Annex C

Summary of Kings Cross EIA Consultation Responses

Comment	Action
London Borough of Camden. Letter dated 20.10.03 from Bob West – Kings Cross Team Manager. Comments on the Scoping Report.	
General	
We are concerned that the focus of the EIA is mainly on construction impacts and does not go into sufficient detail regarding the operational impacts of the new concourse.	Due consideration has been given to both construction and operational impacts during the EIA and are reported in the ES as appropriate in Chapters 4 to 14.
Platform 0 is presented as a means to reorganise the existing operations within Kings Cross Station. We are concerned that this could enable future capacity increases at Kings Cross greater that the design of the new concourse would allow and would expect the EIA to address this.	This has been addressed in the ES with regard to pedestrian effects and noise.
We do not feel that the baseline for the EIA fully addresses the development likely to go ahead in the area. The EIA needs to take account of the Kings Cross Opportunity Area as proposals for this area are at an advanced stage and Camden expect an outline planning application for the site by the end of 2003. Even if the application is not submitted in time to be assessed by this EIA you should take account of Camden's draft Kings Cross Opportunity Area. Proposals for the new concourse will need to take account of the demand generated by development on this site and nearby.	Full account has been taken of all significant developments in the area.
The Council expects that development on the Kings Cross site be exemplar in terms of sustainable design and construction, for example there is no mention of how the EIA will investigate the use of renewables, energy efficient design, recycling/waste measures and other matters which are key to achieving sustainable design and construction.	This has been addressed principally through the design brief. The ES focuses on identifying, quantifying and assessing the impacts that the project will have on the environment, including where appropriate the use of raw materials, energy, etc. It should be noted that the Western Concourse will rely principally on natural lighting and will not be heated, thereby minimising energy consumption. New waste handling facilities will help maximise recycling of wastes.
Paragraph 2.4.1 – Construction Works	
There needs t be consistency in the construction and opening dates throughout the EIA process. This paragraph gives the start date as 2007 and a four year construction date, which gives a completion date of 2011. However paragraph 3.9 defines the year of opening as 2010.	This is clear in the ES and the references to opening dates are consistent.
In addition the implications of this timescale being delayed need to be examined in order to assess the impacts on other development in the area and the capacity of the transport infrastructure.	It is ERM's understanding that this programme is firm and that there is no indication that it will slip. Sensitivity tests are not therefore required.
Table 3.1. Key Receptors in the vicinity of the proposed project	
Built Resources should include the London Underground Kings Cross Ticket Halls, German Gym and Stanley Buildings. Reference to St Pancras Station will need to include the St Pancras Chambers,	Agreed. This has been done in the ES.

Comment	Action
International Station as well as the existing Station; likewise Kings Cross Station should include the western ranges and the suburban and main train shed.	
<u>Paragraphs 3.2.4, 3.2.5 and 3.8</u>	
We think this is risk relying exclusively on 2006/7 as the baseline date if the application is submitted in 2003. We recognise the timeframe for the completion of the Channel Tunnel Rail Link (CTRL) works and the probability that much of this will be completed by 2006/7. However, we believe that a baseline date of 2003 (ie date of which the report states the submission is being made) is more appropriate. Whilst a baseline date of 2003 would need to make some assumptions about the progress of the CTRL and London Underground Limited works, it would be based on the certainty of current conditions (ie air quality, population in surrounding areas, retailing in wider areas, employment and so on). Our Lawyers tells is that taking 2006/7 as the baseline date also makes it difficult to assess the cumulative impact. They say this is already a difficult discipline without having to 'float on a sea of assumptions'. We are aware that the proposed planning application is no longer schedule for 2003 and so we would expect the baseline to reflect the actual date of the planning application when it is made.	The baseline date has been set to allow for the completion of the works currently being undertaken at the station. Since the works that are the subject of the ES cannot commence until these current works are completed, it would be unrealistic to take a baseline date of 2006.
The EIA should take account of Platform 0 being constructed post completion of the concourse as there is no guarantee that this work will be undertaken prior to or during the construction of the new concourse.	It is ERM's understanding that this programme is firm and that there is no indication that it will slip. Sensitivity tests are not therefore required.
The proposal should also take account of the proposed demolition of the taxi rank access including walls and street furniture and the proposed demolition of the Bothy building.	Noted.
Assumptions include the completion of the LUL works. However it is important to note that the appearance of the surface structures associated with this work is not yet confirmed.	Noted.
The assumptions only take account of those projects which currently have planning permission. The EIA should also take account of the likely development on the Kings Cross Opportunity Area, the likely form of this development is set out in Camden's Kings Cross Opportunity Area Planning and Development Brief. The council expects that an outline application for this development will be submitted in December 2003.	Implications of the Kings Cross Central redevelopment have been fully taken into account.
<u>Paragraph 3.3.1</u>	
We would welcome the opportunity of commenting on the assessment of what constitutes a 'significant effect' prior to the final Environmental Statement (ES) being submitted.	The EIA methodologies and criteria were summarised in the Scoping Report and feedback from the consultation process on this issue has been taken into account. Having identified appropriate criteria, specialist experts applied these criteria and drew conclusions as to the significance or otherwise of the environmental effects. Full conclusions and the reasons behind them are set out in the ES.

Comment	Action
Paragraph 3.6 Spatial Scope	
The spatial scope of the EIA should address the importance of Kings Cross on the national transport infrastructure and the need for it to interface with the St Pancras International Station.	Agreed. This has been covered in the ES.
Paragraphs 3.8.1& 3.8.2 Definition of 2007 & 2010 Project Baseline	
See comments above on baseline. The project needs to take account of other developments in the area that will generate increased passenger flow such as Kings Place and Regents Quarter on York Way.	Full account has been taken of all significant developments in the area.
Box 4.1 Environmental Issues Comprising Technical Scope of the ES	
Construction waste – If there us going to be a considerable amount of excavation as part of the development the removal of spoil could be an issue particularly its transportation to landfill. Although highly desirable it cannot be assumed that spoil can be used on the rest of the site, therefore the disposal of spoil will need to be explored and transport options including use of trains assessed.	Spoil disposal has been addressed in the ES.
Box 4.2 Topics Scoped Out	
Operational Waste – The new concourse is likely to generate large quantities of waste during its operational lifetime, the Council would therefore expect operational waste to be included within the scope of the EIA. *Climate Change* – There is no information provided to justify the statement that the concourse will not generate significant levels of greenhouse gases. *Micro Climate* – There is no building currently on the site of the proposed concourse therefore the Council would expect the micro climate impacts of the new building to be assess ion order to show that the resulting building does not generate any adverse effects.	There will be little difference in generated waste, and waste from the retail premises will be disposed of in the normal way. No special wastes will be generated. It is not considered therefore that there will be any significant environmental effects associated with waste transport or disposal. The development has been designed taking account of energy efficiency. A development of this scale will not generate amounts of greenhouse gas that would be significant in a regional or national context, either during construction or operation. It is not considered likely that there will be any significant effects on micro-climate.
Paragraph 5.1.2	
We suggest that prior to undertaking the EIA the EIA team makes itself aware of the Draft Kings Cross Opportunity Area Planning and Development Brief and Draft Kings Cross Conservation Area Statement. These documents provide important supplementary planning guidance of what the criteria that the council will assess any application on.	Noted.
Table 5.1 Definitions of Receptor Sensitivity	

Comment	Action
More detail would be welcomed in this table for example under 'High – Townscape' a townscape may be valued locally, nationally or internationally (Station complex is seen of international importance).	A full description of the criteria and assessments is given in the ES.
Table 5.2 Definitions of Magnitude of Change	
These definitions should be further elaborated to allow wider ranges of interpretation eg under 'Moderate-Townscape', moderate changes can be made in the townscape more widely than just by 'townscape components'. It would also be helpful to broaden the descriptions and to elaborate on what is meant by the definition eh what is meant by 'an extensive area' in the High Magnitude of change.	The assessment of impacts on landscape and townscape has been carried out in a conventional manner in accordance with the guidance issued by the Landscape Institute / Institute of Environmental Assessment.
Paragraph 5.3.1 Planning and Land Use Methodology	
Again the review should include the Kings Cross Opportunity Area Planning and Development Brief and the Mayors Draft Plan.	Noted.
Paragraph 5.4.4	
This should include reference to local views with respect to affects on townscape character and resources and on visual impacts.	This has been included in the ES.
Paragraph 5.5.2	
This should include detailed consideration of effects on the impact of demolition and alteration of features of the Great Northern Hotel and Kings Cross Station and their remodelling.	This has been included in the ES.
Section 5.7 Noise	
The EIA should take into consideration Camden's UDP noise and vibration standards set out in DS6 of the adopted UDP.	This has been included in the ES.
Table 5.7	
The thresholds set for construction noise are 75dB for day time and 65dB for evening and 45dB for night time working. If the ambient is higher than these, a weighting needs to be agreed with the local authority. We would suggest that if the ambient is equal to or up to 5dB above the proposed threshold, the ambient is taken to be the threshold. If the ambient is more than 5dB above the threshold, 5dB is added to the threshold.	This has been included in the ES.
Section 5.12 Ecology	
It appears that you have written out any effects on ecology, with the exception of bats (protected	Ecological surveys indicated that there were no issues associated with

Comment	Action
species). We suggest that in addition the EIA should examine the impact on nesting birds.	nesting birds.
Paragraph 6.1	
The EIA should take account of government good practice guidance including best practice sustainable construction techniques and a review of working practices on other projects, examples that could be looked at are the Great Western Hospital by Corillian and the Wessex Water Operations Centre.	This has been addressed principally through the design brief. The ES focuses on identifying, quantifying and assessing the impacts that the project will have on the environment, including where appropriate the use of raw materials, energy, etc. It should be noted that the Western Concourse will rely principally on natural lighting and will not be heated, thereby minimising energy consumption. New waste handling facilities will help maximise recycling of wastes.
In the development of agreed mitigation measures, the Council will look for an environmental management system and detailed environmental management plans. This will facilitate sound management if any environmental issues arising from the long term construction of Kings Cross Central and ensure appropriate mitigation in accordance with relevant environmental standards and best practice. Good examples of Environmental Management, which the EIA should review, have been developed on the CTRL and Thameslink 2000 projects. The EIA should adopt other mitigation measures such as the development of a Code of Construction Practice as successfully implemented on the CTRL project.	This has been included in the ES.
Network Rail, 12.12.05, Tom Higginson – Planning Manager. Comments on Draft ES.	
General	
The Non-Technical Summary could usefully and properly contain more detail and I refer you to the NTS pertaining to the King's Cross Central development, which has been commended in this regard.	Noted.
The local employment effects are identified but the opportunity to engage in local training, employment and procurement initiatives is not stated, i.e. improving the beneficial effect.	It is difficult at this stage to predict to what extent this will be feasible. It is suggested that this will be addressed nearer to the time of construction.
The increased retail floorspace is not assessed for impact on retailing or in transport terms, or in combination with the King's Cross Central proposals.	The additional retail space will be used primarily be passengers transiting through the station, so no retail impact assessment is considered necessary.
The effects on the Great Northern Hotel of arcading are not fully explored in section 7.	This has been included in the ES.
Annex F should refer to the Mayor's other relevant Strategies, such as for energy, accessibility, etc.	This has been included in the ES.
Code of construction practice not mentioned.	This has been included in the ES.

Comment	Action
Key sustainability components appear to be missing, particularly on energy, water and micro-climate.	This has been addressed principally through the design brief. The ES focuses on identifying, quantifying and assessing the impacts that the project will have on the environment, including where appropriate the use of raw materials, energy, etc. It should be noted that the Western Concourse will rely principally on natural lighting and will not be heated, thereby minimising energy consumption. New waste handling facilities will help maximise recycling of wastes. It is not considered likely that there will be any significant effects on micro-climate.
Community safety not mentioned.	It is not considered that this is an EIA issue.
London Borough of Camden, December 2005, Bob West. Comments on Draft ES.	
Cultural Heritage	
Paragraph 7.5.4 - St Pancras Station and Chambers section needs to be updated.	This has been included in the ES.
Section 7.6: Assessment of the Effects and Mitigation - This section needs to be updated. The assessment of effects and mitigation does not include the current (2005) proposals for the footbridge in the main station, the new link and associated works. 7.6 omits items dismantled (currently in LUL storage in Daventry) as a result of the CTRL works: the porte cochere to the Western Range of King's Cross Western Range, there was an entrance canopy to the east side of the Great Northern Hotel, and railings to the east side and south-east corner. The KXSE project will result in these elements not being reinstated. There was also a flagpole on this entrance canopy. It is not known whether this flagpole would be reinstated at the hotel.	This has been included in the ES.
Paragraph 7.6.11 and table H1.2, 1.1.1 and 1.2.2 - regarding significance of effects resulting from physical changes: do not fully address the impact of the new concourse on the Western Range of the mainline station itself. The effects on open space, the Conservation Area and the interventions are covered.	This has been included in the ES.
Table H1.2 - Magnitude of physical changes: this needs to be updated as the proposed substantial demolition and collonading of the upper and lower ground floors of the Great Northern Hotel (by others) have a greater impact than the word 'alterations' would suggest.	This has been included in the ES.
Chapter 8, Townscape and Visual Impact Assessment - The dates need revising, for example works to the station are due to commence in late 2008. The baseline would change.	This has been included in the ES.
Paragraph 8.2.10 - The King's Cross Conservation Area Statement by Camden Council was published in 2004.	This has been included in the ES.

Comment	Action
Paragraph 8.4.19 - should permission be granted for the Argent King's Cross scheme, then the Culross Buildings may not be in position for all of the period in question and the Culross Buildings would not therefore act as a shield during all of this period. The visualisations include a new canopy to the south elevation of the King's Cross mainline station and two new taxi rank canopies, but these are not mentioned in the chapter 7 or 8 text. These should be made consistent or an explanatory note should be provided to the visualisations to state that these are not part of the application.	This has been included in the ES.
London Borough of Camden, December 2005, Bob West. Comments on Draft ES.	
Environmental Effects	
We are very concerned about the criterion proposed to assess night-time noise effects. 45 dBLAeq(T) is suggested, but is qualified by saying that where the ambient is above this criterion, the ambient is taken to be the criterion. This is different to the approach normally taken in this situation and goes against advice provided by the Council on the scoping report (letter dated 20 October 2003).	This has been included in the ES.
I am concerned that there is not a clear indication of the amount of work expected to be required outside normal working hours. A set of normal working hours is set out but the need for railway related possessions is identified. In order to generate the predictions on likely effects, there must have been assumptions made on the amount of night-time working required and this could have been set out.	This has been included in the ES.
Six receptors have been used to identify potential construction effects. Receptor 6 is York Central, which seems to be identified as offices but which has a large number of residential flats. This block overlooks the station throat and is likely to be affected by the Platform Y works, yet the effects seem to be have been largely overlooked. For example, in para 10.5.11, Table 10.11 does not even have receptor 6 listed, although impacts are identified at receptor 4 and 5.	This has been included in the ES.
The operational effects on York Central are also not detailed. A more detailed explanation of the change in operational noise needs to be provided so that this can be considered in relation to the requirements of the Noise Insulation Regulations. You are advised to discuss the York Central impacts with Islington's EHOs.	This has been included in the ES.
The ES does not address the issue of plant noise. It may be that no new plant is to be provided, but this would be unusual on a project of this type.	This has been included in the ES.
Apart from the above noise issues, there may well be issues relating to construction traffic and around the interface of this project with other projects in the area, in particular the King's Cross Underground Station Redevelopment and the Channel Tunnel Rail Link. It is difficult to fully understand the interface issues because the programme in the ES indicates a project commencement date early in 2005. This programme therefore needs updating.	This has been included in the ES. All issues have been updated.

Comment	Action
Transport	
Paragraph 3.2.4 - The passenger movement data were collected between 2000 and 2002 and by applying a growth factor of 2.5%, the 2007 passenger demand has been estimated. It may be worthwhile to verify the growth with more up-to-date pedestrian flows (2005) to ensure the assumed growth factor is appropriate.	This is noted but the data available at the time was used with growth applied this provides a reasonable forecast for 2007.
Paragraph 4.2.7 - The EIA needs to explain how the 'some 20%' of the passengers can be moved into adjacent station facilities during service disruption period.	It is assumed that the 20% of passengers will naturally disperse to surrounding station facilities and retails areas.
Paragraph 4.2.6 - I am concerned about the overspill effects of the waiting passengers at the station on the surrounding interchange facilities. It would be helpful if you can provide us with an indication on the probability of this occurrence based on previous record.	No data was available on the probability of occurrence of disrupted services. The perturbated scenario was a worst case planning test.
Paragraph 4.2.7 - It is not clear if the concourse area used in the LOS calculation is effective area or total area. Effective area would be more appropriate as it takes into account the physical obstruction within the concourse.	The effective area has been used.
Paragraph 4.3.3 - Detailed output from PEDROUTE should be included in the report	This is detailed technical material that is summarised in the ES. A reference is given to reports that can be made available that contain the full details of the analysis. This information is included in King's Cross Station Enhancement Investment Appraisal, Dynamic Modelling, January 2006, Report P200 Existing Concourse/LUL NTH 2007 and 2010, December 2003.
Paragraph 4.5.7 - Where would the combined car parking facility be provided? What is the total car parking provision for the two stations?	The main car park will be located north of the St Pancras train sheds. This is a multi-storey facility.
Paragraph 4.5.9 - Detailed calculation of the Arup/TfL Taxi Pick Up Model would need to be provided.	Technical reference - Station Forecourt Operations.
Paragraph 4.6.2 - Would the increase (80 to 150 cycle spaces) in cycle parking be sufficient to accommodate the growing cycling demand at the station?	Increase is sufficient to accommodate estimated growth in cycle use.
Paragraph 4.8.2 & 4.8.3 - Upon completion of the Western Concourse, all station servicing should take place within the basement facility instead the existing on-street servicing.	The main station servicing area will be at basement level. However, smaller servicing bays for retail will be located adjacent to the vehicle set-down/pick-up on the eastern side of Pancras Road, with a separate small loading bay for LUL at the south end of Pancras Road.

Comment	Action
Paragraph 4.8.4 - The estimation of the future servicing trips would need to be explained.	Based on calculations of estimated retail operations in the station and assumed servicing operations.
Paragraph 4.9.8 - Increasing the cycle time to 120s for the Euston Road junction would increase the pedestrian wait time at the junction, which is not in line with the current planning framework to facilitate pedestrian movements.	Increased cycle is a test case that allows effective traffic operations of the Euston Road/Pancras Road junction. It is acknowledged that this would cause delays to some pedestrians but it is also noted that pedestrians can use the subways to enter/exit LUL.
<u>Figures</u>	
Figure 5.3 - If the Western Concourse scheme is to be implemented, the Great Northern Hotel would need to be colonnaded at ground floor level to provide sufficient footway capacity for the expected pedestrian demand in this area. This would need to be included as part of the proposal.	Great Northern Hotel needs to be colonnaded in order to accommodate expected pedestrian demand, provide good visual connections and provide circulation space during Western Concourse perturbated conditions.
General - Layout plans for the station concourse and Pancras Road should be provided in 1:200 drawing. Some of the figures in the report are illegible.	This would be too detailed for an ES, but detailed drawings will be included in the planning application documents.

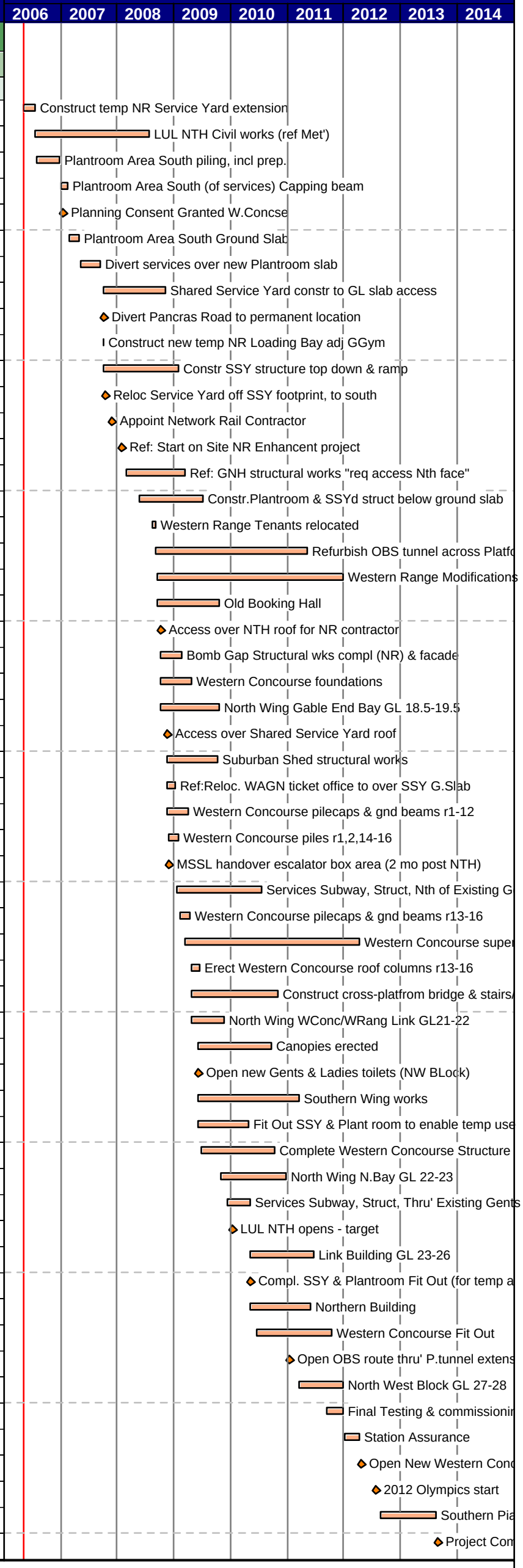
Annex D

Detailed Construction Programme and Additional Waste Strategy Information

Executive Summary - Kings Cross general

KX Station Enhancement - Construction

Act ID	Description	Resp.	Orig Dur	Early Start	Early Finish
1000	Construct temp NR Service Yard extension	MRSSL	11w	09MAY06	25JUL06
1010	LUL NTH Civil works (ref Met')	MRSSL	100w	17JUL06 *	31JUL08
1020	Plantroom Area South piling, incl prep.	MRSSL	22w	26JUL06	04JAN07
1030	Plantroom Area South (of services) Capping beam	MRSSL	8w	05JAN07	01MAR07
1040	Planning Consent Granted W.Concse	NR	0	16JAN07	
1050	Plantroom Area South Ground Slab	MRSSL	8w	02MAR07	04MAY07
1060	Divert services over new Plantroom slab	NR	20w	08MAY07	26SEP07
1070	Shared Service Yard constr to GL slab access	MRSSL	63w3d *	01OCT07	20NOV08
1080	Divert Pancras Road to permanent location	A	0	01OCT07	
1090	Construct new temp NR Loading Bay adj GGym	NR	2w	01OCT07	12OCT07
1100	Constr SSY structure top down & ramp	MR/NR	66w	01OCT07	12FEB09
1110	Reloc Service Yard off SSY footprint, to south	NR	0	15OCT07	
1120	Appoint Network Rail Contractor	NR	0	21NOV07	
1130	Ref: Start on Site NR Enhancent project	NR	0	31JAN08	
1140	Ref: GNH structural works "req access Nth face"	A	52w	04MAR08	27MAR09
1150	Constr.Plantroom & SSYd struct below ground slab	NR	57w	21MAY08	21JUL09
1160	Western Range Tenants relocated	NR	4w	18AUG08 *	15SEP08
1170	Refurbish OBS tunnel across Platforms 1-8	NR	153w2d *	02SEP08	24MAY11
1180	Western Range Modifications	NR	186w2d *	16SEP08	09JAN12
1190	Old Booking Hall	NR	62w3d *	16SEP08	30OCT09
1200	Access over NTH roof for NR contractor	NR	0	06OCT08 *	
1210	Bomb Gap Structural wks compl (NR) & facade	NR	20w	06OCT08	06MAR09
1220	Western Concourse foundations	NR	33w4d *	06OCT08	05MAY09
1230	North Wing Gable End Bay GL 18.5-19.5	NR	59w3d *	06OCT08	29OCT09
1240	Access over Shared Service Yard roof	NR	0		20NOV08
1250	Suburban Shed structural works	NR	51w3d *	21NOV08	21OCT09
1260	Ref:Reloc. WAGN ticket office to over SSY G.Slab	NR	6w	21NOV08	15JAN09
1270	Western Concourse pilecaps & gnd beams r1-12	NR	18w	21NOV08	09APR09
1280	Western Concourse piles r1,2,14-16	NR	8w	28NOV08	05FEB09
1290	MSSL handover escalator box area (2 mo post NTH)	MRSSL	0	01DEC08	
1300	Services Subway, Struct, Nth of Existing Gents	NR	85w2d *	20JAN09	02AUG10
1310	Western Concourse pilecaps & gnd beams r13-16	NR	10w	06FEB09	24APR09
1320	Western Concourse superstructure & fit out	NR	175w1d *	13MAR09	24APR12
1330	Erect Western Concourse roof columns r13-16	NR	8w	27APR09	23JUN09
1340	Construct cross-platfrom bridge & stairs/escal's	NR	85w *	29APR09	12NOV10
1350	North Wing WConc/WRang Link GL21-22	NR	31w1d *	29APR09	27NOV09
1360	Canopies erected	NR	73w *	03JUN09	28SEP10
1370	Open new Gents & Ladies toilets (NW BLock)	NR	0	05JUN09	
1380	Southern Wing works	NR	100w2d *	05JUN09	25MAR11
1390	Fit Out SSY & Plant room to enable temp use	NR	44w	10JUN09	07MAY10
1400	Complete Western Concourse Structure & Cladding	NR	74w *	24JUN09	26OCT10
1410	North Wing N.Bay GL 22-23	NR	68w *	02NOV09	07JAN11
1420	Services Subway, Struct, Thru' Existing Gents	NR	26w *	16DEC09	21MAY10
1430	LUL NTH opens - target	MRSSL	0	11JAN10 *	
1440	Link Building GL 23-26	NR	64w2d *	10MAY10	04JUL11
1450	Compl. SSY & Plantroom Fit Out (for temp access)	NR	0	10MAY10	
1460	Northern Building	NR	61w2d *	10MAY10	13JUN11
1470	Western Concourse Fit Out	NR	75w2d *	15JUN10	25OCT11
1480	Open OBS route thru' P.tunnel extension	NR	0	20JAN11	
1490	North West Block GL 27-28	NR	45w1d *	24MAR11	09JAN12
1500	Final Testing & commissioning	NR	15w	14SEP11	09JAN12
1510	Station Assurance	NR	14w	10JAN12	24APR12
1520	Open New Western Concourse	NR	0	24APR12	
1530	2012 Olympics start	NR	0	27JUL12 *	
1540	Southern Piazza works	NR	56w1d *	24AUG12	27AUG13
1550	Project Complete	NR	0		27AUG13



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Kings Cross Station Enhancement
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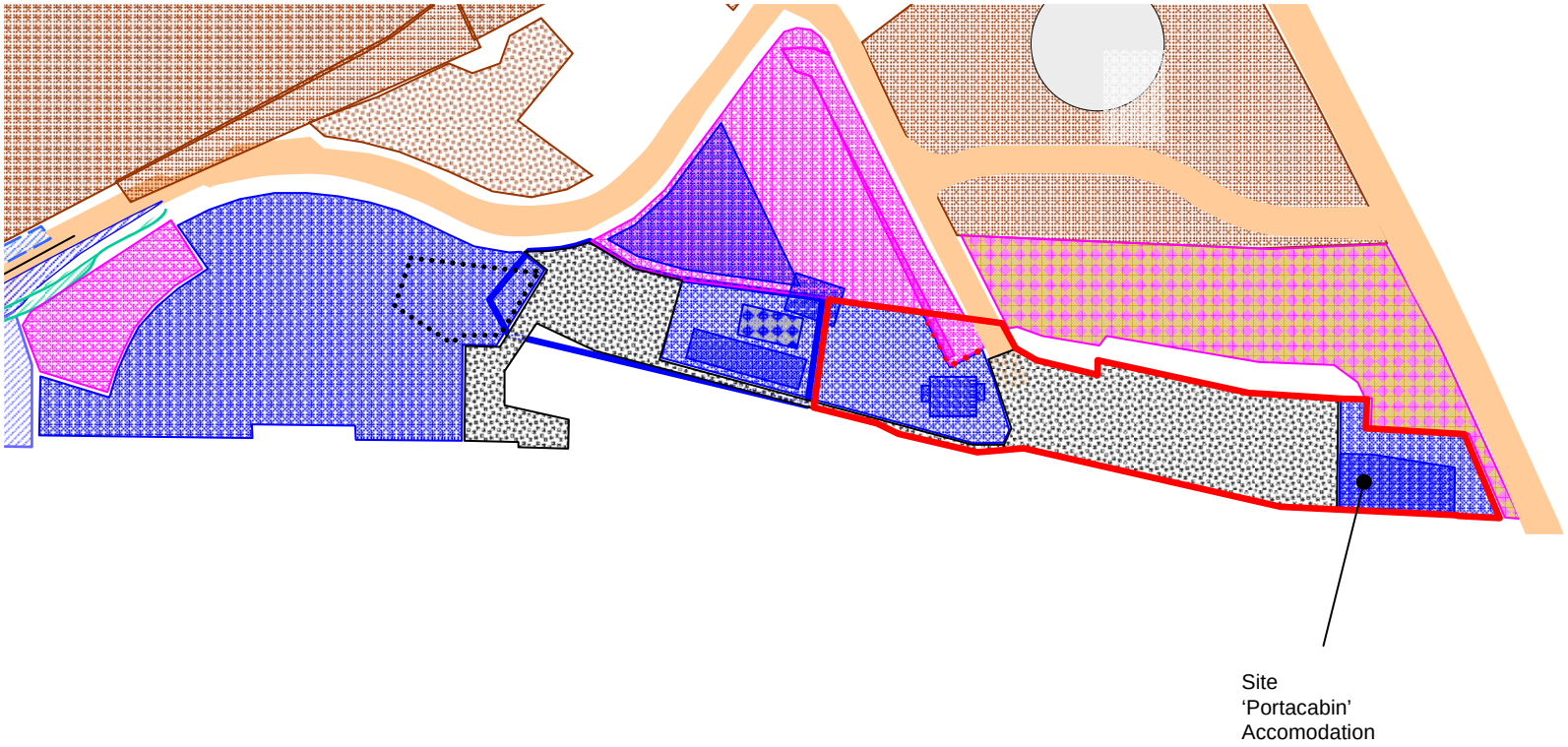
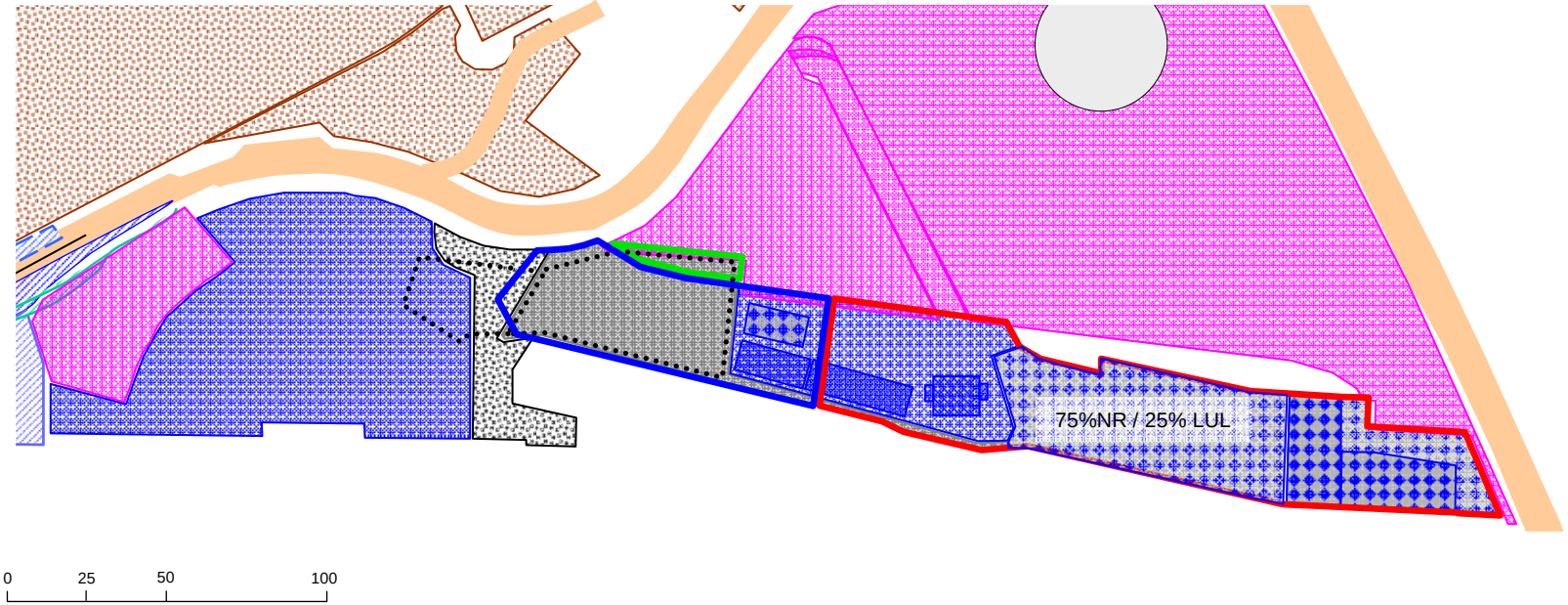
Network Rail
Executive Summary

ARUP

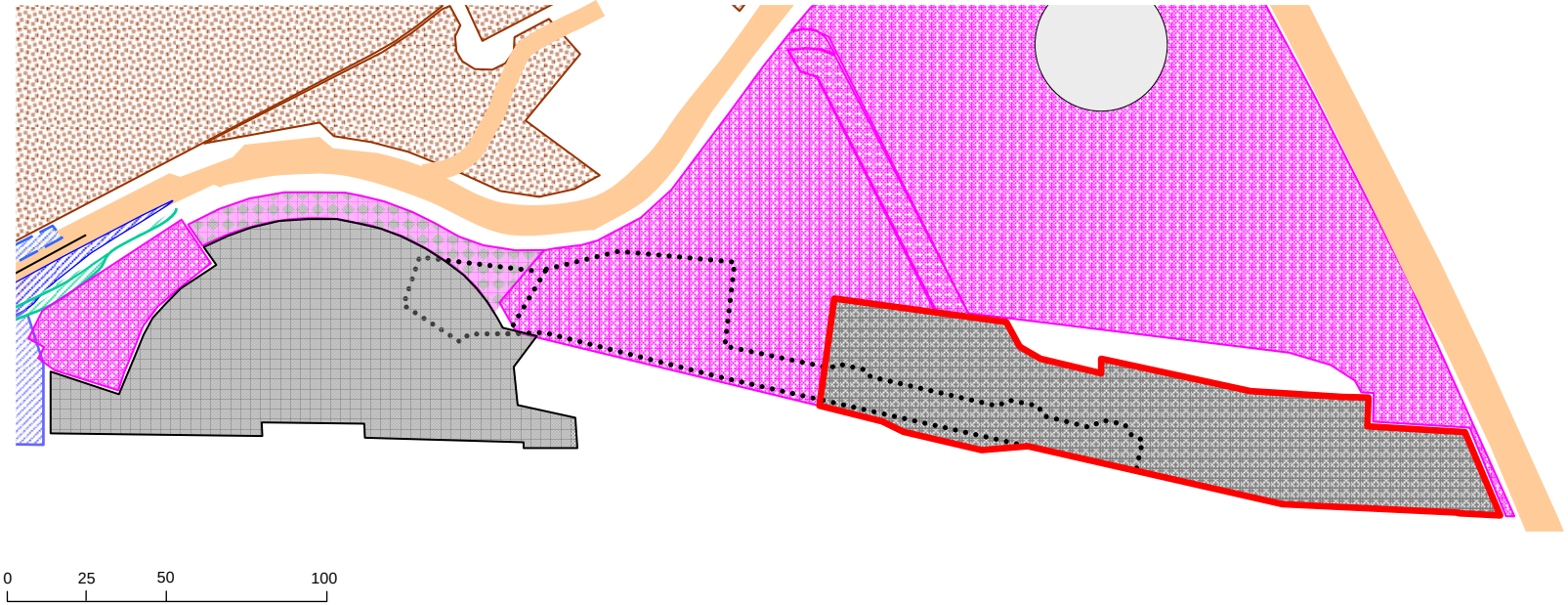
Worksite Phase A (Q4 2006 to Q4 2007)



Worksite Phase B (Q1 2008 to Q4 2010)



Worksite Phase B (Q1 2011 to Q4 2011)



CONTENTS

D1 WASTE

D1.1 OVERVIEW

Waste King's Cross Station falls within the London Borough of Camden, and is therefore subject to their waste legislation, which is primarily based on BS5906: 1980 (Storage and on site treatment of solid waste from Buildings). As well as this standard, the London Borough of Camden Unitary Development Plan (UDP) states that in line with European Government policies and statutory targets, the levels of recycling must increase from current standards in existing developments. Following the EU Waste Framework Directive (75/442/EEC) the government legislates that more materials are to be reused or recycled. It is recommended that Network Rail implement a waste collection strategy for the station that will allow a greater level of segregation and ensure waste is disposed of in a way that does not compromise health and the environment. The present system, which has limited segregation, only separates paper from the rest of the waste.

D1.2 WASTE GENERATION

To comply with BS5906 and Camden requirements, waste generation calculations have been completed to highlight the volume and weight of anticipated waste for various waste streams; that which can be segregated, either for re-use or recycling, and that which is non-segregated (also known as 'refuse'). Using calculations based on recorded data and BS5906:1980, the volumes of waste generated in each area of the site are then used to assess which waste streams can be segregated, how this will be achieved and the areas required to carry out the segregation. Depending on the volume reduction method applied (e.g. baler, compactor) the compaction ratios differ. Paper, plastics, packaging waste and aluminium can all be baled with a compaction ratio of 3:1 ($3m^3$ waste is reduced to 1 m^3). Glass cannot be compacted and it shall be stored in 330 litre Eurocarts (in order to maintain a manageable weight). Therefore the overall compaction ratio for bars and pubs is lower. The results of the waste generation calculations are shown below:

Table D1.1 Waste Generation Calculations

Western Concourse	**m^3/day (uncompacted)**
Retail	0.92
Bars/Pubs	1.67
OBS	2.79
Catering	2.24
Office	3.18
Services/Other	0.45
Total	**13.25**

Table D1.2 Train Waste

Train Waste	m^3/day (uncompacted)	m^3/day (compacted)
Train waste	65.00	16.00

The waste can be broken down into waste streams (apart from the train waste, which is all nonrecoverable) as shown in the table below:

Table D1.3 Waste Streams

Western Concourse Waste Break-down	m^3/day (uncompacted)	m^3/day (compacted)
Paper	2.34	1.17
Non-recoverable	7.53	1.88
Plastics	0.87	0.28
Packaging	1.28	0.52
Aluminium	0.46	0.15
Glass	0.77	0.77
Total	**13.25**	**4.78**

D1.3 GENERAL WASTE STRATEGY

It is recommended that a central team co-ordinate all waste collections between various tenants (i.e. travel centre, retail, offices, etc). The main points of the proposed waste collection strategy are as follows:

- Tenants segregate their waste at source. The segregated waste will then be placed in designated waste containers temporarily stored in an interim waste room. Waste room sizes and locations are shown on the architect's drawings. Segregation of paper, cardboard/packaging, plastic, aluminium and glass is proposed. The proposed high level of segregation maximises the potential for reuse and recycling.

- Waste will then be collected by a site waste contractor and taken to a central waste area (CWA) for consolidation. At the CWA, waste will either be baled, stored in a Eurocart or put in a 30m³ compactor located in the loading bay area. Headroom required for the 30m³ compactor is 6m and the waste rooms require a minimum of 2.5m (clear).

- All the food waste from the catering areas in the station and the waste from trains will be treated as non-recoverable and placed in the compactor. Catering waste will be put into the non-recoverable waste containers prior to being taken to the compactor.

- Hygiene standards state that lifts can be used for transporting both food and waste as long as they are separated (e.g. food is sealed, in a box or in a dedicated caged trolley).

- The waste contractor will collect the compactor and return with an empty one, as there is no space for delivery and collection in a single trip. However, it is expected that the waste management team on site will manage a convenient time to replace the compactor. In the event the compactor is replaced at an inconvenient time, there are a number of

areas in the service area where full Eurocarts can be stored. As there is no loading dock, it is possible to use one of the loading bays including the compactor bay. The removal of the compactor will also only affect the non-recoverable waste stream.

- London Borough of Camden and any other external waste contractor should be able to schedule convenient collection times for the other recyclable waste stored either in Eurocarts or in bales. Recoverable waste will be collected every 2 days; alternative frequency of collection can be arranged. Non-recoverable waste, including food waste, in a compactor will be collected daily.

- Storage provision has been made for 1.5 days non-recoverable waste; and 2 days recoverable waste. In the event that a collection is missed, full Eurocarts can be temporarily stored in the Shared Service Yard.

- Waste rooms require wash down facilities, drainage, mechanical ventilation and smooth impervious walls and floors.

- Power supplies will be required for the baler and compactor.

D1.4 WASTE FROM TRAINS (PLATFORM WASTE)

- When a train arrives at the station, a team of cleaners will walk down the train removing all litter and placing it into plastic bags.

- Waste bags will be placed into Eurocarts located on each platform.

- Expired consumables in the catering trolleys, will be dealt with within the OBS facility.

- Each Eurocart will be placed in a platform lift and brought down to the Old Parcels Tunnel; for onward transfer to the CWA by a waste contractor using an EV, and lifts.

- The waste in the Eurocarts will be unloaded into the 30m³ compactor in the SSY at sub-basement level.

- The empty Eurocarts will then be taken back to the platforms.

D1.5 RETAILERS (INCLUDING CATERING/BARS)

- Under the EU Waste Directive and the UK Packaging and Packaging Waste Regulations, all retail tenants are obliged to recover and recycle a certain proportion of all packaging waste.

- Interim waste storage rooms will be provided on each floor of the Western Range.

- All retailers with accordance to waste regulations will provide 3-4 waste bins (paper, glass, packaging materials and non-recoverable waste) to

allow staff to segregate waste at source. All non-recoverable waste will be placed into black plastic bags; while paper, glass and packaging waste will be placed in transparent or dedicated coloured bags.

- Cleaners/Staff will collect the bags after hours and take them to the interim waste room where the non-recoverable waste bags will put into one 1100litre Eurocart and the recoverable waste bags (paper, plastic and packaging) will be put into another 1100litre Eurocart.

- Each retailer will have a set of keys for the interim waste rooms, which will be locked when not in use for security reasons.

- The waste will be collected from interim waste rooms by a waste contractor and taken down to the CWA as an out of hours operation.

- Western Range waste contractors will use the main service corridors and goods lifts to access the CWA

D1.6 OFFICES

- The waste collection principle will be similar to the retail areas. Internal office waste contractors will collect the non-recoverable, glass and plastics waste from the office floors and take them to the interim waste rooms located on each floor.

