Thames Tideway Tunnel
Thames Water Utilities Limited

Application for Development Consent

Application Reference Number: WWO10001

Transport Assessment

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Kirtling Street

Main Report

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Thames Tideway Tunnel

Creating a cleaner, healthier River Thames

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Thames Tideway Tunnel

Transport Assessment

Section 14: Kirtling Street

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14 Kirtling Street

14.1 Introduction

14.1.1 This site specific *Transport Assessment (TA)* presents the findings of the assessment of the transport issues of the Thames Tideway Tunnel project at the Kirtling Street site located within the London Borough (LB) of Wandsworth.

14.1.2 The assessment takes into consideration the changes as a result of all other Thames Tideway Tunnel project sites to ensure that results indicate the significance of each individual site in combination with construction works being undertaken at other sites. The purpose of this *TA* is to identify the Kirtling Street site context, development proposals and any transport implications arising from these proposals to ensure that appropriate mitigation measures are identified, where necessary.

14.1.3 The TA draws on a number of project-wide or application documents which include the *Transport Strategy* and the *Code of Construction Practice (CoCP)*. Further detail on these documents which form the background to the *TA* can be found in Section 1 of the *TA*.

14.1.4 The *TA* structure is as follows:

a. Section 14.2 includes a description of the proposed development, detailing construction phasing, vehicle and person trip generation and construction traffic routing and details of the operational phase.

b. Section 14.3 outlines the assessment methodology used for the *TA* for the construction and operational phases.

c. Section 14.4 details the baseline conditions on the transport network surrounding the site, including survey data analysis and accident analysis.

d. Section 14.5 provides the assessment of the construction phase of the project, including a comparison between the construction base case and the construction development case. This section also outlines sensitivity testing for the highway network.

e. Section 14.6 provides the assessment of the operational phase of the project.

f. Section 14.7 summarises the *TA* findings.

14.2 Proposed development

14.2.1 The proposed development site is located south of the River Thames adjacent to the Riverlight development and west of Heathwall Pumping Station in the LB of Wandsworth. The site would be comprised of two areas; the northern area is bounded to the north by the river Thames, to the east by the Riverlight development (Tideway Wharf Industrial Estate) and Kirtling Street, to the south by Cringle Street and to the west by the Cemex concrete batching plant.

14.2.2 The southern area is bounded to the southeast by Nine Elms Lane (A3205), to the north by Cringle Street and to the west by Kirtling Street. Figure 14.2.1 in the Kirtling Street *Transport Assessment* figures indicates the Kirtling Street site location.

14.2.3 The development at Kirtling Street would be a main tunnel double drive site with tunnelling progressing eastwards to Chambers Wharf and westwards to Carnwath Road Riverside.

Construction

14.2.4 The construction site would be located on existing industrial areas south of the River Thames. Vehicle access to and from the site would be from Nine Elms Lane (A3205) or Battersea Park Road via Cringle Street and Kirtling Street. Kirtling Street would need to be closed to general traffic, except Cemex vehicles, at its northern and north-western sections for the duration of the construction period.

14.2.5 There would be a number of phases of construction at the Kirtling Street site phase 1 - covering site set-up, shaft construction, phase 2 - tunnelling, phase 3 - secondary lining and phase 4 - demobilisation. Construction at the site is anticipated to last for six years. The access plan and highway layout during construction (phases 1-3) plan is provided in the Kirtling Street *Transport Assessment* figures.

14.2.6 Stage 1 *Road Safety Audits* have been carried out on the illustrative highway layouts proposed for this site. The *Road Safety Audit* reports for this site are contained in Appendix E.

14.2.7 During construction it is anticipated that transport networks could be affected as a result of the additional construction traffic associated with Kirtling Street and other construction sites with construction routes along Nine Elms Lane (A3205), vehicle and pedestrian diversions along Kirtling Street and the Thames Path, the suspension of car parking bays and relocation of a bus stand.

14.2.8 A temporary jetty would be provided to transfer excavated material via conveyors from the site to barges.

14.2.9 During all phases of construction the northern and north-western section of Kirtling Street would be closed and would form part of the construction site. This 131m section would only provide vehicular access to the Kirtling Street site and the neighbouring concrete batching plant. This would result in a diversion for pedestrians using the Thames Path. The existing Thames Path route westbound along Kirtling Street from the north-eastern corner of Kirtling Street would be diverted southbound along Kirtling Street to Cringle Street where it would re-join the Thames Path as it is expected to route during construction.

14.2.10 There would be additional vehicle crossovers on Kirtling Street and Cringle Street where new site access points would be constructed. These would be provided with tactile paving and dropped kerbs. These new accesses would create additional vehicle/pedestrian conflict points. However the number of pedestrians walking along these sections of Kirtling Street and

Cringle Street is expected to be low because of the proposed diversion of the Thames Path during construction work.

14.2.11 Public traffic would not be permitted to access the northern and north-western section of Kirtling Street which would be closed during the construction period. However, with the exception of the concrete batching plant vehicles, for which access would be maintained, it would not be necessary for general traffic to gain access to properties in this area, which would be taken over by the construction site. Traffic accessing the eastern section of Kirtling Street north of Cringle Street would be required to travel back along that section and exit via Cringle Street in order to return to Nine Elms Lane (A3205). This diversion would be clearly signposted.

14.2.12 A gated access would provide access to the northern site for construction vehicles at the section of Kirtling Street that currently forms a crossroads with Cringle Street. This gate would provide entry only; vehicles exiting the northern site would do so into the north of Kirtling Street adjacent to the Riverlight development then route into Cringle Street, then turn left towards Nine Elms Lane (A3205). A second access from the northern site would be provided on Cringle Street between the northern site entry access and the Cringle Street/Kirtling Street junction in the south-eastern corner. This second access will operate right-turn out only.

14.2.13 Access to the southern site would be via a right-turn in/ right-turn out only access on Cringle Street opposite the proposed location of the second northern site access. The highway layout during construction vehicle swept path analysis (phases 1-3) plan is provided in the Kirtling Street *Transport Assessment* figures.

14.2.14 Parking for fifteen essential maintenance/ operational vehicles would be provided on the Kirtling Street site. No worker parking would be provided.

14.2.15 For the purpose of this Transport Assessment, it has been assumed that 90% of excavated material from the main tunnel along with sand and aggregates for secondary tunnel lining would be transported by barge from/to the site. All other materials would be transported by road.

14.2.16 Construction details for Kirtling Street site relevant to the construction Transport Assessment are summarised in Table 14.2.1.

Table 14.2.1 Maximum Construction traffic details

Description	Assumption
Assumed peak period of construction lorry movements	Site Year 3 of construction
Assumed average peak daily construction lorry vehicle movements and duration	192 movements per day (96 vehicle trips) 1 month

Description	Assumption
Assumed average peak period of construction barge movements	Site Year 3 of construction
Assumed average peak daily construction barge movements	8 movements per day (4 barge trips)
Types of lorry requiring access (comprising rigid-bodied, flatbed and articulated vehicles)	Office delivery lorries Temporary construction material lorries including pipe/track/oils/greases lorries Plant and equipment lorries Readymix mixer lorries Steel reinforcement lorries Excavated material lorries Cement tanker lorries Aggregate lorries Tunnel precast concrete linings lorries

Note: a movement is a construction vehicle/barge moving either to or from the site. A Site Year is a 12 month period, one in a series of Site Years; Site Year 1 commences at the start of construction.

Construction routes

14.2.17 The Kirtling Street site is located adjacent to Kirtling Street and Cringle Street, which are accessed from Nine Elms Lane (A3205). Nine Elms Lane (A3205) forms part of the Transport for London Road Network (TLRN).

14.2.18 Figure 14.2.2 in the Kirtling Street *Transport Assessment* figures shows the construction traffic routes for Kirtling Street. These have been discussed with both Transport for London (TfL) and the Local Highway Authority.

14.2.19 The main junctions in the vicinity of the site, along the construction traffic routes are:

a. Nine Elms Lane (A3205) / Battersea Park Road (A3205) / Kirtling Street / Covent Garden Market access junction

b. Nine Elms Lane (A3205) / Cringle Street junction

c. Kirtling Street / Cringle Street junction

d. Vauxhall gyratory.

14.2.20 The Kirtling Street site will operate with four access points for Thames Tideway Tunnel traffic during the construction period as described in

14.2.12 to 14.2.13. Construction vehicles will approach northbound along Kirtling Street from the junction with Nine Elms Lane (A3205) / Battersea Park Road (A3205) / New Covent Garden Market access road into the main access on Cringle Street. Traffic would exit to the junction with Nine Elms Lane (A3205) / Cringle Street, turning left onto Nine Elms Lane.

14.2.21 The majority of construction vehicles are likely to route to/from the east via Vauxhall gyratory, while a proportion of site traffic could route west along Nine Elms Lane (A3205) and Battersea Park Road (A3205).

14.2.22 Some construction vehicles could also travel to and from the Kirtling Street site from the south west via Queenstown Road (A3216).

14.2.23 Vehicles routing to/from the east towards the Vauxhall gyratory would either cross Vauxhall bridge to continue west along the A3212 towards Chelsea Bridge Road, or alternatively route south at the Vauxhall gyratory along the A202m towards the A2 and A20. .

14.2.24 The exact routing depends on the material origins and destinations which are detailed in the *Project-wide TA*.

Proposed construction flows

Construction vehicles and barges

14.2.25 During construction 90% of excavated material from the main tunnel (export) and 90% of secondary lining aggregates (import) would be transported by barge from the site and all other materials would be transported by road.

14.2.26 The proposed working hours are set out in the *CoCP* and vehicle movements would take place during the standard day shift of ten hours on weekdays (08:00 to 18:00) and five hours on Saturdays (08:00 to 13:00).

14.2.27 Construction activity would occur 24 hours a day for some periods but during such periods, construction vehicle movements would only occur during the ten and five hour periods stated above.

14.2.28 A limited number of extensions to working hours may be required to cover certain construction activities at the Kirtling Street site such as major concrete pours. The site would also require continuous working hours when the tunnelling and secondary lining construction activities are taking place. These underground works would occur on a continuous 24 hour cycle seven days a week. However, construction vehicle movements would be limited to the hours stated in para. 14.2.26 other than in exceptional circumstances.

14.2.29 In exceptional circumstances HGV and abnormal load movements could occur up to 22:00 for large concrete pours and later at night on agreement with the LB of Wandsworth.

14.2.30 The histograms in Plate 14.2.1 (construction lorry profile) and Plate 14.2.2(construction barge profile) show that the peak site-specific activity at the Kirtling Street site would occur in Site Year 3 of construction. The peak activity for barge movements at this site would also occur in Site Year 3 of construction.

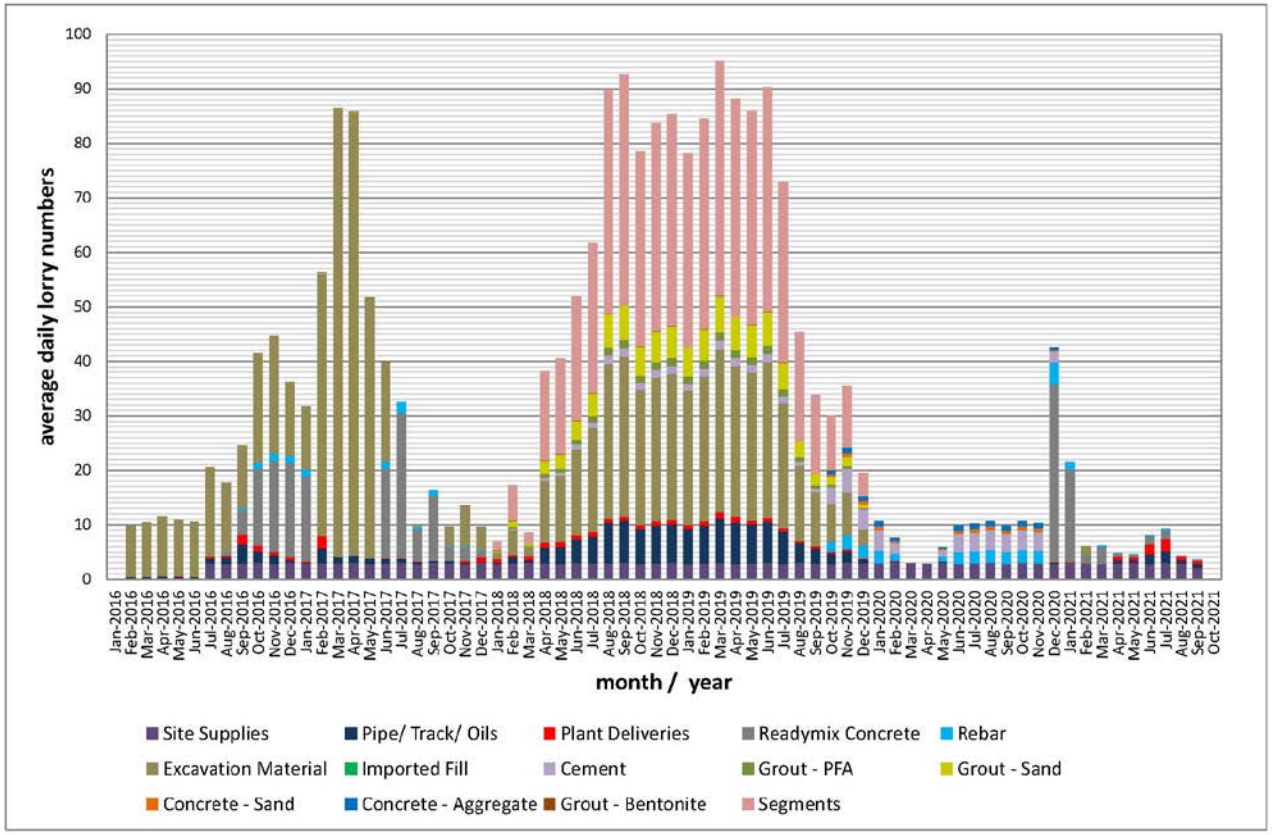
14.2.31 The site-specific peak construction assessment year is 2019. This site-specific peak year is the same as the overall project-wide construction peak activity year of 2019.

14.2.32 This *TA* assesses this site-specific peak construction year. As detailed in Table 14.2.1 there would be an estimated 192 (i.e. 96 two-way vehicle trips) average peak daily construction lorry vehicle movements and an estimated eight peak daily construction barge movements in Site Year 3 of construction.

14.2.33 The assessment is based on 10% of the daily number of lorry journeys occurring in the peak hours, which has been agreed with TfL as a reasonable approach. It is recognised that it may be desirable to reduce the number of construction lorry movements in peak hours and the mechanisms for addressing this would form part of the *Traffic Management Plans* (*TMP)* which are required as part of the *CoCP*.

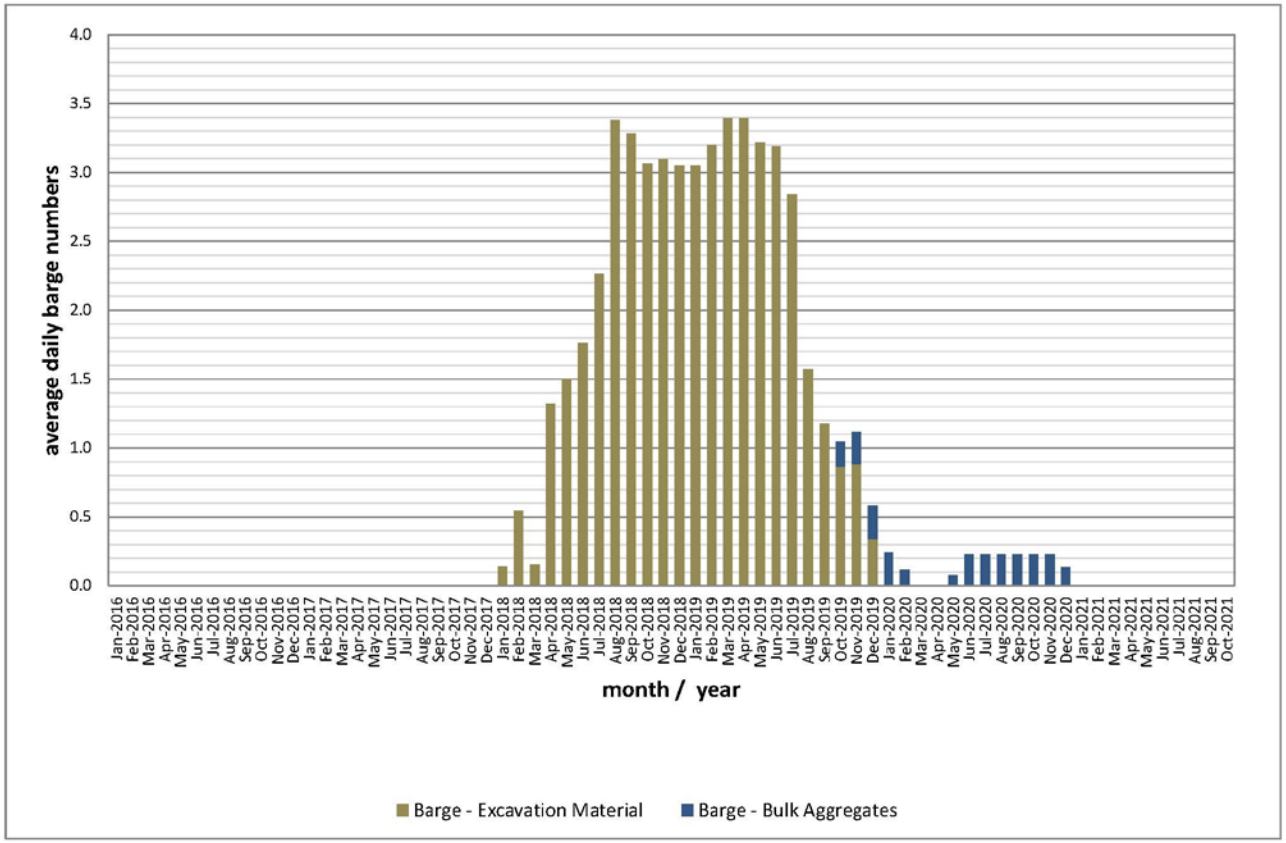
14.2.34 The number of vehicular movements will vary throughout the construction period and Plate 14.2.1 Plate 14.2.1 Construction lorry profileindicates the construction vehicle profile during construction.

Plate 14.2.1 Construction lorry profile



Note: Figure shows approximate volumes and vehicle trips based upon assumed timings for the works. It is not a programme and remains subject to change.

Plate 14.2.2 Construction barge profile



Note: Figure shows approximate volumes and barge trips based upon assumed timings for the works. It is not a programme and remains subject to change.

14.2.35 As indicated in Plate 14.2.1 Construction lorry profilethe number of vehicular movements varies throughout the construction period with one month of 192 movements a day, 13 months with between 140 to 190 HGV movements a day, four months with between 100 to 140 HGV movements a day, 16 months with between 40 to 100 HGV movements a day and 30 months with less than 40 movements a day during the six year build programme.

14.2.36 As the *Project-wide TA* explains, the TfL Highway Assignment Models (HAMs) used for the strategic highway modelling represent peak hours of 08:00 to 09:00 and 17:00 to 18:00 and these have been taken as being the network-wide AM and PM peak hours in the project-wide and site-specific assessments.

14.2.37 The 08:00 - 09:00 and 17:00 - 19:00 periods identified from the local traffic surveys are busier on the network in the weekday than those encountered at the weekends (this is discussed in Section 14.3). Whilst the AM and PM peak hours differ slightly from these network-wide peak hours, in practice the number of vehicle movements at this site would be low in comparison to base case traffic flows on the adjacent network and is expected to be constant throughout the day.

14.2.38 Hourly construction vehicle trips during the inter-peak period are not expected to exceed the hourly trips generated between 08:00 - 09:00 and 17:00 - 18:00. The peak travel periods hours utilised for the modelling assessments in this report are therefore the weekday periods between 08:00 - 09:00 and 17:00 - 18:00.

14.2.39 Other construction vehicle movements associated with site operations and contractor activities would be cars and light goods vehicles (LGVs). The construction worker vehicle movements expected to be generated by the Kirtling Street Wharf site are shown in Table 14.2.4.

Construction workers

14.2.40 The construction site is expected to require a maximum workforce of 426 workers on site. However, as a result of shift patterns, there will be a maximum of 235 workers on site at any one time. The number and type of workers is shown in Table 14.2.2.

Table 14.2.2 Maximum estimated construction worker numbers

Contractor					Client	
Staff[a]		Labour[b]			Staff[c]	
08:00-18:00	18:00-08:00	08:00-15:00	15:00-23:00	23:00-08:00	08:00-18:00	18:00-08:00
80	20	90	90	75	65	6

[a] *Staff Contractor – engineering and support staff to direct and project manage the engineering work and site.*
[b] *Labour – those working on site doing engineering, construction and manual work.*
[c] *Staff Client – engineering and support staff managing the project and supervising the Contractor.*

Note: The table shows maximum number of workers required (426). However, as a result of shift patterns the maximum work force on site would be 235 occurring during the day shift (08:00 – 18:00). Travel for the workers will occur both during and outside of these hours.

14.2.41 The worker mode split has been derived by taking the highest number of workers during the peak month and calculating the percentage of trips based on the 2001 Census[i] journey to work data for the area in the vicinity of the Kirtling Street site.

14.2.42 The Census data indicates that the predominant mode of travel for journeys to work in this area is public transport. There is no parking available on-site for workers and there would be no parking provided within the site boundary. Parking on surrounding streets is also restricted and measures to reduce car use would be incorporated into a site-specific Travel Plan which means that workers would be unlikely to drive to the site. Therefore, the Census mode shares have been adjusted to reflect increased levels of non-car use by workers at this site. In order to assess a scenario which represents the most likely mode split at a construction site within this area, the mode split outlined in Table 14.2.3 has been used to assess the impacts of worker journeys on the highway and public transport networks.

14.2.43 The method of distribution of worker trips on the transport networks, including the public transport services, has been agreed with the TfL and Local Highway Authority.

[i] Based on 2001 Census. This type of data had not been released from the 2011 Census at the time of the assessment.

Table 14.2.3 Transport mode split

Mode	Percentage of trips to site	Equivalent number of worker trips (based on 235 AM peak hour and 145 PM peak hour worker trips)	
		AM peak (07:00-08:00)	PM peak (18:00-19:00)
Bus	20.0%	47	29
National Rail	33.5%	79	49
Tube	28.8%	68	42
Car driver	<1%*	0	0
Car passenger	<1%*	0	0
Cycle	3.7%	9	5
Walk	8.8%	21	13
River	0.6%	1	<1
Other (taxi/motorcycle)	4.6%	10	7
Total	**100%**	**235**	**145**

Note: The peak travel time for construction workers is anticipated to occur between 07:00 – 08:00 and between 18:00 – 19:00, and the PM peak hour trips will be lower than the AM peak hour trips as shift changes occur at 15:00.
** assuming to be zero for the purpose of this assessment.*

14.2.44 Information regarding the travel arrangements of these workers would be included in the contractors' *Construction Management Plan* and *Workplace Travel Plan* documents for the Kirtling Street site.

14.2.45 It is difficult to predict with certainty the directions that workers would travel to and from the Kirtling Street site. Staff could potentially be based in the local area or in the wider Greater London area and are unlikely to have the same trip origin-destination distributions as construction lorries.

14.2.46 It is assumed that the predominant mode of travel for journeys to work in this area is public transport and it is assumed that the directions to and from the site would be along Nine Elms Lane (A3205) to the nearest bus stops to the northeast of the site and to Battersea Park National Rail station to the southwest of the site.

Vehicle movements summary

14.2.47 Other construction vehicle movements associated with site operations and contractor activities would be cars and LGVs. Other construction vehicle movements expected to be generated by the Kirtling Street site are shown in Table 14.2.4.

14.2.48 Table 14.2.4 also shows the construction lorry movement assumptions for the local peak traffic periods. These are based on the peak months of construction activity at this site.

Table 14.2.4 Construction works vehicle movements

Vehicle type	Vehicle movements per time period				
	Total Daily	**07:00 to 08:00**	**08:00 to 09:00**	**17:00 to 18:00**	**18:00 to 19:00**
Construction lorry vehicle movements 10%[a]	192	0	19	19	0
Other construction vehicle movements[b]	134	6	6	6	6
Worker vehicle movements[c]	nominal	0	0	0	0
Total	**326**	**6**	**25**	**25**	**6**

[a] *The assessment is based on 10% of the daily construction lorry movements associated with materials taking place in each of the peak hours.*

[b] *Other construction vehicle movements includes cars and light goods vehicles associated with site operations and contractor activity.*

[c] *Worker vehicle numbers are based on less than 1% of workers driving, on the basis that there would be no worker parking on site, on-street parking in the area is restricted, and site-specific Travel Plan measures would discourage workers from driving by car. In practical terms, this would be close to zero.*

14.2.49 Assuming that 90% of excavated material from the main tunnel and secondary tunnel lining aggregate is transported by barge with all other material transported by road, an average peak flow of 326 vehicle movements a day is expected during the months of greatest activity during Year 3 of construction at this site. At other times in the construction period, vehicle flows would be lower than this average peak figure.

14.2.50 The assessment has been based on a combination of the peak hour of movements for construction and worker vehicle movements between 07:00 to 09:00 and 17:00 to19:00. These have been applied to the peak hours to take into account the highest number of movements generated by the site. In reality, not all peaks for these movements would occur concurrently and the peak for worker trips would be outside of the highway network peak hour, therefore the assessment is considered to be a robust case.

14.2.51 Table 14.2.4 shows that in the AM (07:00 – 09:00) and PM (17:00 – 19:00) peak periods, the Kirtling Street site would generate approximately 31 vehicle movements in each peak period. This has been assessed against

the peak hour operation of the highway network and represents a robust figure for assessment as it combines the anticipated movements between 07:00 and 09:00 in the morning and 17:00 to 19:00 in the evening.

14.2.52 It is anticipated that there would be an additional 19 two-way HGV movements along Nine Elms Lane (A3205) during these AM and PM peak periods as a result of the construction at the Kirtling Street site, plus an average of seven two-way HGV movements during the peak hour associated with other Thames Tideway Tunnel sites passing along Nine Elms Lane (A3205) during Site Year 3 of construction at the Kirtling Street site.

Code of Construction Practice

14.2.53 Measures incorporated into the *Code of Construction Practice* (*CoCP*)[ii] *Part A* (Section 5) to reduce transport effects include:

a. site specific *Traffic Management Plans* (TMP): to set out how vehicular access to the site would be managed so as to minimise impact on the local area and communicate this with the local borough and other stakeholders. This includes any works on the highway, diversion or temporary closure of the highway or public right of way

b. HGV management and control: to ensure construction vehicles use appropriate routes to the sites and the vehicle fleet and/or drivers meet current safety and environmental standards

c. site specific *River Transport Management Plans* (RTMP) are to be produced for each relevant worksite. As with the TMP's this would set out how river access to site would be managed so as to minimise impact on the river and communicate this with the PLA, local borough and other stakeholders.

14.2.54 In addition to the general transport measures within the *CoCP Part A*, the following measures have been incorporated into the *CoCP Part B* (Section 5) relating to the Kirtling Street site:

a. access to/from the site would be from Kirtling Street and Cringle Street

b. there would be no direct access to and from the Kirtling Street site from Nine Elms Lane (A3205) between Kirtling Street and Cringle Street junctions

c. construction traffic would utilise a route one-way system on Kirtling Street and Cringle Street. Except where being shown as stopped up on the access plan, Kirtling Street and Cringle Street would be kept open for two-way movements for general (non-construction) traffic

d. exit from the site onto Kirtling Street is by the Riverlight development including the car park entrance/exit and nursery. The contractor would put in measures to manage potential conflicts with vehicles entering

[ii] The *Code of Construction Practice* (CoCP) is provided in Vol 1 Appendix A of the *Environmental Statement*. It contains general requirements (Part A), and site specific requirements for this site (Part B).

and exiting the site at these access points and other traffic on Cringle Street and pedestrians and cyclists on the Thames Path

e. the site access onto the southern side of Cringle Street would operate as right turn in and right turn out only for construction vehicles. The site exit on the northern side of Cringle Street would operate as left turn out only.

f. the site encompasses part of the existing Cemex site. Access to the Cemex site would be maintained throughout the construction period via Kirtling Street with egress via Cringle Street

g. bus stand in Cringle Street to be relocated

h. the diversion of the Thames Path would be adequately signed.

14.2.55 Based on current travel planning guidance including TfL's '*Travel planning for new development in London* (TfL, 2011)[1]', this development lies within the threshold for producing a Strategic Framework Travel Plan. A *Project Framework Travel Plan* has been prepared based on the TfL ATTrBuTE[iii] guidance. The *CoCP Part A* addresses Project-wide travel planning measures, including the need for a Project-Wide Travel Plan Manager, initial travel surveys during construction and a monitoring framework at each site, while *CoCP* Part B addresses site-specific measures. The site-specific travel-planning measures of relevance to the Project Framework Travel Plan are as follows:

a. information on existing transport networks and travel initiatives for the Kirtling Street site including shuttle bus services for staff and labour

b. a mode split established for the Kirtling Street site construction workers to establish and monitor travel patterns

c. site-specific targets and interim targets would be established based on the mode share which would link to objectives based on local, regional and national policy

d. a nominated person would be assigned responsibility for managing the Travel Plan monitoring and action plans specifically for this site.

Other measures during construction

14.2.56 Embedded design measures which are not outlined in the *CoCP* but are of relevance to the *TA* at the Kirtling Street site comprise:

a. closure of the northern and northwestern section of Kirtling Street and the introduction of a one way system for construction vehicles to accommodate this

b. removal of the footway at the crossover of the two new site accesses on Cringle Street.

[iii] Assessment Tool for Travel plan Building Testing and Evaluation, (*ATTrBuTE*), is a web-based travel planning tool, which ensures that Travel Plans are in accordance with TfL's published guidance on travel planning for new development in London, http://www.attrbute.org.uk/.

14.2.57 These measures are detailed further within Section 14.5 construction assessment.

Operation

14.2.58 During operation it is anticipated that there would be no significant issues for the transport infrastructure and operation within the local area because maintenance trips to Kirtling Street site would be infrequent and short term. On this basis, the only elements considered in the operational assessment are:

a. highway layout and operation.

14.2.59 There would be potential for some operational issues to arise as a result of the short-term changes to the physical aspects of access to the Kirtling Street site for maintenance. These are only considered qualitatively because the physical changes required to the highway network during maintenance activity would be minor and temporary, meaning that a quantitative assessment is not required. The scope of this analysis has been discussed with the TfL and LB of Wandsworth.

14.2.60 On completion of the construction phase the existing highway layout would be reinstated and the operational access on Kirtling Street would be taken from an existing access to the concrete batching works.

14.2.61 Access would be required for a light commercial vehicle, typically a transit van, on a three- to six-monthly maintenance schedule. On occasions there may be a consequent need for small flatbed vehicles to access the site.

14.2.62 Additionally there would be more significant maintenance visits approximately every ten years requiring access to enable two mobile cranes and associated support vehicles to be brought to the site to facilitate lowering and recovery of tunnel inspection vehicles and to provide duty/standby access for personnel. This may require a temporary diversion of the Thames Path in the vicinity of the site.

14.2.63 During operation, maintenance vehicles would enter the site from Kirtling Street at the existing access to the concrete batching site. The highway layout during operation plans (areas 1 and 2) are provided in the Kirtling Street *Transport Assessment* figures and indicate the operational layout at the site.

14.3 Assessment methodology

Engagement

14.3.1 An extensive scoping and technical engagement process has been undertaken. All consultee comments relevant to this site are presented in the *Environment Statement.*

14.3.2 Whilst the effects associated with transport for the operational phase have been scoped out of the *Environment Statement.*, the *TA* examines the operational phase in order to satisfy the relevant stakeholders that

technical issues have been addressed (for example, those associated with access for maintenance activities).

Consultees

14.3.3 Throughout the scoping and technical engagement process the key stakeholders with regards to transport, primarily TfL and the relevant borough for each site, have been consulted. For Kirtling Street, the LB of Wandsworth has been consulted and the comments which have arisen relating directly to Kirtling Street have been recorded and responded to accordingly.

14.3.4 The key comments arising from the stakeholder engagement are:

a. highway layout is to be assumed to remain the same as existing during construction despite the Battersea Power Station proposals to alter it.

b. the residents of house boats moored at the Nine Elms Pier community and Tideway Village should be consulted to determine their requirements regarding parking spaces.

c. this site is expected to have a workforce of 175 during the daytime. Thames Water will need to prepare a plan at all sites to deal with staff travel, but this site is particularly important given the larger numbers.

d. a riverside walk of 6m in width should be provided post construction which would follow the Thames frontage. A new access path is also sought which would run from Kirtling Street towards the Thames Path along the western boundary of the site.

e. the use of the river should be maximised at the Kirtling Street site and Thames Water should investigate further the potential to transfer 100% of the excavated material by river.

f. Thames Water must ensure that any movement of materials both in and out of the site are minimised.

g. assessment of the impact of lorry movements in the transport assessment must include the cumulative impact of lorry movements from other development within the Opportunity Area.

h. investigate whether permitting all movements by construction vehicles at the Nine Elms Lane (A3205) / Cringle Street junction would create significant impact on traffic. Investigate whether this junction should be signalised.

i. during construction it would be most suitable to divert the Thames Path along Nine Elms Lane (A3205) between Heathwall Pumping Station and Kirtling Street.

j. check bus stops / stand location on Nine Elms Lane (A3205) and Cringle Street then review vehicle swept paths and liaise with TfL Buses to determine whether they require relocation.

k. the current level of usage of parking in Kirtling Street and Cringle Street should be investigated and the impact of removing this parking determined.

l. the likely road layout changes as a consequence of US Embassy proposals in the area should be investigated.

m. it is unclear what the difference is between secondary and primary routes and at what times or circumstances you are likely to use the secondary routes.

n. St John's Hill, Lavender Hill and Wandsworth Road are local roads with primarily residential and retail frontage and therefore should not be used by construction vehicles. Queenstown Road and Silverthorne Road to the south of the Tarmac and London Concrete Battersea site, which takes its access from Battersea Park Road (A3205), should also not be used by construction vehicles.

o. Battersea Bridge Road, Prince of Wales Drive, Albert Bridge Road, Latchmere Road and Elspeth Road are residential and contain two low bridges and should be removed if a logical alternative TLRN route is available.

p. background traffic growth assumptions should be discussed with TfL in relation to their assessment of the Northern Line Extension (NLE).

q. regarding the Thames Tideway Tunnel assumptions on background traffic growth provided in the summary table, the following comments should be considered:

    i Thames Tideway Tunnel shows a seven year construction period, but shows a steady movement throughout that period. Is it unlikely that the construction traffic profile would be that smooth.

    ii NLE construction is programmed between 2015 and 2018 with NLE expected to open in 2019.

    iii Battersea Power Station – likely construction will commence in 2013 and could extend over this period. However from 2015 there will also be operational traffic coming from this site as Phase 1 is occupied.

    iv US Embassy - A figure should be included for construction traffic (for example 4-6 vehicles during peak hours), which is due to commence in 2014 and be complete in 2017.

    v Embassy Gardens – Construction start in 2012 and a suitable construction vehicle flow should be estimated (for example 6-7 Vehicle during peak hours). There is likely to be some operational traffic from 2015 onwards.

    vi New Covent Garden Market - we suggest 2025 as more realistic construction end date. Again there will be construction traffic from later phases and operational traffic from the earlier phases.

    vii Market Towers – 2013 is a more realistic start date with a four year build out.

    viii Battersea Plant –expect an increase in traffic as it will hopefully supply many of the construction sites in the area.

r. the impact of the proposed diversion of the Thames Path along Nine Elms Lane (A3205) will need assessing and appropriate mitigation put forward, including pedestrian crossings, diversionary signage etc which will need to be discussed further with TfL.

s. the impact on the Nine Elms Lane (A3205) junctions with Cringle Street and Kirtling Street, including any proposed modifications, during construction will need to be assessed and discussed further with TfL.

t. Further work on the completed scheme needs to be undertaken to ensure that the re-instatement provides an improved Thames Path and public realm appropriate for this changing location.

u. the construction management plans for works at Battersea Power Station and Riverlight should be reviewed and similar principles adopted if possible.

v. the number of vehicle movements between sites must be determined and assessed if Kirtling Street is used as a hub site for Heathwall.

14.3.5 The key technical issues raised have been addressed as far as is practicable at this stage within this *TA*, *Project-wide TA* and the *Environmental Statement*, in consultation with both TfL and the LB of Wandsworth.

Construction

14.3.6 The assessment methodology for the construction phase follows that described in the *Project-wide TA* with the exception of the method of local capacity modelling. Due to the number of committed developments in the Nine Elms area the base case traffic flows in the TfL HAMs are lower than the expected flows. Background traffic flows have therefore been calculated using information available for each committed development site and manually adding these into the models as described further in this section.

14.3.7 The effect of all other Thames Tideway Tunnel sites on the area surrounding Kirtling Street (for example, the Heathwall Pumping Station site) has been taken into account within the assessment of the peak year of construction at this site.

Construction assessment area

14.3.8 The assessment area for the Kirtling Street site includes the site accesses from Kirtling Street and Cringle Street, which are local roads off Nine Elms Lane (A3205) which is part of the TLRN. The junctions of Kirtling St / Nine Elms Lane (A3205) / Battersea Park Road (A3205)) / New Covent Garden access road and Cringle Street / Nine Elms Lane (A3205) have been assessed for highway, cycle and pedestrian impacts.

14.3.9 The Thames Path was included within the assessment due to its proximity to the development site. Effects on local bus services within 640m (see para. 14.4.29) of the site and rail services within 960m (see para. 14.4.29) of the site have been assessed. The Public Transport Accessibility Level (PTAL) of the site, calculated using TfL's approved PTAL methodology assumes a walking speed of 4.8km/h and considers rail stations within a

12 minute walk (960m) of the site and bus stops within an eight minute walk (640m).

14.3.10 The extent of the assessment area for the local highway network modelling has been informed by considering the volume of construction traffic at this site and the degree of impact that would be experienced at the nearest junction of the construction vehicle route with the Strategic Road Network (SRN) or TLRN. Where the assessment shows that the forecast impacts at this junction would not be significant, junctions further afield on the strategic network have not been assessed. Where impacts are forecast to be significant, a wider area of the local network has been considered in the assessment.

Construction assessment year

14.3.11 The year 2019 has been used as the peak construction assessment year for the assessment of project-wide effects. This has been agreed with TfL and is reported in the *Environmental Statement*.

14.3.12 To assess the busiest case scenario for the Kirtling Street locality the peak construction traffic year has been identified. This ensures that the assessment for Kirtling Street takes into consideration the heaviest flow of construction vehicles at this site on local roads for the local modelling assessment.

14.3.13 The site-specific peak construction traffic year at Kirtling Street is Year 3 of construction for both construction lorries and construction barges.

14.3.14 The assessment of the aggregated Thames Tideway Tunnel construction traffic flows on the wider highway network is included within the *Project-wide TA*.

Highway network modelling

14.3.15 The assessment of the local highway network includes the redevelopment of Battersea Power Station and the surrounding land, to provide a mixed use development (see Section 14.5). This is included in the construction development case.

14.3.16 The assessment for each site takes account of construction vehicle movements associated with the Kirtling Street site, together with construction traffic from other Thames Tideway Tunnel project sites that would use the highway network in the vicinity of this site in Year 3 of construction.

14.3.17 The *Project-wide TA* indicates that the TfL HAMs have been used as part of the assessment to take into account a level of future growth and development across London. However, it is expected that because of the scale and rate of change in the wider Nine Elms area, trips associated with the committed developments in the vicinity of the Kirtling Street site could significantly alter the operation of the highway network in the future.

14.3.18 From inspection of the TfL HAM for this area, it is not clear whether the changes associated with committed development are fully represented at the detailed local level. Therefore in assessing the transport effects of this site it has been agreed with TfL and LB Wandsworth that specific

allowance should be made in the local highway models for trips associated with these developments in addition to the growth factors derived from the HAMs.

14.3.19 The construction base case in Year 3 takes into account the following developments that are planned to be complete at this time[iv]:

a. NLE
b. US Embassy
c. Market Towers
d. Island Site Vauxhall Cross
e. Nine Elms Sainsbury's
f. Spring Mews, Vauxhall
g. Vauxhall Sky Gardens
h. Riverlight development, Nine Elms Lane
i. St George's Wharf (Vauxhall Tower)
j. Marco Polo House
k. Battersea Power Station (Phase 1- 3)
l. Embassy Gardens (Buildings A02, A05,and A09- A11)
m. New Covent Garden Market (Buildings B4- B6).
n. 10 Pascal Street
o. Riverwalk House, Millbank
p. 1-9 Bondway and 4-6 South Lambeth Place

14.3.20 There will also be developments under construction during construction works at the Kirtling Street site[v]. These are:

a. 81 Black Prince Road (Parliament Road)
b. 10 Albert Embankment (Hampton House)
c. 20 Albert Embankment (Wah Kwong House)
d. Chelsea Barracks
e. Marco Polo House (Phase 2)
f. Battersea Power Station (Phase 4 and 6))
g. Nine Elms Parkside (Plots B- D)
h. Embassy Gardens (Buildings A01, A03, A04 and A07)

[iv] Site f from the bulleted list has been identified in liaison with TfL and LB of Wandsworth, which are in addition to those indicated in the site development schedule (see Vol 14 Appendix N of the *Environmental Statement*)

[v] Sites a, b and c from the bulleted list have been identified in liaison with TfL and LB of Wandsworth, which are in addition to those indicated in the site development schedule (see Vol 14 Appendix N of the *Environmental Statement*)

i. New Covent Garden Market (Buildings B1- B3 and site entrance).

j. Vauxhall Square Cap Gemini

14.3.21 This means that the *TA* also considers cumulative effects in relation to those developments under construction at the same time as construction works in Site Year 3 at the Kirtling Street site.

14.3.22 The assessment of transport effects is based on the Battersea Power Station development being partially completed and partially under construction in Site Year 3 of construction at the Kirtling Street site. This includes a new highway layout at the Kirtling Street / Battersea Park Road (A3205) / Nine Elms Lane (A3205) / New Covent Garden access road junction, which is assumed to be complete before the commencement of construction at Kirtling Street. However, as there are some uncertainties around the timescale for implementation of the Battersea Power Station development, a sensitivity test has been undertaken. The construction base case and the development cases of the sensitivity test assume that the development is not progressed within a timescale that coincides with the Thames Tideway Tunnel project and hence the highway layout will be as existing. This sensitivity test is presented in this *TA.*

14.3.23 Construction traffic associated with other Thames Tideway Tunnel project sites using routes in this area has also been included in the assessment.

14.3.24 This approach provides a robust assessment case for local modelling as the baseline traffic has been increased to account for a high level of growth due to new development in the area. No allowance has been made for existing traffic that might divert to other routes as a consequence of the use of local roads by this traffic growth or Thames Tideway Tunnel project related traffic.

Sensitivity testing

14.3.25 The 'core' assessment presented in the *TA* is based on the *Transport Strategy*. It examines the month(s) in which construction vehicle activity at this site would be greatest and uses the average daily number of construction lorry movements that would occur in that month. This is considered to be reasonable because it addresses:

a. the time at which construction vehicle movements would be greatest at this site and there would be longer periods when the number of vehicle movements would be lower

b. although there may be occasions in the peak month when the number of lorry movements in one day might exceed the average daily figure, these would be limited. The number of instances would be small in the context of the overall construction period at this site and would be offset by other times when the number of construction vehicle movements would be lower than the average daily figure for the peak month

c. If lorry movements are required outside the typical hours of 08:00 to 18:00, this would be agreed in advance with TfL and the Local Highway Authority.

14.3.26 The need for sensitivity testing has been discussed with TfL. Such a test could be used to address:

a. variation in construction vehicle numbers around the average daily figure for the peak month

b. a lower level of river transport for construction materials (leading to an increased number of lorry movements)

c. changes in programme which might lead to construction activity peaking at different times and/or a greater coincidence of peaks at adjacent sites which could lead to higher construction lorry flows on the surrounding highway network.

14.3.27 As para. 14.3.25 explains, if construction vehicle numbers were to exceed the average daily figure for the peak month this would be an infrequent occurrence and should be seen in the context that the assessment is based on the peak month of construction activity at each site rather than a lower 'standard' month.

14.3.28 It is expected that river transport will be used for certain construction materials and this forms part of the *Transport Strategy*. It is therefore not likely that all materials would be moved by road at all sites. However, there is the possibility that river transport might not be available at a particular site or sites for short periods of time and this might be the result of temporary navigational constraints, local issues temporarily preventing access to the river, or wider issues restricting river movements to a number of sites (such as the closure of the Thames Barrier).

14.3.29 In practice the potential for increased coincidence of construction peaks between sites is limited because of the sequential nature of the construction activities required. Whilst it is possible that individual site peaks might change slightly, it is very unlikely that all sites would experience peak activity in the same period.

14.3.30 Although these events, if they were to arise, would be limited and short-term, it has been agreed with TfL that sensitivity testing would be undertaken within the *TA* to identify the potential impacts associated with such occurrences. It has also been agreed that for consistency, the test would be based on the number of construction lorry movements that would be related to moving all construction materials by road. This has been assumed to act as a proxy for events of this nature and represents an upper bound on the level of construction traffic that could be expected.

Operation

14.3.31 The assessment methodology for the operational phase follows that described in the *Project-wide TA*. There are no site specific variations for undertaking the operational assessment of this site.

14.3.32 Once the Thames Tideway Tunnel project is operational it is anticipated that there would be no significant effects on the transport infrastructure and operation within the local area because maintenance trips to the site would be infrequent and short-term. However, the physical aspects of

access to the site for maintenance have been considered in relation to highway layout and operation.

14.3.33 These aspects are considered qualitatively (as described in the Project Wide TA) because the minimal effect on the highway network means that a quantitative assessment is not required. The scope of this analysis has been discussed with the LB of Wandsworth and TfL

14.3.34 Given the level of the transport activity associated with the Thames Tideway Tunnel during the operational phase, impacts from other Thames Tideway Tunnel sites including Heathwall Pumping Station site, would be localised and would not have operational impacts on the Kirtling Street site. Therefore, only the localised transport issues around the Kirtling Street site are assessed (i.e. other Thames Tideway Tunnel sites are not considered).

14.3.35 With regard to other developments in the vicinity of the Kirtling Street site identified in the site development schedule (see Vol 14 Appendix N of the Environmental Statement) and in liaison with TfL and LB Wandsworth, the following developments would be complete and operational by Year 1 of operation[vi]:

a. Northern Line Extension
b. US Embassy
c. New Covent Garden Market (Buildings B1- B6 and site entrance)
d. Market Towers
e. Island Site Vauxhall Gyratory
f. Vauxhall Square Cap Gemini
g. Nine Elms Sainsburys
h. 81 Black Prince Road (Parliament House)
i. Spring Mews
j. Riverlight development
k. Chelsea Barracks
l. Embassy Gardens
m. Vauxhall Sky Gardens
n. Marco Polo House
o. Battersea Power Station (Phases 1-4, part of phase 5, phase 6)
p. St George's Wharf (Vauxhall Tower)
q. Nine Elms Parkside (Plots A-D)
r. 10 Pascal Street

[vi] Sites h, i, u and v from the bulleted list have been identified in liaison with TfL and LB of Wandsworth, which are in addition to those indicated in the site development schedule (see Vol 14 Appendix N of the *Environmental Statement*)

s. Riverwalk House, Millbank

t. 1-9 Bondway and 4-6 South Lambeth Place

u. 10 Albert Embankment (Wah Kwong House)

v. 20 Albert Embankment (Hampton House)

14.3.36 There are also some developments that would still be under construction in Year 1 of operation of the Kirtling Street site. These are:

a. Battersea Power Station (Phase 7 and part of phase 5)

b. Nine Elms Parkside (Plots E-G)

c. New Covent Garden Market (Buildings T1-T3)

14.3.37 As a result these developments have been included within the operational base case which takes into consideration the effects on highway layout and operation

Operational assessment area

14.3.38 The assessment area for the operational assessment remains the same as for the construction assessment as outlined in paras. 14.3.8 to 14.3.10.

Operational assessment year

14.3.39 The operational assessment year has been taken as Year 1 of operation which is the year in which it is assumed that the Thames Tideway Tunnel would become operational. As transport activity associated with the operational phase is very low, there is no requirement to assess any other year beyond that date.

14.4 Baseline

14.4.1 This section sets out the baseline conditions on the local transport network in the vicinity of the Kirtling Street site in 2012, with the exception of the traffic survey data which was collected in 2011.

Policy review

14.4.2 The site is located within the LB of Wandsworth; the relevant national, regional and local policy documents have been reviewed and included within the Appendix A.

Existing land use

14.4.3 The site is located on four parcels of land. The western-most parcel of land is made up of a Cemex concrete batching works; this is also a safeguarded wharf.

14.4.4 The northern-most parcel, between Kirtling Street and the river, is a depository used by the Victoria and Albert museum, which is part of the Battersea Power Station redevelopment area.

14.4.5 The central parcel is currently an unused depot. The southern parcel is in mixed use; part is a maintenance area for London Duck Tours, part is a terrace of offices and part is a disused petrol filling station.

Existing access

14.4.6 The site is currently accessed from various accesses on Cringle Street and Kirtling Street. There is pedestrian and cycle access from the Thames Path along the northern/western footway along Kirtling Street.

Pedestrian network and facilities

14.4.7 The existing pedestrian network and facilities in the vicinity of the site are described below and shown in Figure 14.4.1 in the Kirtling Street *Transport Assessment* figures. The key pedestrian network to and from the site is directly related to local public transport services including bus stops and National Rail stations.

14.4.8 The key pedestrian network related to the Kirtling Street site are:

a. Thames Path

b. Nine Elms Lane - Battersea Park Road (A3205) which provides pedestrian connections to bus stops located on Nine Elms Lane (A3205) to the northeast of the site and to Battersea Park Network Rail station to the southwest of the site.

Thames Path

14.4.9 The Thames Path from the west follows the riverside to Battersea Power Station where it routes along Cringle Street and Kirtling Street before returning to the riverside at the Riverlight development site. The route then follows the river edge returning briefly to Nine Elms Lane (A3205) before re-joining the riverside. The Thames Path passes William Henry Walk opposite the Westminster Boating Base before re-joining Nine Elms Lane (A3205) and passing along Wandsworth Road (A3036) to Vauxhall Bridge (A202).

14.4.10 Plate 14.4.1 shows the Thames Path between Kirtling Street and the River Thames.

Plate 14.4.1 Thames Path between Kirtling Street and River Thames

Nine Elms Lane - Battersea Park Road (A3205)

14.4.11 Nine Elms Lane - Battersea Park Road (A3205) provides a continuous southwest-northeast link for pedestrians along the south-eastern side of the Kirtling Street site.

14.4.12 The footways on either side of Nine Elms Lane - Battersea Park Road (A3205) vary in width from 3m to 6m and are shared with cycle lanes. See Plate 14.4.2.

14.4.13 A signalised pedestrian crossing facility is located approximately 100m east of the junction of Nine Elms Lane (A3205) with Kirtling Street for southwest-northeast pedestrian movements.

14.4.14 Pedestrian crossing facilities with dropped kerbs and tactile paving are provided on the Nine Elms Lane (A3205) and New Covent Garden Market access road arms of the signalised crossroad junction with these roads and Kirtling Street and Battersea Park Road (A3205).

14.4.15 Approximately 100m east of this junction there is a signalised pedestrian crossing facility which aids north-south pedestrian movements. Additional pedestrian crossings are located to the east of the site at the signalised junctions of Nine Elms Lane (A3205) with Ponton Road, St. George Wharf and Wandsworth Road (A3036).

14.4.16 No formal pedestrian crossing points are provided at the junction of Cringle Street and Nine Elms Lane (A3205). However dropped kerbs and

tactile paving are provided on the Cringle Street arm of the junction. Cringle Street has footpaths approximately 2m and 1.5m wide on the northern and southern side of the two-way vehicular carriageway respectively.

Plate 14.4.2 Footway along Nine Elms Lane (A3205)

Kirtling Street

14.4.17 Pedestrian crossings are provided to the west of the junction of Kirtling Street and are located at the Battersea Park Road (A3205) junctions with Prince of Wales Drive and Queenstown Road (A3216).

14.4.18 Kirtling Street has footpaths 2m wide on both sides of the two-way vehicular carriageway, providing a continuous north-south link of good quality between Nine Elms Lane - Battersea Park Road (A3205) and the southern bank of the River Thames. The Kirtling Street footway is shown in Plate 14.4.3.

Plate 14.4.3 Footway along Kirtling Street

Cringle Street

14.4.19 Cringle Street provides local access from Nine Elms Lane (A3205) and Kirtling Street as well as Gate 1 at Battersea Power Station at its western end. The street has footways each of approximately 1.8m width provided on both sides of the carriageway along with street lighting.

14.4.20 Dropped kerb crossings are provided at its junctions with both Nine Elms Lane (A3205) and Kirtling Street.

Cycle network and facilities

14.4.21 The existing cycle network and facilities in the vicinity of the site are described below and shown in Figure 14.4.1 in the Kirtling Street *Transport Assessment* figures.

14.4.22 The main cycle route within the area is National Cycle Network Route 4 (off-road) which routes along the Nine Elms Lane (A3205) Battersea Park Road (A3205) footways north-eastwards and south-westwards. The cycle path is located on the footway at the carriageway kerb. Additionally, cyclists are permitted to use the Nine Elms Lane (A3205) bus lanes which are in operation as bus lanes between 07:00 – 19:00 (see Plate 14.4.2).

14.4.23 At the signalised junction Kirtling Street / Nine Elms Lane (A3205) / Battersea Park Road (A3205) / New Covent Garden access road, advanced stop lines for cyclists are in place on all arms of the junction except the New Covent Garden Market access road arm.

14.4.24 Cyclists may also use the Thames Path as described above in para. 14.4.9.

Barclays Cycle Superhighways

14.4.25 The closest Barclays Cycle Superhighway (CS) to the site is CS8 which routes between Wandsworth and Westminster. CS8 passes along Battersea Park Road (A3205) and Queenstown Road (A3216) to Chelsea Bridge (A3126) continuing from there to Westminster. The cycle journey time between Wandsworth and Westminster is approximately 30 minutes. The closest point on CS8 to the Kirtling Street site is at Queenstown Road (A3216) approximately 885m to the southwest.

Barclays Cycle Hire Scheme

14.4.26 The closest Barclays Cycle Hire docking station is at Vauxhall Cross within Vauxhall gyratory, approximately 1.1km walking distance to the east of the site. The docking station is located on the western footway of Parry Street (A3036) and accommodates 17 bicycles.

Cycle parking

14.4.27 There are no on-street cycle parking facilities within the immediate vicinity of the site. The closest cycle parking facilities are provided at the Battersea Park National Rail station on Battersea Park Road (A3205) within the western footway approximately 810m walking distance southwest of the site; where there are two 'Sheffield' style parking stands provided.

14.4.28 Cycle parking facilities are also provided at:

a. Queenstown Road rail station approximately 1.1km walking distance southwest of the site with 8 'Sheffield' style stands

b. Vauxhall Cross rail and bus stations with the Vauxhall gyratory, approximately 1.4km walking distance east of the site with 8 'Sheffield' style stands and several more beneath the bridge arch.

Public transport

Public Transport Accessibility Level

14.4.29 The Public Transport Accessibility Level (PTAL) of the site has been calculated using TfL's approved PTAL methodology (TfL, 2010)[2] (analysis is included in Appendix B). The PTAL methodology assumes a walking speed of 4.8km/h and considers rail stations within a 12 minute walk (960m) of the site and bus stops within an eight minute walk (640m).

14.4.30 Using this methodology the Kirtling Street site has a PTAL rating of between 3 and 4, rated as 'moderate' (with 1 being the lowest accessibility and 6b being the highest accessibility).

14.4.31 The following sections detail the public transport services in the vicinity of the site which are shown in Figure 14.4.2 in the Kirtling Street *Transport Assessment* figures.

Bus services

14.4.32 A total of three daytime bus routes operate within 640m walking distance of the Kirtling Street site. Table 14.4.1 provides a summary of the bus services operating at the nearest bus stop to the site and their frequencies during the weekday peaks.

14.4.33 The bus routes operate from the following bus stops in the vicinity of the site:

a. Elms Quay Court (Nine Elms Lane (A3205)) – eastbound and westbound – approximately 400m walking distance east of the site

b. Sleaford Street (Nine Elms Lane (A3205)) – eastbound and westbound – approximately 270m walking distance west of the site

c. Ascalon Street – approximately 420m walking distance southwest of the site

d. Battersea Dogs and Cats Home (Nine Elms Lane (A3205)) – eastbound and westbound – approximately 580m walking distance west of the site.

14.4.34 On average there are 21 bus services per hour in the AM peak hour and 21 bus services per hour in the PM peak hour (in each direction) within 640m walking distance of the Kirtling Street site.

14.4.35 A bus stand is located on Cringle Street that allows TfL buses to park when not in operation.

14.4.36 There is a night time bus route serving within a 640m walking distance of the site, route 344, which stops at Cringle Street, and is a 24 hour service with two to four buses per hour during the night.

14.4.37 Vauxhall bus station (at Vauxhall Cross within Vauxhall gyratory) is approximately 1.1km walking distance (14 minute walk) northeast of the Kirtling Street site. This bus station serves a large number of bus services.

14.4.38 On average there are approximately 146 daytime bus services in total per hour in the AM and PM peak to and from Vauxhall bus station. There are approximately six night-time bus services per hour Monday – Friday between 00:00 – 06:00 and a total of nine night-time bus services per hour on Saturdays between 00:00 – 06:00.

Table 14.4.1 Existing local bus services and frequencies

Bus number	Origin - destination	Nearest bus stop to the Kirtling Street site	Approximate walking distance from Kirtling Street site (m)	Weekday two-way frequency	
				AM peak (08:00-09:00)	PM peak (17:00-18:00)
156	Archway Station – Waterloo Station	Elm Quay Court	20	8	8
	Waterloo Station – Archway Station			8	7
344	Clapham Junction – Liverpool Street Station			9	9
	Liverpool Street Station – Clapham Junction			9	10

Source: TfL (2011) Timetables. Available at: www.tfl.gov.uk (site last accessed March 2012)

London Underground

14.4.39 There are no London Underground services within a 960m walking distance from the site. However, Vauxhall underground station is located approximately 1.1km walking distance (14 minute walk) northeast of the site. It is served by the Victoria Line; serving Vauxhall travel northbound to Green Park, King's Cross, Tottenham Hale and Walthamstow Central, and southbound to Brixton.

14.4.40 Currently in the AM and PM peak hours, the service frequency on the Victoria Line is approximately every two to five minutes, providing up to 21 services per hour in each direction.

14.4.41 Table 14.4.2 provides a summary of the London Underground service and their frequencies during the weekday peaks.

Table 14.4.2 Existing London Underground services and frequencies

Line and station	Origin - destination	Approximate walking distance from Kirtling Street site (m)	Weekday two-way frequency	
			AM peak (08:00-09:00)	PM peak (17:00-18:00)
Victoria Line, Vauxhall Station	Seven Sisters – Brixton	1100	21	21
	Brixton – Seven Sisters		21	21

Source: TfL (2011) Timetables. Available at:www.tfl.gov.uk (last accessed April 2012)

National Rail

14.4.42 The closest National Rail station to the site is Battersea Park station, which is approximately 810m walking distance to the southwest of the site.

14.4.43 Battersea Park station provides access to Southern Railway train services which provide northbound services to London Victoria and southbound services to Sutton (Surrey), London Bridge and Caterham.

14.4.44 In the AM peak hour there are approximately 32 services. In the PM peak hour there are approximately 27 services.

14.4.45 Queenstown Road station is located approximately 1.1km walking distance (14 minute walk) to the southwest of the site (300m south of Battersea Park).

14.4.46 Queenstown Road provides access to South West Trains services and provides northbound services to London Waterloo and southbound services towards Clapham Junction and Weybridge.

14.4.47 In the AM and PM peak hour there are approximately 16 services (eight southbound and eight northbound services) which call at Queenstown Road.

14.4.48 Vauxhall Station is located approximately 1.1km walking distance (14 minute walk) to the northeast of the site. Vauxhall Station provides access to South West Trains services and provides southbound services to Guildford, Woking, Clapham Junction, Chessington South, Hampton Court and Shepperton and northbound services to London Waterloo.

14.4.49 In the AM peak hour there are approximately 90 services (62 southbound and 28 northbound) calling at Vauxhall station. In the PM peak hour there are approximately 82 services (61 southbound and 21 northbound).

14.4.50 Table 14.4.3 summarises the National Rail services and frequencies during the weekday peaks.

Table 14.4.3 Existing national Rail weekday peak hour services and frequencies

National Rail station	Origin - destination	Approximate walking distance from Kirtling Street site (m)	Weekday two-way frequency	
			AM peak (08:00-09:00)	PM peak (17:00-18:00)
Battersea Park	London – Luton – London – Milton Keynes Central — East and West Croydon	810m	12	7
	East and West Croydon – Milton Keynes Central – London – Luton – London		12	12
	London Bridge – London Victoria (Croydon and East London Line)		4	4
	London Victoria – London Bridge (Croydon and East London Line)		4	4
Queenstown Road	London – Hounslow, Richmond, Kingston, Windsor, Weybridge, Ascot, Guildford & Reading	1.1km	8	8
	Reading, Guildford, Ascot, Weybridge, Windsor, Kingston, Richmond, Hounslow – London		8	8
Vauxhall	Waterloo – Aldershot, Chessington, Dorking, Effingham Junction, Guildford, Hampton Court, Hounslow, Kingston, Shepperton, Reading, Richmond, Windsor, Woking	1.1km	90	82

Source: Railplanner information and timetables: www.nationalrail.co.uk (site accessed March 2012)

River passenger services

14.4.51 There are no passenger service piers in the immediate vicinity of the Kirtling Street site with the nearest pier located at St George Wharf Pier on the south bank of the river approximately 1.2km walking distance to the northeast of the site.

14.4.52 St George Wharf Pier is served by Thames Clippers services. Thames Clippers services run between St George Wharf Pier and London Eye Millennium Piers in the west and Woolwich Arsenal Pier in the east.

14.4.53 River passenger services at St George Wharf Pier provide a route to Blackfriars Millennium Pier in the AM and PM peak hours with two services in each direction with a frequency of approximately every 30 minutes. Outside of peak hours the service travels from St George Wharf to Bankside via Millbank and Embankment. The frequency of both eastbound services during the weekend is approximately every 30 minutes in peak hours. Embankment Pier, east of St George Wharf is also served by Thames Executive Charters to Putney Pier in the west and Blackfriars Millennium Pier in the northeast. Onward connections can be made at Blackfriars Millennium Pier for eastbound piers as far as Woolwich Arsenal. St George Wharf Pier is accessed from the western footway of Vauxhall Bridge Road (A202) and ticketing is located at the entrance to the pier.

River navigation

14.4.54 The Kirtling Street site is located adjacent to Cringle Dock, which is a waste transfer station for the Western Riverside Waste Authority. Waste leaving this facility is containerised and transported by barge to the new Belvedere energy from waste plant. This is a daily operation and comprises arriving and departing tugs towing up to three barges.

14.4.55 The dock itself is of a ‘finger’ design, meaning it is cut headlong into the embankment, with barges being berthed within the dock and along the river wall to the west of the dock entrance. Tugs arriving and departing the dock have to manoeuvre around the existing operational aggregates jetty that forms part of the Kirtling Street site. This operation can only be performed when the river is in the correct tidal state, as the dock and foreshore dry out at low tide.

14.4.56 Other river traffic, including commercial freight and passenger traffic, and private leisure traffic, pass the Kirtling Street site and it is estimated that the peak hour is between 14:00 to 15:00, Monday to Friday. During this hour it is estimated that about 11 vessels typically pass the site. There are also a further two to three vessels (on average) calling at Cringle Dock. This figure however, is not constant as freight vessel transit patterns are influenced by the rising and falling tide. Therefore, such a peak will only occur every 10 to 12 days when the tide is at its highest.

14.4.57 Table 14.4.4 shows the estimated typical passing river traffic rate.

Table 14.4.4 Aggregated typical river movement frequencies (passing craft per hour)

	Time of day																
	0600 - 0700	0700 - 0800	0800 - 0900	0900 – 1000	1000 - 1100	1100 – 1200	1200 – 1300	1300 - 1400	1400 - 1500	1500 - 1600	1600 - 1700	1700 - 1800	1800 – 1900	1900 – 2000	2000 - 2100	2100 - 2200	2200 - 2300	2300 - 0000
Kirtling Street site	1	2	5	2	2	1	1	6	11	6	9	2	2	2	0	0	0	0

Taxis

14.4.58 There are no taxi rank facilities within 960m of the site.

Highway network and operation

14.4.59 The site is located on Kirtling Street which routes north from its junction with Nine Elms Lane (A3025) towards the River Thames, bisecting Cringle Street. Kirtling Street is a two-lane single carriageway that loops back to Cringle Street to the east of the site. The local road network is subject to a 30mph speed limit.

14.4.60 Cringle Street is an east-west two lane single carriageway that links to Nine Elms Lane (A3025).

14.4.61 Kirtling Street and Cringle Street are local roads servicing industrial units and access to the River Thames.

14.4.62 Construction vehicles would approach and depart from the Kirtling Street site via the following network of A roads as shown in Figure 14.2.2 in the Kirtling Street *Transport Assessment* figures:

a. Nine Elms Lane – Battersea Park Road (A3205)

b. Queenstown Road (A3216)

c. Wandsworth Road (A3036) and Albert Embankment (A3036)

d. Parry Street (A3205) and South Lambert Road (A203)

e. Vauxhall gyratory.

14.4.63 Nine Elms Lane (A3205) / Battersea Park Road (A3205) forms part of the TLRN and is a four-lane carriageway, with two lanes in each direction of which one lane in each direction is a bus lane.

14.4.64 The Nine Elms Lane (A3205) / Battersea Park Road (A3205)/ Kirtling Street / New Covent Garden access junction is controlled by traffic signals. This junction provides access to New Covent Garden Market and the junction has advanced right-turn lanes provided for both Kirtling Street and New Covent Garden Market.

14.4.65 There are further signalised junctions along Nine Elms Lane (A3205) / Battersea Park Road (A3205) to the southwest of Kirtling Street, including those at Prince of Wales Drive and Queenstown Road (A3216). To the northeast of Kirtling Street junction there are also a number of signalised junctions, including Ponton Road, St George Wharf and Wandsworth Road (A3036).

14.4.66 Nine Elms Lane (A3205) links to the Parry Street (A3205) / Wandsworth Road (A3036) junction to the north and Battersea Park Road (A3205) to Queenstown Road (A3216) to the south.

14.4.67 Queenstown Road (A3216) is a three-lane single carriageway travelling in a north-south direction including a northbound bus lane providing access to Battersea Park and Central London. Queenstown Road forms part of the SRN.

14.4.68 Nine Elms (A3205) / Parry Street (A3205) / Wandsworth Road (A3036) junction is a four-arm signalised junction and northwards of this junction, Wandsworth Road (A3036) provides a connection with the Vauxhall gyratory.

14.4.69 The Parry Street (A3036) / South Lambeth Road junction is a three-arm signalised junction and northwards of this junction, South Lambeth Road (A202) provides a connection with the Vauxhall gyratory.

14.4.70 Vauxhall gyratory provides a six-lane one way system which includes a bus lane around Vauxhall Cross which itself provides access to Vauxhall London Underground and bus stations.

14.4.71 The modelling outputs for the baseline situation of the signalised Kirtling Street / Battersea Park Road / Nine Elms Lane (A3205) junction and the priority Nine Elms Lane (A3205) / Cringle Street junction are shown in Table 14.4.10 and Table 14.4.11 respectively. The overall junction performances show that both junctions are operating within capacity in the weekday AM and PM peak hours.

