Thames Tideway Tunnel
Thames Water Utilities Limited

Application for Development Consent

Application Reference Number: WWO10001

Transport Assessment

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Acton Storm Tanks

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 4: Acton Storm Tanks

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4.1 Introduction

4.1.1 This site specific *Transport Assessment (TA)* presents the findings of the assessment of the transport effects of the Thames Tideway Tunnel project at the Acton Storm Tanks site located within the London Borough (LB) of Ealing.

4.1.2 The assessment takes into consideration the impacts of all other Thames Tideway Tunnel project sites to ensure that results indicate the impact of each individual site in combination with construction works being undertaken at other sites.

4.1.3 The purpose of this *TA* is to identify the site context, development proposals and any transport implications arising from these proposals to ensure that appropriate mitigation measures are identified, where necessary.

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

4.1.5 The *TA* structure is as follows:

a. Section 4.2 below 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 4.3 below outlines the assessment methodology used for the transport assessment for the construction and operational phases.

c. Section 4.4 below details the baseline conditions on the transport network surrounding the site, including survey data analysis and accident analysis.

d. Section 4.5 below provides the assessment of the construction phase of the project, including a comparison between the construction base case and the construction development case.

e. Section 4.6 below provides the assessment of the operational phase of the project.

f. Section 4.7 below summarises the transport assessment findings.

[i] 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).

4.2 Proposed development

4.2.1 The proposed development site is located on land within the existing Thames Water pumping station and storm water tanks fronting Warple Way and Canham Road, within the LB of Ealing, as shown in Figure 4.2.1 in the Acton Storm Tanks *Transport Assessment* figures.

4.2.2 Canham Road and industrial units lie to the north of Acton Storm Tanks site. To the east and southeast of the site lie Warple Way and multi storey residential properties. To the southwest and west there are further dwellings along Greenend Road.

Construction

4.2.3 The construction site would be located on land within the existing Thames Water pumping station and storm water tanks fronting Warple Way and Canham Road, within the LB of Ealing.

4.2.4 A temporary construction access would be created off Canham Road, on the northern perimeter of the site, and this would be arranged on a 'left in, left out' basis. Construction vehicles would access the site via the existing one way system along Warple Way, Canham Road and Stanley Gardens.

4.2.5 Construction at the Acton Storm Tanks site is anticipated to last for approximately three years. There would be two phases of construction phase 1 - covering site set-up and shaft construction, and phase 2 - construction of other structures and secondary lining. This would be followed with 12 months of site restoration and demobilisation. The highway layout during construction (areas 1-3) plans are provided in the Acton Storm Tanks *Transport Assessment* figures.

4.2.6 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.

4.2.7 During construction it is anticipated that the transport networks may be affected as a result of the additional construction traffic associated with the Acton Storm Tanks site, with changes to pedestrian and cycle routes and the temporary suspension of car parking bays.

4.2.8 As part of the construction phase, there would be a new gated access for the left-turn in / left turn out movement for construction traffic travelling eastbound along Canham Road approximately 75m west of Warple Way. The new access layout would include kerb realignment to ensure that vehicles could access the site without overrunning the footways. Either side of the footway, dropped kerbs would be put in place to improve connectivity for pedestrians. Pedestrian routes would not, however, require diversion during construction.

4.2.9 To accommodate larger construction vehicle manoeuvres on the one-way route along Warple Way, Canham Road and Stanley Gardens, a number of on-street parking bays would need to be suspended. Four sections of parking have been identified where a total of 78m of parking or approximately 15 vehicle spaces would need to be suspended.

4.2.10 A 16m length of parking, or three spaces, would be suspended along the eastern side of Warple Way, just north of the junction with Canham Road. Along the northern side of Canham Road a 41m length, or eight spaces, of parking bay would be suspended (opposite and to the west of the site access). On Stanley Gardens, two sections would be suspended on the western side of the carriageway, a 10m length, or two spaces, near to the corner with Canham Road and an 11m length, or two spaces, on the eastern side of the carriageway, just to the south of the junction with The Vale (A4020).

4.2.11 Parking for five essential maintenance/operational vehicles would be provided on site. No worker parking would be provided.

4.2.12 Construction details for the site relevant to the construction transport assessment are summarised in Table 4.2.1.

Table 4.2.1 Construction traffic details

Description	Assumption
Assumed peak period of construction lorry movements	Site Year 2 of construction
Assumed average peak daily construction lorry vehicle movements and duration	46 movements per day (23 vehicle trips) 1 month
Types of lorry requiring access	Office delivery lorries Pipe/track/oils/greases lorries Plant and equipment lorries Ready mix mixer lorries Steel reinforcement lorries Excavation lorries Imported fill lorries Cement tanker lorries Aggregate lorries.

Note: a movement is a construction vehicle 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

4.2.13 The site is located on Canham Road which is accessed off both Stanley Gardens and Warple Way via The Vale (A4020) which is part of the Strategic Road Network (SRN).

4.2.14 Figure 4.2.2 in the Acton Storm Tanks *Transport Assessment* figures shows the primary construction routes for the site and the main junctions along the immediate construction traffic routes are:

a. The Vale (A4020)/ Warple Way/ East Acton Lane traffic signal controlled crossroads

b. The Vale (A4020)/ Stanley Gardens uncontrolled T junction.

4.2.15 Connections to The Vale (A4020) would be made along the A40 via Old Oak Road or North Circular Road (A406) both of which form part of the Transport for London's Road Network (TLRN).

4.2.16 A new temporary construction access would be created off Canham Road along the northern perimeter of the Acton Storm Tanks site, which would be arranged on a 'left-in, left-out' basis.

4.2.17 Construction vehicles would access/leave the site via the existing one-way system consisting of Warple Way (southbound), Canham Road (eastbound) and Stanley Gardens (northbound). The road width is around 7.5m and the available carriageway widths are further reduced by on-street parking.

4.2.18 Construction routes have been discussed with both TfL and the Local Highway Authority.

4.2.19 The exact routing depends on the material origins and destinations which are detailed in the *Project-wide TA* (contained in Section 3).

Proposed construction flows

Construction vehicles

4.2.20 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).

4.2.21 Construction activity would occur twenty four 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.

4.2.22 A limited number of extensions to working hours may be required to cover certain construction activities at Acton Storm Tanks 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. 4.2.20 other than in exceptional circumstances.

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

4.2.24 All construction materials to and from this site would be transported by road.

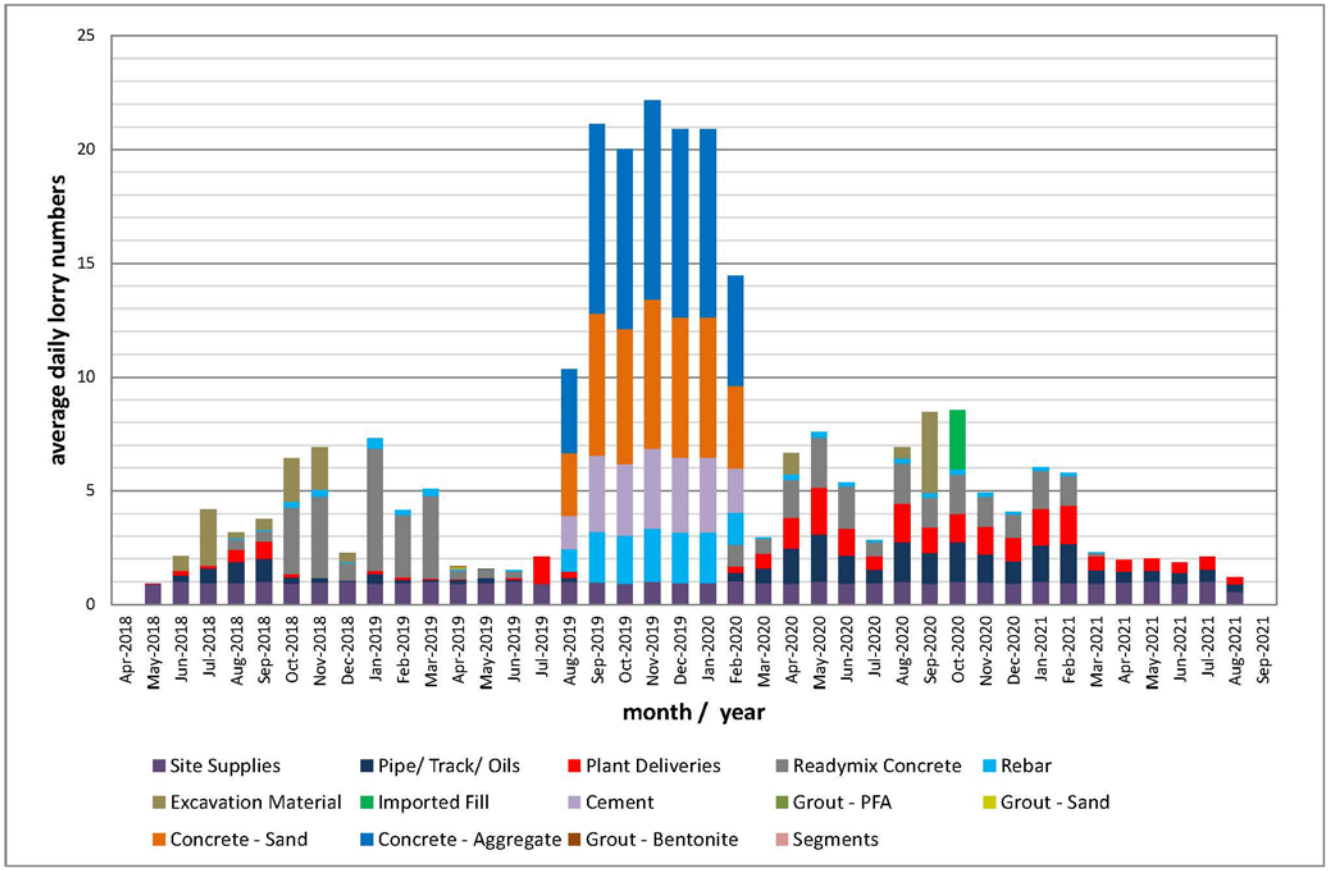
4.2.25 A site-specific peak construction assessment year has been identified. The histograms in Plate 4.2.1 show that the peak site-specific activity at the Acton Storm Tanks site would occur in Year 2 of construction. This site-specific peak is earlier than the overall project-wide construction peak activity year of 2019.

4.2.26 This *TA* assesses the site-specific peak construction year. As detailed in Table 2.2.1, there would be 46 (i.e. 23 two-way movements) assumed average peak daily construction lorry vehicle movements.

4.2.27 The number of vehicular movements would vary throughout the construction period, and Plate 4.2.1 indicates the construction vehicle profile during construction.

4.2.28 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.*

Plate 4.2.1 Estimated construction lorry profile



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

4.2.29 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.

4.2.30 The 07:00 - 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 4.4 below). 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.

4.2.31 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.

4.2.32 As indicated in Plate 4.2.1, the peak month in Year 2 of construction has 46 daily movements. In addition, there are a further six months with 20 movements or more a day during the three year build programme. The movements have been assumed to take place during the peak hours to give a busiest case assessment. The AM and PM peak hours are assumed to be 08:00 to 09:00 and 17:00 to 18:00 respectively.

Construction workers

4.2.33 The construction site is expected to require a maximum workforce of approximately 40 workers on site at any one time. The number and type of workers is shown in the Table 4.2.2.

Table 4.2.2 Maximum estimated construction worker numbers

Contractor		Client
Staff[a]	**Labour[b]**	**Staff[c]**
08:00-18:00	**08:00-18:00**	**08:00-18:00**
15	20	5

[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.

4.2.34 The worker mode split has been derived by taking the highest number of workers during the peak month and calculating the percentage of trips by mode using the 2001 Census[ii] journey to work data for the area in the

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

vicinity of the Acton Storm Tanks site. The Census data indicates that the predominant mode of travel for journeys to work in this area is by car.

4.2.35 The mode split outlined in Table 4.2.3 has been used to assess the impact of worker journeys on the highway and public transport networks.

Table 4.2.3 Transport mode split

Mode	Percentage of trips to site	Equivalent number of worker trips (based on 40 worker trips)	
		AM peak	PM peak
Bus	10.5%	4	4
National Rail*	6.9%	3	3
Tube	16.0%	6	6
Car driver	48.5%	19	19
Car passenger	2.8%	1	1
Cycle	3.5%	1	1
Walk	9.2%	4	4
River	0.5%	<1	<1
Other (taxi/motorcycle)	2.1%	1	1
Total	**100%**	**40**	**40**

*Note: Census mode shares have been used in the assessment to provide a robust analysis; notwithstanding that Travel Plan measures would be likely to reduce worker car journeys to a minimum. *The mode split is based on 2001 Census data which was collected before the introduction of London Overground services. As most overground sites used to serve National Rail, the numbers for London Overground mode split have been based on National Rail numbers as there are no National Rail sites in the vicinity of the Acton Storm Tank site*

4.2.36 Although no worker parking would be provided on-site, an assessment of potential worker vehicle movements has been included representing an unconstrained case to produce a robust assessment. The *Draft Project Framework Travel Plan* and site-specific *Workplace Travel Plan* would include measures to discourage workers from travelling by car or parking in surrounding streets. Information regarding the travel arrangements of these workers would be included in the *Construction Management Plan* and *Workplace Travel Plan* documents for the site.

4.2.37 It is difficult to predict with certainty the directions to and from which workers at the site would travel. 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.

Vehicle movement summary

4.2.38 Other construction vehicle movements associated with site operations and contractor activities would be cars and light goods vehicles. The

construction vehicle movements expected to be generated by the Acton Storm Tanks site are shown in Table 4.2.4

4.2.39 Table 4.2.4 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. The table also shows the construction worker vehicle movements expected to be generated by the site.

Table 4.2.4 Peak construction works vehicle movements

Vehicle type	Vehicle movements per time period				
	Total daily	**0700 to 0800**	**0800 to 0900**	**1700 to 1800**	**1800 to 1900**
Construction lorry vehicle movements 10%[a]	46	0	5	5	0
Other construction vehicle movements[b]	36	4	4	4	4
Worker vehicle movements[c]	38	19	0	0	19
Total	**120**	**23**	**9**	**9**	**23**

[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 based on 48.5% of workers travelling by car, derived by taking the highest number of workers during the peak month and calculating the % of trips using the 2001 Census Journey to Work data. This represents an unconstrained case to produce a robust assessment, as there would be no parking on site for workers and the Draft Project Framework Travel Plan and site-specific Travel Plan would include measures to discourage workers from travelling by car or parking in surrounding streets.*

4.2.40 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.

4.2.41 Based on the above, an average peak flow of 120 vehicle movements a day is expected during the months of greatest activity during Year 2 of construction at this site. At other times in the construction period, vehicle flows would be lower than this average peak figure.

4.2.42 Table 4.2.4 shows that in the AM (07:00 – 09:00) and PM (17:00 – 19:00) peak periods, the Acton Storm Tanks site would generate approximately

32 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 16:00 to 18:00 in the evening.

Code of Construction Practice

4.2.43 Measures incorporated into the C*ode of Construction Practice (CoCP) 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

4.2.44 In addition to the general transport measures within the *CoCP* Part A Section 5, the following transport measures have been incorporated into the *CoCP* Part B Acton Storm Tanks (Section 5):

a. the site access is to be from The Vale (A4020) via Warple Way and Canham Road with only a left turn into the site and left turn out. Vehicles would egress to The Vale (A4020) via Canham Road and Stanley Gardens

b. the site entrance would be designed to prevent any vehicles over swinging the footpath

c. safe access for construction vehicles would be maintained during winter conditions, along Warple Way, Canham Road and Stanley Gardens

d. a security barrier would be positioned to allow a standard rigid tipper vehicle to be wholly off the road whilst awaiting barrier operation

e. five sections of on-street parking on Canham Road, Warple Way and Stanley Gardens would be suspended with no reprovision

f. access to a third party vehicle parking area to be reduced to one lane at entrance for short period during construction. Access for general traffic would be maintained throughout, unless agreed otherwise

g. some temporary parking suspension would be required in a third party vehicle parking area during construction, but not for the duration of the construction period

h. the contractor would manage entry and egress of vehicles across the entrance and potential conflicts with pedestrians crossing, by use of measures such as traffic marshals. This is particularly for pedestrians going to/from the existing nursery.

4.2.45 Based on current travel planning guidance including TfL's '*Travel planning for new development in London*'[1], this development falls within the

threshold for producing a Strategic Framework Travel Plan. A *Draft Project Framework Travel Plan* has been prepared based on the TfL ATTrBuTE[iii] guidance. The *Draft Project Framework Travel Plan* addresses Project-wide travel planning measures and CoCP Part B addresses site-specific measures including the need for a Project-wide Travel Plan Manager, initial travel surveys during construction and a monitoring framework. It also contains requirements and guidelines for the development of site-specific plans. The site-specific travel planning requirements of relevance to the *Draft Project Framework Travel Plan* are as follows:

a. information on existing transport networks and travel initiatives for the Acton Storm Tanks site

b. a mode split established for the Acton Storm Tanks site construction workers to establish and monitor travel patterns

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

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

Other measures during construction

4.2.46 There are no other embedded design measures which are not outlined in the *CoCP* which are of relevance to the *TA* at the Acton Storm Tanks site.

Operation

4.2.47 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 the site will be infrequent and short term. On this basis the only elements considered are:

a. effects on car parking

b. effects on highway layout and operation.

4.2.48 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 site for maintenance. These have only been considered qualitatively because the 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 LB of Ealing and TfL.

4.2.49 The existing access at the Warple Way/Canham Road junction would be used by maintenance vehicles on a three to six monthly maintenance schedule. Vehicles would utilise the existing one-way route southbound

[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/.

along Warple Way, eastbound along Canham Road and northbound along Stanley Gardens.

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

4.2.51 Additionally, there would be more significant maintenance visits approximately every ten years, requiring access to enable two mobile cranes to be brought to the site. For these visits, the new vehicle access on Canham Road, used during construction, would be maintained and utilised for these larger vehicles. Again this access would be arranged on a 'left-in, left-out' basis. Construction vehicles would access/leave the site via the existing one-way system consisting of Warple Way (southbound), Canham Road (eastbound) and Stanley Gardens (northbound).

4.2.52 The highway layout during operation plans are provided in the Acton Storm Tanks site *Transport Assessment* figures and indicate the operational layout at the site.

4.3 Assessment methodology

Engagement

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

4.3.2 Whilst the effects associated with transport for the operational phase have been scoped out of the *Environmental Statement*, the *TA* examines the operational phase in order to satisfy the relevant stakeholders that technical issues have been addressed (ie, those associated with access for maintenance activities).

Consultees

4.3.3 Throughout the scoping and technical engagement process, the key stakeholders with regards to transport, primarily TfL and the relevant local borough for each site, have been consulted. For the Acton Storm Tanks site, the LB of Ealing has been consulted and the comments which have arisen relating directly to Acton Storm Tanks have been recorded and responded to accordingly.

4.3.4 The key issues arising from stakeholder engagement are:

a. The assessment should cover road safety, network impact, construction strategy, method statement, trip generation, freight management, travel plan and parking.

b. Road surfaces are to be returned to standard if damage is caused by the construction process.

c. The ability of Warple Way, Canham Road and Stanley Gardens to accommodate large vehicles was questioned.

d. Parking suspensions will be required on Warple Way, Canham Road and Stanley Gardens to allow construction vehicle access. Suspensions should be kept to a minimum.

e. The programme of construction works should be checked against the programme of utility works on Warple Way, Canham Road and Stanley Gardens. The Borough will seek to programme works to take place outside of Thames Tideway Tunnel construction period.

f. The Shepherd's Bush Gyratory experiences heavy congestion and construction vehicles should avoid routing through if possible.

g. The A4020 is a strategic route. General traffic must be kept moving along it at all times.

h. Vehicles must have their wheels washed before leaving the site to prevent site dirt being transferred to the highway.

i. Warple Way, Canham Road and Stanley Gardens are not on the Borough's gritting route during winter. Conditions during icy weather should be monitored and the Borough should be notified if the roads require gritting.

j. Construction lorry routes should avoid Holland Park roundabout, Shepherd's Bush gyratory and Earls Court one-way system if possible.

4.3.5 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 Ealing.

Construction

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

Construction assessment area

4.3.7 The assessment area for the Acton Storm Tanks site includes the length of Canham Road, from its junction with Warple Way to the junction with Stanley Gardens, which includes the site access. Warple Way, Stanley Gardens and the junctions of The Vale (A4020) / Warple Way/ East Acton Lane and The Vale (A4020) / Stanley Gardens have also been assessed.

4.3.8 These roads and junctions have been assessed for highway, cycle and pedestrian impacts. Effects on local bus services within 640m (see para. 4.4.26) of the site and rail services within 960m (see para. 4.4.26) of the site have also 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).

4.3.9 The effect of all other Thames Tideway Tunnel sites on the area surrounding Acton Storm Tanks has been taken into account within the assessment of the peak year of construction at this site.

4.3.10 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 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

4.3.11 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.*

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

4.3.13 The site-specific peak construction traffic year at Acton Storm Tanks is Year 2 of construction and the overall project-wide construction peak activity year is 2019.

4.3.14 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

4.3.15 The assessment for each site takes account of construction vehicle movements associated with the Acton Storm Tanks 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 Site Year 2 of construction.

4.3.16 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. It is expected that all of the other developments within 1km of the Acton Storm Tanks site would be complete and operational by Site Year 2 of construction and therefore form part of the base case.

4.3.17 For future year assessments the TfL West London (WeLHAM) has been used for the Acton Storm Tanks site. The model provides factors for the increase in vehicle-kilometres in the borough between the construction base year and 2021. The relevant growth factor for the site was applied to the traffic surveys collected in 2011 to produce 2012 flows for existing traffic.

4.3.18 Office and operational trips associated with the site were assigned to the TfL WeLHAM model using the EIA scenario and the project peak month. The assigned flows were added to the 2021 existing flows and the construction flows provide the turning movements for local modelling.

4.3.19 Construction traffic associated with other Thames Tideway Tunnel project sites using routes in this area has been included in the WeLHAM scenario.

4.3.20 This approach provides a robust assessment case for local modelling as the baseline traffic has been forecast to 2021, which is later than the site-specific peak year of construction, and no allowance has been made for existing traffic that might divert to other routes as a consequence of the use of local roads by the project related traffic.

Sensitivity testing

4.3.21 All materials to the Acton Storm Tanks site would be transported by road which represents the worst case highway impact.

Operation

4.3.22 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.

4.3.23 Given the level of transport activity associated with the Thames Tideway Tunnel during the operational phase, only the localised transport issues around the Acton Storm Tanks site are assessed. Other Thames Tideway Tunnel sites would not affect the area around Acton Storm Tanks in the operational phase and therefore are not considered in the assessment.

4.3.24 All developments within 1km of the site and would be complete and operational by Year 2 of operation. 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

4.3.25 The assessment area for the operational assessment remains the same as for the construction assessment as outlined in paras. 4.3.7 and 4.3.10

Operational assessment year

4.3.26 The operational assessment year has been taken as Year 2 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.

4.4 Baseline

4.4.1 This section sets out the baseline conditions on the local transport network in the vicinity of the Acton Storm Tanks site in 2012, with the exception of the traffic survey data which was collected in 2011.

Policy review

4.4.2 The site is located within the LB of Ealing; the relevant national, regional and local policy documents have been reviewed and a review is included in Appendix A.

Existing land use

4.4.3 The site is currently open space, forming part of the landscaped area of the pumping station, situated within the northern part of the pumping station site and adjacent to Canham Road.

4.4.4 The site comprises land largely within the curtilage of a Thames Water operational facility, which includes Acton Storm Tanks and associated pumping station covering an area of approximately 2ha.

4.4.5 The surrounding area is predominantly light industrial and residential in character with the nearest residential properties to the site situated on the southern side of Canham Road, adjacent to the existing pumping station boundary.

Existing access

4.4.6 There is an existing road access to the pumping station and storm tanks facility on the corner of Warple Way and Canham Road, approximately 400m to the south of The Vale (A4020).

Pedestrian network and facilities

4.4.7 The key pedestrian network and facilities in the vicinity of the site are shown in Figure 4.4.1 in the Acton Storm Tanks *Transport Assessment* figures and comprises:

a. Canham Road – Rugby Road to the west providing a connection to bus stops on Southfield Road and The Avenue

b. Warple Way and Stanley Gardens to the north providing two connections to access bus stops on The Vale (A4020)

c. The Vale (A4020) – East Acton Lane to the east providing a connection to bus stops on Acton Lane.

Canham Road

4.4.8 Canham Road provides an east–west link between Warple Way to the west and Stanley Gardens in the east. Canham Road has footways on both sides of the carriageway, although these are narrow near to the construction site boundary with a maximum width of 1.7m. There is a pedestrian footpath to Rugby Road from the western end of Canham Road.

Plate 4.4.1 Footway looking west along Canham Road

Warple Way

4.4.9 Warple Way, which bounds the site to the east and southeast, provides a link between the site and The Vale (A4020). Warple Way also provides a connection to Canham Road to the west and Cobbold Road to the east.

4.4.10 There are footways on both sides of the road with widths of between 2.0m and 3.5m. There is a footpath at the southern end of Warple Way providing a link to Woodstock Road. At the southernmost end of Warple Way pedestrians can access a private car park located along the southern boundary of the site.

Plate 4.4.2 Footway along Warple Way looking north from Canham Road junction

Stanley Gardens

4.4.11 Stanley Gardens is located to the north of the site and provides a connection between Canham Road to the south and The Vale (A4020) to the north. It has footways along both sides of the road with widths of approximately 2.0m to 2.5m.

4.4.12 There are no formal pedestrian crossing facilities at the junction of The Vale (A4020) and Stanley Gardens.

Plate 4.4.3 Footway along Stanley Gardens looking north

The Vale (A4020)

4.4.13 There is good pedestrian access along The Vale (A4020), with footway widths of 4.0m on the southern side of the carriageway, providing a connection between Uxbridge Road (A4020) to the east and High Street (A4020) to the west.

4.4.14 There are dropped kerbs and signalised pedestrian crossing points at the junction of The Vale (A4020)/ Warple Way/ East Acton Lane. There are no formal pedestrian crossing facilities at the junction of The Vale (A4020)/Stanley Gardens.

Cycle network and facilities

4.4.15 The existing cycle network and facilities in the vicinity of the site are described below and illustrated in Figure 4.4.1 in the Acton Storm Tanks *Transport Assessment* figures.

4.4.16 There are a number of signed routes on busier roads for cyclists near to the site. In the local area, these signed routes include:

a. Sections of St Albans Avenue, Speldhurst Road and Rusthall Avenue to the southwest of the site

b. The Vale (A4020) to the north

c. Larden Road, Cobbold Road, Warple Way (south of the junction with Canham Road)

d. Valetta Road (between Warple Way and Larden Road).

4.4.17 A contraflow cycle lane exists along Warple Way, south of the Canham Road junction.

4.4.18 Advanced stop lines are provided in both directions along The Vale (A4020) at the junction with Warple Way.

4.4.19 A short section of advisory cycle lane is provided in the westbound direction on The Vale (A4020), across the junction with Stanley Gardens. This advisory route leads into a bus lane just to the west of the Stanley Gardens junction.

4.4.20 Lightly trafficked roads in the area, and therefore quieter routes for cyclists include:

a. Rugby Road, Southfield Road, Somerset Road and St Albans Avenue to the west

b. the one-way route of Warple Way, Canham Road, and Stanley Gardens directly north of the site

c. Valetta Road, Agnes Road, and Bromyard Avenue to the east.

4.4.21 There are additional quiet routes further north, along East Acton Lane and across the adjacent park.

Barclays Cycle Superhighways

4.4.22 Barclays Cycle Superhighways (CS) are new cycle routes that run between central London and outer London, providing cyclists with safer, faster and more direct journeys into the city. The cycle lanes have bold road markings and signage which increase awareness among other road users. They incorporate information about journey times and links to other cycle routes along these CS routes.

4.4.23 There are no Barclays CS in close proximity to the site. The closest is CS8, which runs from Wandsworth to Westminster and is located some 8km to the south on York Road in Wandsworth, at its closest point to the Acton Storm Tanks site.

Barclays Cycle Hire scheme

4.4.24 There are no Barclays Cycle Hire docking stations in the vicinity of the site.

Cycle parking

4.4.25 There are no cycle parking facilities in the vicinity of the site.

Public transport

Public Transport Accessibility Level

4.4.26 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) and assumes a walking speed of 4.8 km/h and

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

4.4.27 Using this methodology the site has a PTAL rating of between 2 and 3, rated as 'poor' to 'average' (with 1 being the lowest accessibility and 6b being the highest accessibility). The following sections detail the public transport services in the vicinity of the site. Figure 4.4.2 in the Acton Storm Tanks *Transport Assessment* figures indicates the public transport services in the vicinity of the site.

Bus services

4.4.28 A total of six daytime bus routes and four night bus routes operate within a 640m walking distance of the Acton Storm Tanks site. These bus services serve a number of local and wider destinations in all directions from the site. Table 4.4.1 provides a summary of the bus services and their frequencies during the weekday peaks.

4.4.29 These bus routes operate from the following bus stops:

a. Rugby Road bus stop on Southfield Road – northbound and southbound located 300m walking distance southwest

b. Acton Park / Greenview Close bus stop on East Acton Lane – northbound and southbound located 350m walking distance northeast

c. East Acton Lane bus stop on The Vale (A4020) – eastbound and westbound located 400m walking distance north

d. Bedford Park, St. Peters Church bus stop on Southfield Road - eastbound and northbound located 500m walking distance southwest

e. Blandford Road bus stop on The Avenue (B491) – northbound and southbound located 550m walking distance southwest

f. Bromyard Avenue bus stop on The Vale (A4020) – eastbound and westbound located 550m walking distance northeast.

Table 4.4.1 Existing day time local bus services and frequency (number of buses per hour)*

Bus number	Weekday two-way frequency		Nearest bus stop to the site	Approximate walking distances from the site	Origin – destination
	AM peak (08:00-09:00)	PM peak (17:00-18:00)			
70	5-10	5-7	Acton Park / Greenview Close on East Acton Lane	350	Acton Market Place – Queensbury Place
	4-9	5-9			Queensbury Place - Acton Market Place
207	8-15	8-15	East Acton Lane on The Vale (A4020)	400	Hayes Bypass – White City Bus Station
	9-12	9-12			White City Bus Station – Hayes Bypass
266	7-12	7-12			Hammersmith Bus Station – Brent Cross Shopping Centre
	7-10	7-10			Brent Cross Shopping Centre – Hammersmith Bus Station
272	4-5	2-5	Bromyard Avenue on The Vale (A4020)	550	Cavendish Road – Shepherds Bush Station
	4-5	2-5			Shepherds Bush Station – Cavendish Road
607	6-9	6-9			Uxbridge Station – White City Bus Station
	5-9	5-9			White City Bus Station – Uxbridge Station
E3	7-12	7-12	Rugby Road on Southfield Road	300	Clifton Road – Edensor Road / Chiswick Pool
	7-12	7-12	Bedford Park, St. Peters Church	500	Edensor Road / Chiswick Pool – Clifton Road
	7-12	7-12			Clifton Road – Edensor Road / Chiswick Pool

Bus number	Weekday two-way frequency		Nearest bus stop to the site	Approximate walking distances from the site	Origin – destination
	AM peak (08:00-09:00)	PM peak (17:00-18:00)			
E3	7-12	7-12	Blandford Road bus stop on The Avenue (B491)	550	Clifton Road – Edensor Road / Chiswick Pool
	7-12	7-12			Edensor Road / Chiswick Pool – Clifton Road

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

4.4.30 On average, there are 97 daytime bus services per hour in the AM peak and 94 bus services per hour in the PM peak within a 640m walking distance of the site.

4.4.31 There are approximately 21 night-time bus services in total per hour Monday–Friday (00:00 – 06:00) and approximately 26 bus services in total per hour on Saturdays (00:00 – 06:00) within a 640m walking distance of the site.

London Underground

4.4.32 As shown on Figure 4.4.2 in the Acton Storm Tanks site *Transport Assessment* figures, Turnham Green station, which is served by the Piccadilly and District lines, is the closest London Underground station; located approximately 1.2km walking distance to the south of the site.

4.4.33 In addition, the Stamford Brook and Chiswick Park London Underground stations are located to the south of the Acton Storm Tanks site but are 1.4km and 1.7km walking distance respectively of the site and hence considered too far away to be included in this assessment.

4.4.34 The Piccadilly Line provides a service between Cockfosters to the north and Uxbridge and Heathrow to the west. District Line trains on the Turnham Green branch travel from Richmond to the south west and Ealing Broadway to the west and Upminster to the east.

4.4.35 In the AM peak, the frequency of the District Line trains is approximately every three to seven minutes, providing nine to 20 services per hour for the westbound service towards Ealing Broadway or Richmond. For the eastbound service to Upminster Underground station, there are a total of 13 services during the AM peak. In the PM peak, the frequency of the District Line trains is every two to six minutes, providing approximately 20 services per hour in each direction. The Olympia service only operates during the weekend, with special weekday services provided during the busiest events at Olympia.

4.4.36 The Piccadilly Line provides a limited number of early morning / evening services at Turnham Green with no trains stopping at the station between 07:00 and 22:00 Monday to Saturday or between 08:00 and 22:00 on Sundays. The Piccadilly Line can be accessed via Acton Town which is two stops westbound on the District Line from Turnham Green Station.

4.4.37 On average, there are a total of 33 Underground services available within a 1.2km walking distance of the site during the AM peak hour and 40 services during the PM peak hour.

4.4.38 Table 4.4.2 provides a summary of the London Underground services and their frequencies during the weekday peaks.

London Overground

4.4.39 As shown on Figure 4.4.2 (see Acton Storm Tanks site *Transport Assessment* figures), the closest London Overground station to the Acton Storm Tanks site is Acton Central; located approximately 900m (11 minute walk) to the northwest of the site. South Acton station is also located in

the surrounding area, approximately 1.2km (15 minute walk) to the southwest.

4.4.40 Acton Central and South Acton are both located on the Richmond to Stratford London Overground line. At both stations, in the AM peak hour there are four eastbound services and four westbound services, and in the PM peak hour there are four eastbound services and westbound services.

4.4.41 Table 4.4.3 provides a summary of the London Overground services and their frequencies during the weekday peaks.

Table 4.4.2 Existing London Underground services and frequency (number of services per hour)*

Line	Weekday two-way frequency		Nearest London Underground station to the site	Approximate walking distance from the site (m)	Origin - destination
	AM peak (08:00-09:00)	PM peak (17:00-18:00)			
District	9-20	10-30	Turnham Green	1,200	Edgware Road, Ealing Broadway, Richmond, Wimbledon, and Kensington (Olympia) Underground stations
	13	10-30			Upminster Underground Station
Piccadilly**	0	0	Turnham Green	1,200	Cockfosters Underground station
	0	0			Uxbridge and Heathrow Terminal 5 stations

**TfL (2011) Timetables. Available at: www.tfl.gov.uk (site last accessed March 2012)*
***Provides a limited number of early morning / evening services*

Table 4.4.3 Existing London Overground services and frequency (number of services per hour)*

London Overground	Weekday two-way frequency		Approximate walking distance from the site (m)	Origin - destination
	AM peak (08:00-09:00)	PM peak (17:00-18:00)		
Acton Central	4	4	900	Stratford – Richmond
	4	4		Richmond – Stratford
South Acton	4	4	1,200	Stratford – Richmond
	4	4		Richmond – Stratford

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

National Rail

4.4.42 There are no National Rail Stations located within 960m walking distance of the Acton Storm Tanks site.

River passenger services

4.4.43 There are no river passenger services within 960m walking distance of the Acton Storm Tanks site. The nearest pier is Kew Pier, approximately 3.8km (48 minute walk) to the southwest of the Acton Storm Tanks site. This provides Westminster Passenger Service Association services (primarily a leisure service) between Westminster Pier in the east and Hampton Court Pier in the west.

Taxis

4.4.44 There are no taxi ranks within a 640m walking distance of the site.

Highway network and operation

4.4.45 The Acton Storm Tanks site is located on land within the existing Thames Water pumping station and storm water tanks fronting Warple Way and Canham Road.

4.4.46 Construction vehicles would approach the Acton Storm Tanks site via Warple Way and Canham Road and depart via Canham Road and Stanley Gardens as shown in Figure 4.2.2 in the Acton Storm Tanks *Transport Assessment* figures. Both Warple Way and Stanley Gardens connect to The Vale (A4020) in the north, which forms part of the SRN.

4.4.47 The northern section of Warple Way, Canham Road and Stanley Gardens form a single carriageway clockwise one-way loop. The minimum carriageway width on Stanley Gardens and Warple Way is 7.3m. When vehicles are parked on both sides of the road the available width is reduced to a minimum of around 3.3m.

4.4.48 The width of Canham Road ranges from 5.4m to 5.5m. Where parking is present, this reduces the available width to a minimum of around 3.6m.

4.4.49 Warple Way has two-way operation south of its junction with Canham Road. Vehicles can route north along this section of Warple Way into Canham Road. However, vehicles routing southbound along Warple Way from The Vale (A4020) cannot access the two-way section of Warple Way. Instead, access to this section is achieved via Cobbold Road.

4.4.50 A refuse vehicle and large rigid were observed to route along Warple Way at a high speed and without difficulty. These vehicles were not observed on Canham Road or Stanley Gardens however these roads are of similar width.

4.4.51 Warple Way and Stanley Gardens were observed to provide good forward visibility for vehicles and were of a relatively straight alignment.

4.4.52 The Vale (A4020) is a wide single two-lane carriageway with one lane in each direction, which in places becomes a three or four lane carriageway with up to two lanes in each direction. There are also sections where

dedicated bus lanes are in place. Traffic signals control the majority of junctions along The Vale (A4020).

4.4.53 Local highway modelling has been undertaken to determine the operation of The Vale (A4020)/ Wardle Way/ East Acton Lane and The Vale (A4020)/ Stanley Gardens junctions in the baseline situation. These are discussed in paras. 4.4.126 to 4.4.138.

4.4.54 The modelling outputs for the baseline situation for these junctions are shown in Table 4.4.10 and Table 4.4.11. The results indicate that both junctions operate within capacity in both weekday peak hours.

Parking

4.4.55 Figure 4.4.3 in the Acton Storm Tanks site *Transport Assessment* figures shows the locations of the existing car and coach parking within the vicinity of the site.

Existing on-street car parking

4.4.56 Canham Road has unrestricted kerbside parking available along its northern side which could accommodate approximately 11 vehicles. A single yellow line covers the full length of the southern side of the road with 'no waiting' between Monday and Saturday 08:00-18:30. The corner of Canham Road and Stanley Gardens is also covered by single yellow lines to restrict parking.

4.4.57 Stanley Gardens has unrestricted parking along the majority of the eastern side of the road, and short sections of unrestricted parking on the western side. There is space for approximately 88 vehicles within the unrestricted parking areas. The remaining sections along the western side of Stanley Gardens have single yellow lines with 'no waiting' between Monday and Saturday 08:30-18:30.

4.4.58 There are short sections of double yellow and single yellow lines along both sides of Warple Way. The single yellow restrictions are 'no waiting' between Monday and Saturday 08:30-18:30 and these lines are located near to the junction with The Vale (A4020) and approximately half way between The Vale (A4020) and Canham Road. On the remaining length of the road there is unmarked and unrestricted kerbside parking which could accommodate approximately 48 vehicles.

4.4.59 Cars parked on-street were observed to be parked neatly and with wing mirrors pulled in which suggests their owners are aware that large vehicles currently route down these roads and they park accordingly.

4.4.60 It was noted that a number of the properties at the southern end of Stanley Gardens that had on-site parking were using the space for other activities, such as workshops.

4.4.61 No parking is permitted along The Vale (A4020) in the vicinity of the Warple Way/ East Acton Road and Stanley Gardens junctions between Monday and Saturday 08:00 to 18:30.

4.4.62 On-street parking is also available on the nearby residential roads, including Dordrecht Road, Bradford Road and Valetta Road. These roads

have Pay and Display spaces, resident parking spaces, unrestricted parking spaces and single yellow line restrictions.

4.4.63 Table 4.4.4 summarises the parking restrictions and the number of bays on the roads in the vicinity of the site. The availability and usage of parking capacity on a weekday and a Saturday on the roads in the vicinity of the site are summarised later in this section in Table 4.4.9.

Table 4.4.4 Existing on-street car parking

Road name	Type of parking restrictions and number of bays				
	Pay and display	Resident	Blue badge	Unrestricted	Short-term (max. 20 mins)
Warple Way	0	0	0	48	0
Canham Road	0	0	0	11	0
Stanley Gardens	0	0	0	88	0
Dordrecht Road	7	56	0	0	0
Valetta Road	10	48	0	0	0
Larden Road	0	28	0	0	0
Total	**17**	**132**	**0**	**147**	**0**

4.4.64 On-street parking surveys were undertaken in May 2011 and June 2012 to determine capacity and demand on the unrestricted parking in Warple Way, Canham Road and Stanley Gardens. The total length of on-street unrestricted parking was found to be 1,030m. The amount of this total length that contained parked vehicles during the surveys is summarised in Table 4.4.6.