- Waste contractors for the Western Range offices will use the goods lifts to take the Eurocarts down to the CWA.

- It may be appropriate to appoint a specialist paper waste contractor who will provide and collect dedicated paper bins on each office floor. This would reduce the number of Eurocarts or bales to be kept on site for waste office paper.

D1.7 OBS FACILITY WASTE

- Catering modules and trolleys will be off-loaded from the trains; brought back to the OBS preparation area and emptied in a holding area (as per the current situation).

- The holding area will need to be separated from crockery, food & drinks in order to avoid cross-contamination.

- Non-recoverable, packaging material and cardboard waste will be put in Eurocarts, which will be colour coded for recognisable segregation.

- Eurocarts will then be taken to the CWA for compaction and baling, and storage prior to collection.

Annex E

Example Environmental Management Plan

EXAMPLE PROCEDURE:			REVISION A
Project Management Procedure **DOCUMENT TITLE:** King's Cross Station Enhancement Project **ENVIRONMENTAL MANAGEMENT PLAN**			
	PRINT	SIGN	DATE
Originator	A N Other Project Environmental Manager		
Checked	A N Other NR Environmental Manager		
Authorised	A N Other Project Director		
Maintenance Responsibility Position		**ENVIRONMENTAL MANAGER**	

Introduction

This Environmental Management Plan (EMP) sets out the policies and practices that the King's Cross Station Enhancement Project will adopt to ensure that the environmental impacts arising from the construction work for the Project are minimised. It also details how the King's Cross Station Enhancement Project will ensure compliance with the requirements of the Network Rail Contract Requirements – Environment (RT/LS/S/015), April 2004, Issue 5, and all applicable legislation.

Amendment Record

Issue Nº	Amendment	Approved by	Date

CONTENTS

E1 *GENERAL PROJECT REQUIREMENTS*

E1.1 *DISTRIBUTION*

1.1.1 This Environmental Management Plan (EMP) is the property of the KXSE Project. Reproduction, use, or distribution by parties other than the KXSE Project is prohibited without written consent. Distribution is to the following parties:

The KXSE Project
Project Team

Network Rail Project Delivery
Project Manager

KXSE Project Contractor
Head Office

E1.2 *ISSUE STATUS AND AMENDMENT SCHEDULE*

1.2.1 The Project Environmental Manager shall update the EMP whenever changes, additions or deletions are found to be necessary. The KXSE Project EMP will be updated from time to time by the KXSE Project Environmental Manager as appropriate.

1.2.2 This document and any amendments to it will be subject to authorisation by the KXSE Project Director, prior to submission to the Network Rail, Project Delivery, Project Manager for review.

1.2.3 The schedule of amendments to this document is shown on the cover page.

E1.3 *PURPOSE*

1.3.1 The purpose of this document is to provide information on the general environmental controls that will be applied during the works to safeguard the environment and minimise nuisance. Project specific controls are detailed in the Weekly Environmental Method Statements, Topic Specific EMPs and the various Project Environmental Management Procedures. A list of the Topic Specific EMPs and Project Environmental Management Procedures is provided in *Appendix A*.

1.3.2 The KXSE Project recognises that the scale and location of the construction works makes environmental control a key issue in the successful implementation of the project. The KXSE Project is also fully cognisant of Network Rail's environmental policy and its commitment to full consideration of the environmental effects, as part of its approach to the development and modernisation of the railway network. The KXSE Project fully endorses this commitment and, in developing this EMP, has sought to provide the

framework to ensure that the works are carried out whilst minimising any significant or unacceptable long-term effects on the environment.

E1.4 *SCOPE*

1.4.1 This EMP is applicable to the entire scope of works associated with the KXSE Project. This includes sub-contractors undertaking work on the project. The KXSE Project will audit sub-contractors waste management procedures and record keeping.

1.4.2 This EMP is the document which describes the Environmental Management for the full scope of the works, as described in the contract documents and includes the KXSE Project tiers of sub-contractors.

1.4.3 Sub-contractors shall work within the KXSE Project system and shall provide such support to that system as may be required.

E1.5 *RELATED DOCUMENTATION*

1.5.1 This document is the principal operating document for environmental management during the undertaking of the works. This plan includes an overall management plan, with separate specific management plans for noise & vibration, air quality, waste, traffic and pollution incident control. All of these documents reflect the requirements of the Network Rail Contract Requirements – Environment, (RT/LS/S/015), April 2004, Issue 5.

E1.6 *ENVIRONMENTAL MANAGEMENT PROCEDURES*

1.6.1 The environmental management procedures, which will be used for the overall environmental management of the KXSE Project, comprise of site specific procedures, which have been and will continue to be developed to suit the Contract requirements. They are introduced commensurate with the specific requirements of the project and the Contract Specification.

1.6.2 The procedures define activities and assign responsibilities required for the control of environmental issues on the KXSE Project. They also identify the records to be maintained for verification of the activities.

E1.7 *SUPPLIERS*

1.7.1 The Network Rail, Project Delivery, Project Manager may issue, at Contract commencement, a list of suppliers and the KXSE Project will be required to select from the list suppliers of certain items of equipment and/or materials pursuant to their requirements. The KXSE Project will audit suppliers against the requirements of this EMP, the relevant specific management plans and the Project contract with Network Rail.

E1.8 *COMMENCEMENT DATE AND KEY DATES*

1.8.1 The works include a number of stages, which are inter-related and essential to the completion of the remodelling programme.

1.8.2 The dates on which physical achievements are to be made available or handed over are defined as Key Dates. A schedule of Key Dates will be agreed with the Network Rail Project Delivery, Project Manager at commencement of the works.

E1.9 MONTHLY PROGRESS REPORTS

1.9.1 Continuous monitoring and reporting of progress is an essential part of the Contract management system, and the periodicity of reporting progress to the Network Rail Project Delivery Project Manager is described in the Contract and in a format to be agreed at commencement of the works.

1.9.2 Any changes notified by the Network Rail, Project Delivery, Project Manager to their environmental policy will be incorporated into the KXSE Project Environmental Procedures.

E1.10 *ENVIRONMENTAL REQUIREMENTS*

1.10.1 The requirements for environmental management on the Project are defined in the Network Rail Contract Requirements – Environment (RT/LS/S/015, April 2004, Issue 5), and are fully explained and detailed in this EMP.

2.1.1 The EMP details the Environmental Management System (EMS) developed by the KXSE Project Environment Manager specifically for the KXSE Project. The EMP follows the requirements of the International Standard for Environmental Management Systems, BS EN ISO 14001 (ISO 14001). The EMP includes the following key elements:

- environmental policy;
- implementation and management;
- monitoring, auditing and reporting;
- identification of roles and responsibilities;
- register of environmental effects;
- environmental design management;
- issue specific management plans; and
- environmental method statements and proposed mitigation measures.

2.1.2 The EMP defines the approach to address all environmental issues identified in the EMP Register of Environmental Effects. The KXSE Project Environmental Manager will review the EMP every four weeks and update as necessary following agreement with Network Rail. Any updates will be submitted to Network Rail for acceptance. The EMP also incorporates the KXSE Project obligations to comply with Network Rail Contract Requirements – Environment (RT/LS/S/015), April 2004, Issue 5.

E3 *THE KXSE PROJECT ENVIRONMENTAL POLICY*

3.1.1 All KXSE Project undertakings will adhere to the KXSE Project Statement of Environmental Policy appended to this section. This Environmental Policy reflects the requirements of Section 4.2 of ISO 14001.

3.1.2 In addition, and specifically for the KXSE Project, all construction work will be governed by KXSE Project Environmental Policy as follows:

[Insert Contractor's Environmental Policy here]

3.1.3 The KXSE Project envisages that it will be necessary for Network Rail and KXSE Project environmental staff to work as a team from the outset to ensure that the above environmental policies and the objectives of this EMP are met.

E4 *PROJECT ENVIRONMENTAL OBJECTIVES AND TARGETS*

4.1.1 The overall environmental objectives to be applied to the works will be to:

- Ensure all practical steps are taken to minimise the environmental effects of the works throughout the contract including design, implementation and completion.
- Ensure that all activities are conducted in accordance with all relevant legislation, Codes of Practice and Network Rail's environmental policies/procedures.
- Ensure all applicable permits, consents and other statutory requirements are obtained prior to works commencing, and fully complied with.
- Ensure that all staff (including sub contractors) are aware of the environmental issues relevant to the works and receive appropriate environmental awareness training.
- Ensure that all work is carried out in accordance with this EMP.
- Conduct an ongoing review of the environmental requirements of the contract and ensure that environmental controls remain adequate throughout the duration of the contract.
- Implement an environmental management programme in accordance with the principles of ISO 14001, to manage the design issues, and the implementation and operational aspects of the contract.

4.1.2 The Overall Environmental Targets for the Project Area are as follows:

- Ensure 100% compliance with Environmental Protection (Duty of Care) Regulations 1991 during project time frame.
- Ensure 100% compliance with conditions of the Section 61 Consent granted by London Borough of Camden.
- Minimise the proportion of the ballast excavated from the Platform Y element of the project to be sent to landfill.
- Minimise the proportion of the soil excavated from the construction of the Plant Room Area to be sent to landfill.
- All reported environmental incidents closed out within 14 days.
- All staff with environmental responsibilities to have received at least two days of environmental training by the end of first year of construction.

E5 *IMPLEMENTATION REQUIREMENTS*

E5.1 *IMPLEMENTATION SCHEDULE*

5.1.1 The Implementation Schedule is reproduced in Appendix B and includes the following points:

- identification of the key stages of EMP implementation;
- tasks to be completed by each stage;
- assigning responsibilities to the KXSE Project staff for meeting the key stages of implementation;
- scheduling the environmental elements of the consultation process;
- identification of permissions and consents to be secured; and

E5.2 *ROLES AND RESPONSIBILITIES*

5.2.1 The implementation of the EMP will be the responsibility of the KXSE Project Environmental Manager who will report directly to the senior management team.

5.2.2 The KXSE Project Environmental Manager will be the focal point for communications on all environmental matters with Network Rail, external bodies and members of the public. The contract environmental staff will be suitably qualified and trained, as necessary.

5.2.3 An organisational chart illustrating the managerial and other linkages is shown in Appendix C. The functions of the various roles are described below:

The KXSE Project Environmental Manager

5.2.4 The KXSE Project Environmental Manager has the following responsibilities:

- To provide a focal point for all communications between the construction team and Network Rail environmental personnel and outside bodies (*eg* local authority, Environment Agency).

- Establish the environmental monitoring programme.

- Establish and implement a suitable audit programme to ensure all environmental objectives are met.

- Ensure the Project Manager and his line managers are kept appraised of any impending or other legislative changes, which could affect the construction practices.

- Ensure all consents/licences are obtained and updated as required by the Contract.

- Implement programmes of environmental performance monitoring and provide regular reports to Network Rail personnel.

- Provision of environmental awareness training.

- Development and implementation of Pollution Incident Control Plan.
- Undertake environmental risk assessments.
- Ensure the environmental procedures covering this project are adequate.
- Conduct environmental monitoring and auditing.
- Support KXSE Project Environmental help desk service.

The KXSE Project Director

5.2.5 The Project Director has overall responsibility for ensuring full compliance to this EMP and the implementation of environmental procedures. He shall also ensure that all sub contractors contribute to the EMP, and are fully committed to monitoring its effectiveness and overall implementation. The Project Director shall also take responsibility for ensuring that all staff and personnel on site are given the necessary training and briefings to carry out their required role.

The KXSE Project Construction Manager

5.2.6 The Project Construction Manager will ensure all agreed control measures are adequate and implemented and feed back information to the KXSE Project Director and Environmental Manager, as necessary. He will also be responsible for ensuring that the incident reporting procedure is adhered to.

The KXSE Project Site Engineers

5.2.7 The Site Engineers have the following responsibilities:

- To ensure all their staff understand their environmental responsibilities.
- To monitor staff working procedures to ensure they follow this EMP.
- Brief and practise the staff in the environmental emergency plan.
- Ensure that all waste consignment notes and muck away tickets are completed and the correct copies retained and returned to the Waste Manager.

The KXSE Project Waste Manager (if required)

5.2.8 The KXSE Project Waste Manager reports to the KXSE Project Environmental Manager and is responsible for managing all waste and scrap material arising from the KXSE Project. The KXSE Project Waste Manager has the following responsibilities:

- Procedures for dealing with waste will be established.
- Identify, classify and quantify all waste generated on site.

- Ensure all waste classification is in line with current legislation.
- Ensure the waste management hierarchy is adopted within the waste management plan in line with current legislation.
- Ensure the integrity of the Duty of Care audit trail is maintained.
- If Duty of Care is breached, ensure that subsequent loads are inspected for adequate description, containment and destination.
- Report all offences to the Project Environmental Manager.
- Ensure that fly tipping on the project work sites is prevented.
- Validate the waste carrier's and waste disposal site's registration with the issuing waste disposal authority.
- Maintain waste management registers in line with the Project EMP and current legislation.
- Undertake random checks to ensure the accurate completion of transfer notes.
- Identify licensed waste disposal contractors in the vicinity of the site and carry out validation checks on licence details.
- Undertake random checks to ensure that waste reaches its destination detailed on the transfer note.
- Establish a system which ensures that all records for waste disposal can be retained for a minimum of three years after completion of the project.
- Undertake a weekly inspection of the site.

E6 *ENVIRONMENTAL INCIDENTS*

6.1.1 In the event of a significant release to the environment of any substance liable to cause pollution, the incident shall be immediately reported to the KXSE Project Construction Manager by the Team Leader or Foreman responsible for the work area. The KXSE Project Construction Manager shall ensure that the correct reporting procedure is followed. The reporting procedure for environmental incidents follows the same principles as the Health and Safety reporting procedure.

6.1.2 Examples of significant releases to the environment include, but are not limited to, the following:

- Spillages of more than 10 litres of chemical, fuel or oil, other than in a bunded area.
- Spillages of HAZCHEM listed chemicals
- Spillages of low hazard products with polluting potential.
- Petrol spillages greater than 100 litres.
- Incidents by or near a watercourse.
- Incidents at Environment Agency identified 'sensitive' sites.
- Major incidents in combined drainage areas (e.g. large railway stations).
- Discoloration of a surface watercourse with silt.
- Fires.
- Ingress into a surface watercourse of any liquid.
- Accidental or deliberate breach of storage tanks or bowsers.
- Breaches of conditions of Section 61 Consent.
- Breaches of the waste management Duty of Care.

6.1.3 For the KXSE Project the procedure for reporting any environmental incidents will be detailed within the Pollution Incident Control Plan (PICP). The PICP will include a flow chart to show the steps to be completed and the report forms required.

6.1.4 All incidents that occur during the KXSE Project will be entered in the KXSE Project Environmental Incident Book. This will be the project environmental incident book for use by all persons working on, or visiting the site. The environmental incident book will be located in the construction office. All reportable environmental incidents will be reported to the KXSE Project Environmental Manager and Network Rail Environmental Manager within 24 hours of their discovery. Appendix D contains the Environmental Incident Report Form

E7 *INTERNAL COMMUNICATION*

7.1.1 Communication on environmental issues within the KXSE Project team will be maintained through combined monthly Health, Safety and Environment meetings chaired by the KXSE Project Safety Manager.

7.1.2 The environment agenda for the monthly meeting will be oriented towards reviewing events and actions arising from the previous month's activities. Other items to be included on the monthly agenda will include:

- Progress with consents.
- Progress with method statements.
- Public consultation.
- Reporting of monitoring results.
- Actions arising from site inspections and audits.

7.1.3 Every fourth meeting will be expanded to include a review of the EMP and associated procedures.

E8 *EXTERNAL COMMUNICATION AND LIAISON*

E8.1 *INTRODUCTION*

8.1.1 The KXSE Project recognises that good communication and community liaison are key components for sound environmental management of the Project. A strategy has been developed in this EMP to ensure that this form of consultation is effectively carried out.

8.1.2 The Network Rail Contract Requirement – Environment (RT/LS/S/015, April 2004, Issue 5) requires the KXSE Project to agree with Network Rail a programme for future public consultation which will be in accordance with the principles set out in Network Rail's Consultation Strategy for this scheme. This programme is required as part of the EMP and includes a procedure of liaison and consultation on environmental issues relating to the Project. The procedure is also required to include a plan for communicating with all parties directly or indirectly affected by any environmental issues arising from the works.

8.1.3 The plan is required to clearly demonstrate to Network Rail the manner in which affected residents, land owners, schools, hospitals *etc* will be consulted and informed of the consequences of work activities and how the KXSE Project will be mitigating any effect.

8.1.4 The KXSE Project consultation and liaison arrangements will be maintained throughout the Contract period and will include but not be limited to:

- consultation with the relevant statutory authorities (*eg* Environment Agency, English Nature, *etc*) in conjunction with Network Rail;
- presentations to the Working Group (established as part of the primary contact between Network Rail, the KXSE Project, residents representatives and the London Borough of Camden) explaining the future programme of the works; and
- advance notification to those most affected by particular environmental effects.

8.1.5 The KXSE Project shall inform occupiers of nearby residential buildings or other sensitive receivers at least 14 days, but no more than 28 days, in advance of the works taking place, including their likely nature and duration. The KXSE Project is also required to agree the extent and manner of the notification with Network Rail.

E8.2 *OBJECTIVES*

8.2.1 The KXSE Project will involve significant interfaces between the principal parties, which include Network Rail, the KXSE Project, the London Boroughs of Camden and Islington and the local community. The Consultation Strategy will include a section on the objectives of the Strategy, which will be designed to:

- ensure that all relevant requirements of statutory bodies are understood and properly taken into account;

- ensure that all consents and approvals are obtained in a timely and co-ordinated manner;

- consult with and disseminate information to all affected parties. This includes residents, businesses, interest groups and elected representatives;

- identify any particular issues requiring resolution by Network Rail and/or the KXSE Project;

- ensure that Network Rail's commitment to the environment is properly reflected in the design and implementation of the works;

- minimise any potentially adverse publicity; and

- maximise public awareness of the Project's benefits.

E8.3 *STRATEGY*

Issues

8.3.1 The key environmental issues associated with this project include:

- noise from construction; including the particular problems associated with night-time and weekend working;

- construction traffic;
- effects on listed buildings and Conservation Areas; and

- other environmental impacts.

8.3.2 The consultation and liaison process must proactively address these issues.

E8.4 *CONSULTATION TARGET GROUPS*

The Consultation Strategy identifies a range of statutory and other bodies, which need to be included in the consultation process. These are identified below. A Register of Statutory Consultees is reproduced as Appendix F.

Statutory Bodies

London Borough of Camden (LBC)

LBC is the local authority within whose area this project will be undertaken. The main focus for the consultation will be with the Environment Department, Pollution Team, which is responsible for the following aspects:

- Planning/Heritage - planning control, conservation areas, listed buildings *etc*.

- Highways/Transportation - traffic control, works on public highways, utility diversions.

- Environmental Health - noise, hours of work *etc*.

8.4.1 The Press Office of London Borough of Camden are also likely to be involved in the provision of information to the public.

8.4.2 The KXSE Project, in conjunction with Network Rail, will seek to work with London Borough of Camden to reduce the impact on residents, landowners, schools, hospitals *etc* and the environment.

English Heritage (EH)

8.4.3 EH is primarily responsible for impacts on listed buildings and scheduled ancient monuments. Due to the effects that the Project will have on the listed buildings, consultation and liaison with EH will be required by the KXSE Project, throughout the implementation of the Project.

Environment Agency (EA)

8.4.4 The EA has responsibility for controlled waters, the handling of waste materials and pollution control. Consultation will be required on all these issues together with any other aspects that may arise during the course of the project.

English Nature (EN)

8.4.5 EN is responsible for nature conservation issues and for any species protected under the Wildlife and Countryside Act 1981. EN has confirmed that there are no sites with statutory nature conservation designations within the area of the worksite. However, there is the possibility that the buildings to be demolished as part of the Platform 0 works could contain bats, which are a protected species. A bat survey of the internal areas of these buildings will need to be undertaken prior to any works to these buildings.

British Waterways Board (BWB)

8.4.6 BWB is responsible for the Regent's Canal, which lies to the north of the works. However, no works to the canal are required and no discharges to the Canal will be made. It would therefore seem unlikely that consultation or liaison with BWB will be required by the KXSE Project.

Statutory Utilities - Gas, Electric, Water, Telecoms

8.4.7 The utilities will be concerned to ensure that any services that need diverting are properly identified and that the works do not affect any other services located in the area. Initial contact has been made by the KXSE Project and this will be continuing throughout the Projects' implementation.

8.4.8 Other services also occur which cross under the track and will be regulated by way leaves, details of which will be obtained from Network Rail.

Rail User Groups

8.4.9 Rail User Groups will require to be advised of any closures or reorganisations of rail services. These changes will occur during possession of the track. The KXSE Project will maintain a programme of works, which will be issued to Network Rail. It is assumed that Network Rail will maintain responsibility for consultation with these user groups.

Emergency Services

8.4.10 The Police, Ambulance Service and the London Fire and Civil Defence Authority will be provided with details of the works and main access points to the worksite.

8.4.11 The emergency services will also be notified and consulted over any required closures to emergency access routes.

Non-Statutory Bodies

8.4.12 The following non-statutory bodies and organisations will need to be involved in the consultation process:

- residents and tenants associations;
- local amenity groups;
- environmental groups;
- other relevant local or London wide groups.

8.4.13 It is intended that the majority of the above will be represented at 'Working Group' meetings, which will be held monthly. The responsibility for updating a Register of non-statutory consultees lies with Network Rail's External Affairs Department.

Individually Affected Residents/Businesses

8.4.14 The KXSE Project is committed to effective consultation with all bodies including individually affected residents and businesses. The work being undertaken for various consents and particularly that being undertaken to address noise issues, will identify residents and businesses that may be affected, and also the periods when effects may occur. This will allow notification in advance of areas that may be affected by the works.

Interface with Other Projects

8.4.15 The Consultation Strategy identifies other major Network Rail or third party projects, which may impact upon the works. The KXSE Project will assume that Network Rail will liaise with these other projects and provide information on potential impacts.

Programme for Future Public Consultation

8.4.16 The Network Rail Contract Requirements – Environment (RT/LS/S/015, April 2004, Issue 5) requires that a programme for future public consultation is agreed with Network Rail. This section provides the Programme that the KXSE Project will implement.

8.4.17 A public Help Line will be staffed whilst works are being undertaken. Key Project staff will attend the Working Groups and/or other meetings, as required.

E9 *REGISTER OF ENVIRONMENTAL EFFECTS*

9.1.1 The Network Rail Contract Requirements – Environment (RT/LS/S/015, April 2004, Issue 5) requires that the KXSE Project Environmental Manager shall develop and implement a procedure for the appraisal of all potential environmental impacts that could result from the planned works. The King's Cross Station Enhancement Project Environmental Statement prepared by ERM will provide the basis for this appraisal.

9.1.2 The appraisal will consider the likely environmental impacts, direct and indirect, on the environment, of the project. Particular attention will be given to the potential effects on the following:

- human beings
- flora and fauna
- soil
- water
- air
- climate
- landscape
- interaction between any of the aforementioned
- material assets
- cultural heritage

9.1.3 The appraisal of effects will consider those that could arise, or are likely to arise, as a consequence of:

- normal construction activities;
- abnormal construction conditions;
- incidents, accidents and potential emergency situations; and
- past activities (where information is made available to The KXSE Project by Network Rail) and current and planned construction activities.

9.1.4 The results of the appraisal have been compiled as a Register of Environmental Effects. This draws out the key effects identified in the appraisal and the proposed mitigation. The Register shall be reviewed and updated, by the KXSE Project Environmental Manager, as necessary throughout the construction programme. Any changes will be submitted to Network Rail for approval. The Register of Environmental Effects will be held in the KXSE Project Office. A generic Register of Environmental Effects is attached as Appendix G of this EMP. Task specific environmental effects will be identified within the Environmental Method Statements. The Register of Environmental Effects will be updated as the method statements are produced.

E10 *ENVIRONMENTAL RISK REGISTER*

10.1.1 The Register of Environmental Effects forms the basis of the Environmental Risk Register. The Environmental Risk Register ensures that all the environmental risks are identified, and adopt a procedure compatible with the Health and Safety Risks reporting procedure.

10.1.2 Broad level, generic risk assessments, relating to work to be undertaken by the KXSE Project during the KXSE Project, were conducted for this EMP. These will be built upon within the Environmental Method Statements for individual tasks. A set of generic risk assessments, relating to particular work activities, is attached as Appendix H of this EMP.

10.1.3 Environmental Risk Assessments have been carried out in accordance with the risk rating approach used for identifying project health and safety risks as described below. The methodology is as follows:

10.1.4 Assessments are carried out in accordance with the risk rating approach using a 3 X 3 matrix, where:

- Degree of Risk (rating) = Likelihood x Severity
- Both Likelihood and Severity are scored on a scale of 1-3.

The scoring method is as follows:

NUMERICAL VALUE	LIKELIHOOD	SEVERITY
1	Unlikely	Minor environmental incident resulting in no environmental damage and requiring minor intervention by site personnel. Incident not reportable to the Environment Agency or Water Authority.
2	Likely	Incident reportable to the Environment Agency, but leading to only minor environmental damage and requiring moderate intervention by site personnel.
3	Very Likely	Major environmental incident resulting in catastrophic damage to the environment, major project delays and prosecution and/or imprisonment.

The above values are combined using the risk matrix as follows:

	SEVERITY		
LIKELIHOOD	1	2	3
1	1	2	3
2	2	4	6
3	3	6	9

Risk categories are defined as follows:

- Low 1 - 3
- Medium 4 - 5
- High 6 - 9

10.1.5 When making such judgements, consideration was given to total loss, severity, and likelihood of the occurrence and the nature of the environment exposed to the risk.

10.1.6 Further Environmental Risk Assessments will be carried out, on a task specific basis, to ensure that all hazards have been identified and control measures are in place. The Project Environmental Manager will hold the Environmental Risk Register in the KXSE Project Office. The Project Environmental Manager will update the register as the project develops and further risks are identified.

E11 *ENVIRONMENTAL DESIGN MANAGEMENT*

E11.1 *PURPOSE*

11.1.1 The purpose of this procedure is to ensure that environmental requirements, as set out in the Network Rail Contract Requirements – Environment (RT/LS/S/015, April 2004, Issue 5) and the Specific EMPs, are incorporated into the detailed design phase of the project. In doing so, the project's environmental sensitivity will be taken into account within the following engineering disciplines:

- Permanent Way;
- Signalling;
- Overhead Electrification;
- Refurbishment of Listed Buildings;
- Demolition of existing buildings;
- Civil Engineering and Building Works (including piling and excavation); and
- E&M.

E11.2 *SCOPE*

11.2.1 This procedure will be applied to all detailed designs associated with the engineering disciplines identified above and include all environmental aspects, as identified in the Network Rail Contract Requirements – Environment (RT/LS/S/015, April 2004, Issue 5) and the Register of Environmental Effects.

E11.3 *PROCESS*

11.3.1 The following process will carry out environmental management of the Design Plan.

E11.4 *ENVIRONMENTAL DESIGN WORKSHOP*

11.4.1 Prior to the commencement of the project design elements, the Environmental Manager will brief the Design Managers on the environmental requirements/constraints to be included in the individual design briefs. This will include, but not be limited to, the following:

- Construction methodology.
- Public Highways.
- Noise.
- Dust and Air Pollution.
- Contaminated Materials.
- Spoil and Waste (minimisation and recycling/reuse).
- Archaeology.
- Built Heritage.
- Protected Species.
- Townscape.
- Overall feasibility.
- Cost implications.

- Safety.
- Quality Assurance.

11.4.2 The Environmental Design Workshop is a key meeting and will be attended by all members of the senior management team, including the Project Manager, Construction Manager and Commercial Manager. The aim of the workshop is to ensure that the design disciplines are aware of the specific environmental effects, requirements, constraints associated with each design brief and to develop detailed methods which reflect Best Practicable Means (BPM) and are the Best Practicable Environmental Option (BPEO).

E11.5 *ENVIRONMENTAL DESIGN REQUIREMENTS (RESPONSIBILITIES)*

11.5.1 All disciplines will set out the environmental design requirements/constraints for their own discipline, including clear statements on the construction requirements. These design requirements will form part of the design specification. The environmental design requirements will be relayed to the various design disciplines through an Environmental Design checklist specific to their discipline to be prepared by the Environmental Manager. Each aspect of the permanent infrastructure detailed on the checklist is to be taken into consideration when finalising the design. The checklist will be reviewed before submitting the design and the designer is to comment, date and initial against each criterion. The KXSE Project Environmental Manager will form part of the authorisation process and will be responsible for ensuring that the methods reflect Best Practicable Means (BPM) and are the Best Practicable Environmental Option (BPEO).

E11.6 *ENVIRONMENTAL COMPLIANCE*

11.6.1 Each design manager will nominate a member of the design team who will be responsible, in conjunction with the KXSE Project Environmental Manager, for ensuring the environmental requirements/constraints are integrated into the design process. Checklists will be provided to the design team with indicators of the environmental issues, which need to be considered during the design process. The checklists will provide an auditable step in the design review process.

E11.7 *DESIGN REVIEW MEETINGS (FREQUENCY AND SCHEDULES)*

11.7.1 Environmental performance, as measured against the relevant specification and the requirements/constraints associated with each design, will be reviewed at each Design Review Meeting. These will be attended by the KXSE Project Environmental Manager as required. These will form part of the environmental monitoring and review process and will ensure that the requirements of the EMP are complied with.

E12 *SPECIFIC MANAGEMENT PLANS*

12.1.1 Network Rail Contract Requirements – Environment (RT/LS/S/015, April 2004, Issue 5) requires that the following Specific Management Plans are prepared as part of the EMP:

- Waste Management Plan (WMP);
- Air Quality Management Plan (AQMP);
- Traffic Management Plan (TMP);
- Pollution Incident Control Plan (PICP); and
- Noise and Vibration Management Plan (N&VMP).

12.1.2 The specific management plans will include the following key components:

- a description of the relevant activities;
- commitments, legislation and guidance;
- consents required;
- mitigation; and
- reporting and monitoring procedures.

12.1.3 The Specific Management Plans will be produced as separate documents forming a sub-set of the EMP.

E13 *ENVIRONMENTAL METHOD STATEMENTS*

13.1.1 The purpose of the Environmental Method Statement will be to specify the proposed mitigation of environmental effects for a particular activity identified in the Register of Environmental Effects.

13.1.2 The Environmental Method Statement will apply the principles and requirements of the Network Rail Contract Requirements – Environment (RT/LS/S/015, April 2004, Issue 5) on a site specific basis, taking into account the environmental issues identified in the Register of Environmental Effects at each site. The Environmental Method Statements will form part of the environmental management measures to be implemented by the KXSE Project.

13.1.3 The method statements will be required to include the following for acceptance by Network Rail prior to the commencement of any site activities:

1) Summary of the work scope
2) Working Hours
3) Site Access
4) Site Communication
5) Working with Plant and Trains
6) Dust and Contaminated Materials
7) Prediction of Impacts
8) Monitoring
    8.1) Noise
    8.2) Discharges
9) Notification to Residents
10) Consents Required
11) Specific Management Plans
    11.1) Pollution Incident Control Plan
    11.2) Waste Management Plan
    11.3) Noise and Vibration Management Plan
    11.4) Traffic Management Plan
    11.5) Water Quality Management Plan
    11.6) Air Quality Management Plan

13.1.4 The Environmental Method Statements will be drawn up on the basis of regular consultations with the London Borough of Camden and through the requirements of any Section 61 consent that may be granted by London Borough of Camden. This proactive approach will ensure the dissemination of information to the local authority regarding the KXSE Project, environmental control measures.

E14 *CONSTRUCTION MONITORING AND REPORTING*

E14.1 *PURPOSE*

14.1.1 Network Rail Contract Requirements – Environment (RT/LS/S/015, April 2004, Issue 5) requires that the KXSE Project develops a construction monitoring, reporting and auditing regime, which shall be applied to each element of the construction works. These obligations will fulfil the requirements of section 4.5 of ISO 14001 for an organisation to establish and maintain a programme for checking and corrective action within their management system.

14.1.2 The KXSE Project recognises that a distinction needs to be made between the different types of monitoring. For the purposes of the KXSE Project a clear distinction has been made between active and reactive monitoring as follows:

E14.2 *ACTIVE MONITORING*

14.2.1 Active monitoring includes the following:

- Site Inspection Schedules.
- Hazards Checklists.
- Identified Project Environmental Deficiencies.
- Record Keeping.
- Analysis of Inspections.
- Senior Managers Documentation.
- Supervisors Training Awareness.
- Performance Reports.
- Monitoring of 3rd Party Inspections.

E14.3 *REACTIVE MONITORING*

14.3.1 Reactive monitoring includes the following:

- Process of incident reporting.
- Records of remedial actions.
- Process of incident inspections.
- Noise monitoring of works.

E14.4 *NOISE MONITORING AND REPORTING*

14.4.1 The KXSE Project will apply to the London Borough of Camden for a Section 61 consent. Noise monitoring will be undertaken in agreement with the London Borough of Camden as part of the consent. Specific reporting requirements will be agreed with London Borough of Camden should they differ from those proposed.

E15 *TRAINING*

15.1.1 In accordance with the requirements of *section 4.4.2* of ISO 14001, the project shall identify the training needs of its staff. The requirement is that all personnel, whose work may cause a significant effect on the environment, will receive environmental training.

15.1.2 Environmental training is training with the primary objective of environmental protection. This includes:

- Training for senior managers.
- Training courses for environmental auditing and environmental management systems.
- Environmental element of induction talks.
- Toolbox Talks on spillages, noise prevention *etc.*

15.1.3 The KXSE Project Environmental Manager will document the training given to various levels of staff. The KXSE Project Environmental Manager will maintain records of the quantity and type of training received so that progress against the training targets can be measured.

E16 *AUDITS AND CORRECTIVE ACTION*

E16.1 *AUDITS*

16.1.1 The purposes of the audits will be as follows:

- obtain assurance that the necessary actions are being fulfilled and that the EMP is being adhered to;
- assess the conformity of the activities with the specified technical requirements; and
- ensure that the EMP is fully understood and that all required documentation is available to concerned parties.

E16.2 *INTRODUCTION*

16.2.1 Environmental Audits will be carried out using a planned schedule, with documented procedures and checklists, to determine the continuing effectiveness of the EMP. The Environmental Compliance Audits are a systematic and independent examination, to determine whether construction activities comply with method statements and are implemented effectively achieving the necessary objectives.

E16.3 *RESPONSIBILITIES*

16.3.1 The KXSE Project Environmental Manager, or designate, will be responsible for the preparation of an audit schedule and for seeking Network Rail's approval of that schedule. The KXSE Project Environmental Manager will be responsible for initiating and conducting the audits but may designate other auditors to effect adequate auditing coverage of the EMP. These other adequately trained auditors will not audit areas for which they are directly responsible.

16.3.2 It will be the responsibility of appropriate persons to determine, and agree, corrective actions resulting from audits with the KXSE Project Environmental Manager. The KXSE Project Environmental Manager will be responsible for organising subsequent follow up of such actions, to ensure their effective implementation within the specified period, and also the maintenance of records relating to the audits.

E16.4 *SCHEDULE, FREQUENCY AND PLANNING OF AUDITS*

16.4.1 In order to ensure that the EMP is being followed, a programme of audits will be established covering the whole EMP structure. Audits will be performed against a predetermined schedule and designed to ensure that each aspect of the EMP is checked at least monthly. A sample audit schedule is reproduced in Appendix I. The environmental inspection report form is reproduced in Appendix E. The data collected from the weekly and monthly inspections will

be used in evaluating the environmental aspects of the project's activities, as required under *Section 4.3.1* of ISO 14001.

E16.5 *DETAILS OF PROCEDURE*

16.5.1 Each Auditor will utilise checklists, which will be used to record objective evidence that the audit has been performed and satisfactorily completed. If, during the audit the Auditor observes any corrective action against the EMP, this will be recorded by completing a Corrective Action Report and will, where appropriate, include recommendations. At the conclusion of the audit, the findings will be discussed by the Auditor with the person responsible for the Corrective Action and the KXSE Project Construction Manager in order to clarify any misunderstandings, and confirm the accuracy of any Corrective Actions noted during the audit.

16.5.2 Corrective Action Report forms shall be distributed as follows:

- the original copy to the person responsible for the non-conformance incurring the corrective action;
- one copy to the Construction Manager;
- one copy to the EMP Audit records
- one copy to the Project Quality Manager; and
- one copy to the Network Rail Environmental Manager.

16.5.3 The personnel responsible for the implementation of the corrective action will indicate on the Corrective Action Report Form their proposals for dealing with the corrective action request, and the effective date for the completion of its implementation. Photographs will be attached to Corrective Action Request Report Forms to aid investigation of the incidents and achievement of best practice. A copy of the report will be returned to the Auditor within 7 days of the date of issue.

16.5.4 A diary system will be maintained by the Auditor to ensure that Corrective Action Report Forms are satisfactorily closed out within the prescribed timescales.

E16.6 *RECORDS*

16.6.1 All Corrective Action Records will be retained within the EMP records for the duration of the KXSE Project.

Appendix A

Draft List of Plans and Procedures

A1 LIST OF ENVIRONMENTAL PLANS AND PROCEDURES

DOCUMENT NAME	DOCUMENT NUMBER
Environmental Manuals	
Environmental Management Plan	xxxx-xxxx
Topic Specific Management Plans	
Noise and Vibration Management Plan	xxxx-xxxx
Waste Management Plan	xxxx-xxxx
Traffic Management Plan	xxxx-xxxx
Pollution Incident Control Plan	xxxx-xxxx
Procedures	
Special Waste Management Procedure	xxxx-xxxx

Appendix B

Sample Implementation Schedule

TASK	ACTION BY	ACTIONS REQUIRED TO COMPLETE TASK	ACTION BY	INFORMATION REQUIREMENTS	ACTION BY	% COMPLETE	DEADLINE
Environmental method statements	Environment Manager	Review of Task Specific Method Statements	Environment Manager	Task Specific Method Statements		Ongoing	
Undertake environmental risk assessments and define further mitigation requirements	Environment Manager	Review of detailed method statements	Environment Manager	Detailed method statements			
Produce Topic Specific Management Plans - Waste management - Traffic management - Noise and vibration - PICP	Environment Manager Environment Manager Environment Manager Environment Manager Environment Manager	Review detailed method statements Waste carrier identification Project Traffic movements Completion of s.61application	Environment Manager Waste Manager Individual Disciplines Environment Manager Environment Manager	Detailed method statements and programme			
Develop consultation strategy	NR Consultation Team	Consultation with Camden	Environment Manager	Meet with Camden			
Develop Helpline	Construction Manager	Consult with NR and agree					

TASK	ACTION BY	ACTIONS REQUIRED TO COMPLETE TASK	ACTION BY	INFORMATION REQUIREMENTS	ACTION BY	% COMPLETE	DEADLINE
		appropriate system					
Environmental awareness training	Environment Manager			EMP	Environment Manager	75	Ongoing
Obtain environmental consents - **Noise**	Environment Manager	Produce s61 application Meet with LBC to discuss s. 61 progress Revise s. 61and submit to LBC LBC to determine application	Environment Manager Environment Manager Environment Manager LBC	Detailed method statements Comments Comments	CONTRACTOR LB of C		

Appendix C

Senior and Environmental Management Charts

[To be completed by chosen Contractor]

Appendix D

Environmental Incident Form

DATE AND TIME OF INCIDENT	LOCATION ON SITE
NATURE OF INCIDENT	
DESCRIPTION OF EVENTS	
EFFECTS OF INCIDENT	
IMMEDIATE ACTION TAKEN	
CORRECTIVE ACTION	
DATE CLOSED OUT	

Appendix E

Inspection Report Form

ENVIRONMENTAL SITE INSPECTION RECORD

Visit By: Signed Date:
Site Representative Signed Date:

LOCATION OF SITE

Items checked	Satisfactory?		Items checked	Satisfactory?	
(Delete items not checked)	Yes	No	(Delete items not checked)	Yes	No
1. Previous Inspection			Facility to containing spillage while refuelling		
All non-complying activities now in order			Compliance with COSHH Regulations		
2. Planning			**7. Temporary Tanks, Bowsers and Drums**		
Environmental issues within method statement			Stored in a bunded area		
3. Site Layout and House Keeping			Stored away from water and drainage system		
General Appearance			Bunded area of sufficient capacity maintained		
Litter			Fuelling device securely locked		
Hoardings to prevent visual intrusion			Condition of fuelling/dispensing equipment		
Condition of temporary hoardings (graffitti, etc)			Facility to containing spillage while refuelling		
Security/safety lighting			8. Emergency Kits		
Security gates and fencing			Available at various locations		
Appropriate site lighting			Compliance with PICP procedures		
4. Noise and Vibration			**9. Contaminated Materials**		
Correct plant being used			Intrusive site investigations undertaken		
Plant maintained			Risk assessment complete		
Plant used correctly (cover closed)			Procedures being adhered to		
Silencers fitted			**10. Spoil and Waste**		
Plant turned off when not in use			Spoil being handled properly		
Plant positioned away from site boundaries			Waste being correctly stored		
Mitigation in place			Waste being correctly segregated		
Contractual and considerate working times			Overfilling of waste containers		
Vehicles waiting to enter the site turned off			Waste containers secured prior to removal		
Site personnel (considerate behavior)			11. Footpath Diversions		
Communication by radio			Public Access		
Noise monitoring being undertaken			Condition of temporary footpath		
5. Dust and Smoke			Adequate diversion/warning signs		
Hard standing and roads free off mud/dust			Presence of mud/loose material on path		
Unsurfaced roads damped down			12. Hydrology and Aquatic Resources		
Dust from cutting gear controlled			No unauthorised discharges to water courses		
Vehicles are sheeted and damped down			No visible pollution in water courses		
Dusty items stored appropriately			Protection measures for water courses		
Concrete being mixed properly			Static plant provided with drip trays		
Controls for removing contaminated spoil			Plant positioned away from drainage system		
Smoke being emitted from plant			Chemicals drums stored/labelled appropriately		
Prohibition of on-site bonfires			13. Training/Toolbox Talks		
Plant left running while not in use			Staff		
6. Permanent Tanks			Gangers		
Containment tank provided and corrosion free			Operatives		
Supply & discharge connection within containment			Sub contractors		
Well maintained containment areas			**Commendations and Corrective Actions**		
Fuelling device securely locked when not in use					
Condition of fuelling/dispensing equipment					

Appendix F

Register of Statutory Consultees

F1 REGISTER OF STATUTORY CONSULTEES

CONSULTEE	ADDRESS	SUBJECT
London Borough of Camden	Town Hall, Argyle Street, London WC1H 8EQ	Noise and Vibration S61 Consent
Environment Agency	Apollo Court, 2 Bishop Square, St Albans Road West, Hatfield, Herts AL10 9PW	Waste Licences Discharge Consents to Controlled Waters
English Nature	Ormond House, 26-27 Boswell Street, London WC1N 3JZ	Protected Species
British Waterways Board	The Toll House, Delamere Terrace, Little Venice, London W2 6ND	Regents Canal
Transco	--	Diversions and site mobilisation
British Telecom	--	Diversions and site mobilisation
London Electricity	--	Diversions and site mobilisation
London Cables	--	Diversions and site mobilisation
Thames Water Utilities	--	Discharge Consents to Foul Sewer Diversions and site mobilisation

Appendix G

Sample Register of Environmental Effects

ENVIRONMENTAL ASPECT	POTENTIAL IMPACTS AND SIGNIFICANCE	MITIGATION
Noise and Vibration a) Vibration	No percussive piling works envisaged , hence potential impacts considered to be limited and not significant	Detailed mitigation to be developed. Agreement on noise limits with local authority and S61 noise consent to be applied for. Detailed noise monitoring to be implemented.
b) Construction Noise (long term)	Long term impacts possible during the blockade. Limited significance due to short time scale in each location.	
c) Construction Noise (short term)	Short term disturbance to local community. Limited significance	Use of portable noise insulation screens and low noise plant. Community liaison/advice
Community	Disruption to community/business..	Early consultation with affected community. Provision of alternative access. Ensure adequate community liaison throughout construction phase.
Atmospheric	Possible nuisance dust impacts on local community. Potentially significant if long term. Impact unlikely.	Damping down of surfaces/unsurfaced internal roads during dry weather. Enclosure of stockpiles. Water bowsers on standby during relay works.
Contaminated Materials	Risks to water courses from movement/stockpiling of contaminated materials (eg ash ballast)	Control of run off through creation of temporary sumps. Prohibition of stockpiling near Regents Canal. No discharges to controlled waters can be permitted. Discharges to foul sewer only under consent from Thames Water Utilities.
	Potential opening up of pollutant transfer pathways during excavation. (Low significance).	
	Specific risks to Regents Canal from spillage/stockpiling.	
	Potential environmental risks considered to be of low significance.	
Contaminated Materials	Insignificant risk to groundwater due to depth of aquifer and clay depth.	Avoid stockpiling of contaminated materials near site boundaries. Maintain adequate dust control during dry weather.
	Potential exposure of members of the public from contaminated dust blowing off-site (insignificant).	
Landscape and Visual	Short term impacts near sites of construction activity. Low significance	Provision of screening/hoarding as appropriate and practicable.

