

UTILITY ASSESSMENT REPORT

BOXWORTH, CAMBRIDGE

Newlands Development



utilityconnections

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CONTENTS

Document verification	1
1. Executive summary	3
1.1. Connection constraints	3
1.2. Financial sums	5
2. Introduction	7
3. Site location	8
4. Proposed development	9
5. Utility network asset records search	10
6. Utility composite drawing	12
7. Identified utility networks, diversions and terminations	13
7.1. Water – Cambridge Water	13
7.2. Gas – Cadent Gas	15
7.3. Electricity (DNO) – UK Power Networks	17
7.4. Telecoms – Openreach	18
7.5. Telecoms – Virgin Media	20
7.6. Telecoms – Mast Operators	21
7.7. Gas – GTC	22
8. New Infrastructure	23
8.1. Electricity Point of Connection (non-contestable) – 18MVA (import only)	24
8.2. Electricity – New Connection (contestable) – 18MVA (import only)	26
8.3. Electricity Point of Connection (non-contestable) – 40MVA (import only)	28
8.4. Electricity – New Connection (contestable) – 40MVA (import only)	30
8.5. Electricity - New import & export, 18MVA connection (budget DNO option)	32
8.6. Electricity - New import & export, 40MVA connection (budget DNO option)	35
8.7. Water Point of Connection	38
8.8. Water – New Connection (contestable)	40
8.9. Gas - Point of Connection (speculative units)	41
8.10. Gas – New Connection	43
8.11. Gas - Point of Connection (speculative units & generation)	44
8.12. Gas – New Connection	45
8.13. Telecoms	46

1. EXECUTIVE SUMMARY

A utility infrastructure feasibility study has been carried out to assess existing utility infrastructure, on or in the vicinity of, the development site, as well as the ability of existing utility distribution networks to support the Boxworth development proposed.

The following items have been identified as requiring attention or consideration prior to works commencing: -

1.1. CONNECTION CONSTRAINTS

ELECTRICITY

- The distribution network operator (DNO) for the area UK Power Networks (UKPN) Ltd have confirmed that the Boxworth site can be connected via the 33kV extra high voltage (EHV) network with a point of connection (POC) identified at new circuit breakers at the Huntingdon Grid substation based upon an import capacity of 18MVA. UKPN have noted that the POC is subject to considerable reinforcement works and the anticipated energisation date would be by the 31st October 2024.

An import capacity of 40MVA has also been considered for this project and UKPN have confirmed that the POC for this would be from Histon Grid site.

- In addition to the import requirements noted above, there is the potential that the overall site will look to export power back onto the DNO network via an onsite renewables / energy centre strategy. UKPN have noted a potential POC location for export requirements and have identified costs for them to configure / reinforce their network to be able to accept exported capacity.
- The DNO have noted that there may be interactivity associated with the import / export POC's and this will be confirmed once formal connection offers are obtained.

WATER

- The statutory undertaker for the area Cambridge Water have confirmed that the Boxworth site can be served from the existing 335mm HPPE distribution main that is to be diverted around the perimeter of the site.

GAS

- The gas transporter (GT) for the area Cadent Gas have confirmed that the Boxworth site can be connected to their existing intermediate pressure (IP) gas mains network with a CSEP point being identified from the 8" inch steel main that currently crosses the site adjacent to the A14. The CSEP position provided is based upon the I&C capacities identified only and Cadent Gas have noted that this can be accommodated without the need for reinforcement works.
- An additional network capacity enquiry has also been made to Cadent Gas to incorporate additional capacity for use by an energy centre or alternative electricity generating method. Cadent Gas have noted that reinforcement works will be required to provide the additional gas requirements and a detailed analysis study (DAS) will need to be undertaken to confirm the final scope of works and associated costs. The DAS is currently being progressed and this is due to be issued by October 2021.

TELECOM

- At present Openreach have existing underground ducted apparatus that spans along Boxworth Road adjacent to the project area. Diverse telecoms options to be explored to identify how the project can be served by alternate exchange points.

