within the one kilometre catchment area are over 65 compared with 16% for the UK as a whole. However, the age profile within regeneration areas is even lower with over 40% aged under 25.

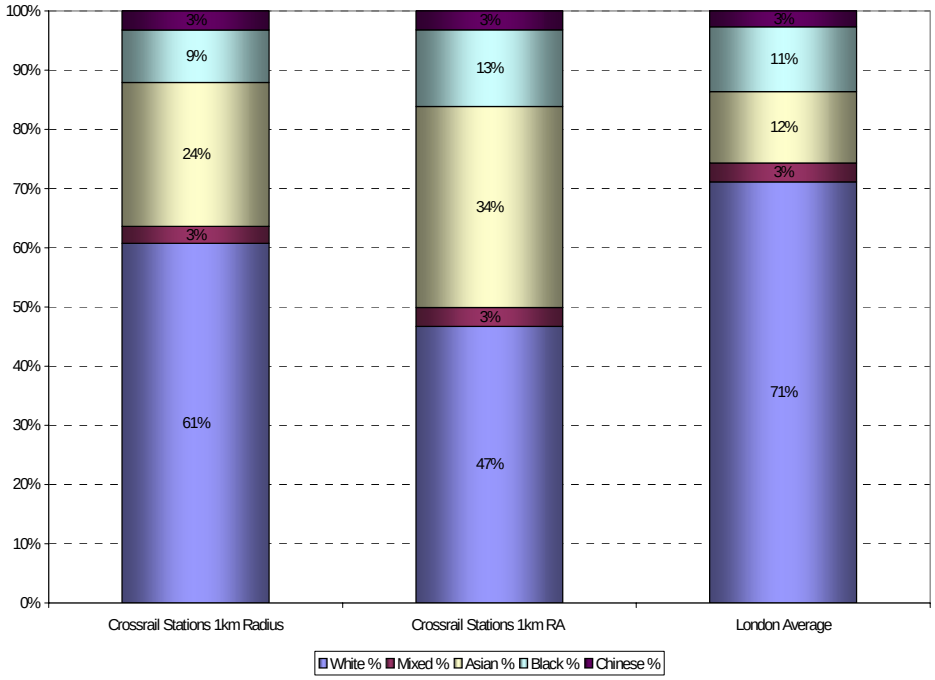
CHART 4.1: AGE STRUCTURE



Source: 2001 Population Census

4.3.3 The population living along the route has a much greater degree of ethnic diversity than London as a whole. There is a lower percentage of white residents and a higher percentage of residents with an Asian ethnic background. The Asian population makes up a quarter of the population living across the Crossrail route, compared to just over a tenth for London as a whole. The full ethnic make-up comparison is illustrated in *Chart 4.2*. Within the regeneration areas over half the population is non-white.

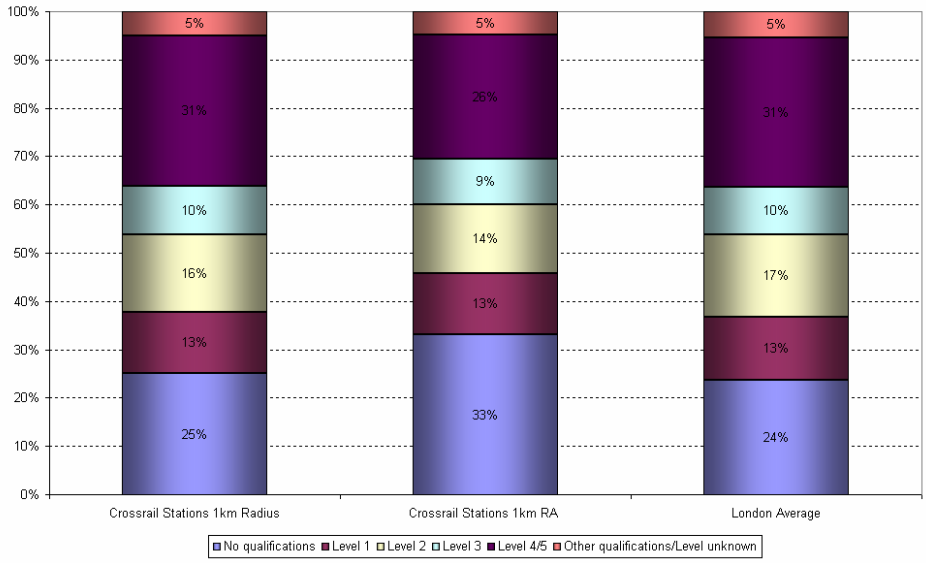
CHART 4.2: ETHNIC GROUPS



Source: 2001 Population Census

4.3.4 Qualification levels of people living across the route are almost identical to the London average; a quarter of the population has no qualifications at all, up to a third in regeneration areas, while almost a third is qualified to Level 4/5, that is to degree level and above (*Chart 4.3*).

CHART 4.3: QUALIFICATION LEVELS

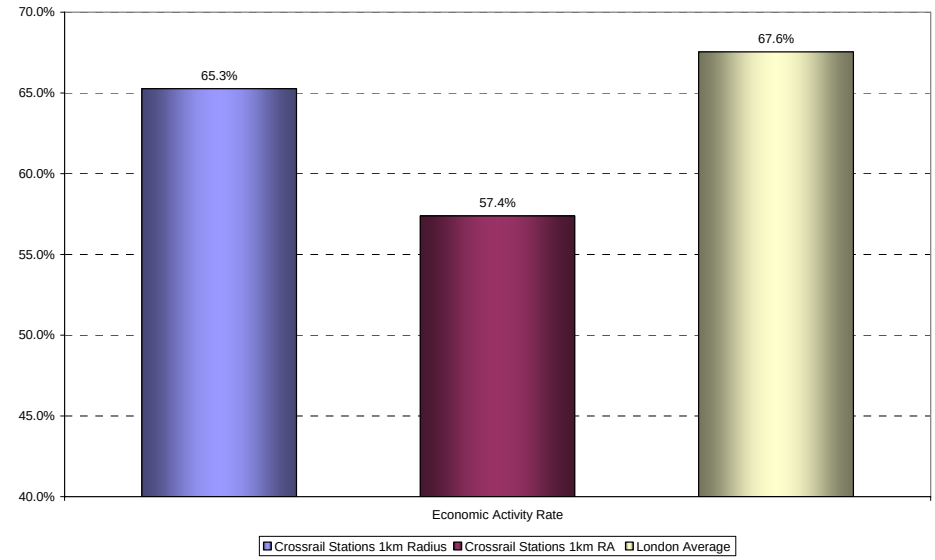


Source: 2001 Population Census

4.3.5 The Economic Activity rate is lower than the London average (*Chart 4.4*) especially in regeneration areas. However, the differences are marginal. Unemployment is higher across the Crossrail route than it is in London as a whole although again the difference is marginal (*Chart 4.5*).[1] Although in the regeneration areas it is almost twice as high as the London average.

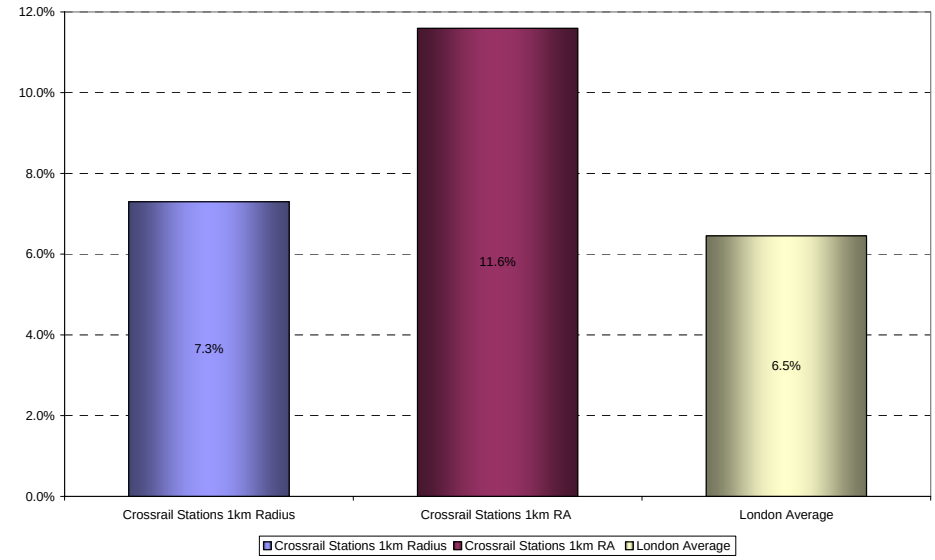
[1] Economic activity rates and unemployment rates reported here are taken from the 2001 Population Census and the definitions are different than those used in other official statistics, for example, the unemployment rate derived from the Claimant Count. The census economic activity rates are based on those aged 16-74.

CHART 4.4: ECONOMIC ACTIVITY



Source: 2001 Population Census

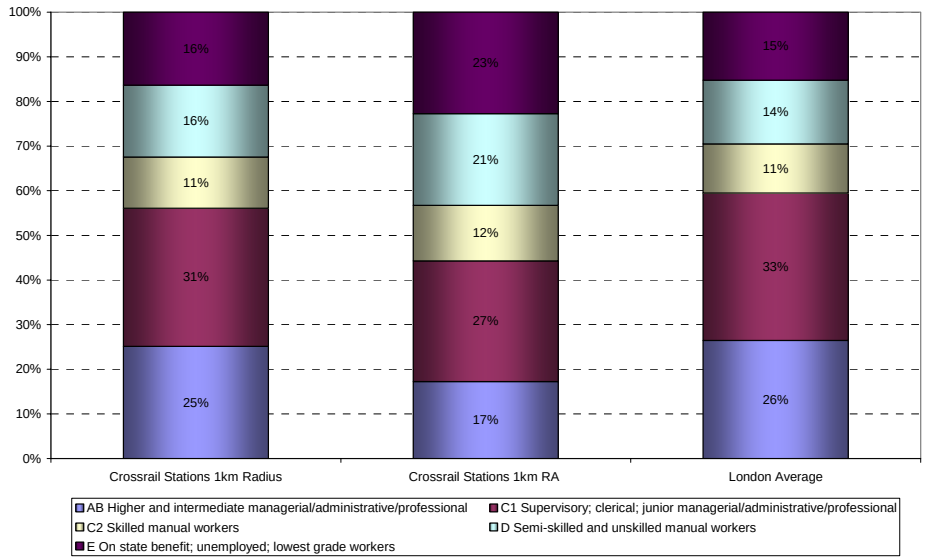
CHART 4.5: UNEMPLOYMENT



Source: 2001 Population Census

4.3.6 People living across the Crossrail route have slightly lower approximated social grades than the London average, with a lower proportion classified in the upper two managerial, professional and clerical grades and a higher proportion classified in the bottom two manual semi-skilled, unskilled and unemployed social grades (*Chart 4.6*).

CHART 4.6: APPROXIMATED SOCIAL GRADE



Source: 2001 Population Census

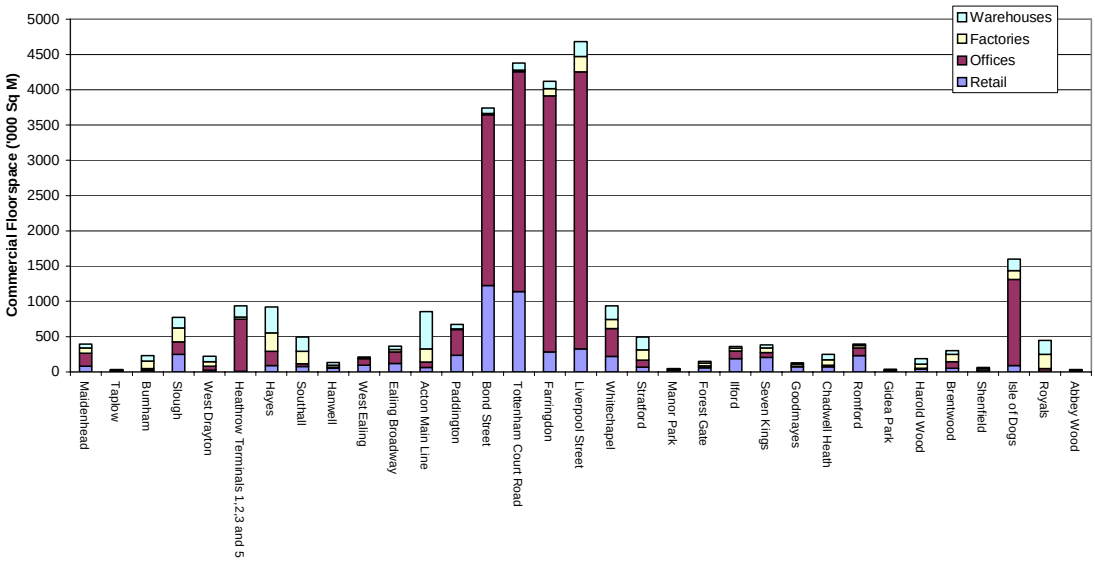
4.3.7 There are close to 1 million jobs located within the one kilometre catchment area accounting for almost a quarter of all London's employment. Over 700,000 of these are located in the areas served by Bond Street, Tottenham Court Road, Farringdon and Liverpool Street stations.

4.4 Commercial floorspace

4.4.1 *Chart 4.7* provides an indication of the total commercial floorspace by station catchment area wards[2]. The chart shows the dominance of the central area. The Isle of Dogs has grown enormously, over the past 10-15 years, but the catchment area served by the station still contains between a half and a third of the floorspace of City, Mid-Town and West End stations. However, floorspace in the Isle of Dogs' is set to double over the next 10 to 15 years.

[2] Data for Langley and Iver is incomplete or unavailable and have been excluded.

CHART 4.7: COMMERCIAL FLOORSPACE: BASELINE CHARACTERISTICS



Source: ODPM Commercial and industrial floorspace and rateable value statistics 2003 and Drivers Jonas

4.5 Defining Regeneration Areas

4.5.1 London's key spatial policies are set out in the Mayor's London Plan (Spatial Development Strategy for Greater London). This identifies 28 Opportunity Areas (nine of which have Crossrail stations[3]) and 14 Areas for Intensification (two of which have Crossrail Stations[4]). It also defines areas of regeneration as those covering the most deprived 20 per cent of wards in London with high levels of unemployment and social exclusion.[5] ODPM's Sustainable Communities Plan has further raised the aspirations for the area, especially in terms of housing growth in the Thames Gateway. The Regional Planning Guidance for South East England (RPG 9) identifies the Thames Gateway as a regional and national priority for regeneration and growth. The Regional Planning Bodies[6], Government Offices for London, East of England and the South East, Thames Gateway Strategic

[3] These are Paddington, Bishopsgate, Isle of Dogs, Ilford, Royal Docks, Stratford, Whitechapel/Aldgate, Heathrow North and Heathrow South.
[4] Namely Farringdon/Smithfield and Tottenham Court Road
[5] Since the London Plan was published a new Index of Multiple Deprivation has been produced that uses Super Output Areas rather than wards. These areas are much smaller than wards and allow regeneration areas to be more closely delineated. Regeneration areas in London have, therefore, been defined as those Super Output Areas in the lowest 20% as ranked by the Index of Multiple Deprivation as well as areas defined by regeneration areas by the relevant Regional Economic Strategies.
[6] East of England Regional Assembly, Greater London Authority and South East England Regional Assembly

Executive, Thames Gateway London Partnership and Essex and Kent County Councils are influential in the development of policies for the planning of the area and regional economic development. London Plan policies cover East London in the Thames Gateway and the West London sub-region (the "Western Wedge"). These high-level policies guide local authority UDP policies in these areas to exploit public transport accessibility and potential for increases in residential, employment and other uses through higher densities and more mixed and intensive use.

4.5.2 The overall objectives for Crossrail include the facilitation of the regeneration of priority areas including Thames Gateway and the Lea Valley in line with policies set out in the London Plan and RPG9.

4.5.3 There is no national definition of what constitutes a regeneration area. This has led to regeneration areas being defined as those areas designated by the relevant regional development agency as regeneration areas. Or failing that those wards that fall within the lowest 20% in terms of the index of multiple deprivation. The latter definition is effectively the one used by the London Development Agency to define regeneration areas in London. For this reason Crossrail has taken the 20% definition although the 2004 Index of Multiple Deprivation is based on Super Output Areas rather than wards. Hence regeneration areas served by Crossrail are defined as those Super Output Areas in the lowest 20% in the Index of Multiple Deprivation within one and two kilometre radii of Crossrail stations depending on the analysis being undertaken.

4.6 Regeneration areas served by Crossrail

Regeneration areas within a 1km radius of Crossrail stations

4.6.1 Twenty Crossrail stations have areas within their one kilometre catchment areas that are ranked in the bottom 20% in the Index of Multiple Deprivation. There are approximately 200,000 people in total living in these deprived areas which means that one third of the population living within a one kilometre radius from the Crossrail stations is amongst the 20% most deprived in England.

4.6.2 As expected the demographic and socio-economic characteristics of these areas are unique reflecting the higher levels of deprivation. A detailed listing of these characteristics is set out in the Appendices C and D.

4.6.3 In general, the regeneration areas have a younger age structure, with 42% of residents aged less than 26 years old compared to the overall one kilometre average of 36% and the London average of 34%.

4.6.4 The white community accounts for less than half (47%) of the population in these areas with the Asian community accounting for 34% and the black community for 13%. This ethnic distribution is much more diverse than the one kilometre average (61% - 24% - 9%) and the London average (71% - 12% - 11%).

4.6.5 Qualification levels are very low, with one third of the population having no qualifications at all and only 26% being qualified to Level 4/5 (compared to the one kilometre and London averages of 31%).

4.6.6 The Economic Activity rate in the twenty regeneration areas averages 57%, compared to 65% for the one kilometre average and 68% for the London average. The unemployment rate is also very high; at 12% it is nearly double the London average.

4.6.7 Approximated social grades are also lower than the one kilometre and London averages; with 44% classified in the bottom two social grades (semi-skilled and unskilled manual workers; on state benefit, unemployed, lowest grade workers) compared to 32% for the route as a whole.

Regeneration areas within a 2km radius of Crossrail stations

4.6.8 Twenty-nine Crossrail stations have regeneration areas located within a two kilometre radius. These areas have a combined population of approximately 540,000. The overall demographic and socio-economic characteristics of the people living in these areas are very similar to those living in deprived areas within a one kilometre radius of Crossrail stations. A detailed listing of these characteristics is set out in the Appendices E and F.

4.6.9 The 2km regeneration areas have a younger than average age structure and a great degree of ethnic diversity. Approximately 41% of the population is aged less than 26 years old, while white residents account for only 52% of the population with the Asian and Black communities accounting for 27% and 14% respectively.

4.6.10 Similar to the one kilometre deprivation areas, more than a third of the residents in the two kilometres deprivation areas have no qualifications and less than a quarter is qualified to level 4/5.

4.6.11 The economic activity rate is 58% and the unemployment rate is 11%; both indicators are significantly worse than the London averages and reflect the great degree of employment deprivation in these areas.

4.6.12 Approximated social grades are also lower than the London average; 44% of residents are classified in the bottom two social grades (semi-skilled and unskilled manual workers; on state benefit, unemployed, lowest grade workers) compared with 32% for the route as a whole.

4.7 Detailed overview of each location served

4.7.1 This section provides a more detailed overview of each location directly served by Crossrail in terms of their socio-economic characteristics and future prospects with and without Crossrail. This information comes from analysis of official statistics as well as discussion with the relevant local authorities and other key stakeholders. Property and development assessment is provided by Drivers Jonas.

Maidenhead

4.7.2 Maidenhead is an important retail centre which has also attracted hi-tech and pharmaceutical companies. Expansion is restricted by the Green Belt which surrounds most of the town. There are good transport links with a regular rail service to Reading and London Paddington, and easy access to the M4, M40 and M25 motorways and Heathrow Airport. It is a prosperous town with good quality residential areas and there are no regeneration areas within the station's catchment area. Residents have higher than average social grades, qualification levels and economic activity rates and lower than average unemployment rates. Around 8,500 live within one kilometre of the station with a much higher than average age profile (17% over 65 compared to 10% on average for the route).

4.7.3 Recent office developments remain vacant due to the slow-down in the Thames Valley office occupier market, although it is likely that these will be let in the short to medium term as the market improves. The biggest constraints to development are the availability of development sites, restrictive planning policies and the physical constraints of the Green Belt. The local authority has, however, identified a number of town centre sites that will become available in the future. The principal ones include;

Site	Capacity m^2	Use
Nicholas Centre MSCP	2,900	Retail
Land North of West Street	8,000	Retail
J. Sainsbury's	7,500	Planning permission for Sainsbury's
Grove Road Car Park	2,500	Mixed
St Ives Road/Park Street	5,000	Mixed
St Ives Road	2,500	Mixed
Cinema Site	800	Retail
Football Club/Bowling Alley	6,000	Retail
Stafferton Way	3,500	Retail – DIY store
Station Redevelopment	15,000	Office led mixed
Total	53,700	

Taplow

4.7.4 Taplow's catchment area is a very prosperous area which is sparsely populated with fewer than 2,000 people living within it. Unemployment is low and economic activity rates are very high. There are no regeneration areas within the station catchment area.

Burnham

4.7.5 Over 15,000 people live within the one kilometre catchment area of Burnham station. Unemployment is low and economic activity rates are very high. There are no regeneration areas within the station catchment area.

Slough

4.7.6 Slough is a major employment centre in the "M4 Silicon Valley" and is dominated by retail and office uses. It is well connected by road and rail, with direct rail services to Paddington and Reading and close to the M4, M25 and Heathrow.

4.7.7 The town combines both areas of prosperity and some deprivation although the latter are some distance from the station and there are no regeneration areas within the station's one kilometre catchment area. Of the 15,000 people who live within a kilometre of the station over 40% are from the Asian community.

4.7.8 Slough currently has 115,000m^2 of vacant office space, 30% of the total office stock. A number of the vacant offices have consent for conversion to residential use, although to date no residential conversions have been completed. Currently, property owners and developers are holding back schemes whilst they assess the viability of residential or office use. As no significant residential conversions have been completed to date, the property market is waiting to see how the first major residential town-centre conversion will perform. It is likely that once one residential scheme in the centre is proven, others will quickly follow.

4.7.9 There are many development sites in the town centre, both cleared land sites and economically and functionally obsolete buildings that are proposed for demolition to make way for new development. The largest redevelopment site is the Heart of Slough scheme, which is being promoted by the local authority, English Partnerships and Development Securities. The Heart of Slough design includes 70,000m² of new commercial space and 1,000 new homes and is predicted to generate 4,000 jobs. This scheme has been proposed for several years without materialising, as has the Slough Central site to the north of the station. Lack of investor confidence affected by the image of the town is a key factor in holding back development.

4.7.10 The UDP recognises the strong pressure on housing, with demand for many more houses but a shortage of sites. Slough BC have recently gained consent to build affordable houses in a Green Belt area. Commercial uses are also strongly supported by the local authority which recognises Slough's role as a regional centre of employment. New leisure and evening economy uses are being encouraged to improve the town centre vitality and environment in the evenings.

Langley

4.7.11 Langley is a commuter town with half its population falling within the C1 and C2 social groupings. It has a very high economic activity rate and unemployment is half the route average. Just over 9,000 people live within one kilometre of the station. There are no regeneration areas within the station's catchment area.

Iver

4.7.12 Iver is a small prosperous village with just 1,300 people living within the station's catchment area. It has a very high economic activity rate and low unemployment. There are no regeneration areas within the station's catchment area.

West Drayton

4.7.13 Over 11,000 people live within one kilometre of the station; 700 of these in regeneration areas. Qualifications in the whole area are lower than average but economic activity rates are high and unemployment low. A third of those living in the regeneration area are under 16. Despite almost 40% of residents of regeneration areas having no qualifications economic activity rates are still high and unemployment is below the route average.

Hayes and Harlington

4.7.14 Hayes is an established town with an industrial and distribution heritage. Employers include Nestles and many printing related businesses. Hayes High Street is geared towards local convenience shopping. The town centre is surrounded by established residential areas characterised by good quality, pre and post war, detached and semi-detached housing.

4.7.15 Despite its closeness to Heathrow airport and the associated support jobs in the area Hayes suffers from pockets of deprivation. Of the 13,000 people who live within one kilometre of the station 1,500 live within regeneration areas. There is a large Asian community making up a third of the population, qualification levels are low and economic activity is average.

4.7.16 Old industrial sites are in plentiful supply and a number of development schemes are planned but supply currently outstrips

demand for both office and industrial space. London Gate is a major 50,000m^2 office development, the first phase of which was completed in 2002, but is yet to be let. The lack of success to date is due in part to the general slow down in the office leasing market, but also because Hayes town centre has a low profile as a contemporary office location. Heathrow 360, meanwhile, is a large industrial site that is being marketed on a pre-let and design and build basis. Following the acquisition of Safeway by WM Morrison, the former Safeway's headquarters in Hayes, which covers 4.1ha and includes 26,000m^2 of office accommodation, has been put on the market. In addition, Prologis is planning a 57,000m^2 scheme at Stockley Road with industrial and office space and 150 homes.

4.7.17 The London Borough of Hillingdon is keen to preserve many of the sites in Hayes town centre as employment sites, particularly for logistics and manufacturing/engineering uses connected with the aviation industry at Heathrow.

Southall

4.7.18 Southall is a retail centre principally serving West London's Asian communities. There is a preponderance of local and specialist retailers with few multiples. The retail centre is surrounded by a mix of residential areas with industrial land immediately to the north and south of the railway line. Traffic congestion in the town is severe and a potential barrier to large scale development.

4.7.19 Southall is the home of a large Asian community, which makes up over 70% of the 24,000 population within the station's catchment area. Economic activity rates and qualification levels are low and unemployment is high. Over 11,000 people in the catchment area live in designated regeneration areas although the socio-economic characteristics of both the regeneration and non-regeneration areas are similar.

4.7.20 Availability of sites is not a constraint on development in Southall. There are a number of redundant buildings and sites in the town centre. The largest is the former Southall Gas Works site, a 38 ha (gross) development site to the west of Southall station. SecondSite Property and Castlemore Securities submitted an outline masterplan for the Gas Works in July 2004 that provides for 4,000 homes and 4,300 jobs in a mixed use development covering retail, offices and manufacturing.

4.7.21 In addition to being one of the London Plan's Opportunity Areas in recognition of its potential to accommodate significant employment growth and new homes, Southall is part of the Heathrow City scheme within the City Growth Strategies initiative. The LDA has made Heathrow City a priority location for strategic intervention and intends to invest £12 million in the region. The

Ealing Community Plan sites the development of Southall as an "Economically Successful Place" as a priority.

Hanwell

4.7.22 Hanwell is a very mixed location including areas of great prosperity but also of deprivation. Just over 19,000 people live within one kilometre of the station of whom nearly two thirds are in social groups ABC1 and nearly 40% are educated to a degree level and above. However, over 5,000 people live in regeneration areas of whom over 50% come from non-white communities. Unemployment in the regeneration area is twice the route average although qualification levels are higher than in other areas with much lower unemployment rates.

West Ealing

4.7.23 West Ealing is a prosperous and very densely populated area with over 25,000 people living within the one kilometre catchment area. Nearly half the residents are qualified to degree level and above and almost three quarters of the population are in social groups ABC1. There are some small pockets of deprivation and some 1,300 people live within regeneration areas. However, economic activity rates in these regeneration areas are high, unemployment is low and qualification levels are far higher than average.

Ealing Broadway

4.7.24 Ealing is a popular residential area with green open spaces, a busy high street and shopping centre. There are a number of large offices in the town, let to longstanding occupiers. To the south of the town centre is the extensive Ealing Studios site which provides accommodation for media industries. Almost 60% of Ealing Broadway's 17,000 catchment population are educated to degree level and above, which is twice the London average. Economic activity rate is high and almost half the population is in social groups AB. There are no regeneration areas within the one kilometre catchment area.

4.7.25 Current developments include a new 7,800m² office to replace a poor condition 1960s office building on Uxbridge Road. More significant and indicative of future development is the conversion of Cavalier House, the former Kodak HQ office building, to 130 residential apartments.

4.7.26 Further town centre residential development in Ealing is predicted. Planned commercial developments that will take place in the near future include a 12,000m^2 extension to Ealing Studios.

4.7.27 The London Plan identifies Ealing as being one of London's Metropolitan Centres. The Ealing UDP (adopted in 2004) seeks to

achieve a pattern of land use and transport which emphasises environmental protection, and effective use of energy and resource conservation. Local authority policies seek to ensure that existing town centres serve as the main focus for shopping, commercial and community activities. The majority of new development at Ealing is likely to take place in the centre and comprise mixed use redevelopment of existing buildings.

Acton Main Line

4.7.28 Acton has some pockets of deprivation and almost 2,000 of the 19,000 population within the one kilometre catchment area live within regeneration areas. Overall around a third of the population is non-white, rising to almost 50% in the regeneration areas. There are limited development opportunities in the area.

Heathrow

4.7.29 Only a small number of people, less than 1,000, live within the catchment area of Heathrow's stations.

Paddington

4.7.30 Paddington station is a key transport hub served by national rail (including a direct link to Heathrow Airport), London Underground and London Buses. The surrounding areas include substantial residential uses, hotels, commercial and health facilities.

4.7.31 Paddington is the second most densely populated area served by Crossrail with over 38,000 people living within its catchment area. The area is dominated by young professionals with over half the population educated to at least degree level and a quarter aged between 26-35. The area has a diverse ethnic mix with 30% non-whites. It also has a large regeneration area within its catchment area with a population of over 14,000 people. The regeneration area has a very skilled workforce and around average economic activity and unemployment rates.

4.7.32 A number of developments have already taken advantage of the capacity and planning policy framework for high density mixed use development in Paddington. The Heathrow Express has undoubtedly been a major factor in the redevelopment of major sites around Paddington. Large scale developments underway include the mixed use Paddington Central and Paddington Basin schemes. The latter scheme has attracted Marks & Spencer as a major office occupier.

4.7.33 There is a further 100,000m² of office space to be completed at Paddington Central as office demand increases. Future development sites identified by Westminster City Council include the sites currently occupied by St Mary's Hospital and Travis Perkins, together with sites at Dudley House, North Wharf Road,

Paddington Basin and Hermitage Street. Demand for residential accommodation is strong in Paddington and prices are correspondingly high.

4.7.34 The London Plan identifies Paddington as a Central London Opportunity Area with potential for 23,200 jobs and 3,000 homes by 2016. Regeneration initiatives include 'New life for Paddington' an SRB project to promote training and capacity building and to encourage business start ups.

Bond Street

4.7.35 Bond Street is a prosperous area with a high proportion of young professionals; 55% of the area's 18,000 residents are educated to degree level and above. There are no regeneration areas within the station's catchment area.

Tottenham Court Road

4.7.36 Over 20,000 people live within one kilometre of the station with a significantly higher number of young people. The area has a higher proportion, almost a third, of residents from social groups D and E, than other central areas. Regeneration areas cover almost 6,000 people in the station's catchment area. However, the socio-economic characteristics of both the regeneration and non-regeneration areas are similar.

4.7.37 The London Plan identifies Tottenham Court Road as an Area for Intensification, which subject to public transport improvements could accommodate 2,000 new jobs and 200 new homes by 2016.

Farringdon

4.7.38 Farringdon is characterised by a mix of offices, residential and small manufacturing operations. The area has attracted creative, media and IT occupiers and business start ups in particular. However, the small scale of many of the buildings, Conservation Area status and St. Paul's viewing corridors restricts development potential.

4.7.39 Nearly 24,000 people live with the station's catchment area of whom over half live within regeneration areas. The socio-economic characteristics of both the regeneration and non-regeneration areas are broadly similar. As with other central areas, it has a highly skilled and relatively young workforce.

4.7.40 In recent years residential demand has grown rapidly and many business premises are now under pressure from residential developers. Islington Council is, however, keen to avoid the loss of business space to residential accommodation. Thornhill Properties are currently seeking consent for a 56,000m^2 mixed-

use scheme centred on the Smithfield Market Annex at 25 Snow Hill. Although close to the core London office markets of the City and Mid-town, Farringdon has lagged behind in terms of office rents and hence development activity, despite its apparent accessibility. This lag is due to the perception amongst occupiers and investors of there being not only distance between Farringdon and the core City Square Mile, but less consistent occupier demand at Farringdon.

4.7.41 The London Plan identifies Farringdon as an Area for Intensification, which subject to public transport improvements could accommodate 2,000 new jobs and 100 new homes by 2016.

Liverpool Street

4.7.42 Whilst Liverpool Street is on the edge of the City it serves a very mixed area. Some 17,000 people live within the station catchment area of whom 12,000 live within designated regeneration areas. Over half the population is non-white, economic activity rates are low and unemployment is high. Almost 40% of residents have no qualifications.

Whitechapel

4.7.43 Whitechapel is a mainly residential area with predominantly low quality housing, high unemployment and a low-skill base. The main road through the area, Whitechapel Road leading into Mile End Road, is characterised by linear retail development including a major street market with residential accommodation above. To the south of Whitechapel Road is the 900-bed Royal London Hospital which occupies a major site and is currently seeking planning permission to redevelop the existing site with a new hospital and health campus.

4.7.44 This is most densely populated area served by Crossrail with almost 44,000 people living within one kilometre of the station. Over 60% of the population is non-white, nearly 40% have no qualifications, unemployment is twice the route average and the economic activity rate is very low. A quarter of the population is under 16. The majority of the locality is a regeneration area encompassing 35,000 residents. However, the socio-economic characteristics of both the regeneration and non-regeneration areas are broadly similar.

4.7.45 The majority of new development in Whitechapel, particularly the employment use development, will take place in the City Fringe/Aldgate area. The redevelopment of the existing Royal London Hospital site will see 70% of the existing buildings demolished and replaced with modern equivalents under a PFI contract. The London Plan identifies Whitechapel as an

Opportunity Area with potential for 14,000 jobs and 700 new homes by 2016.

Stratford

4.7.46 Stratford is an established major town centre in the Lea Valley, with a mix of high street and shopping centre retailing. Current residential stock is characterised by Victorian streetscapes with private sector terraced houses, interspersed with high density local authority housing developments, many of which are high rise from the 1960s and 1970s.

4.7.47 Given the large amount of brownfield land, the station's catchment area is not very densely populated with less than 13,000 living within it. Over half the population is non-white with both large black and Asian communities. There is a very high unemployment rate (almost double the route average) and a low economic activity rate. A third of the population has no qualifications. Over 10,000 of the population live within regeneration areas although the socio-economic characteristics of both the regeneration and non-regeneration areas are broadly similar.

4.7.48 Due to its proximity to central London, good (albeit heavily capacity constrained) transport links and availability of development sites, Stratford is emerging as a significant growth area. The Jubilee Line Extension and the construction of the Channel Tunnel Rail Link with its new station at Stratford have been the catalyst to recent activity, not least the proposed development of "Stratford City" by property developers Chelsfield, Stanhope and London & Continental Railways.

4.7.49 The development pipeline is dominated by Stratford City on the 100 ha Stratford Rail Lands. LB Newham resolved to grant planning consent in 2004 for 2,000 hotel rooms, 4,850 homes, 464,500m² of office space and 185,800m² of retail space. In total it is estimated the development will provide capacity for 38,000 jobs.

4.7.50 In addition, plans for enhanced retailing and high-density residential development are evolving for the town centre and other surrounding sites. LDA's London Thames Gateway Development & Investment Framework predicts 7,300 homes to beyond 2012. The London Plan identifies Stratford as an Opportunity Area with potential for 30,000 jobs and 4,500 homes by 2016. Stratford is part of the Lea Valley and Thames Gateway regeneration corridors and is eligible for European Regional Development Funding (ERDF) under Objective Two. LDA objectives for Stratford include major infrastructure work, land assembly and remediation and education programmes.

4.7.51 Being part of London Thames Gateway, the area falls under the Thames Gateway Planning Framework (RPG9a), 1995. The LDA, The Regional Planning Bodies, Government Office London and

the Thames Gateway London Partnership[7] are also influential in the planning of the area.[8] Through its UDP, the London Borough of Newham has designated the area as the northern part of the Arc of Opportunity masterplan. Over time, developments are expected to turn Stratford into a mixed-use "European Business Quarter" and enable Stratford's transition from its Major Town Centre designation to a Metropolitan Town Centre.

Forest Gate

4.7.52 Forest Gate is a residential area with a variety of housing types and qualities. It has a busy local retail pitch with national and local retailers. There are several multi-storey 1960s offices on Romford Road, some in sole occupancy (e.g. Barclays and local authority) and some multi-let on flexible terms.

4.7.53 Forest Gate is one of the most ethnically mixed areas with the population almost split three ways between white, black and Asian. It is a densely populated area with 33,000 people, 23,000 of whom live in regeneration areas with correspondingly low economic activity rates and high unemployment. Qualification levels are low and over a quarter of the population is under 16 years of age. The socio-economic characteristics of both the regeneration and non-regeneration areas are broadly similar.

4.7.54 There are many sites in the area that are either ready for development or will come forward in the future, the largest of which include the former Upton football club and the existing Hovis bakery. However, the majority of sites are much smaller. It is unlikely that any further large offices will be constructed in Forest Gate as major East London office centres such as Royal Docks, Stratford City and Isle of Dogs will dominate and are likely to attract the majority of occupiers.

4.7.55 Future development is, therefore, anticipated to be residential led. As the number of new homes in Forest Gate increases, small-scale commercial developments will come forward to service the demand for convenience shopping and leisure created by the increasing population. Through consideration of the available development sites and potential sites for redevelopment in Forest Gate, it is believed that in the period to 2021, around 1,650 new homes will be completed and 1,900 jobs accommodated in the commercial developments that will take place over the same period.

4.7.56 Forest Gate is identified as a District Centre in the London Plan and is within the London Borough of Newham. Newham UDP was adopted in 2001 and seeks to encourage regeneration and quality

[7] See TGLP's Going East, Thames Gateway: the future of London and the South East

[8] See Growth and Regeneration in the Gateway, ODPM August 2004.

design. Forest Gate Station Square and Town Centre is within an Area of Townscape Value. Within these areas the local authority requires development proposals to have regard for the townscape value area.

Manor Park

4.7.57 Manor Park is a residential area with reasonable quality stock and open space (Wanstead Flats to the north). Romford Road provides retail facilities, but the larger retail centres of Ilford and Forest Gate dominate. The area has seen little new development in recent years, one of the exceptions being the Lumiere Building, a 15 storey residential tower completed in 2000.

4.7.58 The Asian community accounts for half the area's 25,000 residents. The population is young with over a quarter being under 16. Unemployment is twice the route average and the economic activity rate is low. Over 15,000 residents live within regeneration areas with similar socio-economic characteristics of both the regeneration and non-regeneration areas.

4.7.59 Possible development sites in Manor Park are largely limited to the tertiary motor-trade retail premises situated on Romford Road. Many of these may come forward as development sites within the next 20 years. Possible redevelopments would be mixed schemes with local convenience retail or community uses at ground floor and residential on the upper floors. These sites are typically 500-1,000m^2. No significant development is currently taking place and it is not anticipated that any commercial development will take place beyond that associated directly with residential development. The larger commercial centres of Ilford and Forest Gate will dominate.

4.7.60 Manor Park is within the London Borough of Newham. The LB Newham UDP was adopted in 2001 and seeks to encourage regeneration and quality design. The local authority does not envisage any large scale developments coming forward in Manor Park in the medium term.

Ilford

4.7.61 One of London's metropolitan areas, Ilford is a busy suburban centre surrounded by established residential areas. The town centre is one of the largest retail centres in London with 107,000m² of comparison goods floorspace, a 13,000m² leisure development at Clements Road and a major Sainsbury's supermarket. The main retail areas in the town centre of High Road and The Exchange shopping centre are well supported, lively retail pitches characterised by low vacancy rates.