Table 4.4.5 Unrestricted on-street car parking demand

Survey (Date)	Total length of Parking Used				
	0800-1000	1200-1300	1300-1600	1700-1900	midnight -0100
Weekday 1 (May 2011)	676m	739m	-	557m	-
Weekday 2 (June 2012)	952m	1,019m	-	915m	780m
Weekday 3 (June 2012)	670m	-	-	-	-
Saturday 1 (May 2011)	-	-	437m	-	
Saturday 2 (June 2012)	-	738m	-	-	-

4.4.65 The peak period for weekday parking demand was found to be the period between midday and 13:00. Weekday surveys 1 and 2 show a conflicting level of parking, with peak demands of 739m and 1,019m respectively.

4.4.66 A further snapshot survey was undertaken (Weekday 3) and the result of this survey was very similar to that of Weekday 1.

4.4.67 During the period of peak demand of the Weekday 1 survey there was a spare parking capacity of 291m (1030 – 739). In this case the removal of 99m of parking as per our proposal would have no negative effect on parking demand.

4.4.68 During the Weekday 2 survey a total of 11m of unrestricted parking remained at the period of peak demand. Given that this length of parking is distributed in small lengths over all roads we could assume that no spaces are available.

Existing off-street/private car parking

4.4.69 Currently there are no public off-street car parks within a 640m walking distance of the Acton Storm Tanks site.

4.4.70 There is some off-street private parking within the business units along Warple Way; however these areas within the units are often utilised for other business purposes, i.e. storage. A larger number of off-street private parking bays are located along Allied Way (off Warple Way) and within Acton Park Industrial Estate which can be accessed off Stanley Gardens.

4.4.71 Further private car parking exists on the land adjacent to the southwest side of the site, which is accessed via the southern end of Warple Way. There are two sections of parking within the land (a northern section and a southern section) which can accommodate approximately 162 vehicles in total. This parking is provided for the Factory Quarter residential and mixed-use development located to the east of Warple Way.

Coach parking

4.4.72 There are no coach parking spaces within a 640m walking distance of the site. The nearest coach parking is located on Chiswick High Road, approximately 1.7km (21 minute walk) south of the site, where two spaces are available.

Car clubs

4.4.73 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 the purchase, storage and operational costs associated with owning a private car. The car clubs available within a 640m walking distance of the Acton Storm Tanks site are discussed below.

4.4.74 The closest car club space is approximately 450m walking distance to the northwest of the Acton Storm Tanks site at the Acton Access Self-Storage car park located just off The Vale (A4020), however this is a single van space.

4.4.75 There are two spaces available approximately 600m walking distance northeast of the site on Swainson Road and Cowley Road. However, the space on Swainson Road is available to Morris House residents only.

4.4.76 The next closest car club spaces are at Bromyard Avenue, where three car spaces and a van space are provided. This is approximately 650m walking distance northeast of the Acton Storm Tanks site.

Servicing and deliveries

4.4.77 There are no formal servicing and delivery areas located on the highway near to the site. In addition to off-street delivery areas for the industrial units near to the site, the unrestricted parking areas around the site are available for servicing and deliveries.

4.4.78 On-street loading is restricted along Warple Way from Monday to Saturday (08:30-18:30).

4.4.79 Observations show that businesses along Warple Way, Canham Road and Stanley Gardens also use these roads for loading and unloading.

Baseline survey data

Description of data

4.4.80 Automatic Traffic Count (ATC) data for The Vale (A4020) was obtained from TfL and was analysed to identify the traffic flows along this road in July 2011 and May 2012. The flows are discussed in paras. 4.4.108 to 4.4.112.

4.4.81 Five year accident data on the roads in the vicinity of the site was obtained from TfL. This data is discussed in paras. 4.4.140 to 4.4.151.

4.4.82 Baseline survey data was collected in May, July, and December 2011 and in May 2012 to establish the existing transport movements in the area, Further surveys were collected in May 2012 to establish traffic flows on The Vale (A4020). Figure 4.4.4 in the Acton Storm Tanks site *Transport Assessment* figures shows the survey locations in the vicinity of the site.

Appendix A of the *Project-wide TA* includes the *Baseline Data Report* which further details the data collection.

4.4.83 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. Parking survey data was collected where it was possible that parking suspensions would be necessary or where additional parking demand might be generated by the proposed development.

4.4.84 As part of surveys in May and July 2011, manual and automated traffic surveys were undertaken to establish specific traffic, pedestrian and cycle movements, including turning volumes, queue lengths, saturation flows, degree of saturation and traffic signal timings.

4.4.85 Further surveys were conducted in December 2011 and in May 2012 to establish the usage of the private car park located to the southwest of the site. Additional on-street parking surveys were undertaken on Warple Way, Canham Road, Stanley Gardens and Bradford Road as a comparison with the corresponding parking surveys undertaken in May 2011.

4.4.86 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.

4.4.87 The surveys undertaken and their locations are summarised in Table 4.4.6.

Table 4.4.6 Survey types and locations

Survey type and location	Dates
Junction survey (including pedestrian and cycle movements)	
The Vale (A4020) / Eastman Road	9th and 12th July 2011
The Vale (A4020) / Stanley Gardens	2nd and 5th July 2011
The Vale (A4020) / Warple Way/ East Acton Lane	2nd and 5th July 2011
The Vale (A4020) / Larden Road	2nd and 5th July 2011
The Vale (A4020) / Old Oak Road/ Askew Road (B408)	2nd and 5th July 2011
High Street (A4020)/ Gunnersbury Lane / Steyne Road	2nd and 13th July 2011
Uxbridge Rd (A4020) / Hanger Lane A406 Road /	2nd and 13th

Survey type and location	Dates
Gunnersbury Avenue	July 2011
Eastman Road / Acton Park Industrial Estate Access	9th and 12th July 2011
Stanley Gardens / Acton Park Industrial Estate Access / Bradford Road	9th and 12th July 2011
Larden Road/ Cobbold Road/ Emlyn Road	12th and 14th May 2011
Automatic Traffic Count (ATC)	
The Vale (A4020) approximately 45m east of Mansell Road	4th to 19th July 2011
The Vale (A4020) approximately 45m east of Agnes Road	4th to 19th July 2011
Pedestrian and cycle surveys	
The Vale (A4020) to the east of Warple Way	2nd and 5th July 2011
The Vale (A4020) to the west of Stanley Gardens	2nd and 5th July 2011
Stanley Gardens/Canham Road/ Rugby Road	2nd and 5th July 2011
Warple Way to Southfield Road/ Woodstock Road	2nd and 5th July 2011
Warple Way to the south of Cobbold Road (western side)	24th and 26th May 2012
Warple Way to the south of Cobbold Road (eastern side)	24th and 26th May 2012
Parking surveys	
Dordrecht Road, Larden Road, Warple Lane, Stanley Gardens, Canham Road, Valetta Road	2nd and 5th July 2011
Northern and southern section of site off Warple Way	26th Nov and 1st Dec 2011
Warple Way / Canham Road / Stanley Gardens	26th and 29th May 2012
Between Warple Way, Holley Road/Mayfield Road, Valetta Road, Stamford Brook Road	9th and 11th June 2011

4.4.88 Pedestrian and cyclist flow data from the pedestrian and cyclist surveys provided the baseline pedestrian traffic data sets which are set out in Table 4.4.7 and Table 4.4.8

4.4.89 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. 4.4.126 to 4.4.138.

4.4.90 The following ATC and junction surveys are on construction traffic routes to and from the Acton Storm Tanks site:

a. ATC on The Vale (A4020) approximately 45m east of Mansell Road
b. ATC on The Vale (A4020) approximately 45m east of Agnes Road
c. Junction survey at The Vale (A4020) / Eastman Road
d. Junction survey at The Vale (A4020) / Stanley Gardens
e. Junction survey at The Vale (A4020) / East Acton Lane / Warple Way
f. Junction survey at The Vale (A4020) / Larden Road
g. Junction survey at Stanley Gardens / Acton Park Industrial Estate Access / Bradford Road.

Results of the surveys

4.4.91 The surveys inform the baseline situation in the area surrounding the Acton Storm Tanks site and are summarised in the following paragraphs.

Pedestrians

4.4.92 Pedestrian surveys were undertaken at four locations around the site as indicated in Figure 4.4.4 in the Acton Storm Tanks *Transport Assessment* figures during the AM and PM peak hours.

4.4.93 Pedestrian surveys were also undertaken at The Vale (A4020)/ Warple Way junction pedestrian crossings as part of the junction surveys.

4.4.94 Table 4.4.6 indicates the survey locations and flow of pedestrians along the main routes surrounding the site.

Table 4.4.7 Baseline pedestrian traffic

Road/route	Direction	Weekday			Weekend
		AM peak (08:00-09:00)	Inter-peak (12:00-13:00)	PM peak (17:00-18:00)	(13:00-14:00)
Crossing of The Vale (A4020), to the east of Warple Way	Northbound	108	56	105	51
	Southbound	113	64	66	49
Crossing of The Vale (A4020), to the west of Stanley Gardens	Northbound	35	20	9	1
	Southbound	5	16	27	10
Stanley Gardens/Canham Road/ Rugby Road	Northbound	56	39	40	4
	Southbound	22	56	60	9
Warple Way to Southfield Road/ Woodstock Road	Northbound	55	22	33	42
	Southbound	150	28	31	63
The Vale (A4020)/ Warple Way junction pedestrian crossings -					
East Acton Lane (north side)	Eastbound	39	41	35	39
	Westbound	34	46	39	41
The Vale (A4020) (east side)	Southbound	38	28	28	27
	Northbound	24	32	56	24
Warple Way (south side)	Westbound	53	79	35	49
	Eastbound	54	92	83	47
The Vale (west side)	Northbound	16	28	67	20
	Southbound	86	47	24	33

4.4.95 Taken from the results of the pedestrian surveys the predominant flows on The Vale (A4020) occurred to the west of Stanley Gardens were over 100 pedestrians crossed northbound across The Vale (A4020) in both AM and PM peaks. Approximately 113 pedestrians crossed southbound across The Vale (A4020) in the AM peak and approximately 66 in the PM peak.

4.4.96 At The Vale (A4020)/ Warple Way/ East Acton Lane junction, the survey indicated that approximately 40 pedestrians crossed northwards on both the west and east side of the junction in the AM peak and approximately 123 in the PM peak. Those crossing southward were approximately 134 in the AM peak and approximately 52 in the PM peak. This indicates that there is a stronger movement northwards across The Vale (A4020) in the AM peak, and this is reflected in the PM peak in the opposite direction.

4.4.97 The pedestrian movement across the Warple Way side of the junction were balanced in the AM peak with less than 55 movements in each direction. In the PM peak, approximately 35 travelled westwards and approximately 83 eastwards.

4.4.98 To the east of Warple Way, the flow of pedestrians crossing The Vale (A4020) were much less than those recorded at either The Vale (A4020) to the west of Stanley Gardens and The Vale (A4020)/ Stanley Gardens junction; with a maximum of approximately 35 pedestrians crossing The Vale (A4020).

4.4.99 On the path between Stanley Gardens/ Canham Road and Rugby Road to the west of the site, the surveys showed there to be approximately 56 pedestrians travelling northwards towards the site and approximately 22 southwards in the AM peak. In the PM peak, the flows were fairly balanced with between 40 and 60 pedestrian movements in each direction.

4.4.100 The path between Warple Way and Southfield Road/ Woodstock Road to the south of the site, the survey recorded approximately 55 pedestrians travelling northwards and a larger demand of approximately 150 pedestrians travelling southwards in the AM peak; indicating that this link is well patronised by pedestrians in the AM peak. The PM peak had significantly less flow of 33 and 31 in the northbound and southbound respectively.

Cyclists

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

4.4.102 Table 4.4.8 indicates the flows of cyclists along the main routes surrounding the site.

Table 4.4.8 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)	(13:00-14:00)
Crossing of The Vale (A4020), to the east of Warple Way	Northbound	1	1	0	0
	Southbound	2	0	0	2
Crossing of The Vale (A4020), to the west of Stanley Gardens	Northbound	5	0	0	0
	Southbound	0	2	1	0
Stanley Gardens/Canham Road/ Rugby Road	Northbound	24	3	4	2
	Southbound	5	4	7	0
Warple Way to Southfield Road/ Woodstock Road	Northbound	11	7	13	13
	Southbound	40	12	14	4
Cobbold Road / Larden Road junction :					
Cobbold Road (west side)	Westbound	19	3	21	8
	Eastbound	20	7	11	7
Larden Road (north side)	Northbound	13	2	17	7
	Southbound	37	1	10	16
Cobbold Road (east side)	Eastbound	28	5	11	10
	Westbound	20	4	24	3
Emlyn Road (south side)	Southbound	26	3	8	7
	Northbound	9	1	12	6

Road/route	Direction	Weekday			Weekend
		AM peak (08:00-09:00)	Inter-peak (12:00-13:00)	PM peak (17:00-18:00)	(13:00-14:00)
The Vale (A4020)/ Larden Road junction :					
The Vale (A4020) (west side)	Westbound	59	34	149	37
	Eastbound	267	37	40	40
Larden Road	Northbound	17	5	13	7
	Southbound	11	4	12	1
The Vale (east side)	Eastbound	273	38	39	46
	Westbound	59	34	147	37
The Vale (A4020) / Warple Way junction :					
East Acton Lane (north side)	Northbound	7	3	5	5
	Southbound	13	3	2	7
The Vale (A4020) (east side)	Eastbound	218	30	41	40
	Westbound	46	24	115	33
Warple Way (south side)	Southbound	16	6	1	2
	Northbound	-	-	-	-
The Vale (A4020) (west side)	Westbound	40	19	114	29
	Eastbound	222	31	44	36
The Vale (A4020) / Stanley Gardens junction :					
The Vale (A4020) (west side)	Westbound	46	25	122	29

Road/route	Direction	Weekday			Weekend
		AM peak (08:00-09:00)	Inter-peak (12:00-13:00)	AM peak (08:00-09:00)	Inter-peak (12:00-13:00)
	Eastbound	213	27	37	38
Stanley Gardens (south side)	Southbound	-	-	-	-
	Northbound	13	2	9	3
The Vale (A4020) / Eastman Road junction :					
The Vale (A4020) (west side)	Westbound	57	n/a	144	21
	Eastbound	225	n/a	52	25
Eastman Road (south side)	Southbound	1	n/a	1	0
	Northbound	2	n/a	4	0

4.4.103 On the junction between The Vale (A4020)/ Warple Way/ East Acton Road, there was a high eastbound flow with 222 cyclists in the AM peak hour, and only 40 in the westbound on the western arm of The Vale (A4020). Correspondingly, in the PM peak hour, the numbers of cyclists travelling eastbound and westbound were 41 and 115 respectively on the eastern arm of The Vale (A4020). The results indicate that The Vale (A4020) is used as a cycle commuting route.

4.4.104 Cyclist flows on Stanley Gardens and on Wardle Way were low with a maximum of approximately 16 cyclist recorded in the AM peak (on Wardle Way).

4.4.105 On the link between Stanley Gardens/Canham Road and Rugby Road to the west of the site, the surveys showed there to be approximately 24 cyclists travelling northwards towards the site and approximately five southwards in the AM peak. In the PM peak, the flows were low with between four and seven cycle movements in each direction.

4.4.106 The path between Warple Way and Southfield Road/ Woodstock Road to the south of the site, the survey recorded approximately 11 cyclists travelling northwards and approximately 40 cyclists travelling southwards in the AM peak. During the PM peak hour the cycle flows northbound and southbound are 13 and 14 respectively.

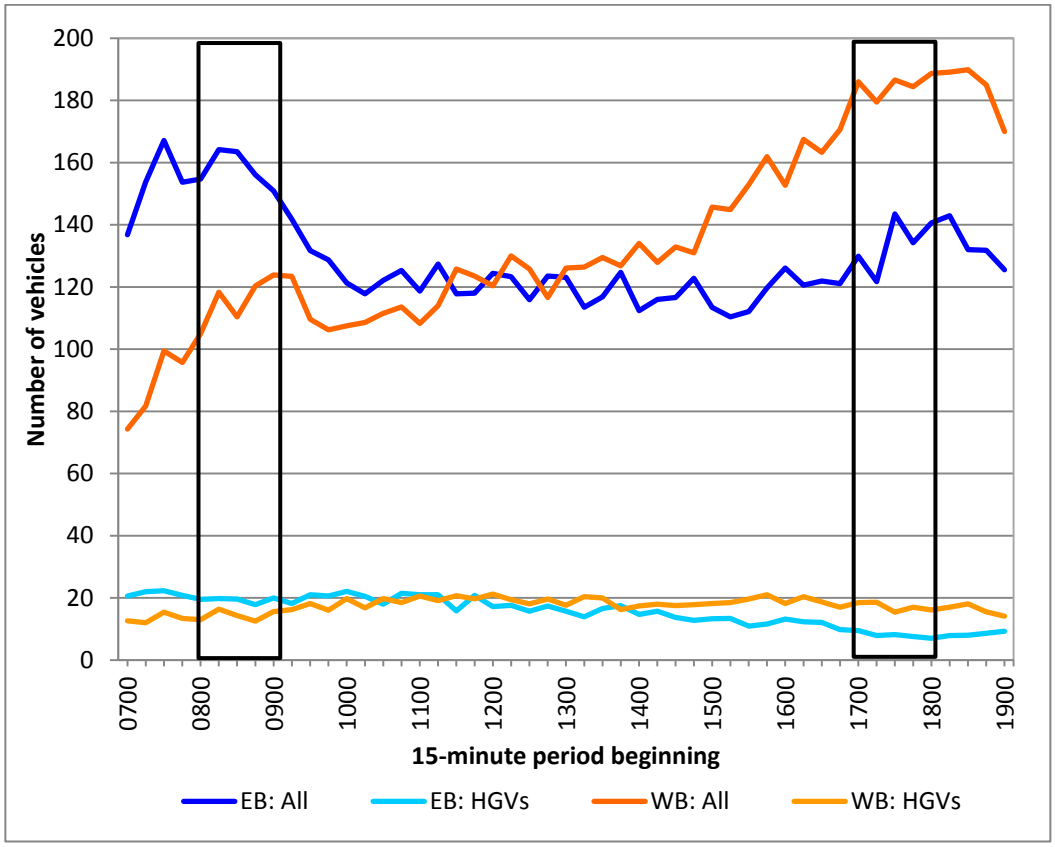
4.4.107 West of the site at the Cobbold Road/ Larden Road junction, the survey indicated fairy low cycle flows; with a maximum of approximately 37 cyclists in any one direction in both the AM and PM peak periods.

Traffic flows

4.4.108 The ATC data has been analysed to identify the existing traffic flows along The Vale (A4020) to the east of Agnes Road and to the east of Mansell Road. The location of the ATC survey sites are shown in Figure 4.4.4 in the Acton Storm Tanks site *Transport Assessment* figures.

4.4.109 The weekday vehicle and HGV flows along The Vale (A4020) for a 12-hour period (07:00-19:00) for both locations are shown in Plate 4.4.4 and Plate 4.4.5.

Plate 4.4.4 Existing 15 minute traffic flows along The Vale (A4020) east of Agnes Road (weekday ATC survey)

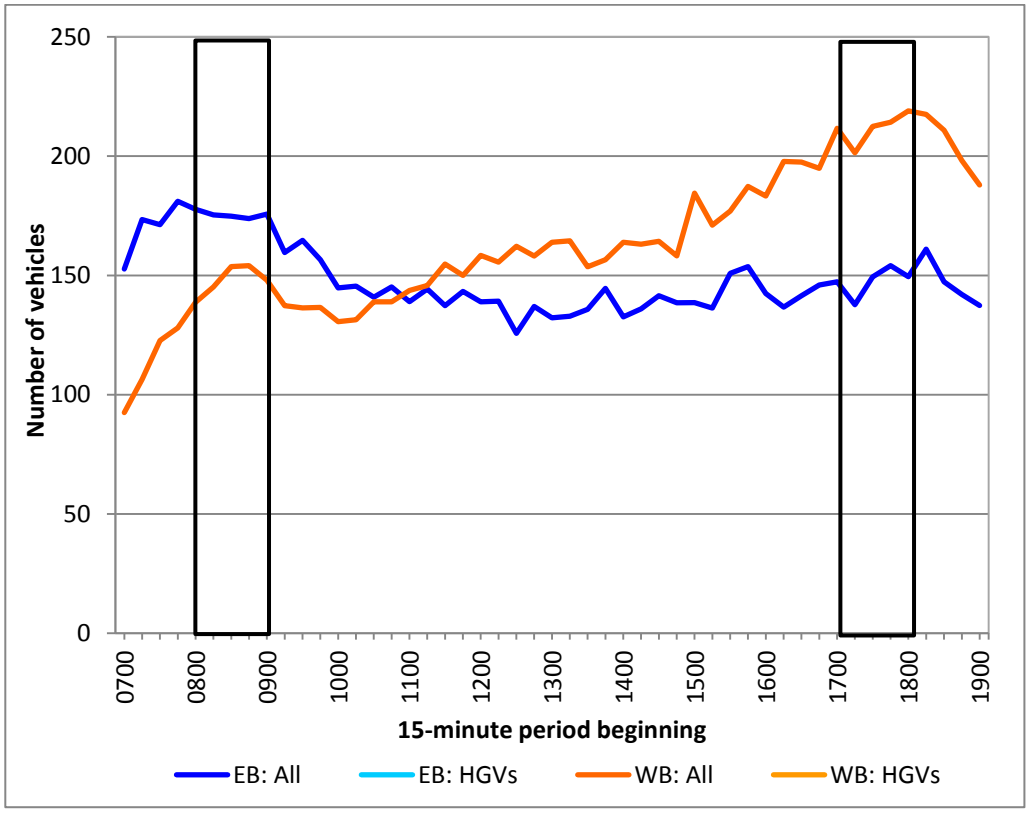


EB – Eastbound, WB – Westbound. The black box represents the peak hour traffic flows used for the traffic assessment

4.4.110 The weekday ATC data for The Vale (A4020) to the east of Agnes Road shows that between 08:00 – 09:00 there are approximately 1,093 two-way vehicle movements. The busiest 15 minute peak period in this period occurred after 08:15 with approximately 164 eastbound vehicles and approximately 118 westbound vehicles.

4.4.111 For the period between 17:00 – 18:00 there are approximately 1,300 two-way vehicle movements. The busiest 15 minute peak period in this period occurred both after 18:15 with approximately 143 eastbound vehicles and approximately 189 westbound vehicles.

Plate 4.4.5 Existing 15 minute traffic flows along The Vale (A4020) east of Mansell Road (weekday ATC survey)



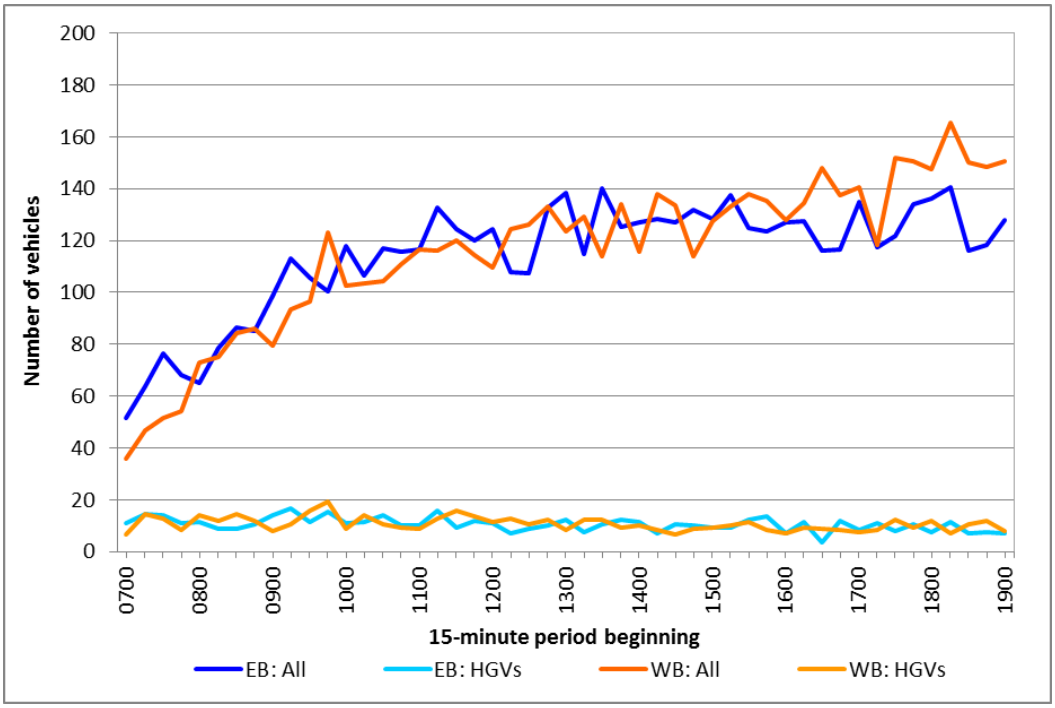
EB – Eastbound, WB – Westbound. The black box represents the peak hour traffic flows used for the traffic assessment

4.4.112 The weekday ATC data for The Vale (A4020) to the east of Mansell Road shows that between 08:00 – 09:00 there are approximately 1,293 two-way vehicle movements. The busiest 15 minute peak period in this period occurred after 08:30 with approximately 175 eastbound vehicles and approximately 154 westbound vehicles.

4.4.113 For the period between 17:00 – 18:00 there are approximately 1,445 two-way vehicle movements. The busiest 15 minute peak period in this period occurred after 18:15 with approximately 161 eastbound vehicles and approximately 218 westbound vehicles.

4.4.114 The Saturday vehicle and HGV flows along The Vale (A4020) for a 12-hour period (07:00-19:00) for both locations are shown in Plate 4.4.6 and Plate 4.4.7.

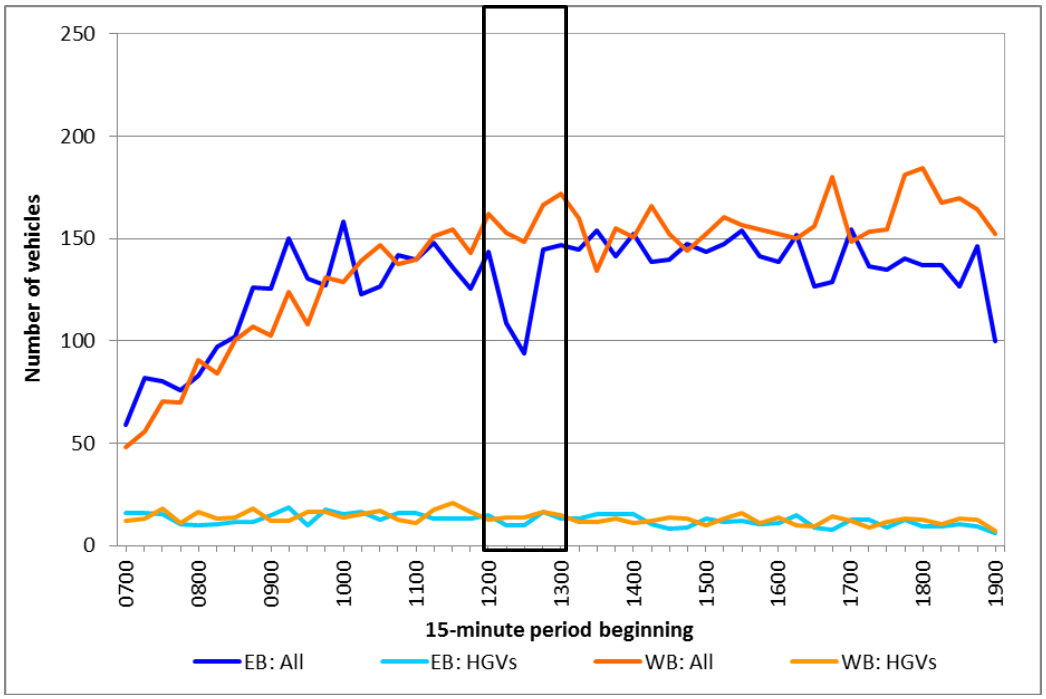
Plate 4.4.6 Existing 15 minute traffic flows along The Vale (A4020) east of Agnes Road(Saturday ATC survey)



EB – Eastbound, WB – Westbound. The black box represents the peak hour traffic flows used for the traffic assessment

4.4.115 Analysis of the data for The Vale (A4020) to the east of Agnes Road showed that the Saturday peak travel period occurred between 17:15 – 18:15 with 1,148 two-way vehicle movements recorded. This is higher than the AM and PM weekday two-way traffic flows but the period falls outside of the normal weekend construction works vehicle movements period of between 08:00 – 13:00. Between 08:00 – 13:00, the peak two-way vehicle movements was 966 which is less than that recorded in the AM and PM weekday two-way traffic flows.

Plate 4.4.7 Existing 15 minute traffic flows along The Vale (A4020) east of Mansell Road (Saturday ATC survey)

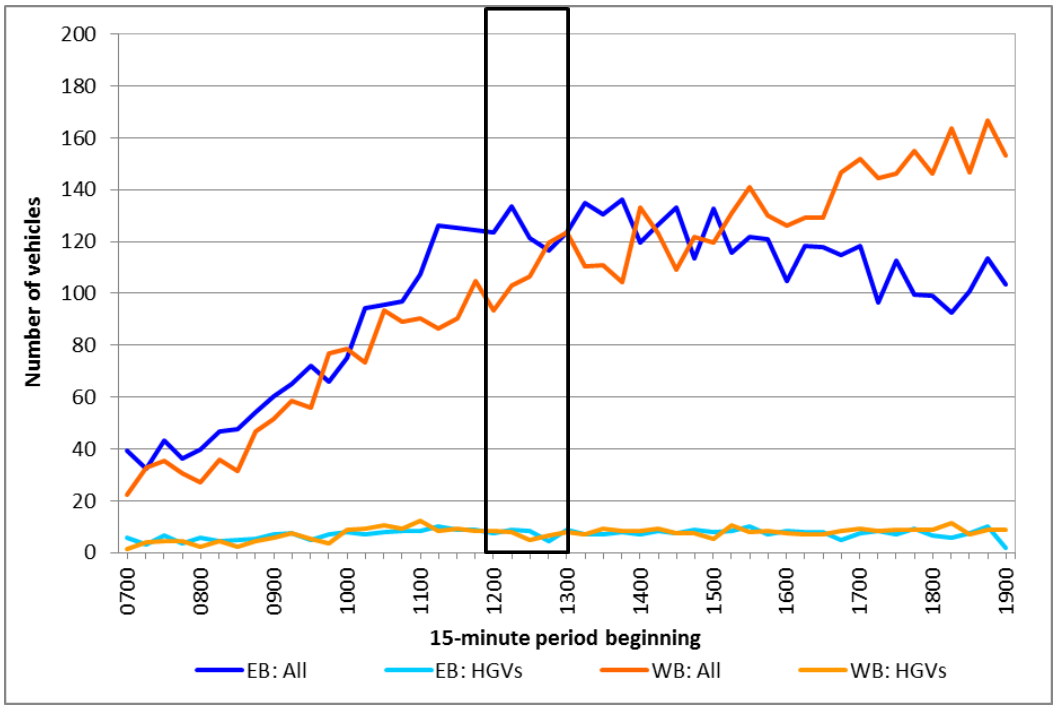


EB – Eastbound, WB – Westbound. The black box represents the peak hour traffic flows used for the traffic assessment

4.4.116 Analysis of the data for The Vale (A4020) to the east of Mansell Road showed that the Saturday peak travel period occurred between 17:30 – 18:30 with 1,243 two-way vehicle movements recorded. This is less than the AM and PM weekday two-way traffic flows and the period falls outside of the normal weekend construction works vehicle movements period of between 08:00 – 13:00.

4.4.117 The Sunday vehicle and HGV flows along The Vale (A4020) for a 12-hour period (07:00-19:00) for both locations are shown in Plate 4.4.8 and Plate 4.4.9.

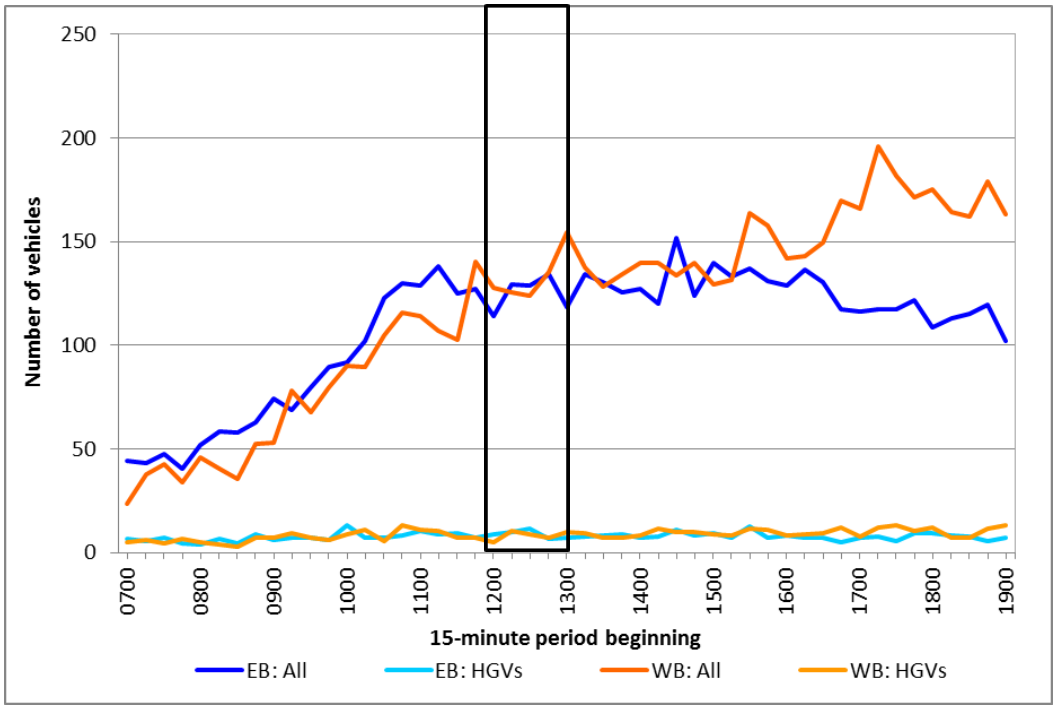
Plate 4.4.8 Existing 15 minute traffic flows along The Vale (A4020) east of Agnes Road (Sunday ATC survey)



EB – Eastbound, WB – Westbound. The black box represents the peak hour traffic flows used for the traffic assessment

4.4.118 Analysis of the data for The Vale (A4020) to the east of Agnes Road showed that the Sunday peak travel period occurred between 18:15 – 19:15 with 1,063 two-way vehicle movements recorded. This is less than the AM and PM weekday two-way traffic flows and the period falls outside of the normal weekend construction works vehicle movements period of between 08:00 – 13:00.

Plate 4.4.9 Existing 15 minute traffic flows along The Vale (A4020) east of Mansell Road (Sunday ATC survey)



EB – Eastbound, WB – Westbound. The black box represents the peak hour traffic flows used for the traffic assessment

4.4.119 Analysis of the data for The Vale (A4020) to the east of Mansell Road showed that the Sunday peak travel period occurred between 17:00 – 18:00 with 1,189 two-way vehicle movements recorded. This is less than the AM and PM weekday two-way traffic flows and the period falls outside of the normal weekend construction works vehicle movements period of between 08:00 – 13:00.

4.4.120 There is no comparable TfL traffic flow data.

Parking

4.4.121 Parking surveys were undertaken for both the weekday AM peak, inter-peak and PM peak periods, and the weekend peak period to assess the use of restricted parking (excluding single yellow lines), unrestricted parking, residential parking and pay and display spaces in the area surrounding the Acton Storm Tanks site.

4.4.122 Table 4.4.9 indicates the parking capacity availability and usage and Plate 4.4.10 indicates a histogram of the car parking.

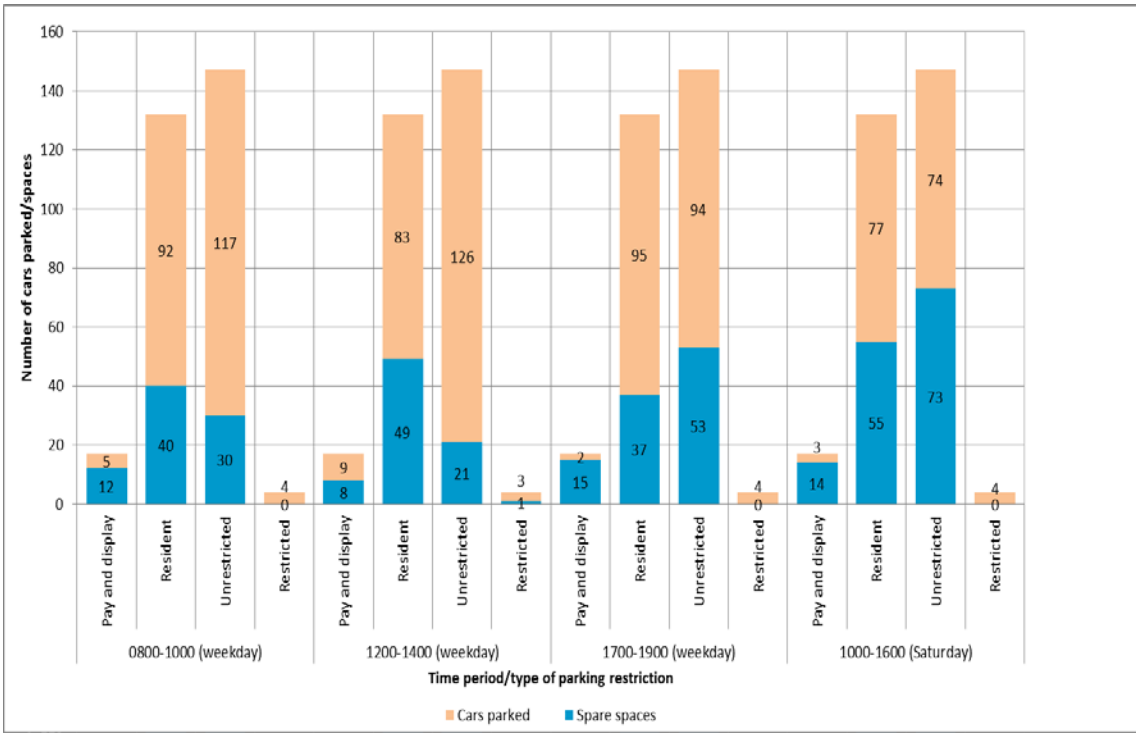
Table 4.4.9 Parking bay availably and usage*

Location	No. of spaces available - weekday			No. of spaces available Saturday 12:00-14:00
	08:00-10:00	12:00-14:00	17:00-19:00	
Warple Way	4	3	11	16
Canham Road	7	2	4	4

Location	No. of spaces available - weekday			No. of spaces available Saturday 12:00-14:00
	08:00-10:00	12:00-14:00	17:00-19:00	
Stanley Gardens	19	16	38	53
Dordrecht Road	24	25	22	33
Valetta Road	21	23	23	29
Larden Road	7	10	7	7

**Car parking spaces available based on an assumed length of 5m per space*

Plate 4.4.10 Existing on-street car parking



4.4.123 The results of the surveys indicate that the restricted, resident and unrestricted parking surrounding Acton Storm Tanks is well used, although there is still a significant level of spare capacity available during the peak and off-peak periods. The results show that during the weekday periods, there was a minimum of 37 residential spaces available and eight pay and display spaces.

4.4.124 During the weekday, there is little variation in the level of spare capacity, which is approximately 26% of the total capacity during the peak and inter-peak periods. The busiest time period was identified as between 12:00 and 14:00 during the weekday.

4.4.125 With regards to the unrestricted parking on Warple Way, Canham Road and Stanley Gardens, the peak period for weekday parking demand was again found to be the period between 12.00 and 14.00. Although the three surveys undertaken during the AM showed a conflicting level of parking

demand with two suggesting more spare parking was available with the other survey suggesting there was less, they all show a higher level of demand between 12.00 and 14:00. This indicates that overall there was some spare capacity on these roads in the AM period between 08:00 and 10:00.

Local highway modelling

4.4.126 To establish the existing capacity on the local highway network, a scope was agreed with TfL and the LB of Ealing to model the junctions of The Vale (A4020) / Wardle Way/ East Acton Lane and The Vale (A4020) / Stanley Gardens.

4.4.127 Traffic models for the junctions have been developed for this assessment and where possible suitable models from TfL have been used. The models have been constructed using on-site measurements of classified vehicle volumes and queue lengths.

4.4.128 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.

4.4.129 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.