1.2. FINANCIAL SUMS

BUDGET COSTS

Utility	New Utility Infrastructure	Budget Cost
<u>Electricity POC – UKPN</u> 18MVA Import option	UKPN non-contestable costs associated with DNO 18MVA import POC connection.	£3,297,812.62
<u>Electricity POC – UKPN</u> 40MVA Import option	UKPN budget non-contestable costs associated with DNO 40MVA import POC connection including second comer costs.	£15,215,000.00
<u>Electricity Infrastructure (Import)</u> 18MVA DNO Import option	Budget costs for: - Installation of 20km of 33kV EHV infrastructure from DNO POC located at Huntington Grid site to development area and establishment of new 33kV / 11kV primary substation and associated CB's for landlords 11kV HV circuit and initial secondary substation onsite. Budget costs caters for multiple DD's.	£16,846,596.00
40MVA DNO Import option	Budget costs for: - Installation of 26km of 33kV EHV infrastructure from DNO POC located at Histon Grid site to development area and establishment of new 33kV / 11kV primary substation and associated CB's for landlords 11kV HV circuit and initial secondary substation onsite. Budget costs caters for multiple DD's as well as bespoke cable requirements and larger compound arrangement.	£24,039,444.00
<u>Electricity POC – UKPN</u> 18MVA Import & export option	18MW Battery Storage, 18MW Solar or 18MW Gas Unconstrained Connection – UKPN budget non-contestable costs associated with DNO 18MVA import & export POC connection. Flexible Connection - UKPN budget non-contestable costs associated with DNO 18MVA import & export POC connection.	£16,000,000.00 £3,200,000.00
<u>Electricity POC – UKPN</u> 40MVA Import & export option	40MW Battery Storage, 40MW Solar or 40MW Gas Unconstrained Connection – UKPN budget non-contestable costs associated with DNO 40MVA import & export POC connection. (Battery Storage) Unconstrained Connection – UKPN budget non-contestable costs associated with DNO 40MVA import & export POC connection. (Solar or Gas) Flexible Connection - UKPN budget non-contestable costs associated with DNO 40MVA import & export POC connection. (Battery Storage) Flexible Connection - UKPN budget non-contestable costs associated with DNO 40MVA import & export POC connection. (Solar or Gas)	£28,100,000.00 £28,400,000.00 £12,100,000.00 £12,400,000.00
<u>Electricity Infrastructure (Import & Export)</u> 18MVA DNO Import & export option	18MW Battery Storage, 18MW Solar or 18MW Gas Unconstrained & Flexible Connection - UKPN budget costs for contestable works to facilitate an 18MVA import and export connection arrangement for the project. Connection and infrastructure work at 33kV EHV voltage tier.	As per import costs
<u>Electricity Infrastructure (Import & Export)</u> 40MVA DNO Import & export option	40MW Battery Storage, 40MW Solar or 40MW Gas Unconstrained & Flexible Connection - UKPN budget costs for contestable works to facilitate an 40MVA import and export connection arrangement for the project. Connection and infrastructure work at 132kV EHV voltage tier.	As per import costs

Water	Budget costs to connect to Cambridge Water mains from diverted apparatus within curtilage of the development area and mains infrastructure works to serve the development.	£570,000.00
Gas (Spec units)	Budget costs for CSEP connection to IP main located adjacent to development area and mains infrastructure works including new IP / MP PRS.	£950,000.00
Gas (Generation)	Cadent Gas – Feasibility study. Cadent Gas – Reinforcement works. Offsite IP mains installation works from CSEP position to be identified to development area. Budget costs for IP and MP mains infrastructure and MP PRS.	£50,000.00 £TBC £TBC £950,000.00
Telecoms	Budget costs for Openreach connection including diverse telecoms options.	£150,000.00
	Total – 18MVA Import only option	£20,144,408.62
	Total – 40MVA Import only option	£39,254,444.00
	Total – 18MVA Import & export (unconstrained) option	£32,846,596.00
	Total – 18MVA Import & export (flexible) option	£20,046,596.00
	Total – 40MVA Import & export (unconstrained) option	£52,439,444.00
	Total – 40MVA Import & export (flexible) option	£36,439,444.00

Asset Owner	Diversion/Disconnection	Budget Cost
Cambridge Water	Budget costs from Cambridge Water to divert existing 355mm HPPE water main for 200m as per budget design received.	£91,125.80
Cadent Gas	Existing 6" inch IP main located adjacent to development to be left in situ.	£N/A
Openreach	Budget costs to alter / divert existing Openreach ducts and chambers located along Hight Street where new access proposals are intended.	£150,000.00
	Total	£700,000.00

2. INTRODUCTION

GENERAL

The report has been produced to assess the feasibility of delivering new utility infrastructure to the Brickyard Farm development in Boxworth, Cambridge as well as an assessment of the existing utility infrastructure which may be affected requiring disconnection and/or diversion prior to construction works commencing.