4.7.62 There are a number of large office buildings in Ilford (mainly clustered around Ilford Hill) that date from the 1960 to the early

1990s that have traditionally housed major employers such as BT and Britannia Music. The office sector has declined in recent years – in 2003 there was 18,000m² of available office space in Redbridge, the majority of which was in Ilford. A number of the major offices on Ilford Hill are part or fully vacant including Valentine House, Mill House and Becketts House.

4.7.63 The town has good transport links, the most significant being the heavily used train service to Liverpool Street station and the A406 North Circular Road, which provides access to the M11 corridor. However, both road and rail capacity is heavily utilised, significantly limiting the potential for future development. Ilford station is currently over-crowded at peak times, as is the train service to Liverpool Street. Studies by Redbridge BC have shown that at peak times it is not uncommon for commuters to have to queue to get onto the platforms and wait for a number of trains to leave the station before it is possible to board a Liverpool Street train.

4.7.64 Ilford is a densely populated area with a diverse ethnic make up. Almost half the catchment area's 24,000 people are Asian. A third of the population has no qualifications, the economic activity rate is low and unemployment is around twice the route average. A third of the population live within regeneration areas although the socio-economic characteristics of both the regeneration and non-regeneration areas are broadly similar.

4.7.65 Ilford is a popular residential location with increasing demand and house prices. The majority of development underway or planned in the town centre is residential led. Since 2002, 1,500 residential units have been granted planning consent which will add 140,000m^2 of residential space by 2006. These new units are being constructed in the town centre with schemes such as Spectrum 67 (a 12 storey tower with 103 units) and Centreway (a 16 storey mixed use scheme with 239 units). A number of existing office block owners have applied for (and are likely to receive) consent for residential conversion, including BT's Mill House.

4.7.66 Retail space in the town centre is expected to grow by 9,000m^2 by 2006, largely due to expansion of the existing Sainsbury's food store, whilst leisure space is forecast to grow by 5,000m^2 in the same period. As a result of the decline of Ilford as an office location, only 4,500m^2 in office space is forecast by 2006.

4.7.67 The London Plan identifies Ilford as an Opportunity Area with potential to accommodate 5,500 new homes by 2016.

4.7.68 The London Borough of Redbridge has produced a 30 year vision for Ilford – "Progressive Ilford". This outlines the local authority's vision for Ilford as a thriving metropolitan centre in the Thames Gateway. Over the next 30 years the forecasts are for land uses

to grow by the following amounts: residential 509,000m^2, retail 55,500m^2, offices 78,000m^2 and other uses by 66,500m^2.

Seven Kings

4.7.69 Some 24,000 people live within Seven Kings' catchment area. The area contains over 60% non-whites with economic activity and unemployment rates similar to the London average. There are no regeneration areas within the station's catchment area.

Goodmayes

4.7.70 Goodmayes is effectively a border area between densely populated inner London (with its wide ethnic make up) and the more affluent outer suburbs (which are predominantly white). In Goodmayes, over half the 21,500 population are white. While skill levels are not particularly high, economic activity and unemployment levels are average. There are no regeneration areas within the station's catchment area.

Chadwell Heath

4.7.71 While almost a third of its 19,000 residents have no qualifications Chadwell Heath has a high economic activity rate and below average unemployment. Approximately, 7,500 residents live within regeneration areas but the socio-economic characteristics of both the regeneration and non-regeneration areas are broadly similar although over 40% of residents of the regeneration areas have no qualifications.

Romford

4.7.72 The town is an important office and retail centre for north-east London and Essex. Romford's 13,000 population is over 90% white with a very high economic activity rate and a more balanced age distribution. Just 10% of residents live within regeneration areas. While unemployment is higher than average in the regeneration areas so is the economic activity rate.

4.7.73 The Brewery development, a mixed use 10 Ha scheme opened in 2004 accommodating 1,500 jobs. Along with shops, cinema and restaurants, the development included a new bus station. Other mixed use development schemes include sites north of Market Place and the former Dolphin site. London Borough of Havering's strategy for Romford station is to sustain the town centre's competitive position and encourage residential development, particularly in a new waterfront area adjacent to the River Rom.

Gidea Park

4.7.74 Around 50% of Gidea Park's approximately 14,000 population is classified as belonging in social groups C1 and C2. An average

proportion of the population has no qualifications but there is a below average presence of degree qualified residents. There are no regeneration areas within the station's catchment area.

Harold Wood

4.7.75 Harold Wood's 9,000 population has broadly the same characteristics as those of Gidea Park. There are no regeneration areas within the station's catchment area.

Brentwood

4.7.76 Brentwood is a well established prosperous town with good quality residential stock. It has good rail and road communications with easy access to the national road network via the M25 and A12.

4.7.77 The town has a very high economic activity rate and almost a third of the 10,000 people living within the station's catchment area are qualified to at least degree level. There are no regeneration areas within the station's catchment area.

4.7.78 Brentwood is seen by many occupiers as the most desirable office location in the North-East sector of the M25, largely due to the excellent schools in the town, the good road links and the attractive working and residential environment. Vacant office space in Brentwood has fallen from 30,000m^2 at the end of 2003 to 22,500m^2 in June 2004. There has been some recent office development (BT and Oce owner-occupier schemes), but residential development currently predominates (e.g. Warley Hospital, south of the High Street and the former gas works). A redevelopment of the town's shopping centre on the High Street is also underway, which will extend the retail space by 2,300m^2 on completion in 2006.

4.7.79 There are two sites in the town suitable for office development. The NV Tools former industrial site has consent for a 5,600m² office building but the developer is currently seeking planning consent for residential use. The local authority owns a former depot site at Warley Hill which will probably come forward as an office development site when the office market in the South-East improves. In general it is most likely that future office developments in Brentwood will be redevelopments of existing office buildings, due to the shortage of suitable sites.

4.7.80 The majority of development taking place in Brentwood in the foreseeable future will centre on small to medium scale residential led schemes in and around the town centre. The local authority envisages 2,000 new units being constructed by 2011 and believes a further 2,500 residential units will be constructed in the town between 2011 and 2021.

4.7.81 Brentwood is bordered by extensive areas of Green Belt which greatly restrict development potential around the town. Brentwood Borough Council planning and land use policies aim to preserve the high quality of the environment in and around Brentwood whilst ensuring the town continues to be sustainable and prosperous.

Shenfield

4.7.82 Shenfield has the highest retired population across the Crossrail route with over 20% of its 6,500 residents aged over 65. Unemployment is half the route average although economic activity rates are low reflecting the age profile of the area. There are no regeneration areas within the station's catchment area.

Isle of Dogs

4.7.83 The Isle of Dogs is characterised by the well-established office towers and increasingly mixed-use development of Canary Wharf to the north of the peninsula. It is physically separated from the low-key Poplar area of Tower Hamlets by the elevated sections of the Docklands Light Railway and A1261 West India Dock Road/Aspen Way. Poplar itself is dissected by the A13, East India Dock Road. Canary Wharf already accounts for over 1.25 million m^2 of office development and 46,000m^2 of retail employing over 60,000 people. The underground shopping centre has become a retail destination in its own right, supported by direct access to the Jubilee Line. The rest of the Isle of Dogs, to the south of Canary Wharf, comprises a mix of modern high density residential flats, principally along the River, lower density post-war housing of a mix of ages, local shops and industrial sites.

4.7.84 The Isle of Dogs covers both areas of prosperity and deprivation. Around a third of the area's 20,000 population has no qualifications while another third is educated to degree level. Amongst the nearly 14,000 people that live within regeneration areas economic activity rates are low and unemployment rates are double the route average.

4.7.85 Canary Wharf and the surrounding developments were hugely assisted by the Jubilee Line Extension. Further significant development potential exists but is constrained by public transport capacity and lack of alternative routes. The development pipeline over the next 10-15 years is dominated by a small number of large sites:

Site	Office Space Net Internal Area m^2
Wood Wharf	610,000
Millennium Quarter	460,000
Canary Wharf	430,000
Total	1,500,000

4.7.86 The main Canary Wharf sites are: North Quay, Riverside South and sites known as DS3, BP2, and BP3/4. Heron Quay is a longer-term site, currently in low density office/industrial use. British Waterway's four-phase Wood Wharf site will also provide 1,500 residential units, a new canal bisecting the site between Blackwall Basin and South Dock, public open space and leisure activities around the waterfront. The Millennium Quarter has a number of landowners. As with some of the Canary Wharf sites, the final balance of development between residential and commercial will depend on the market. The above figures reflect the Millennium Quarter masterplan aspiration.

4.7.87 The London Plan identifies the Isle of Dogs as an Opportunity Area with potential for 100,000 jobs and 3,500 homes by 2016. The area contains wards which fall within the top 20% most deprived wards in the national Index of Multiple Deprivation. Isle of Dogs is part of the Lea Valley and Thames Gateway regeneration corridors. The area is also eligible for European Regional Development Funding (ERDF) under Objective Two.

4.7.88 Being part of London Thames Gateway, the area falls under the Thames Gateway Planning Framework (RPG9a), 1995. The LDA, The Regional Planning Bodies, Government Office London and the Thames Gateway London Partnership[9] are also influential in the planning of the area.[10] The London Borough of Tower Hamlets sets out its planning policies in its UDP. One of the key areas is the Millennium Quarter to the south of Canary Wharf, for which Tower Hamlets have produced a mixed-use masterplan.

Custom House/Royal Docks

4.7.89 The Royal Docks, currently served by the Docklands Light Railway, is part of the Thames Gateway regeneration corridor. As well as London City Airport, it is characterised by the clearance of former port-related industrial sites, which are in the process of being redeveloped for residential, commercial, leisure and educational uses. The economy of the Royals is shifting towards finance and business services as the area is seen as the natural next centre of development in Docklands after Canary Wharf.

4.7.90 Custom House is similar to the Isle of Dogs with areas of both prosperity and deprivation. Some 8,000 of its 11,500 residents live within regeneration areas, economic activity rates are average but unemployment is high and skill levels are lower than the Isle of Dogs with fewer people holding degree level qualifications.

[9] See TGLP's Going East, Thames Gateway: The Future of London and the South East.
[10] See Growth and Regeneration in the Gateway, ODPM August 2004.

4.7.91 The developments of the ExCel exhibition centre, West Silvertown, City Airport and University of East London have already begun the transformation of this area of Docklands. Thames Gateway Bridge and DLR extensions from Canning Town to London City Airport and to North Woolwich will support further growth but the heart of the Royal Docks lacks good public transport accessibility into Central London.

4.7.92 The LDA suggest that 10,300 housing units could potentially be completed in the Royals by 2016; 2,030 of these after 2012. This is more than twice the number suggested in the London Plan and reflects the very strong residential market over the past few years. Residential development predominates towards the eastern end of the area at Silverton Dock, Peruvian Wharf and Albert Basin South.

4.7.93 The future of the Royals, however, is principally shaped by its employment sites, which are more sensitive to accessibility by public transport. Significant developments at Royal Albert Dock include University of East London (Docklands Campus), the 270,000m^2 Excel exhibition centre and the 440,000m^2 Royals Business Park (the 66,000m^2 first phase of which is under construction).

4.7.94 The 50ha Royal Docks area is identified in the London Plan as an Opportunity Area with potential for 11,000 jobs and 5,500 homes by 2016. The area is eligible for European Regional Development Funding (ERDF) under Objective Two. Being part of London Thames Gateway, it falls under the Thames Gateway Planning Framework (RPG9a), 1995. The LDA, The Regional Planning Bodies, Government Office London and the Thames Gateway London Partnership[11] are also influential in the planning of the area.[12] Through its UDP, the London Borough of Newham has designated it the southern part of the Arc of Opportunity masterplan area, which is scheduled for major redevelopment.

Abbey Wood

4.7.95 Abbey Wood is a residential area with a small retail pitch close to the station. The residential stock is mixed, with Victorian terraced houses, 1960s local authority schemes and recently constructed private flats. The local workforce is, on average, poorly qualified although its economic activity rate is reasonably high. Over 10,000 of its 19,000 population live within regeneration areas where unemployment is almost twice the route average.

4.7.96 There are few sites close to the station that are cleared for development. However, there are extensive areas of 1960s

[11] See TGLP's Going East, Thames Gateway: the future of London and the South East

[12] See Growth and Regeneration in the Gateway, ODPM August 2004.

housing that have uncertain life expectancy. The local and regional authorities envisage that future development in Abbey Wood will be led by the replacement of poor quality, deck-access housing. It is not envisaged that any commercial development will take place at Abbey Wood beyond small scale convenience shops and community centres.

4.7.97 The area is identified as a Zone of Change by the Thames Gateway Strategic Executive within the Thames Gateway regeneration corridor. It is also eligible for European Regional Development Funding (ERDF) under Objective Two.

5. Route-wide impacts: Agglomeration benefits

5.1 Introduction

5.1.1 One of the key objectives for Crossrail, as published by the CLRL Board, is to facilitate the continued development of London's Finance and Business Service (FBS) activities. The chosen route passes through the West End, the City of London and the Isle of Dogs, the three main FBS clusters not only in London but also in the UK.

5.1.2 The starting point, both for this analysis and the transport impacts is the forecast of future population and employment in London as defined within the London Plan. The London Plan expects an increase in total London employment of 636,000 jobs between 2001 and 2016 and an 800,000 increase in population. These projections are based on the extrapolation of historic trends and have been approved by government following a rigorous examination.

5.1.3 The two key conclusions from the London Plan (for this assessment of the Agglomeration impacts of Crossrail) are that:

- the dominant sector behind future employment growth will be FBS. The FBS sector created a net 750,000 jobs in London between 1971 and 2001 equal to the entire growth in employment (all sectors) over that 30 year period;
- the FBS sector is heavily concentrated within the central area (largely due to the agglomeration benefits of locating there). Of the overall employment growth, roughly half is expected to locate within the central area (including the Isle of Dogs).

5.1.4 The dominance of the FBS sector and its geographic focus on the central area has significant transport implications. Growth will be focussed within those areas that are served by the most congested parts of the rail network and that growth will be almost entirely dependant on public transport (no additional highway capacity is planned and even before congestion charging, commuting by car into the central area was declining).

5.1.5 Growth in the FBS sector within the central area will, therefore, create significant problems for the public transport network. Crossrail's role is to support and enable that growth and there are two reasons why that support is vital for the UK economy as a whole:

- the FBS growth is market led. It is the market that is demanding additional FBS jobs and the market that is demanding that those additional jobs be located within the central area. If that growth were to be constrained there is no guarantee that it would take place elsewhere within London, or the UK.

- employment growth in central London has a significant productivity advantage over employment growth elsewhere. That productivity differential is driven by the agglomeration benefits of locating within one of the three largest FBS clusters in the world (the others being New York and Tokyo).

5.2 Agglomeration

Agglomeration theory

5.2.1 There are a variety of definitions of agglomeration, most of them along the lines of "The act or process of collecting in a mass; a heaping together". Agglomeration is a common process and high degrees of agglomeration of FBS companies exist in major financial centres such as London, New York, Tokyo, Frankfurt and Paris. Cities exist as an agglomeration of economic activities in which the costs of being crowded must be outweighed by the benefits of the location to businesses and indeed residents. Preferences appear to exist over a wide range of locations for co-location of these types of services.

5.2.2 The reasons why agglomeration occurs include:

- *a larger, deeper, labour market* – providing employers with more choice of skills and more competition for jobs;

- *more competing and complementary businesses and institutions* – providing additional pressure for innovation and efficiency and enabling greater specialisation amongst support services;

- *a larger, deeper, client market* – London's FBS sector for instance is a global player attracting business from around the world;

- *greater potential for contact and knowledge sharing* – both informally via social interaction and more formally via conferences.

5.2.3 It is possible to conclude that:

- agglomeration effects exist and the extent of FBS clustering suggests that they are of particular importance to this sector;

- agglomeration effects within the FBS sector are largely associated with central London;

- increases in employment density will increase the scale of agglomeration.

5.3 Constraints on future employment growth

5.3.1 Given the characteristics of travel to the central area, the heavy dependence on rail to get people to work and the high levels of crowding to and within the central area, it is clear that a lack of public transport capacity can and probably does already, constrain growth. Before addressing the transport constraint in more detail, however, consideration needs to be made of other possible constraints on growth. CLRL have specifically looked at two: the property and labour markets.

The property constraint

5.3.2 CLRL investigated whether the property market would be able to deliver the amount of additional office space required to meet projected employment growth. The conclusion was that the property sector would be able to supply sufficient office space to accommodate the expansion predicted within the London Plan forecasts[13].

The labour market constraint

5.3.3 Assuming there was demand from employers to locate within central London and property to accommodate them, would there be sufficient supply of labour to fill those positions? In terms of mobility of labour there should not be a problem, workers will migrate if necessary to fill labour shortages, especially in high wage sectors such as FBS. In addition high population growth is expected within London anyway, driven by the demographic characteristics of the current population. If there is a constraint it is likely to be due to the London housing market. In this respect the role of Crossrail in linking the Thames Gateway to the central area is important by creating new residential locations accessible to the areas of expected employment growth.

The transport constraint

5.3.4 The transport constraint is that the level of growth forecast by the London Plan by 2016 cannot be accommodated by the anticipated increase in rail capacity without Crossrail – and future growth beyond 2016 will be even more negatively affected by the transport constraint.

[13] Drivers Jonas – The Economic Case for Crossrail, June 2002

5.3.5 Public transport capacity is a complex technical area with questions over both the definition and measurement of capacity and what passenger responses are to increases in crowding. The base year for Crossrail's modelling work is 2001 and hence that is the comparator for the future year scenarios.

5.3.6 Cordon analysis measures the level of supply and demand across individual cordons. CLRL have used three cordons around:

- the central area (roughly equivalent to the zone 1 fares area);
- the City;
- the Isle of Dogs.

5.3.7 Information is presented in *Table 5.1* for the morning peak period (7am to 10am) although within that period crowding is much worse in the peak hour.

TABLE 5.1: 2001 CORDON ANALYSIS RESULTS

	Demand	Supply	Crowding
Central	897,000	1,220,000	74%
City	324,000	523,000	62%
IOD	51,000	83,000	62%

Notes: Demand = passenger flows inbound across the cordon for AM peak period (7-10)
Supply = Planning Guidance Capacity (PGC) TfL's standard definition of capacity
Crowding = Demand as % of Supply
Cordon analysis excludes InterCity and CTRL services from both supply and demand figures.

5.3.8 It should be noted that cordon analysis substantially underestimates average crowding because aggregation of all the individual links ignores the fact that the busiest (most crowded) links carry the most passengers.

5.3.9 Select Link Analysis (SLA) provides information on crowding levels to the three main employment centres within London, namely the City, Isle of Dogs and Central London (effectively Fare Zone 1). SLA identifies users of all links crowded in excess of a pre-defined level of crowding and allows their destination zone to be identified. It is, therefore, possible to identify:

- the numbers of passengers experiencing defined levels of crowding according to their destination;
- the amount of time spent on links crowded in excess of defined levels of crowding, again according to individual destination areas;

- dividing one by the other, the average amount of time spent by passengers to particular areas at each defined level of crowding.

5.3.10 *Table 5.2* shows the amount of time spent by passengers according to the level of crowding experienced. The numbers shown refer to the amount (and proportion) of on-train time rather than total journey time. About one third of all on train time (38% to the central area) is spent in excess of PGC.

TABLE 5.2: AVERAGE MINUTES PER PASSENGER BY CROWDING LEVEL (2001, AM PEAK HOUR)

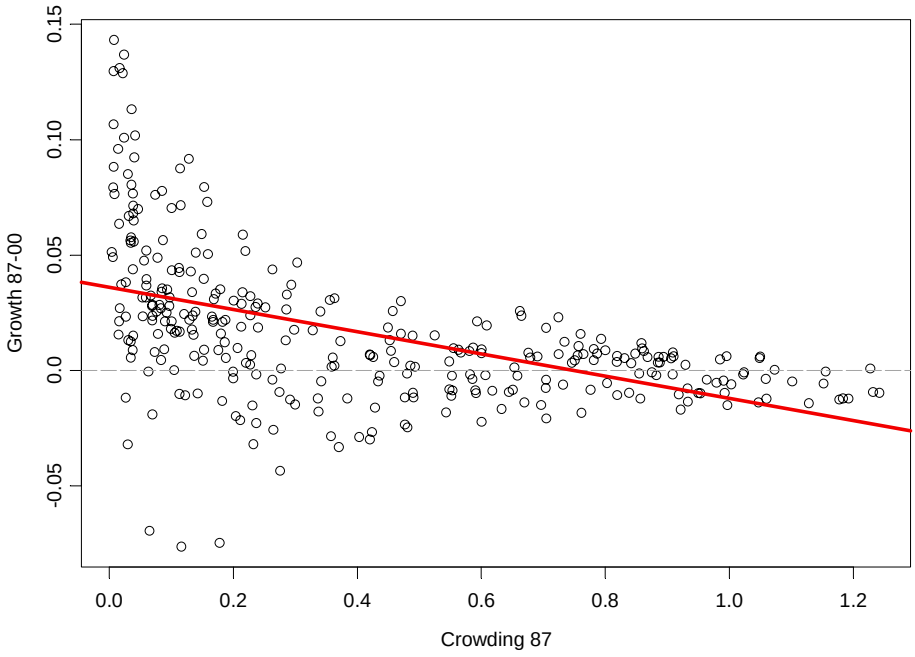
	Total Trip (average)	Crowd > 30% PGC	Crowd > 80% PGC	Crowd > 100% PGC	Crowd > 125% PGC	Crowd > 150% PGC
Isle of Dogs	26.28	25.27	15.60	9.00 (34%)	2.91	0.24 (1%)
City	30.65	28.23	19.60	10.91 (36%)	4.07	0.44 (1%)
Central	28.55	25.98	17.85	10.83 (38%)	4.02	0.31 (1%)

5.4 Crowding and its constraint on growth

5.4.1 CLRL have investigated the historic relationship between the level of congestion on underground links and the amount of subsequent growth in demand for a number of time periods between 1981 and 2000. The analysis showed that there was a strong, statistically significant, negative relationship between the initial level of crowding on a link and the subsequent average annual growth rate in demand. That relationship held across a variety of time periods and whether overall demand was rising (e.g. 1994 to 2000) or falling (e.g. 1987 to 1994).

5.4.2 Crowding was found to have an impact on growth even at low levels of crowding but became much more marked at levels of crowding above 70% of PGC across the morning peak period. *Figure 5.1* shows the relationship between the initial level of crowding ("crowd 87") and the subsequent average annual growth rate in passenger flow ("growth 87-00") over the period 1987 and 2000. It shows the outcome for each of the individual links considered and the line of best fit which shows that average growth becomes negative at a level of crowding around 75% of PGC over the morning peak period.

FIGURE 5.1: RELATIONSHIP BETWEEN LEVEL OF CROWDING (D/PGC) IN 1987 AND ANNUAL AVERAGE GROWTH RATE IN DEMAND (1987 – 2000)



5.4.3 There is clearly a number of potential responses contained within this relationship, including reassignment to a new route or mode of travel, changes to travel behaviour (such as peak spreading or working from home), changes to home or employment location and even people who continue to travel because of increases in wages. At an individual link level it is not possible to break down the change between these.

5.4.4 When looking at central London as a whole however, the options for changes to mode and/or route are limited. The average inbound level of crowding across the central cordon is 75% so there are few opportunities to shift to a less crowded route. The other options all entail real economic costs whether those are changes to the preferred time of travel, higher wages, loss of agglomeration benefits from jobs moving out of the capacity constrained clusters or simply people choosing to work in less productive sectors because they are easier to travel to.

5.5 Conclusions on constraints

5.5.1 It does not appear that either property or labour supply will provide insurmountable constraints on the future growth of FBS employment in central London. That growth will, however, place

additional demands on an already crowded rail network and a lack of rail capacity could well constrain growth. Analysis of historic trends shows that passengers are averse to crowding and that highly crowded links experience much lower growth than others.

5.6 Future transport conditions and the impact of Crossrail

5.6.1 There are substantial changes expected to occur between the 2001 base year and the 2016 forecast year. The key issues relevant to the central London employment impacts are:

- the London Plan predicts increases in both population and employment. By 2016 population is expected to rise by 800,000 and employment by 636,000;
- due largely to the concentration of employment growth in the central area and minimal increases in highway capacity, this growth results in a disproportionate increase in public transport use. Total morning peak period public transport trips in 2016 are expected to rise by 25%;
- despite the increases in rail capacity assumed in the base scenario (Thameslink 2000, East London Line Extension, CTRL, significant increases on many of the Train Operating Companies (TOCs) and full PPP network growth assumptions for LUL) the overall result, before Crossrail is introduced, is a substantial increase in crowding. That comprises both increases in the highest levels of crowding and a spreading of the locations in which crowding takes place.

2016 base

5.6.2 For comparison with the 2001 cordon figures, *Table 5.3* shows the 2016 results with and without Crossrail.

TABLE 5.3: 2016 WITH AND WITHOUT CROSSRAIL, ALL RAIL MODES EXCLUDING CTRL

	2016 without Crossrail			2016 with Crossrail		
	Demand	**Supply**	**Crowding**	**Demand**	**Supply**	**Crowding**
Central Cordon	1,129,000	1,452,000	78%	1,162,000	1,539,000	76%
City Cordon	439,000	649,000	68%	481,000	787,000	61%
Isle of Dogs	113,000	137,000	82%	138,000	212,000	65%

5.6.3 Crossrail reduces average crowding across the City cordon to just below 2001 levels, and to the Isle of Dogs and Central cordons to

somewhere between 2001 and 2016 without-Crossrail levels. Without Crossrail there is a significant increase in crowding across all three cordons. It should be noted that although the City cordon appears less crowded than the central area that is only because the rail services entering the City from the west are less crowded than they were when they crossed the central cordon (having already dropped off passengers in the West End). The Select Link Analysis (*tables 5.4(a) and (b)*) takes account of crowding experienced over the whole journey and shows the City to be the destination which suffers the highest average crowding.

TABLE 5.4(A): SELECT LINK ANALYSIS: 2016 WITHOUT CROSSRAIL

	All Trips	**Crowd > 30% PGC**	**Crowd > 80% PGC**	**Crowd > 100% PGC**	**Crowd > 125% PGC**	**Crowd > 150% PGC**
Isle of Dogs	36,000	34,000	34,000	34,000 (94%)	21,000	9,000 (26%)
City	105,000	97,000	95,000	90,000 (85%)	75,000	25,000 (24%)
Central	450,000	400,000	394,000	370,000 (82%)	309,000	110,000 (24%)
All Zones	1,143,000	796,000	717,000	657,000 (57%)	512,000	187,000 (16%)

TABLE 5.4(B): SELECT LINK ANALYSIS: 2016 WITH CROSSRAIL

	All Trips	Crowd > 30% PGC	Crowd > 80% PGC	Crowd > 100% PGC	Crowd > 125% PGC	Crowd > 150% PGC
Isle of Dogs	36,000	34,000	32,000	27,000 (74%)	14,000	7,000 (19%)
City	105,000	97,000	92,000	86,000 (82%)	54,000	19,000 (18%)
Central	450,000	401,000	383,000	355,000 (79%)	232,000	90,000 (20%)
All Zones	1,143,000	814,000	722,000	652,000 (57%)	402,000	149,000 (13%)

5.6.4 *Tables 5.4(a)* and *(b)* show how crowding increases by 2016 without Crossrail (in comparison with the 2001 results in *Table 5.2)* and then how Crossrail relieves crowding (especially at higher levels of crowding). Comparing *Tables 5.4(b)* and *5.4(a)* shows that for crowding levels of 150% of PGC, Crossrail reduces the numbers of passengers affected by between 20% and 30%.

5.7 Quantifying the impact on central London employment

5.7.1 The next stage is to link the reduction in rail crowding provided by Crossrail to the number of additional jobs enabled within the central area. A number of approaches to this have been developed and applied by the Crossrail team and its consultants. Volterra Consulting Ltd (Volterra) and Oxford Economic Forecasting (OEF) have developed mechanisms for forecasting the impact of additional crowding on central area employment growth. These are described below.

The Volterra approach

5.7.2 Volterra developed two approaches, one based on the cordon analysis (described above) and the other on the Select Link data. The cordon approach applies a "crowding-out" function, which in essence says that the proportion of "unconstrained" development demand that takes place reduces as crowding across the cordon increases. As crowding increases from current (2001) levels, an increasing percentage of unconstrained development demand is assumed not to occur. The relationship is such that once crowding increases to a level 25% higher than the 2001 base, all future development is stopped (and at, for example, 2.5% higher than 2001 levels, 10% of unconstrained development is stopped).

5.7.3 The Select Link data approach looks at the existing distribution of crowding for central area workers and postulates that any increase in crowding beyond that distribution would represent a constraint and gradually reduce growth.

5.7.4 Volterra's approach suggests that by 2016 the transport constraint without Crossrail would have reduced employment within the West End, City and Isle of Dogs by between 5,000 (cordon approach) and 13,000 (Select Link approach). Post 2016, assuming a continuation of the growth trends in demand for those locations and supply to them, the size of the constraint increases to 33,000 and 40,000 jobs by 2027.

The OEF approach

5.7.5 OEF used their in-house macro-economic model of the UK, which incorporates spatial and sectoral disaggregation. Into that model they input the impact of Crossrail on the three key central areas (City, West End and Isle of Dogs) with reference to its impact on travel costs. OEF derived that impact on travel costs through their non-linear generalised cost curve. This approximates to the crowding curves used in the Railplan and LTS models at most levels of demand, but implies much higher crowding penalties at high levels of overcrowding (specifically more than 20% over PGC). The curve was designed to overcome the straight-line crowding functions and lack of capacity constraints within the existing models for LUL services in particular.

5.7.6 The OEF model then uses the change in generalised travel costs to determine changes in wages required to attract staff, resulting in changes in business efficiency and hence changes in employment by sector and location. Their results are for an equilibrium position, recognising the interactions between changes in employment and changes in crowding.

5.7.7 The OEF approach suggests that by 2016 the transport constraint without Crossrail would have reduced employment within the West End, the City of London and the Isle of Dogs by 10,000

compared to the with-Crossrail scenario. The 2016 results do not take full account of the time lags within OEF's model. By 2027 central area employment is reduced by 23,000 without Crossrail.

5.7.8 Both approaches forecast a substantial constraint on employment in central London in the no-Crossrail scenario. It is reassuring to note that other transport models, reviewed briefly in the following paragraphs, predict a similar scale of impact of Crossrail on employment in central London.

The LTS model distribution function

5.7.9 The LTS model incorporates a Distribution function which predicts changes in the distribution of trip destinations (predominantly employment locations) as a result of changes to the network. Analysis of the LTS demand matrices as a result of the introduction of Crossrail indicates that they show an additional 35,000 trips (all modes) terminating in central London in the morning peak period for the 2016 with-Crossrail scenario. That might reasonably be assumed to equate to an additional 35,000 central area jobs.

The Elasticity approach

5.7.10 In the July 2003 Business Case an elasticity approach was adopted rather than the DMS (distribution and mode split) function. This factored up passenger trips in accordance with the percentage reduction in average travel costs derived from the introduction of Crossrail applying an elasticity of –0.6. The elasticity approach resulted in an overall increase of some 25,000 trips with some 17,000 of them to the central area.

LASER model results

5.7.11 LASER is a model which analyses, "economic activities, land use and transport" within London And the South East Region (LASER). LASER explicitly models the interaction between land use, density and transport accessibility. A LASER model test of Crossrail from 2002 (a different scheme from the current one) concluded that without Crossrail "it appears that overcrowding may cause 30-50 thousand jobs not to be sustainable".

Centre for Economics and Business Research (cebr) approach

5.7.12 cebr (in work undertaken for the Canary Wharf Group) developed an approach based on changes to accessibility with and without Crossrail. The approach models the relationships between the amount of population and jobs within six defined travel isochrones (15, 30, 45, 60, 75 and 90 generalised minutes). It uses changes in those accessibility indices to predict changes in population and employment within each zone.

5.7.13 The conclusions from the cebr work are that as a result of Crossrail there would be 63,000 additional jobs in the City and the Isle of Dogs by 2023, another 85,000 jobs in the Thames Gateway and 33,000 elsewhere in London (including the West End).

5.8 Conclusions

5.8.1 This chapter has brought together evidence from a number of sources. The cebr and LASER model references are taken from work undertaken at different times and for other purposes and are, therefore, not strictly comparable. The other approaches are taken directly (or derived) from model outputs and are, therefore, consistent with the transportation analysis of the scheme.

5.8.2 There are three potential sources of agglomeration benefits that would result from the implementation of Crossrail. These are:

- the additional jobs that are enabled to locate within the central area as a result of the additional capacity supplied by Crossrail will benefit from an increase in productivity by virtue of being within the agglomeration instead of outside;
- those jobs that are already located within the central area will also benefit from increased efficiency (agglomeration benefits) derived from the marginal increase in employment density provided by the additional central area jobs;
- all jobs within the central area will benefit from an increase in the effective density of the central area caused by the improvements made by Crossrail to transport within the central area.

5.8.3 Every approach suggests additional central area employment (including the Isle of Dogs) resulting from the implementation of Crossrail and although there are significant differences between the forecasts a central range might be 5,000-13,000 jobs in 2016 and 32,000-40,000 ten years later. This will result in significant GDP growth which will be a significant beneficial impact.

6. Route-wide impacts: Regeneration and Economic Development benefits

6.1 Introduction

6.1.1 This section examines the employment impacts of the scheme on regeneration areas. These impacts arise from improved accessibility to employment opportunities for those living in areas served by Crossrail, the attraction of new commercial and residential developments to locations served by Crossrail and increased leisure and tourist visits to Crossrail served areas which have seen improvements in accessibility.

6.1.2 The section details the:

- accessibility changes as a result of Crossrail;
- volume of development attracted to regeneration areas as a result of Crossrail;
- consequential impacts on employment.

6.1.3 It is assumed that the impacts set out in this section will arise by 2021.

6.2 Accessibility changes

6.2.1 Crossrail will significantly improve the public transport accessibility of the areas it serves and create a range of new direct journey opportunities and improve accessibility across parts of the south east and London, particularly from southeast London and Kent by the provision of a new rail crossing of the River Thames between Custom House and Abbey Wood.

6.2.2 Examples of 'before' and 'after' Crossrail travel times for a range of journeys are shown in *Table 6.1*.

TABLE 6.1 ILLUSTRATIVE JOURNEY TIMES AND TIME SAVINGS WITH CROSSRAIL (IN MINUTES)

	Before Crossrail	After Crossrail	Saving
Abbey Wood to Isle of Dogs	30	9	21
Isle of Dogs to Paddington	29	18	11
Stratford to Heathrow	65	49	16
Ealing Broadway to Farringdon	25	17	8
Hayes to Tottenham Court Road	34	24	10
Southall to Custom House	58	36	22
Paddington to Liverpool Street	17	11	6

Source: CLRLL based on TfL Railplan model

6.2.3 From an economic and regeneration perspective these time savings can be also be measured in terms of the number of additional jobs that become available within particular key isochrones and the number of additional potential employees who can now access jobs within station catchment areas to serve new developments attracted there.

6.2.4 Two measures have been used. The first is to assess the additional number of jobs that become available within 30 minutes travel time from regeneration areas. This reflects typical travel patterns for socially excluded groups and the unemployed. The second is the increase in the potential workforce within 45 minutes travel time of prospective development sites. This represents average travel to work times in London.

6.2.5 In absolute numbers, *figure 6.1*, the biggest increase in access to both jobs and potential workers is in the east, with the areas between Whitechapel to Abbey Wood and Manor Park seeing the largest benefits.

FIGURE 6.1: ABSOLUTE INCREASE IN EMPLOYMENT OPPORTUNITIES WITHIN 30 AND 45 MINUTES

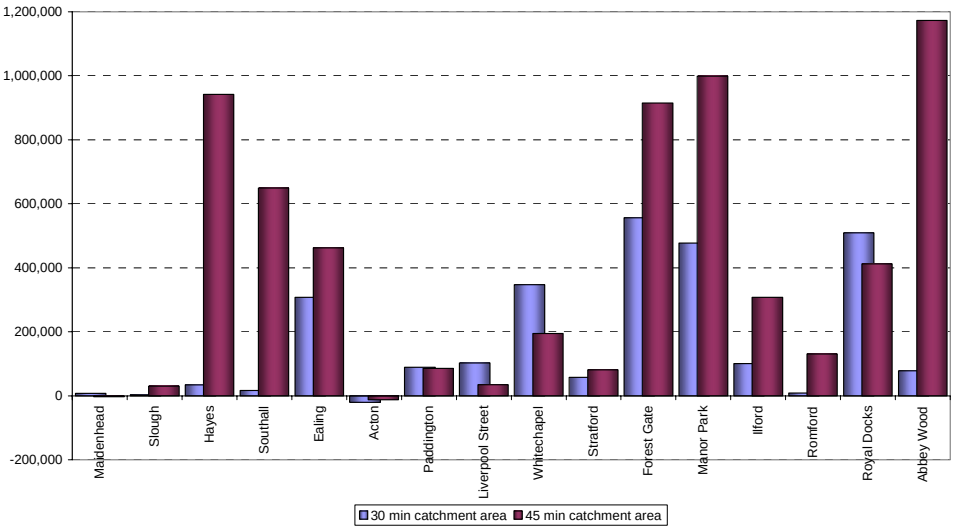
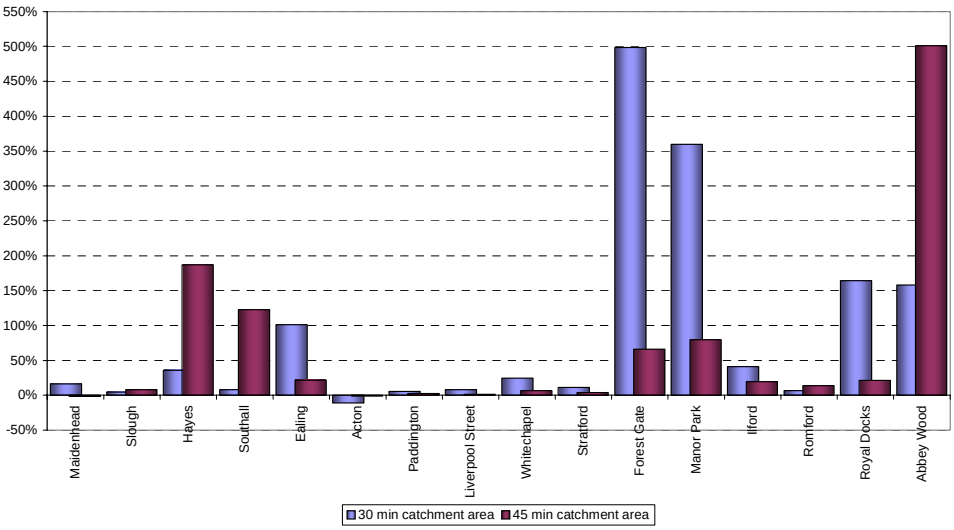


FIGURE 6.2: PERCENTAGE INCREASE IN EMPLOYMENT OPPORTUNITIES WITHIN 30 AND 45 MINUTES



6.2.6 Whilst in percentage terms the benefits are greatest again in the east, they are still significant even further out from central London, *figure 6.2*.

6.2.7 Besides improved access to employment Crossrail will also improve access to a wide range of other services and facilities. National policy objectives (eg, OPDM Social Exclusion Unit *Making the Connections: Final Report on Transport and Social*

Exclusion 2003), to promote social inclusion through transport planning seek to improve accessibility for those in disadvantaged groups and areas to those opportunities that are likely to have the most impact on life chances, including employment, education, health and retail facilities.

6.2.8 Crossrail will assist in achieving this objective by both increasing accessibility generally and especially for the mobility impaired. Therefore the assessment of accessibility included consideration of the impact of Crossrail on accessibility to further education, regional hospitals and major centres.

