# URS

## Esso Garage Site on Chalk Farm Road

Student Accommodation Construction Traffic Management Plan

February 2012

47061404

Prepared for: Risetall Ltd

UNITED KINGDOM & IRELAND













REVISION SCHEDULE					
Rev	Date	Details	Prepared by	Reviewed by	Approved by
1	03 February 2012	Final Draft for Comment	Ewa Skupinska Transport Consultant	Beckie Woodland Senior Transport Consultant	Mark Watson Principal Transport Consultant
2	06 February 2012	Final	Ewa Skupinska Transport Consultant	Beckie Woodland Senior Transport Consultant	Mark Watson Principal Transport Consultant

URS 6-8 Greencoat Place London SW1P 1PL

Tel +44 (0)207 798 5000 Fax +44 (0)207 798 5001



#### Limitations

URS Infrastructure & Environment UK Limited ("URS") has prepared this Report for the sole use of Risetall Ltd ("Client") in accordance with the Agreement under which our services were performed. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by URS. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of URS.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by URS has not been independently verified by URS, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by URS in providing its services are outlined in this Report. The work described in this Report was undertaken in January 2012 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

URS disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to URS' attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. URS specifically does not guarantee or warrant any estimate or projections contained in this Report.

#### Copyright

© This Report is the copyright of URS Infrastructure & Environment UK Limited. Any unauthorised reproduction or usage by any person other than the addressee is strictly prohibited.

#### TABLE OF CONTENTS

1	INTRODUCTION	5
1.1	Scope of the Works	5
1.2	Purpose of the CTMP	6
1.3	Overarching Objectives of the CTMP	6
1.4	Status of the CTMP	6
1.5	Construction Environmental Management System Overview	7
1.6	Exclusions	7
1.7	Structure of This Document	7
2	CONSTRUCTION SITE ACTIVITIES, PHASING AND LAYOUT	8
2.1	Outline Description of Proposed Development	8
2.2	Construction Site Activities	8
2.3	Site Layout	9
2.4	Construction Programme	9
2.5	Construction Stages and Phasing	9
2.5.1	Construction Stage 1 – Foundation piling and excavation	9
2.5.2	Construction Stage 2 – RC and steel frame structure 1	0
2.5.3	Construction Stage 3 – POD/room installation 1	0
2.5.4	Construction Stage 4 – Service connection and cladding	0
2.5.5	Construction Stage 5 – Internal and communal finishe	es 0
2.6		
	Hours of Site Operation1	0
2.7	Hours of Site Operation1 Crane Use and Location1	0 1
2.7 3	Hours of Site Operation	0 1 2
2.7 3 3.1	Hours of Site Operation	0 1 2 2
2.7 3 3.1 3.2	Hours of Site Operation	0 1 2 3
2.7 3 3.1 3.2 <i>3.2.1</i>	Hours of Site Operation	0 1 2 3 <i>4</i>
2.7 3 3.1 3.2 <i>3.2.1</i> 3.3	Hours of Site Operation       1         Crane Use and Location       1         CONSTRUCTION PHASE ACCESS       1         Heavy Goods Vehicle Types       1         Heavy Goods Vehicle Volumes       1         Existing Large Vehicle Movements       1         Workforce Traffic       1	0 1 2 3 <i>4</i> 4
2.7 3 3.1 3.2 3 <i>.2.1</i> 3.3 4	Hours of Site Operation       1         Crane Use and Location       1         CONSTRUCTION PHASE ACCESS       1         Heavy Goods Vehicle Types       1         Heavy Goods Vehicle Volumes       1         Existing Large Vehicle Movements       1         Workforce Traffic       1         CONSTRUCTION SITE ACCESS       1	0 1 2 2 3 4 5
2.7 3 3.1 3.2 3.2. <i>1</i> 3.3 4 4.1	Hours of Site Operation       1         Crane Use and Location       1         CONSTRUCTION PHASE ACCESS       1         Heavy Goods Vehicle Types       1         Heavy Goods Vehicle Volumes       1         Existing Large Vehicle Movements       1         Workforce Traffic       1         CONSTRUCTION SITE ACCESS       1         Strategic Road Network       1	0 1 2 2 3 <i>4</i> 5 5
2.7 3 3.1 3.2 3.2.1 3.3 4 4.1 4.2	Hours of Site Operation       1         Crane Use and Location       1         CONSTRUCTION PHASE ACCESS       1         Heavy Goods Vehicle Types       1         Heavy Goods Vehicle Volumes       1         Existing Large Vehicle Movements       1         Workforce Traffic       1         CONSTRUCTION SITE ACCESS       1         Strategic Road Network       1         Local Road Network and Public Transport Provision 1	0 1 2 2 3 <i>4</i> 4 5 5 6
2.7 3 3.1 3.2 3.2.1 3.3 4 4.1 4.2 4.3	Hours of Site Operation       1         Crane Use and Location       1         CONSTRUCTION PHASE ACCESS       1         Heavy Goods Vehicle Types       1         Heavy Goods Vehicle Volumes       1         Existing Large Vehicle Movements       1         Workforce Traffic       1         CONSTRUCTION SITE ACCESS       1         Strategic Road Network       1         Local Road Network and Public Transport Provision 1       1         Immediate Site Access       1	0 1 2 3 4 5 5 6 8
2.7 3 3.1 3.2 3.2.1 3.3 4 4.1 4.2 4.3 <i>4.3.1</i>	Hours of Site Operation1Crane Use and Location1CONSTRUCTION PHASE ACCESS1Heavy Goods Vehicle Types1Heavy Goods Vehicle Volumes1Existing Large Vehicle Movements1Workforce Traffic1CONSTRUCTION SITE ACCESS1Strategic Road Network1Local Road Network and Public Transport Provision 1Immediate Site Access1Pedestrian Access1	0 1 2 2 3 4 4 5 5 6 8 8
2.7 3 3.1 3.2 3.2.1 3.3 4 4.1 4.2 4.3 4.3.1 4.3.2	Hours of Site Operation1Crane Use and Location1CONSTRUCTION PHASE ACCESS1Heavy Goods Vehicle Types1Heavy Goods Vehicle Volumes1Existing Large Vehicle Movements1Workforce Traffic1CONSTRUCTION SITE ACCESS1Strategic Road Network1Local Road Network and Public Transport Provision 1Immediate Site Access1Vehicle Access1	0 1 2 2 3 4 4 5 5 6 8 8 8 8 8 8