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

4.4.131 The signalled junction of The Vale (A4020) / Warple Way/ East Acton Lane was modelled in LinSig and the priority junction of Stanley Gardens/ The Vale (A4020) was modelled in PICADY.

4.4.132 The weekday AM and PM baseline model outputs for The Vale (A4020) / Warple Way/ East Acton Lane were compared against observed queue lengths for the peak periods to validate the models and ensure reasonable representation of existing conditions.

4.4.133 Figures 4.4.5 and 4.4.6 in the Acton Storm Tanks *Transport Assessment* figures indicate the traffic flows that were used for the baseline AM and PM peak hour assessments which take into account the observed flows.

4.4.134 Table 4.4.10 shows the LinSig modelling outputs for The Vale (A4020)/ Wardle Way/ East Acton Lane junction and Table 4.4.11 shows the

PICADY modelling outputs for The Vale (A4020)/ Stanley Gardens junction.

Table 4.4.10 LinSig model outputs, baseline – The Vale (A4020) / Wardle Way/ East Acton Lane junction

Approach	Movement	Weekday							
		AM peak hour (08:00-09:00)				PM peak hour (17:00-18:00)			
		Flow (PCU)	DoS	MMQ	Delay (Seconds per PCU)	Flow (PCU)	DoS	MMQ	Delay (Seconds per PCU)
East Acton Lane (southbound)	Left / ahead	203	48%	5	36	123	52%	3	51
	Right / ahead	250	59%	6	39	138	55%	4	51
The Vale (A4020) (eastbound)	Left / ahead	401	58%	9	28	502	57%	9	21
	Right / ahead	56	25%	1	41	135	44%	2	35
The Vale (A4020) (westbound)	Left / ahead	360	58%	8	29	331	44%	6	19
	Right / ahead	431	62%	9	30	426	48%	7	20
		Practical Reserve Capacity (PRC)		Total Delay (PCU Hours)		Practical Reserve Capacity (PRC)		Total Delay (PCU Hours)	
Overall junction performance		46%		15		59%		12	

Notes: Warple Way is 'entrance only' (southbound) and no traffic enters the junction from that arm so it is not included in the table.
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 4.4.11 PICADY model outputs, baseline – The Vale (A4020)/ Stanley Gardens junction

Approach	Movement	Weekday							
		AM peak hour (08:00-09:00)				PM peak hour (17:00-18:00)			
		Flow (vehs)	RFC	Max Queue (vehs)	Delay (seconds/ vehs)	Flow (vehs)	RFC	Max Queue (vehs)	Delay (seconds/ vehs)
Stanley Gardens	Left	58	13%	0.15	9	85	19%	0.24	10
Stanley Gardens	Right	35	15%	0.18	18	85	32%	0.46	19

Notes: The PICADY model does not report results for The Vale (A4020) as there is no right turn into Stanley Gardens (one-way) and other movements along The Vale (A4020) have the right of way.
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.

4.4.135

4.4.136 For The Vale (A4020)/ Wardle Way/ East Acton Lane junction, the results demonstrate that the junction is currently operating within capacity during both the weekday AM and PM peak hours. The validated model indicates that the maximum delay per vehicle is 41 seconds per PCU in the AM peak hour for the right turn lane on the eastern approach of The Vale (A4020) and 51 seconds per PCU in the PM peak hour for southbound traffic on East Acton Lane.

4.4.137 The LinSig junction model output shows that total junction delay is 15 PCU hours in the AM peak period assessed and 12 PCU hours in the PM peak period assessed. These equate to 32 seconds per PCU in the AM and 13 seconds per PCU in the PM peak periods assessed.

4.4.138 For The Vale (A4020)/ Stanley Gardens junction, PICADY model outputs demonstrate that the junction is currently operating well within capacity in both the weekday AM and PM peak hours. The model results show that delays to traffic turning left out of Stanley Gardens are an average of nine and ten seconds per vehicle in the AM and PM peak hours respectively. Delays to traffic turning right from Stanley Gardens are an average of 18 and 19 seconds per vehicle in the AM and PM peak hours respectively.

4.4.139 More detailed model outputs are included in Appendix C which also supplies diagrams showing the lane structure used for the assessment of the junctions.

Accident analysis

4.4.140 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.

4.4.141 Data has been obtained for a five year period to the 31st March 2011. Figure 4.4.7 in the Acton Storm Tanks *Transport Assessment* figures indicates the accidents that have occurred within the vicinity of the site. The following roads and junctions have been analysed:

a. The Vale (A4020)

b. The Vale (A4020)/ East Acton Junction

c. The Vale (A4020)/ Eastman Road Junction

d. The Vale (A4020)/ Larden Road Junction.

4.4.142 Table 4.4.12 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 4.4.12 Accident severity from 2006 to 2011

Location	Slight	Serious	Fatal	Total
The Vale	1	3	0	4
The Vale/ Curricle Street Junction	1	0	0	1
The Vale/ Du Cross Road Junction	1	0	0	1
The Vale/ East Acton Junction	7	1	0	8
The Vale/ Eastman Road Junction	10	0	0	10
The Vale/ Larden Road Junction	6	3	0	9
Location	**Slight**	**Serious**	**Fatal**	**Total**
The Vale/ Vale Grove Junction	1	0	0	1
The Vale/ Stanley Gardens Junction	1	0	0	1
The Vale/ Warple Way Junction	0	2	0	2
Total	**28**	**9**	**0**	**37**

4.4.143 A total of 37 accidents occurred within the Acton Storm Tanks assessment area over the five year period analysed. Of these, 28 were slight and nine serious. There were no fatal accidents.

4.4.144 The largest number of accidents occurred at the junction of The Vale (A4020)/Eastman Road, with nine accidents recorded, all of which were classified as slight accidents. Eastman Road is located approximately 200m to the west of the junction of The Vale (A4020)/Stanley Gardens.

4.4.145 Of the serious accidents, two involved both cars and bicycles. The major contributory factor in the serious accidents was failure to look properly and passing too closely to a cyclist.

4.4.146 The largest number of serious accidents occurred on The Vale (A4020) at its junctions with Warple Way/East Acton Road and Larden Road (250m to east of Warple Way), with two accidents recorded. These three accidents involved a car and another car/pedestrian. The major contributory factor to the other serious accidents was a failure to look properly and passing too closely to a cyclist.

4.4.147 Two of the total accidents included HGVs and one medium goods vehicle (MGV).

4.4.148 None of the accident descriptions suggested that an accident occurred due to the road geometry or infrastructure.

4.4.149 Figure 4.4.8 in the Acton Storm Tanks *Transport Assessment* figures shows the pedestrian and cyclist accidents by severity.

4.4.150 The records show that there were 11 accidents involving pedestrians and cyclists on The Vale (A4020). Inspection of the data showed that up to six of these occurred at junctions with signalised control facilities, with the remaining accidents occurring at locations without signal control.

4.4.151 In the context of the temporary HGV movements associated with the Acton Storm Tanks 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 *Construction Management Plan*. 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[3].

4.5 Construction assessment

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

4.5.2 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 Acton Storm Tanks site or from other sites.

Construction base case

4.5.3 As described in Section 4.4, the construction assessment year for transport effects in relation to this site is Site Year 2 of construction.

Pedestrians and cyclists

4.5.4 There are no proposals to change the cycle or pedestrian network by Site Year 2 of construction and the construction base case for these networks is therefore the same as indicated in the baseline description in Section 4.4.

Public transport

4.5.5 In terms of the public transport network, it is expected that as a result of the TfL *London Underground Upgrade Plan*[4], compared to the current baseline, capacity will increase by approximately 24% on the District Line. The TfL Upgrade Plan envisages a combined increase in capacity on the Circle and Hammersmith and City Line of 65% although it is clear that a significant proportion of this increase is attributed to the revised service patterns implemented in 2009, which will already be reflected in the baseline data.

4.5.6 Due to the traffic growth in the construction base case compared to the baseline situation, bus journey times along The Vale (A4020) and East Acton Lane, and within the wider area will be affected. The effect on journey times is detailed under the highway operation and network assessment paras. 4.5.17 to 4.5.23 and will result in an additional road

network delay of a maximum of approximately 1 second in the AM and PM peak hours.

4.5.7 It is anticipated that patronage on public transport services may change between the baseline situation and Site Year 2 of construction. Future patronage changes on bus and rail networks will be driven by a range of complex factors and there are inherent uncertainties in setting a patronage level for a future year. There are further capacity improvements anticipated at the Bakerloo, Piccadilly and Central Lines, however, the best way of delivering these improvements, including the timescales, are currently being investigated by TfL. With the exception of the London Overground extension between Dalston Junction and Clapham Junction (via Surrey Quays) there are no further proposals at the time of writing for the London Overground. Services on this part of the Overground network are not expected to change. At this stage, we are unable to estimate how much of these upgrades will have been completed by the construction base case or how much will be remaining.

4.5.8 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.

Highway network and operation

4.5.9 Baseline traffic flows (from the junction surveys) have been used and forecasting carried out to understand the capacity on the highway network in the vicinity of the Acton Storm Tanks site in Site Year 2 of construction without the Thames Tideway Tunnel project. The scope of this analysis has been agreed with TfL and LB of Ealing.

4.5.10 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.*

4.5.11 For the Acton Storm Tanks site, WeLoHAM has been used. The relevant growth factor for this site is described in para. 4.5.15 which was applied to the 2011 survey flows to produce flows for the base and development cases.

4.5.12 It should be noted that these factors represent growth over the period to 2021, which is beyond Site Year 2 of construction at the Acton Storm Tanks site and therefore ensures that the construction base case for the highway network is robust.

Committed developments

4.5.13 The South Acton Estate development would be complete and operational by Site Year 2 of construction while some phases of the development would still be under construction. This means that part of the development should be considered within the base case and part should be considered

as cumulative effects. However, as the TfL HAMs which have been used in the *TA* have been developed using GLA employment and population forecasts and are based on the employment and housing projections set out in the *London Plan*, the assessment inherently takes into account a level of future growth and development across London. This means that the construction and operational trips associated with the South Acton Estate is already taken into consideration within the traffic modelling. The Oaks Shopping Centre development would also be complete.

4.5.14 As a result these developments have been included within the operational base case which takes into consideration the effects on highway layout, operation and parking. As the volume of traffic created by operational vehicles at the Acton Storm Tanks site will be relatively low, there are no operational cumulative effects requiring assessment.

Local highway modelling

4.5.15 The growth factors for the LB of Ealing based on the WeLHAM model have been agreed with TfL and the LB of Ealing and applied to the baseline traffic flows. The growth factors are:

a. Weekday AM Peak: +4.5%

b. Weekday PM Peak: +4.6%

4.5.16 Paras. 4.3.6 to 4.3.8 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.

4.5.17 The construction base case LinSig and PICADY model outputs for The Vale (A4020) / Wardle Way/ East Acton Lane junction and The Vale (A4020) / Stanley Gardens junction are shown in Table 4.5.1 andTable 4.5.2.

4.5.18 The construction development case includes the optimisation of traffic signal timings at The Vale (A4020) / Wardle Way/ East Acton Lane junction in order to minimise journey time increases within the local area.

Table 4.5.1 Construction base case LinSig model outputs for The Vale (A4020) / Wardle Way/ East Acton Lane junction

Approach	Movement	Weekday							
		AM peak hour (08:00-09:00)				PM peak hour (17:00-18:00)			
		Flow (PCU)	DoS	MMQ (PCU)	Delay (seconds per PCU)	Flow (PCU)	DoS	MMQ (PCU)	Delay (seconds per PCU)
East Acton Lane	Left Ahead	213	51%	5	37	129	55%	4	52
	Right Ahead	262	62%	7	40	145	58%	4	52
The Vale (e)	Left Ahead	423	61%	9	29	524	59%	10	22
	Right Ahead	55	26%	1	44	141	48%	2	38
The Vale (w)	Left Ahead	378	61%	8	30	348	46%	6	20
	Right Ahead	449	64%	10	31	445	50%	8	20
		Practical Reserve Capacity (PRC)		Total Delay (PCU hours)		Practical Reserve Capacity (PRC)		Total Delay (PCU hours)	
Overall junction performance		40%		16		52%		13	

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 Assessment has assumed that traffic signal optimisation has been undertaken as detailed in the methodology set out in the Project-wide Transport Assessment.
Warple Way is one-way entrance only from this junction.

Table 4.5.2 Construction base case PICADY model outputs for The Vale (A4020)/ Stanley Gardens junction

Approach	Movement	Weekday							
		AM peak hour (08:00-09:00)				PM peak hour (17:00-18:00)			
		Flow (vehs)	RFC	Max Queue (vehs)	Delay (seconds/ vehs)	Flow (vehs)	RFC	Max Queue (vehs)	Delay (seconds/ vehs)
Stanley Gardens	Left	61	14%	0.16	9	89	21%	0.26	10
Stanley Gardens	Right	37	17%	0.20	19	89	35%	0.52	21

Notes: RFC represents Ratio of Flow to Capacity. Queue represents number of vehicles in queue. Delay represents the mean delay per vehicle. Stanley Gardens is one-way exit only at this junction

4.5.19 The resulting construction base case LinSig model output indicates that The Vale (A4020) / Wardle Way/ East Acton Lane junction will operate within capacity in both AM and PM periods assessed, with a maximum Degree of Saturation of 64%.

4.5.20 The LinSig junction model output shows that total junction delay is 16 PCU hours in the AM and 13 PCU Hours in the PM peak periods assessed. These equate to 16 seconds per PCU in the AM and 13 in the PM peak periods assessed.

4.5.21 The construction base case PICADY model for the junction of The Vale (A4020) / Stanley Gardens junction indicates that overall average delays to traffic turning left and right out of Stanley Gardens will increase by one to two seconds per vehicle in the AM and PM peaks respectively.

4.5.22 Overall the results indicate that in the construction base case these junctions will continue to operate well within capacity in both the AM and PM peak hours.

4.5.23 The results indicate that the local network will continue to operate within capacity, when taking into account the construction base case traffic flows.

Construction development case

4.5.24 This section summarises the findings of the assessment undertaken for the peak year of construction at the Acton Storm Tanks site (Site Year 2 of construction).

Pedestrian routes

4.5.25 As discussed in Section 4.2, there would be no diversions required for pedestrians resulting from the construction phase. Pedestrians travelling along the southern footway of Canham Road would be required to make an additional crossing across the Canham Road site access point.

4.5.26 The highway layout during construction (areas 1-3) plan is provided in the Acton Storm Tanks *Transport Assessment* figures and shows the effect on the pedestrian footways during construction.

4.5.27 To assess a busiest case scenario, it has been anticipated that all worker trips would finish their journeys by foot. As a result, the 40 worker trips generated by the site have been added to the construction base case pedestrian flows during the AM and PM peak hours.

4.5.28 Taking into consideration the fact that there would no pedestrian route diversions and only a modest increase in worker trips, the greatest effect would be on the local routes to and from the site, particularly the southern footway along Canham Road where the site access is located.

4.5.29 It is anticipated that crossing the site access would result in an average additional delay of a few seconds given the relatively low number of construction vehicle movements that would be expected at this site. This results in a negligible impact on pedestrian delay along the southern footway of Canham Road. Other pedestrian movements in the area would also experience a negligible impact.

4.5.30 During all construction work and on any section of road subject to temporary diversions or restrictions imposed by roadworks associated with the Acton Storm Tanks 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[5] to ensure safe passage for mobility and vision impaired pedestrians.

Cycle routes

4.5.31 Cyclists using the highway would experience minimal change to journey time as a result of the construction works at the Acton Storm Tanks site. The effect on journey times is outlined under the highway network and operation assessments and would be an increase of a maximum of one to two seconds for cyclists travelling along The Vale (A4020) and Stanley Gardens in the PM peak hour, over that in the construction base case. This represents a negligible impact.

4.5.32 With regard to accidents and safety; whilst cyclists would not be required to make any additional road crossings, although they would cross the new site entrance, as a result of the Acton Storm Tank site there would be an increase in construction traffic flow of between four and 20 two-way HGV movements per hour and appropriate signage would be provided to warn cyclists of the presence of larger vehicles.

4.5.33 Construction vehicles serving the site will 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.

4.5.34 The works would include the following measures affecting cyclists:

a. a security barrier would be positioned to allow a standard rigid tipper vehicle to be wholly off the road whilst awaiting barrier operation

b. traffic marshals shall manage entry and egress of vehicles across the entrance and pedestrians crossing, particularly with the existing nursery.

4.5.35 Measures set out in the *CoCP* include marshalling of traffic at the site access. During all construction work and on any section of road subject to temporary diversions or restrictions imposed by roadworks associated with the Acton Storm Tanks 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[6]) to ensure safe passage for cyclists.

4.5.36 During the construction period, 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 Ealing prior to execution of any works.

Bus routes and patronage

4.5.37 No bus services run immediately past the site. However, additional construction vehicles serving the site and the traffic management arrangements along The Vale (A4020) may affect some bus routes and bus journey times along The Vale (A4020) 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. 4.5.63 to 4.5.71) and the results show that there would be a maximum increase in delay for bus users of one second on The Vale (A4020) in the PM peak hour over the baseline case.

4.5.38 It is expected that approximately four additional worker trips would be made by bus during the AM and PM peak hours, which would result in less than one worker trip per bus (based on a service of 97 buses and 94 buses within a 640m walking distance during the AM and PM peak hours respectively).

4.5.39 As London Underground and National Rail stations are all more than 960m from the Acton Storm Tanks site it is possible that workers using these services as their main mode of transport would complete their journeys by bus. This would be an a maximum of nine additional worker trips would be made by bus during the AM and PM peak hours, given a maximum of 13 additional trips in both peaks, which would still result in less than one worker trip per bus (based on a service of 97 buses and 94 buses within a 640m walking distance during the AM and PM peak hours respectively).

4.5.40 This would not have a significant effect on local bus services.

London Underground and London Overground patronage

4.5.41 Although no London Underground or London Overground rail stations are directly adjacent to the site it is anticipated that approximately nine workers would use London Underground or London Overground services to access the site which would result in three additional person trips on London Overground services and six additional person trips on London Underground services in the AM and PM peak hours.

4.5.42 On London Overground and Underground services this equates to less than one additional passenger per train based on the frequency of services available in the vicinity of the site.

4.5.43 This would not have a significant effect on London Underground and London Overground patronage.

Parking

4.5.44 The highway layout during construction (phases 1-3) plan(see Acton Storm Tanks *Transport Assessment* figures) shows the proposed suspension and removal of parking bays associated with the construction works at the site.

4.5.45 To accommodate construction vehicles on the one-way route along Warple Way, Canham Road and Stanley Gardens a number of on-street parking bays would need to be suspended during the construction phase.

These suspensions have been discussed with LB Ealing. A total parking length of 99m would need to be suspended at the following locations:

a. 21m on the eastern side of Warple Way outside 27 to 35 and 37 to 41 Warple Way. This was recommended for suspension by the LB of Ealing due to the width of the carriageway at this location on a curve in the road

b. 16m on the eastern side of Warple Way just north of the junction with Canham Road. This is considered necessary to enable construction vehicles right-turning into Canham Road to be able to perform this manoeuvre

c. 41m on Canham Road opposite the proposed site access to allow construction vehicles to left-turn into and out of the site access without obstruction

d. 10m on the southernmost end of the western side of Stanley Gardens to allow construction vehicles to right-turn into Stanley Gardens from Canham Road

e. 11m on the northern end of the eastern side of Stanley Gardens to allow vehicles to left-turn out of Stanley Gardens into The Vale.

4.5.46 The parking surveys undertaken approximately one year apart provided very different results in terms of parking demand with the second survey suggesting a very high level of parking demand. It is therefore difficult to conclude that either survey represents usual parking conditions.

4.5.47 A third survey undertaken for the 8-9am time period was consistent with the first survey which suggested a low parking demand. If we consider the second survey as representing a worst case demand there would be a shortfall in parking equivalent to 16-17 cars.

4.5.48 The parking on the roads affected is unrestricted; therefore no designated resident or business parking would be lost. It was noted that a number of properties near the southern end of Stanley Gardens were using potential on-site parking facilities for activities other than parking. It could be assumed therefore that they have associated vehicles parked on-street in the immediate vicinity that could be parked off-street.

4.5.49 The level of parking suspension represents a minimum level of impact as suggested by the LB of Ealing. Our tracking analysis suggests that the majority of the suspensions (58m of the total 99m) are necessary for any large vehicle to route along these roads. It could be assumed therefore that vehicles currently travelling along this route risk conflict with parked vehicles and that these suspensions would make access for all vehicles safer. It also follows that vehicles currently parked at these locations where they are in conflict with the movement of large vehicles contravene the recommendations of the highway code.

4.5.50 The roads around Warple Way, Canham Road and Stanley Gardens are all subject to controlled parking zone restrictions, therefore there could be no overspill parking into the residential streets.

4.5.51 During the construction phase there would also be a short period where the access arrangement to the private car parking area (Lemon Land car park) on the land adjacent to the southwest side of the site would be affected. There are currently separate inbound and outbound lanes provided to/from this car park at the southern end of Warple Way with the lanes separated by a traffic island. During construction it would be necessary to close the exit lane and the entrance lane sequentially and the access to the car park would be restricted to a single lane during these times. In addition, there will be some temporary parking suspensions made in the Lemon Lane car park for a short period during the construction phase.

4.5.52 Parking for five essential maintenance vehicles would be provided on site. With regard to construction worker parking, measures would be taken for this site to discourage workers from travelling by car, including promoting the use of public transport, walking or cycling. These measures are included in the *Draft Project Framework Travel Plan* and *CoCP* and would be reflected in the site-specific *Workplace Travel Plan* for this site.

4.5.53 Taking account of the suspension of parking, the potential availability of spare capacity in the area (including consideration of the use of local parking by construction workers) and the impact on on-street parking and loading on Warple Way, Canham Road and Stanley Gardens would be significant.

Highway assessment

Highway layout

4.5.54 The highway layout during construction (areas 1-3) plans are provided in the Acton Storm Tanks *Transport Assessment* figures and show the highway layout during Phases 1 and 2 of the construction works.

4.5.55 During all phases the highway network would remain unchanged, with the exception of the installation of the new access on Canham Road to serve the Thames Tideway Tunnel construction site. This would involve some kerbline realignment, which would ensure that construction vehicles could manoeuvre without overrunning the footways. The removal of on-street parking at a number of locations, as discussed in paras. 4.2.9 and 4.2.10, would increase the effective width of the carriageway at key turning points.

4.5.56 The highway layout during construction vehicle swept path analysis (areas 1-2) plans are provided the Acton Storm Tanks site *Transport Assessment* figures and show that the construction vehicles would be able to safely enter and leave the site.

Highway network

4.5.57 Construction lorry movements would be limited to the day shift only (08:00 to 18:00). 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 Ealing.

4.5.58 Table 4.2.4 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.

4.5.59 Table 4.2.4 shows an average peak flow of 120 vehicle movements a day is expected during the months of greatest activity during Year 2 of construction at the Acton Storm Tanks site. At other times in the construction period, vehicle flows would be lower than this average peak figure.

4.5.60 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 will occur concurrently and the peak for worker trips will be outside of the highway network peak hour, therefore the assessment is considered to be robust.

4.5.61 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.

4.5.62 The assignment of construction lorry trips has been undertaken using OmniTrans[iv] 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 Acton Storm Tanks site, or with other Thames Tideway Tunnel project sites, that would use routes in the vicinity of the Acton Storm Tanks site. Figure 4.5.1 in the Acton Storm Tanks *Transport Assessment* figures shows the OmniTrans plot for the local road network around the Acton Storm Tanks site.

4.5.63 Changes to the highway network during construction and the additional construction traffic generated by the project may lead to local changes in traffic flow and capacity. Local modelling has been undertaken to assess the effect on the highway operation resulting from these changes. The local 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).

4.5.64 A summary of the construction assessment results for the weekday AM and PM peak hours is presented in Table 4.5.3 to Table 4.5.6.

4.5.65 The construction development case includes the optimisation of traffic signal timings at The Vale (A4020) / Wardle Way/ East Acton Lane junction in order to minimise journey time increases within the local area.

[iv] *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

Table 4.5.3 Construction development case LinSig model outputs for The Vale (A4020) / Warple Way/ East Acton Lane junction (AM peak)

Approach	Arm	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
East Acton Lane (southbound)	Left / ahead	215	51%	54%	+3%	5	5	0	37	39	+2
	Right / ahead	262	62%	65%	+3%	7	7	0	40	43	+3
The Vale (A4020) (eastbound)	Left / ahead	428	61%	60%	-1%	9	9	0	29	28	-1
	Right / ahead	57	26%	26%	0%	1	1	0	44	42	-2
The Vale (A4020) (westbound)	Left / ahead	393	61%	62%	+1%	8	8	0	30	29	-1
	Right / ahead	455	64%	64%	+2%	10	10	0	31	30	-1
			Practical Reserve Capacity (PRC)						Total delay (PCU hours)		
Overall junction performance			40%	39%	-1%				16	16	0

Notes: Warple Way is 'entrance only' (southbound) and no traffic enters the junction from that arm so it is not included in the table.
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 Units. 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.

Table 4.5.4 Construction development case LinSig model outputs for The Vale (A4020) / Warple Way/ East Acton Lane junction (PM peak)

Approach	Arm	Flow (PCU)	Weekday								
			PM peak hour (17:00-18:00)								
			DoS			MMQ (PCUs)			Delay (Seconds per PCU)		
			Base case	Devt case	Change	Base case	Devt case	Change	Base case	Devt case	Change
East Acton Lane (southbound)	Left / ahead	130	55%	55%	0%	4	4	0	52	52	0
	Right / ahead	145	58%	58%	0%	4	4	0	52	52	0
The Vale (A4020) (eastbound)	Left / ahead	528	59%	60%	+1%	10	10	0	22	22	0
	Right / ahead	141	48%	49%	+1%	2	2	0	38	39	+1
The Vale (A4020) (westbound)	Left / ahead	351	46%	46%	0%	6	6	0	20	20	0
	Right / ahead	447	50%	50%	0%	8	8	0	20	20	0
			Practical Reserve Capacity (PRC)						Total delay (PCU hours)		
Overall junction performance			52%	51%	-1%				13	13	0

Notes: Warple Way is 'entrance only' (southbound) and no traffic enters the junction from that arm so it is not included in the table.

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.

Table 4.5.5 Construction development case PICADY model outputs for The Vale (A4020) / Stanley Gardens junction (AM peak)

Approach	Arm	Flow (vehs)	Weekday								
			AM peak hour (08:00-09:00)								
			DoS			Max Queue (vehs)			Delay (seconds/veh)		
			Base case	Devt case	Change	Base case	Devt case	Change	Base case	Devt case	Change
Stanley Gardens	Left	62	14%	14%	0%	0.16	0.16	0	9	10	+1
Stanley Gardens	Right	40	17%	19%	+2%	0.20	0.23	+0.03	19	20	+1

Table 4.5.6 Construction development case PICADY model outputs for The Vale (A4020) / Stanley Gardens junction (PM peak)

Approach	Arm	Flow (vehs)	Weekday								
			PM peak hour (17:00-18:00)								
			DoS			Max Queue (vehs)			Delay (seconds/veh)		
			Base case	Devt case	Change	Base case	Devt case	Change	Base case	Devt case	Change
Stanley Gardens	Left	91	21%	24%	+3%	0.26	0.32	+0.06	10	11	+1
Stanley Gardens	Right	92	35%	39%	+4%	0.52	0.62	+0.10	21	22	+1

Notes: RFC represents Ratio of Flow to Capacity. Queue represents number of vehicles in queue. Delay represents the mean delay per vehicle. The PICADY model does not report results for The Vale (A4020) as there is no right turn into Stanley Gardens (one-way) and other movements along The Vale (A4020) have the right of way.

4.5.66 The LinSig model results suggest that The Vale (A4020) / Warple Way/ East Acton Lane junction there would a minimal increase in demand resulting from the construction traffic. The largest increase in the degree of saturation is 3% on East Acton Lane southbound right/ahead direction in the AM peak hour with a maximum additional delay of three seconds per PCU. In the PM peak hour the only change in degree of saturation is an additional 1% on The Vale (A4020) eastbound, and there would be only a one second delay per PCU.

4.5.67 The LinSig junction model output shows that total junction delay is 16 PCU hours in the AM peak period assessed and 13 PCU hours in the PM peak period assessed. These equate to 16 seconds per PCU in the AM peak period assessed and 13 seconds per PCU in the PM peak period assessed.

4.5.68 With the inclusion of the construction traffic generated by the Acton Storm Tanks site the construction development case indicates that The Vale (A4020) / Warple Way / East Acton Lane and The Vale (A4020) / Stanley Gardens junctions would continue to operate well within capacity.

4.5.69 The PICADY model outputs suggest that there would also be a minimal increase in demand at The Vale (A4020) / Stanley Gardens junction resulting from the construction traffic. The degree of saturation would increase by a maximum of 4% on traffic turning right from Stanley Gardens in PM peak hour with an additional one second delay per vehicle. There will only be a 2% increase in the degree of saturation for the same movement at the AM peak with an addition of one second delay. No material increase in queuing is predicted as a result of the construction.

4.5.70 The construction base case model indicates that the junctions assessed would operate well within capacity in both the AM and PM peak hours without the Thames Tideway Tunnel proposals.

4.5.71 The construction assessment indicates that there would be no significant impact on the road network during the AM and PM peak hours as a result of the additional construction traffic.

Construction mitigation

4.5.72 The project has been designed to limit the issues arising on transport networks as far as possible and many measures have been embedded directly in the design of the project. These are summarised in Table 4.5.7.

4.5.73 No additional measures are proposed for transport and therefore there is no mitigation identified for the construction phase.

Table 4.5.7 Acton Storm Tanks Station site design measures

Phase	Issues	Design measures
Construction	Creating access point	• Creation of a left-in/ right-out site access for construction traffic
	Safe passage for pedestrians and cyclists	• Provision of a safe crossing point for pedestrians and cyclists at the site access • a security barrier would be positioned to allow a standard rigid tipper vehicle to be wholly off the road whilst awaiting barrier operation
	Street parking	• Suspension of approximately 15 parking bays on Abbey Lane, Warple Way, Canham Road and Stanley Gardens.
	Movement of construction traffic flows on the local highway network	• Providing traffic marshals as appropriate at the site access to minimise conflicts with construction traffic • Temporary reduction of access to Lemon Lane car park to one lane along with some temporary reduction in parking.
	Community liaison to provide appropriate information and resolve issues of concern	• Community Liaison Plan to be prepared to, among other things, maintain regular communication with the community, other stakeholders and affected parties to ensure they are kept informed of the scope of works being undertaken, the progress of the works and programme.
Operation	Permanent access point	• Provision of permanent kerbing at site access to accommodate ten yearly maintenance vehicles - architect to advice on finishes / material.

4.5.74 These embedded measures, discussed in Section 4.2, 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**.**

4.6 Operational assessment

4.6.1 This section summarises the findings of the assessment undertaken for Year 2 of operation at the Acton Storm Tanks site.

4.6.2 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 4.3. This has been discussed with TfL and the LB of Ealing.

Operational base case

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

4.6.4 As explained in para. 4.2.47, the elements of the transport network that would be affected during operation are car parking and 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

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

4.6.6 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.

4.6.7 During the operational phase, the highway and parking layouts in the local vicinity would be reinstated to base case conditions and there would be a new access on Canham Road to the operational area around the Thames Tideway Tunnel main tunnel site and associated buildings.

4.6.8 The permanent highway layout plans (areas 1-3) are provided in the Acton Storm Tanks *Transport Assessment* figures indicates the operational phase permanent works.

Parking

4.6.9 No change is required to parking to accommodate the routine maintenance visits to the Acton Storm Tanks site, which would be undertaken every three to six months

4.6.10 When larger cranes are required to service the site some parking areas would have to be temporarily suspended to ensure the vehicles have sufficient space to manoeuvre into the site. These temporary suspensions would be on the same sections of road as the construction phase and would be on an infrequent basis (approximately once every ten years).

4.6.11 Taking into consideration the infrequent and temporary nature of the arrival of vehicles at Acton Storm Tanks which would require parking suspension, it is anticipated that there is unlikely to be a significant overall change to parking in the local area.

Highway layout and operation

4.6.12 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.

4.6.13 For these inspections, the Acton Storm Tanks site would be accessed via the existing access situated at the junction of Warple Way and Canham Road.

4.6.14 During the ten-yearly inspections, space to locate two large cranes and associated support vehicles within the site area would be required. Access for the mobile cranes would utilise the new access of Canham Road. The cranes would facilitate the lowering and recovery of tunnel inspection teams and provide duty/standby access for personnel.

4.6.15 To assess the effect of these on the highway layout, swept paths have been undertaken for the largest vehicles, including 11.36m mobile cranes, a 10m rigid vehicle and a 10.7m articulated vehicle. The permanent highway layout vehicle swept path analysis (areas 1-2) plans are provided in the Acton Storm Tanks *Transport Assessment* figures and show safe access/egress at the site for the operational phase.

4.6.16 As identified above, as a result of the large turning circles of the cranes, a maximum of 15 parking bays would have to be suspended to ensure the vehicles have sufficient space to manoeuvre into the site. This would be every ten years.

4.6.17 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.

4.6.18 Due to the infrequent nature of maintenance trips, there is anticipated to be no significant change to the surrounding highway network.

Operational mitigation

4.6.19 Due to there being no significant change to the transport networks during the operational phase, no mitigation is required.

4.7 Summary of site specific Transport Assessment

4.7.1 The key outcomes and findings of this *TA* are summarised in Table 4.7.1.

Table 4.7.1 Acton Storm Tanks Transport Assessment results

Phase	Mode of transport	Key findings
Construction	Pedestrians	Minor changes to journey times for some pedestrians due to a new site access along Canham Road.
	Cyclists	Minimal delay (approximately one or two seconds) experienced by cyclists using Stanley Gardens as a result of additional construction traffic demand in the area.
	Bus patronage and operators	Approximately 13 worker trips would be made by bus in each peak hour and could be accommodated on base case bus networks (including those finishing their trips from other modes). Minimal delay to bus services (approximately two or three seconds) would be anticipated resulting from the additional construction traffic demand.
	London Underground and London Overground patronage	Approximately nine worker trips in each peak hour would be made by London Underground or London Overground and could be accommodated on base case services.
	Parking	15 car parking bays along Warple Way, Canham Road and Stanley Gardens would be suspended during construction. Temporary suspension of access to and parking within Lemon Land car park. Spare capacity exists in the area to accommodate displaced demand.
	Highway network and operation	Approximately 120 additional daily movements would be generated by the construction works at Acton Storm Tanks. The addition of the Thames Tideway Tunnel traffic (anticipated to be 27 two-way vehicle movements during the peak hours) would cause an insignificant change to the operation of The Vale (A4020) / Warple Way/ East Acton Lane junction and The Vale (A4020) / Stanley Gardens junction.

Phase	Mode of transport	Key findings
Operation	Parking	A maximum of 15 car parking bays would require temporary suspension when large cranes require access to the site, approximately every ten years.
	Highway layout and operation	Some minor network delay may be experienced by other road users when large vehicles are accessing the site. However, this would be infrequent and temporary.

References

[1] TfL, *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] TfL. *London Underground Upgrade Plan*, February. (2011). Available at: http://www.tfl.gov.uk/corporate/projectsandschemes/18072.aspx

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

[6] 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: **7.10.1**

Acton Storm Tanks

Appendices

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

Hard copy available in

Box **49** Folder **B**
January 2013

Thames Tideway Tunnel

Creating a cleaner, healthier River Thames

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Thames Tideway Tunnel

Transport Assessment

Section 4 Appendices: Acton Storm Tanks

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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 Acton Storm Tanks. 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 Borough of Ealing.

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:

A.2.5 "*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.2.6 The guidance goes on to advise at paragraph 32:

A.2.7 *"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:*

- *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;*
- *safe and suitable access to the site can be achieved for all people; and*
- *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.2.8 The document also states that:

A.2.9 *"Plans should protect and exploit opportunities for the use of sustainable transport modes for the movement of goods or people"*. Therefore:

A.2.10 *"A key tool to facilitate this would be a Travel Pan*. *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.2.11 The National Policy Statement for Waste Water 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.2.12 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.2.13 The NPS seeks a sustainable long term solution to address the untreated sewage discharged into the River Thames and the Thames Tideway Tunnel has been considered as the preferred solution.

A.2.14 With particular reference to transport matters the document states:

A.2.15 *"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.2.16 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.2.17 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.2.18 The NPS for Waste Water 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:

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

A.2.19 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 city that meets the challenges of economic and population growth;
- An internationally competitive and successful city;
- A city of diverse, strong, secure and accessible neighbourhoods;
- A city that delights the senses;
- A city that becomes a world leader in improving the environment; and
- 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 Ealing has a number of policies relevant to transport within the Unitary Development Plan (UDP), the emerging Local Development Framework (LDF) and Supplementary Planning Guidance (SPG) documents including, the Sustainability Checklist, Transport Assessment Reports for Development and Green Travel Plans.

Unitary Development Plan (LB of Ealing, Oct 2004)

A.4.2 The UDP (known as The Plan for the Environment) was adopted by the London Borough of Ealing in October 2004. This acts as the statutory guidance for development within the Borough until it is replaced by the LDF, which is planned for mid 2013. Due to the emerging 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 October 2007 are outlined below.

A.4.3 The transport related policies set out in this document focus on using existing rail and barge borne freight depots within the borough for mineral waste disposal, providing adequate access for sustainable transport users and ensuring all developments design adequately for road safety and road space for all users within the borough.

A.4.4 **Policy 2.3 – Land – mineral development** identifies the borough's policy on extracted minerals and mineral waste. The policy states that development would not be permitted where it would have negative impacts on the local environment.

A.4.5 **Policy 2.4 – Land – mineral aggregates** distribution emphasises the support for increased rail and barge bourne freight and re-using aggregates.

A.4.6 **Policy 9.1 – Development, access and parking** identifies that development would be considered acceptable if the development ensures that it maximises access by foot and public transport, provides suitable and adequate car parking and servicing proposals and is supported by a Transport Assessment and a Travel Plan.

A.4.7 **Policy 9.5 – Walking and streetscape** highlights that development proposals should include footpaths/pavements that are safe, attractive,

well-lit, and comfortable for all, particularly for those who have difficulties with mobility.

A.4.8 **Policy 9.6 – Cycling** identifies that development proposals should improve the safety and ease of movement of cyclists by enhancing strategic cycle routes routing through or connecting with development sites, improving cycle crossing points, connecting cycle routes to local amenities such as to schools and/or leisure centres and supplying secure parking facilities.

A.4.9 **Policy 9.9 – Highways and traffic management** suggests that development would be regulated on road safety and on ensuring that available road space is maximised for all users. The policy also states that access points should be limited on Strategic and Main Distributor Roads and developments that would "generate significant traffic increases on local roads will be resisted." Finally, this policy highlights that the design of new roads, paths and accesses associated with the development should contribute to the environment, placing a focus on people rather than on vehicles.

A.4.10 **Policy 9.10 – Freight** – states that the Council will encourage:

- *"Warehousing development in Major Employment Locations, provided that the environmental costs of heavy goods traffic do not outweigh the benefits of employment generated;*
- *The management of goods vehicle movements by restricting the permitted hours of servicing and operation where this is appropriate;*
- *The use of non-road freight transport such as rail and canal in industrial and warehousing development; and*
- *The development of freight partnerships for new developments in Major Employment Locations."*

A.4.11 **Policy 9.11 – Public car parks and private (non-residential) parking areas** sets out the criteria for public and private car parking, including:

- Non-residential development parking should be accessible to the public in areas where there is a shortage of public car parking;
- Generally, the development of temporary off-street public car parks would not be supported; and
- Applications for the alternative use of existing non-residential parking areas would be encouraged, providing it is supported by a Travel Plan.

Local Development Framework - Core Strategy (LB of Ealing, April 2012)

A.4.12 The emerging LDF, which will eventually replace the UDP, aims to guide and manage development and regeneration in the borough up until 2026. The Core Strategy was adopted in April 2012 and the policies of the LDF are expected to fully replace the UDP by mid 2013.

A.4.13 Transport policies within this document largely focus on improving public transport accessibility and enhancing sustainable travel.

A.4.14 **Policy 1.2 – Delivery of the vision for Ealing 2026** sets out the council's vision for guiding development in the borough for the next 14 years. Relevant to transport, this policy focuses on:

- The benefits that will come from Crossrail and High Speed 2, such as improved accessibility and enhanced public transport capacity;
- Ensuring sustainable design for future developments; and
- Supporting developments of higher densities in areas with good transport links.

Supplementary Planning Guidance (SPG)

A.4.15 SPG documents provide additional guidance and detail to support the LDF and the UDP. The most relevant SPG documents to transport are the 'Sustainability Checklist', 'Transport Assessment Reports for Development' and 'Green Travel Plans'.

A.4.16 Transport policies within these documents are concerned with ensuring improvements are made to the borough's ten sustainability activities, and that developments abide by the Councils Transport Assessment and Green Travel Plan initiatives.

