



**CLEARSTONE
ENERGY**

WARLEY ENERGY HUB

Construction Traffic Management Plan (CTMP)

Prepared by Clearstone Energy and Transport Planning
Associates | October 2024 | Document Reference: R009

A Planning Application by
CLEARSTONE ENERGY

In respect of
**Warley Energy Hub,
LONDON BOROUGH OF HAVERING**

Construction Traffic Management Plan (CTMP)

October 2024



Document Management

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Document Review

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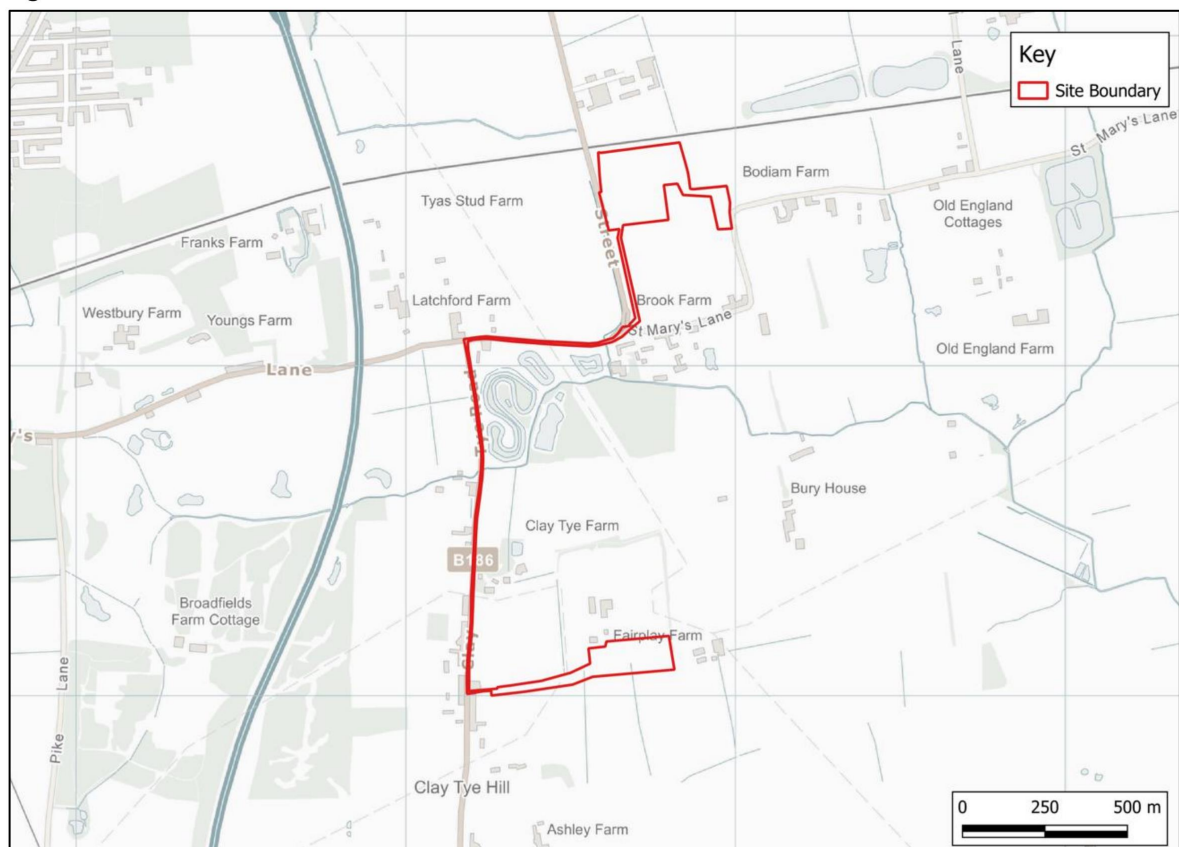
1 Introduction

- 1.1 This Outline Construction Traffic Management Plan (CTMP) has been prepared by Transport Planning Associates (TPA) on behalf of Clearstone Energy (the 'Applicant') in relation to a proposed Battery Energy Storage System (BESS) facility (the 'Proposed Development') on land at St Marys Lane, near Upminster. The Proposed Development will be known as Warley Energy Hub.
- 1.2 The local planning authority and highway authority is the London Borough of Havering.

Site Location and Proposed Development

- 1.3 The Site location is shown in **Figure 1.1**.

Figure 1.1 Site Location



- 1.4 The Site is located approximately 4.6km to the east of Upminster and approximately 13km to the west of Basildon. The Site is comprised of a single parcel of land which is currently of agricultural use, along with an underground cable route connecting to Warley Substation.

- 1.5 In the context of the local highway network, the Site is located to the east of the B186 and M25 and to the south of the A127. St Marys Lane encompasses the Site to the south and east. The northern Site boundary abuts a railway line.
- 1.6 Planning permission is being sought for a battery energy storage facility and associated infrastructure with a grid connection capacity of 200MW. An indicative Site Layout Plan is shown in **Appendix A**.

Construction Traffic Management Plan (CTMP)

- 1.7 This Outline CTMP provides a framework for the management of construction vehicle movements to and from the Site, to ensure that the effect of the construction phase on the local highway network is minimised.
- 1.8 The construction period for the development is expected to last between six to twelve months.
- 1.9 This Outline CTMP sets out the strategy for the following;
- Site access;
 - Construction vehicle routing;
 - Site compound and internal routing;
 - Construction vehicle trip generation; and
 - Proposed mitigation measures.
- 1.10 It will be the responsibility of the appointed contractor to comply with all statutory regulations and guidelines in relation to construction and movement activities.
- 1.11 It is anticipated that a condition shall be applied to planning permission which will require submission of a Final CTMP, based on the principles set out in this Outline CTMP, to be agreed with the local planning authority prior to construction commencing in the event planning permission is granted. The appointed contractor's details will be provided as part of the Final CTMP.

2 Summary of Construction Methodology and Development

2.1 This section provides an overview of the Development and the construction programme.

Battery Energy Storage System

2.2 The Proposed Development is for a Battery Energy Storage System ('BESS') Facility. The BESS Facility is designed to provide peak generation and grid balancing services to the electricity grid by allowing excess electricity imported from the electricity grid to be stored in batteries and dispatched when required.

Construction Programme

2.3 The construction period will last approximately six to twelve months.

2.4 This period will include the development of the main BESS site facility to the north, as well as the installation of the underground cable connecting to Warley Substation to the south.

2.5 The construction is anticipated to be broken down into several key components, including:

- Mobilisation and site preparation;
- Civils;
- Cable installation;
- Equipment installation;
- Landscaping; and
- Energisation.

2.6 A detailed programme will be produced as part of the Final CTMP.

Construction Compound and Internal Access Track

2.7 A construction compound will be set up within the Site. The construction compound will include the following facilities:

- Appropriate car parking spaces;

- Welfare facilities, including toilets, a canteen, changing rooms and offices. These will be in the form of temporary mobile units;
 - A storage area for equipment, including storage crates;
 - A refuse and recycle store;
 - A turning area to ensure vehicles arrive and depart in a forward gear.
- 2.8 An internal access track will be constructed throughout the Site allowing for the movement of construction and maintenance vehicles.
- 2.9 The access track and construction compound will be constructed using a hard-standing bound material of permeable design to ensure suitable drainage and that it can be easily sprayed (if required) to prevent mud, debris and muddy water being tracked onto the highway.
- 2.10 The Site will be secured using a perimeter fence. Heras fencing (or similar) may be required to secure the construction compound and any other areas of the Site until the perimeter fence is completed.
- 2.11 The compound will include a wheel wash facility. Excess water from the wheel wash facility will be appropriately disposed of. A visual inspection of vehicles will be undertaken before they depart the Site, to ensure that they are not carrying any residual debris onto the highway. Should significant mud be carried onto the highway after the washing then a road sweeper will clean the affected area of highway.

Grid Connection

- 2.12 The BESS facility will be connected to the National Grid at Warley Substation via an underground cable. Approximately one third of the cable will be laid within private land, with the remainder in the public highway along the B186 and B187.
- 2.13 At this stage, it is envisaged that the cable will be installed in sections via Horizontal Directional Drilling (HDD) as part of a rolling programme to minimise disruption to road users. The installation will include the following stages:
1. Establish a launch and receive pit for each section of the cable installation route;
 2. Directionally drill a small diameter pilot hole within the highway between the launch and receive pits, at the prescribed depth agreed with the local highway authority through the design process;
 3. Enlarge the pilot hole for installation of the pipeline;

4. Pull the pipeline back into the enlarged hole;
5. Insert the cables into the pipe

- 2.14 Once the drilling works are complete and connected, the launch / receive pits will be backfilled and reinstated and resurfaced to match the original surface.

Section 50 Licence

- 2.15 Prior to these works being undertaken, all appropriate licences will be obtained, including a Section 50 licence. Through this process, traffic management will be agreed with the local Highway Authority. Works within the public highway will be divided into sections of the road to minimise disruption to the local traffic.
- 2.16 The local community will have early notice of the exact works and their location a minimum of four weeks ahead of commencement, via flyers, signage and online notices.

3 Existing Traffic Flows and Speeds

- 3.1 This Section provides details of the existing traffic flows and speeds on the B186 Warley Street and St Mary's Lane, within the vicinity of the Site.
- 3.2 Automatic Traffic Council (ATC) surveys were undertaken between the 22nd January and the 28th January 2024. The ATC data is shown in **Appendix B**. The recorded traffic volumes and speeds are summarised in **Table 3.1**.

Table 3.1 Summary of ATC Data

Location	Direction	Total Vehicles			HGV %*	Speeds (mph)**	
		24hr AAWT	08:00-09:00	17:00-18:00		Ave Speed	85% Speed
B186 Warley Street	NB	6,493	581	357	3%	37.4	43.4
	SB	5,817	395	514	1%	37.6	42.1
	Total	12,310	976	871	2%	37.5	42.8
St Mary's Lane	NB	2,515	177	240	2%	35	39.4
	SB	2,219	274	81	2%	33.5	37.3
	Total	4,734	451	321	2%	34.3	38.4

*HGV is over 3.5tonnes **Recorded over five-day average

- 3.3 Table 3.1 shows that, on an average weekday, there are around 12,310 two-way movements on The B186 and 4,737 of St Mary's Lane. The 85th percentile speed was recorded as 42.8 mph on the B186 and 38.4 on St Mary's Lane.