ENVIRONMENTAL ASPECT	POTENTIAL IMPACTS AND SIGNIFICANCE	MITIGATION
Archaeology and Heritage	a) Potential damage to historic structures. Low significance as no buildings are affected by the works. b) Buried archaeological structures. Low risk as most structures probably removed during construction of railway during last century and current LUL works.	Avoidance. Awareness of construction teams and control of activities near sensitive sites. Provision of warning signs. Vigilance and watching brief.
Water Resources	Impacts on groundwater resources (low significance)	Repair and upgrading of drainage facilities. Presence of clay barrier will minimise risks of downward migration to aquifer.
Transport	Disruption from vehicle movements. Low significance due to low volume of vehicles.	Careful selection of lorry routes to minimise disruption. Maximisation of use of rail. Consultation with local highway authority on selection of routes and location of concrete pumps and road cranes.

Appendix H

Sample Environmental Risk Register

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Handling Spent Ballast

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. If above not possible, erect baffle boards and/or construct noise bunds. Inspection of plant to be carried out regularly, paying attention to noise emissions. Reprogramming of works into daytimes. Downsizing of work scope.		
Dust	Public Nuisance Bronchial Infections	Public		During dry weather the area of work concerned should be "damped down"		
Contamination of existing water Courses	Pollution of water may cause death of wildlife through poisoning or loss of natural habitat	Fauna and Flora		No tipping of any sort to carried out adjacent to existing water course		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Laying Ballast

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. If above not possible, erect baffle boards and/or construct noise bunds. Inspection of plant to be carried out regularly, paying attention to noise emissions. Reprogramming of works into daytimes. Downsizing of work scope.		
Dust	Public Nuisance Bronchial Infections	Public		During dry weather the area of work concerned should be "damped down"		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: General Excavation Works

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. If above not possible, erect baffle boards and/or construct noise bunds. Inspection of plant to be carried out regularly, paying attention to noise emissions. Reprogramming of works into daytimes. Downsizing of work scope.		
Dust	Public Nuisance Bronchial Infections	Public		During dry weather the area of work concerned should be "damped down"		
Disturbing the natural environment	Destruction of wildlife and natural habitats	Fauna and Flora		Translocation of the present flora for preservation and to encourage the migration of the existing fauna		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Placing and Mixing of Concrete

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. If above not possible, erect baffle boards and/or construct noise bunds. Inspection of plant to be carried out regularly, paying attention to noise emissions. Reprogramming of works into daytimes. Downsizing of work scope.		
Dust	Public Nuisance Bronchial Infections	Public		During dry weather the area of work concerned should be "damped down"		
Contamination of existing water Courses	Pollution of water may cause death of wildlife through poisoning or loss of natural habitat	Fauna and Flora		No tipping of any sort to carried out adjacent to existing water course		
Spillage	Ground Contamination	Flora and Fauna		Toolbox talk to be given to the labour force on site tidiness, to ensure that they are aware of their responsibilities. All hazardous material to be removed from site to approved tips, if necessary, with the use of waste transfer note. Material to be treated as indicated within the COSHH data		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Operating Site Plant

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Vibration	Public Nuisance	Public		Plant producing a low vibration output to be use wherever possible. Detail monitoring to be carried out prior to using equipment, to predict working levels and plan accordingly to avoid nuisance. Work during daylight hours as much as possible.		
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. If above not possible, erect baffle boards and/or construct noise bunds. Inspection of plant to be carried out regularly, paying attention to noise emissions		
Oil/Fuel Spillage	Contamination of ground and/or water courses	Fauna and Flora		Toolbox talk to be given to the labour force on site tidiness, to ensure that they are aware of their responsibilities. All hazardous material to be removed from site to approved tips, if necessary, with the use of waste transfer note. Material to be treated as indicated within the COSHH data Fuel storage tanks held on site must be double skinned and lockable. Where possible, an earth bund should be built around the bowser.		
Plant movement	Disturbance to natural environment	Flora and Fauna		Translocation where possible		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Storage of Fuel/Oil on Site in Tank or Bowser

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Vandalism	Spillage	Ground and Water		Security fences to be erected around perimeter of work sites and to be inspected for damage at regular intervals. In particularly crime prone areas, security firms should be hired to patrol the sites. Ensure all access gates and storage areas can be locked. Nominate as site member as public liaison officer and ensure visits to local schools are carried out.		
Spillage	Contamination of ground and/or water courses	Fauna and Flora		Storage tanks held on site must be double skinned and lockable. Where possible, an earth bund should be built around the bowser. Drip trays to be used with all diesel, oil and petrol tanks.		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Plant Maintenance

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Spillage	Ground/water Contamination	Fauna and Flora		Fuel storage tanks held on site must be double skinned and lockable. Where possible, an earth bund should be built around the bowser. Drip trays to be used with all diesel, oil and petrol tanks.		
Waste	Visual impact on the public and also possible contamination of surrounding area	Public, Fauna and Flora		Toolbox talk to be given to the labour force on site tidiness, to ensure that they are aware of their responsibilities. All hazardous material to be removed from site to approved tips, if necessary. Contaminated soil and special waste to be removed to approved tips. Rubbish bins to be made available within the site compounds. Skips to be available at work locations to ensure quick removal of rubbish		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Painting

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Spillage	Ground/water Contamination	Fauna and Flora		Any pouring operation to be carried out over a concreted area where possible. Contaminated soil and special waste to be removed to approved tips		
Disposal of waste paint/cans	Ground and water contamination	Public, Fauna and Flora		All hazardous material to be treated in accordance with the accompanying COSHH assessment data and removed to approved tips, where necessary. Rubbish bins to be made available within the site compounds. Skips to be available at work locations to ensure quick removal of rubbish		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Cutting, Burning and Welding

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. If above not possible, erect baffle boards and/or construct noise bunds. Inspection of plant to be carried out regularly, paying attention to noise emissions. Reprogramming of works into daytimes. Downsizing of work scope.		
Fire/Smoke	Loss of local wildlife habitats	Wildlife		All flammable materials to be marked as such. No smoking signs to be erected. Fire points to be set up around the work sites, fire extinguishers to be regularly inspected and replaced when necessary. All hot works to be carried out under cover of a Hot Works Permit.		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Night Working

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Vibration	Public Nuisance	Public		Plant producing a low vibration output to be used wherever possible. Detail monitoring to be carried out prior to using equipment, to predict working levels and plan accordingly to avoid nuisance. Work during daylight hours as much as possible.		
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. If above not possible, erect baffle boards and/or construct noise bunds. Inspection of plant to be carried out regularly, paying attention to noise emissions. Downsizing of work scope.		
Oil/Fuel Spillage	Contamination of ground and/or water courses	Fauna and Flora		Toolbox talk to be given to the labour force on site tidiness, to ensure that they are aware of their responsibilities. All hazardous material to be removed from site to approved tips, if necessary, with the use of waste transfer note. Material to be treated as indicated within the COSHH data Fuel storage tanks held on site must be double skinned and lockable. Where possible, an earth bund should be built around the bowser.		
Dust	Public Nuisance	Public		During dry weather the area of work concerned should be "damped down" with a water bowser.		
Lighting	Public Nuisance	Public		Ensure a letter drop is carried out prior to any overnight work, to notify local residents of possible disruption. Be considerate when setting up the temporary site lighting, ensure glare is not fully directed onto any one property. Permanent lighting should not be focused directly onto any one property.		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Setting Up and Removal of Site Accommodation

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. Inspection of plant to be carried out regularly, paying attention to noise emissions. Reprogramming of works into daytimes.		
Dust	Public Nuisance Bronchial Infections	Public		During dry weather the area of work concerned should be "damped down"		
Waste	Ground and water contamination	Public, Fauna and Flora		All hazardous material to be treated in accordance with COSHH assessment data and removed to approved tips, where necessary. Rubbish bins to be made available within the site compounds. Skips to be available at work locations to ensure quick removal of rubbish		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Storage of Redundant Sleepers

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Untidiness	Visual Impact	Public		Tool box talk on site cleanliness to be given to labour force to ensure that they know their responsibilities		
Residual oil within sleepers	Ground contamination	Flora and Fauna		Contaminated soil and special waste to be removed to approved tips.		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Site Clearance

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Removing contaminated soil	Contamination of other areas	Fauna and Flora		Contaminated soil and special waste to be removed to approved tips. Rubbish bins to be made available within the site compounds. Skips to be available at work locations to ensure quick removal of rubbish		
Visual Impact	Public Nuisance	Public		Tool box talk on site cleanliness to be given to labour force to ensure that they know their responsibilities		
Burning of waste	Public nuisance and possible destruction of wildlife	Public and Wildlife		No smoking signs to be erected. Fire points to be set up around the work sites, fire extinguishers to be regularly inspected and replaced when necessary.		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Delivery and Removal of Materials to and from Site

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. Inspection of plant to be carried out regularly, paying attention to noise emissions. Reprogramming of works into daytime hours.		
Dust	Public Nuisance Bronchial Infections	Public		During dry weather the area of work concerned should be "damped down"		
Waste	Ground and water contamination	Public, Fauna and Flora		All hazardous material to be treated in accordance with COSHH assessment data and removed to approved tips, where necessary. Rubbish bins to be made available within the site compounds. Skips to be available at work locations to ensure quick removal of rubbish		
Plant movement	Disturbance to natural environment	Flora and Fauna		Translocation of habitats where possible		
Contamination of existing water courses and groundwater	Loss of natural habitat	Fauna and Flora		No tipping of any sort to be carried out adjacent to existing watercourse. Any pouring operation to be carried out over a concreted area where possible. Contaminated soil and special waste to be removed to approved tips		
Untidiness	Visual Impact	Public		Tool box talk on site cleanliness to be given to labour force to ensure that they know their responsibilities		

Location: King's Cross Station Enhancement Project. Date: February 2006
Assessor: Environmental Manager
Activity: Drainage Maintenance

HAZARD	RISK	THOSE AT RISK	PRE-CONTROL RISK RATING SEVERITY	CONTROL	PERSON RESPONSIBLE FOR CONTROL	RESIDUAL RISK RATING
Untidiness	Visual Impact	Public		Tool box talk on site cleanliness to be given to labour force to ensure that they know their responsibilities		
Site lighting	Public Nuisance	Public		Consideration when setting up the temporary site lighting, ensure glare is not fully directed onto any one property. Permanent lighting should not be focused directly onto any one property.		
Plant movement	Disturbance to natural environment	Flora and Fauna		Translocation of flora where possible		
Noise	Public Nuisance	Public		Noise reducers to fitted to items of plant. Inspection of plant to be carried out regularly, paying attention to noise emissions		
Dust	Public Nuisance	Public		During dry weather the area of work concerned should be "damped down"		
Waste	Ground and water contamination	Fauna and Flora		All hazardous material to be treated in accordance with COSHH assessment data and removed to approved tips, where necessary. Rubbish bins to be made available within the site compounds. Skips to be available at work locations to ensure quick removal of rubbish		
Contamination of existing water courses	Loss of natural habitat	Fauna and Flora		No tipping of any sort to be carried out adjacent to existing water course.		

Appendix I

Audit Schedule

[To be completed by chosen Contractor]

Annex F

Land Use and Transport Planning Policy

CONTENTS

F1 *LAND USE AND TRANSPORT PLANNING POLICY*

F1.1 *PLANNING POLICY GUIDANCE NOTE NO. 13: TRANSPORT (MARCH 2001)*

F1.1.1 PPG13 seeks to achieve the integration of planning and transport at the national, regional and local level to:

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

F1.1.2 Paragraph 48 of PPG13 identifies quick, easy and safe public transport interchanges as essential to an efficient transport system and effective integration between modes of transport. The PPG promotes the careful location of transport interchanges with respect to travel generating uses and the identification and protection for sites and routes that will be critical in widening choices for passengers. Sites where interchange improvements are required also need to be identified and prioritised.

F1.1.3 Providing a safe, convenient and accessible public transport network is essential to reducing travel by car. Paragraph 72 of PPG13 encourages a partnership between local authorities and transport providers and operations to

> *'establish a high quality, safe, secure and reliable network of routes, with good interchanges, which matches the pattern of travel demand in order to maximise the potential usage of public transport.' (para. 72)*

F1.2 *TRANSPORT WHITE PAPERS*

F1.2.1 The White Paper 'A New Deal for Transport', published in July 1998 outlines the Government's commitment and approach to creating a modern, more integrated transport system. Integration, in this context, is sought with and between different types of transport, with the environment, with land use planning and with other policies including those for education, health and wealth creation.

F1.2.2 'A New Deal for Transport' supports improvements to interchanges, reflecting the guidance contained in PPG13. It reinforces the importance of safe, easy and efficient public transport interchanges to compete with travel by car.

F1.2.3 'The Future of Rail' White Paper and 'The Future of Transport: A Network for 2030' White Paper were both published in July 2004. The White Papers set the Government's commitment to improving railways, viewing its growth as an important contribution to its sustainable development strategy.

F1.3 *TRANSPORT 2010: THE 10 YEAR PLAN (ADOPTED 2000)*

F1.3.1 The 10 Year Plan integrates the goals of the Integrated Transport White Paper. The Plan presents a strategy for investment, with key targets to be achieved over the period 2000 – 2010. In terms of rail transport the key targets include (inter alia):

- 50% increase in use;
- improvements to service quality: more punctual and reliable trains, less overcrowding;
- more attractive, secure stations;
- improved commuter services in London and other cities;
- better integration with cars, buses, taxis, bicycles and better links to airports.

F1.3.2 In summary, the plan seeks '*better track, better trains, better stations and a safer network*'.

F1.4 *THE MAYOR'S ENERGY STRATEGY: GREEN LIGHT TO CLEAN POWER (FEBRUARY 2004)*

F1.4.1 The Mayor's energy strategy, 'Green light to clean power', aims to minimise the impacts on health and on the local and global environment of meeting the essential energy needs of all those living and working in London. Specifically, it aims to reduce London's contribution to global climate change, tackle the problem of fuel poverty and at the same time promote London's economic development through renewable and energy efficient technologies. The strategy contains information on reducing energy via the use of public transport and encouragement to increase use:

> *'The Transport Strategy contains measures to improve public transport and encourage drivers to switch from cars to trains, buses and trams, and also to facilitate walking and cycling. Measures include a 40 per cent increase in bus services, the Central London Congestion Charging Scheme, London Underground's line upgrade programme, CrossRail 1 and 2, and extensions to the East London Line. Overall, the programme will offer more and better public transport, encouraging a greater proportion of trips to be made by public transport, and discouraging the use of private' (Para 8.11)'*

F1.5 *THE LONDON PLAN: SPATIAL DEVELOPMENT STRATEGY FOR GREATER LONDON (ADOPTED FEBRUARY, 2004)*

F1.5.1 Chapter 3C relates to improving travel in London and promotes public transport as a means to achieve a more environmentally sustainable and

compact city. Ongoing major improvements to public transport are supported and encouraged. This is articulated and expanded in Policy 3C.1 which states that the integration of transport and development will be sought by improving:

> *'public transport capacity and accessibility where it is needed, for areas of greatest demand and areas designated for development and regeneration, including the Thames Gateway, Central Activities Zone, Opportunity Areas, Areas for Intensification and town centres'(p.104)*

F1.5.2 Paragraph 3.167 further highlights the importance of good interchange facilities to the efficiency and integration of the public transport network. Policy 3C.5 (London's international, national and regional transport links) seeks to improve and expand London's international and national links for both passengers and freight for the principal purposes of supporting London's development and achieving regeneration benefits whilst minimising environmental impacts.

F1.5.3 The London Plan in Policy 3C.9 supports increased capacity, quality and integration of public transport to meet London's needs, focussing on the integration, reliability, safety, quality, accessibility, frequency and attractiveness of the existing public transport system.

F1.6 *THE MAYOR'S TRANSPORT STRATEGY (JULY 2001)*

F1.6.1 The Mayor's Transport Strategy recognises that London has a transport system that is at or nearing capacity and highlights the need for significant investment and funding to allow for growth in travel demand requirements. 'The Mayor's first priority is to create a world class transport system which enhances business efficiency, ensures a wider spread of the fruits of economic prosperity and improves the quality of life for every Londoner' (para 7, p3).

F1.6.2 Suffering from a legacy of 'chronic under-investment', the Strategy identifies the need for a 'complete overhaul of public transport management' which needs to be:

> *'accompanied in the medium to long term by an increase in the capacity of the public transport system to relieve overcrowding, and accommodate economic and demographic growth' (para 8, p3).*

F1.6.3 The national rail system is highlighted as a critical component in London's transport network, and the overall Strategy seeks to expand appropriate services into London whilst ensuring adequate capacity over the whole system. Chapter 4E is dedicated to the national rail network as a key component of the public transport system. It highlights the considerable and immediate need for massive investment into national rail services to improve infrastructure and enhance service capacity to a level which will ensure the network is capable of supporting future travel demands (para 4E.9, 4E.19, 4E.31). The continued and improved integration of the national rail system into the wider network is supported (para 4E.14).

F1.6.4 Policy 4P.2 promotes the seamless integration between modes of transport. Improved integration, both within national rail services and with the wider public transport network is specifically identified as part of this policy (para 4P.19). Improvements to interchanges will focus on those where investment will have associated regeneration benefits. Prioritising the interchange improvement projects being undertaken in conjunction with regeneration proposals is suggested in support of this policy (4P.14).

F1.7 *CAMDEN UNITARY DEVELOPMENT PLAN (ADOPTED 2006)*

F1.7.1 The Camden UDP was adopted in June 2006 and contains a number of references to the strategic significance and requirement for redevelopment of Kings Cross Station.

F1.7.2 King's Cross is identified in the UDP as a key transport hub:

> *'which will provide first class international, national, London and local links to the Opportunity Area' (para 9.23).*

F1.7.3 The redevelopment of King's Cross Station is recognised as an integral component in the achievement of the strategic policy of the King's Cross Opportunity Area. As such, Camden has given full support:

> *'to ensure that the redevelopment proposals for King's Cross station are fully integrated into the overall development and are in balance with the public transport provision and the wider development' (para 9.23).*

F1.7.4 Works associated with the remodelling and enlargement of King's Cross Station are anticipated in paragraph 9.7 and are provisionally scheduled for in the years 2003 to 2010. Paragraph 9.16 refers to the importance of accessibility to the Opportunity Area and states that:

> *'The redevelopment of Kings Cross and St Pancras railway stations and the Underground station will enhance the already high levels of accessibility of the area.'*

F1.7.5 Local policy KC5 (Transport) states that Camden will support proposals

> *'which improve public transport interchange and services and provide a safe and accessible environment for all users of existing and proposed public transport systems'.*

F1.7.6 The redevelopment of the station also meets the policy objectives of policy KC6 to improve accessibility, facilities and safety to and within the area for pedestrians, cyclists and people with disabilities.

F1.7.7 From the wider Borough perspective, the provision of a better quality public transport system is a strategic transport objective (para 5.4) and will seek to guide investment into appropriate infrastructure such as high quality, accessible and affordable public transport services (para

5.3). In relation to public transport interchanges policy T5 states Camden's encouragement for

> *'transport interchange facilities where it considers the proposals to maximise travel benefits and cause minimum environmental harm.'*

F1.8 *KING'S CROSS OPPORTUNITY AREA PLANNING AND DEVELOPMENT BRIEF (ADOPTED JANUARY 2004)*

F1.8.1 The King's Cross Opportunity Area Planning and Development Brief was adopted in January 2004 as Supplementary Planning Guidance (SPG). The SPG does not have the same status as adopted development plan policy but is a material consideration in determining any planning application.

F1.8.2 The Development Brief anticipates the removal of the existing concourse and its replacement on the western side of the station, enhancement of the pedestrian and the provision of essential supporting facilities. The brief outline key objectives for transport in developing the King's Cross area which centre on the improvements to King's Cross Station. Providing in particular, the removal of the southern concourse; development of a replacement western concourse, enhancement of pedestrian accessibility and provision of essential supporting facilities such as taxis, servicing, cycle parking. The plans to redevelop the station conform to these specific objectives.

F1.9 *ISLINGTON UNITARY DEVELOPMENT PLAN (ADOPTED 2002)*

F1.9.1 The boundary of the London Borough of Islington lies along the eastern boundary of King's Cross Station and the station therefore provides an important interchange and public transport provision for the borough.

F1.9.2 Chapter 6 'Sustainable Transport' reinforces the central role public transport plays in serving the needs of the Borough community. London Borough of Islington makes a firm commitment to quality, reliability and accessibility improvements, which will support its sustainable transport strategy and the key principle of promoting the greater use of public transport.

F1.9.3 Islington seeks to enhance integration between modes of transport, improve the quality of public transport services and facilities and improve the capacity of the public transport network (p 24).

F1.9.4 Policy T38 supports the expansion of both the underground and rail networks, including improved interchange facilities and other improvements to stations. Policies T40 and T41 elaborate on this, indicating that a collaborative approach will be applied to ensure enhanced safety and security of public transport facilities and improved interchange within rail station and between rail and other modes of transport. The pedestrian links to and from stations will be considered as part of improvement programs.

F2 *PLANNING POLICIES RELATED TO DELIVERING REGENERATION OPPORTUNITIES*

F2.1 *SPATIAL DEVELOPMENT STRATEGY FOR GREATER LONDON: THE LONDON PLAN (FEBRUARY 2004)*

F2.1.1 According to the London Plan, King's Cross is a Central London Opportunity Area, in recognition of its central location and unsurpassed public transport accessibility which 'offer particular scope for high-density business development'. This is further reinforced by the proposed public transport improvements, incorporating the CTRL link, Thameslink 2000 and Cross River Transit. Given its development potential, overall environmental quality is considered of critical importance and the Plan supports a development framework that will:

> *'draw upon the historic features of the site to create a truly sustainable business and residential community, reliant on the minimal use of cars' (para 5.37).*

F2.2 *CAMDEN UNITARY DEVELOPMENT PLAN (ADOPTED JUNE 2006)*

F2.2.1 The station falls within the King's Cross Opportunity Area which encompasses the King's Cross and St Pancras Railway Stations and the adjoining King's Cross railway lands to the north. The area has been designated in recognition of the exceptional opportunities it presents for inner city regeneration. Within the UDP, Chapter 9 is the primary source of relevant policy relating to the King's Cross Opportunity Area.

F2.2.2 Strategic Policy SKC1 outlines the ultimate objective for the redevelopment of the King's Cross Opportunity Area to:

> *'to support and develop London's role as a world business, commercial and cultural centre… achieve economic, social, and physical integration with surrounding communities… and to maximise the use of existing and proposed public transport facilities'.*

F2.3 *KING'S CROSS OPPORTUNITY AREA PLANNING & DEVELOPMENT BRIEF (ADOPTED JANUARY 2004)*

F2.3.1 The brief seeks to ensure that the redevelopment of the area creates a better transport network for everyone, thereby giving greater choice and easier access to jobs, homes and other facilities in the area. Delivering effective transport connections is seen as an integral part of the integration and regeneration objectives for the wider area.

F2.4 *ISLINGTON UNITARY DEVELOPMENT PLAN (ADOPTED 2002)*

F2.4.1 Islington Borough Council lies immediately to the east of King's Cross Station. The Islington UDP supports the regeneration intent for the King's Cross area. The aim is to facilitate the transformation of the area into a 'vibrant and distinctive quarter of London' whilst maximising the benefits for Islington (part 1: para 6.4). Sites to the east of King's Cross Station, along York Way, are allocated as Areas of Opportunity and are intended to contribute to the overall regeneration of the area. *Planning Policies Related to Cultural Heritage, Listed Buildings and Archaeology*

F2.5 *PLANNING POLICY GUIDANCE NOTE NO 15: PLANNING AND THE HISTORIC ENVIRONMENT (1994)*

F2.5.1 Planning Policy Guidance Note 15 (PPG15) contains government guidance and advice on the control of development affecting listed buildings and conservation areas. Large parts of the document are relevant to the consideration of the issues within the scope of this assessment, but the following elements are of primary importance.

F2.5.2 Specific advice is given on the alteration, extension and demolition of listed buildings in paragraphs 3.12-3.19. The meaning of 'demolition' has changed since the issue of PPG15 in 1994, as a result of the Shimizu decision in the House of Lords. In general, there is a presumption in favour of the preservation of listed buildings, and a clear intention to justify and minimise the effects of alteration and extension. Detailed advice about the alteration of listed buildings appears in Annex C of PPG15.

F2.5.3 Advice on the extent of the setting of listed buildings is contained in paragraphs 6.16 and 6.17 of PPG15. The setting of a prominent listed building will often be affected by any development within the street in which it stands.

F2.5.4 PPG15 reinforces the statutory duty on the decision maker to consider the desirability of preserving or enhancing the character and appearance of conservation areas during the development process. As to the meaning of 'preserve' and 'enhance', it has been held in the courts that preservation (ie not harming) can satisfy the requirement set out in the 1990 Act.

F2.6 *PLANNING POLICY GUIDANCE NOTE NO 16: ARCHAEOLOGY AND PLANNING (1990)*

F2.6.1 PPG16 sets out general policy advice for best practise in the management of archaeological remains under development plan and control systems:

> *'Archaeological remains should be seen as a finite, and non-renewable resource, in many cases highly fragile and vulnerable to damage and destruction. Appropriate management is therefore essential to ensure that they survive in good condition'(para 6). However, the case for 'the preservation of archaeological remains must…be assessed on the individual merits of each case...including the intrinsic importance of the remains and*

weighing these against the need for the proposed development'(para 27).

F2.6.2 The guidance advocates the resolution of potential conflicts through the use of planning conditions and legal agreements to ensure that any remains are either preserved in situ or recorded and removed. This is the approach adopted for the proposed redevelopment.

F2.7 *SPATIAL DEVELOPMENT STRATEGY FOR GREATER LONDON: THE LONDON PLAN (FEBRUARY 2004)*

F2.7.1 The London Plan Policies 4B.10 and 4B.11 deal with historic conservation led regeneration and aims to ensure that:

- the special character of the historic environment is recognised and understood;
- inclusive solutions provide access to all;
- protection and enhancement forms part of the wider design and urban improvement agenda; and
- the strategic London context and setting is taken into account.

F2.7.2 Policy 4B.12 supports the reuse of historic buildings and places and states support for:

'schemes that make use of historic assets to stimulate environmental, economic and community regeneration where they:

- *bring underused buildings and spaces into appropriate use;*
- *help to improve local economies and community cohesion;*
- *fit in with wider regeneration objectives; and*
- *promote inclusiveness in their design.'*

F2.8 *CAMDEN UNITARY DEVELOPMENT PLAN (ADOPTED JUNE 2006)*

Heritage issues at King's Cross are contained in Policy KC11:

The Council will grant planning permission for development proposals for the King's Cross Opportunity Area that:

- *preserve listed buildings or structures and their settings;*
- *preserve or enhance buildings, structures and other features of character and historic interest, and their setting, within the Conservation Areas; and*
- *preserve remains of significant archaeological importance and their settings.*

F2.8.1 The Opportunity Area is described as a place of outstanding national architectural, historical and industrial archaeological importance (para 9.67), with King's Cross and St Pancras contributing the finest complex of railway stations in the world (para 9.68). The re-creation of this setting anticipates the concourse relocation as proposed.

F2.8.2 The importance of preserving the character and appearance of the Conservation Area to Camden Council is articulated in Policy B7. Policy B6 relates specifically to listed buildings and requires the general protection of both buildings and their settings. Support is given to the appropriate re-use of entire buildings provided that the architectural or historic value is not diminished, particularly where use is reverted back to the original purpose of the building. Para 3.60 states that the value of a listed building can be greatly diminished if unsympathetic development near by harms its appearance or the harmonious relationship with its surroundings.

F2.8.3 The UDP recognises the importance of the buried archaeological heritage, reflecting the national policies outlined above. The Council seeks to ensure the preservation of the archaeological heritage and to promote its interpretation and presentation to the public. The Borough's archaeological heritage is protected through policy B8.

F2.8.4 According to B8, developers will be required to put in place acceptable measures to preserve remains permanently in situ. Where this is not possible satisfactory excavation and recording of the remains would need to be carried out.

F2.8.5 The Inspector recommended minor changes to the wording of Policies B6 and B7, but these do not affect the intent of the policy. No changes were recommended to policies KC11 and B8 nor reasoned justification paragraphs 9.66, 9.67 and 3.59.

F2.9 *CONSERVATION AREA STATEMENT 22: KING'S CROSS (ADOPTED 2004)*

F2.9.1 The King's Cross Conservation Area Statement 22 (CAS) was approved at Executive Committee in December 2003 and published in June 2004. The Conservation Area Statement replaces the 1998 draft version.

F2.9.2 The adopted CAS recognises the national heritage importance and technological significance of King's Cross Station. The CAS requires that any redevelopment of the station is required to acknowledge and respect the architectural and historic values of the site, retaining the existing listed buildings and contributing to the enhancement of the local context.

F2.9.3 The draft King's Cross CAS divides the Conservation Area into sub areas, defined on the basis of distinct 'character' elements. Sub Area 2 King's Cross/St Pancras is described as 'the heart' of the King's Cross Conservation Area and its character is described as '...robust industrial character, mostly Victorian…', dominated by the Grade 1 listed railway stations. The buildings, together with the Great Northern Hotel, are described 'to reflect the power of the Railway age' and 'as the most important group of railway buildings in Britain'.

F2.9.4 Specifically in relation to King's Cross Station, the Euston Road façade is noted for its striking architectural features. The removal of the Southern Concourse, which currently obscures the view of this elevation, is promoted as an opportunity to enable greater appreciation of these architectural assets. Its removal in conjunction with the development of a Western Concourse is anticipated by the draft CAS.

F2.9.5 The considerable potential for high quality redevelopment at King's Cross is recognised and forthcoming plans are anticipated by the CAS. In recognition of the likely significant changes to character and appearance of the Conservation Area, a range of key considerations for new development have been formulated. These include:

- quality of architectural design;
- effect on the character and appearance of the Conservation Area;
- effect on the settings of listed buildings;
- effect on views of local landmarks; and
- legibility of the proposed urban form and its integration with the surrounding environment.

F2.9.6 The CAS does not, however, rule out modern developments provided that they are sympathetic to existing development. Policies contained in Chapter 9 of the UDP and UDP Policy KC11 are referred to. In relation to development proposals, these should:

> *'preserve or enhance buildings, structures and other features of character and historic interest, and their setting, within the Conservation Areas' (KC11)*

F2.9.7 Analysis of the effects of the proposed redevelopment on the archaeological and cultural heritage values of the site and buildings is provided in Chapter 6 and Chapter 7 respectively.

F2.10 *KING'S CROSS OPPORTUNITY AREA PLANNING & DEVELOPMENT BRIEF (ADOPTED JANUARY 2004)*

F2.10.1 The development brief sets out the aspirations for development within the opportunity area. Paragraph 3.3.6 of the development brief states that development in this sub-area should preserve or enhance the setting of the grade I listed buildings and not compromise their distinctive appearance, skyline and massing. It should also retain and restore with appropriate uses the Great Northern Hotel.

F2.10.2 Development should also provide for the early replacement of the 1970s concourse to the front of King's Cross Station with a new Western Concourse. Camden consider that a new Western Concourse should achieve the following:

- 'have a distinctive and strong, even dramatic presence that responds to and takes inspiration from the main line stations. At the same time it should not dominate them;

- create a strong sense of arrival and departure with a real presence between the station and the Great Northern Hotel;

- not project above the height of the Western Range or significantly from the south façade of the main station;

- relate successfully to the Great Northern Hotel and the Suburban Train Shed;

- provide north south visibility and free movement and visually draw people from the interchange north into the development beyond and from the development to Euston Road and southwards;

- relate well to the public realm outside by being light and spacious;

- help to define the public realm to the west and be clear of barriers to east west movement between St Pancras and King's Cross entrances and facades;

- incorporate advanced sustainable building design;

- create strong visual and pedestrian connections from Euston Road northwards into the King's Cross central site and corresponding from this development southwards to Euston Road; and

- create the highest quality of new public realm around the interchange, forming a high quality setting for the listed stations.'

F2.11 *ISLINGTON UNITARY DEVELOPMENT PLAN, (ADOPTED 2002)*

F2.11.1 As previously noted, King's Cross Station lies on the boundary between the London Boroughs of Camden and Islington. Proposed changes to the station will affect the character and heritage values in Islington and, it is therefore relevant to examine the policies of London Borough of Islington in relation to heritage and conservation.

F2.11.2 Conservation strategies within the Islington UDP also support the careful and sympathetic design of new development, ensuring that character and appearance of existing buildings and settings within conservation areas are not compromised (policy D22). In support of this, the council expresses favour for the use of traditional materials for extensions and refurbishment in conservation areas (policy D24).

F2.11.3 Council's strategic policy in relation to listed building and archaeological sites seeks to protect and enhance the character, appearance and setting of statutory and locally listed buildings, and to protect the Borough's archaeological heritage (chapter 12, p 23).

F2.12 *KING'S CROSS CONSERVATION AREA DESIGN GUIDELINES (ISLINGTON), JANUARY 2002*

F2.12.1 Islington Borough Council produced design guidelines for that part of the King's Cross conservation area within its boundary in January 2002. This sets out policies for the retention of locally listed buildings, several of which are in the Regent's Quarter along York Way. The document also refers to the 'National set-piece' – the major sequence and group of buildings between the British Library and the Caledonian Road.

F2.13 *SUMMARY*

F2.13.1 The careful and detailed consideration of the heritage and archaeological values of the station buildings and the appropriate measures proposed to maximise their protection are described in more detail in Chapter 6: Archaeology and Chapter 7: Cultural Heritage. However, in general terms, the approach adopted in relation to the effects on archaeology and heritage issues conform to national regional and local policy requirements to protect and enhance the historic environment. The relocation of the concourse from the southern façade of the station, in particular will greatly enhance the historic environment.

F3 *PLANNING POLICIES RELATED TO TOWNSCAPE, OPEN SPACE AND STRATEGIC VIEWS*

F3.1.1 The removal of the existing Southern Concourse proposed as part of the redevelopment of the station creates an excellent opportunity for the creation of a major new public space. This is supported by national and local planning documents, as demonstrated in the following section.

F3.2 *PLANNING POLICY STATEMENT 1: DELIVERING SUSTAINABLE DEVELOPMENT (2005)*

F3.2.1 PPS1 focuses on overarching policies to deliver sustainable development via the planning system. The policy ensures that sustainable development is pursued in an integrated manner to promote and achieve environmental, economic and social objectives via high quality inclusive designs and inclusive access. An integral aim of the policy is to break-down social barriers, encourage community involvement and improve the character and quality of an area.

F3.2.2 The PPS outlines good design as high quality and inclusive; addressing the connections between people and places, integrating new design into the existing built and natural environment, and accessible, safe and available to all members of society.

F3.3 *SPATIAL DEVELOPMENT STRATEGY FOR GREATER LONDON: THE LONDON PLAN (FEBRUARY 2004)*

F3.3.1 The London Plan recognises the importance of open spaces as a key contribution to the 'liveability' of the city. Through its policies, the draft London Plan supports the expansion and diversification of open space provision to make the city a more enjoyable place to live (para 3.245). Policy 4B.4 seeks to improve areas of the public realm.

F3.3.2 The site is located within two of the 'London Panoramas' identified in the London Plan. The London Panoramas are from Parliament Hill to Central London and from Kenwood to Central London. The London Plan notes that the focus of vision within London Panoramas is the skyline but that changes in the foreground of the view have the greatest potential to detract from the view's quality. It notes that it is in the fore and middle ground of the view that most protection is needed. Policy 4B.16 of the London Plan states that the management of views will:

- seek to enhance the view through improving the quality of the fore, middle or background of the view;
- prevent undue damage to the view either by blocking, or unacceptably imposing on, a landmark or creating an intrusive element in the view's fore or middle ground; and
- protect backgrounds that give a context to landmarks.

F3.3.3 While the proposals do not include tall buildings, these draft policies were a relevant consideration as the site is located within the middle ground of strategic views. The potential of the proposals to form part of the context of the strategic views therefore required assessment.

F3.4 *CAMDEN UNITARY DEVELOPMENT PLAN (ADOPTED JUNE 2006)*

F3.4.1 Policy KC9 promotes a unified approach to the design, appearance and location of transport services and facilities in order to achieve a townscape solution of the highest possible quality:

> *'The open precinct between and in front of King's Cross and St Pancras stations presents a particular urban design challenge. It is the context for numerous transport activities and flows, where physical structures and surface movements need to be reconciled with high architectural quality. The Council's aim is to achieve a highly attractive public space, a fit setting for the Grade 1 listed stations, and legible access to efficiently managed underground, bus and taxi services.' (paras 9.63 and 9.64)*

F3.4.2 Policy B1 provides further support to these aspirations by seeking high quality design that is safe and accessible to all and improves the spaces around and between buildings, particularly public areas.

F3.4.3 Local policies deal with urban design, views and the need for a high quality environment with links into the surrounding areas. Specific objectives in policy seek to ensure high quality design that:

- *'protects the strategic views across the Opportunity Area to St. Paul's Cathedral and, where appropriate, views to and from important local landmarks;*
- *achieves an attractive, safe, legible and stimulating environment for resident, worker and visitor alike;*
- *achieves a high degree of physical integration with the surrounding area; and*
- *promotes sustainable design principles and also maximise opportunities for improved* energy efficiency to limit greenhouse gas emissions'.

F3.5 *KING'S CROSS OPPORTUNITY AREA PLANNING AND DEVELOPMENT BRIEF (ADOPTED JANUARY 2004)*

F3.5.1 The creation of new public spaces associated with the interchange, located north and south of the Great Northern Hotel, are anticipated by the Brief (para 3.3.5). These spaces should create the:

> *'highest quality of new public realm around the interchange, forming a high quality setting for the listed stations' (para*

3.3.6).

F3.6 *CONSERVATION AREA STATEMENT 22: KING'S CROSS (ADOPTED 2004)*

F3.6.1 All development within the Conservation Area is required to provide a high standard of external space, which is appropriate to the character and appearance of the Conservation Area (para 7.17.3). The opportunity for the creation of a new public space in association with the King's Cross interchange is anticipated by the CAS and, in particular, is required to be of the highest quality, incorporating hard landscaping, integrating the surrounding buildings and maximising the important view opportunities presented in the area (para 4.2.48).

F3.7 *ISLINGTON UNITARY DEVELOPMENT PLAN, (ADOPTED 2002)*

F3.7.1 As previously noted, King's Cross Station lies on the boundary between the London Boroughs of Camden and Islington. Proposed changes to the station will affect the character and heritage values in Islington and, it is therefore relevant to examine the policies of London Borough of Islington in relation to heritage and conservation.

F3.7.2 Conservation strategies within the Islington UDP also support the careful and sympathetic design of new development, ensuring that character and appearance of existing buildings and settings within conservation areas are not compromised (policy D22). In support of this, the council expresses favour for the use of traditional materials for extensions and refurbishment in conservation areas (policy D24).

Council's strategic policy in relation to listed building and archaeological sites seeks to protect and enhance the character, appearance and setting of statutory and locally listed buildings, and to protect.

F3.8 *KING'S CROSS CONSERVATION AREA DESIGN GUIDELINES (ISLINGTON), JANUARY 2002*

F3.8.1 Islington Borough Council produced design guidelines for that part of the King's Cross conservation area within its boundary in January 2002. This sets out policies for the retention of locally listed buildings, several of which are in the Regent's Quarter along York Way. The document also refers to the 'National set-piece' – the major sequence and group of buildings between the British Library and the Caledonian Road.

F3.9 *SUMMARY*

The provision of open space and creation of a high quality and attractive public realm conforms with policy objectives in terms of high quality design, improved pedestrian accessibility and better integration with the surrounding area. The project conforms with policies to protect strategic views across London.

F4 *PLANNING POLICIES RELATED TO NOISE*

F4.1.1 The implications of the project with regard to noise are dealt with in detail in Chapter 10of this ES. This Section describes how the project conforms to relevant national and local planning policies in relation to noise.

F4.2 *PLANNING POLICY GUIDANCE NOTE NO 24: PLANNING AND NOISE (1994)*

F4.2.1 PPG24 aims to provide guidance on how the planning system can be used to minimise the impacts of noise without placing unreasonable restrictions on development or unduly adding to costs.

F4.2.2 Paragraph 12 of the PPG refers to development proposals in areas where noise sources exist and recommends local authorities carefully consider the compatibility of the existing and proposed land uses, both at the present time and in the future.

F4.2.3 As a major transport interchange, the existing noise environment at King's Cross Station is well-established and relatively significant. The addition of another platform will enable greater flexibility for station operations and provide for a small increase in capacity and frequency of trains at King's Cross Station. However, this increase in capacity is not predicted to generate additional operational noise effects. Further details on the noise assessment are provided in Chapter 10: Noise.

F4.3 *CAMDEN UNITARY DEVELOPMENT PLAN (ADOPTED JUNE 2006)*

F4.3.1 Policy SD7B states that unless appropriate attenuation measures are included planning permission will not be granted for development likely to develop noise and vibration pollution. Details of specific noise limits and requirements are dealt with in Appendix 1 of the UDP.

