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J4726 AGAR GROVE

RESPONSE TO GLA PLANNING CONSULTATION

19th March 2013

Introduction

The overarching objective of the Agar Estate regeneration project is to deliver new accommodation in a manner that will allow existing residents to remain in-situ whilst construction works are taking place and move into their new homes in a single decant thus retaining community cohesion. This requirement has placed a significant pressure on the project to deliver sufficient homes within the first phase of development to "free-up" the remainder of the site for subsequent phases of development.

Secondary drivers are financial allowing LBC to fund the development but responsibly manage their debt exposure through the various phase of construction.

The utilities and services strategy has been developed in response to these brief requirements and constraints and designed to be best serving the development and the residents with particular consideration to energy costs and concerns regarding fuel poverty, including through the adoption of Passivhauss to maximise energy efficiency within the building design and fabric.

A single energy centre serving the whole development is not preferred having assessed the:

- Impact of the plant area required (which would inhibit a single decant)
- Difficulties in phasing the development (and additional cost burden)
- Additional standing losses of the district heating mains, and associated costs to residents (particularly Council tenants)
- Complexities that would prohibit the inclusion of solar thermal
- Associated additional carbon emissions and primary energy use

We have investigated the potential for connecting the development with existing heat networks and whilst this is not practical at this stage (details below) the scheme has been developed to enable easy future connection to a neighbourhood heat network via the block-by-block energy centres.

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Correspondence with Argent

The adjacent site, maiden lane is also owned by LB Camden and is being redeveloped as part of the same CIP programme. In this regard, the relation of Maiden lane to the Argent site is very similar in that it is a Council owned residential site located just North of the railway line to the North of the Argent development. At that time correspondence was entered into, LB Camden assessed the feasibility of connecting to the Argent site district heating scheme. Aspects which were assessed included the

- Technical feasibility
- Capital cost
- Planning benefits
- Management implications
- Legal risks
- Assessment of future scenarios

Contracts for heat supply were proposed by Argent, for domestic & for commercial supply. Those are included in this response as separate documents.

Correspondence is attached as appendix 1. The legal issues were not resolved. Under public sector regulations, the contract for energy supply would need to be advertised for a competitive tender.

However the is only one supplier available, this creates a legal risk, which may have required a special resolution.

Furthermore, as the heat would be coming from one source & uncompetitively tendered. There were concerns over cost, quality of service and reliability of supply.

The commercial risk of third party legal negotiations were not able to be quantified, which was undesirable.

The conclusion of the report was to provide a site wide district heating scheme, with no connection to Argent. This was accepted by the GLA

The response from GLA, from Colin Wilson, GLA Planning, To Neil McDonald LB Camden

Our ref: 2854EW01
Your ref: 2012/5552/P
Date: 23 November 2012

District heating

53 The applicant has identified that the Kings Cross district heating network is within the vicinity of the development. However, a railway line separates the development from the network and the applicant sets out that as such it is not practical to connect. The applicant has set out that the network will be designed to allow future connection to a district network. This is acceptable in this instance.

GLA confirmed that the connection to Argent was not necessary in that instance so the connection was not made to Maiden lane.

Development phasing

The block based energy strategy for the proposed development is preferred as it better serves the phased development and the overarching objective for a single tenant decant.

Phasing Summary

Phase	Decant / Demolition	Start	End	Construction	Tenure	Units Accumulative
1	Broadstone	Q3'14	Q2'16	Block A	Social	38
2	Manston, Sherborne, Sturminster & shop to	Q2'16	Q3'17	Block G	Private	61
		Q3'16	Q4'17	Block F	Social	75
		Q1'17	Q1'18	Block H	Social	95
3	Ashmore & Nettlecombe	Q1'18	Q1'20	Block JKL	Private	168
4	Frampton & Abbotsbury	Q3'19	Q3,20	Block I	Interim	206
5	None	Q4'19	Q2'21	Blocks CD&E	Social	240
4'		Q3'19	Q4'21	Block B	Social	345
6	Luworth House to B	Q2'21	Q2'23	Luworth refurb'	Private	493

Temperature Regime

The proposed block based energy strategy is based upon 70/40 Low Temperature Hot Water (LTHW) temperature regime. Typically heating is direct, i.e. the circulated water in the heating mains, circulate through radiator in the apartments, there is no separating plate heat exchanger and associated degradation of temperature.