4 Construction Vehicle Trip Generation

- 4.1 The section sets out the trip generation associated with the construction phase of the Scheme.
- 4.2 It is anticipated that the construction phase will last for approximately six to twelve months.
- 4.3 Construction activities and deliveries will be carried out Monday to Friday 08:00-18:00 and between 08:00 and 13:30 on Saturdays. No construction activities or deliveries will occur on Sunday or Public Holidays. Where possible, construction deliveries will be coordinated to avoid construction vehicle movements during the traditional AM peak hour (08:00-09:00) and PM peak hour (17:00-18:00).
- 4.4 The construction period will include the use of HGVs to bring the equipment onto the Site and this will be strictly managed to ensure that vehicle movement is controlled and kept to a minimum. The vast majority of deliveries by HGV will be by 16.5m articulated vehicles or 8-10m rigid vehicles.
- 4.5 Deliveries to the Site will be reported to the Site Manager and will be made by the smallest possible vehicle for that particular item of plant or material, whilst ensuring efficiency of vehicle movements is maintained.

HGV Movements

- 4.6 **Table 3.1** sets out a summary of the HGV movements that will be associated with the construction phase of the Scheme.

Table 4.1 Warley Energy Hub: Indicative Delivery Movements

Activity	Type of Vehicle (Max)	Total Number of Deliveries
Battery Modules	16.5m Articulated	104 (208 two-way movements)
Invertor	16.5m Articulated	26 (52 two-way movements)
Client Control Room	16.5m Articulated	2 (4 two-way movements)
Storage Containers	16.5m Articulated	5 (10 two-way movements)
Substations	16.5m Articulated	15 (30 two-way movements)
Miscellaneous (fencing, water tanks, cable, gravel, landscaping etc.).	10m Rigid and 16.5m Articulated	125 (250 two-way movements)
Total		277 deliveries (554 two-way movements)

- 4.7 As set out in **Table 3.1** it is anticipated that approximately 277 deliveries could be made by during the construction of the BESS facility, at an average of approximately two deliveries per day assuming a six months construction period (26 weeks or 150 working days).
- 4.8 If a 25% buffer is added on to these deliveries, there will be 346 deliveries, at an average of just over three vehicles per day.
- 4.9 There is likely to be a small peak in deliveries early in the construction process for Site set-up, including the construction of the access track and then again when the electrical equipment (BESS units) are ready for installation.
- 4.10 The Applicant has advised that there will be no more than 10-15 deliveries per day by HGV during this period, which will last approximately four to six weeks.

Construction Worker Trips

- 4.11 In addition to the HGV movements identified in **Table 3.1**, there will also be a number of construction movements associated with smaller vehicles for the transportation of construction workers and sub-contractors.
- 4.12 Approximately 20 construction workers are anticipated to be required on Site on an average day. This may increase slightly during peak construction. The location where staff will travel from is unknown at this stage as it will depend on the appointed contractor. However, it is envisaged that the majority of non-local workforce will stay at local accommodation and be transported to the Site by shared

transport to minimise the impact on the strategic and local highway network. Based on this, it is likely that there could be up to 10 LGV arrivals per day.

Construction Vehicle Movements Timings

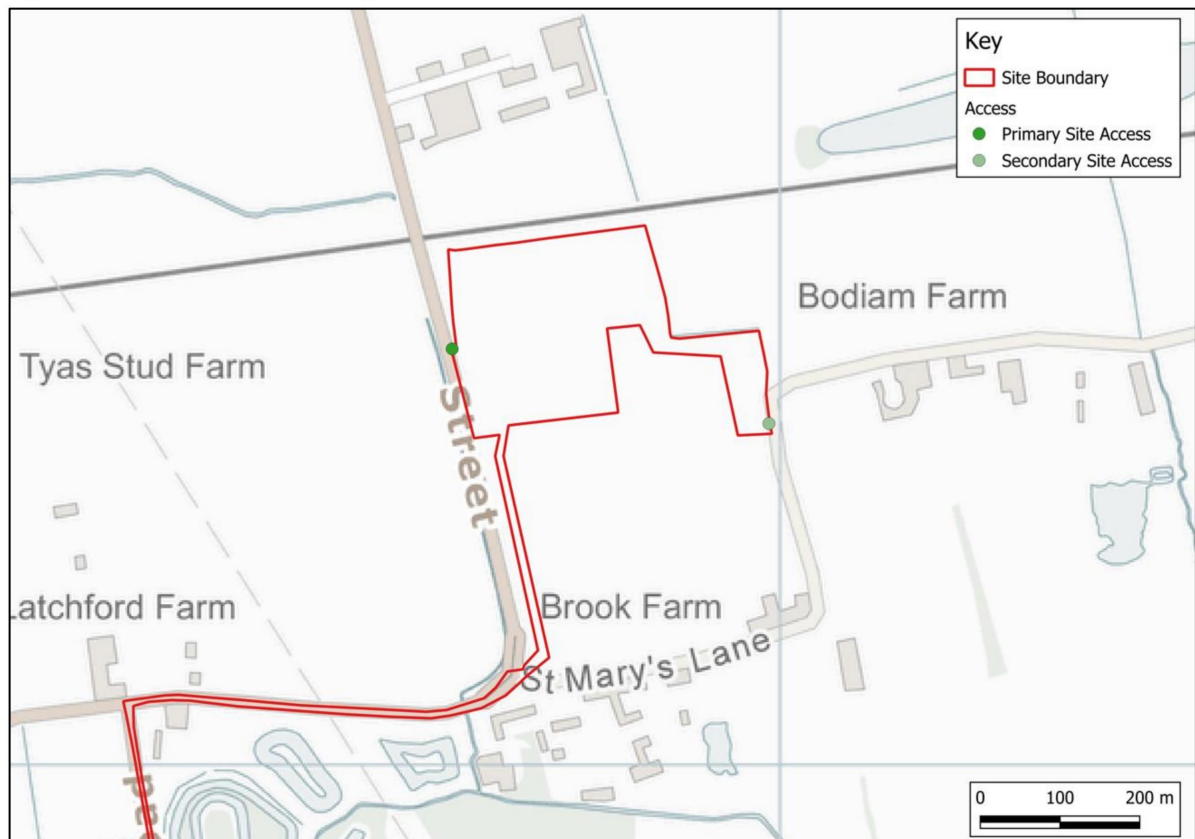
- 4.13 Where possible, construction deliveries will be coordinated to avoid construction vehicle movements during the traditional AM peak hour (08:00-09:00) and PM peak hour (17:00-18:00).
- 4.14 Due to the Site operational hours (08:00-18:00), construction worker travel will occur outside of the peak hours.

5 Site Access Arrangements

5.1 This section sets out the details of the construction and operational phase access arrangements.

5.2 The location of the accesses are shown in **Figure 5.1**

Figure 5.1 Site Access Arrangements



Primary Site Access

5.3 Vehicles will enter the Site via a new access to access location on the B186 Warley Street. The proposed access arrangement is shown in **Drawing SK01** in **Appendix C**. The access has historically been used as a field entrance for agricultural vehicles.

5.4 **Drawing SK01** provides information on the visibility splays. It demonstrates that visibility splays in accordance with the recorded 85th percentile speeds (see Table 3.1) can be achieved.

5.5 **Drawing SK01** also shows the swept-path analysis of a 16.5m articulated vehicle accessing and egressing the Site in a forward gear. This is the largest vehicle that will be required to deliver equipment to the Site.

- 5.6 During the construction phase, banksmen will be deployed at the Site access whenever construction vehicles are accessing or egressing the Site. This is to ensure the safety of all road users.
- 5.7 In addition, temporary signage will be erected in the vicinity of the junction during the construction phase. Diagram 7301 'WORKS TRAFFIC' in the Traffic Signs Regulations and General Directions (TSRGD) will be used to indicate the access and will read 'WORKS TRAFFIC LARGE VEHICLE TURNING'. These signs will be white text and red background 1050 x 750 mm mounted in 'A' frames.
- 5.8 The access will be retained for use by maintenance vehicles. Maintenance vehicles, in the form of a transit van or similar, will visit the Site only a handful of times per month.

Secondary/ Emergency Site Access

- 5.9 An emergency access point is proposed on St Marys Lane. This will only be used in the event of an emergency. The proposed emergency access arrangement is shown in **Drawing SK02**, included within **Appendix C**. This is provided to ensure that Proposed Development is in accordance with the latest guidance published by the National Fire Chiefs Council (NFCC).

Public Rights of Way

- 5.10 There is one existing Public Right of Way (PRoW) which runs alongside the north-eastern boundary of the Site. It is not anticipated this will be affected by the construction or operation of the proposed development.