4.4	Site Access During Construction1	9
4.4.1	Construction Stage 1 – Foundation piling and excavation 1	19
4.4.2	Construction Stage 2 – RC and steel frame structure 2	20
4.4.3	Construction Stage 3 – POD/room installation	20
4.4.4	Construction Stage 4 – Service Connection and Cladding2	20
4.4.5	Construction Stage 5 – POD/room installation	20
4.5	Delivery Booking System2	21
5	ADDITIONAL CONSIDERATIONS 2	22
5.1	Vehicle 'Muck' Control 2	22
5.2	Land Decontamination 2	22
5.3	Off Site Highways Works to Facilitate Construction 2	22
5.4	Pedestrian Movement and Route Diversions	22
5.5	Access to Public Transport Facilities 2	22
5.6	Cycle Movement and Route Diversions	23
5.7	Local Community Engagement 2	23
6	ONGOING DEVELOPMENT OF THE CTMP 2	24

APPENDIX A – SITE LAYOUT DRAWINGS APPENDIX B – CONSTRUCTION MANAGEMENT PROGRAMME

**APPENDIX C – SITE TRACKING DRAWINGS** 



#### 1 INTRODUCTION

#### 1.1 Scope of the Works

The works that are the subject of this Construction Traffic Management Plan (CTMP) involve redeveloping a currently vacant petrol filling station site with a student accommodation building, which will also accommodate a range of ground A1 and A3 retail units. The site to be redeveloped is at 29-33 Chalk Farm Road, London, NW1 8AJ.

The proposed development will include a four-storey student accommodation building containing a total of 63 student rooms on the top three levels. In addition the proposed development will include five retail A1 units and one retail A3 unit on the basement and ground floor levels. This will be achieved by way of clearance of the existing site and the construction of a new structure. The structure is proposed to be built with the use of materials in keeping with the neighbouring buildings, with the top floor set back and cladded with glass and metal mesh for articulation and to provide a feeling of a top floor within the roof space. The development will be constructed with a green roof.

The proposed development is car free with provision for cycle parking on the basement level. A total of 63 bicycle spaces will be provided accommodating bicycles for the students resident at the proposed development.

The plan below shows the development outline. Further details of the proposed development and associated servicing and access arrangements can be found in the Transport Statement produced by URS and submitted to support the planning application for this development.



Figure 1.1 Existing Site Location and Application Boundary (Not to Scale) Source: © Crown copyright, All rights reserved. License Number 100020449



The construction of the proposed development follows Modern Methods of Construction (MMC) which provides a route to improve construction from a sustainable perspective. MMC encourages innovative construction methods which reduce construction periods, reduce onsite risk and improve quality by a number of methods including off-site manufacturing.

#### 1.2 Purpose of the CTMP

The CTMP describes the proposals to safely manage vehicular, cyclist and pedestrian traffic during the construction of the development proposals.

The purpose of this CTMP is to achieve the following:

- Provide details of the Construction Traffic Management Plan to be applied to provide a safe environment for traffic, road users, pedestrians, cyclists and construction staff;
- Ensure that any impacts on road users are mitigated;
- Ensure that access is maintained for the local resident community and local businesses;
- Outline how potential construction-related environmental effects identified in the London Borough of Camden's (LBC) 'Sustainable Design and Construction Policy' will be avoided, remedied or mitigated during the construction period.

Outline the potential stakeholder issues and set out strategies, systems and procedures to provide for ongoing consultation between local residents and businesses, LBC and Transport for London (TfL).

#### 1.3 Overarching Objectives of the CTMP

- Provision of a safe environment for pedestrians, cyclists, and vehicular traffic through the installation of plans which effectively warn, protect, inform and guide in accordance with best practice guidance;
- Plan and stage all works effectively to minimise delays to pedestrian, cyclist and vehicular traffic, and minimise conflict points on the respective transport networks;
- Enable pedestrians, cyclists and road users to plan their journeys by providing them with timely and accurate information on programmed traffic management measures;
- Limit obstructions and restrictions to current movement patterns, and where required, provide alternative routes for use by pedestrians, cyclists and vehicular traffic;
- Actively liaise with key stakeholders and ensure they are informed about proposed changes to plan measures and implementation programmes.

#### 1.4 Status of the CTMP

The CTMP should be referred to when:

- Planning works to minimise, remedy or mitigate the effects on the environment;
- Undertaking all works that may have an impact on the environment;
- Communicating with Stakeholders.

Once the CTMP has been agreed with relevant stakeholders it will be adopted and developed in further detail by the successful contractor and made available to all parties so that it can be used as a practical construction and communication management tool and reference source.

It should be noted that any future amendments to the information contained within the CTMP must be approved by the LBC and complied with thereafter. An up-to-date CTMP will be kept



in the proposed site office and all construction staff will be made aware of its location for reference as required.

#### 1.5 Construction Environmental Management System Overview

The CTMP forms one of a suite of documents specifying processes and mitigation measures for all potential areas of construction impact. These documents will cover the following areas:

- Dust and Air Pollution Management;
- Noise and Vibration Management;
- Water/Sediment Management;
- Spoil and Fill Management;
- Management of Construction Waste and Re-use;
- Site Hazards and Risk Management; and
- Incident Management.

It should be noted that there are overlaps between some of these documents and the CTMP. For example, construction traffic can contribute to noise and vibration and will need to be mentioned in the relevant construction traffic management document where necessary.

#### 1.6 Exclusions

The appointed contractor will prepare a specific Health and Safety Plan for site works to cover all activities within the construction process for the development. This CTMP only considers traffic related risks and management.