F4.3.2 Noise from the operation of plant and machinery, such as ventilation ducts or air handling equipment, are identified as important considerations during the assessment of applications. Proposals must ensure impacts on local amenity are minimised. Where the construction phase is anticipated to generate particular impacts due to the duration, scale, location or nature of the works, the Council will require appropriate measures to be implemented to minimise disturbance to amenity (Appendix 1, Table E, p 195).

F4.4 *ISLINGTON UNITARY DEVELOPMENT PLAN, (ADOPTED 2002)*

F4.4.1 The London Borough of Islington seeks 'to minimise noise, pollution and nuisance and to improve air quality' (chapter 3, p15).

F4.4.2 The Council accepts that noisy uses are necessary in some locations and that such uses provide employment opportunities and necessary service provision to the community. However, the Council aims to reconcile this with the need for satisfactory living conditions and as such will rigorously assess applications

for noise generating activities. In order to protect and enhance amenity, new applications may be appropriately conditioned in order to control the source of noise or exposure to it (para 3.4.1 and 3.4.3).

F4.5 *THE MAYOR'S AMBIENT NOISE STRATEGY (MARCH 2004)*

F4.5.1 The Mayor's Ambient Noise Strategy encourages a reduction in ambient noise and is predominantly achieved via many of the policies in the Mayor's Transport Strategy, including encouragement to public transport, walking and cycling, and 'Streets for People', to bring about a quieter London. The London Plan contains an overall statement of planning policy on noise while a range of ways in which buildings and public spaces can be designed to improve city soundscapes are promoted.

F5 *PLANNING POLICIES RELATED TO ECONOMICS*

F5.1 *THE MAYOR'S ECONOMIC DEVELOPMENT STRATEGY: SUSTAINING SUCCESS (JANUARY 2005)*

F5.1.1 The current Economic Development Strategy, entitled Sustaining Success supports the development of London's economy, promotes employment, helps people participate in London's economy and supports businesses to be more competitive - all within the context of economic development being fair and sustainable.

F5.1.2 This strategy focuses on four major investment themes. These are investing in:

- places and infrastructure
- people
- enterprise
- marketing and promoting London

Annex G

Additional Archaeological Information

CONTENTS

G1 EVALUATION CRITERIA FOR ARCHAEOLOGICAL IMPORTANCE

G1.1.1 The first consideration in evaluating the importance of elements of the historic environment will be their legal or quasi-legal status as Scheduled Ancient Monuments, listed historic parks and gardens, or forming part of an archaeological priority zone.

G1.1.2 The present system of archaeological resource management in England relies on ascribing significance, and hence value, to a particular part of the resource. The terms local, regional and national importance are nationally recognised and are used in planning policy and guidance. English Heritage has proposed a definition for national importance, in the form of recommended (nonstatutory) criteria for scheduling ancient monuments in *Annex 4* of PPG16 (1). However, this annex states that '*these criteria should not...be regarded as definitive; rather they are indicators which contribute to a wider judgment based on the individual circumstances of a case*' (2). The criteria for defining national importance are:

- Criterion 1, Period (3);
- Criterion 2, Rarity (4);
- Criterion 3, Documentation (5);
- Criterion 4, Group Value (6);
- Criterion 5, Survival/Condition (7);
- Criterion 6, Fragility (8);
- Criterion 7, Diversity; and
- Criterion 8, Potential (9).

G1.1.3 The categories of local and regional importance are less clearly established and, implicitly, relate to local and regional priorities which themselves will be varied and diverse across the country. These priorities may be set out in a wide range of vehicles but are normally most clearly articulated in:

- Local Authority UDPs
- Local and Regional Research Agendas

(1) These are given even greater prominence in the draft revised text for the successor to PPG16, *Annex A*.
(2) *Annex 4*, DOE, Planning and Policy Guidance 16, (1990). For detailed definition of the criteria see that document.
(3) Taken as a whole whether 'the site' is characteristic of any single particular period.
(4) Whether the site can be considered rare in a national context.
(5) Whether there are surviving contemporary documentary records for the site.
(6) Whether the or elements of the site is clearly associated with a known Monument(s) outside the study area, thus enhancing its value.
(7) To what extent or condition of survival has already been compromised or affected. This could take the form of fragmentation (eg where a single monument has been extensively piled through), decay (eg organic deterioration of remains caused by known dewatering), truncation (eg earthworks barely surviving in plan following ploughing), instability, etc.
(8) This can be interpreted as the inherent propensity of the site towards further disturbance as in criterion five, eg buried organic remains are highly susceptible to changes in future water tables.
(9) The potential inherent in the site to add significantly to our understanding of the history and archaeology of the surrounding area at various periods.

G1.1.4 Accordingly, this assessment will identify the following categories of importance of the resource:

High importance: one or more of the following characteristics is exhibited:

- It/they forms part of or contains:
  - a nationally protected resource, such as a Scheduled Ancient Monument;
  - an identified resource of notable and established significance (1).
- A demonstrable considerable historical potential measured against English Heritage criteria and the local Research Agenda.
- An extensive corpus of supporting data/sources, such as historic documentation.
- Resources with a considerable wider collective/comparative potential and group value. They can contribute significantly to regional or national Research Agendas and policy objectives.
- Resources that are notably rare, fragile or complex.
- Notable and well-established historic associations, eg with notable people, events, etc.
- Considerable amenity or social values are associated with the site.

Moderate Importance: where the resource exhibits one or more of the following characteristics:

- A demonstrable historical potential measured against local or regional criteria, eg the local Research Agenda (Museum of London 2002).
- Supporting data / sources such as historic documentation exist.
- Resources that have a collective/comparative potential and group value, measurable against local Research Agendas and/or local policy objectives (eg UDPs).
- Multi-phase resources exhibiting evidence of continuity.
- Resources that are considered scarce or vulnerable.

Low Importance: where the resource does not have any of the characteristics listed under Moderate or High Importance.

(1) such as a known archaeological site, burial ground, historic town or settlement.

G2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND INFORMATION

G2.1.1 The time-scales used in this report are:

Palaeolithic:	450 000-12 000 BC
Mesolithic:	12 000-4 000 BC
Neolithic:	4 000-2 000 BC
Bronze Age:	2 000-600 BC
Iron Age:	600 BC-AD 43
Roman:	AD 43-410
Saxon (early-medieval):	AD 410-1066
Medieval:	AD 1066-1485
Post-medieval:	AD 1485-present

G2.1.2 Sites referred to within this Section (eg Site 1, Site 2, etc) are shown on *Figure 6.1* in *Chapter 6* and appear in the Gazetteer of Sites, Section.

G2.2 GEOLOGY AND TOPOGRAPHY

G2.2.1 London occupies part of the Thames Basin, a broad syncline of chalk filled in the centre with Tertiary sands and clays. The site lies on London Clay, with no overlying drift geology.

The site lies in the northern side of the shallow valley of the former River Fleet (1). The reconstructed medieval, and probably Roman, course of the Fleet is shown in *Figure 6.1* in *Chapter 6*, but it should be noted that the width of the former river is not known, and is likely to be wider than the line in the figure. This line also shows the approximate location of the 19th century Fleet Sewer, into which the river was culverted in 1867 (GLSMR 083804).

G2.2.2 Evidence of palaeo-channels associated with the rivers Fleet and Brill were recorded at the CTRL St Pancras terminus (Site 4 on *Figure 6.1*), where alluvium from the River Fleet was overlaid by 19th-century deposits.

G2.2.3 In the earlier parts of prehistory it is likely that the course of the Fleet differed considerably from the route shown in *Figure 6.1* in *Chapter 6*, and prehistoric archaeological and palaeo-environmental remains could be sealed beneath any surviving alluvium. In all periods the Fleet would have provided an attractive resource and possibly means of communication, but the known Saxon and medieval settlements grew up outside of the site (see below).

G2.2.4 Observations on the proposed concourse site during a MoLAS watching brief on the initial groundworks for the LU underground ticket hall recorded alluvial clays, thought to be Fleet alluvium, but possibly the upper strata of the London Clay itself, 2m below ground level at 14.22m OD. This was located immediately to the east of the Great Northern Hotel. London Clay lay at 12.82m OD.

(1) Strictly speaking only the lower part of the river were referred to as the Fleet, the higher reaches being known as the Hole Bourne and the Turnmill Brook.

G2.2.5 London Clay further east had been partly truncated by construction of the Fleet Sewer and the cut-and-cover LU tunnels. Near the south-eastern corner of the train shed, adjacent to York Way, it lay 2.0 to 2.5m below ground level at c 12.4m OD (Bull 2002 and pers comm). No data are currently available for the level of natural deposits on the eastern side of the site to the north of this.

G2.2.6 Taking into account this evidence, it is probable that the original, un-truncated natural London Clay would have lain less than 2m below existing ground level, but it is unlikely that this surface survives within the site. Fleet alluvium may be preserved below this level, in palaeo-channels cut into the London Clay.

G2.2.7 The existing truncated surface of the London Clay is to be found at approximately 2.0 to 3.5m below ground level, c 12.94 to 14.2m OD, but deeper truncation occurs in the areas of individual tunnels, sewers, or basement level structures.

G2.2.8 By way of contrast, modern ground levels are c 16.2 to 16.4m OD in the area of the proposed concourse. Near the south-eastern corner of the train shed, to the south of the proposed new tracks, ground level lies at c 16.4m OD. Within the train shed, the platforms and the taxi way are approximately level with the external ground level at the south-eastern corner of the train shed, although York Way rises considerably to the north, so that at the northern end of the train shed the taxi way lies some 2m or more below York Way.

G2.2.9 York Way rises from 16.1m OD at its southern end, to 18.3m OD between Albion Yard and Railway Street, 19.3m OD opposite Wharfedale Road (at the top of the taxi way, to the north of the train shed), and 22.5m OD at the junction with Goods Way.

G2.3 ARCHAEOLOGICAL AND HISTORICAL SUMMARY

Prehistoric

G2.3.1 There is a scatter of Palaeolithic artefacts and animal remains in the surrounding area, and a smaller number of later prehistoric remains. These find spots are restricted to the terrace gravels, thus it is unlikely that such material would be found on the current site, which lies on London Clay, unless it were sealed beneath alluvium and/or within a palaeo-channel, such as a former course of the River Fleet.

Roman

King's Cross lies some 2.5km to the north-west of the Roman city of Londinium, located where the present City of London is now situated. Whilst it has been postulated that York Way may be of Roman origin (Site 16 *Figure 6.1*) (1), there is little evidence to support this hypothesis, and only scattered finds of Roman date have been found in the area. These include a Roman tombstone bearing an inscription of the Twentieth Legion (Site 9 *Figure 6.1*) (2), a coin hoard from York Way (Site 11 *Figure 6.1*) (3), and three coins from Kings Cross (Site 9 *Figure 6.1*). Roman tile reused in St Pancras Old Church (Site

(1) GLSMR 080540.
(2) GLSMR 080382; Lee 1955, p 6.
(3) GLSMR 080365.

10 *Figure 6.1*) suggests some Roman settlement in the area north-west of the site.

G2.3.2 The area of the site appears likely to have been unused or agricultural land in the Roman period, but the find of the tombstone is problematic. If in situ or close to its original location, it could suggest the presence of a Roman cemetery and perhaps associated settlement closer than those of Londinium. It is possible, however, than the tombstone had been moved a considerable distance from its original location, perhaps by a post-medieval antiquarian, and that its find spot is meaningless.

G2.3.3 The notion that the site of Boudicca's last battle in AD 60 lay at King's Cross is now generally discredited (GLSMR 080377).

Saxon

G2.3.4 The site lies c 2km to the north of the Middle Saxon settlement of Lundenwic, centred on present day Covent Garden, Aldwych and the Strand, and some 2.5km to the north-west of the City, which was reoccupied by the Saxons under King Alfred in AD 886.

St Pancras Old Church (Site 10 Figure 6.1) lies beside the River Fleet. It is believed that the church was founded before the Norman Conquest, on land assigned by King Ethelbert to St Paul's Cathedral in AD 604. The existence of this prebendal manor is confirmed by the entry in the Domesday Book, and in 1847 an altar stone was found beneath the former 13th century tower. This stone has been dated on stylistic grounds to the late 6th or early 7th century (1) It is not clear whether the boundaries of the manor would have encompassed the present site in the Saxon or medieval periods. As the lands that belonged to the Saxon manor covered 5 hides, approximately 600 acres, the site could have lain within that area. As the site would have been close to the River Fleet, if it did form part of the manor, it may only have been used as meadows for grazing cattle, rather than agriculture.

G2.3.5 Apart from the evidence for the manor and church, there is no evidence to suggest Saxon occupation extended to the site.

Medieval

G2.3.6 There are two medieval settlements in the area around the site, at St Pancras (Site 15 *Figure 6.1*) (2) and Battle Bridge (Site 13 *Figure 6.1*). The Archaeological Priority Zone corresponding to the former lies c 250 to the north-west of the site, and that based around Battle Bridge lies c 30m to the south-east.

G2.3.7 St Pancras Old Church (Site 10 *Figure 6.1*) appears to have continued in use from the Saxon period, and extensive flooding from the River Fleet is recorded in 1331. The village was deserted by 1593, perhaps from this cause (Site 15 *Figure 6.1*). Earthworks recorded by Stukely in the 17th century may have been a moated vicarage and rectory (Sites 15 & 17 *Figure 6.1*). One enclosure

(1) na 1972, St Pancras Old Church pp 4 & 9.
(2) GLSMR 082061.

measured 400 x 500 paces; a size which led Stukely to ascribe it to the Romans (1), although this is now thought less likely.

G2.3.8 The village of Battle, or Bradford, Bridge (2) lay in the area of modern Kings Cross (Site 13 Figure 6.1), at a crossing of the River Fleet (Site 12 *Figure 6.1*) (3). This settlement is believed to have been located on the northern bank of the Fleet, east of the line of York Way.

G2.3.9 There is no evidence to suggest that either of these settlements extended to the present site, and this suggestion is reinforced by the post-medieval maps showing the area of the site remaining as open land in the later periods (eg Figure G1.1). Whilst the site may have fallen within fields or water meadows belonging to the settlements, the records of flooding suggest that little permanent activity would have taken place there.

Post-medieval

G2.3.10 Cartographic sources show that the area of the site remained open land into the middle of the 18th century. The Agas map of c 1562 (not illustrated) does not show the area of the site clearly, but it appears to be open land. On Rocque's map of 1746 (*Figure G1.1*) the site lay within undeveloped fields, although precursors of Pancras Road and York Way (Sites 14 & 16 *Figure 6.1*) are illustrated, as is the River Fleet. The settlements of The Bruel and Battle Bridge, as well as Pancras, all lie outside of the area of the site.

G2.3.11 The first recorded development on the site did not take place until the middle of the 18th century. The London Smallpox Hospital was constructed in 1767 (4), at a location either the same as, or slightly to the north of, the later Great Northern Hotel. The hospital is depicted on Rocque's map of 1769 (not illustrated) and Horwood's map of 1799 (*Figure G1.1*), which shows development extending to the north of the hospital.

G2.3.12 Between the surveys of Baker in 1805 and that of Langley and Belch in 1812 (not illustrated, but similar to *Figure G1.2*), much of the remainder of the site appears to have been developed with buildings along a network of small roads, and open yards to the rear of the buildings. The area to the south and east of the hospital remained open gardens, as did a strip long the western side of Maiden Lane, now York Way. This situation is also depicted on Greenwood's survey of 1824–6 (*Figure G1.2*), and Shury in 1832.

G2.3.13 The hospital survived until 1846, and in 1851 King's Cross station was constructed (Weinreb & Hibbert 1983, 448). This is depicted in detail on the Ordnance Survey maps of 1871 (*Figure G1.3*) and 1893. The station was designed by Lewis Cubitt and built as the London terminus for the Great Northern Railway. Cubitt added the Great Northern Hotel in 1854, placing it to the west of the station on a curved site. The railway layout included the tunnel of the 'hotel curve' of the St Pancras branch of the Midland Railway, later the GNR, completed in 1863 (5), to the north and east of the hotel.

(1) Mills 1982 [not paginated]; Lee 1955, p 6.
(2) GLSMR 082062.
(3) GLSMR 082060.
(4) Hunter & Thorne 1990, 13.
(5) Change at Kings Cross, 62.

G2.3.14 By the early 19th century the River Fleet had been culverted and used as a sewer, roughly along the line of Pancras Place. Whilst the Fleet can be traced on Rocque's map of 1746 (*Figure G1.1*), it is not visible on Horwood's survey of 1799 (*Figure G1.1*).

G2.3.15 Whilst part of the early-19th century housing south of Suffolk Road, later called Battle Bridge Road, survived the initial phases of railway construction, as demonstrated by the Ordnance survey map of 1871 (*Figure G1.3*), but a 'cartridge and percussion cap manufactory' occupied a site over the western part of the Hotel Curve tunnel. By 1914, King's Cross station had expanded to cover the majority of the site, with the exception of a garage to the south-west of Cheney Street.

G2.3.16 Remains of the post-medieval development of the area have been found during archaeological fieldwork on many sites in the study area (Sites 1 to 8 *Figure 6.1*), notably during works in advance of construction of the LU ticket hall beneath the proposed mainline concourse, where the remains of two ice houses associated with the Great Northern Hotel have been recorded, along with a tunnel connecting one of then to the hotel basements.

G3 GAZETTEER OF ADJACENT OR RELEVANT ARCHAEOLOGICAL SITES

G3.1.1 The list below represents a gazetteer of archaeological excavations and observations in the vicinity of the site, and should be read in conjunction with *Figure 6.1* in Chapter 6.

Sites with five letter/number site codes (eg BUC87) (1), were controlled excavations carried out by the Museum of London, or archaeological units acting for it, between 1973 and the present.

Museum of London sites

- Site 1

KXS01
Hotel Curve, Kings Cross Underground Station Redevelopment, NW1
TQ 30214 82989 & TQ 30194 83068
Raoul Bull & Alison Telfer

G3.1.2 **Phase 1 Works**: A watching brief was carried out on the excavation of an eastwest trench located between The Great Northern Hotel and the taxi ramp of Kings Cross Station. The trench was excavated to locate services and divert them to the Hotel Curve tunnel. The southern east-west trench, located to the south of Boots pharmacist in Kings Cross Station, was also monitored.

G3.1.3 In the northern trench alluvial clay deposits, probably from the former River Fleet were observed approximately 2m below current ground level (c 14.3m OD). 19th century or later rubble and redeposited clay sealed this clay horizon beneath the modern made ground for road tarmac or paving. No archaeology was present.

G3.1.4 The south access shaft was excavated to a depth of 4m below current ground level to the top of the current Northern Line Tube Tunnel. Truncated naturalclay was observed between 2.5 to 2m below current ground level (c 14.7 to 14.2m OD). Redeposited clay and rubble sealed natural clay beneath the pavement slab. No archaeology was present.

G3.1.5 **Phase 2 Works**: The archaeological fieldwork was carried out in advance of the construction of a new Northern Ticket Hall, as part of the redevelopment of the station.

G3.1.6 It was initially thought that the oldest structure on the site was a brick-built icehouse, pre-dating the Great Northern Hotel and possibly associated with the London Smallpox Hospital. The hospital had been built on the eastern side of Pancras Place in the late 18th century, before the construction of the railway terminus. A later false floor, internal concrete rendering and metal fixtures within the icehouse appeared contemporary with a curving brick tunnel, which connected the icehouse to the basement kitchen of the Great Northern Hotel. It was thought likely that the hotel had therefore reused the upper part of the older icehouse for storage.

(1) Very occasionally six letter codes were used, especially in the earlier period.

G3.1.7 The completion of the investigation has established that the icehouse postdated the Great Northern Hotel. Brick samples taken from the icehouse during the second phase of the investigation date the structure to the 1860s, due to the presence of stamped letters on the bricks.

G3.1.8 The remains of a second icehouse were also recorded and it was clear that the small tunnel between the first icehouse and the hotel kitchen had curved to accommodate it. Only the bottom 2m of the second icehouse was seen during the investigation and it is possible that it was never completed. In addition, it had been truncated by the Hotel Curve Tunnel, an underground connection constructed in 1863 to run local trains to Farringdon. Bricks from the second icehouse also dated to the 1860s, suggesting an almost immediate abandonment of the structure, probably due to its unfortunate position. The complete icehouse, only 3m away to the north, was likely to have been its replacement.

G3.1.9 The icehouse and tunnel were completely backfilled in the second half of the 20th century.

- Site 2

PNC01
St Pancras Railway Station, Midland Road and Pancras Road, and former Somers Town Goods Station, Midland Road, Brill Place and Ossulston Street, N1.
TQ 3000 8300
Andrew Westman

G3.1.10 St Pancras Station was constructed in 1863−8 for the Midland Railway, and Somers Town Goods Depot, to its W, in 1878. The station train shed, vaults and concourse are listed Grade I and other parts Grade II. Construction of the London terminus of the Channel Tunnel Rail Link will entail the demolition and partial reconstruction of platform-level buildings to the west of the train shed and north of a canopied cab stop. Additionally the brick vaults facing Midland Road and Pancras Road to the west and north of the train shed, the shopfronts on Pancras Road and to the east, a brick retaining wall around the edge of the former goods station will also be demolished. These structures are being surveyed before demolition.

- Site 3

PLT77
18-22 Platt Street, NW1
TQ 2970 8330
Graham Black (ILAU)

G3.1.11 Excavation in Platt Yard in 1977 revealed evidence of heavy waterlogging dated no later than the 17th century.

Other Archaeological Units' sites (post 1992)

- Site 4

YKW01
St Pancras Terminus, Kings Cross Lands, York Way, Euston Road, N1
TQ 2990 8340
Simon Blatherwick & Alistair Douglass, GAP/PCA

G3.1.12 Evidence of Palaeo-channels associated with the rivers Fleet and Brill were recorded. Alluvium of the River Fleet was overlaid by 19th-century deposits.

G3.1.13 Many items were recorded relating to the industrial heritage of the area, including the Midland Railway, its viaduct, embankments, and turntables, Grand Union (Regents) Canal, and foundations of the York Way Potato Market. Domestic basements and foundations were also recorded.

G3.1.14 Gravestones and tomb fragments from the disused St Pancras burial ground were recovered, mostly from a probably 20th century wall and railway embankment. Dense post-medieval burials in the graveyard were also discovered. (Summary from Greater London Archaeology Advisory Service Quarterly Review, September to December 2002).

- Site 5

SPN95
St Pancras Station, Pancras Road, Midland Road, NW1.
TQ 3000 8320
OAU for Rail Link Engineering (CTRL)

G3.1.15 19th-century deposits relating to the construction of the Regents Canal and East Coast/Midland mainlines were recorded in the 1995 evaluation and watching brief.

G3.1.16 Roman, Medieval, Post-Medieval periods were represented in the subsequent excavation phase. No further information has been made publicly available at the time of writing.

- Site 6

KGC99
P&O Land Holdings (Block C), Site location, King's Cross (beside), York Way, N1.
TQ 3040 8321
Kim Stabler, AOC

G3.1.17 Above the natural gravels demolition deposits of 19th-century structures and a brick wall were recorded.

- Site 7

YKY01
Albion Foundry, Site location, 32 York Way, N1
TQ 3042 8335
Giles Dawkes, AOC

G3.1.18 Cultivation soils and dumped deposits of 18th-century date overlay the natural gravels. Above this were the remains of structures relating to the 19th-century foundry, including brick machinery bases, flues, floors and internal partitions.

- Site 8

YWS99
York Way School, Site location, York Way, Islington, N1, Borough, Islington.
TQ 3034 8374
Jeff Perry, SAS

G3.1.19 Modern (19th-century?) overburden overlay London Clay. Monitoring of groundworks recorded no archaeological deposits earlier than 19th-century in date.

Table 3.1 Greater London SIte s and Monuments Records

Site no (Fig 6.1)	SMR no.	Name	Description	Date
9	080382	York Way	tombstone	43 AD to 409 AD
9	080360	Kings Cross	3 coins of Carausius	AD 287–9
10	202503	Pancras Rd	church	1540 AD to 1900 AD
10	081792	Pancras Rd	altar	410 AD to 1065 AD
10	081767	Pancras Rd Near St Pancras Old Church	possible building ? (roman tiles & bricks are reported as being seen in the church walls)	43 AD to 409 AD
10	081796	Pancras Rd	church	410 AD to 1900 AD
11	080365	York Way	coin hoard	43 AD to 409 AD
12	082062	Kings Cross Rd	bridge	1066 AD to 1539 AD
13	082063	Kings Cross Rd	village	1066 AD to 1539 AD
13	080396	Kings Cross	village	1066 AD to 1539 AD
14	082051	St Pancras Way	road	1066 AD to 1900 AD
15	082053	St Pancras	village, deserted settlement	410 AD to 1900 AD
15	082340	Pancras Rd (East Of St Pancras Old Church)	enclosure, (moated site)	1066 AD to 1539 AD
16	080540	York Way	road	43 AD to 1900 AD
17	082339	Pancras Rd	enclosure	1066 AD to 1539 AD
18	083606	Caledonia St	foundry	1540 AD to 1900 AD

G3.2 PAST IMPACTS ON ARCHAEOLOGICAL RESOURCES

Natural Geology

G3.2.1 It is probable that the original, un-truncated natural London Clay would have lain less than 2m below existing ground level, but it is unlikely that this surface survives within the site. Fleet alluvium may be preserved below this level, in palaeo-channels cut into the London Clay.

G3.2.2 See *Chapter 12: Contaminated Land for description of underlying geology*.

G3.3 IMPACT FROM THE 19TH AND 20TH-CENTURY CONSTRUCTION

G3.3.1 Previous works in the area of the proposed mainline concourse (Site 1 *Figure 6.1*) have shown that the existing truncated surface of the London Clay is to be found at approximately 2.0 to 3.5m below ground level, c 12.94 to 14.2m OD, but deeper truncation occurs in the areas of individual tunnels, sewers, or basement level structures.

G3.3.2 At the southern end of the proposed new trackwork, similar levels of truncation are likely to occur to those recorded immediately to the south (Site 1 *Figure 6.1*): 2.0 to 2.5m below ground level, c 11.9 to 12.4m OD. The existing station platforms and taxi way, however, remain level as the adjacent street level on York Way rises to the north. Thus the original level of the London Clay may also be expected to have risen to the north.

G3.3.3 The northern part of the station and the tracks to the north are effectively in a cutting which increases in depth until the tracks enter the tunnel beneath Goods Way. At the northern end of the train shed, the platforms and taxi way are approximately 2m below the level of York Way, and therefore very probably below the original surface of the London Clay. It is unlikely that any potential archaeological deposits would survive to the north of the train shed.

G3.3.4 Within the train shed, it appears unlikely that any potential deposits will survive north of a line approximately opposite Railway Street. If the depths of truncation within the train shed are similar to the 2.0 to 2.5m below ground level seen in a trail trench to the south (Site 1 *Figure 6.1*), it is unlikely that any potential pre-railway remains would survive in the area of the new tracks. If this figure is not applicable within the train shed, then truncation from construction of the existing platform and taxi way surfaces is predicted to be of minimum 0.5m.

G3.3.5 The only potential archaeological deposits likely to survive are those preserved in the alluvium of the former channel of the River Fleet, probably of prehistoric date, and 19th-century structures excavated below ground level, such as the ice houses and associated tunnel seen during the LU works (Site 1 *Figure 6.1*).

G3.3.6 The Hotel Curve Tunnel must have been constructed by cut-and-cover techniques, as it bisected one of the icehouses seen during the initial LU works on the site (Site 1 Figure 6.1). It can, therefore, be assumed that this tunnel will also have truncated any potential archaeological remains. Part of the tunnel, from a point to the north of the Great Northern Hotel to

approximately level with the western range of the main station building has been broken out and/or filled in with concrete.

G3.4 LU TICKET HALL AND RELATED BELOW-GROUND CONSTRUCTION

G3.4.1 This is currently under construction, and will have basement FFL levels of c 11.2 to 11.8m OD (John Mc Aslan & Partners dwg no OP4rev1-GN-008). This is deeper than both the predicted original surface of the London Clay, and the levels to which it is currently truncated.

G3.4.2 No horizontal stratigraphy (archaeological deposits above the surface of the natural geological deposits) will survive this truncation, and it is likely to have also removed any potential remains within former channels of the River Fleet. Consequently no archaeological remains are expected to survive within the area of LU construction.

G3.4.3 This truncation from LU construction forms part of the baseline situation for the current impact assessment.

G3.5 DEPTH OF ARCHAEOLOGICAL DEPOSIT

G3.5.1 No horizontal stratigraphy pre-dating the mid-19th century railway construction is likely to survive on the site, but remains of 19th-century basements and other below ground features associated with the railways may survive.

G3.5.2 It is possible that levels of truncation from railway construction within the area of the proposed new tracks are not similar to the 2.0 to 2.5m seen outside of the train shed, if this were so, then pre-railway deposits could survive within the train shed, no further north than a line opposite Railway Street.

G3.5.3 The ice house belonging to the Great Northern Hotel survived up to 0.2m below modern ground level, 16.0m OD, and the associated tunnel to c 15.6m OD.

G3.5.4 The possible Fleet alluvium seen in the earlier works on the site was 1.5m thick, truncated at 14.22m OD, but no remains of human activity were seen.

G3.5.5 These resources would not survive within the area of LU construction, nor of the Hotel Curve Tunnel.

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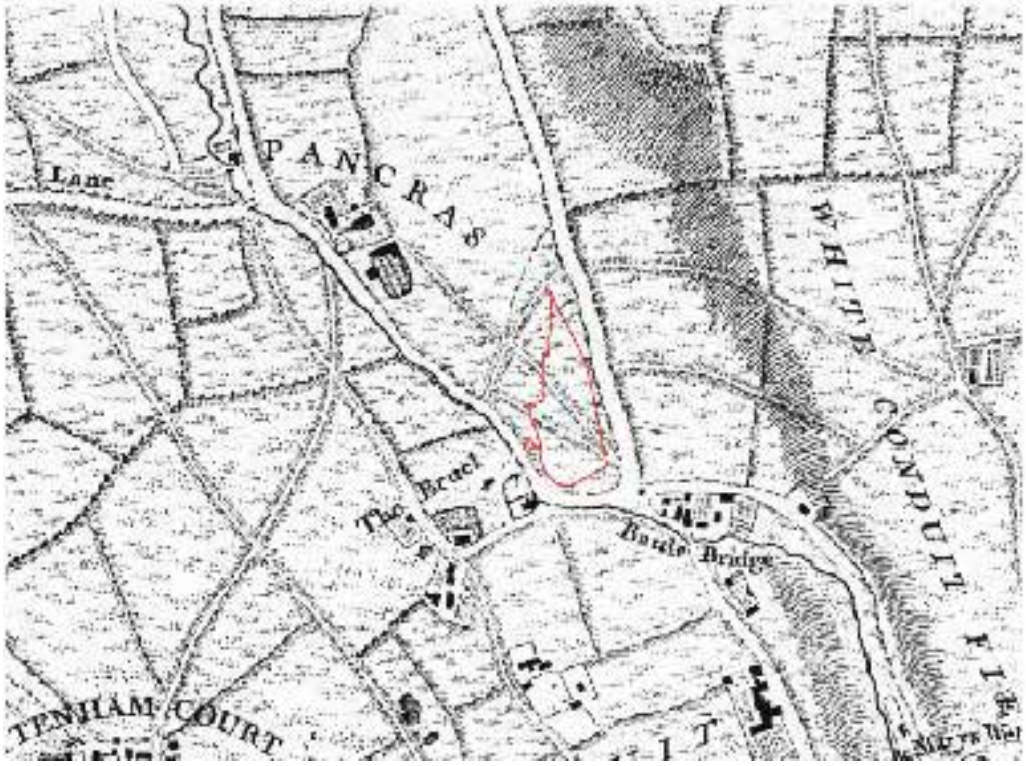
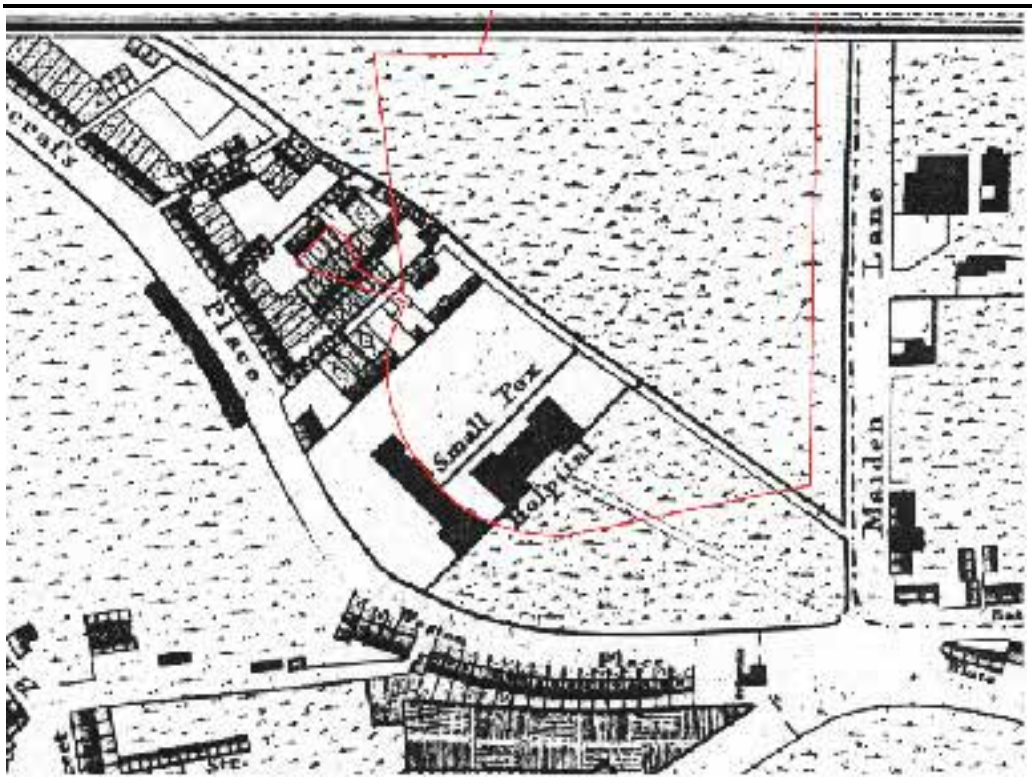
Roque's Map of 1746



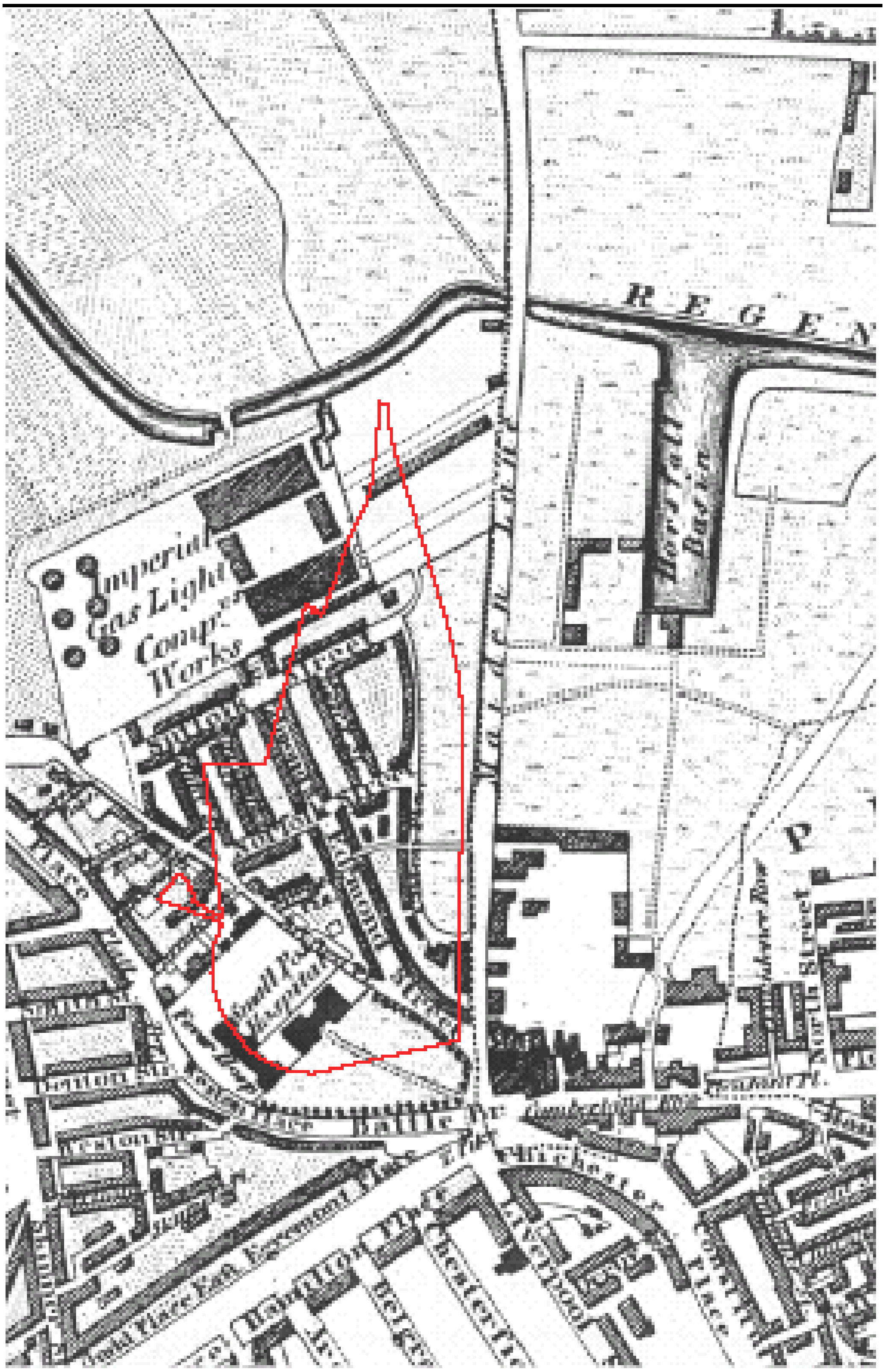
Source: MoLAS 2003

Horwood's Map of 1799



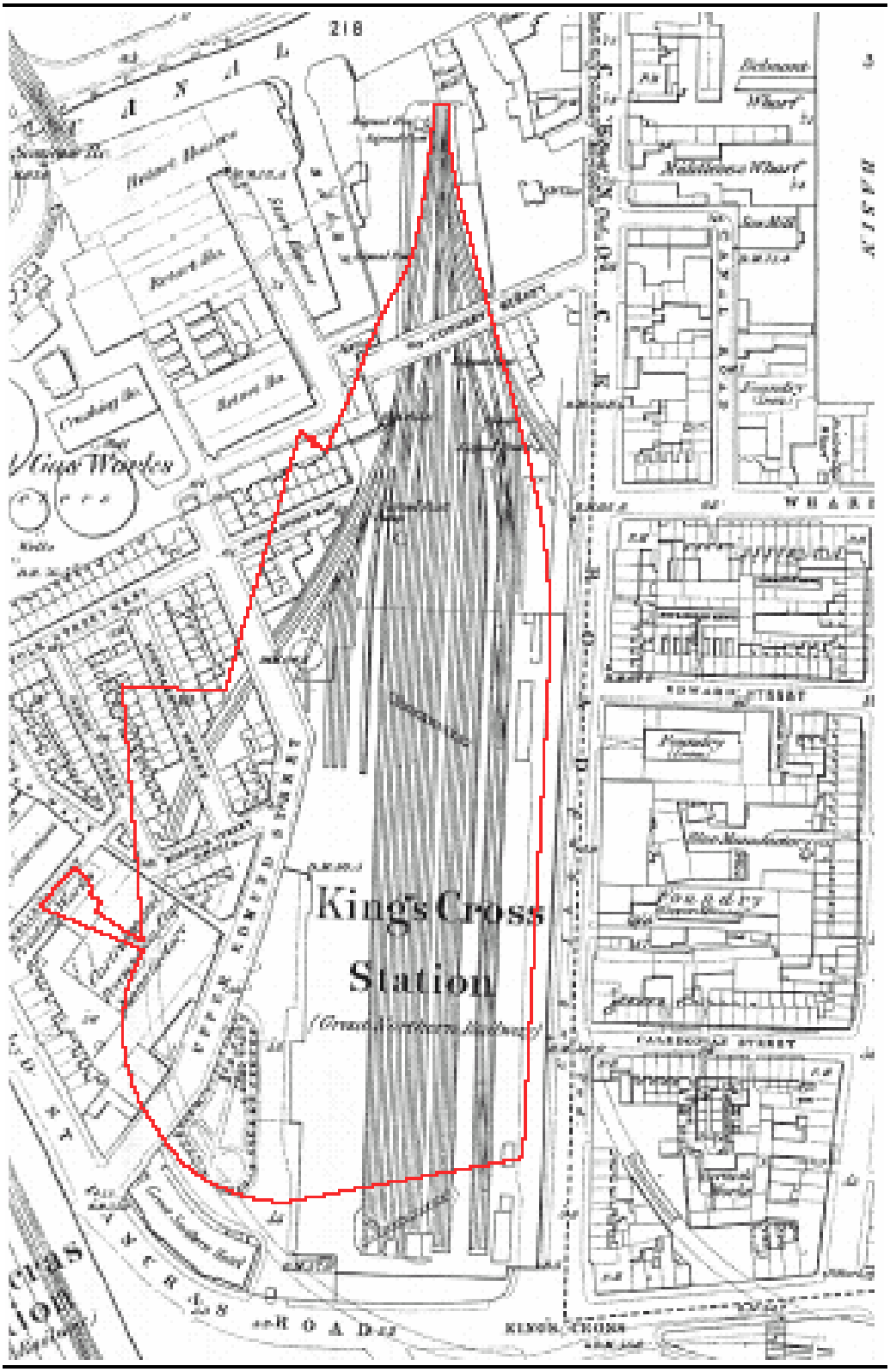
Source: MoLAS 2003

Greenwood's Map of 1824-6



Source: MoLAS 2003

Ordance Survey Map of 1871



Source: MoLAS 2003

Annex H

Cultural Heritage

CONTENTS

H1 CULTURAL HERITAGE

Box H1.1 Documents Consulted during the Cultural Heritage Assessment

- Planning (Listed Buildings and Conservation Areas) Act 1990
- Channel Tunnel Rail Link Act 1996.
- PPG15
- Draft London Plan
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- Network Rail King's Cross-Station Enhancement Project, Environmental Scoping Report, September 2003, ERM

H1.1 HISTORICAL DEVELOPMENT IN THE STUDY AREA

Historical background to the King's Cross area

1.1.1 In 1846 a parliamentary commission decided that central London was not an appropriate location for large surface railways, and that because the streets south of Euston Road had already been developed by this time, new termini and railways would have taken up prime inner city land. Therefore, when the Great Northern Railway was constructed between 1846 and 1850, and the main-line station and Great Northern Hotel were completed on the north side of Euston Road 1850-1854, a predominantly rural area north of the City of London was changed into a major transport interchange. Both buildings were erected on land acquired from the London Fever and Smallpox Hospital, and a dense mix of residential, commercial and industrial buildings and associated communities were soon established around them. King's Cross became a vibrant and commercially attractive area of London in the second half of the nineteenth century, and from c.1850 it was the busiest goods handling area in Britain. It became an even more important focal point after the construction of the Metropolitan Railway (the first underground railway in the world), and the building of St Pancras Station and the Midland Grand Hotel (St Pancras Chambers) in 1868–76.