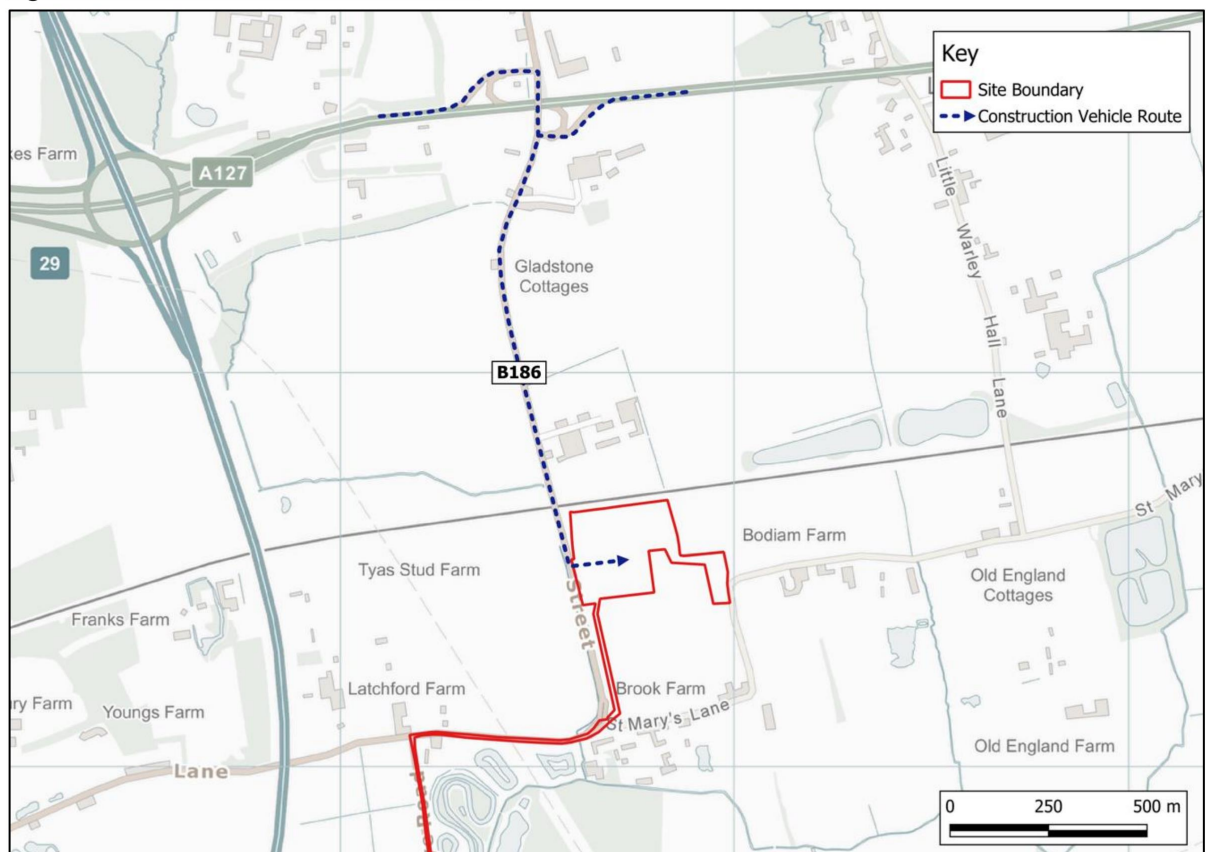
6 Construction Vehicle Routing

- 6.1 The details of the construction vehicle route are set out below. Drivers will be made aware of the route in advance of driving to the Site. The selected route is considered the most appropriate route to the Site.

Route Overview

- 6.2 The designated route for all construction HGVs associated with the construction period is illustrated in **Figure 6.1**

Figure 6.1 Construction Vehicle Route



- 6.3 The construction vehicle route to the Site is:
- A127 → B186 → Site Access.
- 6.4 All vehicles will route to the Site from the A127 to the north of the Site. Construction vehicles will then exit the A127 onto the B186 where they will continue for approximately 1.2km before turning left into the Primary Site Access.

- 6.5 There is no posted weight or height restriction along the above-described route, although it is acknowledged that the B186 does narrow over the railway bridge. Additional warning signs will be installed on the approach to the bridge to advise drivers of the potential for construction HGVs to be present.
- 6.6 Upon egressing the Site, outbound construction vehicles will follow the reverse of the route described above.
- 6.7 The route has been selected to mitigate the impact of vehicle movements in relation to sensitive uses, such as residential properties.

Route Signage

- 6.8 Temporary road signage will be implemented along the designated route to inform background traffic of the ongoing construction works and to direct construction traffic to and from the Site. The signs will be located at key points on the route, such as at junctions.
- 6.9 All signage will be compliant with Chapter 8 of the Traffic Signs Manual where applicable. The following points will be considered when locating signage:
- The position of the sign in relation to the highway;
 - Possible distraction to drivers; and
 - The proximity to junctions.
- 6.10 The signage strategy will be agreed with the local highway authority.

Management of Deliveries

- 6.11 All deliveries will be scheduled in advance using a booking system. Drivers will be instructed to stop in an appropriate layby or service station and make contact if they are likely to miss their allotted slot to allow the schedule to be adapted in as much as possible.
- 6.12 The following procedure will be initiated when deliveries are made to the Site:

Procedure for Arrival to Site

- Drivers to be notified of scheduled arrival time ahead of delivery to the Site;
- When the delivery vehicle is due, operators will be mobilised and will go to position at the Site access;
- All operatives will communicate with each other, as necessary; and
- Banksman will assist HGVs to manoeuvre into the Site access.

- 6.13 The following procedure will be initiated when HGVs are leaving the Site:

Procedure for Leaving the Site

- Before drivers depart, the Site Manager will be notified. They will then mobilise the banksmen at the Site access;
- Drivers will be advised when the banksmen are in place; and
- Banksmen will guide the drivers out of the Site access.

Summary

- 6.14 The proposed construction vehicle route provides the most appropriate route between the strategic highway network and the Site. There is no posted weight of height restrictions along the route.
- 6.15 The route has been selected to mitigate the impact of vehicle movements in relation to sensitive uses, such as residential properties.
- 6.16 The use of any roads other than the designated and signposted route shall not be permitted and this shall be enforced through the agreement of the CTMP.
- 6.17 Appropriate management measures will be provided throughout the construction phase in order to manage the arrival and departure of HGVs at the Site. This is set out further in **Chapter 6**.

7 Management Measures

- 6.1 The contractor will introduce measures to minimise the impact resulting from construction activities. It will be the responsibility of the Project Manager and Site Manager to oversee the implementation of the management measures.
- 6.2 The management measures are set out below.

Signage

- (i) Signs to direct construction vehicles associated with the development will be installed along the construction traffic route. Delivery drivers, contractors and visitors will be provided with a route plan in advance of delivering to Site to ensure that vehicles follow the identified route;
- (ii) All signage on the designated route will be inspected daily by the Site Manager, to ensure they are kept in a well-maintained condition and located in safe and appropriate locations;

Vehicle Movement

- (iii) Where possible, construction deliveries by will be coordinated to avoid the network peak hours of 08:00-09:00 and 17:00-18:00;
- (iv) Banksman will be provided at the Site access to indicate to construction traffic when it is safe for them to enter and exit the Site;

Abnormal Load

- (v) All agreements will be in place, as will the appropriate traffic management. The National Highways 'Code of Practice' for the lighting, marking and signage on the vehicles will be followed.

Booking System

- (vi) A booking system will be set up to manage arrivals and departures to the Site. A log will be kept as part of the booking system;

Parking

- (vii) Advisory signs informing contractors and visitors that parking is not permitted on-street in the vicinity of the Site. Contractors and visitors will be advised that parking facilities will be provided on-Site in advance of visiting the Site and that they should not park on-street;

Wheel Wash Facility

- (viii) A wheel washing facility will be provided. This will be located on the access track near to the Site access.
- (ix) A visual inspection of vehicles will be undertaken before they depart the Site, to ensure that they are not carrying any residual debris onto the highway;

Noise Reduction and Air Quality

- (x) When on Site and when not in use, vehicle engines will be switched off;
- (xi) Vehicles carrying material off-Site will be sheeted to prevent the spread of dust;
- (xii) In dry conditions, areas near to the Site access will be sprayed with water supplied to prevent the spread of dust;

Site Security

- (xiii) The Site will be secured at all times via a perimeter fence or temporary fencing. CCTV will be operational within the construction compound;

Construction Site Management

- (xiv) The Construction Site Manager (CSM) will be responsible for undertaking co-ordination for the Site. Their main duties will include:
 - a. Managing the implementation of the CTMP;
 - b. Scheduling deliveries to the Site;
 - c. Checking for road works scheduled that may affect the construction route as well as for refuse collection to avoid conflict with construction vehicles;
 - d. Handling complaints received, if any;
 - e. To act as the point of contact between the employees and contractors;

- f. Update the CTMP prior to commencement;
- g. Community Engagement.