6.2.9 TfL's transport model CAPITAL was used to model accessibility changes with and without Crossrail. Data from the 2001 census were used to capture the demographic and socio-economic characteristics of the population within these isochrones. This analysis was applied to changes in accessibility to universities, hospitals and major centres along the route.

Access to education

6.2.10 *Table 6.2* below summarises universities that are located within walking distance of Crossrail stations, and the functions based at those sites.

TABLE 6.2: UNIVERSITIES SERVED BY CROSSRAIL

Universities	Function	Location	Nearest Crossrail Station
University College London	Various undergraduate and postgraduate courses, including engineering, clinical/medical science, and neurology. Various research centres including human genetics, neuroscience and transport.	Bloomsbury	Tottenham Court Road
Queen Mary College, University of London	Queen Mary's School of Medicine and Dentistry. Hall of residence, lecture theatres and several research departments of the School.	Charterhouse Square, Farringdon	Farringdon
Queen Mary College, University of London	Queen Mary's School of Medicine and Dentistry. Teaching campus. Extensive medical and dental library	Next to the Royal London Hospital, Whitechapel	Whitechapel
Queen Mary College, University of London	Queen Mary's School of Medicine and Dentistry. Teaching campus.	Within St Bartholomew's Hospital.	Farringdon
London Metropolitan University	Various undergraduate and postgraduate courses, including accountancy, economics, humanities, social science, art/media and management courses.	Moorgate & Aldgate East	Liverpool Street/Whitechapel
City University	Postgraduate and undergraduate courses in radiography. Postgraduate and undergraduate courses in nursing & midwifery	Department of Radiography (Charterhouse Square), St Bartholomew's School of Nursing & Midwifery, St Bartholomew's West Smithfield.	Farringdon
City University	Links to Queen Mary College as above.	St Bartholomew's School of Nursing & Midwifery, Royal London Hospital	Whitechapel
Thames Valley University	Various undergraduate and postgraduate courses, including music & media, law, business, nursing and tourism	Ealing	Ealing Broadway
Thames Valley University	Various undergraduate and postgraduate courses, including nursing, business management, music & media, and computing.	Slough	Slough
Guildhall School of Music & Drama	Undergraduate and postgraduate courses in music and drama programmes.	Barbican	Farringdon
University of Westminster	Various undergraduate and postgraduate courses, including biosciences, computer science, health, social science and law.	Cavendish and Regent Campuses, Regent Street and New Cavendish Street	Bond Street

6.2.11 The introduction of Crossrail increases the number of young people who live within 30 and 60 minutes of these establishments as shown in *table 6.3*. Overall, there will be a 10% increase in the number of 18 to 24 year olds living within 30 minutes of these universities and a 6% increase in the living within 60 minutes of the universities. Given the increasing number of students who live with their parents while at university this improved accessibility will assist them accessing higher education facilities.

TABLE 6.3: PERCENTAGE INCREASE IN THE NUMBER OF 18-24 YEARS OLD LIVING WITHIN 30 AND 60 MINUTES OF UNIVERSITIES SERVED BY CROSSRAIL.

	Number of 18-24 year olds within 30 min of University	Number of 18-24 year olds within 60 min of University
University	% change on Base	% change on Base
Queen Mary St Barts	18%	8%
Queen Mary St Barts City University – Farringdon	18%	8%
Queen Mary	17%	8%
Thames Valley University Slough	17%	-16%
Royal London	10%	5%
Royal London City University – Whitechapel	10%	5%
Metropolitan University	9%	4%
Guildhall Barbican	8%	5%
Thames Valley University Ealing	5%	19%
Westminster University	2%	4%
University College London	0%	3%

6.2.12 The reduced catchment for the Thames Valley University Slough campus, is due to the replacement of some limited or non-stop Great Western services to Paddington with all stopping Crossrail services

Access to health facilities

6.2.13 Regional hospitals along the Crossrail route and the main services they provide are set out in *table 6.4*.

TABLE 6.4: REGIONAL HOSPITALS SERVED BY CROSSRAIL STATIONS

Regional Hospital	Function	Location	Nearest Crossrail Station
Royal London Hospital	Together the RLH and St Bartholomew's provide: • District general hospital (DGH) for Tower Hamlets and the City, providing secondary level services to our local population. • Tertiary centre for north east London, providing complex specialist services for the sector and beyond, notably Essex. • Provider of innovative and leading-edge clinical services to London and the UK. RLH departments include the Helicopter Emergency Centre. Coronary Care Unit Dental Hospital, neurology, and orthopaedics. Proposals for new hospital include London's leading trauma and emergency care centre, Europe's largest renal service and the capital's second biggest paediatric service, provided within a dedicated Women and Children's Unit.	Whitechapel	Whitechapel
St Bartholomew's Hospital	As above. St Bartholomew's departments include a breast cancer unit, cardiology, ear nose & throat, and endocrinology. Planning permission to redevelop the hospital, to include a Cancer and Cardiac Centre of Excellence.	Farringdon	Farringdon
Ealing Hospital	A district general hospital providing acute services for patients in the West London area.	Ealing Broadway	
Goodmayes Hospital	Mental health.	Goodmayes	Goodmayes
Old Church Hospital	Serving Barking, Havering and Redbridge, departments include A&E, dermatology, ENT, neurology, and paediatrics. The Cancer Centre at Barts and The London together with Oldchurch Hospital form the East London Regional Cancer Centre.	Romford	Romford
Harold Wood Hospital	Serving Barking, Havering and Redbridge, departments include dermatology, ENT, neurology, and paediatrics. May be closing as part of plans to expand Oldchurch hospital.	Harold Wood	Harold Wood
St Mary's Hospital	St Mary's provides a wide range of specialist and acute services to people including bone marrow transplant, cancer treatment, cardiology, neurology, orthopaedics, renal and transplant unit, and HIV. Proposals for a Paddington Health Campus (PHC) will create a world class clinical, research and teaching centre for north west London. It will bring together on one site the teaching hospital, St Mary's NHS Trust, with the Royal Brompton & Harefield NHS Trust and the medical faculty of Imperial College London including the National Heart and Lung Institute.	Paddington	Paddington

6.2.14 The introduction of Crossrail increases the number of households who live within 30 and 60 minutes of the establishments by an average of 9% and 7% respectively. Increases to individual hospitals are shown in *table 6.5*. This improved accessibility benefits patients, their friends and relatives as well as potential employees. There is no material difference in accessibility for those with or without a car.

TABLE 6.5: PERCENTAGE INCREASE IN THE NUMBER OF HOUSEHOLDS LIVING WITHIN 30 AND 60 MINUTES OF REGIONAL HOSPITALS SERVED BY CROSSRAIL

	Number of households within 30 min	Number of households without a car within 30 min	Number of households within 60 min	Number of households without a car within 60 min
Regional Hospital	% change on Base	% change on Base	% change on Base	% change on Base
Queen Mary St Barts	21%	19%	8%	6%
Oldchurch Romford	8%	11%	1%	0%
Harold Wood	10%	10%	4%	6%
Goodmayes	9%	9%	10%	12%
Royal London	11%	9%	5%	3%
Paddington	1%	2%	5%	4%
Ealing	0%	0%	12%	17%

Access to major centres

6.2.15 There are a number of metropolitan and regional centres (as defined by the London Plan) served by Crossrail. These include Romford, Ilford, Ealing, Southall, and Stratford while outside London major centres served include Slough, Brentwood and Maidenhead.

6.2.16 Crossrail brings about an 11% increase in the number of households without access to a car within the 30 minute isochrone of the centres listed. This will significantly improve access to key shops, services, and entertainment facilities for this population. The improvements occur on each branch of the system with the largest accruing to Southall and Slough. The reduced catchment for Maidenhead is due to the replacement of some limited or non-stop Great Western services to Paddington with all stopping Crossrail services.

TABLE 6.6: PERCENTAGE INCREASE IN THE NUMBER OF HOUSEHOLDS LIVING WITHIN 30 MINUTES OF MAJOR CENTRES

	Number of households within 30 min	Number of households without a car within 30 min
Major Centre	% change on Base	% change on Base
Southall	28%	30%
Slough	34%	25%
Romford	9%	11%
Ilford	8%	11%
Stratford	7%	6%
Ealing	2%	0%
Brentwood	0%	0%
Maidenhead	-4%	-16%

6.3 Approach to assessment and assumptions

6.3.1 The impacts of Crossrail on employment are associated with increased employment opportunities for the unemployed and economically inactive residents of regeneration areas due to improved accessibility from locations served by Crossrail and employment associated with increased commercial and residential development attracted to locations served by Crossrail.

6.3.2 This analysis can only provide a broad indication of possible employment impacts. It has to assume that unemployment and economic activity rates in areas that are presently designated regeneration areas will remain similar to those pertaining at present. Unemployment levels and economic activity rates are closely linked. Higher levels of unemployment discourage economic activity while as employment opportunities increase economic activity rates rise. In assessing employment impacts it has been assumed that economic activity rates in regeneration areas will rise to the average for non-regeneration areas in response to these new opportunities.

6.3.3 In assessing the development opportunities by location, account has to be taken of the fact that the property market is notoriously heterogeneous and difficult to predict. Each local area has its own peculiarities and market dynamics making it difficult to accurately predict future market conditions. Given the many factors that impact on the property market, it is impossible to isolate the effect of a particular transport scheme or regeneration initiative with certainty. Nevertheless, Crossrail will have positive impacts on local property markets along the route. That is, Crossrail will encourage development and the move towards higher value uses due to improvements in accessibility, capacity and the image of the areas served. Nowhere, it is predicted, will Crossrail have a negative effect on the property market. The nature, scale and

timing of the impact will, however, vary according to local conditions. For some areas, Crossrail will bring significant property market and regeneration benefits; for others, it will be beneficial but is unlikely to have a significant bearing on the timing or scale of development.

6.3.4 A review of the areas served by Crossrail has been undertaken in order to estimate the scale of residential and commercial development that might happen over the next 12-15 years (and in some cases beyond) and consider how much of this might be attributable to Crossrail.

6.3.5 Crossrail will facilitate significant additional commercial and residential development at various centres served by the scheme. These will not be new jobs for London as a whole but they will be additional jobs for the benefiting areas.

6.3.6 The analysis has focused on:

- establishing the potential quantum of development in terms of employment floorspace and residential units;
- estimating the proportion of development due to Crossrail's effect on relieving transport constraints and improving the image of areas;
- converting commercial floorspace figures into number of jobs (depending on the anticipated use and development density);
- converting the number of residential units into population figures (assuming the number of people per dwelling);
- estimating local area (services and support) jobs attributable to the increase in local area population;
- estimating the take-up of jobs by regeneration area residents.

6.3.7 The methodology for establishing the amount of floorspace or homes has varied according to the level of information available for each area. Outside Central London, property information is patchy with no single source of information. Information has been pieced together on the property market and future development data from a number of sources including:

- local area inspections;
- interviews with local authority regeneration and property officers;
- schedules of development sites provided by some local authorities;

- ODPM discussions and reports;
- LDA discussions, reports and residential sites database;
- The London Plan (Mayor of London's Spatial Development Strategy for Greater London);
- other regeneration bodies' reports and schedules;
- published property market information;
- local property agents.

6.3.8 Such information helps to establish the current development pipeline based on known sites for the short to medium term (5-10 years); and development aspirations in the longer term (to around 2021). Because Crossrail is not expected to open until 2013, a great deal of judgement in establishing longer term development potential attributable to Crossrail is required. This is especially so in areas where the over-arching vision for an area is not yet reflected in either local planning policy or the development pipeline.

6.4 Impact by location

6.4.1 This section sets out, principally for regeneration areas, the anticipated impact in the view of Drivers Jonas that Crossrail will have in terms of commercial and residential development. A summary tabulation is given as Appendix G.

Maidenhead

6.4.2 Crossrail will further augment the appeal of Maidenhead by improving the quality of journeys and creating new journey possibilities. However, the amount of development attributable to Crossrail in Maidenhead is likely to be low. Both commercial and residential developments will come forward without Crossrail, due to sustained housing demand and the significant impact of Terminal 5 at Heathrow. It is anticipated that by 2021 only 10% of housing units forecast (125 in number) and 100 jobs will be attributable to Crossrail.

Slough

6.4.3 Crossrail is perceived to be a positive image builder and a catalyst to give developers confidence to invest in the town. However, the regional commercial property market and Heathrow Airport are likely to be greater determinants of development in Slough. In the medium to long term Slough is likely to see significant residential and mixed use development with the

opening of Terminal 5. It is anticipated that only 10% of the 2,600 homes that will be built and the 8,000 jobs that will be created in Slough town centre up to 2021, will be attributable to Crossrail.

Hayes

6.4.4 From spring 2005 Heathrow Express will provide a stopping service at Hayes, which will greatly improve accessibility for residents to Heathrow and central London. Whilst Crossrail will bring further accessibility benefits, it is not thought that it will have a large effect on future development. Of the 1,200 homes that will be built and the 4,700 jobs that will be created in Hayes town centre up to 2021, it is estimated that only 10% of these will be attributable to Crossrail.

Southall

6.4.5 The Heathrow Express stopping service that comes into service in spring 2005 will enable Southall residents to more easily access employment at Heathrow Airport. Crossrail will increase accessibility to employment opportunities in the Thames Valley and Central London. In addition to removing perceived barriers to eastward commuting by local residents, Crossrail is expected to encourage an increase in cultural tourism and leisure trips to Southall from other parts of London. It is anticipated that, 20% of the development in Southall forecast to take place up to 2021 will be attributable to Crossrail, that equates to just under 1,000 residential units and 1,700 jobs.

Ealing Broadway

6.4.6 Ealing's popularity as both a business and residential location is well established. Crossrail will be an added attraction for Ealing, but the majority of the development forecast to take place in Ealing up to 2021 is likely to take place anyway. It is estimated that 10% of the residential, that is 250 units, and 15% of the jobs growth (1,200 jobs) forecast for the centre of Ealing will be attributable to Crossrail

Paddington

6.4.7 Whilst Paddington already has excellent transport infrastructure, Crossrail will greatly improve its accessibility to and from the City of London and the Isle of Dogs. This will increase the appeal of the area to office occupiers considering re-locating from more central parts of London. It will also underpin the long-term sustainability of the new major office schemes at Paddington. It is estimated that as a result of Paddington's existing popularity as a residential location, only 10% of the 3,000 new homes forecast in the London Plan will be attributable to Crossrail. However, it will have a greater impact on economic activity with 25% of new jobs attributable to Crossrail, that is 5,800.

Farringdon

6.4.8 Whilst already very accessible, Crossrail will greatly enhance Farringdon's image and overcome the present negative perception amongst occupiers and investors despite its closeness to the core City Square Mile.

Stratford

6.4.9 Substantial new development is proposed at Stratford based on the new CTRL link. Crossrail is needed to support this growth due to actual and perceived capacity constraints and will have a significantly positive impact on both residential and commercial developments by addressing the present transport capacity constraints. Overall 9,500 jobs and 2,200 residential units are judged to be attributable to Crossrail.

Whitechapel

6.4.10 Crossrail will provide a direct link with the Isle of Dogs, greatly increasing Whitechapel residents' access to the major centre of employment at Canary Wharf. It will be key in improving the image of Whitechapel encouraging new residential development in residential areas, which in turn will increase demand for leisure and retail led developments on Whitechapel Road. It is anticipated that 10% of the new homes envisaged in Whitechapel and 25% of the jobs will be attributable to Crossrail. This is equivalent to 70 residential units and 3,500 jobs.

Isle of Dogs / Poplar

6.4.11 The LDA estimate that by 2021 a further 10,700 homes will be built on the Isle of Dogs. It is estimated that 10% of this will be attributable to Crossrail. Over the next 15-20 years employment growth is estimated to be 100,000, in line with the GLA's aspirations. Further sites are likely to come forward for development, so this could be a conservative estimate. Such an increase in employment, however, is not sustainable without the increased capacity and journey possibilities that Crossrail will provide. Crossrail will improve business to business accessibility to the Isle of Dogs from the City of London, the West End and Heathrow. It will also provide improved access from the east, notably from potential new settlements around Greenhithe, Swanscombe and Ebbsfleet, which are forecast to provide over 30,000 homes over the next 15 to 20 years. Because of capacity improvements and improved access to labour supply and the central London business cluster, it is estimated that 40% of the increase in employment (or 40,000 jobs) can be attributed to Crossrail.

Forest Gate

6.4.12 Crossrail will significantly increase the profile and greatly improve the image of Forest Gate, as well as providing greater rail capacity to London. As a result it is likely that the number and scale of residential developments in Forest Gate will increase. It is anticipated that 50% of jobs accommodated and new homes completed in Forest Gate up to 2021 will be attributable to Crossrail, that is, 1,000 jobs and 800 residential units.

Manor Park

6.4.13 Crossrail will broaden the appeal of Manor Park as a residential area. Increased residential demand will be a catalyst for the development of mixed use schemes along Romford Road as the existing marginal retail sites become available. It is anticipated that in the period to 2021, 25% of future development, equivalent to 200 housing units, will be attributable to Crossrail.

Ilford

6.4.14 Whilst there are plenty of sites and demand to support further development, the local authority is conscious that this will be greatly constrained by the capacity of Ilford station and the Liverpool Street rail service. Without the increase in capacity that Crossrail will bring, the local authority will have to restrict further development to ensure transport demand from Ilford residents does not exceed available capacity. In addition Crossrail will support a more sustainable pattern of development will be possible in Ilford town centre with higher densities of residential units and less reliance on private cars as a means of transport.

6.4.15 Redbridge BC anticipates that 1,650 housing units will be completed and 2,500 new jobs will be created in Ilford town centre without Crossrail. With Crossrail, it is anticipated that a further 3,850 housing units will be completed and a further 2,500 jobs created.

Brentwood

6.4.16 It is anticipated that Crossrail will broaden the appeal of Brentwood as a residential location to those commuting to Central London, thus increasing demand for residential accommodation and local services. This increased demand is expected to be reflected in house prices, rather than the quantum of development. It is anticipated that 10% of future homes and jobs will be attributable to Crossrail, totalling 70 jobs and 450 residential units.

Royal Docks

6.4.17 Although the presence of London City Airport imposes height restrictions on development, Crossrail will support higher development densities and, most importantly, increase accessibility and improve perception. The LDA have significant land holdings, so site assembly and availability is not a constraint on development. Residential development is likely to continue without Crossrail. However, after 2012 (one of the LDA's forecasting dates), Crossrail will be needed to support the additional 2,000 dwellings proposed from this date.

6.4.18 It is anticipated that Crossrail will be the catalyst for accelerating employment development activity by encouraging occupier demand, which will remain patchy until a critical mass of development is built up. It is estimated that Crossrail could facilitate around 11,000 jobs in the Royal Docks area out of a site capacity total (beyond 2021) of around 49,000 jobs. This is based on a site by site assessment. The figures assume that high-density development is promoted from the outset.

Abbey Wood

6.4.19 Crossrail will improve journeys to central London and the image of the area which will be a catalyst for residential development. With regard to the availability of sites and research carried out by the LDA and Bexley and Greenwich local authorities, it is estimated that 1,500 new residential units will be constructed at Abbey Wood up to 2021. The accessibility improvements and image change that Crossrail will deliver are of such magnitude that it is estimated that 50% of these residential units will be attributable to Crossrail.

6.5 Potential additional workers in regeneration areas

6.5.1 The economic activity rate in regeneration areas within one kilometre radius of Crossrail stations is lower than in non-regeneration areas and the unemployment rate is also higher (*Table 6.7*).

TABLE 6.7: ECONOMIC ACTIVITY RATES ALONG THE CROSSRAIL ROUTE

One kilometre radius of Crossrail stations	Economically active	Economically active, Unemployed
Regeneration areas only	57%	12%
Non-regeneration areas only	69%	6%
All areas	66%	7%

6.5.2 Economic activity rates are closely linked to employment opportunities. As employment opportunities increase economic activity increases. If it is assumed that the economic activity rate in regeneration areas within one kilometre radius of Crossrail stations will increase to the levels of non-regeneration areas (within one kilometre radius), it is possible to obtain an estimate of the potential additional available workers in the regeneration areas.

6.5.3 Potential additional available workers are those people who are not currently economically active but will become active after Crossrail comes into operation, in addition to the currently unemployed.

6.5.4 As *Table 6.8* illustrates, there could be nearly 30,000 potential additional available workers in regeneration areas within one kilometre radius of Crossrail stations. The most noticeable increase in Whitechapel, where 5,700 new potential workers could become available. Other regeneration areas that could see significant increases in potential available workers include Forest Gate, Liverpool Street and Manor Park.

TABLE 6.8: POTENTIAL ADDITIONAL AVAILABLE WORKERS –20% MOST DEPRIVED AREAS WITHIN ONE KILOMETRE RADIUS OF CROSSRAIL STATIONS

	Economically Active, Employed	Potential Additional Available Workers
West Drayton	300	0
Hayes	600	200
Southall	4,100	1,200
Hanwell	1,700	700
West Ealing	700	0
Acton Main Line	700	200
Paddington	5,900	1,600
Tottenham Court Road	2,800	500
Farringdon	5,300	1,500
Liverpool Street	4,200	3,900
Whitechapel	11,100	5,700
Isle of Dogs	4,300	2,100
Royals	2,800	900
Abbey Wood	3,500	1,200
Stratford	3,700	1,300
Forest Gate	7,500	3,300
Manor Park	4,600	2,200
Ilford	2,700	1,200
Chadwell Heath	2,800	600
Romford	600	100
Total	69,700	28,300

6.6 Employment opportunities due to improved accessibility to work

6.6.1 The accessibility chart earlier in this section illustrated the additional number of jobs that become available within a 30 minute isochrone. The Census Travel to Work data provides an indication of the take up of jobs in central London by residents of each Borough. This gives a penetration rate which varies along the route from 0.6% to 2.4%. Using that penetration rate and matching qualifications of the unemployed and economically inactive with the skills required for work within London as whole an assessment has been made of the number of jobs that could be taken by presently unemployed and economically inactive residents of regeneration areas along the route. This figure comes to 14,000.

6.7 Employment opportunities due to new commercial and residential developments

6.7.1 Given the uncertainties in terms of development and the assumptions used with regard to unemployment and economic activity the impacts presented here are indicative, being based on a series of assumptions that are felt to be reasonable at each stage. However, given potential margins of error these figures are best looked at in total or sub-total by area, rather than at individual local or station level. The assessment indicates that 80,000 additional jobs and 40,000 people will be attracted to key regeneration areas served by Crossrail.

6.7.2 This will provide new job opportunities for the residents of these areas. Based on existing take up of jobs in these areas by local people, the skill level of the available workforce and the probable skills required by employers it has been assessed that 17,000 of these jobs will be taken up by unemployed and economically inactive residents of regeneration areas within a 2 kilometre catchment area of the relevant Crossrail station. A two kilometre radius has been used as this is the equivalent of a 30 minute catchment area and represents a conservative assessment of travel to work distances.

6.8 Loss of jobs due to increased competition

6.8.1 However, improved accessibility to regeneration areas also means additional competition for jobs in these areas. Taking present penetration rates of local jobs by non-residents of the area and the increase in catchment area resulting from Crossrail it has been estimated that there may be a loss of nearly 22,000 jobs from regeneration area residents.

6.8.2 The net impact of all these factors is that some 9,000 presently unemployed and economically inactive residents of regeneration areas along the route will obtain employment as a result of the secondary impacts of Crossrail. *Table 6.9* shows the impact by route section and the various components that make up this 9,000 figure.

TABLE 6.9: NET ADDITIONAL JOBS BY ROUTE SECTION ACCRUING TO UNEMPLOYED AND ECONOMICALLY INACTIVE RESIDENTS OF REGENERATION AREAS ATTRIBUTABLE TO CROSSRAIL – BASE CASE.

	Additional jobs due to improved access to jobs out side the area	Jobs attracted to the area	Number of those jobs taken up by local unemployed and economically active residents of regeneration areas	People attracted to area	Associated jobs related to larger population taken by local people	Total jobs	Loss of jobs due to improved access to regeneration areas	Net increase in jobs
Western[14]	-200	4,300	1,400	4,100	100	1,300	600	700
Central[15]	6,600	58,800	9,900	8,800	100	16,700	13,600	3,100
North East[16]	5,800	3,600	1,800	12,800	200	7,700	1,300	6,400
South East[17]	1,800	13,900	3,900	14,900	200	6,000	7,000	-1,000
Total	14,000	80,600	17,000	40,600	600	31,700	22,500	9,200

6.8.3 Simple sensitivity analysis has been undertaken looking at the possible down and upsides in terms of commercial and residential developments. These lower and higher cases are set out in *Tables 6.10* and *6.11*.

[14] Covers the area from Maidenhead to Acton
[15] From Paddington to Isle of Dogs and Stratford
[16] From Forest Gate to Shenfield
[17] Covers Royal Docks to Abbey Wood

TABLE 6.10: NET ADDITIONAL JOBS BY ROUTE SECTION ACCRUING TO UNEMPLOYED AND ECONOMICALLY INACTIVE RESIDENTS OF REGENERATION AREAS ATTRIBUTABLE TO CROSSRAIL – LOW CASE.

	Additional jobs due to improved access to jobs out side the area	Jobs attracted to the area	Number of those jobs taken up by local unemployed and economically active residents of regeneration areas	People attracted to area	Associated jobs related to larger population taken by local people	Total jobs	Loss of jobs due to improve d access to regener ation areas	Net increase in jobs
Western[18]	-200	2,100	800	2,400	0	600	600	100
Central[19]	6,600	34,700	6,500	4,800	100	13,200	13,600	-300
North East[20]	5,800	2,200	1,200	8,200	100	7,000	1,300	5,800
South East[21]	1,800	7,100	2,500	8,400	100	4,400	7,000	-2,600
Total	14,000	46,100	11,000	23,800	300	25,200	22,500	3,000

6.8.4 In the low case the net increase in jobs attributable to Crossrail is 3,000 as a high proportion of the additional jobs coming into regeneration areas are offset by increased competition from outsiders for existing employment in the area.

6.8.5 The upside is that 12,500 jobs are taken up by the unemployed and economically inactive due to the higher number of jobs attracted to regeneration areas as shown in *table 6.11*.

[18] Covers the area from Maidenhead to Acton
[19] From Paddington to Isle of Dogs and Stratford
[20] From Forest Gate to Shenfield
[21] Covers Royal Docks to Abbey Wood

TABLE 6.11: NET ADDITIONAL JOBS BY ROUTE SECTION ACCRUING TO UNEMPLOYED AND ECONOMICALLY INACTIVE RESIDENTS OF REGENERATION AREAS ATTRIBUTABLE TO CROSSRAIL – HIGH CASE.

	Additional jobs due to improved access to jobs out side the area	Jobs attracted to the area	Number of those jobs taken up by local unemployed and economically active residents of regeneration areas	People attracted to area	Associated jobs related to larger population taken by local people	Total jobs	Loss of jobs due to improved access to regeneration areas	Net increase in jobs
Western[22]	-200	7,000	1,800	6,400	100	1,700	600	1,100
Central[23]	6,600	86,900	11,600	13,000	200	18,500	13,600	4,900
North East[24]	5,800	4,300	2,100	16,500	200	8,000	1,300	6,700
South East[25]	1,800	21,900	4,700	23,000	300	6,800	7,000	-200
Total	14,000	120,100	20,200	58,900	800	35,000	22,500	12,500

6.9 Conclusion

6.9.1 Crossrail delivers radical improvements in accessibility across the route especially outside the central area. This improved accessibility benefits residents accessing a wide range of social services, retail, education and health facilities and employment.

6.9.2 Improved accessibility and enhancements of locations' image will lead to increased development along the Crossrail route. This will not be new development to London but a redistribution of existing forecasted growth of both jobs and people. The analysis shows that some additional 80,000 jobs and 40,000 people in excess of present forecasts will be attracted to locations served by Crossrail.

6.9.3 The improved accessibility from regeneration areas to employment opportunities in the central area and additional jobs attracted to Crossrail stations will bring benefits to regeneration areas along the line of route. Based on existing skill levels of the unemployed and economically inactive in regeneration areas served by Crossrail and the skill levels of the jobs attracted or accessible to them it is possible to estimate the take up of employment by this group. However, improved accessibility into

[22] Covers the area from Maidenhead to Acton
[23] From Paddington to Isle of Dogs and Stratford
[24] From Forest Gate to Shenfield
[25] Covers Royal Docks to Abbey Wood

regeneration areas will also increase competition from outsiders offsetting some of these benefits. After netting out this it is estimated that Crossrail will result in 9,000 unemployed and economically inactive residents of regeneration areas obtaining employment.

6.9.4 Finally it should be noted that the regeneration and the agglomeration job numbers for the Isle of Dogs are not comparable. The agglomeration forecasts prepared by Volterra assess "constrained" employment growth forecasts with and without Crossrail.

6.9.5 The employment impact arising from increases in development floorspace prepared by Drivers Jonas are based on an assessment of how the implementation of Crossrail will change developers' expectations and proposals, and what the impact of those changes (a function of both accessibility changes and developer confidence) will be on total employment within the Isle of Dogs.

6.9.6 Drivers Jonas' forecasts are not "constrained" in the same way as Volterra's, but they take account of how Crossrail will change development patterns, which is not part of the agglomeration analysis.

7. Route-wide impacts: Direct employment impacts

7.1 Introduction

7.1.1 This section examines the route wide impacts of Crossrail in terms of:

- construction employment;
- operational employment;
- jobs at risk due to land take; and
- multiplier impacts.

7.2 Construction employment

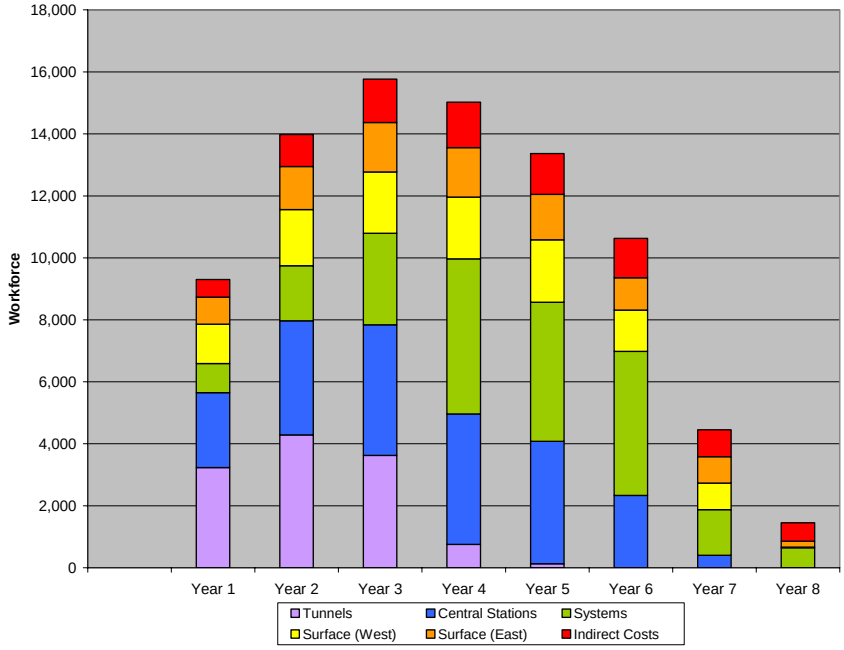
7.2.1 Crossrail is a massive construction project covering a seven year period. The exact cost and inputs will not be finalised until the scheme is tendered. The estimation of construction employment is, therefore, a top down approach based on best estimates of the cost of the project as estimated at the end of 2004.

7.2.2 The project costs for the scheme are split into eight broad categories: land and property, tunnels, route infrastructure, trackworks at surface, stations, railway systems, depots and stabling, project team. The cost of each of these elements has been estimated by Crossrail based on inputs from the relevant project engineers and advisers.

7.2.3 Based on previous similar projects labour costs account, on average, for around 41% of project costs. To turn labour costs into employment numbers, estimates need to be made of average employment costs. To do this, employment is split between four categories: office labour, site labour, project team and land and property. Each category has been allocated an average employment cost.

7.2.4 Crossrail assumptions for construction activity combined with assumed labour costs give an employment profile for the project as shown in *Figure 7.1*. This shows employment peaking at around 16,000 jobs during year 3 and being in excess of 10,000 for a five year period.

FIGURE 7.1: CONSTRUCTION EMPLOYMENT BY YEAR



7.2.5 Total direct labour requirements for the construction of Crossrail over the period are estimated at 87,000 employment years. Based on the convention that 10 employment years is the equivalent to one permanent job this means that the construction of Crossrail will generate the equivalent of 8,700 permanent full time jobs.

7.2.6 Given the nature of the project and the specialist labour required these jobs are likely to be filled from both the London and wider UK or even international labour market.

7.3 Operational employment

7.3.1 Once Crossrail is in operation it will employ a large number of staff to operate the service and to maintain the infrastructure and rolling stock. While Crossrail replaces some existing services it also provides a considerable volume of additional services. So while a proportion of these jobs will be filled by transfers from existing rail companies, especially on the suburban lines, a significant number will be new positions.

7.3.2 Based on the proposed service pattern the following estimates of operational employment have been reached:

- train drivers: 270 (150 of which will be new posts);
- on train revenue protection staff: 65 posts (all new);
- station staff: 175 new posts and 250 existing staff transferred at existing suburban stations on Shenfield, Dartford and Maidenhead lines;
- head office staff: 110 new posts (including route control staff);
- depot staff (maintenance and administrative workers): 375 new posts;
- infrastructure maintenance: 115 (all new).

7.3.3 This gives a net increase in employment of over 990 full time jobs.

7.3.4 Depot and route control staff are all expected to be located in Romford. The new positions for station staff would mainly be at new central stations from Paddington to Whitechapel, in an approximately even split between these sites, which leads to between 25-30 jobs per station.

7.4 Employment at risk through land take

7.4.1 The construction of Crossrail requires the acquisition of a number of properties and land along the line of route. The majority of these land and buildings are presently in commercial use and hence the acquisition will lead to the displacement of businesses and the possible loss of employment.

7.4.2 The initial task of identifying land and properties to be acquired was undertaken by Crossrail. Surveys were then undertaken to identify both owners and occupiers of these premises. This included visiting each of the properties concerned.

7.4.3 Having identified occupiers a questionnaire was sent to all businesses affected by land take. The purpose of the questionnaire was to identify the number of people employed at the site, the ease with which the business may relocate and the level of linkage with the local area in terms of customer and supplier base. That is, what proportions of both are local to the area or come from a wider geographic base.

7.4.4 To maximise responses follow up telephone calls were made to businesses that did not respond. A 20% response rate was

achieved which is in line with expectations for a postal survey, followed up by telephone calls. This data was supplemented by the standard process of using average jobs per given floorspace.

7.4.5 For each site affected by land take the footprint of the buildings concerned was calculated either from the Valuation Office's Rating List data or by using the Ordnance Survey's ProMap software. In the latter case a field survey was then undertaken to assess the number of floors in use. Multiplying the footprint area by the number of floors provided an estimate of the total floorspace in the building. Research by OffPAT (Office of Project Appraisal Training) on job density provides average figures of square metres per employee in office and retail work. Thereby, the floor space of the buildings demolished can be translated into an approximate number of jobs by using the following formula:

Total floorspace (sqm) / average sqm per employee = number of employees

7.4.6 These methods enable an estimate to be made of the total number of jobs that will be displaced by land take associated with the construction of Crossrail. The result is that an estimated 5,000-7,000 jobs will be displaced. It should be stressed these are not job losses but the number of jobs that may be displaced if all the buildings required by Crossrail are occupied at the time of acquisition. On the whole vacancy rates for office, retail, industrial and warehousing within the areas served by Crossrail can easily absorb this level of displacement. Where it is anticipated that specific occupiers would experience difficulty in relocating due to the nature of the business and/or size and space requirements, this is highlighted in the relevant route window text in chapters 8-12.

7.5 Mitigation

7.5.1 The Secretary of State will seek powers to compulsorily acquire the freehold interest of land required for the Crossrail works. These powers are contained in the Bill. Powers to acquire land for the relocation of businesses are generally not contained in the Bill. Instead, impacts will be mitigated through the payment of compensation for land compulsory acquired in accordance with the general statutory framework incorporated within the Bill, the Crossrail Land Acquisition Policy and the Crossrail Disposal Policy.

7.6 Indirect and induced employment: the multiplier effect

7.6.1 Besides the direct employment effects of the construction and operation of Crossrail, there are secondary impacts. These are termed indirect and induced employment.

7.6.2 Indirect employment results from expenditure on supplies and services necessary for the construction of Crossrail. For example, the purchase of rolling stock is a capital item for Crossrail but it results in the employment of workers to produce that rolling stock.

7.6.3 Induced employment results from the spending of incomes earned by those directly employed on the construction of Crossrail and by workers employed by suppliers to Crossrail.

7.6.4 In the case of business closures resulting from land take, there will also be secondary impacts which will be negative: fewer employees mean lower spending in the local economy which in turn can put other jobs at risk. This is referred to as a “reverse multiplier”. This will be offset by any additional jobs housed by the over station developments and their multiplier effect.

7.6.5 However, any indirect loss of jobs due to a reduction in spending associated with the temporary displacement of businesses and jobs has not been assessed. This is due to the nature of London’s economy with considerable potential for businesses to relocate within the area and/or for local competitors to take up demand.

7.6.6 Multipliers are a standard concept to quantify the indirect and induced effects resulting from a specific investment project e.g. a multiplier of 1.2 means that for every 1 construction jobs directly generated by the project 0.2 indirect or induced jobs will also materialise. Differentiating indirect and induced impacts is a complex and uncertain process which would not add value to this project.

7.6.7 Depending on the spatial scope of the impact study, various levels of multipliers can be used: local, regional or national. The more localised the multiplier, the smaller it will be (because a larger share of income will be spent outside of the area under analysis). As far as this study is concerned, only a national multiplier is considered. Therefore, there is no need (in this particular case) to consider leakages from the local or regional economy into other regions (i.e. whether supplies / services are purchased locally or not is irrelevant). However, the purchase of material or equipment from suppliers abroad is a leakage that will need to be taken into account.

7.6.8 Thameslink 2000 and Channel Tunnel Rail Link are two other large scale projects that can be used as benchmarks for

Crossrail. The multipliers for these projects are listed in *Table 7.1* below (these are regional multipliers).

TABLE 7.1: MULTIPLIERS USED IN OTHER MAJOR RAIL SCHEMES

	Multiplier	Reverse multiplier
Thameslink 2000	1.5	1.1
Channel Tunnel Rail Link	1.4	n/a

7.6.9 Another quantitative source of information on employment multipliers is a table created by the Scottish Executive in 1996. It is one of the few attempts at quantifying multipliers by sectors. *Table 7.2* lists multipliers for a variety of industries relevant to Crossrail:

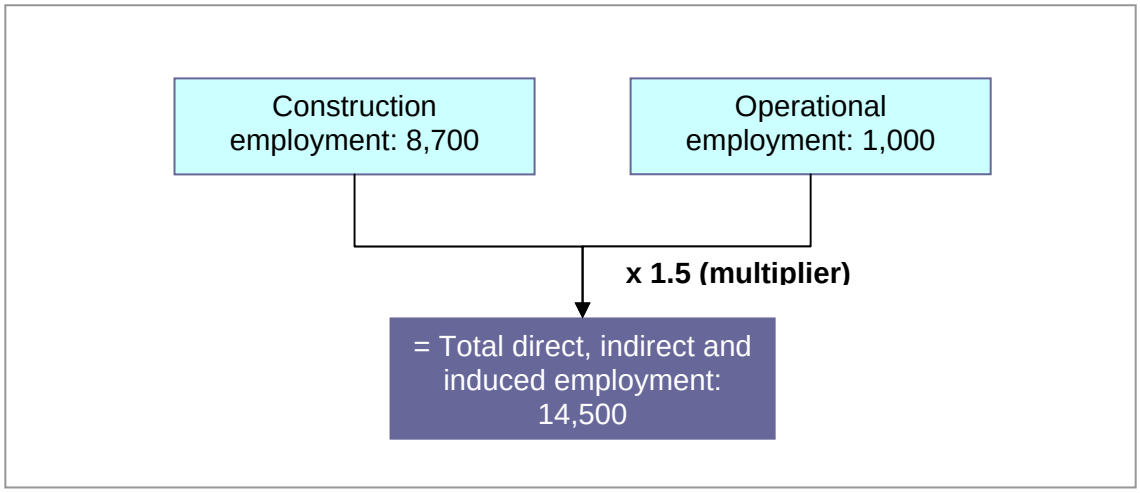
TABLE 7.2: MULTIPLIERS FOR CONSTRUCTION PROJECTS

Sector	Multiplier
Manufacture of structural metal products	1.52
Manufacture of other general purpose machinery	1.51
Manufacture of special purpose machinery	1.63
Manufacture of other transport equipment	1.33
Construction	1.86

7.6.10 Based on these benchmarks, an employment multiplier of 1.5 is suggested for Crossrail. As a national multiplier it might be expected to be higher than the regional multipliers mentioned previously, however, Crossrail is likely to source a significant proportion of equipment and materials abroad, somewhat limiting its impact on the employment market. Altogether, this possibly conservative estimate is deemed safer.