Block B and Lulworth Tower operate in-direct heating, the height requires a greater primary system pressure, and the plate heat exchangers provide a separation for the domestic installation from this pressure.

70/40 is preferred for the lower temperature distributing internally to minimise the contribution to overheating, as the LTHW is circulated continuously for the full year.

A primary flow of 70^{o}C is typically required by Hydraulic interface unit (HIU) for domestic hot water generation at 50^{o}C. This is a compromise reached with NHBC (on other project. NHBC technical standard 8 requires 60^{o}C to be available at the kitchen sink for washing up.)

A phased development like Agar Grove connected to a new, existing or 3rd party District Heating systems would require each block (or phase) to be connected by a heat substation. A large plate heat exchanger and secondary pumps, providing hydraulic separation, demarcation of responsibility and bulk metering. The primary side of the heat substation would require elevated temperatures. 75/55 or 80/50. The higher temperatures lead to higher standing losses in the district heating mains.

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Potential Energy Centre Location

The energy centre considered during the option analysis was based on the following:

Peak diversified load 1300 kW (passivhaus), 1900kW otherwise
Plant room area 80 m2
Proposed equipment

- 3 No. 650 kW boiler (N+1)
- 1 No. 450 kW lead/summer boiler
- 9000 l Buffer volume
- 2No. 300 l Expansion
- 10.2 l/s @ 500 kPA Circulation (duty /standby)

CHP option +20 m2

- 70 kW_{Th}/ 35 kW_e CHP engine

General features

- Located at ground floor, for safe removal and replacement of plant large plan.
- Naturally ventilated (significant louvered area), not compromising means of escape.
- >2.5m clear working height. Passivhaus would require c. 300 mm insulation to underside should residential be located above.
- Flue & exhaust termination in accordance with Clean Air Act

There is significant pressure on the Phase 1 site to accommodate the first decant/relocation to enable phase 2 that creates the momentum for the development. The housing needs requirements established through extensive stake holder engagement has led to a varied and complex mix that needed to be incorporated into block A. Given this decant requirement there would not be sufficient space within the first phase to accommodate the energy centre.

Phases 2 & 3 fronts along Agar Grove opposite the conservation area, as such the proposed development has made many concessions by limiting high, presenting a high quality façade to this very sensitive location. It was considered inappropriate as a planning risk to locate the energy centre in this prominent location.

Ground floor Block B was considered the most suitable potential location as the commercial spaces at the ground floor of the building have floor to ceiling heights that could accommodate an energy centre and access and louvred ventilation could be achieved via Camley Street. However, Block B this forms part of the final stage of the development and so will not be delivered (or be available) for a number of years

An alternative location considered was the refurbished basement of Lulworth Tower. Again the flue and exhaust could discharge at roof level. The existing floor to ceiling level in the basement, and existing structure would constrain a plant room layout and become less efficient requiring c. 20% more area. Access for plant removal and replacement would require, lifting introducing additional H&S risks. Lifting is required for the block based plant in the proposed Lulworth Scheme although the plant would be smaller in size and weight.

District Heating Network

The plan attached shows the DH network considered for the phased development and location of a temporary energy centre. This would be utilised up until the completion of Block B, sized for 600 kW load. Typically this type of hire equipment is housed within a shipping container. The appropriate location would be close to the further connection into Block B. A recent budget estimate for extended hire costs on another project of similar scale (550kW) and need was c. £335/week before fuel. At £100,000 for the period between end of phase 1 and completion of block B, the outright purchase of a temporary heating plant would prove more economical.

The district heating main would be installed in stages, sized for the final loads. Our analysis has been based on the same working assumptions as the systems, for the proposed development. Where possible we are proposing using 'twin pipe' this is only considered viable available as plastic mains up to 40mm diameter, 50 mm diameter and grater would be installed as separate flow and return pipe.

Should all costs associated for the standing losses be recovered through the energy bills of the connected dwellings at the time, the initial dwellings would be paying greater costs associate with systems losses for longer until they are apportioned to more dwellings.

Block	Unit, accumulative	Standing losses, kW[1]	£/unit/yr [2]
A	38	12	152
G	61	16	126
F	75	18	116
H	95	25	127
JKL	168	43	123
I	206	50	117
CDE	240	57	114
B	345	75	105
Lw	493	99	97

[1] Standing losses (thermal only) include, internal distribution losses and below ground mains
[2] Costs based upon energy tariff 5p/kWh

During the 9.5 year construction programme a single social tenure dwelling in Block A would have spent £934 on system losses, £554 more than the proposed block based system (with contribution from solar thermal)

Heat load, minimum turn down & variable volume circulation.