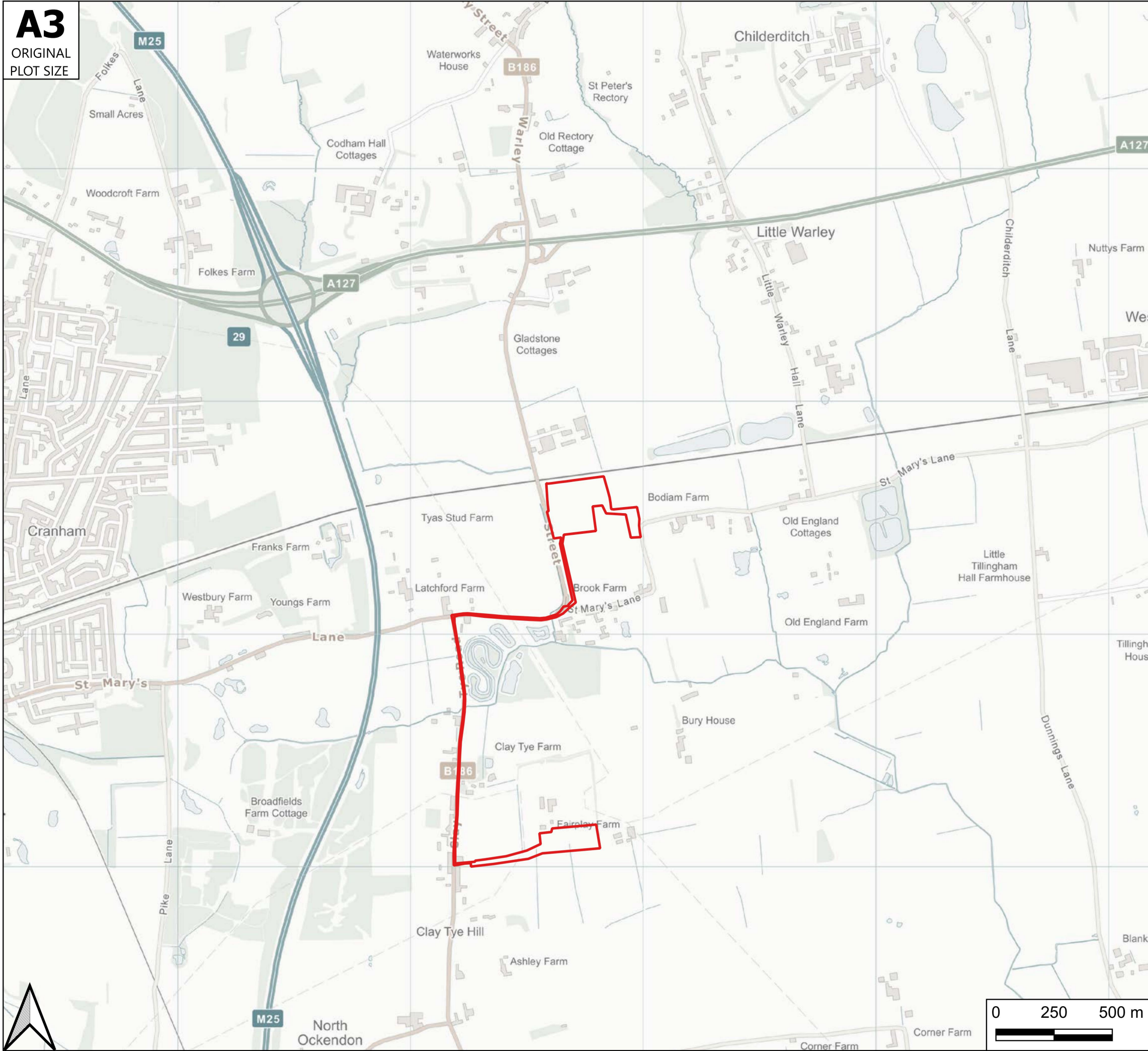
Community Engagement

- (xv) The details of the Construction Site Manager will be provided to the local highway authority in advance of any work being carried out.
- (xvi) The Construction Site Manager's details will also be provided on a Site-board at the Site access. If anyone in the local community has any issues during the construction phase, the Site Manager will be available to discuss.

Drawings

Figures

A3
ORIGINAL
PLOT SIZE



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Key

Site Boundary

Rev	Date	Details	Drawn by	Checked by	Approved by

Bristol
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Clearstone Energy

PROJECT:

Warley Energy Hub,
Upminster

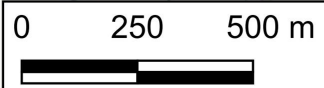
TITLE:

Site Location

STATUS:

FOR INFORMATION

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
NTS	08/10/24	AC	RR	RR
JOB NO: 2309-036		DRAWING NO: Figure 1.1		REVISION: -





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Site Boundary

Access

Primary Site Access

Secondary Site Access

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TITLE:

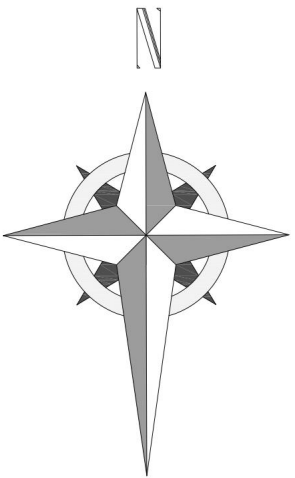
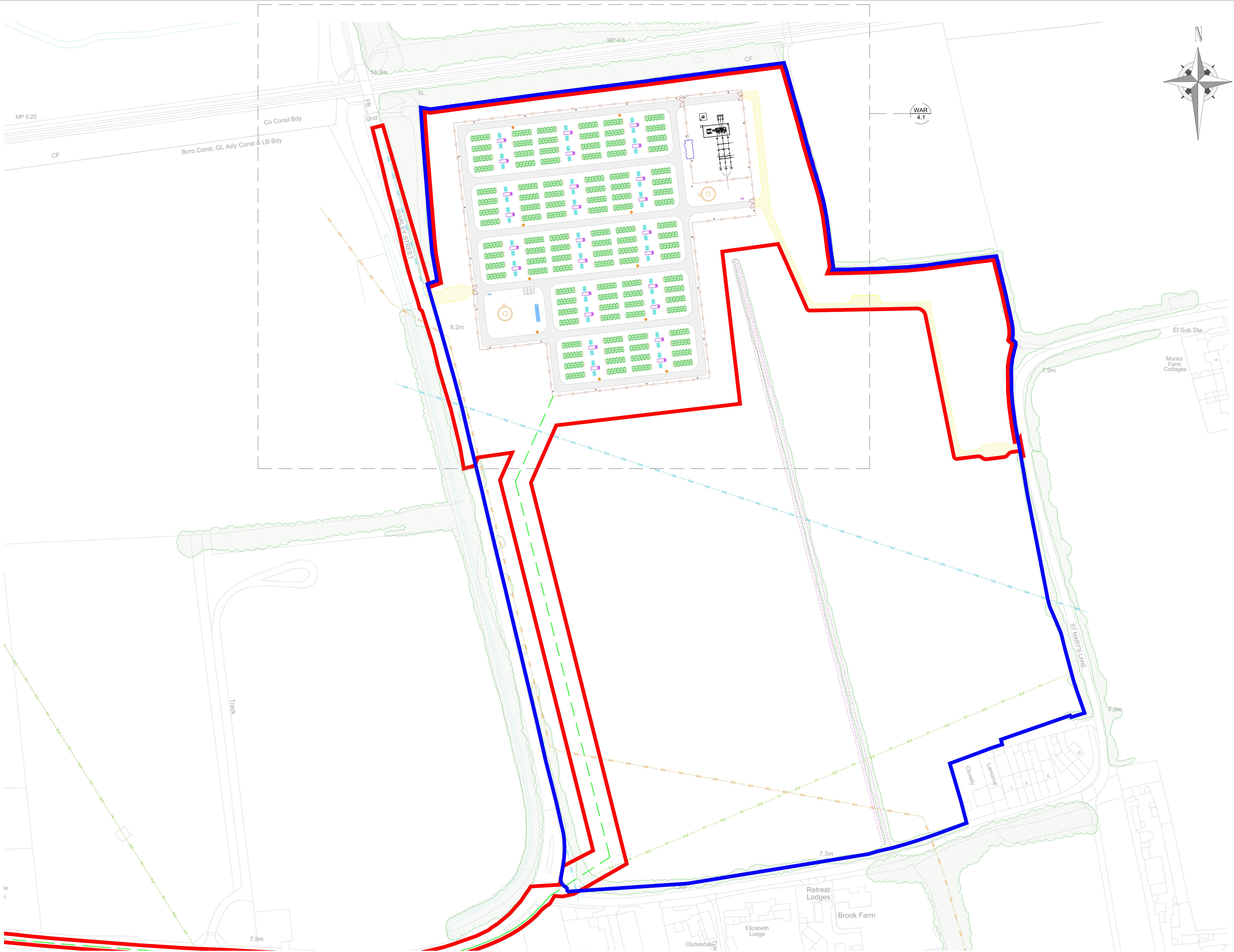
Access Locations

STATUS:

FOR INFORMATION

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
NTS	08/10/24	AC	RR	RR
JOB NO:	DRAWING NO:		REVISION:	
2309-036	Figure 5.1		-	

APPENDIX A



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Scaled dimensions must not be taken from this drawing. All dimensions are to be confirmed on site prior to commencement of work.

Revisions:

Revision	Date	Revision Notes	Drawn	Inspected
A	18.10.24	First Issue	OB	RG

LEGEND:

—	LAND OWNERSHIP BOUNDARY	—
—	PLANNING APPLICATION BOUNDARY	—
—	INTERNAL SITE ROADS	—
—	ACCESS	—
—	PROPOSED SECURITY FENCE	—
—	EXISTING DITCH	—
—	EXISTING OVERHEAD LINE	—
—	EXISTING NATIONAL GAS LINE	—
—	EXISTING CADENT GAS LINE	—
—	OFFICIAL PROW ROUTE	—
—	EXISTING VEGETATION	—
—	INDICATIVE CABLE ROUTE	—

SITE INFRASTRUCTURE:

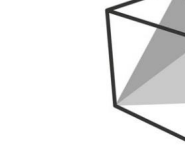
—	SECURITY GATE	—	MV TWIN SKID
—	ACC/DCC PANEL	—	INVERTER
—	BATTERY UNIT	—	CUSTOMER SWITCHGEAR (MV)
—	275KV SUBSTATION	—	40R STORAGE CONTAINER
—	CCTV CAMERA	—	WATER TANK & PUMP
—	FIRST RESPONDER REPEATER PANEL	—	WATER HYDRANT
—		—	FIRST RESPONDER PANEL

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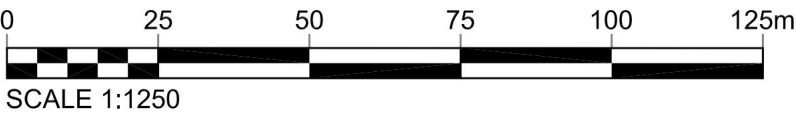
Status:

SUBMISSION

Drawing Title: **Warley Energy Hub**
Indicative Site Layout Plan

Drawn: OB	Checked: RG	First Issued: 18.10.2024
Project Code: CST011-	Drawing Number: WAR4.0	
Sheet Size: A1	Scale: 1:1250	Revision: A

1 **WARLEY ENERGY HUB - INDICATIVE SITE LAYOUT PLAN**
Scale: 1:1250@A1



APPENDIX B



ATC SUMMARY REPORT

PROJECT	38213 Warley, Upminster
LOCATION	38213-002 - B186 Warley St
LOC. DESC.	B186 Warley St
START DATE	Mon 22 Jan, 2024
END DATE	Sun 28 Jan, 2024
SPEED LIMIT	60mph
SURVEY TYPE	7-day ATC, 15min periods, 6 veh. classes

OVERVIEW

A 7-day automatic traffic count on B186 Warley St, commencing Mon 22 Jan 2024, recorded a total of 79,972 vehicles. The posted speed limit of 60mph was exceeded by 0.3% of vehicles, and the seasonally adjusted, combined AADT value is 13,282 (see Equipment & Methodology below).