7.7 Results

7.7.1 Bearing these limitations in mind, the figures reached through the method highlighted earlier are as follows:



7.7.2 Crossrail is, therefore, expected to create around 14,500 jobs, during its construction and operation, in the UK, although as mentioned earlier these will not all be brand new jobs; there will be a degree of redistribution and displacement.

8. Environmental baseline and assessment of impacts: Western section

8.1 Introduction

8.1.1 This chapter describes the western route section of Crossrail from Maidenhead station to Portobello Junction (Westbourne Park), the baseline situation and the significant temporary and permanent socio-economic impacts that will arise from its construction and operation.

8.1.2 The basic socio-economic and demographic characteristics of the areas in this section served by Crossrail are set out in *Table 8.1*

TABLE 8.1: SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE WESTERN SECTION

Age structure	<16	16-25	26-35	36-45	46-55	56-65	>65
	19%	15%	21%	15%	11%	8%	11%
Ethnic groups	White	Mixed	Asian	Black	Chinese		
	65%	3%	23%	7%	3%		
Qualifications	No qualifications	Level 1	Level 2	Level 3	Level 4/5	Other	
	22%	13%	17%	10%	33%	5%	
Econ activity / unemployment	Economic Activity Rate	Unemployment Rate					
	71%	5%					
Number of jobs	Jobs						
	102,000						
Social grade	AB Higher and intermediate managerial/administrative/professional	C1 Supervisory; clerical; junior managerial/administrative/professional	C2 Skilled manual workers	D Semi-skilled and unskilled manual workers	E On state benefit; unemployed; lowest grade workers		
	27%	32%	12%	16%	13%		

8.2 Overview of Crossrail works in western route section

8.2.1 The Crossrail service will use only the existing Great Western relief lines (in normal operations). Additional new track will however, be provided at some locations. For example, a new line will be constructed over about 1 km between Langley and West Drayton, which will link existing (but upgraded) freight lines to its east and west so providing increased track capacity.

8.2.2 Crossrail's major new structures or facilities include a new diveunder (rail underpass) at Acton (W4), a new flyover at

Stockley in Hillingdon (W11) and new or remodelled sidings at Maidenhead (W25), West Drayton (W13) and Old Oak Common depot (W3). Crossrail will require at several places, changes to the permanent way, such as new track or track realignment. It will also require new or extended station platforms to accommodate Crossrail's 200 m long trains. At nine stations, improved facilities, including new or modified ticket halls, will be provided to accommodate the increased number of passengers from Crossrail.

8.2.3 Much of the Great Western Main Line is not electrified: only the section between Paddington and the Stockley Road bridge in Hillingdon is electrified at present. The remainder of the route west of Stockley Road bridge will require the provision of new 25kV AC overhead line equipment (OHLE), generally in the form of 6 m high gantries from which catenary wires and contact wires will be suspended. This in turn will require that some of the bridges on the route be raised or the track lowered beneath them. In some cases, bridges will be reconstructed completely. In other cases, bridge works will be more limited; for example, raising of parapets (side walls) for public safety reasons.

8.3 Construction

8.3.1 Construction methods for each of the works are described in their route window; for example with respect to construction of bridges, station buildings, stabling facilities and grade separated crossings. The construction works, where they take place on or near to the railway, may need to be undertaken during 'possessions', when the railway is closed to normal passenger and freight services. These possessions generally take place at night, at weekends or over bank holidays. Where time periods for the works are given in this chapter, they may be subject to alteration to accommodate possession planning requirements (i.e. times to be negotiated with the train companies and Network Rail, when the works can be undertaken during temporary closure of the railway) and final commissioning, which may need to be completed for the corridor as a whole.

8.3.2 Methods for constructing OHLE and platform extensions are much the same wherever they are undertaken and so, for brevity, are described once here.

8.3.3 Construction of OHLE will require that ground bearing or piled foundations be installed using rail-mounted machinery or by hand. Masts (which will have a bolted base) and electrical equipment will be installed generally from the rail. Materials will be delivered by rail or road as appropriate.

8.3.4 Plant and equipment required for construction of OHLE will include a mini digger, piling rigs, concreting plant, diesel

locomotives and wagons, a vibrating poker, generators and road/rail cranes and hand held plant.

8.3.5 Platform extensions, which will be undertaken at 13 stations, will involve:

- break out and removal of existing surfaces and ramps;
- excavation and construction of foundations using piling where appropriate;
- construction of platforms using crosswalls and pre-cast concrete planks;
- fitting of reinforced concrete screed, copings and paving, fitting of tactile strips and levelling of the surface;
- installation of lighting and drainage; and
- adjustment of track alignments, if required.

8.3.6 Proprietary platform extension systems may be used which may vary with the construction activities.

8.3.7 Subject to possession planning requirements and excluding final commissioning, platform extensions will generally take between one and three months to complete.

8.4 The Route Windows

8.4.1 The scale of the works along the route varies, with relatively minor works taking place in some route windows and more substantial works in others. *Table 8.2* summarises the main works (excluding enabling works) that will take place in the Western Section. Those route windows containing the more substantial works are highlighted with shading.

8.4.2 The level of detail that is reported in subsequent sections for route windows W25 to W1 is commensurate with the extent of works that is proposed in each of these route windows.

TABLE 8.2 MAIN ELEMENTS OF THE SCHEME WITHIN THE WESTERN ROUTE SECTION (ROUTE WINDOWS WITH MAJOR WORKS ARE HIGHLIGHTED)

Route Window	Main project works	Local authority
W25: Maidenhead station Welbeck Road to York Stream	Stabling and turnback facility Replacement of one ticket hall and provision of new ticket office New bay platform and platform extensions Extension to existing subway Overhead line equipment	Royal Borough of Windsor and Maidenhead
W24: Maidenhead railway bridge York Stream to Jubilee River Bridge	Overhead line equipment	Royal Borough of Windsor and Maidenhead and District of South Bucks
W23: Taplow station Jubilee River Bridge to Hitcham Road	Platform extensions Overhead line equipment Footbridge works	District of South Bucks
W22: Lent Rise Hitcham Road to Clare Road	Overhead line equipment	District of South Bucks and Borough of Slough
W21: Burnham station Clare Road to Henley Road	Platform extensions Overhead line equipment	Borough of Slough
W20: Dover Road and Leigh Road bridges Henley Road to Yarmouth Road	Overhead line equipment Works to Dover Road bridge Replacement of Leigh Road bridge	Borough of Slough
W19: Stoke Poges Lane bridge Yarmouth Road to Grays Road	Overhead line equipment Works to Stoke Poges Lane road bridge and footbridge Works to Farnham Road bridge including track lowering	Borough of Slough
W18: Slough station Grays Road to Eastbridge	Changes to the ticket hall, a new footbridge and provision of lift access Platform extensions and a new bay platform Overhead line equipment Works to three road bridges Construction of a new goods loop	Borough of Slough
W17: Middlegreen Road, St. Mary's Road and Trenches bridges Eastbridge to Darwin Road	Overhead line equipment Replacement of Middlegreen Road bridge, St. Mary's Road (Church Lane) bridge, and Trenches footbridge	Borough of Slough
W16: Langley station Darwin Road to Southwold Spur	Overhead line equipment Platform extension Reinstatement and extension of track at Langley East Junction	Borough of Slough

Route Window	Main project works	Local authority
W15: Dog Kennel bridge Southwold Spur to Bathurst Walk	Overhead line equipment 1.2 km of new track on the north side of the line with associated embankment widening Demolition of Dog Kennel bridge Construction of new bridge span over road adjacent to existing Chequers bridge	District of South Bucks and Borough of Slough
W14: Iver Station Bathurst Walk to River Colne	Overhead line equipment Replacement of ticket office Platform extension and provision of new platform face Track realignment Demolition and replacement of Thorney Lane bridge including road realignment	District of South Bucks
W13: West Drayton station and stabling River Colne to Roberts Close	New stabling facility on the site of former West Drayton coal depot Replacement of the ticket hall, and new overbridge and lifts Platform extensions and track realignment Overhead line equipment	District of South Bucks and LB Hillingdon
W12: Kingston lane Bridge and Old Stockley Road bridge Roberts Close to Stockley Road Bridge	Overhead line equipment Replacement of existing Kingston lane Bridge and Old Stockley Road bridge with new footbridges and cycleways	LB Hillingdon
W11: Stockley flyover Stockley Road Bridge to Alpha Estate	New viaduct along the north side of the railway and new transfer structures at either end, with associated trackworks Overhead line equipment to the west	LB Hillingdon
W10: Hayes and Harlington station Alpha Estate to Brent Road	New track on north side of rail corridor and extension of Station Road bridge New ticket hall, footbridge and lifts New platform and platform extensions	LB Hillingdon
W9: Southall West sidings Brent Road to Randolph Road	None	LB Hillingdon and LB Ealing
W8: Southall station Randolph Road to Lyndhurst Avenue	New ticket hall, new overbridge and lifts Extended platforms Track works including new track	LB Ealing
W7: Hanwell station Lyndhurst Avenue to Church Road	Platform extensions	LB Ealing
W6: West Ealing station Church Road to St Leonards Road	Replacement of the ticket hall; new overbridge and lifts New bay platform Platform extensions	LB Ealing

Route Window	Main project works	Local authority
W5: Ealing Broadway station St Leonards Road to District and Piccadilly Line Bridge	Replacement of the ticket hall Platform extensions	LB Ealing
W4: Acton Main Line station and yard District and Piccadilly Line Bridge to Western Avenue	New rail underpass west of Acton Yard and remodelling of Acton Yard New ticket hall New footbridge Platform extensions and new lifts	LB Ealing
W3: Old Oak Common depot Western Avenue to Hythe Road	Fifteen new stabling sidings Carriage washing facility and crew accommodation	LB Ealing and LB Hammersmith & Fulham
W2: Canal Way Hythe Road to Admiral Mews	Changes to the track layout	LB Hammersmith and Fulham and Royal Borough of Kensington and Chelsea
W1: Portobello Junction Admiral Mews to Edenham Way	Remodelling of Paddington approaches trackwork	Royal Borough of Kensington and Chelsea

8.5 Route window W25: Maidenhead Station

Baseline

8.5.1 This route window features Maidenhead Station and stabling sidings. Maidenhead station lies on the southeast edge of the town centre, within a wholly urban setting. Retail and office uses predominate in the town centre, which is adjoined by the residential area of Grenfell Park. To the south lies the mixed-use area of South Maidenhead, comprising housing, open space (Desborough Park and the Desborough school playing fields) and community facilities.

8.5.2 The proposed stabling site is located on an enlarged embankment that is adjoined to the north by the Boyn Valley Industrial Estate, beyond which lies the residential area of Boyn Hill. To the south lie the woodland belt of The Gullet and the residential area of Desborough.

8.5.3 Within one kilometre of the station there are approximately 10,000 jobs and around 390,000m² of commercial floor space of which almost half is dedicated to offices.

Main works

8.5.4 Within this route window the main Crossrail works will involve:

- construction of stabling and turnback facilities west of Maidenhead station;
- upgrading of Maidenhead station including a new ticket hall, lifts, a new platform for Marlow branch services and platform extensions, an extension to the existing subway; and
- introduction of overhead line equipment.

Temporary impacts and mitigation

8.5.5 Utility works require the use of some land within Maidenhead Business Park used for storage or car parking south of Boyn Road. However, this will have no material impact on employment. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.5.6 Retail and commercial units will be displaced from the station building and in the former railway yard (affecting Cullen Burns Associates Ltd, Body Image, Café Tee and station kiosks). The displacement of jobs (around 30) in relation to total employment in this area is not significant.

8.5.7 Some 30-40 new jobs will be created for train crew and servicing staff to enable trains to operate from the stabling sidings. However, this is not a significant socio-economic impact.

8.6 Route window W24: Maidenhead Railway Bridge

Baseline

8.6.1 The route runs across the Thames floodplain on an embankment, with a bridge carrying the line across the river itself. To the west of the river, the area is mainly built-up, comprising a mix of residential and business areas. To the east of the river, the area between the railway and Bath Road is built-up, mainly with housing. The areas to the north of Bath Road and to the south of the railway are predominantly open and rural, although housing extends along River Road. There is no station in this route window.

Main works

8.6.2 The permanent works will comprise the introduction of overhead line equipment.

Temporary impacts and mitigation

8.6.3 There is no land take or demolition of buildings that will have a material impact on businesses or employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.6.4 There are no significant impacts.

8.7 Route window W23: Taplow Station

Baseline

8.7.1 This route window comprises countryside and urban fringe uses. Taplow station lies on the western edge of the built-up area of Burnham. Commercial and light industrial premises lie immediately to its east. Beyond Approach Road and Institute Road to the north, is located recreational space, a few residential properties and countryside. The area to the south, beyond Bath Road, is also mainly rural, but includes some residential properties. Within one kilometre of the station there are around 700 jobs and 30,000m² of commercial floor space.

Main works

8.7.2 Crossrail will entail the introduction of overhead line equipment throughout the alignment in this route window. At Taplow station, the safety implications of this electrification will require that the parapets of the station footbridge be modified. Platforms at Taplow station will be extended to accommodate Crossrail trains.

Temporary impacts and mitigation

8.7.3 There is no land take or demolition of buildings that will have a material impact on business or employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.7.4 There are no significant impacts.

8.8 Route window W22: Lent Rise

Baseline

8.8.1 This route window includes the western part of Slough, which comprises mostly residential land uses alongside the railway. Residential uses lie to the north with Marsh Gate trading estate lying to the west. To the south, residential uses back onto the rail corridor. There is no station in this route window.

Main works

8.8.2 Crossrail will entail the introduction of overhead line equipment throughout the alignment in this route window.

Temporary impacts and mitigation

8.8.3 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.8.4 There are no significant impacts.

8.9 Route window W21: Burnham Station

Baseline

8.9.1 This route window covers Burnham station, which lies in a mainly built-up area. Residential uses predominate to the north of the railway. To the south and east, residential uses are intermixed with commercial and light industrial sites, of which Slough Trading Estate is the most prominent. Within one kilometre of the station there are approximately 7,000 jobs and 230,000m² of commercial floor space of which more than two-thirds are factories and warehouses.

Main works

8.9.2 Crossrail will entail the introduction of overhead line equipment throughout the alignment in this route window. The island platform at Burnham station will be extended to accommodate Crossrail trains.

Temporary impacts and mitigation

8.9.3 There is no land take or demolition of buildings that will have a material impact on businesses or employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.9.4 There are no significant impacts.

8.10 Route window W20: Dover Road & Leigh Road Bridges

Baseline

8.10.1 Business and commercial development is located on either side of the rail corridor, including retail warehousing and offices. There is no station in this route window.

Main works

8.10.2 Overhead line equipment will be introduced throughout the alignment in this route window. In order to accommodate this, Leigh Road bridge will be replaced and the parapets of Dover Road bridge will be raised.

Temporary impacts and mitigation

8.10.3 Construction work on the road bridges across the railway line requires the use of car parks as work sites. At Dover Road worksites will utilise car parks of 748-749 Deal Avenue on Slough Trading Estate and at 514-515 Ipswich Road (Protyre Tyre Fit Ltd and Scarlet Couriers (Slough) Ltd). The works will take a little over two months to complete.

8.10.4 Worksites at Leigh Road bridge will utilise the car parks of Ragus Sugars (190-1 Bedford Avenue) and Icore International Ltd at 812-5 Ajax Avenue and at 225 Ipswich Road. The main works will be completed in about six months.

8.10.5 This disruption to business and the actual bridge closures are not anticipated to have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.10.6 There are no significant impacts.

8.11 Route window W19: Stoke Poges Lane Bridge

Baseline

8.11.1 The majority of the area through which the route passes is residential housing, which backs onto the rail corridor. Industrial areas are located north of the railway at the western and eastern ends of the route window. There is no station in this section.

Main works

8.11.2 New overhead line equipment will be introduced throughout the alignment in this route window. In order to accommodate this, modifications will be required to Stokes Poges Lane and Farnham Road bridges. At Stoke Poges Lane, the road bridge will be raised to provide sufficient clearance for OHLE. At Farnham Road bridge, the parapets will be raised and the track will be lowered slightly beneath the bridge.

Temporary impacts and mitigation

8.11.3 At Farnham Road bridge worksites will be based in two car parks used by Network Q (Malton Avenue) and Satchwell Control Systems (Farnham Road). Works are anticipated to take two months. For Stoke Poges Lane Bridge the works will last eight months and will utilise land used by Rhocoloma Ltd and Tyre Services (Slough) Ltd off Stoke Gardens. This disruption to business and the actual bridge closures are not anticipated to

have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.11.4 There are no significant impacts

8.12 Route window W18: Slough Station

Baseline

8.12.1 This route window is centred on Slough Station and neighbouring bridges. Slough station is located on the northern edge of the town centre. Town centre uses predominate to the south of the railway, mainly comprising offices and retailing, with residential areas to the west (beyond the branch railway) and to the east (beyond the supermarket). Business uses (offices, light industry and distribution) predominate to the area to the north of the railway, with residential areas beyond Stoke Gardens and Petersfield Road. Approximately 8,000 jobs and 750,000 m² of commercial floorspace are situated within one kilometre of the station.

Main works

8.12.2 Within this route window the main Crossrail works will involve:

- upgrading of Slough station including a new bay platform, platform extensions and modifications to the ticket halls;
- a new footbridge at the western end of the station with lift access to all platforms;
- provision of a Slough goods loop; and
- introduction of overhead line equipment throughout, and changes to three road bridges to accommodate this.

8.12.3 Works will be undertaken at the following bridges.

- William Street bridge: alterations will be made to the parapets of this bridge, located at the west end of Slough station.
- Wexham Road bridge: its brick arch span over the main lines will be removed and reconstructed to provide sufficient clearance for OHLE, and alterations will be made to the parapets.
- Uxbridge Road bridge: the parapets of this bridge will be replaced.

Temporary impacts and mitigation

8.12.4 The construction work will lead to the displacement of a taxi office and café at Slough station. However, the extended ticket hall will provide for additional retail facilities.

8.12.5 One of the worksites at Wexham Road bridge utilises 40% of the car park of Wexham House, which is occupied by ICI. The works will take approximately 10 months to complete. This disruption to business and the actual bridge closures are not anticipated to have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.12.6 There are no significant impacts.

8.13 Route window W17: Middlegreen Road, St. Mary's Road and Trenches Bridges

Baseline

8.13.1 The area south of the railway is wholly urban. It comprises mainly residential streets, with some community uses such as schools. To the north, between the railway and the Grand Union Canal, a playing field lies to the west of Middlegreen Road. The Middlegreen Trading Estate lies to the east of the road. The area north of the canal comprises countryside, which has been altered by urban fringe features such as power lines, nurseries and residential properties, especially around Middle Green. There is no station in this route window.

Main works

8.13.2 New overhead line equipment will be provided along the Crossrail route. In order to accommodate this, bridge modifications will be required. The brick arches of both Middlegreen Road (Langley Down) bridge and St. Mary's Road (Church Lane) bridge will be demolished and replaced with new bridge decks. Trenches footbridge will be partially demolished and a new superstructure erected.

Temporary impacts and mitigation

8.13.3 Adjacent to each bridge is a worksite none of which should directly impact on any business. Although a number of car parks related to local businesses are within the limits of deviation any potential disruption to business and the actual bridge closures are not anticipated to have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.13.4 There are no significant impacts.

8.14 Route window W16: Langley Station

Baseline

8.14.1 This route window covers Langley Station and Slough electrification feeder station. Langley station lies within the built-up area of Langley and is adjoined on both sides by industrial or business premises. Residential areas abut the southern side of the railway corridor further to the west and east. To the east, open land creates a wedge of rural land separating Langley from Richings Park. Approximately 4,000 jobs are based within one kilometre of the station.

Main works

8.14.2 New overhead line equipment will be provided along the Crossrail route. Platforms at Langley Station will be extended to accommodate Crossrail trains. In addition, some track works will also be required to the east of Langley station, with the provision of a new junction for the Langley-West Drayton loop scheme.

8.14.3 A new feeder station (Slough feeder station) will be required to supply the main power to the railway. This will be located at a strategic location adjacent to high voltage power supplies, on the north side of the railway north of Darwin Road.

Temporary impacts and mitigation

8.14.4 There will be no material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.14.5 There are no significant impacts.

8.15 Route window W15: Dog Kennel Bridge

Baseline

8.15.1 There are no stations in this section, which consists mainly of residential and open land. To the north lies a large open arable field, the Bison Works including warehousing, outdoor storage areas and cranes, and the Mansion Caravan and Mobile Home Site adjacent to the Grand Union Canal (Slough Arm). To the

south of the line, the land comprises a number of large open arable fields extending southwards to North Park Road and Richings Park Golf Course. To the west side of this route window is the built up edge of Slough and housing fronting Market Lane.

Main works

8.15.2 New overhead line equipment will be provided along the Crossrail route. A new single track relief line will be constructed on the northern side of the alignment over about 1.2 km between Chequer bridge (in Route Window W16) and Dog Kennel bridge. This will link the existing freight lines that exist to the west and east, so creating a continuous loop between Langley and West Drayton stations and providing additional capacity both for freight and passenger trains by increasing the route from four tracks to five along this section.

8.15.3 At Chequer bridge, a new single track railway bridge will be built to the north of the existing structure to carry the new track over Hollow Hill Lane/Market Lane east of Langley. The works at Chequer bridge will need to be preceded by the diversion of two gas mains and an oil pipeline, which are currently located in the vicinity of the most easterly bridge support.

8.15.4 Dog Kennel bridge will be demolished and not replaced.

Temporary impacts and mitigation

8.15.5 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.15.6 There are no significant impacts.

8.16 Route window W14: Iver Station

Baseline

8.16.1 North of Iver station lies an area of open land comprising rough grassland and scrub. This is bounded to the west by a concrete works, to the east by Thorney Lane and to the north by a branch of the Grand Union Canal. To the south of the station, the built-up area of Richings Park adjoins the railway. This is a mainly residential area, with a range of local shops and services on Bathurst Walk.

Main works

8.16.2 The permanent works will comprise the provision of overhead line equipment along the Crossrail route. At Iver station, a new ticket office will be provided on the site of the existing facility. Platforms will be extended to accommodate Crossrail trains. In order to accommodate the OHLE, Thorney Lane road bridge will be replaced with a new structure immediately to its east. Thorney Lane South and associated roads will be realigned and modified as necessary.

8.16.3 In order to provide sufficient electromagnetic clearances between the OHLE and the existing high voltage (HV) 132kv cables above the railway, two 20 m high lattice masts will be installed to raise the HV cables. A new feeder station (Iver feeder station) will be required to supply the main power to the railway.

Temporary impacts and mitigation

8.16.4 There is no land take or demolition of buildings that will have a material impact on businesses or employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.16.5 The existing junction of the Bison Concrete Works access road and Thorney Lane South will be relocated north and improved. This will enable lorries from the concrete works to turn more easily into and out of the access road. While an improvement this impact is not significant.

8.17 Route window W13: West Drayton Station

Baseline

8.17.1 West Drayton station and stabling sidings are featured in this route window. West Drayton station lies within an entirely urban setting, between the built-up areas of Yiewsley to the north and West Drayton to the south. These areas form a wedge of development that extends southwards to the M4 and is bounded to the west by the Colne valley and to the east by open land along the A408 corridor. To the east of the station, the Grand Union Canal runs parallel with the railway, before turning northwards along the Colne Valley. The station adjoins the town centre of West Drayton/Yiewsley, which comprises a range of typical retail and service activities extending southwards along Station Road and northwards along High Street.

8.17.2 West Drayton stabling sidings is currently occupied by an aggregates distribution centre and other open storage use. It is

bounded to the south by the Great Western Main Line and to the north by the Colnbrook branch line.

8.17.3 Approximately 9,000 jobs are based within one kilometre of the station. There are around 220,000m² of commercial floor space in the area of which more than two-thirds are dedicated to warehouses and factories.

Main works

8.17.4 Within this route window the main Crossrail works will involve:

- construction of a new stabling facility on the site of the former West Drayton coal concentration depot;
- redevelopment of West Drayton station; and
- introduction of overhead line equipment throughout.

Temporary impacts and mitigation

8.17.5 There are no temporary impacts.

Permanent impacts and mitigation

8.17.6 The existing ticket hall will be converted to retail and commercial units. A new one will be built east of the existing hall. There will be a loss of four retail units during the construction (two of which are presently empty).

8.17.7 There are a number of businesses situated in the sidings area that will be displaced. Given present warehouse/industrial vacancy rates of 6% in West London and the number of jobs affected, approximately 20-40, in relation to total local employment this is not regarded as a significant impact.

8.17.8 Occupiers displaced by the works include Eurostorage, Dodds, Star Parking, Parksafe, William Boyer Ltd, Construction Plant Services, Sound & Vision, Cox Hire Centre and the Tuck Box.

8.17.9 Approximately 75 jobs will be created for train crew and servicing staff to enable trains to operate from the stabling sidings in this location, but this is not significant impact.

8.18 Route window W12: Horton Road & Old Stockley Road Bridges

Baseline

8.18.1 This route window covers a mix of residential developments, industrial and commercial premises as well as office developments. There is no station in this section. Horton Bridge lies within the built-up area of West Drayton adjoining the residential areas to the west and south. The Grand Union Canal and Horton Road Industrial Estate lie to the north. The land to the southwest immediately adjoining the bridge comprises a vacant clear site under development.

8.18.2 The Old Stockley Road bridge also lies within the built-up area of West Drayton. To the north lies the Grand Union Canal beyond which is Stockley Business Park. Hanson Aggregates Dispatching Depot lies to the northeast beyond the A408 bridge. To the southwest is a residential development.

Main works

8.18.3 New overhead line equipment will be provided along the Crossrail route. Stockley Road bridge marks the eastern extremity of new OHLE, it already being in place along the remainder of the alignment into London.

8.18.4 In order to accommodate the OHLE, bridge modifications will be required. Horton footbridge will be replaced by a new footbridge immediately to its west.

8.18.5 At Old Stockley Road bridge, foundations for a new bridge will be installed adjacent to the existing bridge. On completion of the new bridge, the existing bridge structure will then be demolished.

8.18.6 Some minor parapet works will be required at the adjacent Stockley Road (A408) bridge.

Temporary impacts and mitigation

8.18.7 There is no land take or demolition of buildings that will have a material impact on employment in the area. This includes the replacement or alteration to bridges required to allow the installation of OHLE. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.18.8 There are no significant impacts.

8.19 Route window W11: Stockley Flyover

Baseline

8.19.1 This route window covers Stockley Flyover and the existing Heathrow Tunnel Portal. These are located in an area of mainly urban land uses: industrial estates are prominent to the north of the railway; to the south, the residential estate of Bourne Farm and the Hayes Repository are the main land uses, together with the Stockley Close industrial estate to the west of the Heathrow line. There is no station in this route window. There are some 17,000 jobs located within the two local authority wards covering the work sites.

Main works

8.19.2 Within this route window the main Crossrail works will involve provision of a new flyover to accommodate the eastbound Crossrail/Heathrow Express line, together with the track realignments associated with this. The construction of the flyover will take approximately 3 years and nine months.

Temporary impacts and mitigation

8.19.3 Temporary land take will be required during the construction period. This will lead to the displacement of a number of firms and industrial units and between 250-400 jobs. Occupiers affected include Dagenham Motors, Allpoint Packaging, Leemark Engineering, Heathrow Motors, KGM Transport and HG Timber.

8.19.4 The industrial estate is protected employment land in the Hillingdon UDP and is identified in the London Plan as a preferred industrial location (in the Hayes industrial area). This, coupled with the potential temporary loss of jobs in relation to the number of jobs in the local area, will result in a significant socio-economic impact.

Permanent impacts and mitigation

8.19.5 Once work is completed worksites will become available for possible redevelopment mitigating the possible loss of jobs outlined above.

8.19.6 It is anticipated there will be no significant permanent impact.

8.20 Route window W10: Hayes and Harlington station

Baseline

8.20.1 Hayes and Harlington station lies between the urban areas of Hayes (to the north) and Harlington (to the south). Business and industrial uses predominate alongside the railway corridor: the Thorn EMI plant, Silverdale Road industrial area and Tarmac plant are prominent to the north; the Nestle factory, Westlands Industrial Park, BA Engineering centre and International Trading Estate are most notable to the south. Some residential areas are also present. Around 6,000 people work in a one kilometre radius and the commercial property stock provides 920,000m^2 of floorspace with a distribution reflecting the manufacturing activity of this area.

Main works

8.20.2 Within this route window the main Crossrail works will involve:

- extension of the existing freight line and creation of a new northern span for Station Road bridge to accommodate this;
- provision of a new ticket hall at Hayes and Harlington station to replace the existing, and of a new passenger overbridge with stairs and lift access to all platforms; and
- track and platform modifications at the station.

Temporary impacts and mitigation

8.20.3 The yard and parking area of Damont Audio at 20-30 Blyth Road are proposed to be used for access during the construction period. It is not envisaged that this will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.20.4 Retail and office accommodation at 107-131 Station Road will be permanently acquired to facilitate the construction of the new station. This will result in the displacement of some 20-30 jobs. Occupiers affected have been identified as Bains Beauty Childrens Wear, Bestmart Convenience, Dental Surgery, Elite Management Ltd, Giggles, Hayes One Ltd, Rhone Dentures, SW Frankson and Tachocard Computer Services Ltd.

8.20.5 Given the number of jobs in the area and availability of alternative premises this is not regarded as significant.

8.21 Route window W9: Southall West Sidings

Baseline

8.21.1 The area to the north is characterised by open land and a gasworks with dense residential developments to the south. There is no station in this route window.

Main works

8.21.2 No Crossrail works will take place in this route window, other than some minor re-signalling.

Temporary impacts and mitigation

8.21.3 There are no temporary significant impacts.

Permanent impacts and mitigation

8.21.4 There is no significant impact.

8.22 Route window W8: Southall Station

Baseline

8.22.1 The area north of Southall station is mainly residential with some retail outlets. South of the station, residential areas are mixed with commercial activities located in the Middlesex Business Centre and a number of industrial estates. A Sikh temple and a plant hire yard border the station. Further north, the area between Park Avenue and the railway is occupied mainly by a mix of vacant land and commercial/business uses. The area north of Park Avenue is mainly residential. Residential uses extend eastwards, occupying the triangle of land between the railway and Uxbridge Road. To the south, business/industrial uses border the railway throughout most of the route window, except for a small pocket of housing south of Merrick Road. Around 6,000 people work in the vicinity of the station and there are 490,000m^2 of commercial floorspace, which is dominated by industrial use.

Main works

8.22.2 Within this route window the main Crossrail works will involve:

- reconstruction of Southall station, including provision of a new ticket hall and footbridge;
- minor realignment of the westbound relief line track;
- platform extensions ; and
- track modifications to the east.

Temporary impacts and mitigation

8.22.3 Construction work will utilise part of a site formerly used as a depot. The land is allocated for employment and safeguarded transport uses in the adopted Ealing UDP. Once work is completed it is anticipated that land would become available for redevelopment.

Permanent impacts and mitigation

8.22.4 There are no significant impacts.

8.23 Route window W7: Hanwell Station

Baseline

8.23.1 Hanwell station lies within a residential neighbourhood. The dense development of Southall lies further west beyond this. Established residential neighbourhoods are located to the north, south and east, including Hanwell Green to the north and Hanwell to the south. Retail units are located along Church Road. Around 4,700 people and 130,000m^2 of commercial floor space can be found within one kilometre of the station.

Main works

8.23.2 Both platforms at Hanwell station will be extended to accommodate Crossrail trains. In the west of the route window, various minor track modifications will be undertaken.

Temporary impacts and mitigation

8.23.3 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.23.4 There are no significant impacts.

8.24 Route window W6: West Ealing Station

Baseline

8.24.1 West Ealing station is located in a mainly residential area. South of the station are the West Ealing Business Centre, a supermarket and a shopping area on Uxbridge Road. The station is separated from Manor Road to the north by a derelict former siding and small workshops. Manor Road is mainly residential. At the western end of the route window an industrial estate lies adjacent to the rail corridor. To the south, a supermarket and car park separate the rail corridor from a residential area. The railway overbridge contains a number of single storey retail units. In a one kilometre radius around the station, there are around 8,900 jobs and 210,000m^2 of commercial floorspace.

Main works

8.24.2 Within this route window the main Crossrail works will involve:

- provision of new track and bay platform for the Greenford branch;
- platform extensions; and
- construction of a new ticket hall and new footbridge with lifts.

Temporary impacts and mitigation

8.24.3 There are no significant impacts.

Permanent impacts and mitigation

8.24.4 The mechanic's garage and adjoining yard at 55-57 Manor Road will need to be permanently acquired to allow the construction of the new station. The existing ticket hall will be converted to commercial use offsetting the employments impact of the above. There are, therefore, no significant impacts.

8.25 Route window W5: Ealing Broadway Station

Baseline

8.25.1 Ealing Broadway station is a major transport hub for West London and serves a busy town centre with shopping centres and leisure and cultural services. Ealing is densely built up with the main shopping areas located to the south of the station. Residential areas predominate north and south of the railway

throughout the route window. Almost 9,500 people work within a one kilometre radius of the station.

Main works

8.25.2 Within this route window the main Crossrail works will involve:

- platform extensions and provision of associated shelters and canopies at Ealing Broadway station;
- replacement of the station's ticket hall;
- new station footbridge, including three new escalators and lifts to create step-free access to all platforms; and
- new interchange footbridge with emergency escape at the east end of the main line platforms.

Temporary impacts and mitigation

8.25.3 There are no significant impacts.

Permanent impacts and mitigation

8.25.4 Existing retail units in the station complex will have to be removed to allow for the refurbishment of the station. These are occupied by Bette Davis Limited, Budgens Stores Limited, Cards Galore Limited, Clarks Limited, Holland & Barratt Retail Limited, Starbucks Coffee Company (UK) Limited, Villiers Park Properties Limited and Sketchley and support between 40-70 retail jobs and consist of nearly 1,000m^2 of commercial floorspace

8.25.5 The refurbished station will only incorporate 2 small kiosks (15-25m^2) providing employment for 2-3 people. This means that most of the jobs in the existing retail units are at risk, however, this is not considered to be a significant impact given the number of jobs in the local area.

8.26 Route window W4: Acton Mainline Station & Yard

Baseline

8.26.1 Acton Mainline station is located in a residential area. The area immediately north of the tracks is used for industrial storage and also includes Acton Freight Yard. The wide railway corridor includes the existing sidings to the north of Acton Main Line station, as well as some light industry. Residential uses predominate either side of the railway. Retail and commercial uses are located along Horn Lane, near to Acton Main Line

station. There are some 10,000 jobs within the station's catchment area.

Main works

8.26.2 Within this route window the main Crossrail works will involve:

- construction of a new rail underpass at Acton Yard; and
- new ticket hall, footbridge and platform canopies, and platform extensions at Acton Main Line station.

Temporary impacts and mitigation

8.26.3 There are a number of industrial units (Lafarge Roofing, Derlin Construction, Horn Metals Ltd, Bridgemarts Ltd, and Hanson), employing in the region of 50 to 70 people, based within the railway yard which will be displaced during the construction period. Given present warehouse/industrial vacancy rates of 6% in West London and the number of jobs in relation to total local employment this is not regarded as significant. As a worst case scenario this assessment has assumed that all these businesses will be displaced. However, further design work is required to establish the extent of land take in this location and whether job losses can be mitigated through the relocation of these businesses within the site. As a minimum it is anticipated that the businesses will be relocated back to the site when the works are completed.

Permanent impacts and mitigation

8.26.4 The new station building will require the acquisition of 267 Horn Lane, which is the Dawa Office of the Royal Embassy of Saudi Arabia with the displacement of approximately 10 jobs. From an employment perspective the potential loss of employment at this site is not significant.

8.27 Route window W3: Old Oak Common Depot

Baseline

8.27.1 Old Oak Common Depot is a large railway depot and stabling site located in a predominantly industrial area. It is bordered by Wormwood Scrubs Park to the south, the Grand Union Canal and Gateway Industrial Estate to the north and several industrial estates to the west. To the south of the railway is Eurostar's North Pole maintenance depot. Old Oak Common is an extensive site comprising stabling sidings, engine sheds and workshops; the works area is confined to the central part of the existing stabling yard. The broad railway corridor contains large engine sheds. The

surrounding area is dominated by industry and industrial estates. Small pockets of residential development are located to the west along Shaftesbury Gardens and Wells House Road, and to the south of Wormwood Scrubs Park. There is no station in this route window.

Main works

8.27.2 Within this route window the main Crossrail works will involve remodelling to provide fourteen new Crossrail stabling sidings and a further siding incorporating train washing plant within the site of Old Oak Common depot. This will require some remodelling of existing trackwork to accommodate the needs of other existing users within the depot. The site to be used for the sidings will also be used temporarily as a tunnel construction and fit out depot.

Temporary impacts and mitigation

8.27.3 Whilst there will be works on the Old Oak Common depot site it is not envisaged that these will have a material impact on employment in the depot. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.27.4 Around 50-60 jobs will be created for train crew and servicing staff to enable trains to operate from the stabling sidings in this location, but this is not a significant impact.

8.28 Route window W2: Canal Way

Baseline

8.28.1 Canal Way Junction is located on the south side of the Grand Union Canal, in the vicinity of Kensal Green Cemetery. South of the Great Western Main Line, the area includes Eurostar's North Pole maintenance depot and residential properties beyond that. To the north, a superstore, an activity centre and Kensal Green gas works are bounded by the canal and the railway. The intensively used rail corridor is bordered to the south by residential areas and by Wormwood Scrubs Park, a significant area of open space, which lies adjacent to the Eurostar North Pole depot. To the northeast, beyond the Grand Union canal are situated commercial uses and gas works. There is no station in this route window.

Main works

8.28.2 The four tracks in the GWML corridor currently increase to six at Ladbroke Grove. In order to provide space for a reversing facility at Westbourne Park this four-six track widening location will need to be moved eastwards to Subway Junction, east of Westbourne Park.

8.28.3 As part of these works, the track layout at Canal Way will be modified to permit Crossrail services to access Old Oak Common depot and to reduce conflict with other services accessing the depot. This will require installation of a series of crossovers between the relief lines and the Crossrail lines leading to the depot, and reinstatement of a second track over the Engine and Carriage Line flyover.

Temporary impacts and mitigation

8.28.4 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.28.5 There are no significant impacts.