1.1.2 King's Cross station was designed in an Italianate style by Lewis Cubitt, and completed in 1852, at which time it was the largest railway station in Britain. Cubitt also designed the Great Northern Hotel, which was completed in 1854 and which faced King's Cross Station across a large formal garden. In 1859 work began on the Metropolitan Railway, which passed along the Euston Road between Paddington and Farringdon stations, requiring the demolition of several buildings, including those on the triangle of land between Gray's Inn Road and Pentonville Road. Following the completion of the railway line, several new properties were built during the 1870s to replace the demolished

buildings. Amongst these was the unusual “lighthouse” tower building at the junction between Gray’s Inn Road and Pentonville Road.

1.1.3 The Midland Railway company began the development of St Pancras Station in 1864, involving the compulsory removal of large parts of Somers Town and Agar Town, to the north of old St Pancras Church, and the clearance of part of the burial ground. When constructed, the train shed roof, designed by the engineer William Barlow, was the world’s largest single span station roof without internal support (it is sometimes referred to as the ‘Barlow shed’). The station opened for goods in 1867 and for passengers in 1868.

1.1.4 In 1876 the Midland Railway company completed the Midland Grand Hotel at the southern end of the Barlow shed, designed in a Gothic revival style by Sir George Gilbert Scott. The hotel occupied the upper floors of the building, and was developed to compete both commercially and architecturally with the Great Northern Hotel.

1.1.5 There was considerable development around and near the stations in the1860s, including tenement blocks in Stanley Passage and Clarence Passage (by the Improved Industrial Dwelling Company, 1864), the gasholders of the Imperial Gas Works Light & Coke Companies 1864-867, and the German Gymnasium (designed by Edward Gruning in 1864 for the German Gymnastic Society). Goods Way was also laid out during this period, and Culross Buildings was developed to the south of the gas works in 1891.

1.1.6 As the character of Euston Road became more commercial, shops replaced the large front gardens that previously fronted the south side, and many of the earlier properties were converted into hotels to serve the passengers of the Great Northern and Midland Railways. In 1877 St Giles Cemetery and the burial ground to the south old St Pancras Church were combined to form St Pancras Gardens (although the present gardens were laid out in 1891 by the vestry and the Midland Railways). At the rear of the gardens the coroner’s court was built in 1886, and in 1904 the gasworks on Goods Way was closed, although the gasholders continued in use and remained a dominant feature of the area until the early years of the 21st Century.

1.1.7 During the 20th century development included the Scala Cinema (1921) with its prominent stuccoed frontage at the southern end of the Caledonian Road, and the Piccadilly and Northern underground lines. In 1935 St Pancras Town Hall (now Camden Town Hall) was constructed on Euston Road, opposite St Pancras Station, to designs by A.J. Thomas, and in 1936 the Battlebridge Flats were constructed by the British Steelwork Association at the junction between Goods Way and Battlebridge Road. In 1937 the Royal Veterinary College was redeveloped to designs by H.P.G. Maule, and was reopened by King George V.

1.1.8 There was extensive bomb damage during the Second World War, but King’s Cross and St Pancras Stations escaped relatively intact. Damage to the west side of Kings Cross Station is still evident in the bomb gap south of the suburban train shed. The worst bomb damage was in the streets surrounding St Pancras Garden and to the south of Euston Road.

1.1.9 Post-war housing redevelopment included Cecil Rhodes House, opposite St Pancras Gardens, and Chenies Place (by Thomas Sibthorpe) to the west of Pancras Road, as well as new flats in Birkenhead Street to the south of Euston Road.

1.1.10 During the 1970s Camden Town Hall was extended to the east, and new retail units were developed in existing buildings fronting Euston Road, Pentonville Road, Gray's Inn Road and Kings Cross Road. A single storey concourse containing a new ticket office was added to the front of Kings Cross Station in 1974.

King's Cross Station: History and development

1.1.11 King's Cross Station is generally acknowledged as one of the finest and most innovative architectural and engineering structures of the nineteenth century. It is a grade I listed building within the King's Cross conservation area. Cubitt's original layout was direct and rational, with passengers buying tickets in the central block of the Western Range, a structure running continuously along the full length of the train shed facing Pancras Road. The Western Range contained first and second-class waiting rooms, and the booking hall. Having bought their tickets, outward-bound passengers departed from the west side of the station. Incoming trains arrived on the east side, and passengers continued their journey from the covered cab road along York Way. Such a system cannot be accommodated with modern timetable arrangements.

1.1.12 The train shed consisted of two arches supporting a roof that was glazed for three quarters of its curve. The arches were 105 feet wide, 72 feet high and 800 feet long, and were originally made of laminated timber. The eastern shed arches were replaced with iron in 1866-67, and those in the western shed were replaced in 1886-87.

1.1.13 To counteract congestion and delay, the station was extended to the west to 15 platforms by 1926, including an expansion southwards into the station forecourt. Despite the reduced space between the southern façade and the ends of the platforms, passengers used the southern entrance in preference to the western booking office. This trend was reinforced by the location of the connections with the Metropolitan Railway, and later the Northern, Piccadilly and Victoria lines. Over time, temporary structures here gave way to more substantial brick and masonry buildings. In 1972, some buildings were demolished to accommodate the Victoria Line and the southern concourse was subsequently constructed.

King's Cross Station: Western Range

1.1.14 The Western Range is largely constructed in load-bearing yellow stock brick, with stone dressings to windows, cornices and string-courses, all under pitched slate roofs supported on timber trusses. It has seven main components or blocks:

(i) South Wing – a three storey block of fifteen windows with a three window return to the south adjacent to the western tower of the main station, with basement;

(ii) Central Block – the main and tallest block originally containing the station's booking hall;

(iii) Bomb Gap – the lost area of the north wing, now comprising a single storey post-war structure with basement;

(iv) North Wing – a four storey truncated block of eight windows with basement;

(v) Link Building – a five storey set back block of six windows between the north west block and north wing;

(vi) North West Block (Parcels Office) – a three storey atrium block with a south facing angled gable wall to the adjacent Link Building;

(vii) Northern Building – a three storey low triangular block terminating at the north end of the station.

1.1.15 The Western Range is in effect a single building made up of interconnecting blocks. Except for the Northern Building, these were constructed as part of the original 1850s railway station.

1.1.16 The two external elevations of the Western Range have remained relatively intact, up to the connection with the former parcels office (North West Block) and the Suburban Train Shed. Internally, there have been extensive alterations and adaptations at the ground floor and basement levels, but the upper floors either side of the bomb gap have retained their original plan form to a greater extent. Floor levels are complex within the Western Range, with first and mezzanine floors situated to the rear of the Old Booking Hall, which in turn is located below a second floor extending the entire width of the central block.

1.1.17 In the basement a perimeter light-well corridor runs the full extent of the Western Range, linking vaults situated on either side of the central block. The corridor is used for mechanical and electrical services. The basement and ground floor structure to the bomb gap has been extensively reconstructed. Substantial concrete encased braced structural steel foundations have been incorporated along the Platform 8 side of the range, to support stanchions to the northern and central main train shed roof replacement steel ribs, installed in 1947.

1.1.18 The Western Range has been maintained to a reasonable standard on the first, second and third floors where offices remain in active use, but there are areas elsewhere where there are signs of deterioration, and repairs to the Bomb Gap are rudimentary. A considerable part of the central block is unused and in a poor state of repair. Significant areas of the Western Range are used to contain plant equipment.

King's Cross Station: The Main Train Shed Roof

1.1.19 The ribs of the Main Train Shed Roof were seated on the original cast iron shoes built into the perimeter train shed walls and thrusts considered by the original designers to be resisted by the (subsequently strengthened) Eastern Range, and the more substantial Western Range construction, where cross

walls generally align with the main roof rib positions. Two ribs situated immediately to the north of the bomb gap are not so disposed, and the path of arch thrusts to the foundations is not currently clearly defined. Historical sources suggest that there were some concerns soon after the station was first opened that insufficient attention had been given in the original train shed design to the accommodation of thrusts generated by the original timber arch ribs, and that some outward movements of the east wall adjacent to York Way occurred. Heavy timber trussing is believed to have been installed in the east range to enhance thrust resistance, but it appears that the western wall was considered sufficiently well buttressed and no strengthening measures were introduced. Timbers ribs were replaced with wrought iron sections to reduce thrusts applied to the side walls.

King's Cross Station: Suburban Train Shed

1.1.20 The local station train shed (now platforms 9 to 11) was built for the Great Northern Railway's suburban services extended in 1894 - 1895, with a functional character clearly deriving from its purpose. It has a trussed roof with a metal and glass porte-cochere. To the west of the entrance is an office range of yellow brick with red brick flashings. The stepped red brick detailing is similar to that on the side elevation to the German Gymnasium.

King's Cross Station: Southern Concourse

1.1.20 The temporary single storey ticket office, along with the canopy structure to the front of the southern canopy of the station was constructed in 1974. It is single storey with a profiled metal fascia that obstructs the full view of the elevation of the Southern Facade.

The Great Northern Hotel

1.1.21 The Great Northern Hotel, also designed by the Architect Lewis Cubitt was opened in 1854. It has 5½ storeys with attic storey and a basement and was tall for its time. It is built on a curved plan that originally followed the course of Old St Pancras Road immediately to the west. The eastern side of the building addressed the western elevation to King's Cross station where the projecting booking office formed the focus of the Western Range.

1.1.22 The hotel is Italianate in style with classical details, being more elaborate than its station. It has a hipped slate roof with tall chimneys. It is built of yellow stock brick with stucco details. The eastern elevation has a six window central bay and five window outer base, separated by staircase base with tripartite windows, slightly projecting. The ground floor windows are plain and semi-circular headed and the windows to the first, second and third floors are square headed with moulded stucco architraves. The fourth floor windows are plain and the dormer windows have pediments. The treatment of windows on the main elevation is progressively simpler from the first floor upwards. Stucco string courses run between the ground, first and second floors and there is a deeply moulded main corners with dentil course above the top floor. The west elevation is longer than the east elevation and is similar. It has seven base of windows in the central section with five base to the sides. The rear staircase base are set forward from the hotel's building line and have rusticated pilasters. The corners have deeply moulded quoins. A single storey extension and a white painted fire escape on the west elevation detract

from the overall quality. The end elevations have rectangular windows with mouldings.

The German Gymnasium

1.1.23 The grade two listed German gymnasium (1864 - 1865) to the south of Stanley Buildings was a unique purpose built gym for the German Gymnastic Society and designed by Edward Gruning. The gym is of great historic and aesthetic importance. It was part of the movement towards the establishment of the Olympic games and was important in the development of public sport and fitness. Its style is a Prussian neo-medieval vernacular. It has rare surviving laminated timber roof ribs of a type originally used in King's Cross station.

1.1.24 Whilst the former entrance to this building from the original alignment of Pancras Road has been demolished as part of the CTRL works, this 2½ storey multi-coloured stock brick building is not diminished by the loss of the immediate urban fabric. Its southern façade is sufficiently imposing to enable the building to sit successfully against the backdrop of the station extension. Its new west wall created by the demolition of the western part of the structure has been rebuilt to form an external wall in keeping with the other elevations.

Stanley Buildings

1.1.25 An early case of tenement housing with interesting architectural form, style, massing and use of materials. Built as a group of five blocks in 1864 to 1865, of which only two now remain. They were built in stock brick with flat roofs. An example of the early use of reinforced breeze concrete to provide fireproof construction to balconies, stairs, and corridors.

H1.2 TABULATED ANALYSIS OF IMPACTS

1.2.1 The following nine Tables (*G1.1* to *G1.5*) have been prepared on the principles set out in *Chapter 7: Cultural Heritage*. The nine tables are as follows:

Table H1.1 Sensitivity of Receptors

Receptor	Sensitivity of Receptor	Status
1. King's Cross Station	High	Listed Grade I
2. Great Northern Hotel	High	Listed Grade II
3. St Pancras Station	High	Listed Grade I
4. German Gymnasium	High	Listed Grade II
5. Stanley Buildings	High	Listed Grade II
6. Gasholder No. 8	High	Listed Grade II
7. King's Cross Conservation Area	High	Conservation area

Table H1.2 Magnitude of Physical Changes

Receptor	Magnitude of Change	Description/Note
1. KING'S CROSS STATION		
1.1 Western Range		
1.1.1 Western Range, west elevation (external)	High	External alterations include (i) the physical attachment of the Western Concourse, and (ii) the reinstatement of the Bomb Gap and adjacent structural strengthening.
1.1.2 Western Range, interior, including basements	High/Moderate	Internal alterations include (i) the reinstatement of the Old Booking Hall as a travel centre and ticket office, (ii) the insertion of ticket barriers in the Southern Wing, (iii) the insertion of a pub in the old parcels office area, (iv) changes in the basement resulting mainly from the new LU Bomb Gap vents, and (v) re-planning of the retail provision in the Western Range.
1.1.3 Western Range, east elevation (internal)	Moderate	Alterations to fabric, notably in the South Block of the Western Range.
1.1.4 Western Range, roof	High/Moderate	Some roof structure will be removed in the central block, and plant will be concealed behind the parapet.
1.2 Suburban (western) shed		
1.2.1 South elevation	High.	Removal of historic fabric is evident internally and externally. Works will require the removal of the whole of the southern façade.
1.2.2 West elevation	Low.	Some proposed alteration of historic fabric is evident internally and externally, which will consist of local structural repairs as required in order to preserve the status quo.
1.2.3 North elevation (void)	Low	No works are planned.
1.2.4 Interior, including platform surfaces	Low.	Some proposed internal alteration is evident from the drawings
1.2.5 Roof	Moderate	Removal of the two southern most roof bays and replaced with a modern flat roof.
1.3. Main Shed, including Eastern Range and Platform Y		
1.3.1 South elevation (external, including the south elevations of the Western and Eastern Ranges)	High/Moderate	Changes result from the demolition and removal of the southern concourse and the restoration of the ground floor with its six main openings. A new canopy will be provided to provide weather protection to passengers exiting the station via the southern façade.
1.3.2 Internal platforms, including Platform Y in the Eastern Range	Low.	Shortening of platforms 5-8 is apparent.
1.3.3 Internal elevation when looking towards Eastern Range	Moderate.	Alterations to fabric have been reported verbally by the Client, including re-glazing and fire protection measures.

Receptor	Magnitude of Change	Description/Note
1.3.4 Internal elevation when looking towards south wall	Low.	No changes noted from plan.
1.3.5 Spine wall	Low.	No changes noted from plan.
1.3.6 Pedestrian walkway across platforms	High.	Removal of existing footbridge.
1.3.7 Alterations to mid-platform access point due to the removal of the existing bridge and the addition of the new bridge to the north.	Low	Alterations include changes to accommodate loss of existing bridge and construction of new bridge.
1.3.8 Roof	Low.	No alterations noted on sections or roof plans as part of this application.
1.3.9 Basements	Low	Provision of lifts into existing shafts.
1.4 Railway structures, including bothy, on west side of York Way	High	Total demolition of these structures is implied by the plans. They are within the curtilage of the grade I listed King's Cross Station.
2. GREAT NORTHERN HOTEL		
2.1 North-east elevation (external)	High.	Alterations include (i) attachment of the concourse roof, and (ii) alterations to ground floor. (NB Not NR works)
2.2 South-west elevation (external)	High	Alterations to ground floor are shown. (NB not NR works)
2.3 North-west (end) elevation	Moderate	Alterations include part removal of fabric (Not NR) and attachment of Western Concourse roof.
2.4 South-east (end) elevation	Moderate.	Alterations include part removal of fabric (Not NR) and attachment of Western Concourse roof.
2.5 Interior, including basements	High/Moderate	Partial removal of structure and partitioning is shown on ground and first floor, with consequences for upper levels (Not NR).
2.6 Roof	Low	No alterations noted from available information
3. RAILWAY STRUCTURES, INCLUDING BOTHY, ON WEST SIDE OF YORK WAY	High	Total demolition of these structures is implied by the plans. They are within the curtilage of the grade I listed King's Cross Station.
4. ST PANCRAS STATION	None	No physical impacts
5. GERMAN GYMNASIUM	None	No physical impacts

Receptor	Magnitude of Change	Description/Note
6. STANLEY BUILDINGS	None	No physical impacts
7. GASHOLDER NO 8	None	No physical impacts

Table H1.2a Significance of Effects Resulting from Physical Changes

Receptor	Sensitivity of receptor	Magnitude of change	Environmental effect	Note/Description
1. King's Cross Station				
1.1 Western Range	High		For details see below	
1.1.1 Western Range, west elevation (external)	High	High	Significant (Positive, particularly the reinstatement of the Old Booking Hall and structural strengthening of the Bomb Gap)	
1.1.2 Western Range, interior, including basements	High	High/Moderate	Significant (Positive, resulting in more effective use of the listed building)	
1.1.3 Western Range, east elevation (internal)	High	Moderate	Significant (Positive, resulting in upgrading of the elevation)	
1.1.4 Western Range, roof	High	High/Moderate	Significant (Negative, but only where there is a local removal of fabric for plant over the central block. Minor in the overall context of the scheme)	
1.2 Suburban (western) shed	High		For details see below	
1.2.1 South elevation	High	Moderate.	Significant (Negative, but only where there is a local removal of fabric at the southern end. Minor in the overall context of the scheme)	
1.2.2 West elevation	High	Moderate.	Not significant (Minor impacts only)	

Receptor	Sensitivity of receptor	Magnitude of change	Environmental effect	Note/Description
1.2.3 North elevation (void)	High	Low	Not significant (no works planned)	
1.2.4 Interior, including platform surfaces	High	Low.	Significant (Positive, including general upgrading of appearance)	
1.2.5 Roof	High	Moderate	Significant negative, but only where there is a local removal of roof structure at the southern end. But minor in the overall context of the scheme.	
1.3. Main Shed, including Eastern Range and Platform Y	High		For details see below	
1.3.1 South elevation (external, including the south elevations of the Western and Eastern Ranges)	High	High/Moderate	Significant (Positive – particularly the impacts arising from the removal of the Southern Concourse)	This conclusion has been balanced against the slight negative addition of the new canopy.
1.3.2 Internal platforms, including Platform Y in the Eastern Range	High	Low.	Significant (Positive in that new Platform Y makes effective use of historic building. Shortening of other platforms has a minor impact)	
1.3.3 Internal elevation when looking towards Eastern Range	High	Moderate.	Significant (Positive – particularly the upgrading of fenestration)	
1.3.4 Internal elevation when looking towards south wall	High	Moderate.	Significant (Positive – particularly the opening up of original views through the southern elevation)	
1.3.5 Spine wall	High	Low.	Not significant (Minor changes only)	
1.3.6 Pedestrian walkway across platforms	High	High.	Significant (negative – complete removal of existing footbridge)	

Receptor	Sensitivity of receptor	Magnitude of change	Environmental effect	Note/Description
1.3.7 Alterations to mid-platform access point due to the removal of the existing bridge and the addition of the new bridge to the north.	Low	Moderate	Not significant (Minor changes only)	
1.3.8 Roof	High	Low.	Significant (Positive – repair and restoration)	
1.3.9 Basements	High	Moderate/Low	Not significant (Potentially negative, but only where there is a local removal of fabric. Minor in the overall context of the scheme)	
1.4 Railway structures, including bothy, on west side of York Way	High	High	Significant (Negative, involving their total removal, but minor in the overall context of the scheme)	
2. GREAT NORTHERN HOTEL	High		For details see below	
2.1 North-east elevation (external)	High	High.	Significant (Negative, but only where there is a local removal of fabric at ground floor – not by Network Rail)	Negative where there may be local alteration of fabric to attach the new Western Concourse. Minor in the overall context of the scheme
2.2 South-west elevation (external)	High	High	Significant (Negative, but only where there is a local removal of fabric at ground floor – not by Network Rail)	
2.3 North-west (end) elevation	High	Moderate	Significant (Negative where there may be local alteration of fabric to attach the new Western Concourse. Minor in the overall context of the scheme	

Receptor	Sensitivity of receptor	Magnitude of change	Environmental effect	Note/Description
2.4 South-east (end) elevation	High	Moderate.	Significant (Negative where there may be local alteration of fabric to attach the new Western Concourse. Minor in the overall context of the scheme)	
2.5 Interior, including basements	High	High/Moderate	Significant (Positive in that the building will be re-used. Negative in that there will be removal of fabric - not by NR)	
2.6 Roof	High	Low	Not significant (probably repair only)	
3. ST PANCRAS STATION	High	None	Not significant	
4. GERMAN GYMNASIUM	High	None	Not significant	
5. STANLEY BUILDINGS	High	None	Not significant	
6. GASHOLDER NO 8	High	None	Not significant	

Table H1.3 Magnitude of Changes to Setting of Listed Buildings

Receptor	Magnitude of Change	Description/Note
1. King's Cross Station (setting)		
1.1 King's Cross Station: Southern Square and Euston Road	High	Removal of Southern Concourse.
1.2 King's Cross Station: Within Western Concourse	High	External setting becomes internal.
1.3 King's Cross Station: North and north-west	Low	Little impact north of German Gymnasium.
1.4 Existing footbridge	High	Complete removal of the existing footbridge.
1.5 Main Train Shed roof	High	Complete removal of the existing footbridge and replacement with modern structure.
2. Great Northern Hotel (setting)		
2.1 Great Northern Hotel: Within Western Concourse	High	External setting becomes internal

Receptor	Magnitude of Change	Description/Note
2.2 Great Northern Hotel: Southern Square and Euston Road	High	Removal of Southern Concourse opens new views, and the new Western Concourse has some impact
3. St Pancras Station (setting)		
3.1 St Pancras Station: Within King's Cross Western Concourse	High	External setting becomes internal
3.2 St Pancras Station: Southern Square and Euston Road	High	Removal of Southern Concourse exposes views of original building
3.3 St Pancras Station: North	Moderate	No impact north of German Gymnasium
4. German Gymnasium (setting)		
4.1 German Gymnasium	Moderate	Presence of Western Concourse has an effect on views southward
5. Stanley Buildings (setting)		
5.1 Stanley Buildings	Moderate	Presence of Western Concourse has an effect on views southward
6. Gasholder No 8 (setting)	None	

Table H1.3a Significance of Effects Resulting from Changes to Setting of Listed Building

Receptor	Sensitivity of receptor	Magnitude of change	Environmental effect	Note/Description
1. KING'S CROSS STATION (SETTING)				
1.1 King's Cross Station: Southern Square and Euston Road	High	High	Significant (Positive – restoration of original setting)	
1.2 King's Cross Station: Within Western Concourse	High	High	Significant positive.	
1.3 King's Cross Station: Northern square and realigned Pancras Road	High	High	Significant positive.	
1.4 King's Cross Station: North and north-west	High	Low	Significant positive.	
1.5 Existing footbridge	High	High	Significant negative.	
1.6 Main Train Shed roof	High	High	Significant positive.	
2. GREAT NORTHERN HOTEL (SETTING)				
2.1 Great Northern Hotel: Within Western Concourse	High	High	Significant positive.	

Receptor	Sensitivity of receptor	Magnitude of change	Environmental effect	Note/Description
2.2 Great Northern Hotel: Northern Square and realigned Pancras Road	High	High	Significant positive.	
2.3 Great Northern Hotel: Southern Square and Euston Road	High	High	Significant positive (Restoration of original setting)	
3. ST PANCRAS STATION (SETTING)				
3.1 St Pancras Station: Within King's Cross Western Concourse	High	High	Significant positive.	
3.2 St Pancras Station: Southern Square and Euston Road	High	High	Significant positive. (Restoration of original setting)	
3.3 St Pancras Station: North	High	Moderate	Not significant (minor impacts)	
4. GERMAN GYMNASIUM (SETTING)				
4.1 German Gymnasium	High	Moderate	Significant (Positive)	
5. STANLEY BUILDINGS (SETTING)				
5.1 Stanley Buildings	High	Moderate	Significant (Positive)	
6. GASHOLDER NO 8 (SETTING)				
6.1 Gasholder No 8	High	None	Not significant	

Table H1.4 Magnitude of Changes to Views/Settings Associated with Conservation Areas

Receptor	Magnitude of Change	Description/Note
NB: Number referencing in brackets relates to sensitivity of receptor identified in Table H1.1		
(1,2,3, 7) King's Cross Station, St Pancras Station and the Great Northern Hotel (conservation area)	High/Moderate	Views from the proposed location of the Western Concourse will be at least partly obscured
(1,2,3,7) King's Cross Station, St Pancras Station and the Great Northern Hotel (conservation area)	High	Views from Euston Road (and Gray's Inn and Pentonville Roads) will be affected by the removal of the Southern Concourse
(1,2,7) King's Cross Station and the Great Northern Hotel (conservation area)	High/Moderate	View from corner of German Gymnasium
(1,2,7) King's Cross Station and Great Northern Hotel (conservation area)	High	Views to and from these buildings, including views from windows, will be affected by the Western Concourse
(1, 7) The bothy on York Way (within the curtilage of King's Cross Station) (conservation area)	High	Removal of the bothy will change views along Wharfdale Road

Receptor	Magnitude of Change	Description/Note
(1, 7) King's Cross Station (conservation area)	Moderate/Low	View from York Way, south of Wharfdale Road
(1, 7) King's Cross Station (conservation area)	Low	View from King's Cross Station platforms to the portals of the gasworks tunnels
(1,2,3,7) King's Cross Station, St Pancras Station and the Great Northern Hotel (conservation area)	Low	Views from Goods Way, York Way and Maiden Lane Bridge

Table H1.4a Significance of Effects Resulting from Changes to Views/Settings Associated with Conservation Areas

Receptor	Sensitivity of receptor	Magnitude of change	Environmental effect	Note/Description
NB: Number referencing in brackets relates to sensitivity of receptor identified in Table H1.1				
(1,2,3, 7) King's Cross Station, St Pancras Station and the Great Northern Hotel (conservation area)	High	High/Moderate	Significant negative unavoidable.	Views from the proposed location of the Western Concourse will be at least partly obscured
(1,2,3,7) King's Cross Station, St Pancras Station and the Great Northern Hotel (conservation area)	High	High	Significant (Positive – restoration of original setting)	Views from Euston Road (and Gray's Inn and Pentonville Roads) will be affected by the removal of the Southern Concourse
(1,2,7) King's Cross Station and the Great Northern Hotel (conservation area)	High	High/Moderate	Significant positive.	View from corner of German Gymnasium
(1,2,7) King's Cross Station and Great Northern Hotel (conservation area)	High	High	Significant negative unavoidable. (The impact on views from the windows of the Western Range will be greatest)	Views to and from these buildings, including views from windows, will be affected by the Western Concourse
(1,7) The bothy on York Way (within the curtilage of King's Cross Station) (conservation area)	High	High	Not significant. (Minor in the overall context of the scheme)	Removal of the bothy will change views along Wharfdale Road
(1,7) King's Cross Station (conservation area)	High	Moderate/Low	Not significant (Positive)	View from York Way, south of Wharfdale Road

Receptor	Sensitivity of receptor	Magnitude of change	Environmental effect	Note/Description
(1,7) King's Cross Station (conservation area)	High	Low	Not significant (Minor)	View from King's Cross Station platforms to the portals of the gasworks tunnels
(1,2,3, 7) King's Cross Station, St Pancras Station and the Great Northern Hotel (conservation area)	High	Low	Not significant (Views are distant and impacts will not be negative)	Views from Goods Way, York Way and Maiden Lane Bridge

Table H1.5 Magnitude of Changes to Spaces, Surfaces and Landscaping

Receptor	Magnitude of Change	Description/Note
NB: Number referencing in brackets relates to sensitivity of receptor identified in Table H1.1		
Southern Square (within conservation area)		
(7).1 Demolition of Southern Concourse	High	Opens up new space with opportunities for enhancement and improvement
(7).2 New south elevation of Western Concourse	Moderate	Will fill visual gap between Kings Cross Station and Great Northern Hotel.
(7).3 Repositioning of Taxi Rank	Moderate/low	
(7).4 Surfacing, landscaping and kerbing	High	Opportunity for high quality natural stone finishes and street furniture
(7).5 Erection of Western Concourse	High	Visual impacts on existing open space
(7).6 Installation of stair link to St Pancras and Thameslink	Low	Within curtilage of new Western Concourse
(7).7 Alterations to Western Shed of King's Cross Station	Moderate/low	
(7).8 Surfacing, landscaping, kerbing and street furniture	High	Opportunity for high quality natural stone finishes and street furniture
Western Concourse		
(7).9 New internal space created by construction of Western concourse	High	
(7).10 Surface materials of new walls and canopy	High	Opportunity for high quality modern building incorporating pedestrian concourse and other uses
(7).11 Internal surfacing and furnishings	High	Opportunity for high quality finishes and furniture
York Way		
(7).12 Realignment of tracks approaching Eastern Range	Moderate	Some impacts on space arising from alterations to walls and buildings.

Receptor	Magnitude of Change	Description/Note
Euston Road	High	Opportunity for enhancement
(7).13 Land to the North of the German Gymnasium	Low	

Table H1.5a Significance of Effects Resulting from Changes to Spaces, Surfaces and Landscaping

Receptor	Sensitivity of receptor	Magnitude of change	Environmental effect	Note/Description
Southern Square (within conservation area)	High			
(7).1 Demolition of Southern Concourse	High	High	Significant (Positive)	
(7).2 New south elevation of Western Concourse	High	Moderate	Significant (Positive – good modern design)	
(7).3 Repositioning of Taxi Rank	High	Moderate/low	Significant (Positive)	
(7).4 Surfacing, landscaping and kerbing	High	High	Significant (Positive)	
(7).5 Erection of Western Concourse	High	High	Significant (Positive)	
(7).6 Installation of stair link to St Pancras and Thameslink	High	Low	Not significant	
(7).7 Alterations to Western Shed of King's Cross Station	High	Moderate/low	Significant (Positive)	
(7).8 Surfacing, landscaping, kerbing and street furniture	High	High	Significant (Positive)	
Western Concourse				
(7).9 New internal space created by construction of Western concourse	High	High	Significant (Positive)	
(7).10 Surface materials of new walls and canopy	High	High	Significant (Positive)	
(7).11 Internal surfacing and furnishings	High	High	Significant (Positive)	
York Way				
(7).12 Realignment of tracks approaching Eastern Range	High	Moderate	Not significant	
Euston Road				
(7).13 Land to the North of the German Gymnasium	High	Low	Not significant	

Annex I

Townscape and Visual

I1 TOWNSCAPE AND VISUAL

I1.1 CRITERIA FOR DETERMINATION OF CONDITION

1.1.1 The following criteria as described in Table I1.1 to Table I1.4 have been used for the determination of condition, value, sensitivity and for evaluating the magnitude of change. These criteria have been taken from a number of sources including the Guidelines for Landscape and Visual Impact Assessment [(1)].

Table I1.1 Criteria for Determination of Condition

Condition	Definition
High	Areas that exhibit a very strong positive character with valued features that combine to give an experience of unity, richness and harmony. These are landscapes [and townscapes] that may be considered to be of particular importance to conserve and which may be particularly sensitive to change in general and which may be detrimental if change is inappropriately dealt with.
Moderate	Areas that exhibit positive character but which may have evidence of alteration to / degradation / erosion of features resulting in areas of more mixed character. Potentially sensitive to change in general; again change may be detrimental if inappropriately dealt with but it may not require special or particular attention to detail.
Low	Areas generally negative in character with few, if any, valued features. Scope for positive enhancement frequently occurs.

Table I1.2 Criteria for Determination of Value

Value		Typical Criteria	Typical Scale	Typical Examples
High	Exceptional	High Importance (or Condition) and Rarity. No or limited potential for substitution.	International, National.	World Heritage Site, National Park, AONB.
	High	High Importance (or Condition) and Rarity. Limited potential for substitution.	National, Regional, Local.	National Park, AONB, AGLV, LCI, ALLI.
Moderate	Moderate	Medium Importance (or Condition) and Rarity. Limited potential for substitution.	Regional, Local.	Undesignated but value perhaps expressed through non-official publications or demonstrable use.
Low	Poor	Low Importance (or Condition) and Rarity.	Local.	Areas identified as having some redeeming feature or features and possibly identified for improvement.
	Very Poor	Low Importance (or Condition) and Rarity.	Local.	Areas identified for recovery.

(1) The landscape Institute and the Institute of Environmental Management and Assessment (2002) Guidelines for Landscape and Visual Impacts Assessment: Second Edition Spon Press, London.

Table I1.3 Criteria for Evaluation of Receptor Sensitivity (1)

Sensitivity	Receptor	Definition
Not Sensitive	Townscape	A townscape that is physically separated from the proposals and does not share an interface with the character area within which the proposals are located.
	Visual	People who do not gain views of any part of the development proposals.
Low	Townscape	A townscape that is not valued for its scenic quality does not have a distinctive character and is tolerant of change.
	Visual	Viewers with a passing interest in their surroundings, e.g. motorists, shoppers, people in their place of work or bar/restaurant users.
Moderate	Townscape	A moderately valued townscape, perhaps a locally important townscape, tolerant of some change.
	Visual	Viewers with a moderate interest in their environment such as users of recreational facilities, hotel users and tourists.
High	Townscape	A townscape of particularly distinctive character or one that is highly valued for its scenic quality and is intolerant of change.
	Visual	Viewers with proprietary interest and prolonged viewing opportunities such as residential receptors.

(1) Swanwick, C., Department of Landscape, University of Sheffield and Land Use Consultants (2002) Landscape Character Assessment: Guidance for England and Scotland (2002) The Countryside Agency and Scottish Natural Heritage, Countryside Agency Publications,

Table I1.4 Criteria for Evaluation of Magnitude of Change

Magnitude of Impact	Receptor	Definition
No Change	Townscape	No change to any elements of the baseline townscape.
	Visual	No viewers affected by changes caused by the proposals.
Low	Townscape	Minor loss of, or alteration to, one or more key elements/characteristics of the baseline townscape or introduction of elements, which may not be uncharacteristic when set within the attributes of the receiving townscape.
	Visual	Few viewers affected by minor changes in views of the townscape (as defined above).
Moderate	Townscape	Partial loss of, or alteration to, key elements/characteristics of the baseline townscape or introduction of elements that may be prominent but may not necessarily be considered to be uncharacteristic when set within the attributes of the receiving townscape.
	Visual	A moderate number of viewers affected by moderate changes in views of the townscape (as defined above).
High	Townscape	Total loss of, or major alteration to, key elements/characteristics of the baseline townscape or introduction of elements considered to be totally uncharacteristic when set within the attributes of the receiving townscape.
	Visual	A large number of viewers affected by major changes in views of the townscape (as defined above).

I1.2 CHARACTER TYPES AND CHARACTER AREAS

1.2.1 The following definitions are from Landscape Character Assessment: Guidance for England and Scotland.

1.2.2 **Character Types** are distinct types of landscapes that share broadly similar patterns of geology, soils, landform, vegetation, land use, settlement and field pattern. They are generic in nature in that they may occur in different areas in different parts of the country. They can be identified at each different level in the hierarchy of assessment (i.e. national/regional, local authority and local scales). An example of a landscape character type would be a Lower River Floodplain.

1.2.3 **Character Areas** are the single, unique individual geographic areas of a particular landscape character type. They share generic characteristics with other areas of the same type but have their own particular identity. In the majority of cases, there will be more landscape character areas than landscape character types, as landscape character types occur in more that one area. An example of a landscape character area would be the Eton Thames Lower River Floodplain.

I1.3 DETAILED DESCRIPTION OF TOWNSCAPE CHARACTER AREAS

Character Area 1: King's Cross St Pancras

1.3.1 The development proposals are located within the southeast of the King's Cross St Pancras Character Area. The character area is dominated by railway and industrial infrastructure with the Midland Main Line on the western boundary and the East Coast Main Line on the eastern boundary of the character area. The area's character is derived from its predominantly Victorian railway heritage, providing a particularly distinctive character.

1.3.2 Photographs of the character area are shown on *Figure I1.1 to Figure I1.4*.

1.3.3 The character area is located within the King's Cross Conservation Area. The character of this area is described in more detail in Camden's Conservation Area Statement [(1)]. The Conservation Area Statement notes that, despite the changes that have occurred, the area retains a robust industrial character, mostly Victorian. It states that the area incorporates monumental Victorian engineering and architecture and buildings and structures associated with the railways.

1.3.4 The topography of the character area is generally flat with a few local variations in the north. The character area is generally at an elevation of approximately 16m to 20m Above Ordnance Datum (AOD), making it approximately the same elevation as adjoining character areas. Ground levels at the site are generally at an elevation of approximately 16.5m to 17m AOD.

1.3.5 The predominant land use within the character area is associated with rail passenger transport, but also includes commercial and industrial land uses. The area is a transport node, used both day and night by rail and underground passengers.

1.3.6 In comparison to surrounding character areas, there are few streets within the King's Cross St Pancras Character Area. The street pattern consists of streets that act as boundaries to the character area. The character area is divided into two large portions by Pancras Road, which runs roughly along the eastern edge of St Pancras Station and the CTRL train shed.

1.3.7 Streetscapes within the character area are utilitarian, with a lack of street trees and streetscaping. Euston Road and the 1970s commercial development that forms a frontage to King's Cross Station influence the southern boundary of the character area. These elements create a busy and cluttered inner city image.

(1) London Borough of Camden (January 2004), King's Cross Conservation Area: London Borough of Camden: Conservation Area Statement, pp. 20 – 30.

1.3.8 The density and layout of buildings differs from other character areas within the study area. The two railway stations each have a large footprint and dominate the character areas. The stations enclose space and separate this character area from adjoining character areas. Remaining portions of the character area are relatively open, notably to the north of King's Cross Mainline Station. This is a result of the open space traditionally required for railway lines, railway infrastructure and gasholders.

1.3.9 St Pancras Chambers (formerly The Midland Grand Hotel) and King's Cross Mainline Station are both Grade I listed buildings. The St Pancras Station train shed (Barlow train shed) is also a Grade I listed structure. These buildings are of national importance and are landmarks within the character area.

1.3.10 St Pancras Chambers is in the Monumental Gothic Revival Style and has its main facade oriented towards Euston Road. St Pancras Chambers has an ornate, flamboyant and towering appearance and dominates its surroundings in scale and decoration. The tower of St Pancras Chambers dominates the local skyline.

1.3.11 The southern façade of the King's Cross Mainline Station is Victorian in a plain Italianate style, providing a different character to St Pancras Chambers. It dominates the junction with York Way, Pentonville Road and Grays Inn Road. Its façade is generally oriented towards Euston Road but is set at an angle to it. The building does not relate well to its street frontage as a result of the temporary single storey ticket office and canopy structure that was constructed in 1974. This structure obstructs views of the station elevation. The clock tower of King's Cross Mainline Station is another key visual marker in the local skyline.

1.3.12 The CTRL train shed forms part of the St Pancras Station and is in a contemporary style, constructed in glass, steel and concrete. The Great Northern Hotel is a Grade II listed building located between St Pancras and King's Cross Stations. It is a typical mid Victorian Italianate hotel with classical details and has a curved footprint. The German Gymnasium is Grade II listed and is in the Prussian neo-medieval vernacular.

1.3.13 Building heights within the character area vary. The height of the CTRL train shed is approximately 19 m high. The Great Northern Hotel is approximately six storeys high, being approximately 26 m to the roof hip. The King's Cross Mainline Station southern façade is approximately 23 m high. Its clock tower is approximately 32 m high. The East Side Buildings of St Pancras Station, on Pancras Road, are approximately 13 m high. The St Pancras Station train shed (Barlow Shed) is approximately 37 m high. St Pancras Chambers varies in height from approximately 42 m to 58 m. The spire on St Pancras Chambers is approximately 76 m high. These details demonstrate the large scale of buildings within the character area.

1.3.14 The north east of the character area incorporates railway lines and industrial land and includes Gasholder No. 8 (1883). Battlebrigde Road incorporates an historic floorscape in the form of traditional granite sets and kerbs.

1.3.15 The predicted 2007 baseline assumes that the CTRL works and London Underground Limited King's Cross Station upgrade will be completed and operational.

1.3.16 The overall condition of the character area is moderate, as a result of its mix of features. For example, there are some detracting features, such as the railway land to the north and ageing railway infrastructure. Conversely, the character area has a sense of place derived from its Victorian heritage and there are features worthy of conservation, such as the Grade I listed buildings. The area exhibits a positive character but has evidence of degradation of features resulting in areas of more mixed character. The moderate rating also relates to the fact that there is scope to improve the management of land uses within the character area.

1.3.17 The character area is located within the King's Cross Conservation Area, signifying the area's high importance and rarity. The character area includes nationally important listed buildings. For these reasons, the character area has a high townscape value.

1.3.18 The sensitivity of the character area to change caused by the development proposals is high. This is a result of being a townscape of particularly distinctive character that is highly valued for its heritage.

Character Area 2:
Euston Road

1.3.19 At the time that this report was written, no development proposals had been submitted to the Local Planning Authority that would significantly alter the townscape of this character area. Therefore, the predicted 2007 baseline townscape is the as described below.

1.3.20 Photographs of the character area are shown on *Figure I1.1*.

1.3.21 A portion of Euston Road, from Judd Street to York Way, is within the King's Cross Conservation Area as designated in the Camden UDP. Chapter 7 of this ES addresses conservation issues.

1.3.22 The topography of the character area falls from approximately 24 m in the west to approximately 16 m in the east, over a distance of 700 m. This creates a slight undulation in the character of the topography.

1.3.23 Euston Road is an east west four-lane A road, and as such, is heavily trafficked. It links three primary rail transport nodes, which generate a large quantity of pedestrian activity along Euston Road. Strip development runs along Euston Road and includes a mix of commercial, retail and institutional land uses. These elements, along with a variety of street furniture, create a busy and cluttered inner city image. However, Euston Road incorporates some intermittent street tree planting to soften the hard urban character.

1.3.24 Building heights along Euston Road are varied but are predominantly four to eight storeys. Tall commercial buildings and hotels dominate the western portion of the character area. Towards the east, the character area incorporates large-scale buildings for institutional and public transport infrastructure. The architectural styles of buildings along Euston Road are mixed and include buildings from approximately 1910 through to the 1970s.

1.3.25 There are several landmark buildings that front Euston Road, which include:

- St Pancras Chambers;
- King's Cross Mainline Station;
- The 'Lighthouse' building at the junction of Pentonville Road and Grays Inn Road;
- The Novotel Hotel at the corner of Ossulston Street and Euston Street (approximately sixteen storeys high); and
- Evergreen House at 150 Euston Road (approximately fifteen storeys high).

1.3.26 While the Euston Road Character Area shares a boundary with the King's Cross St Pancras Character Area there are no proposals within the Euston Road Character Area. Therefore, the Euston Road Character Area is not sensitive to the development proposals.