COMBINED

Total recorded volume	79,972
Avg daily volume (based on 7 days)	11,424.6
Average daily speed (7 days)	38.6mph
Average daily 85%ile (7 days)	44.1mph
AADT (annual average daily traffic)	13,282

Avg weekday volume (Mon-Fri, 24hrs)	12,311.0
Avg weekday speed (Mon-Fri, 24hrs)	38.0mph
Avg 12hr weekday volume (Mon-Fri, 0700-1900)	10,321.2
Avg 12hr weekday speed (Mon-Fri, 0700-1900)	37.5mph

NORTHBOUND ↑

Total recorded volume	42,253
Avg daily volume (based on 7 days)	6,036.1
Average daily speed (7 days)	38.8mph
Average daily 85%ile (7 days)	44.7mph
% of vehicles exceeding 60mph	0.4%

Avg weekday volume (Mon-Fri, 24hrs)	6,493.6
Avg weekday speed (Mon-Fri, 24hrs)	38.0mph
Avg 12hr weekday volume (Mon-Fri, 0700-1900)	5,451.6
Avg 12hr weekday speed (Mon-Fri, 0700-1900)	37.4mph
Avg 12hr weekday 85%ile (Mon-Fri, 0700-1900)	43.4mph

The combined summary on the left shows the total volumes, average speeds, AADT and 85%iles recorded in both directions from all the recorded data. Speeding vehicles are defined as those travelling 61mph and above.

The summaries below provide directionalised details including speeding percentages and weekday daytime details.

SOUTHBOUND ↓

Total recorded volume	37,719
Avg daily volume (based on 7 days)	5,388.4
Average daily speed (7 days)	38.5mph
Average daily 85%ile (7 days)	43.5mph
% of vehicles exceeding 60mph	0.2%

Avg weekday volume (Mon-Fri, 24hrs)	5,817.4
Avg weekday speed (Mon-Fri, 24hrs)	38.0mph
Avg 12hr weekday volume (Mon-Fri, 0700-1900)	4,869.6
Avg 12hr weekday speed (Mon-Fri, 0700-1900)	37.6mph
Avg 12hr weekday 85%ile (Mon-Fri, 0700-1900)	42.1mph

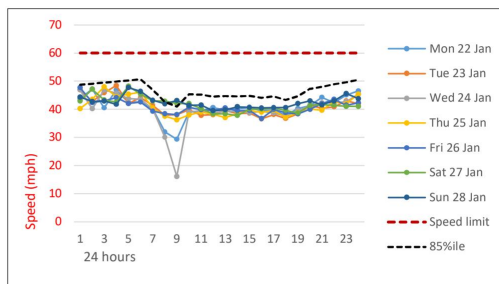
SITE LOCATION



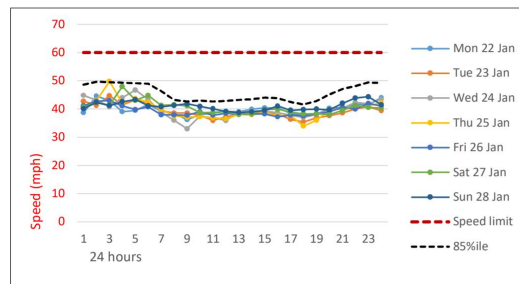
Location	B186 Warley St
Lat, lng.	51°33'53.21"N, 0°18'2.36"E
Project & site	38213-002
PSL	60mph
Bus route	No
Direction 1	Northbound↑
Direction 2	Southbound↓

DAILY SPEEDS

NORTHBOUND ↑



SOUTHBOUND ↓

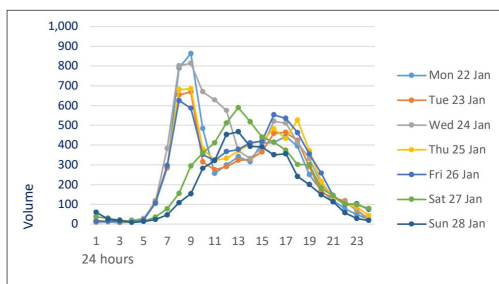


Average daily speeds (solid thin colours) and 85thile (dashed black) compared against 60mph posted speed limit (dashed red). The 85thile is the speed at which 85% of all vehicles are observed to travel under free flowing conditions. A minimum of ten vehicles per speed bin is required for this calculation, hence the overnight low-volume 85thile values may be zero.

The peak average northbound daytime speed was 47.5mph at 07:15 on Sat 27 Jan, whilst the peak average southbound speed was 43.2mph at 08:15 on Sun 28 Jan (based on 15min averages between 0700 & 1900).

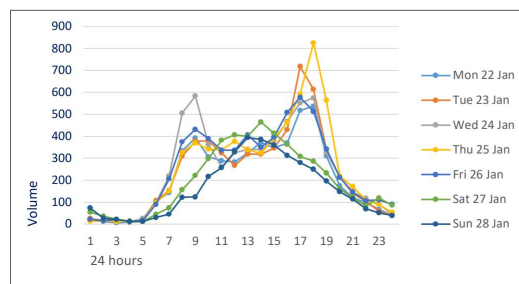
HOURLY VOLUMES

NORTHBOUND ↑



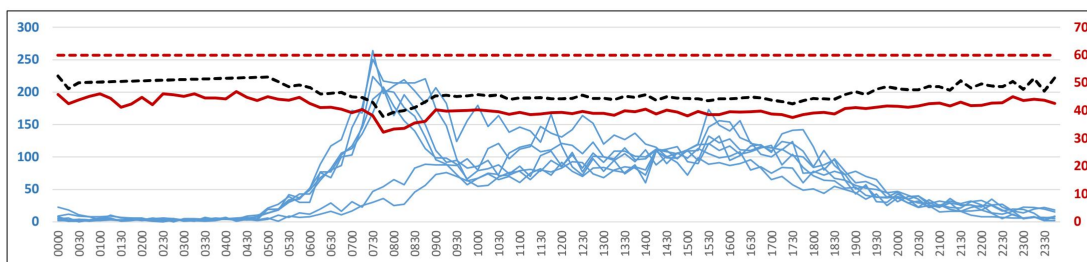
↑ Hourly northbound traffic volumes over each 24hr period for 7 days from all available data.

SOUTHBOUND ↓

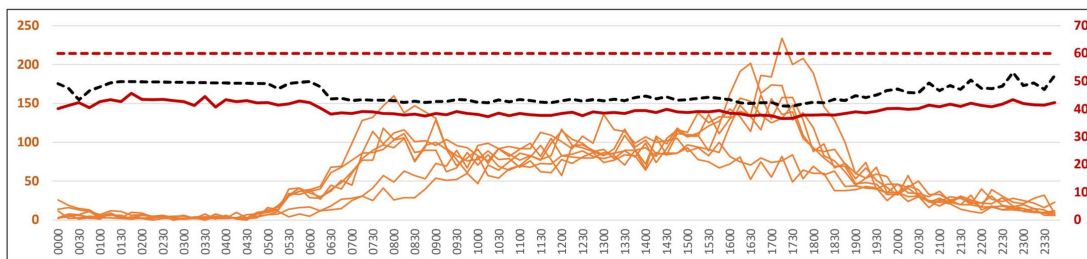


Hourly southbound traffic volumes over each 24hr period for 7 days from all available data. ↓

15min VOL & SPEED

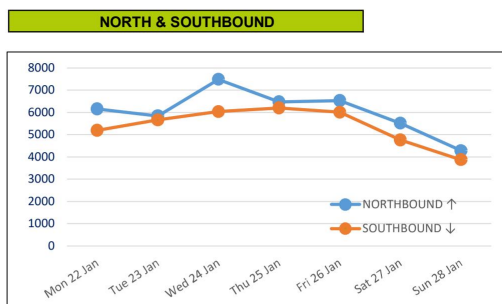


↑ 15min daily northbound flows (blue), against the average speed (red) and 85thile (dotted black) for each 15min period over the 7-day period.



15min daily southbound flows (orange), against the average weekly speed (red) and 85thile (dotted black) for each 15min period over the 7-day period. ↓

DAILY VOLUMES



Total 24hr northbound (blue) and southbound (orange) traffic volumes over 7 consecutive days from all available data.

As can be expected, the lowest volumes were recorded on the Sunday, whilst the highest was on the Wednesday.

7-DAY AVERAGE CLASSES

NORTHBOUND 7-DAY AVG ↑

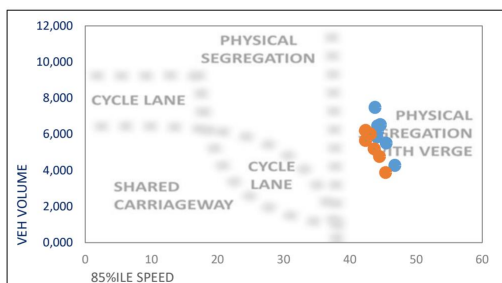
TIME	MOTOR CYCLES	CARS / LGV	OGV1	OGV2	PSV	TOTAL
0000	0.1	22.0	0.1	0.6	0.0	22.9
0100	0.0	15.7	0.4	1.1	0.1	17.4
0200	0.0	11.9	0.1	1.0	0.6	13.6
0300	0.0	10.9	0.0	2.1	0.1	13.1
0400	0.0	16.3	1.9	1.1	0.0	19.3
0500	0.9	80.6	1.3	2.9	0.9	86.4
0600	1.1	225.0	8.3	3.3	0.9	238.6
0700	2.1	521.6	14.6	6.0	0.7	545.0
0800	2.0	555.3	14.0	7.6	2.1	581.0
0900	1.4	385.4	12.3	5.9	1.1	406.1
1000	2.1	342.1	10.9	5.6	2.1	362.9
1100	3.1	382.7	11.4	4.6	2.4	404.3
1200	2.0	389.6	8.0	2.9	3.1	405.6
1300	2.9	370.4	6.9	5.1	1.0	386.3
1400	1.6	392.3	6.9	3.4	0.7	404.9
1500	2.6	440.6	7.9	4.0	1.4	456.4
1600	1.0	436.9	6.0	0.9	0.6	445.3
1700	1.4	388.4	2.9	1.9	0.3	394.9
1800	1.7	293.4	3.9	0.9	0.0	299.9
1900	0.4	185.9	2.9	1.4	0.3	190.9
2000	0.6	128.3	2.9	1.3	0.0	133.0
2100	0.9	91.9	1.1	0.9	0.1	94.9
2200	2.0	68.6	0.6	1.0	0.1	72.3
2300	0.7	40.4	0.3	0.0	0.0	41.4
12hr TTL	24.0	4898.7	105.4	48.6	15.7	5092.4
24hr TTL	30.7	5796.0	125.3	65.3	18.9	6036.1
	1%	96%	2%	1%	0%	