8.29 Route window W1: Portobello Junction

Baseline

8.29.1 The area is located immediately to the west of the Westway. The surrounding area is mainly residential with some commercial activity. The intensively used rail corridor is bordered on both sides by residential areas, principally three to five storey flats, and commercial estates. There is no station in this route window.

Main works

8.29.2 In order to provide space for a reversing facility at Westbourne Park the four-six track widening location will need to be moved eastwards to Subway Junction, east of Westbourne Park. The works will require the removal of existing tracks, the laying of new tracks, crossovers and turnouts, and the provision of new signalling.

Temporary impacts and mitigation

8.29.3 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

8.29.4 There are no significant impacts.

9. Environmental baseline and assessment of impacts: Heathrow Airport

9.1 Introduction

9.1.1 This section follows the existing Heathrow Express Route and the Terminal 5 extension which is presently under construction. There are, therefore, no new works associated with Crossrail in this section.

9.2 Route window H1: Heathrow Express Tunnels (North)

Baseline

9.2.1 The line runs through existing railway tunnel in this section

Temporary impacts and mitigation

9.2.2 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

9.2.3 There are no significant impacts

9.3 Route window H2: Heathrow Express Tunnels (South)

Baseline

9.3.1 The line runs through existing railway tunnel in this section

Temporary impacts and mitigation

9.3.2 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

9.3.3 There are no significant impacts

9.4 Route window H3: Heathrow Terminals 1, 2, 3

Baseline

9.4.1 This route window is centred on the existing Heathrow Central station.

9.4.2 Heathrow Airport accommodates approximately 17,000 jobs and 930,000m² of commercial floor space of which more that 80% are dedicated to offices.

Temporary impacts and mitigation

9.4.3 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

9.4.4 There are no significant impacts

9.5 Route window H4: Heathrow Terminal 4

Baseline

9.5.1 This route window is centred on the existing Heathrow Express station at Heathrow Terminal 4.

9.5.2 Heathrow Airport accommodates approximately 17,000 jobs and 930,000m² of commercial floor space of which more that 80% are dedicated to offices.

Temporary impacts and mitigation

9.5.3 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

9.5.4 There are no significant impacts

9.6 Route window H5: Heathrow Terminal 5

Baseline

9.6.1 This route window covers the new Heathrow Express Terminal 5 station.

9.6.2 Heathrow Airport accommodates approximately 17,000 jobs and 930,000m² of commercial floor space of which more that 80% are dedicated to offices.

Temporary impacts and mitigation

9.6.3 There is no land take or demolition of buildings that will have a material impact on employment in the area. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

9.6.4 There are no significant impacts

10. Environmental baseline and assessment of impacts: Central section

10.1 Introduction

10.1.1 This chapter describes the central route section of Crossrail from Ladbroke Grove to Stratford and the Isle of Dogs, the baseline situation and the significant temporary and permanent socio-economic impacts that will arise from its construction and operation.

10.1.2 The basic socio-economic and demographic characteristics of the areas in this section served by Crossrail are set out in *table 10.1*.

TABLE 10.1: SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE CENTRAL SECTION

Age structure	<16	16-25	26-35	36-45	46-55	56-65	>65
	17%	19%	24%	14%	9%	7%	10%
Ethnic groups	White %	Mixed %	Asian %	Black %	Chinese %		
	60%	3%	25%	7%	5%		
Qualifications	No qualifications	Level 1	Level 2	Level 3	Level 4/5	Other	
	23%	8%	12%	12%	41%	4%	
Econ activity / unemployment	Economic Activity Rate	Unemployment Rate					
	62%	9%					
Number of jobs	Jobs						
	824,490						
Social grade	AB	C1	C2	D	E		
	29%	29%	8%	14%	20%		

10.2 Overview of Crossrail works in the central section

10.2.1 The central route section represents the largest scale engineering component of the project. The route will comprise 6 m diameter twin-bore tunnels running under central London that will connect existing railways to the east and west. The tunnels will be up to 50 m deep, but generally between 20 m and 30 m deep[26]. At a point beneath Stepney Green, the route will fork: one route will

(1) The tunnel depth referred to here and throughout the ES is taken to be from street level to rail level within the tunnel.

continue northeastwards towards Stratford, the other will head southeastwards towards the Isle of Dogs.

10.2.2 New Crossrail stations will be provided at intervals along the new tunnel alignment at Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street, Whitechapel and the Isle of Dogs. Each of these stations (except Whitechapel and the Isle of Dogs) will have two entrances and ticket halls to provide access to the east and west ends of the below ground platforms. At Whitechapel, it will be possible to provide a second ticket hall should demand for Crossrail require this, while at the Isle of Dogs, there will be passive provision for a second ticket hall.

10.2.3 New portal structures will be provided in the west at Royal Oak (Paddington) and in the east at Pudding Mill Lane (Stratford). For the southeast route to Docklands, the tunnel will be continued east of the Isle of Dogs – this is addressed in the southeast route section. At particular locations along the new railway, shafts connecting the tunnels with the surface will be provided for access and/or ventilation. Some of these shaft structures will be incorporated into the new station buildings; others will be located independently of the stations in accordance with safety requirements.

10.2.4 The twin-bore tunnels will be excavated using tunnel boring machines. Up to nine of these will be working in the central section at any one time. Excavated material will be removed at the west and east portals and via a temporary tunnel linking Hanbury Street shaft to a temporary shaft on Pedley Street, from where it will be taken by a conveyor to a holding site in Mile End Park prior to removal by rail.

10.2.5 Provision of new station entrance buildings and ticket halls will require that existing buildings be demolished. The Crossrail Bill does not provide powers for development to replace these for the reasons described in *Section 3.8* of *Chapter 3*. However, it is extremely unlikely that such developments will not be constructed.

10.2.6 The main elements of the scheme are summarised in *Table 10.2.*

TABLE 10.2 MAIN CONSTRUCTION WORKS IN THE CENTRAL SECTION

Route Window	Route Window Name	Main Works	Description of the Works	Local Authority
C1	Royal Oak portal	Westbourne Park reversing facility	Provision of a reversing facility consisting of two island platforms and four tracks to enable some or all of the westbound Crossrail service to terminate at Paddington.	Royal Borough of Kensington and Chelsea. and City of Westminster
		Royal Oak portal	Construction of the western portal of the central area tunnels, located west of Lord Hill's Bridge, consisting of an approach ramp and cut and cover tunnel between the portal and the tunnel eye located between Ranelagh Bridge and Westbourne Bridge.	
		Westbourne Bridge shaft	Provision of a shaft for the construction of twin-bore tunnels. The shaft will be used to house ventilation equipment and provide access as an emergency intervention point (EIP).	
		Tunnel eye	Works at the point where bored tunnelling begins, located between Ranelagh Bridge and Westbourne Bridge.	
		Twin-bore tunnels	Construction of the twin tunnels with the rails at a depth of between 15 and 20 m below street level.	
C2	Paddington station	Paddington station	Works to the station consisting of a new 340 m length box with a 210 m island platform and new ticket halls at the eastern and western ends. The station will be located underneath Eastbourne Terrace. The station will include a narrow glazed structure above ground called the 'light spine'.	City of Westminster
		Paddington station shafts	Provision of ventilation and EIP facilities, to be located at the eastern and western ends of the station box.	
		Twin-bore tunnels	Construction of the twin tunnels with the rails at a depth of approximately 20 to 30 m below street level.	
C3	Hyde Park shaft and Park Lane Shafts	Hyde Park shaft	Construction of a shaft to house ventilation equipment and provide access as an EIP. The shaft will be located at the northern boundary of Hyde Park, close to Victoria and Clarendon Gates. The shaft surface building will be up to 2 m high and located to the west of Victoria Gate Lodge.	City of Westminster
		Park Lane shaft	Construction of a shaft to house ventilation equipment and provide access as an EIP. The shaft will be located in the central reservation of Park Lane immediately south of Marble Arch and opposite Green Street. The surface building will be approximately 2 m high.	City of Westminster
		Twin-bore tunnels	Construction of the twin tunnels with the rails at a depth of between 27 m and 30 m from street level.	
C4	Bond Street station	Bond Street station	Works at the station to provide new 245m length platform tunnels fitted out to 210m between Davies Street and Hanover Square. Ventilation and access as an EIP will be provided at each end of the station.	City of Westminster

Route Window	Route Window Name	Main Works	Description of the Works	Local Authority
		Western and Eastern ticket halls	Construction of a new one storey western facility at 65 Davies St, to include a ventilation stack approximately 30 m high. Construction of a new 7m high eastern ticket hall to include a ventilation stack approximately 35 m high at 18/19 Hanover Square.	
		Twin-bore tunnels	Twin tunnels will be constructed with the rails at a depth of approximately 26 to 32 m from street level.	
C5	Tottenham Court Road station	Tottenham Court Road station	Works at the station to provide new 245 m length platform tunnels fitted out to 210 m between Great Chapel Street and Charing Cross Road.	City of Westminster and LB Camden
		Western and Eastern ticket halls	Construction of a new ticket hall beneath the Plaza at the front of Centre Point. The deep station box at Goslett Yard will include a shaft that will house ventilation equipment and provide access as an EIP. This ticket hall is an extension of the existing London Underground ticket hall Construction of a new western ticket hall at Dean Street. Ventilation equipment and EIP access will be constructed at Fareham Street.	
		Fisher Street shaft	Construction of a shaft that will house ventilation equipment and provide access as an EIP at Fisher Street on the site of 8 - 10 Southampton Row. The original building façade to 8 - 10 Southampton Row will be retained.	
		Twin-bore tunnels	Construction of the twin tunnels with the rails at a depth of between 20 and 30 m from street level.	
C6	Farringdon station	Farringdon station	Works at the station to provide new 245m length platform tunnels fitted out to 210m between Farringdon Road and Lindsey Street. Construction of a new 8 m high western ticket hall at Farringdon Road (to include EIP access and ventilation equipment within its footprint). Construction of a new 8 m high eastern ticket hall at Lindsey Street at the west end of Barbican station, to include EIP and ventilation equipment. Emergency escape will be via a new separate shaft in 38 - 42 Charterhouse Street.	LB Camden, LB Islington and City of London
		Twin-bore tunnels	Construction of the twin tunnels with the rails at a depth of approximately 12 to 36 m from street level. A crossover will be constructed to the east of the station.	
C7	Liverpool Street station	Liverpool Street station	Works at the station to provide new 245m length platform tunnels fitted out to 210m between Moorfields and Blomfield Street.	City of London and LB Tower

Route Window	Route Window Name	Main Works	Description of the Works	Local Authority
		Moorgate ticket hall	Construction of a new 8 m deep western ticket hall at Moorgate station, to include EIP access and ventilation equipment within its footprint (shaft is approximately 20 m high).	Hamlets
		Finsbury Circus	Replacement of the pavilion and bowling green and re-establishment of the gardens that are lost to the construction site at this location.	
		Blomfield Street shaft	Construction of a shaft approximately 28 m high at 11 – 12 Blomfield Street to contain ventilation equipment and provide EIP access.	
		Twin-bore tunnels	Construction of the twin tunnels with the rails at a depth of approximately 36 to 42 m from street level.	
C8	Whitechapel station	Hanbury Street shaft	Construction of a shaft to contain ventilation equipment and provide EIP access; the surface structure will be approximately 12 m high.	LB Tower Hamlets
		Hanbury Street to Pedley Street temporary tunnel and shaft.	Construction of a single bore temporary tunnel from the Hanbury Street shaft to a temporary shaft at Pedley Street. This tunnel and shaft will be used to transfer excavated materials from the central section tunnelling works by Conveyor, and then onto the stockpile at Mile End (Devonshire Street) sidings for onward transport by rail.	
		Whitechapel station	Works at the station to provide new 245 m length platform tunnels fitted out to 210m between Court Street and Cambridge Heath Road.	
		Western and Eastern ticket halls	Construction of a new eastern ticket hall at the junction of Cambridge Heath Road and Whitechapel Road, including ventilation and EIP. New ticket hall over the London Underground District Line platforms including a new concourse at Essex Wharf to allow access to the western end of the Crossrail platforms.	
		Durward Street shaft	Construction of a ventilation and EIP access shaft as part of the Whitechapel Station Essex Wharf concourse structure.	
		Twin-bore tunnels	Construction of twin-bore tunnels with the rails at a depth of between 25 m and 38 m from street level.	
C8A	Mile End conveyor corridor	Temporary works	Temporary works will take place within this route window to construct a conveyor belt to take excavated material from Pedley Street to temporary excavated material handling facilities, to be constructed at Mile End (Devonshire Street) sidings and Mile End Park.	LB Tower Hamlets
C9	Stepney Green shafts	Stepney Green shaft	Provision of a ventilation, escape and EIP access shafts on Stepney Green between an all weather sports ground and Garden Street, which will include two 7.5 m high structures at ground level.	LB Tower Hamlets

Route Window	Route Window Name	Main Works	Description of the Works	Local Authority
		Twin-bore tunnels	Construction of twin tunnels with the rails at a depth of between 22 m and 37 m from street level; two turn out caverns beneath Stepney Green will be constructed to allow for the junction between the Shenfield and the Abbey Wood branches.	
C10	Lowell Street shaft	Lowell Street shaft	Construction of a ventilation, escape and EIP access shaft of approximately 15 m in height at the corner of Commercial Road and Basin Approach (610 Commercial Road).	LB Tower Hamlets
		Twin-bore tunnels	Construction of the twin tunnels with the rails at a depth of between 32 m and 40 m from street level.	
C11	Isle of Dogs station	Hertsmere Road shaft	Construction of an EIP access shaft on Hertsmere Road, which will include an 8m high structure at the surface.	LB Tower Hamlets
		Isle of Dogs station	Construction of a station and crossover within a 475 m long box located below West India North Dock. The cross-over will be constructed within the western part of the box and the station, with a 210 m long island platform which will be constructed in the eastern part of the box. The crossover will enable trains to terminate at the station and return to central London or Abbey Wood. Construction of a station entry/exit point to the west of Great Wharf Bridge, which will be rebuilt. Construction of escape and ventilation shafts within the station box, one at the eastern end and one at the western end of the station platform.	
		Twin-bore tunnels	Construction of the twin tunnels with the rails at a depth of approximately 30 m to 50m from street level.	
C12	Mile End Park and Eleanor Street shafts	Mile End Park shaft	Construction of a ventilation, escape and EIP access shaft in the southeast corner of Mile End Park next to Burdett Road, which will include a 7 m high surface structure.	LB Tower Hamlets
		Eleanor Street shaft	Construction of an EIP access and ventilation shaft in the eastern end of the caravan park, which will include an 11 m high surface structure.	
		Twin-bore tunnels	Construction of twin tunnels with the rails at a depth of between 23 m and 28 m from street level.	
C13	Pudding Mill Lane portal	Pudding Mill Lane portal	Construction of the eastern portal of the central area tunnels along with a shaft accommodating EIP and escape facilities. The tunnel eye will be located to the east of the River Lea. A ramp will be provided to access the Great Eastern Mainline at track level, which will be partially enclosed in a cut and cover box. Demolition of and reconstruction of the Pudding Mill Lane DLR station to accommodate these works.	LB Tower Hamlets and LB Newham

Route Window	Route Window Name	Main Works	Description of the Works	Local Authority
		Road closures	Pudding Mill Lane will be permanently closed to road traffic. Marshgate Lane will be permanently opened to road traffic as compensation.	
		Changes to the Docklands Light Railway	Re-alignment of the DLR to the south and provision of a replacement DLR Pudding Mill Lane station.	
		Changes to Great Eastern Main Line	Re-alignment of the westbound (up line) electric track of the Great Eastern Mainline to Liverpool Street to accommodate Crossrail.	
		Twin-bore tunnels	Construction of twin tunnels with the rails at a depth of up to 38 m from street level and ground level.	
C13A	Abbey Mills		Sewer diversion	LB Newham

10.3 Route window C1: Royal Oak Portal

Baseline

10.3.1 Land uses within this part of London are predominantly residential, the elevated A40 Westway and the Great Western Main Line and the London Underground rail corridor to Paddington station. There are a number of commercial land uses to the north of the railway, including a concrete batching plant, transport-related uses (including a taxi servicing facility and Westbourne Park Bus Garage) and artist studios, including Great Western Studios. There are residential areas further to the north containing high-rise and medium-rise blocks. Residential areas also lie to the south of the railway corridor and to the east of Bishops Bridge Road. There are approximately 26,000 jobs located within the catchment area of the local underground station, Royal Oak.

Main works

10.3.2 The permanent works will consist of:

- a train reversing facility at Westbourne Park and track alterations to the Great Western main line;
- an approach ramp, a portal, at Royal Oak, a cut and cover tunnel, and twin-bore tunnel commencing at Westbourne Park; and
- Westbourne Bridge shaft containing intervention and ventilation facilities.

10.3.3 Enabling works will comprise:

- relocation of existing Network Rail maintenance facilities, trackworks and signalling;
- relocation of an external bus parking compound adjacent to the eastern side of the Westbourne Park bus garage; and
- relocation of electrical substation and cables within this area.

10.3.4 The relocation of the external bus parking compound, which currently lies immediately to the north of the Great Western Main Line, has been the subject of a separate planning application and is not assessed here.

Temporary impacts and mitigation

10.3.5 Paddington New Yard contains a concrete readymix plant providing 10 jobs that will be displaced by the construction works. However, it is proposed to reinstate the plant once the works are completed.

Permanent impacts and mitigation

10.3.6 The following businesses have been identified in Paddington New Yard and Taxi Yard as directly affected by permanent acquisition of premises during the construction and operation of Crossrail, (Great Western Studios Management Ltd, Marcon Topmix Limited, J. Murphy & Sons Limited, British Clean Fuels,

SGQ Ltd, London Cab Company Ltd, Taxi Tyre Service Limited, Enfield Taxi Motors Ltd, Royal Oak Taxi Centre Ltd, Dyno's Bike Ltd and 125 artists' studios at Great Western studios). They will, therefore, need to seek alternative locations or close down.

10.3.7 Occupiers of Great Western studios tend to be on short leases and the turnover of companies and individuals in the premises is high. The needs of individuals renting these spaces are different from more traditional commercial outfits. The closure of the studios will result in 5 jobs at the Great Western Studios Management Ltd operation being at risk. It will also put the activity of the artists using the studios at risk given the shortage of suitable accommodation in the area for this type of activity.

10.3.8 Paddington New Yard also accommodates Murphy & Sons, a construction company employing 100-110 employees and Tarmac Topmix concrete readymix plant providing 10 jobs. Discussions with the local authority suggest that it is unlikely that Murphy & Sons will find suitable alternative premises in the immediate local area.

10.3.9 The other location facing permanent acquisition is Paddington Taxi Yard. This offers taxi drivers; parking, refuelling, mess and car washing facilities. There are not many such facilities left and no alternative facilities nearby. Eight companies have been identified on the site.

10.3.10 Around 260-300 jobs are at risk representing around 1% of employees in a one kilometre radius from Royal Oak station. Whilst, unemployment is low in Westminster (2.7% in October 2004). The displacement of jobs includes niche occupations in an important local cluster.

10.3.11 Significant impacts in this area, therefore, relate solely to the potential loss of niche employment opportunities associated with the loss of the Great Western Studios.

10.4 Route window C2: Paddington Station

Baseline

10.4.1 The Paddington station area accommodates a significant number of businesses (mostly retail) and the Great Western hotel (Hilton hotel). The surrounding area is a mixture of cafes and restaurants, offices, tourist accommodation and residential housing. Land uses in the area are dominated by Paddington station and associated rail land. The area is typically residential in character, with small retail uses lining Praed Street. Multi-storey offices front Eastbourne Terrace opposite the station. Surrounding streets consist mainly of residential and hotel accommodation, with St Mary's Hospital and its associated medical school to the north of Paddington station. A spur of the Paddington branch of the Grand Union Canal passes immediately north of the station.

10.4.2 The area surrounding Paddington station is undergoing a regeneration programme and several major developments are under construction or have been recently completed. The area, which is referred to in the Westminster Unitary Development Plan as the Paddington Special Policy Area (PSPA), is the largest development area in Westminster and a site of strategic importance in London. The PSPA includes major redevelopments at Paddington Basin,

Paddington Goods Yard (Paddington Central) and St Mary's Hospital. Some 38,000 jobs are located within a kilometre of Paddington station.

Main works

10.4.3 At Paddington station, the permanent works will consist of:

- a new Crossrail station with two new ticket halls under Eastbourne Terrace; and
- two new ventilation and emergency intervention structures one at each of the ticket halls.

10.4.4 The main works will commence after enabling works that will include:

- diversion of public utilities (including the sewer in Eastbourne Terrace);
- temporary relocation of the taxi rank from Eastbourne Terrace to the area on the north side of the station occupied by the Lynx building (formerly Red Star);
- modifications to LUL infrastructure; and
- alterations to utilities within MacMillan House as a result of the demolition works.

Temporary impacts and mitigation

10.4.5 In most cases, impacts are likely to be a mixture of noise, vibration and construction traffic. The Hilton Hotel will experience an increase in daytime noise levels for 14 months, though if it was a residential property it would not be eligible for noise insulation and hence there is anticipated to be no material impact on its business. The Sussex Court Public House on Spring Street is in the same position. There are, therefore, no significant impacts.

Permanent impacts and mitigation

10.4.6 A range of professional service businesses and retail units will be displaced due to the demolition or use of premises as worksites at 4-18 Bishop's Bridge Road, 191-199 Praed Street, 19-22 Spring Street and a retail unit within the ticket hall area of the London Underground station. (Occupiers affected include, The Bridge Research, BMP DDB Ltd, Lynx Express Ltd, Fotosprint, Ashwin Amin, Leluu Accessories, Dallas Cars, Reload Internet, Mercury Change International, Desai News, Tutto, Fresco, Lolita, Sandro Sandwich Bar and WH Smith.)

10.4.7 In total between 60-100 jobs will be displaced. Even if all these jobs were lost this represents under 0.3% of the employment market within 1 kilometre of the station. Moreover, the borough's low unemployment rate (2.7%) means alternative employment opportunities are likely to be readily available

10.4.8 As for the businesses themselves, office vacancy rates in central London (according to Chesterton's quarterly Central London Offices) are presently over 12% and the stock of commercial floorspace is over 600,000m^2 in a one kilometre radius around the station. This would suggest alternative locations would be available.

10.4.9 A small positive employment impact in terms of an increase in recruitment catchment area is expected at St Mary's Hospital and the adjacent medical school at the back of the station. Indeed, Crossrail is expected to facilitate a 9% increase in the potential labour force accessible within a 45 minute catchment area from Paddington Station

10.4.10 Overall there are no significant impacts.

10.5 Route window C3: Hyde Park & Park Lane Shafts

Baseline

10.5.1 The main features of this route window are Hyde Park and Kensington Gardens. Hyde Park and residential and commercial properties along its edge dominate land uses within this part of London. There are various commercial land uses, including hotels, on the north side of Oxford Street and residential areas to the north of Bayswater Road and the east of Park Lane.

Main works

10.5.2 To comply with safety requirements, Crossrail will construct two shafts between Paddington and Bond Street stations. One is needed in the Hyde Park/Sussex Gardens area and the other is required in the Park Lane area.

Temporary impacts and mitigation

10.5.3 No temporary or permanent acquisition of land or buildings that materially affect employment activity is required for either Hyde Park or Park Lane vent shafts. There are, therefore, no significant temporary impacts.

Permanent impacts and mitigation

10.5.4 There are no significant impacts.

10.6 Route window C4: Bond Street Station

Baseline

10.6.1 This route window is centred on Bond Street Underground Station. The surrounding area is a prime retail centre and a major office location combined with significant numbers of residential properties. The route runs beneath Mayfair, Regent Street and the western edge of Soho. Retail uses dominate along Oxford Street; offices are the main land use in surrounding streets. There are also a number of residential properties around Davies Street and Hanover Square. Other land uses include the open spaces of Grosvenor Square and Hanover Square gardens. Bond Street and Oxford Circus Underground stations are to the north of the alignment, on Oxford Street. There are about 190,000 workers and 3.7 million m^2 of commercial floorspace within a one kilometre radius of the station.

Main works

10.6.2 The permanent works will consist of two new twin-bore tunnels and a new station at Bond Street featuring two ticket halls.

Temporary impacts and mitigation

10.6.3 Properties at 65 Davies Street and 18/19 Hanover Square/1A Tenterden Street will be permanently acquired.

10.6.4 65 Davies Street will be the site of the Western Ticket Hall. It currently provides around 10,500m^2 of floorspace and accommodates the London College of Fashion part of the University of the Arts. The University also has its main headquarters here. As the lease on 65 Davies Street runs out in 2008 the College is already looking for new premises. As a result of the permanent acquisition, 460 members of staff will be displaced.

10.6.5 For the construction of the Eastern Hall Ticket, buildings at 18-19 Hanover Square/1A Tenterden Street will be demolished. Although these are vacant at the moment, they have the capacity (11,500m^2) to house between 500-800 employees.

10.6.6 Altogether, around 0.5% of the workforce in a one kilometre radius of the station will be temporarily displaced and just over 0.5% of retail and office space will be demolished. With low unemployment, a dynamic economy, considerable volumes of commercial floorspace and an office vacancy rate presently at 9% in the West End, the local labour and property market should readily absorb this displacement of activity and no significant temporary impacts are forecast.

10.6.7 Weighhouse Street (a one-way street) will be closed at the junction with Davies Street. The remainder of the street will be turned into a two way road in order to allow lorry movements out of the work site and deliveries into West One shopping centre. Aside from these lorry movements, the road closure may reduce car traffic. There will also be a loss of on-street parking in the wider area. Altogether, although potentially disruptive for businesses around both worksites no significant temporary impacts are expected.

Permanent impacts and mitigation

10.6.8 The Crossrail Bill does not provide powers for development to replace those demolished but it is extremely unlikely that only operational works will be constructed.

10.7 Route window C5: Tottenham Court Road Station

Baseline

10.7.1 This is a predominantly commercial area focused around Tottenham Court Road Station to the east, Oxford Street to the north and Great Chapel Street to the west. Aside from numerous retail outlets, the area is also home to several small advertising, television production and graphic design businesses as well as the Astoria nightclub and the Dominion theatre. Further east, this route window also covers Fisher Street ventilation shaft located just south of St Martin's College of Art and Design. The existing land use is predominantly

commercial with several office blocks, most notably Centre Point, and retail uses. Oxford Street is an internationally renowned shopping area and Charing Cross Road is a specialist retail street noted for its large number of bookshops. Altogether, there are approximately 145,000 jobs and 4.4 million m^2 of commercial floorspace within a one kilometre radius of the station.

Main works

10.7.2 The permanent works will consist of:

- twin-bore tunnels;
- a new station at Tottenham Court Road consisting of a new box at Goslett Yard and two new ticket halls;
- ventilation and EIP facilities at Fareham Street and Goslett Yard;
- a ventilation and EIP at Fisher Street; and
- the closure of Andrew Borde Street and streetscape enhancement.

Temporary impacts and mitigation

10.7.3 The construction of the Eastern Ticket Hall at the corner of Oxford Street and Charing Cross Road will result in the permanent acquisition of several buildings accommodating a number of retail outlets, private teaching institutions, small television, advertising and graphic design businesses as well as the Astoria nightclub.

10.7.4 The Western Ticket Hall will also require the permanent acquisition of several buildings between Great Chapel Street to the west, Dean Street to the east, Oxford Street to the north and Diadem Court to the south. The occupants in these blocks tend to be media and property companies.

10.7.5 Additionally, two small blocks will have to be demolished to allow for the implementation of Fisher Street vent shaft: 8-10 Southampton Row, although the façade will be retained, and 1-2 Fisher Street combined with 2-6 Catton Street. The University of the Arts and its Student Union occupies 2-6 Catton Street and employs 45 members of staff. A bar occupies the ground and first floors of 8-10 Southampton Row with approximately 10 workers while the rest of the building is residential. Small professional services operate from Fisher Street and employ about 20 people. Altogether, between 75-85 people work in these buildings.

10.7.6 Overall, some 100 businesses with between 900 and 1,300 employees are expected to be displaced. However, it takes place in an area of buoyant economic activity. In fact, it only represents less than 1% of all jobs and around 0.8% of commercial property stock within a one kilometre radius of the station in a dynamic area with substantial employment opportunities and an office vacancy rate of around 9%. No significant impacts are, therefore, expected.

10.7.7 Occupiers who will be displaced have been identified as 1st Oxford College, A Vision, Alpha Angelo College, Ann Summers, Aquarius, ARD TV and Radio (Norddeutscher Rundfunk), Art4Noise, Astoria, B52 couriers, Barbara Music, Bella Napoli Pasta & Pizza, Benjys, Broadcast & Video Company, Bruce

Dunlop & Associates, Café Nero, Cambio Bureau de Change, CFS Independent, Chased by Cowboys, Chatsworth Television, Chopstix Noodle Bar, Clarks Shop, Computer Wire services, Couch PH, Creative Brief UK Ltd, Design Sensation Ltd, Doneli, Ealing Studios, EMI Music Publishing, EPK, Eurochange Ltd, Euromoney Exchange, Evening Entertainment Co, Finishing Touches, Flip Side Marketing, Flying Records, Fourth Hurdle Consulting, Fragile Films Ltd, GHA Group, Ghetto Nightclub, Google, Great Chapel College, Guiltronics, Harlequin Sports, Harmony, Karushi Ltd, KBA Design, Kitsch Casting, KPM Music House, LCC Trans-Sending Limited, Littlestar services Ltd, London Institute, Mars (club), Melfemi Entertainment, Metro Broadcast Ltd, Mexx & Monet, Mexx Factory Outlets, Michael Wildsmith, Mr Ted, Mr Toppers, MTV Films Europe, Nats Post Production, New Media Law, Office (shoe shop), OTM Studios, Peach Arch Films, Pierre Victorie, Pistol Marketing Ltd, Portavia, Primrose Agency, Promopromo, Pukka Post, Push, Rangepost Ltd, RDP Ltd, Real 451 Ltd, Red Veg Ltd, Reel Enterprises Ltd, Riccardo's Snack Bar, Richard Clark, Riddle International, Right Recruitment, Rouge Nightclub, Sainsbury's, Saks, Scidev. Net, Science & Development Network, Sensation, Shaw Graham Kersh Solicitors, Siguy Films, Stage One Storyboard, Study Eight Productions, Super 8 Rushes, Tai Buffet, The Annex (Films) Ltd, The Bath House, The Chinman Partnership, The Ivy House, The Link Asset & Securities Co Ltd, The Link Stores, The Mean Fiddler, The Project, Tidal Olive, TVFC, TVP Videodubbing Ltd, University of the Arts, Walji, Waterstones, William Hill and Wood Burden.

10.7.8 Although access to Centre Point will be maintained, occupiers are likely to be affected by disruption resulting from the long term worksites in the area, construction traffic and local road closures. However, it is not envisaged that there will be any significant employment impacts. The Royal Mail sorting office's car park in Newman Street will be used as a lorry holding area. Although this may be disruptive, discussions with the Royal Mail confirm that the sorting office will continue to be able to operate during the use of the car park as a lorry holding area. The Tottenham Public House on Oxford Street will be affected by construction noise for varying periods. However, no significant impacts are anticipated.

Permanent impacts and mitigation

10.7.9 The Crossrail Bill does not provide powers for development to replace those demolished but it is extremely unlikely that only operational works will be constructed.

10.8 Route window C6: Farringdon Station

Baseline

10.8.1 The central feature of this area is Farringdon Station. The surroundings of the station offer a mixture of offices, restaurants, and retail outlets along with Smithfield wholesale market. Land uses within this part of London are mixed and include residential, commercial and retail uses. Smithfield Market is adjacent to the site of the eastern ticket hall. It is one of London's oldest markets, where meat has been bought and sold for over 800 years. The Medical College of St Bartholomew's Hospital, and the hospital itself, are located to the north and south of the Smithfield Market, respectively. The Barbican, a major residential and cultural development, is further to the east. Farringdon is on the City Fringe and presents a typical combination of modern office buildings with small convenience retail units by the station employing

around 180,000 people and providing 4.1 million m^2 of commercial floorspace in a one kilometre radius from the station.

Main works

10.8.2 The permanent works will consist of two new twin-bore tunnels and a new station at Farringdon with two new ticket halls.

Temporary impacts and mitigation

10.8.3 The construction of the Western entrance and ticket hall to Crossrail (located south of Cowcross Street) will require the permanent acquisition of Cardinal House and several retail outlets while to the East some office space, retail and catering outlets will be affected.

10.8.4 Altogether, the construction of Farringdon station will result in the displacement of between 800-1,100 retail and office jobs. Occupiers affected have been identified as A J M Studios, Adams Kara Taylor, Ambient, Bar Bombay, Benjy's, Best Café, Buckley Deane Wakefield, Café Gulsman, Chambers and Partners Publishing Ltd, Charterhouse Bar, Criminal Injuries Compensation Appeal Panel, Dyer Brown & Associates, Fabermaunsell, Farringdon Flowers, Fox Haynes Ltd, Hallmark, Hallmark, Immigration Appellate Authority, Immigration Law Practioners Association, Improvement and Development Services for Local Government, John Stevens, Kentucky Fried Chicken, Laing O'Rourke, Lindsey Hotel, Magicalia, Mailround.com, Mal Architects Ltd, McColls Raj Tandoori, McDonald's, Messrs C, Moneybox Corporations Ltd, Ovum Ltd, Oyez Legal Technologies, Pinnacle PSG Ltd, Postercscope Ltd, Prontaprint, Pure, Robert Rolls & Co, Search Partners Ltd, Smithfield Tandoori, Springdene Ltd, Starbucks, Touch Group, Tribunals Group, Vacant, Whitecross Dental Care, William Hill and World Markets Research Centre.

10.8.5 It will entail the demolition of commercial premises of around 14,300m^2 to the west and 2,100m^2 to the east. This is not deemed a significant impact as it represents at most 0.6% of jobs and around 0.4% of commercial property stock within a one kilometre radius of Farringdon station. In addition office vacancy rates in Midtown are presently running at 11%.

10.8.6 Approximately half of Smithfield Market's underground car park will be required for the works and construction traffic will have an impact on access to the market. However, this is not predicted to affect the on-going viability of the market, based on consultation with the Corporation of London's Markets Division. The loss of off-street car parking spaces to worksites at Snow Hill, Cardinal House, Caxton House, as well as local road closures, will have some disruptive impacts on businesses in the area. However, these will not have a significant impact on employment

10.8.7 Overall there are no significant impacts

Permanent impacts and mitigation

10.8.8 The Crossrail Bill does not provide powers for development to replace those demolished but it is extremely unlikely that only operational works will be constructed.

10.9 Route window C7: Liverpool Street Station

Baseline

10.9.1 This route window covers Liverpool Street station and the surrounding area which is dominated by office developments combined with retail activity to the East (the Arcade). Land uses within this part of London are dominated by the financial and business services of the City, which extend about 1 km southwards to the River Thames. Moorgate Underground station is located in the west and Liverpool Street station and the vast commercial buildings of Broadgate predominate in the central part of the area. The one kilometre catchment area around the station is the most densely populated area along the route in terms of employment with approximately 210,000 jobs. The property market offers 330,000m^2 of retail and 3.9 million m^2 of office floorspace.

Main works

10.9.2 The new Crossrail station at Liverpool Street will have a new ticket hall connected to the western end of the station platforms. This will be adjoining the existing London Underground ticket hall at Moorgate Station and will require the demolition of buildings at 91 -109 Moorgate. A new passage will connect the eastern end of the Crossrail platforms with the existing London Underground ticket hall at Liverpool Street station. A new shaft structure at Blomfield Street will also result in demolition of 11-12 Blomfield.

Temporary impacts and mitigation

10.9.3 The main impact will be the demolition of the former AMRO Bank building, Moor House and 11-12 Blomfield Street site will entail the displacement of between 300-550 jobs or 0.2-0.3% of the local job market. In terms of floorspace, it means a temporary reduction of 0.3% of the office and retail property stock. Occupiers affected have been identified as ABN Amro Bank, Balls Brothers Limited, Benjys, Birleys Ltd, Bishop of Norwich, Blomfield Group, Boots, City People, Davy`s of London Limited, Ernst Jones, Firth Ross Martin Associates, Hitchmans Harrison, Hollingworth Consultants Limited, Jamies at The Pavilion, Julian Dove, K&O International, Lawson Clark Ltd, Medical Direct Clinics, N V Tyler, Norton Rose, Norwich Union Life & Pensions Limited, Oddbins, Origin HR Consulting, Robert Dyas, Snappy Snaps, Sudbroke Asset Management, The Shipping Corporation of India, Tiffinbites, Tim Bugler (Dental Surgery) and Victoria Steamship Co Ltd.

10.9.4 In addition, the Lord Aberconway pub will need to be closed to enable construction works to take place. The Pavilion Wine Bar at Finsbury Circus will also be displaced during the construction works. Once the works are completed they will be restored to their previous use. The temporary closure of Moorfields and the partial closure of Moorgate will cause some disruption to businesses but it will have no significant impact on employment. Overall, therefore, there are no temporary significant impacts.

Permanent impacts and mitigation

10.9.5 The Crossrail Bill does not provide powers for development to replace those demolished but it is extremely unlikely that only operational works will be constructed.

10.10 Route window C8: Whitechapel Station

Baseline

10.10.1 Land uses within this part of London are predominantly residential. The Hanbury Street shaft site is adjoined by residential and retail property. The Pedley Street worksite and temporary shaft site lie in an area comprising mainly warehousing, storage and retail buildings, a large number of which are vacant, particularly to the south, along with some residential properties. The areas around the Whitechapel Crossrail station and the Durward Street shaft site are characterised mostly by retail and educational uses. The Royal London Hospital is located on the south side of the A11 Whitechapel Road across from Whitechapel station. There are approximately 28,000 jobs available within one kilometre radius of the station and 930,000m^2 of commercial use (a third of which is industrial).

Main works

10.10.2 Besides the Crossrail tunnels other permanent elements of the scheme will consist of:

- a shaft at Hanbury Street;
- a new station at Whitechapel with an interchange concourse beneath Durward Street and, integrated with it, a shaft structure; and
- a new ticket hall over the District line tracks.

10.10.3 The Hanbury Street shaft will be connected via a temporary tunnel under Spital Street to a temporary construction shaft at Pedley Street. This will be used for the delivery and removal of materials during the construction phase. The temporary shaft at Pedley Street will be backfilled and the site reinstated.

Temporary impacts and mitigation

10.10.4 Some buildings around Hanbury Street, currently operating as retail and light industrial premises will be temporarily acquired. These are 68-80 and 82-102 Hanbury Street while the rear extensions of 63-67 Princelet Street will require demolition. The ground floor of 63-65 Princelet Street is occupied by several small travel agencies serving the large local Asian community. Given local street closures and noise impacts it is envisaged that these businesses would be unable to continue to operate and will be displaced. At this location, between 180-300 jobs are at risk. This represents just over 1% of jobs in the local area, they are also more likely to be filled by local people and unemployment in Tower Hamlets is high (5.7%) and, therefore, the impact is regarded as significant. Two businesses presently operating from under the railway arches of Valance Road will also be displaced.

10.10.5 Occupiers who may be displaced by the works have been identified as Aerospace Travel Agents, Air Express Travel and Tours, Al-Madina Travel Limited, ABN Amro Holdings (UK) Limited, D. Steinberger Limited, Mizuho International plc, Salamon & Seaber Limited, Sardar Properties (UK) Limited, Habitiat, Banjax, Collective of Bangladeshi Governors, Forest Reclaim, Jonota Travel Agency, KMC Travel and Zinda Bazar Cash & Carry**.**

10.10.6 At Whitechapel, while there will be a loss of parking at the Sainsbury's car park to accommodate a worksite (see Traffic and Transport), this will not be sufficient to affect the viability of the store or give rise to job losses and no significant temporary impacts are foreseen at this location.