Parking

14.4.72 Figure 14.4.3 in the Kirtling Street *Transport Assessment* figures shows the locations of the existing car and coach parking as well as car clubs within the vicinity of the Kirtling Street site.

Existing on-street car parking

14.4.73 There is on-street parking in place along Kirtling Street and Cringle Street. The majority of the parking provision on these streets is restricted to one side of the carriageway; however some sections of Kirtling Street have parking on both sides of the carriageway.

14.4.74 There is also on-street parking in place along Sleaford Street on the southern side of Nine Elms Lane (A3205). The parking provision is restricted to the southern side of the carriageway.

14.4.75 Parking in this area is unrestricted and not subject to a controlled parking zone (CPZ).

14.4.76 On-street parking is not permitted along Nine Elms Lane (A3205) or Battersea Park Road (A3205), which are part of the TLRN.

14.4.77 Table 14.4.5 summarises the parking restrictions and the number of bays on the roads in the vicinity of the Kirtling Street site. The availability and usage of car parking capacity on a weekday and a Saturday on the roads in the vicinity of the site is summarised in Table 14.4.9.

Table 14.4.5 Existing on-street car parking in the vicinity of Kirtling Street site

Road name	Type of parking restrictions and number of bays
	Unrestricted
Kirtling Street	10
Cringle Street	56
Sleaford Street	28

Existing off-street/private car parking

14.4.78 A Sainsbury's car park is located on Wandsworth Road approximately 1.3km walking distance east of Kirtling Street site and is open Monday to Friday between 07:00 - 23:00, Saturday between 07:00 - 22:00 and Sunday 12:00 - 18:00. It is intended for customer use only.

14.4.79 The riverboat communities on Nine Elms Pier have 14 parking spaces within the 'Riverlight' development that is adjacent to the Kirtling Street site.

Coach parking

14.4.80 The nearest coach parking is at New Covent Garden Market coach park which is immediately south of the site on the New Covent Garden access road. There are 25 bays available which are intended for customers' use only.

Car clubs

14.4.81 Car clubs provide members with easy access to cars for short-term use. Cars are available as and when needed and allow members to access a car without purchase, storage and operational costs associated with owning a private car.

14.4.82 The nearest car club space to Kirtling Street is operated by ZipCar and is on Thessaly Road approximately 400m to the south-west of Kirtling Street site where one car is provided.

Servicing and deliveries

14.4.83 There are no on-street loading bays available near to the Kirtling Street site. Nine Elms Lane (A3205) is a Red Route and no stopping is permitted along this road at any time. There are however, a number of unrestricted parking areas along Cringle Street and Kirtling Street which could be used for on-street servicing and deliveries.

Baseline survey data

Description of data

14.4.84 Automatic Traffic Count (ATC) data for Nine Elms Lane was obtained from TfL and was analysed to identify traffic flows along this road in May to June 2011. These flows are discussed in paras. 14.4.106 to 14.4.112.

14.4.85 Five year accident data on the roads in the vicinity of the Kirtling Street site was obtained from TfL. This data is discussed in paras. 14.4.130 to 14.4.141.

14.4.86 Baseline survey data were collected in three phases in May, July,and September 2011 to establish the existing transport movements in the area. Figure 14.4.4 in the Kirtling Street site *Transport Assessment* figures shows the survey locations in the vicinity of the Kirtling Street site. Appendix A of Section 3 of the *TA* includes the baseline report which provides full detail of the surveys undertaken and the data collected.

14.4.87 The scope of the surveys in terms of location and time periods was considered to ensure that the data required for assessment was collected. In some cases ATC data was collected on links to validate the junction count data and provide information for noise and air quality assessments. Pedestrian and cycle count data was collected at locations where flows could be affected by pedestrian and cycle diversions during construction, the generation of additional trips or where conflicts could occur with construction vehicles.

14.4.88 The surveys included manual and automated traffic surveys undertaken to establish specific traffic, pedestrian and cycle movements including turning volumes, queue lengths, saturation flows, degree of saturation and traffic signal timings. Parking surveys were also undertaken to establish the usage of on-street car parking. The third phase of surveys was conducted in September 2011 to establish the summer usage of Thames Path.

14.4.89 Traffic surveys were carried out on a weekday and a weekend to represent a weekly profile of traffic at particular locations. Where two weekly profiles are surveyed, the busiest survey was used.

14.4.90 The surveys undertaken and their locations are summarised in Table 14.4.6.

Table 14.4.6 Survey types and locations

Survey type and location	Dates
Junction turning movement survey (including pedestrian and cycle movements)	
Battersea Park Road (A3205) / Nine Elms Lane (A3025) / Kirtling Street	17th and 21st May 2011
Nine Elms Lane / Cringle Street	17th and 21st May 2011
Automatic Traffic Count (ATC)	
Nine Elms Lane (A3205), 650m east of Ponton Road (approximately 50m to the northeast of Ponton Road)	20th May to 12th June, 1st Sept 2011
Pedestrian and cycle surveys	
Thames Path adjacent to Battersea Barge restaurant	17th and 21st May 2011
Battersea Park Road(A3205), between Sleaford Street and Thessaly Road	17th and 21st May 2011
Nine Elms Lane(A3205) northern footway across Kirtling Street	14th and 10th Sept 2011
Nine Elms Lane (A3205) northern footway across Cringle Street	14th and 10th Sept 2011
Nine Elms Lane (A3205) northern footway at riverside path access approximately 280m north of Cringle Street	14th and 10th Sept 2011
Parking surveys	
Battersea Park Road (A3205) / Nine Elms Lane (A3205) between Kirtling Street and 100m east of Sleaford Street, and Sleaford Street	9th and 11th June 2011
Kirtling Street and Cringle Street	9th and 11th June 2011

14.4.91 Pedestrian and cyclist flow data from the pedestrian and cyclist surveys provided the baseline pedestrian traffic data sets which are set out in Table 14.4.7 and Table 14.4.8.

14.4.92 Vehicular traffic flow data from the junction turning movement surveys provided the baseline vehicular traffic data sets which were input into the junction assessment models described in paras. 14.4.117 to 14.4.129.

14.4.93 The following junction surveys and ATCs are on construction traffic routes to and from the Kirtling Street site:

a. Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street

b. Nine Elms Lane (A3205) / Cringle Street

c. Nine Elms Lane (A3205), approximately 50m northeast of Ponton Road.

Results of the surveys

14.4.94 The surveys inform the baseline situation in the area surrounding the site and are summarised in the following paragraphs.

Pedestrians

14.4.95 Pedestrian surveys were undertaken at five locations around the site as indicated in Figure 14.4.4 in the Kirtling Street *Transport Assessment* figures during the AM and PM peak hours.

14.4.96 Pedestrian surveys were also undertaken at the Battersea Park Road (A3205)/ Nine Elms Lane (A3025) / Kirtling Street pedestrian crossings and Nine Elms Lane (A3205) / Cringle Street pedestrian crossings as part of the junction surveys.

14.4.97 Table 14.7.1 indicates the survey locations and flow of pedestrians along the main routes surrounding the site.

14.4.98 The pedestrian surveys show that there is a higher volume of pedestrian and cycle movements along Nine Elms Lane - Battersea Park Road (A3205) than along the Thames Path.

14.4.99 The pedestrian surveys show that there is a low flow of pedestrians during the AM peak hour along the Thames Path footway adjacent to the Battersea Barge restaurant of approximately 21 pedestrians in total. During the PM peak hour the flow is similar with approximately 11 pedestrians in total on the Thames Path. There was no notable variation between the May and September surveys.

14.4.100 A survey along Battersea Park Road (A3025) between Thessaly Road and Sleaford Street indicated a higher volume of pedestrian movements during the AM peak hour of approximately 205 pedestrians in total. During the PM peak hour the flow is slightly lower with approximately 170 pedestrians in total on this section of road.

14.4.101 Pedestrian flows between Kirtling Street and the Thames Path link to the north of Cringle Street were recorded as a maximum of 45 two-way movements in the AM peak and 63 in the PM peak.

Table 14.4.7 Existing pedestrian flows

Road/route	Direction	Weekday			Weekend
		AM peak (08:00-09:00)	Inter-peak (12:00-13:00)	PM peak (17:00-18:00)	Saturday peak hour (13:00-14:00)
Thames Path adjacent to Battersea Barge restaurant (May 2011)	Westbound	8	9	4	3
	Eastbound	13	16	7	10
Thames Path adjacent to Battersea Barge restaurant (Sep2011)	Westbound	3	3	6	-
	Eastbound	5	0	8	-
Battersea Park Road(A3205), between Sleaford Street and Thessaly Road	Westbound	102	61	97	81
	Eastbound	103	44	73	50
Nine Elms Lane(A3205) northern footway across Kirtling Street	Northeastbound	32	15	31	48
	Southwestbound	13	11	31	46
Nine Elms Lane (A3205) northern footway across Cringle Street	Northeastbound	31	8	34	64
	Southwestbound	6	5	26	35
Nine Elms Lane (A3205) northern footway at riverside path access approximately 280m north of Cringle Street -					
Thames Path to Nine Elms Lane (A3205) east	Northeastbound	11	3	1	9
Nine Elms Lane (A3205) east to Thames Path	Northwestbound	1	4	1	2

Road/route	Direction	Weekday			Weekend
		AM peak (08:00-09:00)	Inter-peak (12:00-13:00)	PM peak (17:00-18:00)	Saturday peak hour (13:00-14:00)
Nine Elms Lane (A3205) east to Nine Elms Lane (A3205) west	Northwestbound	8	10	27	34
Nine Elms Lane (A3205) west to Nine Elms Lane (A3205) east	Southeastbound	29	13	36	45
Battersea Park Road (A3205)/ Nine Elms Lane (A3025) / Kirtling Street pedestrian crossings -					
Nine Elms Lane (northeast arm)	Southeastbound	2	0	1	1
	Northwestbound	5	1	1	1
New Covent Garden access (southeast arm)	Southwestbound	19	5	28	17
	Northeastbound	36	4	17	19
Kirtling Street (northwest arm)	Northeastbound	36	13	15	16
	Southwestbound	19	16	25	26
Nine Elms Lane (A3205) / Cringle Street pedestrian crossings -					
Nine Elms Lane (southwest arm)	Eastbound	2	3	2	0
	Westbound	18	2	5	5

Cyclists

14.4.102 Cyclist surveys were undertaken at the same locations as the pedestrian surveys during the AM and PM peak hours.

14.4.103 Table 14.4.8 indicates the flows of cyclists along the main routes surrounding the site.

14.4.104 The cycle surveys show that movements in and out of both Kirtling Street and Cringle Street were low, as were the cyclist movements on Thames Path. There was no discernible variation between the May and September surveys.

14.4.105 The junction survey counts suggest a large number of cyclists travelling north-eastbound along Battersea Park Road (A3205) and Nine Elms Lane (A3205) (up to 279 cyclists in the AM peak). In the PM peak, this reduced to 55. In the opposite direction, cyclist movements amounted to less than 34 south-westbound in the AM peak and less than 84 in the PM peak (at the Nine Elms Lane (A3205)/ Cringle Street junction).

Table 14.4.8 Existing cycle traffic

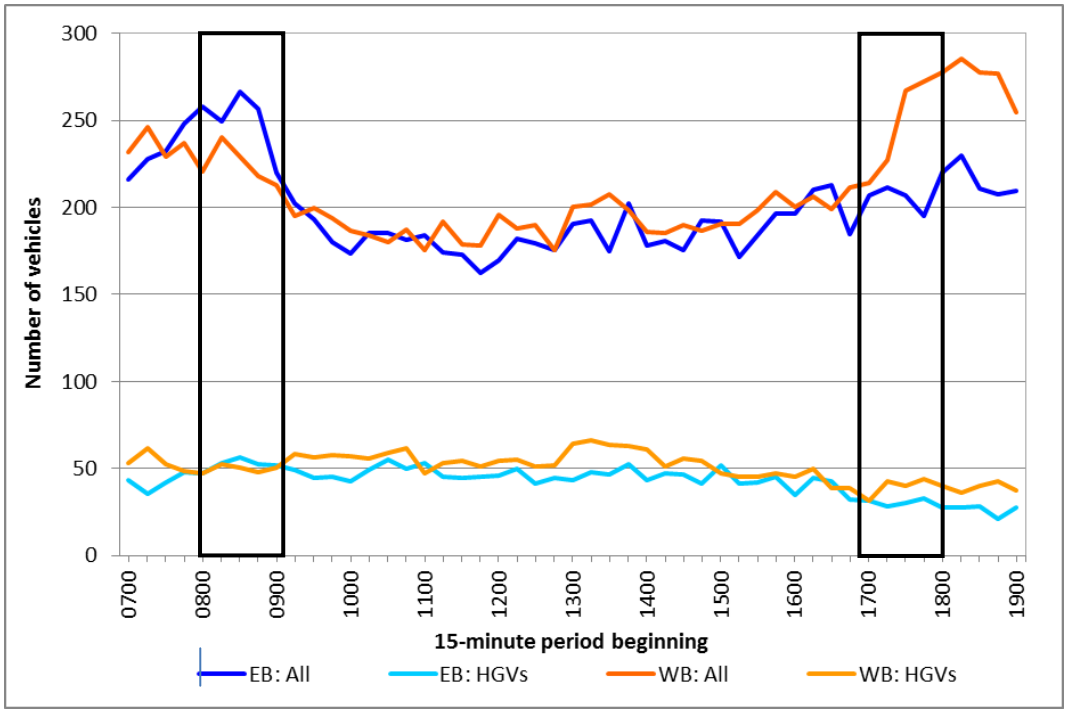
Road/route	Direction	Weekday			Weekend
		AM peak (08:00-09:00)	Inter-peak (12:00-13:00)	PM peak (17:00-18:00)	Saturday peak hour (13:00-14:00)
Thames Path adjacent to Battersea Barge restaurant (May 2011)	Westbound	2	2	1	1
	Eastbound	0	1	2	2
Thames Path adjacent to Battersea Barge restaurant (Sep2011)	Westbound	2	0	2	-
	Eastbound	0	0	0	-
Battersea Park Road(A3205), between Sleaford Street and Thessaly Road	Westbound	8	4	3	2
	Eastbound	3	7	14	7
Nine Elms Lane(A3205) northern footway across Kirtling Street	Northeastbound	1	2	1	5
	Southwestbound	2	1	8	3
Nine Elms Lane (A3205) northern footway across Cringle Street	Northeastbound	0	3	4	5
	Southwestbound	1	0	9	1
Nine Elms Lane (A3205) northern footway at riverside path access approximately 280m north of Cringle Street -					
Thames Path to Nine Elms Lane (A3205) east	Northeastbound	0	0	2	0
Nine Elms Lane (A3205) east to Thames Path	Northwestbound	0	0	0	0
Nine Elms Lane (A3205) east to Nine Elms Lane (A3205) west	Northwestbound	1	0	10	3
Nine Elms Lane (A3205) west to Nine Elms Lane (A3205) east	Southeastbound	1	3	6	5

Road/route	Direction	Weekday			Weekend
		AM peak (08:00-09:00)	Inter-peak (12:00-13:00)	PM peak (17:00-18:00)	Saturday peak hour (13:00-14:00)
Battersea Park Road (A3205)/ Nine Elms Lane (A3025) / Kirtling Street on carriageway -					
Nine Elms Lane (northeast arm)	Northeastbound	272	17	51	31
	Southwestbound	1	0	2	1
New Covent Garden access (southeast arm)	Southeastbound	2	0	2	2
	Northwestbound	0	3	0	2
Nine Elms Lane (southwest arm)	Southwestbound	1	4	6	3
	Northeastbound	279	18	53	32
Kirtling Street (northwest arm)	Northwestbound	5	1	1	0
	Southeastbound	0	1	5	1
Nine Elms Lane / Cringle Street on carriageway -					
Nine Elms Lane (northeast arm)	Northeastbound	268	17	55	32
	Southwestbound	33	9	83	23
Nine Elms Lane (southwest arm)	Southwestbound	34	9	84	25
	Northeastbound	267	17	54	33
Cringle Street (west arm)	Westbound	0	0	0	1
	Eastbound	2	0	2	2

Traffic flows

14.4.106 The ATC data has been analysed to identify the existing traffic flows along Nine Elms Lane (A3205) northeast of its junction with Ponton Road. The weekday vehicle and HGV flows for a 12-hour period (07:00-19:00) are presented in Plate 14.4.4 as this is when the greatest impacts from the project are likely to be experienced.

Plate 14.4.4 Existing 15-minute traffic flows along Nine Elms Lane (A3205) 650m east of Ponton Road (weekday ATC survey)



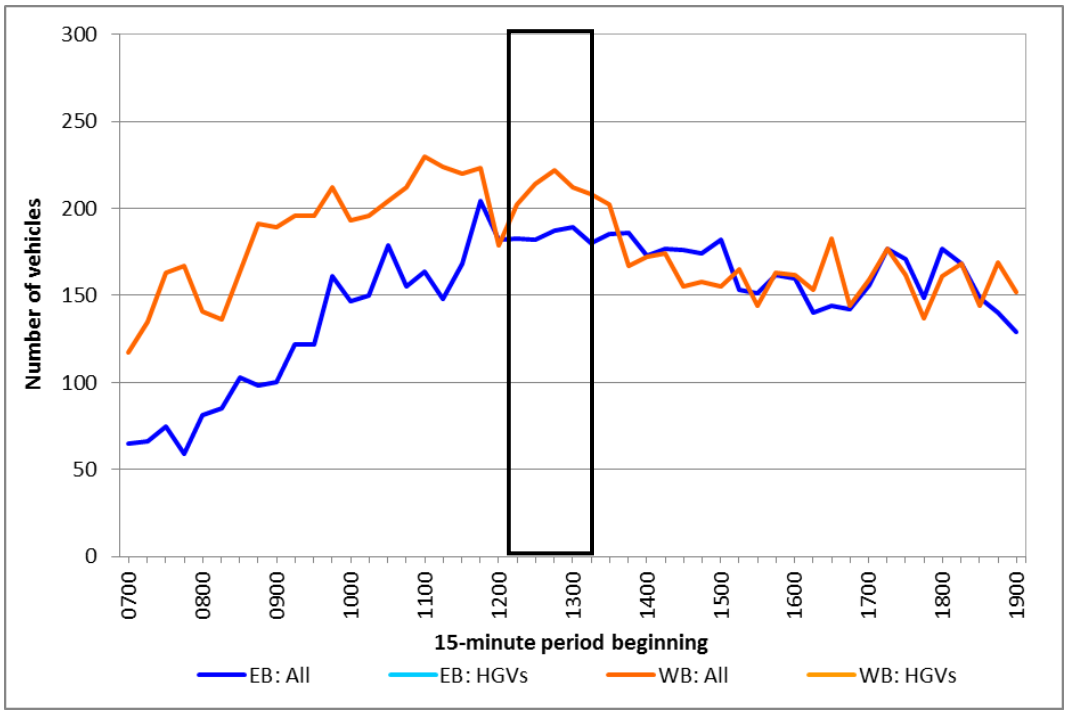
EB – East Bound, WB – West Bound. The black box represents the peak hour traffic flows used for the traffic assessment.

14.4.107 The weekday ATC data shows that between 08:00 – 09:00 there are approximately 1,938 two-way vehicle movements. The busiest 15 minute peak period in this period occurred after 08:30 with approximately 266 eastbound vehicles and approximately 229 westbound vehicles.

14.4.108 For the period between 17:00 – 18:00 there are approximately 1,801 two-way vehicle movements. The busiest 15 minute peak period in this period occurred after 17:30 with approximately 207 eastbound vehicles and approximately 267 westbound vehicles.

14.4.109 The Saturday vehicle and HGV flows for a 12-hour period (07:00-19:00) are presented in Plate 14.4.5.

Plate 14.4.5 Existing 15-minute traffic flows along Nine Elms Lane (A3205) 650m east of Ponton Road (Saturday ATC survey)

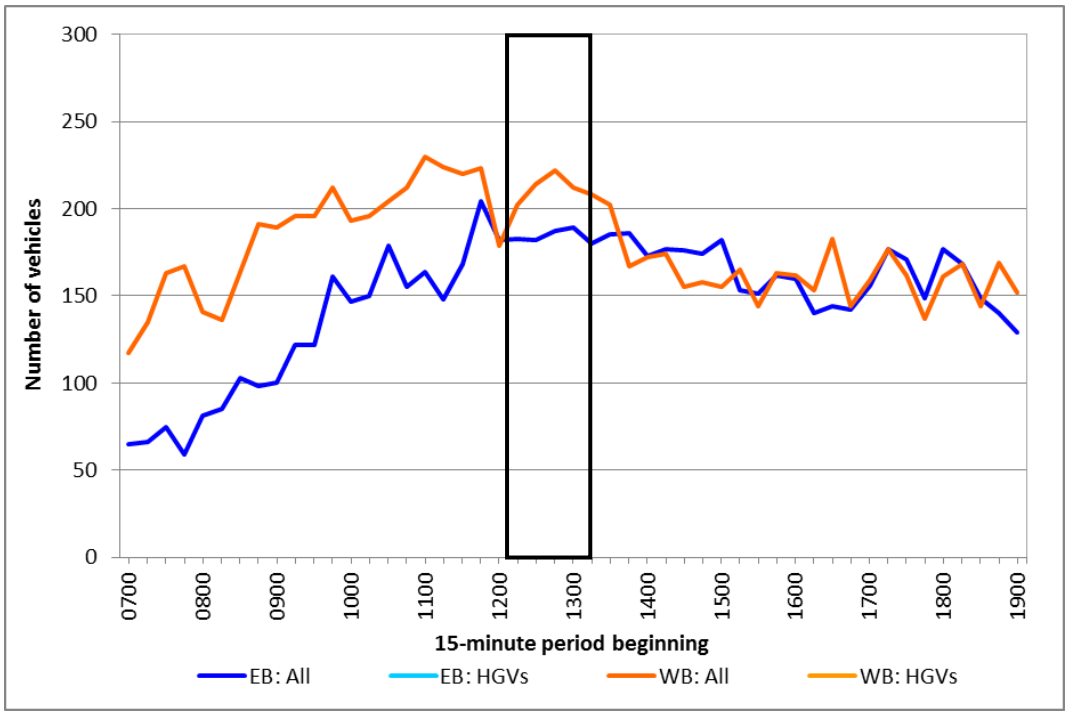


EB – East Bound, WB – West Bound. The black box represents the peak hour traffic flows used for the traffic assessment.

14.4.110 Analysis of the data showed that the Saturday peak travel period occurred between 12:15 – 13:15 with 1,411 two-way vehicle movements recorded. This is less than the AM and PM weekday two-way traffic flows and the period falls within the normal weekend construction works vehicle movements period of between 08:00 – 13:00.

14.4.111 The Sunday vehicle and HGV flows for a 12-hour period (07:00-19:00) are presented in Plate 14.4.6.

Plate 14.4.6 Existing 15-minute traffic flows along Nine Elms Lane (A3205) 650m east of Ponton Road (Sunday ATC survey)



EB – East Bound, WB – West Bound. The black box represents the peak hour traffic flows used for the traffic assessment.

14.4.112 Analysis of the data showed that the Sunday peak travel period occurred between 12:15 – 13:15 with 1,594 two-way vehicle movements recorded. This is less than the AM and PM weekday two-way traffic flows. However, construction vehicle movements are not expected to take place on a Sunday.

Parking

14.4.113 Car parking availability and usage surveys in the area surrounding Kirtling Street site were undertaken during the AM, inter-peak and PM peaks on a weekday and during the Saturday peak periods.

14.4.114 Table 14.4.9 presents a summary of the parking availability and usage, and Plate 14.4.7 depicts the results as a histogram.

14.4.115 The results of the parking surveys indicate that the on-street parking along Kirtling Street and Cringle Street is moderately well used but that there is spare capacity available on both weekdays and at weekends during the peak and off-peak periods.

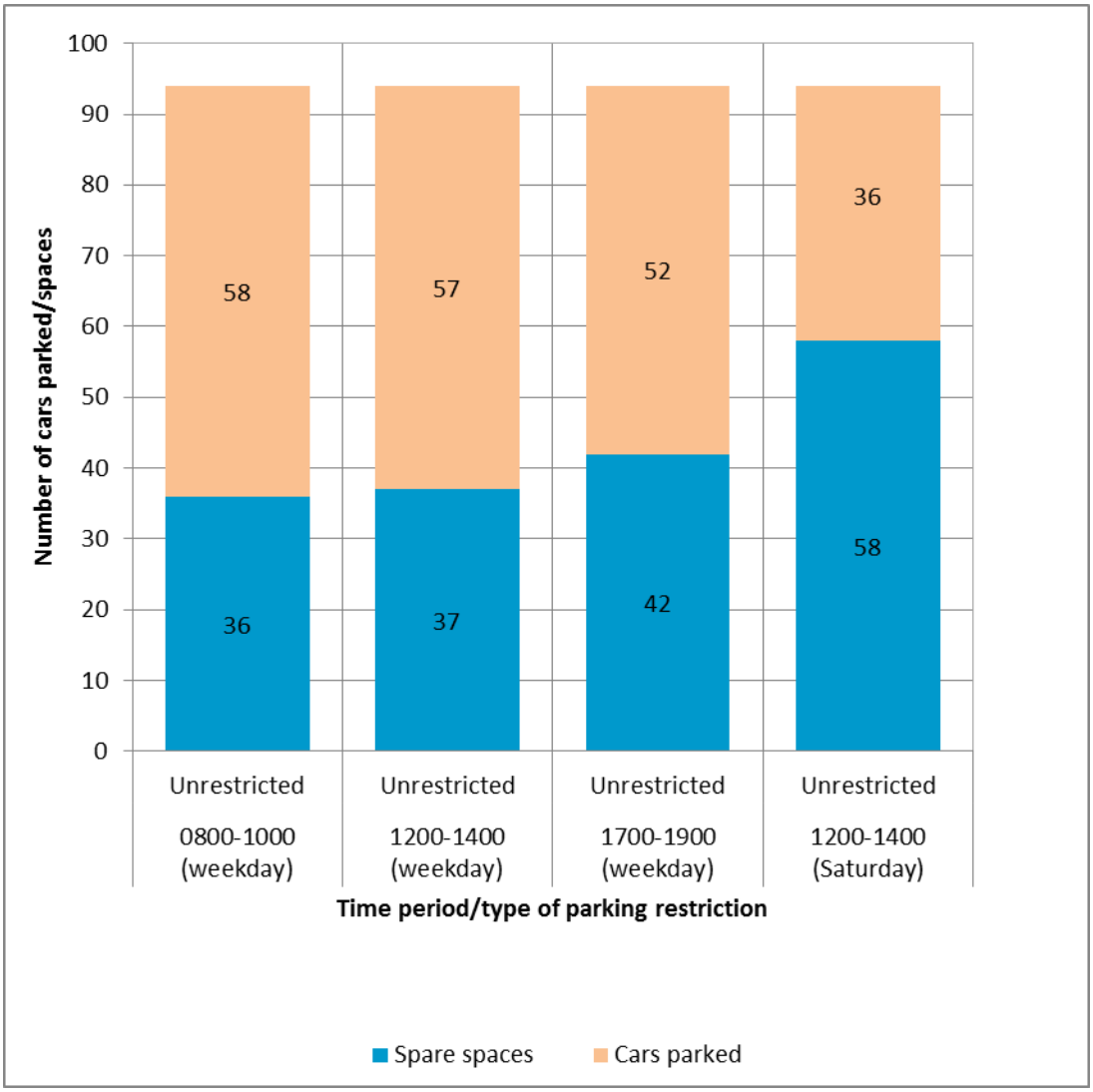
14.4.116 The parking survey suggested that about 60% of all available spaces were used throughout the day. The utilisation is lower in the Saturday peak when compared to the weekday.

Table 14.4.9 Parking bay availability and usage

Location	Number and Type of Bays		No. of spaces available			
			Weekday			Saturday
			08:00-10:00	12:00-14:00	17:00-19:00	12:00-14:00
Kirtling Street	No. of unrestricted parking bays	56	19	20	23	36
Cringle Street	No. of unrestricted parking bays	10	8	6	6	10
Sleaford Street	No. of unrestricted parking bays	28	9	11	13	12

Note: Parking spaces available based on an assumed length of 5m per vehicle

Plate 14.4.7 Existing on-street car parking availability and usage



Local highway modelling

14.4.117 To establish the existing capacity on the local highway network a scope was agreed with TfL and the LB of Wandsworth to model the signalised Kirtling Street / Nine Elms Lane (A3205) / Battersea Park Road (A3205) / New Covent Garden access road junction using LinSig, and the Nine Elms Lane (A3205) / Cringle Street priority junction using PICADY.

14.4.118 Traffic models for these junctions have been developed for this assessment. The models have been constructed using on-site measurements of classified vehicle volumes and queue lengths.

14.4.119 The signal timings used in the assessment of the Kirtling Street / Nine Elms Lane (A3205) / Battersea Park Road (A3205) / New Covent Garden access road junction have been obtained from the TfL Signal Timing Sheet for this junction.

14.4.120 The TfL modelling guidelines and Modelling Audit Process (MAP) have been used as the basis for preparing and checking models and their outputs. All required input data has been used in order to calibrate the model. Where TfL models have been used, saturation flows have been

retained where no change is proposed to junctions; where changes are proposed, saturation flows have been calculated and compared with site observations to determine suitable values. Validation of the models has been based on observed data including signal timings, vehicle volumes and queue lengths to provide the key criteria for comparison with modelled queue lengths.

14.4.121 The models are considered suitable for this planning stage and are intended to demonstrate the nature of the effects of the additional vehicles generated by the Thames Tideway Tunnel project in this location. It is acknowledged that these models may require further refinement as the project moves from planning to detailed design stage; however as a period of time will elapse before construction commences at this site, it will be necessary in any case to review and revalidate the models against traffic conditions at that time, as is normal practice.

14.4.122 The baseline model therefore accounts for the current traffic and transport conditions within the vicinity of the site.

14.4.123 The weekday AM and PM baseline model flows for the two junctions were compared against observed queue lengths for the peak periods to validate the LinSig and PICADY models and ensure reasonable representation of existing conditions.

14.4.124 Figures 14.4.5 and 14.4.6 in the Kirtling Street *Transport Assessment* figures indicate the traffic flows which were used for the baseline AM and PM peak hour assessments which take into account the observed flows. Model outputs are included in Appendix C which indicates the lane structure used for the assessment of the junction.

14.4.125 Table 14.4.10 summarises the baseline performance of the signalised Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street junction.

14.4.126 Table 14.4.11 summarises the baseline performance of the priority Nine Elms Lane (A3205) / Cringle Street junction.

Table 14.4.10 Baseline LinSig model outputs

Approach	Movement	Weekday							
		AM peak				PM peak			
		(08:00-09:00)				(17:00-18:00)			
		Flow (PCU)	DoS	MMQ (PCU)	Delay (Seconds per PCU)	Flow (PCU)	DoS	MMQ (PCU)	Delay (Seconds per PCU)
Kirtling Street	Left Ahead Right	27	9%	1	32	33	10%	1	32
Nine Elms Lane (A3205)	Left Ahead	467	50%	7	19	448	48%	7	19
	Ahead Right	418	46%	7	20	412	46%	7	20
New Covent Garden Market	Left	67	10%	1	18	68	10%	1	18
	Right Ahead	27	8%	1	33	22	7%	0	33
Battersea Park Road (A3205)	Left Ahead	377	41%	6	16	380	41%	6	17
	Right	484	44%	6	19	419	40%	6	17
		Practical Reserve Capacity (PRC)		Total Delay (PCU Hours)		Practical Reserve Capacity (PRC)		Total Delay (PCU Hours)	
Overall junction performance		79.7%		10		85.9%		9	

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PCU represents Passenger Car Unit. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs

Table 14.4.11 Baseline PICADY model outputs

Approach	Movement	Weekday							
		AM peak				PM peak			
		(08:00-09:00)				(17:00-18:00)			
		Flow (vehs)	RFC	Max Queue (vehs)	Delay (seconds/ veh)	Flow (vehs)	RFC	Max Queue (vehs)	Delay (seconds/ veh)
Cringle Street	Left Ahead Right	18	8%	0	16	62	19%	0	14
Nine Elms Lane (E) (A3205)	Right	25	8%	0	13	25	7%	0	10

Notes: RFC represents Ratio of Flow to Capacity. Queue represents number of vehicles in queue. Delay represents the mean delay per vehicle. Nine Elms Lane (A3205) westbound is not included in table as PICADY model only considers movements where vehicles have to give way.

14.4.127 The LinSig model outputs demonstrate that the Kirtling Street / Nine Elms Lane (A3205) / Battersea Park Road (A3205) / New Covent Garden access road junction is currently operating within capacity in the weekday AM and PM peak hours. The validated model indicates that the AM and PM peak hours are relatively balanced and the Nine Elms Lane (A3205) westbound left and ahead movement is operating within capacity in the baseline, with a Mean Maximum Queue length of approximately seven PCUs calculated in both the AM and PM peak. The delay to vehicles is most significant during the AM and PM peak hours on the New Covent Garden Market right ahead movement, which currently experiences an average of 33 seconds of delay.

14.4.128 The LinSig junction model output shows that total junction delay is 10 PCU hours in the AM peak period assessed and 9 PCU hours in the PM peak period assessed. These equate to 19 seconds in both the AM and PM peak periods assessed.

14.4.129 The PICADY model outputs demonstrate that the Nine Elms Lane (A3205) / Cringle Street junction is currently operating within capacity in the weekday AM and PM peak hours. The validated model indicates that the PM peak hour is the busiest period and that the traffic turning out of Cringle Street is operating at 19% RFC in that period, but with no queues generated. The longest delay occurs at the AM peak hour with 16 seconds delay on the exit from Cringle Street.

Accident analysis

14.4.130 Accident data within the vicinity of the site has been obtained from TfL and analysed to determine if there are any specific road safety issues, trends or patterns evident on the surrounding highway network.

14.4.131 Data has been obtained for a 5 year period to the 31st March 2011. Figure 14.4.7 in the Kirtling Street *Transport Assessment* figures indicates the accidents that have occurred within the vicinity of the site. The following roads and junctions have been analysed:

a. Kirtling Street / Cringle Street junction
b. Nine Elms Lane (A3205)
c. Nine Elms Lane / Cringle Street Junction
d. Battersea Park Road (A3205)
e. Battersea Park Road / Kirtling Street / Nine Elms Junction
f. Battersea Park Road / Sleaford Street Junction
g. Battersea Park Road / Thessaly Road Junction
h. Battersea Park Road / Savona Street.

14.4.132 Table 14.4.12 provides a summary of the accident locations, total number of accidents and the associated level of accident severity. Appendix D provides a full analysis of the accidents.

Table 14.4.12 Accident severity from 2006 to 2011

Location (Road / Junction)	Slight	Serious	Fatal	Total
Kirtling Street / Cringle Street junction	1	0	0	1
Nine Elms Lane (A3205)	2	0	0	2
Nine Elms Lane / Cringle Street junction	4	2	0	6
Battersea Park Road (A3205)	7	0	1	8
Battersea Park Road / Kirtling Street / Nine Elms junction	4	1	0	5
Battersea Park Road / Sleaford Street junction	6	1	0	7
Battersea Park Road / Thessaly Road junction	2	0	0	2
Battersea Park Road / Savona Street	5	0	0	5
Total	**31**	**4**	**1**	**36**

14.4.133 During the five year period, a total of 36 accidents were recorded within the within the study area analysed. Of these accidents, 31 were categorised as slight, four as serious and one accident resulted in a fatality.

14.4.134 The fatal injury accident occurred on Battersea Park Road approximately 100m northeast of Prince of Wales Drive. The accident involved a pedestrian but the details of the cause of the accident were not provided.

14.4.135 The majority of both the serious and the slight accidents occurred as a result of factors such as vehicle drivers / riders failing to look properly, carrying out a poor turn or manoeuvre and sudden breaking.

14.4.136 The highest number of accidents (27) occurred along Battersea Park Road (A3205) with 24 recorded as slight, two recorded as serious and one as fatal accident.

14.4.137 Of the total accidents, 8 accidents involved LGV's which were rated as slight in severity. One accident involved an HGV which led to a serious accident, this occurred at the junction of Nine Elms Lane and Cringle Street and was a result of failing to look properly and undertaking a poor turn or manoeuvre by the HGV driver. LGV's were involved in 8 of the total accidents

14.4.138 The majority of both the serious and the slight accidents occurred as a result of factors such as vehicle drivers / riders failing to look properly, carrying out a poor turn or manoeuvre and sudden breaking.

14.4.139 Figure 14.4.8 in the Kirtling Street *Transport Assessment* figures shows the pedestrian and cyclist accidents by severity.

14.4.140 The records show that there were nine accidents involving pedestrians and cyclists. All occurred on the roads to be taken by construction vehicles within the study area. Inspection of the data showed that three of these occurred at junctions with signalised control facilities, with the remaining accidents occurring at locations without signal control. The pedestrian fatality is described above in para. 14.4.134.

14.4.141 In the context of the temporary HGV movements associated with the Kirtling Street site, the accident risk to these modes of travel will be managed by providing pedestrian and cyclist awareness training for commercial drivers associated with the construction works as set out in the *CoCP*. For sections of road affected by roadworks, the risk to all road-users will be managed by the contractor(s) in accordance with the provisions made under the Traffic Signs Manual Chapter 8 - Traffic Safety Measures and Signs for Road Works (DfT, 2009)[3].

14.5 Construction assessment

14.5.1 The *TA*, including both qualitative and quantitative analysis, has been undertaken drawing in discussions with TfL and the Local Highway Authorities, knowledge of the transport networks and their operational characteristics in the vicinity of each site and the anticipated construction programme, duration and levels of construction activity.

14.5.2 The construction assessment compares a construction base case, which represents transport conditions in the assessment year without the Thames Tideway Tunnel project, with a construction development case, which represents conditions with the Thames Tideway Tunnel under construction. The construction base case does not include any traffic related to the Thames Tideway Tunnel, whether from the Kirtling Street site or from other sites.

Construction base case

14.5.3 As described in Section 14.3, the construction assessment year for transport effects in relation to this site is Year 3 of construction.

Pedestrians and cyclists

14.5.4 Changes to the pedestrian and cycle network by Year 3 of construction would occur as a result of the developments at Battersea Power Station, the US Embassy and Embassy Gardens, Nine Elms Parkside and Vauxhall Sky Gardens (see committed developments paras. 14.5.13 to 14.5.16). The changes include:

a. providing signalised pedestrian crossing facilities on all arms of the Nine Elms Lane (A3205) / Battersea Park Road (A3205) / Kirtling Street / New Convent Garden Market access junction

b. re-routing of the Thames Path from Nine Elms Lane to Cringle Street via the new Battersea Power Station development

c. improved public realm surrounding Nine Elms Parkside and Vauxhall Sky Gardens

d. realignment of Ponton Road inclusive of pedestrian refuge islands at the junction.

Public transport

14.5.5 Changes to the public transport network by Year 3 of construction as a result of the developments at Battersea Power Station and Nine Elms Pier include the possible extension of the London Underground Northern Line and a new London Underground station (see committed developments paras. 14.5.13 to 14.5.16). The completion of the NLE would increase the PTAL level from baseline (para. 14.4.30).

14.5.6 All other planned upgrades included in the TfL London Underground Upgrade Plan, such as capacity improvements on Jubilee, Victoria, Northern, Hammersmith and City, Metropolitan and District lines, are also planned to be in place by the construction base case year.

14.5.7 Due to the traffic growth in the construction base case compared to the baseline situation, bus journey times along Battersea Park Road - Nine Elms Lane (A3205) and within the wider area will be affected. The effect on journey times on this route is detailed in the construction base case local highway modelling (see paras. 14.5.17 to 14.5.23) and the results show that there would be a maximum increase in delay for bus users of 28 seconds over the baseline case.

14.5.8 It is anticipated that patronage on public transport services may change between the baseline situation and Year 3 of construction. Future patronage changes on bus, rail and river networks will be driven by a range of complex factors and there are inherent uncertainties in setting a patronage level for a future year. Further capacity improvements are anticipated on the Bakerloo, Piccadilly and Central lines however the best way of delivering these improvements, including the timescales, are currently being investigated by TfL. In addition, additional bus services are likely to be provided to serve the new developments in the area. At this stage however, the extent to which these upgrades will have been completed by the construction base case is unknown. Therefore, in order to ensure that a busiest case scenario is addressed in assessing the result of additional construction worker journeys by public transport, the capacity for public transport services in the construction base case has been assumed to remain the same as capacity in the baseline situation. This ensures a robust assessment.

River navigation

14.5.9 There are no proposals to alter river passenger services or river navigation patterns from the current baseline conditions. The number of barge movements generated by the Cemex site may increase as a result of increased demand from new development, but this will depend on a number of factors such as the level and timing of development, construction techniques (i.e. steel or concrete frame) and whether Cemex is chosen as the source to meet the demand. Given these uncertainties the construction base case in Site Year 1 of construction remains similar to the baseline position.

Highway network and operation

14.5.10 Baseline traffic flows (determined from the junction surveys) have been used and forecasting carried out to understand the capacity on the highway network in the vicinity of the Kirtling Street site in Year 3 of construction without the Thames Tideway Tunnel project. The scope of this analysis has been discussed with TfL and the LB of Wandsworth.

14.5.11 Strategic highway network modelling has been undertaken at a Project-wide level using the TfL HAMs, which include forecasts of employment and population growth in line with the *London Plan*. Growth factors have been derived at individual borough level by comparing the 2008/9 base and 2021 forecast years in the HAMs, as described in the modelling methodology of the *Project-wide TA*.

14.5.12 As explained in Assessment methodology of this *TA*, the traffic flows for the base and development cases have been calculated by considering the net change in traffic resulting from the committed developments in the area to ensure that the construction base case for the highway network is robust.

Committed developments

14.5.13 There are a number of developments identified within 1km of the Kirtling Street site that would be complete and operational by Site Year 3 of construction meaning that they would form part of the base case (unless the information has not been available). These are identified in the site development schedule (see Vol 14 Appendix N in the *Environmental Statement*) along with additional sites identified in liaison with TfL and LB Wandsworth[vii]. These developments are:

a. Northern Line Extension
b. US Embassy
c. Market Towers
d. Island Site Vauxhall Gyratory
e. Nine Elms Sainsbury's
f. Spring Mews, Vauxhall
g. Vauxhall Sky Gardens
h. Riverlight development
i. St George's Wharf (Vauxhall Tower)
j. Marco Polo House (Phase 1a and 1b)
k. Battersea Power Station (Phase 1- 3)
l. Embassy Gardens (Buildings A02, A05,and A09- A11)

[vii] Site f from the bulleted list has been identified in liaison with TfL and LB of Wandsworth, which is in addition to those indicated in the site development schedule (see Vol 14 Appendix N of the *Environmental Statement*)

m. New Covent Garden Market (Buildings B4- B6)

n. 10 Pascal Street

o. Riverwalk House, Millbank

p. 1-9 Bondway and 4-6 South Lambeth Place

14.5.14 There are also some developments that would be under construction at the same time as construction works at the Kirtling Street site[viii]. These are:

a. 81 Black Prince Road (Parliament Road)

b. 10 Albert Embankment (Hampton House)

c. 20 Albert Embankment (Wah Kwong House)

d. Chelsea Barracks

e. Marco Polo House (Phase 2)

f. Battersea Power Station (Phase 4-6)

g. Nine Elms Parkside (Plots B- D)

h. Embassy Gardens (Buildings A01, A03, A04 and A07)

i. New Covent Garden Market (Buildings B1- B3 and site entrance)

j. Vauxhall Square Cap Gemini

14.5.15 Changes to the highway network and operation by Year 3 of construction are as a result of the developments at Battersea Power Station, Riverlight development, US Embassy, Embassy Gardens, New Covent Garden Market and Nine Elms Parkside. Changes include:

a. suspension of parking on Kirtling Street and Cringle Street (as a result of the Battersea Power Station development proposals)

b. provision of a dedicated right-turn lane from Nine Elms Lane (A3205) into Kirtling Street

c. provision of two lanes on the Kirtling Street arm of the Nine Elms Lane (A3205) / Battersea Park Road (A3205) / Kirtling Street / New Convent Garden Market access junction

d. realignment of Ponton Road (as a result of the US Embassy development proposals)

e. upgrade of the Ponton Road / Nine Elms Lane (A3205) junction and potentially two new junctions along Nine Elms Lane (A3205) (as a result of the US Embassy development proposals)

f. conversion of the Nine Elms Lane (A3205) / Cringle Street junction into a crossroads to create a new access road for the Nine Elms Parkside development

[viii] Sites a, b and c from the bulleted list have been identified in liaison with TfL and LB of Wandsworth, which is in addition to those indicated in the site development schedule (see Vol 14 Appendix N of the *Environmental Statement*)

14.5.16 The assessment of transport effects is based on the Battersea Power Station development being partially completed and partially under construction by Site Year 3 of construction at the Kirtling Street site. This includes a new highway layout at the Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street / New Covent Garden access junction. However, as there are some uncertainties around the timescale for implementation of the Battersea Power Station development a sensitivity test has been undertaken in which the construction base and development cases assume that development is not progressed within a timescale that coincides with the Thames Tideway Tunnel project, and hence the highway layout will be as existing. This sensitivity test is presented in the assessment.

Local highway modelling

14.5.17 The modelling included the committed developments detailed in paras. 14.5.13 and 14.5.14 for the construction base case model. Appendix C contains a summary of the trips assumed for these developments in our assessment. These assumptions have been formed in discussion with LB of Wandsworth and TfL based on the information available at the time.

14.5.18 Paras. 14.3.8 to 14.3.10 explains the definition of the assessment area for local highway network modelling. At this site, the assessment examines only the two nearest junctions of the construction vehicle routes with the TLRN at both Kirtling Street and Cringle Street.

14.5.19 The construction base case LinSig and PICADY model outputs for the Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street/ New Covent Garden Market access junction and the Nine Elms Lane (A3205) / Cringle Street / Nine Elms Parkside junction are shown in Table 14.5.1 and Table 14.5.2 respectively.

14.5.20 The construction development case includes the optimisation of signal timings for the Kirtling Street / Nine Elms Lane (A3205) / Battersea Park Road (A3205) / New Covent Garden access road junction in order to minimise journey time increases within the local area.

Table 14.5.1 Construction base case LinSig model outputs (with Battersea Power Station)

Approach	Movement	Weekday							
		AM peak (08:00-09:00)				PM peak (17:00-18:00)			
		Flow (PCU)	DoS	MMQ (PCU)	Delay (seconds per PCU)	Flow (PCU)	DoS	MMQ (PCU)	Delay (Seconds per PCU)
Kirtling Street	Left	4	3%	0	58	6	5%	0	59
	Right	52	37%	2	64	43	31%	1	62
Nine Elms Lane (A3205)	Left Ahead	574	75%	14	36	596	78%	16	38
	Ahead	520	70%	13	36	553	75%	15	38
New Covent Garden Market	Left	96	72%	4	91	93	70%	4	88
	Right Ahead	40	29%	1	62	33	24%	1	60
Battersea Park Road	Left Ahead	480	75%	13	41	518	81%	15	45
	Right Ahead	603	79%	15	43	576	80%	16	43
		Practical Reserve Capacity (PRC)		Total Delay (PCU hours)		Practical Reserve Capacity (PRC)		Total Delay (PCU hours)	
Overall junction performance		13.3%		28		10.8%		29	

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PCU represents Passenger Car Unit. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs

Table 14.5.2 Construction base case PICADY model outputs (with Battersea Power Station)

Approach	Movement	Weekday							
		AM peak				PM peak			
		(08:00-09:00)				(17:00-18:00)			
		Flow (vehs)	RFC	Max Queue (vehs)	Delay (seconds/ veh)	Flow (vehs)	RFC	Max Queue (vehs)	Delay (seconds/ veh)
Cringle Street	Left Ahead Right	71	36%	1	29	126	58%	1	39
Nine Elms Lane (W) (A3205)	Right	2	1%	0	19	3	2%	0	20
Nine Elms Parkside	Left	5	2%	0	17	4	2%	0	18
	Right	3	4%	0	50	2	3%	0	60
Nine Elms Lane (E) (A3205)	Right	81	37%	1	26	78	33%	0	23

Notes: RFC represents Ratio of Flow to Capacity. Queue represents number of vehicles in queue. Delay represents the mean delay per vehicle.

14.5.21 The resulting construction base case LinSig model output for the Kirtling Street / Nine Elms Lane (A3205) / Battersea Park Road (A3205) / New Covent Garden access road junction indicates that the Degree of Saturation on some approaches, namely Battersea Park Road (A3205) will increase to near capacity of 81% for left ahead lane and 80% for the right ahead lane in the PM peak hour. At the same approach the Mean Maximum Queue length of approximately 15 PCUs was estimated in both AM and PM peak hour. Overall, the junction will be operating within capacity.

14.5.22 The LinSig junction model output shows that total junction delay is 28 PCU hours in the AM and 29 PCU Hours in the PM peak periods assessed. These equate to 42 seconds per PCU in the AM and 43 seconds per PCU in the PM peak periods assessed.

14.5.23 The construction base case PICADY model output for Nine Elms Lane (A3205) / Cringle Street / Nine Elms Parkside junction indicates that the local network will continue within capacity. The maximum Ratio of Flow to Capacity (RFC) will be in the PM Peak on the Cringle Street approach with 58%. The longest delay occurs at the PM peak hour with 60 seconds delay on the right-turn exit from Nine Elms Parkside.

Construction development case

14.5.24 This section summarises the findings of the assessment undertaken for the peak year of construction at the Kirtling Street site (Year 3 of construction).

Pedestrian routes

14.5.25 There would be no changes required to pedestrian routes at the Kirtling Street / Nine Elms Lane (A3205) / Battersea Park Road (A3205) / New Covent Garden access road junction as swept path analysis indicates that construction vehicles would be able to pass through the junction without any need for changes to the junction layout. The highway layout during construction vehicle swept path analysis (phases 1-3) plan is provided in the Kirtling Street *Transport Assessment* figures and shows that the construction vehicles would be able to safely enter and leave the site.

14.5.26 Pedestrians would not be able to access the northern and north-western sections of Kirtling Street north of Cringle Street as this would form part of the construction site. This would result in a diversion for pedestrians using the Thames Path who would otherwise route along these sections. In the base case, pedestrians using the Thames Path would route from the riverside to Kirtling Street along the existing path adjacent to the Riverlight development then route west then south along Kirtling Street to Cringle Street before continuing west along Cringle Street to the Battersea Power Station development. The route west then south along Kirtling Street would be closed to pedestrians. The diversion would instead route pedestrians south along Kirtling Street (instead of west) to Cringle Street then west through the Battersea Power Station development.

14.5.27 There would be additional vehicle crossovers on Kirtling Street and Cringle Street where new site access points would be constructed. These would

be provided with tactile paving and dropped kerbs. These new accesses would create additional vehicle/pedestrian conflict points. Two of the new accesses are located across what in the base case is public highway and therefore would represent vehicle/pedestrian conflict points. .

14.5.28 The access plan and highway layout during construction (phases 1-3) plan is provided in the Kirtling Street *Transport Assessment* figures and show the effect on the pedestrian footways during construction.

14.5.29 To assess a busiest case scenario, it has been anticipated that all workers would finish their journeys to the site and start their journeys from the site on foot. As a result it has been assumed that 235 worker trips in the AM peak hour and 145 in the PM peak hour would travel on the pedestrian network near to the Kirtling Street site. This would create up to a total flow of 440 pedestrians in the vicinity of the Kirtling Street site in the AM peak and 315 in the PM peak hour when taking into account the existing flows from the pedestrian survey.

14.5.30 A forecast distribution of worker pedestrian trips can be determined by considering the mode split shown in Table 14.2.3 and the location of the nearest rail/tube stations and bus stops. Based on this, it is assumed that approximately 35% of workers would be travelling along Battersea Park Road (A3205), Kirtling Street or along the Thames Path to the west of Kirtling Street site, and approximately 65% would be travelling along Nine Elms Lane (A3205), Cringle Street and the Thames Path to the east of Kirtling Street site.

14.5.31 This would equate to a maximum of 82 construction workers in the AM peak hour along Battersea Park Road (A3205), Kirtling Street or along the Thames Path to the west of Kirtling Street site, and 51 in the PM peak hour.

14.5.32 Along Nine Elms Lane (A3205), Cringle Street and the Thames Path to the east of Kirtling Street site, there would be a maximum of 153 workers in the AM peak hour and 94 in the PM peak hour.

14.5.33 The assessment assumes that all construction workers would travel in the peak hours. The increase in pedestrian numbers against baseline usage during the peak hours due to construction workers walking is considered to be a conservative estimate because, due to the site working start and finish times, many workers would be travelling outside of peak network hours. An extension to the length of the pedestrian phase at the Battersea Park Road (A3205) / Nine Elms Lane (A3205)/ Kirtling Street junction of is therefore not required.

14.5.34 Taking into consideration the pedestrian diversions and increase in worker trips, the greatest change would be on the footway along Cringle Street between its two junctions with Kirtling Street to which pedestrians would be diverted from the riverside footway of the Thames Path.

14.5.35 It is anticipated that the pedestrian diversions around the Kirtling Street site would result in a journey time increase of less than one minute based on a walking speed of 1.3m/sec, due to the need for additional road crossing movements and increase in the length of the journey by 20m.

14.5.36 The introduction of new site accesses along Cringle Street and Kirtling Street could result in pedestrians having to cross a maximum of three site accesses, two of which operate one way only for vehicles. When construction vehicles are entering or leaving Kirtling Street site, this could introduce occasional delays to pedestrian journeys which are expected to be a maximum of 30 seconds in each case. The maximum overall delay could therefore be one minute 30 seconds, however it is unlikely that pedestrians will cross all access points or encounter vehicle movements at all accesses. Therefore the average delay to the few pedestrians who are delayed whilst waiting for a vehicle to access Kirtling Street site is likely to be in the order of one minute.

14.5.37 The closure of the eastern, western and northern Kirtling Street footway would result in pedestrians having to make two additional road crossings – one on Kirtling Street and one on Cringle Street – if they wish to route to the Kirtling Street junction with Nine Elms from the Thames Path route along the river. However, traffic flows along these roads are relatively low and appropriate management measures would be put in place.

14.5.38 The additional construction vehicle movements to and from the Kirtling Street site, the closure of the eastern, western and northern Kirtling Street footway and the site accesses would present a minor increase in the risk of accidents to pedestrians, although appropriate signage and management measures (including marshals on the construction site entrances and exits) would be put in place to ensure pedestrian safety as a result of the changes.

14.5.39 During all construction work and on any section of road subject to temporary diversions or restrictions imposed by roadworks associated with the Kirtling Street site, the risk to all road-users would be managed by the contractor(s) in accordance with the provisions made under the Traffic Signs Manual Chapter 8 - Traffic Safety Measures and Signs for Road Works. This will include compliance with the Equality Act 2010 (HM Government, 2010)[4] to ensure safe passage for mobility and vision impaired pedestrians.

Cycle routes

14.5.40 There are no designated cycle routes along Kirtling Street or Cringle Street. The designated London Cycle Network 4 routes along Nine Elms Lane (A3205) which provides wide footway/cycleways with capacity to accommodate additional cycle movements.

14.5.41 Cyclists using the highway could experience delay to their journey time as a result of the construction works at the Kirtling Street site. The effect on journey times on this route is detailed in the construction development case highway network assessment (see paras. 14.5.68 to 14.5.78) and the results show that there would be a maximum increase in delay for cyclists using the roadspace of 10 seconds over the baseline case.

14.5.42 With regards to accidents and safety, cyclists would be required to make three additional road crossings as a result of the diversions and lane adjustments along Kirtling Street/Cringle Street if they wish to route to the Kirtling Street junction with Nine Elms from the Thames Path route along

the river. This would lead to a minor increase in the risk of accidents to cyclists although there would be less than 20 HGV movements per hour at the Kirtling Street site and appropriate signage would be provided to warn cyclists of the presence of larger vehicles.

14.5.43 Construction vehicles serving the site would comprise a range of sizes and types, including light vans, rigid bodied vehicles and longer articulated vehicles. At this site the majority of the vehicles are expected to be medium or heavy rigid bodied goods vehicles.

14.5.44 Works would include the following measures affecting cyclists:

a. The contractor shall put in measures to manage potential conflicts between vehicles entering/exiting the site at these access points and other traffic on Cringle Street and pedestrians and cyclists on the Thames Path

b. The diversion of the Thames Path is to be adequately signed.

14.5.45 During all construction work and on any section of road subject to temporary diversions or restrictions imposed by roadworks associated with the Kirtling Street site, the risk to all road-users would be managed by the contractor(s) in accordance with the provisions made under the Traffic Signs Manual Chapter 8 - Traffic Safety Measures and Signs for Road Works. This would include compliance with TfL guidance (Cyclists at Roadworks - Guidance[5]) to ensure safe passage for cyclists.

14.5.46 During the construction period, the operation and layout of the road network would not change other than to construct a site access crossover point on Cringle Street. A minimum carriageway width of either 4m (where HGVs can safely overtake cyclists) or 3.25m (where HGVs cannot overtake cyclists) would be retained for traffic in each direction. Where necessary, carriageway widths of less than 3.25m would be agreed with the LB of Wandsworth prior to execution of any works.

Bus routes and patronage

14.5.47 No bus services run immediately past the site entrances. However, additional construction vehicles serving the site may affect some bus routes and bus journey times along Battersea Park Road - Nine Elms Lane (A3205) and its junctions with Kirtling Street and Cringle Street and within the wider area. The effect on journey times on this route is detailed in the construction development case highway network assessment (see paras. 14.5.68 to 14.5.78) and the results show that there would be a maximum increase in delay for bus users of two seconds over the construction base case.

14.5.48 It is expected that approximately 47 additional two-way worker trips would be made by bus during the AM peak hour and 29 in the PM peak hour. Based on a service of 17 buses within a 640m walking distance during the AM and PM peak hours, this is equivalent to less than three additional passengers per bus service in and AM peak hour and less than two in the PM peak hour. On this basis the additional worker trips made by bus in peak hours would be capable of being accommodated on the base case

bus services and would typically be well within the daily variation in bus patronage on these routes.

London Underground and National Rail patronage

14.5.49 No Underground or rail stations are directly adjacent to the site and therefore none would be directly affected by the construction site development. However, it is anticipated that approximately 147 construction workers in the AM peak hour and 91 in the PM peak hour would use London Underground or National Rail services to access the site. This would be split into 79 and 49 additional person trips on National Rail services and 68 and 42 additional person trips on London Underground services in each of the AM and PM peak hours respectively.

14.5.50 On London Underground services this equates to less than one person per train during the AM and PM peak hours based on a frequency of up to 42 trains during the peaks. On National Rail services there would be less than one additional passenger per train based on a frequency of over 100 trains during the peaks serving the site from all train stations.

14.5.51 Based on the quantitative assessment of patronage and the impact criteria on rail patronage set out in the *Environmental Statement*, this would result in a negligible impact on London Underground and National Rail patronage.

River passenger services and patronage

14.5.52 There are river passenger services passing the Kirtling Street site on their way to Putney, but are limited to three in the morning and three in the evening Monday to Friday. Generally their presence is not expected to be affected by the Kirtling Street site barges.

14.5.53 It is anticipated that few, if any, construction workers and labourers would use the river services to access the construction site, based on the mode shares set out in Table 14.2.3 and therefore there would be no discernible change in river patronage as a result of the construction proposals at this site.

River navigation and access

14.5.54 During construction it is anticipated that 90% of excavated material from the main tunnel and 90% of main tunnel secondary lining aggregate would be transported by barge. The peak number of barge movements is within Year 3 of construction with a daily average of eight barge movements a day.

14.5.55 As outlined in Section 14.2, a temporary jetty would be provided to serve the Kirtling Street site.

14.5.56 As the maximum average peak number of barge movements at the Kirtling Street site is eight during peak periods, it is anticipated that there could be a change to river navigation in the vicinity of the site as a result of the barges arriving at Kirtling Street.

14.5.57 It should be noted that a separate *Navigational Issues and Preliminary Risk Assessment* has been undertaken for the temporary construction works and barges to be used at Kirtling Street. This is reported separately

outside of the *Environmental Statement* and *TA* to accompany the application for development consent (the 'application').

14.5.58 It is anticipated that 1000T barges would be used at this site. Barges would be hauled by tugs which may be capable of hauling two barges together. The number of transit movements required on the river may therefore be lower than the number of individual barge movements.

14.5.59 The temporary jetty would also have the potential to affect access to Cringle Dock which is used by the Western Riverside Waste Authority to transport containers from the waste transfer station. The presence of the temporary jetty to the northeast of the dock could cause minor delays to barges as they may need to undertake additional manoeuvres to access the dock and may have to wait if other barges are docking at or leaving the temporary jetty.

14.5.60 The concrete batching facility adjacent to the site would continue operations during construction. Access from this facility to Kirtling Wharf and jetty would be affected by the temporary jetty serving the Kirtling Street site. This could lead to minor delays to barges docking and leaving the jetty.

14.5.61 The Project-wide impacts of vessels being used for the Thames Tideway Tunnel are outlined in the *Project-wide TA*.

Parking

14.5.62 As part of the Battersea Power Station development it is proposed to remove on-street parking along Kirtling Street and Cringle Street, and this therefore forms the construction base case. This will provide adequate road width to allow construction vehicles to travel to the site access points.

14.5.63 As there would therefore be no change to parking within the Kirtling Street site compared to the construction base case there would be a negligible impact on parking.

Highway assessment

Highway layout

14.5.64 The access plan and highway layout during construction (phases 1-3) plan is provided in the Kirtling Street *Transport Assessment* figures. The site is on four different parcels of ground on the northern side of Nine Elms Lane (A3205) and would be accessed from the eastbound lane via Kirtling Street and Cringle Street.

14.5.65 Public traffic would not be permitted to access the northern and north-western section of Kirtling Street which would be closed during the construction period.

14.5.66 The construction site areas would be accessed from Kirtling Street either turning left or right from Battersea Park Road or Nine Elms Lane (A3205) at the signalised junction. The sites are also bounded to the north and south by Cringle Street, where vehicles can egress using its priority junction with Nine Elms Lane (A3205).

14.5.67 The highway layout during construction vehicle swept path analysis (phases 1-3) plan is provided the Kirtling Street *Transport Assessment*

figures and show that the construction vehicles would be able to safely enter and leave the site.

Highway network

14.5.68 The modelling included the committed developments detailed in paras. 14.5.15 and 14.5.16 for the construction development case model.

14.5.69 Table 14.2.2 in Section 14.2 shows the vehicle movement assumptions for the local peak traffic periods based on the peak months of construction activity at this site. The table also shows the construction worker vehicle movements expected to be generated by the site.

14.5.70 Table 14.2.2 shows an average peak flow of 326 vehicle movements a day is expected during the months of greatest activity during Year 3 of construction at the Kirtling Street site. At other times in the construction period, vehicle flows would be lower than this average peak figure.

14.5.71 The busiest peak in the AM and PM period for each type of movement (construction lorries, other construction vehicles and worker vehicles) has been combined in the development case and assessed against the peak hour operation of the highway network. In reality not all peaks for these movements would occur concurrently and the peak for worker trips would be outside of the highway network peak hour, therefore the assessment is considered to be robust.

14.5.72 The *Project-wide TA* explains the method used to assign construction traffic to the HAMs, from which the likely changes in turning movements at local junctions have been identified and added to the construction base case flows.

14.5.73 The assignment of construction lorry trips has been undertaken using OmniTrans[ix] software, which enables a fixed assignment to be created for these trips in order to ensure that they are assigned only to the proposed construction routes. The OmniTrans outputs also identify lorry traffic which would be associated with the Kirtling Street site, or with other Thames Tideway Tunnel project sites, that would use routes in the vicinity of the Kirtling Street site. Figure 14.5.1 in the Kirtling Street *Transport Assessment* figures shows the OmniTrans plot for the local road network around the Kirtling Street site.

14.5.74 Highway changes may lead to local changes in traffic flow and capacity and, as a result, local modelling has been undertaken to assess the effect on the highway operation resulting from the layout changes and construction traffic flows.

14.5.75 The validated LinSig and PICADY models have been used to apply the construction traffic demands to the construction base case to determine the changes in the highway network operation due to the project (i.e. comparison of base and development cases).

[ix] *OmniTrans* is a software package used for multi-modal transport network modelling and in this case has been used to produce assignments of construction traffic across the proposed network of routes to be used for the project

14.5.76 A summary of the construction assessment results for the weekday AM and PM peak hours is presented in Table 14.5.3 to Table 14.5.6.

Table 14.5.3 Construction development case LinSig model outputs with the Battersea Power Station development (AM peak hour)

Approach	Movement	Flow (PCU)	Weekday								
			AM peak hour (08:00-09:00)								
			DoS			MMQ (PCU)			Delay (Seconds per PCU)		
			Base case	Devt case	Change	Base case	Devt case	Change	Base case	Devt case	Change
Kirtling Street	Left	4	3%	3%	0%	0	0	0	58	58	0
	Right	52	37%	37%	0%	2	2	0	64	64	0
Nine Elms Lane (A3205)	Left Ahead	576	75%	75%	0%	14	15	+1	36	36	0
	Right Ahead	540	70%	73%	+3%	13	14	+1	36	37	+1
New Covent Garden Market	Left	96	72%	72%	0%	4	4	0	91	91	0
	Right Ahead	40	29%	29%	0%	1	1	0	62	62	0
Battersea Park Road	Left Ahead	484	75%	76%	+1%	13	14	+1	41	42	+1
	Right	607	79%	80%	+1%	15	15	0	43	44	+1
			Practical Reserve Capacity (PRC)						Total Delay (PCU hours)		
Overall junction performance			13.3%	12.5%	-0.8%				28	28	0

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PCU represents Passenger Car Unit. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs. Thames Tideway Tunnel construction vehicles would be a mixture of three- and four-axle vehicles and have therefore been given a PCU value of two. Assessment has assumed that traffic signal optimisation has been undertaken as detailed in Section 2.

Table 14.5.4 Construction development case LinSig model outputs with the Battersea Power Station development (PM peak hour)

Approach	Movement	Flow (PCU)	Weekday								
			PM peak hour (17:00-18:00)								
			DoS			MMQ (PCU)			Delay (Seconds per PCU)		
			Base case	Devt case	Change	Base case	Devt case	Change	Base case	Devt case	Change
Kirtling Street	Left	6	5%	5%	0%	0	0	0	59	59	0
	Right	43	31%	31%	0%	1	1	+1	62	62	0
Nine Elms Lane (A3205)	Left Ahead	598	78%	79%	+1%	16	16	0	38	38	0
	Right Ahead	572	75%	77%	+2%	15	15	+1	37	39	+2
New Covent Garden Market	Left	93	70%	70%	0	4	4	0	88	88	0
	Right Ahead	33	24%	24%	0	1	1	0	60	60	0
Battersea Park Road	Left Ahead	521	81%	82%	+1%	15	15	0	45	46	+1
	Right	579	80%	80%	0	16	16	0	43	43	0
			Practical Reserve Capacity (PRC)						Total Delay (PCU hours)		
Overall junction performance			10.8%	10.0%	-0.8%				29	30	+1

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PCU represents Passenger Car Unit. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs

Thames Tideway Tunnel construction vehicles would be a mixture of three- and four-axle vehicles and have therefore been given a PCU value of two. Assessment has assumed that traffic signal optimisation has been undertaken as detailed in Section 2.