Many district heating scheme are oversized and such are unresponsive. It is essential for efficient and economic operation that heating plant is matched to the anticipated heat loads. The block based systems for the proposed development are sized upon:

- Space heating load per dwelling
  - Passivhaus dwelling 1.5 kW
  - Lulworth new dwelling 2.5 kW

- Domestic Hot Water load
  - Danish Standard DS 439 coincidence factor
  - HIU 47 kW
  - 15 mim peak diversified flow/ thermal store recovery

- Standing losses above ground distribution, plant room, HIU
  - 166 w/dwelling

Boilers are typically a cascade arrangement of modulating high efficiency condensing boiler with a minimum of N+1 for system redundancy.

The LTHW circulation systems are designed as a variable volume constant pressure, continuously circulating a minimum volume of hot water to prime the HIU and allow draw off as prescribed by Building Regulations and NHBC technical standards.

Too often District Heating or Communal systems are sized believing that the diversified peak hot water load is present continuously. This is not the case and for the majority of the time (throughout the night, particularly during summer) there is no load present and only the standing losses. The proposed development has made significant design decisions to limit the systems losses and annual demand:

- Passivhaus certification, 120 kWh/m2 primary energy
- Chilled water specification of insulation and installation methods for LTHW distribution
- Minimising distribution pipework lengths
- Primary system design temperatures 70/40 Heating & 70/20 domestic hot water
- Use of twin pipe in below ground mains

Typically boilers only modulate to 20% of their rated output. For example a 200kW boiler would reduce to 40 kW before dropping out on high return temperature. It's important to limit the boiler turn down to less than 250% of the minimum load of the system, to avoid the boilers continuously cutting in and out.

Block	Units	Units	Htg	DHW	loss	DH loss	Load	Flow	Flow
	Per block	Total	kW	kW	kW	kW	Peak, kW	Peak, l/s	Min, l/s
A	38	38	57.0	32.0	6.3	6.0	101.3	0.80	0.10
G	23	61	91.5	52.0	10.1	9.6	163.2	1.29	0.16
F	14	75	112.5	53.0	12.5	9.6	187.6	1.48	0.17
H	20	95	142.5	67.0	15.8	9.6	234.9	1.86	0.20
JKL	73	168	252.0	118.0	27.9	15.3	413.2	3.27	0.34
I	38	206	309.0	145.0	34.2	16.2	504.4	3.99	0.40
CDE	34	240	360.0	169.0	39.8	17.4	586.2	4.64	0.45
B	105	345	517.5	243.0	57.3	17.4	835.2	6.61	0.59
Lw	148	493	887.5	348.0	81.8	17.4	1334.7	10.57	0.79

The table above shows the breakdown of the thermal load at each stage of the development, and plotted against time and the proposed construction programme below.

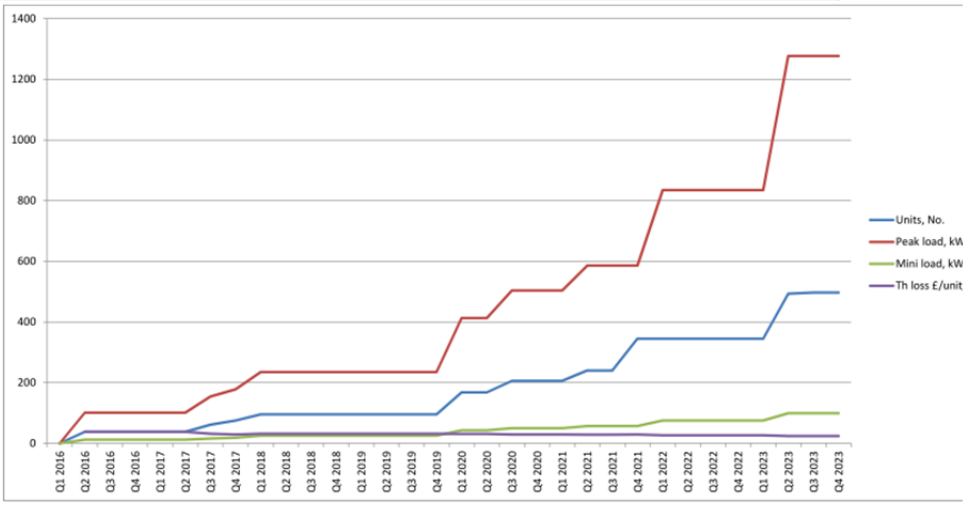
The summer boiler proposed for the potential central energy centre is 450kW allowing a turn down to 90 kW and could manage the peak diversified load. This boiler alone would be significantly over sized for phases 1 & 2, and only just suitable once phase 3 is complete, 4 years after the block A dwellings are occupied. Splitting the summer load into two No. boilers at 225 kW would be over sized for the first two phases.