Character Area 3:
Regents Quarter and York Way

1.3.27 The predicted 2007 baseline townscape includes the completed Regents Quarter Development.

1.3.28 Photographs of the character area are shown on *Figure I1.1*.

1.3.29 The topography of the character area is slightly undulating and York Way rises gradually in the north to pass over the canal. The character area is generally at an elevation of approximately 16 m AOD in the south to 20 m AOD in the north.

1.3.30 The Regents Quarter Development is a 5.8 hectare site incorporating 63,000 square feet of office, residential, retail, restaurant and leisure facilities to the south of Wharfdale Road. The character area has a dense urban structure, which is predominantly residential. Commercial premises are located to the north of Wharfdale Road.

1.3.31 Building heights within the character area vary from three to five storeys. Architectural styles are mixed and include mid Victorian and contemporary buildings south of Wharfdale Road. Buildings north of Wharfdale Road are predominantly Victorian warehouse buildings.

1.3.32 York Way is the shared interface between King's Cross Mainline Station and Regents Quarter. It is a heavily trafficked road with a utilitarian streetscape character.

1.3.33 The Regents Quarter and York Way Character Area lies beside the King's Cross Character area but is separated by York Way. However, there are no proposals within the Regents Quarter and York Way Character Area. Therefore, the Regents Quarter and York Way Character Area is not sensitive to the development proposals.

Character Area 4:
St Pancras Gardens

1.3.34 The St Pancras Gardens Character Area does not adjoin the site but is separated by the Midland Main Line and the CTRL train shed.

1.3.35 The topography of the character area is flat with some local variations in topography at the interface with Pancras Road, as the gardens are raised above the road. The character area is generally at an elevation of approximately 20 m Above Ordnance Datum (AOD) and has a roughly similar elevation to the site.

1.3.36 St Pancras Gardens provides the immediate setting for the St Pancras Old Church, which is Grade II listed landmark building within the character area. St Pancras Old Church has had several periods of restoration, alteration and extension and was substantially rebuilt in mid nineteenth century. It reflects an early Victorian gothic style. The park is public open space with a tranquil character. Large deciduous trees contribute positively to the character of the park. The park's historic past is evident in features such as the Hardy Tree(1) and St Pancras Old Church with its graves, monuments.

1.3.37 The street pattern is formed by streets that act as boundaries to the character area. The Coroners Court, the Gardeners Cottage and buildings associated with the St Pancras University College Hospital are located around the edge of the park and contribute to the historic character. They form an intermittent boundary to the park. On the eastern boundary of St Pancras Gardens, a brick wall has been constructed to separate the park from the CTRL lands and Midland Main Line. The park is valuable for local amenity but is limited in its contribution to wider open space functions as a result of its isolation.

1.3.38 As a result of the physical separation of St Pancras Gardens from the site, the character of St Pancras Gardens is not sensitive to changes caused by the development proposals.

1.3.39 The character of this area is described in more detail in Camden's Conservation Area Statement.

1.3.40 Photographs of the character area are shown on *Figure I1.2*.

Character Area 5:
Regents Canal

1.3.41 The Regents Canal Character Area does not adjoin the site but is separated by railway land to the north of the King's Cross train shed.

(1) During the 1850s, the novelist and poet, Thomas Hardy (1840 – 1928), undertook the exhumation of human remains and dismantling of tombstones in the church grounds to make way for the Midland Railway Line. The tombstones are now located around the base of an Ash know as the Hardy Tree.

1.3.42 The topography of the character area is varied, as the canal is located at a lower level than adjoining lands. The water level of the canal is generally at an elevation of approximately 19.5 m AOD, while the elevation of canal banks varies from approximately 20 m to 24 m AOD. The character area includes the Camley Street Natural Park, the southern end of which is at an elevation of approximately 24 m AOD, making it elevated above the site by approximately 8 m.

1.3.43 This character area forms part of the Regents Canal Conservation Area, which is addressed in *Chapter 7: Cultural Heritage*.

1.3.44 The canal is a dominant linear element with a distinctive character that separates townscapes within the study area. The character of the canal changes along its length as surrounding land uses change.

1.3.45 In the west, the canal's boundaries are formed by Bagley's Industrial Estate and Camley Street Natural Park, creating an industrial character to one side and a natural character on the other.

1.3.46 In the east, the canal's boundaries are formed by a mix of architectural styles including Victorian warehouses and contemporary buildings. Buildings heights are predominantly three or four storeys but up to eight storeys in some cases. Trees line the canal in some of the eastern portion of the canal although the bridges and several adjoining warehouse buildings maintain an industrial character.

1.3.47 The canal also has a tranquil recreational character as a result of its use by canal boats and the provision of moorings at the British Waterways Yacht Basin and the Battle Ridge Basin. A towpath is located along the canal and is used for recreational purposes. The canal also performs a number of non-recreational roles including nature conservation.

1.3.48 The Camley Street Natural Park is located within the character area and is a nature reserve with restricted public access. The park is a public resource that has an enclosed, natural character as a result of the planting within and around the edges of the park. The park is valuable for local amenity but is limited in its contribution to wider open space functions as a result of its isolation.

1.3.49 In this scenario and as a result of the physical separation of the Regents Canal Character Area from the site, the character of the Regents Canal Character Area is not sensitive to changes caused by the development proposals.

1.3.50 Photographs of the character area are shown on *Figure I1.2*.

Character Area 6:
Bagley's Industrial Estate

1.3.51 The Bagley's Industrial Estate Character Area does not adjoin the site but is separated by Regents Canal and railway land to the north of the King's Cross train shed.

1.3.52 The character of the area is influenced by its railway and industrial infrastructure and the interface with Regents Canal.

1.3.53 The topography of the character area is flat, with variation at the interface with Regents Canal. The character area is generally at an elevation of approximately 24 m AOD, making it elevated above the site by approximately 8 m.

1.3.54 The street pattern is formed by streets that act as boundaries to the character area.

1.3.55 Bagley's Industrial Estate includes a collection of Victorian warehouse buildings and sheds with detailed ironwork, the majority of which are listed Grade II. They are used primarily as warehouse storage with a mix of niche businesses, artists and nightclubs along Wharf Road in the southwest. Some of the buildings are unused and boarded up, contributing to a partial derelict character. As a result of the large industrial buildings, the area has an enclosed character.

1.3.56 Building heights vary from two storeys to six storeys, although the majority of buildings are three storeys. The large six-storey Granary is a landmark building within the character area.

1.3.57 In this scenario and as a result of the physical separation of Bagley's Industrial Estate from the site, the character of Bagley's Industrial Estate is not sensitive to changes caused by the development proposals.

1.3.58 Photographs of the character area are shown on *Figure I1.2*.

Character Area 7:
Upper York Way Residential

1.3.59 The Upper York Way Character Area does not adjoin the site but is separated by Regents Canal and railway land to the north of the King's Cross train shed.

1.3.60 The topography of the character area is flat. The character area is generally at an elevation of approximately 25 m AOD, making it elevated above the site by approximately 9 m.

1.3.61 The character of the area is predominantly residential with a dense urban structure with private and council built residential blocks interspersed with courtyards. Building heights are varied from two to four storeys, with the majority of buildings being four storeys. Architectural styles are varied and include late Victorian and 1950s architecture, although the architecture is predominantly from the 1970s, 1980s and 1990s.

1.3.62 The street pattern is roughly on a grid layout, consisting of predominantly quiet residential streets. Larger streets, such as Caledonian Road, introduce higher levels of traffic and mixed commercial development.

1.3.63 As a result of the physical separation of the Upper York Way Character Area from the site, the character of the Upper York Way Character Area is not sensitive to changes caused by the development proposals.

1.3.64 Photographs of the character area are shown on *Figure I1.3*.

Character Area 8:
Caledonian Road Residential

1.3.65 The Caledonian Road Character Area does not adjoin the site but is separated by the Regents Quarter and York Way Character Area.

1.3.66 The topography of the character area is slightly undulating. The character area is generally at an elevation of 17 m AOD in the southwest and 23 m AOD in the northeast.

1.3.67 The character area has a dense urban structure, which is predominantly residential. Building heights are generally three to four storeys. Architectural styles are mixed and include late Georgian terraces, Victorian, Edwardian, 1970s and contemporary styles.

1.3.68 The street pattern is roughly on a grid with Caledonian Road forming a diagonal across the grid. Caledonian Road is heavily trafficked, while quieter streets of lower hierarchy feed into it. Residential properties, commercial development and schools are located on these quieter streets.

1.3.69 As a result of the physical separation of the Caledonian Road Character Area from the site, it is not sensitive to the potential changes caused by the development proposals.

1.3.70 Photographs of the character area are shown on *Figure I1.3*.

Character Area 9:
Western Residential

1.3.71 The Western Residential Character Area does not adjoin the site but is separated by the CTRL train shed and the British Library.

1.3.72 The topography of the character area is relatively flat. The character area is generally at an elevation of approximately 19 m to 20 m AOD.

1.3.73 The character of the area is predominantly residential with a dense urban structure dominated by local authority housing estates interspersed with schools and public open space. Architectural styles are varied and include architecture from approximately 1910 through to the 1980s. Building heights range from three to eight storeys, but are predominantly five storeys. The eight storey art deco residential buildings on Pancras Road are landmark buildings within the character area.

1.3.74 Streetscapes consist mostly of hard engineered elements, although some streets are cobbled and tree lined, contributing to a positive character. Chalton Street is the main route through the area, providing a commercial centre with cafés and bars at the Euston Road end. Tree planting and traffic calming contribute positively to the character of Chalton Street in this location.

1.3.75 As a result of the physical separation of the Western Residential Character Area from the site, it is not sensitive to changes caused by the development proposals.

1.3.76 Photographs of the character area are shown on *Figure I1.3*.

Character Area 10:
British Library and Lands North

1.3.77 The British Library Character Area does not adjoin the site but is separated by the St Pancras Station and the CTRL train shed.

1.3.78 The topography of the character area is generally flat, with some minor variations. The character area is generally at an elevation of 19m to 20 m AOD.

1.3.79 Building heights within the British Library vary from approximately two storeys to ten storeys. Access to the main entrance is gained from Euston Road through the enclosed courtyard. As a public open space, the courtyard is separated from Euston Road by brick fencing. As a result, the courtyard and library have a more tranquil character than the busy Euston Road and adjoining character areas. On the western boundary of the character area, Ossulston Street has a residential character.

1.3.80 As a result of the physical separation of the British Library Character Area from the site, it is not sensitive to the potential changes caused by the development proposals.

1.3.81 Photographs of the character area are shown on *Figure I1.4*.

Character Area 11:
Pentonville Road and Grays Inn Road

1.3.82 The Pentonville Road and Grays Inn Road Character Area does not adjoin the site but is separated by the Euston Road and Regents Quarter Character Areas.

1.3.83 The topography of the character area is undulating. The character area is generally at an elevation of 20 m AOD in the west and north, dipping down to approximately 15 m AOD along King's Cross Road and the railway line.

1.3.84 The overall character is a mix of commercial and residential influences. Primary roads, namely Pentonville Road, Grays Inn Road and King's Cross Road, with their ground floor level commercial strip development, also influence the character of the area. King's Cross Road and Grays Inn Road are lined with a mix of early 19th century terraces with ground floor level retail units and larger scale institutional buildings. The area between these roads contains narrow streets lined with a mix of residential and former industrial uses as well as several vacant sites used for car parking.

1.3.85 Building heights vary from three to five storeys, although the majority of buildings are four storeys. The character area has a mix of architectural styles, which include late Victorian, post war reconstruction, 1970s, 1980s and post modern styles.

1.3.86 Streetscapes within the character area are generally utilitarian, with a lack of street trees and streetscaping. Pentonville Road rises from west to east and is lined with commercial buildings, predominantly four stories in height. In the east, the footpath widens and street trees become part of the streetscape. A 15 storey commercial building at 200 Pentonville Road is a landmark building in the character area.

1.3.87 Grays Inn Road is a wide, busy street of one-way northbound traffic. It is lined with continuous terraces on its western side and larger scale educational and medical institutions on the eastern side. The character of development at the northern end of Grays Inn Road is commercial and includes numerous restaurants. Further south, the character of Grays Inn Road changes. It becomes more institutional with the Royal National Throat, Nose and Ear Hospital. Its main building is in the classical style

1.3.88 As a result of the physical separation of the Pentonville Road and Grays Inn Road Character Area from the site, the character of the Pentonville Road and Grays Inn Road Character Area is not sensitive to changes caused by the development proposals.

1.3.89 Photographs of the character area are shown on *Figure I1.4*.

Character Area 12:
Argyle Square and Southern Residential

1.3.90 The Argyle Square and Southern Residential Character Area does not adjoin the site but is separated by the Euston Road Character Area.

1.3.91 The topography of the character area is slightly undulating. The character area is generally at an elevation of 24 m AOD in the west, falling to approximately 15 m AOD in the east.

1.3.92 The overall character of the area is residential. Building heights are predominantly four storeys but include buildings up to nine storeys. Architectural styles are mixed and include:

- Six storey 1960s local authority residential blocks;
- Four storey late Georgian / early Victorian terraced houses;
- Edwardian civic buildings; and
- Late 19th C social housing.

1.3.93 Streetscapes are varied, although the majority are utilitarian, with a lack of streetscaping or street tree planting. However, some streetscaping and traffic calming has occurred in Argyle Street, which includes cobbled pavement, bollards and street trees.

1.3.94 There are several areas of open space within the character area including Argyle Square and areas within housing estates.

1.3.95 As a result of the physical separation of the Argyle Square and Southern Residential Character Area from the site, the character of the Argyle Square and Southern Residential Character Area is not sensitive to changes caused by the development proposals.

1.3.96 Photographs of the character area are shown on *Figure I1.4*.

Photograph 1: View from Euston Road looking north up Pancras Road.

Photograph 2: View from the proposed King's Cross Station western concourse towards King's Cross Station Western Range and Great Northern Hotel.

Photograph 3: View from immediately northeast of the German Gymnasium towards King's Cross Station and Great Northern Hotel.

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Date: 14/11/03	Drawn: AT

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JMP Landscape
John McAslan + Partners

Figure I1.1
Representative Viewpoints

Kings Cross Station Enhancement Project

Photograph 4: View from Camley Street Natural Park to King's Cross Station.

Photograph 5: View from Goods Way to King's Cross Station.

Photograph 6: View from the third floor of the Granary Complex.

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Date: 14/11/03	Drawn: AT	ERM	JMP Landscape John McAslan + Partners
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Figure I1.2
Representative Viewpoints

Kings Cross Station Enhancement Project

Photograph 7: View from York Way at the corner of Wharfdale Road.

Photograph 8: View from Platform 1 at King's Cross Station to the portals of the gasworks tunnels.

Photograph 9: View from the intersection of Pentonville Road and Grays Inn Road, west of the 'Lighthouse' block area.

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Date 14/11/03	Drawn AT	ERM	JMP Landscape John McAslan + Partners
WORK IN PROGRESS			

Figure I1.3
Representative Viewpoints

Kings Cross Station Enhancement Project

Photograph 10: View from Birkenhead Street at the corner of St Chad's Street.

Photograph 11: View from Argyle Square at the corner of St Chad's Street.

Photograph 12: View from Argyle Square at the corner of Argyle Street.

Photograph 13: View from Platform 1 at King's Cross Station.

Photograph 14: View from Platform 4 at King's Cross Station.

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Date: 14/11/03	Drawn: AT	ERM	JMP Landscape John McAslan + Partners
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Figure I1.4
Representative Viewpoints

Kings Cross Station Enhancement Project

I1.4 BASELINE VISUAL RESOURCES

1.4.1 The baseline visual resources have been identified below in *Table I1.5* in relation to strategic views, important local views, potential visual receptors and representative viewpoints.

Strategic Views

1.4.2 The King's Cross Mainline Station and other structures within the site are not visible from St Paul's Cathedral, Parliament Hill or Kenwood. This is a result of intervening buildings. Proposed structures within the site that will be lower than the King's Cross Mainline Station will not be visible within the 'Strategic Viewing Corridor' or 'Wider Setting Consultation Area' identified in the adopted policy documents.

1.4.3 Proposed structures within the site that will be lower than the King's Cross Mainline Station will not be visible within the two 'London Panoramas' identified in the London Plan (that is, from Parliament Hill to Central London and from Kenwood to Central London).

Important Local Views

1.4.4 Camden's Planning and Development Brief lists a number of important local views. These views were studied and photographed during field assessment and, where appropriate, have been included in the representative views identified below.

1.4.5 Important local views identified within Camden's Planning and Development Brief that take in the site include the following main views:

- views from Euston Road looking north up Pancras and Midland Roads to the side elevation of Barlow shed;
- series of views from the proposed King's Cross Western Concourse towards King's Cross Station front façade, Great Northern Hotel, St Pancras Chambers and the Barlow shed;
- views from York Way south of Wharfdale Road, looking southwest to King's Cross Station shed and over tracks to new development; and
- glimpsed views of local landmarks from viewpoints in the Goods Yard complex (including Wharf Road, Granary open space and the upper level of the Coal Drops).

1.4.6 Secondary views include the following:

- glimpsed views from middle and eastern parts of Goods Way to King's Cross Station;
- a newly opened view from immediately northeast of the German Gymnasium towards the stations and Great Northern Hotel;
- the views from King's Cross Station platforms and from trains to the portals of gasworks tunnels;

- views from Pentonville Road, the Lighthouse Block area and Grays Inn Road, towards the stations; and

- views from Euston Road towards the stations, St Pancras Chambers and Great Northern Hotel.

Potential Visual Receptors

1.4.7 A visual receptor is the *'…special interest or viewer group that will experience an effect'* as a result of the project. Potential visual receptors are users of those locations where at least some portion of the proposals may be visible.

1.4.8 The main potential visual receptors have been identified in terms of their predominant type, distance from the site, the nature of the existing view and their sensitivity to the development proposals, as shown in *Table 8.2* in *Chapter 8*.

1.4.9 Views of the site from potential visual receptors have been identified as close, middle distance or long distance in accordance with *Table I1.5*.

Table I1.5 Viewpoint Distance

Type of View	Distance from Proposals
Close Views.	Less than 200m.
Middle Distance Views.	200m to 1000m.
Long Distance Views.	Greater than 1000m.

1.4.10 The nature of the views from potential visual receptors has been identified in terms of screening effects, angle of view and duration of view as shown in *Table I1.6*.

Table I1.6 Nature of Views

Issue	Nature of View		
Screening Effects	Unobstructed.	Filtered.	Glimpsed.
Angle of View	Direct	Oblique (*eg* in relation to the orientation of windows).	
Duration of View	Static	Dynamic (part of a sequence).	

1.4.11 Based on Guidelines for Landscape and Visual Impact Assessment, potential visual receptors have been rated in relation to their sensitivity to the visual change caused by the proposals, as shown in *Table I1.7*.

Table I1.7 Sensitivity to Visual Change

Visual Receptor Type	Sensitivity
Residential	High
Public Rights of Way and Towpaths	High
Public and Private Open Space	High
Recreational Facilities	Moderate
Tourist Facilities	Moderate
Hotels	Moderate
Schools	Moderate
Pedestrian	Moderate
Retail	Low
Rail Commuters	Low
Motorists	Low
Commercial (Places of work such as Businesses, Offices and Institutional uses)	Low
Industrial	Low

Representative Viewpoints: Photograph Methodology

1.4.12 The *Guidelines for Landscape and Visual Impact Assessment* states that, in relation to field photography of a development site taken from a fixed viewpoint, '35 mm film format with a 50mm lens is recommended'. The representative viewpoint photography was undertaken with a 35mm Cannon EOS 500N with the lens focal length set at 50mm.

1.4.13 A series of overlapping photographs were taken from each viewpoint to show the context of the view. A minimum fifty percent overlap between adjacent photographs was achieved as recommended in the *Guidelines for Landscape and Visual Impact Assessment*. At the time the film was developed, the photographs were transferred into digital format by the commercial film developer. The individual digital photographs were then 'stitched' together.

1.4.14 The photographs were taken from publicly accessible locations, with the exception of *Photograph 6* in *Figure I1.2*, were access to the Granary Complex was made available. The locations of the viewpoints are shown on *Figure 8.2* in *Chapter 8: Townscape and Visual Impact Assessment* and the photographs are shown on *Figure I1.1* to *Figure I1.4*.

1.4.15 The following criteria have been used for the assessment of visual effects. The criteria are based on the *Guidelines for Landscape and Visual Impact Assessment: Second Edition*.

Table I1.8 Visual Assessment Criteria

Criteria	Definition
Distance	The greater the distance, the less detail is observable and the more difficult it is to distinguish the site from its background, diminishing potential effects.
Elevation	When a viewpoint is lower than the site feature, the feature is more likely to be viewed against the sky, increasing its impact. When a viewpoint is higher than the site, it is viewed against a backdrop, diminishing its impact.

Criteria	Definition
Size	The greater the proportion of the view occupied by the features and activities, the greater the impact. Colour and form can increase or diminish impact, by drawing the eye or by providing camouflage.
Context	This relates to the degree to which the proposed development is in character with the context, whether urban or rural.
Visibility	Features in the view, such as landform or vegetation, can frame, mask, filter or highlight views of the site. The greater the visibility, the greater the effect.
Season & Weather	The season and weather conditions can affect visibility. Seasonal changes in leaf cover have a substantial influence on visibility. The clarity of the air and the angle and direction of the sun at different times of the year also affect visibility.
Activity	Movement of vehicles and light reflection changing with movement, draw the eye, thereby increasing impact. Static, neutral coloured, sympathetic forms diminish adverse impacts.
Change	The degree of change in the view and the rapidity of the process of change each affect the degree of impact.

Table I1.9 Short Term Construction Effects: Townscape Character

	Character Area	Description of Key Effects	Magnitude of Change	Sensitivity	Effect on Condition	Effect on Value	Nature of Effect	Significance
1	King's Cross St Pancras	The character of portions of the site will be temporarily changed to a construction site and will be influenced by: • Demolition of the 1970s temporary buildings. • Construction of structures associated with the western concourse, including the diagrid shell. • Site traffic and parking. • Access and haulage roads. • Site compound. • Stockpiles and material storage. • Cranes and other construction plant. • Removal of existing trees. • Retention of positive heritage elements and character.	Moderate	High.	Negative	Negative	Negative Short term Site specific Direct	**Significant.**
2 - 12	Remaining Character Areas	No physical effect on townscape character.	No change.	Not sensitive.	No Effect.	No Effect.	No Effect.	No Effect.

Table I1.10 Short Term Construction Effects: Visual Amenity

Potential Visual Location	Predominant Receptor Type	London Borough of Camden (LBC) Views [1]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
Euston Road.	Pedestrians, Motorists, Commercial and Institutional.	These potential visual receptors fall within a **LBC Main View**, where views are up Pancras Road. Potential visual receptors also fall within a **LBC Secondary View**, where there are views to the stations and Great Northern Hotel from Euston Road.	Views will be temporarily changed and may be influenced by: • Demolition of the 1970s temporary buildings. • Construction of structures associated with the western concourse, including the diagrid shell. • Site traffic and parking. • Access, haulage roads and construction traffic. • Site compound. • Stockpiles and material storage. • Cranes and other construction plant. • Removal of existing trees. • Retention of positive heritage elements and character. • From the LBC Main View (up Pancras Road), the construction of the diagrid shell will be visible.	Low to Moderate.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	Not Significant.
Regents Quarter and York Way.	**Residential**, Pedestrians and Motorists.	These potential visual receptors fall within a **LBC Main View** (i.e. York Way, south of Wharfdale Road)	• Minor changes to the station facade. • Access, haulage roads and construction traffic. • Cranes and other construction plant. • Retention of positive heritage elements and character. • There will be little effect on the LBC Main View.	Low.	Ranges from **High** to Low.	Negative. Short term. Indirect.	Not Significant.
Pancras Road.	Pedestrians and Motorists.	These potential visual receptors fall within a **LBC Secondary View**, where located immediately northeast of the German Gymnasium.	• The majority of the construction site of the proposed diagrid shell at the western concourse will be visible from Pancras Road, with the exception of locations where the Great Northern Hotel will obstruct views. Visible construction elements will be as identified for the Euston Road visual receptors. • Retention of positive heritage elements and character. • Effects will be significant as a result of the proximity of visual receptors to the site. • Effects on the LBC Secondary View will be significant and negative but short term.	Moderate.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	**Significant.**

(1) As defined in the King's Cross Opportunity Area: Planning and Development Brief: January 2004 prepared by the London Borough of Camden.

Potential Visual Location	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
Pentonville Road.	Pedestrians, Motorists, Commercial and Institutional.	These potential visual receptors fall within a **LBC Secondary View**, where located at the intersection of Grays Inn Road and the 'Lighthouse' block area.	• Visible construction elements will be as identified for the Euston Road visual receptors. However, much of the construction site will not be visible from the majority of locations along Pentonville Road, with the exception of the western end of Pentonville Road in the vicinity of Grays Inn Road. • Effects on the LBC Secondary View will not be significant.	Low.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	Not Significant.
Grays Inn Road.	Pedestrians, Motorists, Commercial and Institutional.	These potential visual receptors fall within a **LBC Secondary View**, where located at the intersection of Pentonville Road and the 'Lighthouse' block area.	• Effects will be as for the Pentonville Road visual receptors.	Low.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	Not Significant.
Birkenhead Street.	**Residential**, Pedestrians, Institutional and Motorists.	Potential visual receptors do not gain a LBC Important View.	• Views to the construction site will be limited as a result of buildings on the street frontage obstructing views. As a result of window orientation, views of the construction site from residential receptors and other internal receptors will be limited.	Low.	Ranges from **High** to Low.	Negative. Short term. Indirect.	Not Significant.
Crestfield Street.	**Residential**, Pedestrians, Commercial and Motorists.	Potential visual receptors do not gain a LBC Important View.	• Effects will be as for the Birkenhead visual receptors.	Low.	Ranges from **High** to Low.	Negative. Short term. Indirect.	Not Significant.
Belgrove Street.	**Residential**, Pedestrians, Commercial and Motorists.	Potential visual receptors do not gain a LBC Important View.	• Effects will be as for the Birkenhead visual receptors.	Low.	Ranges from **High** to Low.	Negative. Short term. Indirect.	Not Significant.
Argyle Street.	**Residential**, Institutional and Pedestrians.	Potential visual receptors do not gain a LBC Important View.	• Effects will be as for the Birkenhead visual receptors.	Low.	Ranges from **High** to Moderate.	Negative. Short term. Indirect.	Not Significant.

Potential Visual Location	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
Argyle Square.	**Open Space, Residential**, Pedestrians.	Potential visual receptors do not gain a LBC Important View.	• Where the construction site will be visible, from locations on the periphery of the open space, views will be filtered and visibility will be limited. From the majority of locations within the Argyle Square open space, the construction site will not be visible. • As a result of window orientation, views of the proposals from residential receptors and other internal receptors will be limited.	Low.	Ranges from **High** to Moderate.	Negative. Short term. Indirect.	Not Significant.
St Pancras Chambers.	Commercial and Hotel.	Potential visual receptors do not gain a LBC Important View.	• From the eastern façade, receptors will gain ground and elevated glimpses of the construction site.	High.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	Not Significant.
Goods Way.	Pedestrians, Motorists and Commercial.	These potential visual receptors fall within a **LBC Secondary View**.	• As a result of the demolition of the Culross buildings as part of the King's Cross Central project, the proposed construction site will be visible from most locations along Goods Way. The viewpoints are approximately 200 m to 320 m from the proposed diagrid shell, which will be visible.	Moderate	Ranges from Moderate to Low.	Negative. Short term. Indirect.	Significant.
Goods Yard Bridge.	Pedestrians and Motorists.	These potential visual receptors fall within a **LBC Secondary View**.	• The key visual effects will be as described above for Goods Way.	Low.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	Significant.
East Coast Main Line.	Rail Commuters.	These potential visual receptors fall within a **LBC Secondary View**, where views are directed to the gasworks tunnels.	• The proposed construction site will not be visible.	Low.	Low.	Negative. Short term. Indirect.	Not Significant.
CTRL Train Shed (St Pancras Extension).	Tourist, Rail Commuters and Commercial.	Potential visual receptors do not gain a LBC Important View.	• From southeastern locations, receptors will gain elevated views of the construction site.	Moderate.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	Not Significant.

Potential Visual Location	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
CTRL Exit / Forecourt on Pancras Road.	Pedestrians, Tourist, Rail Commuters.	Potential visual receptors do not gain a LBC Important View.	• Receptors will gain close ground level views of the diagrid shell.	Moderate.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	**Significant.**
Internal Spaces within King's Cross Mainline Station.	Tourist, Rail Commuters and Commercial.	These potential visual receptors fall within a **LBC Secondary View**, where views are directed to the gasworks tunnels.	• The construction site will generally not be visible as a result of hoarding. Screening of the construction site will slightly reduce the scope of views from the platforms and the sense of space experienced within the station.	High.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	**Significant.**
King's Cross Mainline Station Southern Concourse: External Areas	**Open Space**, Pedestrians, Tourists, Rail Commuters.	Potential visual receptors do not gain a LBC Important View.	• Views from external areas of the existing King's Cross Mainline Station Southern Concourse will be limited, as the area will be a construction site.	High.	Ranges from **High** to Low.	Negative. Short term. Indirect.	**Significant.**
King's Cross Mainline Station Western Concourse.	**Open Space**, Pedestrians, Tourists, Rail Commuters.	The potential visual receptors fall within a **LBC Main View**.	• Views from external areas of the existing King's Cross Mainline Station Western Concourse will be limited, as the area will be a construction site.	High.	Ranges from **High** to Low.	Negative. Short term. Indirect.	**Significant.**
Camley Street.	Pedestrians and Motorists.	Potential visual receptors do not gain a LBC Important View.	• The construction site will not be visible, with the exception of cranes and a small portion of the upper elements of the proposed diagrid shell that will be visible to the east of the German Gymnasium, as construction progresses. As a result of the angle of view of the panorama and the distance of the proposed diagrid shell from the viewpoint (approximately 250m to 480m), the proposed diagrid shell will make up only a small portion of the view.	Low.	Ranges from Moderate to Low.	Negative. Short term. Indirect.	Not Significant.
Camley Street Natural Park.	**Open Space**.	Potential visual receptors do not gain a LBC Important View.	• The key visual effects will be as described above for Camley Street.	Low.	**High**.	Negative. Short term. Indirect.	Not Significant.

Potential Visual Location	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
Tall Buildings within the Study Area.	Commercial.	Potential visual receptors do not gain a LBC Important View.	With the possible exception of cranes, the construction site will not be visible from the following tall buildings: • The Novatel Hotel (corner of Ossulston & Euston Streets); • Evergreen House (150 Euston Rd); or • 200 Pentonville Rd.	Low.	Low.	Negative. Short term. Indirect.	Not Significant.
Northern Portions of Character Area 1 (King's Cross Central Site).	Commercial and Industrial	Some of these potential visual receptors fall within a **LBC Main View**.	• As a result of the location of the Culcross buildings, the proposed construction site will not be visible from most locations, with the exception of cranes. Where glimpsed and filtered views of the proposed diagrid shell are available, only a small portion of the proposed structure will be visible.	Moderate.	Low	Negative. Short term. Indirect.	Not Significant.

Table I1.11 Long Term Operational Effects: Townscape Character

Character Area		Description of Key Effects	Magnitude of Change	Sensitivity	Effect on Condition	Effect on Value	Nature of Effect	Significance
1	King's Cross St Pancras	• Removal of 1970s temporary buildings and associated clutter. • Improvement in the way the station addresses Euston Road. • New high quality public space as the Southern Square (incorporating hard and soft landscaping). • Retention of positive heritage elements and character. • Proposed enhancement of listed buildings, including filling the bomb gap in the western ranges and the refurbishment of facades. • High quality architecture associated with the western concourse and diagrid shell. • The diagrid shell will have regard to the height and scale of existing buildings. Notably, the roofline of the diagrid shell will be at a lower level than adjoining listed buildings. • The diagrid shell will have regard to the character of the area. Notably, the diagrid shell will be a visually 'light' structure that will allow the listed buildings to dominate.	Moderate	High.	Positive.	Positive.	Positive. Long term. Site specific. Direct.	**Significant**
2 - 12	Remaining Character Areas	No physical effect on townscape character.	No change.	Not sensitive.	No Effect.	No Effect.	No Effect.	No Effect.

Table I1.12 Long Term Operational Effects: Visual Amenity

Potential Visual Receptor	Predominant Receptor Type	London Borough of Camden (LBC) Views [1]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
Euston Road.	Pedestrians, Motorists, Commercial and Institutional.	These potential visual receptors fall within a **LBC Main View**, where views are up Pancras Road. Potential visual receptors also fall within a **LBC Secondary View**, where there are views to the stations and Great Northern Hotel from Euston Road.	• Removal of 1970s temporary buildings and associated clutter. • The southern façade on King's Cross Station will become more visible from Euston Road, namely the lower elements and its interface with the ground plane. • Improvement in the way the station addresses Euston Road. • A new high quality public space (the Southern Square, incorporating hard and soft landscaping) will become visible from Euston Road, rather than the existing 1970s temporary buildings. • Retention of positive heritage elements and character. • Proposed enhancement of listed buildings, including the refurbishment of facades. • From some locations, a portion of the diagrid shell at the western concourse will be visible between King's Cross Station and the Great Northern Hotel, although from many locations along Euston Road it will not be visible. • High quality architecture associated with the western concourse and diagrid shell. • The diagrid shell will have regard to the height and scale of existing buildings. Notably, the roofline of the diagrid shell will be at a lower level than adjoining listed buildings. • The diagrid shell will have regard to the character of the area. Notably, the diagrid shell will be a visually 'light' structure that will allow the listed buildings to dominate. • From the LBC Main View (up Pancras Road), the contemporary character of the diagrid shell will relate to the contemporary character of the CRTL train shed. Refer to the photomontage in *Figure 8.3* for the proposed LBC Main View from Euston Road looking up Pancras Road. Refer to the photomontage in *Figure 8.4* for the proposed LBC Secondary View from the intersection of Grays Inn Road, Pentonville Road and the 'Lighthouse' block area.	Moderate.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	**Significant**.

(1) As defined in the King's Cross Opportunity Area: Planning and Development Brief: January 2004 prepared by the London Borough of Camden.

Potential Visual Receptor	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
Regents Quarter and York Way.	**Residential**, Pedestrians and Motorists.	These potential visual receptors fall within a **LBC Main View** (i.e. York Way, south of Wharfdale Road)	• Minor changes to the eastern station façade. • Retention of the positive heritage elements and character. • Proposed enhancement of listed buildings, including the refurbishment of facades.	Low.	Ranges from **High** to Low.	Positive. Long term. Indirect.	Not Significant.
Pancras Road.	Pedestrians and Motorists.	These potential visual receptors fall within a **LBC Secondary View**, where located immediately northeast of the German Gymnasium.	• The majority of the diagrid shell at the western concourse will be visible from Pancras Road, with the exception of locations where the Great Northern Hotel will obstruct views. • High quality architecture associated with the western concourse and diagrid shell. • The diagrid shell will have regard to the height and scale of existing buildings and the character of the area. Notably, the roofline of the diagrid shell will be at a lower level than adjoining listed buildings. • The diagrid shell will be a visually 'light' structure that will allow the listed buildings to dominate. • Retention of positive heritage elements and character. • Proposed enhancement of listed buildings, including filling the bomb gap in the western ranges and the refurbishment of facades.	High.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	**Significant**.
Pentonville Road.	Pedestrians, Motorists, Commercial and Institutional.	These potential visual receptors fall within a **LBC Secondary View**, where located at the intersection of Grays Inn Road and the 'Lighthouse' block area.	• The diagrid shell will not be visible from most locations along Pentonville Road, with the exception of the western end of Pentonville Road in the vicinity of Grays Inn Road. • The southern façade of King's Cross Station will not be visible from most locations along Pentonville Road, with the exception of the western end of Pentonville Road in the vicinity of Grays Inn Road where the removal of 1970s temporary buildings and associated clutter will be visible. The proposed Southern Square will be difficult to discern from most locations along Pentonville Road, with the exception of the western end in the vicinity of Grays Inn Road. Where the proposed Southern Square and southern façade of King's Cross Station will be visible, visual effects will be positive for the reasons identified for the Euston Road visual receptors.	Low.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	Not Significant.
Grays Inn Road.	Pedestrians, Motorists,	These potential visual receptors fall	• The diagrid shell will not be visible from most locations along	Low.	Ranges from Moderate to	Positive. Long term.	Not Significant.

Potential Visual Receptor	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
	Commercial and Institutional.	within a **LBC Secondary View**, where located at the intersection of Pentonville Road and the 'Lighthouse' block area.	Grays Inn Road, with the exception of the northern end of Grays Inn Road in the vicinity of Pentonville Road. • The southern façade of King's Cross Station will not be visible from most locations along Grays Inn Road, with the exception of the northern end of Grays Inn Road in the vicinity of Pentonville Road where the removal of 1970s temporary buildings and associated clutter will be visible. The proposed Southern Square will be difficult to discern from most locations along Grays Inn Road, with the exception of the northern end of Grays Inn Road in the vicinity of Pentonville Road. Where the proposed Southern Square and southern façade of King's Cross Station will be visible, visual effects will be positive for the reasons identified for the Euston Road visual receptors.		Low.	Indirect.	
Birkenhead Street.	**Residential**, Pedestrians, Institutional and Motorists.	Potential visual receptors do not gain a LBC Important View.	• The diagrid shell will not be visible from most locations along Birkenhead Street, with the exception of the northern end of the street where a portion of the diagrid shell at the western concourse will be visible between King's Cross Station and the Great Northern Hotel. As a result of window orientation, views of the diagrid shell from residential receptors and other internal receptors will be limited. • The removal of the 1970s temporary buildings and associated clutter will be visible from most locations along Birkenhead Street. However, as a result of window orientation, views of the proposed Southern Square from residential receptors will be limited. Where the proposed Southern Square and southern façade of King's Cross Station are visible, visual effects will be positive for the reasons identified for the Euston Road visual receptors.	Low.	Ranges from **High** to Low.	Positive. Long term. Indirect.	Not Significant.
Crestfield Street.	**Residential**, Pedestrians, Commercial and Motorists.	Potential visual receptors do not gain a LBC Important View.	• A portion of the diagrid shell will be visible from most locations along Crestfield Street, seen between King's Cross Station and the Great Northern Hotel. As a result of window orientation, views of the diagrid shell from residential receptors and other internal receptors will be limited. • The removal of the 1970s temporary buildings and associated clutter will be visible from most locations along Crestfield Street. However, as a result of window orientation, views of the proposed Southern Square from residential receptors and	Low.	Ranges from **High** to Low.	Positive. Long term. Indirect.	Not Significant.

Potential Visual Receptor	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
			other internal receptors will be limited. Where the proposed Southern Square and southern façade of King's Cross Station are visible, visual effects will be positive for the reasons identified for the Euston Road visual receptors.				
Belgrove Street.	**Residential**, Pedestrians, Commercial and Motorists.	Potential visual receptors do not gain a LBC Important View.	• The key visual effects will be as described above for Crestfield Street.	Low.	Ranges from **High** to Low.	Positive. Long term. Indirect.	Not Significant.
Argyle Street.	**Residential**, Institutional and Pedestrians.	Potential visual receptors do not gain a LBC Important View.	• The diagrid shell will not be visible from most locations along Argyle Street, with the exception of the northern end of Argyle Street in the vicinity of Euston Road. The diagrid shell will not be visible from residential properties. • The proposed Southern Square and southern façade of King's Cross Station will not be visible from most locations along Argyle Street, with the exception of the extreme northern end of Argyle Street in the vicinity of Euston Road where the removal of the 1970s temporary buildings and associated clutter will be visible. Where the proposed Southern Square and southern façade of King's Cross Station will be visible, visual effects will be positive for the reasons identified for the Euston Road visual receptors. • The proposals will not be visible from residential receptors in Argyle Street.	Low.	Ranges from **High** to Moderate.	Positive. Long term. Indirect.	Not Significant.
Argyle Square.	**Open Space, Residential**, Pedestrians.	Potential visual receptors do not gain a LBC Important View.	• There may be some locations on the periphery of the open space where the proposals will be visible. However, views will be filtered and visibility will be limited. From the majority of locations within the open space of Argyle Square, the proposals will not be visible. • As a result of window orientation, views of the proposals from residential receptors and other internal receptors will be limited.	Low.	Ranges from **High** to Moderate.	Positive. Long term. Indirect.	Not Significant.

Potential Visual Receptor	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
St Pancras Chambers.	Commercial and Hotel.	Potential visual receptors do not gain a LBC Important View.	• From the eastern façade, receptors will gain ground and elevated views of the proposed Southern Square and a portion of the diagrid shell viewed between King's Cross Station and the Great Northern Hotel. • The King's Cross Station and Great Northern Hotel will remain the dominant built forms in these views. • Visual effects will be positive for the reasons identified for the Euston Road visual receptors.	High.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	Not Significant.
Goods Way.	Pedestrians, Motorists and Commercial.	These potential visual receptors fall within a **LBC Secondary View**.	• As a result of the location of the Culcross buildings, the proposed diagrid shell will not be visible from most locations along Goods Way. However, there will be some glimpsed and filtered views of the proposed diagrid shell from eastern portions of Goods Way. The viewpoints are approximately 200m to 320m from the proposed diagrid shell, of which only a small portion will be visible.	Low.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	Not Significant.
Goods Yard Bridge.	Pedestrians and Motorists.	These potential visual receptors fall within a **LBC Secondary View**.	• The key visual effects will be as described above for Goods Way.	Low.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	Not Significant.
East Coast Main Line.	Rail Commuters.	These potential visual receptors fall within a **LBC Secondary View**, where views are directed to the gasworks tunnels.	• The proposed diagrid shell will not be visible. • The proposed Southern Square will not be visible. • The removal of the Engineer's Bothy will be visible.	Low.	Low.	Positive. Long term. Indirect.	Not Significant.
CTRL Train Shed (St Pancras Extension).	Tourist, Rail Commuters and Commercial.	Potential visual receptors do not gain a LBC Important View.	• From southeastern locations, receptors will gain elevated views of the diagrid shell. • The contemporary character of the diagrid shell will relate to the contemporary character of the nearby CRTL train shed, within which the receptors will be located. • Visual effects will be positive for the reasons identified for the Euston Road visual receptors.	Moderate.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	Not Significant.
CTRL Exit / Forecourt on Pancras Road.	Pedestrians, Tourist, Rail Commuters.	Potential visual receptors do not gain a LBC Important	• Receptors will gain close ground level views of the diagrid shell. • The contemporary character of the diagrid shell will relate to	Moderate.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	**Significant**.