10.10.7 At Whitechapel, partial land take would include part of Sainsbury's car park. This, however, will not affect the viability of the store. No significant temporary impacts are foreseen at this location.

10.10.8 Whitechapel Ticket Hall will be built on part of the Blind Beggar public house's beer garden and require the demolition of its conservatory. It is expected that the pub will still be able to operate albeit at reduced capacity and no significant permanent impacts are reported at this site.

Permanent impacts and mitigation

10.10.9 The Crossrail Bill does not provide powers for development to replace those demolished but it is extremely unlikely that only operational works will be constructed.

10.11 Route window C8A: Mile End Conveyor Corridor

Baseline

10.11.1 This route window covers the Sand End sidings to Mile End Park spoil handling site. The area includes Mile End Park as well as some warehouses to the north of the railway and residential dwellings and the Royal London Hospital to the South.

Main works

10.11.2 The works will involve the installation of temporary conveyor which will run along the south side of the existing railway corridor. It will be used to carry excavated material, removed through the Pedley Street temporary shaft to Mile End (Devonshire Street) sidings and a holding area located within part of Mile End Park.

Temporary impacts and mitigation

10.11.3 The erection and dismantling of the conveyor may be disruptive to businesses based under the railway arches in this route window. However, this is not anticipated to have a material impact on employment and hence there are no significant impacts.

Permanent impacts and mitigation

10.11.4 The construction work will lead to the demolition of an empty retail unit on Globe Road displacing the opportunity for approximately 10 jobs. However, the possible displacement of employment is not regarded as material so there will be no significant impact.

10.12 Route window C9: Stepney Green Shafts

Baseline

10.12.1 Land uses within this part of London are dominated by residential properties and recreational areas. The Stepney Green shaft site is located in Stepney Green Park, an area of outdoor recreation that includes an all-weather sports pitch, an urban farm and a number of archaeological ruins. St Dunstan's Church lies at its eastern edge.

Main works

10.12.2 To comply with safety requirements, Crossrail will construct shafts on to provide facilities for EIP, escape and ventilation.

Temporary impacts and mitigation

10.12.3 Stepping Stones Farm will experience disruption from the construction works, however, it is assessed as a community facility rather than as a business facility. There are no land use requirements directly affecting commercial premises in this area and hence no significant impacts.

Permanent impacts and mitigation

10.12.4 There are no significant impacts.

10.13 Route window C10: Lowell Street Shaft

Baseline

10.13.1 The area is mainly residential, but with some offices, storage/warehousing, retail and educational buildings. High value residential development at the waterside of Limehouse Basin, which is to the south of the site, contrasts with the run down, bustling east London character of Commercial Road. Regent's Canal and Limehouse Cut run north-south from Limehouse Basin. The River Thames is located further to the south.

Main works

10.13.2 To comply with safety requirements, Crossrail will require a shaft to be located at the corner of Commercial Road and Basin Approach (at 610 Commercial Road).

Temporary impacts and mitigation

10.13.3 No significant temporary socio-economic impacts will occur in this area.

Permanent impacts and mitigation

10.13.4 Permanent acquisition of 622 Commercial Road and Mill Place will lead to the displacement of 11 jobs affecting S Ward & Co Ltd and Bronze Age Art Foundry Ltd. This is not regarded as significant.

10.13.5 The Crossrail Bill does not provide powers for development but it is extremely unlikely that only operational works will be constructed.

10.14 Route window C11: Isle of Dogs Station

Baseline

10.14.1 This route window is centred on Canary Wharf, a major commercial and retail development area and part of Docklands. The predominant land uses are offices and retail, with some outdoor recreation and storage/warehousing, surrounded by, or adjacent to, West India Dock. The River Thames lies to the south of the alignment beyond the docks, with Billingsgate Market being located towards the east end of the North Dock. In a one kilometre radius of the station, there are 24,000 jobs and 1.6 million m^2 of commercial floorspace with the potential for future development.

Main works

10.14.2 The main permanent features within this route window comprise the Hertsmere Road shaft and the Isle of Dogs station. The main temporary features will be the North Quay and Billingsgate worksites.

10.14.3 The permanent works will consist of:

- Hertsmere Road shaft;
- Isle of Dogs station; and
- twin-bore tunnels.

Temporary impacts and mitigation

10.14.4 Tunnelling work for Crossrail conflicts with the foundations of Hertsmere House leading to the need to acquire and demolish it. This building has the capacity to accommodate 350 to 450 jobs. However, a planning application has been approved to build a new tower on the site, Columbus Tower. While Hertsmere House currently provides 6,913 m^2 of office space its proposed replacement will provide 93,423 m^2 of hotel, office, retail, leisure, residential and catering. The design of the new tower has taken Crossrail tunnelling requirements into account and it is envisaged that the tower will be completed before Crossrail's opening.

10.14.5 The cofferdam along the North Dock's southern side means that barges on West India Quay will either have to move before the closure is implemented or accept to be blocked at this location for the construction phase. The only risk in adopting this option is that boats have to leave the Dock if they need major overall maintenance.

10.14.6 There are 8 boats on West India Quay including an architect studio, an art gallery, a photo gallery, a private venue and a bar. The bar and galleries rely on passing trade. A change in location would have an impact on them but it is not considered to be a significant socio-economic impact.

10.14.7 Billingsgate market is the largest inland fish market in the UK with 54 tenants and an average of 25,000 tonnes of fish sold through it each year for a

turnover in the region of £200 million. Billingsgate market will be impacted upon insofar as part of its car park will be needed as a work site. This will lead to the displacement of a fish processing unit but it is anticipated that this can be re-housed within the main building on the site. Consultation with the market confirms that the overall viability of the market will not be affected and, therefore, there is no significant temporary. The other main worksite in this area will utilise a temporary car park at North Quay. While disruptive this will not have a material impact on businesses.

10.14.8 On Hertsmere Road, the worksite will comprise the Cannon Workshops car parking area bounded by Cannon Drive along with the adjacent hard standing area on the forecourt to the building. The temporary loss of 27 parking spaces from the Cannon Workshops car park and close proximity of the worksite, while disruptive, will not have a material impact on employment at these businesses.

Permanent impacts and mitigation

10.14.9 No permanent acquisition that will materially impact on business will occur and hence there will be no residual significant impact.

10.15 Route window C12: Mile End Park and Eleanor Street Shafts

Baseline

10.15.1 The main land uses are residential, with many residential Victorian terraces. However, there are significant areas of open green space, including Mile End Park and Tower Hamlets Cemetery Park. Bow Road Underground station and Bow Church DLR station are to the north, with the Royal London Hospital further to the west, all on the A11 Bow Road. There are also a number of schools in the area.

Main works

10.15.2 The permanent works will consist of:

- Mile End Park shaft;
- Eleanor Street shaft; and
- twin-bore tunnels.

Temporary impacts and mitigation

10.15.3 There are no temporary significant impacts in this area.

Permanent impacts and mitigation

10.15.4 The Eleanor Street construction site will require acquisition of the travellers' caravan park which doubles up as a place of business with activities focused around car scrapping. This is not a significant economic impact and has been assessed as a community impact.

10.16 Route window C13: Pudding Mill Lane Portal

Baseline

10.16.1 This route window covers a highly built-up residential area in its western part, while the remainder consists of industrial areas, extensive railway lands and the north-south corridors of a number of rivers including the River Lea, the City Mill River, the Waterworks River and the Bow Back River.

Main works

10.16.2 Besides Crossrail's twin-bore tunnels other elements of the scheme in this route window include a replacement Docklands Light Railway station and some realignment of existing railway**.** There are substantial enabling works including sewer diversions.

10.16.3 Permanent works will consist of:

- Pudding Mill Lane Portal, ramp and cut and cover box;
- a new Pudding Mill Lane Docklands Light Railway station and alignment;
- re-alignment of the westbound (up line) electric track of the Great Eastern Main Line (GEML);
- twin-bore tunnels; and
- permanent closure of Pudding Mill Lane to road traffic and the opening up of Marshgate Lane to road traffic.

Temporary impacts and mitigation

10.16.4 Construction works will require the demolition of industrial units on Clement's Wharf, Bow Railway Yard and on the Heron Industrial Estate. Overall, it is estimated that 800 to 1,300 jobs are at risk and over 30,000 m^2 of industrial floorspace will be required. Industrial vacancy rates in Tower Hamlets are reported to be 8%, equivalent to 100,000 m^2 and 15% in Newham or 190,000 m^2. Given the scale of the potential job losses, high than average levels of unemployment in both Boroughs, the level of property loss in relation to potential vacancies, and that Pudding Mill Lane is a protected employment area in the Newham UDP and is identified as a Preferred Industrial Location in the London Plan, this is a significant temporary impact.

10.16.5 Occupiers identified as being affected by the works are Badat Brothers Limited, Bardon Aggregates, Bodyworks, Bolsons Ltd, Bow Midland Waste Recycling Limited, Capital Print & Display, Demenex Plant Hire, Discount (Construction) Double glazing, GEM Supplies, Goddard & Gibbs Studios Ltd, Grays Waste Services Limited, Hiremasters Ltd, Ilford Barratt Roofing Ltd, Jarroy (Importers) Limited, John Denton, Kendon Packaging Group, London Concrete Ltd, Mastpine Limited, Nagrecha bros, South Herts Waste Management Limited, Star Furniture, Tarmac Southern Limited and Top Office Equipment Ltd.

Permanent impacts and mitigation

10.16.6 Once work is completed, worksites will become available for possible redevelopment mitigating the displacement of jobs outlined above.

10.17 Route window C13A: Abbey Mills

Baseline and Main works

10.17.1 The works in this route window, which is located in LB Newham, comprise the diversion of the Hackney to Abbey Mills and Wick Lane sewers, as a result of alignment of the Crossrail running tunnels at Pudding Mill Lane (Route Window C13).

Temporary impacts and mitigation

10.17.2 There are no temporary significant impacts in this area

Permanent impacts and mitigation

10.17.3 There are no significant impacts in this area

11. Environmental baseline and assessment of impacts: Northeastern section

11.1 Introduction

11.1.1 This chapter describes the northeast route section of Crossrail from Stratford to Shenfield the baseline situation and the significant temporary and permanent socio-economic impacts that will arise from its construction and operation.

11.1.2 The basic socio-economic and demographic characteristics of the areas in this section served by Crossrail are set out in *table 11.1*.

TABLE 11.1: SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE NORTH EASTERN SECTION

Age structure	<16	16-25	26-35	36-45	46-55	56-65	>65
	23%	15%	18%	15%	11%	8%	11%
Ethnic groups	White %	Mixed %	Asian %	Black %	Chinese %		
	55%	3%	29%	11%	1%		
Qualifications	No qualifications	Level 1	Level 2	Level 3	Level 4/5	Other	
	28%	16%	20%	9%	22%	6%	
Econ activity / unemployment	Economic Activity Rate	Unemployment Rate					
	64%	7%					
Number of jobs	Jobs						
	57,318						
Social grade	AB	C1	C2	D	E		
	22%	32%	13%	17%	16%		

11.2 Overview of Crossrail works in the northeastern route section

11.2.1 Crossrail services within the north east route section will use the Great Eastern Main Line. No new rail alignment will be created, although some new track will be required to provide a freight loop between Goodmayes and Chadwell Heath in order to replace an existing loop at Manor Park, which will be removed.

11.2.2 Crossrail will require new or extended platforms at several stations in order to accommodate its 210m long trains. At Romford and Ilford, new station buildings and other facilities will be provided as well.

11.2.3 Crossrail's other major new structures or facilities include a new dive-under (rail underpass) west of Romford. This will enable trains to access the sidings and depot to the south without hindering Crossrail services. A new depot will also be built on this existing site at Romford. New sidings will be provided at Ilford, Goodmayes and Shenfield.

11.2.4 The main elements of the scheme in this route section are summarised in *Table 11.2* below.

TABLE 11.2: MAIN ELEMENTS OF THE PROJECT IN THE NORTH EASTERN ROUTE SECTION (ROUTE WINDOWS WITH MAJOR WORKS ARE HIGHLIGHTED)

Route Window	Main Project Works	Local Authority
NE 1 Stratford Station (Biggers Road to Carnarvon Road)	Platform alterations	LB Newham
NE2 Forest Gate Station (Carnarvon Road to Balmoral Road)	Platform extensions	LB Newham
NE3 Manor Park Station (Balmoral Road to Gloucester Road)	Platform extensions Removal of freight loop	LB Newham
NE4 Ilford Station (Gloucester Road to Hainault Street)	Extension of platforms and removal of the bay platform Reconstruction of the ticket hall. New stabling sidings	LB Redbridge
NE5 Seven Kings Station (Hainault Street to St Albans Road)	Platform extensions.	LB Redbridge
NE6 Goodmayes Station (St Albans Road to Wadeville Avenue)	Platform extensions Introduction of new freight loop (Chadwell Heath Loop)	LB Redbridge
NE7 Chadwell Heath Station (Wadeville Avenue to Whalebone Lane South)	Platform extensions Track works Introduction of new freight loop (Chadwell Heath Loop)	LB Redbridge LB Barking and Dagenham
NE8 Romford Depot (west) (Whalebone Lane South to Sheringham Avenue)	Romford Depot Underpass and associated track works Widening of Jutsums Lane bridge	LB Barking and Dagenham LB Havering
NE9 Romford Station and Depot (east) (Sheringham Avenue to Carlisle Road)	Extension of platforms Reconstruction of the ticket hall Construction of a new depot	LB Havering
NE10 Gidea Park Station (Carlisle Road to Upper Brentwood Road)	Platform extensions.	LB Havering
NE11 Gidea Park Stabling Sidings (Upper Brentwood Road to Briars Walk)	New stabling sidings	LB Havering
NE12 Harold Wood Station (Briars Walk (western end) to Harold Court Road)	Platform extensions	LB Havering
NE13 LB Havering / Brentwood BC Boundary (Harold Court Road to M25)	None	LB Havering Brentwood BC
NE14 Brook Street (M25 to Kavanaghs Road)	None	Brentwood BC

Route Window	Main Project Works	Local Authority
NE15 Brentwood Station (Kavanaghs Road to Seven Arches Road)	Platform extensions.	Brentwood BC
NE16 Thrift Wood (Seven Arches Road to Woodway)	None	Brentwood BC
NE17 Shenfield Station (Woodway to Brentwood Long Ridings school)	New stabling sidings.	Brentwood BC

11.3 Route window NE1: Stratford Station

Baseline

11.3.1 This route window is centred on Stratford Station, a major transport interchange. The station will become an even more significant transport hub for East London with the opening of the CTRL station and the arrival of Crossrail. The area around the station comprises a large area of railway land to the north of Stratford station, which is currently the main CTRL worksite. Other parts of the route window are relatively built-up, with industrial areas to the southwest and residential areas to the east.

11.3.2 Around 11,000 jobs and 500,000m^2 of commercial floor space, two thirds of which are warehouses and factories, are based within one kilometre of the station. The neighbouring surroundings to the north are characterised by major regeneration and transport schemes such as the CTRL station, opening in 2007 and the Stratford City development. The latter is presently going through the planning approval process and has at time of writing (October 2004) received approval from the London Borough of Newham and the Mayor of London.

Main works

11.3.3 The works will involve the widening of platform five, which forms part of island platform three/four/five. Some refurbishment works in addition to the fitting of new platform furniture will also be undertaken on the platforms.

Temporary impacts and mitigation

11.3.4 There is no land take or demolition of buildings that will have a material impact on employment in the area. The Stratford Station worksite is allocated in the adopted Newham UDP for mixed use development as part of the wider Stratford Rail lands redevelopment. Once work is completed it is anticipated that land would become available for redevelopment. There are, therefore, no temporary significant impacts.

Permanent impacts and mitigation

11.3.5 There are no significant impacts.

11.4 Route window NE2: Forest Gate Station

Baseline

11.4.1 This section of the route follows existing rail lines and serves Forest Gate Station. The surrounding area includes retail, residential and light industrial developments. There are approximately 4,000 jobs and 150,000m^2 of commercial floor space within a kilometre of the station. Of the latter 40% is retail.

Main works

11.4.2 The main works in this route window comprise platform extensions.

Temporary impacts and mitigation

11.4.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.4.4 There are no significant impacts.

11.5 Route window NE3: Manor Park Station

Baseline

11.5.1 Manor Park Station is surrounded by parkland, cemeteries and residential developments. The area around the station comprises a mixture of residential, commercial and light industrial use. There are some 3,000 jobs and 50,000m² of commercial floor space within the station's catchment area.

Main works

11.5.2 The main works in this route window comprise platform extensions.

Temporary impacts and mitigation

11.5.3 Construction activity will require as a worksite land presently used for storage at 42 Station Road for around one year. This will not have a material impact on employment in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.5.4 There are no significant impacts.

11.6 Route window NE4: Ilford Station

Baseline

11.6.1 Centred on Ilford Station the area is characterised by retail activities, offices as well as residential uses. There are a number of shops in the locality of Ilford station, primarily located along Cranbrook Road, with a large shopping centre to the east of the station. To the north there are largely residential areas along York Road. To the south, commercial development is concentrated in a number of large office blocks along Ilford Hill. To the west, the rail corridor passes beneath the North Circular Road, with Ilford Golf Course and City of London Cemetery beyond.

11.6.2 About 11,000 jobs and 350,000m² of commercial floor space are situated within one kilometre of the station. More than half of this floor space is in retail use.

Main works

11.6.3 The works include the provision of a new station building and temporary tunnel fit out sidings on derelict land at the Aldersbrook sidings site to the west of the North Circular Road.

Temporary impacts and mitigation

11.6.4 Construction work will lead to the demolition of retail units and taxi office at the station itself and at 27-29 Cranbrook Road (Pops Tobacconist and Kart). In total this will lead to the displacement of approximately 10 jobs. Given the number of jobs available in the area this is not significant.

Permanent impacts and mitigation

11.6.5 There is the potential to redevelop the site of the present station building for commercial use mitigating the local job displacement. There are no significant permanent impacts.

11.7 Route window NE5: Seven Kings Station

Baseline

11.7.1 The route window covers Ilford train depot and Seven Kings station. This is mainly a residential area with some commercial, retail and light industrial developments in the wider neighbourhood. The area around the station comprises predominantly railway land/operations and commercial premises. There are approximately 4,000 jobs and 380,000m² of commercial floor space, half of which is retail.

Main works

11.7.2 Within this route window, two platforms will be extended to accommodate 10-car Crossrail trains. Platform works will be carried out in conjunction with track realignments, OHLE and signal works.

Temporary impacts and mitigation

11.7.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.7.4 There are no significant impacts.

11.8 Route window NE6: Goodmayes Station

Baseline

11.8.1 This route window covers the principally residential area around Goodmayes station. The area around the station comprises a densely built-up urban area intersected by the existing railway. There are residential neighbourhoods to the south, east and west of the station, and an extensive retail park to the

north. There are approximately 2,700 jobs and 130,000m² of commercial floor space within one kilometre of the station, of which roughly 60% is retail.

Main works

11.8.2 The main works in this route window comprise platform extensions at Goodmayes station and the construction of the Chadwell Heath freight loop.

Temporary impacts and mitigation

11.8.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.8.4 There are no significant impacts.

11.9 Route window NE7: Chadwell Heath Station

Baseline

11.9.1 The area around Chadwell Heath station comprises a heavily built-up residential area to the north of the railway line, with a more open urban landscape to the south, where depots and warehousing are located. The one kilometre catchment area around Chadwell Heath station contains about 4,000 jobs and 250,000m² of commercial floor space.

Main works

11.9.2 The main works comprise platform extensions to Chadwell Heath station and the construction of the Chadwell Heath freight loop.

Temporary impacts and mitigation

11.9.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.9.4 There are no significant impacts.

11.10 Route window NE8: Romford Depot (West)

Baseline

11.10.1 This route window contains a number of open spaces, industrial and residential uses. The area to the north of the GEML is dominated by the Westland's Playing Field. West Ham United Football Club (FC) training ground and residential areas, residential and industrial works are located to the south. Crowlands Heath Golf Course is also located to the south of the GEML.

Main works

11.10.2 The main works in this route window comprise the construction of a rail underpass in order to reduce conflicting movements between trains on the GEML and those moving to and from a new Romford depot. This will also require works to Jutsums Lane bridge.

Temporary impacts and mitigation

11.10.3 A number of sites will be acquired for contractor's compounds and worksites. These are mainly open spaces but include a training facility of West Ham United FC. However, this will not affect the viability of the club. Network Rail's OHLE maintenance facility will be displaced as will DA Skip Hire adjacent to 208 Crow Lane. There will be land take from the rear of businesses along Crow Lane including at 288, 208, 198, 188 and 178. However, it is not envisaged that construction activity will have a material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.10.4 There are no significant impacts.

11.11 Route window NE9: Romford Station and Depot (East)

Baseline

11.11.1 The area is characterised by a substantial number of retail units including a large shopping centre in Exchange street. A number of industrial units and warehouses are located to the south west of the station. Romford station is located to the west of South Street on the railway viaduct between Havanna Close and Atlanta Boulevard. South Street runs through the commercial and retail centre of Romford, connecting with the Romford ring road. The site of the depot and stabling sidings is surrounded primarily by industrial and commercial uses to the south, and by the GEML and residential neighbourhoods to the north, with Old Church Hospital immediately to the east of Nursery Walk. Within one kilometre of Romford Station there are around 13,000 jobs and almost 400,000m² of commercial floor space of which 60% are retail.

Main works

11.11.2 The main works in this route window will consist of a new depot and stabling sidings located on the old goods yard site to the west of Romford station and on the south side of the GEML. In addition, the works will include a rebuild and extension to Romford station.

Temporary impacts and mitigation

11.11.3 Construction work will impact on a Transco site and the local Royal Mail Sorting Office. However, this will not have a material impact on their operations. Redevelopment of the railway station requires the demolition of 110 – 116 South Street and a temporary loss of premises in The Battis with the potential displacement of 60-100 jobs, although parts of these premises are presently vacant. (Present occupiers include Whitecross Dental Care, and Luminar Dancing.) Given the availability of alternative retail premises and the

number of jobs in the area this is not deemed to be a significant impact. There will also be a loss of some 20 car parking spaces at a health club/fitness centre but it is not envisaged that this will have a significant impact on employment.

Permanent impacts and mitigation

11.11.4 Once the depot is operational it will create around 390 permanent jobs in the area. This will add 3% to the number of jobs in the local area and hence is a positive significant residual impact.

11.12 Route window NE10: Gidea Park Station

Baseline

11.12.1 The station area is dominated by suburban housing developments and a number of educational facilities. Within a one kilometre radius there are 7,000 jobs and about 35,000m² of commercial floor space.

Main works

11.12.2 The main works in this route window comprise platform extensions.

Temporary impacts and mitigation

11.12.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.12.4 There are no significant impacts.

11.13 Route window NE11: Gidea Park Stabling Sidings

Baseline

11.13.1 Crossrail follows existing rail lines. There are no stations in this section. The current stabling sidings are surrounded primarily with residential neighbourhoods to the north and south of the station, with light industrial units and warehousing to the south of the rail corridor. The Royal Liberty School is located on the northern side of Upper Brentwood Road. There are few shops in the locality, with no obvious town centre location. Light industrial, residential and commercial areas are located on the Southend Arterial Road located to the east of the stabling sidings.

Main works

11.13.2 The proposed Crossrail works at Gidea Park involve the extension of existing sidings and provision of new sidings in order to provide stabling for Crossrail trains.

Temporary impacts and mitigation

11.13.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.13.4 There are no significant impacts.

11.14 Route window NE12: Harold Wood Station

Baseline

11.14.1 This route window covers Harold Wood Station. The area around the station comprises residential neighbourhoods to the northeast, south and east, with small retail and commercial units along the northern sides of Station Road and Oak Road. Harold Wood Hospital is located to the northwest of the station, accessed from Gubbins Lane. Areas of open space exist at Harold Wood Park and along Ingrebourne River and Paines Brook. Around 2,000 jobs and approximately 180,000m² of commercial floor space are located within the station catchment area. Two-thirds of the floor space is dedicated to warehouses and factories.

Main works

11.14.2 The main works in this route window comprise platform extensions.

Temporary impacts and mitigation

11.14.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.14.4 There are no significant impacts.

11.15 Route window NE13: LB Havering/Brentwood BC

Baseline

11.15.1 Crossrail follows existing rail tracks. There is no station or work site in this section.

Main works

11.15.2 No Crossrail works will take place in this route window.

Temporary impacts and mitigation

11.15.3 There is no construction activity in this area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.15.4 There are no significant impacts.

11.16 Route window NE14: Brook Street

Baseline

11.16.1 Crossrail follows existing rail tracks. There is no station or worksite in this section.

Main works

11.16.2 No Crossrail works will take place in this route window.

Temporary impacts and mitigation

11.16.3 There is no construction activity in this area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.16.4 There are no significant impacts.

11.17 Route window NE15: Brentwood Station

Baseline

11.17.1 The area around Brentwood station comprises small-scale commercial, retail and light industrial premises, while the wider area is primarily residential. The station catchment area accommodates 5,000 jobs and 300,000m² of commercial floor space of which a third is industrial.

Main works

11.17.2 The main works in this route window comprise platform extensions.

Temporary impacts and mitigation

11.17.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.17.4 There are no significant impacts.

11.18 Route window NE16: Thrift Wood

Baseline

11.18.1 Crossrail follows existing rail tracks. There is no station or worksite in this section.

Main works

11.18.2 No Crossrail works will take place in this route window.

Temporary impacts and mitigation

11.18.3 There is no construction activity in this area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.18.4 There are no significant impacts.

11.19 Route window NE17: Shenfield Station

Baseline

11.19.1 The current land use in the immediate surrounding area is mainly residential with some small retail outlets and offices situated to the northwest of the station. Within one kilometre of the station are approximately 1,000 jobs and around 60,000m² of commercial floor space.

Main works

11.19.2 Works in this route window include the provision of additional stabling, a new platform and alterations to the Southend and Colchester rail lines.

Temporary impacts and mitigation

11.19.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.19.4 There are no significant impacts.

11.20 Route window R1: Pitsea Sidings

Baseline

11.20.1 The site is bounded to the north by a belt of open land. The elevated A13 highway passes to the north of the site on the far side of this open land. A hypermarket and residential buildings on the southern edge of Basildon are located to the immediate north of this highway. The eastern boundary of the

site is bounded by Pitsea Hall Lane. The area to the south is occupied by open marshland along with the Pitsea Landfill operated by Cleanaway.

Main works

11.20.2 The main works involve the development of a rail siding for unloading excavated material from rail to road for final delivery to the landfill site at Pitsea. The permanent works will comprise the introduction of railway tracks, lighting columns, unloading equipment, a new access road and a new building at the entrance to the site.

Temporary impacts and mitigation

11.20.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

11.20.4 There are no significant impacts.

12. Environmental baseline and assessment of impacts: Southeastern section

12.1 Introduction

12.1.1 This chapter describes the southeast route section of Crossrail from the Isle of Dogs station to the Crossrail terminus at Abbey Wood, the baseline situation and the significant temporary and permanent socio-economic impacts that will arise from its construction and operation.

12.1.2 The basic socio-economic and demographic characteristics of the areas in this section served by Crossrail are set out in *Table 12.1.*

TABLE 12.1: SOCIO-ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF THE SOUTH EAST SECTION

Age structure	<16	16-25	26-35	36-45	46-55	56-65	>65
	26%	13%	17%	16%	11%	7%	10%
Ethnic groups	White %	Mixed %	Asian %	Black %	Chinese %		
	68%	3%	6%	18%	4%		
Qualifications	No qualifications	Level 1	Level 2	Level 3	Level 4/5	Other	
	35%	17%	17%	7%	18%	7%	
Econ activity / unemployment	Economic Activity Rate	Unemployment Rate					
	63%	10%					
Number of jobs	Jobs						
	5,637						
Social grade	AB	C1	C2	D	E		
	16%	28%	15%	21%	20%		

12.2 Overview of Crossrail works in southeastern route section

12.2.1 Through the southeast route section, Crossrail services will, for the most part, use existing main line railway: they will pass through the Royal Docks area using the North London line, between Custom House and North Woolwich stations; and they will follow the North Kent line through Greenwich, Bexley and into Kent, although some new track will be required to accommodate Crossrail services. Two sections of new railway will be required.

12.2.2 East of the Isle of Dogs, the twin-bored tunnel beneath London will be continued beneath the River Lea and Newham, before emerging at a portal on Victoria Dock Road onto the North London line. Two new shaft structures will be required: in Blackwall and on the Limmo Peninsula of the River Lea.

12.2.3 A new twin-bored tunnel will be required beneath the Thames in order to link North Woolwich station (on the North London line) with Plumstead station (on the North Kent line). New portal structures will be located at each site and two

shafts structures will be provided south of the Thames on Warren Lane and on Arsenal Way, in the Royal Arsenal.

12.2.4 Between Plumstead and a point about 200 m east of Abbey Wood stations, two new tracks will be provided in order to serve up to eight Crossrail trains per hour in each direction. The widened railway corridor that this will entail will require works to, or replacement of, some overbridges.

12.2.5 Custom House station and Abbey Wood station will be reconstructed. Silvertown station will be demolished, although with passive provision for a new Crossrail station in the future.

12.2.6 The main elements of the scheme within this route section are summarised in *Table 12.2* below.

TABLE 12.2: MAIN ELEMENTS OF THE SCHEME WITHIN THE SOUTHEAST ROUTE SECTION (ROUTE WINDOWS WITH MAJOR WORKS ARE HIGHLIGHTED)

Route Window	Major Project Works	Local Authority
SE1 Blackwall Way and Limmo Peninsula shafts Blackwall Way to Tarling Road.	Blackwall Way shaft Limmo Peninsular shaft	LB Tower Hamlets LB Newham
SE2 Custom House Station Tarling Road to Prince Regent Footbridge.	Victoria Dock portal Reconstruction of Custom House station; modifications to DLR platform.	LB Newham
SE3 Connaught Tunnel Prince Regent Footbridge to Lord Street.	Refurbishment of Connaught Tunnel Demolition of Silvertown station	LB Newham
SE4 North Woolwich Portal and Thames Tunnel Lord Street to 80 Beresford Street.	North Woolwich portal New twin-bore tunnel (Thames Tunnel) Warren Lane shaft	LB Newham LB Greenwich
SE5 Arsenal Way Shaft 80 Beresford Street to Ann Street bridge.	New twin-bore tunnel (Thames Tunnel) Arsenal Way shaft	LB Greenwich
SE6 Plumstead Portal Ann Street bridge to Marmadon Road	Plumstead portal Replacement of White Hart Road bridge Two new tracks and track realignment	LB Greenwich
SE6A Manor Wharf	Excavated materials handling site	LB Bexley
SE7 Church Manorway Bridge Marmadon Road to De Lucy Street.	Two new tracks and track realignment Replacement of footbridges on Church Manorway and Bostall Manorway Works to Eynsham Drive bridge	LB Greenwich
SE8 Abbey Wood Station and Sidings De Lucy Street to Tunstock Way	New Abbey Wood sidings Two new tracks and track realignment Two new platforms and new elevated station.	LB Greenwich LB Bexley

12.3 Route window SE1: Blackwall Way & Limmo Peninsula Shafts

Baseline

12.3.1 The central features of this route window are Blackwall Way and Limmo Peninsula Shafts, both located east of Canary Wharf, close to the River Lee and surrounded by residential and office developments, brownfield sites and industrial premises.

Main works

12.3.2 To comply with safety requirements, Crossrail will construct two shafts between the Isle of Dogs station and Victoria Dock portal.

Temporary impacts and mitigation

12.3.3 There will be a loss of some 30 car parking spaces at the Reuters building. While this will be a temporary disruption, it is not envisaged to have a temporary significant impact on employment.

Permanent impacts and mitigation

12.3.4 There are no significant impacts.

12.4 Route window SE2: Custom House Station

Baseline

12.4.1 This route window covers two construction sites; Victoria Dock Portal and Custom House Station. The area north of Victoria Dock Road is characterised by residential uses while that to the south by the ExCel Exhibition Centre and the basins of the Victoria Royal Docks with its mixed-use regeneration developments on both sides of the water feature. Custom House station is located south of Victoria Dock Road near its junction with Freemasons Road. The ExCel Centre is located south of the station and beyond that the Royal Victoria Dock. Residential areas and a recreation ground lie to the north of the alignment.

12.4.2 Within one kilometre of Custom House Station are approximately 3,000 jobs and 440,000m² of commercial floor space of which around 50% are factories and warehouses.

12.4.3 This is a Regeneration Area with considerable development potential related to its availability of land, proximity to the London City Airport and the provision of new public transport links.

Main works

12.4.4 Proposed works within the route window comprise the construction of the Victoria Dock portal, a new station at Custom House station, the installation of overhead line electrification equipment, and the construction of twin-bore tunnels. The route window lies within LB Newham.

Temporary impacts and mitigation

12.4.5 Part of the ExCel Centre's lorry holding space will be required during construction works. In addition construction works will displace a local taxi office. Whilst this will be disruptive neither will have a significant impact on employment and, therefore, no adverse impacts on employment will occur. Construction work will lead to the demolition of the Barge Hotel which is a hostel for the homeless, this is covered in the community assessment.

Permanent impacts and mitigation

12.4.6 The completed Victoria Dock portal works will results in a permanent loss of a strip of the ExCel Centre lorry parking area which is used in the lorry management arrangements for the set up and break down of exhibitions. This is likely to be disruptive for the ExCel centre, but is unlikely to result in job losses. As such there will be no significant permanent impacts.

12.5 Route window SE3: Connaught Tunnel

Baseline

12.5.1 This area is characterised by light industrial estates, derelict land, London City Airport and by the residential settlements of North Woolwich served by local amenities. The Connaught Tunnel passes beneath Connaught Passage with Royal Victoria Dock to the west and Royal Albert Dock to the east. The ExCel Centre is located to the west of the tunnel which is flanked by modern hotels and office blocks. The north tunnel is adjacent to the Royal Albert Dock to the north and the Royal Victoria Dock to the south.

Main works

12.5.2 The proposed works within the route window comprise the alteration and refurbishment of the Connaught Tunnel to OHLE, the demolition of Silvertown station, and the installation of OHLE.

Temporary impacts and mitigation

12.5.3 The works will not have a material impact on employment in the area, although they impinge on land at the Ramada Hotel on Festoon Street, and hence there are no significant temporary impacts.

Permanent impacts and mitigation

12.5.4 There are no significant impacts.

12.6 Route window SE4: North Woolwich Portal and Thames Tunnel

Baseline

12.6.1 This route window covers North Woolwich Portal, the Thames Tunnel and Warren Lane Shaft. The area around North Woolwich Portal is characterised by residential developments, brownfield and industrial sites. The Warren Lane Shaft is itself based in a park with the surrounding area characterised by commercial premises. There are around 12,600 people employed in the area.

Main works

12.6.2 The proposed works within this route window comprise the construction of the North Woolwich portal, the twin bore Thames Tunnel, Warren Lane shaft, and the installation of OHLE equipment.

Temporary impacts and mitigation

12.6.3 Construction activity will require use of 21 industrial units on the Standard Industrial Estate, Factory Road. At present 15 of the units are empty and are being actively marketed. When fully occupied, the units could accommodate 120-220 employees. Occupiers affected are Canning Car Hire, Blessed Cash & Carry, Fortivo International, Resolution Productions, Permaguard and Archfield Shipping. Given the cumulative loss of industrial floorspace in this location and at Pudding Mill Lane, that this industrial estate is a protected employment area in the Newham UDP, and an identified Preferred Industrial Location in the London Plan, this is a significant impact.

Permanent impacts and mitigation

12.6.4 Once the works are completed worksites will be available for possible redevelopment mitigating the possible loss of jobs outlined above. It is anticipated that there will no significant permanent impacts.

12.7 Route window SE5: Arsenal Way Shaft

Baseline

12.7.1 The Royal Arsenal is currently undergoing major development as pat of regeneration initiatives promoted by the local authority and the London Development Agency. The area south of Plumstead Road is dominated by residential use. The Arsenal Way shaft site lies to the north of Plumstead Road (A206) and is bounded by industrial buildings and offices to the north, and Woolwich town centre to the south.

Main works

12.7.2 The proposed works within this route window comprise the construction of the twin bored Thames Tunnel and Arsenal Way shaft.

Temporary impacts and mitigation

12.7.3 The shaft's head building will be built on the surface car park site adjacent to Plumstead Road. The worksite will result in temporary loss of car parking used by businesses on Cornwallis Road. Although this will be disruptive for businesses detailed design will seek to minimise impacts and it is likely that businesses would be able to continue to operate. As such no significant impact on employment will occur.

Permanent impacts and mitigation

12.7.4 The permanent shaft structure will result in permanent loss of car parking used by businesses on Cornwallis Road. However, no significant impact on employment will occur.

12.8 Route window SE6: Plumstead Portal

Baseline

12.8.1 This route window features Plumstead portal east of Plumstead Station on the existing North Kent Line. The railway line acts as a physical barrier between two distinctive urban setting: a dense residential area towards the south and an area characterised by industrial estates, brownfield and various light industrial premises in the north. The Plumstead portal site is located on land at Plumstead Goods Yard. The surrounding land uses include commercial and residential areas. Residential areas lie to the south of the surface route alignment, centred along Plumstead High Street (A206).

Main works

12.8.2 The proposed works within the route window comprise the construction of the twin bore Thames Tunnel, Plumstead portal, White Hart Road Bridge, track realignment of the existing railway corridor, and the installation of OHLE equipment.

Temporary impacts and mitigation

12.8.3 The construction site will mainly be located on the adjoining Plumstead Goods Depot. The works will require the acquisition of sites which are presently used for timber (Conmax Timber Merchants Ltd) and scrap yards.

12.8.4 The potential loss of job on this site is not deemed to be significant in relation to the total of jobs available in the area hence there are no significant temporary impacts.

Permanent impacts and mitigation

12.8.5 There are no significant impacts.

12.9 Route window SE6A: Manor Wharf

Baseline

12.9.1 The route window lies within in a primarily industrial area.

Main works

12.9.2 . The proposed works comprise the refurbishment of Manor Wharf at the site of the former Belvedere power station. Works will require the replacement of fendering to the jetty, with works undertaken from boats, and some dredging of the wharf to enable barge access. A conveyor will be constructed to allow excavated material to be loaded onto barges.

Temporary impacts and mitigation

12.9.3 The works will not have a material impact on employment in the area and hence there are no significant temporary impacts.

Permanent impacts and mitigation

12.9.4 The addition of a new working wharf may lead to new economic activity in the area. However, this is not regarded as significant.

12.10 Route window SE7: Church Manorway Bridge

Baseline

12.10.1 Crossrail now follows the existing North Kent Line railway corridor. The route window is increasingly residential in nature with local community and retail facilities.

Main works

12.10.2 The proposed works within the route window comprise track realignment and the provision of two additional tracks within the existing railway corridor, the construction of new footbridges at Church Manorway and Bostall Manorway, the strengthening of Eynsham Drive Bridge, a 2 m high noise barrier will be erected for the length of the route window on both sides of the railway, and the installation of OHLE equipment.

Temporary impacts and mitigation

12.10.3 Construction activity will have no material impact on businesses in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

12.10.4 There are no significant impacts.

12.11 Route window SE8: Abbey Wood

Baseline

12.11.1 The route follows the existing rail line serving a high density residential area around Abbey Wood station. The area is almost entirely residential punctuated by urban green spaces. A small industrial estate lies to the north of the station, and a single commercial building belonging to British Telecom overlooks the southern side of the station. There are approximately 2500 jobs and over 30,000m² of commercial floor space within the station catchment area.

Main works

12.11.2 The proposed works within the route window comprise the reconstruction of Abbey Wood station, track realignment, the provision of two additional tracks within the existing railway corridor, and the installation of OHLE equipment.