Table 14.5.5 Construction development case PICADY model outputs with the Battersea Power Station development (AM peak hour)

Approach	Movement	Flow (vehs)	Weekday								
			AM peak hour (08:00-09:00)								
			RFC			Max Queue (vehs)			Delay (seconds/veh)		
			Base case	Devt case	Change	Base case	Devt case	Change	Base case	Devt case	Change
Cringle Street	Left Ahead Right	83	36%	43%	+5%	1	1	0	29	34	+5
Nine Elms Lane (W) (A3205)	Right	2	1%	1%	0	0	0	0	19	19	0
Nine Elms Parkside	Left	5	2%	2%	0	0	0	0	17	17	0
Nine Elms Parkside	Right	3	4%	4%	0	0	0	0	50	52	+2
Nine Elms Lane (E) (A3205)	Right	81	37%	37%	0	1	1	0	26	26	0

Notes: RFC represents Ratio of Flow to Capacity. Queue represents number of vehicles in queue. Delay represents the mean delay per vehicle.

Table 14.5.6 Construction development case PICADY model outputs with the Battersea Power Station development (PM peak hour)

Approach	Movement	Flow (vehs)	Weekday								
			PM peak hour (17:00-18:00)								
			RFC			Max Queue (vehs)			Delay (seconds/veh)		
			Base case	Devt case	Change	Base case	Devt case	Change	Base case	Devt case	Change
Cringle Street	Left Ahead Right	139	58%	66%	+8%	1	2	+1	39	49	+10
Nine Elms Lane (W) (A3205)	Right	3	2%	2%	0	0	0	0	20	20	0
Nine Elms Parkside	Left	4	2%	2%	0	0	0	0	18	18	0
Nine Elms Parkside	Right	2	3%	3%	0	0	0	0	60	64	+4
Nine Elms Lane (E) (A3205)	Right	78	33%	33%	0	0	0	0	23	23	0

Notes: RFC represents Ratio of Flow to Capacity. Queue represents number of vehicles in queue. Delay represents the mean delay per vehicle.

14.5.77 The LinSig model results suggest that the junction would continue to operate within capacity with Battersea Park Road (A3205) reaching 80% in the AM peak and 82% in the PM peak. The increase in Mean Maximum Queue length for this movement would be one additional PCU in both peaks. This suggests that the changes caused as a result of construction traffic on road network delay at this junction would be negligible for both peak periods.

14.5.78 The LinSig junction model output shows that total junction delay is 28 PCU hours in the AM peak period assessed and 30 PCU hours in the PM peak period assessed. These equate to 42 seconds per PCU in the AM peak period assessed and 44 seconds per PCU in the PM peak period assessed.

14.5.79 The PICADY model outputs suggest that the Nine Elms Lane (A3205) / Cringle Street / Nine Elms Parkside junction would continue to operate within capacity in the construction development case. The maximum increase in delay would be ten seconds in the PM peak hour for vehicles turning out of Cringle Street. The ratio of flow to capacity for this movement would increase by 8% in the PM peak hour, which would be the maximum increase at this junction. This indicates that there would be an insignificant change at the junction as a result of the additional construction traffic.

Construction mitigation

14.5.80 The project has been designed to limit the effects on transport networks as far as possible and many measures have been embedded directly into the design of the project. These are summarised in Table 14.5.7. No additional measures are proposed for transport and therefore there is no mitigation identified for the construction phase.

Table 14.5.7 Kirtling Street site design measures

Phase	Issues	Design measures
Construction	Creating access point	▪ Access to the southern area of the site would be to/from Cringle Street on its southern side between its two junctions with Kirtling Street. This would operate on a right-turn in, right-turn out basis only. ▪ A further exit would be located in the northern side of Cringle Street and would operate as left-turn out only.

Phase	Issues	Design measures
	Safe passage for pedestrians and cyclists	• Traffic marshal would be stationed at the site access to manage potential conflicting movements • Provision of a safe crossing point for pedestrians and cyclists at the site access • Provision of hoarding to segregate the site from public footpath and vehicular traffic. • The diversion of the Thames Path is to be adequately signed.
	Movement of construction traffic flows on the local highway network	• Providing traffic marshals at the site access to minimise conflicts with construction traffic.
Operation	Permanent access point	• Provision of permanent kerbing at site access to accommodate ten yearly maintenance vehicles.

14.5.81 These embedded measures, discussed in Section 14.2, have been taken into account in the assessment. The outcomes indicate that with these measures in place the changes to be expected in the transport networks are not significant and therefore no additional measures are required for the construction phase.

Sensitivity testing

14.5.82 The assessment outcomes reported earlier are based on the Transport Strategy for this site as outlined in Section 14.3. In that scenario, the construction development case assumes that the Battersea Power Station development is in place along with improvements at the Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street / New Covent Garden Market access road junction.

14.5.83 A sensitivity test has been carried out to examine the implications of the Transport Strategy in the peak month of activity at this site without the Battersea Power Station development and associated junction improvements in place.

14.5.84 Two further sensitivity tests with and without the Battersea Power Station development in place have been undertaken to examine the implications of variation in the number of construction vehicles in the peak month of activity at this site, including the possibility that river transport were not available for short periods of time which could temporarily increase vehicle numbers.

14.5.85 The sensitivity scenario tests summarised in this section provide the sensitivity testing for:

a. Proposed Transport Strategy but without the Battersea Power Station development in place. In this sensitivity test, the number of construction vehicles would be the same as in the previous sections of this report, i.e. 192 movements per day (96 two-way vehicle trips)

b. Sensitivity test (no barge use) with the Battersea Power Station development in place. In this sensitivity test, the number of construction vehicles modelled is 794 movements per day (397 two-way vehicle trips)

c. Sensitivity test (no barge use) without the Battersea Power Station development in place. In this sensitivity test, the number of construction vehicles modelled is 794 movements per day (397 two-way vehicle trips).

Proposed Transport Strategy without the Battersea Power Station development sensitivity test

14.5.86 The sensitivity test without the Battersea Power Station development in place provides an assessment using the proposed construction materials *Transport Strategy* with the exclusion of the Battersea Power Station development and associated transport improvements.

14.5.87 The committed schemes outlined in paras. 14.5.13 and 14.5.14 within this section are included in this sensitivity test, with the exception of the Battersea Power Station.

14.5.88 The outcomes of this sensitivity test on pedestrians, cyclists, public transport, parking and highway network and operation are provided in the following paragraphs.

Pedestrians and cycles

14.5.89 In this ‘without Battersea Power Station’ scenario the Thames Path would route along Kirtling Street to Nine Elms Lane from the river instead of through the Battersea Power Station site. The Kirtling Street development proposals would alter the potential changes to cycle facilities and routes by introducing a diversion to the Thames Path which meant pedestrians and cyclists would route to Nine Elms Lane (A3025) through the junction with Cringle Street instead of through the junction with Kirtling Street.

14.5.90 In addition, the radius between Kirtling Street and Battersea Park Road (A3205) at the junction with Nine Elms Lane (A3205) and the New Covent Garden access road would need to be increased to enable large vehicles to make the left-turn into Kirtling Street without over-running the stop line on the cycle advance area of Kirtling Street. This would marginally increase the crossing distance for pedestrians crossing the Kirtling Street arm at this location.

Public transport

14.5.91 The impacts on bus routes and patronage would not change if the Battersea Power Station development proposals were not included within the assessment.

14.5.92 If the Battersea Power Station development was not included within the assessment there would be no change to the magnitude of effects described for London Underground or National Rail services.

14.5.93 The bus stand in Cringle Street, removed from this location in the Battersea Power Station proposals, would require relocation to Kirtling Street between the junction with Nine Elms Lane (A3025) and Cringle Street on the northbound carriageway. The relocation of this stand to this location has been discussed with TfL.

Parking

14.5.94 If the Battersea Power Station development proposals for Kirtling Street and Cringle Street were excluded within the assessment the parking on Kirtling Street and Cringle Street present in the baseline would also be present in the base case.

14.5.95 This parking would need to be removed prior to construction at Kirtling Street to enable safe access by HGVs. There would therefore be a low adverse impact on parking from the Kirtling Street site.

Highway network and operation

14.5.96 Without the Battersea Power Station development the proposed improvements at the Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street / New Covent Garden access junction would not have been implemented. This junction would therefore need to be modified by the Thames Tideway Tunnel project, as described in para. 14.5.90.

14.5.97 Summaries of the construction assessment results from the LinSig model for this junction in the weekday AM and PM peak hours using the 'without Battersea Power Station' development sensitivity test figures are presented in Table 14.5.8 and Table 14.5.9.

14.5.98 The Battersea Power Station development proposals do not include changes to the Nine Elms Lane (A3025) / Cringle Street / Nine Elms Parkside junction. The construction assessment for the Nine Elms Lane (A3025) / Cringle Street junction without the Battersea Power Station development would therefore remain the same.

Table 14.5.8 Construction case and development case LinSig model outputs for the Transport Strategy without the Battersea Power Station development sensitivity test (AM peak hour)

Approach	Movement	Flow (PCU)	Weekday								
			AM peak hour (08:00-09:00)								
			DoS			MMQ (PCUs)			Delay (Seconds per PCU)		
			Base case	Devt case	Change	Base case	Devt case	Change	Base case	Devt case	Change
Kirtling Street	Left Ahead Right	46	15%	15%	0%	1	1	0	33	33	0
Nine Elms Lane (A3205)	Left Ahead	612	62%	66%	+4%	11	10	-1	22	23	+1
	Right Ahead	558	57%	72%	+15%	12	9	-3	22	28	+6
New Covent Garden Market	Left	96	14%	14%	0%	1	1	0	18	18	0
	Right Ahead	40	13%	13%	0%	1	1	0	34	34	0
Battersea Park Road	Left Ahead	480	52%	52%	0%	8	8	0	18	18	0
	Right Ahead	602	55%	55%	0%	8	8	0	20	20	0
			Practical Reserve Capacity (PRC)						Total Delay (PCU hours)		
Overall junction performance			45.9%	25.7%	-20.2%				14	14	+1

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs. Thames Tideway Tunnel construction vehicles would be a mixture of three- and four-axle vehicles and have therefore been given a PCU value of two. Assessment has assumed that traffic signal optimisation has been undertaken as detailed in Section 2.

Table 14.5.9 Construction case and development case LinSig model outputs for the Transport Strategy without the Battersea Power Station development sensitivity test (PM peak hour)

Approach	Movement	Flow (PCU)	Weekday								
			PM peak hour (17:00-18:00)								
			DoS			MMQ (PCUs)			Delay (Seconds per PCU)		
			Base case	Dev case	Change	Base case	Dev case	Change	Base case	Dev case	Change
Kirtling Street	Left Ahead Right	39	12%	12%	0%	1	1	0	33	33	0
Nine Elms Lane (A3205)	Left Ahead	629	64%	68%	+4%	10	11	+1	22	24	+2
	Right Ahead	582	60%	79%	+19%	10	14	+4	22	32	+10
New Covent Garden Market	Left	92	14%	14%	0%	1	1	0	18	18	0
	Right Ahead	33	10%	10%	0%	1	1	0	33	33	0
Battersea Park Road	Left Ahead	510	55%	55%	0%	9	9	0	19	19	0
	Right	568	54%	54%	0%	8	8	0	19	19	0
			Practical Reserve Capacity (PRC)						Total Delay (PCU hours)		
Overall junction performance			40.8%	13.8%	-27.0%				14	16	+2

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs. Thames Tideway Tunnel construction vehicles would be a mixture of three- and four-axle vehicles and have therefore been given a PCU value of two. Assessment has assumed that traffic signal optimisation has been undertaken as detailed in Section 2.

14.5.99 The LinSig assessment results suggest that under the Transport Strategy sensitivity test without the Battersea Power Station development in place, the Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street / New Covent Garden access junction would operate within capacity with a maximum additional delay of 10 seconds per PCU compared with the construction base case on the Nine Elms Lane (A3205) right-turn lane into Kirtling Street in the PM peak hour.

14.5.100 The LinSig junction model output shows that total junction delay is 14 PCU hours in the AM and 19 PCU hours in the PM peak periods assessed. These equate to 23 seconds per PCU in the AM and 30 seconds per PCU in the PM peak periods assessed.

Sensitivity test (no barge use) with the Battersea Power Station development

14.5.101 This sensitivity test has been undertaken to examine the implications of variation in the number of construction vehicle movements in the peak month of activity at this site, including the possibility that river transport is not available for short periods of time which could temporarily increase vehicle numbers. In this sensitivity test, the construction vehicle movements in the peak year of construction would be approximately 85 in the AM and PM peak hours. This would be an increase of 60 movements in the AM and PM peak hours compared with that for the *Transport Strategy*.

14.5.102 This assessment assumes that the Battersea Power Station development and associated highway modifications are in place, as for the construction development case.

14.5.103 The committed schemes outlined in paras. 14.5.13 and 14.5.14 within this section are included in this sensitivity test.

14.5.104 The outcomes of this sensitivity test on pedestrians, cyclists, public transport, parking and highway network and operation are provided in the following paragraphs.

Pedestrians and cycles

14.5.105 As all committed schemes are included in the assessment there would be no changes to pedestrian and cycle facilities or routes.

Public transport

14.5.106 The impacts on bus routes and patronage would not change if barges were not used at this site.

14.5.107 There would also be no change to the magnitude of effects described for London Underground or National Rail services.

Parking

14.5.108 If barges were not used at this site there would be no change in parking at this site from the base case.

Highway network and operation

14.5.109 Summaries of the construction assessment results from the LinSig model for the Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling

Street / New Covent Garden access junction in the weekday AM and PM peak hours using the sensitivity test with no barge use are presented in Table 14.5.10 and Table 14.5.11.

14.5.110 Summaries of the construction assessment results from the PICADY model for the Nine Elms Lane (A3205) / Cringle Street / Nine Elms Parkside junction in the weekday AM and PM peak hours using the sensitivity test with no barge use are presented in Table 14.5.12 and Table 14.5.13.

Table 14.5.10 Construction case and development case LinSig model outputs for the sensitivity test (no barge use) with the Battersea Power Station development (AM peak hour)

Approach	Movement	Flow (PCU)	Weekday								
			AM peak hour (08:00-09:00)								
			DoS			MMQ (PCU)			Delay (Seconds per PCU)		
			Base case	Sensit'y test	Change	Base case	Sensit'y test	Change	Base case	Sensit'y test	Change
Kirtling Street	Left	4	3%	3%	0%	0	0	0	55	58	+3
	Right	52	37%	37%	0%	2	2	0	64	64	0
Nine Elms Lane (A3205)	Left Ahead	576	75%	75%	0%	14	15	+1	38	26	+12
	Right Ahead	594	70%	78%	+8%	13	16	+3	40	41	+1
New Covent Garden Market	Left	96	72%	72%	0%	4	4	0	77	91	+14
	Right Ahead	40	29%	29%	0%	1	1	0	61	62	+1
Battersea Park Road	Left Ahead	485	75%	76%	+1%	13	14	+1	44	42	-2
	Right	607	79%	80%	+1%	15	15	0	47	44	-3
			Practical Reserve Capacity (PRC)						Total Delay (PCU hours)		
Overall junction performance			13.3%	12.5%	-0.8%				28	29	+1

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs. Thames Tideway Tunnel construction vehicles would be a mixture of three- and four-axle vehicles and have therefore been given a PCU value of two. Assessment has assumed that traffic signal optimisation has been undertaken as detailed in Section 2.

Table 14.5.11 Construction case and development case LinSig model outputs for the sensitivity test (no barge use) with the Battersea Power Station development (PM peak hour)

Approach	Movement	Flow (PCU)	Weekday								
			PM peak hour (17:00-18:00)								
			DoS			MMQ (PCU)			Delay (Seconds per PCU)		
			Base case	Sensit'y test	Change	Base case	Sensit'y test	Change	Base case	Sensit'y test	Change
Kirtling Street	Left	6	5%	5%	0%	0	0	0	59	59	0
	Right	43	31%	31%	0%	1	1	0	62	62	0
Nine Elms Lane (A3205)	Left Ahead	598	78%	79%	+1%	16	16	0	38	38	0
	Right Ahead	626	75%	83%	+8%	15	17	+2	38	44	+6
New Covent Garden Market	Left	93	70%	70%	0%	4	4	0	88	88	0
	Right Ahead	33	24%	24%	0%	1	1	0	60	60	0
Battersea Park Road	Left Ahead	521	81%	82%	+1%	15	15	0	45	46	+1
	Right Ahead	579	80%	80%	0%	16	16	0	43	43	0
			Practical Reserve Capacity (PRC)						Total Delay (PCU hours)		
Overall junction performance			10.8%	8.9%	-1.9%				29	31	+1

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs Thames Tideway Tunnel construction vehicles would be a mixture of three- and four-axle vehicles and have therefore been given a PCU value of two. Assessment has assumed that traffic signal optimisation has been undertaken as detailed in Section 2.

Table 14.5.12 Construction case and development case PICADY model outputs for the sensitivity test (no barge use) with the Battersea Power Station development (AM peak hour)

Approach	Movement	Flow (vehs)	Weekday								
			AM peak hour (08:00-09:00)								
			RFC			Max Queue (vehs)			Delay (seconds/veh)		
			Base case	Devt case	Sensitivity test	Base case	Devt case	Sensitivity test	Base case	Devt case	Sensitivity test
Cringle Street	Left Ahead Right	110	36%	43%	57%	1	1	1	29	34	43
Nine Elms Lane (W) (A3205)	Right	2	1%	1%	1%	0	0	0	19	19	19
Nine Elms Parkside	Left	5	2%	2%	2%	0	0	0	17	17	17
Nine Elms Parkside	Right	3	4%	4%	5%	0	0	0	50	52	60
Nine Elms Lane (E) (A3205)	Right	81	37%	37%	37%	1	1	1	26	26	26

Notes: RFC represents Ratio of Flow to Capacity. Queue represents number of vehicles in queue. Delay represents the mean delay per vehicle.

Table 14.5.13 Construction case and development case PICADY model outputs for the sensitivity test (no barge use) with the Battersea Power Station development (PM peak hour)

Approach	Movement	Flow (vehs)	Weekday								
			PM peak hour (17:00-18:00)								
			RFC			Max Queue (vehs)			Delay (seconds/veh)		
			Base case	Devt case	Sensitivity test	Base case	Devt case	Sensitivity test	Base case	Devt case	Sensitivity test
Cringle Street	Left Ahead Right	166	58%	66%	79%	1	2	3	39	49	77
Nine Elms Lane (W) (A3205)	Right	3	2%	2%	2%	0	0	0	20	20	21
Nine Elms Parkside	Left	4	2%	2%	2%	0	0	0	18	18	18
Nine Elms Parkside	Right	2	3%	3%	4%	0	0	0	60	64	77
Nine Elms Lane (E) (A3205)	Right	78	33%	33%	33%	0	0	0	23	23	23

Notes: RFC represents Ratio of Flow to Capacity. Queue represents number of vehicles in queue. Delay represents the mean delay per vehicle.

14.5.111 The LinSig assessment results suggest that under the sensitivity test with no barge use, the Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street / New Covent Garden access junction would operate within capacity with a maximum additional delay of six seconds per PCU compared with the construction base case) on the Nine Elms Lane (A3205) right-turn lane into Kirtling Street in the PM peak hour.

14.5.112 The LinSig junction model output shows that total junction delay is 29 PCU hours in the AM peak and 31 in the PM peak periods assessed. These equate to 43 seconds per PCU in the AM peak period assessed and 45 seconds per PCU in the PM peak period assessed.

14.5.113 The PICADY assessment for Nine Elms Lane (A3205) / Cringle Street / Nine Elms Parkside junction indicates that the local network will continue to operate within capacity. The longest delay over the construction development case occurs at the PM peak hour on the Cringle Street approach with an additional delay of approximately 27 seconds per vehicle.

Sensitivity test (no barge use) without the Battersea Power station development

14.5.114 This sensitivity test has been undertaken to examine the implications of variation in the number of construction vehicle movements in the peak month of activity at this site without the Battersea Power Station development and associated transport improvements in place.

14.5.115 As for the sensitivity test described above, the construction vehicle movements in the peak year of construction would be approximately 85 in the AM and PM peak hours. This would be an increase of 60 movements in the AM and PM peak hours compared with that for the *Transport Strategy*.

14.5.116 The committed schemes outlined in paras. 14.5.13 and 14.5.14 within this section are included in this sensitivity test, with the exception of the Battersea Power Station.

14.5.117 The outcomes of this sensitivity test on pedestrians, cyclists, public transport, parking and highway network and operation are provided in the following paragraphs.

Pedestrians and cycles

14.5.118 In this without Battersea Power Station scenario the Thames Path would route along Kirtling Street to Nine Elms Lane (A3025) from the river instead of through the Battersea Power Station site. The Kirtling Street site proposals would alter the potential changes to cycle facilities and routes by introducing a diversion to the Thames Path which meant pedestrians and cyclists would route to Nine Elms Lane (A3025) through the junction with Cringle Street instead of through the junction with Kirtling Street.

14.5.119 The radius between Kirtling Street and Battersea Park Road (A3205) at the junction with Nine Elms Lane (A3205) and the New Covent Garden access road would need to be increased to enable large vehicles to make the left-turn into Kirtling Street without over-running the stop line on the

cycle advance area of Kirtling Street. This would marginally increase the crossing distance for pedestrians crossing the Kirtling Street arm at this location.

Public transport

14.5.120 The impacts on bus routes and patronage would not change if the Battersea Power Station development proposals were not included within the assessment and barges were not used.

14.5.121 If the Battersea Power Station development was not included within the assessment there would be no change to the magnitude of effects described for London Underground or National Rail services.

14.5.122 The bus stand in Cringle Street would also require relocation to Kirtling Street between the junction with Nine Elms Lane and Cringle Street on the northbound carriageway.

Parking

14.5.123 If the Battersea Power Station development proposals for Kirtling Street and Cringle Street were excluded within the assessment and barges were not used there would be low adverse impact on parking from the Kirtling Street site. This is because all parking on these roads would not have been removed prior to construction at Kirtling Street but would need to be removed to allow access for construction vehicles.

Highway network and operation

14.5.124 The Battersea Power Station development proposals do not include changes to the Nine Elms Lane (A3025) / Cringle Street junction. The construction assessment for the Nine Elms Lane (A3025) / Cringle Street junction without the Battersea Power Station development and with no barge use would therefore remain the same as the sensitivity test with the Battersea Power Station proposals and with no barge use.

14.5.125 No improvements would have been made to the Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street / New Covent Garden access junction without the Battersea Power Station development. This junction would therefore need to be modified by the Thames Tideway Tunnel project, as described in para. 14.5.119.

14.5.126 Summaries of the construction assessment results from the LinSig model for this junction in the weekday AM and PM peak hours using the sensitivity test with no barge use and without the Battersea Power Station development proposals are presented in Table 14.5.14 and Table 14.5.15.

Table 14.5.14 Construction base and development case LinSig model outputs for the sensitivity test (no barge use) without the Battersea Power Station development (AM peak hour)

Approach	Movement	Flow (PCU)	Weekday								
			AM peak hour (08:00-09:00)								
			DoS			MMQ (PCU)			Delay (Seconds per PCU)		
			Base case	Sensit'y test	Change	Base case	Sensit'y test	Change	Base case	Sensit'y test	Change
Kirtling Street	Left Ahead Right	46	15%	15%	0%	1	1	0	33	33	0
Nine Elms Lane (A3205)	Left Ahead	585	62%	63%	+1%	10	10	0	22	22	0
	Right Ahead	531	57%	59%	+2%	10	10	0	22	22	0
New Covent Garden Market	Left	96	14%	14%	0%	1	1	0	18	18	0
	Right Ahead	40	13%	13%	0%	1	1	0	34	34	0
Battersea Park Road	Left Ahead	479	52%	52%	0%	8	8	0	18	18	0
	Right Ahead	602	55%	55%	0%	8	8	0	20	20	0
			Practical Reserve Capacity (PRC)						Total Delay (PCU hours)		
Overall junction performance			45.9%	43.0%	-2.9%				14	14	0

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs. Thames Tideway Tunnel construction vehicles would be a mixture of three- and four-axle vehicles and have therefore been given a PCU value of two. Assessment has assumed that traffic signal optimisation has been undertaken as detailed in Section 2.

Table 14.5.15 Construction base and development case LinSig model outputs for the sensitivity test (no barge use) without the Battersea Power Station development (PM peak hour)

Approach	Movement	Flow (PCU)	Weekday								
			PM peak hour (17:00-18:00)								
			DoS			MMQ (PCU)			Delay (Seconds per PCU)		
			Base case	Sensit'y test	Change	Base case	Sensit'y test	Change	Base case	Sensit'y test	Change
Kirtling Street	Left Ahead Right	39	12%	12%	0%	1	1	0	33	33	0
Nine Elms Lane (A3205)	Left Ahead	601	64%	65%	+1%	10	11	+1	22	23	+1
	Right Ahead	556	60%	62%	+2%	10	10	0	22	23	+1
New Covent Garden Market	Left	92	14%	14%	0%	1	1	0	18	18	0
	Right Ahead	33	10%	10%	0%	1	1	0	33	33	0
Battersea Park Road	Left Ahead	509	55%	55%	0%	9	9	0	19	19	0
	Right Ahead	568	54%	54%	0%	8	8	0	19	19	0
			Practical Reserve Capacity (PRC)						Total Delay (PCU hours)		
Overall junction performance			40.8%	38.4%	-2.4%				14	14	0

Notes: DoS represents Degree of Saturation; the ratio of flow to capacity. MMQ represents Mean Maximum Queue for the busiest-case 15 minute modelled period (in vehicle lengths). Delay represents the mean delay per PCU. PRC represents Practical Reserve Capacity; measure of how much additional traffic could pass through a junction whilst maintaining a maximum DoS of 90% on all lanes. PCU value for a car is one PCU. Vans and three-axle vehicles are 1.5 PCUs, vehicles with four or more axles are 2.3 PCUs. Buses and coaches are two PCUs. Motorcycles are 0.4 PCUs and pedal cycles are 0.2 PCUs Thames Tideway Tunnel construction vehicles would be a mixture of three- and four-axle vehicles and have therefore been given a PCU value of two. Assessment has assumed that traffic signal optimisation has been undertaken as detailed in Section 2.

14.5.127 The LinSig assessment results suggest that for the sensitivity test (no barge use) without the Battersea Power Station development, the Battersea Park Road (A3205) / Nine Elms Lane (A3205) / Kirtling Street / Nine Elms Parkside junction would operate within capacity with a maximum additional delay of one second per PCU compared with the construction base case on the Nine Elms Lane (A3205) right-turn lane into Kirtling Street in the PM peak hour.

14.5.128 The LinSig junction model output shows that total junction delay is 14 PCU hours in both the AM and PM peak periods assessed. These equate to 21 seconds per PCU in both the AM and PM peak periods assessed.

14.6 Operational assessment

14.6.1 This section summarises the findings of the assessment undertaken for Year 1 of operation at the Kirtling Street site.

The assessment of the operational phase is limited to the physical issues associated with accessing the site from the highway network as outlined in Section 14.2. This has been discussed with the LB of Wandsworth and Transport for London.

Operational base case

14.6.2 The operational assessment year for transport is Year 1 of operation.

14.6.3 As explained in para. 14.2.61 the elements of the transport network that would be affected during operation are highway layout and operation. For the purposes of the operational base case, it is anticipated that the highway layout and parking will be as indicated in the construction base case.

Operational development case

14.6.4 The operational development case for the site includes any permanent changes in the vicinity of the Kirtling Street site as a result of the Thames Tideway Tunnel project and takes into consideration the occasional maintenance activities required at the site.

14.6.5 The transport demands created by the development in the operational phase would be extremely low and limited to occasional maintenance visits every three to six months, and larger cranes required for access to the shaft and tunnel every ten years.

14.6.6 The operational assessment has taken into consideration those elements that could be affected, which comprise the short term impacts on car parking and on the highway layout and operation when maintenance visits are made to the site.

14.6.7 The permanent highway layout plans (areas 1 and 2) are provided in the Kirtling Street *Transport Assessment* figures and indicates the operational phase permanent works.

Parking

14.6.8 The Battersea Power Station development proposals would remove all parking from Kirtling Street and Cringle Street therefore maintenance vehicles would have sufficient road width to access the site. Therefore no change is expected to car parking in the vicinity of the site, compared to the base case, as a result of the operational phase of the proposed development at the Kirtling Street site.

14.6.9 As a consequence the effects of the operational phase would remain negligible.

Highway layout and operation

14.6.10 For routine three- or six-monthly inspections vehicular access would be required for light commercial vehicles, typically a transit van. On occasion there may be a consequent need for small flatbed vehicles to access the site.

14.6.11 The site would be accessed from Kirtling Street via its junction with Battersea Park Road (A3025) / Nine Elms Lane (A3025) / New Covent Garden access from the eastbound carriageway during the operational phase.

14.6.12 During ten-yearly inspections, space to locate two large cranes within the site area and associated support vehicles would be required. The cranes would facilitate lowering and recovery of tunnel inspection vehicles and to provide duty/standby access for personnel. To assess the effect of these on the highway layout, swept paths have been undertaken for the largest vehicles including an 11.36m mobile cranes, a 10m rigid vehicle and a 10.7m articulated vehicle. The permanent highway layout vehicle swept path analysis plan is provided in the Kirtling Street *Transport Assessment* figures and show safe access/egress at the site for the operational phase.

14.6.13 When larger vehicles are required to service the site, there may also be some temporary, short-term delay to other road users while manoeuvres are made. However it is anticipated that the arrival of large vehicles would normally be scheduled to take place outside of the peak hours to minimise the effect on the local highway network.

14.6.14 Due to the infrequent nature of maintenance trips there is anticipated to be a negligible impact on the surrounding highway network.

Operational mitigation

14.6.15 Due to there being no significant changes to transport during the operational phase, no mitigation is required.

14.7 Summary of site specific Transport Assessment

14.7.1 The outcomes of this *TA* demonstrate the key findings indicated in Table 14.7.1.

Table 14.7.1 Kirtling Street Transport Assessment results

Phase	Mode of transport	Key Findings
Construction	Pedestrians	Less than one minute delay to pedestrian journeys along Thames Path due to 20m diversion including three additional road crossings. A maximum delay of a minute for pedestrians crossing the new entrances.
	Cyclists	Minimal delay (less than 5 seconds) experienced by cyclists using Thames Path as a result of the diversion delay and a delay of less than 5 seconds to cyclists using the carriageway of Nine Elms Lane (A3205) due to additional construction vehicle movements.
	Bus patronage and operators	Approximately 47 and 29 worker trips would be made by bus during AM and PM peak hours respectively. Maximum delay to bus services would be approximately two seconds in the peak periods assessed over the construction base case.
	London Underground and National Rail patronage	Approximately 147 and 91 worker trips would be made by LUL or National Rail in the AM and PM peak hours respectively. No other impact on LUL or National Rail services.
	River passenger services and patronage	River services would not be altered during construction and any additional patronage would not significantly affect services.
	River navigation	There would be an assumed average peak of eight barge movements a day during Year 3 of construction which could impact on existing river navigation due to access being needed for Cringle Dock and its Western Riverside Waste Authority and Cemex Concrete Batching Plant occupiers. Further detailed consideration of navigational issues is presented in the *Navigational Issues and Preliminary Risk Assessment*.
	Parking	In the scenario that the Battersea Power Station has not made planned modifications to the highway layout, a bus standing bay would be relocated from existing location along Cringle Street to the western side of the one-way southern section of Kirtling Street
	Highway network and	Public traffic would not be permitted to access the northern and northwestern section of

Phase	Mode of transport	Key Findings
	operation	Kirtling Street which will be closed All entry movements would be made via Kirtling Street and Cringle Street and all exit movements would be from Cringle Street. Approximately 326 additional daily movements would be produced by the construction works at Kirtling Street. The Kirtling Street junction with Battersea Park Road (A3205) / Nine Elms Lane (A3205) / New Covent Garden access would be operating within capacity in the construction base case. The addition of the Thames Tideway Tunnel traffic has negligible impact on the operation of the junction. The Cringle Street junction with Nine Elms Lane (A3205) and Nine Elms Parkside will be also operating within capacity in the construction base case. The addition of the Thames Tideway Tunnel traffic has negligible impact on the operation of the junction.
Operation	Parking	No effect on parking during operational phase.
	Highway layout and operation	Some network delay may be experienced by other road users when large vehicles are accessing the site, however this will be infrequent and temporary.

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References

[1] Transport for London, *Travel Planning for new development in London,* Transport for London (2011)

[2] Transport for London, *Transport Assessment Best Practice guidance*. (April 2010).

[3] Department for Transport (DfT), *Traffic Signs Manual Chapter 8 - Traffic Safety Measures and Signs for Road Works and Temporary Situations*. (2009).

[4] HM Government, *Equality Act 2010 – Guidance*. (2010).

[5] Traffic Advisory Leaflet 15/99 (December 1999) *Cyclists at Roadworks* – Guidance was produced by TfL and provides recommended lane widths at roadworks.

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Thames Tideway Tunnel
Thames Water Utilities Limited

Application for Development Consent

Application Reference Number: WWO10001

Transport Assessment

Doc Ref: **7.10.11**

Kirtling Street

Appendices

APFP Regulations 2009: Regulation **5(2)(q)**

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Transport Assessment

Section 14 Appendices: Kirtling Street

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Appendix A: Policy review

A.1 Introduction

A.1.1 There are a number of documents containing planning policies that are relevant to transport matters for the proposed development at Kirtling Street. This includes national, regional and local policies relevant to the site.

A.1.2 This section reviews current documents relevant to the proposed development which is situated within the London Borough (LB) of Wandsworth.

A.2 National Policy

National Planning Policy Framework (March 2012)

A.2.1 The Department for Communities and Local Government published the National Planning Policy Framework (NPPF) in March 2012. The NPPF replaces a variety of existing planning guidance, most notable the following document, Planning Policy Guidance 13: Transport (November 2010).

A.2.2 The key objective of the NPPF is to create a policy context to support economic growth. The principle of the guidance is to place an emphasis on sustainable development, where environmental conditions should be considered alongside economical and social matters.

A.2.3 It outlines the importance of local development plans and notes that where development accords with an up to date development plan then the proposals should be approved. Moreover, it suggests that local authorities should follow the approach of the presumption in favour of sustainable development.

A.2.4 With particular reference to transport matters the documents states:

"*In preparing local plans, local planning authorities should therefore support a pattern of development which, where reasonable to do so, and facilitates the use of sustainable modes of transport."*

A.2.5 The guidance goes on to advise at paragraph 32:

"All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:

a. the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;

b. safe and suitable access to the site can be achieved for all people; and

c. improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development.

Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe."

A.2.6 The document also states that:

"Plans should protect and exploit opportunities for the use of sustainable transport modes for the movement of goods or people". Therefore:

"A key tool to facilitate this would be a Travel Plan. *All developments which generate significant amounts of movement should be required to provide a Travel Plan".*

National Policy Statement for Waste Water (March 2012)

A.2.7 The National Policy Statement for Waste Water (NPS) was published by the Department of Environment, Food and Rural Affairs in March 2012. This National Policy Statement (NPS) sets out Government policy for the provision of major waste water infrastructures. The NPS does not recognise the Thames Tideway Tunnel project within the original thresholds which is contained within the Planning Act. However the document indicates that *"the Government has already stated its intention that the project should be considered at a national level"*.

A.2.8 The Secretary of State announced that development consent for the Thames Tideway Tunnel project should also be dealt with under the regime for nationally significant infrastructure projects under the Planning Act 2008.

A.2.9 The NPS seeks a sustainable long term solution to address the untreated sewage discharged into the River Thames and Thames Tideway Tunnel has been considered as the preferred solution.

A.2.10 With particular reference to transport matters the document states:

"The ES should include a transport assessment, using the NATA/WebTAG methodology stipulated in Department for Transport (DfT), or any successor to such methodology. Applicants should consult the Highways Agency and/or the relevant highway authority, as appropriate, on the assessment and on mitigation measures. The assessment should distinguish between the construction, operation and decommissioning project stages as appropriate".

A.2.11 The document states that the impacts on the surrounding transport infrastructure should be mitigated and where the mitigation measures are not sufficient the requirements to mitigate adverse impacts on transport networks should be considered.

A.2.12 Therefore it is advised to prepare a travel plan which includes demand management measures to mitigate transport impacts, and *"to provide details of proposed measures to improve access by public transport, walking and cycling, to reduce the need for parking associated with the proposal and to mitigate transport impacts".*

A.2.13 The NPS prefers water-borne or rail transport over road transport and where there is likely to be substantial HGV traffic, the following measures should be looked:

a. *"control numbers of HGV movements to and from the site in a specified period during its construction and possibly on the routing of such movements;*

b. *make sufficient provision for HGV parking, either on the site or at dedicated facilities elsewhere, to avoid 'overspill' parking on public roads, prolonged queuing on approach roads and uncontrolled on-street HGV parking in normal operating conditions; and*

c. *ensure satisfactory arrangements for reasonably foreseeable abnormal disruption, in consultation with network providers and the responsible police force".*

A.2.14 The proposed development is located at a relatively moderate accessible transport hub and the proposed location has a Public Transport Accessibility Level (PTAL) rating of 3, rated as 'moderate'. It is assumed that construction workers would not travel by car to and from the site on the basis that there would be no worker parking on site; on-street parking in the area is restricted; and site-specific Travel Plan measures will discourage workers from travelling by car. Information regarding the travel arrangements of the workers associated with the site will be included in the *Draft Project Framework Travel Plan* which accompanies this application.

A.3 Regional policy

The London Plan (July 2011)

A.3.1 The London Plan 2011 is produced by the Greater London Authority (GLA) and sets out the strategic planning guidance for London planning authorities. The Mayor of London is responsible for strategic planning and the production of a Spatial Development Strategy called The London Plan. The London plan sets out the integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The Plan takes the year 2031 as its formal end date and its over-arching vision is supported by six detailed objectives for London:

a. A city that meets the challenges of economic and population growth;

b. An internationally competitive and successful city;

c. A city of diverse, strong, secure and accessible neighbourhoods;

d. A city that delights the senses;

e. A city that becomes a world leader in improving the environment; and

f. A city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities.

A.3.2 The last objective of the plan relates specifically to transport. Policies within the London Plan of relevance to the proposed development are outlined as follows:

A.3.3 **Policy 6.1 – Strategic Approach** advises that the mayor will work with all relevant partners to encourage the closer integration of transport and development by:

- Encouraging patterns and nodes of development that reduce the need to travel, especially by car;
- Seeking to improve the capacity and accessibility of public transport, walking and cycling, particularly in areas of greater demand;
- Supporting development that generates high levels of trips at locations with high public transport accessibility and/or capacity, either currently or via committed, funded improvement;
- Seeking to increase the use of the Blue Ribbon Network, especially the Thames, for passenger and freight use;
- Facilitating the efficient distribution of freight whilst minimising its impacts on the transport network;
- Supporting measures that encourage shifts to mode sustainable modes and appropriate demand management; and
- Promoting greater use of low carbon technology so that carbon dioxide and other contributors to global warming are reduced.

A.3.4 **Policy 6.2 – Providing public transport capacity and safeguarding land for transport** which notes that development proposals that do not provide adequate safeguarding for the schemes should be refused.

A.3.5 **Policy 6.3 – Assessing effects of development on transport capacity** outlines that development proposals should ensure that impacts on transport capacity and the transport network, at both a corridor and local level, are fully assessed. Development should not adversely affect safety on the transport network. Where existing transport capacity is insufficient for the travel generated by proposed developments, and no firm plans exist for an increase in capacity, boroughs should ensure that the development proposals are phased until it is known that these requirements can be met. The policy notes that the use of Travel Plans and addressing freight issues can help reduce the impact of development on the transport network.

A.3.6 **Policy 6.7 – Better streets and surface transport** notes that high levels of priority should be provided to bus routes and there should be direct, secure, accessible and pleasant walking routes to stops. The development would include provision of transport to and from public transport nodes where sites are at a distance from public transport services.

A.3.7 **Policy 6.9 – Cycling** presents measures to increase cycling mode share in London to 5 percent by 2026. Measures include completing the Cycle Super Highways and expanding the London cycle hire scheme. To support this, developments should provide cycle parking to at least the minimum standards, provide showers and changing facilities and facilitate the major cycling schemes in London (Super Highways / Cycle Hire).

A.3.8 **Policy 6.10 – Walking** recommends the use of shared space principles with simplified streetscape, de-cluttering and access for all. Developments should therefore ensure high quality pedestrian environments and emphasise the quality of pedestrian and street space. It points to the 'Legible London' pedestrian wayfinding system as a successful measure to support walking journeys.

A.3.9 **Policy 6.13 – Parking** outlines the need to seek an appropriate balance between promoting new development and preventing excessive car parking provision that can undermine cycling, walking and public transport use. As such, car parking should reduce as public transport accessibility (measured by PTAL) increases. The policy advises that Transport assessments and travel plans for major developments should give details of proposed measures to improve non-car based access, reduce parking and mitigate adverse transport impacts.

A.3.10 **Policy 6.14 – Freight** notes that freight distribution should be improved and movement of freight by rail and waterway should be promoted. To support this, developments that generate high number of freight movements should be located close to major transport routes. In addition, the Freight Operators Recognition Scheme, construction logistics plans and delivery and servicing plans should be promoted. The policy also advises the increase in the use of the Blue Ribbon Network for freight transport.

The Mayors Transport Strategy (GLA, 2010)

A.3.11 In addition to the London Plan, the Mayor has prepared a number of strategies that are essentially an extension of the London Plan. Published by the GLA in 2010, the Mayor's Transport Strategy (MTS) (Greater London Authority, May 2010) envisages *"London's Transport system excelling among that of global cities, providing access to opportunities for all people and enterprises while achieving the highest environmental standards and leading the world in its move towards tackling the urban transport challenges of the 21st century"*.

A.3.12 The MTS sets out a number of policy commitments or requirements which have implications for TfL and a range of other delivery partners including the GLA and the London boroughs. The policies that are relevant to the proposed development are:

- **Policy 4** indicating that the Mayor will seek *"to improve people's access to jobs, business' access to employment markets, business to business access, and freight access by seeking to ensure appropriate transport capacity and connectivity is provided on radial corridors into central London";*
- **Policy 5** seeks *"to ensure efficient and effective access for people and goods within central London";*
- **Policy 8** supports *"a range of transport improvements within metropolitan town centres for people and freight that help improve connectivity and promote the vitality and viability of town centres, and that provide enhanced travel facilities for pedestrians and cyclists";*

- **Policy 9** states that the Mayor *"will use the local and strategic development control processes";*
- **Policy 11** specifies that the Mayor will *"encourage the use of more sustainable, less congesting modes of transport, set appropriate parking standards, and aim to increase public transport, walking and cycling mode share";*
- **Policy 12** states that the Mayor *"will seek to improve the distribution of freight through the provision of better access to/from Strategic Industrial Locations, delivery and servicing plans, and other efficiency measures across London"; and*
- **Policy 15** and **Policy 16** indicate that the Mayor will seek to reduce emissions of air pollutants and noise impacts from transport respectively.

A.3.13 The *London Freight Plan, Sustainable Freight Distribution: a Plan for London* (TfL, June 2008) sets out the steps that have to be taken over the next five to ten years to identify and begin to address the challenge of delivering freight sustainably in the capital. Principles set in that document are expected to be relevant to the consideration of the construction logistics strategy for the proposed development.

A.4 Local policy

A.4.1 The London Borough of Wandsworth has a number of policies relevant to transport within the Local Development Framework (LDF) and the Unitary Development Plan (UDP). Both reflect national and regional focused policies and are referred to below where appropriate.

Local Development Framework

A.4.2 The emerging LDF aims to guide and manage development and regeneration in the borough until 2025. The Core Strategy of the LDF – adopted in October 2010 – now forms part of the statutory planning guidance for the borough, together with the saved policies of the borough's Unitary development Plan (UDP).

A.4.3 Transport policies within this document are concerned with ensuring improvements are made to the public transport, river wharves and accessibility, reducing carbon emissions, and encouraging the use of sustainable transport within the borough.

A.4.4 **Policy PL 3 – Transport** – outlines how the borough will improve the transport network by ensuring *'quality cycling conditions will be delivered'* and *'improved conditions for walking'* along the Thames Path and other accessible routes will be delivered.

A.4.5 **Policy PL 9 – River Thames and the riverside** - outlines that '*greater use will be made of the river'* and that the 'five wharves will continue to be safeguarded', while the redevelopment of these wharves will be accepted *'if the wharf is no longer viable or capable of being made viable for cargo handling uses'*. Further*'existing river infrastructure that provides access to the river and the foreshore, such as piers, jetties, drawdocks, slipways,*

steps and stairs will be protected and new facilities, including piers for river buses, promoted'.

A.4.6 *'Putney Embankment's special recreational character and function'* will be protected, particularly for river sports. Also this policy commits to stating that *'development will not be permitted which encroaches onto the river foreshore'* and opportunities will be taken in consultation with partner agencies, to *'create habitat and reduce flood risk'*.

A.4.7 Also measures will be made to protect and enhance the river as a valuable resource for wild life, in particular at the mouth of the River Wandle.

A.4.8 **Policy PL 10 – The Wandle Valley** - identifies that *'improved accessibility within the corridor and to the riverside will be pursued including the provision of pedestrian and cycle ways'*.

A.4.9 It further outlines the council will support the recreation development of *'King George's Park and north of Wandsworth town centre to the River Wandle mouth'*.

A.4.10 **Policy PL 12 – Central Wandsworth and the Wandle Delta** outlines a number of proposals within central Wandsworth and the Wandle Delta. Amongst them are:

a. The Ram Brewery development is to provide a 'high quality public realm' linking the riverside and the juinction of Wandsworth Plain and Armoury Way,

b. The banks of the River Wandle will be improved to provide a resource for wild life and recreation and enhancing the existing open space at Causeway Island,

c. Wandsworth Business Village 'will provide pedestrian and cycle links to the south via a new park side promenade at Neville Gill Close' which will access King George's Park.

A.4.11 The council further state that 'the impact of traffic on the town centre should be reduced in partnership with TfL' and they will achieve this 'through developer contributions and funds from TfL and other transport infrastructure providers'.

A.4.12 **Policy IS 1 – Sustainable development** - supports '*measures that mitigate and adapt to climate change and reduce emissions of carbon dioxide, and will promote a sustainable relationship between development and transport so as to minimise the need to travel'*.

Development Management Policies (LB of Wandsworth, Feb 2012)

A.4.13 The DMP was adopted by the LB of Wandsworth in February 2012 and supports the Core Strategy. It sets out the Council's detailed policies for managing development in the borough. The policies in the DMP and the SSA replace all of the remaining policies in the Councils Unitary Development Plan (UDP) which have not previously expired or been superseded by the policies in the Core Strategy.

A.4.14 Transport policies within this document are concerned with ensuring sustainable urban design, riverside walking and cycling and parking within the borough.

A.4.15 **Policy DMS 1 – General development principles - Sustainable urban design and the quality** – identifies that developments must ensure that they do *'not harm the amenity of occupiers/users and nearby properties through unacceptable'* traffic congestion, it *'is adequately served by public transport'*, is *'designed to reduce the need to travel and minimise car use'* and is *'accessible to people with disabilities'*.

A.4.16 **Policy DMO 6 – Riverside development** – distinguishes developments adjoining the River Thames and River Wandle which *'promotes sustainable transport'* and in particular *'provides access to public transport routes including the incorporation of a public riverside walk and cycle-path'*.

A.4.17 **Policy DMT1 – Transport impacts of development** – recognises that developments do *'not have a negative impact on the transport system, including public transport capacity and the highway network'*.

A.4.18 **Policy DMT 2 – Parking and servicing** – ascertains that developments will be permitted once 'off-street car parking is provided subject to the maximum levels' set out by the borough.

A.4.19 **Policy DMT 3 – Riverside walking and cycling routes** - permits developments along the River Thames and Wandle once provision has been made *'for a riveside walk at least 6 metres wide (Thames) or 3 metres wide (Wandle)'*, *'new accesses lining the riverside walk to the surrounding area are a least 3 metres wide'* and *'riverside routes incorporate provision for cyclists, ensuring pedestrian safety'*.

Site Specific Allocations Document (LB of Wandsworth, Feb, 2012)

A.4.20 The SSAD was adopted by LB Wandsworth in February 2012 and supports the Core Strategy.

A.4.21 **Battersea Park Station** – is classified as being *'within the Vauxhall/Nine Elms/ Battersea Opportunity Area'* and is a key strategic site that will *'deliver transport improvements'* and *'significant public transport provision'* will be needed. Amongst this provision will be an extension to the London Underground Northern Line, river passenger pier including provision of a river bus service, a bus service between BPS and Wandsworth Road and enhancement for the strategic Nine Elms Lane/Battersea Park Road *'to overcome the hostile environment for pedestrians and cyclists that currently exists'*. A Thames Path *'linking with existing and proposed Thames paths must be provided'*.

A.4.22 **Riverlight Development** – identifies that improvements would be made to the *'Riverside walk and cycle route'* as well as the junction between Cringle Street and Nine Elms Lane. Also within this SSAD the importance of the safeguarded wharves at Cringle Dock, Kirtling Wharf and Middle Wharf will *'require their retention and continued operation'*. As for BPS there will be *'significant public transport provision*' here as well.

A.4.23 **US Embassy** – outlines the proposed realignment of Ponton Road, as well as potential for a proposed river crossing. As the same for BPS, there will be *'significant public transport provision*' here as well.

A.4.24 **Embassy Gardens –** ascertains that a public realm is expected to run through the site in conjunction with the proposed *'linear park linking Vauxhall to BPS*'. As the same for BPS, there will be *'significant public transport provision*' here as well.

A.4.25 **Nine Elms Parkside** - recognises that provisions are to be made for *'improved pedestrian and cycle links through the site to provide improved permeability particularly between Nine Elms Lane and Wandsworth Road'*. There is to be a site access onto Nine Elms Lane at the junction of Cringle Street and Nine Elms Lane, making it a four arm junction. As for BPS there will be *'significant public transport provision*' here as well. As in Embassy Gardens there are proposals for a public realm to run through the site linking BPS and Vauxhall.

A.4.26 **New Covent Garden Market** – identifies that the public realm and the existing main access to NCGM 'will need particularly careful treatment' to ensure that the public realm will continue *'across what will continue to be a major junction'* at Kirtling Street/Battersea Park Road.

A.4.27 **Wandsworth Business Village** – outlines that provision will be given for three new connections providing public access through the site. A new pedestrian crossing facility on Buckhold Road will need to be provided, as well improvements to the King George Park entrance and Neville Gill Close promenade.

A.4.28 **Ram Brewey/ Capita Studios** – distinguishes that there should be *'provision for new riverside walks on both banks of the River Wandle'*. Proposals to change the trunk road system with the Wandsworth One-Way System will be required. Also, proposals are to be made to improve the bus services, provide a public realm and the provision of land to public highway, riverside walks and cycle paths surrounding the site.

Supplementary Planning Guidance

A.4.29 The SPG supports and is a document with important local views which support local areas within the borough and their relevant transport issues.

A.4.30 Transport policies within these documents are concerned with views of surrounding buildings and landmarks within the borough.

Unitary Development Plan (LB of Wandsworth, Aug 2003)

A.4.31 The UDP was adopted by the London Borough of Wandsworth in August 2003. Due to the merging LDF and the adoption of the Core Strategy, a number of policies have been deleted from the UDP. The relevant UDP policies which have been saved since September 2007 are outline below.

A.4.32 **Policy RDP1: Regeneration and Development Principles** - outline that without *'adequate and satisfactory provision for pedestrian access and for parking'* a development will not be permitted.

A.4.33 **Policy RDP5: Regeneration and Development Principles** – further identifies that the beneficial effects resulting from a lighting scheme on site must not affect 'vehicle users and pedestrians'.

A.4.34 **Policy TBE1: Townscape and Built Environment** - classifies that a development *'provides safe and convenient access for cyclists and pedestrians'*.

A.4.35 **Policy R2: River Thames and Riverside** - ascertains that developments will not be permitted unless *'provision is made for riverside walk at least 6m wide along the entire river frontage'* and *'any new accesses linking the riverside walk to the surrounding area are at least 3m wide'*.

A.4.36 **Policy R7: River Thames and Riverside** – further recognises that proposals for piers and jetties will be permitted provided *'they do not harm the use of the docks and working wharves or other existing uses of the river'.*

A.4.37 **Policy R8: River Thames and Riverside** – identifies that the *'loss of drawdocks, slipways, steps and stairs which give safe access to the river and foreshore'* within development proposals will not be permitted.

A.4.38 **Policy R9: River Thames and Riverside** – distinguishes that for proposals adjoining the River Wandle the council will seek the provision of a riverside walk at least 3m wide and improved access to the riverside.

A.4.39 **Policy R11: River Thames and Riverside** – further identifies that the Council will seek developments within Causeway Island for *'river related uses'*.

A.4.40 **Policy R14: River Thames and Riverside** – further categorizes that the Council will not permit the loss of uses and facilities relying on access to the River Thames within the Putney Embankment Area.

A.4.41 **Policy H3: Housing** – identifies that developments harming the *'amenities of predominantly residential areas'* because of traffic generation.

A.4.42 **Policy T2: Transport** – recognises that developments that would *'generate sufficient traffic to harm the environment, or create congestion or hazards on the road network'* would not be permitted by Council.

A.4.43 **Policy T5: Transport** – further pinpoints that *'new developments will only be permitted where they provide safe, secure and direct access for pedestrians, connected to existing pedestrian routes in the surrounding area'*.

A.4.44 **Policy T7: Transport** – distinguishes that for non-residential developments *'adequate servicing arrangements'* must be made for *'commercial vehicles'* in order for the Council to permit planning.

A.4.45 **Policy T8: Transport** – categorizes that developments that propose *'new or expanded wharves and railheads will be permitted where they do not cause harm to the environment and are located so that there is suitable road access'*.

A.4.46 **Policy T12: Transport** – classifies that the loss of off-street parking spaces in areas in or adjacent t the House Conversion Restraint Areas will be resisted.

Appendix B: PTAL analysis

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PTAI Study Report File Summary

PTAI Run Parameters

PTAI Run	20120110155325
Description	20120110155325
Run by user	PTAL web application
Date	01/10/2012

Walk File Parameters

Walk File	PLSQLTest
Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
BUS Walk Access Time (mins)	8
BUS Reliability Factor	2.0
LU LRT Walk Access Time (mins)	12
LU LRT Reliability Factor	0.75
NATIONAL_RAIL Walk Access Time (mins)	12
NATIONAL_RAIL Reliability Factor	0.75
Coordinates:	529241, 177475

Mode	Stop	Route	Distance (metres)	Frequency (vph)	Weight	Walk time (mins)	SWT (mins)	TAT (mins)	EDF	AI
BUS	NINE ELMS LN ROYAL MAIL	156	159.85	7.5	0.5	2	6	8	3.75	1.88
BUS	NINE ELMS LN ROYAL MAIL	344	159.85	10	1	2	5	7	4.29	4.29
NATIONAL_RAIL	BATTERSEA PARK	LONDON LONDON BRIDGE BR to LONDON VICTORIA BR	823.81	2	1	10.3	15.75	26.05	1.15	1.15
NATIONAL_RAIL	BATTERSEA PARK	LONDON VICTORIA BR to CATERHAM	823.81	1.33	0.5	10.3	23.31	33.6	0.89	0.45
NATIONAL_RAIL	BATTERSEA PARK	LONDON VICTORIA BR to TATTENHAM CORNER BR	823.81	0.33	0.5	10.3	91.66	101.96	0.29	0.15
NATIONAL_RAIL	BATTERSEA PARK	EAST CROYDON BR to LONDON VICTORIA BR	823.81	1.33	0.5	10.3	23.31	33.6	0.89	0.45
NATIONAL_RAIL	BATTERSEA	LONDON	823.81	2	0.5	10.3	15.75	26.05	1.15	0.58

Mode	Stop	Route	Distance (metres)	Frequency (vph)	Weight	Walk time (mins)	SWT (mins)	TAT (mins)	EDF	AI
	PARK	VICTORIA BR to WEST CROYDON								
NATIONAL_RAIL	BATTERSEA PARK	WEST CROYDON to LONDON VICTORIA BR	823.81	0.33	0.5	10.3	91.66	101.96	0.29	0.15
NATIONAL_RAIL	BATTERSEA PARK	EPSOM DOWNS to LONDON VICTORIA BR	823.81	1.33	0.5	10.3	23.31	33.6	0.89	0.45
NATIONAL_RAIL	BATTERSEA PARK	LONDON VICTORIA BR to EPSOM	823.81	0.67	0.5	10.3	45.53	55.82	0.54	0.27
NATIONAL_RAIL	BATTERSEA PARK	LONDON VICTORIA BR to SUTTON (SURREY)	823.81	0.33	0.5	10.3	91.66	101.96	0.29	0.15
NATIONAL_RAIL	BATTERSEA PARK	NORWOOD JUNCTION to LONDON VICTORIA BR	823.81	0.33	0.5	10.3	91.66	101.96	0.29	0.15
NATIONAL_RAIL	BATTERSEA	CATERHAM to	823.81	0.33	0.5	10.3	91.66	101.96	0.29	0.15

Mode	Stop	Route	Distance (metres)	Frequency (vph)	Weight	Walk time (mins)	SWT (mins)	TAT (mins)	EDF	AI
	PARK	LONDON VICTORIA BR								
NATIONAL_RAIL	BATTERSEA PARK	WIMBLEDON BR to LONDON VICTORIA BR	823.81	0.67	0.5	10.3	45.53	55.82	0.54	0.27
NATIONAL_RAIL	BATTERSEA PARK	EPSOM to LONDON VICTORIA BR	823.81	0.33	0.5	10.3	91.66	101.96	0.29	0.15
NATIONAL_RAIL	BATTERSEA PARK	BECKENHAM JUNCTION BR to LONDON VICTORIA BR	823.81	1	0.5	10.3	30.75	41.05	0.73	0.37
NATIONAL_RAIL	BATTERSEA PARK	LONDON VICTORIA BR to LONDON LONDON BRIDGE BR	823.81	1.67	0.5	10.3	18.71	29.01	1.03	0.52
NATIONAL_RAIL	BATTERSEA PARK	LONDON VICTORIA BR to EPSOM	823.81	1.67	0.5	10.3	18.71	29.01	1.03	0.52

Mode	Stop	Route	Distance (metres)	Frequency (vph)	Weight	Walk time (mins)	SWT (mins)	TAT (mins)	EDF	AI
		DOWNS								
NATIONAL_RAIL	BATTERSEA PARK	SANDERSTEAD BR to LONDON VICTORIA BR	823.81	0.33	0.5	10.3	91.66	101.96	0.29	0.15
NATIONAL_RAIL	BATTERSEA PARK	SUTTON (SURREY) to LONDON VICTORIA BR	823.81	0.33	0.5	10.3	91.66	101.96	0.29	0.15

Total AI for this POI is 12.4.
PTAL Rating is 3.