SOUTHBOUND 7-DAY AVG ↓

TIME	MOTOR CYCLES	CARS / LGV	OGV1	OGV2	PSV	TOTAL
0000	0.0	29.3	1.7	1.3	0.0	32.3
0100	0.0	17.7	1.6	0.7	0.1	20.1
0200	0.0	13.3	1.3	0.6	0.4	15.6
0300	0.0	10.0	1.0	0.6	0.1	11.7
0400	0.0	14.4	0.4	1.3	0.0	16.1
0500	1.0	77.3	2.3	0.6	0.1	81.3
0600	1.7	132.0	5.0	2.7	0.3	141.7
0700	2.1	292.6	5.4	3.9	0.1	304.1
0800	1.3	347.1	4.1	4.6	0.1	357.3
0900	1.7	311.3	8.1	6.3	0.4	327.9
1000	2.3	299.6	4.7	4.0	1.4	312.0
1100	2.9	316.0	6.9	5.6	0.7	332.0
1200	2.7	344.3	6.4	6.3	0.6	360.3
1300	2.6	347.7	8.6	4.9	1.1	364.9
1400	1.9	359.0	8.0	6.4	1.0	376.3
1500	2.9	399.3	8.9	3.6	1.9	416.4
1600	2.7	491.9	5.9	4.7	1.0	506.1
1700	1.9	504.9	4.1	3.0	0.6	514.4
1800	1.9	321.1	4.0	2.9	0.4	330.3
1900	0.9	186.4	2.4	2.1	0.3	192.1
2000	1.3	131.4	2.1	1.9	0.3	137.0
2100	0.4	95.1	1.7	0.6	0.1	98.0
2200	1.3	77.7	4.1	0.7	0.0	83.9
2300	1.1	51.7	2.0	1.7	0.0	56.6
12hr TTL	26.7	4334.7	75.1	56.0	9.4	4502.0
24hr TTL	34.4	5171.1	100.9	70.7	11.3	5388.4
	1%	96%	2%	1%	0%	

Average daily northbound and southbound volumes by class (condensed to the AQMA scheme), including 12hr totals for 0700-1900 and overall average percentages. Calculated from all available data over 7 days.

CYCLE PROVISION



The diagram compares total daily traffic flow (vertical axis) against the average daily 85%ile speed (horizontal axis) to demonstrate cyclist and vulnerable user considerations.

The guidelines are based on the Sustrans Design Manual (Apr 2014); Understanding User Needs, part 2.

Valid 85%iles are required to plot the graph.

METHODOLOGY

Equipment & methodology

Automatic traffic counts are undertaken using a pair of pneumatic tubes installed securely across the carriageway, one metre apart, recording air pulses to determine vehicle speed, class and volume. The ATC equipment generally remains in place for a consecutive seven day period, and the data analysed post-survey.

In queuing conditions, the accuracy of ATC recording equipment will reduce as follows;

- 20 – 30mph: potential reduction of 9% accuracy in volume values
- 10 – 20mph: potential reduction of 26% accuracy in volume values
- 00 – 10mph: potential reduction of 39% accuracy in volume values

These figures are based on multiple ATC results compared against accepted reference values from resilient manual counts.

AADTs are calculated using the seasonal COBA methodology; DMRB Vol. 13, Pt 4:

Weather & environmental

Inclement conditions during winter months or outbreaks of unseasonable weather may affect survey data collection. This can result in distorted traffic flows or unusable data and should be considered prior to survey approval. Although forecast checks are made prior to the survey commencing, A-T-R cannot be held responsible for the forecast accuracy.

CLASS	ABBREV.	DESCRIPTION	LENGTH	COBA
1	MC	Motorcycle	SHORT Up to 5.5m	N/A
2	SV	Cars, taxis, 4WD, vans		CAR & LGV
3	SVT	Class 2 plus trailer	MEDIUM 5.5m to 14.5m	OGV1 & PSV
4	TB2	2 axle truck / bus		OGV1
5	TB3	3 axle truck / bus		
6	T4	4 axle truck		
7	ART3	3 axle articulated	LONG 11.5m to 19.0m	OGV2
8	ART4	4 axle articulated		
9	ART5	5 axle articulated		
10	ART6	6+ axle articulated		

Generated	19 Sep 2024	v6.0
38213-002 Warley, Upminster. B186 Warley St. Summary Repoi		

Equipment damage & failure

Although checked intermittently the equipment remains unmanned for much of the duration of the survey, and can potentially be interfered with, vandalised, damaged or stolen and A-T-R cannot be held responsible for any periods where data has not been captured.

The equipment is located in accordance with the details provided by the client and A-T-R cannot be held responsible for the accuracy of the data or loss of equipment due to theft and vandalism.

Roadworks & events

Where possible, roadworks checks are made 7 days before the survey commences. Additionally, influencing major local events are also monitored, covering the immediate vicinity of the surveys and any routes likely to affect the outcome of the survey.

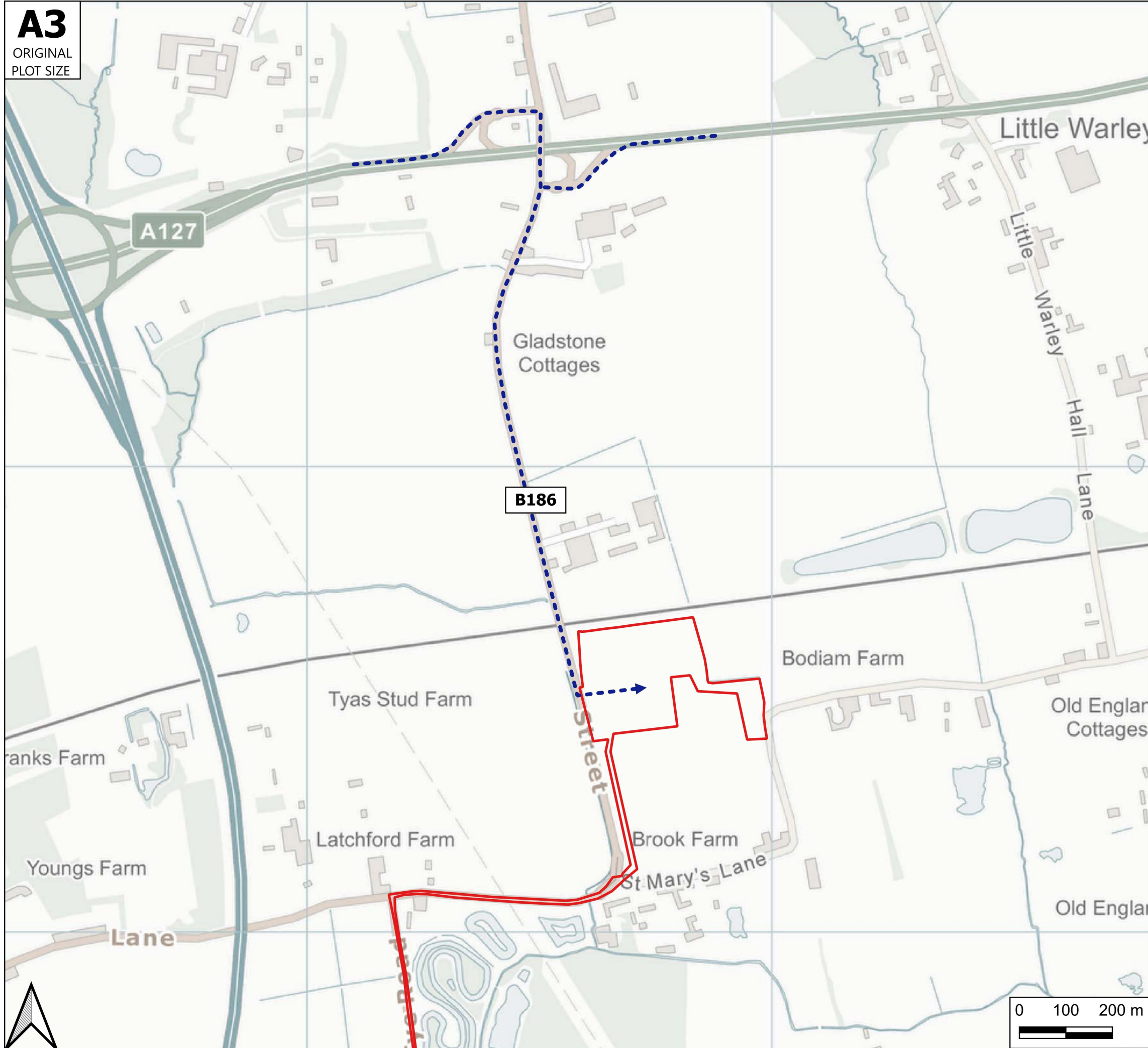
Vehicle classifications

Vehicles recorded by the ATC are placed into one of ten classes based on axle spacing and pattern. This scheme is based on the AustRoad 94 algorithm and modified for UK traffic, referred to as ARX. The table on the left aligns the ARX classifications with the COBA Chapter 8 (Vol 13, Sec 1) classifications.

Under adverse conditions the accuracy of ATC classifications will deteriorate and an appropriate link count should be used for validation.

Disclaimer

Although every attempt is made to achieve accuracy, A-T-R may not be held liable for errors of fact or interpretation.



Reproduced from

Key

- Site Boundary
- Construction Vehicle Route

Rev	Date	Details	Drawn by	Checked by	Approved by

Bristol
Cambridge
London
Welwyn Garden City

tpa
Transport Planning Associates

40 Berkeley Square
Clifton
Bristol
BS8 1HP

0117 925 9400
www.tpa.uk.com

CLIENT:
Clearstone Energy

PROJECT:
Warley Energy Hub, Upminster

TITLE:
Construction Vehicle Route

STATUS:
FOR INFORMATION

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
NTS	08/10/24	AC	RR	RR

JOB NO:	DRAWING NO:	REVISION:
2309-036	Figure 6.1	-



ATC SUMMARY REPORT

PROJECT	38213 Warley, Upminster
LOCATION	38213-001 - St. Marys Ln
LOC. DESC.	St. Marys Ln
START DATE	Mon 22 Jan, 2024
END DATE	Sun 28 Jan, 2024
SPEED LIMIT	40mph
SURVEY TYPE	7-day ATC, 15min periods, 6 veh. classes

OVERVIEW

A 7-day automatic traffic count on St. Marys Ln, commencing Mon 22 Jan 2024, recorded a total of 28,433 vehicles. The posted speed limit of 40mph was exceeded by 9.8% of vehicles, and the seasonally adjusted, combined AADT value is 4,825 (see Equipment & Methodology below).