Temporary impacts and mitigation

12.11.3 Construction work will have no material impact on employment in the area and hence there are no temporary significant impacts.

Permanent impacts and mitigation

12.11.4 There are no significant impacts.

13. Appendix A: Demographic and socio-economic characteristics within a 1km radius of Crossrail stations by subject

Census 2001 Socio-Economic Characteristics by Geographical Area (1km Radius of Crossrail Stations)

AGE STRUCTURE	<16	16-25	26-35	36-45	46-55	56-65	>65
West	19%	15%	21%	15%	11%	8%	11%
Central	17%	19%	24%	14%	9%	7%	10%
Northeast	23%	15%	18%	15%	11%	8%	11%
Southeast	26%	13%	17%	16%	11%	7%	10%
ETHNIC GROUPS	**White %**	**Mixed %**	**Asian %**	**Black %**	**Chinese %**		
West	65%	3%	23%	7%	3%		
Central	60%	3%	25%	7%	5%		
Northeast	55%	3%	29%	11%	1%		
Southeast	68%	3%	6%	18%	4%		
QUALIFICATIONS	**No qualifications**	**Level 1**	**Level 2**	**Level 3**	**Level 4/5**	**Other**	
West	22%	13%	17%	10%	33%	5%	
Central	23%	8%	12%	12%	41%	4%	
Northeast	28%	16%	20%	9%	22%	6%	
Southeast	35%	17%	17%	7%	18%	7%	
ECON ACTIVITY / UNEMPLOYMENT	**Economic Activity Rate**	**Unemployment Rate**					
West	71%	5%					
Central	62%	9%					
Northeast	64%	7%					
Southeast	63%	10%					
NUMBER OF JOBS	**Jobs**						
West	102,000						
Central	824,000						
Northeast	57,000						
Southeast	6,000						
SOCIAL GRADE	**AB**	**C1**	**C2**	**D**	**E**		
West	27%	32%	12%	16%	13%		
Central	29%	29%	8%	14%	20%		
Northeast	22%	32%	13%	17%	16%		
Southeast	16%	28%	15%	21%	20%		

Notes: The 1km total does not correspond to the sum of all stations due to the overlap of the 1km catchment areas. **West**: Maidenhead, Taplow, Burnham, Slough, Langley, Iver, West Drayton, Heathrow, Hayes, Southall, Hanwell, West Ealing, Ealing Broadway, Acton Main Line. **Central**: Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street, Whitechapel, Isle of Dogs, Stratford. **Northeast**: Forest Gate, Manor Park, Ilford, Seven Kings, Goodmayes, Chadwell Heath, Romford, Gidea Park, Harold Wood, Brentwood, Shenfield. **Southeast**: Royals, Abbey Wood,

Census 2001 Population – 1km radius

Crossrail Station	Population	Crossrail Station	Population
Maidenhead	8,500	Liverpool Street	16,900
Taplow	1,900	Whitechapel	43,800
Burnham	15,400	Isle Of Dogs	19,600
Slough	14,900	Royals	11,500
Langley	9,300	Abbey Wood	18,800
Iver	1,300	Stratford	12,700
West Drayton	11,400	Forest Gate	33,200
Heathrow (Both Stations)	900	Manor Park	25,300
Hayes	13,000	Ilford	24,000
Southall	24,400	Seven Kings	24,000
Hanwell	19,000	Goodmayes	21,600
West Ealing	25,300	Chadwell Heath	19,000
Ealing Broadway	17,400	Romford	13,400
Acton Main Line	18,900	Gidea Park	13,800
Paddington	38,600	Harold Wood	9,300
Bond Street	18,000	Brentwood	9,700
Tottenham Court Road	20,700	Shenfield	6,600
Farringdon	23,900	**1KM TOTAL**	**567,000**

Census 2001 Age Structure – 1km radius

Crossrail Station	<16	16-25	26-35	36-45	46-55	56-65	>65
Maidenhead	18%	12%	20%	13%	11%	9%	17%
Taplow	18%	10%	17%	19%	14%	11%	10%
Burnham	21%	12%	18%	16%	12%	8%	13%
Slough	20%	17%	22%	14%	10%	7%	9%
Langley	21%	12%	17%	15%	12%	9%	14%
Iver	20%	11%	12%	15%	19%	12%	11%
West Drayton	21%	14%	19%	15%	12%	8%	10%
Heathrow (Both Stations)	15%	21%	16%	14%	16%	10%	8%
Hayes	25%	16%	17%	15%	11%	8%	9%
Southall	24%	18%	18%	15%	10%	8%	8%
Hanwell	19%	14%	23%	16%	11%	7%	10%
West Ealing	17%	14%	24%	16%	11%	8%	10%
Ealing Broadway	12%	15%	29%	14%	11%	7%	12%
Acton Main Line	19%	15%	20%	16%	11%	8%	11%
Paddington	13%	18%	27%	14%	11%	8%	10%
Bond Street	8%	18%	25%	14%	13%	10%	12%
Tottenham Court Road	10%	24%	23%	15%	10%	8%	10%
Farringdon	14%	16%	24%	16%	11%	8%	11%
Liverpool Street	20%	19%	24%	14%	8%	7%	8%
Whitechapel	25%	20%	22%	12%	7%	6%	9%
Isle Of Dogs	21%	18%	24%	13%	8%	7%	10%
Royals	26%	15%	19%	16%	10%	7%	7%
Abbey Wood	25%	12%	16%	16%	12%	7%	12%
Stratford	24%	17%	20%	14%	9%	6%	9%
Forest Gate	26%	18%	19%	15%	9%	6%	7%
Manor Park	27%	18%	17%	14%	10%	6%	8%
Ilford	24%	16%	18%	15%	10%	7%	9%
Seven Kings	24%	15%	16%	15%	12%	8%	9%
Goodmayes	23%	15%	18%	16%	11%	8%	9%
Chadwell Heath	23%	12%	19%	16%	11%	8%	12%
Romford	19%	13%	20%	15%	12%	8%	14%
Gidea Park	18%	12%	13%	15%	15%	10%	17%
Harold Wood	19%	12%	15%	15%	13%	9%	17%
Brentwood	17%	11%	21%	15%	12%	8%	15%
Shenfield	18%	9%	10%	14%	14%	13%	21%
1KM TOTAL	**20%**	**16%**	**20%**	**15%**	**11%**	**8%**	**11%**

Census 2001 Ethnic Groups – 1km radius

Crossrail Station	White	Mixed	Asian	Black	Chinese
Maidenhead	86%	1%	10%	1%	2%
Taplow	95%	1%	3%	1%	1%
Burnham	84%	2%	11%	3%	1%
Slough	48%	3%	41%	7%	1%
Langley	82%	2%	12%	4%	1%
Iver	92%	1%	6%	1%	1%
West Drayton	84%	2%	9%	3%	1%
Heathrow (Both Stations)	64%	2%	24%	6%	4%
Hayes	54%	3%	34%	7%	2%
Southall	15%	2%	71%	8%	3%
Hanwell	70%	4%	11%	11%	3%
West Ealing	75%	4%	10%	8%	3%
Ealing Broadway	79%	3%	8%	4%	5%
Acton Main Line	65%	5%	12%	10%	8%
Paddington	70%	5%	10%	6%	8%
Bond Street	79%	3%	8%	4%	7%
Tottenham Court Road	72%	3%	13%	5%	8%
Farringdon	78%	3%	8%	7%	4%
Liverpool Street	49%	2%	41%	6%	2%
Whitechapel	38%	2%	54%	5%	2%
Isle Of Dogs	57%	2%	27%	8%	6%
Royals	58%	4%	8%	25%	5%
Abbey Wood	75%	3%	5%	14%	3%
Stratford	46%	4%	18%	29%	3%
Forest Gate	33%	4%	39%	22%	2%
Manor Park	27%	3%	50%	18%	2%
Ilford	33%	3%	48%	15%	2%
Seven Kings	39%	3%	44%	12%	1%
Goodmayes	51%	3%	34%	10%	1%
Chadwell Heath	79%	2%	10%	7%	1%
Romford	91%	2%	3%	2%	1%
Gidea Park	95%	1%	2%	1%	1%
Harold Wood	95%	1%	2%	1%	1%
Brentwood	94%	1%	2%	1%	1%
Shenfield	97%	1%	1%	0%	1%
1KM TOTAL	**61%**	**3%**	**24%**	**9%**	**3%**

Census 2001 Qualification Levels – 1km radius

Crossrail Station	No qualifications	Level 1	Level 2	Level 3	Level 4/5	Other / Unknown
Maidenhead	23%	14%	18%	9%	32%	5%
Taplow	20%	18%	23%	8%	23%	7%
Burnham	25%	20%	21%	8%	19%	6%
Slough	26%	15%	19%	9%	25%	6%
Langley	26%	19%	22%	8%	18%	7%
Iver	19%	14%	26%	9%	23%	9%
West Drayton	27%	19%	19%	10%	18%	7%
Heathrow (Both Stations)	26%	21%	21%	10%	15%	7%
Hayes	30%	18%	20%	9%	17%	6%
Southall	31%	16%	17%	10%	21%	5%
Hanwell	19%	12%	16%	10%	38%	5%
West Ealing	14%	9%	14%	11%	48%	4%
Ealing Broadway	9%	6%	12%	11%	59%	3%
Acton Main Line	20%	10%	15%	11%	39%	5%
Paddington	15%	6%	11%	13%	51%	4%
Bond Street	10%	5%	12%	15%	55%	3%
Tottenham Court Road	15%	7%	11%	18%	45%	3%
Farringdon	19%	8%	11%	11%	48%	3%
Liverpool Street	28%	9%	12%	11%	37%	4%
Whitechapel	36%	10%	12%	10%	28%	4%
Isle Of Dogs	33%	11%	12%	9%	31%	4%
Royals	33%	14%	16%	8%	23%	6%
Abbey Wood	36%	18%	18%	6%	14%	7%
Stratford	31%	13%	15%	10%	26%	6%
Forest Gate	31%	13%	17%	9%	24%	5%
Manor Park	33%	14%	16%	10%	21%	6%
Ilford	29%	14%	18%	9%	25%	5%
Seven Kings	26%	14%	20%	10%	24%	6%
Goodmayes	26%	17%	20%	9%	23%	6%
Chadwell Heath	31%	21%	21%	7%	14%	6%
Romford	27%	20%	22%	8%	16%	6%
Gidea Park	25%	19%	24%	9%	16%	8%
Harold Wood	30%	19%	22%	7%	14%	8%
Brentwood	17%	15%	23%	9%	31%	5%
Shenfield	15%	14%	25%	12%	29%	6%
1 KM TOTAL	**25%**	**13%**	**16%**	**10%**	**31%**	**5%**

Census 2001 Economic Activity and Unemployment rates – 1km radius

Crossrail Station	Economically active	Unemployed
Maidenhead	73%	4%
Taplow	79%	3%
Burnham	76%	3%
Slough	70%	6%
Langley	74%	3%
Iver	77%	3%
West Drayton	72%	4%
Heathrow (Both Stations)	73%	4%
Hayes	67%	6%
Southall	60%	9%
Hanwell	71%	5%
West Ealing	73%	5%
Ealing Broadway	76%	5%
Acton Main Line	67%	6%
Paddington	65%	7%
Bond Street	70%	5%
Tottenham Court Road	62%	7%
Farringdon	66%	7%
Liverpool Street	61%	10%
Whitechapel	54%	13%
Isle Of Dogs	61%	11%
Royals	63%	10%
Abbey Wood	64%	10%
Stratford	61%	12%
Forest Gate	59%	12%
Manor Park	56%	13%
Ilford	59%	11%
Seven Kings	63%	7%
Goodmayes	66%	6%
Chadwell Heath	69%	5%
Romford	72%	4%
Gidea Park	70%	3%
Harold Wood	69%	4%
Brentwood	75%	3%
Shenfield	63%	2%
1KM TOTAL	**65%**	**7%**

2002 Annual Business Inquiry Employee Analysis: Number of Jobs – 1km radius

Crossrail Station	Number of Jobs
Maidenhead	9,900
Taplow	800
Burnham	7,500
Slough	7,700
Langley	4,200
Iver	700
West Drayton	9,400
Heathrow (Both Stations)	17,200
Hayes	5,800
Southall	6,000
Hanwell	4,700
West Ealing	8,900
Ealing Broadway	9,400
Acton Main Line	10,100
Paddington	38,200
Bond Street	190,300
Tottenham Court Road	144,600
Farringdon	180,800
Liverpool Street	206,900
Whitechapel	28,100
Isle Of Dogs	24,400
Royals	3,200
Abbey Wood	2,500
Stratford	11,200
Forest Gate	4,400
Manor Park	2,900
Ilford	11,000
Seven Kings	4,100
Goodmayes	2,700
Chadwell Heath	4,000
Romford	12,800
Gidea Park	7,100
Harold Wood	2,100
Brentwood	4,900
Shenfield	1,200
1KM TOTAL	**989,600**

Census 2001 Approximated Social Grade – 1km radius

Crossrail Station	AB	C1	C2	D	E
Maidenhead	31%	31%	10%	14%	15%
Taplow	28%	36%	15%	12%	9%
Burnham	23%	31%	17%	16%	13%
Slough	20%	29%	15%	23%	13%
Langley	22%	33%	15%	16%	14%
Iver	36%	36%	13%	8%	7%
West Drayton	21%	34%	16%	17%	12%
Heathrow (Both Stations)	22%	29%	16%	20%	13%
Hayes	14%	31%	17%	24%	14%
Southall	14%	24%	16%	31%	15%
Hanwell	31%	33%	10%	12%	14%
West Ealing	39%	34%	7%	9%	11%
Ealing Broadway	47%	34%	5%	6%	8%
Acton Main Line	29%	35%	10%	13%	14%
Paddington	36%	32%	6%	10%	16%
Bond Street	41%	35%	4%	7%	14%
Tottenham Court Road	32%	32%	7%	10%	19%
Farringdon	34%	30%	7%	11%	18%
Liverpool Street	26%	27%	8%	17%	20%
Whitechapel	18%	25%	12%	21%	25%
Isle Of Dogs	24%	26%	11%	16%	23%
Royals	17%	29%	13%	22%	18%
Abbey Wood	14%	28%	15%	21%	21%
Stratford	17%	28%	11%	22%	22%
Forest Gate	17%	29%	14%	21%	19%
Manor Park	16%	28%	14%	23%	19%
Ilford	20%	31%	13%	18%	18%
Seven Kings	22%	33%	14%	19%	12%
Goodmayes	23%	33%	14%	18%	12%
Chadwell Heath	17%	34%	17%	17%	15%
Romford	21%	34%	15%	15%	15%
Gidea Park	26%	37%	13%	11%	13%
Harold Wood	22%	35%	14%	13%	16%
Brentwood	34%	37%	9%	9%	12%
Shenfield	44%	35%	4%	4%	12%
1KM TOTAL	**25%**	**31%**	**11%**	**16%**	**16%**

14. Appendix B: Demographic and socio-economic characteristics within a 1km radius of Crossrail stations by station

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station – 1km radius

		Maidenhead	Taplow	Burnham	Slough	Langley
Age Structure	<16	18%	18%	21%	20%	21%
	16-25	12%	10%	12%	17%	12%
	26-35	20%	17%	18%	22%	17%
	36-45	13%	19%	16%	14%	15%
	46-55	11%	14%	12%	10%	12%
	56-65	9%	11%	8%	7%	9%
	>65	17%	10%	13%	9%	14%
Ethnic Groups	White %	86%	95%	84%	48%	82%
	Mixed %	1%	1%	2%	3%	2%
	Asian %	10%	3%	11%	41%	12%
	Black %	1%	1%	3%	7%	4%
	Chinese %	2%	1%	1%	1%	1%
Qualification Levels	No qualifications	23%	20%	25%	26%	26%
	Level 1	14%	18%	20%	15%	19%
	Level 2	18%	23%	21%	19%	22%
	Level 3	9%	8%	8%	9%	8%
	Level 4/5	32%	23%	19%	25%	18%
	Other / Unknown	5%	7%	6%	6%	7%
Economic Activity - Unemployment	Economically active	73%	79%	76%	70%	74%
	Economically active, Unemployed	4%	3%	3%	6%	3%
Approximated Social Grade	AB	31%	28%	23%	20%	22%
	C1	31%	36%	31%	29%	33%
	C2	10%	15%	17%	15%	15%
	D	14%	12%	16%	23%	16%
	E	15%	9%	13%	13%	14%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station – 1km radius

		Iver	West Drayton	Heathrow (both stations)	Hayes	Southall
Age Structure	<16	20%	21%	15%	25%	24%
	16-25	11%	14%	21%	16%	18%
	26-35	12%	19%	16%	17%	18%
	36-45	15%	15%	14%	15%	15%
	46-55	19%	12%	16%	11%	10%
	56-65	12%	8%	10%	8%	8%
	>65	11%	10%	8%	9%	8%
Ethnic Groups	White %	92%	84%	64%	54%	15%
	Mixed %	1%	2%	2%	3%	2%
	Asian %	6%	9%	24%	34%	71%
	Black %	1%	3%	6%	7%	8%
	Chinese %	1%	1%	4%	2%	3%
Qualification Levels	No qualifications	19%	27%	26%	30%	31%
	Level 1	14%	19%	21%	18%	16%
	Level 2	26%	19%	21%	20%	17%
	Level 3	9%	10%	10%	9%	10%
	Level 4/5	23%	18%	15%	17%	21%
	Other / Unknown	9%	7%	7%	6%	5%
Economic Activity - Unemployment	Economically active	77%	72%	73%	67%	60%
	Economically active, Unemployed	3%	4%	4%	6%	9%
Approximated Social Grade	AB	36%	21%	22%	14%	14%
	C1	36%	34%	29%	31%	24%
	C2	13%	16%	16%	17%	16%
	D	8%	17%	20%	24%	31%
	E	7%	12%	13%	14%	15%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station – 1km radius

		Hanwell	West Ealing	Ealing Broadway	Acton Main Line	Paddington
Age Structure	<16	19%	17%	12%	19%	13%
	16-25	14%	14%	15%	15%	18%
	26-35	23%	24%	29%	20%	27%
	36-45	16%	16%	14%	16%	14%
	46-55	11%	11%	11%	11%	11%
	56-65	7%	8%	7%	8%	8%
	>65	10%	10%	12%	11%	10%
Ethnic Groups	White %	70%	75%	79%	65%	70%
	Mixed %	4%	4%	3%	5%	5%
	Asian %	11%	10%	8%	12%	10%
	Black %	11%	8%	4%	10%	6%
	Chinese %	3%	3%	5%	8%	8%
Qualification Levels	No qualifications	19%	14%	9%	20%	15%
	Level 1	12%	9%	6%	10%	6%
	Level 2	16%	14%	12%	15%	11%
	Level 3	10%	11%	11%	11%	13%
	Level 4/5	38%	48%	59%	39%	51%
	Other / Unknown	5%	4%	3%	5%	4%
Economic Activity - Unemployment	Economically active	71%	73%	76%	67%	65%
	Economically active, Unemployed	5%	5%	5%	6%	7%
Approximated Social Grade	AB	31%	39%	47%	29%	36%
	C1	33%	34%	34%	35%	32%
	C2	10%	7%	5%	10%	6%
	D	12%	9%	6%	13%	10%
	E	14%	11%	8%	14%	16%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station – 1km radius

		Bond Street	Tottenham Court Road	Farringdon	Liverpool Street	Whitechapel
Age Structure	<16	8%	10%	14%	20%	25%
	16-25	18%	24%	16%	19%	20%
	26-35	25%	23%	24%	24%	22%
	36-45	14%	15%	16%	14%	12%
	46-55	13%	10%	11%	8%	7%
	56-65	10%	8%	8%	7%	6%
	>65	12%	10%	11%	8%	9%
Ethnic Groups	White %	79%	72%	78%	49%	38%
	Mixed %	3%	3%	3%	2%	2%
	Asian %	8%	13%	8%	41%	54%
	Black %	4%	5%	7%	6%	5%
	Chinese %	7%	8%	4%	2%	2%
Qualification Levels	No qualifications	10%	15%	19%	28%	36%
	Level 1	5%	7%	8%	9%	10%
	Level 2	12%	11%	11%	12%	12%
	Level 3	15%	18%	11%	11%	10%
	Level 4/5	55%	45%	48%	37%	28%
	Other / Unknown	3%	3%	3%	4%	4%
Economic Activity - Unemployment	Economically active	70%	62%	66%	61%	54%
	Economically active, Unemployed	5%	7%	7%	10%	13%
Approximated Social Grade	AB	41%	32%	34%	26%	18%
	C1	35%	32%	30%	27%	25%
	C2	4%	7%	7%	8%	12%
	D	7%	10%	11%	17%	21%
	E	14%	19%	18%	20%	25%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station – 1km radius

		Isle of Dogs	Royals	Abbey Wood	Stratford	Forest Gate
Age Structure	<16	21%	26%	25%	24%	26%
	16-25	18%	15%	12%	17%	18%
	26-35	24%	19%	16%	20%	19%
	36-45	13%	16%	16%	14%	15%
	46-55	8%	10%	12%	9%	9%
	56-65	7%	7%	7%	6%	6%
	>65	10%	7%	12%	9%	7%
Ethnic Groups	White %	57%	58%	75%	46%	33%
	Mixed %	2%	4%	3%	4%	4%
	Asian %	27%	8%	5%	18%	39%
	Black %	8%	25%	14%	29%	22%
	Chinese %	6%	5%	3%	3%	2%
Qualification Levels	No qualifications	33%	33%	36%	31%	31%
	Level 1	11%	14%	18%	13%	13%
	Level 2	12%	16%	18%	15%	17%
	Level 3	9%	8%	6%	10%	9%
	Level 4/5	31%	23%	14%	26%	24%
	Other / Unknown	4%	6%	7%	6%	5%
Economic Activity - Unemployment	Economically active	61%	63%	64%	61%	59%
	Economically active, Unemployed	11%	10%	10%	12%	12%
Approximated Social Grade	AB	24%	17%	14%	17%	17%
	C1	26%	29%	28%	28%	29%
	C2	11%	13%	15%	11%	14%
	D	16%	22%	21%	22%	21%
	E	23%	18%	21%	22%	19%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station – 1km radius

		Manor Park	Ilford	Seven Kings	Goodmayes	Chadwell Heath
Age Structure	<16	27%	24%	24%	23%	23%
	16-25	18%	16%	15%	15%	12%
	26-35	17%	18%	16%	18%	19%
	36-45	14%	15%	15%	16%	16%
	46-55	10%	10%	12%	11%	11%
	56-65	6%	7%	8%	8%	8%
	>65	8%	9%	9%	9%	12%
Ethnic Groups	White %	27%	33%	39%	51%	79%
	Mixed %	3%	3%	3%	3%	2%
	Asian %	50%	48%	44%	34%	10%
	Black %	18%	15%	12%	10%	7%
	Chinese %	2%	2%	1%	1%	1%
Qualification Levels	No qualifications	33%	29%	26%	26%	31%
	Level 1	14%	14%	14%	17%	21%
	Level 2	16%	18%	20%	20%	21%
	Level 3	10%	9%	10%	9%	7%
	Level 4/5	21%	25%	24%	23%	14%
	Other / Unknown	6%	5%	6%	6%	6%
Economic Activity - Unemployment	Economically active	56%	59%	63%	66%	69%
	Economically active, Unemployed	13%	11%	7%	6%	5%
Approximated Social Grade	AB	16%	20%	22%	23%	17%
	C1	28%	31%	33%	33%	34%
	C2	14%	13%	14%	14%	17%
	D	23%	18%	19%	18%	17%
	E	19%	18%	12%	12%	15%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station – 1km radius

		Romford	Gidea Park	Harold Wood	Brentwood	Shenfield
Age Structure	<16	19%	18%	19%	17%	18%
	16-25	13%	12%	12%	11%	9%
	26-35	20%	13%	15%	21%	10%
	36-45	15%	15%	15%	15%	14%
	46-55	12%	15%	13%	12%	14%
	56-65	8%	10%	9%	8%	13%
	>65	14%	17%	17%	15%	21%
Ethnic Groups	White %	91%	95%	95%	94%	97%
	Mixed %	2%	1%	1%	1%	1%
	Asian %	3%	2%	2%	2%	1%
	Black %	2%	1%	1%	1%	0%
	Chinese %	1%	1%	1%	1%	1%
Qualification Levels	No qualifications	27%	25%	30%	17%	15%
	Level 1	20%	19%	19%	15%	14%
	Level 2	22%	24%	22%	23%	25%
	Level 3	8%	9%	7%	9%	12%
	Level 4/5	16%	16%	14%	31%	29%
	Other / Unknown	6%	8%	8%	5%	6%
Economic Activity - Unemployment	Economically active	72%	70%	69%	75%	63%
	Economically active, Unemployed	4%	3%	4%	3%	2%
Approximated Social Grade	AB	21%	26%	22%	34%	44%
	C1	34%	37%	35%	37%	35%
	C2	15%	13%	14%	9%	4%
	D	15%	11%	13%	9%	4%
	E	15%	13%	16%	12%	12%

15. Appendix C: Demographic and socio-economic characteristics of regeneration areas within a 1km radius of Crossrail stations by subject

Census 2001 Population - National 20% most deprived areas - 1km radius

Crossrail Station	Population
West Drayton	700
Hayes	1,500
Southall	11,100
Hanwell	5,400
West Ealing	1,300
Acton Main Line	1,900
Paddington	14,400
Tottenham Court Road	5,700
Farringdon	13,000
Liverpool Street	12,000
Whitechapel	35,600
Isle of Dogs	13,900
Royals	8,000
Abbey Wood	10,200
Stratford	10,700
Forest Gate	23,100
Manor Park	15,200
Ilford	8,300
Chadwell Heath	7,600
Romford	1,500
TOTAL	**196,000**

Census 2001 Age Structure - National 20% most deprived areas - 1km radius

Crossrail Station	<16	16-25	26-35	36-45	46-55	56-65	>65
West Drayton	34%	12%	18%	14%	9%	7%	6%
Hayes	27%	17%	18%	12%	10%	8%	9%
Southall	24%	17%	19%	14%	10%	8%	9%
Hanwell	29%	16%	20%	13%	8%	5%	9%
West Ealing	16%	16%	25%	15%	11%	8%	9%
Acton Main Line	26%	14%	18%	16%	10%	6%	9%
Paddington	16%	16%	23%	14%	10%	8%	12%
Tottenham Court Road	9%	25%	24%	16%	10%	8%	8%
Farringdon	18%	17%	24%	16%	9%	7%	11%
Liverpool Street	24%	22%	22%	12%	7%	6%	7%
Whitechapel	25%	20%	21%	12%	7%	6%	9%
Isle of Dogs	25%	17%	18%	12%	9%	7%	12%
Royals	27%	15%	18%	16%	10%	7%	8%
Abbey Wood	26%	13%	16%	14%	11%	7%	13%
Stratford	25%	17%	20%	14%	9%	6%	9%
Forest Gate	27%	18%	19%	14%	9%	6%	7%
Manor Park	28%	18%	17%	14%	9%	6%	8%
Ilford	26%	16%	18%	15%	9%	7%	9%
Chadwell Heath	25%	13%	16%	15%	10%	8%	14%
Romford	22%	15%	21%	16%	10%	5%	10%
TOTAL	**24%**	**18%**	**20%**	**14%**	**9%**	**7%**	**9%**

Census 2001 Ethnic Groups - National 20% most deprived areas - 1km radius

Crossrail Station	White	Mixed	Asian	Black	Chinese
West Drayton	84%	5%	8%	1%	2%
Hayes	47%	3%	33%	13%	3%
Southall	17%	3%	67%	10%	4%
Hanwell	47%	7%	16%	25%	6%
West Ealing	79%	3%	10%	6%	2%
Acton Main Line	53%	6%	15%	21%	5%
Paddington	67%	6%	11%	9%	7%
Tottenham Court Road	73%	3%	9%	6%	8%
Farringdon	74%	3%	10%	9%	4%
Liverpool Street	36%	2%	55%	6%	2%
Whitechapel	38%	2%	53%	5%	2%
Isle of Dogs	52%	3%	31%	9%	5%
Royals	59%	4%	8%	26%	4%
Abbey Wood	75%	3%	4%	15%	3%
Stratford	44%	4%	18%	31%	3%
Forest Gate	27%	3%	46%	21%	2%
Manor Park	24%	3%	53%	18%	2%
Ilford	33%	3%	40%	22%	2%
Chadwell Heath	84%	2%	7%	6%	1%
Romford	85%	3%	7%	3%	2%
TOTAL	**47%**	**3%**	**34%**	**13%**	**3%**

Census 2001 Qualification Levels - National 20% most deprived areas - 1km radius

Crossrail Station	No qualifications	Level 1	Level 2	Level 3	Level 4/5	Other
West Drayton	38%	18%	20%	8%	9%	7%
Hayes	35%	18%	16%	9%	17%	6%
Southall	31%	16%	16%	10%	21%	5%
Hanwell	28%	17%	17%	9%	23%	5%
West Ealing	14%	10%	15%	11%	47%	4%
Acton Main Line	27%	14%	16%	10%	28%	5%
Paddington	25%	8%	13%	11%	38%	5%
Tottenham Court Road	15%	7%	13%	17%	45%	3%
Farringdon	26%	10%	12%	10%	39%	4%
Liverpool Street	34%	10%	12%	10%	30%	4%
Whitechapel	38%	10%	13%	9%	27%	4%
Isle of Dogs	41%	13%	13%	8%	20%	5%
Royals	38%	14%	15%	8%	19%	6%
Abbey Wood	39%	17%	17%	6%	14%	7%
Stratford	33%	13%	15%	10%	23%	6%
Forest Gate	33%	14%	16%	10%	23%	5%
Manor Park	35%	15%	16%	9%	19%	6%
Ilford	33%	15%	17%	8%	20%	6%
Chadwell Heath	41%	19%	18%	6%	9%	7%
Romford	32%	18%	21%	6%	17%	5%
TOTAL	**33%**	**13%**	**14%**	**9%**	**26%**	**5%**

Census 2001 Economic Activity and Unemployment rates - National 20% most deprived areas - 1km radius

Crossrail Station	Economically active	Unemployed
West Drayton	64%	6%
Hayes	58%	8%
Southall	60%	10%
Hanwell	56%	13%
West Ealing	76%	5%
Acton Main Line	57%	8%
Paddington	60%	9%
Tottenham Court Road	65%	9%
Farringdon	60%	10%
Liverpool Street	55%	13%
Whitechapel	53%	13%
Isle of Dogs	54%	13%
Royals	60%	12%
Abbey Wood	59%	12%
Stratford	59%	13%
Forest Gate	56%	13%
Manor Park	54%	13%
Ilford	56%	14%
Chadwell Heath	62%	7%
Romford	68%	9%
TOTAL	**57%**	**12%**

Census 2001 Approximated Social Grade - National 20% most deprived areas - 1km radius

Crossrail Station	AB	C1	C2	D	E
West Drayton	15%	27%	20%	24%	14%
Hayes	12%	28%	15%	26%	19%
Southall	15%	24%	16%	29%	17%
Hanwell	16%	28%	11%	20%	25%
West Ealing	36%	39%	5%	9%	11%
Acton Main Line	20%	30%	10%	19%	21%
Paddington	24%	31%	8%	15%	22%
Tottenham Court Road	32%	34%	7%	10%	17%
Farringdon	25%	29%	9%	15%	22%
Liverpool Street	19%	26%	10%	20%	24%
Whitechapel	16%	24%	12%	21%	26%
Isle of Dogs	14%	24%	14%	19%	28%
Royals	14%	28%	14%	23%	21%
Abbey Wood	13%	26%	14%	22%	25%
Stratford	15%	26%	12%	22%	24%
Forest Gate	16%	29%	13%	23%	20%
Manor Park	13%	27%	16%	23%	21%
Ilford	14%	27%	14%	21%	24%
Chadwell Heath	11%	30%	17%	22%	20%
Romford	15%	31%	16%	20%	18%
TOTAL	**17%**	**27%**	**12%**	**21%**	**23%**

16. Appendix D: Demographic and socio-economic characteristics of regeneration areas within a 1km radius of Crossrail stations by station

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 1km radius

		West Drayton	Hayes	Southall	Hanwell	West Ealing
Age Structure	<16	34%	27%	24%	29%	16%
	16-25	12%	17%	17%	16%	16%
	26-35	18%	18%	19%	20%	25%
	36-45	14%	12%	14%	13%	15%
	46-55	9%	10%	10%	8%	11%
	56-65	7%	8%	8%	5%	8%
	>65	6%	9%	9%	9%	9%
Ethnic Groups	White %	84%	47%	17%	47%	79%
	Mixed %	5%	3%	3%	7%	3%
	Asian %	8%	33%	67%	16%	10%
	Black %	1%	13%	10%	25%	6%
	Chinese %	2%	3%	4%	6%	2%
Qualification Levels	No qualifications	38%	35%	31%	28%	14%
	Level 1	18%	18%	16%	17%	10%
	Level 2	20%	16%	16%	17%	15%
	Level 3	8%	9%	10%	9%	11%
	Level 4/5	9%	17%	21%	23%	47%
	Other / unknown	7%	6%	5%	5%	4%
Economic Activity / Unemployment	Economically active	64%	58%	60%	56%	76%
	Economically active, Unemployed	6%	8%	10%	13%	5%
Approximated Social Grade	AB	15%	12%	15%	16%	36%
	C1	27%	28%	24%	28%	39%
	C2	20%	15%	16%	11%	5%
	D	24%	26%	29%	20%	9%
	E	14%	19%	17%	25%	11%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 1km radius

		Acton Main Line	Paddington	Tottenham Court Road	Farringdon	Liverpool Street
Age Structure	<16	26%	16%	9%	18%	24%
	16-25	14%	16%	25%	17%	22%
	26-35	18%	23%	24%	24%	22%
	36-45	16%	14%	16%	16%	12%
	46-55	10%	10%	10%	9%	7%
	56-65	6%	8%	8%	7%	6%
	>65	9%	12%	8%	11%	7%
Ethnic Groups	White %	53%	67%	73%	74%	36%
	Mixed %	6%	6%	3%	3%	2%
	Asian %	15%	11%	9%	10%	55%
	Black %	21%	9%	6%	9%	6%
	Chinese %	5%	7%	8%	4%	2%
Qualification Levels	No qualifications	27%	25%	15%	26%	34%
	Level 1	14%	8%	7%	10%	10%
	Level 2	16%	13%	13%	12%	12%
	Level 3	10%	11%	17%	10%	10%
	Level 4/5	28%	38%	45%	39%	30%
	Other / unknown	5%	5%	3%	4%	4%
Economic Activity / Unemployment	Economically active	57%	60%	65%	60%	55%
	Economically active, Unemployed	8%	9%	9%	10%	13%
Approximated Social Grade	AB	20%	24%	32%	25%	19%
	C1	30%	31%	34%	29%	26%
	C2	10%	8%	7%	9%	10%
	D	19%	15%	10%	15%	20%
	E	21%	22%	17%	22%	24%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 1km radius

		Whitechapel	Isle of Dogs	Royals	Abbey Wood	Stratford
Age Structure	<16	25%	25%	27%	26%	25%
	16-25	20%	17%	15%	13%	17%
	26-35	21%	18%	18%	16%	20%
	36-45	12%	12%	16%	14%	14%
	46-55	7%	9%	10%	11%	9%
	56-65	6%	7%	7%	7%	6%
	>65	9%	12%	8%	13%	9%
Ethnic Groups	White %	38%	52%	59%	75%	44%
	Mixed %	2%	3%	4%	3%	4%
	Asian %	53%	31%	8%	4%	18%
	Black %	5%	9%	26%	15%	31%
	Chinese %	2%	5%	4%	3%	3%
Qualification Levels	No qualifications	38%	41%	38%	39%	33%
	Level 1	10%	13%	14%	17%	13%
	Level 2	13%	13%	15%	17%	15%
	Level 3	9%	8%	8%	6%	10%
	Level 4/5	27%	20%	19%	14%	23%
	Other / unknown	4%	5%	6%	7%	6%
Economic Activity / Unemployment	Economically active	53%	54%	60%	59%	59%
	Economically active, Unemployed	13%	13%	12%	12%	13%
Approximated Social Grade	AB	16%	14%	14%	13%	15%
	C1	24%	24%	28%	26%	26%
	C2	12%	14%	14%	14%	12%
	D	21%	19%	23%	22%	22%
	E	26%	28%	21%	25%	24%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 1km radius

		Forest Gate	Manor Park	Ilford	Chadwell Heath	Romford
Age Structure	<16	27%	28%	26%	25%	22%
	16-25	18%	18%	16%	13%	15%
	26-35	19%	17%	18%	16%	21%
	36-45	14%	14%	15%	15%	16%
	46-55	9%	9%	9%	10%	10%
	56-65	6%	6%	7%	8%	5%
	>65	7%	8%	9%	14%	10%
Ethnic Groups	White %	27%	24%	33%	84%	85%
	Mixed %	3%	3%	3%	2%	3%
	Asian %	46%	53%	40%	7%	7%
	Black %	21%	18%	22%	6%	3%
	Chinese %	2%	2%	2%	1%	2%
Qualification Levels	No qualifications	33%	35%	33%	41%	32%
	Level 1	14%	15%	15%	19%	18%
	Level 2	16%	16%	17%	18%	21%
	Level 3	10%	9%	8%	6%	6%
	Level 4/5	23%	19%	20%	9%	17%
	Other / unknown	5%	6%	6%	7%	5%
Economic Activity / Unemployment	Economically active	56%	54%	56%	62%	68%
	Economically active, Unemployed	13%	13%	14%	7%	9%
Approximated Social Grade	AB	16%	13%	14%	11%	15%
	C1	29%	27%	27%	30%	31%
	C2	13%	16%	14%	17%	16%
	D	23%	23%	21%	22%	20%
	E	20%	21%	24%	20%	18%

17. Appendix E: Demographic and socio-economic characteristics of regeneration areas within a 2km radius of Crossrail stations by subject

Census 2001 Population - National 20% most deprived areas - 2km radius

Crossrail Station	Population
Burnham	3,400
Slough	1,400
Langley	1,600
West Drayton	2,800
Hayes	6,200
Southall	22,400
Hanwell	14,800
West Ealing	6,000
Ealing Broadway	3,200
Acton Main Line	14,000
Paddington	39,400
Bond Street	19,400
Tottenham Court Road	32,400
Farringdon	50,700
Liverpool Street	84,100
Whitechapel	111,400
Isle of Dogs	55,300
Royals	39,400
Abbey Wood	21,000
Stratford	54,700
Forest Gate	70,500
Manor Park	62,300
Ilford	26,100
Seven Kings	4,500
Goodmayes	14,300
Chadwell Heath	24,100
Romford	1,500
Gidea Park	700
Harold Wood	3,000
TOTAL	543,500