3. SITE LOCATION

The site intended is located at the former Brickyard Farm in Boxworth, Cambridge as can be seen in figures 3.1 and 3.2 below.

Grid Reference: TL34886575

Figure 3.1– Site Location (Map View)

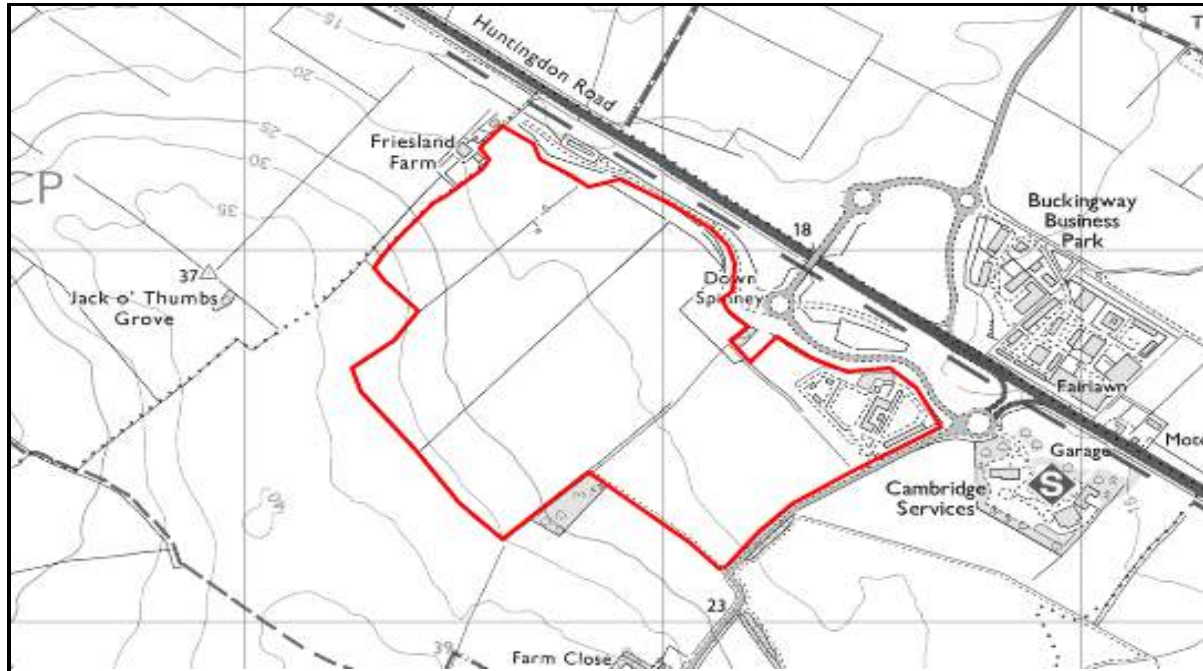


Figure 3.2– Site Location (Satellite View)



4. PROPOSED DEVELOPMENT

The latest masterplan for the proposed development can be seen in figure 4.1 below.

Figure 4.1– Proposed Development Layout Plan



Item	Description
Drawing	19260 F0014 Rev A
Development Area	2,500,000sqft
Proposed number of Units	13 units
Development Type/use	I&C

5. UTILITY NETWORK ASSET RECORDS SEARCH

A utility asset records search has been undertaken to determine what assets exist near to or on the proposed development site. The results of this search and affected assets only can be seen in table 5.1 below.

Table 5.1– Search Results

Company Name	Type	Plant in Area
Anglian Water (Sewers)	Water	Yes
BT Openreach	Telecoms	Yes
Cadent Gas	Gas	Yes
Cambridge Water (Potable)	Water	Yes
GTC	Gas	Yes
National Grid – Electricity Transmission	Electricity	Yes
National Grid – Gas Transmission	Gas	Yes
O2 UK Limited	Telecoms	Yes
UK Power Networks	Electricity	Yes
Virgin Media	Telecoms	Yes
All pipelines via Linesearch	Oil / Fuel	No
Cityfibre	Telecoms	No
Colt Networks C/O McNicholas Construction Services	Telecoms	No
Easynet Telecoms Ltd	Telecoms	No
Energetics	Multi-utility	No
ENGIE	N/A	No
Fibernet UK Ltd	Telecoms	No
Fibrespan Limited	Telecoms	No
Global Crossing PEC UK Ltd	Telecoms	No
Global Crossing UK Ltd	Telecoms	No
Hibernia Networks	N/A	No
Highways Agency	Multi-utility	No
Interoute Ltd	Telecoms	No
Interoute Vtesse Ltd	Telecoms	No