COMBINED

Total recorded volume	28,433
Avg daily volume (based on 7 days)	4,061.9
Average daily speed (7 days)	34.5mph
Average daily 85%ile (7 days)	38.7mph
AADT (annual average daily traffic)	4,825

Avg weekday volume (Mon-Fri, 24hrs)	4,734.0
Avg weekday speed (Mon-Fri, 24hrs)	34.3mph
Avg 12hr weekday volume (Mon-Fri, 0700-1900)	4,095.4
Avg 12hr weekday speed (Mon-Fri, 0700-1900)	34.2mph

NORTHBOUND ↑

Total recorded volume	15,629
Avg daily volume (based on 7 days)	2,232.7
Average daily speed (7 days)	35.2mph
Average daily 85%ile (7 days)	39.8mph
% of vehicles exceeding 40mph	13.7%

Avg weekday volume (Mon-Fri, 24hrs)	2,515.4
Avg weekday speed (Mon-Fri, 24hrs)	35.1mph
Avg 12hr weekday volume (Mon-Fri, 0700-1900)	2,153.2
Avg 12hr weekday speed (Mon-Fri, 0700-1900)	35.0mph
Avg 12hr weekday 85%ile (Mon-Fri, 0700-1900)	39.4mph

The combined summary on the left shows the total volumes, average speeds, AADT and 85%iles recorded in both directions from all the recorded data. Speeding vehicles are defined as those travelling 41mph and above.

The summaries below provide directionalised details including speeding percentages and weekday daytime details.

SOUTHBOUND ↓

Total recorded volume	12,804
Avg daily volume (based on 7 days)	1,829.1
Average daily speed (7 days)	33.7mph
Average daily 85%ile (7 days)	37.7mph
% of vehicles exceeding 40mph	5.8%

Avg weekday volume (Mon-Fri, 24hrs)	2,218.6
Avg weekday speed (Mon-Fri, 24hrs)	33.5mph
Avg 12hr weekday volume (Mon-Fri, 0700-1900)	1,942.2
Avg 12hr weekday speed (Mon-Fri, 0700-1900)	33.5mph
Avg 12hr weekday 85%ile (Mon-Fri, 0700-1900)	37.3mph

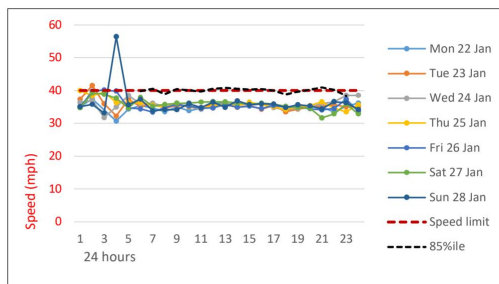
SITE LOCATION



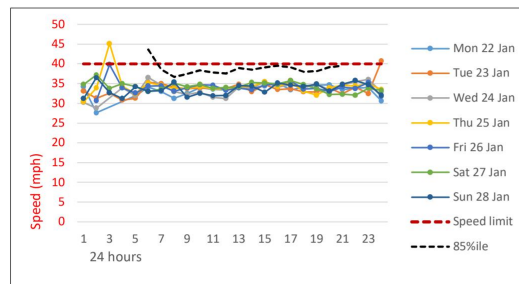
Location	St. Marys Ln
Lat, lng.	51°33'46.97"N, 0°18'24.51"E
Project & site	38213-001
PSL	40mph
Bus route	No
Direction 1	Northbound↑
Direction 2	Southbound↓

DAILY SPEEDS

NORTHBOUND ↑



SOUTHBOUND ↓

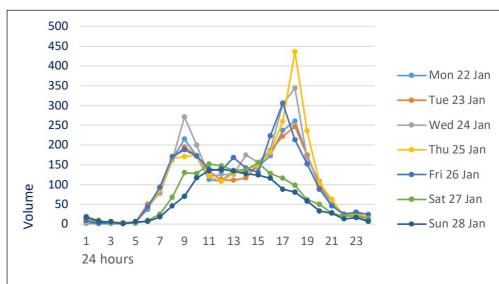


Average daily speeds (solid thin colours) and 85th percentile (dashed black) compared against 40mph posted speed limit (dashed red). The 85th percentile is the speed at which 85% of all vehicles are observed to travel under free flowing conditions. A minimum of ten vehicles per speed bin is required for this calculation, hence the overnight low-volume 85th percentile values may be zero.

The peak average northbound daytime speed was 38.8mph at 12:00 on Wed 24 Jan, whilst the peak average southbound speed was 37.6mph at 16:30 on Wed 24 Jan (based on 15min averages between 0700 & 1900).

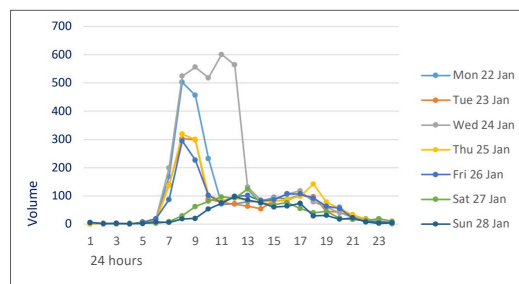
HOURLY VOLUMES

NORTHBOUND ↑



Hourly northbound traffic volumes over each 24hr period for 7 days from all available data.

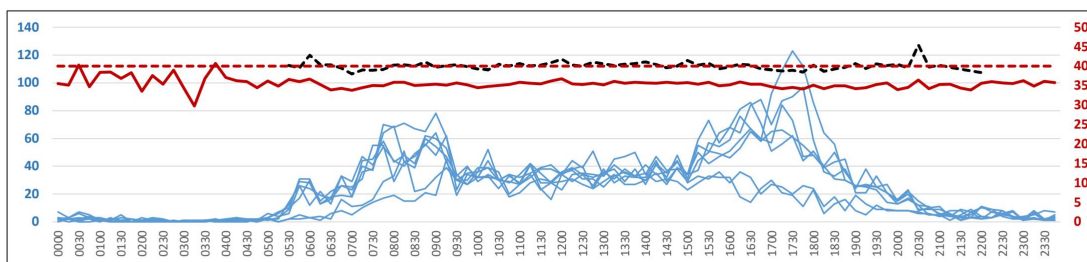
SOUTHBOUND ↓



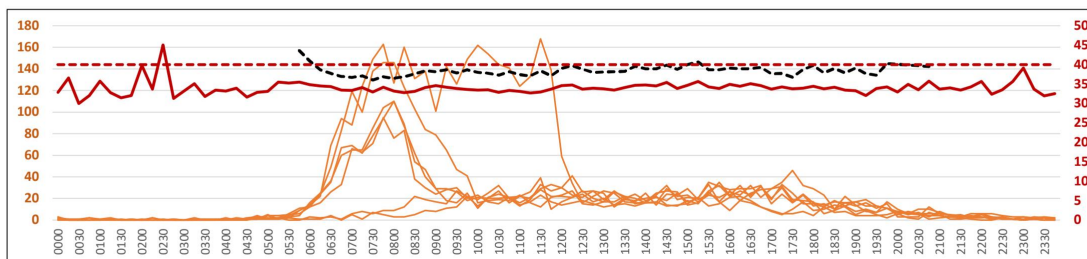
Hourly southbound traffic volumes over each 24hr period for 7 days from all available data.



15min VOL & SPEED



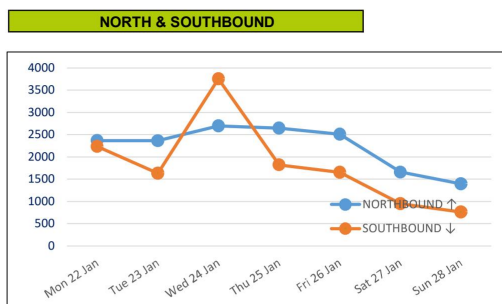
15min daily northbound flows (blue), against the average speed (red) and 85th percentile (dotted black) for each 15min period over the 7-day period.



15min daily southbound flows (orange), against the average weekly speed (red) and 85th percentile (dotted black) for each 15min period over the 7-day period.



DAILY VOLUMES



Total 24hr northbound (blue) and southbound (orange) traffic volumes over 7 consecutive days from all available data.

As can be expected, the lowest volumes were recorded on the Sunday, whilst the highest was on the Wednesday.