#### 1.7 Structure of This Document

The remainder of this document is structured as follows:

- Chapter 2 Provides background on the construction site activities, phasing and layout;
- Chapter 3 Provides details on the proposed construction vehicle types and volumes;
- Chapter 4 Provides details on the proposed access for construction vehicles to the site;
- Chapter 5 Outlines additional considerations for the CTMP;
- Chapter 6 Indicates how the CTMP is envisaged to be developed as further information becomes available.
- Appendix A Contains the drawings of the indicative site layout during construction;
- Appendix B Contains the construction management programme;
- Appendix C Contains tracking drawings of the site layout proposals;

#### 2 CONSTRUCTION SITE ACTIVITIES, PHASING AND LAYOUT

#### 2.1 Outline Description of Proposed Development

This pre-planning document has been prepared in support of the proposed mixed use development of student accommodation with accompanying A1/A3 retail units. It is proposed that the commercial units will occupy the ground floor with the three upper levels intended for the student accommodation rooms. The top floor of the proposed development is to be set back and cladded with glass and metal mesh for articulation and provide a feeling that the top floor is within the roof space. This development is proposed in place of the already demolished former Esso petrol filling station at 29-33 Chalk Farm Road, LONDON NW1.

The proposed development will house 63 rooms for student accommodation, as well as five A1 units and one large A3 retail unit. The style of the property will be in keeping with other properties in the neighbouring area. The development will also include the construction of a green roof.

It is proposed that the development will be car free with a provision of 63 cycle spaces for the resident students. The cycle stands will be located in the basement of the building beneath the stairs and will be adjacent to additional refuse room for the commercial A1/A3 units, accessible via the lift at the entrance to the building.

To the front of the development site there are two pay & display parking bays, which are set into the pavement and parallel to the Chalk Farm Road carriageway. It is suggested that during the construction of the new building at 29-33 Chalk Farm Road parking at the two bays will be suspended and the bays will become the main location for the loading and unloading of construction vehicles.

Following the conclusion of the construction period the area currently accommodating the two parking bays will become a loading bay for the proposed development and the parking bays will be relocated to Hartland Road.

#### 2.2 Construction Site Activities

The proposed activities to be conducted during the construction of the proposed development are as follows:

- Construction of site compounds and placement of site offices within the site.
- Placement of hoarding around the site parameter.
- Piling and reinforced concrete (RC) retaining walls around the parameter as foundation.
- Piling cap and RC floor slab to part and front of the site at ground level above the soil.
- Relocating the site compound on the new RC slab.
- Excavation of soil down to 4 meters for the entire site including below the ground floor slab.
- Underground service and drainage instillation.
- Instillation of Basement floor slab.
- Completion of the ground floor RC slab.
- Locating a luffing crane within stair core adjacent to no.1 Hartland Road.
- Deliveries of construction materials and plant equipment.
- Construction of structural steel framework and internal stud work above ground level.



- Pod delivery and installation of upper student accommodation floors.
- Instillation of scaffolding around the building.
- Construction of circulation cores and communal areas such as corridors.
- All external cladding and fenestrations including green roof.
- All internal work including partitions and fixtures and fittings.
- Service and M+E connections.
- Final internal decorations.
- Removal of scaffolding.

#### 2.3 Site Layout

Appendix A of this report contains drawings indicating the proposed site layout during the construction period.

The access and hoarding arrangements will vary depending on the phase of construction with site clearance, foundations and construction phases requiring different hoarding arrangements. These are all outlined and labelled in separate drawings contained in Appendix A.

It should be noted that the gated area shown on the drawings will be constructed to accommodate the vehicles accessing the site as discussed in Section 4 of this report.

#### 2.4 Construction Programme

A full construction management programme is provided in Appendix B.

The total construction programme will take approximately 18 months to complete. Approximately five months have been allowed for preliminary design and ground works including foundation piling and excavation, with a further 13 months estimated for building and construction.

#### 2.5 Construction Stages and Phasing

The construction of the proposed development has been divided into five distinct stages. The access arrangements for the entire construction period are described in Chapter 4.

At all stages of the construction work all construction vehicle movements will be managed by the appointed contractors to minimise disruption to the nearby properties, local residents and the adjacent road network. The following phases are envisaged:

#### 2.5.1 Construction Stage 1 – Foundation piling and excavation

Drawings 002 - 006 in Appendix A demonstrate the construction activities for Stage 1.

The piling and excavation stage of the construction process will include the following:

- Site establishment / set up
- Setting out / surveys
- Dilapidation survey and photos
- Disconnection of all services
- Hoardings around the building parameter.



- Sheet piling around both street fronts and RC retaining wall foundation against adjoining properties
- Construction of part of the ground floor RC slab.
- Excavation of site down by 4 meters.

The site establishment/office will be placed at the rear and close to the adjoining Harmood Street student accommodation building. Once part of the ground floor RC slab is in place, all site compounds will be relocated above the slab.

#### 2.5.2 **Construction Stage 2 – RC and steel frame structure**

Drawings 007 - 009 in Appendix A demonstrate the construction activities for Stage 1.

The second stage will focus on the reinforced concrete and steel frame structure. Service and drainage trenches will be dug by the on-site digger and all pipes and tanks will be installed.

The basement RC floor slab will be constructed, as will the RC structural walls of the basement level.

A reinforced concrete structural ground floor slab will also be constructed to cover the entire site, as will the RC and steel frame structural walls and circulation cores to the ground floor.

#### 2.5.3 Construction Stage 3 – POD/room installation

Drawings 010 - 013 in Appendix A demonstrate the construction activities for Stage 1.

During this stage the delivery and installation of the luffing crane will take place. The crane will be positioned within the stair core adjacent to No.1 Hartland Road. The crane will be used during the pre-fabricated POD/room installation process and will be removed from the site within the same stage, once the POD/room installation process is complete.

The construction of the RC steel frame structural walls and circulation cores to the upper floor will also take place during this stage.

#### 2.5.4 **Construction Stage 4 – Service connection and cladding**

This stage includes all service connections to all rooms and the communal parts of the building. It also includes the installation of temporary scaffolding around the building and all external cladding as well as the green roof.

#### 2.5.5 **Construction Stage 5 – Internal and communal finishes**

The fifth stage of the construction process includes the final internal fittings and finishes to all commercial, communal and residential areas. Final fixtures and fittings will also be completed at this stage. Distribution and connections of all services including M+E Plants and lift installation will also take place at this stage. The temporary scaffolding will be removed from around the building.

#### 2.6 Hours of Site Operation

In accordance with the hours recommended in the LBC 'Noise from Construction Sites', the hours of work are proposed to be:

- Monday to Friday 08:00 18:00;
- Saturday 08:00 13:00; and



No work is to be carried out on Sundays or Bank Holidays unless necessary, whereby a license will need to be obtained from the London Borough of Camden.