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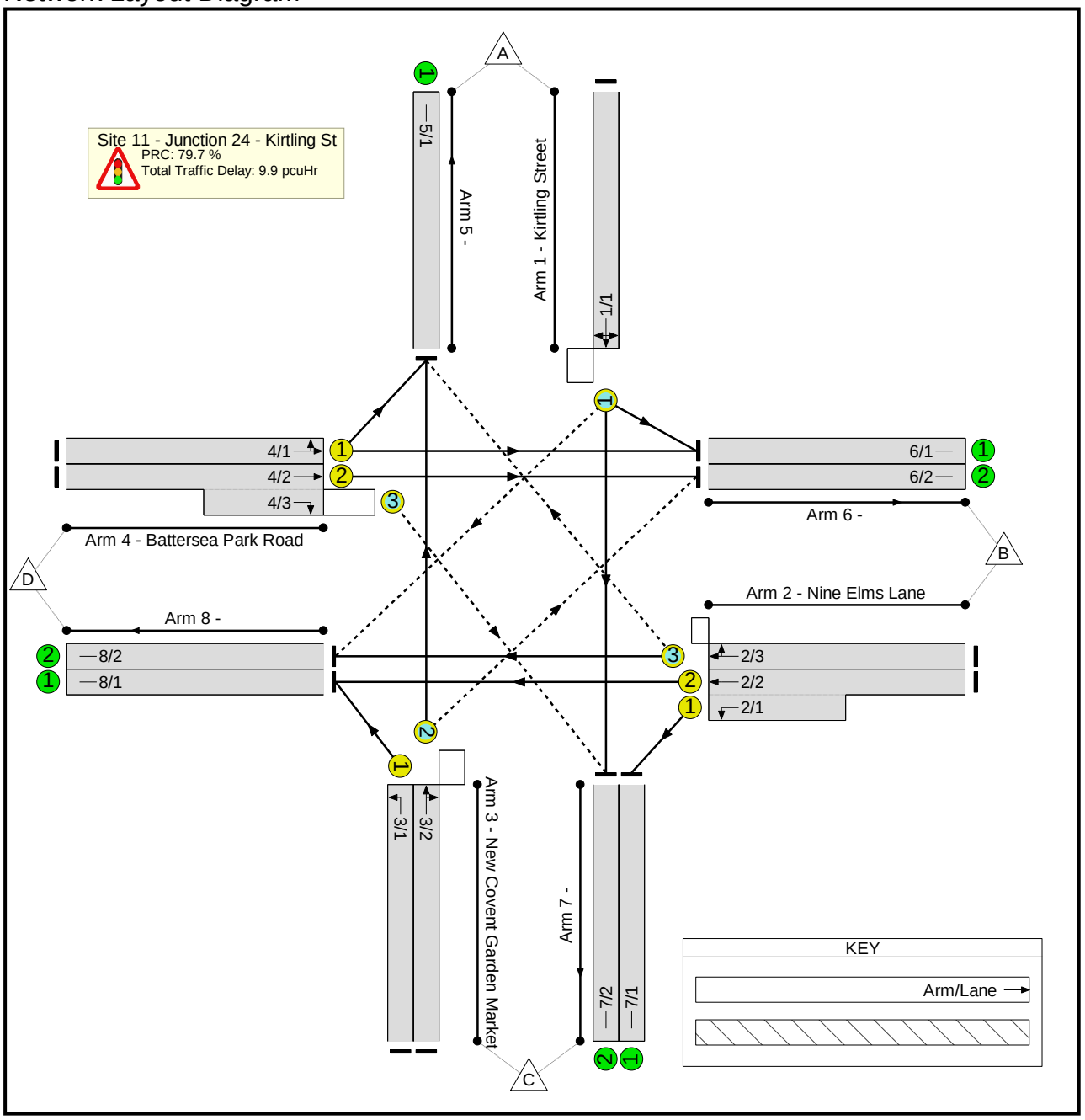
Appendix C: Local modelling outputs

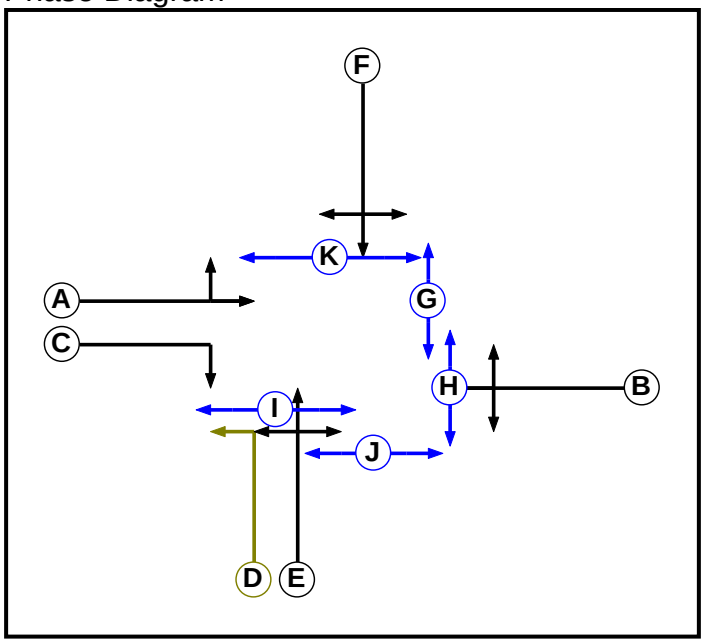
C.1 Baseline results, AM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road existing signalised layout

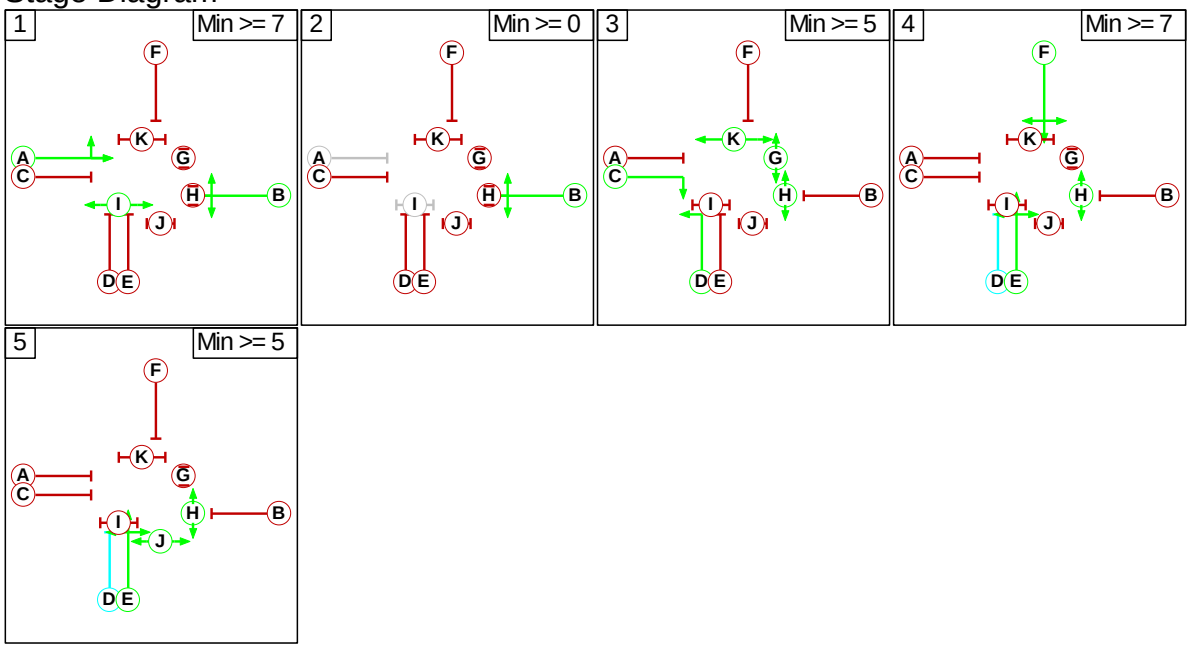
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B I
2	B
3	C D G H K
4	E F H
5	E H J

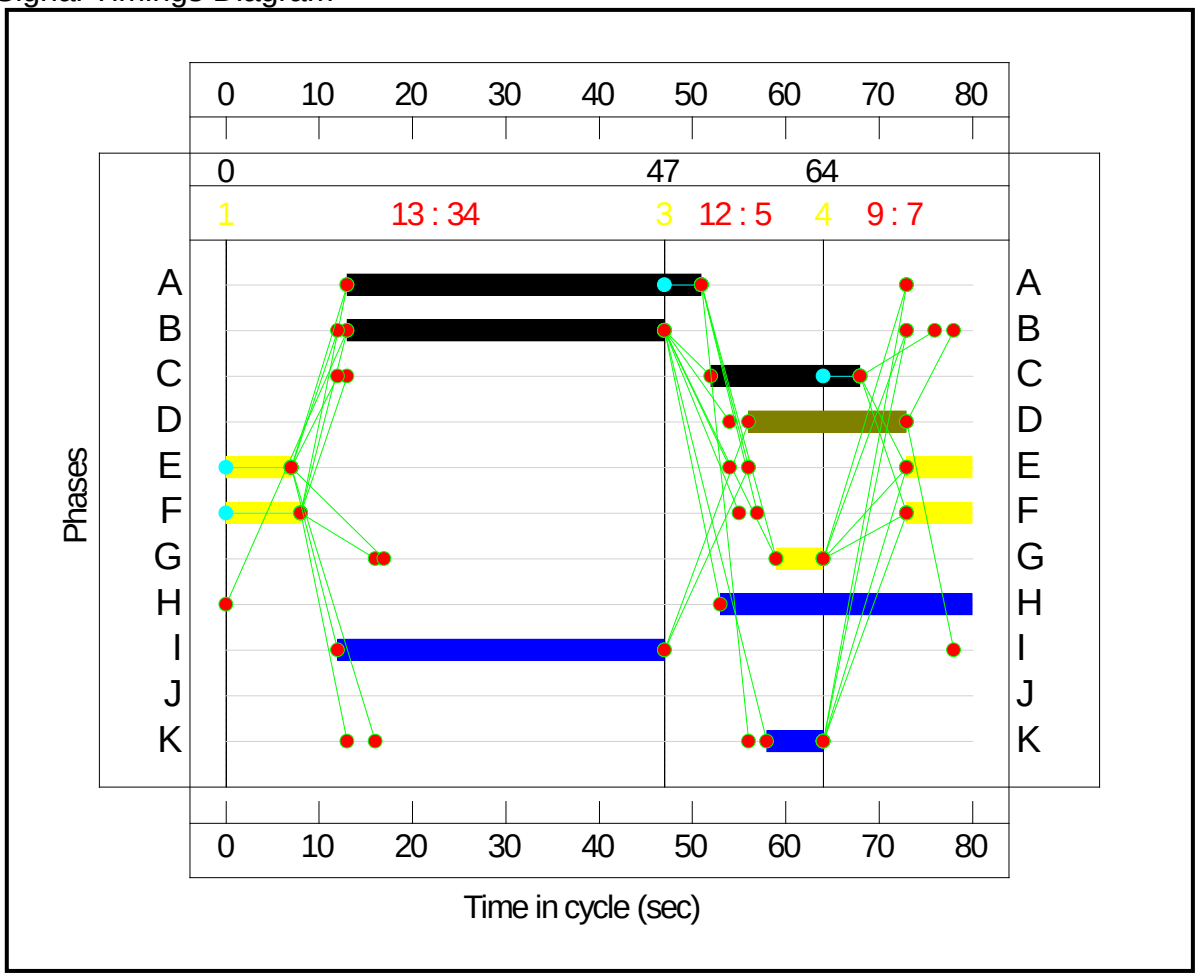
Phase Intergreens Matrix

	Starting Phase											
Terminating Phase		A	B	C	D	E	F	G	H	I	J	K
	A	-	-	-	-	5	6	8	-	-	-	5
	B	-	-	5	7	7	8	12	6	-	8	11
	C	-	8	-	-	5	5	-	-	-	12	-
	D	-	5	-	-	-	-	-	-	5	-	-
	E	6	5	5	-	-	-	10	-	5	-	9
	F	5	5	5	-	-	-	8	-	-	10	5
	G	9	9	-	-	9	9	-	-	-	-	-
	H	-	13	-	-	-	-	-	-	-	-	-
	I	-	-	-	9	9	-	-	-	-	-	-
	J	-	9	9	-	-	9	-	-	-	-	-
	K	9	9	-	-	9	9	-	-	-	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	4	0	23	27
	B	2	0	48	835	885
	C	0	27	0	67	94
	D	31	723	107	0	861
	Tot.	33	754	155	925	1867

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left Ahead Right	O	F		1	15	-	27	1582	316	8.5%	23	0	0	0.2	32.3	0.5
2/2+2/1	Nine Elms Lane Left Ahead	U	B		1	34	-	467	2070:1698	933	50.1%	-	-	-	2.5	19.4	7.0
2/3	Nine Elms Lane Right Ahead	O	B		1	34	-	418	2069	905	46.2%	2	0	0	2.3	19.6	6.9
3/1	New Covent Garden Market Left	U	E	D	1	31	17	67	1663	665	10.1%	-	-	-	0.3	18.0	1.0
3/2	New Covent Garden Market Ahead Right	O	E		1	14	-	27	1713	320	8.4%	27	0	0	0.2	33.2	0.5
4/1	Battersea Park Road Left Ahead	U	A		1	38	-	377	1890	921	40.9%	-	-	-	1.7	16.4	5.7
4/2+4/3	Battersea Park Road Ahead Right	U+O	A C		1	38:16	-	484	2055:2033	1096	44.1%	4	103	0	2.6	19.1	5.6

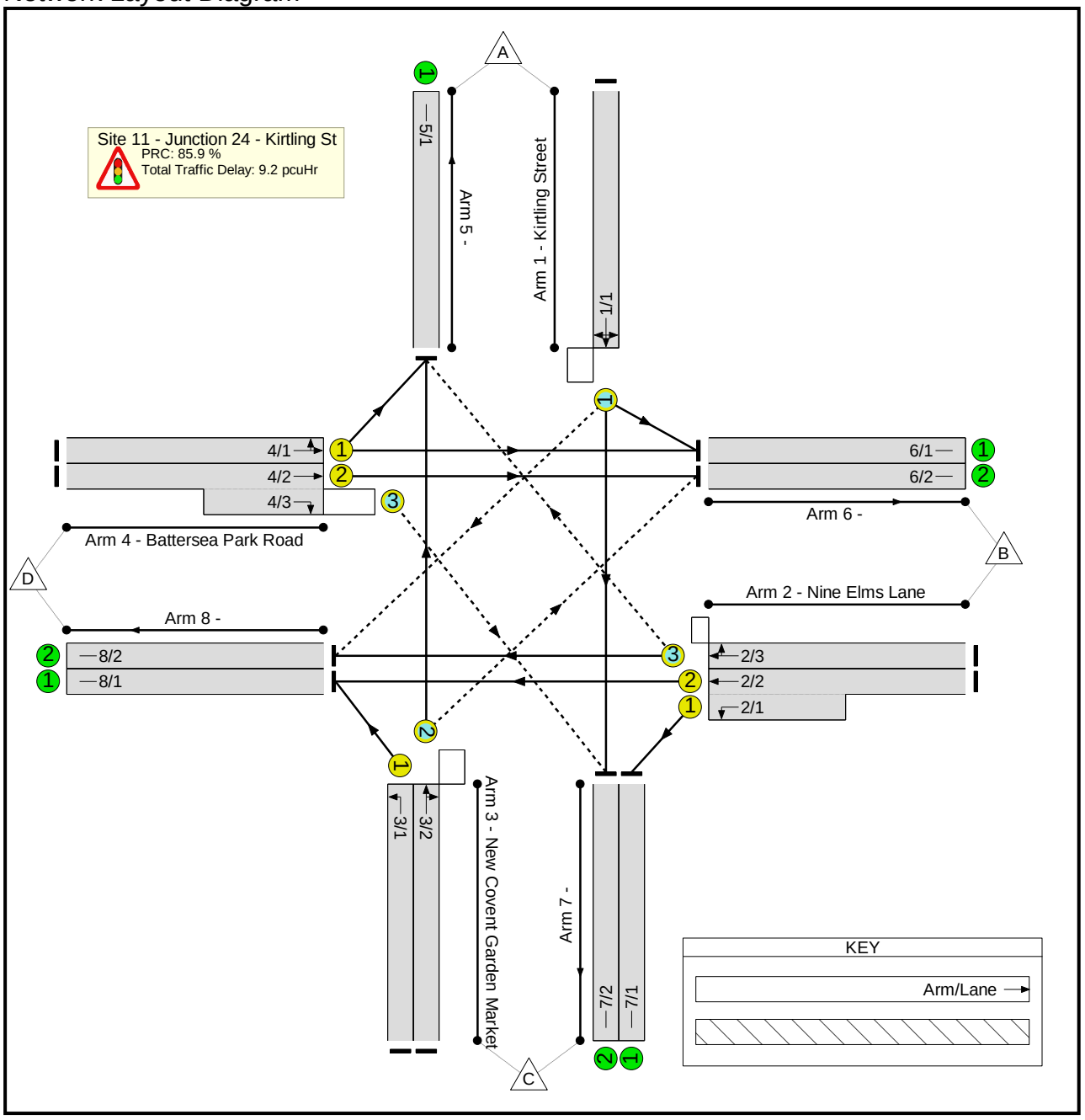
C1 PRC for Signalled Lanes (%): 79.7 Total Delay for Signalled Lanes (pcuHr): 9.91 Cycle Time (s): 80

PRC Over All Lanes (%): 79.7 Total Delay Over All Lanes(pcuHr): 9.91

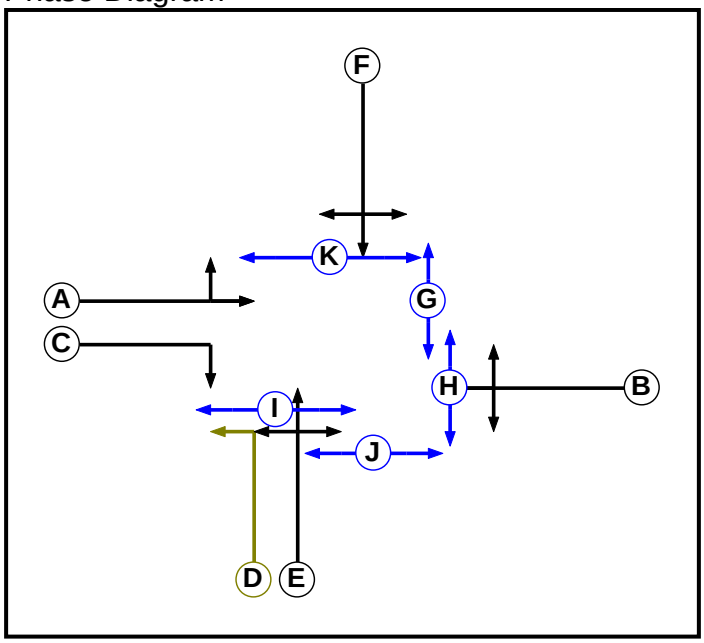
C.2 Baseline results, PM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road existing signalised layout

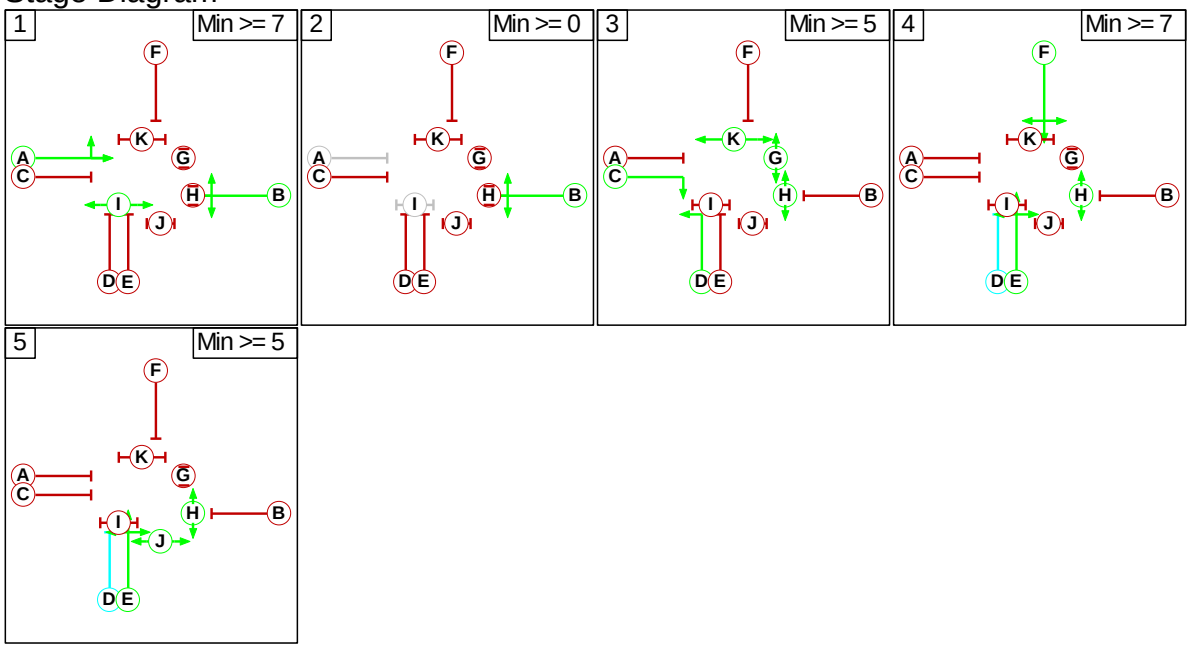
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B I
2	B
3	C D G H K
4	E F H
5	E H J

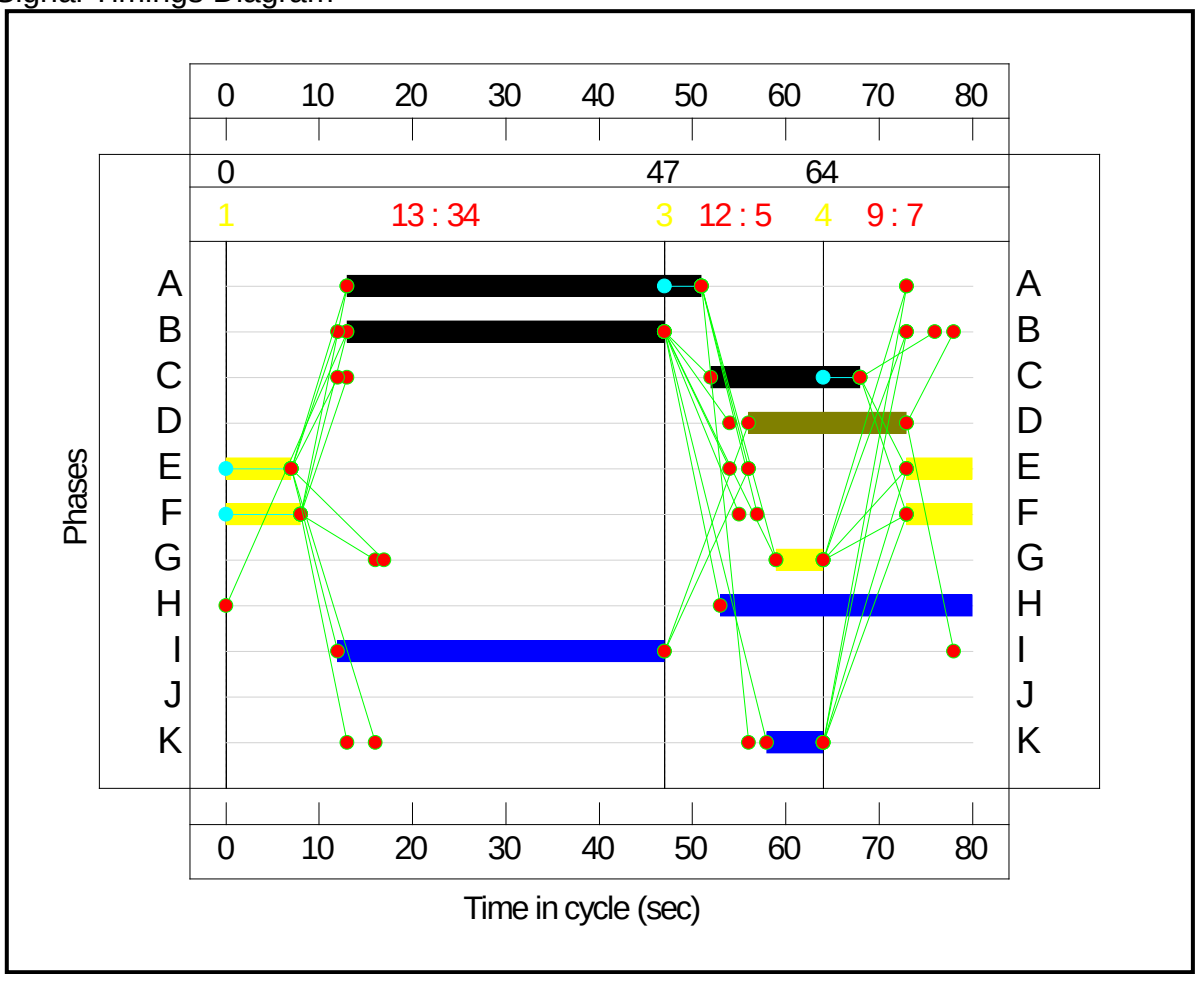
Phase Intergreens Matrix

		Starting Phase										
		A	B	C	D	E	F	G	H	I	J	K
Terminating Phase	A	-	-	-	-	5	6	8	-	-	-	5
	B	-	-	5	7	7	8	12	6	-	8	11
	C	-	8	-	-	5	5	-	-	-	12	-
	D	-	5	-	-	-	-	-	-	5	-	-
	E	6	5	5	-	-	-	10	-	5	-	9
	F	5	5	5	-	-	-	8	-	-	10	5
	G	9	9	-	-	9	9	-	-	-	-	-
	H	-	13	-	-	-	-	-	-	-	-	-
	I	-	-	-	9	9	-	-	-	-	-	-
	J	-	9	9	-	-	9	-	-	-	-	-
	K	9	9	-	-	9	9	-	-	-	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	6	0	27	33
	B	3	0	36	821	860
	C	1	21	0	68	90
	D	38	722	39	0	799
	Tot.	42	749	75	916	1782

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left Ahead Right	O	F		1	15	-	33	1580	316	10.4%	27	0	0	0.3	32.6	0.7
2/2+2/1	Nine Elms Lane Left Ahead	U	B		1	34	-	448	2070:1698	925	48.4%	-	-	-	2.4	19.3	6.9
2/3	Nine Elms Lane Right Ahead	O	B		1	34	-	412	2068	905	45.5%	3	0	0	2.2	19.5	6.8
3/1	New Covent Garden Market Left	U	E	D	1	31	17	68	1663	665	10.2%	-	-	-	0.3	18.0	1.0
3/2	New Covent Garden Market Ahead Right	O	E		1	14	-	22	1727	324	6.8%	21	0	0	0.2	32.9	0.4
4/1	Battersea Park Road Left Ahead	U	A		1	38	-	380	1885	919	41.4%	-	-	-	1.7	16.5	5.7
4/2+4/3	Battersea Park Road Ahead Right	U+O	A C		1	38:16	-	419	2055:2033	1040	40.3%	1	38	0	2.0	17.1	5.6

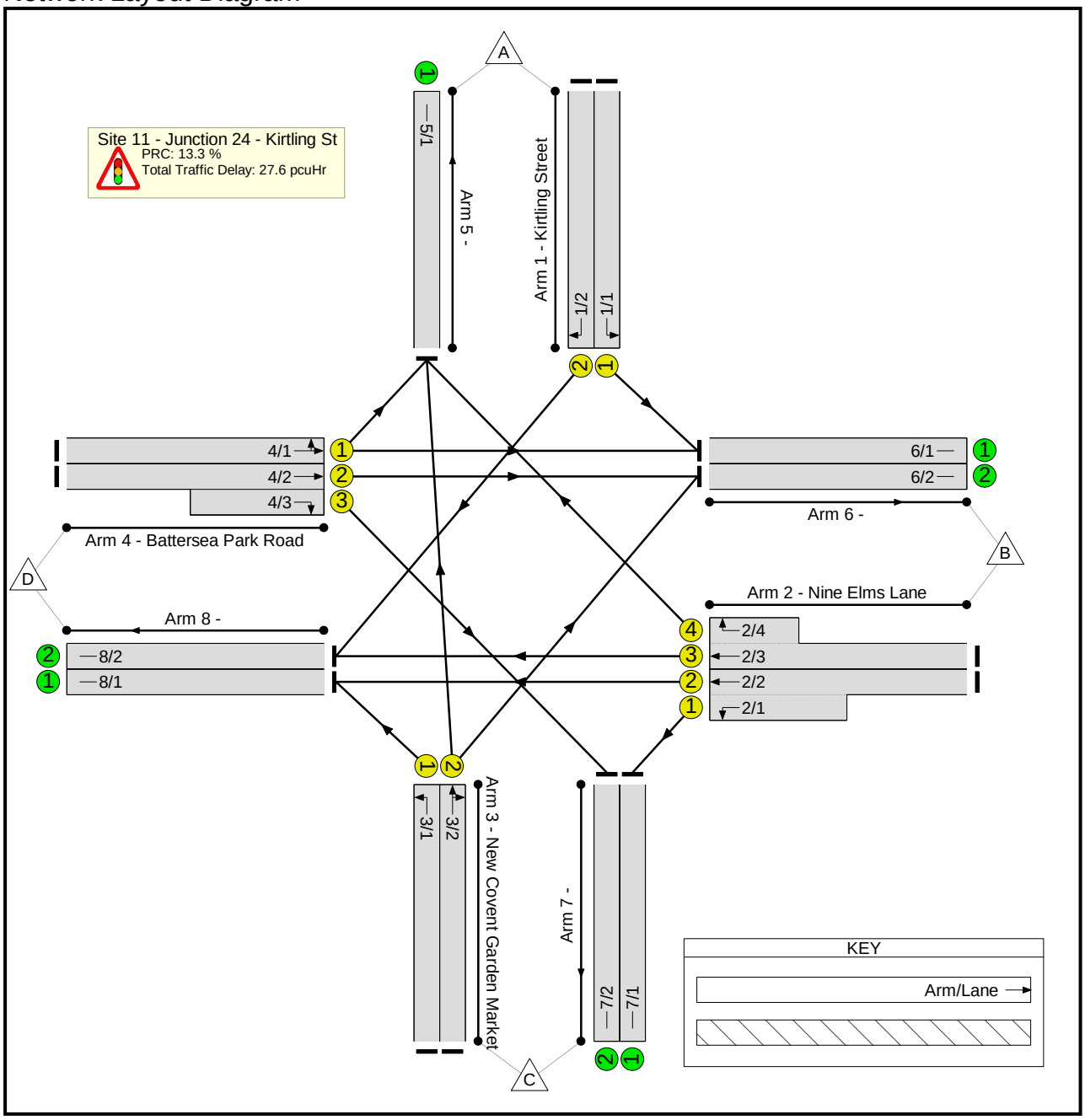
C1

PRC for Signalled Lanes (%): 85.9
PRC Over All Lanes (%): 85.9
Total Delay for Signalled Lanes (pcuHr): 9.21
Total Delay Over All Lanes(pcuHr): 9.21
Cycle Time (s): 80

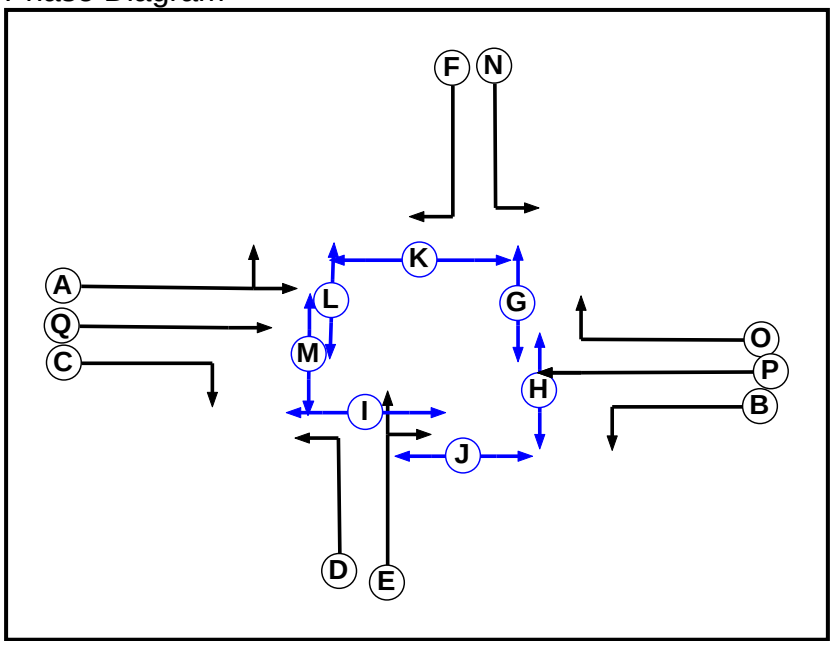
C.3 Construction base case results, AM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road new signalised layout

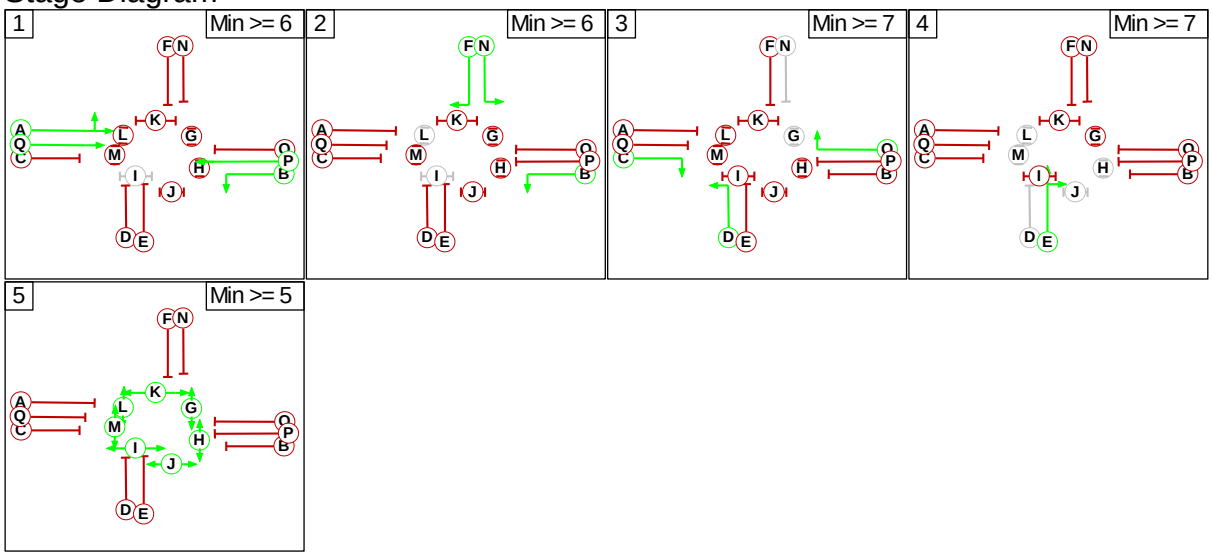
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B P Q
2	B F N
3	C D O
4	E
5	G H I J K L M

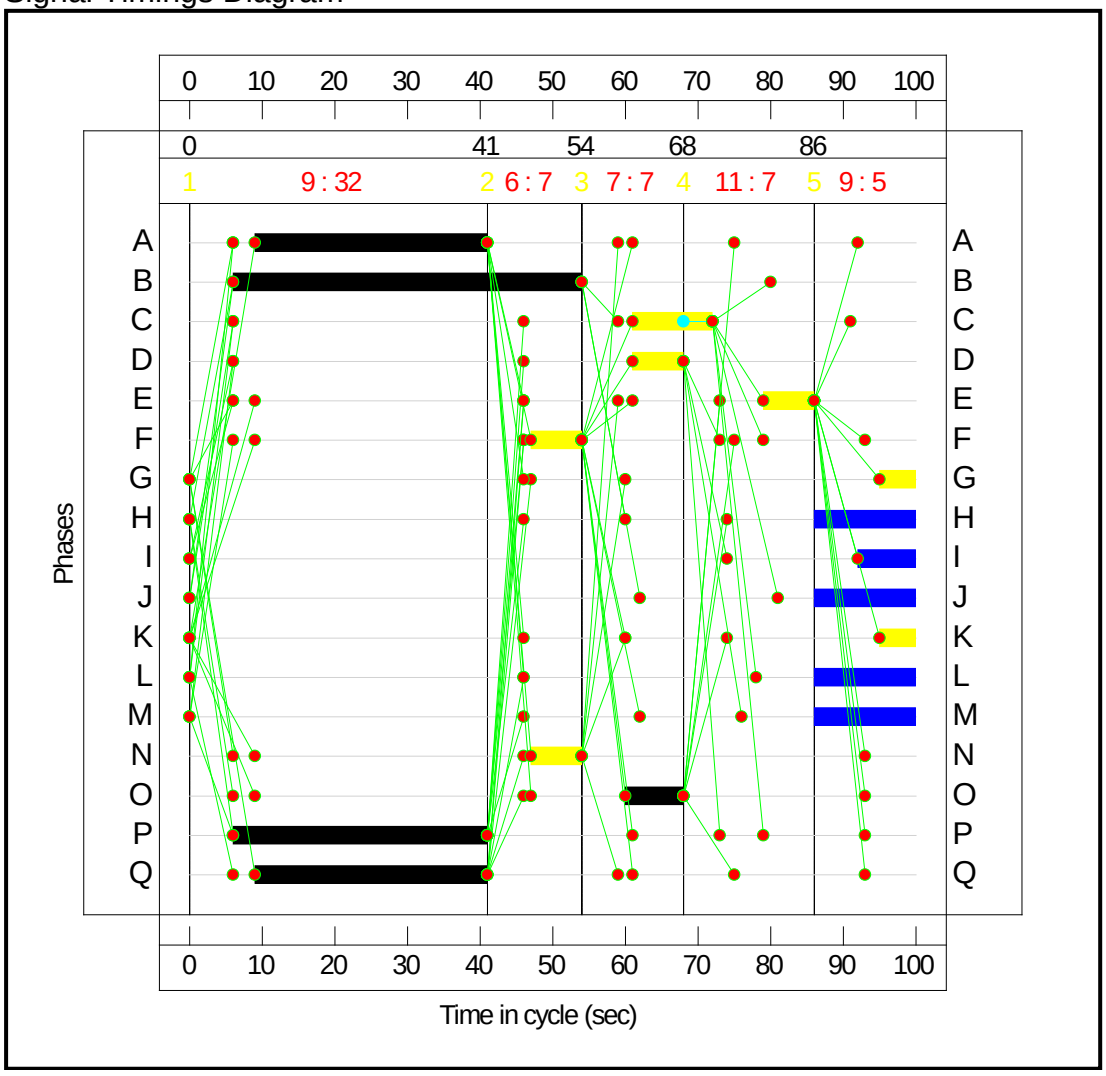
Phase Intergreens Matrix

		Starting Phase																
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Terminating Phase	A	-	-	-	-	5	6	5	-	-	-	5	5	-	6	6	-	-
	B	-	-	5	-	-	-	-	6	-	8	-	-	-	-	-	-	-
	C	-	8	-	-	7	7	-	-	-	9	-	6	-	-	-	7	-
	D	-	-	-	-	-	5	-	-	6	-	-	-	8	-	-	5	-
	E	6	-	5	-	-	7	9	-	6	-	9	-	-	7	7	7	7
	F	7	-	7	7	7	-	-	-	-	-	6	-	8	-	6	7	7
	G	6	-	-	-	6	-	-	-	-	-	-	-	-	6	-	-	9
	H	-	6	-	-	-	-	-	-	-	-	-	-	-	-	6	6	-
	I	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-
	J	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K	9	-	-	-	9	9	-	-	-	-	-	-	-	9	9	-	-
	L	6	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	6
	M	-	-	-	6	-	6	-	-	-	-	-	-	-	-	-	6	-
	N	5	-	-	-	5	-	6	-	-	-	6	-	-	-	-	-	5
	O	7	-	-	-	5	7	-	6	-	-	6	-	-	-	-	-	7
	P	-	-	5	5	5	5	-	5	-	-	-	-	5	-	-	-	-
	Q	-	-	-	-	5	5	6	-	-	-	-	5	-	5	5	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	4	0	52	56
	B	2	0	55	1037	1094
	C	0	40	0	96	136
	D	58	902	123	0	1083
	Tot.	60	946	178	1185	2369

Signal Timings Diagram



Network Results

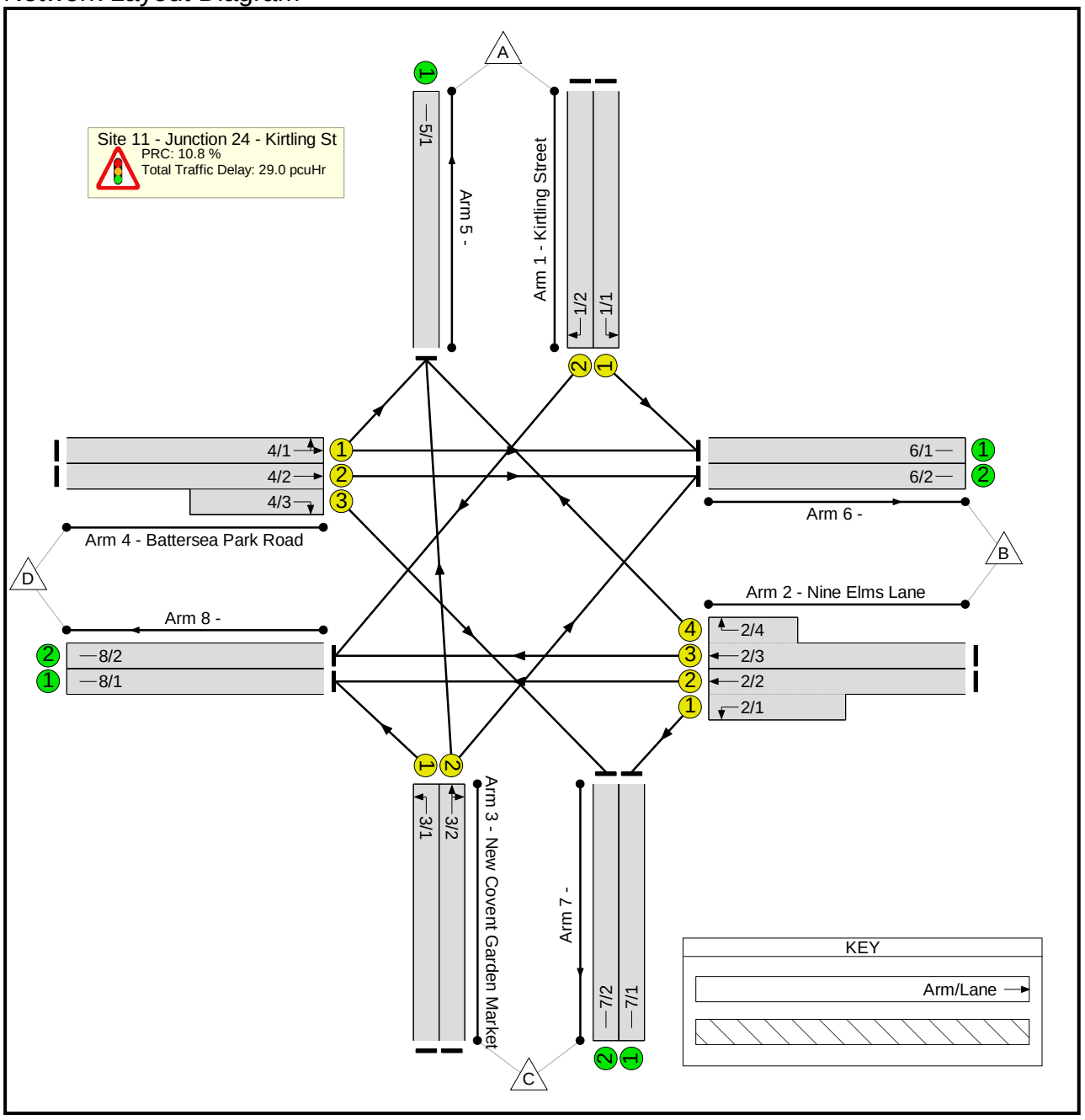
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left	U	N		1	7	-	4	1505	120	3.3%	-	-	-	0.1	58.2	0.1
1/2	Kirtling Street Right	U	F		1	7	-	52	1747	140	37.2%	-	-	-	0.9	64.0	1.7
2/2+2/1	Nine Elms Lane Left Ahead	U	P B		1	35:48	-	574	2070:1698	765	75.1%	-	-	-	5.7	35.8	14.3
2/3+2/4	Nine Elms Lane Right Ahead	U	P O		1	35:8	-	520	2070:1783	742	70.0%	-	-	-	5.1	35.5	13.4
3/1	New Covent Garden Market Left	U	D		1	7	-	96	1663	133	72.2%	-	-	-	2.4	90.5	3.8
3/2	New Covent Garden Market Ahead Right	U	E		1	7	-	40	1733	139	28.9%	-	-	-	0.7	61.5	1.2
4/1	Battersea Park Road Left Ahead	U	A		1	32	-	480	1928	636	75.4%	-	-	-	5.5	41.2	13.4
4/2+4/3	Battersea Park Road Ahead Right	U	Q C		1	32:11	-	603	2070:1796	759	79.4%	-	-	-	7.2	43.1	14.6

C1 PRC for Signalled Lanes (%): 13.3 Total Delay for Signalled Lanes (pcuHr): 27.63 Cycle Time (s): 100
PRC Over All Lanes (%): 13.3 Total Delay Over All Lanes(pcuHr): 27.63

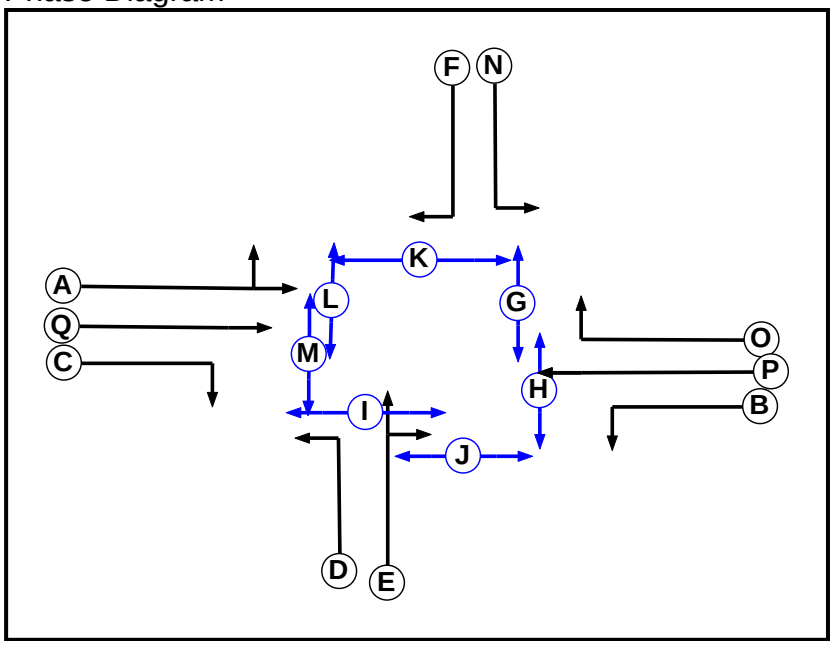
C.4 Construction base case results, PM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road new signalised layout

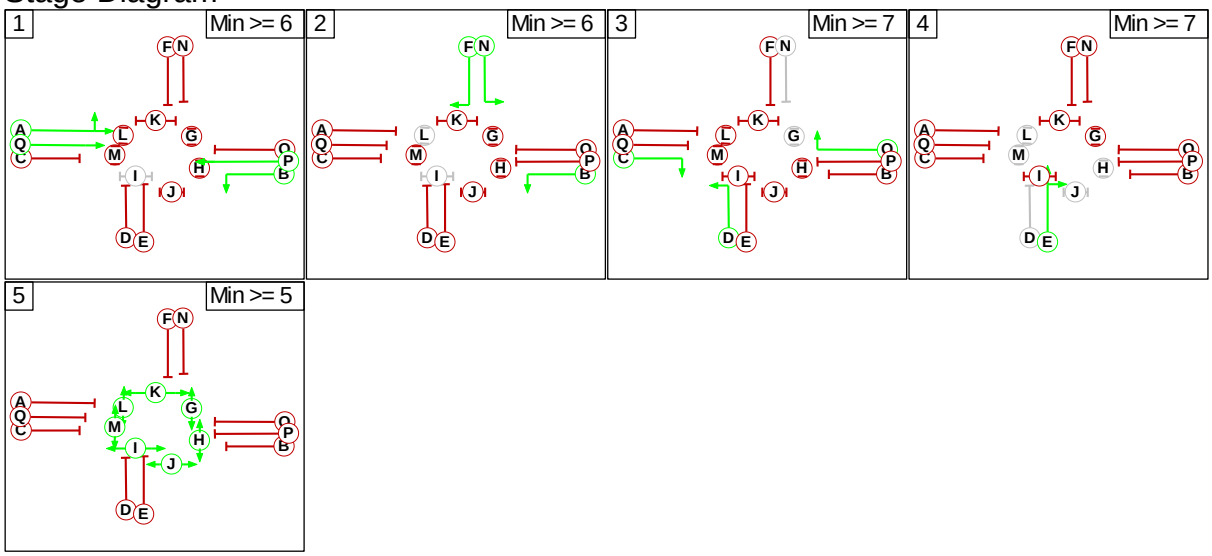
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B P Q
2	B F N
3	C D O
4	E
5	G H I J K L M

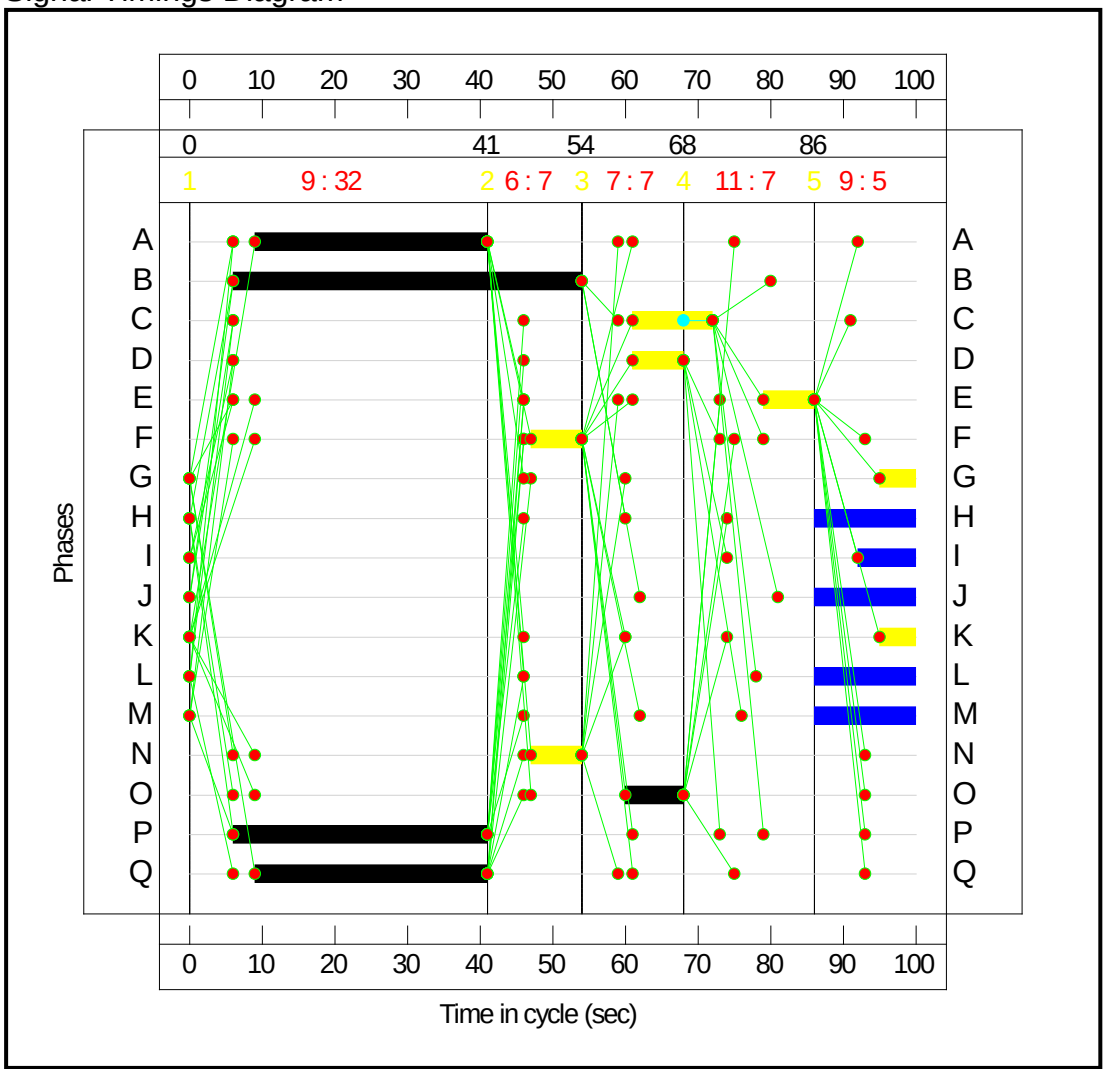
Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
A	-	-	-	-	5	6	5	-	-	-	5	5	-	6	6	-	-
B	-	-	5	-	-	-	-	6	-	8	-	-	-	-	-	-	-
C	-	8	-	-	7	7	-	-	-	9	-	6	-	-	-	7	-
D	-	-	-	-	-	5	-	-	6	-	-	-	8	-	-	5	-
E	6	-	5	-	-	7	9	-	6	-	9	-	-	7	7	7	7
F	7	-	7	7	7	-	-	-	-	-	6	-	8	-	6	7	7
G	6	-	-	-	6	-	-	-	-	-	-	-	-	6	-	-	9
H	-	6	-	-	-	-	-	-	-	-	-	-	-	-	6	6	-
I	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-
J	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	9	-	-	-	9	9	-	-	-	-	-	-	-	9	9	-	-
L	6	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	6
M	-	-	-	6	-	6	-	-	-	-	-	-	-	-	-	6	-
N	5	-	-	-	5	-	6	-	-	-	6	-	-	-	-	-	5
O	7	-	-	-	5	7	-	6	-	-	6	-	-	-	-	-	7
P	-	-	5	5	5	5	-	5	-	-	-	-	5	-	-	-	-
Q	-	-	-	-	5	5	6	-	-	-	-	5	-	5	5	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	6	0	43	49
	B	3	0	46	1100	1149
	C	1	32	0	93	126
	D	56	979	59	0	1094
	Tot.	60	1017	105	1236	2418

Signal Timings Diagram



Network Results

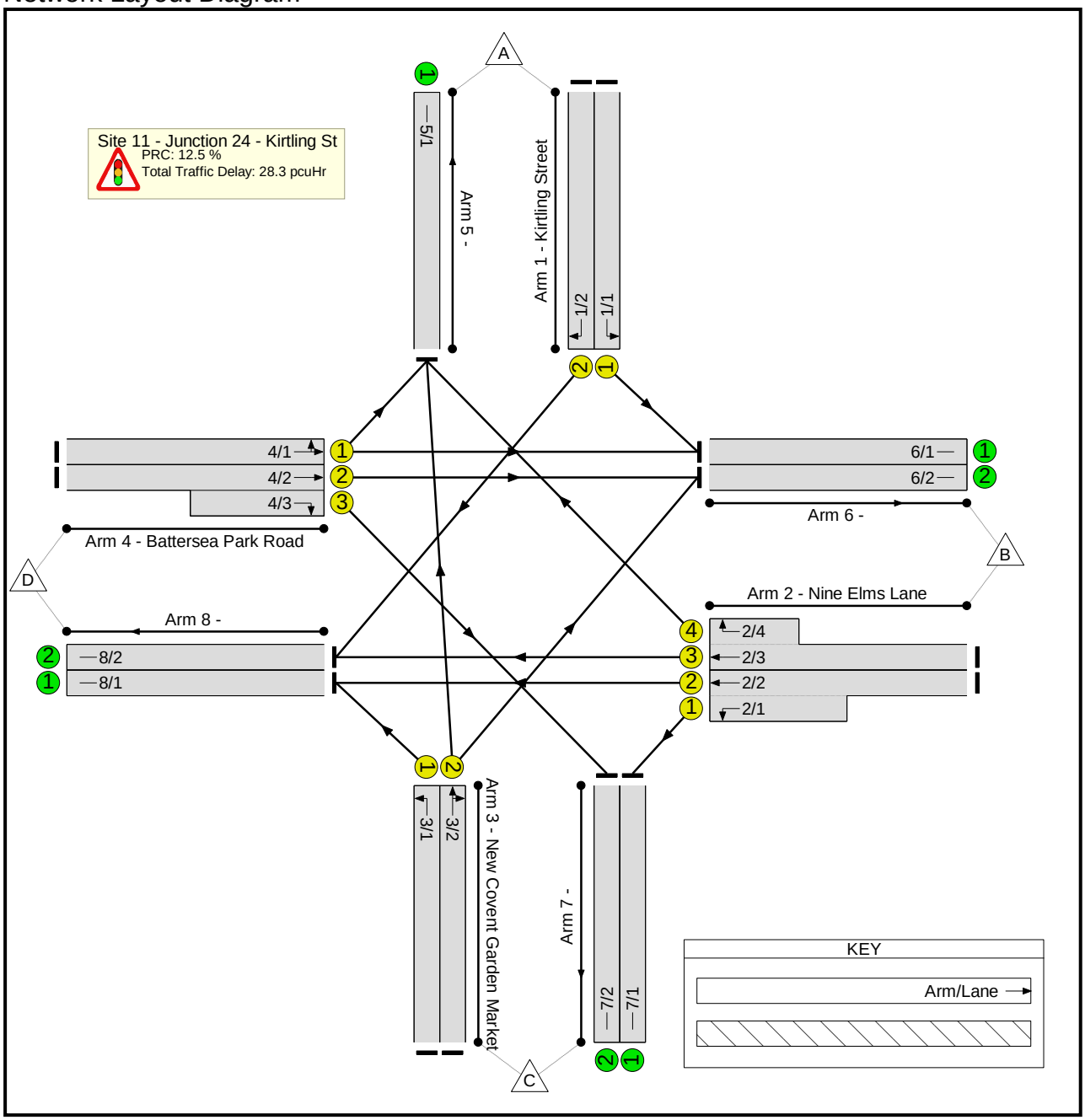
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left	U	N		1	7	-	6	1505	120	5.0%	-	-	-	0.1	58.5	0.2
1/2	Kirtling Street Right	U	F		1	7	-	43	1747	140	30.8%	-	-	-	0.7	61.9	1.3
2/2+2/1	Nine Elms Lane Left Ahead	U	P B		1	35:48	-	596	2070:1698	760	78.4%	-	-	-	6.3	38.0	15.7
2/3+2/4	Nine Elms Lane Right Ahead	U	P O		1	35:8	-	553	2070:1783	743	74.5%	-	-	-	5.7	37.4	14.8
3/1	New Covent Garden Market Left	U	D		1	7	-	93	1663	133	69.9%	-	-	-	2.3	87.5	3.6
3/2	New Covent Garden Market Ahead Right	U	E		1	7	-	33	1742	139	23.7%	-	-	-	0.6	60.1	1.0
4/1	Battersea Park Road Left Ahead	U	A		1	32	-	518	1932	638	81.2%	-	-	-	6.5	45.2	15.2
4/2+4/3	Battersea Park Road Ahead Right	U	Q C		1	32:11	-	576	2070:1796	725	79.5%	-	-	-	6.8	42.8	15.2

C1 PRC for Signalled Lanes (%): 10.8 Total Delay for Signalled Lanes (pcuHr): 29.04 Cycle Time (s): 100
PRC Over All Lanes (%): 10.8 Total Delay Over All Lanes(pcuHr): 29.04

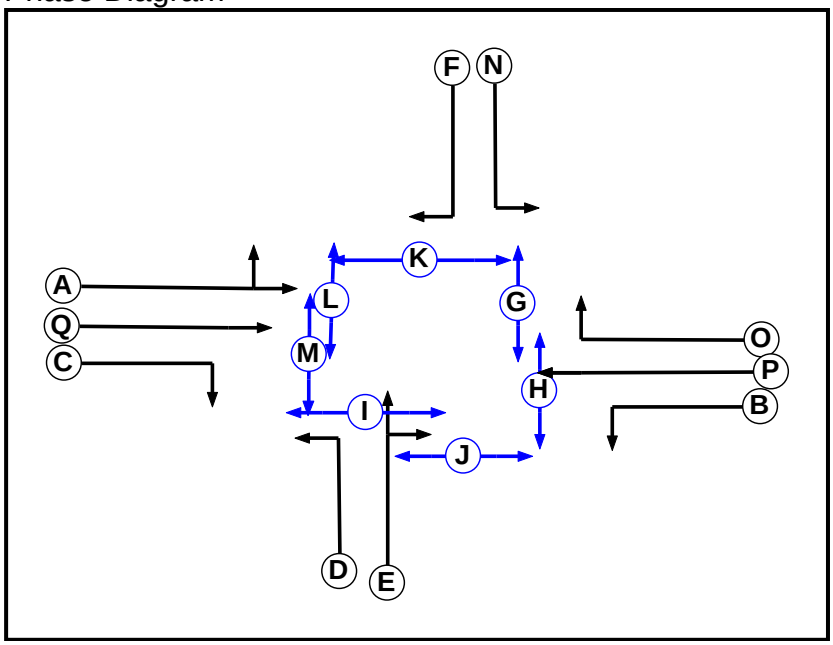
C.5 Construction development case results, AM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road new signalised layout

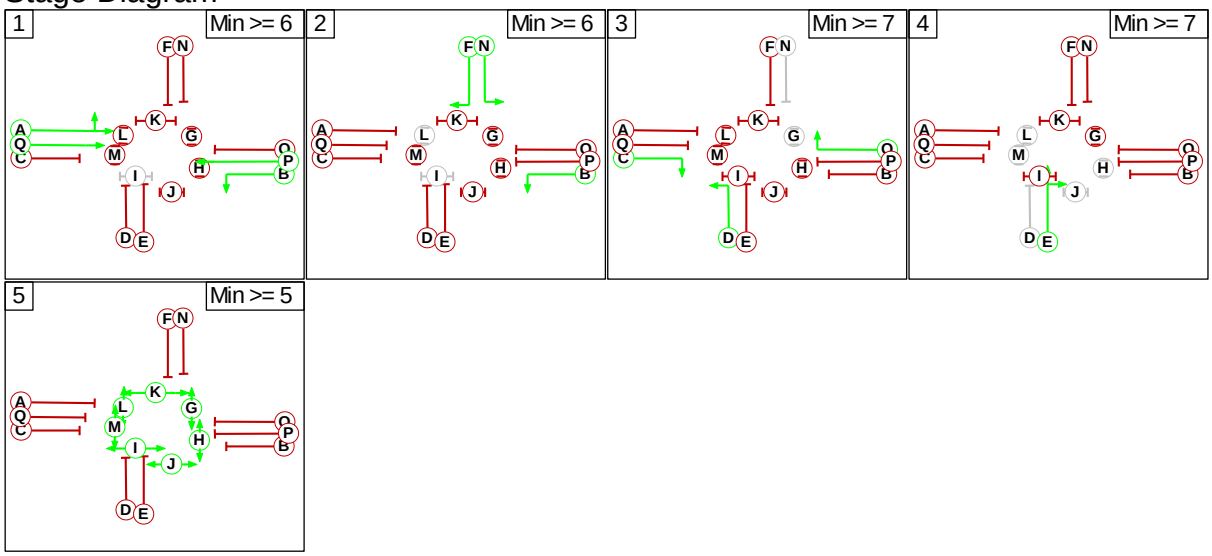
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B P Q
2	B F N
3	C D O
4	E
5	G H I J K L M

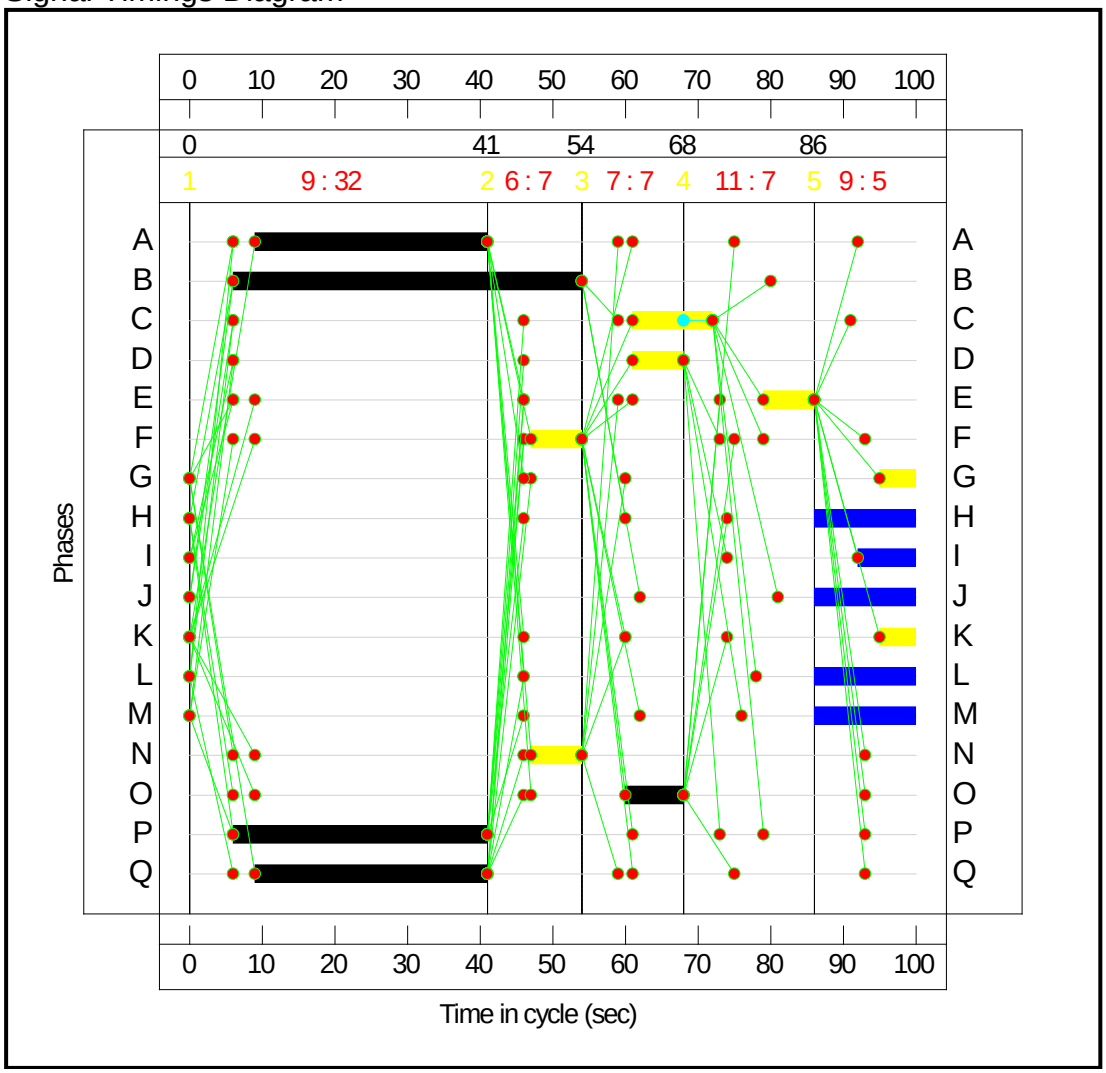
Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
A	-	-	-	-	5	6	5	-	-	-	5	5	-	6	6	-	-
B	-	-	5	-	-	-	-	6	-	8	-	-	-	-	-	-	-
C	-	8	-	-	7	7	-	-	-	9	-	6	-	-	-	7	-
D	-	-	-	-	-	5	-	-	6	-	-	-	8	-	-	5	-
E	6	-	5	-	-	7	9	-	6	-	9	-	-	7	7	7	7
F	7	-	7	7	7	-	-	-	-	-	6	-	8	-	6	7	7
G	6	-	-	-	6	-	-	-	-	-	-	-	-	6	-	-	9
H	-	6	-	-	-	-	-	-	-	-	-	-	-	-	6	6	-
I	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-
J	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	9	-	-	-	9	9	-	-	-	-	-	-	-	9	9	-	-
L	6	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	6
M	-	-	-	6	-	6	-	-	-	-	-	-	-	-	-	6	-
N	5	-	-	-	5	-	6	-	-	-	6	-	-	-	-	-	5
O	7	-	-	-	5	7	-	6	-	-	6	-	-	-	-	-	7
P	-	-	5	5	5	5	-	5	-	-	-	-	5	-	-	-	-
Q	-	-	-	-	5	5	6	-	-	-	-	5	-	5	5	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	4	0	52	56
	B	20	0	55	1041	1116
	C	0	40	0	96	136
	D	63	905	123	0	1091
	Tot.	83	949	178	1189	2399

Signal Timings Diagram



Network Results

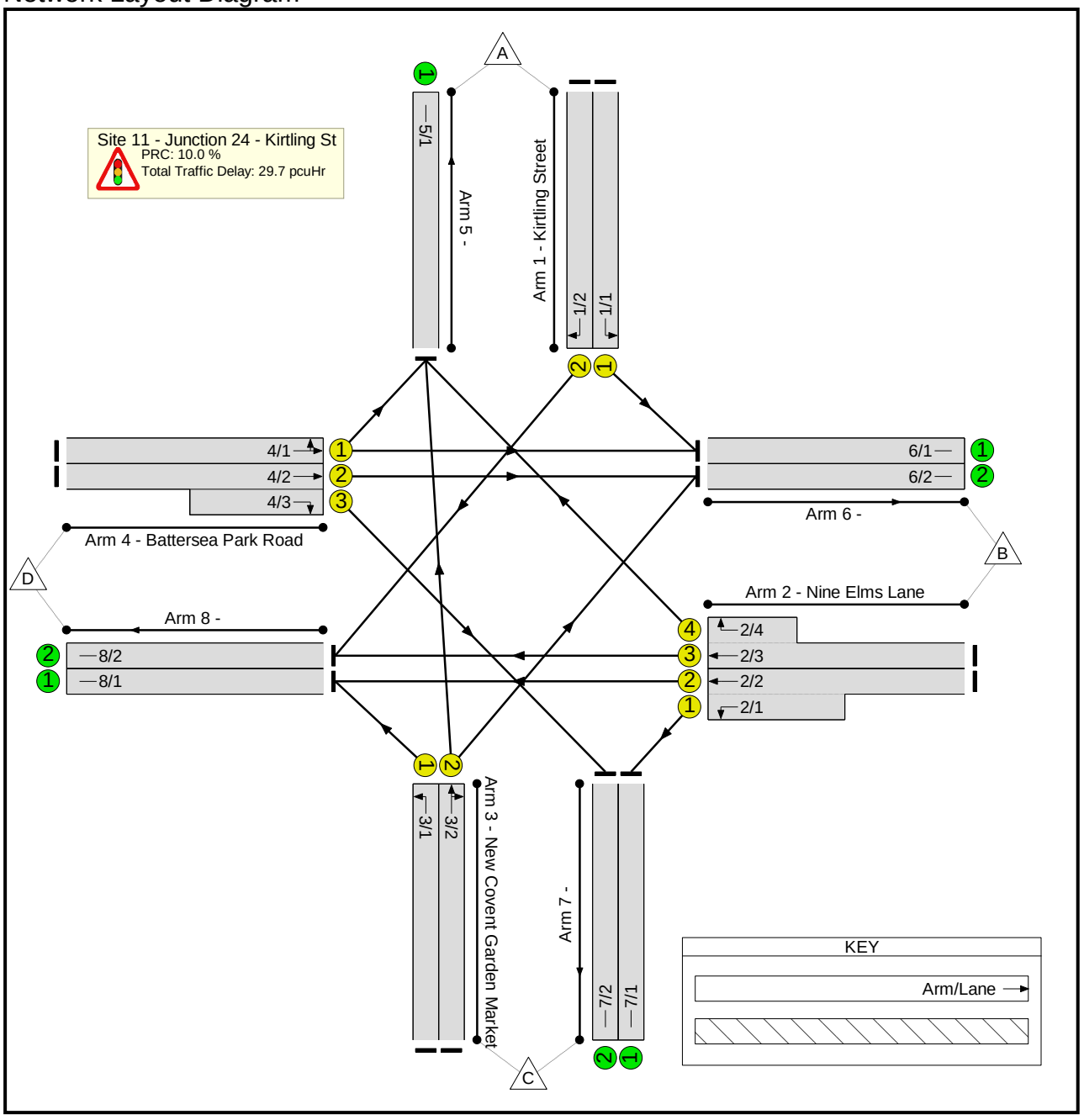
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left	U	N		1	7	-	4	1505	120	3.3%	-	-	-	0.1	58.2	0.1
1/2	Kirtling Street Right	U	F		1	7	-	52	1747	140	37.2%	-	-	-	0.9	64.0	1.7
2/2+2/1	Nine Elms Lane Left Ahead	U	P B		1	35:48	-	576	2070:1698	764	75.3%	-	-	-	5.7	35.9	14.6
2/3+2/4	Nine Elms Lane Right Ahead	U	P O		1	35:8	-	540	2070:1783	746	72.4%	-	-	-	5.5	36.7	14.0
3/1	New Covent Garden Market Left	U	D		1	7	-	96	1663	133	72.2%	-	-	-	2.4	90.5	3.8
3/2	New Covent Garden Market Ahead Right	U	E		1	7	-	40	1733	139	28.9%	-	-	-	0.7	61.5	1.2
4/1	Battersea Park Road Left Ahead	U	A		1	32	-	484	1925	635	76.2%	-	-	-	5.6	41.6	13.5
4/2+4/3	Battersea Park Road Ahead Right	U	Q C		1	32:11	-	607	2070:1796	759	80.0%	-	-	-	7.3	43.5	15.0

C1 PRC for Signalled Lanes (%): 12.5 Total Delay for Signalled Lanes (pcuHr): 28.27 Cycle Time (s): 100
PRC Over All Lanes (%): 12.5 Total Delay Over All Lanes(pcuHr): 28.27

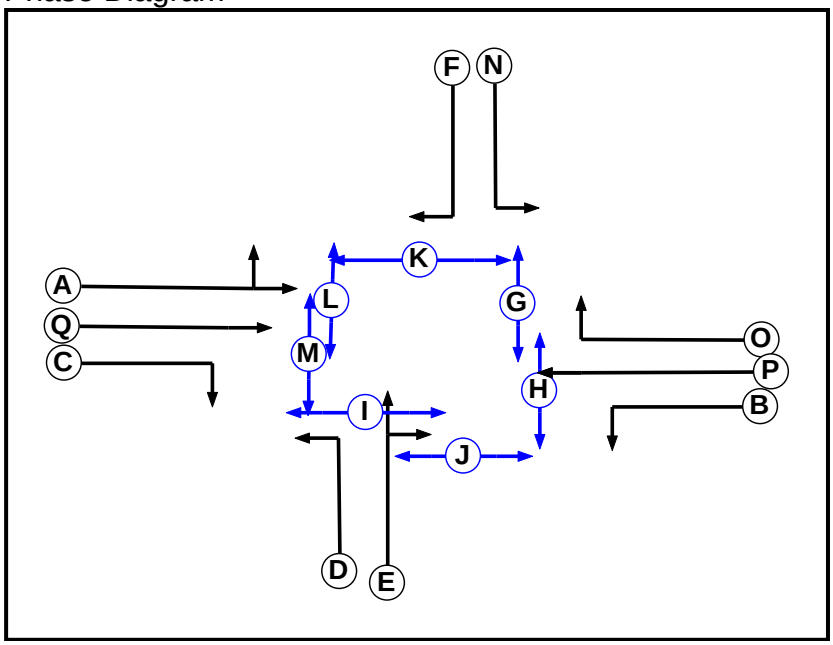
C.6 Construction development case results, PM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road new signalised layout