7-DAY AVERAGE CLASSES

NORTHBOUND 7-DAY AVG ↑

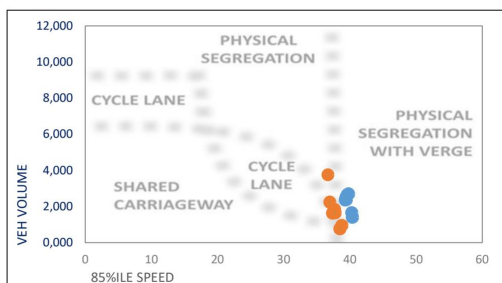
TIME	MOTOR CYCLES	CARS / LGV	OGV1	OGV2	PSV	TOTAL
0000	0.0	8.0	2.0	0.0	0.0	10.0
0100	0.0	3.1	1.6	0.0	0.0	4.7
0200	0.0	1.6	1.1	0.3	0.0	3.0
0300	0.0	1.4	0.6	0.0	0.0	2.0
0400	0.0	4.4	0.0	0.0	0.0	4.4
0500	0.4	32.6	0.3	0.0	0.0	33.3
0600	1.3	64.6	1.3	0.4	0.0	67.6
0700	1.7	129.6	2.4	0.9	0.0	134.6
0800	1.4	171.1	2.4	1.7	0.4	177.1
0900	0.7	156.4	3.3	1.6	0.3	162.3
1000	2.7	121.7	4.3	1.9	0.4	131.0
1100	3.1	116.6	3.6	1.3	0.6	125.1
1200	3.1	122.9	5.1	2.4	0.6	134.1
1300	1.6	128.7	5.4	2.6	0.3	138.6
1400	0.9	133.3	5.6	4.1	0.1	144.0
1500	1.4	159.0	4.7	4.3	1.3	170.7
1600	1.1	209.9	4.6	2.3	1.1	219.0
1700	2.0	233.6	3.9	0.6	0.0	240.0
1800	0.3	142.1	2.3	1.3	0.0	146.0
1900	1.4	79.4	0.9	0.7	0.0	82.4
2000	0.7	45.1	0.4	0.3	0.1	46.7
2100	0.3	19.7	0.6	0.3	0.0	20.9
2200	0.3	19.7	2.6	0.1	0.0	22.7
2300	0.0	11.3	0.9	0.1	0.1	12.4
12hr TTL	20.1	1824.9	47.6	24.9	5.1	1922.6
24hr TTL	24.6	2115.9	59.7	27.1	5.4	2232.7
	1%	95%	3%	1%	0%	

SOUTHBOUND 7-DAY AVG ↓

TIME	MOTOR CYCLES	CARS / LGV	OGV1	OGV2	PSV	TOTAL
0000	0.0	2.3	0.0	0.0	0.0	2.3
0100	0.0	1.6	0.0	0.0	0.0	1.6
0200	0.0	1.1	0.0	0.0	0.0	1.1
0300	0.0	0.4	0.9	0.0	0.0	1.3
0400	0.0	3.0	1.3	0.0	0.0	4.3
0500	0.1	12.9	0.6	0.4	0.0	14.0
0600	0.1	104.0	1.0	1.3	0.1	106.6
0700	1.0	276.3	4.4	2.4	0.3	284.4
0800	1.6	264.7	5.3	2.7	0.0	274.3
0900	1.0	159.0	6.0	2.0	0.0	168.0
1000	2.3	144.3	4.7	2.4	0.4	154.1
1100	2.9	145.3	5.0	1.7	0.4	155.3
1200	3.0	89.3	1.6	0.7	0.7	95.3
1300	2.6	71.3	0.9	0.9	0.1	75.7
1400	1.4	77.6	1.3	0.4	0.0	80.7
1500	2.7	82.7	1.7	0.3	0.3	87.7
1600	2.1	91.0	0.4	0.1	0.0	93.7
1700	1.1	79.4	0.7	0.0	0.0	81.3
1800	0.3	53.7	0.1	0.1	0.0	54.3
1900	1.0	39.7	0.6	0.0	0.0	41.3
2000	0.6	22.6	0.0	0.4	0.0	23.6
2100	0.1	14.3	0.0	0.0	0.0	14.4
2200	0.1	9.3	0.0	0.0	0.0	9.4
2300	0.1	4.1	0.1	0.0	0.0	4.4
12hr TTL	22.0	1534.6	32.1	13.9	2.3	1604.9
24hr TTL	24.3	1749.9	36.6	16.0	2.4	1829.1
	1%	96%	2%	1%	0%	

Average daily northbound and southbound volumes by class (condensed to the AQMA scheme), including 12hr totals for 0700-1900 and overall average percentages. Calculated from all available data over 7 days.

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The diagram compares total daily traffic flow (vertical axis) against the average daily 85th percentile speed (horizontal axis) to demonstrate cyclist and vulnerable user considerations.

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CLASS	ABBREV.	DESCRIPTION	LENGTH	COBA
1	MC	Motorcycle	SHORT Up to 5.5m	N/A
2	SV	Cars, taxis, 4WD, vans		CAR & LGV
3	SVT	Class 2 plus trailer	MEDIUM 5.5m to 14.5m	OGV1 & PSV
4	TB2	2 axle truck / bus		OGV1
5	TB3	3 axle truck / bus		
6	T4	4 axle truck		
7	ART3	3 axle articulated	LONG 11.5m to 19.0m	OGV2
8	ART4	4 axle articulated		
9	ART5	5 axle articulated		
10	ART6	6+ axle articulated		

Equipment damage & failure

Although checked intermittently the equipment remains unmanned for much of the duration of the survey, and can potentially be interfered with, vandalised, damaged or stolen and A-T-R cannot be held responsible for any periods where data has not been captured.

The equipment is located in accordance with the details provided by the client and A-T-R cannot be held responsible for the accuracy of the data or loss of equipment due to theft and vandalism.

Roadworks & events

Where possible, roadworks checks are made 7 days before the survey commences. Additionally, influencing major local events are also monitored, covering the immediate vicinity of the surveys and any routes likely to affect the outcome of the survey.

Vehicle classifications

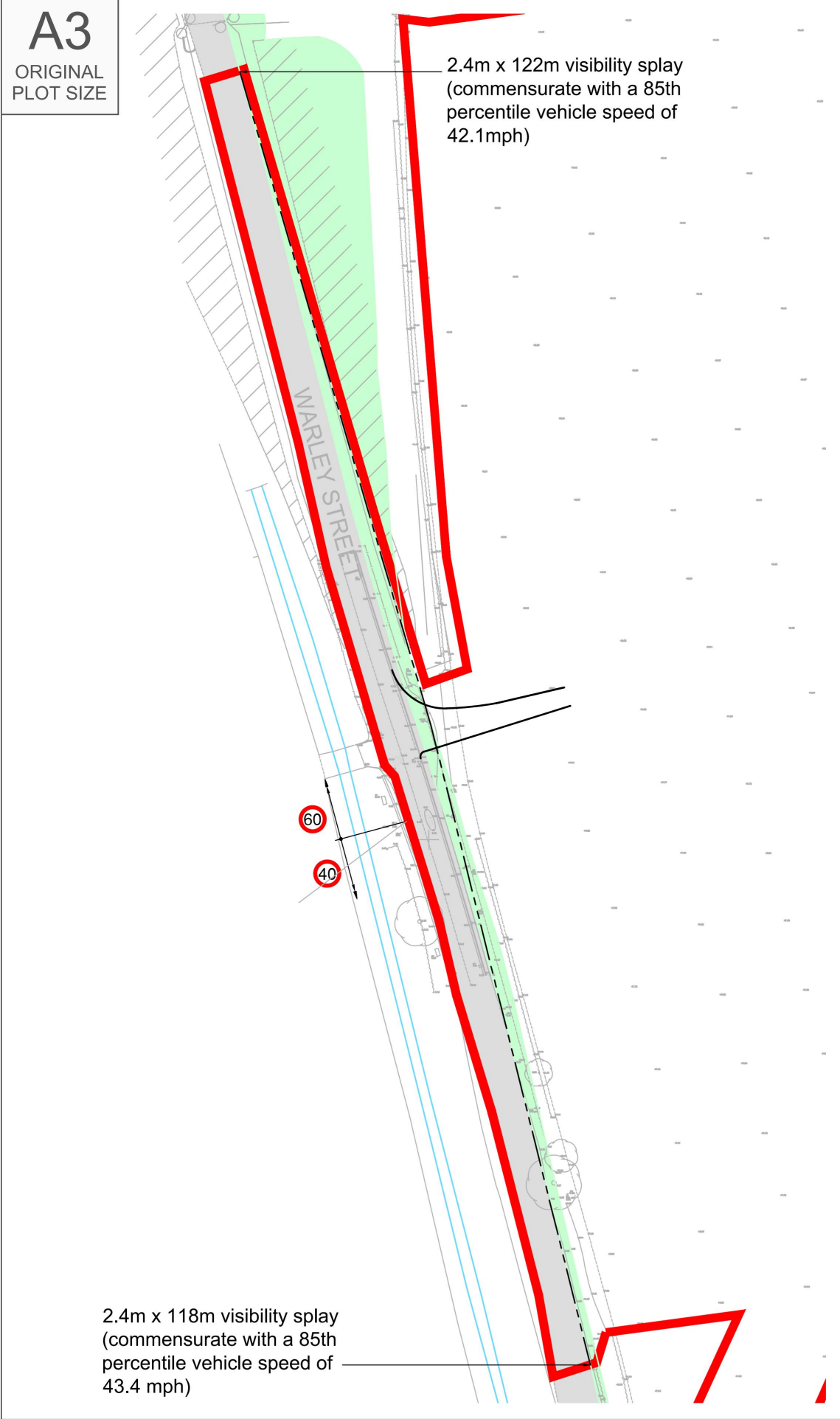
Vehicles recorded by the ATC are placed into one of ten classes based on axle spacing and pattern. This scheme is based on the AustRoad 94 algorithm and modified for UK traffic, referred to as ARX. The table on the left aligns the ARX classifications with the COBA Chapter 8 (Vol 13, Sec 1) classifications.

Under adverse conditions the accuracy of ATC classifications will deteriorate and an appropriate link count should be used for validation.

Disclaimer

Although every attempt is made to achieve accuracy, A-T-R may not be held liable for errors of fact or interpretation.

APPENDIX C



16.5m Articulated HGV Entering
Scale 1:250



16.5m Articulated HGV Exiting
Scale 1:250

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NOTES:

1. The 85th percentile speed used to determine the length of visibility splays have been taken from ATC speed survey undertaken by ATR from MONDAY 22nd January to 28 January 2024.

= Highway Boundary

= Highway Verge

= Redline Boundary

D	28.10.24	Added redline boundary.	KVT	AG	JD
C	17.09.24	Adjusted access detail. Added highway verge.	KVT	RR	JD
B	13.09.24	Adjusted access to accommodate emergency vehicles. Corrected visibility splay with provided ATC data.	KVT	RR	JD
A	16.01.24	Removed LHP and MP mains on drawing.	KVT	RR	RR

Bristol
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London
Welwyn Garden City

Transport Planning Associates

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BS8 1HP
0117 925 9400
www.tpa.uk.com

CLIENT:

CLEARSTONE ENERGY LTD

PROJECT:

WARLEY 2 BESS,
UPMINSTER

TITLE:

Swept Path Analysis Of A 16.5m
Articulated HGV At Warley St

STATUS:

INDICATIVE

SCALE: As Shown	DATE: 14.11.23	DRAWN: KVT	CHECKED: RR	APPROVED: RR
JOB NO: 2309-036	DRAWING NO: SK01		REVISION: D	