A.4.17 SPG 1 – Sustainability Checklist (LB of Ealing, April 2011)

A.4.18 Within this SPG document the Council state that it is a "quick way to evaluate the environmental and community benefits arising from a proposed property development, and to identify any negative economic social and environmental impacts."

A.4.19 SPG 20 – Transport Assessment Reports for Development (LB of Ealing, October 2004)

A.4.20 This SPG document is intended to "provide advice when a transport assessment should be provided, what issues should be considered by the assessment, the appropriate level of analysis and the approach to be adopted."

A.4.21 SPG 21 – Green Travel Plans (LB of Ealing, October 2004)

A.4.22 Within this SPG document, the Council will assess appropriate development by ensuring "that the travel demands arising from a proposed development support sustainable transport."

Appendix B: PTAL analysis

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PTAI Study Report File Summary

PTAI Run Parameters

PTAI Run	20120410122329
Description	20120410122329
Run by user	PTAL web application
Date	04/10/2012

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:	521154, 179744

Mode	Stop	Route	Distance (metres)	Frequency (vph)	Weight	Walk time (mins)	SWT (mins)	TAT (mins)	EDF	AI
BUS	LARDEN ROAD VALETTA ROAD	272	331.18	4	0.5	4.14	9.5	13.64	2.2	1.1
BUS	THE VALE EAST ACTON LANE	207	409.87	12	1	5.12	4.5	9.62	3.12	3.12
BUS	E ACTON LANE ACTON PARK	70	458.75	6	0.5	5.73	7	12.73	2.36	1.18
BUS	THE VALE EAST ACTON LANE	266	409.87	7.5	0.5	5.12	6	11.12	2.7	1.35
BUS	THE VALE EAST ACTON LANE	607	409.87	6	0.5	5.12	7	12.12	2.47	1.24

Total AI for this POI is 7.99.

PTAL Rating is 2.

Appendix C: Local modelling outputs

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C.1 Baseline results, AM peak hour

The Vale/Stanley Gardens junction priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Existing Layout	ARCADY		✓				100.000	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)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Baseline, AM	Baseline	AM	Base 2011 - AM	DIRECT	08:00	09:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
untitled	T-Junction	Two-way	A,B,C		12.69	B

Junction Network Options

Driving Side	Lighting	Road Surface
Left	Normal/unknown	(Mini-roundabouts only)

Arms

Arms

Arm	Name	Description	Arm Type
A	The Vale (E)		Major
B	Stanley Gardens		Minor
C	The Vale (W)		Major

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)
C	10.53		0.00		2.20	100.00		

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	Two lanes		3.00	3.00								30	18

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	496.154	0.073	0.183	0.115	0.262
1	B-C	635.268	0.078	0.198	-	-
1	C-B	631.874	0.197	0.197	-	-

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	DIRECT	✓	N/A	100.000
B	DIRECT	✓	N/A	100.000
C	DIRECT	✓	N/A	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	653.000
	B	35.000	0.000	58.000
	C	909.000	0.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.38	0.00	0.62
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.109
	B	1.086	1.000	1.052
	C	1.069	1.000	1.000

Heavy Vehicle Percentages - Junction 1 (for whole period)

	To

From		A	B	C
	A	0.000	0.000	10.870
	B	8.570	0.000	5.170
	C	6.930	0.000	0.000

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
B-C	0.13	9.18	0.15	A	58.00	58.00	8.72	9.03	0.15	8.73	9.03
B-A	0.15	18.33	0.18	C	35.00	35.00	10.37	17.77	0.17	10.37	17.78
C-A	-	-	-	-	909.00	909.00	-	-	-	-	-
C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A-B	-	-	-	-	0.00	0.00	-	-	-	-	-
A-C	-	-	-	-	653.00	653.00	-	-	-	-	-

C.2 Baseline results, PM peak hour

The Vale/Stanley Gardens junction priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors

Existing Layout	ARCADY		✓				100.000	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)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Baseline, PM	Baseline	PM	Base 2011 - PM	DIRECT	17:00	18:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
untitled	T-Junction	Two-way	A,B,C		14.98	B

Junction Network Options

Driving Side	Lighting	Road Surface
Left	Normal/unknown	(Mini-roundabouts only)

Arms

Arms

Arm	Name	Description	Arm Type
A	The Vale (E)		Major
B	Stanley Gardens		Minor
C	The Vale (W)		Major

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)
C	10.53		0.00		2.20	100.00		

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	Two lanes		3.00	3.00								30	18

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	496.154	0.073	0.183	0.115	0.262
1	B-C	635.268	0.078	0.198	-	-
1	C-B	631.874	0.197	0.197	-	-

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	DIRECT	✓	N/A	100.000
B	DIRECT	✓	N/A	100.000
C	DIRECT	✓	N/A	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	700.000
	B	85.000	0.000	85.000
	C	702.000	0.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.50	0.00	0.50
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.064
	B	1.024	1.000	1.024
	C	1.063	1.001	1.001

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	6.430
	B	2.350	0.020	2.350
	C	6.270	0.060	0.060

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay	Max Queue	Max LOS	Average Demand	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay	Rate Of Queueing Delay (Veh-	Inclusive Total Queueing Delay	Inclusive Average Queueing Delay (s)

		(s)	(Veh)		(Veh/hr)			(s)	min/min)	(Veh-min)	
B-C	0.19	10.20	0.24	B	85.00	85.00	14.15	9.99	0.24	14.15	9.99
B-A	0.32	19.76	0.46	C	85.00	85.00	26.94	19.02	0.45	26.96	19.03
C-A	-	-	-	-	702.00	702.00	-	-	-	-	-
C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A-B	-	-	-	-	0.00	0.00	-	-	-	-	-
A-C	-	-	-	-	700.00	700.00	-	-	-	-	-

C.3 Construction base case results, AM peak hour

The Vale/Stanley Gardens junction priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Existing Layout	ARCADY		✓				100.000	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)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Base Case, AM	Base Case	AM	Future 2021 - AM	DIRECT	08:00	09:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
untitled	T-Junction	Two-way	A,B,C		13.33	B

Junction Network Options

Driving Side	Lighting	Road Surface
Left	Normal/unknown	(Mini-roundabouts only)

Arms

Arms

Arm	Name	Description	Arm Type
A	The Vale (E)		Major
B	Stanley Gardens		Minor
C	The Vale (W)		Major

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)
C	10.53		0.00		2.20	100.00		

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	Two lanes		3.00	3.00								30	18

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	496.154	0.073	0.183	0.115	0.262
1	B-C	635.268	0.078	0.198	-	-
1	C-B	631.874	0.197	0.197	-	-

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	DIRECT	✓	N/A	100.000
B	DIRECT	✓	N/A	100.000
C	DIRECT	✓	N/A	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	682.000
	B	37.000	0.000	61.000
	C	950.000	0.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.38	0.00	0.62
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

	To

		A	B	C
From	A	1.000	1.000	1.109
	B	1.086	1.001	1.052
	C	1.069	1.001	1.001

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	10.873
	B	8.571	0.086	5.172
	C	6.931	0.069	0.069

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
B-C	0.14	9.44	0.16	A	61.00	61.00	9.43	9.27	0.16	9.43	9.28
B-A	0.17	19.53	0.20	C	37.00	37.00	11.65	18.90	0.19	11.66	18.91
C-A	-	-	-	-	950.00	950.00	-	-	-	-	-
C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A-B	-	-	-	-	0.00	0.00	-	-	-	-	-
A-C	-	-	-	-	682.00	682.00	-	-	-	-	-

C.4 Construction base case results, PM peak hour

The Vale/Stanley Gardens junction priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Existing Layout	ARCADY		✓				100.000	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)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Base Case, PM	Base Case	PM	Base 2011 - PM	DIRECT	17:00	18:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
untitled	T-Junction	Two-way	A,B,C		16.00	C

Junction Network Options

Driving Side	Lighting	Road Surface
Left	Normal/unknown	(Mini-roundabouts only)

Arms

Arms

Arm	Name	Description	Arm Type
A	The Vale (E)		Major
B	Stanley Gardens		Minor
C	The Vale (W)		Major

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)
C	10.53		0.00		2.20	100.00		

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	Two lanes		3.00	3.00								30	18

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	496.154	0.073	0.183	0.115	0.262
1	B-C	635.268	0.078	0.198	-	-
1	C-B	631.874	0.197	0.197	-	-

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	DIRECT	✓	N/A	100.000
B	DIRECT	✓	N/A	100.000
C	DIRECT	✓	N/A	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	732.000
	B	89.000	0.000	89.000
	C	734.000	0.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.50	0.00	0.50
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.064
	B	1.024	1.000	1.024
	C	1.063	1.001	1.001

Heavy Vehicle Percentages - Junction 1 (for whole period)

	To

From		A	B	C
	A	0.000	0.000	6.429
	B	2.353	0.024	2.353
	C	6.268	0.063	0.063

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
B-C	0.21	10.60	0.26	B	89.00	89.00	15.38	10.37	0.26	15.39	10.37
B-A	0.35	21.39	0.52	C	89.00	89.00	30.43	20.51	0.51	30.46	20.54
C-A	-	-	-	-	734.00	734.00	-	-	-	-	-
C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	9999999999.00
A-B	-	-	-	-	0.00	0.00	-	-	-	-	-
A-C	-	-	-	-	732.00	732.00	-	-	-	-	-

C.5 Construction development case results, AM peak hour

The Vale/Stanley Gardens junction priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors

Existing Layout	ARCADY		✓				100.000	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)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Dev Case, AM	Dev Case	AM	Future 2021 - AM	DIRECT	08:00	09:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
untitled	T-Junction	Two-way	A,B,C		14.19	B

Junction Network Options

Driving Side	Lighting	Road Surface
Left	Normal/unknown	(Mini-roundabouts only)

Arms

Arms

Arm	Name	Description	Arm Type
A	The Vale (E)		Major
B	Stanley Gardens		Minor

C	The Vale (W)		Major

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)
C	10.53		0.00		2.20	100.00		

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	Two lanes		3.00	3.00								30	18

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	496.154	0.073	0.183	0.115	0.262
1	B-C	635.268	0.078	0.198	-	-
1	C-B	631.874	0.197	0.197	-	-

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	DIRECT	✓	N/A	100.000
B	DIRECT	✓	N/A	100.000
C	DIRECT	✓	N/A	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	682.000
	B	40.000	0.000	62.000
	C	950.000	0.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.39	0.00	0.61
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

		To		
		A	B	C
From	A	1.000	1.000	1.109
	B	1.132	1.001	1.051
	C	1.069	1.001	1.001

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	10.873
	B	13.223	0.130	5.088
	C	6.931	0.070	0.070

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay	Max Queue	Max LOS	Average Demand	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay	Rate Of Queueing Delay (Veh-	Inclusive Total Queueing Delay	Inclusive Average Queueing Delay (s)

		(s)	(Veh)		(Veh/hr)			(s)	min/min)	(Veh-min)	
B-C	0.14	9.52	0.16	A	62.00	62.00	9.66	9.35	0.16	9.66	9.35
B-A	0.19	20.90	0.23	C	40.00	40.00	13.45	20.18	0.22	13.46	20.19
C-A	-	-	-	-	950.00	950.00	-	-	-	-	-
C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	9999999999.00
A-B	-	-	-	-	0.00	0.00	-	-	-	-	-
A-C	-	-	-	-	682.00	682.00	-	-	-	-	-

C.6 Construction development case results, PM peak hour

The Vale/Stanley Gardens junction priority layout

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Existing Layout	ARCADY		✓				100.000	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)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Dev Case, PM	Dev Case	PM	Base 2011 - PM	DIRECT	17:00	18:00	60	15				✓		

Junction Network

Junctions

Name	Junction Type	Major Road Direction	Arm Order	Do Geometric Delay	Junction Delay (s)	Junction LOS
untitled	T-Junction	Two-way	A,B,C		17.35	C

Junction Network Options

Driving Side	Lighting	Road Surface
Left	Normal/unknown	(Mini-roundabouts only)

Arms

Arms

Arm	Name	Description	Arm Type
A	The Vale (E)		Major
B	Stanley Gardens		Minor
C	The Vale (W)		Major

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)
C	10.53		0.00		2.20	100.00		

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	Two lanes		3.00	3.00								30	18

Pedestrian Crossings

Arm	Crossing Type
A	None
B	None
C	None

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	496.154	0.073	0.183	0.115	0.262
1	B-C	635.268	0.078	0.198	-	-
1	C-B	631.874	0.197	0.197	-	-

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	DIRECT	✓	N/A	100.000
B	DIRECT	✓	N/A	100.000
C	DIRECT	✓	N/A	100.000

Turning Proportions

Turning Counts or Proportions (Veh/hr) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	732.000
	B	99.000	0.000	103.000
	C	734.000	0.000	0.000

Turning Proportions (Veh) - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.00	0.00	1.00
	B	0.49	0.00	0.51
	C	1.00	0.00	0.00

Vehicle Mix

Average PCU Per Vehicle - Junction 1 (for whole period)

	To

		A	B	C
From	A	1.000	1.000	1.064
	B	1.046	1.001	1.023
	C	1.063	1.001	1.001

Heavy Vehicle Percentages - Junction 1 (for whole period)

		To		
		A	B	C
From	A	0.000	0.000	6.429
	B	4.570	0.050	2.301
	C	6.268	0.060	0.060

Results

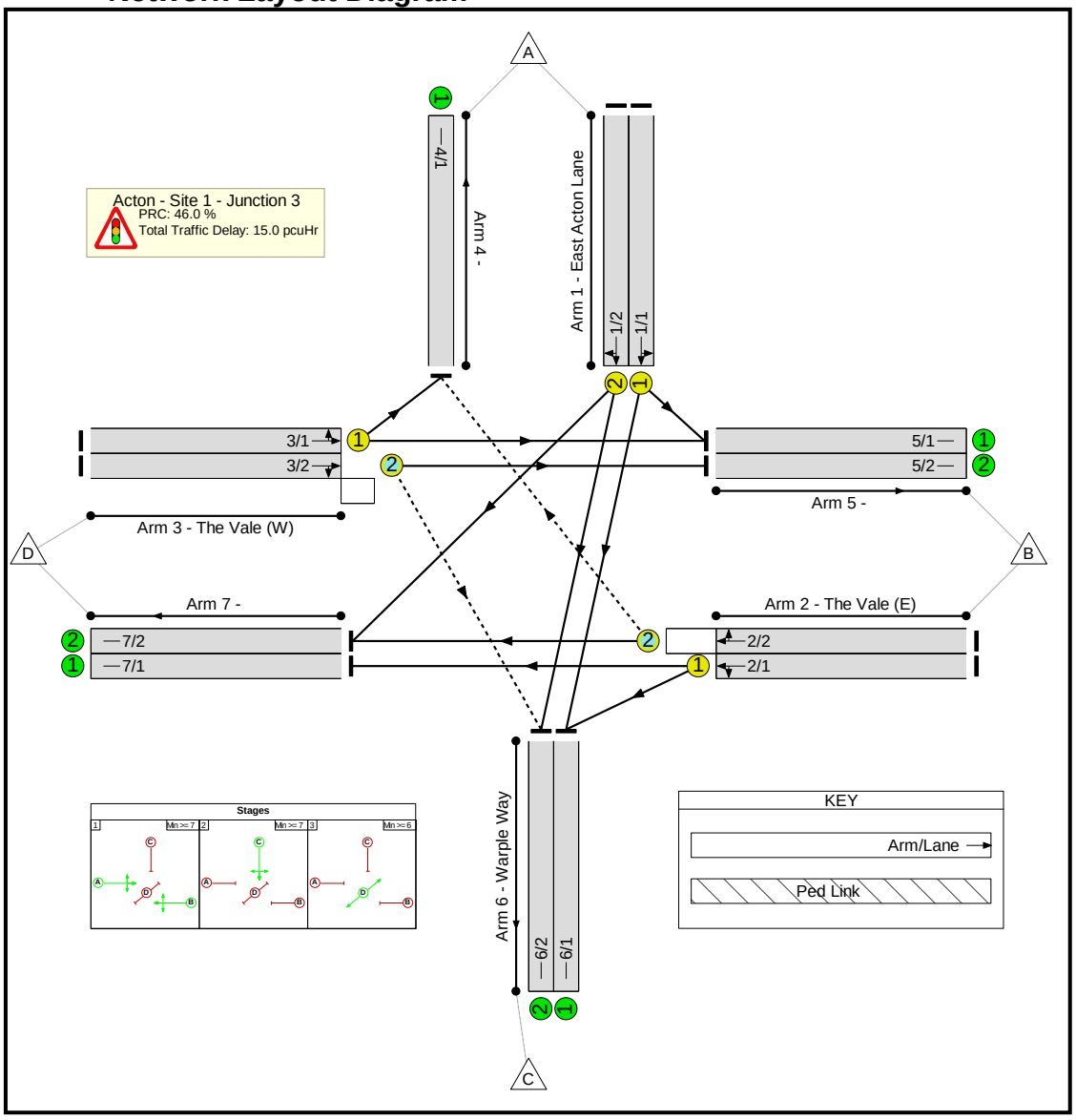
Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)	Total Queueing Delay (Veh-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (Veh-min/min)	Inclusive Total Queueing Delay (Veh-min)	Inclusive Average Queueing Delay (s)
B-C	0.24	11.25	0.32	B	103.00	103.00	18.85	10.98	0.31	18.86	10.99
B-A	0.39	23.55	0.64	C	99.00	99.00	37.06	22.46	0.62	37.10	22.49
C-A	-	-	-	-	734.00	734.00	-	-	-	-	-
C-B	0.00	0.00	0.00	A	0.00	0.00	0.00	0.00	0.00	0.00	9999999999.00
A-B	-	-	-	-	0.00	0.00	-	-	-	-	-
A-C	-	-	-	-	732.00	732.00	-	-	-	-	-

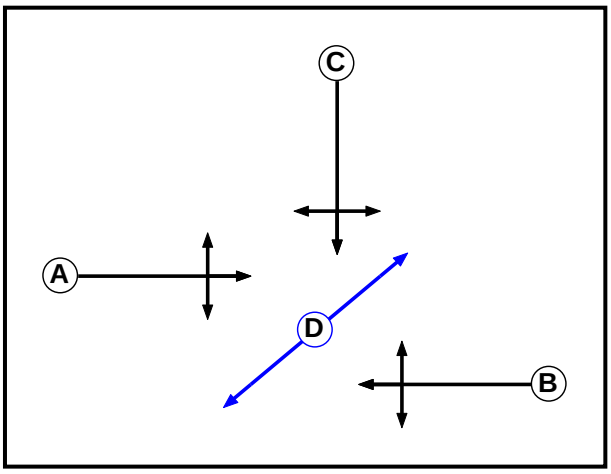
C.7 Baseline results, AM peak hour

The Vale/East Acton Lane/Warple Way junction signalised layout

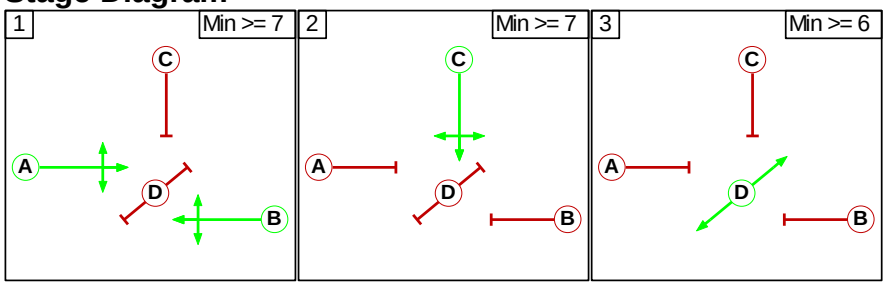
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B
2	C
3	D

Phase Intergreens Matrix

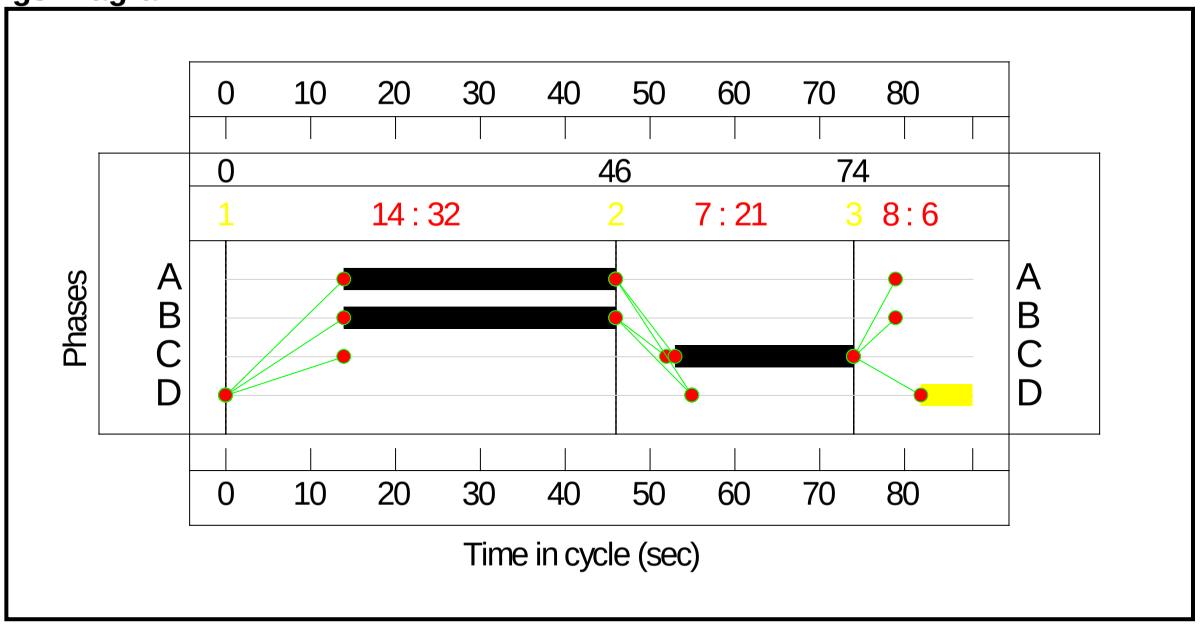
Terminating Phase	Starting Phase				
		A	B	C	D
A			-	7	9
B		-		6	9
C		5	5		8
D		14	14	14	

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	116	87	250	453
	B	52	0	25	380	457
	C	0	0	0	0	0
	D	237	514	40	0	791
	Tot.	289	630	152	630	1701

Signal Timings Diagram



Network Results

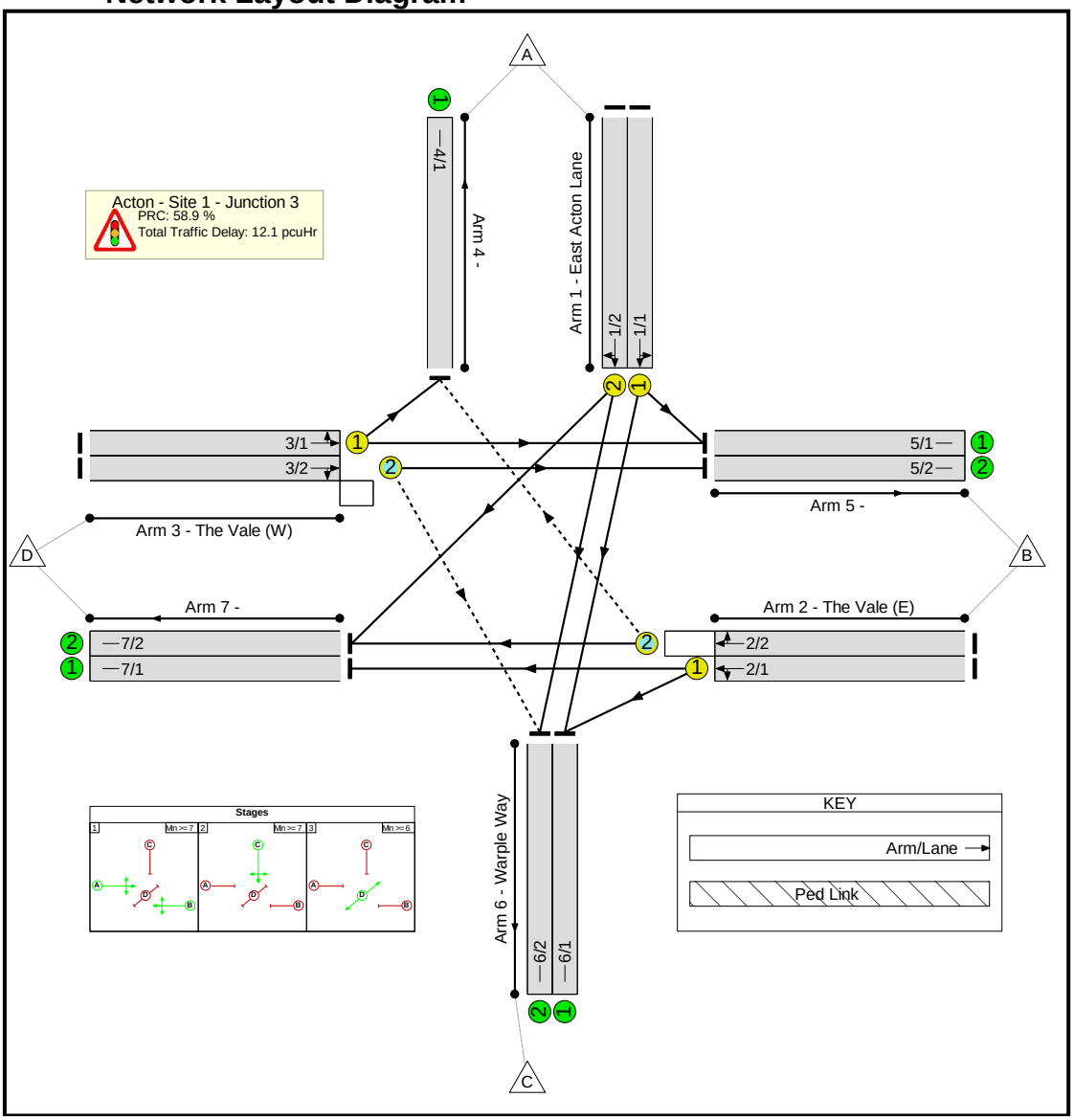
Item	Lane Description	Lane Type	Full Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	East Acton Lane Left Ahead	U	C	203	1679	1679	420	48.4%	-	-	-	2.1	36.4	4.7
1/2	East Acton Lane Ahead Right	U	C	250	1690	1690	422	59.2%	-	-	-	2.7	39.4	6.1
2/1	The Vale (E) Left Ahead	U	B	401	1845	1845	692	58.0%	-	-	-	3.1	28.1	8.5
2/2	The Vale (E) Right Ahead	O	B	56	1698	1698	226	24.7%	50	0	2	0.6	41.0	1.0
3/1	The Vale (W) Left Ahead	U	A	360	1643	1643	616	58.4%	-	-	-	2.9	29.0	7.7
3/2	The Vale (W) Ahead Right	O	A	431	1865	1865	699	61.6%	40	0	0	3.6	29.7	9.3

C1 PRC for Signalled Lanes (%): 46.0 Total Delay for Signalled Lanes (pcuHr): 15.01 Cycle Time (s): 88
PRC Over All Lanes (%): 46.0 Total Delay Over All Lanes(pcuHr): 15.01

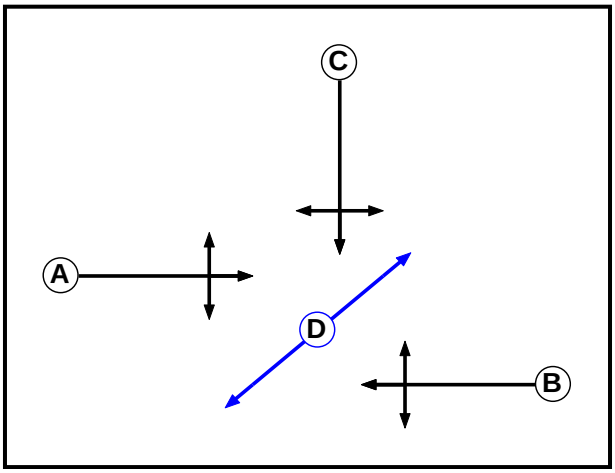
C.8 Baseline results, PM peak hour

The Vale/East Acton Lane/Warple Way junction signalised layout

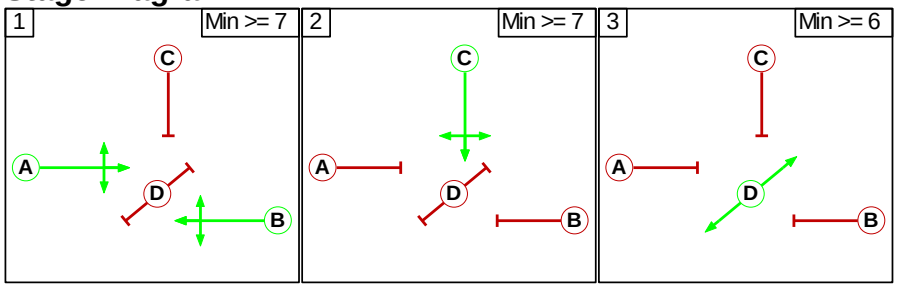
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B
2	C
3	D

Phase Intergreens Matrix

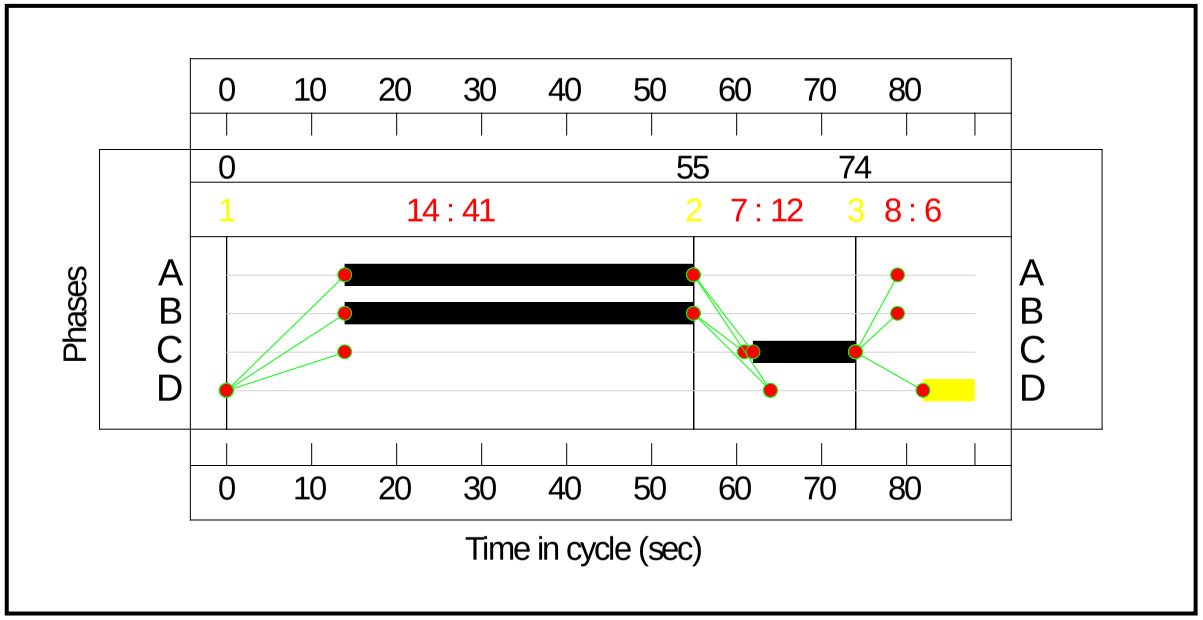
Terminating Phase	Starting Phase				
		A	B	C	D
A			-	7	9
B		-		6	9
C		5	5		8
D		14	14	14	

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	106	25	130	261
	B	135	0	16	486	637
	C	0	0	0	0	0
	D	275	464	18	0	757
	Tot.	410	570	59	616	1655

Signal Timings Diagram



Network Results

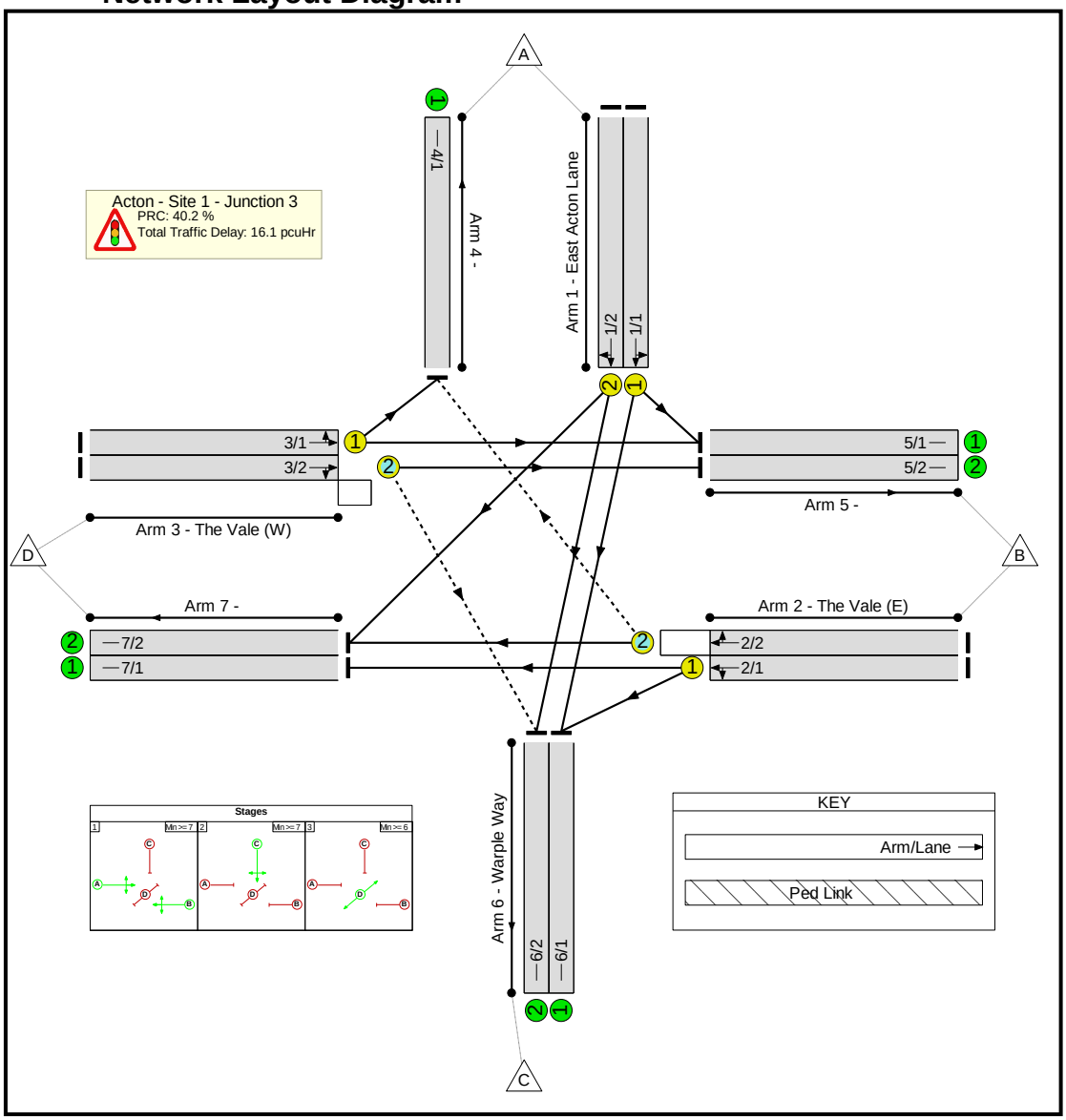
Item	Lane Description	Lane Type	Full Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	East Acton Lane Left Ahead	U	C	123	1591	1591	235	52.3%	-	-	-	1.7	50.6	3.3
1/2	East Acton Lane Ahead Right	U	C	138	1700	1700	251	55.0%	-	-	-	1.9	50.5	3.7
2/1	The Vale (E) Left Ahead	U	B	502	1857	1857	886	56.6%	-	-	-	2.9	21.1	9.4
2/2	The Vale (E) Right Ahead	O	B	135	1686	1686	310	43.5%	133	0	2	1.3	35.4	2.3
3/1	The Vale (W) Left Ahead	U	A	331	1592	1592	760	43.6%	-	-	-	1.8	19.4	5.7
3/2	The Vale (W) Ahead Right	O	A	426	1876	1876	895	47.6%	18	0	0	2.3	19.7	7.4

C1 PRC for Signalled Lanes (%): 58.9 Total Delay for Signalled Lanes (pcuHr): 12.05 Cycle Time (s): 88
PRC Over All Lanes (%): 58.9 Total Delay Over All Lanes(pcuHr): 12.05

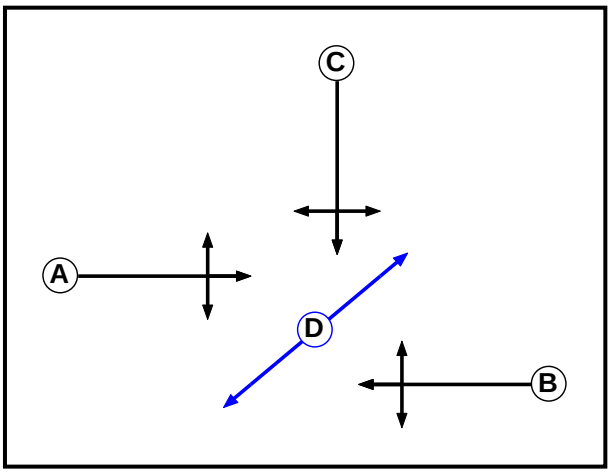
C.9 Construction base case results, AM peak hour

The Vale/East Acton Lane/Warple Way junction signalised layout

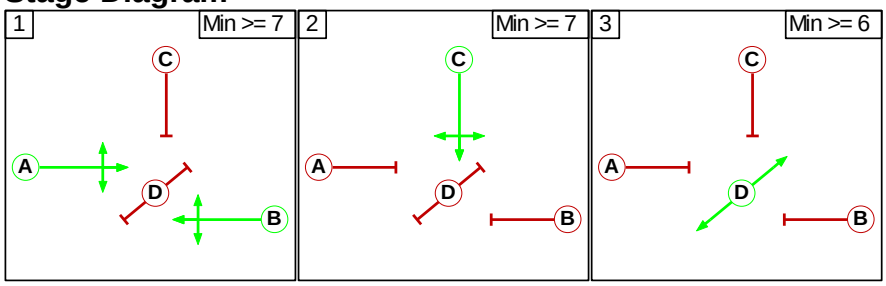
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B
2	C
3	D

Phase Intergreens Matrix

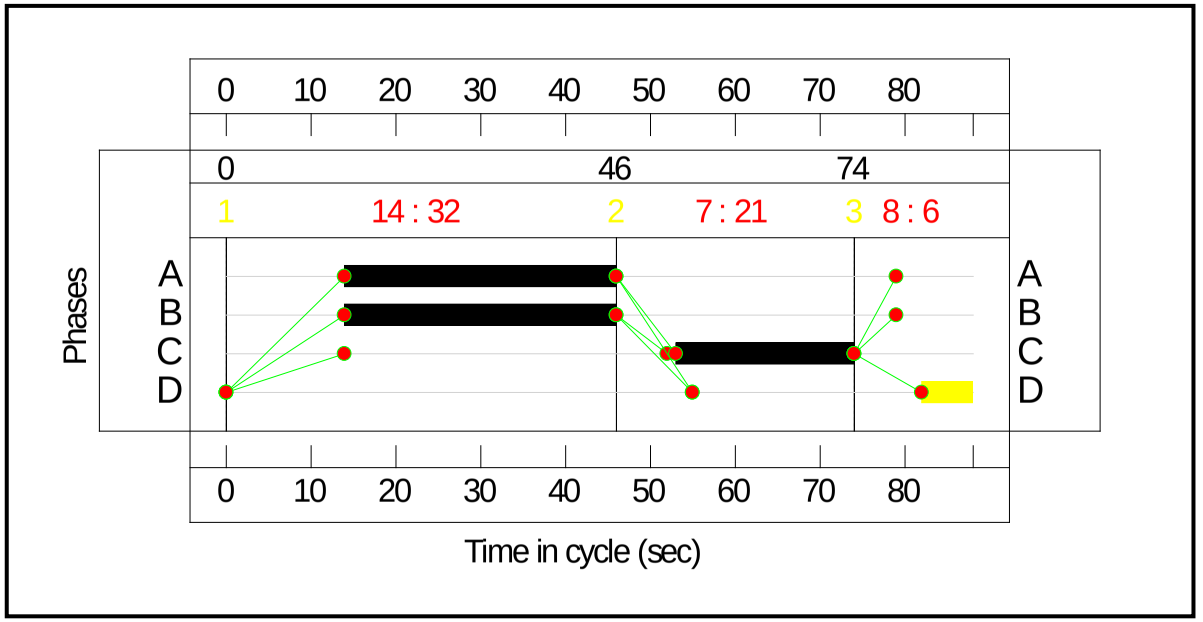
Terminating Phase	Starting Phase				
		A	B	C	D
A			-	7	9
B		-		6	9
C		5	5		8
D		14	14	14	