Similar issues exist with variable volume pumping, in reality pumps circuits can only de turned down to 20% of the rate output, before control valves lose their authority over the systems.

For the proposed phasing of Agar Grove two sets of temporary plant would need to be installed. The first before the completion of phase 1 for 4 year, and replaced before the completion of phase 3, for the 1.5 year before brining online the permanent energy centre.

Agar Grove: Construction Phasing & District Heating Profile 20140317

Phase	Block	Start	PC
1	Block A	Oct-14	May-16
2	Block G	May-16	Sep-17
	Block F	Oct-16	Dec-17
	Block H	Oct-16	Jan-18
3	Block JKL	Jan-18	Feb-20
4	Block I	Jun-19	Sep-20
	Block B	Jun-19	Nov-21
5	Block CDE	Oct-19	May-21
6	Lulworth	May-21	Jul-23



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Future connectivity

The London heat map doesn't show any planned of future District heating developments passing through the or close by to the Agar Grove Estate.

The most likely route of any further DH development would be running east-west along Agar Grove and/or north-south along Camley Street to Agar grove.

The proposed block based heating systems allow a single point of entry into the building to server all dwellings connected or group of block. We see there would be 7 points of connection show tabled below. We would propose to include a capped of incoming pair of DH mains coming into each point of connection, terminating at an inspection chamber externally and a low level at ground floor within the plant room or services riser. The operational parameters of any future DH network are unknown, the primary temperature regime must be greater than 70 ^{o}C.

We would assume that the DN network would operate at least a 20^{o}C difference between flows and return temperatures, and base incoming mains sizes on 20^{o}C at maximum 250 Pa/m. connections would be in plastic as this would remain stable without a hydraulic connection.

We would anticipate that each would connect into a future district heating as a bulk-metred supply, via a heat sub-station (plate heat exchanger).The heat exchanger acts as a point of hydraulic separation between the DH network the block and the dwellings. The auxiliary systems for the secondary side circulation, systems expansion and pressurisation would all remain the same. The plate heat exchanger would replace the location of the redundancy boiler, thus reducing the disruption during the switch over period.

The attached marked up site plan show the points of connection and an indicative route for the further DH main from Agar Grove and alternatives for connecting to a future systems DH main inn Camly Street

All services are being the final phase will have seen all utility and site wide services having been re-planned to suite the landscape master plan and new road layout. Typically these will be located below the foot path in accordance with the NJUC published guidance.

A proposed 1000mm wide 800 deep zone could be left within the carriageway for the future DH mains to be installed at a later date. As the site will been redeveloped it would be unlikely that the space would be taken by other services. Should further assurance be required legal way leave could arranged to reserve the space for further DH connections.

Connection	No. units	Peak load (reserved cap) , kW	Heat main dia' mm
Block A	38	101 (125)	50
Block B	105	242 (300)	65
Block CDE	34	117 (140)	50
Block G (F&H)	57	131 (160)	50
Block I	38	101 (125)	50
Block JKL	73	168 (200)	65
Lulworth	148	488 (580)	100
TOTAL	**493**	**1348 (1630)**	

APPENDIX 1 CORRESPONDENCE BETWEEN LB CAMDEN AND ARGENT

From: Clare Hebbes [mailto:clare.hebbes@argent group.plc.uk]
Sent: 31 January 2012 16:27
To: Christensen, Michelle
Cc: Garner, Harold
Subject: RE: Maiden Lane estate - connection to Argent Kings Cross site

Michelle,
Apologies for the slow response. I have added comments below and attached our supply agreements for your reference. Given that we had discussed a bulk supply, we would need top consider one or two changes to these agreements I suspect.

In looking at your cost analysis, I notice that you are still allowing for boilers – is this for resilience, or do you imagine them being used?