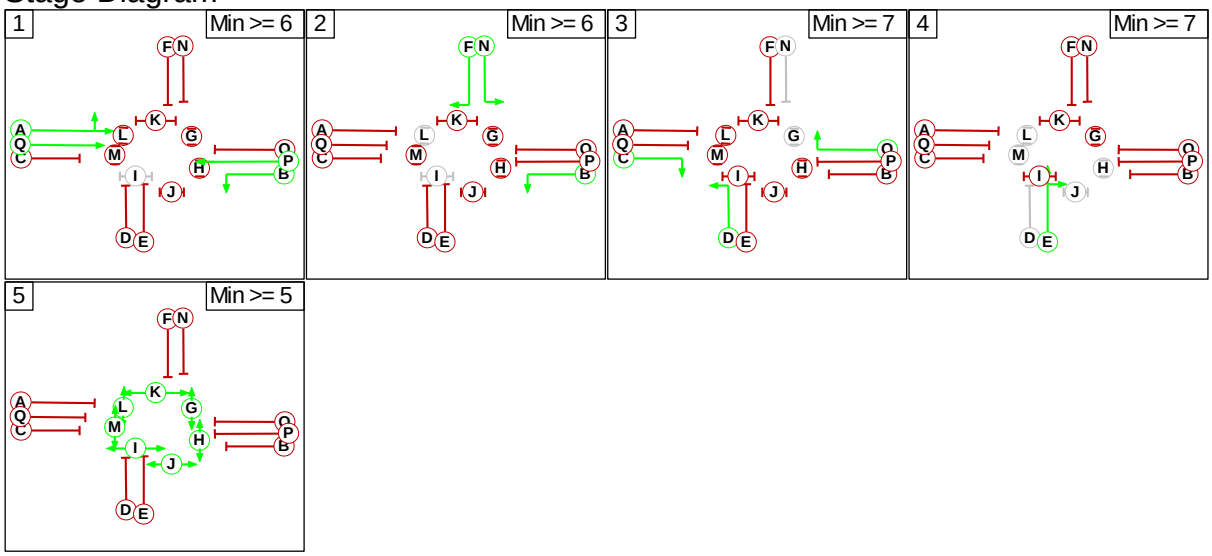
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B P Q
2	B F N
3	C D O
4	E
5	G H I J K L M

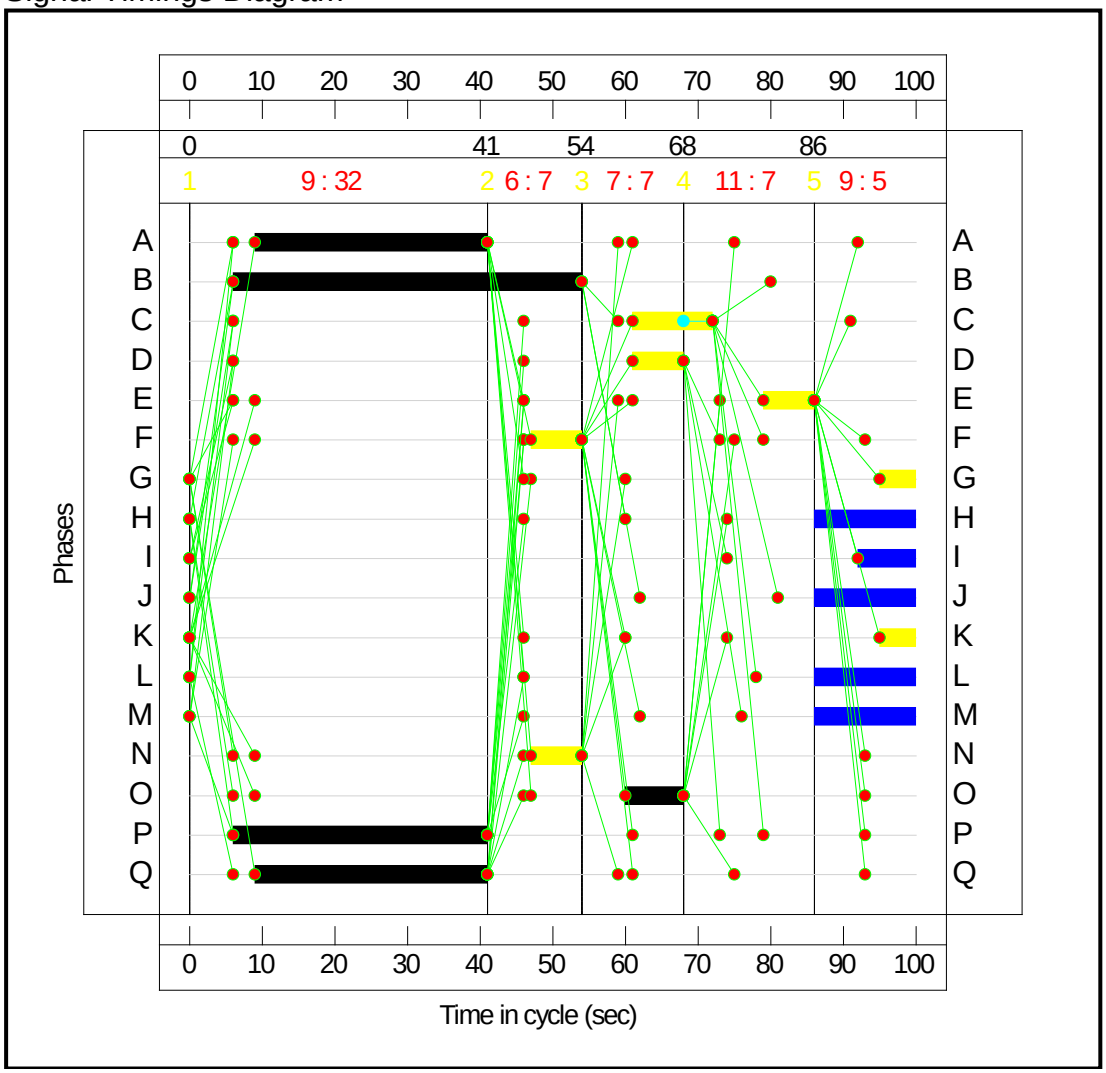
Phase Intergreens Matrix

		Starting Phase																
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Terminating Phase	A	-	-	-	-	5	6	5	-	-	-	5	5	-	6	6	-	-
	B	-	-	5	-	-	-	-	6	-	8	-	-	-	-	-	-	-
	C	-	8	-	-	7	7	-	-	-	9	-	6	-	-	-	7	-
	D	-	-	-	-	-	5	-	-	6	-	-	-	8	-	-	5	-
	E	6	-	5	-	-	7	9	-	6	-	9	-	-	7	7	7	7
	F	7	-	7	7	7	-	-	-	-	-	6	-	8	-	6	7	7
	G	6	-	-	-	6	-	-	-	-	-	-	-	-	6	-	-	9
	H	-	6	-	-	-	-	-	-	-	-	-	-	-	-	6	6	-
	I	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-
	J	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	K	9	-	-	-	9	9	-	-	-	-	-	-	-	9	9	-	-
	L	6	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	6
	M	-	-	-	6	-	6	-	-	-	-	-	-	-	-	-	6	-
	N	5	-	-	-	5	-	6	-	-	-	6	-	-	-	-	-	5
	O	7	-	-	-	5	7	-	6	-	-	6	-	-	-	-	-	7
	P	-	-	5	5	5	5	-	5	-	-	-	-	5	-	-	-	-
	Q	-	-	-	-	5	5	6	-	-	-	-	5	-	5	5	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	6	0	43	49
	B	21	0	46	1103	1170
	C	1	32	0	93	126
	D	59	982	59	0	1100
	Tot.	81	1020	105	1239	2445

Signal Timings Diagram



Network Results

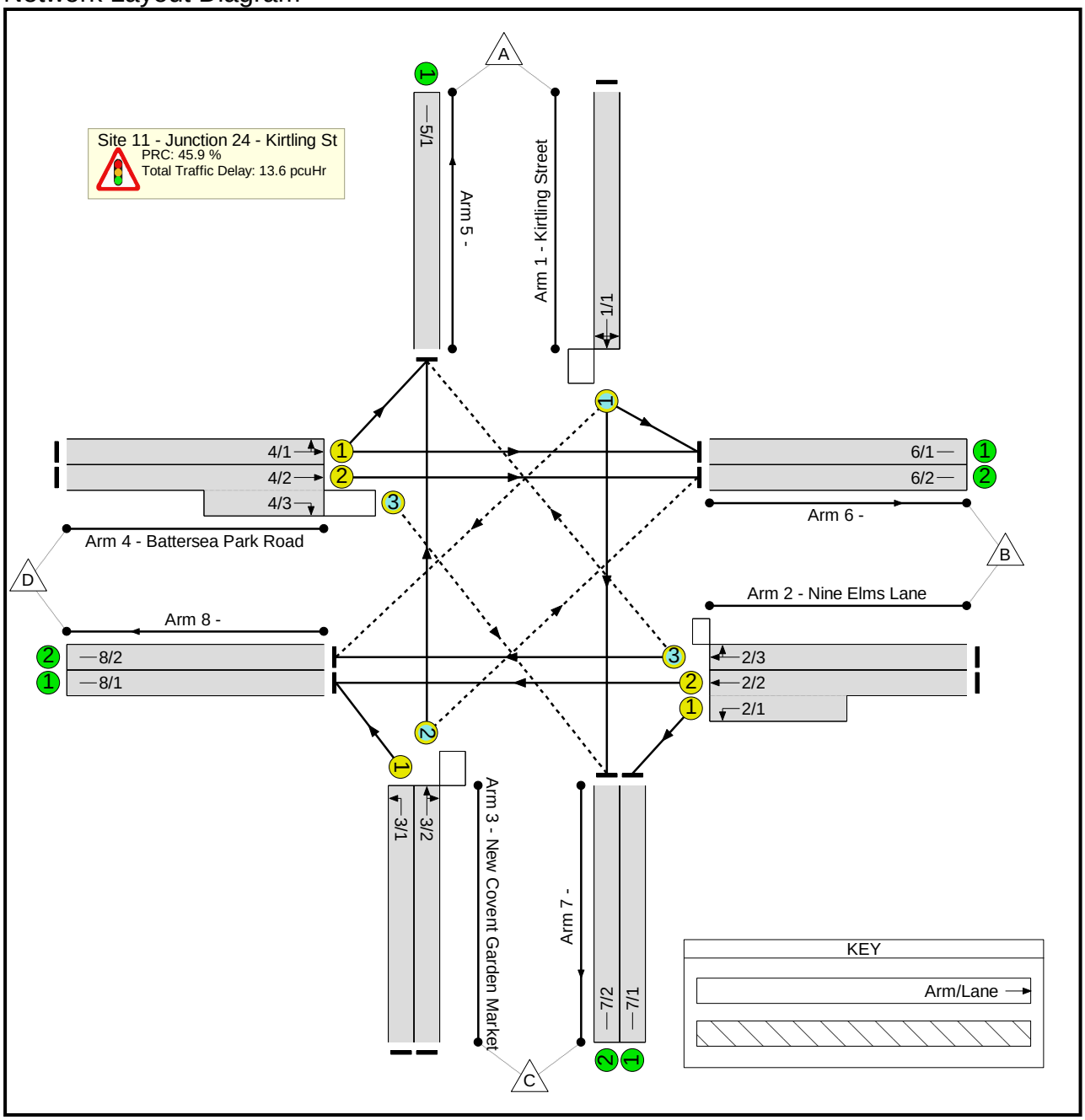
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left	U	N		1	7	-	6	1505	120	5.0%	-	-	-	0.1	58.5	0.2
1/2	Kirtling Street Right	U	F		1	7	-	43	1747	140	30.8%	-	-	-	0.7	61.9	1.3
2/2+2/1	Nine Elms Lane Left Ahead	U	P B		1	35:48	-	598	2070:1698	760	78.7%	-	-	-	6.3	38.2	15.8
2/3+2/4	Nine Elms Lane Right Ahead	U	P O		1	35:8	-	572	2070:1783	746	76.7%	-	-	-	6.2	38.8	15.4
3/1	New Covent Garden Market Left	U	D		1	7	-	93	1663	133	69.9%	-	-	-	2.3	87.5	3.6
3/2	New Covent Garden Market Ahead Right	U	E		1	7	-	33	1742	139	23.7%	-	-	-	0.6	60.1	1.0
4/1	Battersea Park Road Left Ahead	U	A		1	32	-	521	1930	637	81.8%	-	-	-	6.6	45.7	15.3
4/2+4/3	Battersea Park Road Ahead Right	U	Q C		1	32:11	-	579	2070:1796	725	79.9%	-	-	-	6.9	43.0	15.5

C1 PRC for Signalled Lanes (%): 10.0 Total Delay for Signalled Lanes (pcuHr): 29.70 Cycle Time (s): 100
PRC Over All Lanes (%): 10.0 Total Delay Over All Lanes(pcuHr): 29.70

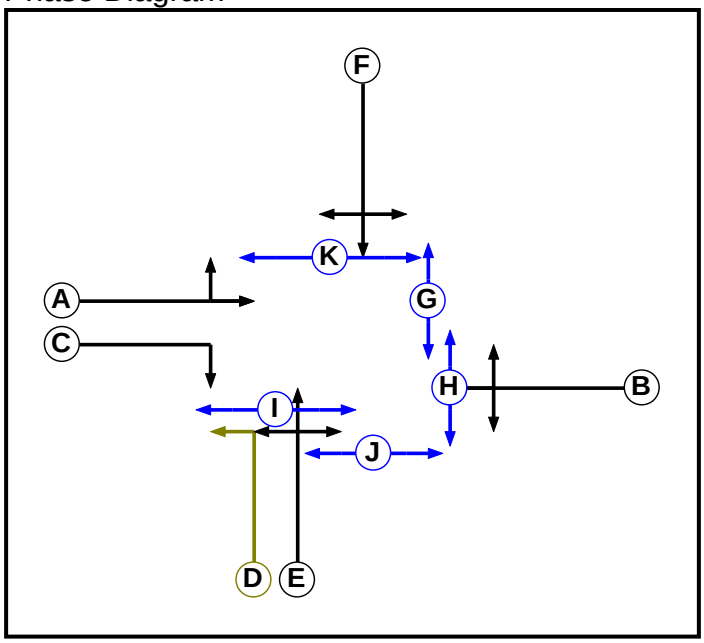
C.7 Construction base case results, without Battersea Power Station sensitivity test, AM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road existing signalised layout

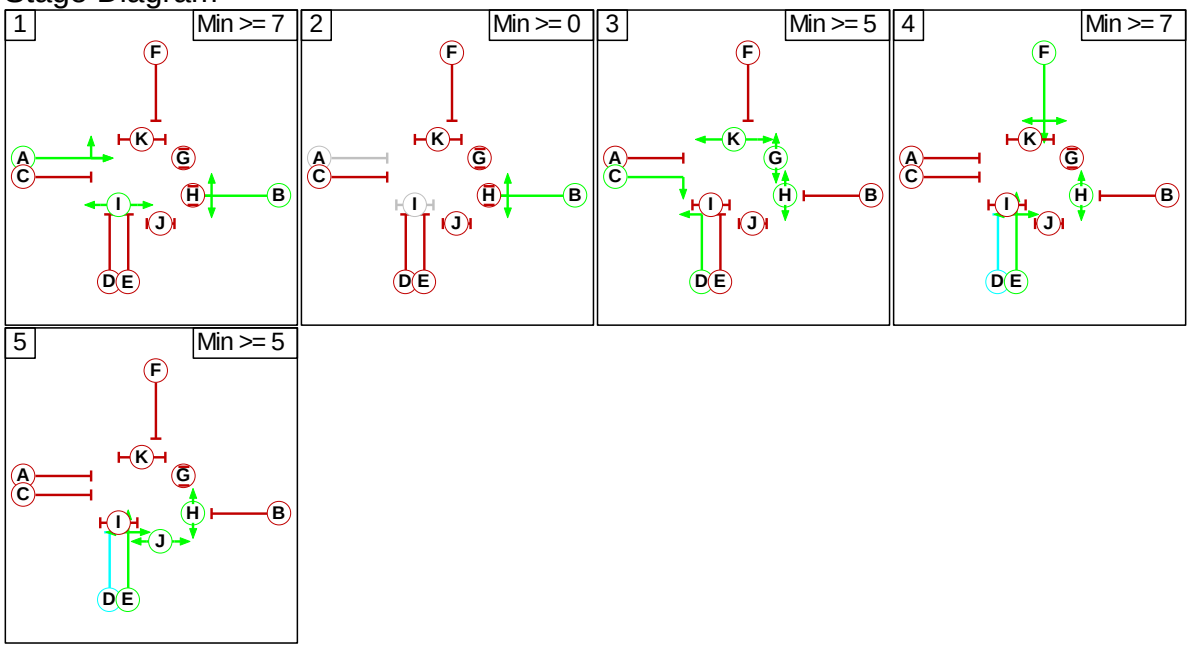
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B I
2	B
3	C D G H K
4	E F H
5	E H J

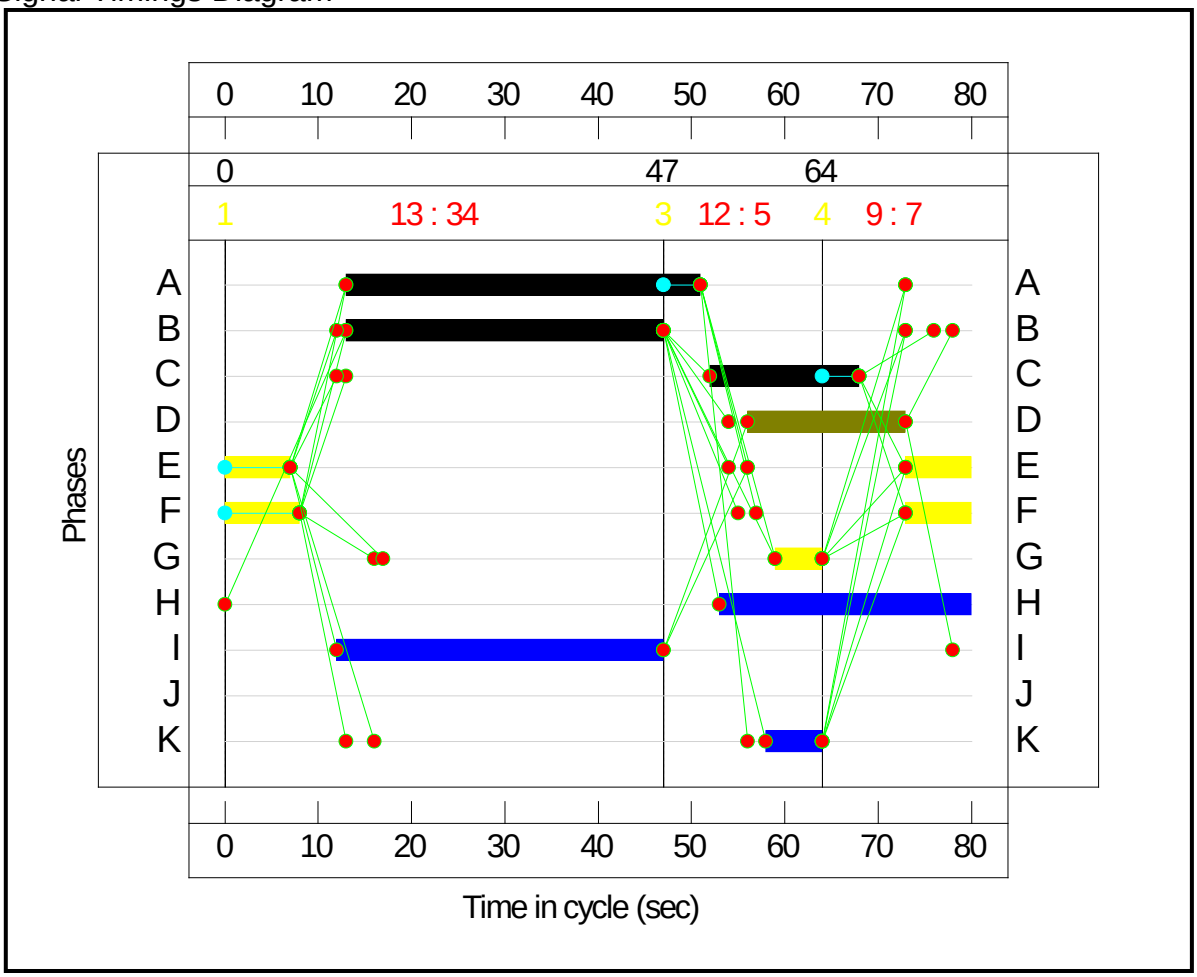
Phase Intergreens Matrix

		Starting Phase										
		A	B	C	D	E	F	G	H	I	J	K
Terminating Phase	A	-	-	-	-	5	6	8	-	-	-	5
	B	-	-	5	7	7	8	12	6	-	8	11
	C	-	8	-	-	5	5	-	-	-	12	-
	D	-	5	-	-	-	-	-	-	5	-	-
	E	6	5	5	-	-	-	10	-	5	-	9
	F	5	5	5	-	-	-	8	-	-	10	5
	G	9	9	-	-	9	9	-	-	-	-	-
	H	-	13	-	-	-	-	-	-	-	-	-
	I	-	-	-	9	9	-	-	-	-	-	-
	J	-	9	9	-	-	9	-	-	-	-	-
	K	9	9	-	-	9	9	-	-	-	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	4	0	42	46
	B	2	0	55	1037	1094
	C	0	40	0	96	136
	D	48	902	123	0	1073
	Tot.	50	946	178	1175	2349

Signal Timings Diagram



Network Results

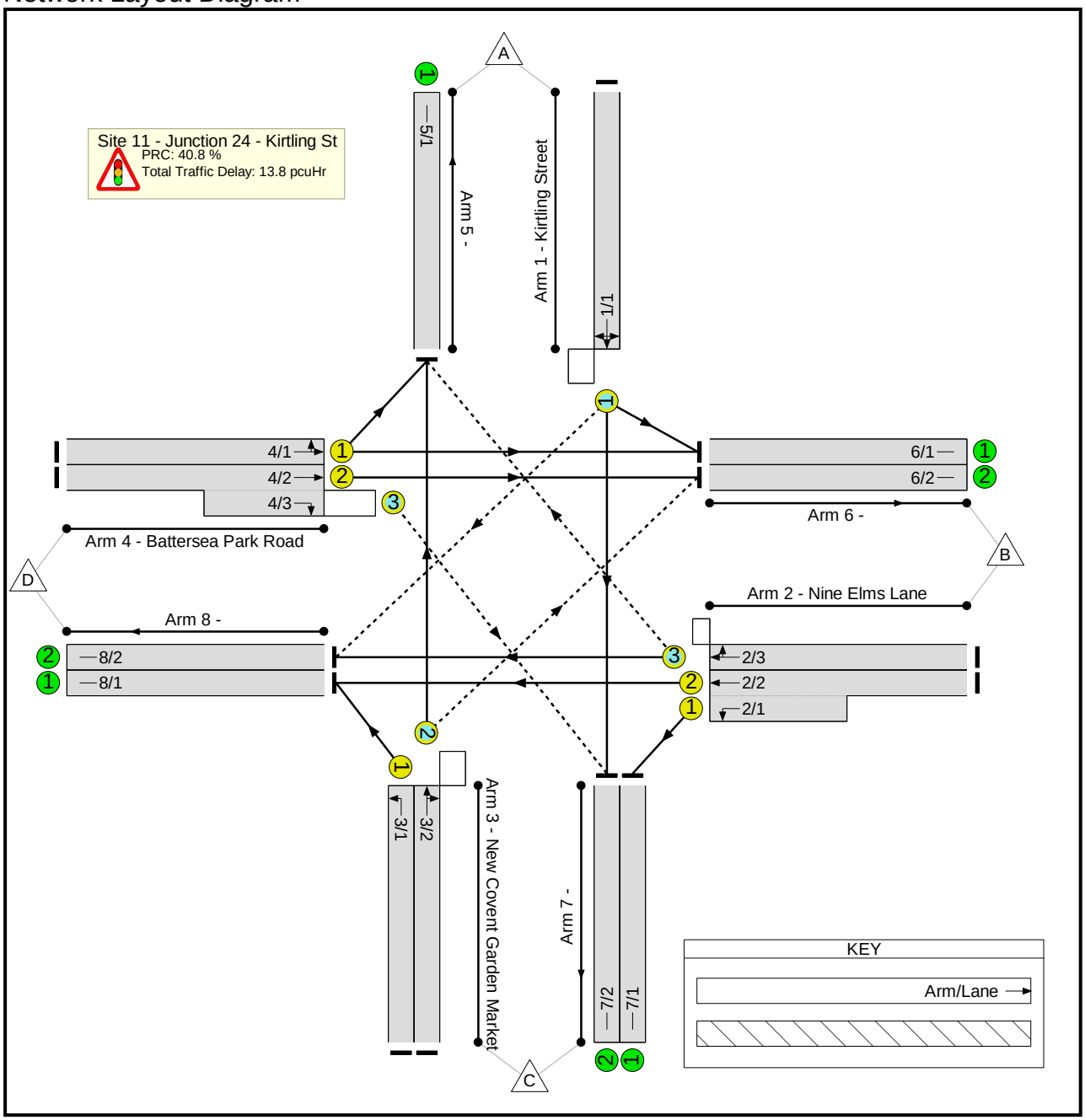
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left Ahead Right	O	F		1	15	-	46	1587	317	14.5%	41	0	1	0.4	33.1	0.9
2/2+2/1	Nine Elms Lane Left Ahead	U	B		1	34	-	574	2070:1698	930	61.7%	-	-	-	3.4	21.6	9.6
2/3	Nine Elms Lane Right Ahead	O	B		1	34	-	520	2069	905	57.4%	2	0	0	3.1	21.6	9.3
3/1	New Covent Garden Market Left	U	E	D	1	31	17	96	1663	665	14.4%	-	-	-	0.5	18.4	1.4
3/2	New Covent Garden Market Ahead Right	O	E		1	14	-	40	1713	320	12.5%	40	0	0	0.4	33.7	0.8
4/1	Battersea Park Road Left Ahead	U	A		1	38	-	475	1885	919	51.7%	-	-	-	2.4	18.1	7.7
4/2+4/3	Battersea Park Road Ahead Right	U+O	A C		1	38:16	-	598	2055:2033	1089	54.9%	5	118	0	3.4	20.3	7.6

C1 PRC for Signalled Lanes (%): 45.9 Total Delay for Signalled Lanes (pcuHr): 13.60 Cycle Time (s): 80
PRC Over All Lanes (%): 45.9 Total Delay Over All Lanes(pcuHr): 13.60

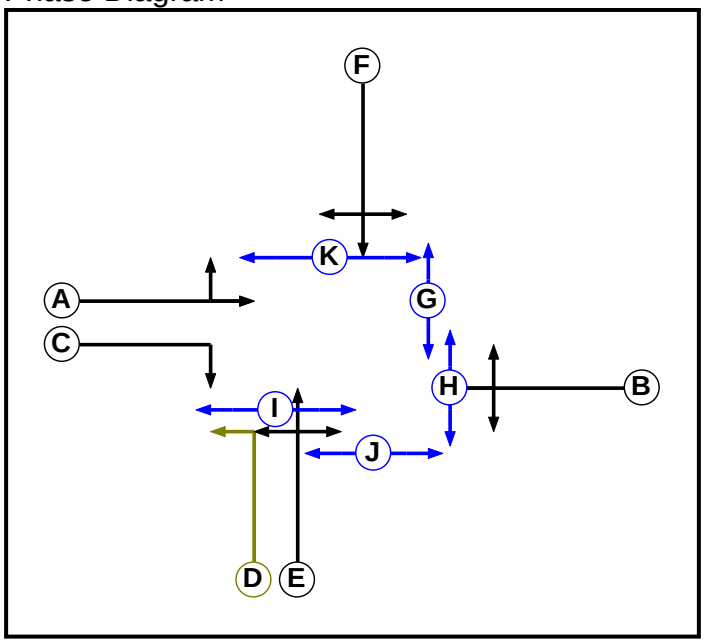
C.8 Construction base case results, without Battersea Power Station sensitivity test, PM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road existing signalised layout

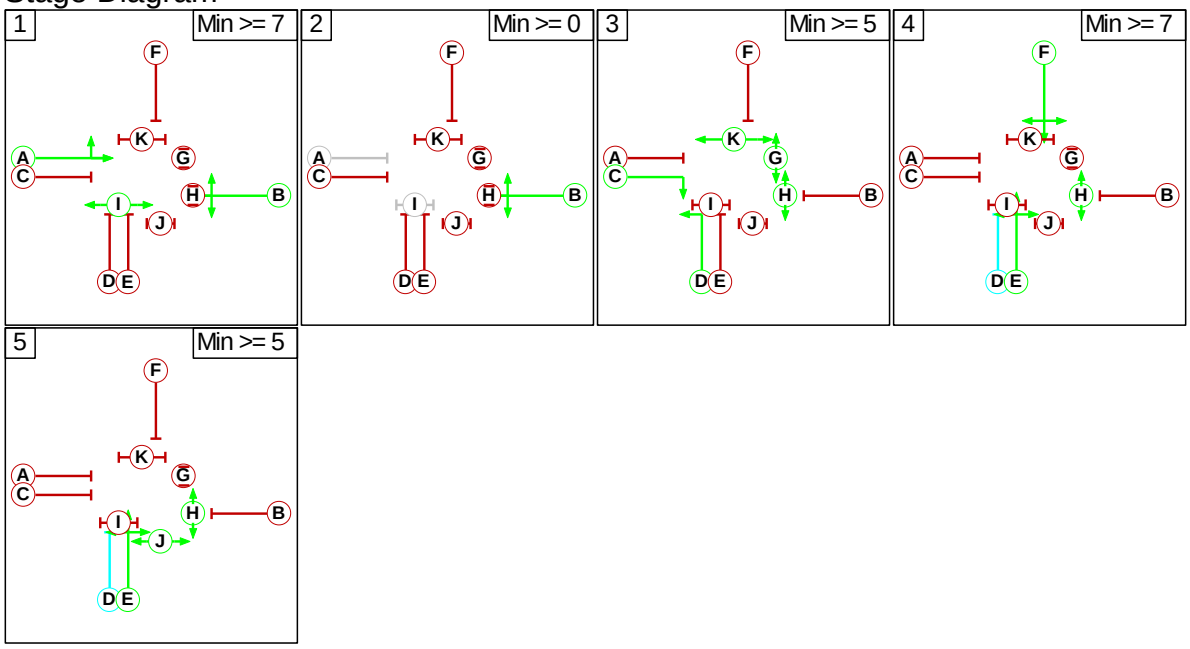
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B I
2	B
3	C D G H K
4	E F H
5	E H J

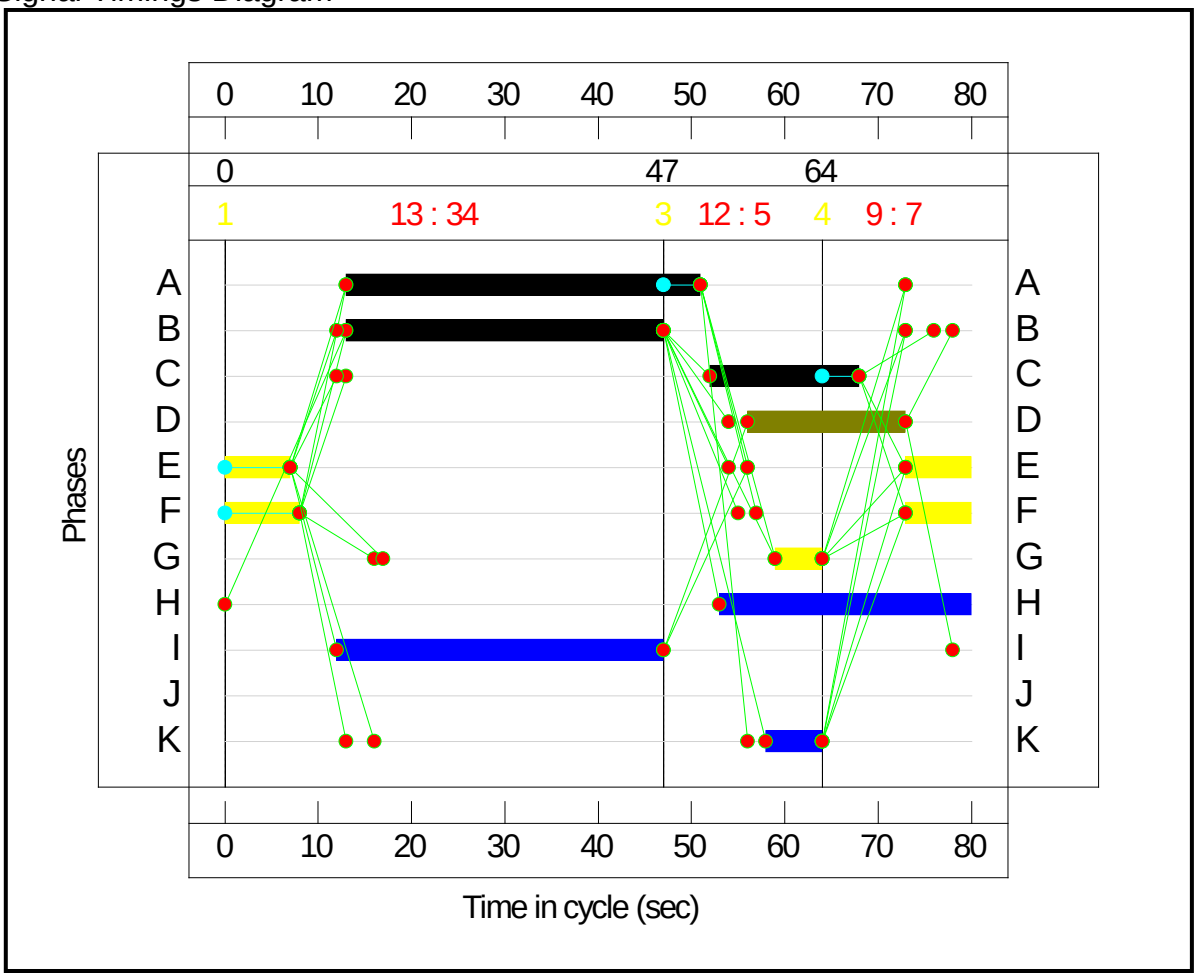
Phase Intergreens Matrix

Terminating Phase	Starting Phase											
		A	B	C	D	E	F	G	H	I	J	K
	A	-	-	-	-	5	6	8	-	-	-	5
	B	-	-	5	7	7	8	12	6	-	8	11
	C	-	8	-	-	5	5	-	-	-	12	-
	D	-	5	-	-	-	-	-	-	5	-	-
	E	6	5	5	-	-	-	10	-	5	-	9
	F	5	5	5	-	-	-	8	-	-	10	5
	G	9	9	-	-	9	9	-	-	-	-	-
	H	-	13	-	-	-	-	-	-	-	-	-
	I	-	-	-	9	9	-	-	-	-	-	-
	J	-	9	9	-	-	9	-	-	-	-	-
	K	9	9	-	-	9	9	-	-	-	-	-

Traffic Flows, Desired
Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	6	0	33	39
	B	3	0	46	1087	1136
	C	1	32	0	92	125
	D	45	967	58	0	1070
	Tot.	49	1005	104	1212	2370

Signal Timings Diagram



Network Results

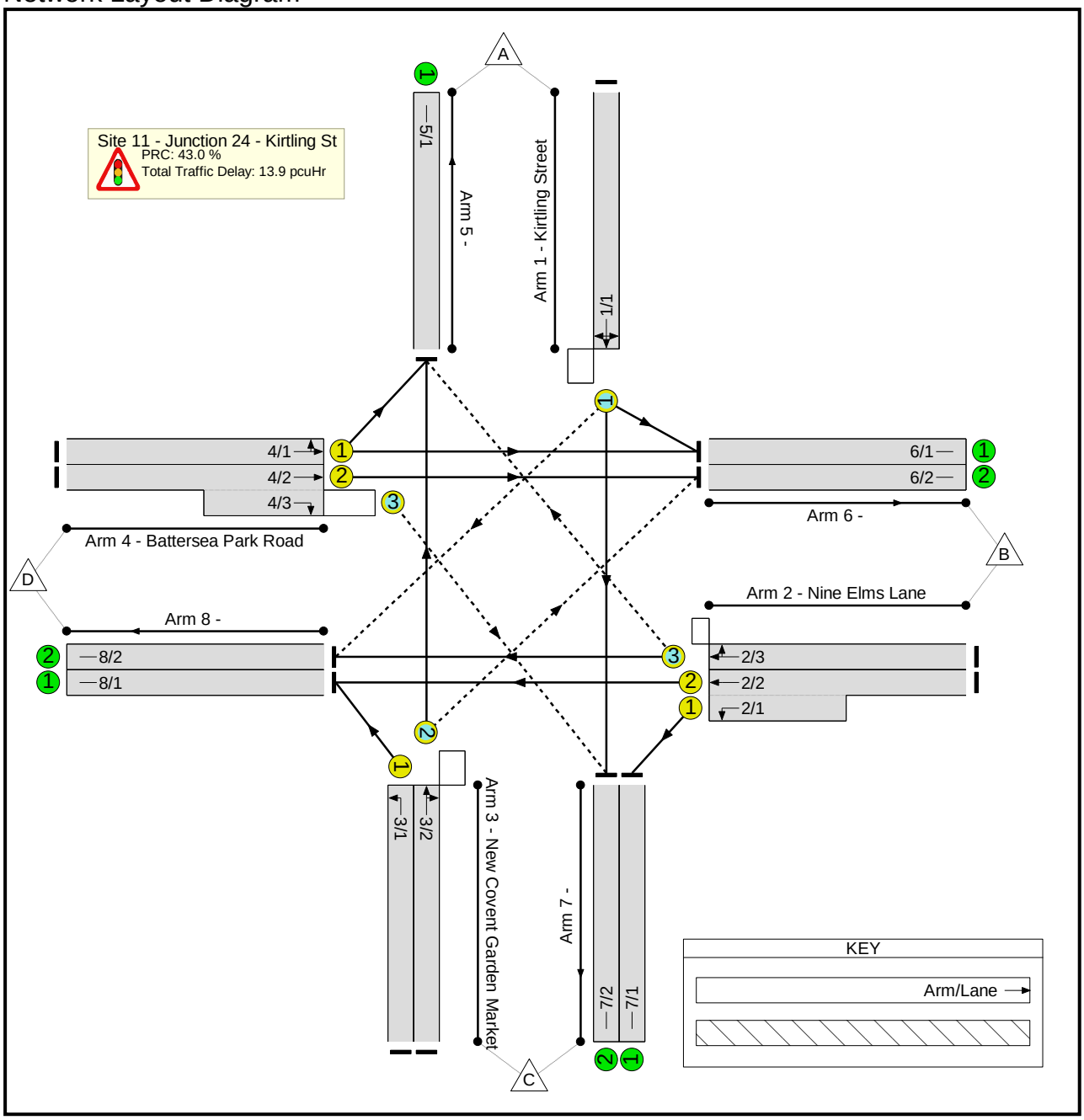
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left Ahead Right	O	F		1	15	-	39	1582	316	12.3%	33	0	0	0.4	32.8	0.8
2/2+2/1	Nine Elms Lane Left Ahead	U	B		1	34	-	591	2070:1698	925	63.9%	-	-	-	3.7	22.3	10.4
2/3	Nine Elms Lane Right Ahead	O	B		1	34	-	545	2068	905	60.2%	3	0	0	3.4	22.2	10.0
3/1	New Covent Garden Market Left	U	E	D	1	31	17	92	1663	665	13.8%	-	-	-	0.5	18.4	1.4
3/2	New Covent Garden Market Ahead Right	O	E		1	14	-	33	1722	323	10.2%	32	0	0	0.3	33.4	0.7
4/1	Battersea Park Road Left Ahead	U	A		1	38	-	506	1888	920	55.0%	-	-	-	2.6	18.7	8.5
4/2+4/3	Battersea Park Road Ahead Right	U+O	A C		1	38:16	-	564	2055:2033	1044	54.0%	2	56	0	3.0	19.0	8.4

C1 PRC for Signalled Lanes (%): 40.8 Total Delay for Signalled Lanes (pcuHr): 13.76 Cycle Time (s): 80
PRC Over All Lanes (%): 40.8 Total Delay Over All Lanes(pcuHr): 13.76

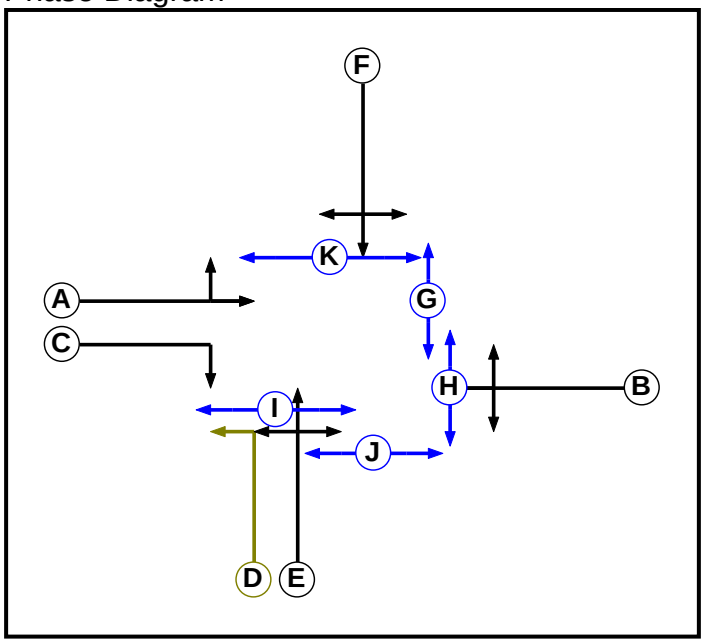
C.9 Construction development case results, without Battersea Power Station sensitivity test, AM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road existing signalised layout

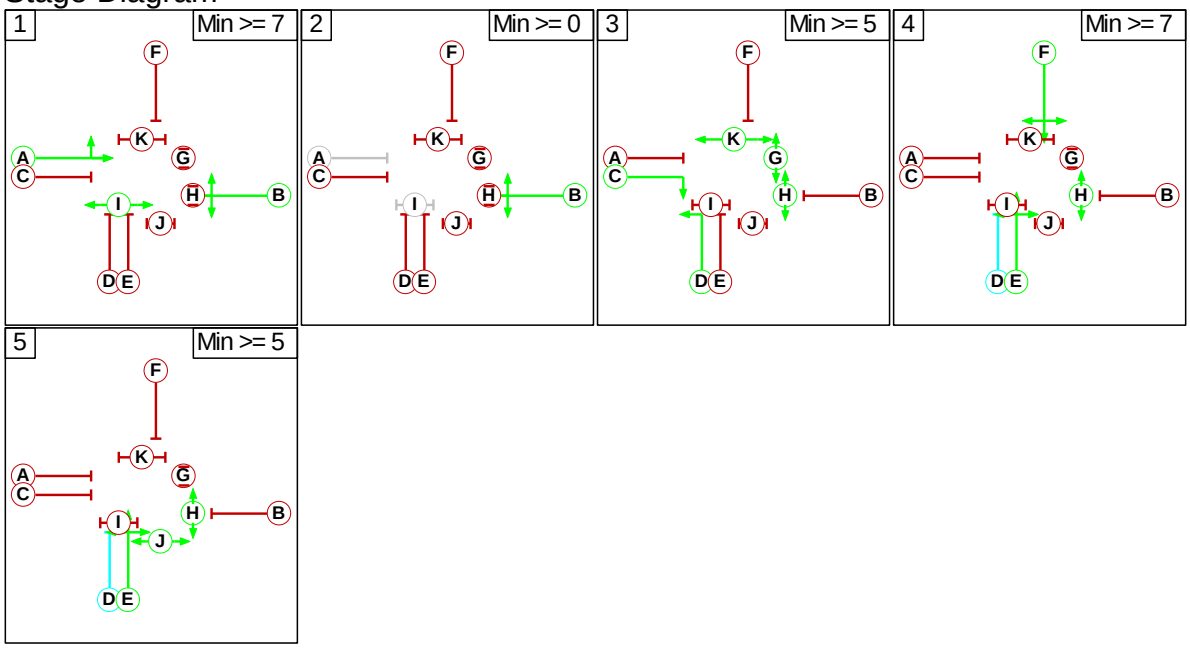
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B I
2	B
3	C D G H K
4	E F H
5	E H J

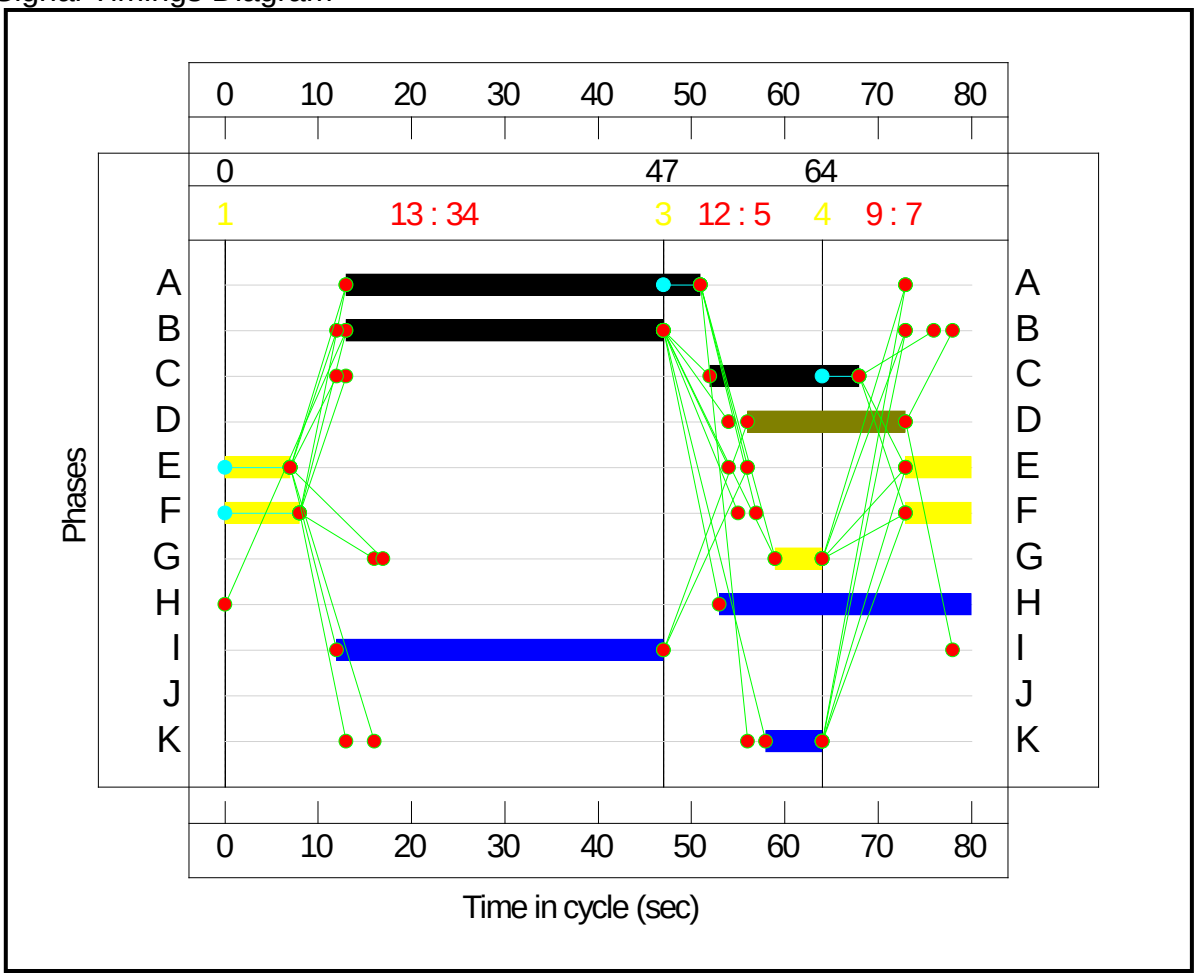
Phase Intergreens Matrix

		Starting Phase										
		A	B	C	D	E	F	G	H	I	J	K
Terminating Phase	A	-	-	-	-	5	6	8	-	-	-	5
	B	-	-	5	7	7	8	12	6	-	8	11
	C	-	8	-	-	5	5	-	-	-	12	-
	D	-	5	-	-	-	-	-	-	5	-	-
	E	6	5	5	-	-	-	10	-	5	-	9
	F	5	5	5	-	-	-	8	-	-	10	5
	G	9	9	-	-	9	9	-	-	-	-	-
	H	-	13	-	-	-	-	-	-	-	-	-
	I	-	-	-	9	9	-	-	-	-	-	-
	J	-	9	9	-	-	9	-	-	-	-	-
	K	9	9	-	-	9	9	-	-	-	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	4	0	42	46
	B	20	0	55	1041	1116
	C	0	40	0	96	136
	D	53	905	123	0	1081
	Tot.	73	949	178	1179	2379

Signal Timings Diagram



Network Results

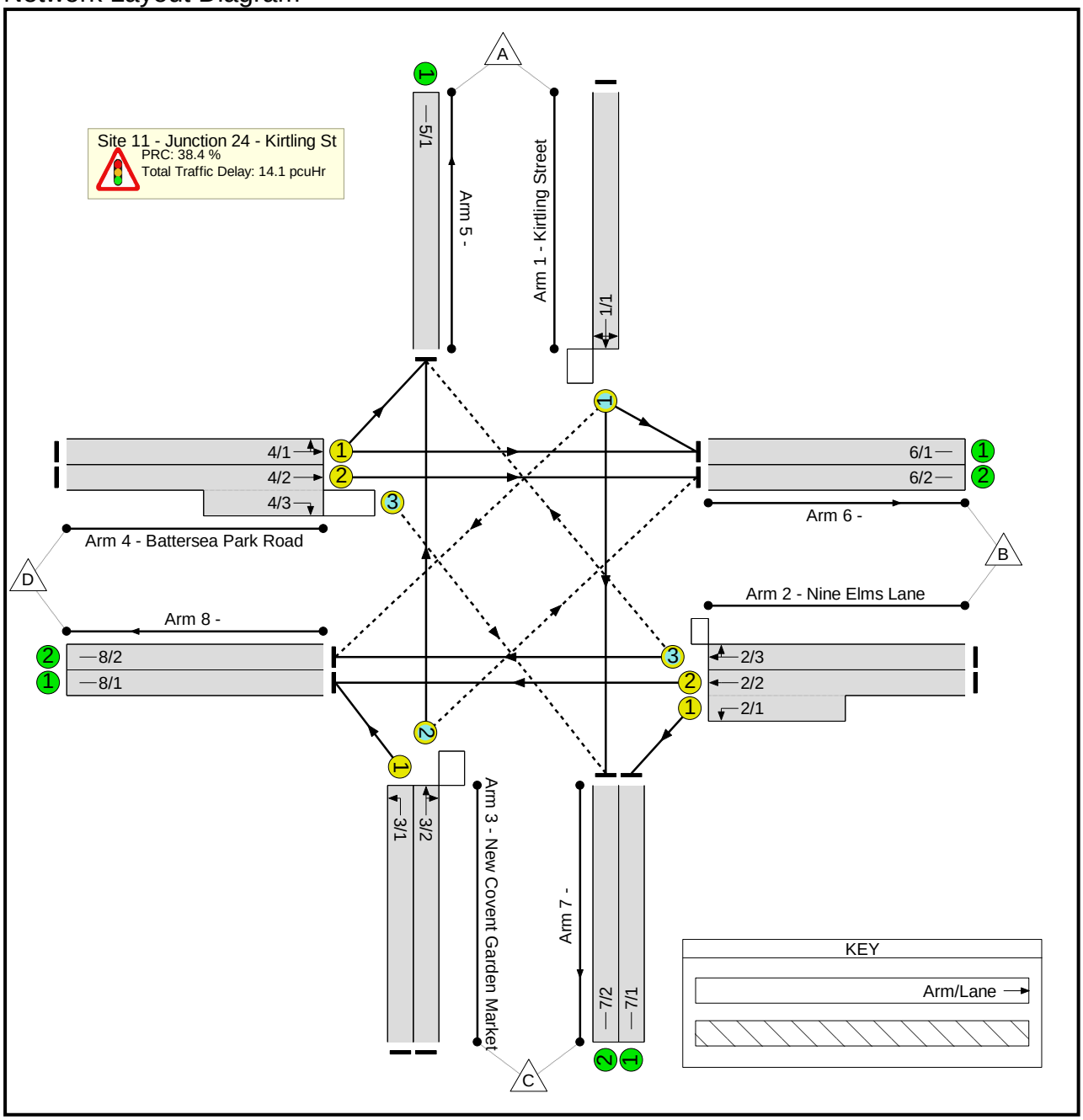
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left Ahead Right	O	F		1	15	-	46	1587	317	14.5%	41	0	1	0.4	33.1	0.9
2/2+2/1	Nine Elms Lane Left Ahead	U	B		1	34	-	585	2070:1698	930	62.9%	-	-	-	3.6	21.9	9.8
2/3	Nine Elms Lane Right Ahead	O	B		1	34	-	531	2059	901	58.9%	20	0	0	3.3	22.2	9.6
3/1	New Covent Garden Market Left	U	E	D	1	31	17	96	1663	665	14.4%	-	-	-	0.5	18.4	1.4
3/2	New Covent Garden Market Ahead Right	O	E		1	14	-	40	1713	320	12.5%	40	0	0	0.4	33.7	0.8
4/1	Battersea Park Road Left Ahead	U	A		1	38	-	479	1882	917	52.2%	-	-	-	2.4	18.2	7.7
4/2+4/3	Battersea Park Road Ahead Right	U+O	A C		1	38:16	-	602	2055:2033	1088	55.3%	5	118	0	3.4	20.3	7.8

C1 PRC for Signalled Lanes (%): 43.0 Total Delay for Signalled Lanes (pcuHr): 13.93 Cycle Time (s): 80
PRC Over All Lanes (%): 43.0 Total Delay Over All Lanes(pcuHr): 13.93

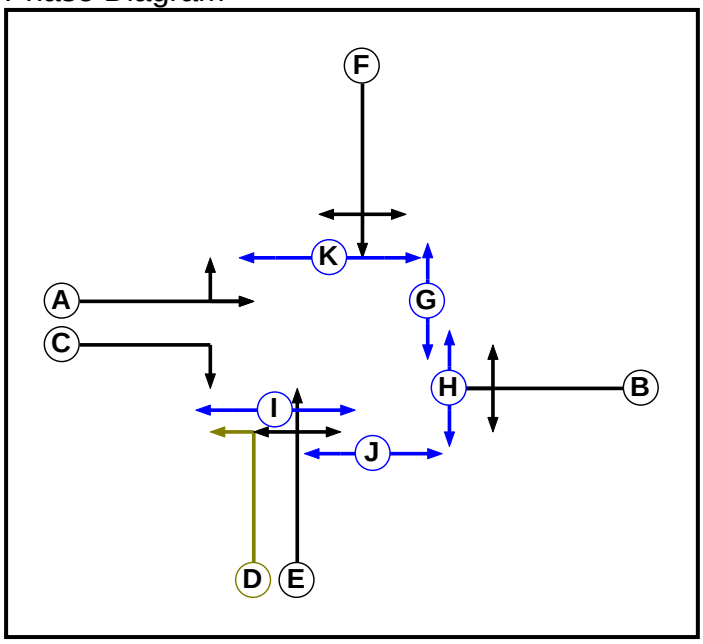
C.10 Construction development case results, without Battersea Power Station sensitivity test, PM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road existing signalised layout

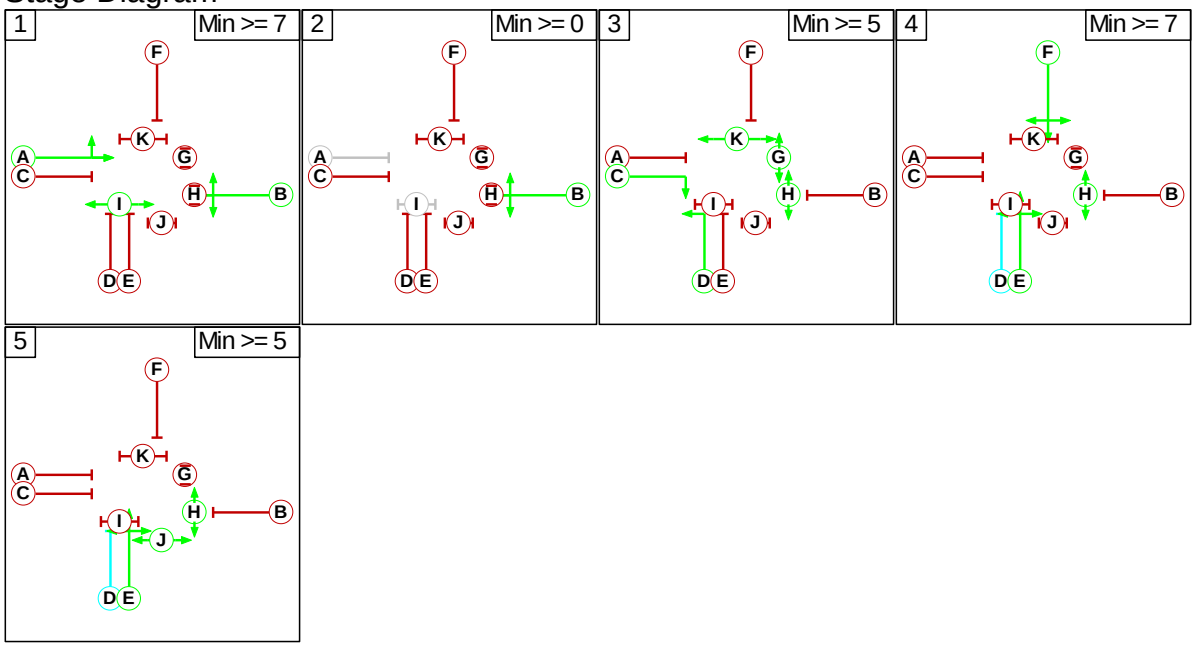
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B I
2	B
3	C D G H K
4	E F H
5	E H J

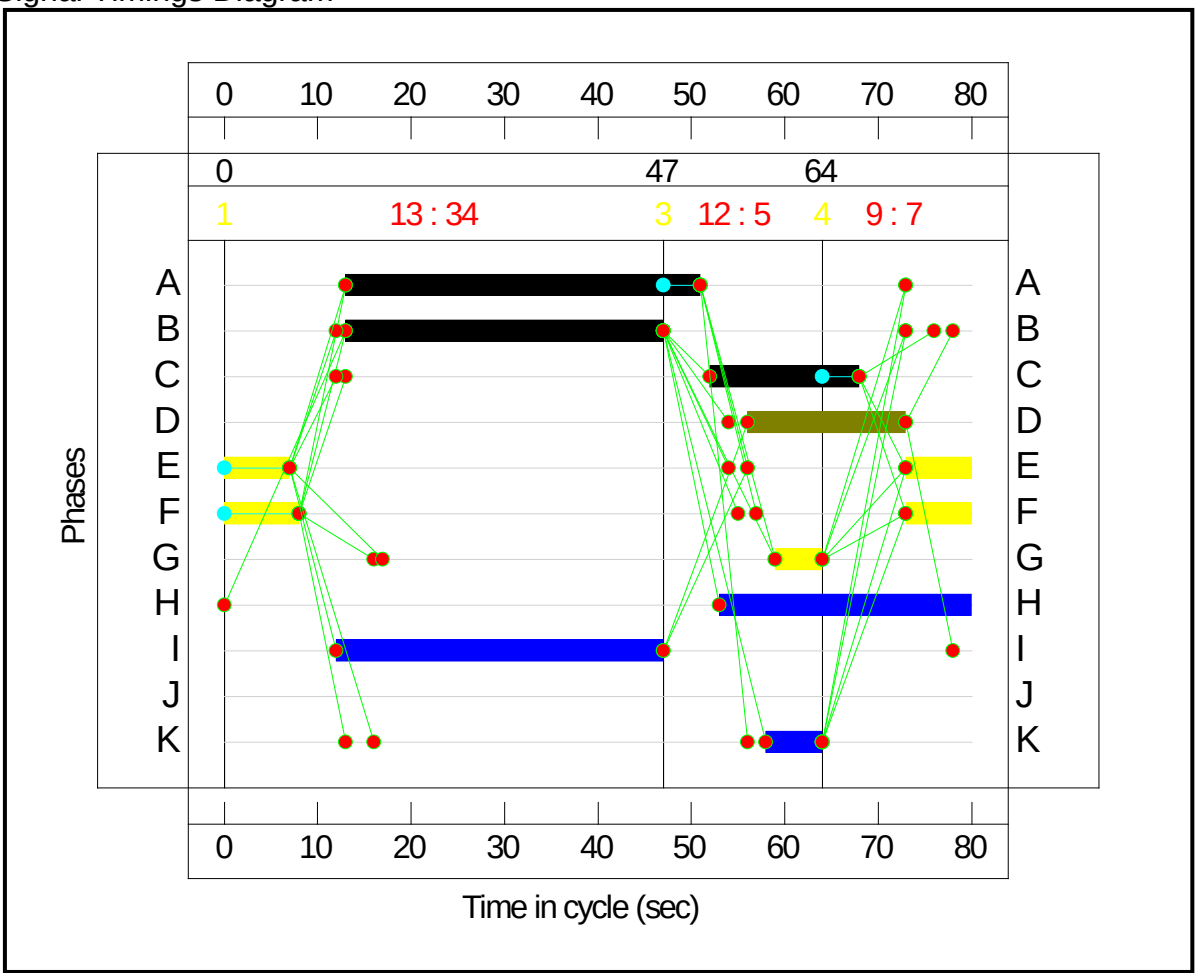
Phase Intergreens Matrix

		Starting Phase										
		A	B	C	D	E	F	G	H	I	J	K
Terminating Phase	A	-	-	-	-	5	6	8	-	-	-	5
	B	-	-	5	7	7	8	12	6	-	8	11
	C	-	8	-	-	5	5	-	-	-	12	-
	D	-	5	-	-	-	-	-	-	5	-	-
	E	6	5	5	-	-	-	10	-	5	-	9
	F	5	5	5	-	-	-	8	-	-	10	5
	G	9	9	-	-	9	9	-	-	-	-	-
	H	-	13	-	-	-	-	-	-	-	-	-
	I	-	-	-	9	9	-	-	-	-	-	-
	J	-	9	9	-	-	9	-	-	-	-	-
	K	9	9	-	-	9	9	-	-	-	-	-

Traffic Flows, Desired
Desired Flow :

	Destination					
Origin		A	B	C	D	Tot.
	A	0	6	0	33	39
	B	21	0	46	1090	1157
	C	1	32	0	92	125
	D	49	970	58	0	1077
	Tot.	71	1008	104	1215	2398

Signal Timings Diagram



Network Results

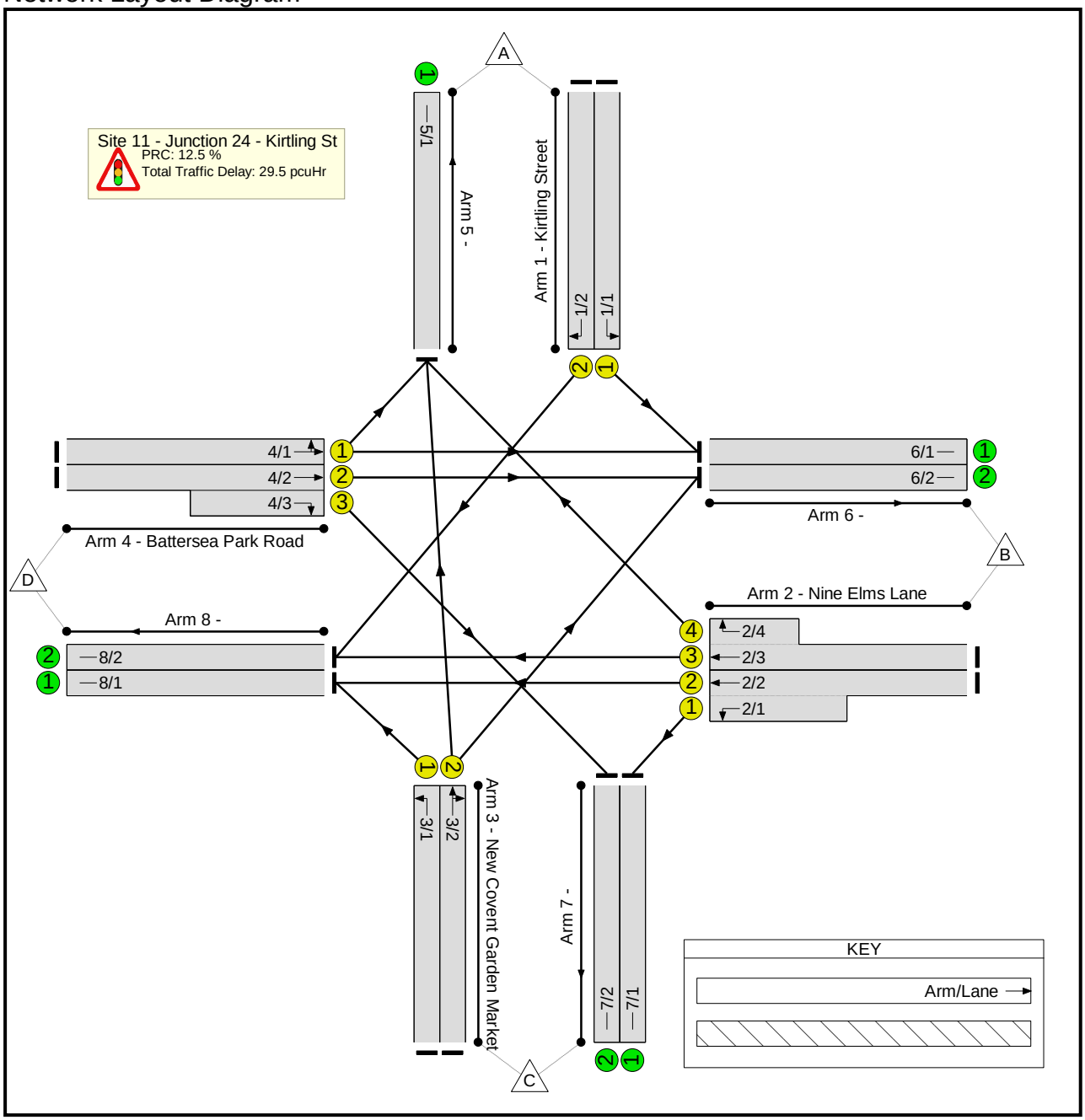
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left Ahead Right	O	F		1	15	-	39	1582	316	12.3%	33	0	0	0.4	32.8	0.8
2/2+2/1	Nine Elms Lane Left Ahead	U	B		1	34	-	601	2070:1698	924	65.0%	-	-	-	3.8	22.6	10.6
2/3	Nine Elms Lane Right Ahead	O	B		1	34	-	556	2059	901	61.7%	21	0	0	3.5	22.8	10.2
3/1	New Covent Garden Market Left	U	E	D	1	31	17	92	1663	665	13.8%	-	-	-	0.5	18.4	1.4
3/2	New Covent Garden Market Ahead Right	O	E		1	14	-	33	1722	323	10.2%	32	0	0	0.3	33.4	0.7
4/1	Battersea Park Road Left Ahead	U	A		1	38	-	509	1886	919	55.4%	-	-	-	2.7	18.8	8.5
4/2+4/3	Battersea Park Road Ahead Right	U+O	A C		1	38:16	-	568	2055:2033	1044	54.4%	2	56	0	3.0	19.1	8.4

C1 PRC for Signalled Lanes (%): 38.4 Total Delay for Signalled Lanes (pcuHr): 14.09 Cycle Time (s): 80
PRC Over All Lanes (%): 38.4 Total Delay Over All Lanes(pcuHr): 14.09