Kingston Communications	Telecoms	No
KPN International C/O McNicholas Construction Services	Telecoms	No
Mobile Broadband Networks Ltd	N/A	No
Network Rail	Telecoms	No
Redcentric Plc	N/A	No
Spectruminteractive	Telecoms	No
SSE Pipelines Ltd	Gas / Telecoms	No
SSE Telecoms	Telecoms	No
Tata Communications C/O McNicholas Construction Services	Telecoms	No
Teliasonera (Telent)	Telecoms	No
Trafficmaster Plc	Telecoms	No
Utility Assets Ltd	N/A	No
Verizon Business	Telecoms	No
Vodafone (Formerly Cable & Wireless)	Telecoms	No
Vodafone (Formerly Thus Plc)	Telecoms	No
Zayo Europe	Telecoms	No

IMPORTANT NOTE

Any plans, records and drawings provided, should be used as a general guide only. Also note that any recent additions or alterations to any utility networks may not be shown. Cables or pipes owned by private companies may not be shown and could be present onsite.

Before any excavations are undertaken you should always verify exact locations of cables using a cable locator, and by careful use of hand tools in accordance with HSE guidance note HSG47 "Avoiding danger from underground services".

[Any services located must be treated as being live until proven otherwise.](#)

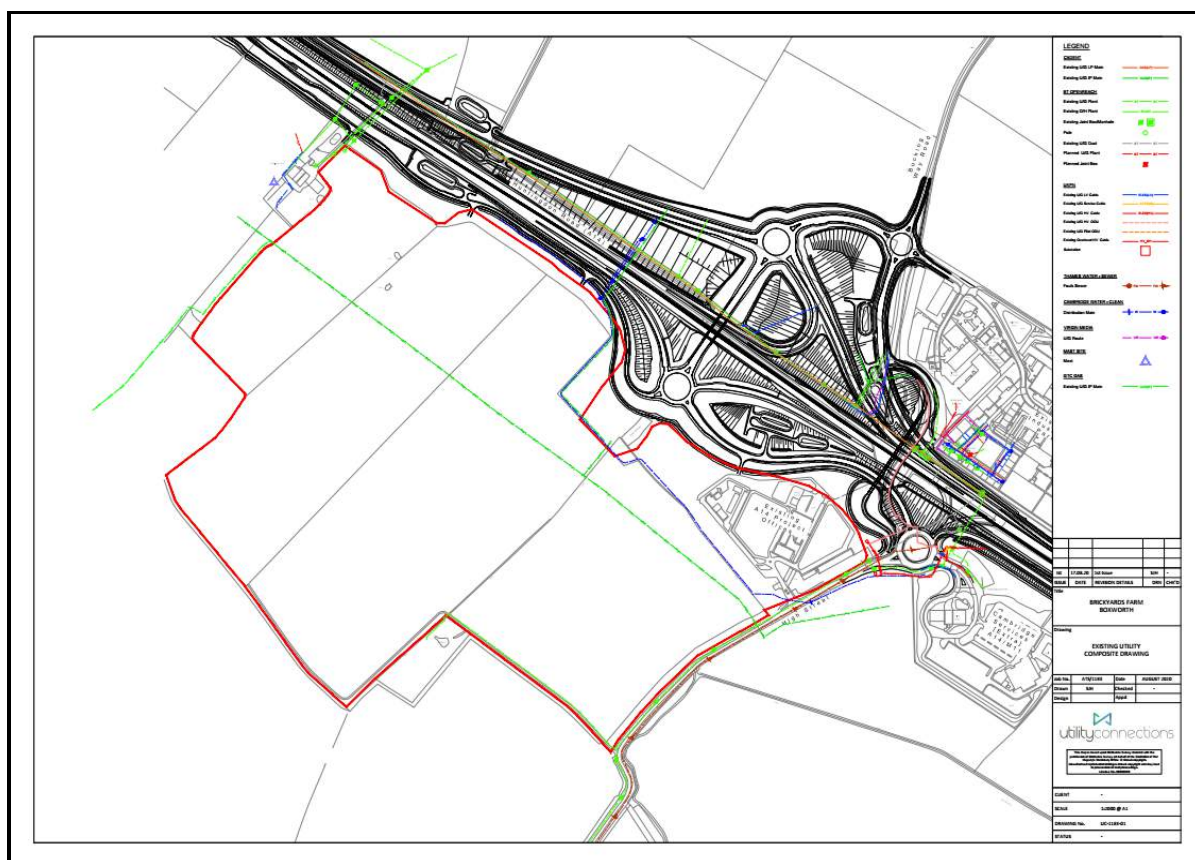
Other useful documents to read prior to undertaking any works are HSE GS6, "Avoiding danger from overhead power lines" and HSE "Avoiding concealed services and overhead power lines"