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	122	91	262	475
	B	54	0	27	397	478
	C	0	0	0	0	0
	D	247	538	42	0	827
	Tot.	301	660	160	659	1780

Signal Timings Diagram



Network Results

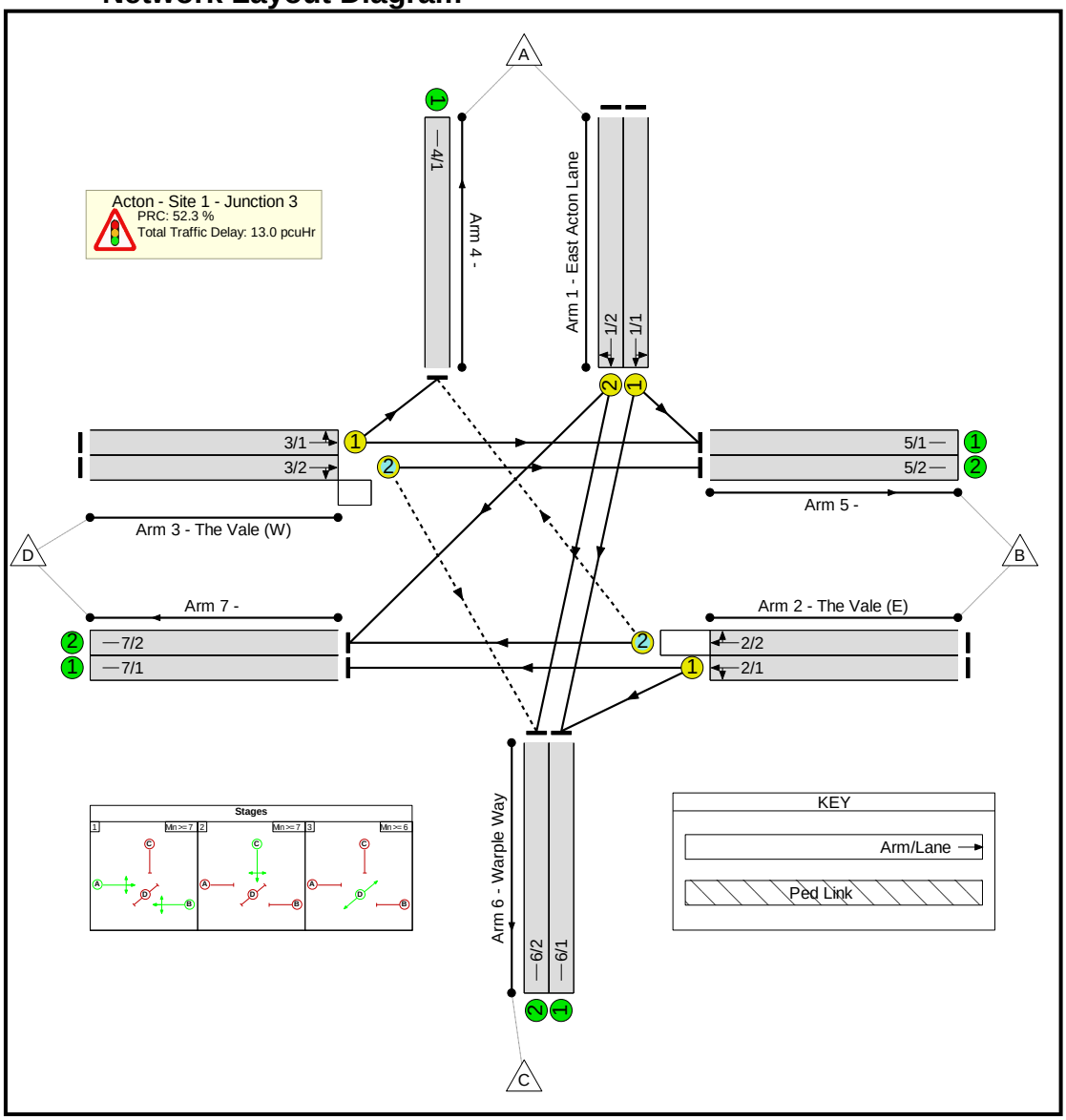
Item	Lane Description	Lane Type	Full Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	East Acton Lane Left Ahead	U	C	213	1679	1679	420	50.7%	-	-	-	2.2	37.0	5.0
1/2	East Acton Lane Ahead Right	U	C	262	1690	1690	422	62.0%	-	-	-	2.9	40.4	6.5
2/1	The Vale (E) Left Ahead	U	B	423	1845	1845	692	61.1%	-	-	-	3.4	29.0	9.1
2/2	The Vale (E) Right Ahead	O	B	55	1689	1689	210	26.2%	52	0	2	0.7	43.8	1.0
3/1	The Vale (W) Left Ahead	U	A	378	1645	1645	617	61.3%	-	-	-	3.1	29.8	8.2
3/2	The Vale (W) Ahead Right	O	A	449	1865	1865	699	64.2%	42	0	0	3.8	30.5	9.9

C1 PRC for Signalled Lanes (%): 40.2 Total Delay for Signalled Lanes (pcuHr): 16.14 Cycle Time (s): 88
PRC Over All Lanes (%): 40.2 Total Delay Over All Lanes(pcuHr): 16.14

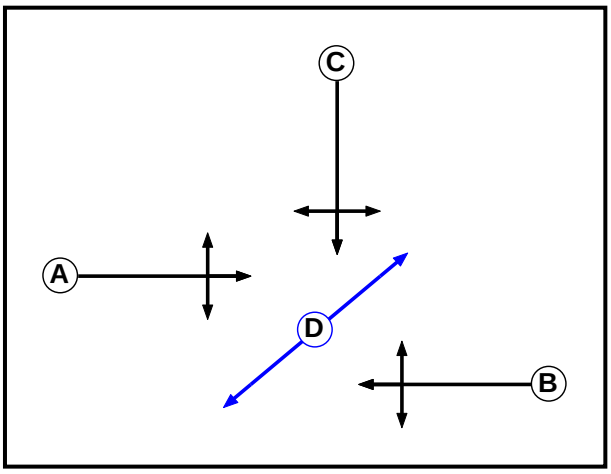
C.10 Construction base case results, PM peak hour

The Vale/East Acton Lane/Warple Way junction signalised layout

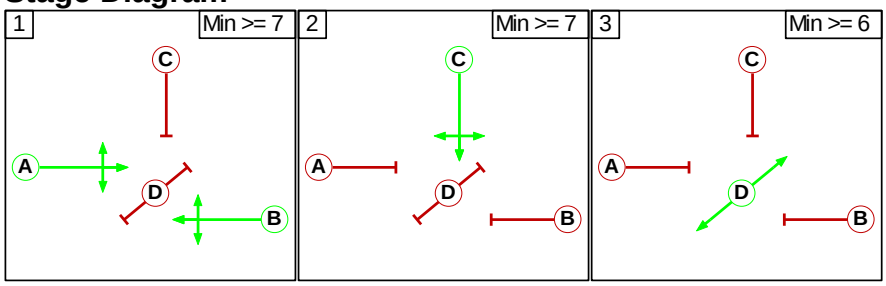
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B
2	C
3	D

Phase Intergreens Matrix

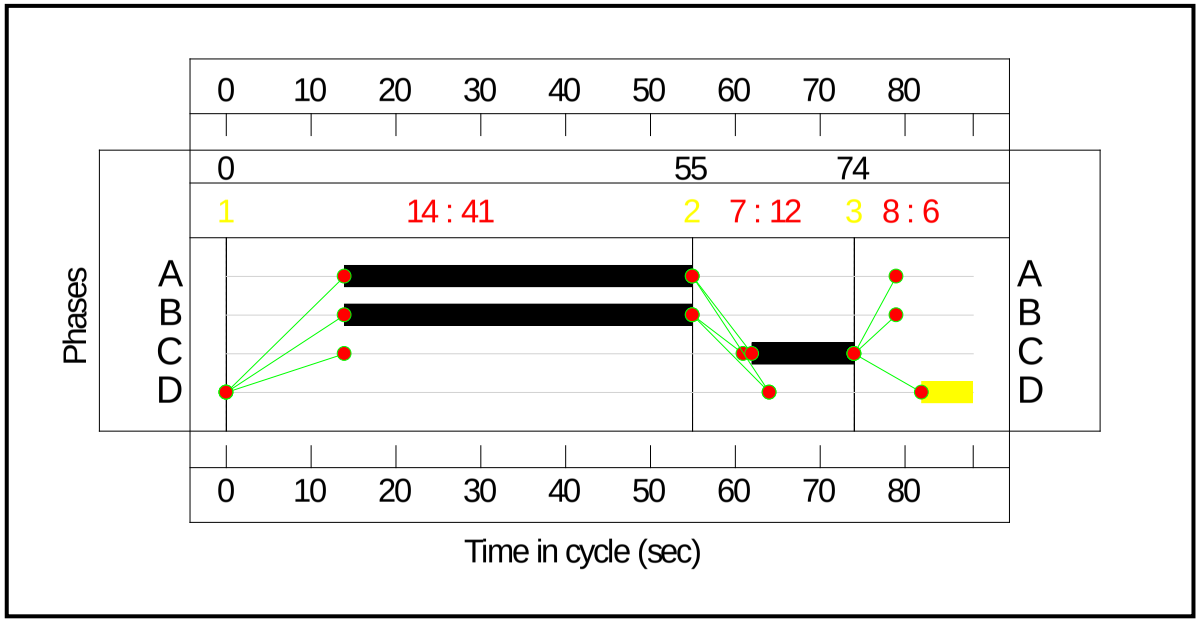
Terminating Phase	Starting Phase				
		A	B	C	D
A			-	7	9
B		-		6	9
C		5	5		8
D		14	14	14	

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	111	27	136	274
	B	141	0	16	508	665
	C	0	0	0	0	0
	D	288	486	19	0	793
	Tot.	429	597	62	644	1732

Signal Timings Diagram



Network Results

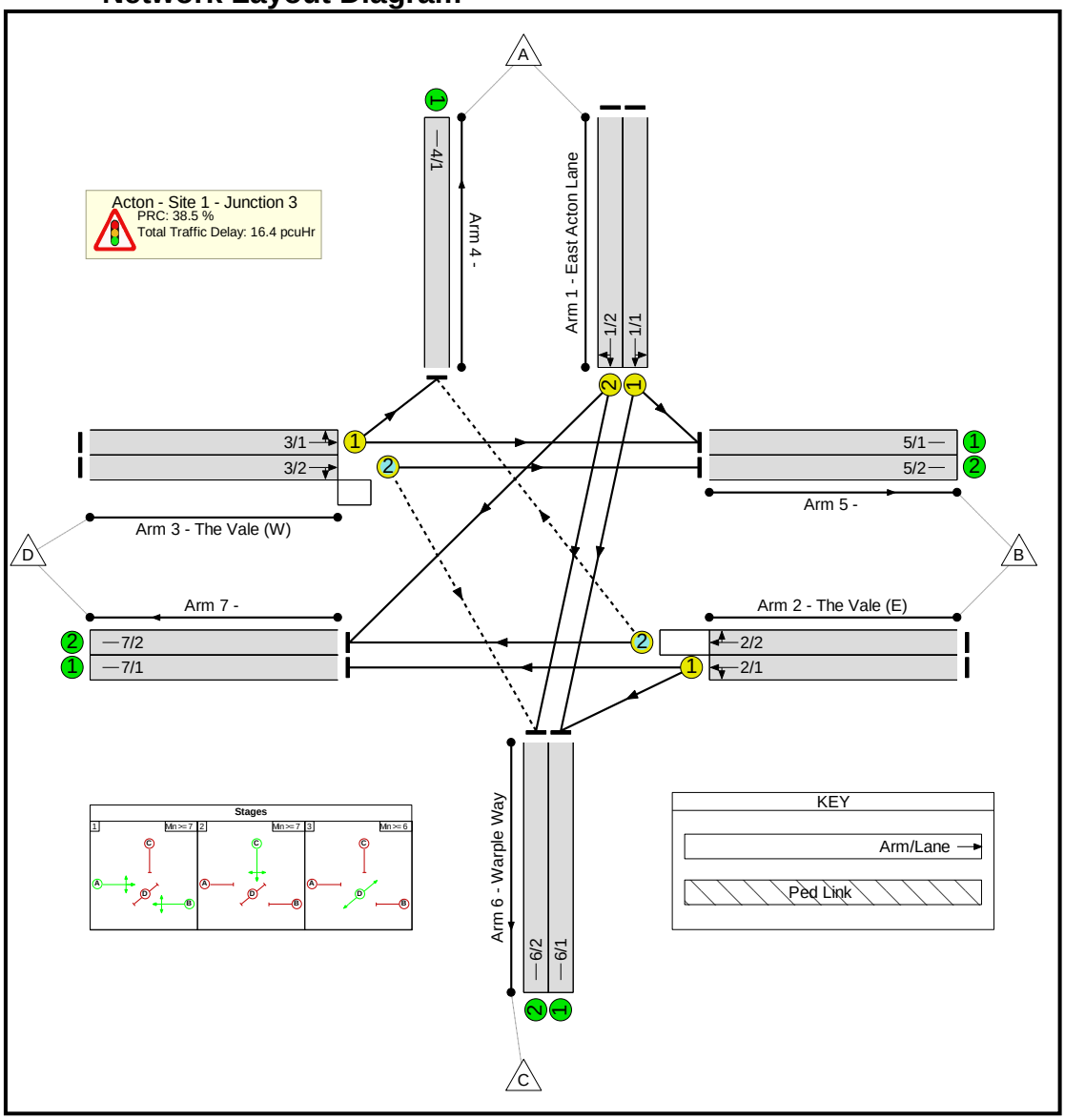
Item	Lane Description	Lane Type	Full Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	East Acton Lane Left Ahead	U	C	129	1592	1592	235	54.9%	-	-	-	1.8	51.6	3.5
1/2	East Acton Lane Ahead Right	U	C	145	1701	1701	251	57.7%	-	-	-	2.1	51.7	3.9
2/1	The Vale (E) Left Ahead	U	B	524	1858	1858	887	59.1%	-	-	-	3.2	21.7	10.0
2/2	The Vale (E) Right Ahead	O	B	141	1686	1686	294	48.0%	139	0	2	1.5	38.3	2.4
3/1	The Vale (W) Left Ahead	U	A	348	1593	1593	760	45.8%	-	-	-	1.9	19.7	6.0
3/2	The Vale (W) Ahead Right	O	A	445	1876	1876	895	49.7%	19	0	0	2.5	20.1	7.9

C1 PRC for Signalled Lanes (%): 52.3 Total Delay for Signalled Lanes (pcuHr): 12.98 Cycle Time (s): 88
PRC Over All Lanes (%): 52.3 Total Delay Over All Lanes(pcuHr): 12.98

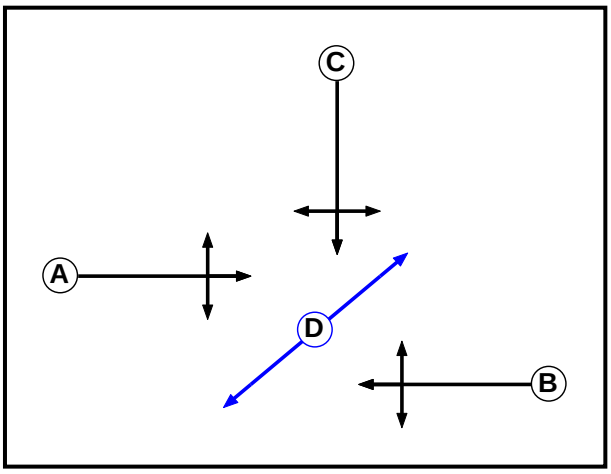
C.11 Construction development case results, AM peak hour

The Vale/East Acton Lane/Warple Way junction signalised layout

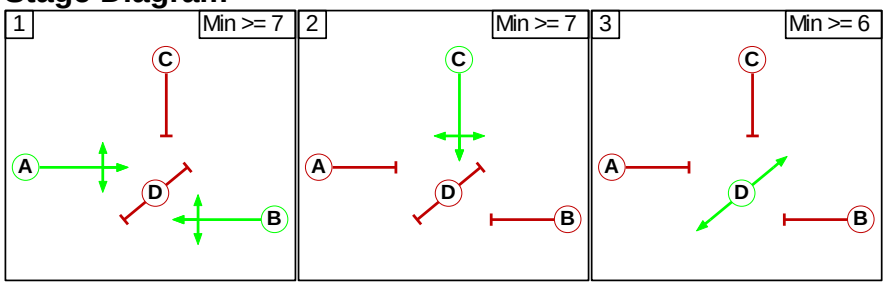
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B
2	C
3	D

Phase Intergreens Matrix

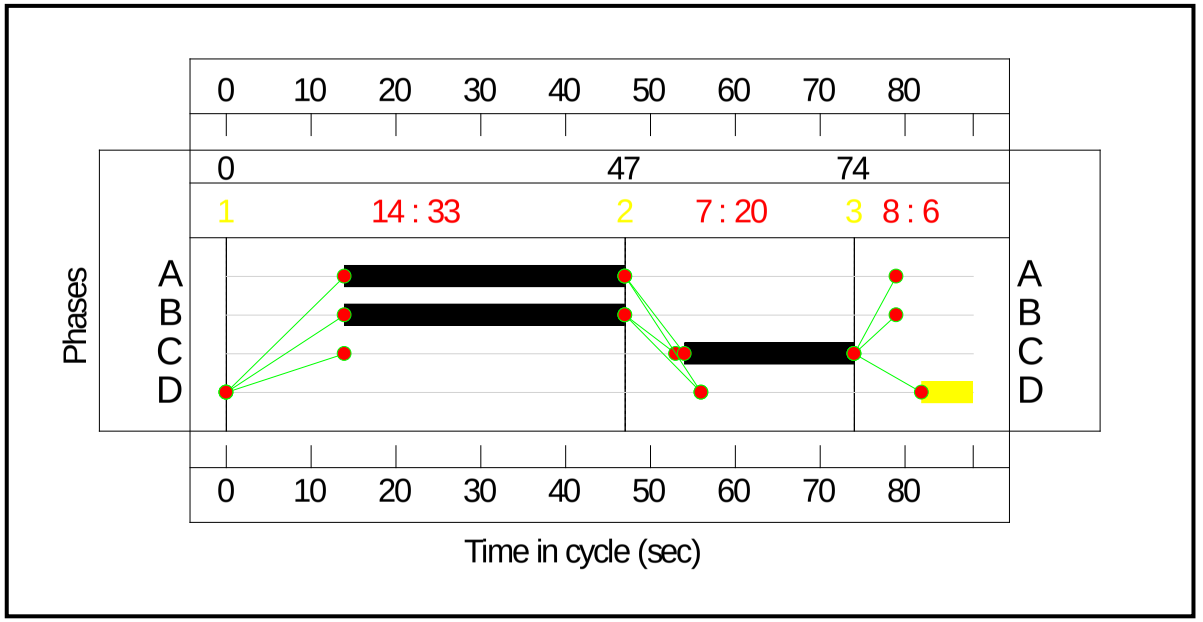
Terminating Phase	Starting Phase				
		A	B	C	D
	A		-	7	9
	B	-		6	9
	C	5	5		8
	D	14	14	14	

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	122	93	262	477
	B	54	0	34	397	485
	C	0	0	0	0	0
	D	247	542	59	0	848
	Tot.	301	664	186	659	1810

Signal Timings Diagram



Network Results

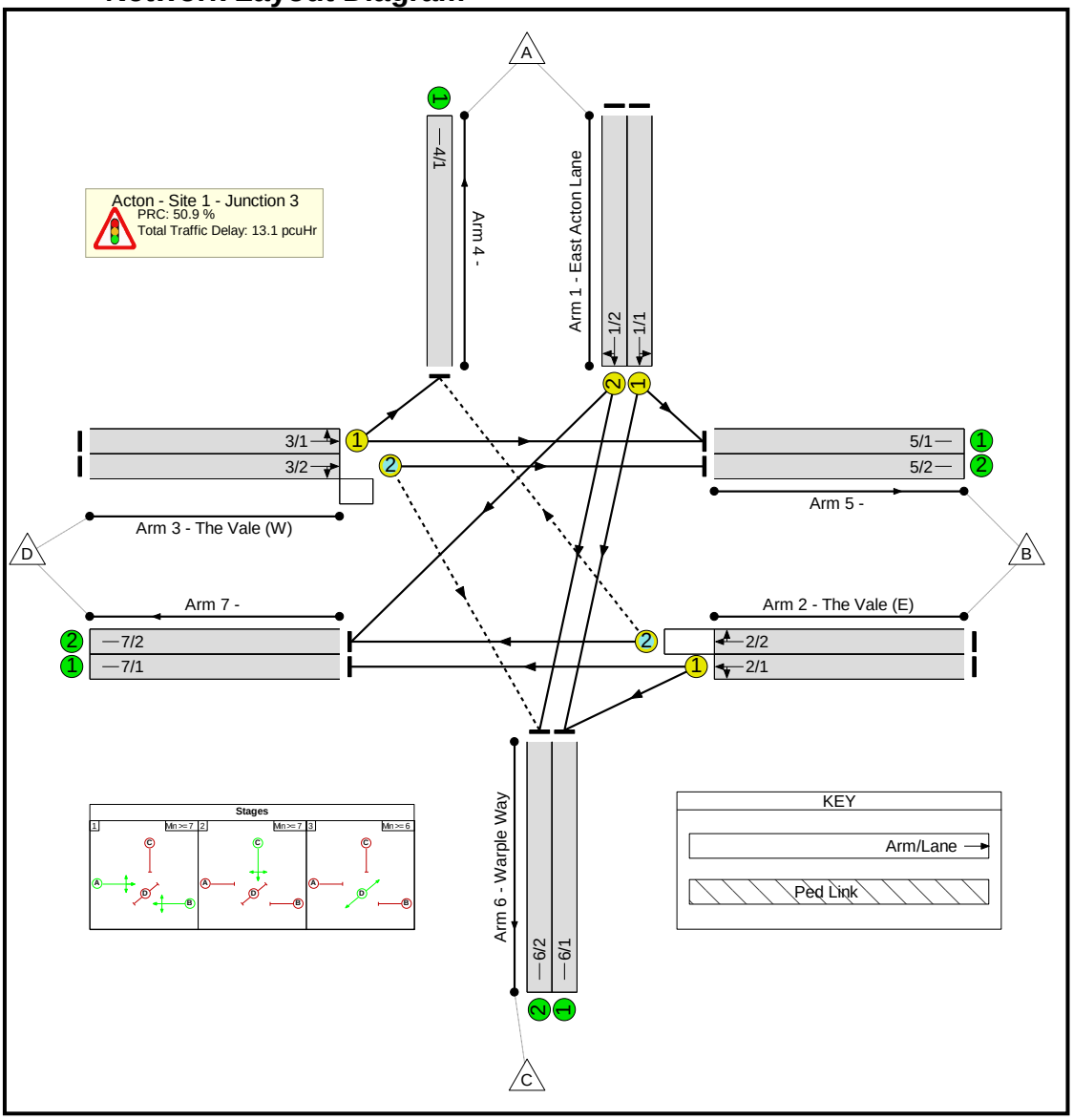
Item	Lane Description	Lane Type	Full Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
1/1	East Acton Lane Left Ahead	U	C	215	1681	1681	401	53.6%	-	-	-	2.3	38.9	5.1
1/2	East Acton Lane Ahead Right	U	C	262	1690	1690	403	65.0%	-	-	-	3.1	42.8	6.7
2/1	The Vale (E) Left Ahead	U	B	428	1839	1839	711	60.2%	-	-	-	3.3	27.9	9.1
2/2	The Vale (E) Right Ahead	O	B	57	1695	1695	218	26.1%	52	0	2	0.7	42.1	1.0
3/1	The Vale (W) Left Ahead	U	A	393	1652	1652	638	61.6%	-	-	-	3.2	29.0	8.4
3/2	The Vale (W) Ahead Right	O	A	455	1857	1857	714	63.7%	59	0	0	3.8	29.9	9.8

C1 PRC for Signalled Lanes (%): 38.5 Total Delay for Signalled Lanes (pcuHr): 16.37 Cycle Time (s): 88
PRC Over All Lanes (%): 38.5 Total Delay Over All Lanes(pcuHr): 16.37

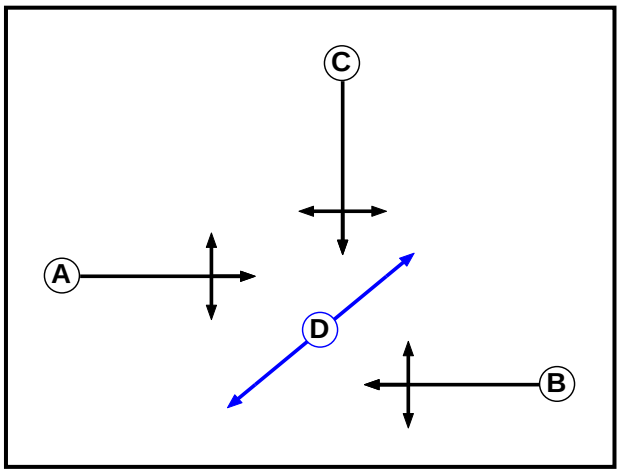
C.12 Construction development case results, AM peak hour

The Vale/East Acton Lane/Warple Way junction signalised layout

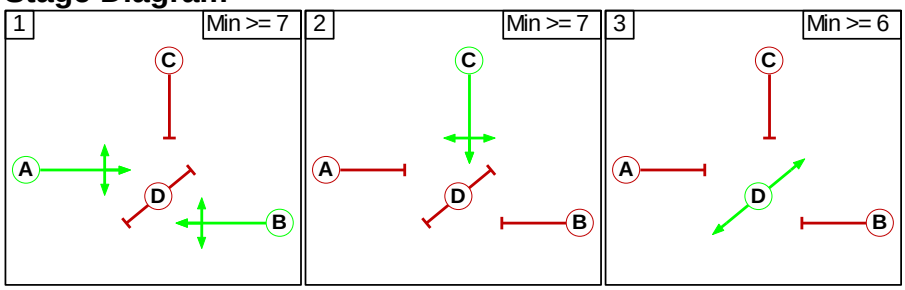
Network Layout Diagram



Phase Diagram



Stage Diagram



Phases in Stage

Stage No.	Phases in Stage
1	A B
2	C
3	D

Phase Intergreens Matrix

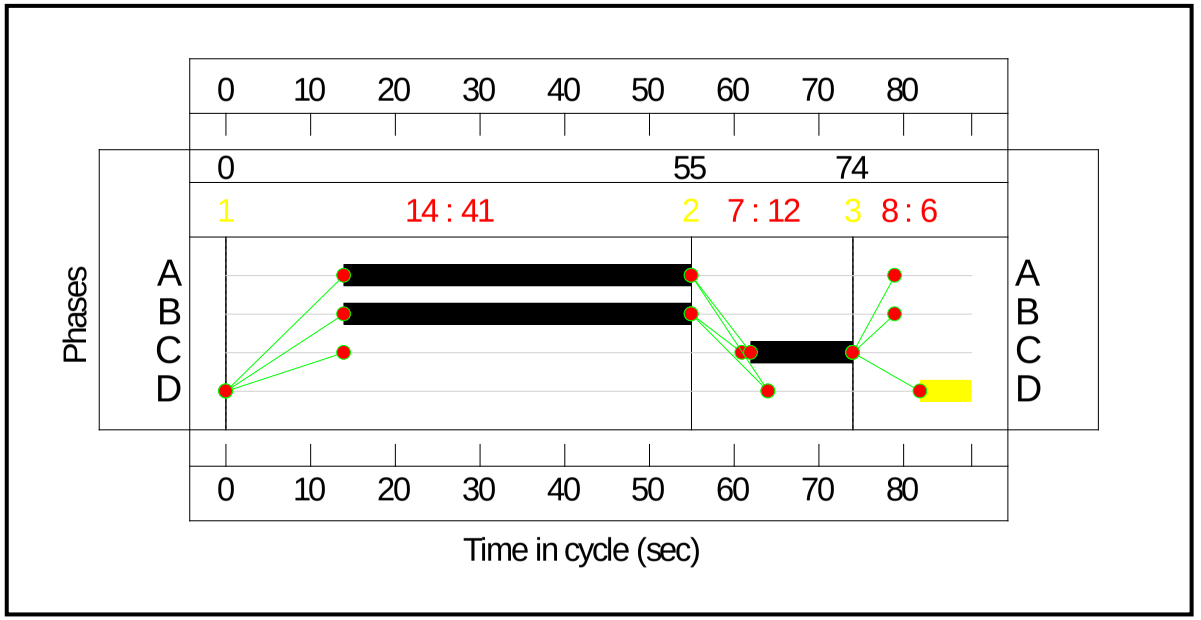
Terminating Phase	Starting Phase				
		A	B	C	D
A			-	7	9
B		-		6	9
C		5	5		8
D		14	14	14	

Traffic Flows, Desired

Desired Flow :

Origin	Destination					
		A	B	C	D	Tot.
	A	0	111	28	136	275
	B	141	0	20	508	669
	C	0	0	0	0	0
	D	288	490	20	0	798
	Tot.	429	601	68	644	1742

Signal Timings Diagram



Network Results

Item	Lane Description	Lane Type	Full Phase	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Max 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	East Acton Lane Left Ahead	U	C	130	1593	1593	235	55.2%	-	-	-	1.9	51.7	3.5
1/2	East Acton Lane Ahead Right	U	C	145	1701	1701	251	57.7%	-	-	-	2.1	51.7	3.9
2/1	The Vale (E) Left Ahead	U	B	528	1855	1855	885	59.6%	-	-	-	3.2	21.8	10.1
2/2	The Vale (E) Right Ahead	O	B	141	1686	1686	291	48.5%	139	0	2	1.5	38.8	2.4
3/1	The Vale (W) Left Ahead	U	A	351	1595	1595	761	46.1%	-	-	-	1.9	19.8	6.1
3/2	The Vale (W) Ahead Right	O	A	447	1875	1875	895	50.0%	20	0	0	2.5	20.2	7.9

C1 PRC for Signalled Lanes (%): 50.9 Total Delay for Signalled Lanes (pcuHr): 13.10 Cycle Time (s): 88
PRC Over All Lanes (%): 50.9 Total Delay Over All Lanes(pcuHr): 13.10

Appendix D: Accident analysis

D.1 Existing highway safety analysis

D.1.1 Details of road traffic accidents within the vicinity of the site have been obtained from Transport for London (TfL) and have been reviewed to determine whether there are particular issues or trends on the local highway network.

D.1.2 Data on accidents for 5 years until the end of March 2011 has been analysed for the following junctions and surrounding roads:

D.1.3 Grosvenor Road (A3212) / Lupus Street junction;

D.1.4 A4020 The Vale;

D.1.5 A4020 The Vale/ East Acton Junction;

D.1.6 A4020 The Vale/ Eastman Road Junction; and

D.1.7 A4020 The Vale/ Larden Road Junction.

D.1.8 Based on the DfT Design Manual for Roads and Bridges, Volume 13 Economic Assessment of Road Schemes, accidents have been analysed according to the method outlined in this guidance which states that accidents that have occurred within 20m of each junction are associated with that specific junction, and the remaining accidents are grouped to the relevant links.

D.1.9 The area of interest together with the locations of the recorded road traffic accidents and the severity of the accidents are indicated in Table D.1.

Table D.1 Accident severity 2006 to 2011

Location	Slight	Serious	Fatal	Total
The Vale	1	3	0	4
The Vale/ Curricle Street Junction	1	0	0	1
The Vale/ Du Cros Road Junction	1	0	0	1
The Vale/ East Acton Junction	7	1	0	8
The Vale/ Eastman Road Junction	10	0	0	10
The Vale/ Larden Road Junction	6	3	0	9
The Vale/ Vale Grove Junction	1	0	0	1
The Vale/ Stanley Gardens Junction	1	0	0	1
The Vale/ Warple Way Junction	0	2	0	2
Total	28	9	0	37

A4020 The Vale

D.1.10 The A4020 The Vale road runs parallel to the north of Canham Road which in turn runs adjacent to the northern boundary of the site. For the area of the A4020 that lies within the study region, the highway is a single lane carriageway. The Vale road extends west as far as M40 and to the

east as far as the A40 Holland Park Avenue. The A4020 also runs parallel to the south of the A40 and to the north of the strategic A4. These junctions included within this analysis are as follows:

- The Vale/ Bromyard Avenue Junction
- The Vale/ Curricle Street Junction
- The Vale/ Du Cros Road Junction
- The Vale/ East Acton Junction;
- The Vale/ Eastman Road Junction
- The Vale/ Larden Road Junction
- The Vale/ Vale Grove Junction
- The Vale/ Warple Way Junction; and
- The Vale/ Stanley Gardens Junction.

D.1.11 In total 37 accidents have occurred along The Vale and the junctions linked with this section of highway. In relation to the severity of these accidents, 28 were slight accidents, principally resulting from poor manoeuvres and failure to look properly.

D.1.12 Of the total accidents, 9 were classified as serious. There is a cluster of three serious accidents at the junction between A4020 The Vale and Larden Road where the major contributory factor to the serious accidents was failure to look properly and poor turning or manoeuvring. These three accidents involved a car and another car/pedestrian. The major contributory factor to the other serious accidents was a failure to look properly and passing too closely to a cyclist. The greater part of serious accidents occurred at the junctions along The Vale.

D.1.13 Two of the total accidents included HGVs and one MGV. Also, within the total accidents five involved pedestrians and 11 pedal cycles.

D.1.14 No fatal accident occurred along the A4020 The Vale in the 5 year time analysed.

Warple Way

D.1.15 Warple Way forms part of the access route to the site, which leads from The Vale in a south-north direction towards the site area. The road is a one-way single-carriageway and there has been no slight, serious or fatal accidents accruing on Warple Way in the 5 year time analysed

Canham Road

D.1.16 Canham Road runs parallel to The Vale and serves as the main access/egress point into the site area. The road is a one-way single-carriageway and there has been no slight, serious or fatal accidents accruing on Canham Road in the 5 year time analysed.

Stanley Gardens

D.1.17 Stanley Road forms part of the egress route from the site onto The Vale. The road is a one-way single-carriageway heading in a north-south direction and there has been no slight, serious or fatal accidents accruing on Stanley Gardens in the 5 year time analysed.

D.2 Summary and conclusion

D.2.1 In total 37 accidents have occurred along The Vale and the junctions linked with this section of highway. In relation to the severity of these accidents, nine were serious, 28 were slight accidents and none were fatal. The major contributory factor to these accidents was principally resulting from poor manoeuvring and failure to look properly.

D.2.2 Of the total accidents, 9 were classified as serious. There is a cluster of three serious accidents at the junction between A4020 The Vale and Larden Road where the major contributory factor to the serious accidents was a failure to look properly and poor turning or manoeuvring. These three accidents involved a car and another car/pedestrian. The major contributory factor to the other serious accidents was a failure to look properly and passing too closely to a cyclist. The greater part of serious accidents occurred at the junctions along The Vale.

D.2.3 Two of the total accidents included HGVs and one MGV. Also, within the total accidents five involved pedestrians and 11 pedal cycles.

D.2.4 No fatal accident occurred along the A4020 The Vale in the 5 year time analysed.

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Appendix E: Road Safety Audit

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Your ref -
Our ref 211146-00/cvl

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Thames Tideway Tunnel
The Point (7th Floor),
37 North Wharf Road,
Paddington,
London W2 1AF
For the attention of Dermot Scanlon

12 February 2013

Dear Sirs

Thames Tideway Tunnel
Acton Storm Tanks - Stage 1 Road Safety Audit

I have the pleasure of enclosing our Acton Storm Tanks – 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

- Warple Way is a signed cycle route (running contra-flow southbound between Canham Road and Cobbold Road) whilst Canham Road and Stanley Gardens are roads recommended for cycling. 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. Furthermore Thames Water Utilities Limited staff maintaining the screening facilities and using the new access on Warple Way should also be briefed accordingly.
- The proposals show the removal of around 10 on-street parking bays from Warple Way, Canham Road and Stanley Gardens during the construction phase at Acton Storm Tanks. It is likely to result in congestion and frustration for residents who cannot find somewhere to park. Replacement facilities should be provided during the duration of the construction works.

- The layout for the construction works show 10m of parking suspended on the western side of Stanley Gardens. The bay actually accommodates three parked vehicles. A partial suspension of parking bays could result in vehicle damage. Designer should ensure the the full length of the parking bay is suspended throughout the construction phase.

IMG_8334.jpg

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 – Acton Storm Tanks

Stage 1 Road Safety Audit

RSA1.1a

Rev A | 12 February 2013

Job number 211146-03

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Newcastle-upon-Tyne NE1 3PL
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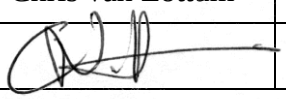
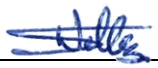
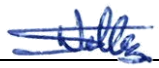
ARUP

Document Verification

ARUP

Job title		Thames Tideway Tunnel – Acton Storm Tanks		**Job number**	211146-03
Document title		Stage 1 Road Safety Audit		**File reference**	
Document ref		RSA1.1a			
Revision	**Date**	**Filename**	RP CVL TTT 01 Acton RSA1.1 130212 Rev A.docx		
Issue	9 Jan 2013	**Description**	Issue Document		
			Prepared by	Checked by	Approved by
		Name	Chris van Lottum	Steve Wells	Steve Wells
		Signature			
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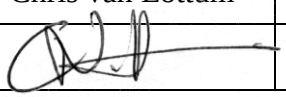
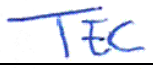
			Prepared by	Checked by	Approved by
		Name	Chris van Lottum	Tom Corke	Steve Wells
		Signature			
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		Description			
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		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	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 Acton Storm Tanks, Canham Road, in the London Borough of Ealing.

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 Tuesday 4th December 2012; weather conditions at the time of the site visit were bright and cold and the road surface was damp.

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 Acton Storm Tanks are situated at the south end of the Acton Park Industrial Estate, north west of Bedford Park; and accessed from Canham Road. The Acton Park Industrial Estate is situated on the south side of the A4020 The Vale which runs between Acton and Shepherd's Bush in west London.

1.2 Scheme Description

The scheme proposes a new gated access for the left-turn in / left turn out movement for construction traffic travelling eastbound along Canham Road. The new access layout would include kerb realignment and dropped kerbs.

To accommodate larger construction vehicle manoeuvres on the one-way route along Warple Way, Canham Road and Stanley Gardens, a number of on-street parking bays would need to be suspended.

2 Stage 1 Road Safety Audit

The Recommendations below are numbered as follows:

STAGE . AUDIT NUMBER . RECOMMENDATION NUMBER

2.1 Construction Layout

Location: Stanley Gardens

Summary: Realignment of kerb may result in vehicle conflict with lamp column.

Description: It is proposed to temporarily realign the western kerb of Stanley Gardens in order to accommodate larger vehicles. This would bring the face of the kerb close to the existing lamp column.

IMG_8333.jpg

Street furniture with insufficient clearance to passing vehicles could be struck by a passing vehicle resulting in vehicle damage, or damage to the street furniture which could injure a passer-by.

S1.1.1 Recommendation: Relocate the lighting column without detriment to lighting levels on the surrounding carriageway.

Location: Canham Road at Stanley Gardens

Summary: Presence of retaining wall could lead to vehicle damage.

Description: There is a concrete retaining wall around the outside of the bend where Canham Road becomes Stanley Gardens. The extents of the retaining wall are not shown on any of the swept path drawings.

IMG_8329.jpg

The presence of the retaining wall at the edge of the carriageway could result in damage to vehicles.

S1.1.2 **Recommendation:** Ensure the retaining wall is correctly represented on the swept path drawings and that vehicles can achieve unobstructed egress from the site.

Location: Canham Road at Stanley Gardens

Summary: Tight swept path could lead to vehicles mounting the footway.

Description: The swept path analysis for the construction layout indicates there is no margin for error around the bend where Canham Road becomes Stanley Gardens.

IMG_8332.jpg

The presence of the retaining wall on the outside of the bend (see above) is likely to result in vehicles taking a tighter path around the bend and overrunning the footway on the inside at the risk of pedestrian conflicts.

S1.1.3 **Recommendation:** Temporarily close the footway during construction and relocate the parking sign so as to mitigate the risk of conflict between pedestrians and vehicles that mount the footway.

Location: Warple Way at Canham Road

Summary: Tight swept path could result in vehicle damage

Description: The swept path analysis for the construction layout indicates conflicts between a rigid HGV approaching the site, and the parking bays on Warple Way immediately north of Canham Road.