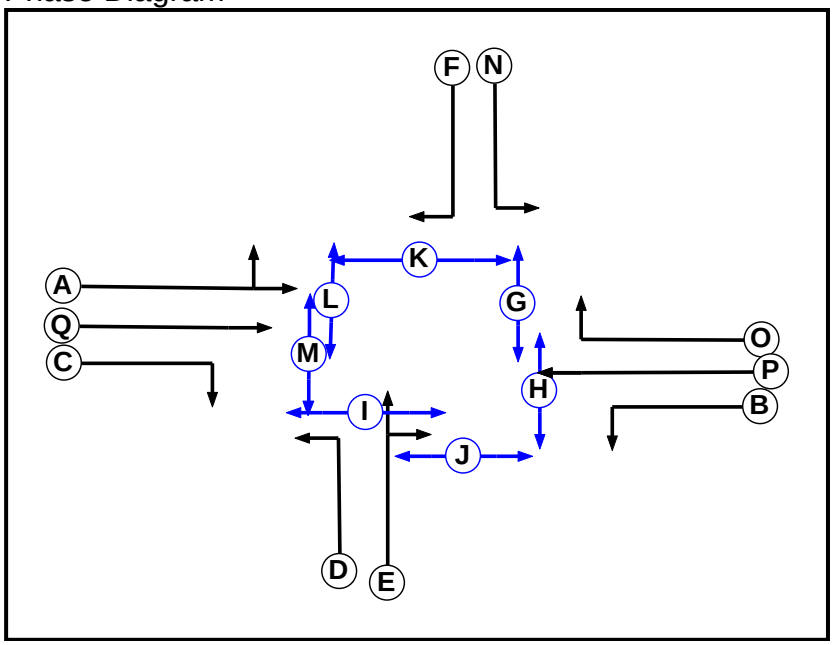
C.11 Construction base case results, 'all by road' sensitivity test, AM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road new signalised layout

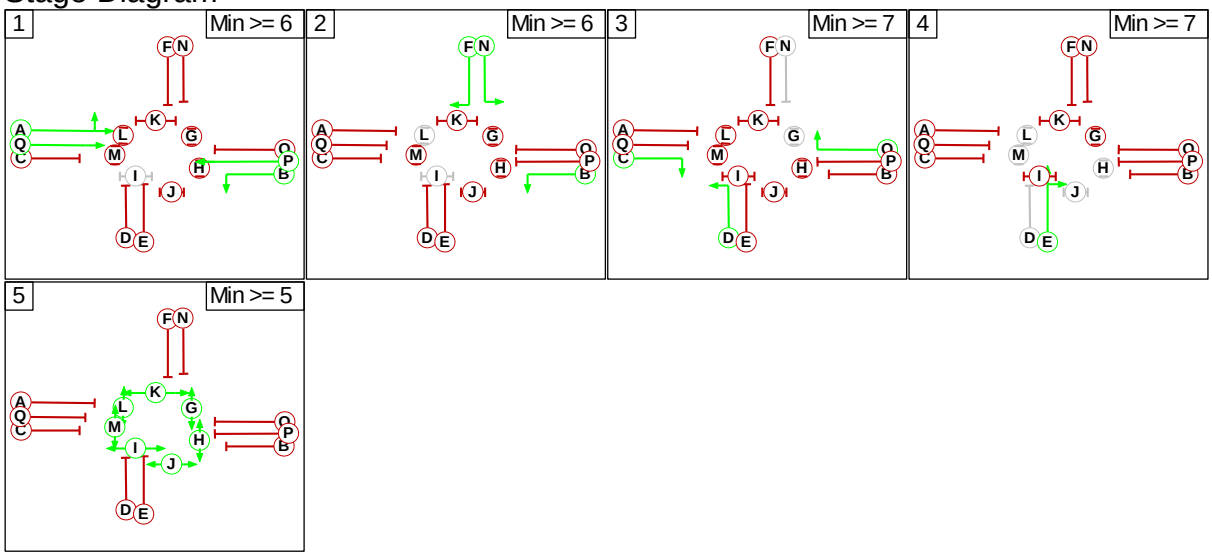
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B P Q
2	B F N
3	C D O
4	E
5	G H I J K L M

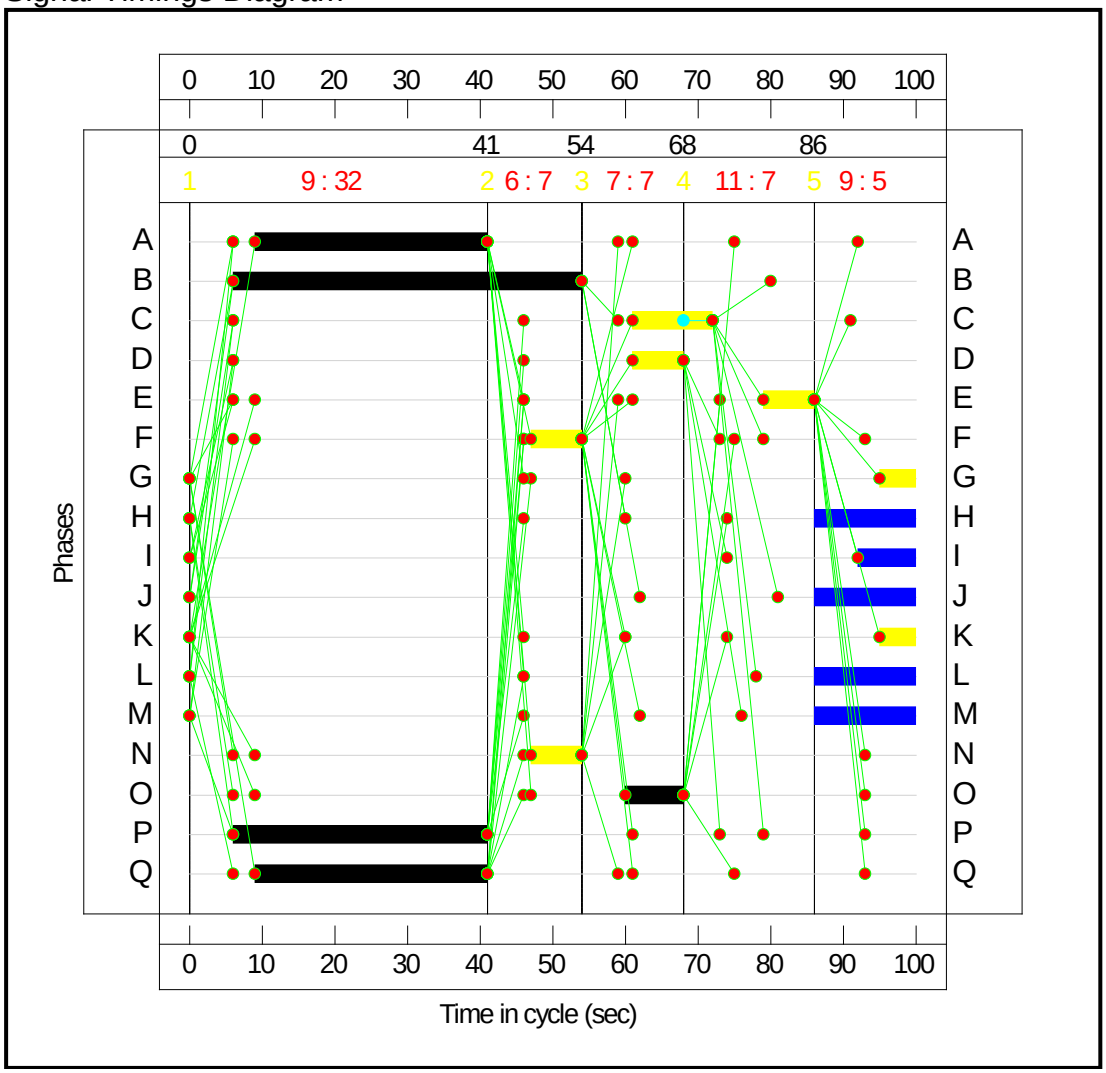
Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
A	-	-	-	-	5	6	5	-	-	-	5	5	-	6	6	-	-
B	-	-	5	-	-	-	-	6	-	8	-	-	-	-	-	-	-
C	-	8	-	-	7	7	-	-	-	9	-	6	-	-	-	7	-
D	-	-	-	-	-	5	-	-	6	-	-	-	8	-	-	5	-
E	6	-	5	-	-	7	9	-	6	-	9	-	-	7	7	7	7
F	7	-	7	7	7	-	-	-	-	-	6	-	8	-	6	7	7
G	6	-	-	-	6	-	-	-	-	-	-	-	-	6	-	-	9
H	-	6	-	-	-	-	-	-	-	-	-	-	-	-	6	6	-
I	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-
J	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	9	-	-	-	9	9	-	-	-	-	-	-	-	9	9	-	-
L	6	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	6
M	-	-	-	6	-	6	-	-	-	-	-	-	-	-	-	6	-
N	5	-	-	-	5	-	6	-	-	-	6	-	-	-	-	-	5
O	7	-	-	-	5	7	-	6	-	-	6	-	-	-	-	-	7
P	-	-	5	5	5	5	-	5	-	-	-	-	5	-	-	-	-
Q	-	-	-	-	5	5	6	-	-	-	-	5	-	5	5	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	4	0	52	56
	B	74	0	55	1041	1170
	C	0	40	0	96	136
	D	63	906	123	0	1092
	Tot.	137	950	178	1189	2454

Signal Timings Diagram



Network Results

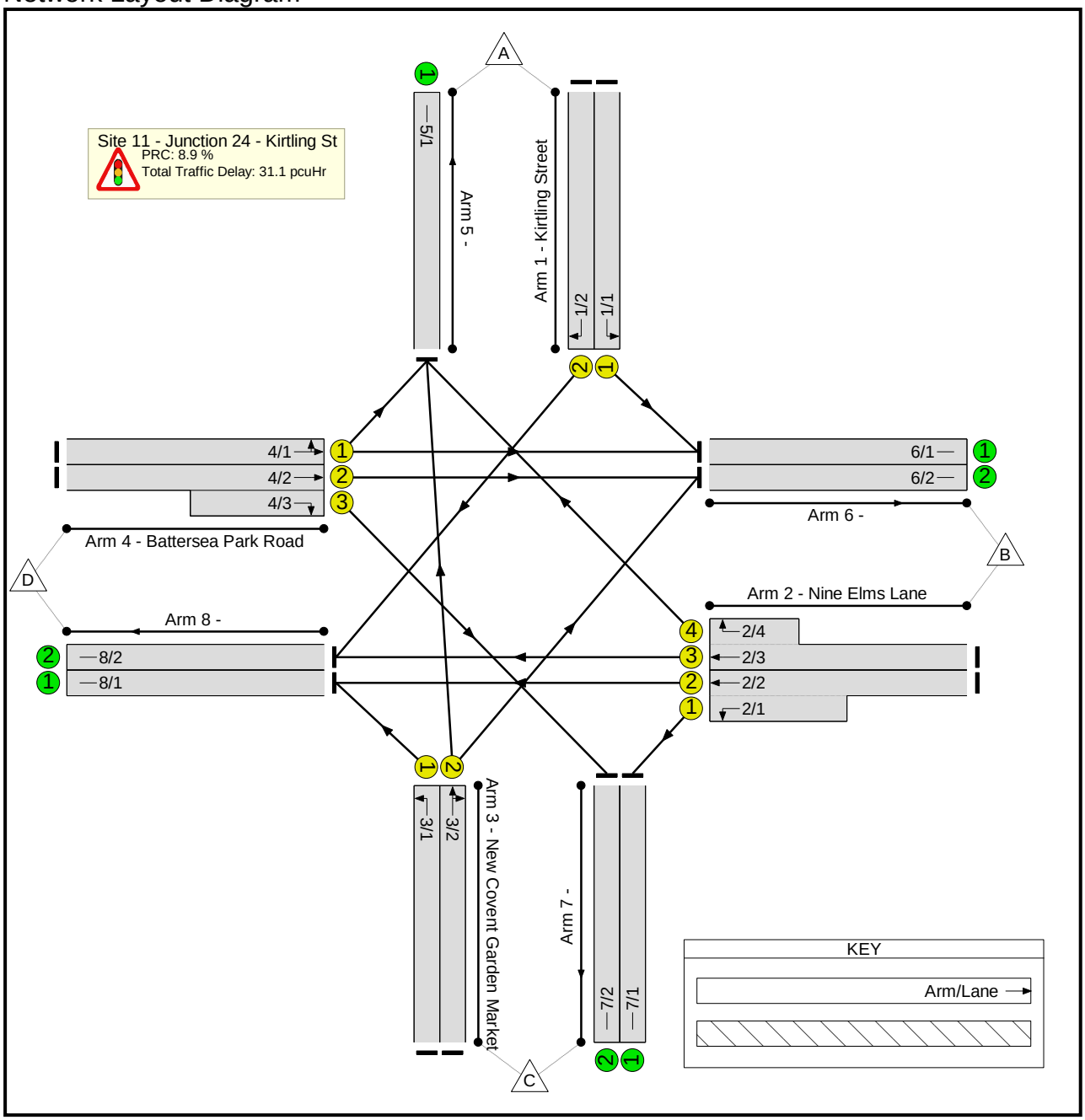
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left	U	N		1	7	-	4	1505	120	3.3%	-	-	-	0.1	58.2	0.1
1/2	Kirtling Street Right	U	F		1	7	-	52	1747	140	37.2%	-	-	-	0.9	64.0	1.7
2/2+2/1	Nine Elms Lane Left Ahead	U	P B		1	35:48	-	576	2070:1698	764	75.3%	-	-	-	5.7	35.9	14.6
2/3+2/4	Nine Elms Lane Right Ahead	U	P O		1	35:8	-	594	2070:1783	758	78.3%	-	-	-	6.7	40.6	15.6
3/1	New Covent Garden Market Left	U	D		1	7	-	96	1663	133	72.2%	-	-	-	2.4	90.5	3.8
3/2	New Covent Garden Market Ahead Right	U	E		1	7	-	40	1733	139	28.9%	-	-	-	0.7	61.5	1.2
4/1	Battersea Park Road Left Ahead	U	A		1	32	-	485	1926	636	76.3%	-	-	-	5.6	41.7	13.6
4/2+4/3	Battersea Park Road Ahead Right	U	Q C		1	32:11	-	607	2070:1796	759	80.0%	-	-	-	7.3	43.5	15.0

C1 PRC for Signalled Lanes (%): 12.5 Total Delay for Signalled Lanes (pcuHr): 29.48 Cycle Time (s): 100
PRC Over All Lanes (%): 12.5 Total Delay Over All Lanes(pcuHr): 29.48

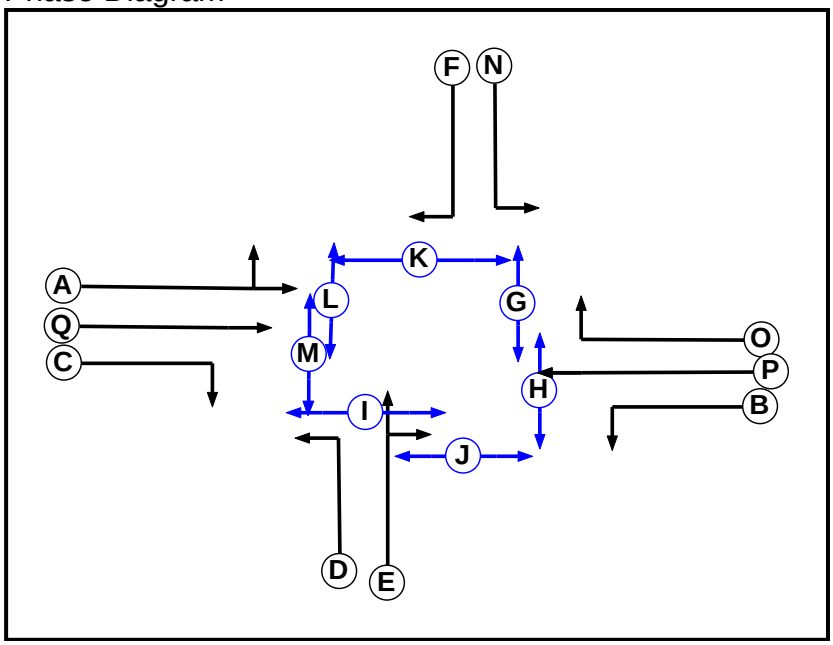
C.12 Construction base case results, 'all by road' sensitivity test, PM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road new signalised layout

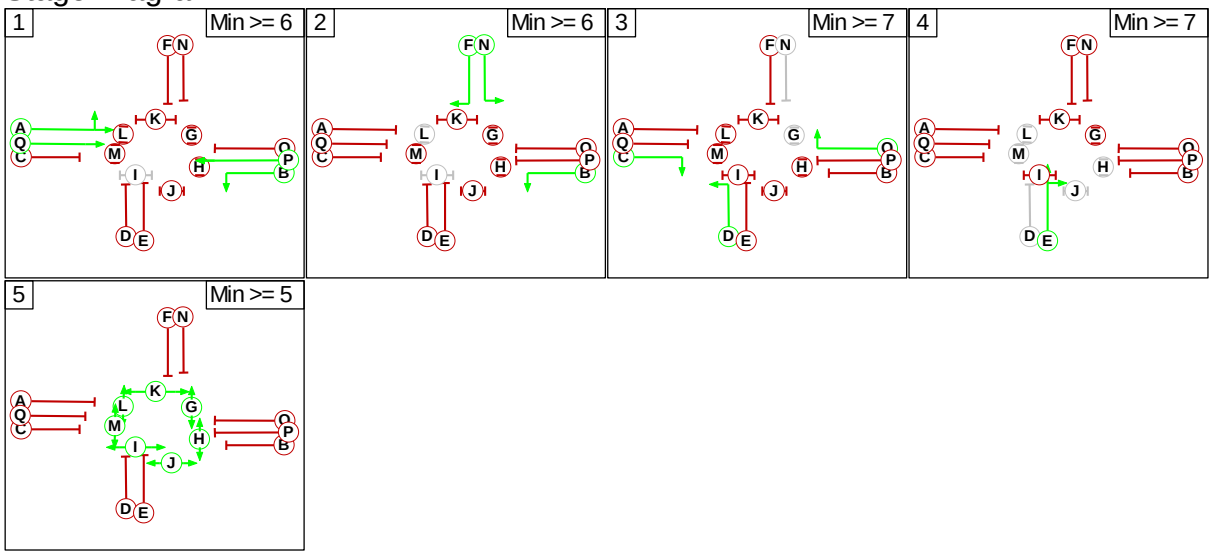
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B P Q
2	B F N
3	C D O
4	E
5	G H I J K L M

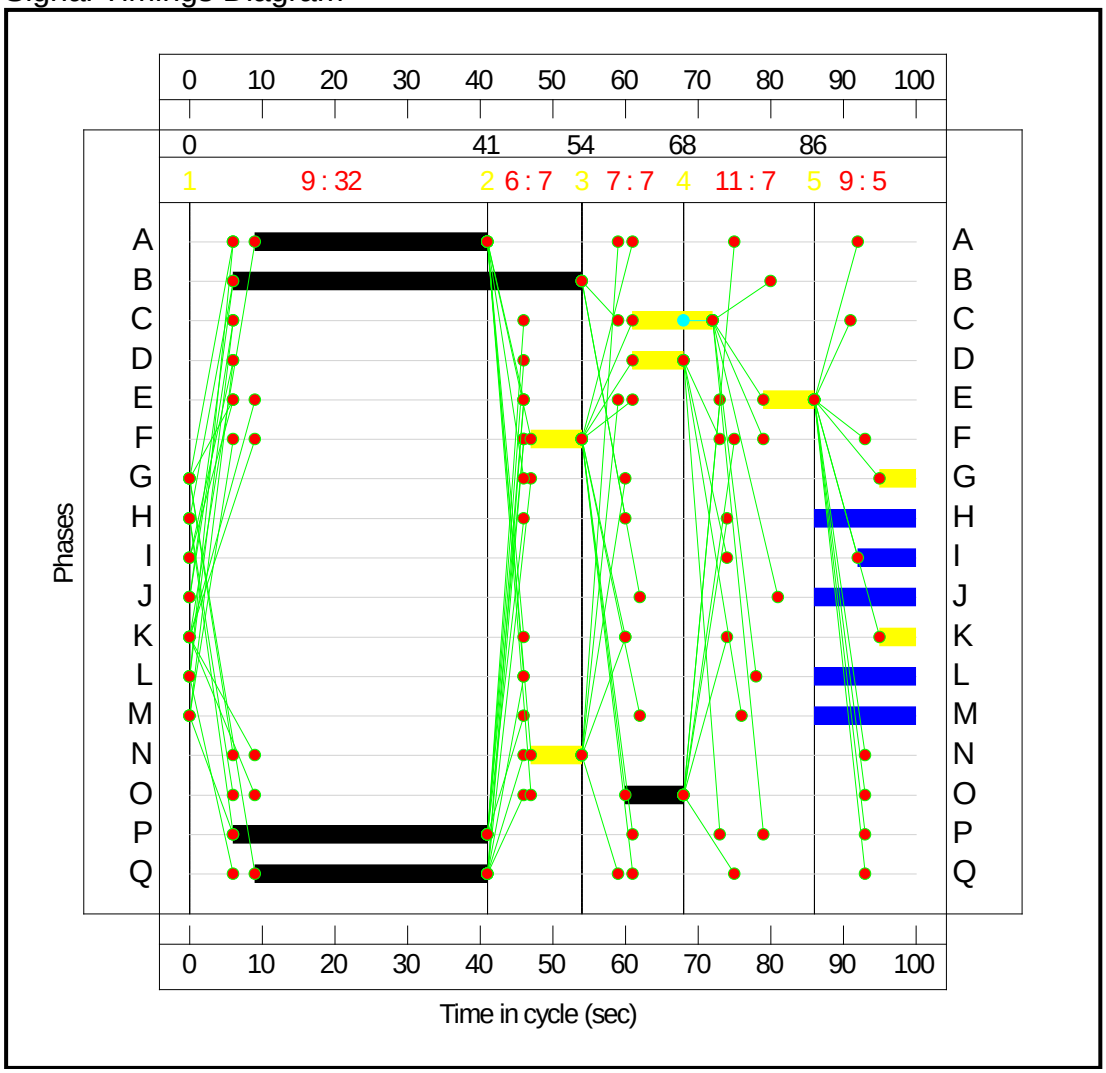
Phase Intergreens Matrix

Terminating Phase \ Starting Phase	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
A	-	-	-	-	5	6	5	-	-	-	5	5	-	6	6	-	-
B	-	-	5	-	-	-	-	6	-	8	-	-	-	-	-	-	-
C	-	8	-	-	7	7	-	-	-	9	-	6	-	-	-	7	-
D	-	-	-	-	-	5	-	-	6	-	-	-	8	-	-	5	-
E	6	-	5	-	-	7	9	-	6	-	9	-	-	7	7	7	7
F	7	-	7	7	7	-	-	-	-	-	6	-	8	-	6	7	7
G	6	-	-	-	6	-	-	-	-	-	-	-	-	6	-	-	9
H	-	6	-	-	-	-	-	-	-	-	-	-	-	-	6	6	-
I	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-
J	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K	9	-	-	-	9	9	-	-	-	-	-	-	-	9	9	-	-
L	6	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	6
M	-	-	-	6	-	6	-	-	-	-	-	-	-	-	-	6	-
N	5	-	-	-	5	-	6	-	-	-	6	-	-	-	-	-	5
O	7	-	-	-	5	7	-	6	-	-	6	-	-	-	-	-	7
P	-	-	5	5	5	5	-	5	-	-	-	-	5	-	-	-	-
Q	-	-	-	-	5	5	6	-	-	-	-	5	-	5	5	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	6	0	43	49
	B	75	0	46	1103	1224
	C	1	32	0	93	126
	D	59	982	59	0	1100
	Tot.	135	1020	105	1239	2499

Signal Timings Diagram



Network Results

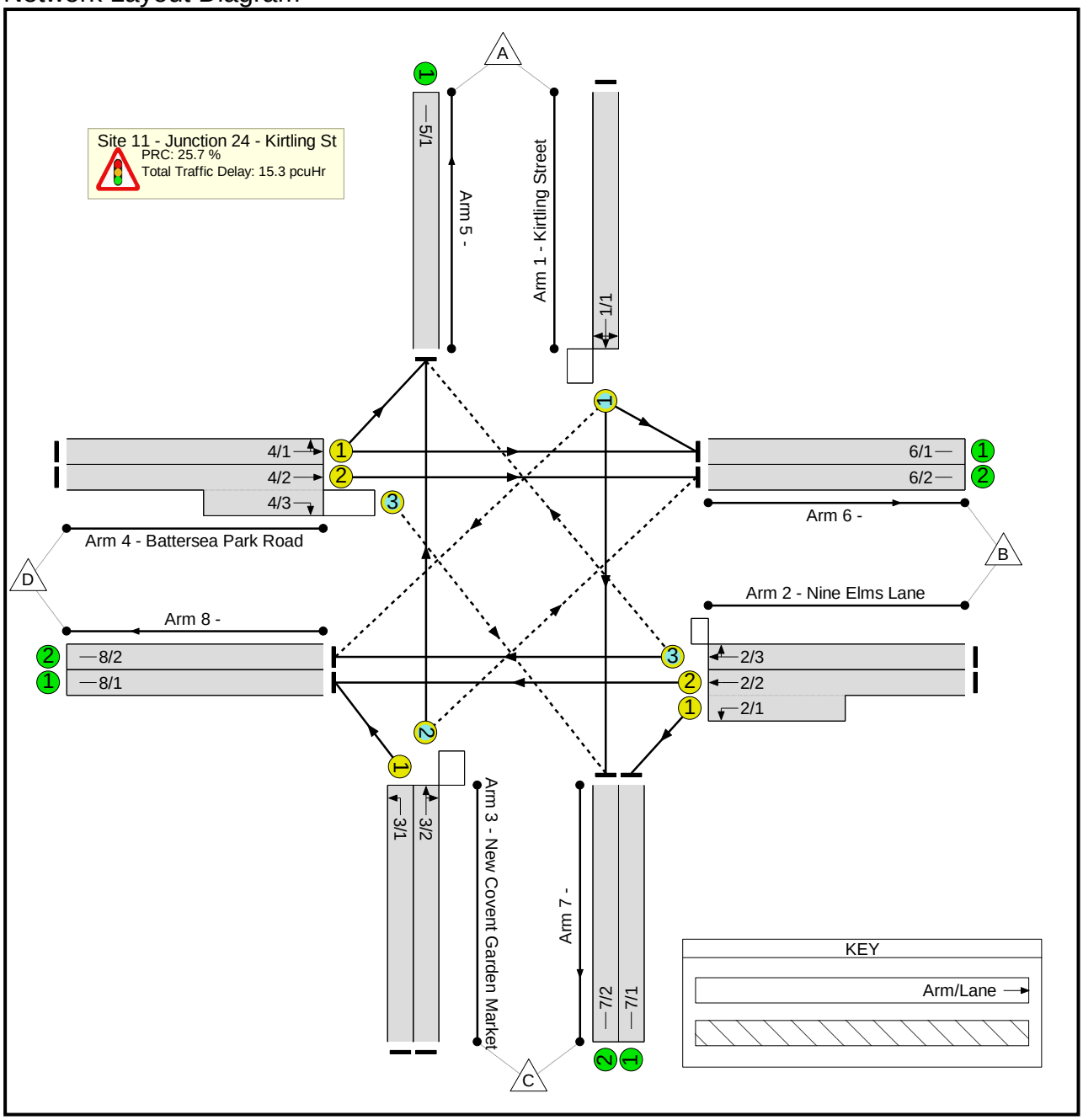
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left	U	N		1	7	-	6	1505	120	5.0%	-	-	-	0.1	58.5	0.2
1/2	Kirtling Street Right	U	F		1	7	-	43	1747	140	30.8%	-	-	-	0.7	61.9	1.3
2/2+2/1	Nine Elms Lane Left Ahead	U	P B		1	35:48	-	598	2070:1698	760	78.7%	-	-	-	6.3	38.2	15.8
2/3+2/4	Nine Elms Lane Right Ahead	U	P O		1	35:8	-	626	2070:1783	757	82.7%	-	-	-	7.6	43.6	17.2
3/1	New Covent Garden Market Left	U	D		1	7	-	93	1663	133	69.9%	-	-	-	2.3	87.5	3.6
3/2	New Covent Garden Market Ahead Right	U	E		1	7	-	33	1742	139	23.7%	-	-	-	0.6	60.1	1.0
4/1	Battersea Park Road Left Ahead	U	A		1	32	-	521	1930	637	81.8%	-	-	-	6.6	45.7	15.3
4/2+4/3	Battersea Park Road Ahead Right	U	Q C		1	32:11	-	579	2070:1796	725	79.9%	-	-	-	6.9	43.0	15.5

C1	PRC for Signalled Lanes (%):	8.9	Total Delay for Signalled Lanes (pcuHr):	31.12	Cycle Time (s):	100	
	PRC Over All Lanes (%):	8.9	Total Delay Over All Lanes(pcuHr):	31.12			

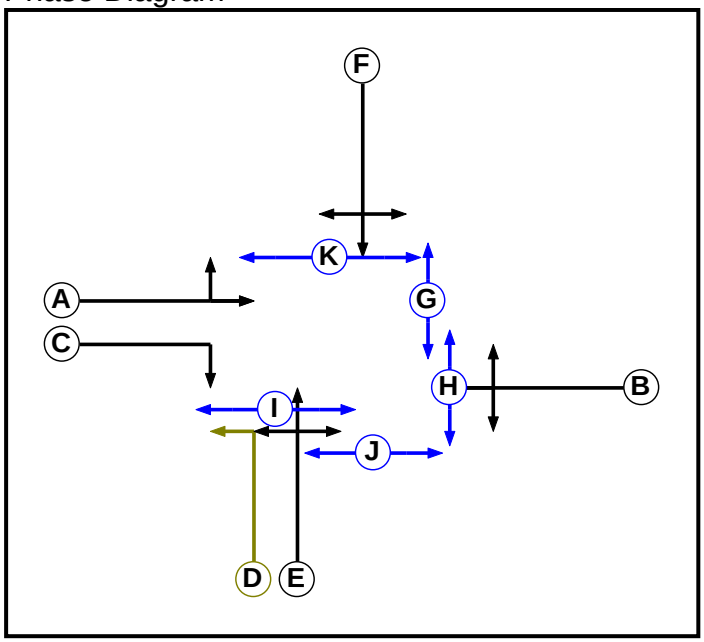
C.13 Construction development case results, 'all by road' sensitivity test, AM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road existing signalised layout

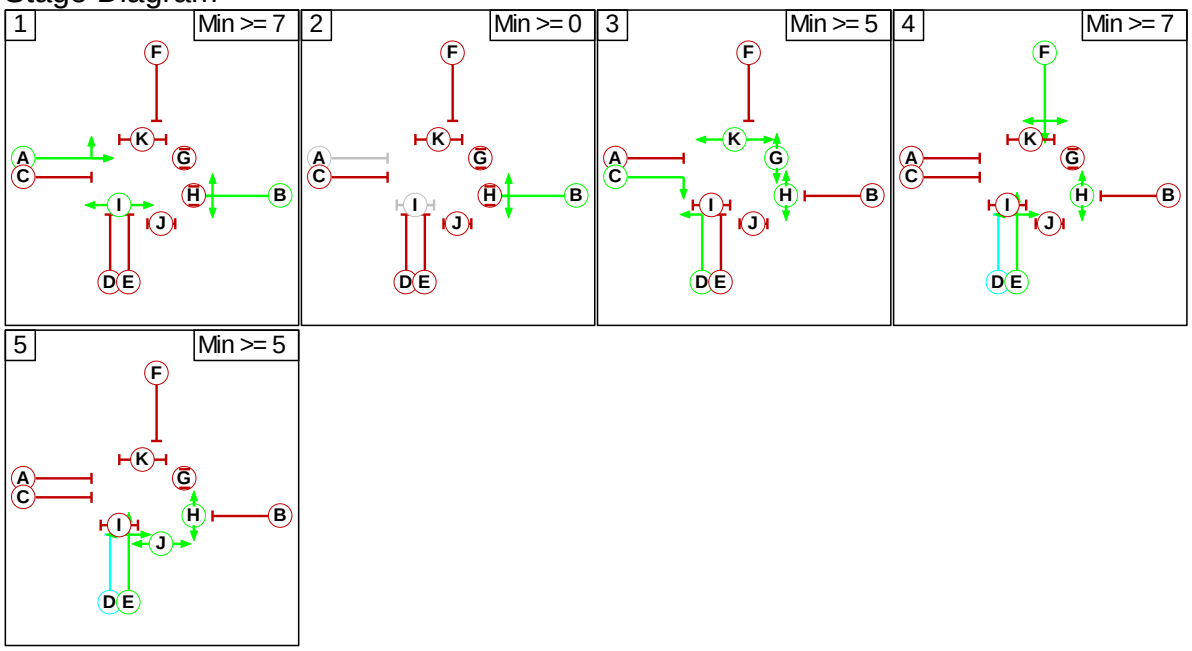
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B I
2	B
3	C D G H K
4	E F H
5	E H J

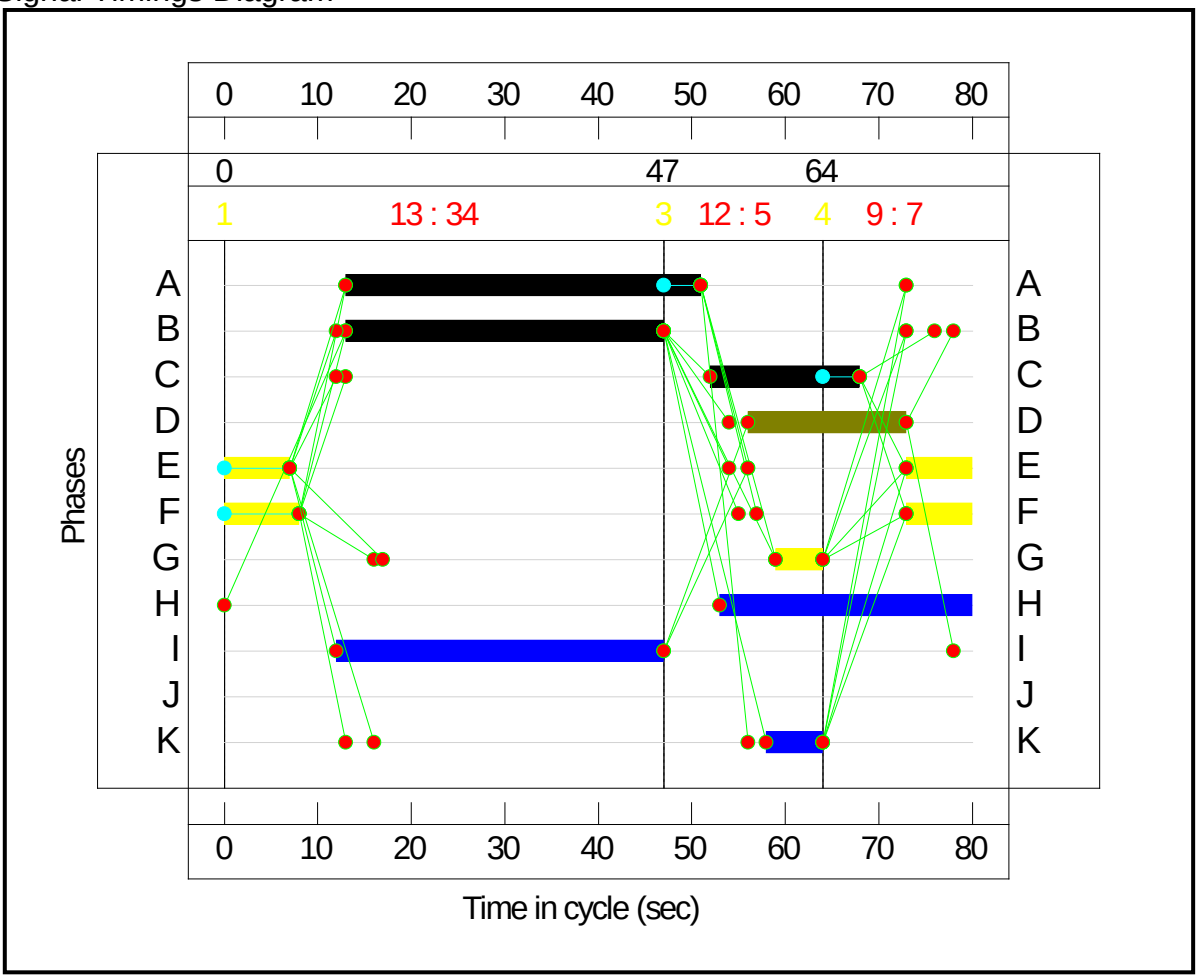
Phase Intergreens Matrix

		Starting Phase										
		A	B	C	D	E	F	G	H	I	J	K
Terminating Phase	A	-	-	-	-	5	6	8	-	-	-	5
	B	-	-	5	7	7	8	12	6	-	8	11
	C	-	8	-	-	5	5	-	-	-	12	-
	D	-	5	-	-	-	-	-	-	5	-	-
	E	6	5	5	-	-	-	10	-	5	-	9
	F	5	5	5	-	-	-	8	-	-	10	5
	G	9	9	-	-	9	9	-	-	-	-	-
	H	-	13	-	-	-	-	-	-	-	-	-
	I	-	-	-	9	9	-	-	-	-	-	-
	J	-	9	9	-	-	9	-	-	-	-	-
	K	9	9	-	-	9	9	-	-	-	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	4	0	42	46
	B	74	0	55	1041	1170
	C	0	40	0	96	136
	D	53	906	123	0	1082
	Tot.	127	950	178	1179	2434

Signal Timings Diagram



Network Results

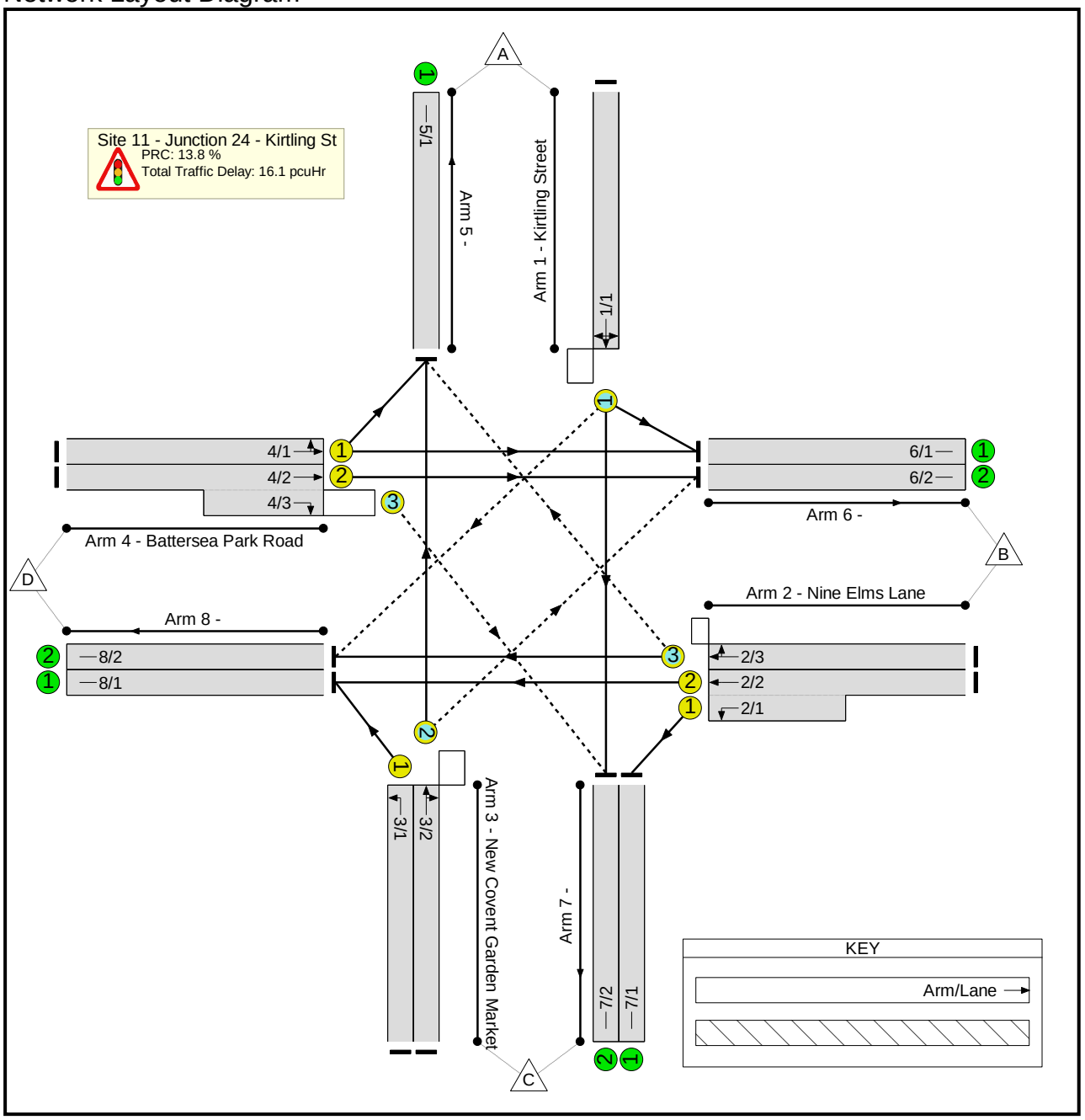
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left Ahead Right	O	F		1	15	-	46	1587	317	14.5%	41	0	1	0.4	33.1	0.9
2/2+2/1	Nine Elms Lane Left Ahead	U	B		1	34	-	612	2070:1698	928	65.9%	-	-	-	3.9	22.7	10.8
2/3	Nine Elms Lane Right Ahead	O	B		1	34	-	558	2033	779	71.6%	74	0	0	4.3	27.7	11.6
3/1	New Covent Garden Market Left	U	E	D	1	31	17	96	1663	665	14.4%	-	-	-	0.5	18.4	1.4
3/2	New Covent Garden Market Ahead Right	O	E		1	14	-	40	1713	320	12.5%	40	0	0	0.4	33.7	0.8
4/1	Battersea Park Road Left Ahead	U	A		1	38	-	480	1882	917	52.3%	-	-	-	2.4	18.2	7.9
4/2+4/3	Battersea Park Road Ahead Right	U+O	A C		1	38:16	-	602	2055:2033	1088	55.3%	5	118	0	3.4	20.4	7.8

C1 PRC for Signalled Lanes (%): 25.7 Total Delay for Signalled Lanes (pcuHr): 15.27 Cycle Time (s): 80
PRC Over All Lanes (%): 25.7 Total Delay Over All Lanes(pcuHr): 15.27

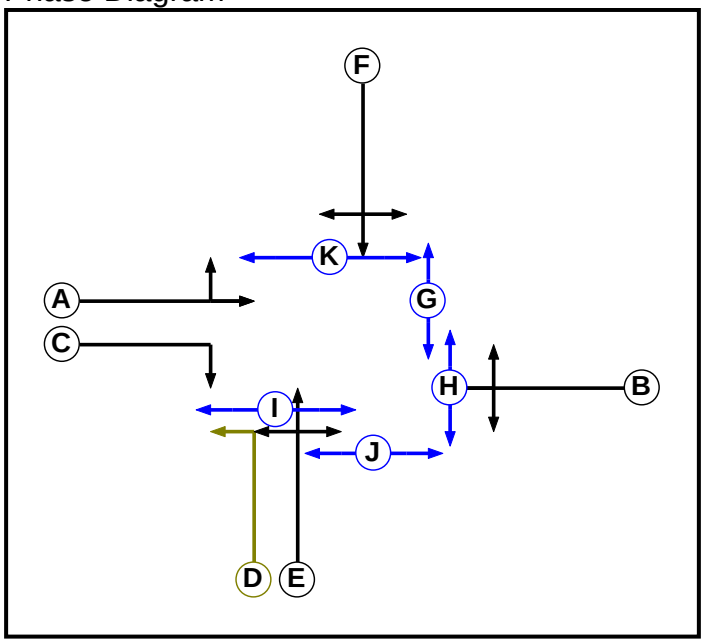
C.14 Construction development case results, 'all by road' sensitivity test, PM peak hour

Kirtling Street/Nine Elms Lane (A3205)/Battersea Road existing signalised layout

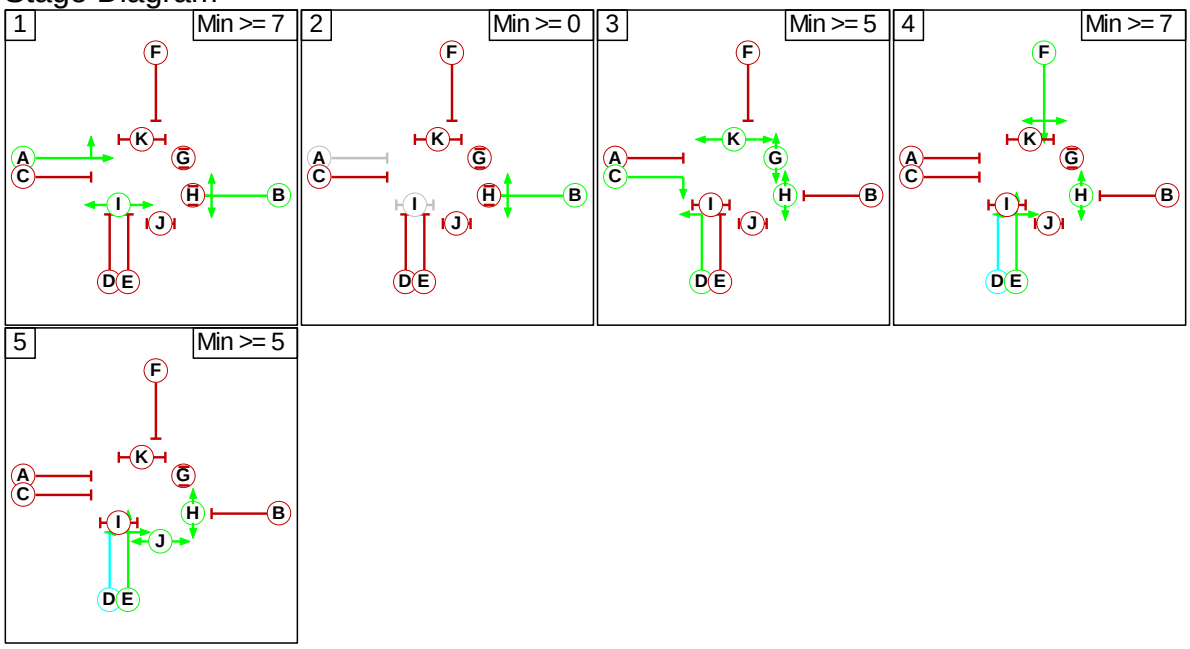
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B I
2	B
3	C D G H K
4	E F H
5	E H J

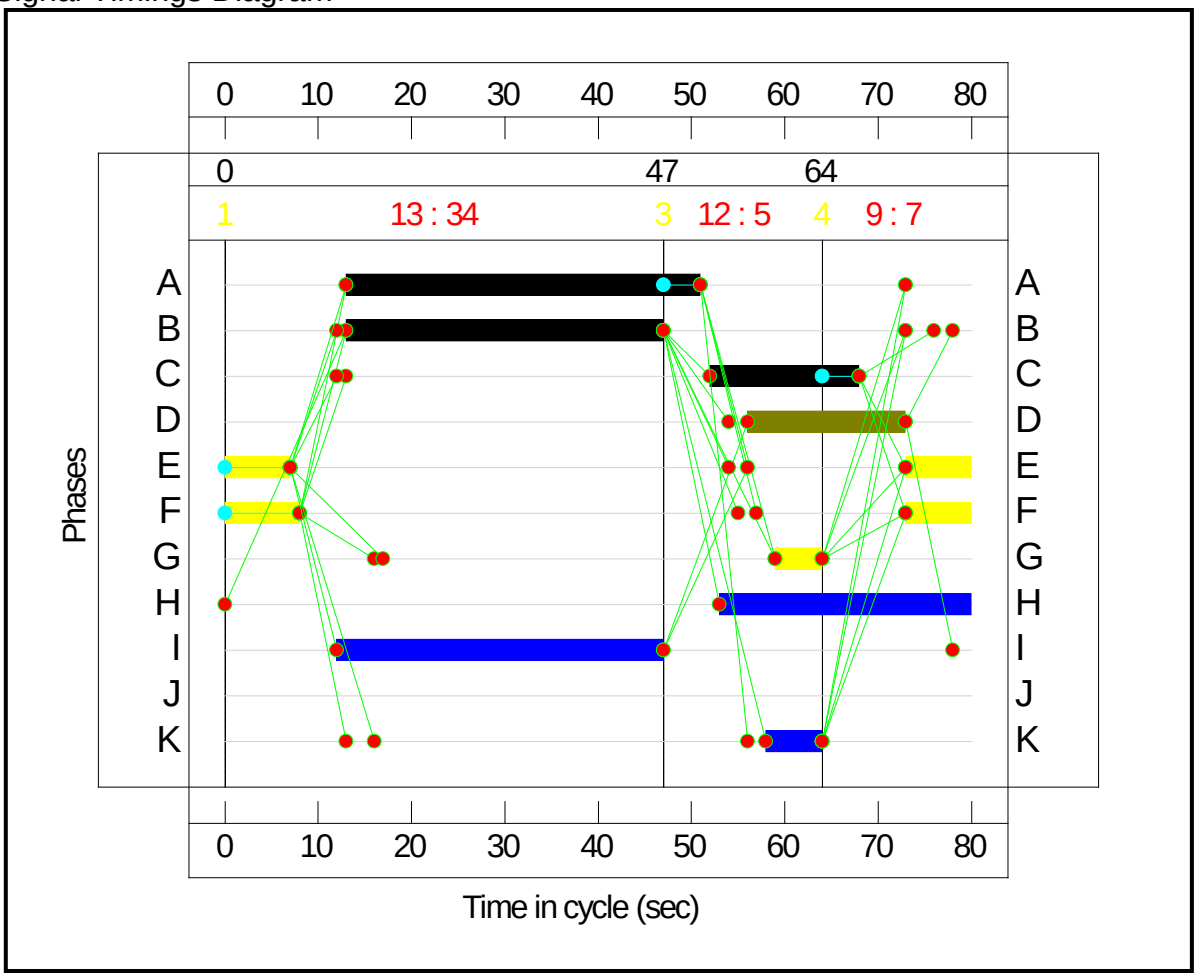
Phase Intergreens Matrix

		Starting Phase										
		A	B	C	D	E	F	G	H	I	J	K
Terminating Phase	A	-	-	-	-	5	6	8	-	-	-	5
	B	-	-	5	7	7	8	12	6	-	8	11
	C	-	8	-	-	5	5	-	-	-	12	-
	D	-	5	-	-	-	-	-	-	5	-	-
	E	6	5	5	-	-	-	10	-	5	-	9
	F	5	5	5	-	-	-	8	-	-	10	5
	G	9	9	-	-	9	9	-	-	-	-	-
	H	-	13	-	-	-	-	-	-	-	-	-
	I	-	-	-	9	9	-	-	-	-	-	-
	J	-	9	9	-	-	9	-	-	-	-	-
	K	9	9	-	-	9	9	-	-	-	-	-

Traffic Flows, Desired
Desired Flow :

		Destination				
		A	B	C	D	Tot.
Origin	A	0	6	0	33	39
	B	75	0	46	1090	1211
	C	1	32	0	92	125
	D	49	971	58	0	1078
	Tot.	125	1009	104	1215	2453

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	Kirtling Street Left Ahead Right	O	F		1	15	-	39	1582	316	12.3%	33	0	0	0.4	32.8	0.8
2/2+2/1	Nine Elms Lane Left Ahead	U	B		1	34	-	629	2070:1698	923	68.1%	-	-	-	4.1	23.5	11.4
2/3	Nine Elms Lane Right Ahead	O	B		1	34	-	582	2034	736	79.1%	75	0	0	5.2	32.1	13.3
3/1	New Covent Garden Market Left	U	E	D	1	31	17	92	1663	665	13.8%	-	-	-	0.5	18.4	1.4
3/2	New Covent Garden Market Ahead Right	O	E		1	14	-	33	1722	323	10.2%	32	0	0	0.3	33.4	0.7
4/1	Battersea Park Road Left Ahead	U	A		1	38	-	510	1886	919	55.5%	-	-	-	2.7	18.8	8.6
4/2+4/3	Battersea Park Road Ahead Right	U+O	A C		1	38:16	-	568	2055:2033	1044	54.4%	2	56	0	3.0	19.1	8.4

C1 PRC for Signalled Lanes (%): 13.8 Total Delay for Signalled Lanes (pcuHr): 16.09 Cycle Time (s): 80
PRC Over All Lanes (%): 13.8 Total Delay Over All Lanes(pcuHr): 16.09

C.15 Baseline results, AM peak hour

Cringle Street/Nine Elms Lane (A3205) Junction existing priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Baseline J26, AM	Baseline J26	AM		Varies by Arm	08:00	09:00	60	15		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
untitled	Crossroads	Two-way	A,B,C,D	14.35	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm Type
A	Nine Elms Lane (W)		Major
B	Cringle Street		Minor
C	Nine Elms Lane (E)		Major
D	Nine Elms Parkside Development		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	13.00		0.00		2.20	60.00		2.50
C	13.00		0.00		2.20	40.00		5.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.10										35	30
D	Two lanes		3.00	3.00								20	30

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1-1	A-D	608.710	-	-	-	-	-	-	0.164	0.234	0.164	-	-	-
1-1	B-A	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	-	0.163	0.163	0.081
1-1	B-C	649.258	0.069	0.175	-	-	-	-	-	-	-	-	-	-
1-1	B-D, nearside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	B-D, offside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	C-B	597.128	0.161	0.161	0.230	-	-	-	-	-	-	-	-	-
1-1	D-A	642.823	-	-	-	-	-	-	0.173	-	0.069	-	-	-
1-1	D-B, nearside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-B, offside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-C	498.808	-	0.100	0.228	0.080	0.160	0.160	0.160	0.160	0.063	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		0	0	HV Percentages	2.00				0	0

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	0	1082.00	100.000
B	FLAT	0	18.00	100.000
C	FLAT	0	812.00	100.000
D	FLAT	0	0.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	4.000	1078.000	0.000
	B	8.000	0.000	10.000	0.000
	C	787.000	25.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (Veh) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.00	1.00	0.00
	B	0.44	0.00	0.56	0.00
	C	0.97	0.03	0.00	0.00
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.062	1.000
	B	1.250	1.000	1.400	1.000
	C	1.098	1.360	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	6.220	0.000
	B	25.000	0.000	40.000	0.000
	C	9.780	36.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
B-ACD	0.08	16.35	0.08	?	C
A-BCD	0.00	0.00	0.00	?	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-AB	0.00	0.00	0.00	?	A
D-BC	0.00	0.00	0.00	?	A
C-ABD	0.08	12.94	0.09	?	B
C-D	-	-	-	-	-
C-A	-	-	-	-	-

C.16 Baseline results, PM peak hour

Cringle Street/Nine Elms Lane (A3205) Junction existing priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Baseline J26, PM	Baseline J26	PM		Varies by Arm	17:00	18:00	60	15		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
untitled	Crossroads	Two-way	A,B,C,D	12.67	B

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm Type
A	Nine Elms Lane (W)		Major
B	Cringle Street		Minor
C	Nine Elms Lane (E)		Major
D	Nine Elms Parkside Development		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	13.00		0.00		2.20	60.00		2.50
C	13.00		0.00		2.20	40.00		5.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.10										35	30
D	Two lanes		3.00	3.00								20	30

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1-1	A-D	608.710	-	-	-	-	-	-	0.164	0.234	0.164	-	-	-
1-1	B-A	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	-	0.163	0.163	0.081
1-1	B-C	649.258	0.069	0.175	-	-	-	-	-	-	-	-	-	-
1-1	B-D, nearside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	B-D, offside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	C-B	597.128	0.161	0.161	0.230	-	-	-	-	-	-	-	-	-
1-1	D-A	642.823	-	-	-	-	-	-	0.173	-	0.069	-	-	-
1-1	D-B, nearside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-B, offside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-C	498.808	-	0.100	0.228	0.080	0.160	0.160	0.160	0.160	0.063	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		▯	▯	HV Percentages	2.00				▯	▯

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	▯	782.00	100.000
B	FLAT	▯	62.00	100.000
C	FLAT	▯	909.00	100.000
D	FLAT	▯	0.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	8.000	774.000	0.000
	B	20.000	0.000	42.000	0.000
	C	884.000	25.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Turning Proportions (Veh) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.01	0.99	0.00
	B	0.32	0.00	0.68	0.00
	C	0.97	0.03	0.00	0.00
	D	0.25	0.25	0.25	0.25

Vehicle Mix

Average PCU Per Vehicle - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.089	1.000
	B	1.150	1.000	1.238	1.000
	C	1.088	1.240	1.000	1.000
	D	1.000	1.000	1.000	1.000

Heavy Vehicle Percentages - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	8.910	0.000
	B	15.000	0.000	23.810	0.000
	C	6.790	24.000	0.000	0.000
	D	0.000	0.000	0.000	0.000

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
B-ACD	0.19	13.61	0.23	?	B
A-BCD	0.00	0.00	0.00	?	A
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-AB	0.00	0.00	0.00	?	A
D-BC	0.00	0.00	0.00	?	A
C-ABD	0.07	10.40	0.07	?	B
C-D	-	-	-	-	-
C-A	-	-	-	-	-

C.17 Construction base case results, AM peak hour

Cringle Street/Nine Elms Lane (A3205) Junction priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Base Case J26, AM	Base Case J26	AM		Varies by Arm	08:00	09:00	60	15		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
untitled	Crossroads	Two-way	A,B,C,D	24.92	C

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm Type
A	Nine Elms Lane (W)		Major
B	Cringle Street		Minor
C	Nine Elms Lane (E)		Major
D	Nine Elms Parkside Development		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	13.00		0.00		2.20	60.00		2.50
C	13.00		0.00		2.20	40.00		5.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.10										35	30
D	Two lanes		3.00	3.00								20	30

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

D	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1-1	A-D	608.710	-	-	-	-	-	-	0.164	0.234	0.164	-	-	-
1-1	B-A	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	-	0.163	0.163	0.081
1-1	B-C	649.258	0.069	0.175	-	-	-	-	-	-	-	-	-	-
1-1	B-D, nearside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	B-D, offside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	C-B	597.128	0.161	0.161	0.230	-	-	-	-	-	-	-	-	-
1-1	D-A	642.823	-	-	-	-	-	-	0.173	-	0.069	-	-	-
1-1	D-B, nearside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-B, offside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-C	498.808	-	0.100	0.228	0.080	0.160	0.160	0.160	0.160	0.063	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		▯	▯	HV Percentages	2.00				▯	▯

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	▯	1152.00	100.000
B	FLAT	▯	71.00	100.000
C	FLAT	▯	1056.00	100.000
D	FLAT	▯	8.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	4.000	1146.000	2.000
	B	11.000	0.000	60.000	0.000
	C	974.000	81.000	0.000	1.000
	D	5.000	0.000	3.000	0.000

Turning Proportions (Veh) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.00	0.99	0.00
	B	0.15	0.00	0.85	0.00
	C	0.92	0.08	0.00	0.00
	D	0.63	0.00	0.38	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.087	2.000
	B	1.400	1.000	1.893	1.000
	C	1.142	1.790	1.000	2.000
	D	2.000	1.000	2.000	1.000

Heavy Vehicle Percentages - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	8.704	100.000
	B	40.000	0.000	89.349	0.000
	C	14.173	79.039	0.000	100.000
	D	100.000	0.000	100.000	0.000

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
B-ACD	0.36	28.95	0.56	?	D
A-BCD	0.01	18.30	0.01	?	C
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-AB	0.02	16.54	0.02	?	C
D-BC	0.04	49.62	0.04	?	E
C-ABD	0.38	21.64	0.72	?	C
C-D	-	-	-	-	-
C-A	-	-	-	-	-

C.18 Construction base case results, PM peak hour

Cringle Street/Nine Elms Lane (A3205) Junction priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Base Case J26, PM	Base Case J26	PM		Varies by Arm	17:00	18:00	60	15		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
untitled	Crossroads	Two-way	A,B,C,D	30.46	D

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm Type
A	Nine Elms Lane (W)		Major
B	Cringle Street		Minor
C	Nine Elms Lane (E)		Major
D	Nine Elms Parkside Development		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	13.00		0.00		2.20	60.00		2.50
C	13.00		0.00		2.20	40.00		5.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.10										35	30
D	Two lanes		3.00	3.00								20	30

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

D	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1-1	A-D	608.710	-	-	-	-	-	-	0.164	0.234	0.164	-	-	-
1-1	B-A	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	-	0.163	0.163	0.081
1-1	B-C	649.258	0.069	0.175	-	-	-	-	-	-	-	-	-	-
1-1	B-D, nearside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	B-D, offside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	C-B	597.128	0.161	0.161	0.230	-	-	-	-	-	-	-	-	-
1-1	D-A	642.823	-	-	-	-	-	-	0.173	-	0.069	-	-	-
1-1	D-B, nearside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-B, offside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-C	498.808	-	0.100	0.228	0.080	0.160	0.160	0.160	0.160	0.063	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		‖	‖	HV Percentages	2.00				‖	‖

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	‖	1055.00	100.000
B	FLAT	‖	126.00	100.000
C	FLAT	‖	1246.00	100.000
D	FLAT	‖	6.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	9.000	1043.000	3.000
	B	25.000	0.000	101.000	0.000
	C	1166.000	78.000	0.000	2.000
	D	4.000	0.000	2.000	0.000

Turning Proportions (Veh) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.01	0.99	0.00
	B	0.20	0.00	0.80	0.00
	C	0.94	0.06	0.00	0.00
	D	0.67	0.00	0.33	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.097	2.000
	B	1.261	1.000	1.658	1.000
	C	1.107	1.739	1.000	2.000
	D	2.000	1.000	2.000	1.000

Heavy Vehicle Percentages - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	9.661	100.000
	B	26.087	0.000	65.836	0.000
	C	10.675	73.853	0.000	100.000
	D	100.000	0.000	100.000	0.000

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
B-ACD	0.58	38.91	1.33	?	E
A-BCD	0.02	19.53	0.02	?	C
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-AB	0.02	17.68	0.02	?	C
D-BC	0.03	60.30	0.03	?	F
C-ABD	0.34	19.82	0.59	?	C
C-D	-	-	-	-	-
C-A	-	-	-	-	-

C.19 Construction development case results, AM peak hour

Cringle Street/Nine Elms Lane (A3205) Junction new priority layout

Data Errors and Warnings

No errors or warnings

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Kirtling Street J26, AM	Kirtling Street J26	AM		Varies by Arm	08:00	09:00	60	15		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
untitled	Crossroads	Two-way	A,B,C,D	27.15	D

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm Type
A	Nine Elms Lane (W)		Major
B	Cringle Street		Minor
C	Nine Elms Lane (E)		Major
D	Nine Elms Parkside Development		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	13.00		0.00		2.20	60.00		2.50
C	13.00		0.00		2.20	40.00		5.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.10										35	30
D	Two lanes		3.00	3.00								20	30

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1-1	A-D	608.710	-	-	-	-	-	-	0.164	0.234	0.164	-	-	-
1-1	B-A	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	-	0.163	0.163	0.081
1-1	B-C	649.258	0.069	0.175	-	-	-	-	-	-	-	-	-	-
1-1	B-D, nearside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	B-D, offside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	C-B	597.128	0.161	0.161	0.230	-	-	-	-	-	-	-	-	-
1-1	D-A	642.823	-	-	-	-	-	-	0.173	-	0.069	-	-	-
1-1	D-B, nearside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-B, offside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-C	498.808	-	0.100	0.228	0.080	0.160	0.160	0.160	0.160	0.063	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		▯	▯	HV Percentages	2.00				▯	▯

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	▯	1153.00	100.000
B	FLAT	▯	83.00	100.000
C	FLAT	▯	1065.00	100.000
D	FLAT	▯	8.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	4.000	1147.000	2.000
	B	15.000	0.000	68.000	0.000
	C	983.000	81.000	0.000	1.000
	D	5.000	0.000	3.000	0.000

Turning Proportions (Veh) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.00	0.99	0.00
	B	0.18	0.00	0.82	0.00
	C	0.92	0.08	0.00	0.00
	D	0.63	0.00	0.38	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.088	2.000
	B	1.355	1.000	1.907	1.000
	C	1.150	1.790	1.000	2.000
	D	2.000	1.000	2.000	1.000

Heavy Vehicle Percentages - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	8.820	100.000
	B	35.530	0.000	90.650	0.000
	C	14.970	79.040	0.000	100.000
	D	100.000	0.000	100.000	0.000

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
B-ACD	0.44	33.36	0.76	?	D
A-BCD	0.01	18.44	0.01	?	C
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-AB	0.02	16.67	0.02	?	C
D-BC	0.04	51.87	0.04	?	F
C-ABD	0.38	21.64	0.72	?	C
C-D	-	-	-	-	-
C-A	-	-	-	-	-

C.20 Construction development case results, PM peak hour

Cringle Street/Nine Elms Lane (A3205) Junction new priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
Kirtling Street J26, PM	Kirtling Street J26	PM		Varies by Arm	17:00	18:00	60	15		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
untitled	Crossroads	Two-way	A,B,C,D	36.66	E

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm Type
A	Nine Elms Lane (W)		Major
B	Cringle Street		Minor
C	Nine Elms Lane (E)		Major
D	Nine Elms Parkside Development		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	13.00		0.00		2.20	60.00		2.50
C	13.00		0.00		2.20	40.00		5.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.10										35	30
D	Two lanes		3.00	3.00								20	30

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

D	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1-1	A-D	608.710	-	-	-	-	-	-	0.164	0.234	0.164	-	-	-
1-1	B-A	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	-	0.163	0.163	0.081
1-1	B-C	649.258	0.069	0.175	-	-	-	-	-	-	-	-	-	-
1-1	B-D, nearside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	B-D, offside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	C-B	597.128	0.161	0.161	0.230	-	-	-	-	-	-	-	-	-
1-1	D-A	642.823	-	-	-	-	-	-	0.173	-	0.069	-	-	-
1-1	D-B, nearside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-B, offside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-C	498.808	-	0.100	0.228	0.080	0.160	0.160	0.160	0.160	0.063	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
				HV Percentages	2.00					

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT		1057.00	100.000
B	FLAT		139.00	100.000
C	FLAT		1255.00	100.000
D	FLAT		6.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	9.000	1045.000	3.000
	B	30.000	0.000	109.000	0.000
	C	1175.000	78.000	0.000	2.000
	D	4.000	0.000	2.000	0.000

Turning Proportions (Veh) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.01	0.99	0.00
	B	0.22	0.00	0.78	0.00
	C	0.94	0.06	0.00	0.00
	D	0.67	0.00	0.33	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.098	2.000
	B	1.249	1.000	1.684	1.000
	C	1.114	1.739	1.000	2.000
	D	2.000	1.000	2.000	1.000

Heavy Vehicle Percentages - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	9.780	100.000
	B	24.860	0.000	68.430	0.000
	C	11.370	73.850	0.000	100.000
	D	100.000	0.000	100.000	0.000

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
B-ACD	0.66	49.02	1.84	?	E
A-BCD	0.02	19.69	0.02	?	C
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-AB	0.02	17.82	0.02	?	C
D-BC	0.03	63.91	0.03	?	F
C-ABD	0.34	19.83	0.59	?	C
C-D	-	-	-	-	-
C-A	-	-	-	-	-

C.21 Construction development case results, 'all by road' sensitivity test, AM peak hour

Cringle Street/Nine Elms Lane (A3205) Junction new priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
F&P ABR J26, AM	F&P ABR J26	AM		Varies by Arm	08:00	09:00	60	15		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
untitled	Crossroads	Two-way	A,B,C,D	32.81	D

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm Type
A	Nine Elms Lane (W)		Major
B	Cringle Street		Minor
C	Nine Elms Lane (E)		Major
D	Nine Elms Parkside Development		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	13.00		0.00		2.20	60.00		2.50
C	13.00		0.00		2.20	40.00		5.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.10										35	30
D	Two lanes		3.00	3.00								20	30

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1-1	A-D	608.710	-	-	-	-	-	-	0.164	0.234	0.164	-	-	-
1-1	B-A	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	-	0.163	0.163	0.081
1-1	B-C	649.258	0.069	0.175	-	-	-	-	-	-	-	-	-	-
1-1	B-D, nearside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	B-D, offside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	C-B	597.128	0.161	0.161	0.230	-	-	-	-	-	-	-	-	-
1-1	D-A	642.823	-	-	-	-	-	-	0.173	-	0.069	-	-	-
1-1	D-B, nearside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-B, offside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-C	498.808	-	0.100	0.228	0.080	0.160	0.160	0.160	0.160	0.063	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
				HV Percentages	2.00					

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT		1154.00	100.000
B	FLAT		110.00	100.000
C	FLAT		1092.00	100.000
D	FLAT		8.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	4.000	1148.000	2.000
	B	15.000	0.000	95.000	0.000
	C	1010.000	81.000	0.000	1.000
	D	5.000	0.000	3.000	0.000

Turning Proportions (Veh) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.00	0.99	0.00
	B	0.14	0.00	0.86	0.00
	C	0.92	0.07	0.00	0.00
	D	0.63	0.00	0.38	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.089	2.000
	B	1.355	1.000	1.933	1.000
	C	1.172	1.790	1.000	2.000
	D	2.000	1.000	2.000	1.000

Heavy Vehicle Percentages - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	8.850	100.000
	B	35.530	0.000	93.290	0.000
	C	17.230	79.040	0.000	100.000
	D	100.000	0.000	100.000	0.000

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
B-ACD	0.57	42.52	1.27	?	E
A-BCD	0.01	18.85	0.01	?	C
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-AB	0.02	17.06	0.02	?	C
D-BC	0.05	59.59	0.05	?	F
C-ABD	0.38	21.59	0.73	?	C
C-D	-	-	-	-	-
C-A	-	-	-	-	-

C.22 Construction development case results, 'all by road' sensitivity test, PM peak hour

Cringle Street/Nine Elms Lane (A3205) Junction new priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)			100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
F&P ABR J26, PM	F&P ABR J26	PM		Varies by Arm	17:00	18:00	60	15		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Junction Delay (s)	Junction LOS
untitled	Crossroads	Two-way	A,B,C,D	55.14	F

Junction Network Options

Driving Side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm Type
A	Nine Elms Lane (W)		Major
B	Cringle Street		Minor
C	Nine Elms Lane (E)		Major
D	Nine Elms Parkside Development		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Width of kerbed central reserve (m)	Has right turn bay	Width For Right Turn (m)	Visibility For Right Turn (m)	Blocks?	Blocking Queue (PCU)
A	13.00		0.00	ǁ	2.20	60.00	ǁ	2.50
C	13.00		0.00	ǁ	2.20	40.00	ǁ	5.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor Arm Type	Lane Width (m)	Lane Width (Left) (m)	Lane Width (Right) (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate Flare Length	Flare Length (PCU)	Visibility To Left (m)	Visibility To Right (m)
B	One lane	3.10										35	30
D	Two lanes		3.00	3.00								20	30

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None
D	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1-1	A-D	608.710	-	-	-	-	-	-	0.164	0.234	0.164	-	-	-
1-1	B-A	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	-	0.163	0.163	0.081
1-1	B-C	649.258	0.069	0.175	-	-	-	-	-	-	-	-	-	-
1-1	B-D, nearside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	B-D, offside lane	508.720	0.064	0.163	0.163	-	-	-	0.102	0.233	0.102	-	-	-
1-1	C-B	597.128	0.161	0.161	0.230	-	-	-	-	-	-	-	-	-
1-1	D-A	642.823	-	-	-	-	-	-	0.173	-	0.069	-	-	-
1-1	D-B, nearside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-B, offside lane	498.808	0.100	0.100	0.228	-	-	-	0.160	0.160	0.063	-	-	-
1-1	D-C	498.808	-	0.100	0.228	0.080	0.160	0.160	0.160	0.160	0.063	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		‖	‖	HV Percentages	2.00				‖	‖

Entry Flows

General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (Veh/hr)	Flow Scaling Factor (%)
A	FLAT	‖	1057.00	100.000
B	FLAT	‖	166.00	100.000
C	FLAT	‖	1282.00	100.000
D	FLAT	‖	6.00	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	9.000	1045.000	3.000
	B	30.000	0.000	136.000	0.000
	C	1202.000	78.000	0.000	2.000
	D	4.000	0.000	2.000	0.000

Turning Proportions (Veh) - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.00	0.01	0.99	0.00
	B	0.18	0.00	0.82	0.00
	C	0.94	0.06	0.00	0.00
	D	0.67	0.00	0.33	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	1.000	1.000	1.098	2.000
	B	1.249	1.000	1.747	1.000
	C	1.134	1.739	1.000	2.000
	D	2.000	1.000	2.000	1.000

Heavy Vehicle Percentages - Junction 1-1 (for whole period)

		To			
		A	B	C	D
From	A	0.000	0.000	9.820	100.000
	B	24.860	0.000	74.660	0.000
	C	13.350	73.850	0.000	100.000
	D	100.000	0.000	100.000	0.000

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS
B-ACD	0.79	76.52	3.35	?	F
A-BCD	0.02	20.15	0.02	?	C
A-B	-	-	-	-	-
A-C	-	-	-	-	-
D-AB	0.02	18.27	0.02	?	C
D-BC	0.04	76.70	0.04	?	F
C-ABD	0.34	19.79	0.59	?	C
C-D	-	-	-	-	-
C-A	-	-	-	-	-

Appendix D: Accident Analysis

D.1 Existing Highway Safety Analysis

D.1.1 Accident data within the vicinity of the site has been obtained from Transport for London (TfL) and analysed to determine if there are any specific road safety issues, trends or patterns evident on the surrounding highway network.