It is your responsibility to satisfy yourselves that it is safe to set either your own staff or sub-contractors to work where utility assets may be present.

The statutory records obtained as part of the utility investigation works undertaken in section 5 of this report have been overlaid onto the latest masterplan for the project to provide an indication of how the existing utility assets present may affect the construction proposals being considered.

The composite drawing drafted can be seen in figure 6.1 below.

Figure 6.1– Utility composite drawing for proposed development.

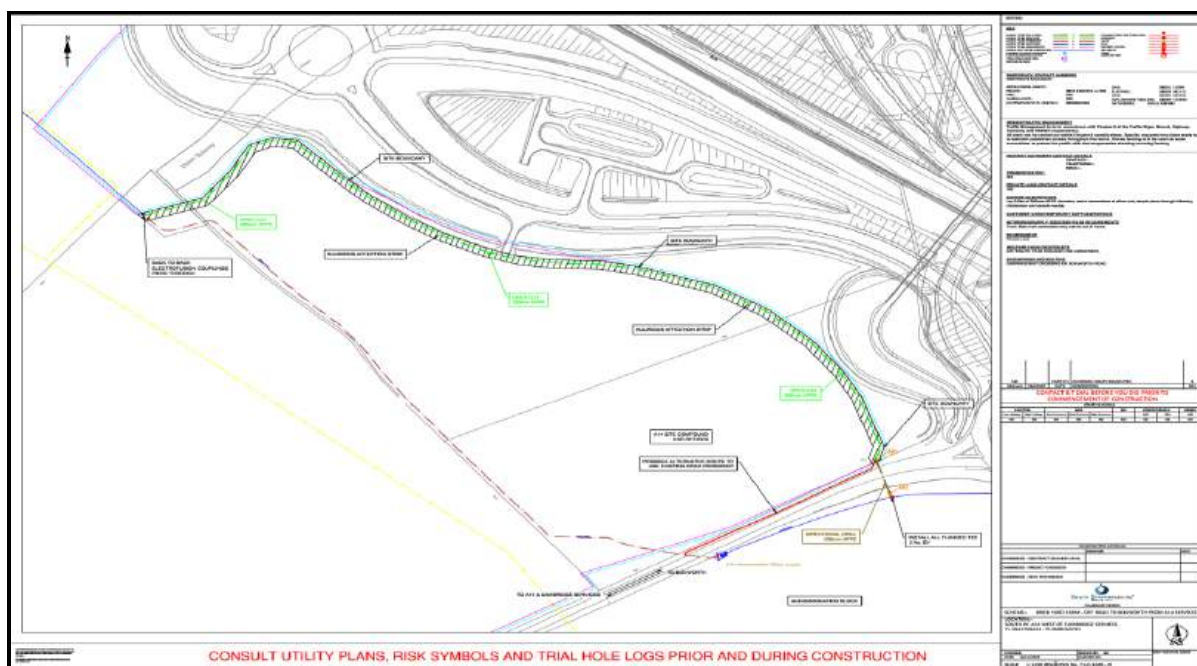


The below utility assets have been identified as being within / in the vicinity of the project area intended and disconnection / diversion works may be required to allow the overall development of the site.

Cambridge Water are the statutory undertaker for the Cambridge area and have existing distribution mains within and in the vicinity of the development area being considered as can be seen in figure 7.1.1, 7.1.2 and 7.1.3 below:

SUMMARY OF WORKS – DISCONNECTIONS / DIVERSIONS

Figure 7.1.4— Cambridge Water diversion proposals for section of mains affected onsite.