Swept path conflicts can lead to vehicle damage and could result in injuries for vehicle occupants or pedestrians if footways are over run to avoid a collision.

S1.1.4 **Recommendation:** Suspend additional parking bays on Warple Way so as to ensure unobstructed egress

---

2.2 Permanent Layout

	Location:	Warple Way at Canham Road
	Summary:	Tight swept path could result in vehicle damage
	Description:	The swept path analysis for the permanent layout indicates conflicts between a mobile crane approaching the site, and the parking bays on Warple Way immediately north of Canham Road. Swept path conflicts can lead to vehicle damage and could result in injuries for vehicle occupants or pedestrians if footways are over run to avoid a collision.
S1.1.5	**Recommendation:**	Temporary suspension of parking bays on Warple Way may be required during maintenance periods so as to ensure unobstructed access.

	Location:	Canham Road site access
	Summary:	Swept path shows conflict with the gate post
	Description:	The swept path analysis for the permanent layout indicates conflicts between some vehicle types leaving the site, and the gate post on the eastern side of the proposed site access on Canham Road. Notwithstanding the damage to a vehicle caused by a collision with the gate and post, if the movement cannot be completed without conflict, it will be necessary for HGV drivers to reverse back to complete their manoeuvre placing other road users at risk from a collision as a result of reduced rearward visibility.
S1.1.5	**Recommendation:**	Widen the site entrance to accommodate the movement allowing vehicles to enter and leave the site in a forward direction of movement.

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.

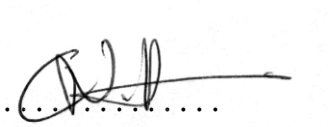
Audit Team Leader

Mr C van Lottum MEng (Hons), MCIHT, MSoRSA

Senior Engineer

Arup

Central Square, Forth Street,
Newcastle upon Tyne, NE1 3PL



12 February 2013

Audit Team Member

Mr T Corke BEng (Hons), MSc, CEng, MICE, MCIHT, MSoRSA

Senior Engineer

Arup

The Arup Campus, Blythe Gate, Blythe Valley Park,
Solihull, B90 8AE

Figures

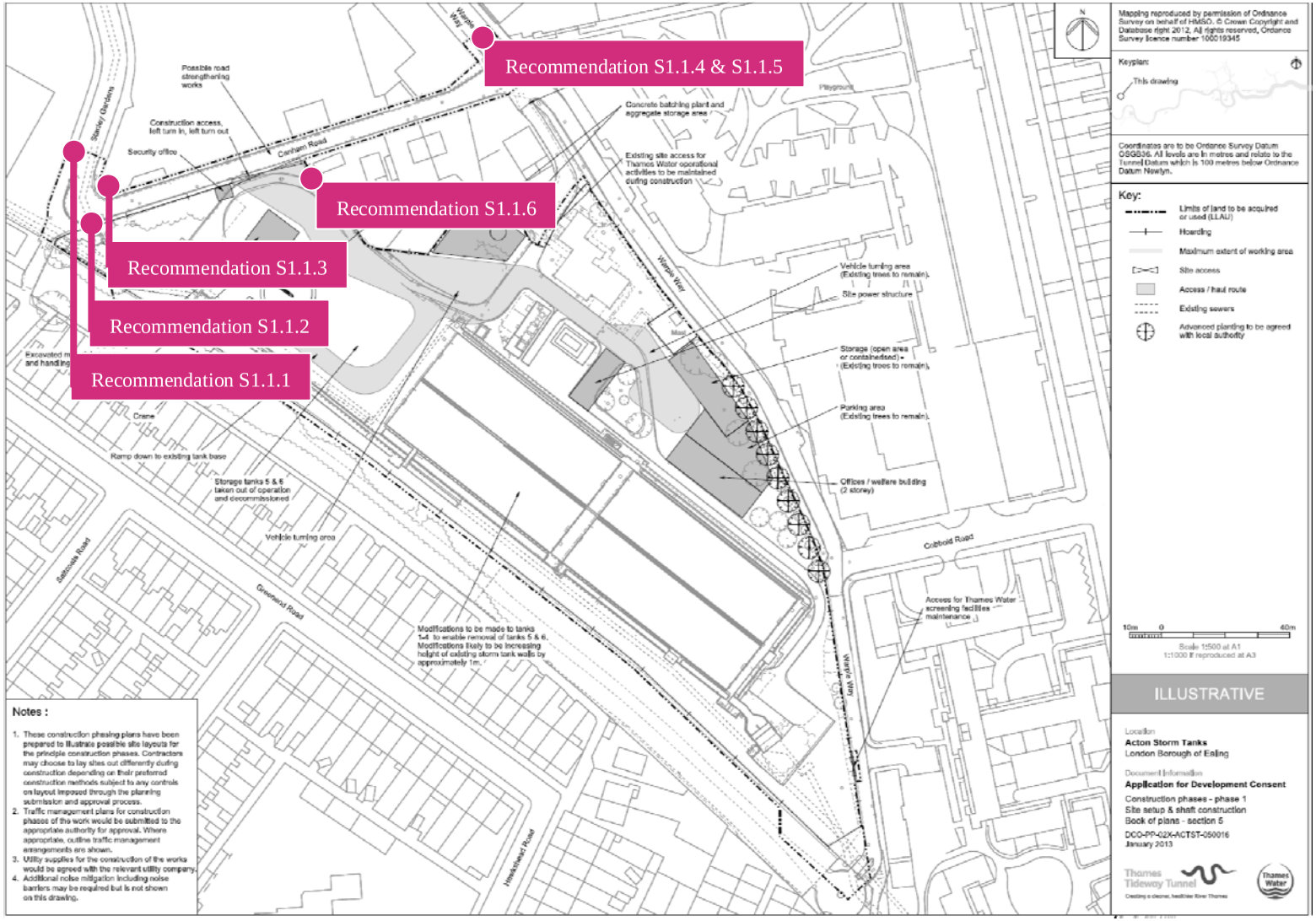


Figure 1 Location of Recommendations

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	-	30/11/2012
Road Accident Data	-	-

A1.2 Drawings

Title	Reference	Revision
Transport - site location plan	1PL03-TT-50705	Jan 2013
Transport - construction traffic routes	1PL03-TT-50697	Jan 2013
Transport - accident locations	1PL03-TT-50761	Jan 2013
Construction phases - phase 1 – Site setup & shaft construction	DCO-PP-02X-ACTST-050016	Jan 2013
Highway layout during construction (Area 2)	DCO-PP-02X-ACTST-050023	Jan 2013
Permanent highway layout – Area 2 work	DCO-PP-02X-ACTST-050026	Jan 2013
Highway layout during construction (Area 2) – Vehicle swept path analysis	DCO-PP-02X-ACTST-050029	Jan 2013
Permanent highway layout (Area 2) – Vehicle swept path analysis	DCO-PP-02X-ACTST-050031	Jan 2013

TECHNICAL NOTE

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T: +44 (0)20 7025 7100
E: london@peterbrett.com

Job Name	**Thames Tideway Tunnel – Acton Storm Tanks**	
Job No.	22104	
Note No.	001	
Date	15th 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 Acton Storm Tanks in the London Borough of Ealing.

1.2 This technical note provides the Designer's Response to the Stage 1 Audit for this site.

2 Stage 1 Road Safety Audit

Construction Layout

2.1 Location: Stanley Gardens

Summary: Realignment of kerb may result in vehicle conflict with lamp column.

Description: It is proposed to temporarily realign the western kerb of Stanley Gardens in order to accommodate larger vehicles. This would bring the face of the kerb close to the existing lamp column.

Street furniture with insufficient clearance to passing vehicles could be struck by a passing vehicle resulting in vehicle damage, or damage to the street furniture which could injure a passer-by.

S1.1.1 Recommendation: Relocate the lighting column without detriment to lighting levels on the surrounding carriageway.

Recommendation Accepted – The relocation of the street lighting column will be reviewed at Stage 2 (Detailed Design).

2.2 Location: Canham Road at Stanley Gardens

Summary: Presence of retaining wall could lead to vehicle damage.

Description: There is a concrete retaining wall around the outside of the bend where Canham Road becomes Stanley Gardens. The extents of the retaining wall are not shown on any of the swept path drawings.

The presence of the retaining wall at the edge of the carriageway could result in damage to vehicles.

S1.1.2 Recommendation: Ensure the retaining wall is correctly represented on the swept path drawings and the vehicles can achieve unobstructed egress from the site.

Recommendation Accepted – The presence of the retaining wall was taken into account when undertaking the swept path analysis for this site. The drawings will be amended to show the exact location of the wall at Stage 2 (Detailed Design).

2.3 Location: Canham Road at Stanley Gardens

Summary: Tight swept path could lead to vehicles mounting the footway.

Description: The swept path analysis for the construction layout indicates there is no margin for error around the bend where Canham Road becomes Stanley Gardens.

The presence of the retaining wall on the outside of the bend is likely to result in vehicles taking a tighter path around the bend and overrunning the footway on the inside at the risk of pedestrian conflicts.

S1.1.3 Recommendation: Temporarily close the footway during construction and relocate the parking

Recommendation Response– The requirement to temporarily close the footway will force pedestrians to walk in the carriageway as no alternative walk way can be provided placing them at greater risk of conflict with vehicles. Further review as to the need to remove parking will be undertaken at Stage 2 (Detailed Design).

2.4 Location: Warple Way at Canham Road

Summary: Tight swept path could result in vehicle damage.

Description: The swept path analysis for the construction layout indicates conflicts between some vehicle types approaching the site, and the parking bays on Warple Way immediately north of Canham Road.

Swept path conflict can lead to vehicle damage and could result in injuries for vehicle occupants or pedestrians if footways are over run to avoid a collision.

S1.1.4 Recommendation: Suspended additional parking bays on Warple Way so as to ensure unobstructed egress.

Recommendation Accepted – The swept path analysis shows that the vehicles can undertake the turning movement within the existing carriageway however the requirement to suspend additional parking here will be reviewed at Stage 2 (Detailed Design).

Permanent Layout

2.5 Location: Canham Road west of permanent site access

Summary: Tight swept path could result in vehicle damage.

Description: The swept path analysis for the permanent layout indicates conflicts between some vehicle types leaving the site, and the parking bays immediately west of the proposed site access on Canham Road.

Swept path conflict can lead to vehicle damage and could result in injuries for vehicle occupants or pedestrians if footways are over run to avoid a collision.

S1.1.5 Recommendation: Temporary suspension of parking bays on Warple Way may be required during maintenance periods so as to ensure unobstructed access.

Recommendation Response – Maintenance vehicle will require access to the site on an infrequent basis. When vehicles require access to the site via this entrance appropriate temporary parking restrictions will be implemented to ensure ease of access and egress.

2.6 Location: Canham Road site access

Summary: Swept path shows conflict with gatepost.

Description: The swept path analysis for the permanent layout indicates conflicts between some vehicle types leaving the site, and the gatepost on the eastern side of the proposed site access on Canham Road.

Notwithstanding the damage to a vehicles caused by a collision with the gatepost, if the movement cannot be completed without conflict, it will be necassery for HGV drivers to reverse back to complete their manouver placing other road users at risk from a collision as a result of rearward visibility.

S1.1.5 Recommendation: Widen the site entrance to accomadate the movement allowing vehicles to enter and leave the site in a forward direction of movement.

Recommendation Accepted – The swept path analysis will be reviewed and the gate either set back or widened as part of the Stage 2 (Detailed Design).

3 Response to Comments provided in addition to the Stage 1 Road Safety Audit

3.1 Additional Comments

Warple Way is a signed cycle route (running contra-flow southbound between Canham Road and Cobbold Road) whilst Canham Road and Stanley Gardens are roads recommended for cycling. 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 vehicles conflict. Furthermore Thames Water staff maintaining the screening facilities and using the new access on Warple Way should also be briefed accordingly.

Comment Response – Delivery drivers and site staff will be informed of the presence of cyclist on Warple Way, Canham Road and Stanley Gardens 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 show the removal of around 10 on-street parking bays from Warple Way, Canham Road and Stanley Gardens during the construction phase at Acton Storm Tanks. It is likely to result in congestion and frustration for residents who cannot find somewhere to park. Replacement facilities should be provided during the duration of the construction works.

Comment Response – The parking surveys of these roads indicate that there is spare capacity available to accommodate any displaced vehicles as a result of the parking suspension.

3.3

The layout for the construction works show 10m of parking suspended on the western side of Stanley Gardens. The bay actually accommodates three parked vehicles. A partial suspension of parking bays could result in vehicle damage. Designer should ensure the full length of the parking bay is suspended throughout the construction phase.

Comment Response – The number of vehicles will not correspond to a set number of vehicles due to different vehicle lengths. The proposed restrictions adequately remove all parking within this area.

Thames Tideway Tunnel
Thames Water Utilities Limited

Application for Development Consent

Application Reference Number: WWO10001

Transport Assessment

Doc Ref: **7.10.1**

Acton Storm Tanks

Figures

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

Hard copy available in

Box **49** Folder **B**
January 2013

Thames Tideway Tunnel

Creating a cleaner, healthier River Thames

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Thames Tideway Tunnel

Transport Assessment

Section 4: Acton Storm Tanks figures

List of contents

Plans

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Acton Storm Tanks

THAMES TIDEWAY TUNNEL - SCHEDULE OF ASSOCIATED HIGHWAY WORKS

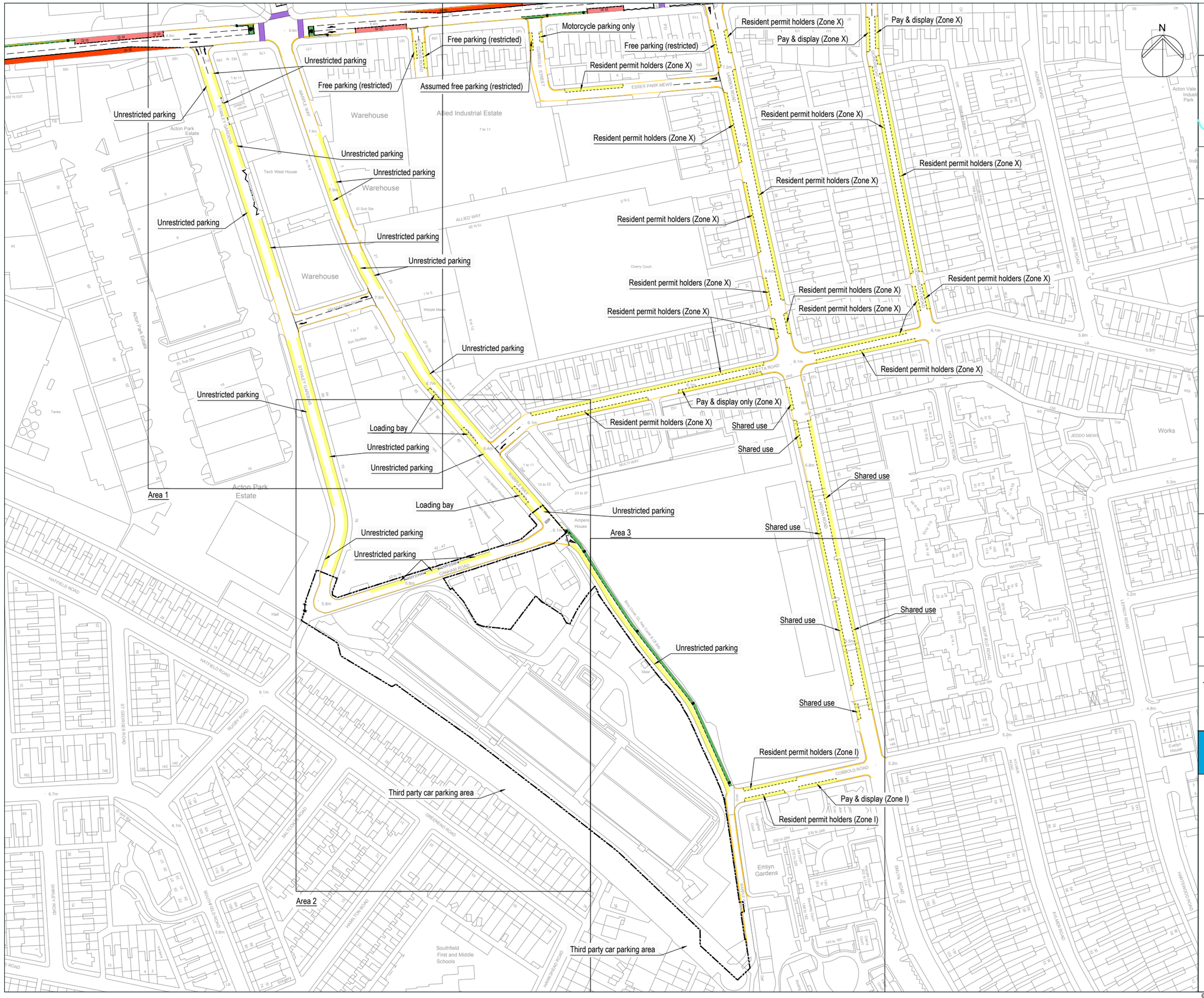
Drawing Number	Works Reference	Location	Item of Work	Date of Implementation
DCO-PP-02X-ACTST-050022	PEG2X_C01	Warple Way and Stanley Gardens	Extension of hours of operation of single yellow line parking restriction from Mon to Sat 8am to 6.30pm to Mon to Sat 7am to 7pm	TBC
	PEG2X_C02	Warple Way and Stanley Gardens	Extension of hours of operation of single yellow line parking restriction from Mon to Fri 8am to 6.30pm to Mon to Sat 7am to 7pm	TBC
	PEG2X_C03	Stanley Gardens	Extension of hours of operation of single yellow line parking restriction from Mon to Sat 8.30am to 6.30pm to Mon to Sat 7am to 7pm	TBC
	PEG2X_C04	Stanley Gardens - South east of Stanley Gardens / The Vale junction	Suspension of approximately 11m of unrestricted on-street parking.	TBC
DCO-PP-02X-ACTST-050023	PEG2X_C05	Stanley Gardens - North of Stanley Gardens / Canham Road junction	Suspension of approximately 10m of unrestricted on-street parking.	TBC
	PEG2X_C06	Warple Way – South of Bradford Road	Suspension of approximately 21m of unrestricted on-street parking.	TBC
	PEG2X_C07	Canham Road - East of Stanley Gardens / Canham Road junction	Suspension of approximately 41m of unrestricted on-street parking.	TBC
	PEG2X_C08	Stanley Gardens - North of Stanley Gardens / Canham Road junction	Realignment of kerb in order to accommodation turning movements of construction vehicles.	TBC
	PEG2X_C09	Stanley Gardens / Canham Road junction	Extension of hours of operation of single yellow line parking restriction from Mon to Fri 8am to 6.30pm to Mon to Sat 7am to 7pm	TBC
	PEG2X_C10	Stanley Gardens - North of Stanley Gardens / Canham Road junction	Extension of hours of operation of single yellow line parking restriction from Mon to Fri 8am to 6.30pm to Mon to Sat 7am to 7pm	TBC
	PEG2X_C11	Warple Way - North east of Warple Way / Canham Road junction	Suspension of approximately 16m of unrestricted on-street parking.	TBC
	PEG2X_C12	Canham Road	Extension of hours of operation of single yellow line parking restriction from Mon to Fri 8am to 6.30pm to Mon to Sat 7am to 7pm	TBC
	PEG2X_C13	Canham Road	Provision of gated construction site access	TBC
	PEG2X_C14	Third party car parking area	Suspension of parking bays along eastern side of third party car parking area. Suspension required to facilitate construction along Acton Storm Tanks perimeter and are not required during all construction phases.	TBC
DCIO-PP-02X-ACTST-050024	PEG2X_C14	Third party car parking area	Suspension of parking bays along eastern side of third party car parking area. Suspension required to facilitate construction along Acton Storm Tanks perimeter and are not required during all construction phases.	TBC
	PEG2X_C15	Third party car parking area	Access to third party car parking area to be restricted to one lane to facilitate construction along Acton Storm Tanks perimeter. Traffic management system to maintain access to car park.	TBC
	PEG2X_C16	Warple Way	Provision of gated access to provide TW operational access to southern region of Acton Storm Tanks during construction period.	TBC
DC0-OO-02X-ACTST-050025	PEG2X_P01	Warple Way and Stanley Gardens	Reinstatement of hours of operation of single yellow line parking restriction to Mon to Sat 8am to 6.30pm.	TBC
	PEG2X_P02	Warple Way and Stanley Gardens	Reinstatement of hours of operation of single yellow line parking restriction to Mon to Fri 8am to 6.30pm	TBC

Date of issue: January 2013

Acton Storm Tanks

THAMES TIDEWAY TUNNEL - SCHEDULE OF ASSOCIATED HIGHWAY WORKS

Drawing Number	Works Reference	Location	Item of Work	Date of Implementation
	PEG2X_P03	Stanley Gardens	Reinstatement of hours of operation of single yellow line parking restriction to Mon to Sat 8.30am to 6.30pm	TBC
	PEG2X_P04	Stanley Gardens - South east of Stanley Gardens / The Vale junction	Reinstatement of approximately 11m of unrestricted on-street parking.	TBC
DCO-PP-02X-ACTST-050026	PEG2X_P05	Stanley Gardens - North of Stanley Gardens / Canham Road junction	Reinstatement of approximately 10m of unrestricted on-street parking.	TBC
	PEG2X_P06	Warple Way – South of Bradford Road	Reinstatement of approximately 21m of unrestricted on-street parking.	TBC
	PEG2X_P07	Canham Road - East of Stanley Gardens / Canham Road junction	Reinstatement of approximately 41m of unrestricted on-street parking.	TBC
	PEG2X_P08	Stanley Gardens - North of Stanley Gardens / Canham Road junction	Reinstatement of kerb which was realigned in order to accommodation turning movements of construction vehicles.	TBC
	PEG2X_P09	Stanley Gardens / Canham Road junction	Reinstatement of hours of operation of single yellow line parking restriction to Mon to Fri 8am to 6.30pm	TBC
	PEG2X_P10	Stanley Gardens - North of Stanley Gardens / Canham Road junction	Reinstatement of hours of operation of single yellow line parking restriction from Mon to Fri 8am to 6.30pm	TBC
	PEG2X_P11	Warple Way - North east of Warple Way / Canham Road junction	Reinstatement of approximately 16m of unrestricted on-street parking.	TBC
	PEG2X_P12	Canham Road - between Warple Way and Stanley Gardens	Closure of construction site access and reinstatement of footpath.	TBC
	PEG2X_P13	Canham Road - between Warple Way and Stanley Gardens	Provision of permanent site access to be used infrequently by larger operational maintenance vehicles.	TBC
	PEG2X_P14	Canham Road - between Warple Way and Stanley Gardens	Widening of existing southern footway and provision of paving to match the existing.	TBC
	PEG2X_P15	Third party car parking area	Reinstatement of third party car parking bays. Surfacing to match existing.	TBC
DCO-PP-02X-ACTST-050027	PEG2X_P15	Third party car parking area	Reinstatement of third party car parking bays. Surfacing to match existing.	TBC
	PEG2X_P16	Third party car parking area	Removal of traffic management system at access to third party car parking area.	TBC
	PEG2X_P17	Warple Way	Removal of temporary TW operational access to southern region of Acton Storm Tanks required during construction.	TBC



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 stop / stand
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line

Revised
- Limit of land to be acquired or used (LLAU)

On Street Parking

Shared use - Zone I permit holders or pay & display max stay 8 hrs Mon - Fri 9:00am - 5:00pm
Resident permit holders (Zone I) - Permit holders only Mon - Fri 9:30am - 5:00pm
Resident permit holders (Zone X) - Permit holders only Mon - Sun 9:30am - 9:00pm
Pay & display (Zone I) - Pay & display only Mon - Fri 9:00am - 5:00pm
Pay & display (Zone X) - Pay & display only Mon - Sun 9:00am - 9:00pm
Free parking (restricted) - Mon - Fri 9:00am - 5:00pm free parking 30 mins no return within 1 hr
Unrestricted parking - Unrestricted parking (unmarked & without signage)
School keep clear - No stopping Mon - Fri 8:00am - 4:30pm
Third party car parking area -
Loading bay - Loading only

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 For The Use Of Tactile Paving, Dft, 1998
- Accessible Bus Stop Design Guidance, Tfl, 2006

Stage

Existing & construction base case

10m 0 100m

Scale 1:1000 at A1
1:2000 if reproduced at A3

FOR INFORMATION

Location

Acton Storm Tanks
London Borough of Ealing

Document Information

Application for Development Consent

Existing and construction base case highway layout

DCO-PP-02X-ACTST-050021
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

Existing and construction base case highway layout

Highway layout during construction

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 stop / stand
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line

Revised
- Parking restrictions
- Suspended parking
- PEG2X_C00 See schedule of works

On Street Parking

Unrestricted parking - Unrestricted parking (unmarked & without signage)
Free parking (restricted) - Mon - Fri 9:00am - 5:00pm free parking 30 mins no return within 1 hr
School keep clear - No stopping Mon - Fri 8:00am - 4:30pm

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 For The Use Of Tactile Paving, Dft, 1998
- Accessible Bus Stop Design Guidance, Tfl, 2006

Stage
Phases 1 & 2

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Acton Storm Tanks
London Borough of Ealing

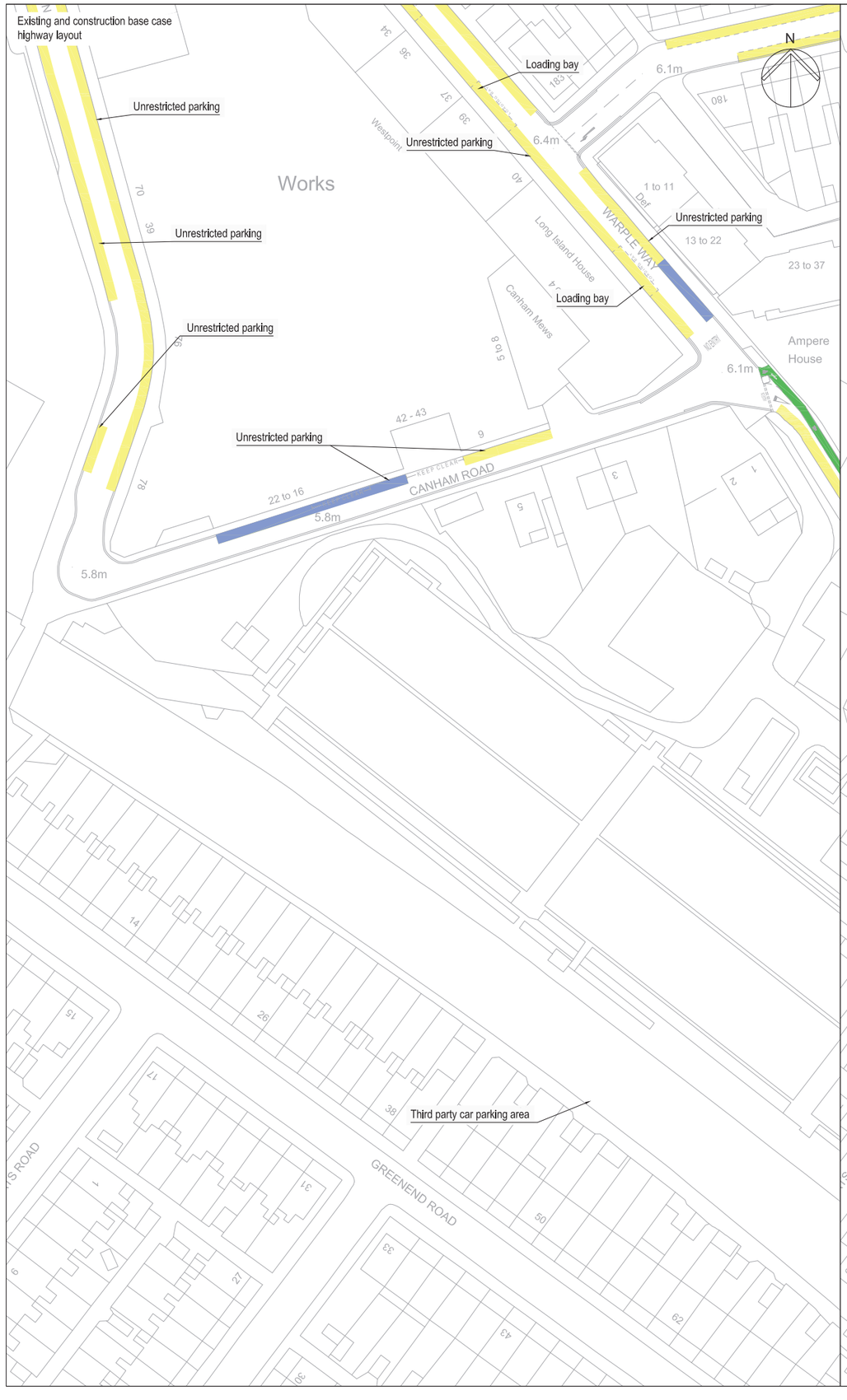
Document Information
Application for Development Consent
Highway layout during construction (Area 1)

DCO-PP-02X-ACTST-050022
January 2013

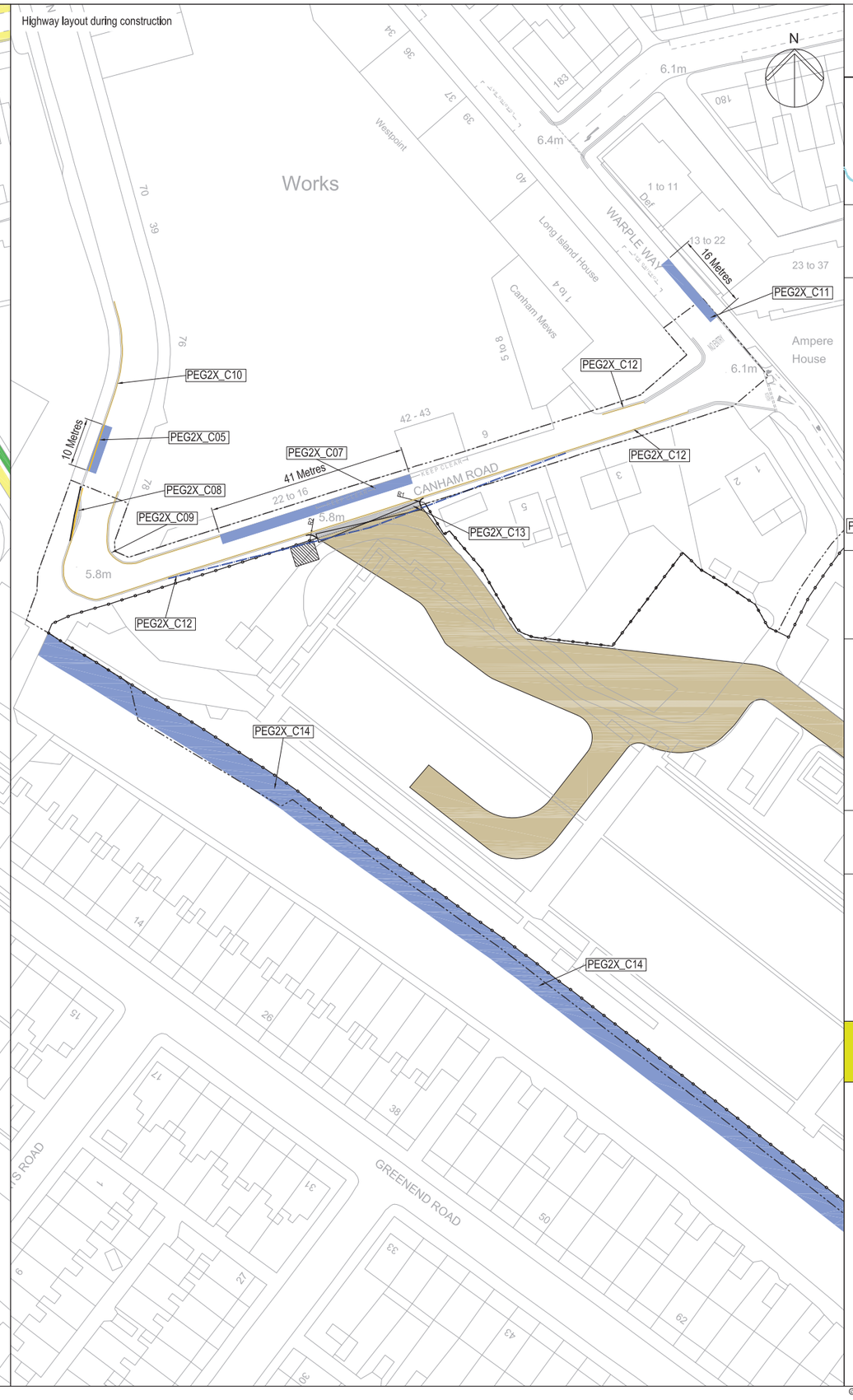
Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

Existing and construction base case highway layout



Highway layout during construction



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
- Cycle lane / advance stop line

Revised
- Removal of footway
- Illustrative on-site manoeuvring zone
- Suspended parking
- Parking restrictions
- Visibility splay - 2.4m x 43m
- Site hut
- Site hoarding
- Access gate
- Limit of land to be acquired or used (LLAU)
- PEG2X_C00 See schedule of works

On Street Parking

Unrestricted parking - Unrestricted parking (unmarked & without signage)
Third party car parking area -
Loading bay - Loading bay

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, Clht, 2010
- Designing For Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design Of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance For The Use Of Tactile Paving, Dft, 1998
- Accessible Bus Stop Design Guidance, Tfl, 2006

Stage
Phase 1, Phase 2

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Acton Storm Tanks
London Borough of Ealing

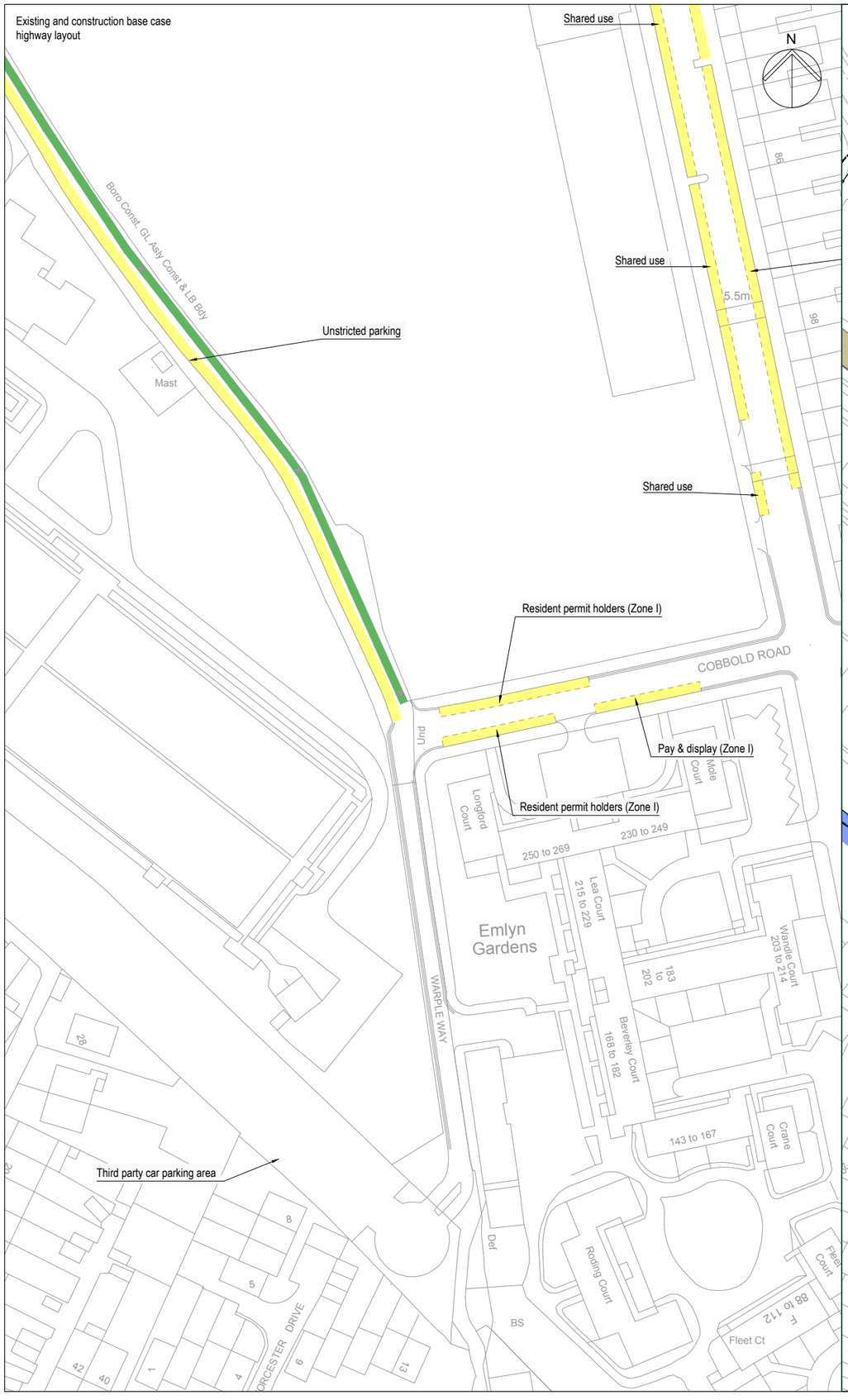
Document Information
Application for Development Consent
Highway layout during construction (Area 2)

DCO-PP-02X-ACTST-050023
January 2013

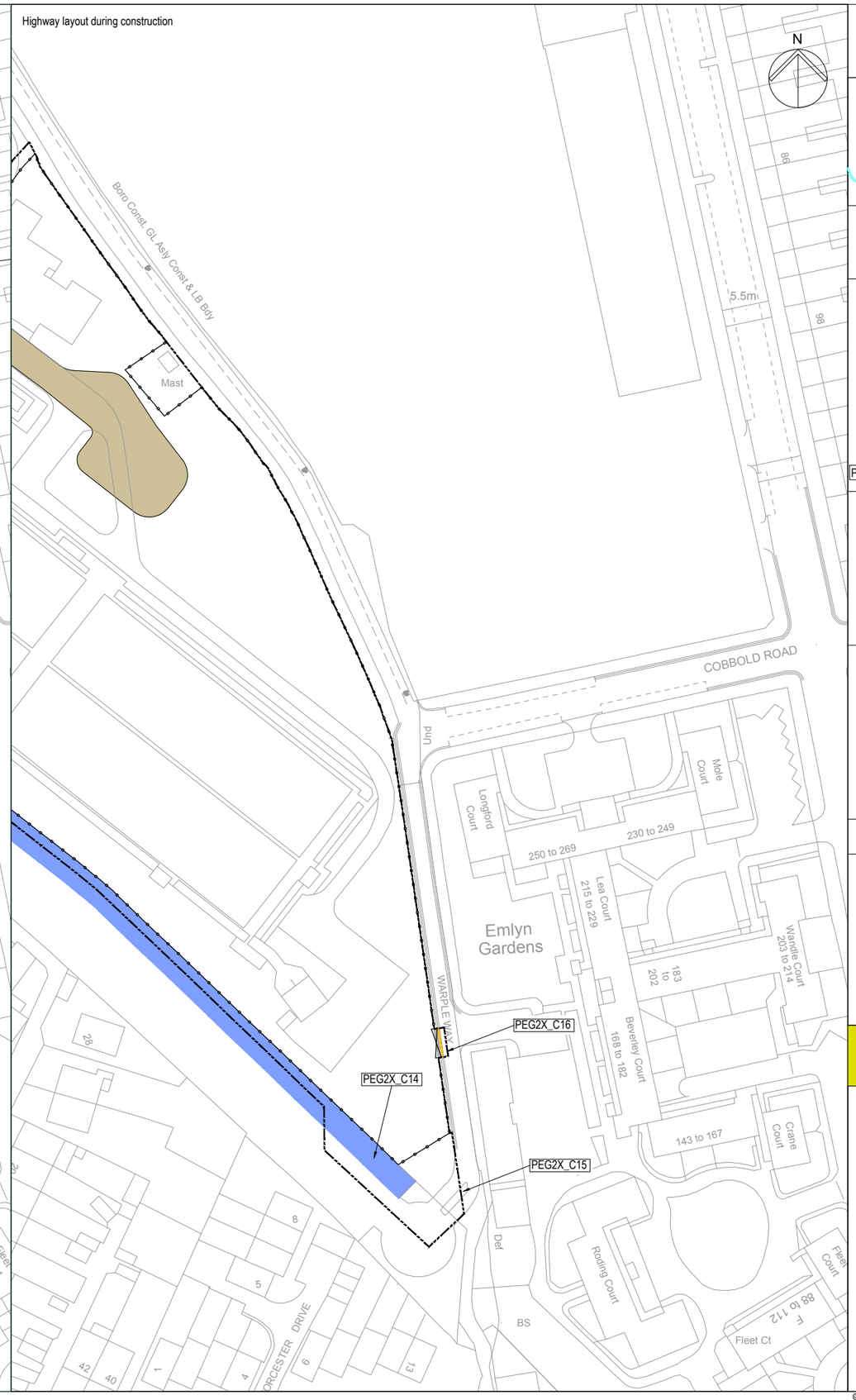
Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