It is proposed that to minimise the traffic impact for residents and help vehicle movements on Hartland Road, all deliveries will be limited to between the hours of 10.00am – 4.00pm.

Should there be any requirement for works to be carried out outside the construction hours outlined above, the construction site management will approach the LBC and TfL prior to this taking place.

#### 2.7 Crane Use and Location

The use of a crane will be required to assist construction. A luffing crane will be employed during construction to lift the PODs into position. The use of a luffing crane will eliminate the risk of over-sailing the adjacent highway and buildings, since the jib angle can be changed to reposition the load at various radii, without the remainder of the jib over-sailing neighbouring properties. When compared with other tower crane types it is also usually possible to construct a lower tower height when using luffing cranes.

The luffing crane will be positioned within the stair core of the proposed development at the northeast corner of the site, near to No.1 Hartland Road as shown in the drawings included in Appendix A. The crane will only be present for a short period of time during Stage 3 of the construction process.

The delivery and removal of the crane is likely to cause some disruption to the local road network. Upon delivery, the crane will be lifted in sections via the Chalk Farm Road access. Once the crane is no longer needed, it will be dismantled and removed from the site on a flat bed lorry. All necessary licences required for the erection and operation of the luffing crane will be applied for in advance of the works.

#### 3 CONSTRUCTION PHASE ACCESS

#### 3.1 Heavy Goods Vehicle Types

A number of types of heavy goods vehicle will serve the site. These are expected to include the following:

- Light Vans used by individual trade contractors, typically during the final fit-out of the proposed development (approximately 7.2m long and 2.2m wide).
- Rigid Skip Lorries for removal of demolition waste (approximately 7.5 meters long and 2.5 meters wide);
- Tipper Bodied Rigid Lorries for removal of demolition waste and spoil from the site (maximum of approximately 10.2 meters long and 2.5 meters wide);
- Box or Flatbed Rigid and Articulated Lorries for the delivery of some plant and other construction materials (maximum 9.5 meters long and 2.5 meters wide); and
- Articulated Low Loader for the delivery of some construction plant (maximum 9.5 meters and 2.5 meters wide).

Due to the constrained nature of the site and in order to minimise any impact on the surrounding area, the maximum vehicle size to be employed during the construction period will be 9.5m in length.

The drawings in Appendix C illustrate the swept paths for the largest vehicles identified as making frequent trips to the site, either entering the site or unloading at the temporary loading bay on Chalk Farm Road. Vehicles used for the swept path analysis include a large tipper lorry, a low loader and a van.

Although the drawings do not show every vehicle type expected to be accessing and egressing the site, the largest vehicles capable of using each lay-by and access point have been selected to illustrate the worst case scenario for construction traffic arrival and departure requirements and constraints.

The gated area shown on the drawings found in the appendices of this report will be constructed to accommodate the vehicles accessing the site as discussed in Section 4 of this report.

These drawings indicate that the pay & display parking bays outside the development will be suspended to enable construction traffic to use the space for loading and unloading (see Section 4). In addition, the crossover areas at existing entry and exit points to the site – at Chalk Farm Road and Hartland Road – would also need to be converted to loading bays for construction vehicles.

As outlined in the Transport Statements, the pay and display bays will be relocated to Hartland Road following the completion of the development. The relevant applications will be made for these suspensions prior to them being necessary.

The drawings demonstrate that construction vehicles are able to access and egress the site with the implementation of the aforementioned parking suspensions. Therefore all of the above vehicles could potentially access the construction site without only minimal overhanging or overrunning of kerb-lines on Chalk Farm Road.



#### 3.2 Heavy Goods Vehicle Volumes

It is anticipated that the maximum number of construction vehicle movements that will occur during the construction period is 48 movements (24 vehicles accessing and then egressing the site per day), which will take place during Stage 1.

Table 3.1 Forecast Construction Vehicle Movements							
Construction Stage	Sub-stage	Volume of Material	Dura- tion (Days)	Vehicle Type	Max. Veh/ Day	Max. Move- ments / Day	
	Sheet piling	n/a	12	Artic.HGV / Flatbed lorry	2	4	
	RC concrete retaining wall	60m <sup>3</sup>	42	Tipper	4	8	
Stage 1 – Piling and	Soil removal	1800m <sup>3</sup>	14	Tipper	12	24	
excavation*	Hardcore	90m <sup>3</sup>	10	Tipper	4	8	
	Concrete for piling cap	30m <sup>3</sup>	6	Concrete mixer	2	4	
	Basement concrete slab	180m <sup>3</sup>	28	Concrete mixer	4	8	
Stage 2 – RC frame	Concrete structural walls	70m <sup>3</sup>	10	Concrete mixer	4	8	
structure	Ground floor concrete slab	180m <sup>3</sup>	12	Concrete mixer	4	8	
	Steel	185t	28	Flat bed	1	2	
Stage 3 – Pod / room	Pod / container	490t	14	Flat bed	12	24	
installation	Concrete	40m <sup>3</sup>	10	Concrete mixer	3	6	
	Concrete cladding tiles	60m <sup>3</sup>	42	Flat bed	2	4	
	Steel mesh	40t	28	Flat bed	1	2	
Stage 4 – Services and	Glass cladding	32m <sup>3</sup>	21	Flat bed	2	4	
cladding	Concrete	185m <sup>3</sup>	42	Concrete mixer	6	12	
	Green roof installation	12t	28	Flat bed	1	2	
	Concrete	32m <sup>3</sup>	10	Concrete mixer	2	4	
	Composite panels	82t	14	Flat bed	2	4	
	Windows and glass frames	110t	15	Flat bed	8	16	
Stage 5 –	Internal fittings	80m <sup>3</sup>	15	Flat bed	6	12	
final finishes	M+E service connections	38m <sup>3</sup>	8	Flat bed	1	2	
	External landscaping	50t	8	Flat bed	4	8	
	Concrete mix	10m <sup>3</sup>	3	Flat bed	1	2	
	External finishing	10m <sup>3</sup>	4	Vans	1	2	



*Site earance	<ol> <li>Small vehicles (e.g. vans) to clear rubbish from site. No demolition required.</li> <li>All necessary disconnection of services for demolition already completed.</li> <li>Scaffolding around the building during construction.</li> <li>Ground floor commercial steel frame structure to be used as construction material holding area.</li> </ol>

Based on the current programme, and in consultation with potential contractors, a table identifying the predicted volume of construction vehicles will be provided. It should be noted that although a time period has been set for each activity the total number of vehicles specified for the associated task within that period will not be evenly spread over the allocated time period.