BOXWORTH, CAMBRIDGE

7.2. GAS – CADENT GAS

Cadent Gas are the gas transporter (GT) for the Cambridge area and have existing mains within and in the vicinity of the site being considered as can be seen in figure 7.2.1, 7.2.2 and 7.2.3 below:

Figure 7.2.1– Existing Cadent Gas asset records for the development area being considered.

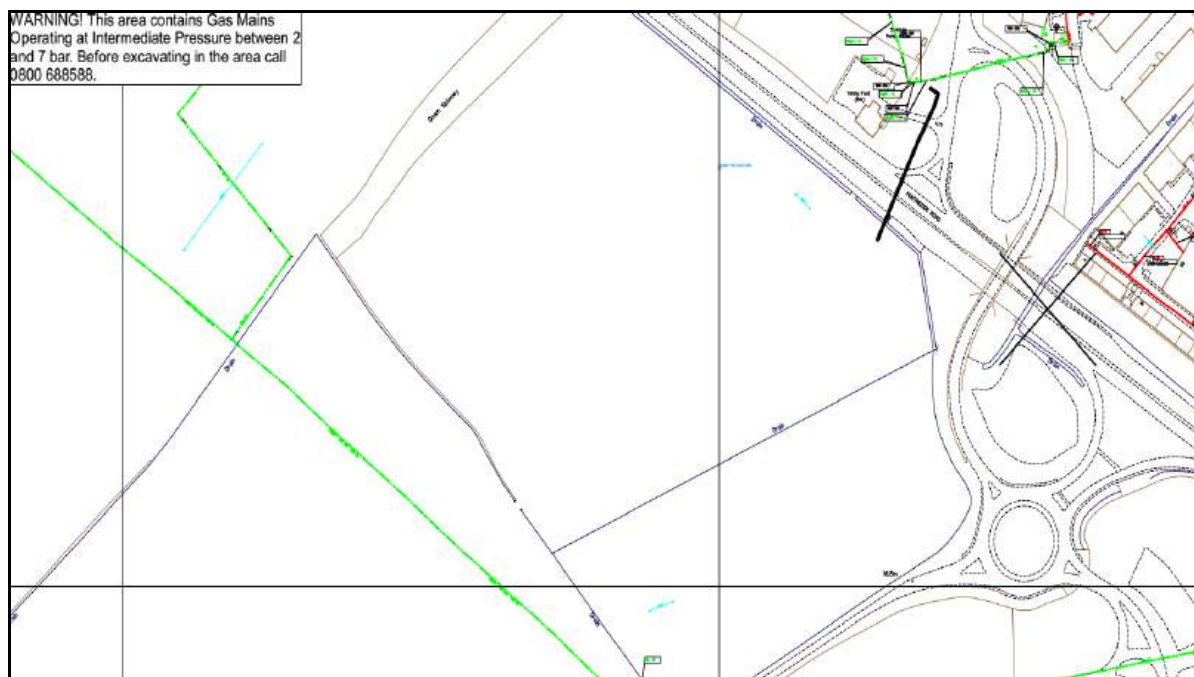


Figure 7.2.2– Existing Cadent Gas asset records for the development area being considered.