Existing and construction base case highway layout



Highway layout during construction



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
- Cycle lane / advance stop line

Revised
- Parking restriction
- Removal of footway
- Illustrative on-site manoeuvring zone
- Suspended parking
- Site hoarding
- Access gate
- Limit of land to be acquired or used (LLAU)
- PEG2X_C00 See schedule of works

On Street Parking

Shared use - Zone I permit holders or pay & display max stay 8 hrs Mon - Fri 9:00am - 5:00pm

Resident permit holders (Zone I) - Permit holders only Mon - Fri 9:00am - 5:00pm

Pay & display (Zone I) - Pay & display only Mon - Fri 9:00am - 5:00pm

Unrestricted parking - Unrestricted parking (unmarked & without signage)

Third party car parking area -

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 For The Use Of Tactile Paving, Dft, 1998
- Accessible Bus Stop Design Guidance, Tfl, 2006

Stage

Existing & construction base case

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location

Acton Storm Tanks
London Borough of Ealing

Document Information

Application for Development Consent

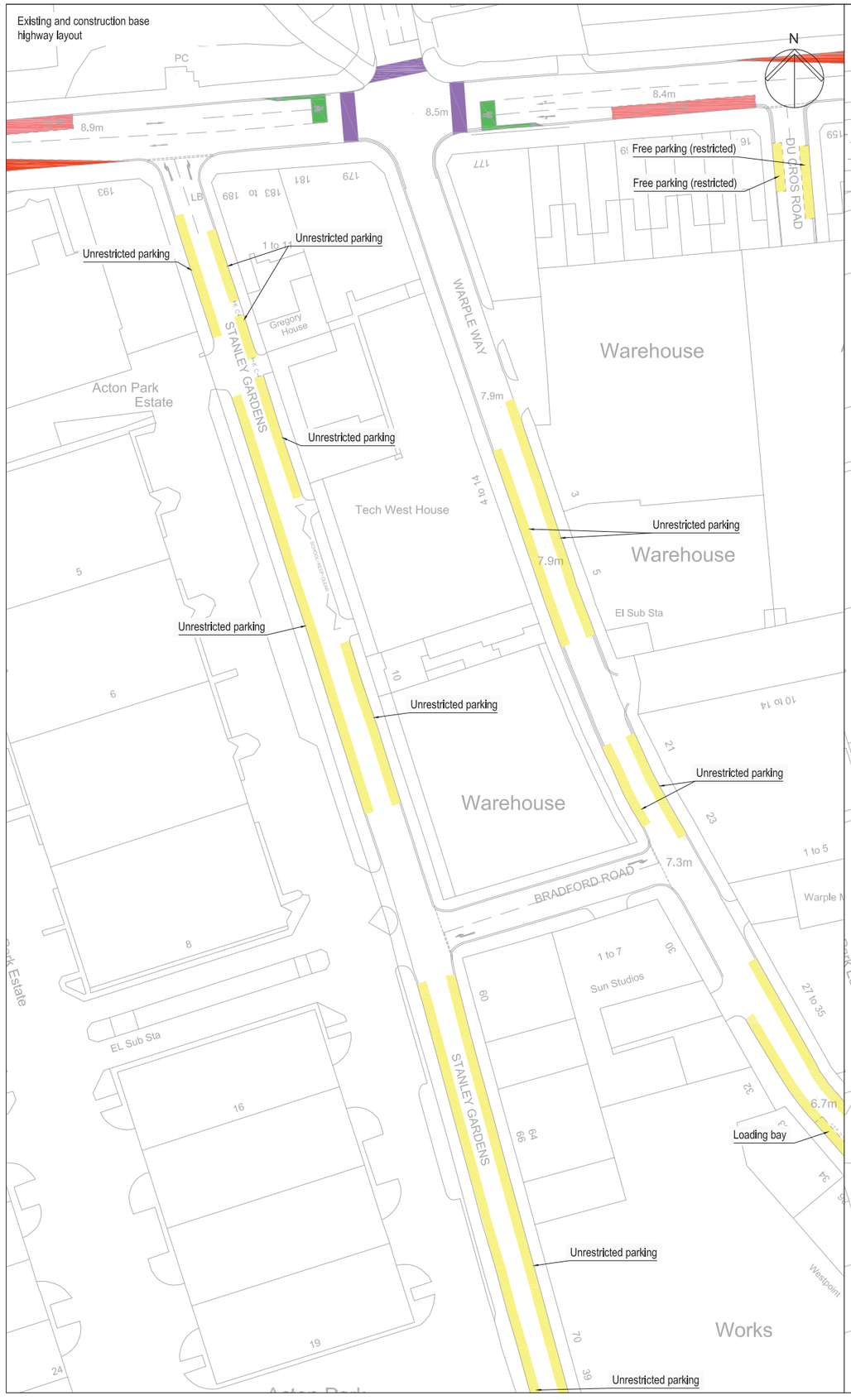
Highway layout during construction (Area 3)

DCO-PP-02X-ACTST-050024
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

Existing and construction base highway layout



Permanent highway layout

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 stop / stand
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line

Revised
- Parking restrictions
- Reinstated parking
- PEG2X_P01 See schedule of works

On Street Parking

Unrestricted parking - Unrestricted parking (unmarked & without signage)
Free parking (restricted) - Mon - Fri 9:00am - 5:00pm free parking 30 mins no return within 1 hr
School keep clear - No stopping Mon - Fri 8:00am - 4:30pm
Loading bay - loading only

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 For The Use Of Tactile Paving, 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
Acton Storm Tanks
London Borough of Ealing

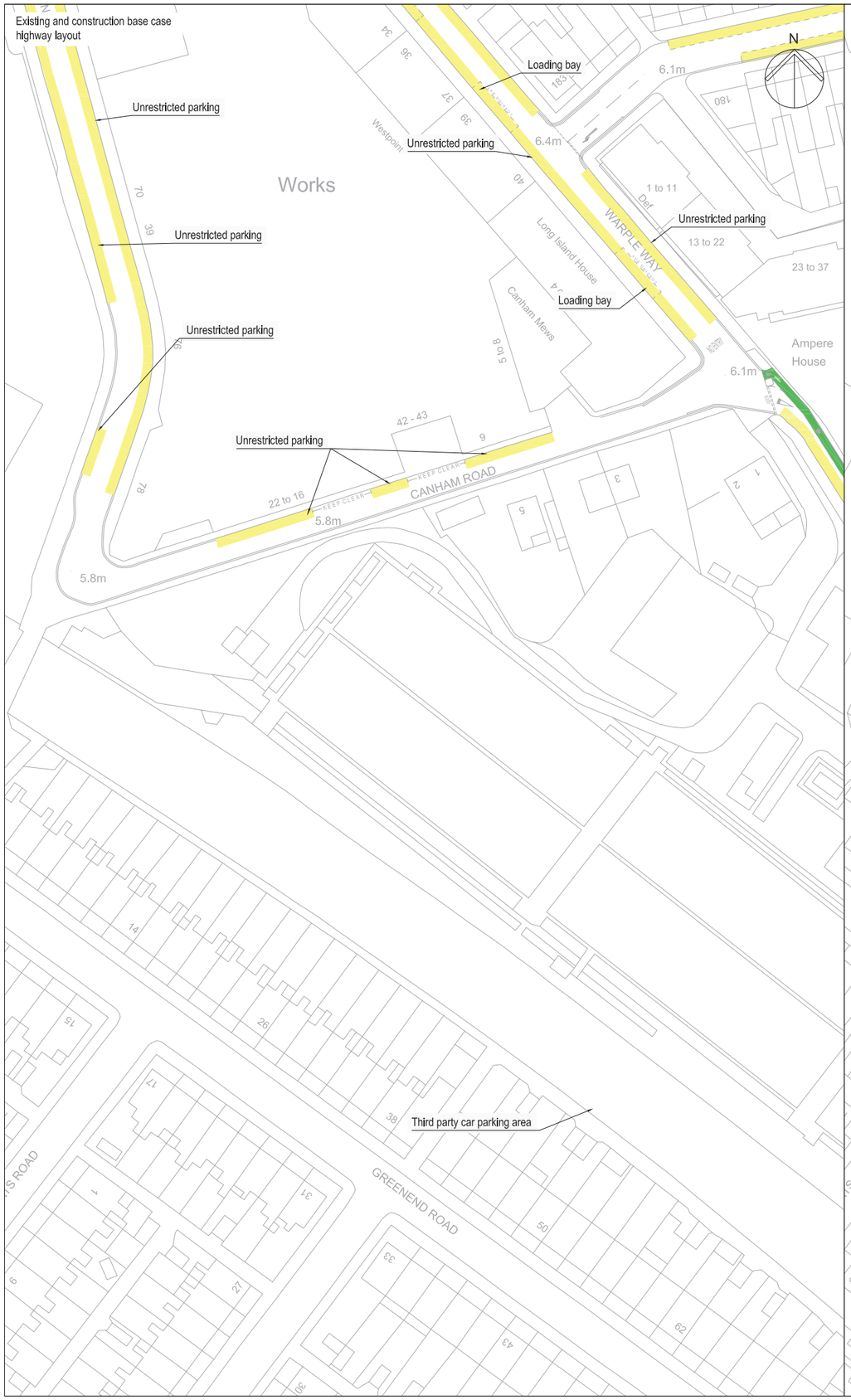
Document Information
Application for Development Consent
Permanent highway layout - Area 1 work

DCO-PP-02X-ACTST-050025
January 2013

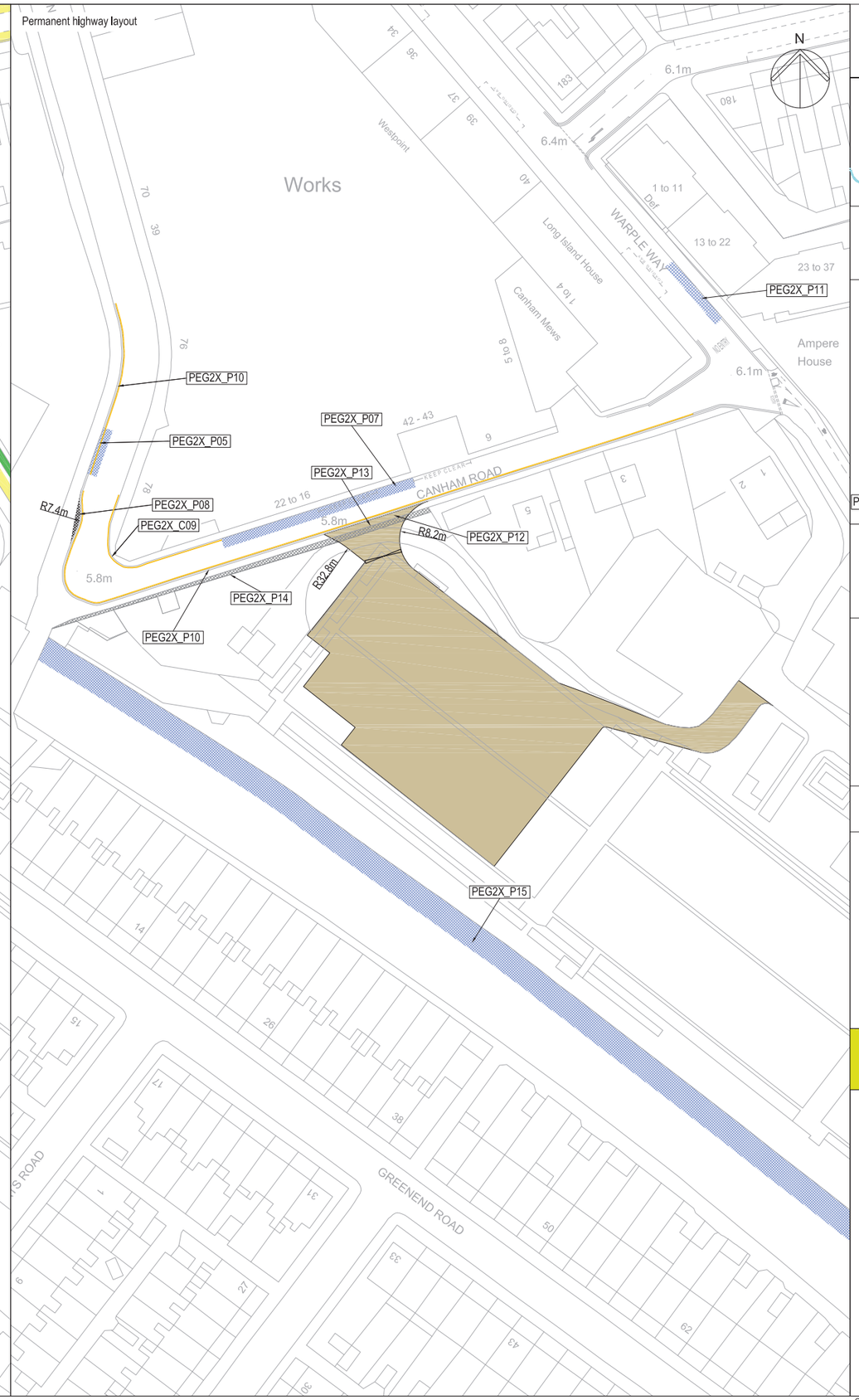
Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

Existing and construction base case highway layout



Permanent highway layout



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
- Cycle lane / advance stop line

Revised
- Removal of footway
- Reinstated footway
- Illustrative on-site manoeuvring zone
- Reinstated parking
- Footway extension
- Parking restrictions
- Access gate
- PEG2X_P00 See schedule of works

On Street Parking

Unrestricted parking - Unrestricted parking (unmarked & without signage)
Third party car parking area -
Loading bay - loading bay

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, Clnt, 2010
- Designing For Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design Of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance For The Use Of Tactile Paving, 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
Acton Storm Tanks
London Borough of Ealing

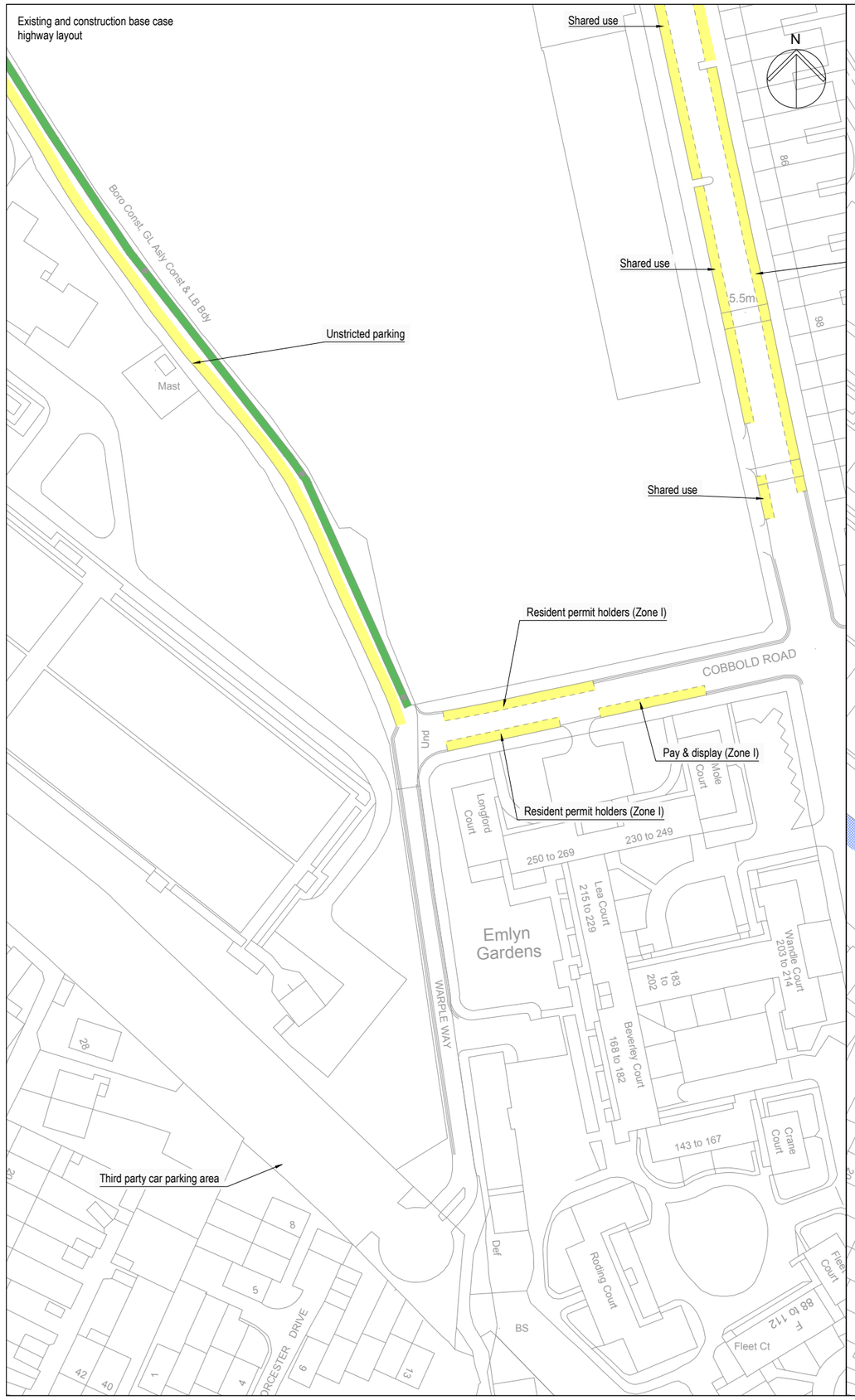
Document Information
Application for Development Consent
Permanent highway layout - Area 2 work

DCO-PP-02X-ACTST-050026
January 2013

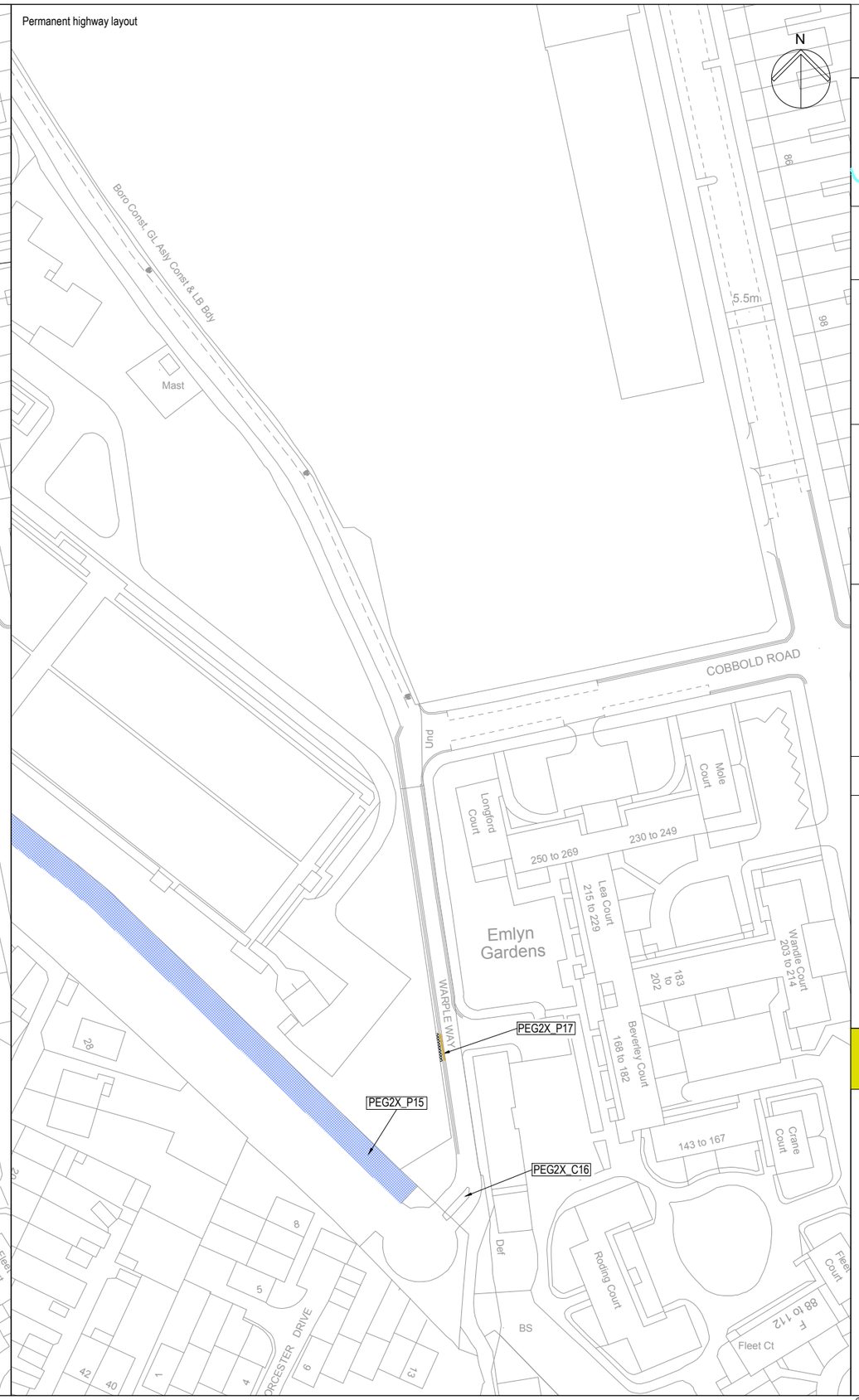
Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

Existing and construction base case highway layout



Permanent highway layout



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
- Cycle lane / advance stop line

Revised
- Reinstated footway
- Reinstated parking

On Street Parking

Shared use - Zone I permit holders or pay & display max stay 8 hrs Mon - Fri 9:00am - 5:00pm
Resident permit holders (Zone I) - Permit holders only Mon - Fri 9:00am - 5:00pm
Pay & display (Zone I) - Pay & display only Mon - Fri 9:00am - 5:00pm
Unrestricted parking - Unrestricted parking (unmarked & without signage)
Third party car parking area -

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, Cilht, 2010
- Designing For Deliveries, Fta, 1998
- Cycle Infrastructure Design Ltn 2/08, Dft, 2008
- Design Of Pedestrian Crossings Ltn 2/95, Dft, 1995
- Guidance For The Use Of Tactile Paving, 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
Acton Storm Tanks
London Borough of Ealing

Document Information
Application for Development Consent
Permanent highway layout - Area 3 work

DCO-PP-02X-ACTST-050027
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

16.5m Articulated vehicle
Speed = 5km/h left turn from Stanley Gardens
20km/h at all other turns

12.0m Rigid vehicle
Speed = 15km/h left turn into Warple Way
20km/h at all other turns

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

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

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 stop / stand
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line
- Unrestricted on-street parking (assumed 2m width)

Revised
- Suspended parking

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 For The Use Of Tactile Paving, Dft, 1998
- Accessible Bus Stop Design Guidance, Tfl, 2006

Stage
Existing & construction base case

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Acton Storm Tanks
London Borough of Ealing

Document Information
Application for Development Consent

Highway layout during construction (Area 1)
Vehicle swept path analysis

DCO-PP-02X-ACTST-050028
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

16.5m Articulated vehicle
Speed = 20km/h

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 = 20km/h

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

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
- Cycle lane / advance stop line
- Unrestricted on-street parking (assumed 2m width)

Revised
- Removal of footway
- Suspended parking
- Illustrative on-site manoeuvring zone
- Site 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 For The Use Of Tactile Paving, Dft, 1998
- Accessible Bus Stop Design Guidance, Tfl, 2006

Stage
Existing & construction base case

10m 0 40m

Scale 1:500 at A1
1:1000 if reproduced at A3

ILLUSTRATIVE

Location
Acton Storm Tanks
London Borough of Ealing

Document Information
Application for Development Consent

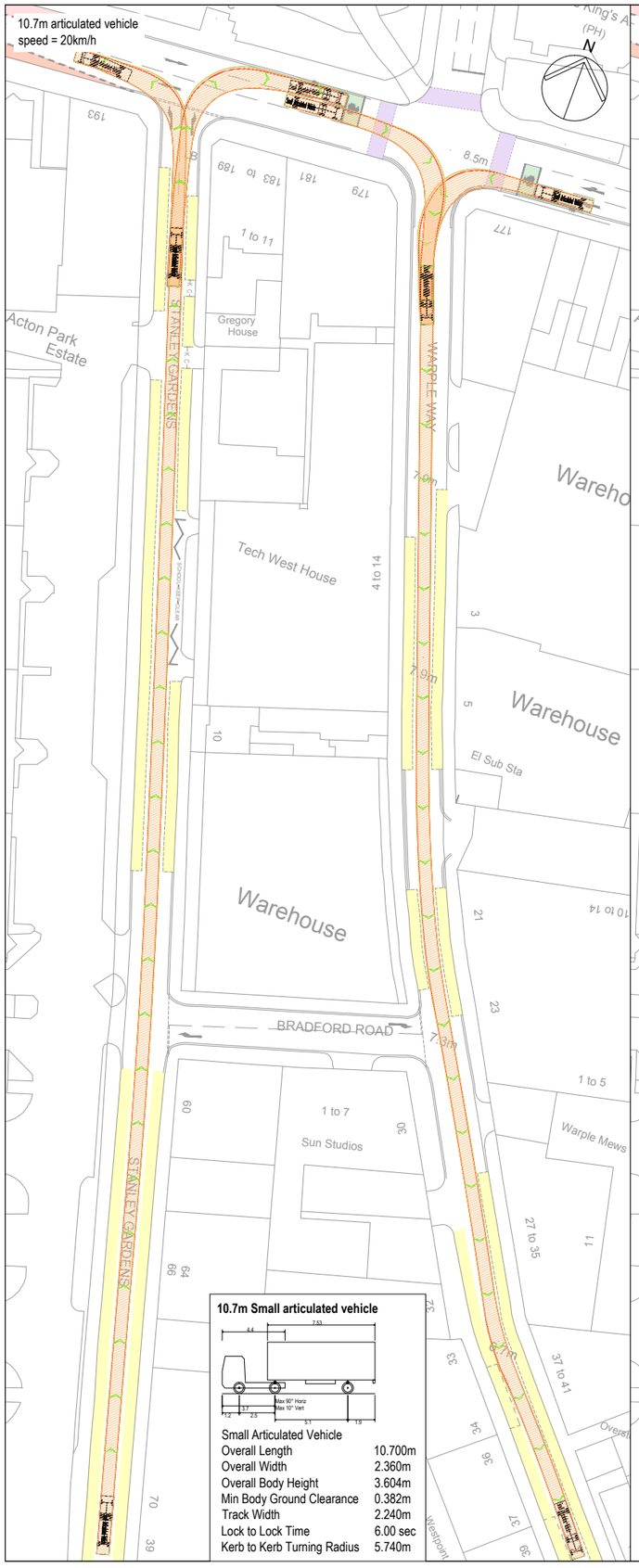
Highway layout during construction (Area 2)
Vehicle swept path analysis

DCO-PP-02X-ACTST-050029
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

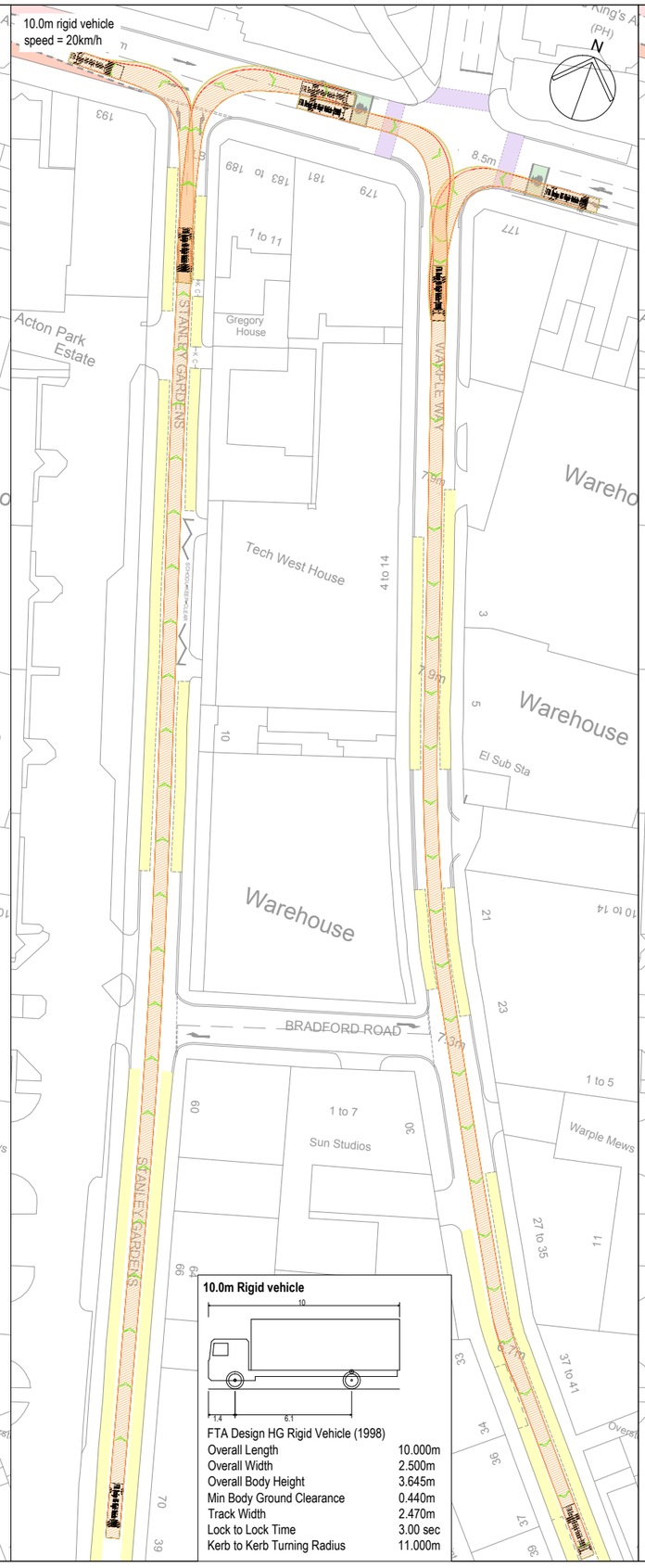
10.7m articulated vehicle
speed = 20km/h



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

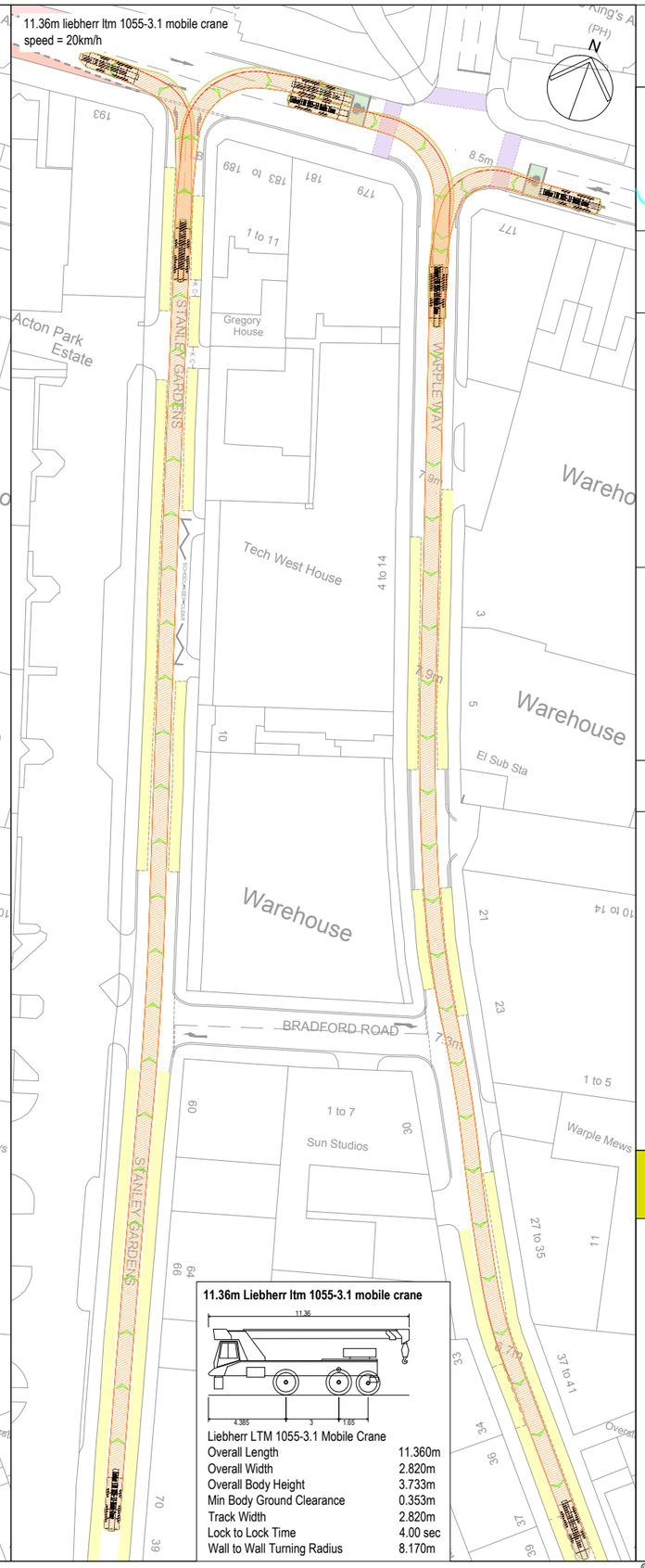
10.0m rigid vehicle
speed = 20km/h



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

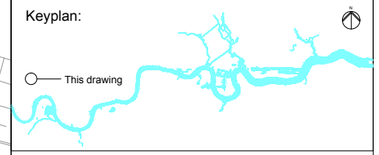
11.36m liebherr ltm 1055-3.1 mobile crane
speed = 20km/h



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

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 stop / stand
- Bus lane
- Pedestrian crossing
- Cycle lane / advance stop line
- Unrestricted on-street parking (assumed 2m width)

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 For The Use Of Tactile Paving, 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
Acton Storm Tanks
London Borough of Ealing

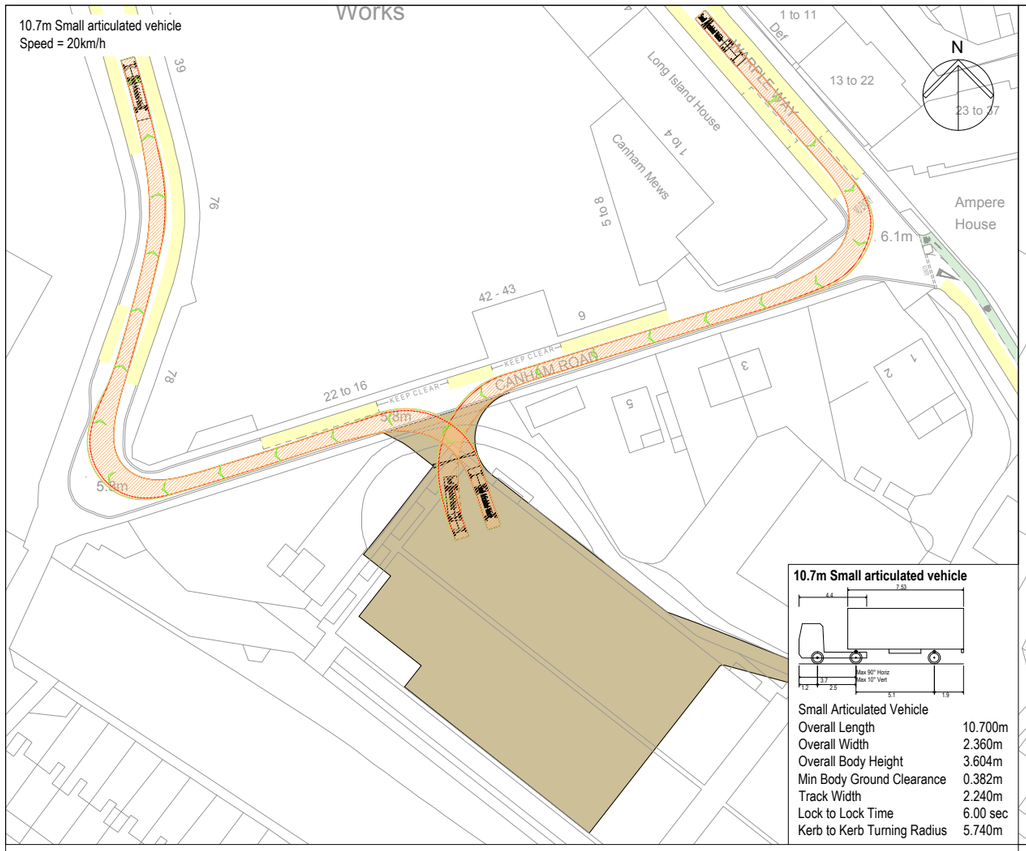
Document Information
Application for Development Consent
Permanent highway layout (Area 1)
Vehicle swept path analysis

DCO-PP-02X-ACTST-050030
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

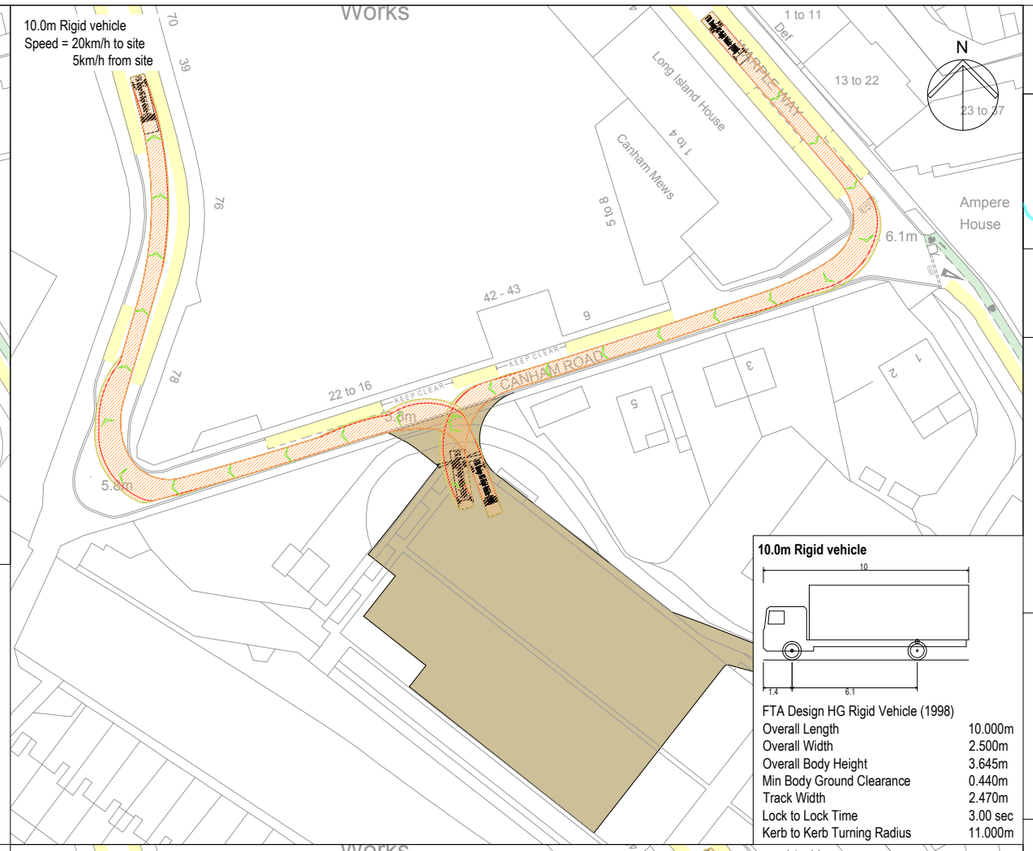
10.7m Small articulated vehicle
Speed = 20km/h