Within the time allocated for each activity there will be peaks in vehicle generation due to the requirements of the site at any one time. As such, the above table represents the anticipated peak movement of vehicles within the specified activity.

#### 3.2.1 Existing Large Vehicle Movements

The proposed development site is currently vacant, with the remaining petrol filling station infrastructure located there no longer in use, and therefore no large vehicles accessing the site at present. Until recently the petrol filling station was operational and attracted a large number of visits by private car and light goods vehicles. Access to the filling station was via both the existing crossovers on Chalk Farm Road and Hartland Road. In addition the site required trips by a fuel tanker to service the petrol filling station. These vehicles are considerable in length and width and accessed the site from Chalk Farm Road, exiting via Hartland Road.

#### 3.3 Workforce Traffic

CI

The site workforce will peak at approximately 20 staff, depending on, and subject to, construction stages.

No staff parking will be provided. Contractors will be responsible for encouraging their workers to share vehicles or use sustainable methods of public transport to the site such as London buses and London Underground.

The existing Controlled Parking Zone (CPZ) surrounding the site will deter workforce parking on residential streets in the area. The CPZ operates between 0830-1830 on weekdays, and between 0930-1730 on Saturdays and Sundays, covering the proposed working hours of the site.

The close proximity of Chalk Farm Underground Station and Kentish Town West Railway Station in addition to a number of bus routes on Chalk Farm Road which stop immediately outside the site also assist in making workforce access to the site by public transport an attractive proposition for many site workers from a wide catchment.

Staggered shift patterns for the various trades and specialists employed on site will ensure that the impact of any workforce traffic is spread over a number of hours, and will therefore have a negligible impact on surrounding road and public transport network capacity.



#### 4 CONSTRUCTION SITE ACCESS

#### 4.1 Strategic Road Network

It is envisaged that the A400 Camden High Street, the A503 Camden Road and the A502 Haverstock Hill will form the most suitable links in the strategic road network to accommodate construction vehicles. Primary routes providing connections to the A400 (i.e. A501 Euston Road and A1 Holloway Road) and the A502 (i.e. A406 North Circular, A1 Great North Way and A41 Hendon Way) will therefore form the main approach routes to the site.

The proposed construction traffic route into and out of the proposed site can be seen in the diagram below:



#### Figure 4.1 Traffic Route Into/Out of Proposed Site Source: ©Google Earth Image 2009 BlueSky

It is proposed that construction vehicles access the site along the eastbound A502, travelling from the strategic road network to the northwest, and egress the proposed development site via the A502 one-way system to the A400 and A503 to the east of the site.

Smaller vehicles will also be able to access the site using the southbound A400, turning right into Prince of Wales Road and left into A502 Haverstock Hill before approaching Chalk Farm Road. However, because of a rail bridge across the road at Kentish Town West, only vehicles less than 4m in height will be able to use this route.



It should be noted that the roads outlined above form part of TfL's Strategic Road Network as well as the local distributor network which is suitable to accommodate construction traffic associated with the proposed development.

#### 4.2 Local Road Network and Public Transport Provision

From Chalk Farm Road (A502), vehicles will be able to turn directly into the construction site from Chalk Farm Road or Hartland Road and subsequently egress the site via Hartland Road back onto Chalk Farm Road. The largest construction vehicles will be unable to manoeuvre into the site due to space restrictions at the pedestrian crossing at the south-west corner of the site and space restrictions within the site itself. These vehicles will therefore access the site using the loading bay outside the proposed development which will replace the pay & display parking bays currently located there. The tracking of these movements can be seen in Appendix C.

Chalk Farm Road operates one lane in each direction, with single yellow lines in operation along much of its length and with a number of pay & display parking bays along the southbound carriageway. In addition, a bus stop is located along the northbound carriageway, opposite the proposed development site. The location of parking bays and bus stops along Chalk Farm Road, Harmood Street and Hartland Road is shown in Figure 4.2 below.



#### Figure 4.2 Chalk Farm Road Parking Bays and Bus Stops

Source: © Crown copyright, All rights reserved. License Number 100020449

Although a wide two-way road, the northbound carriageway is wider, allowing for buses and loading vehicles to stop without blocking northbound traffic flow (as shown in Figure 4.3).

Hartland Road is a residential road with a single narrow lane in each direction and parking on both sides of the road and traffic calming measures along its full length. At the junction with



Chalk Farm Road the road is wider with no parking provision and therefore with more manoeuvring space for construction vehicles.



Figure 4.3 Chalk Farm Road Source: ©Google Earth Image 2009 BlueSky

The proposed development site is located within a residential Controlled Parking Zone (CPZ), which is in operation between 08:30 and 23:00 Monday to Friday and 09:30-23:00 Saturday and Sunday. No residential parking is permitted along Chalk Farm Road itself, however residential parking extends the length of Harmood Street and Hartland Road north of the development site.

Pay & display parking bays are located along the southbound carriageway of Chalk Farm Road between Ferdinand Street and Hawley Street, as well as along a short section of Hartland Road. These are in operation Monday to Friday between 08:30 and 18:30 and Saturday and Sunday between 09:30 and 17:30. The bays are all set into the kerbside and thus do not impact on the width of the carriageway available to moving traffic. Two pay & display bays are located on the kerbside immediately outside the proposed development site.

The northbound side of the Chalk Farm carriageway at this location is occupied by a bus stop at the junction with Hartland Road as well as single yellow lane markings which permit loading Monday to Friday between 08:30 and 23:00 and Saturday and Sunday between 09:30 and 23:00.

The existing pay & display parking bay is long enough to accommodate two passenger cars (12.5m) and will therefore be unable to accommodate construction vehicles longer than 10m. Furthermore, during the final three construction stages construction vehicles will be unable to enter the site, making the 12.5m bay on Chalk Farm Road the main loading bay for all construction traffic.

As such, it is proposed that throughout the entire construction period none of the vehicles used at the site will exceed 10m in length. This is particularly significant for low loaders and flatbed lorries which can be up to 16m in length. Because of the access and egress



restrictions to the site and the limited space for loading and unloading outside it, vehicles longer than 10m will not be used at any stage of the construction process.