D.1.2 Data has been obtained for a 5 year period, up until the 31st March 2011. Figure 1.1 shows the extent of the study area which has been reviewed. The following roads and junctions have been analysed:

a. Kirtling Street / Cringle Street junction;

b. Nine Elms Lane (A3205);

c. Nine Elms Lane / Cringle Street Junction;

d. Battersea Park Road (A3205);

e. Battersea Park Road / Kirtling Street / Nine Elms Junction;

f. Battersea Park Road / Sleaford Street Junction;

g. Battersea Park Road / Thessaly Road Junction; and

h. Battersea Park Road / Savona Street.

D.1.3 Table D.1 provides a summary of the accident locations, the total number of accidents and the associated level of accident severity.

Table D.1 Accident severity

Location	Slight	Serious	Fatal	Total
Kirtling Street / Cringle Street junction	1	0	0	1
Nine Elms Lane (A3205)	2	0	0	2
Nine Elms Lane / Cringle Street junction	4	2	0	6
Battersea Park Road (A3205)	7	0	1	8
Battersea Park Road / Kirtling Street / Nine Elms junction	4	1	0	5
Battersea Park Road / Sleaford Street junction	6	1	0	7
Battersea Park Road / Thessaly Road junction	2	0	0	2
Battersea Park Road / Savona Street	5	0	0	5
Total	31	4	1	36
Grosvenor Road (A3212) / Lupus Street junction	10	3	0	13
Total	**69**	**18**	**0**	**87**

D.1.4 During the 5 year period, a total of 36 accidents have been recorded within the study area analysed. Of these accidents, 31 were categorised as slight, 4 were identified as serious and one accident was fatal. The accident data is further analysed, for each accident location, in the following sections.

Kirtling Street

D.1.5 The site is located to the north of Kirtling Street. It is proposed that the site would be accessed from Kirtling Street via Battersea Park Road (A3205) and Cringle Street, by Nine Elms Lane (A3205).

D.1.6 Kirtling Street is a two-way street, which is accessed from Nine Elms Lane and Cringle Street (also located off Nine Elms Lane). A small section of Kirtling Street forms part of Transport for London's Road Network (TLRN), however the majority of the road consists of on-street car parking along both sides of the street.

D.1.7 Over the 5 year period, only one accident occurred on Kirtling Street approximately 40 metres south of the junction with Cringle Street. This accident was rated as slight in severity and involved one vehicle reversing into another vehicle following an argument between the vehicle drivers. The cause of accident was attributed to aggressive driving. Thus, it is considered that this accident was primarily a result of human error rather than as a result of the highway design.

Nine Elms Lane (A3205)

D.1.8 Nine Elms Lane (A3205), which is part of the TLRN, links to Battersea in the south-west and Vauxhall in the north-east. Part of the carriageway is a two-way road with adjacent bus lanes routing in both a north-east and south-west direction. The road forks to the west of the junction with Cringle Street, where Nine Elms Lane splits with Battersea Park Road (A3205). At this section, the A3205 increases to a four-lane carriage way (2 lanes in both directions). There is also a fork in the road to the north-east of the site (outside of the study analysed), slightly west of the junction with Ponton Road.

D.1.9 It is proposed that the A3205 will be a primary route for the construction traffic because it provides access to the site via both Kirtling Street and Cringle Street.

D.1.10 In total, there were 8 accidents along Nine Elms Lane including the junction with Cringle Street. Of these accidents, 6 were identified as slight and 2 were documented as serious. The accidents which have occurred at the junction of Battersea Park Road / Kirtling Street and Nine Elms Lane are discussed in the following section.

D.1.11 The majority of accidents (6 accidents) including the two serious accidents occurred at the junction with Cringle Street. One of the serious accidents involved a motorcyclist overtaking a HGV and colliding with an oncoming car as result of failing to look properly and undertaking a poor turn or manoeuvre. The other serious accident involved the collision of a cyclist and motorcyclist as a result of the motorcyclist driver failing to judge the

speed of the cyclist and experiencing impaired vision resulting from the sun.

D.1.12 Additionally, there were 4 slight accidents which occurred at the junction of Nine Elms Lane and Cringle Street. These accidents were often caused by vehicle drivers / riders exceeding the speed limit, sudden breaking and failing to judge speed of other vehicles.

D.1.13 There were two accidents which occurred along Nine Elms Lane; one located approximately 50 metres north-east of the Cringle Street junction and the other located approximately 80 metres north-west of the Kirtling Street junction. Both of these accidents were slight and were caused as a result of vehicle drivers / riders failing to look properly, undertaking a poor turn or manoeuvre and travelling too fast for the conditions at the time.

D.1.14 Out of the total accidents, 3 involved motorcyclists and 2 involved cyclists. There were no pedestrian accidents recorded at this location. Three of the accidents involved LGVs, however of these accidents were rated slight in severity. Generally, the cause of accidents at this location has been largely attributed to human factors rather than the highway layout.

Battersea Park Road (A3205)

D.1.15 Battersea Park Road (A3205) forms part of the fork in the road with Nine Elms Lane, routing traffic in south-westerly direction. The A3205 consists of 4 lanes of traffic (2 lanes in both directions) at this section of the carriageway. The road then returns to a two-way carriageway, west of the junction with Sleaford Street, with adjacent bus lanes routing in both a north-east and south-west direction.

D.1.16 In total, 27 accidents have occurred along Battersea Park Road and at the junctions associated with this stretch of highway including the junctions with Kirtling Street and Nine Elms Lane, Sleaford Street, Thessaly Road and Savona Street.

D.1.17 Of these accidents, 24 were identified as slight, 2 were serious and one accident was fatal. The highest number of accidents occurred along Battersea Park Road (including the fatal accident) and at the junction with Sleaford Street.

D.1.18 The fatal accident occurred on Battersea Park Road approximately 100m north-east of Prince of Wales Drive. The accident involved a pedestrian but the details of the accident were not known.

D.1.19 The serious accidents occurred at the junction with Nine Elms Lane and Kirtling Street and at the junction with Sleaford Street. The accident at the junction of Nine Elms Lane and Kirtling Street involved a HGV where the driver disobeyed a red light causing a collision with a cyclist. The cause was attributed to the HGV driver failing to look properly, driving carelessly / recklessly or in a hurry, undertaking a poor turn or manoeuvre and failing to judge the cyclists speed. The accident at the junction with Sleaford Street included the collision of a LGV and a motorcyclist. The cause of accident was attributed to both the driver and rider failing to look properly.

D.1.20 The remaining slight accidents were attributed to vehicle drivers / riders failing to look properly, driving recklessly or sudden breaking and pedestrians failing to use the pedestrian crossings properly.

D.1.21 Of the total accidents, 5 accidents involved LGV's. However, all of these accidents were rated as slight in severity.

D.1.22 In general, it is considered that the majority of accidents have occurred as a result of human error rather than as a result of the highway layout.

D.2 Summary and Conclusion

D.2.1 During the 5 year period, a total of 36 accidents occurred within the vicinity of site. The majority of the accidents were rated as slight in severity, however 4 accidents were serious and one accident was fatal.

D.2.2 The highest number of accidents was recorded along Battersea Park Road. This is also where the fatal accident occurred, which involved a pedestrian but the cause is unknown.

D.2.3 Of the total accidents, 8 accidents involved LGV's which were rated as slight in severity. One accident involved an HGV which led to a serious accident, this occurred at the junction of Nine Elms Lane and Cringle Street and was a result of failing to look properly and undertaking a poor turn or manoeuvre by the HGV driver. LGV's were involved in 8 of the total accidents

D.2.4 The majority of both the serious and the slight accidents occurred as a result of factors such as vehicle drivers / riders failing to look properly, carrying out a poor turn or manoeuvre and sudden breaking.

D.2.5 Therefore, it is considered that the majority of accidents occurred as a result of human error rather than as a result of the highway layout, infrastructure or geometry.

Appendix E: Road Safety Audit

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Your ref -
Our ref 211146-00/cvl

ARUP

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15 February 2013

Dear Sirs

Thames Tideway Tunnel
Kirtling Street – Stage 1 Road Safety Audit

I have the pleasure of enclosing our Kirtling Street – Stage 1 Road Safety Audit report. In addition to the enclosed report, the Audit Team noted the following points outwith the remit of the audit. I would be grateful if you would bring these issues to the attention of the Highway Authority, Designer and/or Maintainer as appropriate.

Additional Comments

- Nine Elms Road is a signed cycle route to the west of Kirtling Street and, to the east, has shared use segregated pedestrian / cycle paths on either side. Any traffic management proposed on these roads should take full account of cycles. Delivery drivers should be made aware of the presence of the cycle routes and the likely increased risk of cycle / goods vehicle conflict.

IMG_8522.jpg

- The proposals indicate the removal of 40 car parking spaces along Kirtling Street and Cringle Street. It is likely to result in congestion and frustration for drivers who cannot find somewhere to park. Replacement facilities should be provided during the duration of the construction works.

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Registered Number: 1312453 | Registered Address: 13 Fitzroy Street London W1T 4BQ

- The swept path analysis drawings indicate that there will be insufficient space to operate a 16.5m articulated HGV adjacent to the proposed security office at the site exit to Kirtling Street.

If you have any further queries regarding this letter or the enclosed report, please do not hesitate to contact me

Yours faithfully

Chris van Lottum
Senior Engineer
Road Safety Audit Team Leader

Enc

cc Phil Longman, Peter Brett Associates
Gavin Wicks, Arup

Thames Tideway Tunnel

Thames Tideway Tunnel - Kirtling Street

Stage 1 Road Safety Audit

RSA1.1a

Rev A | 15 February 2013

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 211146-03

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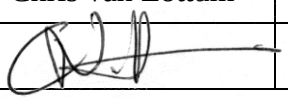
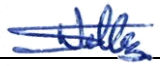
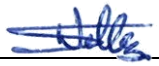
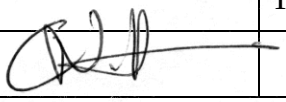
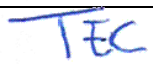
ARUP

Document Verification

ARUP

Job title		Thames Tideway Tunnel - Kirtling Street		**Job number**	211146-03
Document title		Stage 1 Road Safety Audit		**File reference**	
Document ref		RSA1.1a			
Revision	**Date**	**Filename**	RP CVL TTT 11 Kirtling RSA1.1 130215 Rev A.docx		
Issue	11 Jan 2013	**Description**	Issue Document		
			Prepared by	Checked by	Approved by
		Name	Chris van Lottum	Steve Wells	Steve Wells
		Signature			
Rev A	15 Feb 2013	**Filename**	RP CVL TTT 11 Kirtling RSA1.1 130215 Rev A.docx		
		Description	Revised informaion received		
			Prepared by	Checked by	Approved by
		Name	Chris van Lottum	Tom Corke	Steve Wells
		Signature			
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		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
				Issue Document Verification with Document	✓

Contents

Figures

Appendices

1 Introduction

Arup was appointed by Thames Tideway Tunnel to conduct a Stage 1 Road Safety Audit on proposals to create a construction access and egress for works associated with the Thames Tideway Tunnel at Kirtling Street in the London Borough of Wandsworth.

The agreed Audit Team consisted of:

- Mr C van Lottum MEng (Hons), MCIHT, MSoRSA
- Mr T Corke BEng (Hons), MSc, CEng, MICE, MCIHT, MSoRSA

The Audit Team visited the site together on Wednesday 5th December 2012; weather conditions at the time of the site visit were overcast with showers and the road surface was wet.

At the time of the site visit the north-eastern part of Kirtling Street was closed (east of the access to Nine Elms Pier), providing access only to the St James's Developments 'Riverlight' site and a pedestrian path through to Tideway Walk. While site offices with a limited vertical clearance of 4.5m have been erected above Kirtling Street, as it stands, implementation of the Thames Tideway Tunnel scheme would block vehicular access to Nine Elms Pier.

IMG_8525.jpg

A list of information provided to the Audit Team has been included as Appendix A to this Report.

The following information was **not** made available to the Audit Team and as such any specific influence of these details on road user safety has not been considered by this audit:

- Departures from Standard
- Road profiles
- Cross sections
- Drainage
- Landscape
- Public utilities
- Traffic signals
- Traffic signs
- Street lighting
- Road markings

- Road restraint systems

It is understood that no previous road safety audits have been conducted on this scheme.

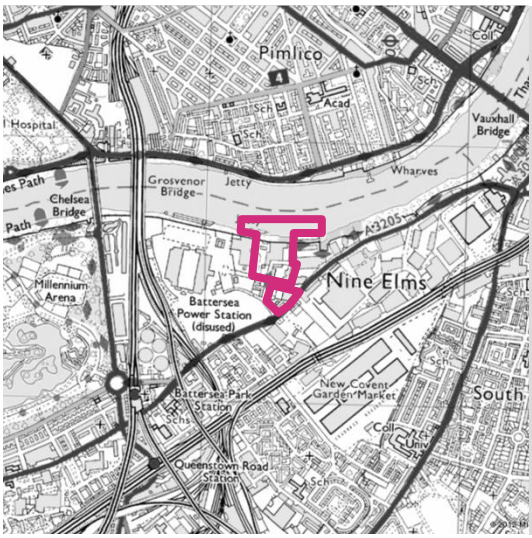
This audit has been undertaken in accordance with the Terms of Reference set out in TfL Procedure 'Road Safety Audit SQA-0170 – Issue 4'; and the Audit Team members meet the training and experience requirements set out therein. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria. However, to clearly explain a problem or recommendation the Audit Team may occasionally refer to design standards without engaging in technical audit.

All problems and recommendations identified by this audit are referenced to the design drawings and the locations have been indicated on the attached plan.

Other issues, including safety issues identified during the Audit but excluded from this report by the Terms of Reference, which the Audit Team wishes to draw to the attention of the Audit Project Sponsor are set out in separate correspondence.

Road Safety Audit is based upon a qualitative risk assessment process and there is no measure of the success achieved by any recommendations given herein. Road Safety Audit cannot guarantee the safe operation of the scheme under consideration in this report as accidents are rare and random events and are largely caused by factors outside the Audit Team's influence, such as driving behaviour and, to a lesser extent, vehicle condition.

1.1 Site Description



Scheme Location

The Kirtling Street site is located on the south bank of the Thames on the eastern side of Battersea Power Station. The site encompasses Cringle Street, which cuts east-west through the site, which is adjacent to the A3205 Nine Elms Lane between Vauxhall and Battersea Park.

1.2 Scheme Description

There would be gated accesses to the Kirtling Street site to the north and south of the central section of Cringle Street. There would be additional vehicle crossovers on Kirtling Street and Cringle Street where new site access points would be constructed.

During all phases, for the site set-up, shaft construction and main tunnel construction and secondary lining, the northern and north-western section of Kirtling Street would be closed and would form part of the construction site. This would result in a diversion for pedestrians using the Thames Path.

2 Stage 1 Road Safety Audit

The Recommendations below are numbered as follows:

STAGE . AUDIT NUMBER . RECOMMENDATION NUMBER

	Location:	Junction of Cringle Street with Nine Elms Road
	Summary:	Existing accident record for delivery route could be exacerbated by construction traffic.
	Description:	There is an existing accident risk relating to vehicles turning in and out of Cringle Street from Nine Elms Lane. The construction necessitates large numbers of HGV turning movements at this junction which may exacerbate the existing problems.
S1.1.1	**Recommendation:**	Traffic management layouts during construction should highlight the likelihood of HGV and plant movements at this location. Delivery drivers and site staff should be made aware of the likely increased risk of turning conflicts, particularly with vulnerable road users, through inclusion in the site induction process and construction method statements.

End of list of problems identified and recommendations offered in this Stage 1 Road Safety Audit.

3 Road Safety Audit Statement

I certify that this audit has been carried out in accordance with HD19/03.

Audit Team Leader

Mr C van Lottum MEng (Hons), MCIHT, MSoRSA

Senior Engineer

Arup

Central Square, Forth Street,
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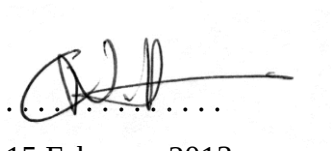

15 February 2013

Audit Team Member

Mr T Corke BEng (Hons), MSc, CEng, MICE, MCIHT, MSoRSA

Senior Engineer

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Figures

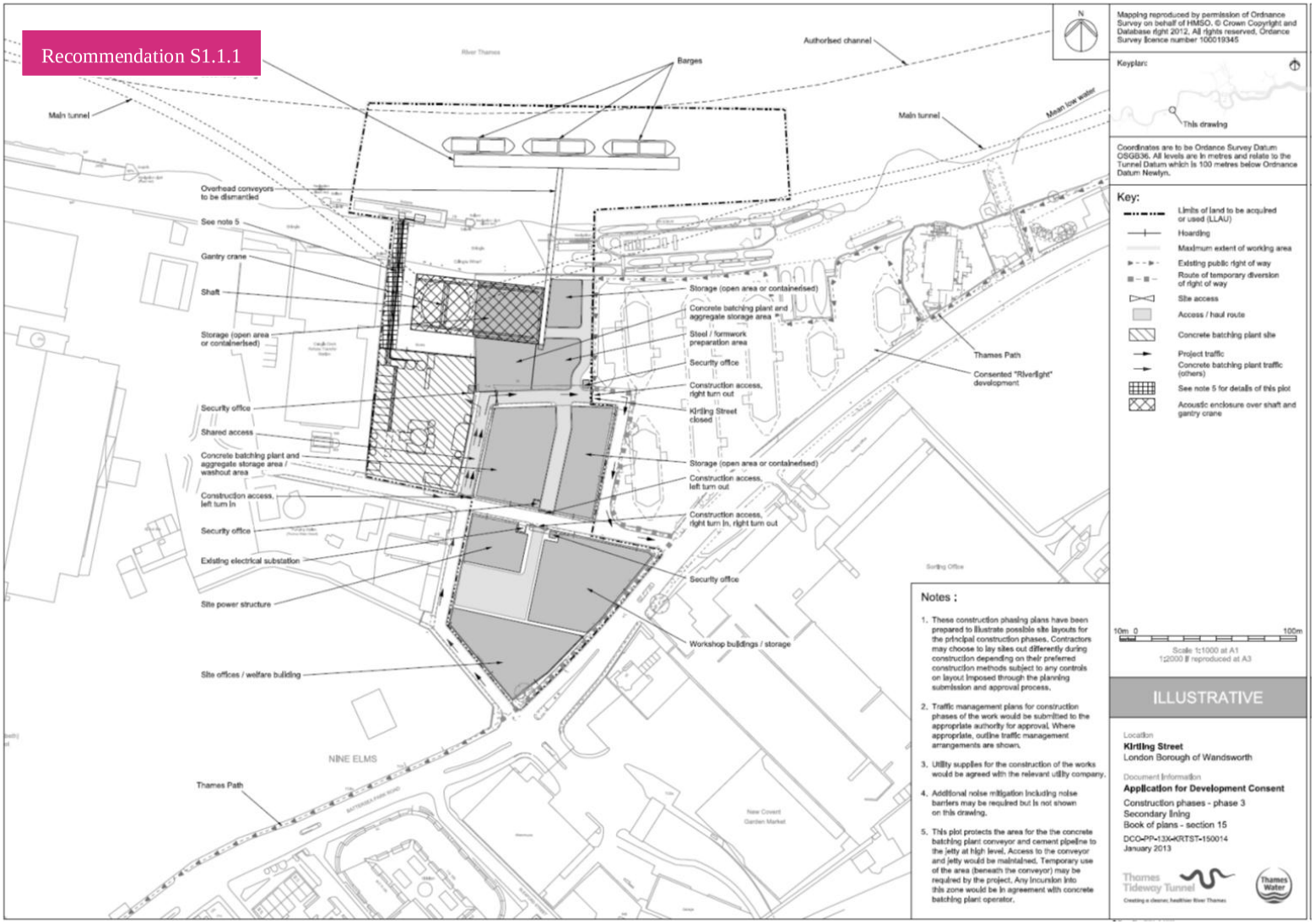

Figure 1 Location of Recommendations

Appendix A

Documents and Drawings

A1 Documents and Drawings

The following documents and drawings were supplied to the Audit Team by the Designer and have been examined in the course of conducting this audit.

A1.1 Documents

Title	Reference	Revision
Road Safety Audit Brief	-	16/12/2012
Road Accident Data	-	-

A1.2 Drawings

Title	Reference	Revision
Transport - site location plan	1PL03-TT-50661	Jan 2013
Transport - construction traffic routes	1PL03-TT-50653	Jan 2013
Transport - accident locations	1PL03-TT-50757	Jan 2013
Construction phases - phase 3 - Secondary lining	DCO-PP-13X-KRTST-150014	Jan 2013
Highway layout during construction (Area 1) - Ph 1 - 3	DCO-PP-13X-KRTST-150021	Jan 2013
Highway layout during construction (Area 1) Ph 1 – 3 - (With Battersea PS)	DCO-PP-13X-KRTST-150022	Jan 2013
Permanent highway layout – Area 1 work	DCO-PP-13X-KRTST-150023	Jan 2013
Permanent highway layout – Area 1 work - (With Battersea PS)	DCO-PP-13X-KRTST-150024	Jan 2013
Highway layout during construction (Area 1) – Vehicle swept path analysis	DCO-PP-13X-KRTST-150027	Jan 2013
Highway layout during construction (Area 1) Vehicle swept path analysis (With Battersea PS)	DCO-PP-13X-KRTST-150028	Jan 2013
Permanent highway layout - (Area 1) – Vehicle swept path analysis (sheet 1 of 2)	DCO-PP-13X-KRTST-150029	Jan 2013
Permanent highway layout - (Area 1) – Vehicle swept path analysis (sheet 2 of 2)	DCO-PP-13X-KRTST-150030	Jan 2013
Permanent highway layout - (Area 1) – Vehicle swept path analysis - (With Battersea PS - sheet 1 of 2)	DCO-PP-13X-KRTST-150031	Jan 2013
Permanent highway layout - (Area 1) – Vehicle swept path analysis - (With Battersea PS - sheet 2 of 2)	DCO-PP-13X-KRTST-150032	Jan 2013

TECHNICAL NOTE

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Job Name	**Thames Tideway Tunnel – Kirtling Street**	
Job No.	22104	
Note No.	001	
Date	15st February 2013	
Subject	Stage 1 Road Safety Audit – Designer's Response	
Prepared by	L Harney	**Reviewed:** B Kemp

1 Introduction

1.1 Arup was appointed by Thames Water to conduct a Stage 1 Road Safety Audit on proposals to create a construction access and egress for works associated with the Thames Tideway Tunnel at Kirtling Street in the London Borough of Wandsworth.

1.2 This technical note provides the Designer's Response to the Stage 1 Audit for this site.

2 Stage 1 Road Safety Audit

2.1 Location: Junction of Cringle Street with Nine Elms Road

Summary: Existing accident record for delivery route could be exacerbated by construction traffic.

Description: There is an existing accident risk relating to vehicles turning in and out of Cringle Street from Nine Elms Lane.

The construction necessitates large numbers of HGV turning movements at this junction which may exacerbate the existing problems.

S1.1.1 Recommendation: Traffic management layouts during construction should highlight the likelihood of HGV and plant movements at this location. Delivery drivers and site staff should be made aware of the likely increased risk of turning conflicts, particularly with vulnerable road users, through inclusion in the site induction process and construction method statements.

Recommendation Accepted – Traffic management layouts at this site will highlight the likelihood of HGV and plant movement. Delivery drivers and site staff will also be made aware of the presence of vulnerable road users as part of the site induction. This will be included in the Code of Construction Practice at Stage 2 (Detailed Design).

3 Response to Comments provided in addition to the Stage 1 Road Safety Audit

3.1 Additional Comments

Nine Elms Road is a signed cycle route to the west of Kirtling Street and, to the east, has shared use segregated pedestrian / cycle paths on either side. Any traffic management proposed on these roads should take full account of cycles. Delivery drivers should be made aware of the presence of the cycle routes and the likely increased risk of cycle / goods vehicle conflict.

Comment Response – Delivery drivers and site staff will be made aware of the presence of cyclists as part of the site induction. This will be included in the Code of Construction Practice at Stage 2 (Detailed Design).

3.2 Additional Comments

The proposals indicate the removal of 40 car parking spaces along Kirtling Street and Cringle Street. It is likely to result in congestion and frustration for drivers who cannot find somewhere to park. Replacement facilities should be provided during the duration of the construction works.

Comment Response – The removal of parking on Kirtling Street will be as a result of the redevelopment of Battersea Power Station and will have taken place prior to construction of the Thames Tunnel.

3.3 Additional Comments

The swept path analysis drawings indicate that there will be insufficient space to operate a 16.5m articulated HGV within the manoeuvring area around the steel / formwork preparation area between Kirtling Street and the River Thames.

Comment Response – The internal vehicle manoeuvring areas for the construction site will be confirmed at Stage 2 (Detailed Design). Adequate space will be provided to allow HGVs to enter and exit the site in forward gear.

Thames Tideway Tunnel
Thames Water Utilities Limited

Application for Development Consent

Application Reference Number: WWO10001

Transport Assessment

Doc Ref: **7.10.11**

Kirtling Street

Figures

APFP Regulations 2009: Regulation **5(2)(q)**

Hard copy available in

Box **51** Folder **B**
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Thames Tideway Tunnel

Creating a cleaner, healthier River Thames

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Thames Tideway Tunnel

Transport Assessment

Section 14: Kirtling Street figures

List of contents

Plans

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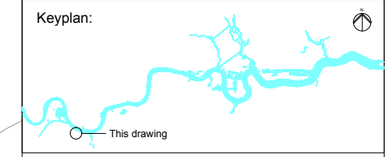
Keyplan:



Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing

- Parking restrictions
- Red route
- On street parking
- Bus stop / stand
- Bus lanes
- Pedestrian crossing
- Cycle lane / advance stop line

Revised

- Limit of land to be acquired or used (LLAU)

On Street Parking

Unrestricted parking - Parking at any time

Standards

- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage

Existing

10m 0 100m

Scale 1:1000 at A1
1:2000 if reproduced at A3

FOR INFORMATION

Location

Kirtling Street
London Borough of Wandsworth

Document Information

Application for Development Consent

Existing highway layout

DCO-PP-13X-KRTST-150020
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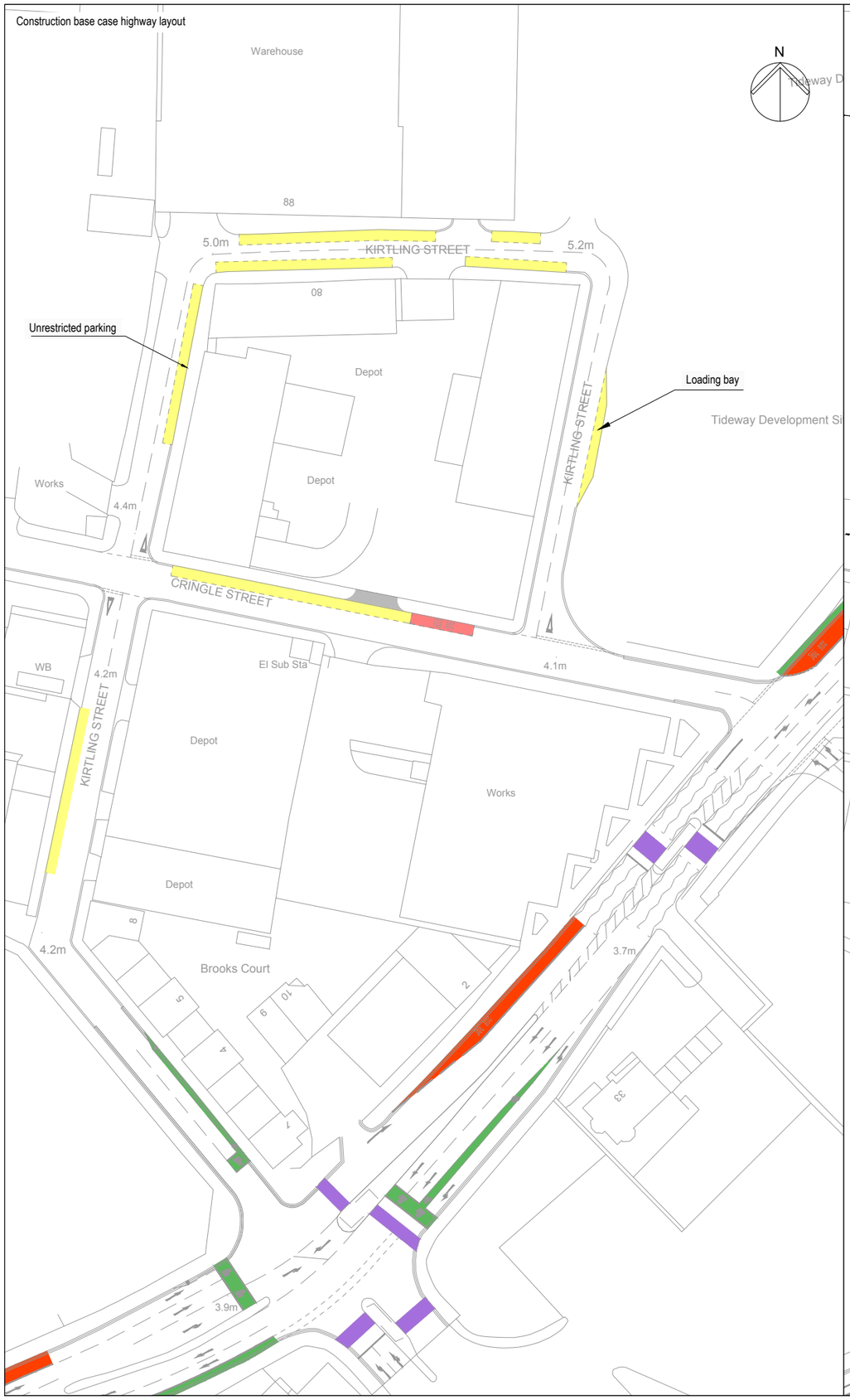
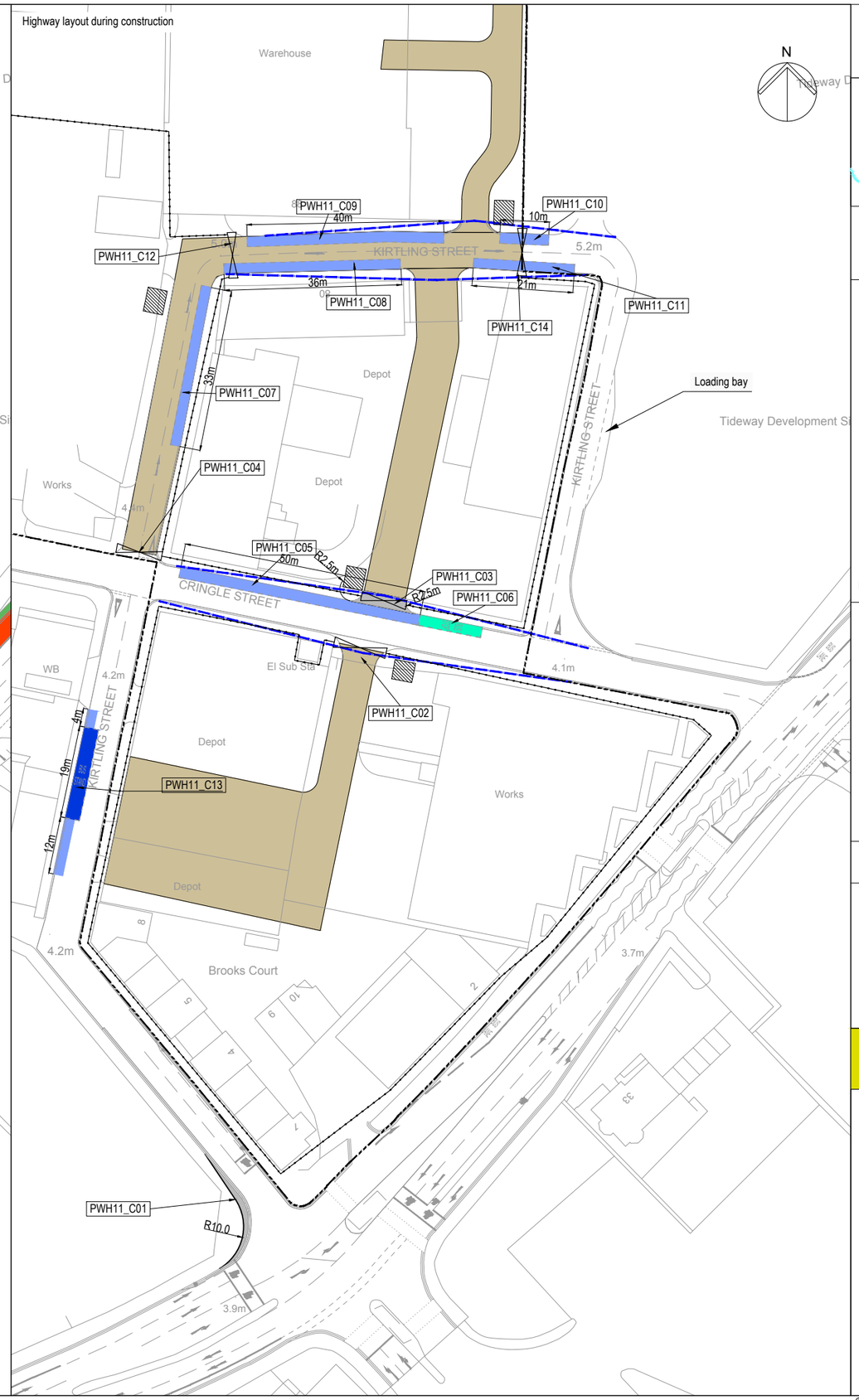
Construction base case highway layout



Highway layout during construction



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Keyplan:

Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing
- Parking restrictions
- On street parking
- Bus lane
- Bus stop/ stand
- Pedestrian crossing
- Cycle lane / advance stop line

Revised
- Removal of footway
- Suspended on-street parking
- Suspended bus stand
- Temporary bus stand
- Illustrative on-site manoeuvring zone
- Visibility splay - 2.4m x 43m (ssd adjust for bonnet length)
- Site hut
- Site hoarding
- Access gate
- Limit of land to be acquired or used (LLAU)
- PWH11_C00 See schedule of works

On Street Parking

Unrestricted parking - Parking at any time
Loading bay - Drop off for coaches and taxis

Standards
- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
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- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage
Phase 1 and 3

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Application for Development Consent

Highway layout during construction
(Area 1)
Ph 1 - 3

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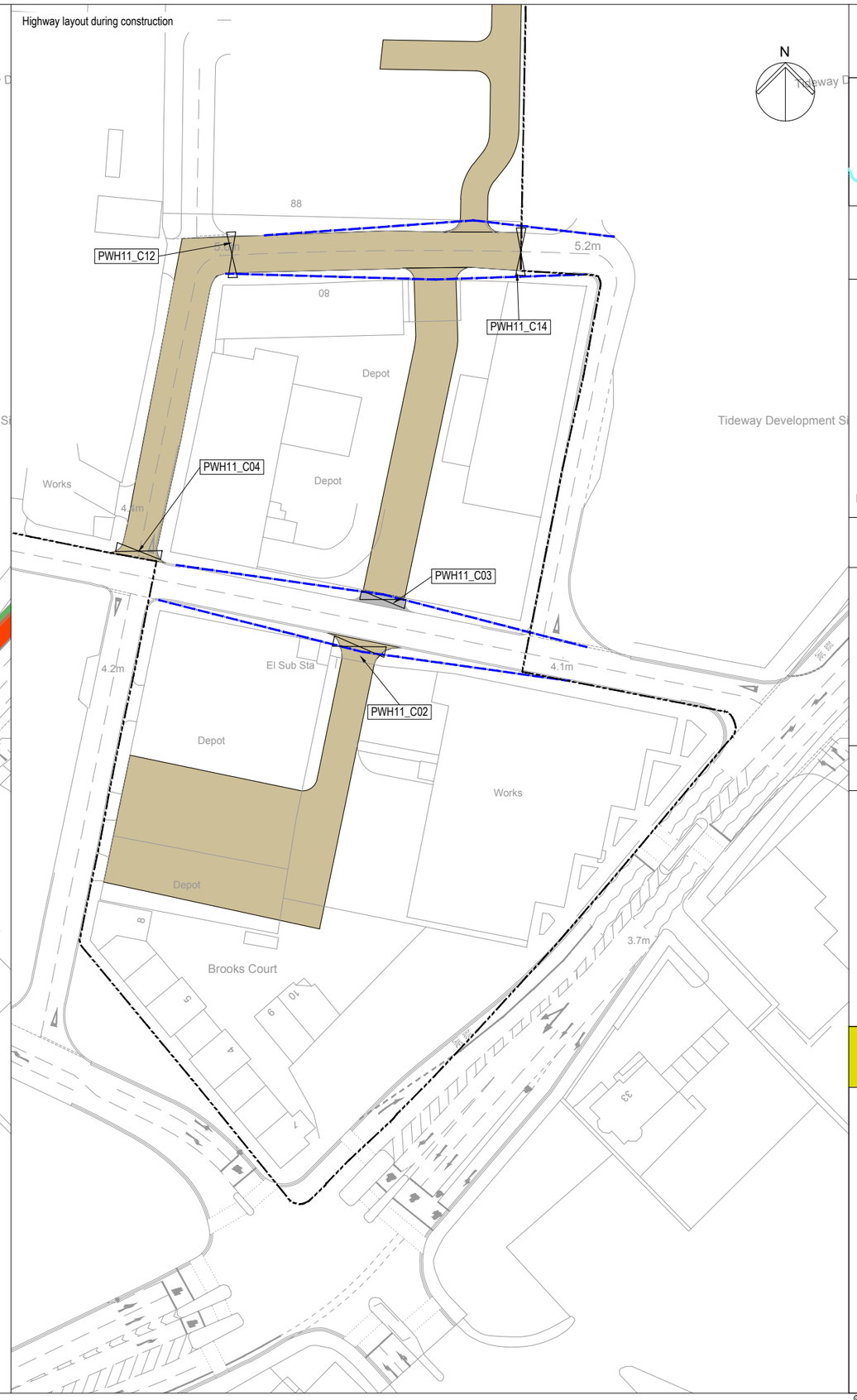
Construction base case highway layout

Highway layout during construction



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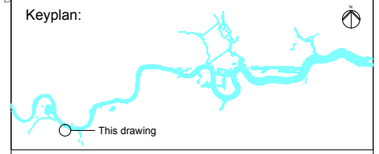
Keyplan:



Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing
- Parking restrictions
- On street parking
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line

Revised
- Removal of footway
- Illustrative on-site manoeuvring zone
- Visibility splay - 2.4m x 43m (ssd adjust for bonnet length)
- Access gate
- Limit of land to be acquired or used (LLAU)
- PWH11_C00 See schedule of works

On Street Parking

Loading bay - Drop off for coaches and taxis

Standards
- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
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- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage

Phases 1 & 3

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location

Kirtling Street
London Borough of Wandsworth

Document Information

Application for Development Consent

Highway layout during construction
(Area 1) Ph 1 - 3
(With Battersea PS)

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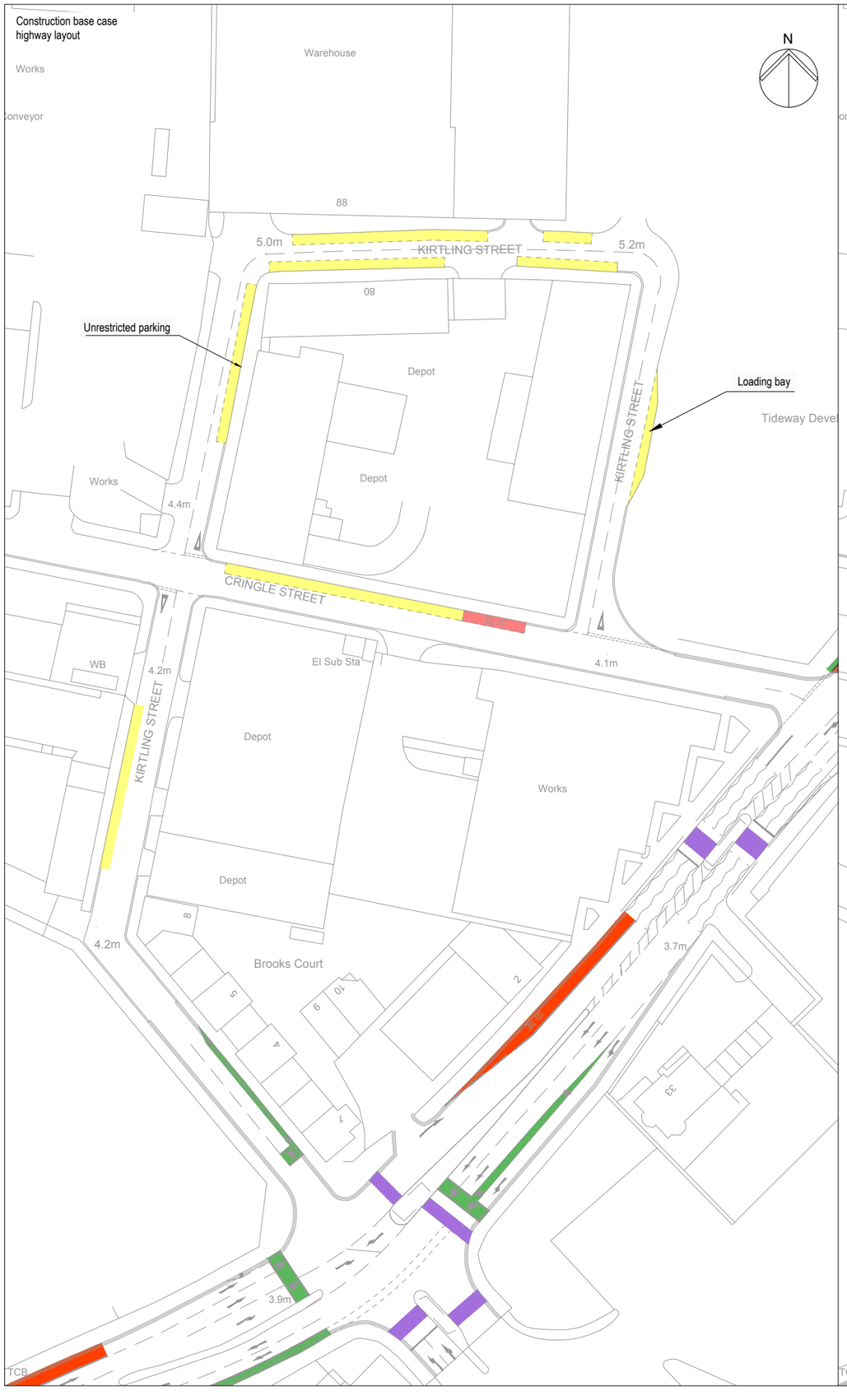
Construction base case highway layout



Permanent highway layout

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Keyplan:

Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing
- Parking restrictions
- On street parking
- Bus lane
- Bus stop/ stand
- Pedestrian crossing
- Cycle lane / advance stop line

Revised
- Reinstated footway
- Reinstated on-street parking
- Reinstated bus stand
- Removal of temporary bus stand
- PWH11_P01 See schedule of works

On Street Parking

Unrestricted parking - Parking at any time
Loading bay - Drop off for coaches and taxis

Standards
- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage
Permanent phase

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Application for Development Consent
Permanent highway layout
Area 1 work

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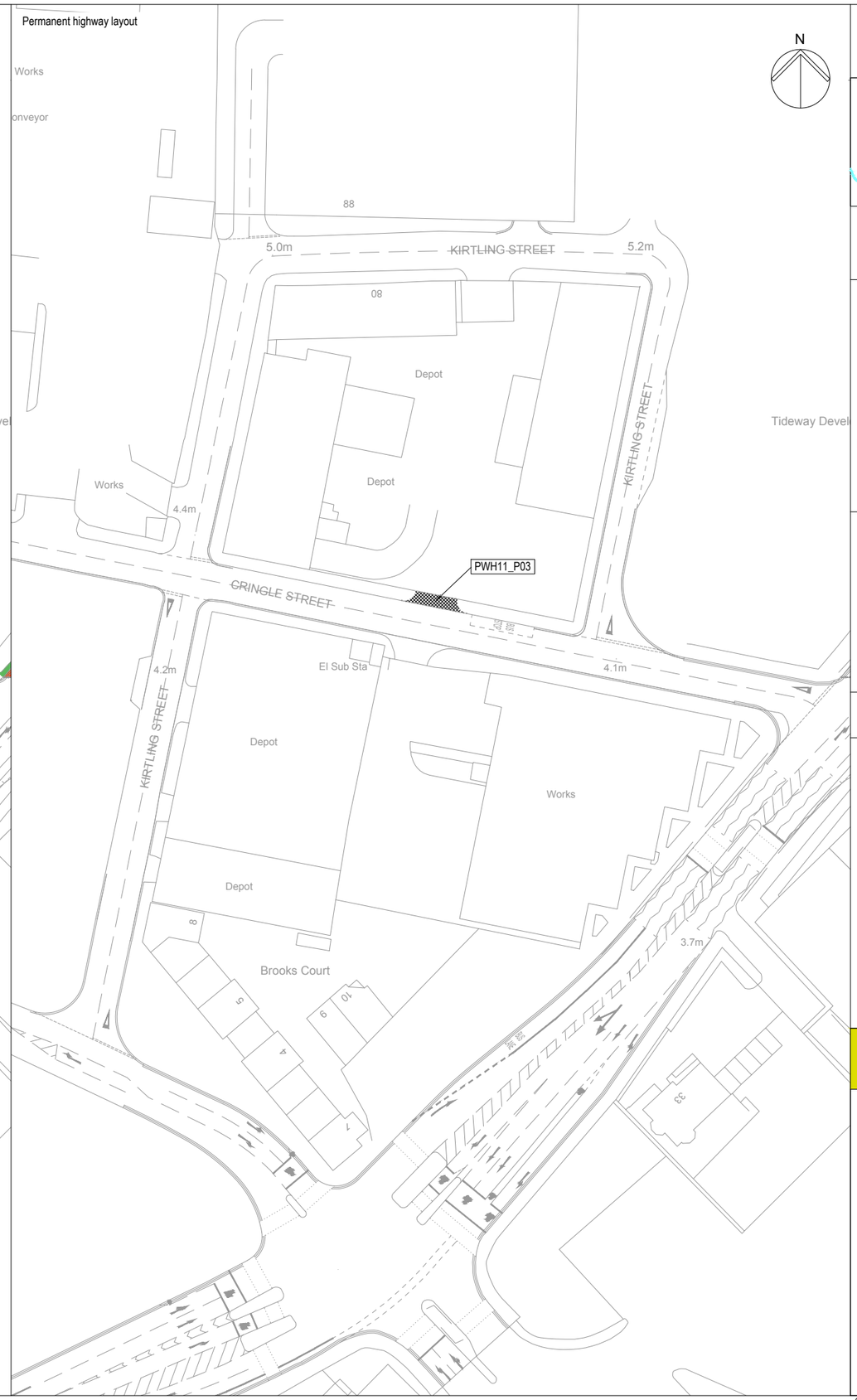
Construction base case highway layout

Permanent highway layout



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Keyplan:

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Key

Existing
- Parking restrictions
- On street parking
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line

Revised
- Reinstated footway
- PWH11_P01 See schedule of works

On Street Parking

Loading bay - Drop off for coaches and taxis

Standards

- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
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- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage

Permanent phase

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location

Kirtling Street
London Borough of Wandsworth

Document Information

Application for Development Consent

Permanent highway layout
Area 1 work
(With Battersea PS)

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Keyplan:

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Key

Existing

- Parking restrictions
- Red route
- On street parking
- Bus stop / stand
- Bus lanes
- Pedestrian crossing
- Cycle lane / advance stop line

Revised

- Limit of land to be acquired or used (LLAU)

On street parking

Unrestricted parking - Parking at any time

Loading bay - Drop off for coaches

Standards

- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
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- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage

Construction base case

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location

Kirtling Street
London Borough of Wandsworth

Document Information

Application for Development Consent

Construction base case highway layout

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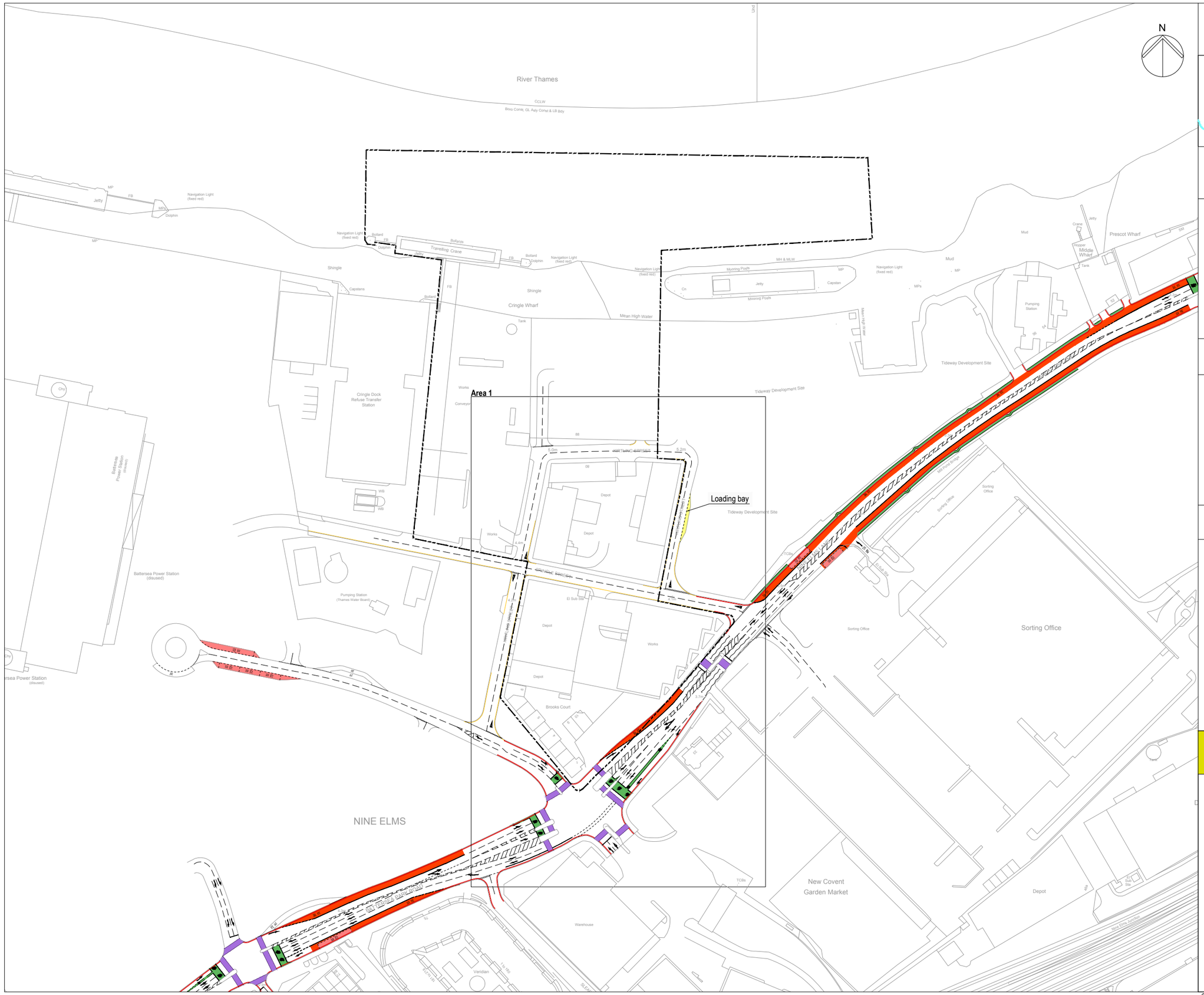

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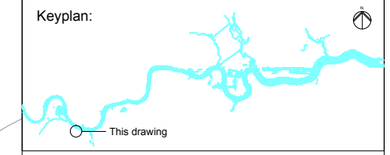

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Key

Existing

- Parking restrictions
- Red route
- Bus stop / stand
- Bus lanes
- Pedestrian crossing
- Cycle lane / advance stop line

Revised

- Limit of land to be acquired or used (LLAU)

On street parking

Loading bay - Drop off for coaches and taxis

Standards

- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage

Construction base case

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location

Kirtling Street
London Borough of Wandsworth

Document Information

Application for Development Consent

Construction base case highway layout (with Battersea PS)

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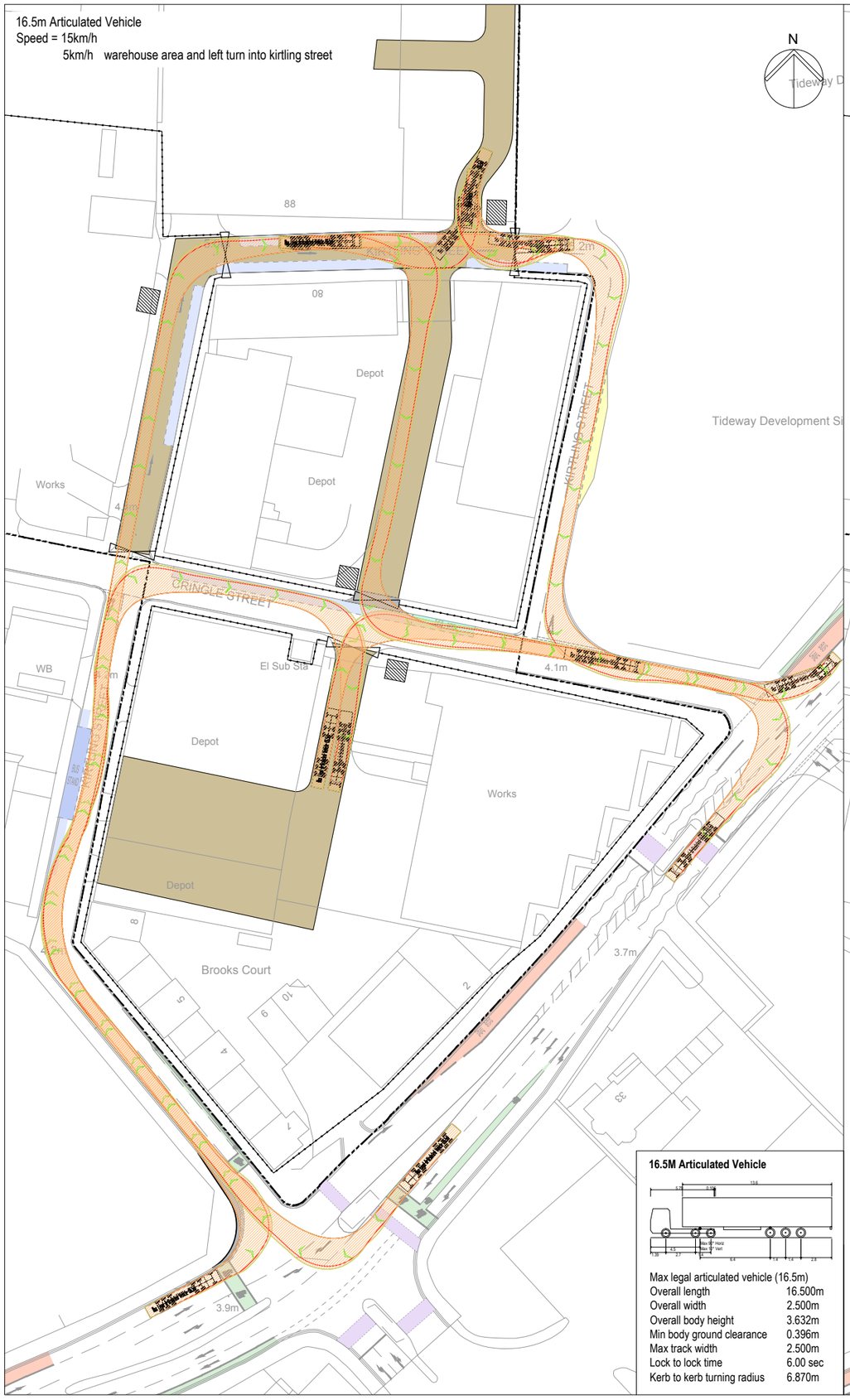
16.5m Articulated Vehicle
Speed = 15km/h
5km/h warehouse area and left turn into kirtling street

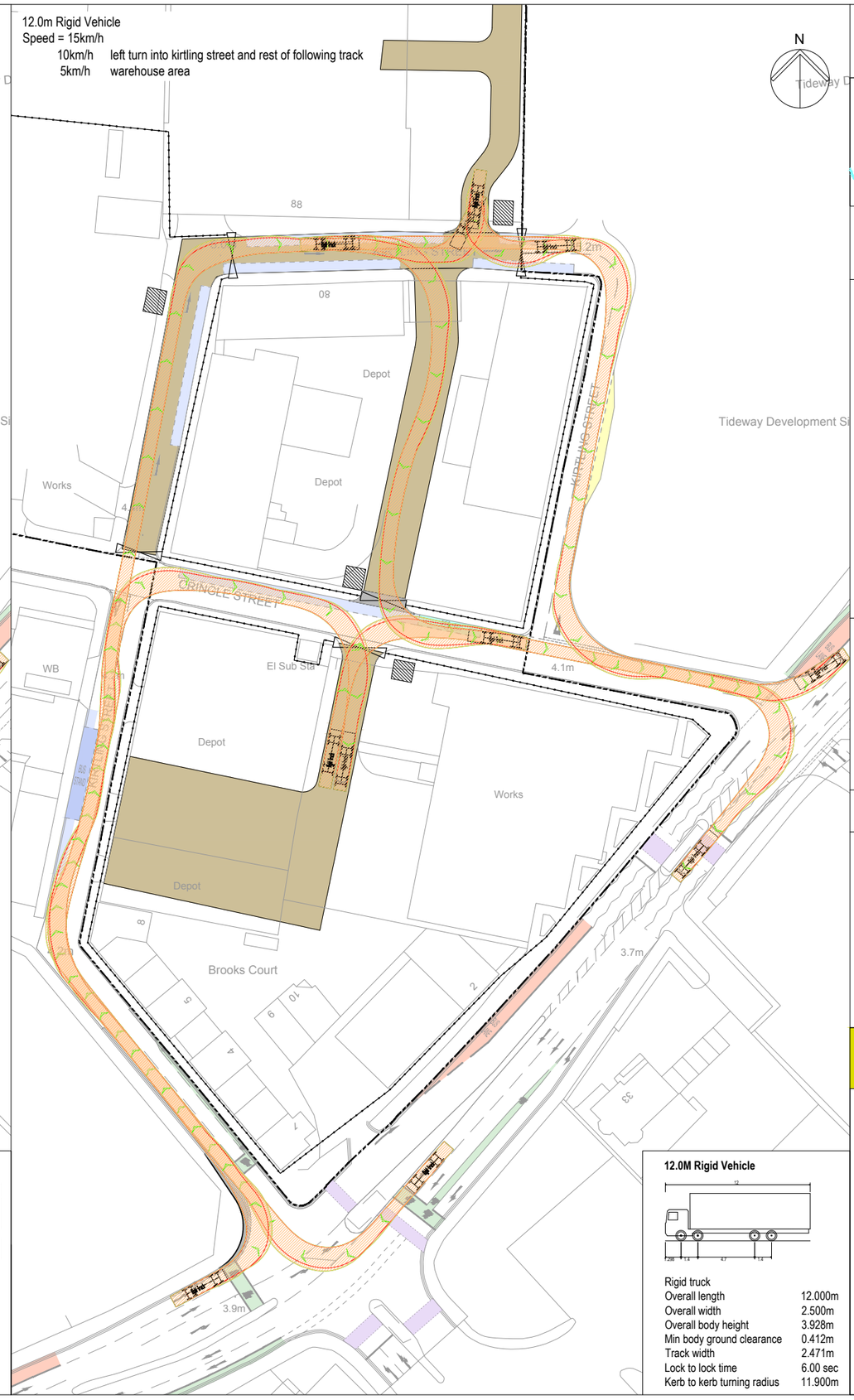


16.5M Articulated Vehicle

Max legal articulated vehicle (16.5m)

Overall length	16.500m
Overall width	2.500m
Overall body height	3.632m
Min body ground clearance	0.396m
Max track width	2.500m
Lock to lock time	6.00 sec
Kerb to kerb turning radius	6.870m

12.0m Rigid Vehicle
Speed = 15km/h
10km/h left turn into kirtling street and rest of following track
5km/h warehouse area



12.0M Rigid Vehicle

Rigid truck

Overall length	12.000m
Overall width	2.500m
Overall body height	3.928m
Min body ground clearance	0.412m
Track width	2.471m
Lock to lock time	6.00 sec
Kerb to kerb turning radius	11.900m

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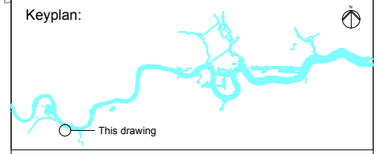
Keyplan:



Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing
- Parking restrictions
- On street parking
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line

Revised
- Removal of footway
- Suspended on street parking
- Suspended bus stand
- Temporary bus stand
- Illustrative on-site manoeuvring zone
- Security hut
- Site hoarding
- Access gate
- Limit of land to be acquired or used (LLAU)

Vehicle swept path analysis
- Vehicle body outlines
- Vehicle chassis outline
- Vehicle swept path

Standards
- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage
Phases 1 & 3

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Application for Development Consent