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

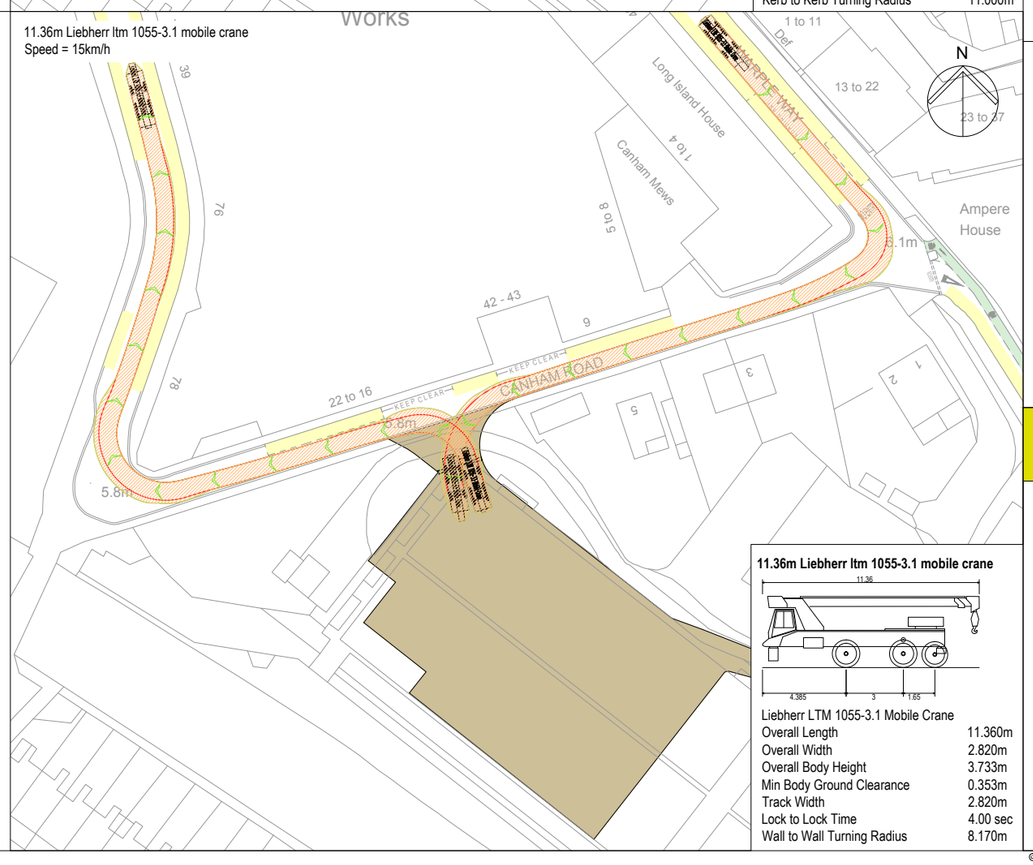
10.0m Rigid vehicle
Speed = 20km/h to site
5km/h from site



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

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

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
- Cycle lane / advance stop line
- Unrestricted on-street parking (assumed 2m width)

Revised
- Illustrative on-site manoeuvring zone
- Access gate

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 For The Use Of Tactile Paving, 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
Acton Storm Tanks
London Borough of Ealing

Document Information
Application for Development Consent
Permanent highway layout (Area 2)
Vehicle swept path analysis

DCO-PP-02X-ACTST-050031
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

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Transport assessment figures

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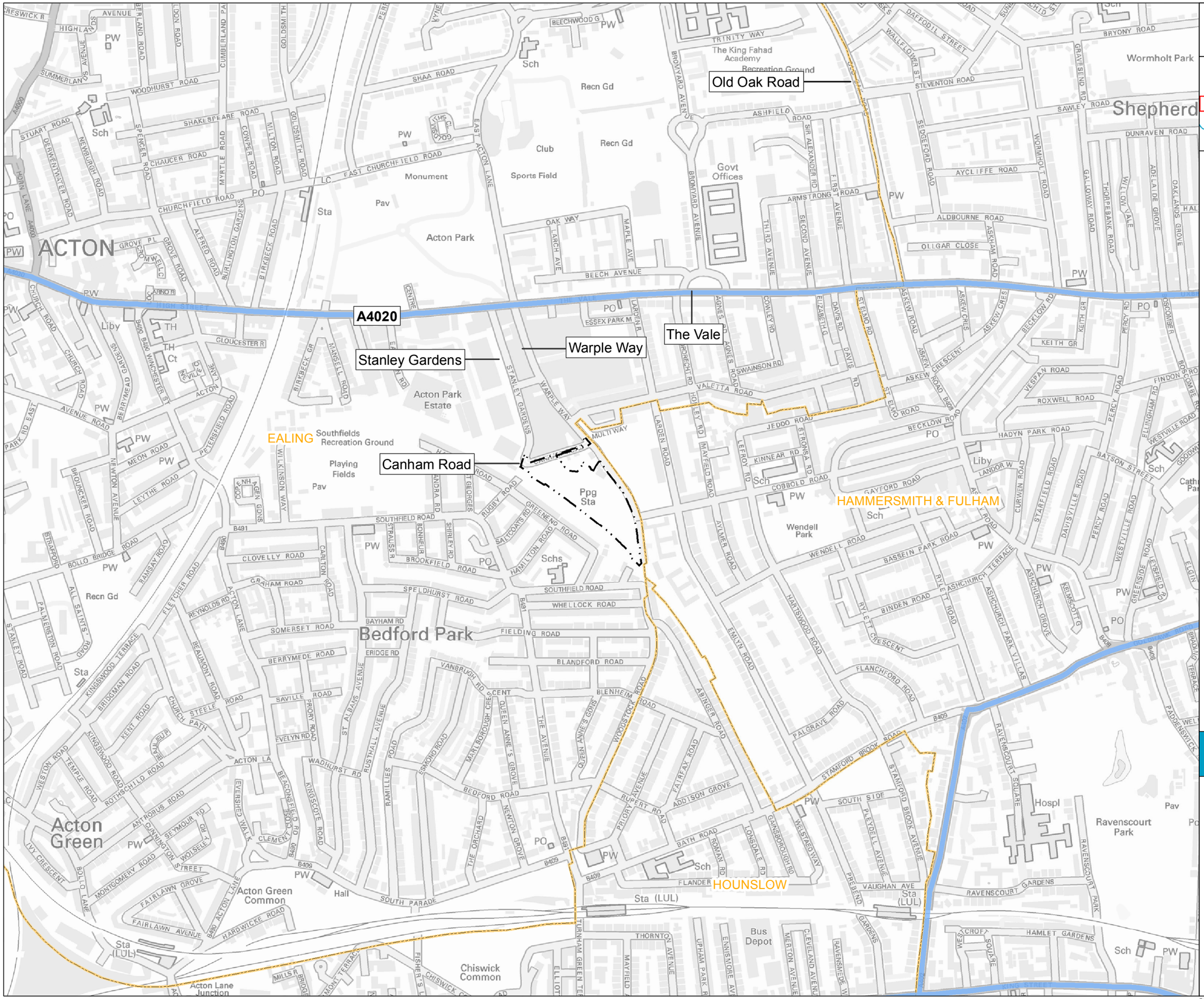

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Keyplan:

Key

- Strategic 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

Acton Storm Tanks
London Borough of Ealing

Document Information

Transport Assessment

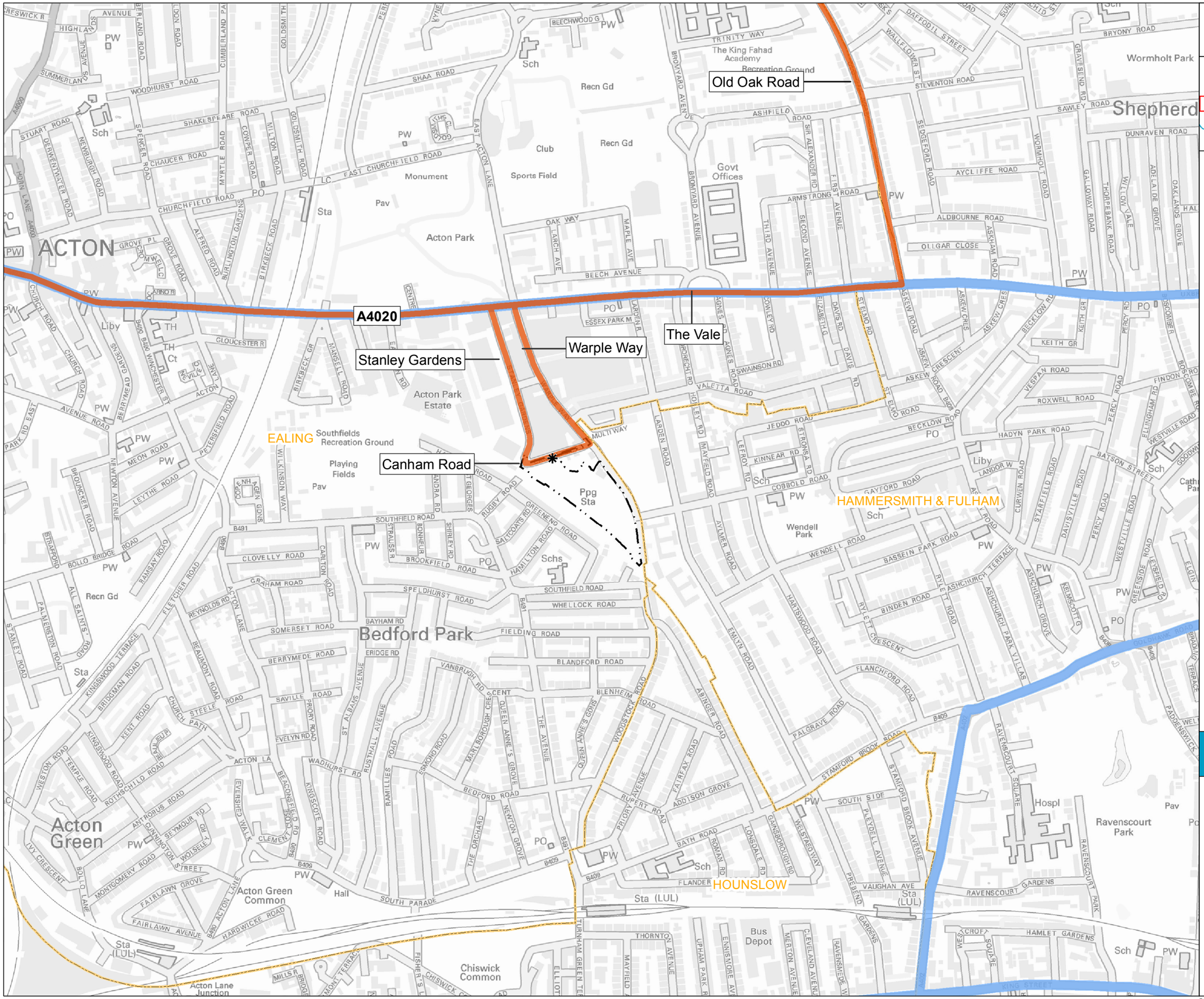
Transport - site location plan

Figure 4.2.1

1PL03-TT-50705
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



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Keyplan:

Key

- Site access
- 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

Acton Storm Tanks
London Borough of Ealing

Document Information

Transport Assessment

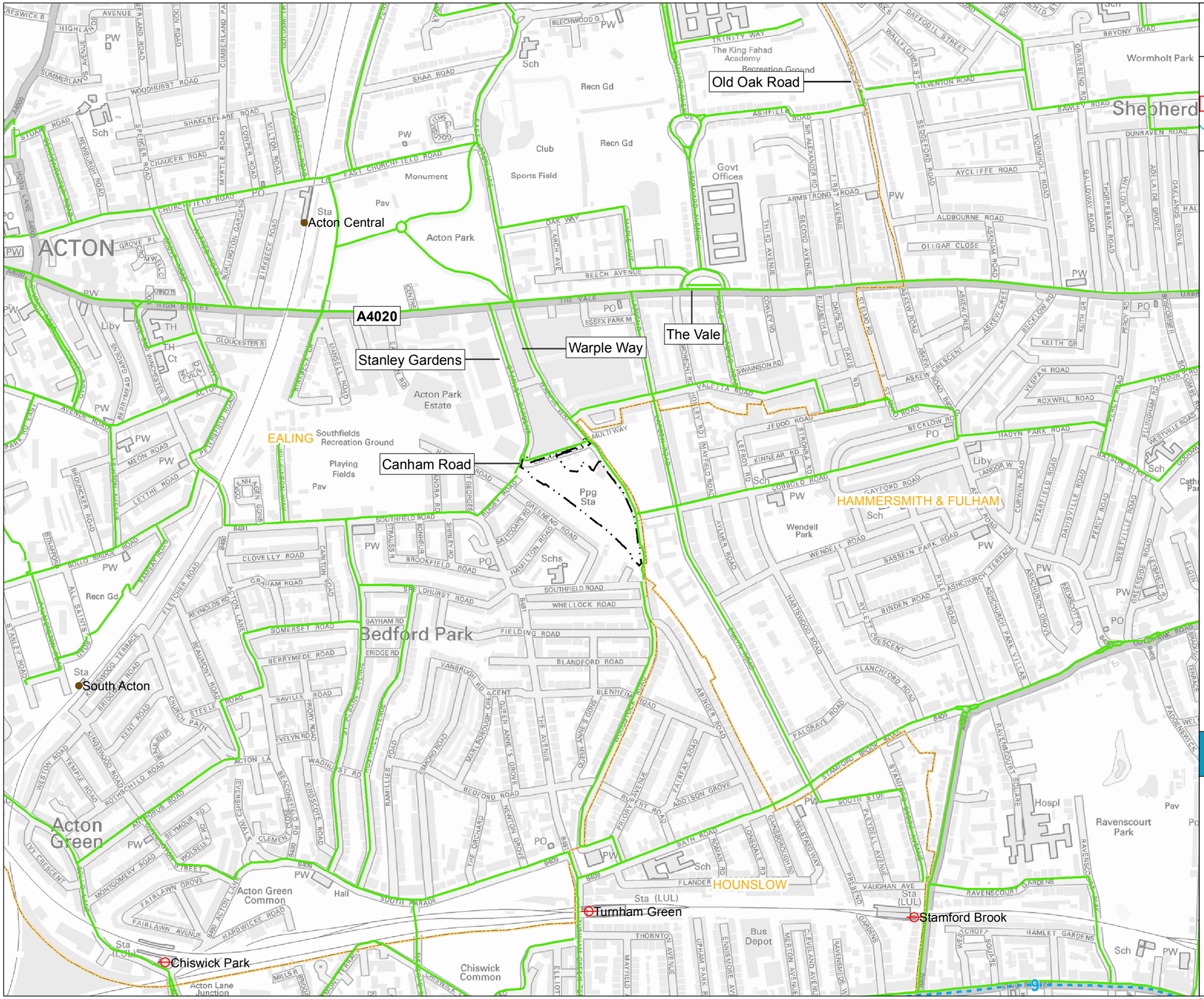
Transport - construction traffic routes

Figure 4.2.2

1PL03-TT-50697
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



Keyplan:

Key

- National rail stations with cycle parking
- Underground stations with cycle parking
- Cycle superhighway (open 2013)
- London cycle 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

Acton Storm Tanks
London Borough of Ealing

Document Information

Transport Assessment

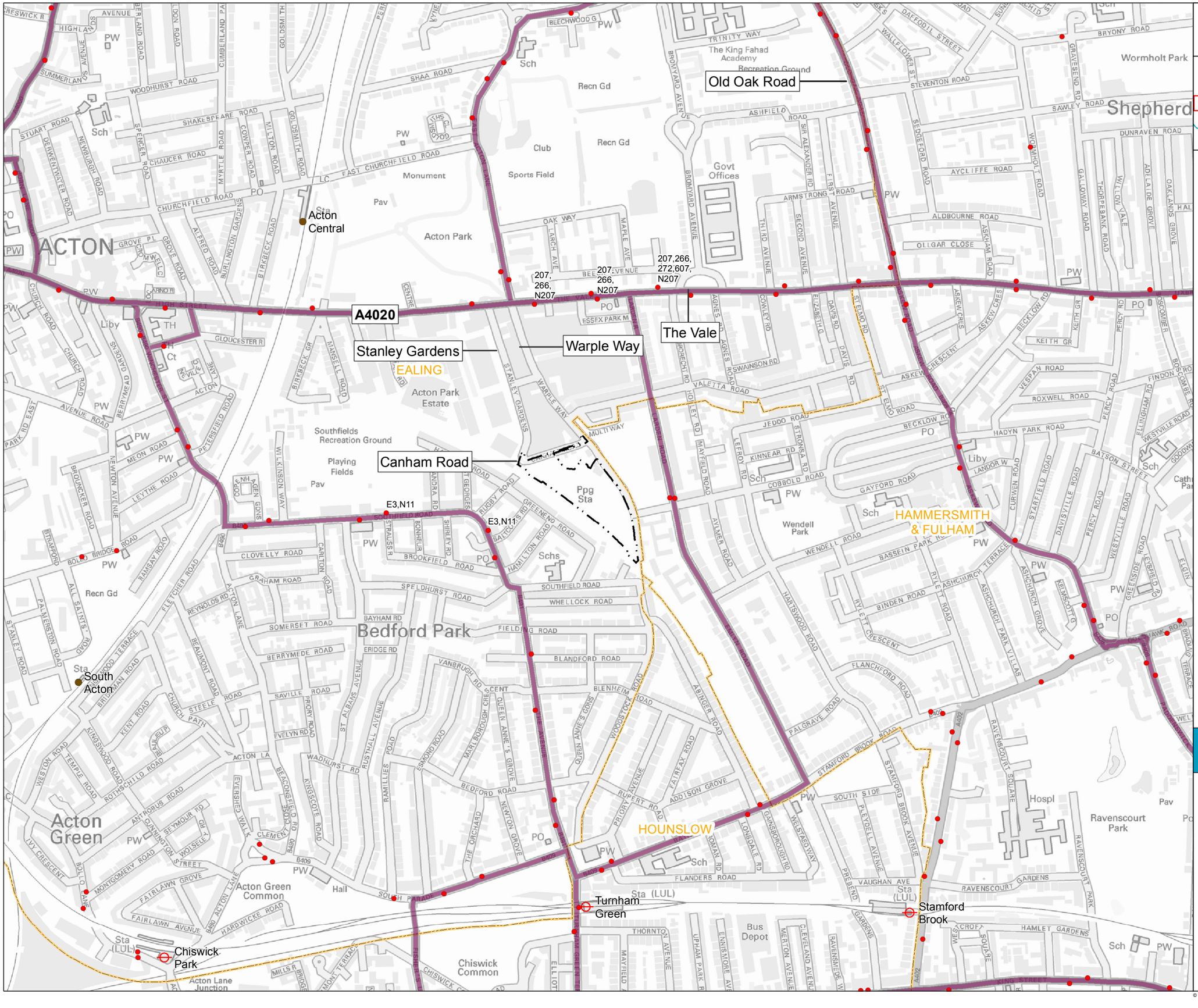
Transport - pedestrian and cycle network

Figure 4.4.1

1PL03-TT-50713
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



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Keyplan:

Key

- TFL bus stops
- National rail stations
- London underground stations
- 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

Acton Storm Tanks
London Borough of Ealing

Document Information

Transport Assessment

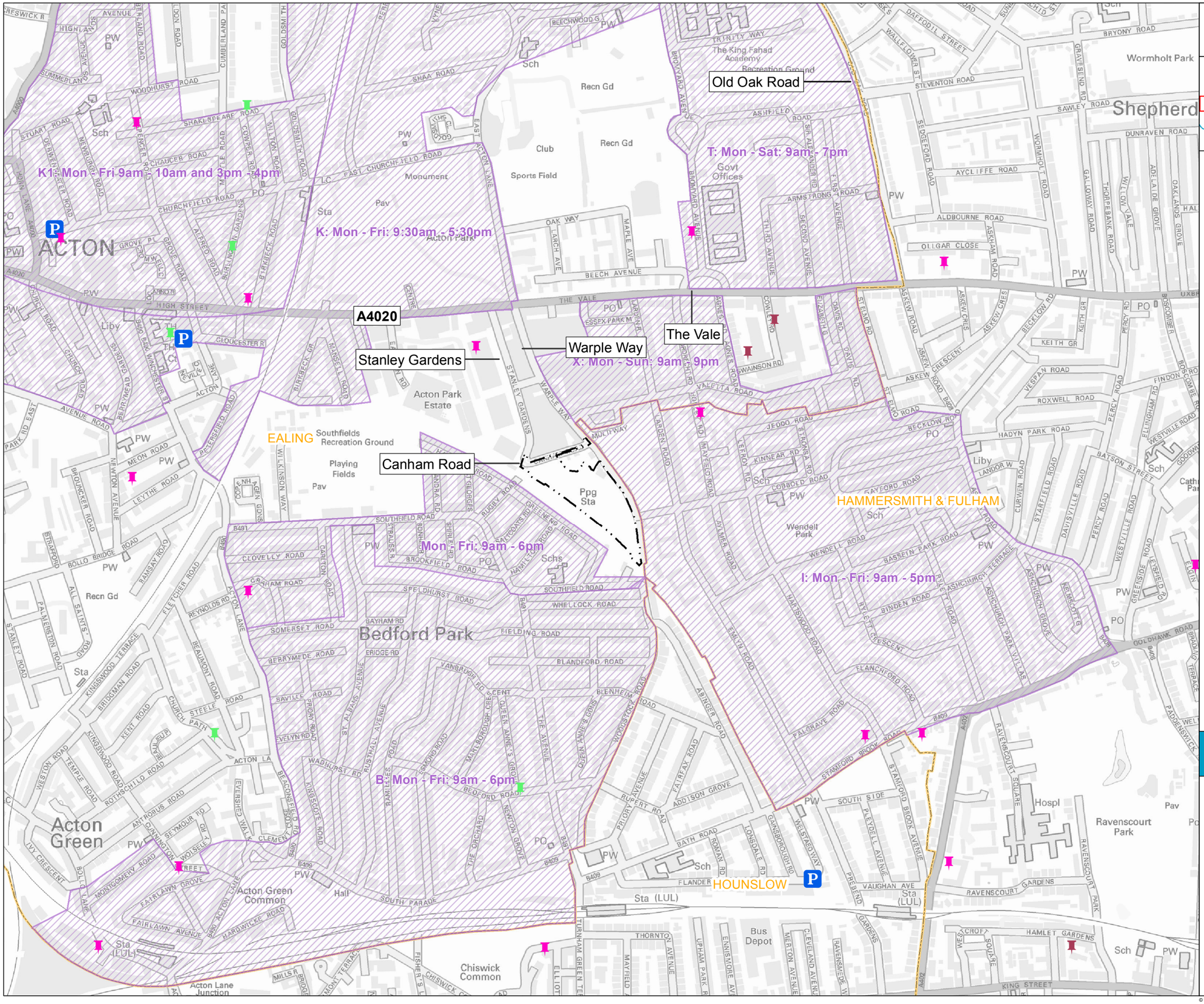
Transport - public transport

Figure 4.4.2

1PL03-TT-50721
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



Keyplan:

Key

- Council parking
- City Car
- Hertz on Demand
- Zip Car
- 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

Acton Storm Tanks
London Borough of Ealing

Document Information

Transport Assessment

Transport - parking

Figure 4.4.3

1PL03-TT-50729
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

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

90 45 0 90 m

Scale 1 : 6,000 at A3

FOR INFORMATION

Location

Acton Storm Tanks
London Borough of Ealing

Document Information

Transport Assessment

Transport - survey locations

Figure 4.4.4

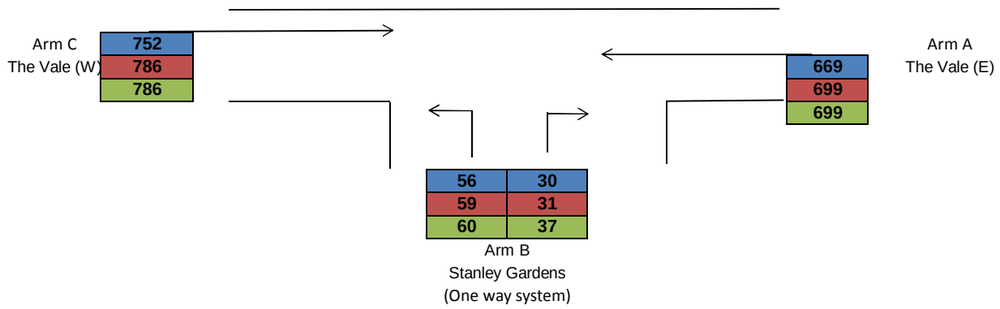
1PL03-TT-50737
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

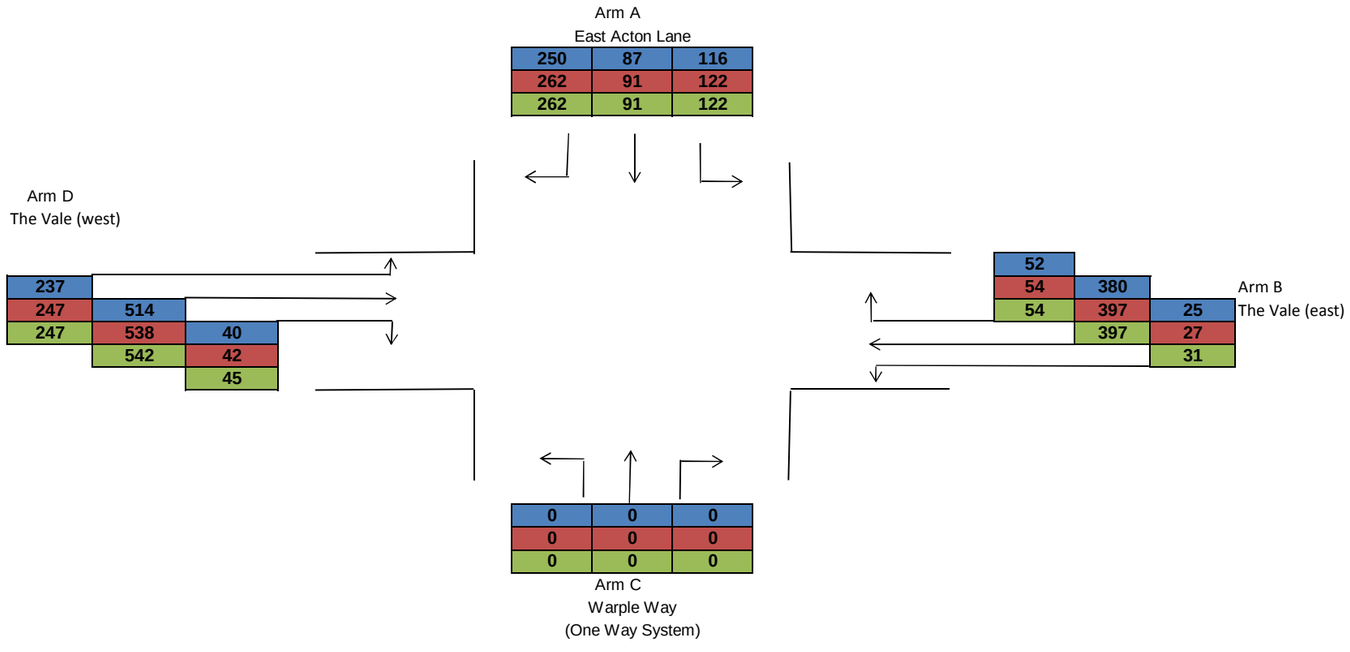
Site: Acton
Borough: Ealing
Junction: The Vale/ Stanley Gardens (out only)
Junction no.: PBA 1

Data: Traffic Flow in PCUs - AM Peak Hour
from Traffic Survey



Site: Acton
Borough: Ealing
Junction: The Vale/ Stanley Gardens (in only)
Junction no.: PBA 3

Data: Traffic Flow in PCUs - AM Peak Hour
from Traffic Survey



Key

- Baseline
- Construction Base
- Development Case

FOR INFORMATION

Location
Acton ST
London Borough of Ealing

Document Information
Transport Assessment

Baseline, Construction and Development case traffic flow (AM peak hour)

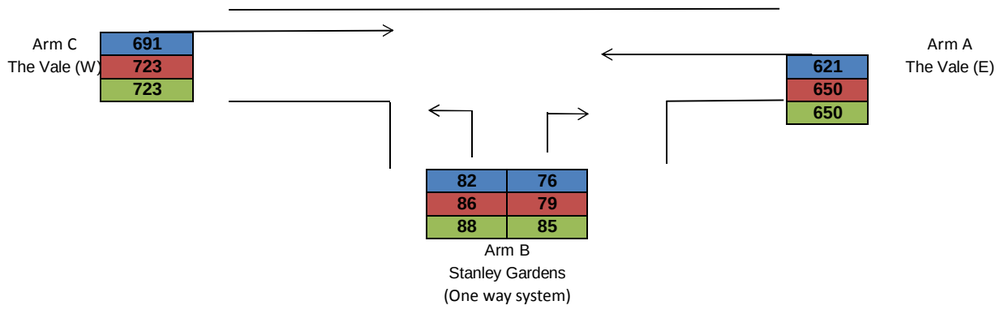
Figure 4.4.5
1PL03-TT-50916
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

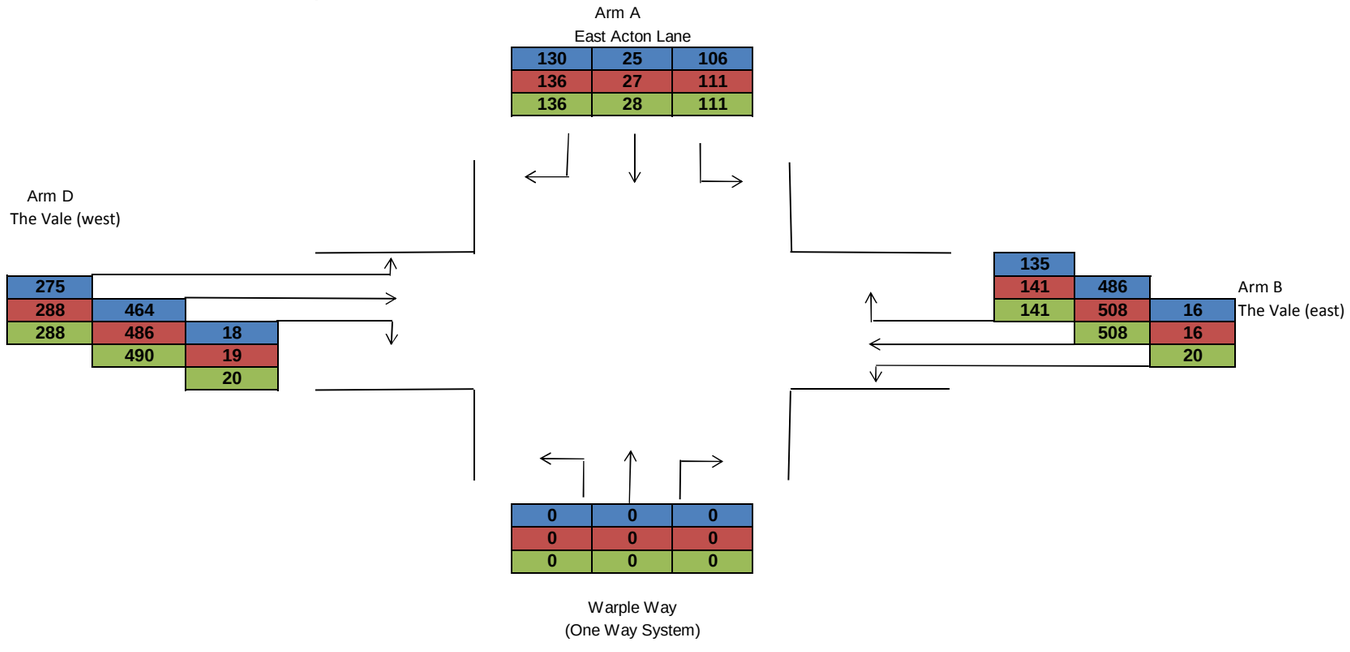
Site: Acton
Borough: Ealing
Junction: The Vale/ Stanley Gardens (out only)
Junction no.: PBA 1

Data: Traffic Flow in PCUs - PM Peak Hour
from Traffic Survey



Site: Acton
Borough: Ealing
Junction: The Vale/ Stanley Gardens (in only)
Junction no.: PBA 3

Data: Traffic Flow in PCUs - PM Peak Hour
from Traffic Survey



Key

- Baseline
- Construction Base
- Development Case

FOR INFORMATION

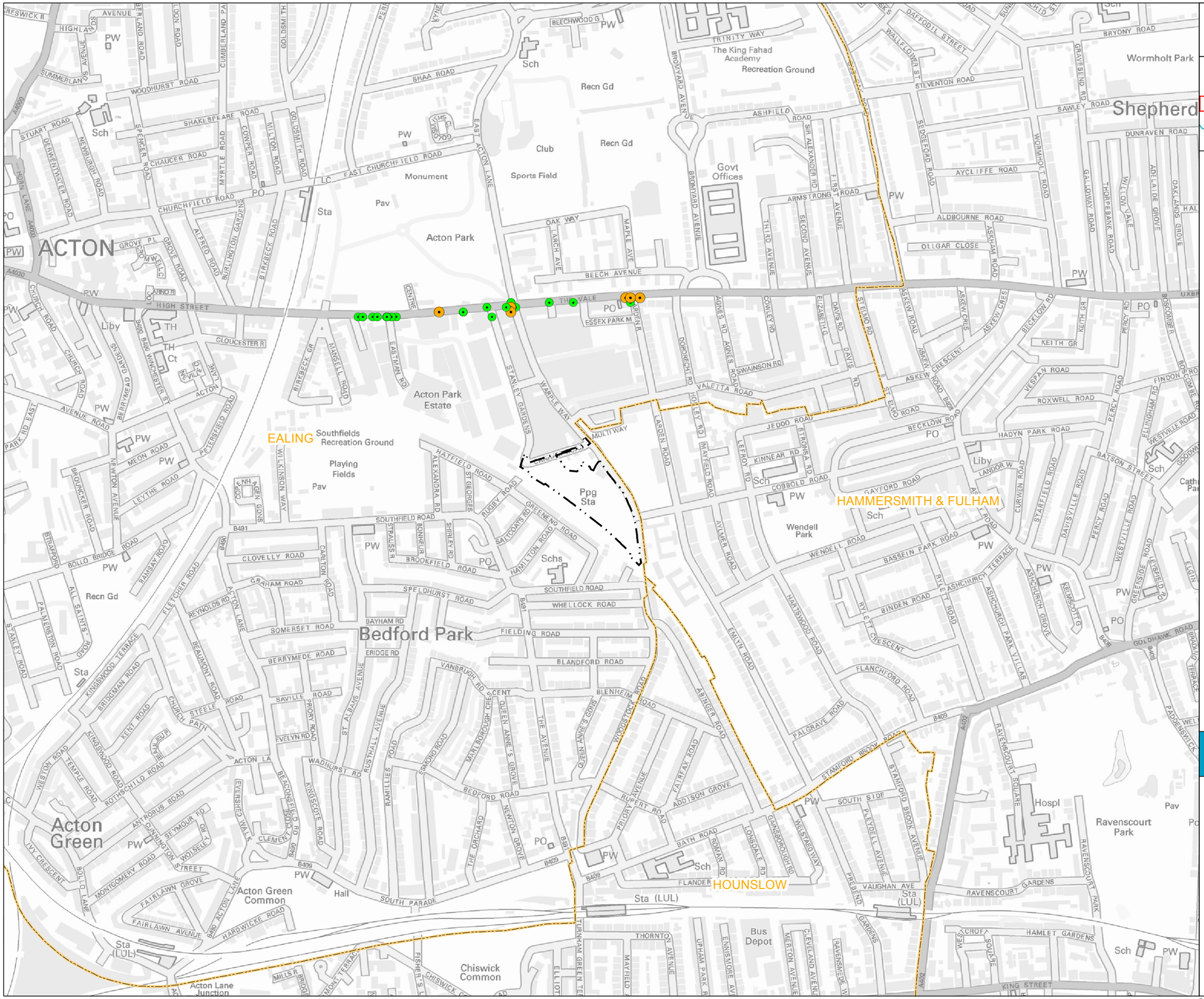
Location
Acton ST
London Borough of Ealing

Document Information
Transport Assessment

Baseline, Construction and Development case traffic flow (PM peak hour)

Figure 4.4.6
1PL03-TT-50940
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames
Thames Water



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Keyplan:

Key

- Slight
- Serious
- 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

Acton Storm Tanks
London Borough of Ealing

Document Information

Transport Assessment

Transport - accident locations

Figure 4.4.7

1PL03-TT-50761
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

Keyplan:

Key

Accidents

(Severity, Mode of travel)

- Slight, Pedestrian
- Slight, Pedal Cycle
- Serious, Pedestrian
- Serious, Pedal Cycle
- 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

Acton Storm Tanks
London Borough of Ealing

Document Information

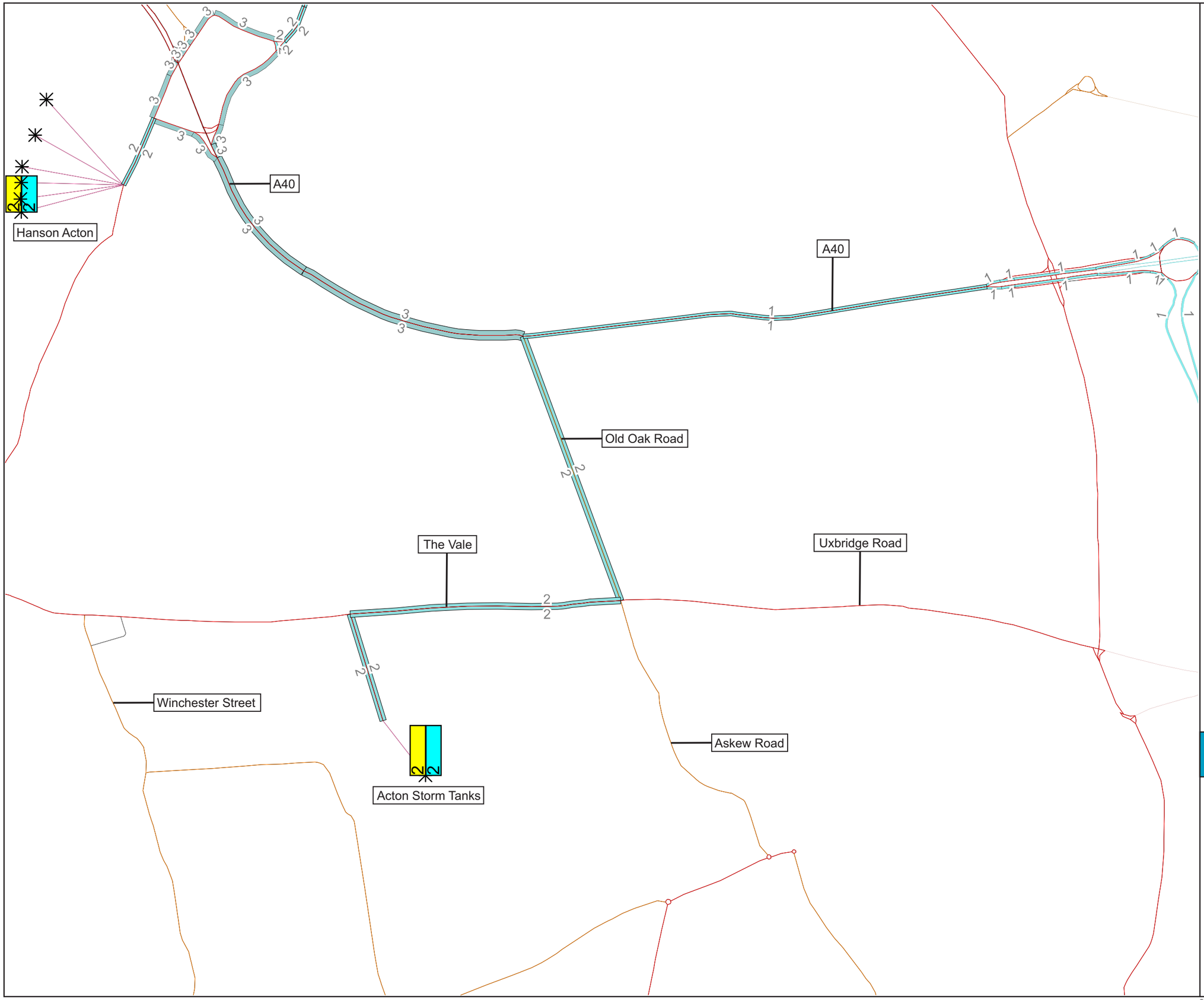
Transport Assessment

Transport - pedestrian and cyclist accidents by severity
Figure 4.4.8

1PL03-TT-50844
January 2013

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water



Hourly construction lorries arrivals and departures

- Arrivals
- Departures

Hourly construction lorries movements

- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 25
- 25 - 30
- 30 - 35
- 35 - 40
- 40 - 45
- 45 - 50
- 50 - 55
- 55 - 60
- 60 - 65
- 65 - 70
- 70 - 75
- > 75

Note: Construction vehicle flows include all Thames Tideway Tunnel sites on this network during this period.

FOR INFORMATION

Location

Acton Storm Tanks
London Borough of Ealing

Document Information

Transport Assessment
Hourly Construction Lorry Movements - Site Year 2 of Construction

Figure 4.5.1

1PL03-TT-50882

Thames Tideway Tunnel
Creating a cleaner, healthier River Thames

Thames Water

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Thames Water Utilities Limited
Clearwater Court, Vastern Road, Reading RG1 8DB

DCO-DT-000-ZZZZZ-071001