Four bus routes run along this section of Chalk Farm Road, allowing direct bus route access to Hampstead, Chiswick, Pimlico, Shepherds Bush and Camberwell. All four routes serve the Hartland Road/Camden Market bus stop at the Chalk Farm Road junction with Hartland Road. The services run at a high frequency between seven and ten buses per hour for each route during weekdays.

Routes 24 and 27 operate on a 24-hour basis with routes 31 and 168 operating between 06:00 and 01:00. The bus stop for northbound services is located just north of Hartland Road and thus immediately opposite the proposed development site. The southbound bus stop is located south of Hartland Road, along the exit route for construction traffic.

#### 4.3 Immediate Site Access

#### 4.3.1 *Pedestrian Access*

Pedestrian access for authorised site personnel will be from Hartland Road. This will provide access to the site office located within the north-western corner of the proposed development site.

#### 4.3.2 Vehicle Access

Chalk Farm Road and Hartland Road will remain open as a public vehicular route throughout the construction period.

All construction vehicles will access the proposed site from eastbound Chalk Farm Road, either directly entering the site, continuing to Hartland Road and entering the site from there or using the parking bays adjacent to the Chalk Farm Road eastbound carriageway. The gated areas shown on the proposed site layout drawings (Appendix A) will be constructed to accommodate the vehicles accessing the site as discussed in later in this report and shown in the tracking drawings contained in Appendix C.

As outlined in Chapter 2 there are a number of stages that make up the construction period. Access and egress arrangements will vary slightly throughout the stages so as to minimise disruption while enabling construction to continue in the most efficient manner. The proposed access/egress gates to the site from the highway will be maintained throughout the construction period and will utilise the existing crossovers on Chalk Farm Road and Hartland Road.

Throughout the construction process the largest vehicles will not enter the site, but use the loading bay on Chalk Farm Road. The vehicles will be able to approach the bays along eastbound Chalk Farm Road and depart in the eastbound direction. It is proposed that parking at those two bays will be suspended as part of the development proposals and construction vehicles will be able to use these parking bays to access the construction site. The bays are inset into the pavement area and as such the construction vehicles will be parked adjacent but away from the eastbound carriageway and not blocking the flow of traffic.

Specific access and egress arrangements for other vehicles will vary depending on the construction phase and are discussed in this section of the report. For most of the construction process, all vehicles up to 10m in length will approach eastbound along Chalk Farm Road, entering the site via the existing crossover on Chalk Farm Road itself or from Hartland Road. Upon exiting the site, vehicles will turn onto Hartland Road and immediately turn onto Chalk Farm Road eastbound.



Intermittently, when such arrangement is not possible, certain vehicles will also access the site via the Hartland Road access. They will then proceed into the site where they will turn around within it and exit the site using the same Hartland Road gate.

During the final stages of construction vehicles will no longer be able to enter the site area due to the advanced stages of the building process. Consequently all vehicles will use the available space on the perimeter of the development site in order to access the construction site. Two loading areas will be designated for that purpose along Chalk Farm Road as shown in the site layout drawings – at the location of the existing crossover into the site as well as at the location of the existing pay & display parking bays – with one more bay available at the existing crossover on Hartland Road.

Vehicles will continue to access the site from the northwest and load/unload using the loading bays. Due to space constraints in Hartland Road, only smaller vehicles such as vans will be able to use that loading bay. The remaining vehicles will use the bays along Chalk Farm Road.

A single Sheffield bicycle stand is currently located outside of the Hartland Road crossover, its position obstructing the access to the proposed construction site gate. Prior to the commencement of the construction works the stand will be removed and will be replaced (as per the existing situation) following the completion of Stage 3 (i.e. when construction vehicles will no longer require site access). Three bollards, two at the edges of the existing Hartland Road crossover and one adjacent to the bicycle stand will also be removed prior to the start of construction works to facilitate construction traffic movements.

The tracking demonstrating the operation of the site access during construction is shown in Appendix C.

#### 4.4 Site Access During Construction

Site access arrangements and frequency of construction vehicle movements will vary across the five construction stages. The layout of the site hoarding and access arrangements may vary within a single construction phase to accommodate the necessary works. All site layout plans are shown in Appendix A of this report and are referred to in this section.

#### 4.4.1 **Construction Stage 1 – Foundation piling and excavation**

All deliveries will come in via Chalk Farm Road and leave via Hartland Road onto Chalk Farm Road. Skips will be positioned close to the site access to be filled with building materials and waste material to be recycled, and will then be removed by tipper bodied rigid vehicles.

During soil excavation all vehicles will use the part of the RC slab next to the site compounds accessing it from Chalk Farm Road and leaving via Hartland Road onto Chalk Farm Road.

During the installation of sheet piling, two deliveries will be made by a flat bed lorry. The first will be to deliver the piling rig to the site with the second journey made for its collection following the completion of the process.

While constructing the RC retaining walls as part of the foundation, only a medium sized digger will be delivered to the site at the early stages of the process. Subsequently, only concrete and steel deliveries will be made during this stage.

For the construction of part of the RC slab to the front of the site, there will be concrete deliveries at a frequency of two vehicles per day.

Drawings 002 - 006 of Appendix A demonstrate the access arrangements for Stage 1 with associated tracking shown in Appendix C.



#### 4.4.2 **Construction Stage 2 – RC and steel frame structure**

Whilst the basement RC floor slab is being constructed, all concrete and steel delivery vehicles will use the part-constructed ground floor slab above.

During this stage all vehicles will access the site from Chalk Farm Road and leave via Hartland Road onto Chalk Farm Road.

Drawings 007-009 of Appendix A demonstrate the access arrangements for Stage 2 with associated tracking shown in Appendix C.

#### 4.4.3 **Construction Stage 3 – POD/room installation**

During the first phase of this stage vehicles up to the size of a large tipper will be able to access the site from Chalk Farm Road and exit onto Hartland Road as shown in Drawing 010 in Appendix A.

Following this, all vehicles will use the designated temporary lay-bys outside the development site. This includes the low loader vehicles which will deliver the luffing crane at the start of the stage and remove the crane at the end of the stage.

Individual POD units will also arrive on low loader vehicles and use the loading bay outside the site.