Potential Visual Receptor	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
		View.	the contemporary character of the nearby CRTL train shed. • Visual effects will be positive for the reasons identified for the Euston Road visual receptors. Refer to the photomontage in *Figure 8.5* for the proposed view.				
Internal Spaces within King's Cross Mainline Station.	Tourist, Rail Commuters and Commercial.	These potential visual receptors fall within a **LBC Secondary View**, where views are directed to the gasworks tunnels.	• Internal views from the existing King's Cross Station platforms and concourse will be improved through the removal of 1970s temporary buildings to the south and commercial premises to the west. • The proposals will allow internal spaces to receive more natural light and will create a greater sense of space. • The proposals will create a visual environment that will improve user orientation by allowing external environments, such as the proposed southern square and western concourse, to be visible. • The proposals will introduce high quality architecture associated with the western concourse and diagrid shell, which will be in character with such an important contemporary transport node.	High.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	**Significant.**

Potential Visual Receptor	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
King's Cross Mainline Station Southern Concourse: External Areas	**Open Space**, Pedestrians, Tourists, Rail Commuters.	Potential visual receptors do not gain a LBC Important View.	• Views will be improved through the removal of 1970s temporary buildings and associated clutter, allowing the creation of the Southern Square and a greater sense of place. The Southern Square will be a high quality public space, incorporating hard and soft landscaping. • The southern façade on King's Cross Station will become more visible. • Improvement in the way the station addresses the external environment. The proposals will create a visual environment that will improve user orientation by allowing access to be easily discernable. • Retention of the positive heritage elements and character. • Proposed enhancement of listed buildings, including the refurbishment of facades. • From some locations, a portion of the diagrid shell at the western concourse will be visible between King's Cross Station and the Great Northern Hotel, although from many locations it will not be visible. The diagrid shell will introduce high quality architecture, which will be in character with such an important contemporary transport node.	High.	Ranges from **High** to Low.	Positive. Long term. Indirect.	**Significant.**
King's Cross Mainline Station Western Concourse.	**Open Space**, Pedestrians, Tourists, Rail Commuters.	The potential visual receptors fall within a **LBC Main View**.	• Receptors will gain ground level internal views of the proposed diagrid shell, western concourse and ticket hall. • High quality architecture associated with the western concourse and diagrid shell. • The diagrid shell will have regard to the height and scale of existing buildings. Notably, the roofline of the diagrid shell will be at a lower level than adjoining listed buildings. • The diagrid shell will have regard to the character of the area. Notably, the diagrid shell will be a visually 'light' structure that will allow the listed buildings to dominate. • Retention of the positive heritage elements and character. • Proposed enhancement of listed buildings, which will include filling the bomb gap and the refurbishment of facades.	High.	Ranges from **High** to Low.	Positive. Long term. Indirect.	**Significant.**

Potential Visual Receptor	Predominant Receptor Type	London Borough of Camden (LBC) Views [I]	Description of Key Visual Effects	Overall Magnitude of Change	Sensitivity of Receptor	Overall Nature of Impact	Overall Significance
Camley Street.	Pedestrians and Motorists.	Potential visual receptors do not gain a LBC Important View.	• A small portion of the upper elements of the proposed diagrid shell will be visible between the Culcross buildings and the German Gymnasium. As a result of the angle of view of the panorama and the distance of the proposed diagrid shell from the viewpoint (approximately 250m to 480m), the proposed diagrid shell will make up only a small portion of the view. • The clock tower of King's Cross Station will remain visible as it is at a higher elevation than the proposed diagrid shell. Refer to the photomontage in *Figure 8.6* for the proposed view.	Low.	Ranges from Moderate to Low.	Positive. Long term. Indirect.	Not Significant.
Camley Street Natural Park.	**Open Space**.	Potential visual receptors do not gain a LBC Important View.	• The key visual effects will be as described above for Camley Street.	Low.	**High**.	Positive. Long term. Indirect.	Not Significant.
Tall Buildings within the Study Area.	Commercial.	Potential visual receptors do not gain a LBC Important View.	The proposals will not be visible from the following tall buildings: • The Novatel Hotel (corner of Ossulston & Euston Streets); • Evergreen House (150 Euston Rd); or • 200 Pentonville Rd.	No change.	Low.	No effect.	Not Significant.
Northern Portions of Character Area 1 (King's Cross Central Site).	Commercial and Industrial	Some of these potential visual receptors fall within a **LBC Main View**.	• As a result of the location of the Culcross buildings, the proposed diagrid shell will not be visible from most locations. Where glimpsed and filtered views of the proposed diagrid shell are available, only a small portion of the proposed structure will be visible.	Low.	Low	Positive. Long term. Indirect.	Not Significant.

Annex J

Transport

Network Rail

King's Cross Station Enhancement

DRAFT 1

Network Rail

King's Cross Station Enhancement

Environmental Impact Assessment Transportation Section

January 2006

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CONTENTS

1 INTRODUCTION

1.1 Environmental Assessment of Transport

1.1.1 The King's Cross area is currently undergoing significant change due to the new CTRL terminal at St Pancras and the associated LUL enhancements at King's Cross Station. These works are planned to be completed in 2007/8 resulting in new transport interchange movements associated with public transport and vehicular modes.

1.1.2 The Network Rail station enhancement project responds to passenger growth and planned enhanced rail services by providing additional station capacity through provision of a new station concourse located to the west of the station. The new western concourse is to be located above the new LUL northern ticket hall. The existing southern concourse is demolished releasing the area for new public space along the Euston Road frontage.

1.1.3 In addition to the station works Argent St George are seeking planning consent for major redevelopment of the lands to the north of the station. These works will reassign existing and expected growth and require new public realm for pedestrian movement, and also result in changes to the vehicle flows on the local road network.

1.1.4 This section of the Environmental Statement identifies the transport movements accommodated by the existing Network Rail station for a base 2007/8 condition defined with the CTRL and LUL Northern Ticket Hall (NTH) works completed.

1.1.5 The Western Concourse station is assessed for a future PM maximum train service option of seven intercity, twelve suburban (7/12, 4x12 cars and 8x8 cars) capacity based assessment. This demand includes the reassignment of a proportion of passenger flows to the King's Cross Central development, assumed to be 100% complete and fully occupied.

1.1.6 The PM maximum capacity case has been tested for normal and perturbated conditions for the proposed Western Concourse design, with results taken from modelling presented to Network Rail in December 2005.

1.1.7 The impacts of the King's Cross Central Development are considered for the 7/12 PM scenario, identifying the expected changes in movement and how the Network Rail scheme has been designed to accommodate this major adjacent project.

2 CONSULTATIONS

2.1 Consultees

2.1.1 Development of the Network Rail project has involved extensive consultations with regard to the station operation, its interface with adjacent interchange modes, and co-ordination with Argent who are promoting the King's Cross Central development. The consultation process on transportation issues has included meetings with:

- Network Rail to review the operational requirements of the new station concourse;
- GNER with regard to concourse and passenger facilities;
- Camden Borough Council on compatibility with the Local Plan and improvements to public realm and highways;
- Transport for London on facilities for bus, taxi, and highway operations.

- London Underground on passenger flow and capacity affects on the new underground network currently being built and longer term issues;
- Argent St George regarding the King's Cross Central requirements in and around the station. This was organised through the Joint Design Group chaired by the Department for Transport.

2.1.2 This consultation process has resulted in positive statements on the presented scheme with agreements reached on the form of the new Western Concourse, the passenger flow requirements within the station, interchange with taxi and private car, alignment and cross sectional details of Pancras Road, and definition of new public realm.

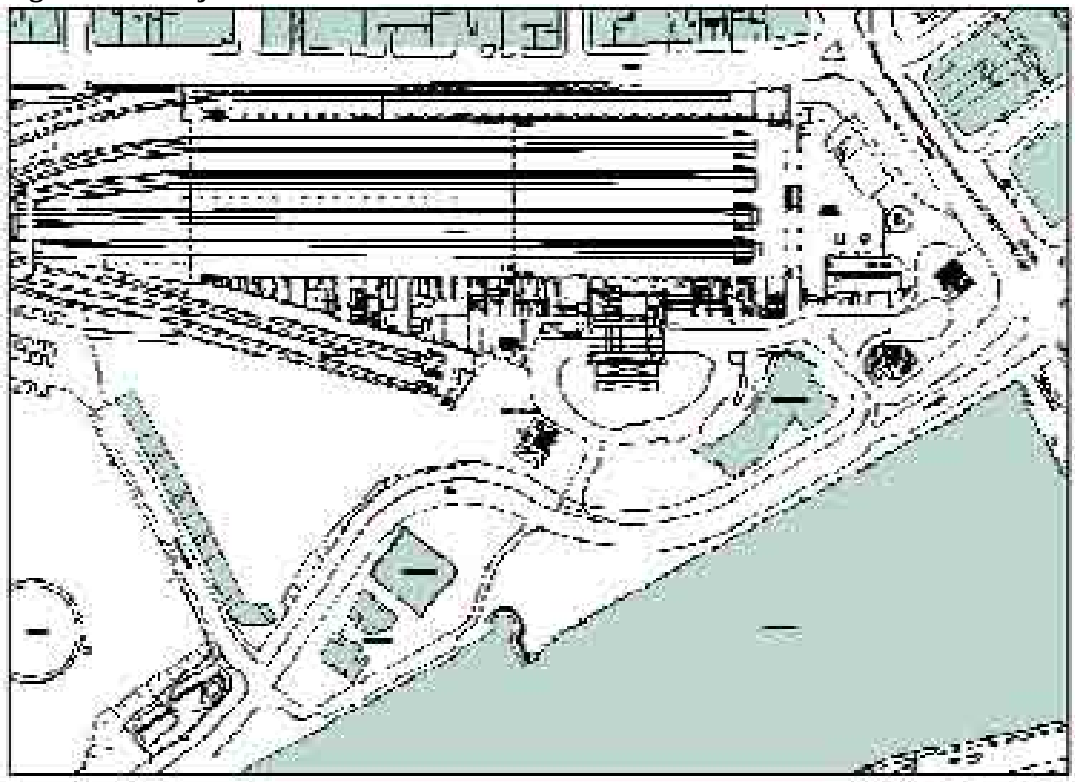
3 BASELINE CONDITIONS

3.1 Definition of Project Baseline

3.1.1 The Project Baseline, shown on **Figure 3.1**, assumes that only those projects, which already have planning permission, will be included. The baseline incorporates the following project and infrastructure conditions which will be completed in 2007/8:

- King's Cross Station will have the basic layout as it is today (2006) with 11 platforms;
- Channel Tunnel Rail Link (CTRL) works are assumed to be completed;
- London Underground works are assumed to be completed;
- Pancras Road will have the layout as proposed under the CTRL works;
- Taxi facilities will be located at the western side of the station.

Figure 3.1. Project Baseline



3.1.2 Passenger and vehicle flow conditions for this base line are presented as:

- King's Cross Station flows forecast for 2007/8.

- Background passenger flows to street destinations and St. Pancras are based on 2002 survey data with growth for the 2007/8 (6/9 train operations) and based on 2011 capacity flows for St. Pancras International and St Pancras Station Domestic services are described by CTRL for 2018.

3.2 Passenger Flows

Assessment Period

3.2.1 Station planning is typically based upon the peak departure condition when the greatest passenger accumulation is expected on the concourse. This will occur during the evening period. During this evening peak period 15 trains depart the station as shown in **Table 3.1**.

Table 3.1: Mainline Train Arrivals and Departures (PM peak hours 2002)

	Trains		
	Intercity	Suburban	Total Trains
1700-1800	6	9	15
1800-1900	5	10	15

3.2.2 It should be noted that whilst there is one less suburban train during 1700-1800 an additional intercity service operates during this period. This is important for station design as the wait times and group characteristics of intercity passengers will place greater accumulation demands on the concourse when compared to commuter services.

3.2.3 In conclusion, station planning has concentrated on assessing the most onerous peak hour passenger accumulation conditions when 6 Intercity and 9 Suburban services depart the station.

Passenger Movements

3.2.4 Passenger movement data was collected throughout the mainline rail station between June 2000 and June 2002. Passenger demand to and from the mainline rail services has been factored up from 2002 to 2007/8 using an agreed Network Rail growth factor of 2.5%. This factor has been generally applied to all 2002 train patronage data throughout the peak periods.

3.2.5 Key passenger movements for the 2007/8 peak period are identified in **Table 3.2** and shown on **Figures 3.2 and 3.3**.

Table 3.2: Base Case 2007/8 Key Station Passenger Flows (3 Hr Periods)

	AM	**PM**
Southern Concourse		
Platforms 1-8	14,770	19,230
Street Connections and Southern LUL	12,320	20,440
LUL (Western Range)	9,910	9,510
Suburban Shed		
Platforms 9-11	7,575	10,150
Street Connections	1,770	3,570
LUL (NE Stair)	3,220	2,700
Total Main Line	**22,345**	**29,380**

3.2.6 From this table it is seen that of the total morning and evening platform movements, of 22,345 and 29,380 respectively, the main shed attracts the highest flow with some 66% of main line passengers using these 8 platforms.

Figure 3.2: King's Cross Station 2007/8 AM 6/9 Operation with LUL Northern Ticket Hall (0700-1000 hours)

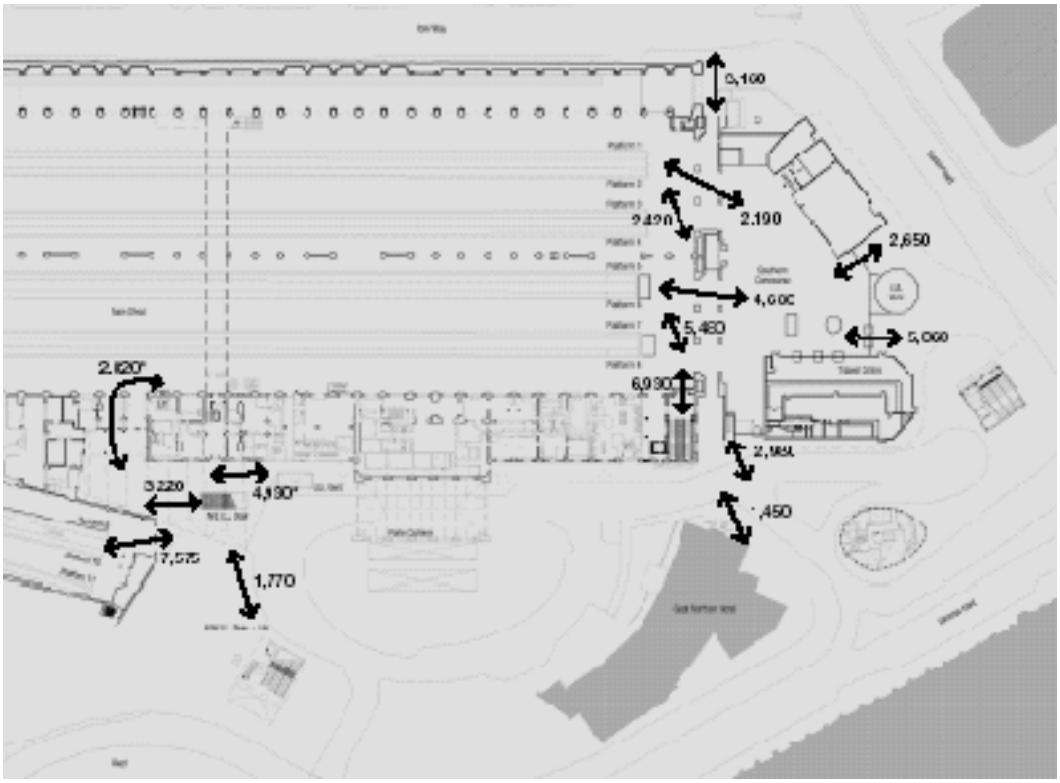
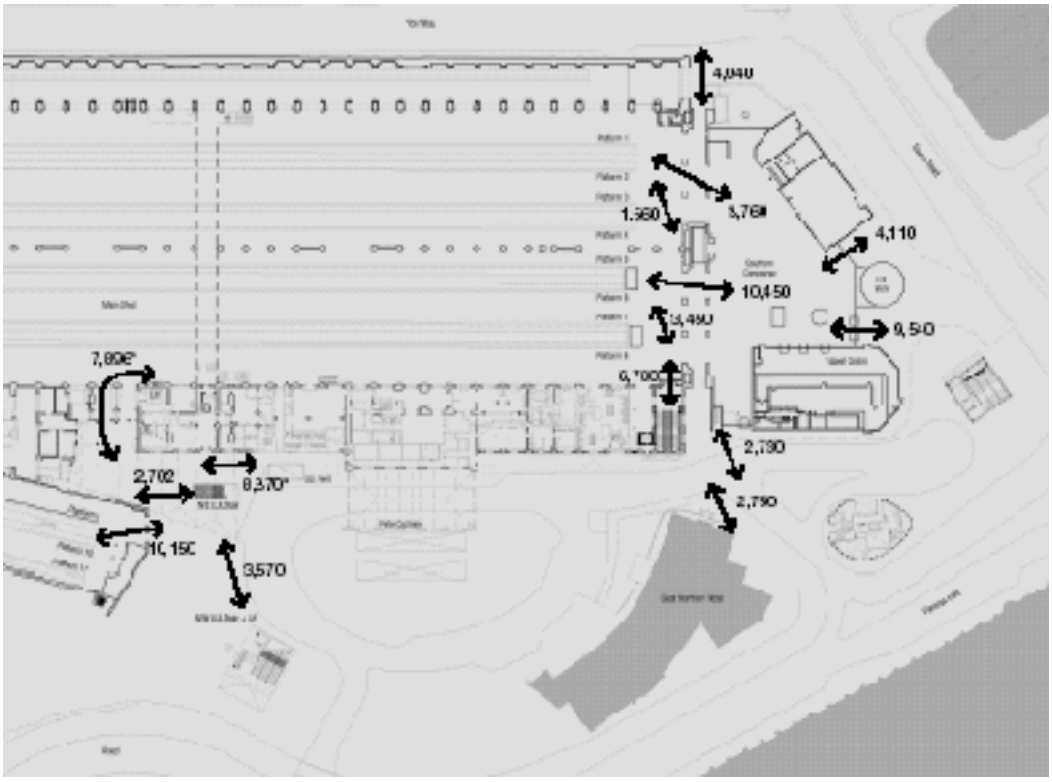


Figure 3.3: King's Cross Station 2007/8 PM6/9 Operation with LUL Northern Ticket Hall (1600-1900 hours)



3.2.7 Passenger accumulation for the existing station occurs in the primary southern concourse fronting Platforms 1-8, and the secondary suburban concourse fronting Platforms 9-11. In the Base year 2007/8, with passenger growth, pedestrian modelling has identified the issues described in the next sub-sections.

3.2.8 Passenger space planning uses Fruin Levels of Service to rate the quality and amount of space available to passengers for accumulation and circulation. The range of Levels of Service is between A which represents free flow conditions, to F which represents a complete breakdown of passenger flow. Network Rail has established guidelines which state the acceptable Levels of Service for various station elements such as concourses, passageways and platforms.

3.2.9 The existing southern concourse (with new Northern Ticket Hall connections) operates at Mid Fruin Level of Service D during the 2007/8 PM peak period, although if it is assumed that 20% of passengers leave the southern concourse and make use of surrounding facilities the concourse will operate at low LoS D.

3.2.10 These levels of service are above Network Rail guidelines which state that concourse areas should be design to accommodate the peak accumulation of passengers at LoS B (0.93 to 1.21 square metres per person) for normal conditions and LoS C (0.65 to 0.93 square metres per person), for perturbated conditions.

3.2.11 The existing passenger waiting area outside the suburban shed is confined in area and operates at poor Levels of Service during the PM peak with LoS E and F experienced by passengers. In addition, routes through to the platforms are narrow and easily blocked.

3.3 Bus Interchange Facilities

Euston Road Bus Services

3.3.1 High frequency bus services currently operate along Euston Road. They are predominantly through routes but some buses terminate and lay over in York Way. The eastbound services stop directly at the front of the station, whilst the westbound services stop on the opposite side of Euston Road.

3.3.2 At present the eastbound services have two designated bus stops with 11 different routes and up to 70 buses per hour calling outside the station. An equivalent number of services run westbound.

3.3.3 From current observation and from the number of buses per hour serving the location, there is not sufficient kerb length for accommodating the high number of services at the standards that would be desirable. This is acknowledged by London Buses.

Pancras Road Bus Services

3.3.4 On Pancras Road the CTRL realigned road accommodates northbound services with two bus stops at the southern end close to the Euston Road junction. These stops have been designed for articulated services and reduce the operational highway to a single through lane at this point. Two routes use these stops with some 12-15 buses per hour.

3.4 Station Deliveries

3.4.1 For the base condition station deliveries will operate from the area in front of the suburban shed. This will provide access to the station facilities and On Board Services. Associated with these activities are trolley movements and refuse collection.

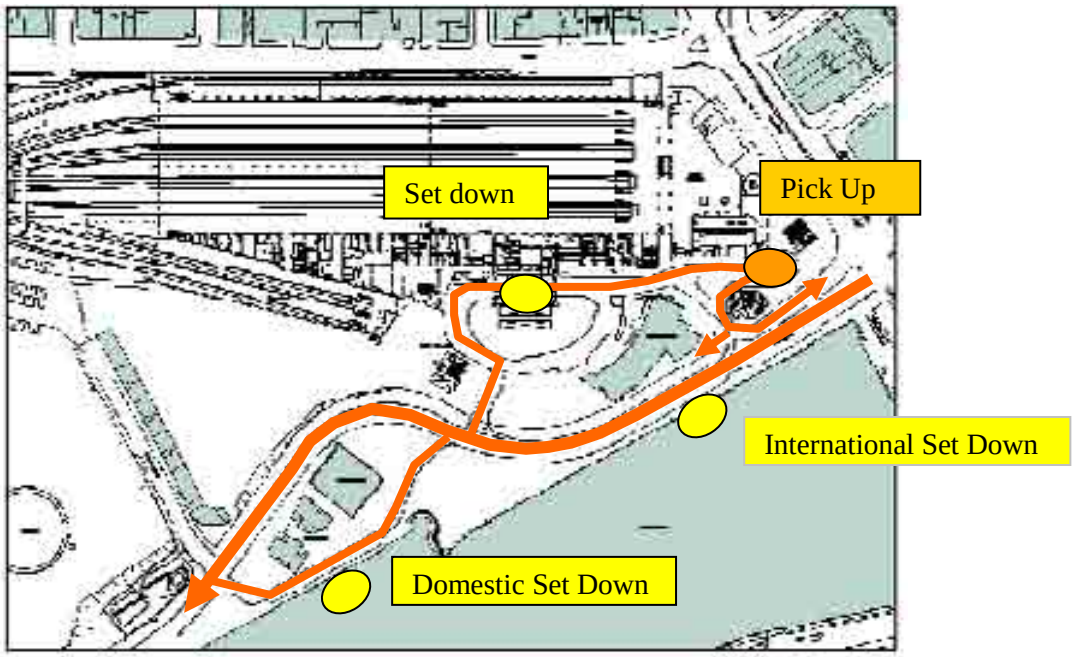
3.4.2 Surveys of vehicle activity and logistics operations in the service yard were carried out in May and June 2002. The survey identified a total of 106 delivery vehicles with 67 light goods vehicles and 39 heavy goods vehicles arriving over a 12 hour period from 0700 to 1900 hours. The busiest periods occurred between 0700-0800, and 1500-1600 hours when 15 vehicles arrived.

3.4.3 In addition to vehicle manoeuvres refuse tugs and trolleys and forklift trucks were active in the service area outside the suburban shed. These movements conflicting with passenger movements.

3.5 Realigned Pancras Road (CTRL Scheme)

3.5.1 The public highway arrangement and operations have significantly changed due to the CTRL works associated with St. Pancras Station. The arrangement shown on **Figure 3.4** will primarily form an anti-clockwise gyratory around St Pancras Station comprising. Pancras Road, Goods Way, and Midland Road. Euston Road which fronts the station remains as existing with modified signal junctions with Pancras Road and Midland Road.

Figure 3.4 Base Station set down and pick up system



3.5.2 Details on operations to note include:

- Pancras Road is realigned to accommodate 2-northbound lanes on an alignment to respect the listed buildings of the Great Northern Hotel and the German Gymnasium. The new highway provides for on-street bus stops, station passenger set down facilities, two-way cycle route along the eastern edge and footways along both sides of carriageway
- Midland Road is one way southbound south of Brill Place. Bus stop facilities are provided along with taxi pick up arrangements.
- Goods Way is realigned to pass underneath the new St. Pancras rail bridge and forms a two-way highway with signal junctions at Pancras Road and Midland Road.

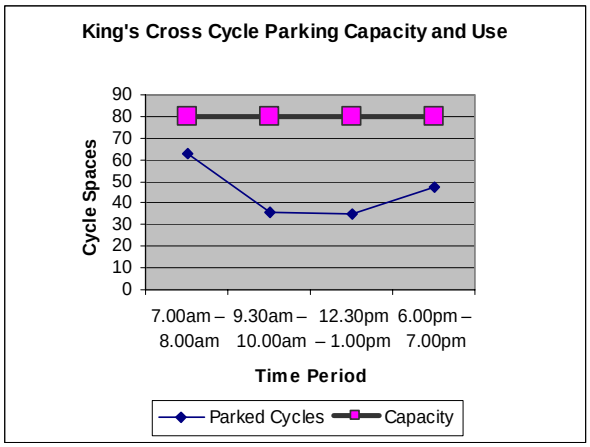
3.6 Station Cycle Parking

3.6.1 A cycle parking survey was undertaken for King's Cross Station and St Pancras Station in 2002 to identify the number of cyclist that use the existing station cycle facilities.

Existing Site conditions

3.6.2 Approximately 80 bicycle parking spaces are provided around the existing station at King's Cross.

3.6.3 From the results of the cycle parking and utilisation surveys at King's Cross it was concluded that the supply of 80 spaces satisfies the peak demand of 70 cycles.



3.6.4 For King's Cross the peak parking demand occurs overnight with some 90% of the 80 spaces occupied. The parking occupancy during the day reduces to some 50% of supply. This profile is similar to results at other Main Line Terminating Stations where passengers arriving by train cycle from the station to London destinations.

3.6.5 There will be a general uplift in bicycle parking demand as a result of future growth in rail passenger capacity and demand. However, the profile of movements is not expected to change.

3.7 Base Vehicular Flows

3.7.1 The Base traffic flows have been developed from RLE and LUL references, surveys at King's Cross station, and joint development with the King's Cross Central development team.

3.7.2 It is important to note that the demands and the resulting traffic flows used form the basis of the terminal design and are not forecasts for a specific year. The approach has been to ensure that the station functions satisfactorily when operating at capacity. Consequently it has been assumed that the trains during the peak hours are close to capacity. This situation during the early years will be unusual especially for the international services but will increase over time. The Base Case defines operations for 2007/8 with limited growth at King's Cross Station. This approach therefore enables a comparison to be made of the change in conditions due to the Station Enhancement scheme and the Kings Cross Central development. In design terms the flow conditions present a worst case with all functions at capacity.

3.7.3 The flows along Pancras Road have a significant taxi content with high potential for taxi drivers to choose where they pick up passengers. This choice has been reflected in the assignment of empty taxis following set down of passengers. Additionally the passenger pick up at both stations is defined as a combined system with management expected to reduce passenger wait times and to reduce empty taxi journey distances. This allows some of the empty taxis from St Pancras International to move across to the King's Cross pick up at times when demand requires. However, it is recognised that additional empty taxis are still required to serve the stations.

3.7.4 At King's Cross Station some 165 and 524 vehicle set down activities by taxis, private cars and mini-cabs take place during the morning and evening peak hours respectively. Taxi pick up varies between 311 and 101 vehicles for the same periods. It was surveyed in 2000 that Taxis, private cars and mini-cabs take a 2-6% modal share between them.

3.7.5 At St Pancras Station, set down is sub divided into International and Domestic locations. The International generates 582 and 425 vehicle set downs and the Domestic 141 and 143 for the morning and evening peak hours respectively. Pick up is a single facility on Midland Road with 441 and 321 taxi pick ups expected in the respective morning and evening peak hours.

3.7.6 Vehicle flows on Pancras Road vary by location due to network arrival and departure distribution patterns. On the southern two-way section, between Euston Road and the Great Northern Hotel, flows of 1628 and 1606 vehicles are expected during the morning and evening peak hours. At a point just to the north of the Hotel the one way northbound flow is 1378 vehicles for the morning peak hour, and 1710 vehicles for the evening peak hour.

4 KING'S CROSS STATION WESTERN CONCOURSE SCHEME

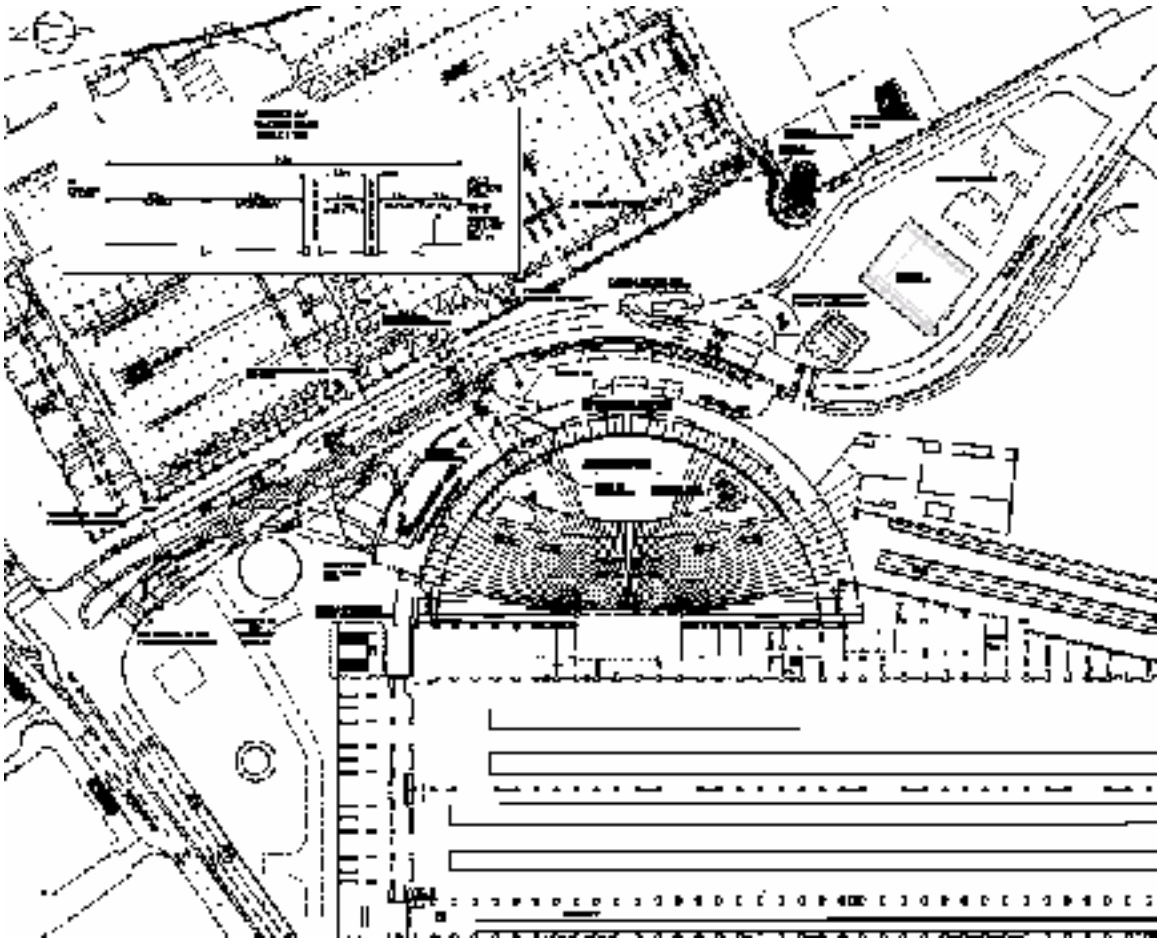
4.1 King's Cross Station Enhancement Proposals

4.1.1 The station project provides a new western concourse to accommodate passenger flows in the year of opening 2012 and beyond to with operational enhancements and maintains the CTRL Pancras Road alignment, shown on **Figure 4.1**, and incorporates a new station forecourt operation to respect this arrangement.

4.1.2 The King's Cross Station Enhancement application for the Western Concourse has the following infrastructure assumptions:

- The southern concourse will be removed;
- CTRL works will be complete;
- London Underground works will be complete;
- Pancras Road will have the CTRL layout;
- King's Cross Station taxis will be located at the western side of the station;
- A shared service yard will be operational with access from either Pancras Road or Goods Way.

Figure 4.1: King's Cross Station Enhancement with CTRL Pancras Rd Alignment (no King's Cross Central)



4.2 Station Concourse

Passenger Demands

4.2.1 For concourse planning the critical period is the PM peak when the maximum number of passengers have to be accommodated awaiting departure from the station.

4.2.2 Passenger volumes for the worst case PM capacity assessment have been based on a projected peak hour service of 7 Intercity, 8 suburban 8 car service, and 4 suburban 12 car services.

4.2.3 It has been assumed that trains are loaded to capacity during the peak hour, but with lower loadings during the shoulder hours of the peak period giving average loadings of 84% during the 3 hour peak period.

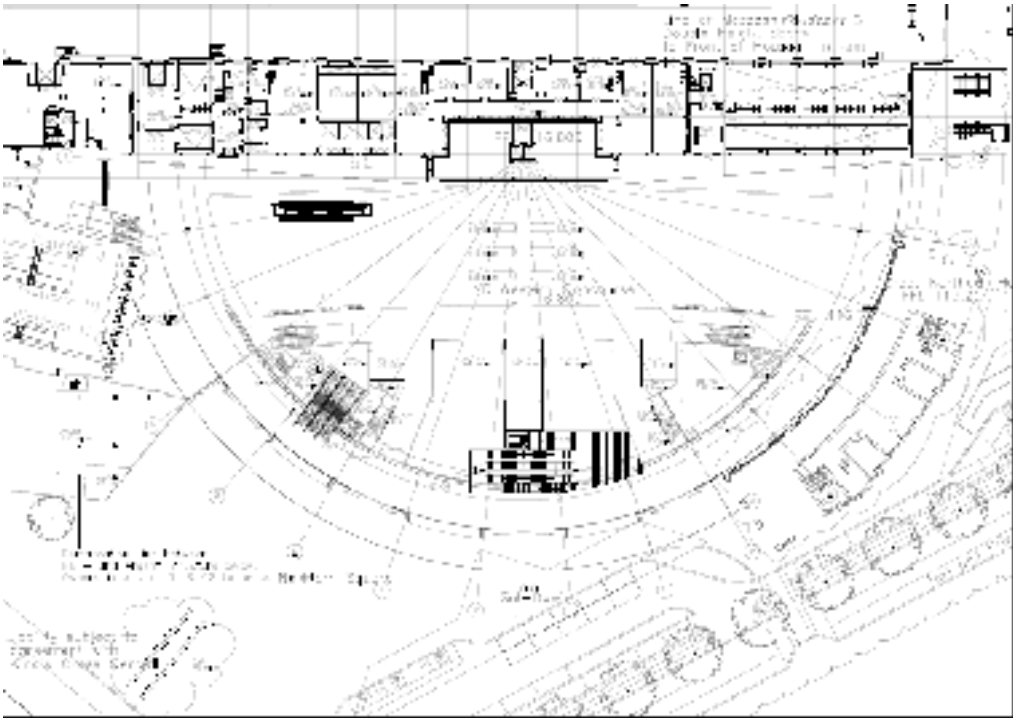
Types of passengers

4.2.4 The critical feature for concourse design is the amount of time passengers are likely to wait on the concourse or in adjacent facilities. Commuters tend to arrive nearer their departure time and spend less time at the station, whilst long distance passengers tend to arrive earlier and are more likely to carry baggage.

Passenger Information

4.2.5 Within the concourse (shown on **Figure 4.2**) two main Customer Information Boards (CIS) are located providing full station information. Passengers will accumulate in front of these depending on their platform requirements with the southern board being the area of greatest use. Passengers will then move from these areas through the gate lines into the paid area where additional monitors will provide local reminder train information at the end of platforms.

Figure 4.2 Western Concourse Layout



4.2.6 Additional information facilities will be located around the station to give passengers greater access to information. This will improve general passenger comfort especially during delayed conditions by reducing the concentration of passenger groups in front of the main boards.

Passenger Service Standards

4.2.7 The concourse design parameters are based on Network Rail Design Standards (Major Stations Design Guide, 2002) and the Fruin Levels of Service. For accumulation areas under normal conditions a Level of Service B (1.0 to 1.2m² per person) should be achieved. However, the concourse will be placed under greatest strain during train delay conditions, and therefore during these conditions the acceptable standard is reduced to Level of Service C (0.65 to 0.9m² per person).

4.2.8 The concourse area should accommodate a perturbated condition with 15 minute disruption to the service. This design process has also to consider the effects of disruption on other interchange operations. In particular the circulation areas fronting the suburban and main shed gate lines plus the cross concourse connections which are to be protected to maintain links with LUL and the external squares. This latter connection being of particular importance for station escape into the Southern and Northern Squares. These squares provide adequate passenger holding areas for evacuation of Kings Cross Station.

Area Requirements for Normal 7/12 Operations

4.2.9 PEDROUTE model results for normal train operations during the worst case 7/12 PM peak period show a maximum accumulation of 5130 people in the concourse areas.

4.2.10 It has been assumed that some 20% of passengers will move into adjacent station facilities whilst waiting for train departures. This reduces the central concourse area demand to some 4,100 passengers for normal conditions.

4.2.11 This requires a concourse area of between 3,810 and 4,920 square metres to satisfy the normal design standard of mid Level of Service B. The total waiting area available in the Western Concourse is 3,300 sq.m and this is calculated to operate at Mid Level of Service C, as shown on **Figure 4.3.**

4.2.12 Whilst this is outside the standard this is a significant improvement on passenger conditions when compared to the existing station concourse for all passengers. Existing passengers in the Suburban Shed concourse experience up to LoS E and F, with those in the Southern Concourse experiencing LoS D.

Area Requirements for Disrupted 7/12 Operations.

4.2.13 Perturbated train operations during the worst case 7/12 PM peak period show that the proposed Western Concourse becomes more congested than under normal conditions, with greater numbers of passengers waiting in the southern and northern accumulation areas.

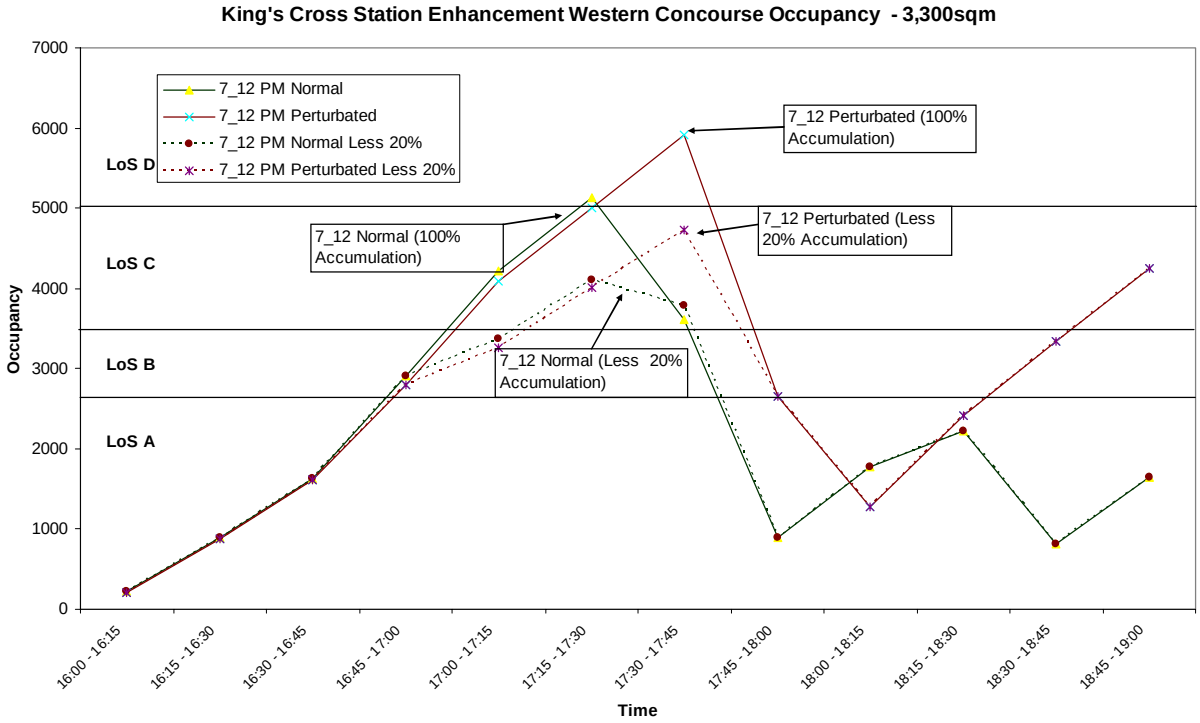
4.2.14 For passenger accumulation levels during 7/12 PM Perturbated train operations some 5,900 passengers need to be accommodated in the station. Assuming that some 20% move into adjacent station facilities this reduces the central concourse area demand to some 4,730 passengers for perturbated conditions.

4.2.15 This requires a concourse area of some between 3,075 and 4,400 square metres to satisfy the perturbated design standard of Level of Service C. The total waiting area available in the Western Concourse is 3,300 sq.m and this is calculated to operate at Level of Service C, as shown on **Figure 4.3**.

4.2.16 This Level of Service is calculated as an average value across the total concourse. This is considered an acceptable design standard for the station during temporary service disruption. During the busiest periods of accumulation it is expected that a greater number of passengers will naturally utilise other station facilities.

4.2.17 The accumulation presented is based upon the assumption that the Thameslink project has not been implemented. Thameslink will result in a reduction in flows through the station because of the diversion of a proportion of suburban Great Northern trains onto the Thameslink system.

Figure 4.3: Western Concourse Accumulation and Performance



4.2.18 The Western Concourse results in much improved passenger conditions during the busiest PM peak period. This is true of 7/12 Normal and Perturbated operations. Benefits are apparent for passengers waiting for Main Shed who did wait in the existing Southern Concourse, and for Suburban Shed passengers who waited for train departures in the Suburban Concourse.

4.3 LUL

4.3.1 The primary interchange for rail passengers is with the LUL with some 60% using this mode. Hence, the scheme has developed appropriate connections with the new Northern Ticket Hall and the upgraded Tube Ticket Hall. The movement of passengers has also been reviewed with respect to natural desire lines, minimising walk times, reducing the impact of accumulation in the areas of LUL access routes, and also to maintain independence of each operation.

4.3.2 Suburban line passengers using the existing suburban shed are given the opportunity to access the Northern Ticket Hall via the new western escalators and north eastern connection.

4.3.3 Passengers using the Main shed are expected to be divided between the western escalators, a new southern stair, and the LUL stair in the Southern Square.

4.4 Passenger Conditions Summary

4.4.1 Detailed modelling of the concourse, interchange and public realm operations have been undertaken. This was undertaken using the PEDROUTE pedestrian simulation modelling program.