Highway layout during construction
(Area 1)
Vehicle swept path analysis

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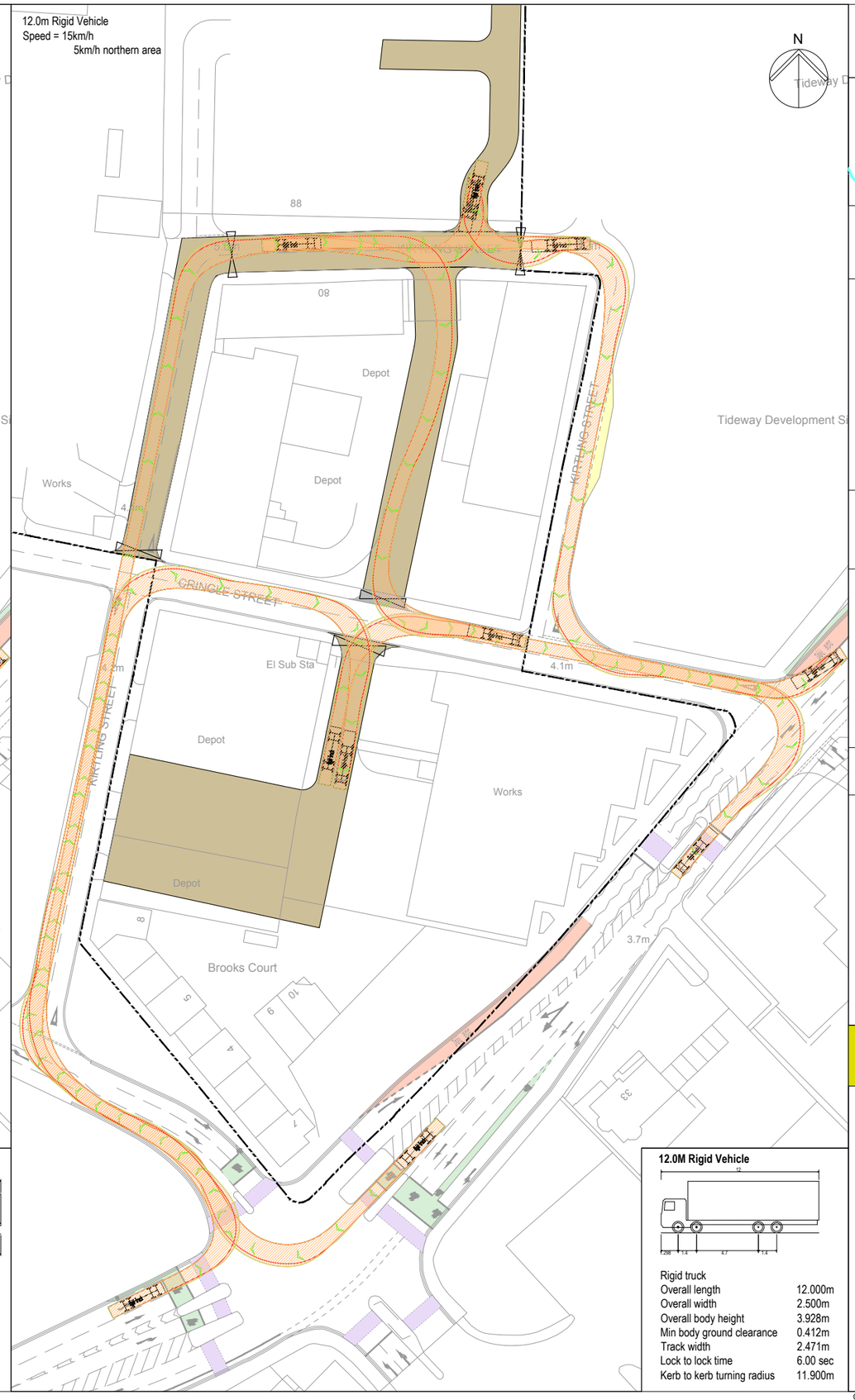
16.5m Articulated Vehicle
Speed = 15km/h
5km/h northern area

16.5M Articulated Vehicle

Max legal articulated vehicle (16.5m)

Overall length	16.500m
Overall width	2.500m
Overall body height	3.632m
Min body ground clearance	0.396m
Max track width	2.500m
Lock to lock time	6.00 sec
Kerb to kerb turning radius	6.870m

12.0m Rigid Vehicle
Speed = 15km/h
5km/h northern area



12.0M Rigid Vehicle

Rigid truck

Overall length	12.000m
Overall width	2.500m
Overall body height	3.928m
Min body ground clearance	0.412m
Track width	2.471m
Lock to lock time	6.00 sec
Kerb to kerb turning radius	11.900m

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Keyplan:

Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing
- Parking restriction
- On street parking
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line

Revised
- Removal of footway
- Illustrative on-site manoeuvring zone
- Access gate
- Limit of land to be acquired or used (LLAU)

Vehicle swept path analysis
- Vehicle body outlines
- Vehicle chassis outline
- Vehicle swept path

Standards
- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage
Phases 1 & 3

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Application for Development Consent

Highway layout during construction
(Area 1) Vehicle swept path analysis
(With Battersea PS)

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January 2013

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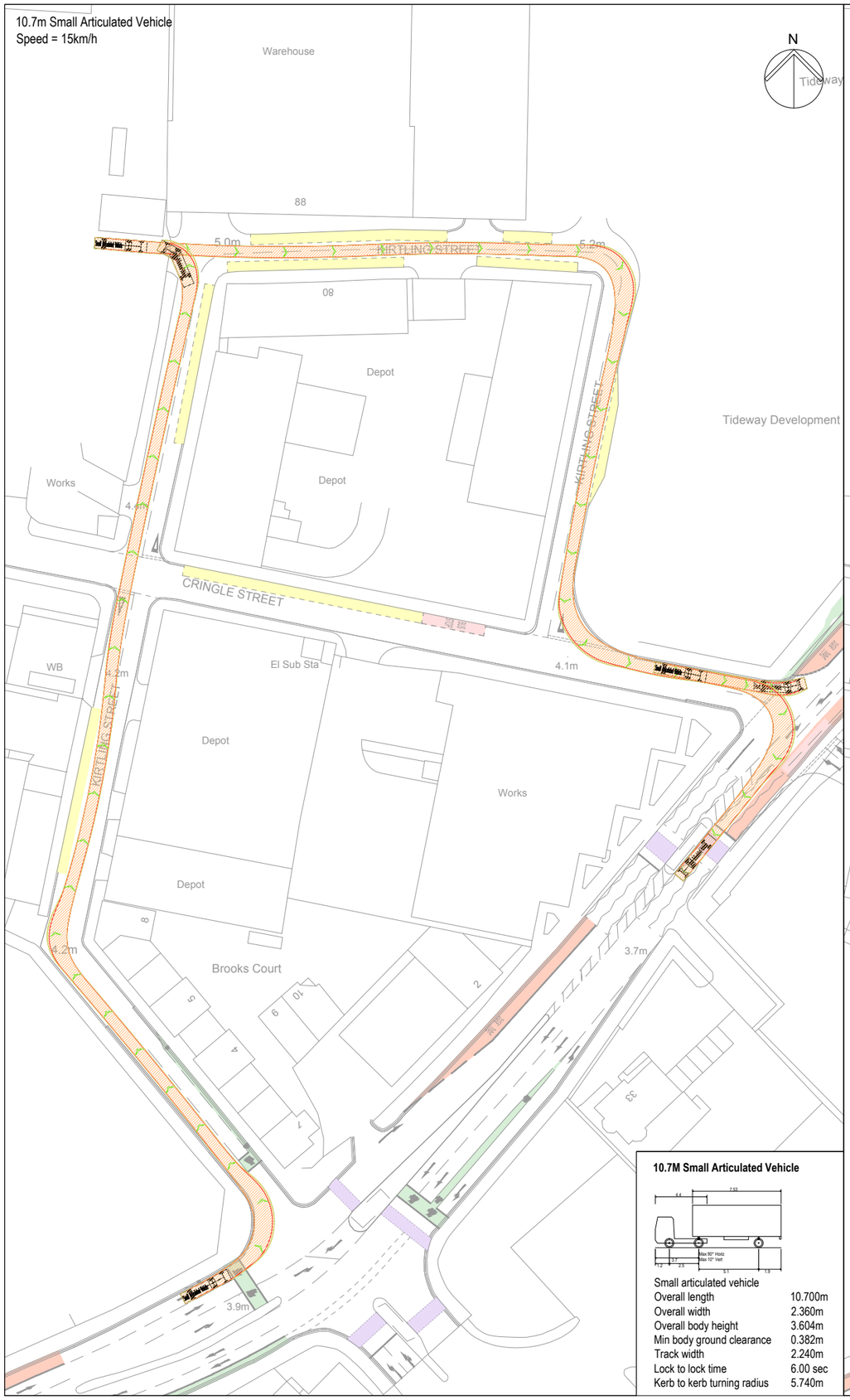
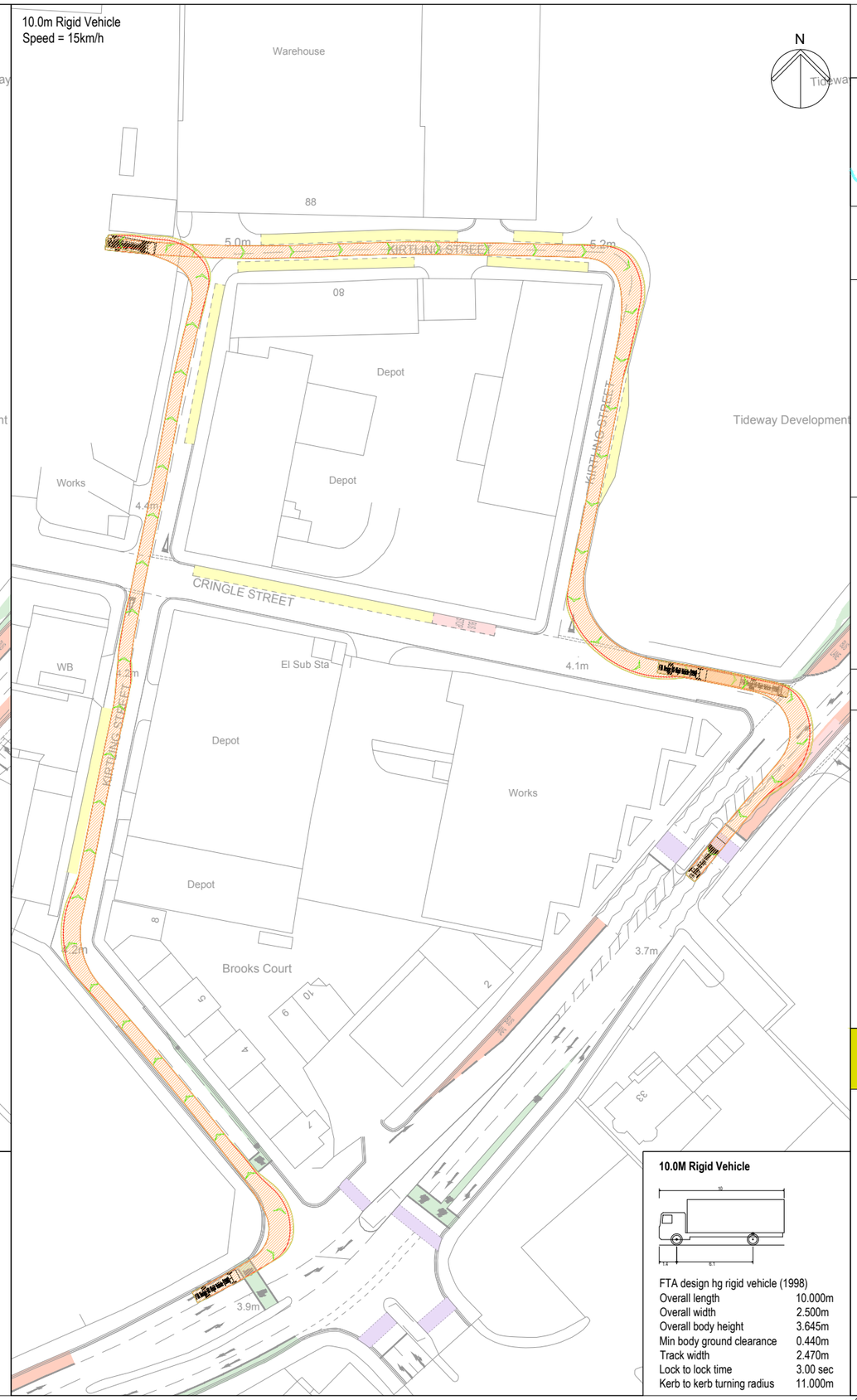
10.7m Small Articulated Vehicle
Speed = 15km/h



10.7M Small Articulated Vehicle

Small articulated vehicle	
Overall length	10.700m
Overall width	2.360m
Overall body height	3.604m
Min body ground clearance	0.382m
Track width	2.240m
Lock to lock time	6.00 sec
Kerb to kerb turning radius	5.740m

10.0m Rigid Vehicle
Speed = 15km/h



10.0M Rigid Vehicle

FTA design hg rigid vehicle (1998)	
Overall length	10.000m
Overall width	2.500m
Overall body height	3.645m
Min body ground clearance	0.440m
Track width	2.470m
Lock to lock time	3.00 sec
Kerb to kerb turning radius	11.000m

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Keyplan:

Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing
- Parking restrictions
- On street parking
- Bus lane
- Bus stop / stand
- Pedestrian crossing
- Cycle lane / advance stop line

Vehicle swept path analysis
- Vehicle body outlines
- Vehicle chassis outline
- Vehicle swept path

Standards
- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage
Permanent phase

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Application for Development Consent

Permanent highway layout
(Area 1)
Vehicle swept path analysis (sheet 1 of 2)

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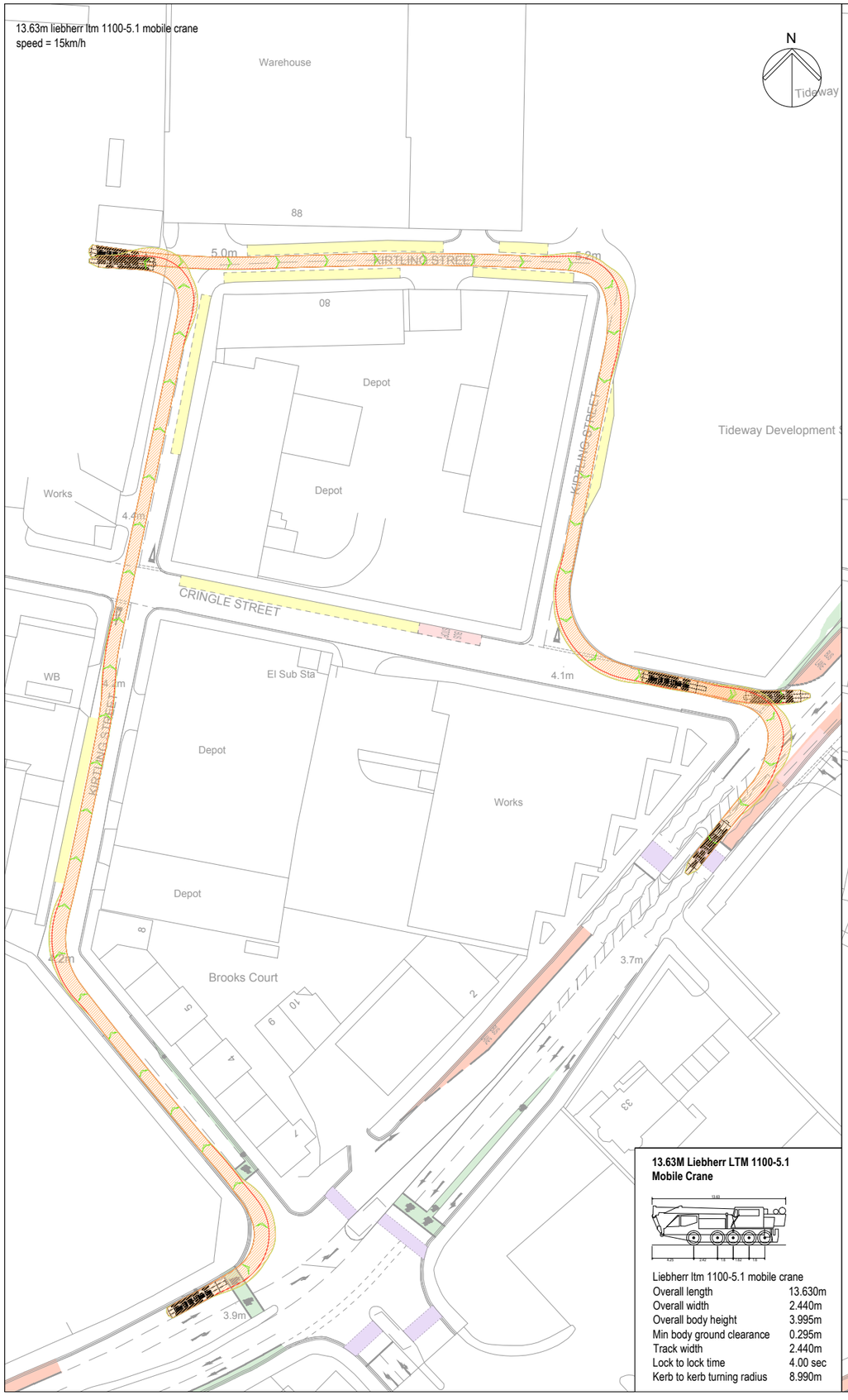
13.63m liebherr ltm 1100-5.1 mobile crane
speed = 15km/h



13.63M Liebherr LTM 1100-5.1 Mobile Crane

Liebherr ltm 1100-5.1 mobile crane	
Overall length	13.630m
Overall width	2.440m
Overall body height	3.995m
Min body ground clearance	0.295m
Track width	2.440m
Lock to lock time	4.00 sec
Kerb to kerb turning radius	8.990m

11.36m liebherr ltm 1055-3.1 mobile crane
speed = 15km/h

11.36M Liebherr LTM 1055-3.1 Mobile Crane

Liebherr ltm 1055-3.1 mobile crane	
Overall length	11.360m
Overall width	2.820m
Overall body height	3.733m
Min body ground clearance	0.353m
Track width	2.820m
Lock to lock time	4.00 sec
Wall to wall turning radius	8.170m

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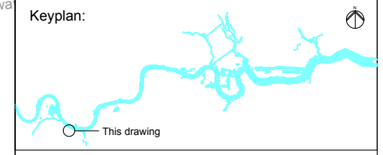
Keyplan:



Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing
- Parking restrictions
- On street parking
- Bus lane
- Bus stop / stand
- Pedestrian crossing
- Cycle lane / advance stop line

Vehicle swept path analysis
- Vehicle body outlines
- Vehicle chassis outline
- Vehicle swept path

Standards
- Design Manual for Roads and Bridges, Dft, 1992
- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage
Permanent phase

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Application for Development Consent

Permanent highway layout
(Area 1)
Vehicle swept path analysis (sheet 2 of 2)

DCO-PP-13X-KRTST-150030
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

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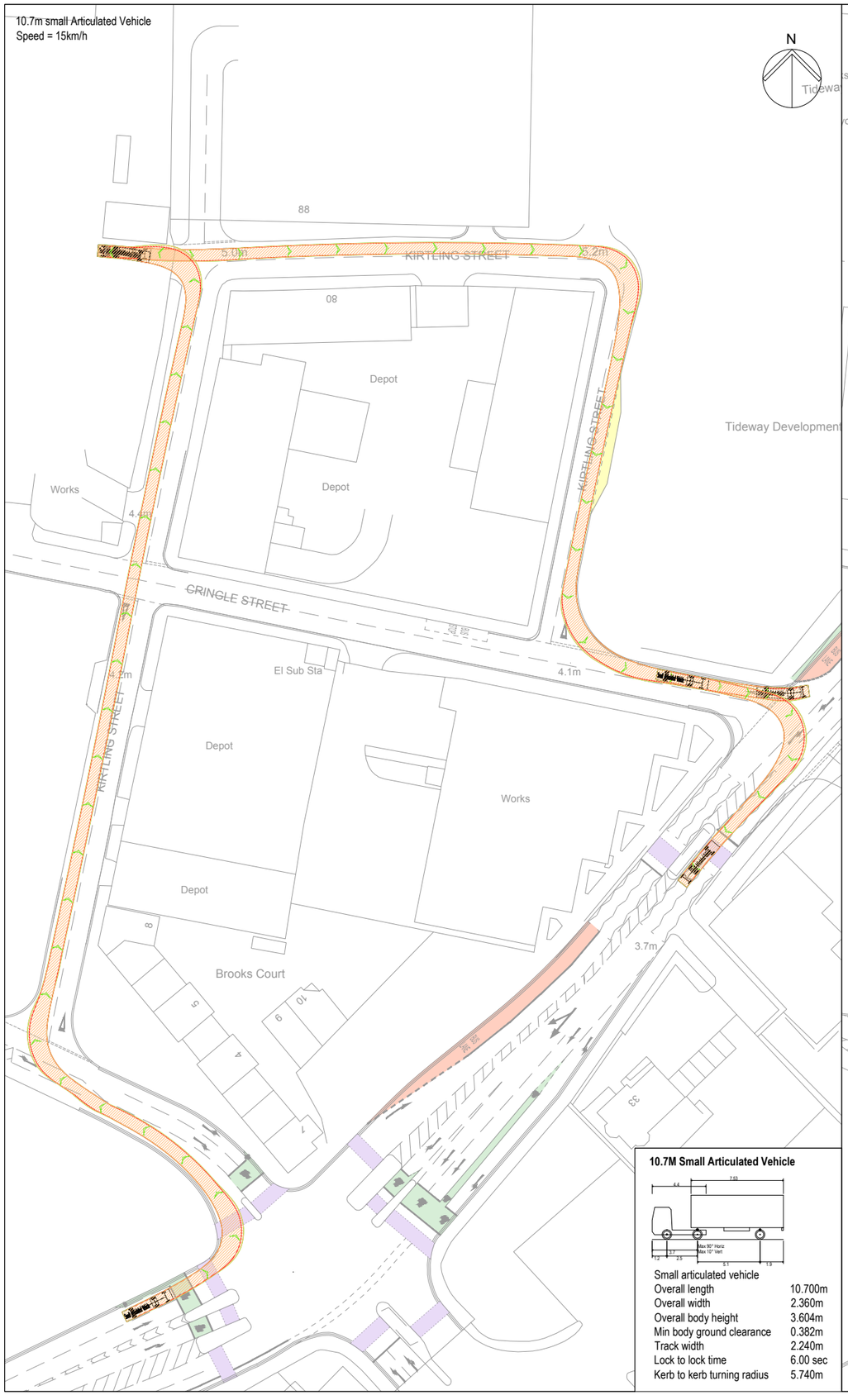
10.7m small Articulated Vehicle
Speed = 15km/h



10.7M Small Articulated Vehicle

Small articulated vehicle	
Overall length	10.700m
Overall width	2.360m
Overall body height	3.604m
Min body ground clearance	0.382m
Track width	2.240m
Lock to lock time	6.00 sec
Kerb to kerb turning radius	5.740m

10.0m Rigid Vehicle
Speed = 15km/h

10.0M Rigid Vehicle

FTA design hg rigid vehicle (1998)	
Overall length	10.000m
Overall width	2.500m
Overall body height	3.645m
Min body ground clearance	0.440m
Track width	2.470m
Lock to lock time	3.00 sec
Kerb to kerb turning radius	11.000m

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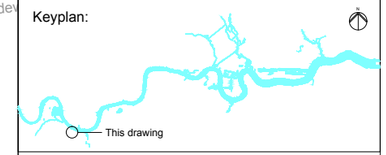
Keyplan:



Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing
- Parking restrictions
- On street parking
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line

Vehicle swept path analysis
- Vehicle body outlines
- Vehicle chassis outline
- Vehicle swept path

Standards
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- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage
Permanent phase

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Application for Development Consent

Permanent highway layout
(Area 1) - Vehicle swept path analysis
(With Battersea Power Station - sheet 1 of 2)

DCO-PP-13X-KRTST-150031
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

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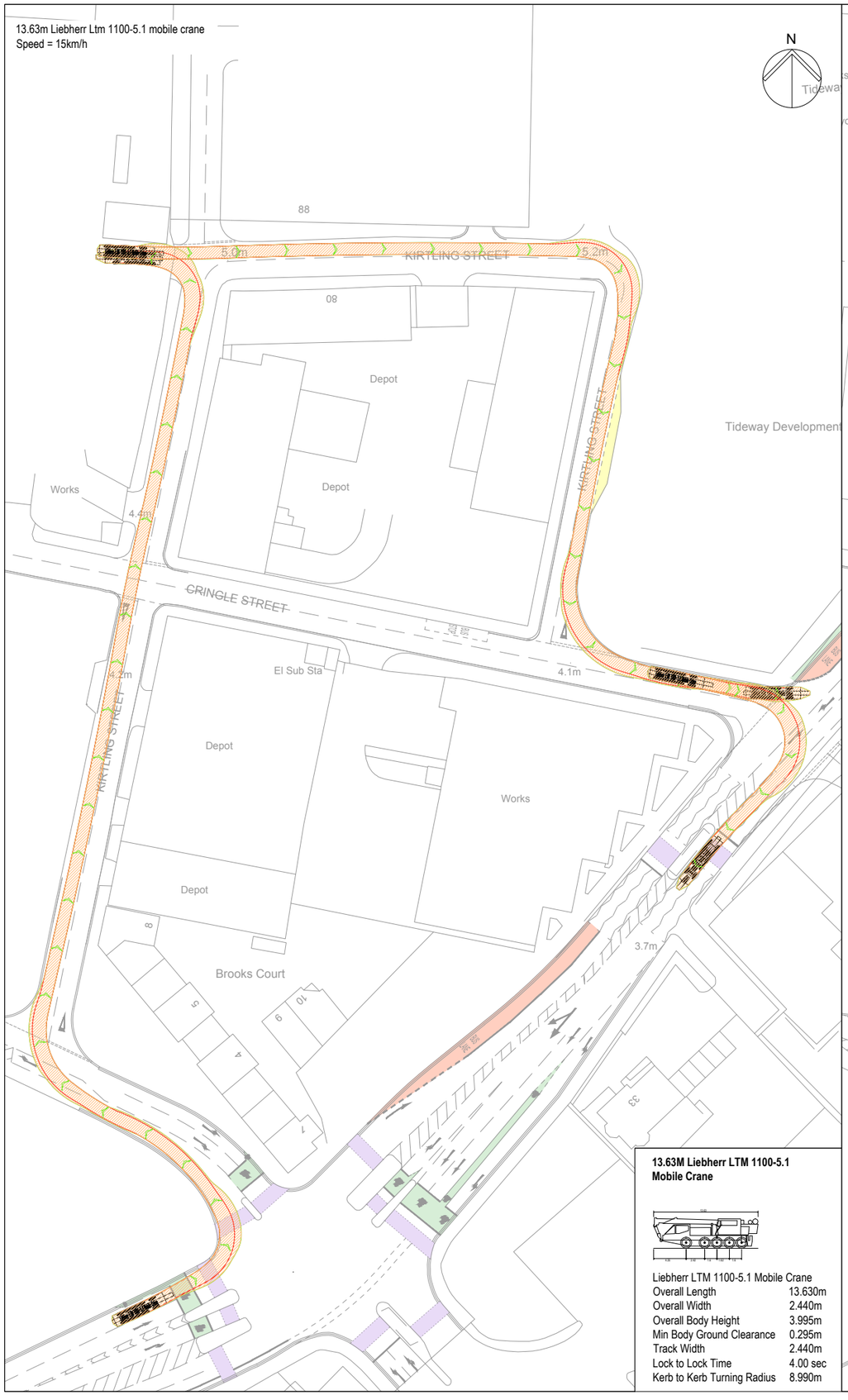
13.63m Liebherr Ltm 1100-5.1 mobile crane
Speed = 15km/h



13.63M Liebherr LTM 1100-5.1 Mobile Crane

Liebherr LTM 1100-5.1 Mobile Crane	
Overall Length	13.630m
Overall Width	2.440m
Overall Body Height	3.995m
Min Body Ground Clearance	0.295m
Track Width	2.440m
Lock to Lock Time	4.00 sec
Kerb to Kerb Turning Radius	8.990m

11.36m Liebherr ltm 1055-3.1 mobile crane
Speed = 15km/h

11.36M Liebherr LTM 1055-3.1 Mobile Crane

Liebherr LTM 1055-3.1 Mobile Crane	
Overall Length	11.360m
Overall Width	2.820m
Overall Body Height	3.733m
Min Body Ground Clearance	0.353m
Track Width	2.820m
Lock to Lock Time	4.00 sec
Wall to Wall Turning Radius	8.170m

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Keyplan:

Coordinates are to be Ordnance Survey Datum OSGB36. All levels are in metres and relate to the Tunnel Datum which is 100 metres below Ordnance Datum Newlyn.

Key

Existing
- Parking restrictions
- On street parking
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line

Vehicle swept path analysis
- Vehicle body outlines
- Vehicle chassis outline
- Vehicle swept path

Standards
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- Traffic Signs Regulations & General Directions, Tso, 2002
- Traffic Signs Manual, Dft, 2006
- Manual for Streets, Dft, 2007
- Manual for Streets 2, CIHT, 2010
- Designing for Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance on the use of Tactile Paving Surfaces, Dft, 1998
- Accessible Bus Stop Design Guidance, TfL, 2006

Stage
Permanent phase

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Application for Development Consent

Permanent highway layout
(Area 1) - Vehicle swept path analysis
(With Battersea Power Station - sheet 2 of 2)

DCO-PP-13X-KRTST-150032
January 2013

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Transport assessment figures

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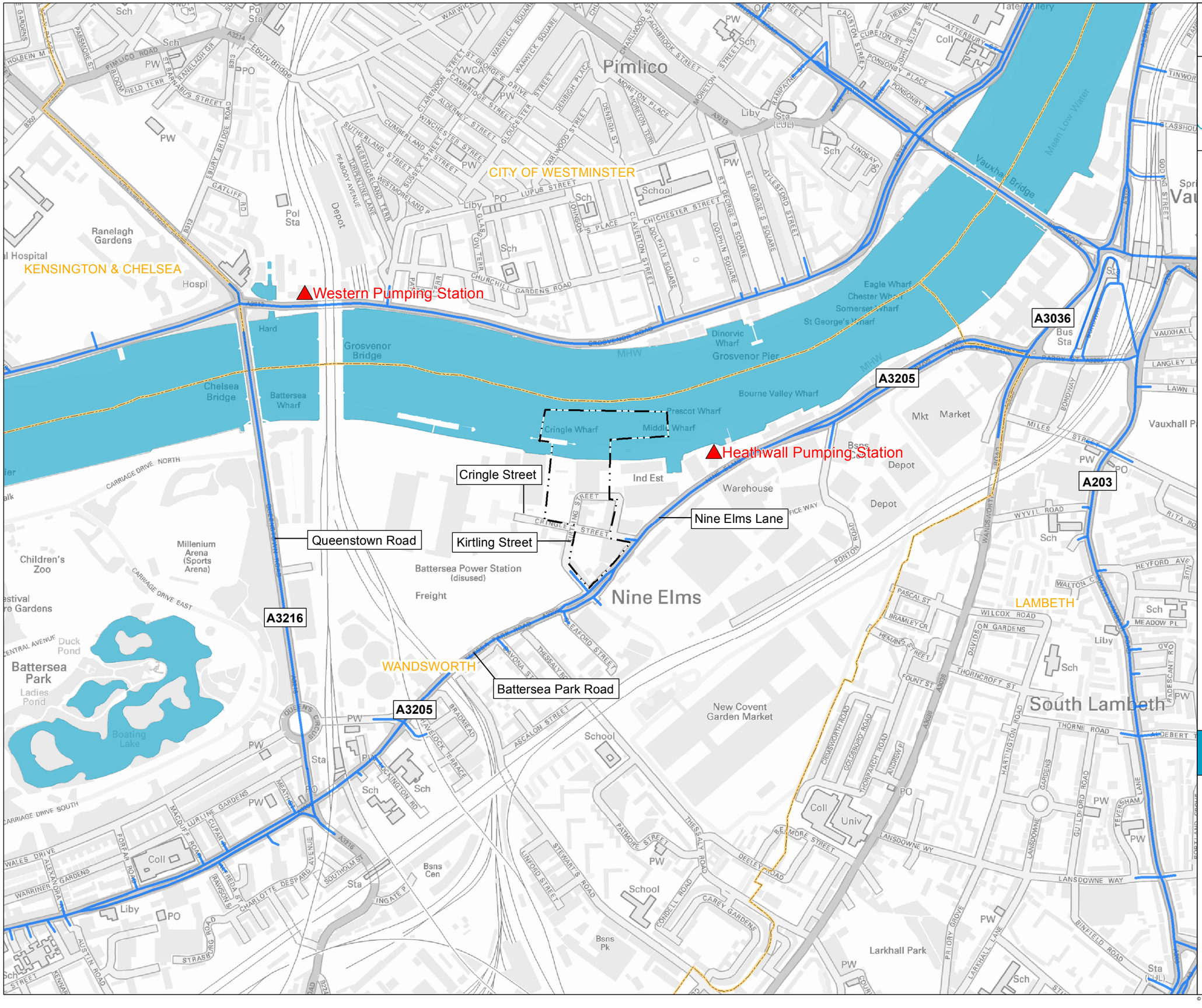

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Keyplan:

Key

- Pumping station
- TFL road network
- Limits of Land to be Acquired or Used
- Local authority boundary

110 55 0 110 m

Scale 1 : 7,500 at A3

FOR INFORMATION

Location
Kirtling Street
London Borough Of Wandsworth

Document Information
Transport Assessment
Transport - site location plan

Figure 14.2.1
1PL03-TT-50661
January 2013

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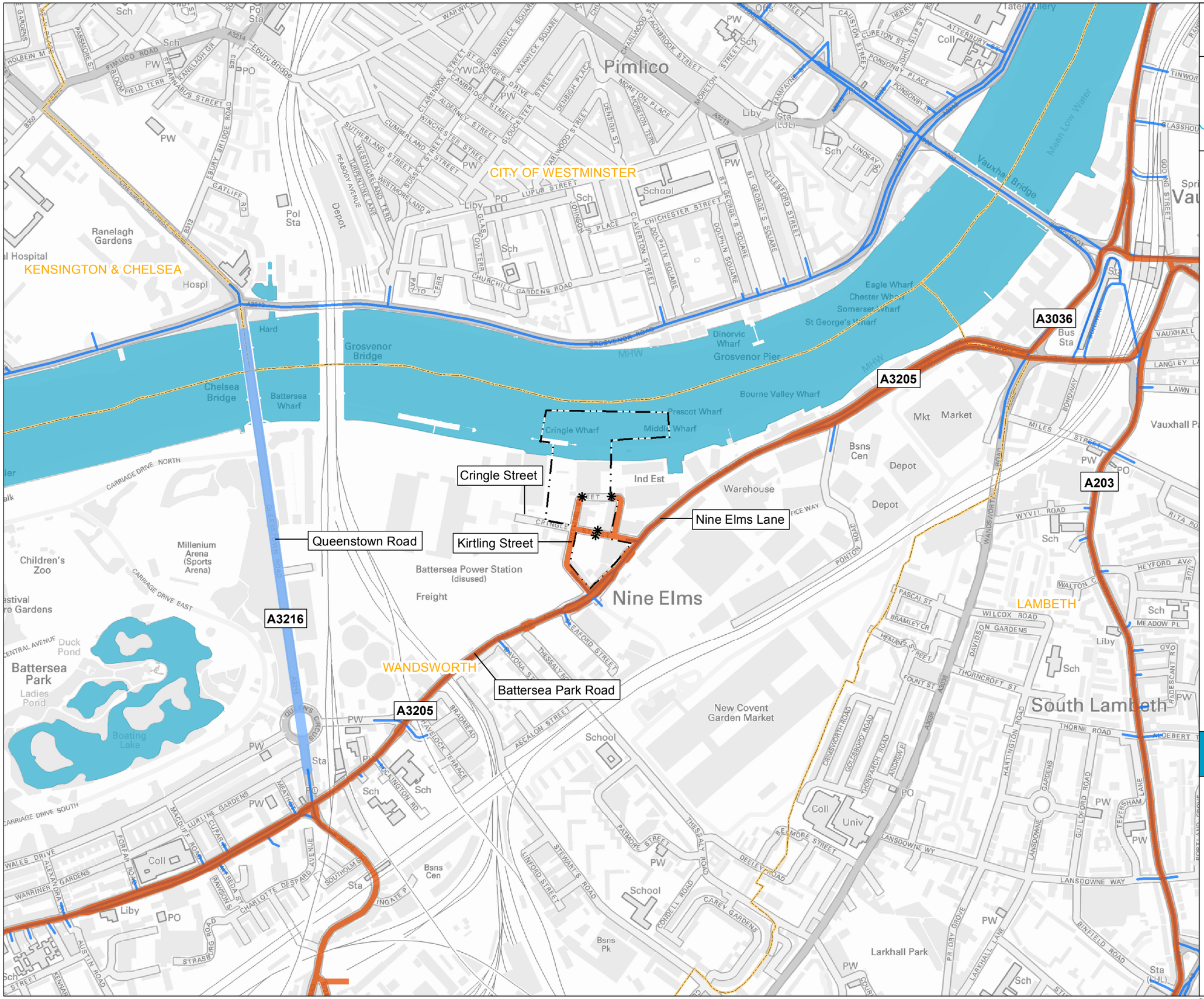

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Keyplan:

Key

- Site access
- TFL road network
- Strategic road network
- Primary construction route
- Limits of Land to be Acquired or Used
- Local authority boundary

110 55 0 110 m

Scale 1 : 7,500 at A3

FOR INFORMATION

Location
Kirtling Street
London Borough Of Wandsworth

Document Information
Transport Assessment
Transport - construction traffic routes

Figure 14.2.2
1PL03-TT-50653
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

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Keyplan:

Key

- National rail stations with cycle parking
- Underground stations with cycle parking
- Barclays cycle hire docking stations
- London cycle routes
- London strategic walk network
- Thames path
- Pedestrian routes

National cycle network

Route Type

- Open on-road
- Limits of Land to be Acquired or Used
- Local authority boundary

110 55 0 110 m

Scale 1 : 7,500 at A3

FOR INFORMATION

Location

Kirtling Street
London Borough Of Wandsworth

Document Information

Transport Assessment

Transport - pedestrian and cycle network

Figure 14.4.1

1PL03-TT-50669
January 2013

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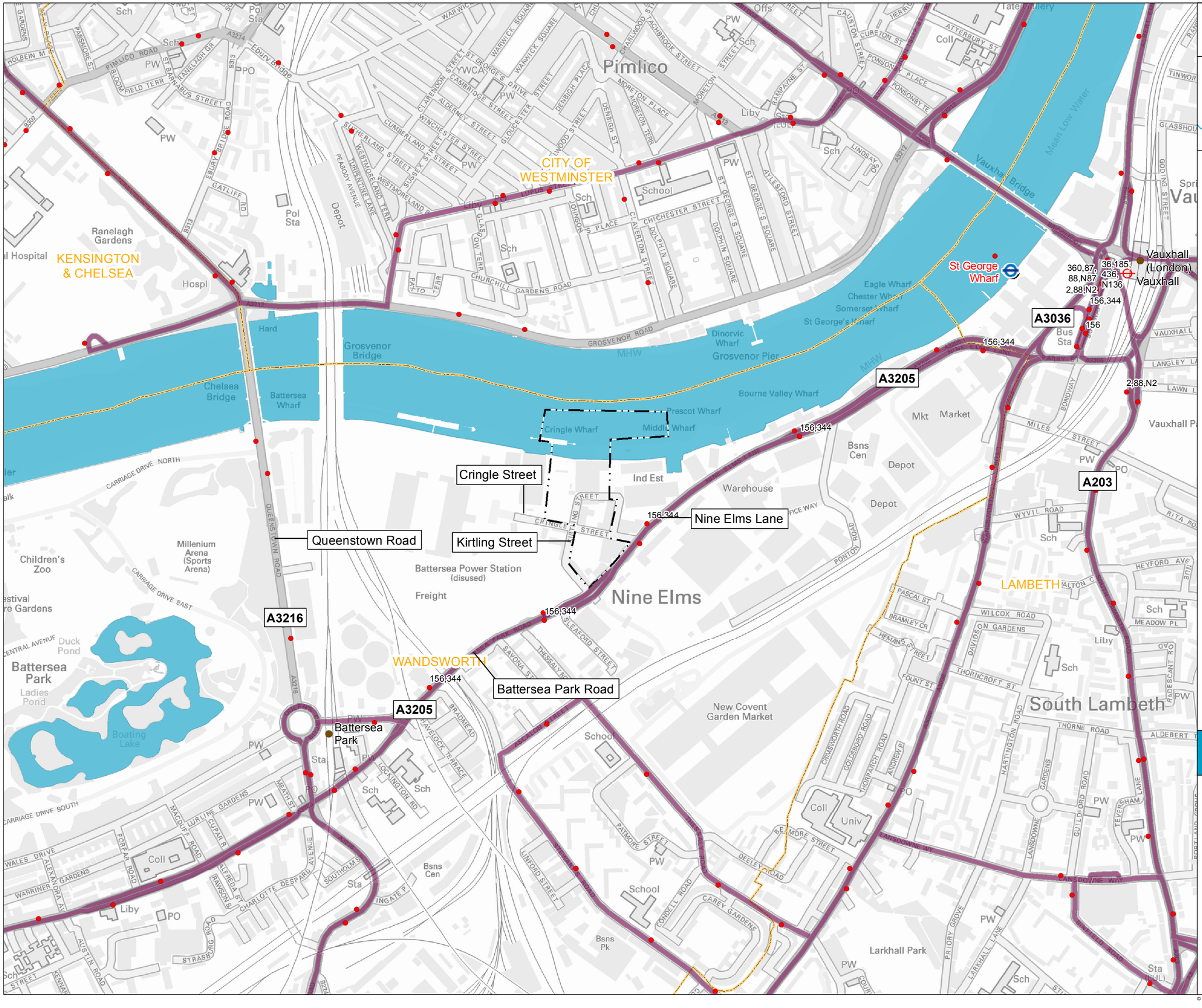

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Keyplan:

Key

- TFL bus stops
- National rail stations
- London underground stations
- Pier locations
- TfL bus routes
- Limits of Land to be Acquired or Used
- Local authority boundary

110 55 0 110 m

Scale 1 : 7,500 at A3

FOR INFORMATION

Location
Kirtling Street
London Borough Of Wandsworth

Document Information
Transport Assessment
Transport - public transport

Figure 14.4.2
1PL03-TT-50677
January 2013

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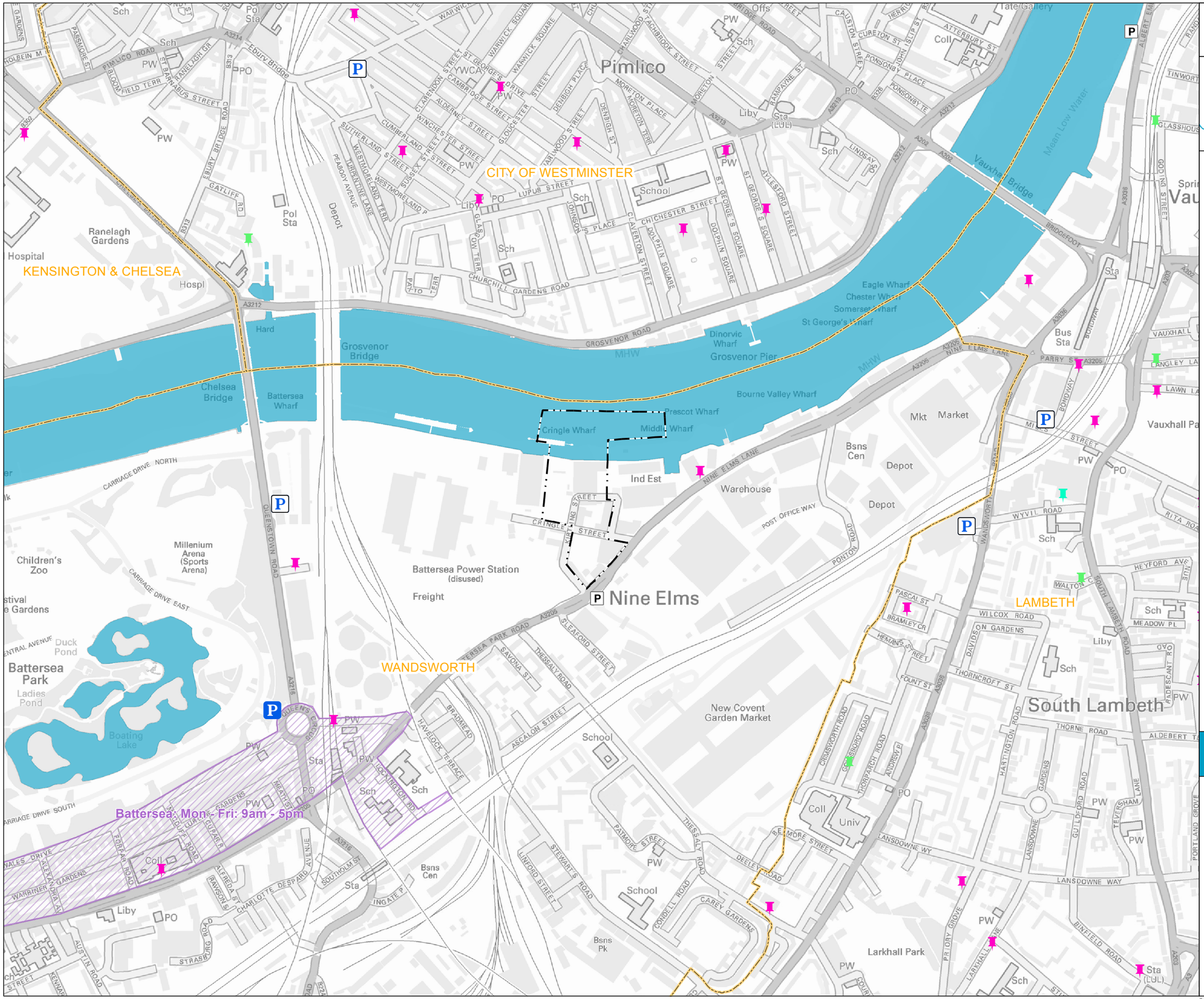

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Keyplan:

Key

- City Car
- Green Wheels
- Zip Car
- Council parking
- Private car parking
- Coach Parking
- Controlled Parking Zones and hours of operation
- Limits of Land to be Acquired or Used
- Local authority boundary

110 55 0 110 m

Scale 1 : 7,500 at A3

FOR INFORMATION

Location

Kirtling Street
London Borough of Wandsworth

Document Information

Transport Assessment

Transport - parking

Figure 14.4.3

1PL03-TT-50685
January 2013

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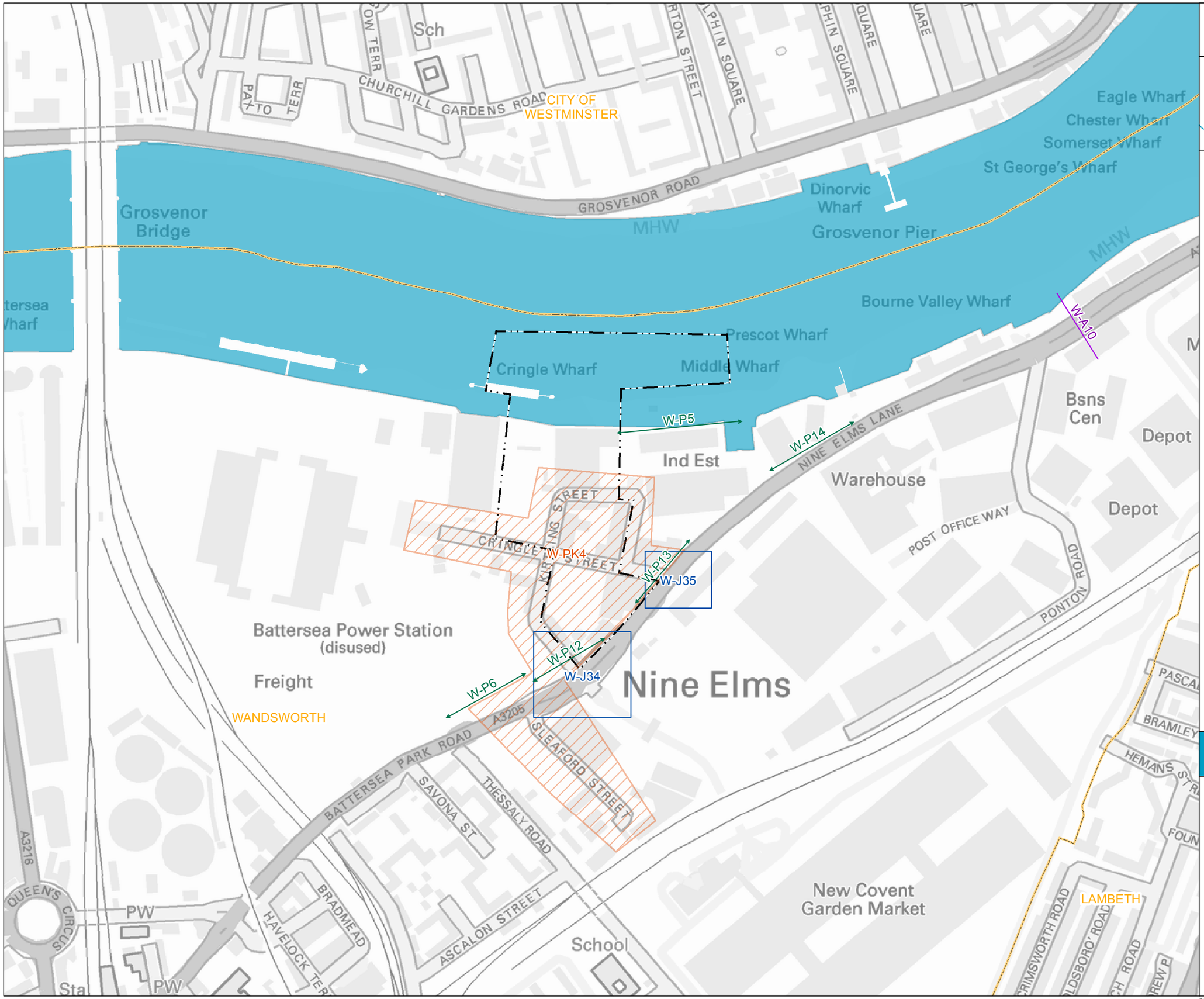

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Keyplan:

Key

- Automatic traffic count surveys
- Pedestrian and cycle surveys
- Junction surveys
- Parking surveys
- Limits of Land to be Acquired or Used
- Local authority boundary

60 30 0 60 m

Scale 1 : 4,000 at A3

FOR INFORMATION

Location
Kirtling Street
London Borough Of Wandsworth

Document Information
Transport Assessment
Transport - survey locations

Figure 14.4.4
1PL03-TT-50693
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

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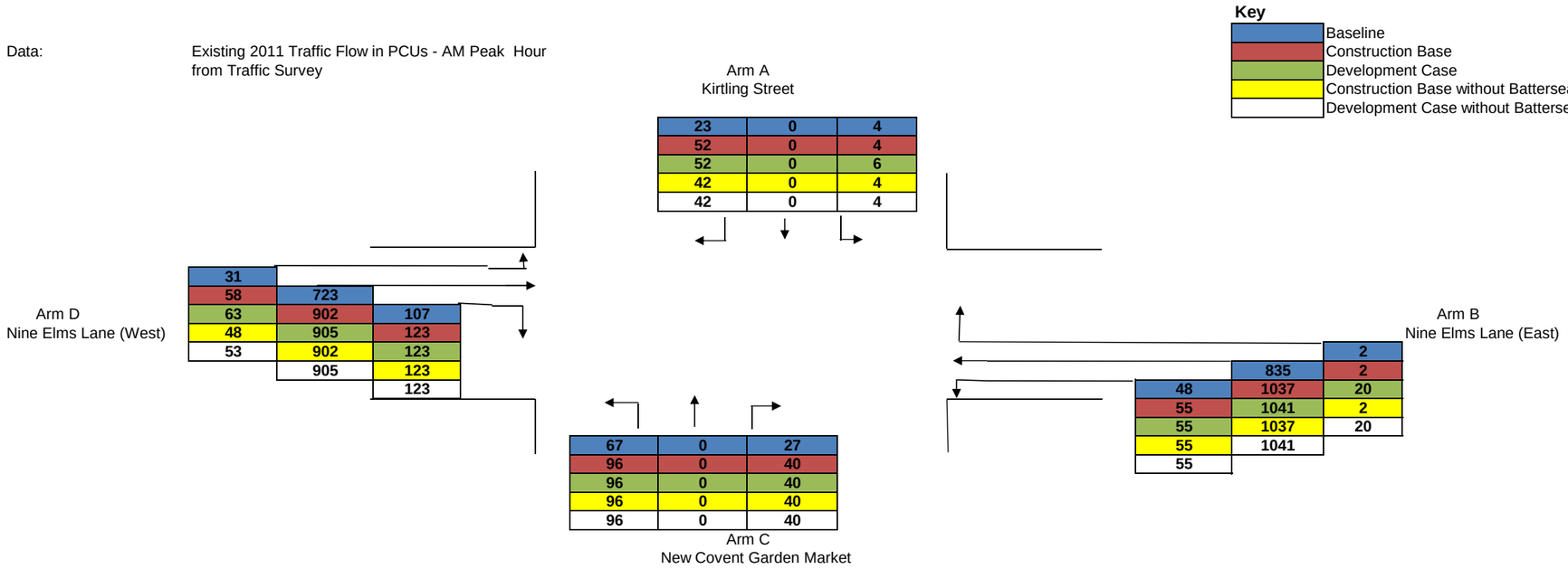
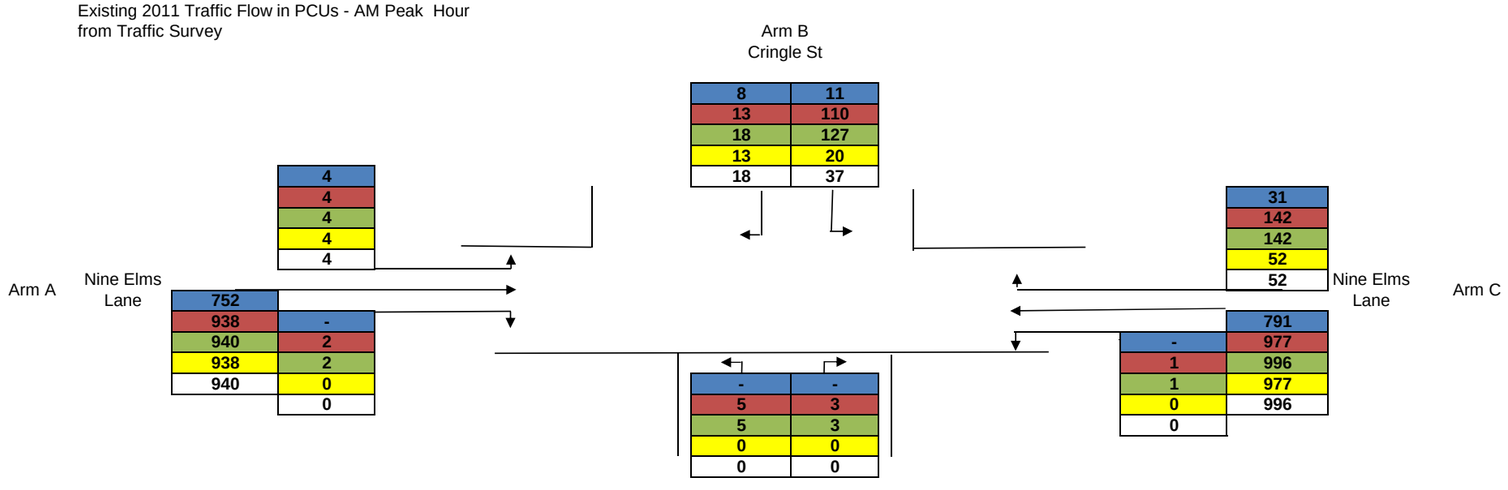
Site: Kirtling St
Borough: Wandsworth
Junction: Nine Elms Lane/ Kirtling St
Junction no.: PBA 24

Data: Existing 2011 Traffic Flow in PCUs - AM Peak Hour from Traffic Survey



Site: Kirtling St
Borough: Wandsworth
Junction: Nine Elms Lane/ Cringle St
Junction no.: PBA 26

Data: Existing 2011 Traffic Flow in PCUs - AM Peak Hour from Traffic Survey



FOR INFORMATION

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Transport Assessment

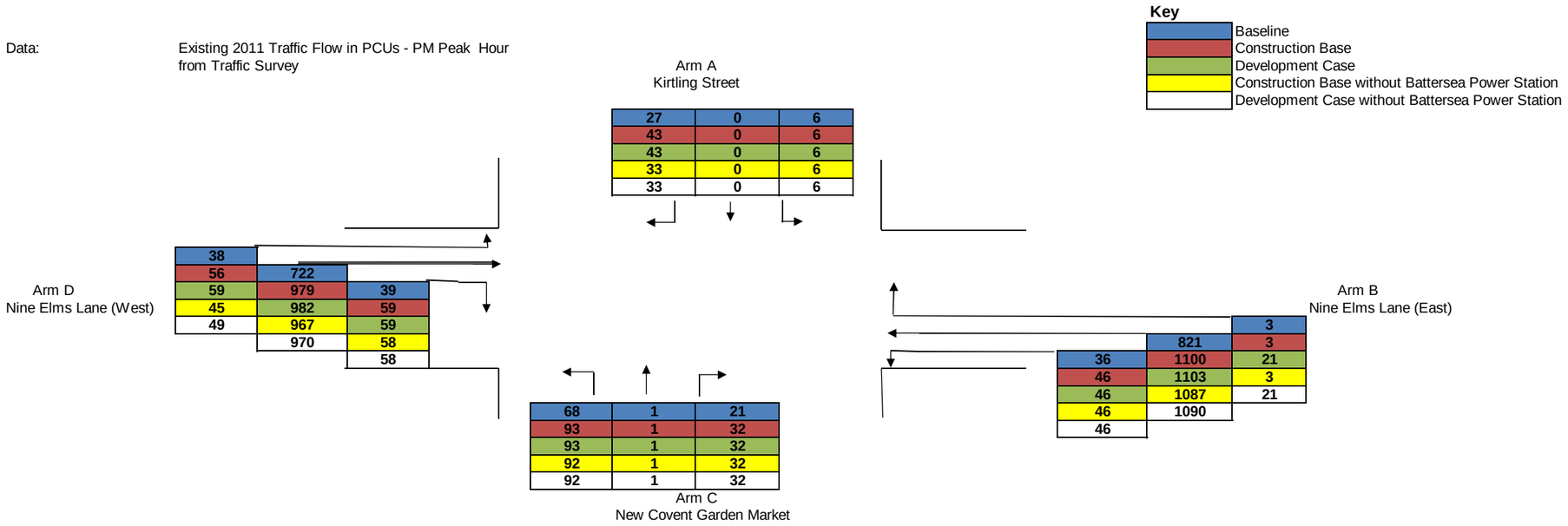
Baseline, Construction and Development case traffic flow (AM peak hour)

Figure 14.4.5
1PL03-TT-50912
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames
Thames Water

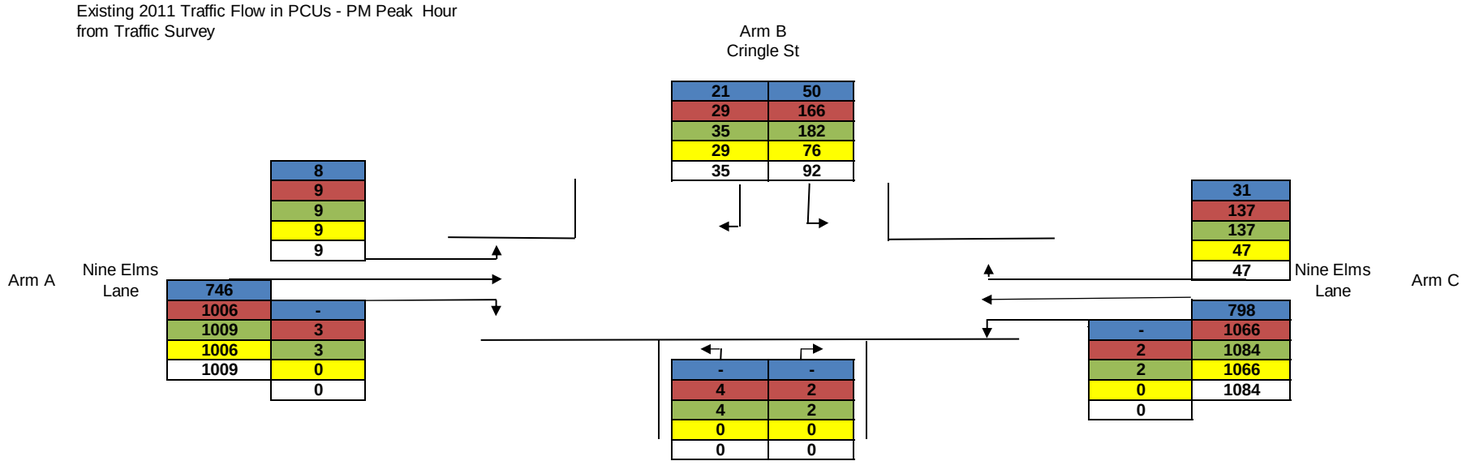
Site: Kirtling St
Borough: Wandsworth
Junction: Nine Elms Lane/ Kirtling St
Junction no.: PBA 24

Data: Existing 2011 Traffic Flow in PCUs - PM Peak Hour from Traffic Survey



Site: Kirtling St
Borough: Wandsworth
Junction: Nine Elms Lane/ Cringle St
Junction no.: PBA 26

Data: Existing 2011 Traffic Flow in PCUs - PM Peak Hour from Traffic Survey



FOR INFORMATION

Location
Kirtling Street
London Borough of Wandsworth

Document Information
Transport Assessment

Baseline, Construction and Development case traffic flow (PM peak hour)

Figure 14.4.6
1PL03-TT-50936
January 2013

Thames Tideway Tunnel
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Thames Water

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Keyplan:

Key

- Slight
- Serious
- Fatal
- Limits of Land to be Acquired or Used
- Local authority boundary

110 55 0 110 m

Scale 1 : 7,500 at A3

FOR INFORMATION

Location

Kirtling Street
London Borough Of Wandsworth

Document Information

Transport Assessment

Transport - accident locations

Figure 14.4.7

1PL03-TT-50757
January 2013

Thames Tideway Tunnel
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Thames Water

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Keyplan:

Key

Accidents

(Severity, Mode of travel)

- Slight, Pedestrian
- Slight, Pedal Cycle
- Serious, Pedestrian
- Serious, Pedal Cycle
- Fatal, Pedestrian
- Limits of Land to be Acquired or Used
- Local authority boundary

110 55 0 110 m

Scale 1 : 7,500 at A3

FOR INFORMATION

Location

Kirtling Street
London Borough Of Wandsworth

Document Information

Transport Assessment

Transport - pedestrian and cyclist accidents by severity
Figure 14.4.8

1PL03-TT-50841
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

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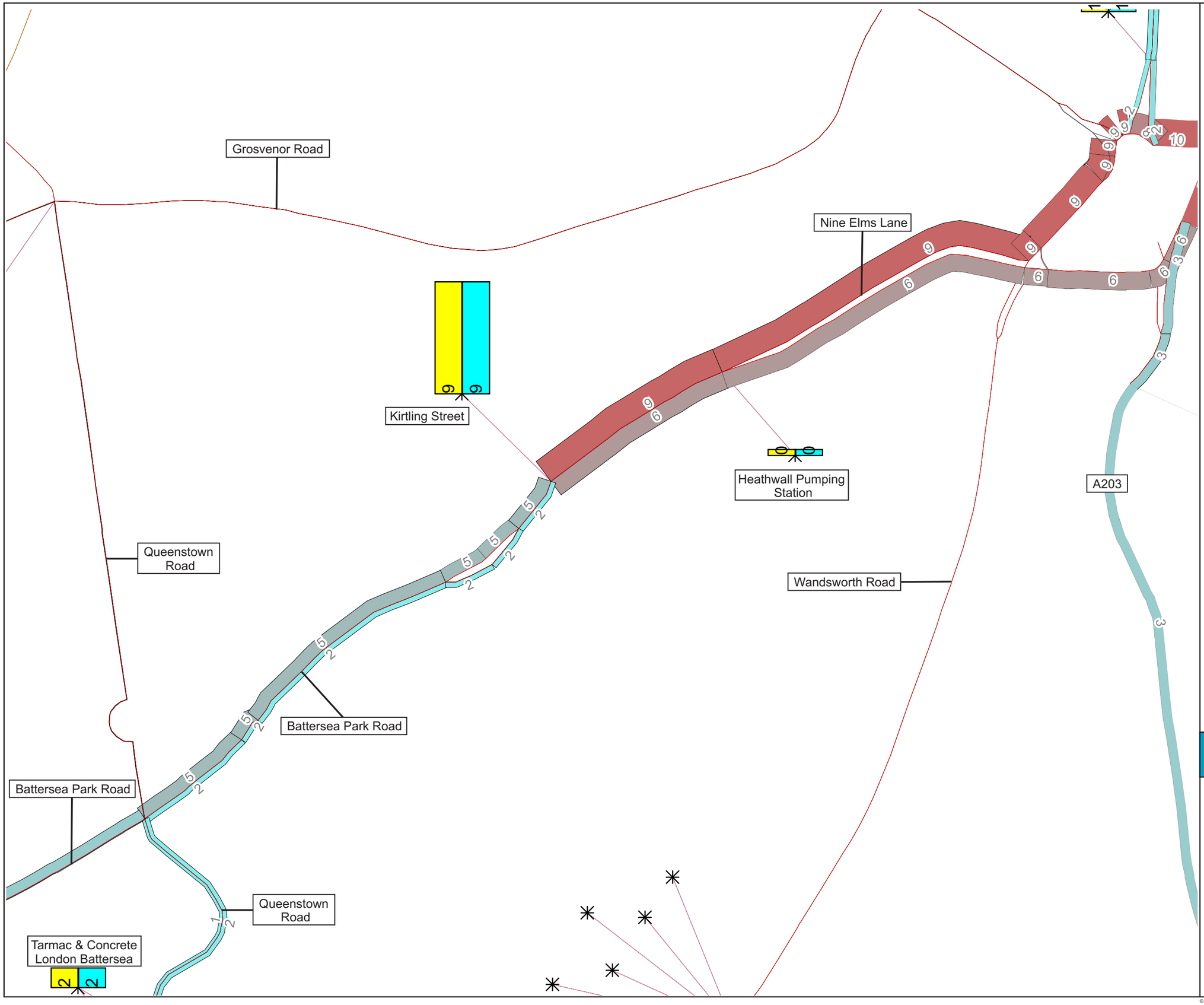

Hourly construction lorries arrivals and departures

- Arrivals
- Departures

Hourly construction lorries movements

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- 6 - 7
- 7 - 8
- 8 - 9
- 9 - 10
- 10 - 11
- 11 - 12
- 12 - 13
- 13 - 14
- 14 - 15
- > 15

Note: Construction vehicle flows include all Thames Tideway Tunnel sites on this network during this period.

FOR INFORMATION

Location

Kirtling Street
London Borough of Wandsworth

Document Information

Transport Assessment
Hourly Construction Lorry Movements - Site Year 3 of Construction

Figure 14.5.1

1PL03-TT-50878

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Thames Water Utilities Limited
Clearwater Court, Vastern Road, Reading RG1 8DB

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DCO-DT-000-ZZZZZ-071011