Drawings 010-013 of Appendix A demonstrate the access arrangements for Stage 3 with associated tracking shown in Appendix C.

#### 4.4.4 Construction Stage 4 – Service Connection and Cladding

Similarly to Stage 3, during stage 4 construction vehicles will use the loading bays outside the site instead of entering the site itself.

Drawing 013 of Appendix A demonstrates the access arrangements for Stage 4 with associated tracking shown in Appendix C.

#### 4.4.5 **Construction Stage 5 – POD/room installation**

In the final stages of construction vehicles will continue to use the lay-bys outside the site. The majority of deliveries will be made to the bays along Chalk Farm Road. Smaller vehicles such as vans will additionally be able to use the loading bay on Hartland Road. They will be able to access the bay from Chalk Farm Road and leave the site in forward gear down Hartland Road, Clarence Road and Castlehaven Road, exiting out onto the A502.

As above, Drawing 013 of Appendix A demonstrates the access arrangements for Stage 5, with associated tracking shown in Appendix C.

The number of deliveries required to be made by large vehicles will be kept to a minimum during all construction stages. The drawings provided in Appendix C indicate the tracking of the various construction vehicles, and the impact of parking bays in the area. The drawings show the 'worst case scenario' routings for the largest possible vehicles likely to be used. However it should be noted that most vehicles accessing the site would be smaller than this and therefore cause less impact than indicated on the drawings.

Banksmen will be stationed at the site access at Chalk Farm Road and Hartland Road and the bays at the front of the site throughout the construction period to assist construction vehicles to enter and exit the site safety, whilst minimising inconvenience to other traffic using Hartland Road and Chalk Farm Road.



#### 4.5 Delivery Booking System

A delivery booking system will be produced and operated by the contractor's site traffic manager. The system will aim to mitigate the following:

- Queuing outside the site;
- Arrival of unscheduled deliveries;
- Deliveries arriving late due to supplier despatch misunderstandings;
- Deliveries failing to arrive;
- Wrong quantities or materials arriving by mistake, requiring the vehicle to be sent away, or an additional 'part-load' vehicle delivery to make up delivery requirements;
- Delivery vehicles arriving early in the hope that they will be dealt with out of turn; and
- No staff or equipment being available on-site to unload the vehicle.

Mitigation of the above will avoid unnecessary vehicle movements to and from the site. It will also importantly reduce the possibility of construction vehicles queuing outside of the site waiting to be processed.

The delivery booking system will contribute towards decreasing / mitigating any potential negative environmental and/or social impacts the construction traffic may have on the surrounding area including neighbouring residents and businesses. Without the booking system in place the impacts could potentially include noise and air pollution as well as congestion and reduced accessibility to Hartland Road and adjoining roads.

The delivery booking system will be operated by the construction site traffic manager.

Banksmen will be employed to ensure the efficient and safe movement of vehicles into and out of the site. The banksmen will be coordinated by the site traffic manager, and will organise both access gates and the loading gates as outlined earlier in this section.

#### 5 ADDITIONAL CONSIDERATIONS

#### 5.1 Vehicle 'Muck' Control

Wheel washing facilities will be in place during construction stages 1 and 2 when vehicles will be accessing the construction site.

For the remainder of the construction period construction vehicles will not access the site and there will therefore be no requirement for a wheel washing facility.

In addition a road sweeper will be on hand to clear up any material inadvertently spread on the public highway by vehicles accessing/egressing the site as quickly as possible after any identified occurrence.

#### 5.2 Land Decontamination

It is suggested that construction works will not commence until after all ground decontamination work is complete by the previous site owners, the Esso Petroleum Organisation.

#### 5.3 Off Site Highways Works to Facilitate Construction

It is proposed to place temporary hoarding and scaffolding at least 1.5m onto the public footway during the construction period, in order to ensure safe passage of pedestrian traffic past the site. The proposed hoarding line is shown in Drawing 001 in Appendix A.

All necessary licences for this will be applied for in advance.

In addition it is proposed to obtain a temporary licence to use the existing drop kerb areas in front of the current site access points – on Chalk Farm Road and Hartland Road – as well as the existing pay & display parking bays on Chalk Farm Road as temporary construction vehicle lay-bys and construction vehicle loading bays.

A Sheffield bicycle stand and three bollards located at the Hartland Road crossover currently restrict the access and egress to and from the site. It is proposed that the three bollards and the bicycle stand will be removed prior to Stage 1 of construction to facilitate construction vehicle movements. The bicycle stand will subsequently be replaced at the end of Stage 3, once vehicular access to the site is no longer required.

#### 5.4 Pedestrian Movement and Route Diversions

The pedestrian footway directly adjacent to the site boundary along Chalk Farm Road will be reduced by the construction works, but will be otherwise unchanged and will remain open to pedestrian traffic. It will also be maintained and managed by the site banksman in order to ensure safe passage of any pedestrians. Appropriate signage and hoarding will be used to advise pedestrians of the ongoing construction works, and safe routes.

Pedestrian access to Hartland Road to the south of the site will remain open to pedestrians but will be maintained and managed by the site banksman in order to ensure safe passage of any pedestrians. Appropriate signage and hoarding will be used to advise pedestrians of the ongoing construction works and these safe routes.

#### 5.5 Access to Public Transport Facilities

No public transport infrastructure or routes will be affected by the construction. Four bus routes run along Chalk Farm Road at this section with the routes serving the bus stops at the



junction with Hartland Road, directly opposite the development. However, due to the proposed construction traffic route layout the traffic movements are unlikely to directly impact upon bus stop operation.

#### 5.6 Cycle Movement and Route Diversions

No LCN cycle routes will be affected by the construction.

#### 5.7 Local Community Engagement

The developer of the site understands the importance of engagement with the local community regarding the development of this CTMP.

It is proposed that a construction working group will be organised and facilitated with the local community within a boundary area to be agreed with the LBC. It is proposed that meetings will be held monthly throughout the construction period at the site office at Hartland Road.

Residents will be invited to the group by way of a letter drop which will provide details of proposed dates and location of the meetings along with the contact details of the project manager.

The developer will continue to liaise with the local community with respect to the construction of the proposed development as outlined above.

The hoarding used to secure the site will make the construction purpose clear, in addition to displaying information on how, and where, to contact the site management.