4.4.2 The AM and PM peak period PEDROUTE model tests, have informed the design and specification of the King's Cross Station enhancement. The following key conclusions were reached regarding the station's performance under the various model scenarios:

- That under AM conditions the concourse and connections to LUL and main line rail platforms operate free of any significant or long term passenger delays and congestion.
- That under normal PM operating conditions localised high Service Factors are evident in the Northern and Southern Passenger Accumulation Areas and at the Western Range and Suburban Shed gatelines. This indicates peak accumulation which disperses effectively through the gatelines when passengers are allowed through to the platforms.
- That under perturbated PM conditions, where all train arrivals and departures are suspended between 1745 and 1800, passenger accumulation results in high Service Factors extending out from the southern passenger accumulation Area.

4.4.3 The model results have also indicated:

- That passenger accumulation areas have good proximity to mainline rail platforms and have a clear legible route to ensure quick and easy dispersal of passengers to trains when called.
- That the design allows for the segregation of external passenger flows from concourse operations during perturbated conditions.
- That clear circulation routes around the passenger accumulation areas are provided to allow for access to the Northern Square and Southern Square.
- The proposed Platform 8 gateline connection to the north end of the Western Concourse, and the Mezzanine connection to the Main Shed platforms assists in reducing peak period flows and congestion through the Western Range (south end) gateline.

4.5 Pancras Road Alignment and Station Forecourt

4.5.1 The future alignment and operation of Pancras Road has been established by CTRL and is due to be fully implemented in 2007. This provides a two lane one-way carriageway running northbound from Euston Road to Goods Way passing to the east of the German Gym. Set down facilities are provided along the St Pancras Station face for taxis, private cars and buses. The design also provides a two way segregated cycleway, promoted by Camden, and footways on either side. On completion of the LUL Northern Ticket Hall works, the Kings Cross Station taxi operations will be returned to a similar arrangement to that in 2002 on the western face of the station.

4.5.2 Through various design workshops held with Camden Borough Council, King's Cross Central, Network Rail and TfL, the need to respect the developing and strong north/south pedestrian flows passing between the Great Northern Hotel and the station were clearly identified. It was agreed that to achieve this the conflicts between vehicles and pedestrians should be removed. For the approved CTRL/LUL scheme vehicle movements between the Hotel and the station are associated with taxis and private cars setting down and collecting passengers at the main line station. Consequently it was jointly agreed to progress a scheme displacing these vehicle activities to Pancras Road whilst respecting other transport functions along the highway.

4.5.3 In consultation with Camden Borough Council an operational cross section for Pancras Road was developed that provides the required highway user facilities. In particular it has been designed to be implemented at two width constraint points; between St. Pancras Station and the Great Northern Hotel, and between St. Pancras Station and the LUL vent under construction.

4.5.4 The proposed cross-section of Pancras Road, whilst slightly modified, maintains the functionality of the agreed CTRL scheme and additional provides extended taxi rank facilities and direct links between the taxi set down and the pick up. This arrangement improves the operational state of the taxi system reducing passenger wait times and empty taxi driving distances.

4.5.5 Taxi facilities, as shown on **Figure 4.1**, for the enhanced King's Cross station have been designed to be incorporated within those proposed for St. Pancras Station. The design of the new provision is in accordance with TfL's Best Practice Guidelines for Taxi Ranks at Major Interchanges.

4.6 Taxi/Private Car Set down and Pick Up

Taxi System

4.6.1 The Taxi System is seen as an important station interchange requirement. The key elements provided include the provision of a good customer environment, identifiable station interface, maintained taxi supply, and active management of both passengers and taxis.

4.6.2 The passenger set down and pick up system at King's Cross and its relationship to St Pancras has been discussed with Transport for London (TfL). This concluded that taxis should move directly from the set down to the pick up area. Following this taxis should exit onto Euston Road to give good network distribution to the south.

The passenger set down and pick up arrangement and management system presented is acceptable to TfL as it could provide a high throughput of passengers, helps to minimise empty taxi journeys, it complements the adjacent St Pancras Station taxi operations, and would provide high quality passenger facilities

Station forecourt

4.6.3 The forecourt of the station is seen as the external reference of the station that provides the interface with the public realm and the public access and egress for taxi and private car modes. Each of these has their own special requirements and if not planned carefully can result in conflicts between users and severance of the station from other modes and local facilities.

4.6.4 The station forecourt for the new King's Cross Station with a western concourse and the Great Northern Hotel retained has been designed to function with the CTRL Pancras Road alignment that runs to the east of the German Gym, and also with it realigned to the west of the German Gym as planned by Kings Cross Central.

Passenger Set Down

4.6.5 A station forecourt is provided for passengers arriving by taxi or private car allowing set down close to the western entrance to the station. This location is convenient for ticketing and information regarding train departures.

4.6.6 The set down facilities are aligned adjacent to the station entrance with local canopies providing cover to arriving passengers. The set down zone provides 10 set-down spaces and 2 disabled parking bays with the walk distance to the station minimised to satisfy the SRA *Train and Station Services for Disabled Passengers, A Code of Practice 2002*. After set down

private cars can then exit onto Pancras Road in a northbound direction whilst empty taxis can progress southbound through to the pick up area.

Short Stay parking

4.6.7 It has been agreed between Network Rail and LCS&P/Argent St George that a combined St Pancras/King's Cross stations car park is to be provided. This will be located away from the forecourt in St Pancras Station to minimise station forecourt area.

Taxi Pick Up

Pick Up in 2000/2002

4.6.8 For reference, surveys at Kings Cross in 2000/2002 indicated 3 to 4 pick up bays were required for the 6/9 train service. However, as taxi supply reduced passenger wait times became unacceptable. Surveys identified passenger wait times of 13 minutes in the evening to 35 minutes in the morning. Taxi sharing was not operated at the station. A taxi rank of some 27 vehicles was regularly observed with passenger queues extending to some 100 to 150 passengers

Taxi pick up requirements for Western Concourse Application

4.6.9 To identify the taxi pick up requirements for the future design condition the Arup/TfL Taxi Pick Up Model (*Improving the Operation of Taxi Ranks at Major Interchanges, Feb 2002*) has been run for the expected peak passenger flows in the peak hour.

4.6.10 Under standard operations and good taxi supply, 8 bays are required at the pick up. However, passenger wait times and queues can become excessive when taxi supply falls and therefore high levels of active management will be required to maintain passenger throughput. Consideration of taxi share operations should also be considered during peak periods when taxi flows cannot be maintained. Under taxi share 6 bays are required.

4.6.11 Passenger queues could range from some 46 passengers with 100% taxi supply and taxi sharing, up to some 269 passengers when supply reduces to 65% under standard operations.

4.6.12 Taxis can move directly from the set down to join the head of the taxi rank by passing along Pancras Road to the west of the Hotel, or exit onto Pancras Road to join the extended taxi rank. At the pick up area, taxis would filter from the single lane into two lanes feeding two pick-up zones serving standard and taxi sharing queues. Taxis exit onto Euston Road promoting good distribution for both central London destinations and northern destinations via York Way.

Taxi Rank

4.6.13 As a general note taxi ranks, during periods of high passenger demand and low taxi supply, are typically short and act as a free flowing approach lane to the pick up. Hence, during these periods taxi queuing is not apparent. As taxi supply increases the actual departure rate of taxis will become dependant on the ability of the management system to maximise passenger loading at the pick up. During these conditions taxi queues within the rank will become more evident and be seen as a slow moving line of vehicles. At these times there may be a need to shorten the passenger loading times by increased active management.

4.6.14 It is also to be noted that during times when no passengers are waiting, the taxi rank will typically be fully occupied and often extend beyond the designated rank as drivers wait for the arrival of passengers from the trains. In 2002 a taxi rank of some 27 spaces was provided on the west side of the station. The Western Concourse Application provides for some 29 spaces in the rank which is extended to some 50 spaces with the King's Cross Central highway modifications.

Forecast Taxi and Vehicle Pick-Up/Set-Down Flows (Pancras Road)

4.6.15 The total passenger set down and pick up traffic flows assume that rail operations are near to capacity allowing for Central London and local demand growth. The change in the taxi and private car flows are shown in **Table 4.1**.

4.6.16 The flows along Pancras Road have a significant taxi content with high potential for taxi drivers to choose where they pick up passengers. This choice has been reflected in the assignment of empty taxis following set down of passengers. Additionally the passenger pick up at both stations is defined as a single system with management expected to reduce passenger wait times and to reduce the taxi empty journey distances. This allows some of the empty taxis from St Pancras International to move across to the King's Cross pick up at times when demand requires. However, it is recognised that additional empty taxis are still required to serve the stations from Euston Road.

Table 4.1:Future Assessment. Passenger Set Down and Pick Up Peak Hours. Pancras Road

	AM				PM			
	Taxis	**Private Cars**	**Mini Cabs**	**Total**	**Taxis**	**Private Cars**	**Mini Cabs**	**Total**
Kings Cross Station								
Set Down	167	25	10	**202**	452	86	35	**573**
Pick Up	310	25	10	**345**	156	86	35	**277**
St Pancras Station								
International Set Down	499	83	0	**582**	360	65	0	**425**
Domestic Set Down	64	77	0	**141**	46	97	0	**143**
Pick Up	441	-	-	**441**	321	-	-	**321**

4.6.17 The combined taxi movements for both stations will place a significant demand on the current available taxi supply. From experience at Paddington Station following the introduction of Heathrow Express the increase during the peak hours, whilst high was lower than expected. However, the daily movements were significantly increased. This change respects the nature of the Heathrow Express passenger movements which are fairly constant throughout the day. Since the initial uplift the increase has been minimal since 1998 with a trend lower than the natural growth in taxis which is in the order of 2% per annum. Observations have also identified the high variation in hourly taxi arrivals which results in a shortfall of passenger throughput. This increases passenger queuing lengths and wait times. To overcome this taxi sharing was introduced at Paddington to improve passenger throughput.

4.6.18 At King's Cross it is expected that a similar trend will be experienced. Firstly the St Pancras rail operations will trigger a significant increase in taxi movements followed by a modest annual growth to account for growth in general traffic at both stations including the demands of Kings Cross Central. Hence the traffic flows presented assume that taxi sharing will need

to be considered during the morning period for King's Cross Station at least. This increases taxi occupancy and has the additional benefit of reducing the demands on the highway network.

4.7 Cyclists

4.7.1 Connections between the station and these routes are to be accommodated within the Northern and Southern Squares.

4.7.2 In accordance with Network Rail Managed Stations Design Guide (Final Draft, 2002), bicycle parking provision within the station will be increased from 80 to 150 spaces. This supply respects the expected increase in passenger growth at the station. These parking facilities will then be linked into the on street cycle lanes planned by Camden on the surrounding streets.

4.8 Bus

4.8.1 The scheme respects bus interchange and enhances existing station links to suit. This is particularly relevant across the Southern Square where a new public space is created with the removal of the existing concourse. Therefore, the public realm development will enhance the environment for passengers waiting and moving across the square.

4.8.2 The CTRL highway arrangement provides bus stops at the southern end of the highway close to Euston Road. With the development of the Western Concourse an additional pedestrian crossing is provided on Pancras Road to improve accessibility.

4.8.3 It is concluded that the Network Rail station enhancement will provide improved connections with bus services on both Euston Road and Pancras Road by improving the public realm and pedestrian connections.

4.9 Operational Facilities

Station Servicing

4.9.1 The servicing strategy objective is to minimise the conflict between passengers and delivery vehicle access and distribution of goods within the station, thereby improving passenger safety. This has been achieved by providing access from either Pancras Road or Goods Way to the shared service yard. This basement facility will be managed to distribute deliveries throughout the day. Service routes will be provided at basement level with lifts onto platforms and within the Western Concourse to allow internal distribution around the station. This therefore reduces conflict with passengers within the station.

4.9.2 In addition to this central facility other servicing routes will be required at grade across the Southern Square for LUL and station facilities. These will be restricted zones to exclude deliveries from peak passenger flow periods.

4.9.3 On street station servicing along York Way will also be maintained from a single bay for links with the Eastern Range. This will be used to serve the office including refuse collection.

4.9.4 The servicing facilities suit the Network Rail requirements, for the enhanced train service, with a station accommodating 1376 Square metres retail, 2,605 square metres catering and 13,145 square metres offices in the Western and Eastern Ranges and the Concourse. These areas have been used to calculate the typical number of deliveries at the basement service area and on York Way. It is estimated :

- that at the basement service area during 12 hours (0700-1900) some 61 vehicles will arrive.
- That some 14 vehicles per day will use the on street York Way service bay.

4.9.5 A segregated waste policy has been applied with a central waste area in the basement service area. This area incorporates recycling of station waste.

4.9.6 The application of a managed delivery operation for station operations and improved storage operations will reduce the number of daily deliveries at the station. Currently surveys show that the 12 hour arrivals of some 106 vehicles occur in the area of the suburban Shed. The future case with management will reduce this to some 61 vehicles over this period in the basement service area. In addition some 14 daily deliveries are expected on York Way.

4.10 Highway Capacity Assessment

4.10.1 The assessment of effects on traffic conditions draws on guidance contained in the Institution of Highways and Transportation (IHT) Traffic Impact Assessment Guidelines. It is considered that there is a potential for traffic impacts during both construction and operation if the predicted traffic levels were to meet the following conditions:

- generated traffic levels exceed 10% of the baseline two-way traffic on the adjoining highway, or 5% where the adjoining highway is already congested; or
- the development generates over 100 vehicle movements (a return journey is two movements) in a peak hour.
- In addition an assessment will be made of whether the ratio of traffic flow to capacity and queue length are within recommended limits for the operational phase.

4.10.2 The change in vehicle flows, shown in **Table 4.2**, along Pancras Road due to the uplift in rail capacity creates an increase of some 90 to 145 vehicles during the morning and evening peak hours respectively at the southern two way section of Pancras Road. This equates to a 5.4% and 9.1% increase respectively when compared to the Base traffic flows. For the one way sections of Pancras Road the change varies between 6.4% to 9.0% during the morning peak hour, and between 1.0% and 3.6% during the evening peak hour.

Table 4.2:Pancras Road Change in Traffic Flows from Base Case to Maximum Case (vehicles)

Location	Base Case		Future Case		Change	
	AM	PM	AM	PM	AM	PM
Pancras Road						
Southern Two-way section	1628	1594	1715	1738	87 (5.4%)	144 (9.1%)
Central one-way section outside King's Cross Set down	1378	1710	1466	1770	88 (6.4%)	61 (3.6%)
Northern one-way section between St Pancras domestic set down and coach station	1006	1186	1096	1198	90 (9.0%)	12 (1.0%)

4.10.3 The percentage changes in traffic flow along Pancras Road range between 5% and 9% for the morning peak hour, and between 1% and 9% for the evening peak hour. Therefore, with reference to the IHT Traffic Impact Assessment Guidelines there is a case to state that the

King's Cross Station western Concourse application has minimal impact on the highway network as the change does not exceed 10% of the base flow.

4.10.4 Due to the strategic nature of the interchange project and the taxi flow interfaces between King's Cross and St Pancras Stations a signal analysis of the Pancras Road operations has been undertaken. This study, initially by Arup and further developed by TfL, has reviewed traffic operations along Pancras Road between Euston Road and Goods Way to confirm that the operations can be accommodated in conjunction with the new pedestrian crossings and station forecourt operations.

5 KING'S CROSS CENTRAL INFLUENCE

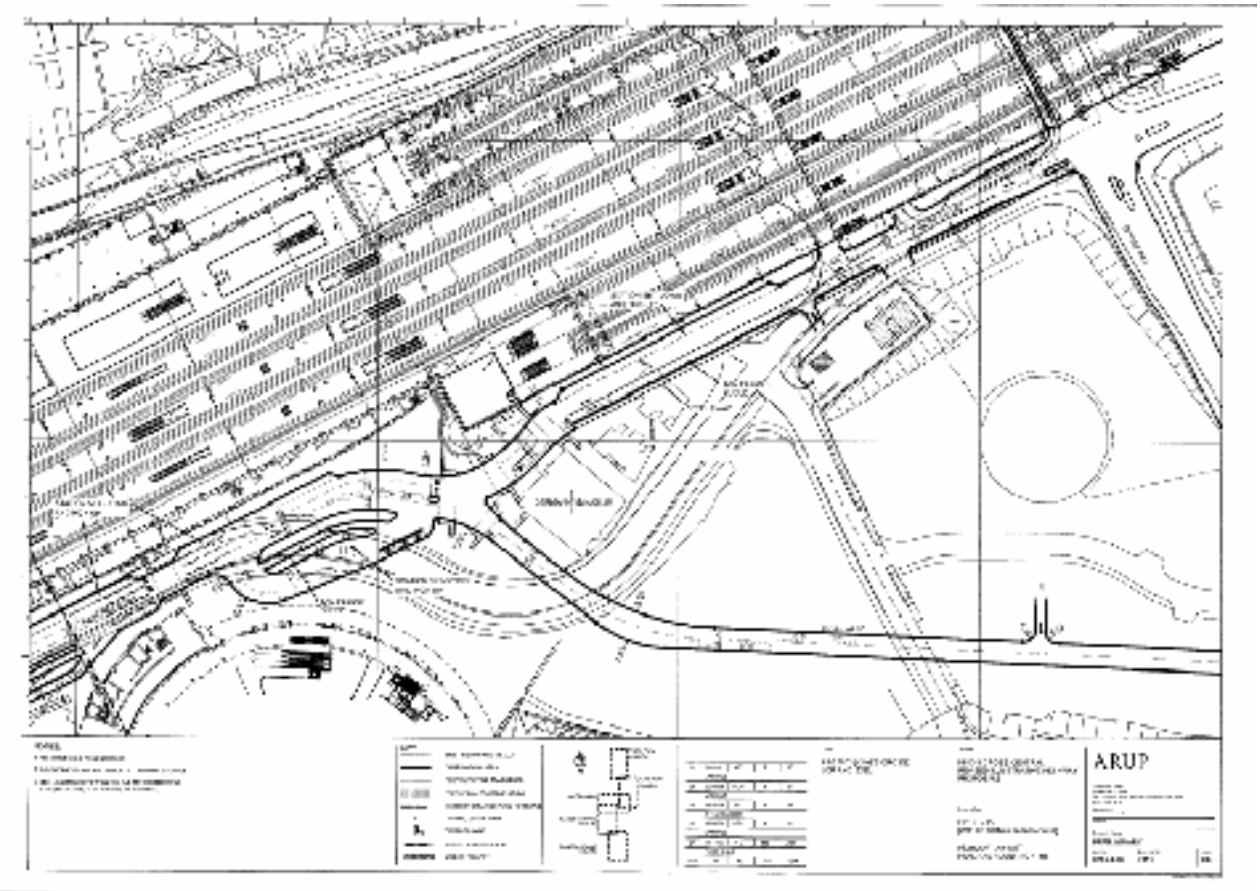
5.1 King's Cross Station with King's Cross Central Development

5.1.1 With the introduction of the Kings Cross Central development, and expected full occupation, new passenger movement within the concourse and new public realm pedestrian movements will be generated. These people will utilise some of the newly available rail and station capacity created by the Station Enhancement project. Passenger movements will be to and from the main station entrance and the boulevard to the north. Pedestrian movements will cross the northern square and use the walkways adjacent to and through the Great Northern Hotel.

5.1.2 Compared with the 2007/8 base, the Kings Cross Central project mobilises the following infrastructure changes shown on **Figure 5.1**:

- Pancras Road will be realigned with a modified station set down forecourt;
- Station servicing entry and exit will be via a ramp with a junction on Goods Way;
- A new LUL entrance will be provided on the new boulevard.
- The northern square will be enlarged.

Figure 5.1: Pancras Road Realigned by King's Cross Central



5.2 King's Cross Central

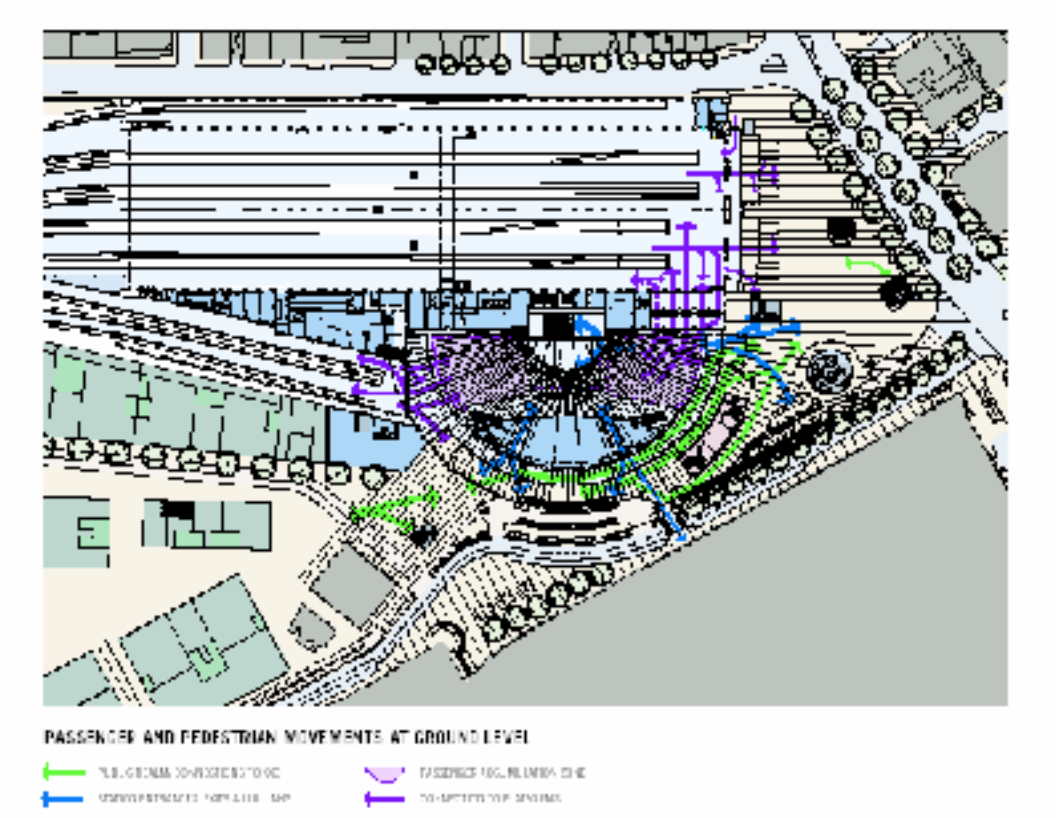
5.2.1 The number of passenger trips to and from the King's Cross Central developments for the PM peak period has been supplied by Argent. The number of King's Cross Central development trips using King's Cross station is dependent on train operations at the mainline station. **Table 5.1** describes the King's Cross Central development trips at full occupancy in relation to total trips using the mainline station.

5.2.2 The design of the station has taken into account the flows generated from the King's Cross Central development with the passenger distribution amended to reflect the new peak hour development passenger flows.

5.3 Concourse and Public Realm Movements

5.3.1 The station design respects the passenger accumulation areas and mainline interchange movements with the various modes including LUL, buses, and taxis. The movements are significantly increased above the Base Case however through careful concourse design and the segregation of other external development pedestrian movements the station provides acceptable operations during normal and train delay conditions. The general movement diagram is presented on **Figure 5.2**.

Figure 5.2: Western Concourse Movement Diagram



5.3.2 **Table 5.1** provides a summary of the 2007/8 Base Case flows and enhanced 7/12 service with King's Cross Central.

Table 5.1: Key Passenger Movements (3hr peak periods)

	1600-1900 hours	
	Base Case 2007/8 6/9 Operation	7/12 Operation with Western Concourse
Main Shed Movements	19,230	21,025
Suburban Shed Movements	10,150	12,930
Total Main Line	29,380	33,955
King's Cross Central to Mainline Rail	NA	3,167

5.3.3 During the evening the forecast passenger flow in the station (for rail related trips and assuming 7/12 operation with King's Cross Central) has increased by 4,575 (16%) when compared with the 2007/8 6/9 Base Case scenario.

5.3.4 For the PM peak period the newly generated King's Cross Central trips are some 9% of the total forecast passenger movements at the station. The King's Cross trips represent 70% of the general increase in demand between the Base Case and the 7/12 scenario.

5.3.5 In addition to movements to and from the Western Concourse, there are a significant number of pedestrian movements within the public realm areas adjacent to of King's Cross station. The concourse design adjacent to the hotel specifically accommodates these high flows by segregating them from the concourse accumulation areas and inter modal links.

5.3.6 During the evening some pedestrians are expected to walk around the perimeter of the Western Concourse between King's Cross Central / St.Pancras station and Euston Road / Southern LUL access points.

5.4 Highway Operations

5.4.1 The King's Cross Development to the north of the station is not identified as generating significant additional vehicle flows along Pancras Road during the peak hours. Reference to King's Cross Central working papers identifies some 70 and 15 additional vehicles during the morning and evening peak periods. These trips are London wide trips and exclude local taxi trips between the stations and development lands, which are included within the flows defined for the Station Application Scheme. The impacts along the strategic road network of York Way and Midland Road are expected to be greater.

5.5 Pancras Road

Figure 5.1 shows the future alignment and operation of Pancras Road with the King's Cross Central developments included. The operation of the layout is described as follows:

- A two lane two direction carriageway running between Euston Road and the St. Pancras 'keyhole' pedestrian crossing open to general traffic. Passenger set down facilities are provided adjacent to both St. Pancras station and the King's Cross Western Concourse for taxis, private cars and buses. Private vehicles entering the station drop-off area from the south can then return south to Euston Road along this section of Pancras Road.
- Pancras Road continues north of the German Gym with two with two northbound lanes for general traffic and a southbound taxi and cycle lane. In addition taxi ranking spaces are provided in the southbound direction.

- The Boulevard continues north of St. Pancras station on the east side of the German Gym with one lane in either direction open to buses and taxis only.
- This arrangement for Pancras Road allows for increased bus frequencies with a total of 32 services during the peak hour. The proposed layout also permits greater flexibility of exit routes from the station set down areas.
- The proposed layout enhances integration between transport modes at both King's Cross and St. Pancras stations.

6 SUMMARY AND CONCLUSIONS

6.1 Operational Summary

6.1.1 The King's Cross Station Enhancement design has allowed for an uplift in main line operations from the current 15 trains an hour to 19 trains an hour. This increase in station capacity supports continued passenger growth including the requirements of the Kings Cross Central development assuming full occupation.

6.1.2 The maximum 7/12 main line passenger capacity within the station will increase by some 4,575 in the evening when compared with the 2007/8 operation. The King's Cross Central development would account for some 9% of the future total station passenger flows assuming the capacity based 7/12 peak hour operation. King's Cross Central accounts for 70% of general growth in the station between the 2007/8 Base Case and the maximum capacity 7/12 scenario. The Station project is shown to accommodate the following:

Concourse and Public Realm

- Increased main line rail operations and support facilities accommodates additional passenger movements generated by increased train service frequencies and capacities. This includes the new western concourse, interchange with other modes, and segregated pedestrian routes linked between new public realm.
- The design allows for the segregation of external passenger flows from concourse operations during perturbated conditions whilst providing clear circulation routes between the north and south squares.

Bus Interchange

- With the demolition of the existing southern concourse improved linkages with bus services on both Euston Road and Pancras Road, in addition to improved linkages to planned pedestrian crossings, are provided through the new public realm areas.

Station Forecourt

- The station forecourt for the new King's Cross Station with a western concourse and the Great Northern Hotel retained has been designed to function with Pancras Road as the CTRL Pancras Road alignment that runs to the east of the German Gym, and also with it realigned to the west of the German Gym as planned by Kings Cross Central. Pancras Road has been maintained as a distributor road for all classes of traffic and is shown to operate to acceptable levels in the future assessment year.
- The taxi operations have been designed to operate as a single system for both the Kings Cross and St Pancras Stations. This will reduce the empty taxi distances travelled in this area.
- The 10 set down bays for taxis and private cars are aligned adjacent to the station entrance with local canopies providing cover to arriving passengers.
- Under standard operations and good taxi supply, 8 bays are provided at the pick up. However, passenger wait times and queues can become excessive when taxi supply falls and therefore high levels of active management will be provided to maintain passenger throughput. Taxi share operations will also be considered during peak periods when taxi flows cannot be maintained. Under taxi share 6 bays are required.
- In 2002 a taxi rank of some 27 spaces was provided on the west side of the station. A similar rank is provided for the Application Scheme with CTRL Pancras Road alignment.

The rank can be increased to some 50 bays with the King's Cross Central realignment of Pancras Road.

Cycle facilities

- Cycle parking is to increase from the current 80 spaces to some 150 spaces within the station. This supply respects the expected increase in passenger growth at the station. These parking facilities will then be linked into the on street cycle lanes planned by Camden on the surrounding streets.

Station Servicing Strategy

- Conflict between passengers and delivery vehicles is reduced by providing a segregated access road initially from Battlebridge Road and then finally from Goods Way down to a new basement services area. The Goods Way access road will also provide access to Argent St George development areas. This basement facility will be managed to distribute deliveries throughout the day and to share facilities where possible. In addition to this central facility other servicing routes will be required at grade across the Southern Square for LUL and station facilities. These will be restricted zones to exclude deliveries from peak passenger flow periods. On street station servicing along York Way will also be maintained for links with the Eastern Range.
- The application of a managed delivery operation for station operations and improved storage operations will reduce the number of daily deliveries at the station. Currently 12 hour arrivals of some 106 vehicles occurs in the area of the Suburban Shed. The future case with management will reduce this to some 43 vehicles over this period in the basement service area. In addition some 14 daily deliveries are expected on York Way.

Pancras Road Operations

- The change in vehicle flows along Pancras Road, due to the uplift in rail capacity, creates an increase of some 90 to 145 vehicles during the morning and evening peak hours respectively at the southern two way section of Pancras Road. This equates to a 5.4% and 9.1% increase respectively when compared to the Base traffic flows. For the one way sections of Pancras Road the change varies between 6.4% to 9.0% during the morning peak hour, and between 1.0% and 3.6% during the evening peak hour.
- Although the flows are not greater than the 10% signal analysis along Pancras Road between Euston Road and Goods Way has been undertaken to confirm that the operations can be accommodated in conjunction with the new pedestrian crossings and station forecourt operations. The results indicate that pressure is placed on the Euston Road right turn into Pancras Road with it operating at capacity in all cases. The remaining junctions along Pancras Road operate within 90% capacity levels, which is acceptable. The final setting of the signals will need to be discussed in detail and considered in the context that the CTRL approved arrangements had similar saturated links for the future year state.

6.2 King's Cross Opportunity Area (Camden Planning and Development Brief) Review

6.2.1 The King's Cross Station Enhancement and provision of the new Western Concourse responds to the London Borough of Camden Planning and Development Brief (December 2003) for the King's Cross Opportunity Area. In particular the project supports the transport objectives and facilitates new developments by:

- The removal of the existing southern concourse to enable good integration with public transport links and enhancement of the public realm along Euston Road.
- Maintains and enhances LUL connections with direct connections within an immediately adjacent to the mainline station concourse.
- Enhances street level interchange with St Pancras Station.
- Improves facilities for interchange with taxi operation at King's Cross for future demand and supports St Pancras Station operations.
- Provides a segregated station servicing strategy that reduces conflict with passengers within the station and also reduces conflict with pedestrians in the enhanced public realm between Euston Road and Goods Way.
- Increase station cycle parking facilities and connects with the on street highway facilities developed by Camden.
- Reduces the need to utilise private cars by enhancing other modal interchange whilst providing facilities for passenger set down in the station forecourt and co-ordinating with St Pancras Station for pick up from the main station car park.
- Provides facilities for mobility impaired in the station forecourt close to the station entrances.
- Provides good north-south connections for adjacent development lands enhancing the public realm and pedestrian connections.

6.3 Conclusion

6.3.1 The King's Cross Station enhancement project has been shown to support future growth in passenger movement by providing a new station western concourse, improving interchange facilities and improving the adjacent public realm. This accommodates the expected long term increase in passenger flows generated by the King's Cross Central Development and other local and central London development. The project also satisfies the objectives established by the London Borough of Camden in their development brief for the King's Cross Opportunity Area.

References

[1] Technical Assessment of Western Concourse Operations Arup Report Ref 130-20/06/03

[2] Station Forecourt operations. Passenger Set down and Pick Up. Arup Report Ref 114.

[3] King's Cross Station Enhancement. Operations Strategy for Stage D. April 2004.

[4] King's Cross Station Enhancement. Pancras Road Junction Assessment. Arup Report Ref 189.

[5] King's Cross Station Enhancement Investment Appraisal, Dynamic Modelling, December 2005

Annex K

Additional Noise Assessment Information

CONTENTS

K1 ASSUMED CONSTRUCTION PLANT INVENTORIES

K1.1 INTRODUCTION

An inventory of construction plant items has been developed based upon experience of similar projects and in the absence of specific information at this time. The key noise generating construction plant inventory for each phase of the scheme is provided below.

K1.2 WESTERN CONCOURSE CONSTRUCTION

Table K1.1 Structural Modifications to Existing Buildings

Plant	Assumed plant sound power level dB(A)	Estimated on time of activity (%)	No. Of Plant	Equivalent continuous sound power level dB(A)
Pneumatic breakers	116	50	2	116
Compressor (silenced)	99	100	2	102
Tracked excavator	109	75	1	108
Lorry	105	50	2	105
Dozer	114	50	1	111
Dumper (small)	107	50	2	107
Mobile crane (small)	104	25	1	98
Tracked excavator with breaker	121	75	1	120
Total				**122**

Table K1.2 Utility Diversions

Plant	Assumed plant sound power level dB(A)	Estimated on time of activity %	No. Of Plant	Equivalent continuous sound power level dB(A)
Tracked excavator	109	50	2	109
Water pumps	97	30	1	92
Compressor (silenced)	99	50	2	99
Pneumatic breakers	106	10	1	96
Truck mixer	94	5	1	81
Generators	104	100	2	107
Lorry	99	25	1	93
Welding equipment	102	50	1	99
Total				**112**

Table K1.3 Excavation

Plant	Assumed plant sound power level dB(A)	Estimated on time of activity %	No. Of Plant	Equivalent continuous sound power level dB(A)
Tracked excavator	106	50	1	103
Trench digger	102	50	1	99
Mobile crane (large)	105	75	1	104
Lorry	102	50	1	99
Compressor (silenced)	102	100	2	105
Truck Mixer	107	30	1	102
Lorry mounted concrete pump	104	30	1	99
Scabbling concrete	106	30	1	101
Total				**111**

Table K1.4 Piling

Plant	**Assumed plant sound power level dB(A)**	**Estimated on time of activity %**	**No. Of Plant**	**Equivalent continuous sound power level dB(A)**
Tracked excavator	106	50	1	103
Trench digger	102	50	1	99
Mobile crane (large)	105	75	1	104
Bored piling rig	112	50	1	109
Lorry	102	50	1	99
Compressor (silenced)	102	100	2	105
Truck Mixer	107	30	1	102
Lorry mounted concrete pump	104	30	1	99
Pnuematic Chipping Hammer	119	15	1	114
Total				**116**

Table K1.5 New Structural Works

Plant	Assumed plant sound power level dB(A)	Estimated on time of activity %	No. Of Plant	Equivalent continuous sound power level dB(A)
Tracked excavator	106	50	1	103
Lorry	104	40	2	103
Mobile crane (large)	105	30	1	100
Mixer truck	103	40	1	99
Lorry mounted concrete pump	104	30	1	99
Compressor (silenced)	102	100	2	105
Generator	104	100	2	107
Scaffolding	91	10	1	81
Total				**112**

K1.3 PLATFORM Y AND EAST SIDINGS CONSTRUCTION

Table K1.6 Services Diversion and Drainage

Plant	**Assumed plant sound power level dB(A)**	**Estimated on time of activity %**	**No. Of Plant**	**Equivalent continuous sound power level dB(A)**
Tracked excavator	109	50	2	109
Water pumps	97	30	1	92
Compressor (silenced)	99	50	2	99
Pneumatic breakers	106	10	1	96
Truck mixer	94	5	1	81
Generators	104	100	2	107
Lorry	99	25	1	93
Welding equipment	102	50	1	99
Total				**112**

Table K1.7 Excavation

Plant	Assumed plant sound power level dB(A)	Estimated on time of activity %	No. Of Plant	Equivalent continuous sound power level dB(A)
Tracked excavator	106	50	1	103
Trench digger	102	50	1	99
Mobile crane (large)	105	75	1	104
Lorry	102	50	1	99
Total				**108**

Table K1.8 Platform Y Construction/Platform 1 Extension

Plant	Assumed plant sound power level dB(A)	Estimated on time of activity %	No. Of Plant	Equivalent continuous sound power level dB(A)
Tracked excavator	106	50	1	103
Lorry	104	40	2	103
Hand tools	112	75	2	114
Mobile crane (large)	105	30	1	100
Mixer truck	103	40	1	99
Lorry mounted concrete pump	104	30	1	99
Compressor (silenced)	102	100	2	105
Generator	104	100	2	107
Total				**115**

Table K1.9 Signalling/OLE Structures

Plant	Assumed plant sound power level dB(A)	Estimated on time of activity %	No. Of Plant	Equivalent continuous sound power level dB(A)
Tracked Crane	116	50	1	113
Lorry	98	25	1	92
Concrete Pump	100	25	1	94
Truck Mixer	100	25	1	94
Total				**113**

Table K1.10 Replacement/Relaying of Track

Plant	Assumed plant sound power level dB(A)	Estimated on time of activity %	No. Of Plant	Equivalent continuous sound power level dB(A)
Lorry	98	25	1	92
Tracked Crane	116	50	1	113
Welding Equipment	91	50	1	88
Total				**113**

Table K1.11 Demolition

Plant	Assumed plant sound power level dB(A)	Estimated on time of activity %	No. Of Plant	Equivalent continuous sound power level dB(A)
Tracked Excavator	108	25	1	105
Tracked Excavator with Breaker	119	25	1	113
Total				**114**

K1.4 PREDICTED CONSTRUCTION NOISE LEVELS

Table K1.12 Predicted Construction Noise Impacts: April 2007 to December 2007

Phase 1: January 2008 to August 2008	**Noise Level at Receptor (Limit – 75 dB)**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Structural modifications to existing buildings	67	57	59	51	53	49	**80**	70
Utility diversions	60	50	52	44	46	42	73	63
Demolition	59	49	51	43	45	41	72	62

Table K1.13 Predicted Construction Noise Impacts: January 2008 to September 2008

Phase 2: September 2008 to March 2009	**Noise Level at Receptor (Limit – 75 dB)**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Structural modifications to existing buildings	72	62	66	57	50	46	71	**76**
Utility diversions	66	56	60	48	42	38	64	71
New structural work	66	56	60	53	48	41	75	72

Table K1.14 Predicted Construction Noise Impacts:October 2008 to December 2009

Phase 3: April 2009 to September 2009	**Noise Level at Receptor (Limit – 75dB)**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Structural modifications to existing buildings	72	62	66	57	50	46	71	**76**
Piling	66	56	60	51	44	40	65	70
New structural work	66	56	60	53	48	41	75	72

Table K1.15 Predicted Construction Noise Impacts: January 2010 to March 2012

Phase 4: September 2009 to August 2010	**Noise Level at Receptor (Limit – 75dB)**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
New Structural Work	68	58	62	53	48	44	**77**	72

Table K1.16 Predicted Construction Noise Impacts: August 2012 to August 2013

Phase 5: September 2010 to June 2011	**Noise Level at Receptor (Limit – 75dB)**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
New structural work	68	57	61	51	46	42	68	74

Table K1.17 Night-time Possessions – Suburban Shed

Associated Phase of Night-time Working	**Estimated Total Duration (Non-consecutive nights – including weekends)**	**Worst Case Noise Level at Receptor[1] (Limit – Lowest Measured Ambient)**					
		2 (59)	**3 (59)**	**4 (66)**	**5 (65)**	**6 (65)**	**8 (58)**
Utilities Diversions	15	50	52	44	46	42	**63**
New Structural Work and Piling	45	53	55	47	49	45	**66**
Demolition of Southern End	15	49	51	43	45	41	**62**

(1) Only residential receptors are considered to be exposed to night-time noise

Table K1.18 Night-time Possessions – Main Shed

Associated Phase of Night-time Working	Estimated Total Duration (Non-consecutive nights – including weekends)	Worst Case Noise Level at Receptor (Limit – Lowest Measured Ambient)					
		2[(1)] (59)	3[(1)] (59)	4 (66)	5[(1)] (65)	6 (65)	8[(1)] (58)
Relocation of Buffers 5 – 8	40	-	-	**71**	-	-	-
Replacement of Cross-Platform Bridge (Utilities Diversions and Removal of Old Bridge)	12 Weeks	-	-	-	-	51	-
Replacement of Cross-Platform Bridge (Piling and Installation of New Bridge)	52 Weeks	-	-	-	-	53	-

(1) As the works will be carried out within the station complex the only receptors exposed to noise from the works are those adjacent to openings in the building, 4 and 6, for relocation of the buffers and installation of the new bridge respectively

K1.5 PLATFORM Y – CONSTRUCTION

Table K1.19 Predicted Construction Noise Impacts: Platform Y (April 2005 – December 2006)

Phase	Noise Level at Receptor[(1)] (Limit – 75 dB)		
	4	5	6
Services Diversions and Drainage	65	55	65
Excavation	61	51	61
Platform Y Construction / Platform 1 Extension	68	58	68
Signalling / OLE Structures	66	56	66
Replacement / Relaying of Track	69	59	69
Demolition	67	57	67

(1) As these works are proposed for the far eastern side of the site, only those receptors on that side are considered to be exposed

Table K1.20 Predicted Construction Noise Impacts: East Sidings

Phase	Noise Level at Receptor[(1)] (Limit – 75dB)		
	4	5	6
Replacement / Relaying of Track	52	51	70
Signalling / OLE Structures	49	48	67
Excavation	44	43	62

(1) As these works are proposed for the far eastern side of the site, only those residential receptors on that side are considered to be exposed

Table K1.21 Night-time Possessions – Platform Y

Associated Phase of Night-time Working	Estimated Total Duration (Non-consecutive nights)	Worst Case Noise Level at Receptor[(1)] (Limit – Lowest Measured Ambient)		
		4 (66)	5 (65)	6 (65)
Platform Y Construction / Platform 1 Extension	27	**68**	58	**68**
Services Diversions	7	65	55	65
Signalling / OLE Structures	15	**66**	56	**66**
Replacement / Relaying of Track	1	**69**	59	**69**

(1) As these works are proposed for the far eastern side of the site, only those residential receptors on that side are considered to be exposed

K2.1 DESCRIPTION OF TERMINOLOGY

K2.1.1 ***A-Weighting*** is the direct measurement by a sound level meter incorporating an electrical filtering network that modifies the frequency response to follow approximately the equal loudness curve of 40 phons. The A-weighted sound level expressed in dB(A), has been shown to correlate extremely well with human subjective response.

K2.1.2 L_{Aeq} is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over a given period.

K2.1.3 L_{A90} is the dB(A) level exceeded 90% of the time and is most commonly used to describe background noise.

K2.1.4 L_{A10} is the dB(A) level exceeded 10% of the time and is often used to describe the level of traffic noise.

K2.1.5 L_{Amax} is the maximum dB(A)sound pressure level recorded over the period measured. L_{Amax} is often used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{Aeq} noise level.

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