Census 2001 Age Structure - National 20% most deprived areas - 2km radius

Crossrail Station	<16	16-25	26-35	36-45	46-55	56-65	>65
Burnham	29%	14%	15%	17%	9%	6%	10%
Slough	24%	13%	18%	14%	10%	11%	10%
Langley	20%	12%	16%	13%	14%	13%	13%
West Drayton	26%	11%	16%	14%	11%	8%	13%
Hayes	26%	14%	18%	14%	11%	8%	10%
Southall	27%	16%	18%	15%	9%	7%	8%
Hanwell	27%	15%	19%	15%	9%	7%	9%
West Ealing	26%	14%	20%	14%	10%	6%	10%
Ealing Broadway	23%	16%	22%	14%	9%	7%	9%
Acton Main Line	22%	15%	18%	15%	11%	8%	11%
Paddington	19%	15%	22%	14%	10%	8%	11%
Bond Street	18%	21%	21%	14%	10%	8%	10%
Tottenham Court Road	19%	19%	22%	15%	10%	6%	9%
Farringdon	18%	17%	23%	16%	9%	7%	10%
Liverpool Street	23%	18%	22%	13%	8%	6%	9%
Whitechapel	24%	19%	21%	12%	7%	6%	9%
Isle of Dogs	27%	18%	19%	13%	8%	6%	9%
Royals	27%	16%	18%	15%	10%	7%	9%
Abbey Wood	26%	13%	17%	15%	11%	7%	11%
Stratford	25%	17%	20%	14%	9%	6%	9%
Forest Gate	26%	17%	19%	14%	9%	6%	8%
Manor Park	28%	18%	18%	14%	9%	6%	7%
Ilford	28%	17%	18%	14%	9%	6%	9%
Seven Kings	23%	15%	20%	16%	9%	6%	10%
Goodmayes	24%	12%	17%	14%	10%	8%	15%
Chadwell Heath	24%	13%	16%	14%	10%	8%	15%
Romford	22%	15%	21%	16%	10%	5%	10%
Gidea Park	24%	19%	21%	14%	10%	5%	7%
Harold Wood	25%	12%	17%	15%	10%	6%	16%
TOTAL	**24%**	**17%**	**20%**	**14%**	**9%**	**7%**	**10%**

Census 2001 Ethnic Groups - National 20% most deprived areas - 2km radius

Crossrail Station	White	Mixed	Asian	Black	Chinese
Burnham	75%	4%	11%	9%	0%
Slough	33%	3%	53%	9%	1%
Langley	69%	3%	13%	14%	1%
West Drayton	86%	2%	9%	1%	2%
Hayes	55%	3%	29%	9%	3%
Southall	28%	4%	52%	14%	3%
Hanwell	46%	5%	26%	20%	4%
West Ealing	57%	6%	14%	18%	4%
Ealing Broadway	62%	6%	12%	17%	4%
Acton Main Line	58%	5%	10%	21%	5%
Paddington	62%	6%	11%	15%	6%
Bond Street	61%	4%	18%	9%	7%
Tottenham Court Road	61%	4%	19%	11%	6%
Farringdon	69%	4%	10%	13%	5%
Liverpool Street	49%	3%	35%	11%	2%
Whitechapel	45%	3%	42%	8%	2%
Isle of Dogs	49%	3%	35%	9%	4%
Royals	58%	4%	10%	25%	3%
Abbey Wood	72%	3%	6%	17%	2%
Stratford	45%	4%	22%	26%	3%
Forest Gate	33%	4%	39%	23%	2%
Manor Park	23%	3%	54%	18%	2%
Ilford	30%	3%	45%	20%	2%
Seven Kings	63%	3%	22%	10%	2%
Goodmayes	88%	2%	4%	5%	1%
Chadwell Heath	89%	2%	3%	5%	1%
Romford	85%	3%	7%	3%	2%
Gidea Park	77%	4%	10%	5%	4%
Harold Wood	95%	1%	1%	2%	1%
TOTAL	**52%**	**3%**	**27%**	**14%**	**3%**

Census 2001 Qualification Levels - National 20% most deprived areas - 2km radius

Crossrail Station	No qualifications	Level 1	Level 2	Level 3	Level 4/5	Other qualifications
Burnham	38%	21%	18%	6%	11%	6%
Slough	38%	15%	15%	8%	19%	5%
Langley	38%	17%	17%	7%	14%	6%
West Drayton	43%	19%	17%	7%	8%	7%
Hayes	35%	17%	17%	8%	16%	7%
Southall	31%	16%	17%	9%	21%	6%
Hanwell	28%	15%	17%	9%	25%	6%
West Ealing	25%	14%	16%	10%	30%	6%
Ealing Broadway	22%	14%	16%	10%	33%	5%
Acton Main Line	32%	13%	15%	10%	25%	6%
Paddington	25%	10%	14%	11%	36%	5%
Bond Street	24%	9%	13%	15%	35%	4%
Tottenham Court Road	25%	9%	13%	13%	35%	4%
Farringdon	27%	10%	12%	11%	36%	4%
Liverpool Street	35%	10%	13%	9%	28%	4%
Whitechapel	37%	10%	13%	10%	27%	4%
Isle of Dogs	40%	12%	13%	9%	22%	5%
Royals	38%	14%	16%	8%	18%	6%
Abbey Wood	37%	17%	18%	6%	16%	7%
Stratford	33%	13%	16%	9%	24%	6%
Forest Gate	34%	14%	16%	9%	22%	6%
Manor Park	34%	14%	16%	9%	20%	5%
Ilford	35%	15%	17%	9%	19%	5%
Seven Kings	32%	18%	17%	8%	20%	5%
Goodmayes	42%	19%	17%	6%	9%	7%
Chadwell Heath	43%	19%	17%	5%	8%	7%
Romford	32%	18%	21%	6%	17%	5%
Gidea Park	31%	15%	19%	6%	25%	4%
Harold Wood	40%	23%	17%	6%	7%	8%
TOTAL	**34%**	**13%**	**15%**	**9%**	**24%**	**5%**

Census 2001 Economic Activity and Unemployment rates - National 20% most deprived areas - 2km radius

Crossrail Station	Economically active	Economically active, Unemployed
Burnham	66%	8%
Slough	64%	7%
Langley	66%	10%
West Drayton	66%	5%
Hayes	62%	8%
Southall	58%	9%
Hanwell	59%	9%
West Ealing	62%	10%
Ealing Broadway	65%	9%
Acton Main Line	59%	10%
Paddington	61%	10%
Bond Street	58%	10%
Tottenham Court Road	58%	11%
Farringdon	62%	10%
Liverpool Street	57%	12%
Whitechapel	55%	13%
Isle of Dogs	55%	14%
Royals	59%	12%
Abbey Wood	62%	11%
Stratford	59%	12%
Forest Gate	57%	13%
Manor Park	55%	13%
Ilford	55%	13%
Seven Kings	60%	9%
Goodmayes	61%	7%
Chadwell Heath	61%	8%
Romford	68%	9%
Gidea Park	67%	13%
Harold Wood	63%	9%
TOTAL	**58%**	**11%**

Census 2001 Approximated Social Grade - National 20% most deprived areas - 2km radius

Crossrail Station	AB	C1	C2	D	E
Burnham	12%	26%	15%	27%	20%
Slough	14%	22%	16%	32%	15%
Langley	10%	23%	15%	31%	20%
West Drayton	13%	31%	17%	21%	19%
Hayes	13%	26%	15%	25%	20%
Southall	15%	25%	16%	27%	18%
Hanwell	19%	29%	12%	20%	20%
West Ealing	22%	31%	9%	17%	21%
Ealing Broadway	25%	32%	8%	15%	19%
Acton Main Line	17%	29%	12%	19%	23%
Paddington	24%	31%	9%	15%	21%
Bond Street	23%	29%	10%	15%	23%
Tottenham Court Road	22%	29%	10%	16%	22%
Farringdon	24%	29%	9%	16%	22%
Liverpool Street	18%	26%	11%	20%	25%
Whitechapel	17%	25%	12%	20%	25%
Isle of Dogs	15%	24%	13%	21%	27%
Royals	14%	27%	14%	23%	23%
Abbey Wood	14%	27%	15%	23%	22%
Stratford	16%	28%	12%	22%	23%
Forest Gate	15%	27%	14%	23%	21%
Manor Park	14%	26%	15%	24%	20%
Ilford	14%	27%	15%	22%	22%
Seven Kings	15%	32%	14%	18%	21%
Goodmayes	11%	28%	17%	21%	22%
Chadwell Heath	10%	27%	17%	21%	24%
Romford	15%	31%	16%	20%	18%
Gidea Park	18%	27%	16%	19%	20%
Harold Wood	9%	29%	16%	22%	23%
TOTAL	**17%**	**27%**	**13%**	**21%**	**23%**

18. Appendix F: Demographic and socio-economic characteristics of regeneration areas within a 2km radius of Crossrail stations by station

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 2km radius

		Burnham	Slough	Langley	West Drayton	Hayes
Age Structure	<16	29%	24%	20%	26%	26%
	16-25	14%	13%	12%	11%	14%
	26-35	15%	18%	16%	16%	18%
	36-45	17%	14%	13%	14%	14%
	46-55	9%	10%	14%	11%	11%
	56-65	6%	11%	13%	8%	8%
	>65	10%	10%	13%	13%	10%
Ethnic Groups	White %	75%	33%	69%	86%	55%
	Mixed %	4%	3%	3%	2%	3%
	Asian %	11%	53%	13%	9%	29%
	Black %	9%	9%	14%	1%	9%
	Chinese %	0%	1%	1%	2%	3%
Qualification Levels	No qualifications	38%	38%	38%	43%	35%
	Level 1	21%	15%	17%	19%	17%
	Level 2	18%	15%	17%	17%	17%
	Level 3	6%	8%	7%	7%	8%
	Level 4/5	11%	19%	14%	8%	16%
	Other / unknown	6%	5%	6%	7%	7%
Economic Activity / Unemployment	Economically active	66%	64%	66%	66%	62%
	Economically active, Unemployed	8%	7%	10%	5%	8%
Approximated Social Grade	AB	12%	14%	10%	13%	13%
	C1	26%	22%	23%	31%	26%
	C2	15%	16%	15%	17%	15%
	D	27%	32%	31%	21%	25%
	E	20%	15%	20%	19%	20%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 2km radius

		Southall	Hanwell	West Ealing	Ealing Broadway	Acton Main Line
Age Structure	<16	27%	27%	26%	23%	22%
	16-25	16%	15%	14%	16%	15%
	26-35	18%	19%	20%	22%	18%
	36-45	15%	15%	14%	14%	15%
	46-55	9%	9%	10%	9%	11%
	56-65	7%	7%	6%	7%	8%
	>65	8%	9%	10%	9%	11%
Ethnic Groups	White %	28%	46%	57%	62%	58%
	Mixed %	4%	5%	6%	6%	5%
	Asian %	52%	26%	14%	12%	10%
	Black %	14%	20%	18%	17%	21%
	Chinese %	3%	4%	4%	4%	5%
Qualification Levels	No qualifications	31%	28%	25%	22%	32%
	Level 1	16%	15%	14%	14%	13%
	Level 2	17%	17%	16%	16%	15%
	Level 3	9%	9%	10%	10%	10%
	Level 4/5	21%	25%	30%	33%	25%
	Other / unknown	6%	6%	6%	5%	6%
Economic Activity / Unemployment	Economically active	58%	59%	62%	65%	59%
	Economically active, Unemployed	9%	9%	10%	9%	10%
Approximated Social Grade	AB	15%	19%	22%	25%	17%
	C1	25%	29%	31%	32%	29%
	C2	16%	12%	9%	8%	12%
	D	27%	20%	17%	15%	19%
	E	18%	20%	21%	19%	23%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 2km radius

		Paddington	Bond Street	Tottenham Court Road	Farringdon	Liverpool Street
Age Structure	<16	19%	18%	19%	18%	23%
	16-25	15%	21%	19%	17%	18%
	26-35	22%	21%	22%	23%	22%
	36-45	14%	14%	15%	16%	13%
	46-55	10%	10%	10%	9%	8%
	56-65	8%	8%	6%	7%	6%
	>65	11%	10%	9%	10%	9%
Ethnic Groups	White %	62%	61%	61%	69%	49%
	Mixed %	6%	4%	4%	4%	3%
	Asian %	11%	18%	19%	10%	35%
	Black %	15%	9%	11%	13%	11%
	Chinese %	6%	7%	6%	5%	2%
Qualification Levels	No qualifications	25%	24%	25%	27%	35%
	Level 1	10%	9%	9%	10%	10%
	Level 2	14%	13%	13%	12%	13%
	Level 3	11%	15%	13%	11%	9%
	Level 4/5	36%	35%	35%	36%	28%
	Other / unknown	5%	4%	4%	4%	4%
Economic Activity / Unemployment	Economically active	61%	58%	58%	62%	57%
	Economically active, Unemployed	10%	10%	11%	10%	12%
Approximated Social Grade	AB	24%	23%	22%	24%	18%
	C1	31%	29%	29%	29%	26%
	C2	9%	10%	10%	9%	11%
	D	15%	15%	16%	16%	20%
	E	21%	23%	22%	22%	25%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 2km radius

		Whitechapel	Isle of Dogs	Royals	Abbey Wood	Stratford	Forest Gate
Age Structure	<16	24%	27%	27%	26%	25%	26%
	16-25	19%	18%	16%	13%	17%	17%
	26-35	21%	19%	18%	17%	20%	19%
	36-45	12%	13%	15%	15%	14%	14%
	46-55	7%	8%	10%	11%	9%	9%
	56-65	6%	6%	7%	7%	6%	6%
	>65	9%	9%	9%	11%	9%	8%
Ethnic Groups	White %	45%	49%	58%	72%	45%	33%
	Mixed %	3%	3%	4%	3%	4%	4%
	Asian %	42%	35%	10%	6%	22%	39%
	Black %	8%	9%	25%	17%	26%	23%
	Chinese %	2%	4%	3%	2%	3%	2%
Qualification Levels	No qualifications	37%	40%	38%	37%	33%	34%
	Level 1	10%	12%	14%	17%	13%	14%
	Level 2	13%	13%	16%	18%	16%	16%
	Level 3	10%	9%	8%	6%	9%	9%
	Level 4/5	27%	22%	18%	16%	24%	22%
	Other / unknown	4%	5%	6%	7%	6%	6%
Economic Activity / Unemployment	Economically active	55%	55%	59%	62%	59%	57%
	Economically active, Unemployed	13%	14%	12%	11%	12%	13%
Approximated Social Grade	AB	17%	15%	14%	14%	16%	15%
	C1	25%	24%	27%	27%	28%	27%
	C2	12%	13%	14%	15%	12%	14%
	D	20%	21%	23%	23%	22%	23%
	E	25%	27%	23%	22%	23%	21%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 2km radius

		Manor Park	Ilford	Seven Kings	Goodmayes	Chadwell Heath
Age Structure	<16	28%	28%	23%	24%	24%
	16-25	18%	17%	15%	12%	13%
	26-35	18%	18%	20%	17%	16%
	36-45	14%	14%	16%	14%	14%
	46-55	9%	9%	9%	10%	10%
	56-65	6%	6%	6%	8%	8%
	>65	7%	9%	10%	15%	15%
Ethnic Groups	White %	23%	30%	63%	88%	89%
	Mixed %	3%	3%	3%	2%	2%
	Asian %	54%	45%	22%	4%	3%
	Black %	18%	20%	10%	5%	5%
	Chinese %	2%	2%	2%	1%	1%
Qualification Levels	No qualifications	34%	35%	32%	42%	43%
	Level 1	14%	15%	18%	19%	19%
	Level 2	16%	17%	17%	17%	17%
	Level 3	9%	9%	8%	6%	5%
	Level 4/5	20%	19%	20%	9%	8%
	Other / unknown	5%	5%	5%	7%	7%
Economic Activity / Unemployment	Economically active	55%	55%	60%	61%	61%
	Economically active, Unemployed	13%	13%	9%	7%	8%
Approximated Social Grade	AB	14%	14%	15%	11%	10%
	C1	26%	27%	32%	28%	27%
	C2	15%	15%	14%	17%	17%
	D	24%	22%	18%	21%	21%
	E	20%	22%	21%	22%	24%

Census 2001 Demographic and Socio-Economic Characteristics by Crossrail Station - Bottom 20% most deprived areas within 2km radius

		Romford	Gidea Park	Harold Wood
Age Structure	<16	22%	24%	25%
	16-25	15%	19%	12%
	26-35	21%	21%	17%
	36-45	16%	14%	15%
	46-55	10%	10%	10%
	56-65	5%	5%	6%
	>65	10%	7%	16%
Ethnic Groups	White %	85%	77%	95%
	Mixed %	3%	4%	1%
	Asian %	7%	10%	1%
	Black %	3%	5%	2%
	Chinese %	2%	4%	1%
Qualification Levels	No qualifications	32%	31%	40%
	Level 1	18%	15%	23%
	Level 2	21%	19%	17%
	Level 3	6%	6%	6%
	Level 4/5	17%	25%	7%
	Other / unknown	5%	4%	8%
Economic Activity / Unemployment	Economically active	68%	67%	63%
	Economically active, Unemployed	9%	13%	9%
Approximated Social Grade	AB	15%	18%	9%
	C1	31%	27%	29%
	C2	16%	16%	16%
	D	20%	19%	22%
	E	18%	20%	23%

19. Appendix G: Employment and jobs attributable to Crossrail by area

Station	*Jobs attracted to area Drivers Jonas analysis* base	*population increase Drivers Jonas analysis* base
Maidenhead	100	300
Taplow	0	0
Burnham	0	0
Slough	800	600
Langley	0	0
Iver	0	0
West Drayton	0	0
Heathrow	0	0
Hayes	500	300
Southall	1,700	2,300
Hanwell	0	0
West Ealing	0	0
Ealing Broadway	1,200	600
Acton Main Line	0	0
Paddington	5,800	700
Bond Street	0	0
Tottenham Court Rd	0	0
Farringdon	0	0
Liverpool St	0	0
Whitechapel	3,500	200
Stratford	9,500	5,300
Isle of Dogs	40,000	2,600
Forest Gate	1,000	2,000
Manor Park	0	500
Ilford	2,500	9,200
Seven Kings	0	0
Goodmayes	0	0
Chadwell Heath	0	0
Romford	0	0
Gidea Park	0	0
Harold Wood	0	0
Brentwood	100	1,100
Shenfield	0	0
Royals	11,000	4,800
Abbey Wood	0	1,800
Total	80600	40600

20. Appendix H: Businesses affected by land take during construction of Crossrail

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
C1	Great Western Studios	W9 3NY	Various artists	150	150	Survey
C1	Great Western Studios	W9 3NY	Great Western Studios Management Ltd	5	5	Survey
C1	Great Western Road	W9 3NY	Marcon Topmix Limited	10	10	Survey
C1	Alfred Road	W2 5EU	J .Murphy & Sons Limited	110	110	Survey
C1	177 Harrow Road	W2 6NB	British Clean Fuels, SGQ Ltd, London Cab Company Ltd, Taxi Tyre Service Limited, Enfield Taxi Motors Ltd, Royal Oak Taxi Centre Ltd, Dyno's Bike Ltd	3	5	VOA
C2	4-18 Bishop's Bridge Road	W2 6AA	The Bridge Research, BMP DDB Ltd	48	96	Promap
C2	London Street		Lynx Express Ltd	0	1	VOA
C2	191-199 Praed Street	W2 1RH	Fotosprint, Ashwin Amin, Leluu Accessories, Dallas Cars, Reload Internet, Mercury Change International	11	17	VOA
C2	19 Spring Street	W2 1JA	Desai News	1	2	VOA
C2	20 Spring Street	W2 1JA	Tutto Fresco	1	2	VOA
C2	21 Spring Street	W2 1JA	Lolita	1	2	VOA
C2	22 Spring Street	W2 1JA	Sandro Sandwich Bar	2	4	VOA
C2	Paddington Lawn Ticket Hall		WH Smith	3	3	Estimate
C4	65 Davis Street	W1K 5DA	University of the Arts, London Institute of Fashion	460	460	Survey
C4	18 Hanover Square	W1S 1HY	Vacant	573	819	Promap
C4	19 Hanover Square	W1S 1HY	Vacant	Included in above	Included in above	
C4	1a Tenterden Street	W1S 1JN	Vacant	Included in above	Included in above	
C5	Newman Street		Royal Mail, car park only			
C5	1 Great Chapel Street	W1F 8FA	GHA Group	5	5	Survey
C5	1 Great Chapel Street	W1F 8FA	Sensation	6	6	Survey
C5	3-4 Great Chapel Street	W1F 8FA	Tai Buffet, Chatsworth Television	10	18	VOA
C5	2 Great Chapel Street	W1F 8FA	Finishing Touches	Included in 1 Great	Included in 1 Great	

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
				Chapel Street	Chapel Street	
C5	5 Great Chapel Street	W1F 8FE	Metro Broadcast Ltd	48	48	Survey
C5	5-7 Great Chapel Street	W1F 8FF	Pukka Post	7	7	Promap
C5	6-7 Great Chapel Street	W1F 8FF	Metro Broadcast Ltd	Included above	Included above	
C5	8 Great Chapel Street	W1F 8FG	Empty	2	4	VOA
C5	9 Great Chapel Street	W1F 8FH	Primrose Agency, Walji, Chased by Cowboys, Pistol Marketing Ltd, Evening Entertainment Co, KBA Design, The Chinman Partnership, Broadcast & Video Company, Great Chapel College	10	13	VOA
C5	10-12 Great Chapel Street	W1F 8FJ	ARD TV and Radio (Norddeutscher Rundfunk)	21	28	VOA
C5	93 Dean Street (+9 Diadem Ct)	W1D 3SZ	Push	5	8	Promap
C5	94 Dean Street	W1D 3TA	Flip Side Marketing, Flying Records, Tidal Olive, Art4Noise, Pierre Victorie	5	9	VOA
C5	95 Dean Street	W1D 3TB	Shaw Graham Kersh Solicitors, Red Veg Ltd	7	10	VOA
C5	96 Dean Street	W1D 3TD	The Bath House	16	25	Promap
C5	97-99 Dean Street	W1D 3TG	Chatsworth Television, Fragile Films Ltd, Ealing Studios, TVFC, Wood Burden, A Vision, GHA Limited, Couch PH, Scidev. Net, Creative Brief UK Ltd, Karushi Ltd, Science & Development Network	32	42	VOA
C5	100 Dean Street	W1D 3TF	LCC Trans-Sending Limited, shop empty, Riddle International	30	30	Survey
C5	101 Dean Street	W1D 3TG	Bella Napoli Pasta & Pizza	16	16	Survey
C5	101 Dean Street	W1D 3TG	The Annex (Films) Ltd	4	6	VOA
C5	102 Dean Street	W1D 3TQ	Doneli	5	5	Survey
C5	102 Dean Street	W1D 3TQ	Study Eight Productions, Peach Arch Films	14	23	VOA
C5	102 Dean Street	W1D 3TQ	Real 451 Ltd	6	6	Survey
C5	102 Dean Street	W1D 3TQ	New Media Law, Barbara Music, MTV Films Europe	Included in first floor figure	Included in first floor figure	VOA
C5	102 Dean Street	W1D 3TQ	Reel Enterprises Ltd	8	8	Survey
C5	2-3 Fareham Street	W1D 3BB	RDP Ltd	12	18	VOA
C5	6-7 Fareham Street	W1D 3BB	Littlestar services Ltd	15	15	Survey
C5	91-101 Oxford Street	W1D 2HA	Guiltronics, Ann Summers, Eurochange Ltd, Café Nero, Stage One Storyboard, GHA Group, TVP Videodubbing Ltd, Design Sensation Ltd, Mr Ted, Alpha Angelo College	47	77	VOA

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
C5	135- 155 Charing Cross Road	WC2H 0EE	William Hill, Portavia, Office (shoe shop), Benjys, Sainsbury's, empty unit, OTM Studios, EMI Music Publishing, KPM Music House, Google, Mexx & Monet	38	123	VOA
C5	135- 155 Charing Cross Road	WC2H 0EE	EMI Music Publishing	110	110	Survey
C5	157- 165 Charing Cross Road	WC2H 0EN	Rangepost Ltd,, Astoria, Euromoney Exchange, Aquarius, The Mean Fiddler, Chopstix Noodle Bar	9	17	VOA
C5	157 Charing Cross Road	WC2H 0EL	Astoria	31	31	Promap
C5	167 Charing Cross Road	WC2H 0EN	Harmony	8	14	Promap
C5	148 Charing Cross Road	WC2H 0LB	Mr Toppers, Rouge Nightclub	15	28	VOA
C5	Charing Cross Road	WC1A 1DD	Harlequin Sports	27	27	VOA
C5	1-1a Oxford Street	W1D 2DB	Saks, 1st Oxford College, Right Recruitment	10	16	VOA
C5	3-5 Oxford Street	W1D 2DE	Empty being refurbished	23	34	VOA
C5	7 Oxford Street	W1D 2DF	The Link Stores	7	12	VOA
C5	9-15 Oxford Street	W1D 2DH	Clarks Shop, Riccardo's Snack Bar, Melfemi Entertainment, Siguy Films, Nats Post Production, Eurochange Ltd, Cambio Bureau de Change	42	64	VOA
C5	1-6 Falconberg Court	W1D 3AB	Bruce Dunlop	60	60	Survey
C5	1-6 Falconberg Court	W1D 3AB	Super 8 Rushes	2	2	Survey
C5	5-6 Falconberg Court	W1D 3AB	Ghetto Nightclub	25	25	Survey
C5	1-6 Falconberg Court	W1D 3AB	Bruce Dunlop & Associates, Super 8 Rushes, Promopromo, Kitsch Casting, EPK, Richard Clark, Michael Wildsmith, Waterstones	2	46	Promap
C5	12 Sutton Row	W1D 4AD	The Link Asset & Securities Co Ltd, Google, The Project (club), Mars (club), Mexx Factory Outlets, B52 couriers, Computer Wire services	93	124	VOA
C5	2-6 Catton Street	WC1R 4AA	University of the Arts, London Institute	45	45	Survey
C5	1-2 Fisher Street	WC1R 4QA	CFS Independent	6	6	Survey
C5	1-2 Fisher Street	WC1R 4QA	Fourth Hurdle Consulting	13	13	Survey
C5	8-10 Southampton Row	WC1B 4AE	The Ivy House	12	24	Promap
C6	Cardinal House	EC1M 3HP	William Hill, McDonald's, Farringdon Flowers, Best Café, Hallmark, Benjy's, Whitecross Dental Care, Improvement and Development Agency, Tribunals Group, Postercscope Ltd, World Markets Research Centre, Ambient, Touch Group, Ovum Ltd, Oyez Legal Technologies, Criminal Injuries Compensation Appeal	460	647	VOA

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
			Panel, Kentucky Fried Chicken, Starbucks, McColls Raj Tandoori, Adams Kara Taylor, Pure, Hallmark, Whitecross Dental Care, Improvement and Development Services for Local Government, Immigration Appellate Authority, Messrs C, Fox Haynes Ltd, Moneybox Corporations Ltd, Pinnacle PSG Ltd, Magicalia, Mailround.com.			
C6	33-35 Charterhouse Square	EC1M 6EA	Mal Architects Ltd, Café Gulsman, Bar Bombay	43	59	VOA
C6	36-37 Charterhouse Square	EC1M 6EA	Robert Rolls & Co, A J M Studios, Bar Bombay	Included in the above	Included in the above	
	38-39 Charterhouse Square	EC1M 6EA	Empty	10	20	Estiamted
C6	38 Charter House Street	EC1M 6EA	Charterhouse Bar, Search Partners Ltd, John Stevens	20	28	VOA
C6	40- 42 Charterhouse Street	EC1M 6EA	Springdene Ltd, Immigration Law Practioners Association, Buckley Deane Wakefield	22	31	VOA
C6	54-56 Charterhouse Street/5 Lindsey Street	EC1M 6EA	Empty	20	20	Estimated
C6	58-64 Charterhouse Street	EC1M 6EA	Empty	Included above	Included above	
C6	8-9 Hayne Street	EC1A 9HP	Fabermaunsell, Dyer Brown & Associates	73	73	Survey
C6	10 Hayne Street	EC1A 9HP	Yard			
C6	2 Lindsey Street	EC1A 9HP	Chambers and Partners Publishing Ltd	Included in 22 Long Lane	Included in 22 Long Lane	
C6	3 Lindsey Street	EC1A 9HP	Vacant	3	6	VOA
C6	4 Lindsey Street	EC1A 9HP	Lindsey Hotel, Smithfield Tandoori	15	30	Estimated
	5 Lindsey Street	EC1A 9HP	Camelot Property Management			
C6	20-21 Long Lane	EC1A 9HP	Prontaprint, Laing O'Rourke	28	37	VOA
C6	22 Long Lane	EC1A 9HP	Chambers and Partners Publishing Ltd	47	62	VOA
C6	23 Long Lane	EC1A 9HP	Chambers and Partners Publishing Ltd	Included in 22 Long Lane	Included in 22 Long Lane	
C6	Snow Hill Car Park		National Car Parks Ltd			
C6	Caxton House Car Park		National Car Parks Ltd			
C6	Smithfield Car		APOCA Parking Ltd			

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
	Park					
C7	17 Moorfields		Boots			
C7	11-12 Blomfield Street	EC2M 7AY	Balls Brothers Limited, Medical Direct Clinics, Tim Bugler (Dental Surgery), Hollingworth Consultants Limited, Sudbroke Asset Management, City People, Victoria Steamship Co Ltd, Hitchmans Harrison, The Shipping Corporation of India, Lawson Clark Ltd, K&O International, Blomfield Group, Origin HR Consulting, Firth Ross Martin Associates	170	244	VOA
C7	Finsbury Circus	EC2M 7AB	Jamies at The Pavilion	4	9	Promap
C7	91-109 Moorgate and 12-24 Moorfields	EC2M 6SJ	Norwich Union Life & Pensions Limited Davy`s of London Limited, Oddbins, Benjys, Snappy Snaps, Norton Rose, Birleys Ltd, Robert Dyas, Julian Dove, Ernst Jones, Tiffinbites 24 ABN Amro Bank N V Tyler, Bishop of Norwich	193	283	Promap
C7	Old Broad Street	EC2M 1QT	Lord Aberconway	10	10	Estimated
C8	68-80 Hanbury Street	E1 5JL	ABN Amro Holdings (UK) Limited, D. Steinberger Limited, Mizuho International plc, Salamon & Seaber Limited, Sardar Properties (UK) Limited, Habitiat	98	170	VOA
C8	82-102 Hanbury Street	E1 5JL	Empty	39	76	VOA
C8	63-67 Princelett Street	E1 5LP	Air Express Travel and Tours Al-Madina Travel Limited Al-Mamur Travel Limited, Collective of Bangladeshi Governors, Aerospace Travel Agents, Jonota Travel Agency, Zinda Bazar Cash & Carry, KMC Travel	14	18	VOA
C8	337 Whitechapel Road	E1	Blind Beggar Pub	0	0	VOA
C8		E1 5SD	Sainsbury's	0	0	VOA
C8	63 Vallance Road	E1 5BW	Banjax	6	11	VOA
C8	73-74 Vallance Road	E1 5BS	Forest Reclaim	12	23	VOA
C8a	123 Globe Road		Empty	10	10	Estiamted
C10	622a Commercial Rd	E14 7HS	S Ward & Co Limited	11	11	Survey
	7 Mill Place	E14 7HZ	Bronze Age Art Foundry Ltd			
C11	100 Cannon Street Workshops					
C11	2 Hertsmere Road		Hertsmere House			
C11	Aspen Way		Britannia Parking Ltd			
C11	Billingsgate		Billingsgate			
C13	Unit 1 Heron Industrial	E15 2PE	Empty	29	58	Promap

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
	Estate					
C13	Unit 2 Heron Industrial Estate	E15 2PE	Empty	20	35	VOA
C13	Unit 3, Heron Industrial Estate	E15 2PE	Empty	48	82	VOA
C13	Unit 4 Heron Industrial Estate	E15 2PE	Empty	11	20	VOA
C13	Unit 5 Heron Industrial Estate	E15 2PE	Capital Print & Display	Included in unit 3	Included in unit 3	VOA
C13	Unit 6 Heron Industrial Estate	E15 2PE	John Denton	4	6	VOA
C13	Unit 7 Heron Industrial Estate	E15 2PE	Top Office Equipment Ltd	11	21	VOA
C13	Unit 8 Heron Industrial Estate	E15 2PE	Jarroy (Importers) Limited	12	12	Survey
C13	Unit 9 Heron Industrial Estate	E15 2PE	South Herts Waste Management Limited	18	32	VOA
C13	Heron Industrial Estate	E15 2PH	Grays Waste Services Limited	43	43	LDA
C13	Largest building BBL Building	E15 2PW	Badat Brothers Limited	40	40	LDA
C13	Marlborough House		Goddard & Gibbs Studios Ltd	36	62	VOA
C13	Unit C The Gatehouse		Bolsons Ltd	12	17	VOA
C13	Warehouse Cook's Road		GEM Supplies	10	15	estimated
C13	47 Marshgate Lane		Ilford Barratt Roofing Ltd	3	4	VOA
C13	50b Marshgate Lane	E15 2NQ	Star Furniture	41	82	Promap
C13	51a Marshgate Lane		Nagrecha bros	10	15	estimated
C13	53 Marshgate Lane, Transfer House	E15 2NQ	Mastpine Limited	11	16	VOA
C13	Largest building, St Clements Wharf	E15 2PJ	Bow Midland Waste Recycling Limited	8	8	Survey
C13	Premises and land		Kendon Packaging Group			LDA
C13	453 Wick Lane	E3 2TB	Tarmac Southern Limited	10	20	estimated
C13	453 Wick Lane	E3 2TB	Demenex Plant Hire	10	10	estimated

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
C13	Yard	Off A12	Timber storage			
C13	Bow Creek		London Concrete Ltd			
C13	Bow Creek		Bardon Aggregates			
C13	Bow Midland East Yard	E15 2PJ	Hiremasters Ltd	10	10	estimated
C13	Unit 1 20 Marshgate Lane		Discount (Construction) Double glazing	23	40	VOA
C13	Unit 3, 20 Marshgate Lane		Bodyworks	14	26	VOA
SE1	Car Park		Reuters			
SE2	Lorry Park		ExCel			
SE3	2 Festoon Way		Ramada Hotel			
SE4	Factory Rd	E16 2HD	Unit 6 Archfield Shipping Ltd	29	50	VOA
SE4	Factory Rd	E16 2EJ	Units 1A-U, Presently empty A, B, D, E, F, G, H, J, K, L, M, N, P, S, T, & U - occupied are C (Canning Car Hire) M (Blessed Cash & Carry) Q (Fortivo International) R (Resolution Productions) V (Permagaurd)	94	174	VOA
SE5	Cornwallis Road		Car park			
SE6	Plumstead Yard		Timber yard Conmax Timber Merchants Ltd	10	10	Estimated
SE6	Plumstead Yard		Scrap yard	10	10	Estimated
NE3	42 Station Road		Waseem Ahmed			
NE4	York Road	Ilford	Shop Platform 2/3	0	0	Promap
NE4	27 Cranbrook Road	IG1 2DG	Pops Tobacconist	1	3	VOA
NE4	29 Cranbrook Road	IG1 2DG	Kart	2	4	VOA
NE8	208 Crow Lane	RM7 0ES	DA Skip Hire			
NE8	Rear of 178-198 Crow Lane		J P Drain, Smith C W & Co, George Copsey & Co, Phillips Transport & Removals			
NE8	Training ground		West Ham United FC			
NE9			Health Club			

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
NE9			Transco			
NE9			Royal Mail Sorting Office			
NE9	110 South Street	RM1 1SS	Whitecross Dental Care,	10	21	VOA
NE9	112 South Street	RM1 1SS	Empty	52	85	VOA
NE9	114 South Street	RM1 1SS	Empty	Included in the above	Included in the above	
NE9	116 South Street	RM1 1SS	Empty	Included in the above	Included in the above	
NE9	The Battis	RM1 1TU	Luminar Dancing, Ronald Raymond	7	11	Estimate
NE9	Station		Kiosks	10	10	Estimate
W4	267 Horn Lane	W3 9EH	The Royal Kingdom of Saudi Arabia	7	10	VOA
W4	Coal Yard	W3 9EH	Lafarge Roofing	10	17	VOA
W4	Coal Yard	W3 9EH	Derlin Construction	10	10	Estimated
W4	Coal Yard	W3 9EH	Horn Metals Ltd	6	10	VOA
W4	Coal Yard	W3 9EH	Bridgemarts Ltd	10	10	Estimated
W4	Coal Yard	W3 9EH	Aggregates Yard	10	10	Estimated
W5	1-9 The Broadway	W5 2NG	Bette Davis Limited Budgens Stores Limited Cards Galore Limited Clarks Limited Holland & Barratt Retail Limited Starbucks Coffee Company (UK) Limited Villiers Park Properties Limited Sketchley, 2 kiosks	37	70	VOA
W6	55 - 57 Manor Road	W13 0NQ	Automania	1	2	VOA
W10	107 Station Road	UB3 4BX	Taxi office	2	4	VOA
W10	109 Station Road	UB3 4BX	Taxi office	1	1	VOA
W10	111-113 Station Road	UB3 4BX		1	2	VOA
W10	115 Station Road	UB3 4BU	Dental Surgery	0	0	VOA
W10	117 Station Road	UB3 4BU	Rhone Dentures	1	1	VOA
W10	Bridge House, 119-123 Station Road	UB3 4BU	Giggles, Tachocard Computer Services Ltd,	5	9	VOA
W10	125 Station Road	UB3 4BX	Elite Management Ltd, Hayes One Ltd, SW Frankson	2	4	VOA

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
W10	127-129 Station Road	UB3 4BX	Bains Beauty Children's Wear, Hayes One Ltd	4	8	VOA
W10	131 Station Road	UB3 4BX	Bestmart Convenience	2	5	VOA
W10	20-20 Blyth Road	UB3 1BY	Damont Audio			
W11	Rigby Lane	UB3 1ET	HG Timber	38	66	VOA
W11	Rigby Lane	UB3 1ET	KGM Transport	20	20	Estimated
W11	Rigby Lane	UB3 1ET	Allpoint Packaging	17	17	Survey
W11	Dawley Road	UB3 1EH	Dagenham Motors	52	86	VOA
W11	Rigby Lane	UB3 1EH	Leemark Engineering			
W11	Dawley Road	UB3 1EH	Heathrow motors			
W11	Stokely Close		Wagenhut now empty	37	51	
W11	Stokely Close		empty warehouses	32	53	VOA
W11	Stokely Close		empty warehouses	29	48	VOA
W11	Stokely Close		empty warehouses	20	36	VOA
W13	West Drayton Coal Yard	UB7 7SH	Eurostorage, Dodds, Millar Sinclair, Shannon Civil Engineers Ltd, CPL Distribution Ltd, Star Parking, West Drayton Parksafe, T Powell & Son	13	17	VOA
W13	1-4 Station Road	UB7 9DY	3-4 Sound & Vision, 1 & 2 empty	4	9	VOA
W13	Station Road	UB7 9DZ	Cox Hire Centre	8	12	VOA
W13	Tavistock Rd	UB7 7QU	People's restaurant	2	3	VOA
W18	Slough station		Cafe	2	5	Estimated
W18	Slough station		Taxi office	2	5	Estimated
W18	Wexham House		ICI			
W19	480 Malton Avenue		Network Q			
W19	Farnham Road		Satchwell Control Systems			
W19	Off Stoke Gardens		Rhocoloma Ltd, Tyre Services			
W20	225 Ipswich Road	SL1	Slough Trading Estate			
W20	812-5 Ajax Avenue	SL1 4BG	Icore International			
W20	748-9 Deal Avenue	SL1 4 SH	Slough Trading Estate			
W20	514-5 Ipswich Road	SL1 4EP	Protyre Tyre Fit Ltd, Scarlet Couriers			

Route Window	*Address*	*Address*	*Occupier*	*Jobs min*	*Jobs max*	*Source*
W20	190-191 Bedford Avenue	SL1	Ragus Sugars			
W25	Maidenhead Station	SL6 1EW	Cullen-Burns Associates Ltd Body Image, Station Kiosks, Café Tee	3	6	VOA
W25	Silco Drive	SL6 1ET	Chep UK Limited	12	21	VOA
W25	South of Boyn Road	SL6 1EW	Reliant Colour Solutions Ltd			

Notes

Job figures are based on surveys of businesses where provided or from floorspace estimates using either Valuation Office or ProMap data. In some locations offices are designed horizontally over a number of buildings/addresses. Occupiers/owners are sourced from surveys or the Book of Reference. In all cases employment figures should be regarded as indicative. Employment numbers are not provided where the only impact is to take car parking or land with no impact on job numbers.