Kind regards,

Clare

From: Christensen, Michelle [mailto:Michelle.Christensen@camden.gov.uk]
Sent: 25 January 2012 13:22
To: Clare Hebbes
Subject: FW: Maiden Lane estate - connection to Argent Kings Cross site

Dear Clare,

Further to my email below dated 16 December 2011, I was hoping to discuss this with you further. Will you be able to provide a response by the end of the month?

We'd like to see if there's a way forward with this, however in order to avoid abortive design costs we will need to get a response from you by the end of January 2012.

I look forward to hearing from you.

Many thanks

Yours sincerely,

Michelle

Michelle Christensen
Development Manager

Telephone: 020 7974 1445

From: Christensen, Michelle
Sent: 16 December 2011 11:52
To: clare.hebbes@argentgroup.plc.uk
Cc: Pert, Robert; Garner, Harold; Kevin Tilson; Briden, Anthony
Subject: Maiden Lane estate - connection to Argent Kings Cross site

Dear Clare,

Thank you for meeting with us on 18 August 2011. Please find attached the costing exercise for the option of connecting to the district heat network on the Argent Kings Cross site. In order to gain a better understanding of the arrangements and the parameters of delivery so

that we can better assess this option and revise our costs if required. Can you please provide the following information:

- details of the ESCO including service arrangements and ownership the ESCO is owned by the King's Cross Central General Partnership (90%) and Metropolitan (10%).
- potential contractual arrangements including length of contract. This will depend on the balance of investment in the network. For information, I have attached a copy of our commercial supply arrangement for the KX site.
- details relating to supply when the contract expires generally, the supply contracts across the site run until the customer terminates, as a normal utility supply.
- details and breakdown of costs associated with the pipe work run from the base of the 27 storey Kings Cross student tower at the north-eastern edge of the Argent site to the red line of the Maiden Lane site at the new pedestrian link at Allensbury Place. This involves running pipe work under two network rail bridges and potentially lowering the road and we would expect Argent to have allowed for all costs in relation to this. I am not sure I fully understand this point. We sent costs for an installed length of pipework, which would certainly run under the new CTRL bridges, but within the depth of the road?
- we have discussed connecting approximately 264 new build units but as part of integrated stratgey we would want to see a phased connection which would include 264 new build units and 444 existing units which make up the rest of the Maiden Lane estate which will be retrofitted in further phases. Would this pose any problems to you? For example, are there any implications or constraints to the timing of our units coming online in various phases? We simply need to understand the load and profile. Generally speaking the residential load is complimentary to the load on the KX site. We would need to understand when load is likely to come on stream in case it has an impact on the phasing of our plant installation.
- what guarantees of supply do you provide to existing Kings Cross occupants? We provide a similar level of service to other utilities. If we supply direct to residential units, there are also penalty payments made to occupiers should MKC not be able to supply heat.
- what are the arrangements for supply within the tenancies of the commercial and residential units within the Kings Cross site? I have attached both supply agreements.
- can you please confirm that the ESCO is unable to fund the capital connection cost and recharge us? Time has moved on a little since we last spoke and there is now a potential for this. However I would be very surprised if MKC could fund capital at a rate lower than the council could achieve through its normal channels?

We are currently working through the detailed design process and plan to submit a detailed planning application in March 2012. In order to avoid abortive design costs we will need to get a response from you by the end of January 2012.

If you feel it would be helpful to meet again to discuss then do please let me know and I will arrange this.

Many thanks

Yours sincerely,

Michelle

Michelle Christensen
Development Manager
Repairs and Improvements
Housing and Adult Social Care
London Borough of Camden