#### 6 ONGOING DEVELOPMENT OF THE CTMP

It is acknowledged that the agreed contents of the Construction Traffic Management Plan (CTMP) must be complied with unless otherwise agreed with the LBC. The contractors' project manager will work with the LBC to review this CTMP if problems arise in relation to the construction of the development. Any future revised plan must be approved by the LBC and complied with thereafter.

This CTMP has been developed in consultation with key stakeholders at a level of detail sufficient to inform them of construction traffic management proposals. The principles identified in this CTMP are considered to form a robust basis and framework for ongoing development and implementation of the CTMP.

It is envisaged that the principles described in this document will be developed in further detail as the construction methodology and logistics plans are progressed and contractors appointed. Contractors will be expected to employ their own 'in-house' management systems to meet the overall aims of the CTMP.

The CTMP may also be revised to maintain compatibility with other documents being developed as part of the Construction Environment Management System.

The overarching aim is to provide a safe environment for the site workforce and the surrounding business and residential community throughout the duration of construction.



**APPENDIX A – SITE LAYOUT DRAWINGS** 





![](_page_28_Figure_0.jpeg)

![](_page_29_Figure_0.jpeg)

![](_page_30_Figure_0.jpeg)

![](_page_31_Figure_0.jpeg)

![](_page_32_Figure_0.jpeg)

![](_page_33_Figure_0.jpeg)

![](_page_34_Figure_0.jpeg)

![](_page_35_Figure_0.jpeg)

![](_page_36_Figure_0.jpeg)

![](_page_37_Figure_0.jpeg)

![](_page_38_Figure_0.jpeg)

![](_page_39_Picture_0.jpeg)

**APPENDIX B – CONSTRUCTION MANAGEMENT PROGRAMME** 

### 29-33 Chalk Farm Road, Camden, London NW1 Student Accommodation & Commercial Mixed Use Development Construction Programme January 2012

ID	0	Task Name	Duration	Start	01 Oct '12 2 Nov '1 4 Dec '1 04 Feb '1 8 Mar '1 29 Apr '13 10 Jun '13 22 Jul '13 2 Sep
0		Former Esso Garage Construction Programme 17th January-2012	418 days	Wed 07/11/12	
1		Party Wall Matters	12 wks	Wed 07/11/12	
2		Sub-Structure Detail Drawing Package	4 wks	Wed 14/11/12	
3		Structural Engineers Foundation Design	2 wks	Wed 14/11/12	
4		Structural Engineers RC Frame Design	6 wks	Wed 28/11/12	
5		Services Engineers Drainage Design	4 wks	Wed 12/12/12	
6		ME Engineers Design	4 wks	Wed 07/11/12	
7		Construction Detail Drawing Package	8 wks	Wed 14/11/12	
8		Construction Stage 1 - Foundation Piling & Excavation	0 days	Mon 14/01/13	<b>♦</b> _14/01
9		Hoarding around the parameter	2 wks	Mon 14/01/13	
10		Concrete slab and soil clearance and piling mat	2 wks	Mon 28/01/13	
11		Sheet piling to depth of proposed basement level of 4 meters	2 wks	Mon 11/02/13	
12		RC Retaining walls against 1 Hartland Rd and 34 Chalk Farm Rd	6 wks	Mon 25/02/13	
13		Installation of RC piling cap and ground floor RC Slab to front of site	1 wk	Mon 08/04/13	
14		Excavation to 4 meters below ground level	2 wks	Mon 15/04/13	
15		Construction Stage 2 - RC & Steel Frame Structure	0 days	Fri 26/04/13	26/04
16		Underground Service and Drainage Instillation	4 wks	Mon 29/04/13	
17		Basement RC Floor Slab including structural walls	4 wks	Mon 27/05/13	
18		Completion of Ground floor RC slab	4 wks	Mon 24/06/13	
19		Ground floor RC & Steel frame structure including lift and stair cores	4 wks	Mon 22/07/13	
20		Construction Stage 3 - POD/Room Instillation		Fri 16/08/13	16/08
21	—	Lufting Crane position within Stair core	1 day	Mon 19/08/13	
22		Pod/Room delivery to site and instillation	2 wks	Mon 19/08/13	
23		Circulation core & RC structure above ground floor	8 wks	Mon 02/09/13	
24		Construction Stage 4 - Service Connection & Cladding	0 dave	Fri 25/10/13	
25		All service connections to PODs/Rooms	4 wks	Mon 28/10/13	
26		Temporary Scaffold above pavement at first floor	1 wk	Mon 25/11/13	
27		External Cladding instillation to building	6 wks	Mon 02/12/13	
28		Green Roof instillation	4 wks	Mon 13/01/14	
29		Construction Stage 5 - Internal Communal Finishes		Eri 07/02/14	
30		All Internal Communal Fittings	8 wks	Mon 10/02/14	
31		Flectric Distributions	2 wks	Mon 24/03/14	
32		Heating & Water Distributions	2 wks	Mon 24/03/14	
33		BT Cable Distributions		Mon 31/03/14	
34		Hot & Cold Water Installations		Mon 14/04/14	
35		Mechanical Lift Installations		Mon 28/04/14	
36		Removal of Scaffold and Site Office		Mon 12/05/14	
37	<ul> <li>Hard Surface Block Paving Entrance and pavements</li> </ul>		2 wks	Mon 19/05/14	
38	<sup>38</sup> Final Building Inspections		1 wk	Mon 02/06/14	
39	39 Building Operation Manual		1 wk	Mon 09/06/14	
40	6	Building Completion & Handover	0 davs	Fri 13/06/14	
<b>_</b>	<u> </u>			Summarv	External Tasks Deadline
Project: 29-33 Chalk Farm Road Date: 17th January 2012		Chalk Farm Road Fundamental Solit Milostopo		Project Summary	
			-	Froject Summary	

![](_page_40_Figure_3.jpeg)

![](_page_41_Picture_0.jpeg)

**APPENDIX C – SITE TRACKING DRAWINGS** 

![](_page_42_Figure_0.jpeg)

SWEPT CTMP 8 SUITANCY 02/02/2012 10:25:17 P.\TRANSPORT CONS Date Name Plot File

![](_page_43_Figure_0.jpeg)

PATHS SWEPT CTMP 470 RS =OLDE 8 CIN TANC 02/02/2012 10:25:23 P \TRANSPORT CON Date Name Plot File