Telephone: 020 7974 1445
Web: camden.gov.uk

1st floor
33-35 Jamestown Road
London NW1 7DB

Revisions

Phase 1
Phase 2
Phase 3
Phase 4
Phase 5
Phase 6

Temporary Energy Centre

DH below ground main

MFIlp mark of phasing strategy and District Heating net work analised. 20140317

Hawkins\Brown

60 Bastwick Street
London EC1V 3TN
020 7336 8030t
020 7336 8851f

mail@hawkinsbrown.com
www.hawkinsbrown.com

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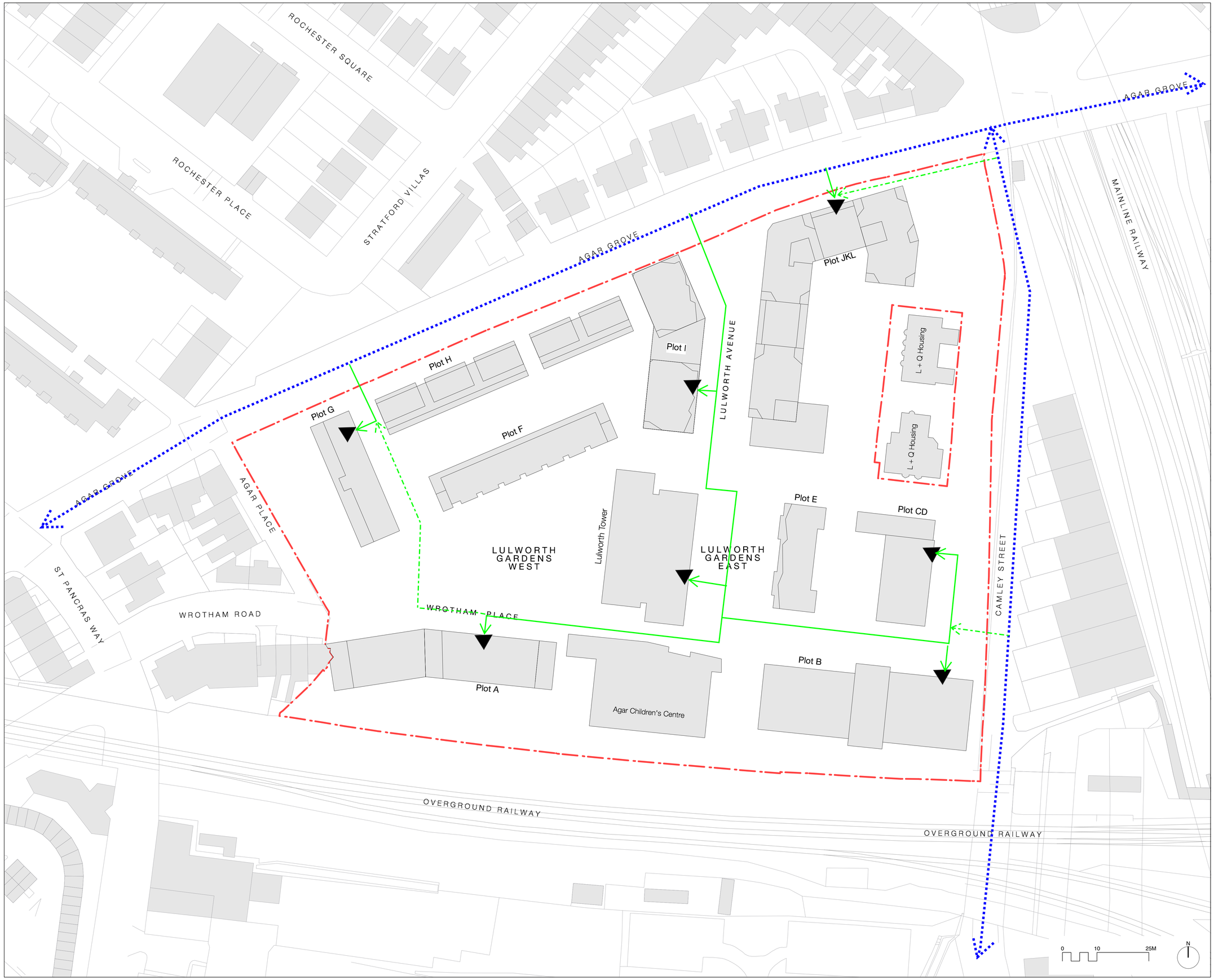
grant associates

Project
Agar Grove
Estate Regeneration

Drawing
Proposed Masterplan
Block Plan

Scale @ A1 @ (A3)	Date
1:500 (1:1000)	December 2013
Drawn by	Checked by
Various	SR
Job Number	Status
HB1423	Planning

Drawing No. & Revision
1423_DWG_00_100



Revisions

Futuer point of connection

Potential future DH network

Potentail connectivity to Agar Grove

Alternative connectivity to Camley Street

MFIlp mark of phasing strategy and District Heating net work analised. 20140318

Hawkins\Brown

60 Bastwick Street
London EC1V 3TN
020 7336 8030t
020 7336 8851f

mail@
hawkinsbrown.com
www.
hawkinsbrown.com

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Project
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Block Plan

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