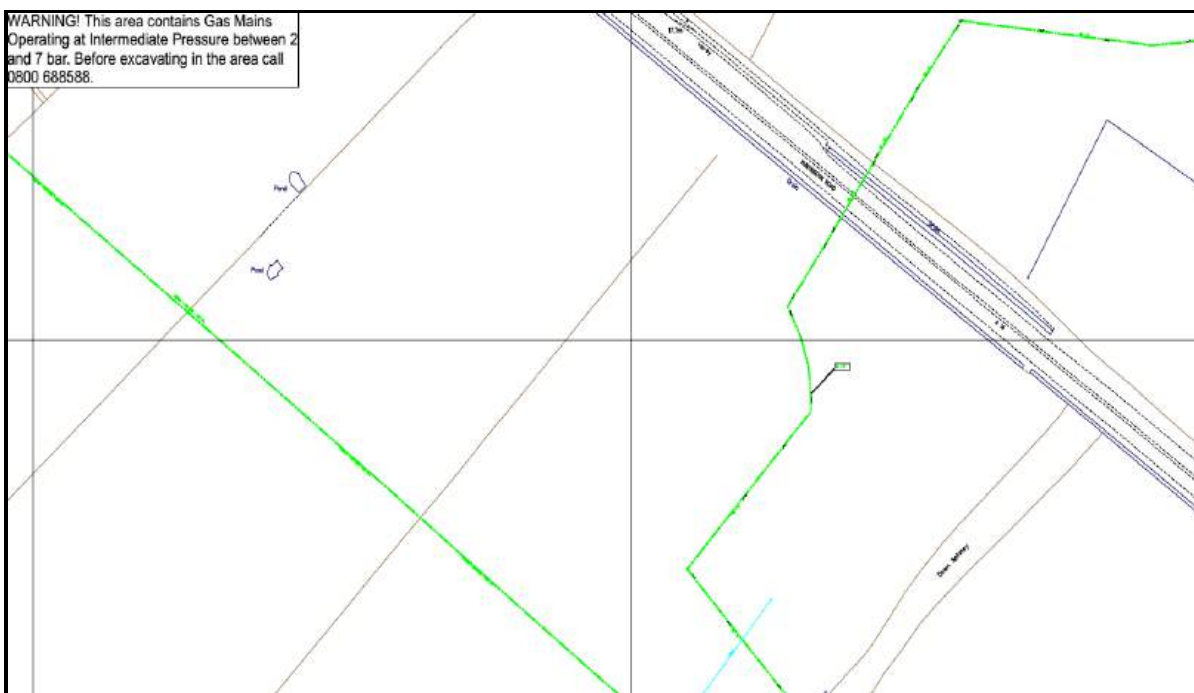
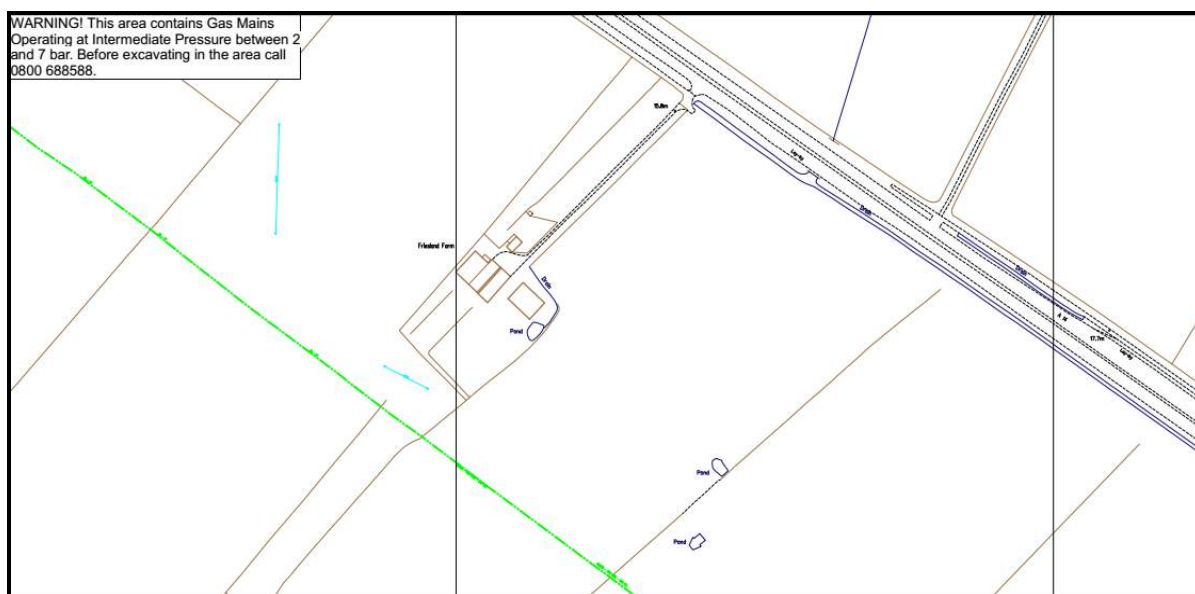


Figure 7.2.3– Existing Cadent Gas asset records for the development area being considered.



The above asset records indicate that the site being considered for development has a intermediate-pressure (IP) main that crosses the project area.

HIGH PRESSURE NETWORK

No HP infrastructure present within area.

INTERMEDIATE PRESSURE NETWORK

At present there is an existing 6" inch steel IP main that crosses the development area from east to west with this apparatus also branching north under the A14.

MEDIUM PRESSURE NETWORK

No MP infrastructure present within the area.

LOW PRESSURE NETWORK

At present there is existing LP infrastructure located on the other side of the A14. This is apparatus is unaffected.

SUMMARY OF WORKS – DISCONNECTIONS / DIVERSIONS

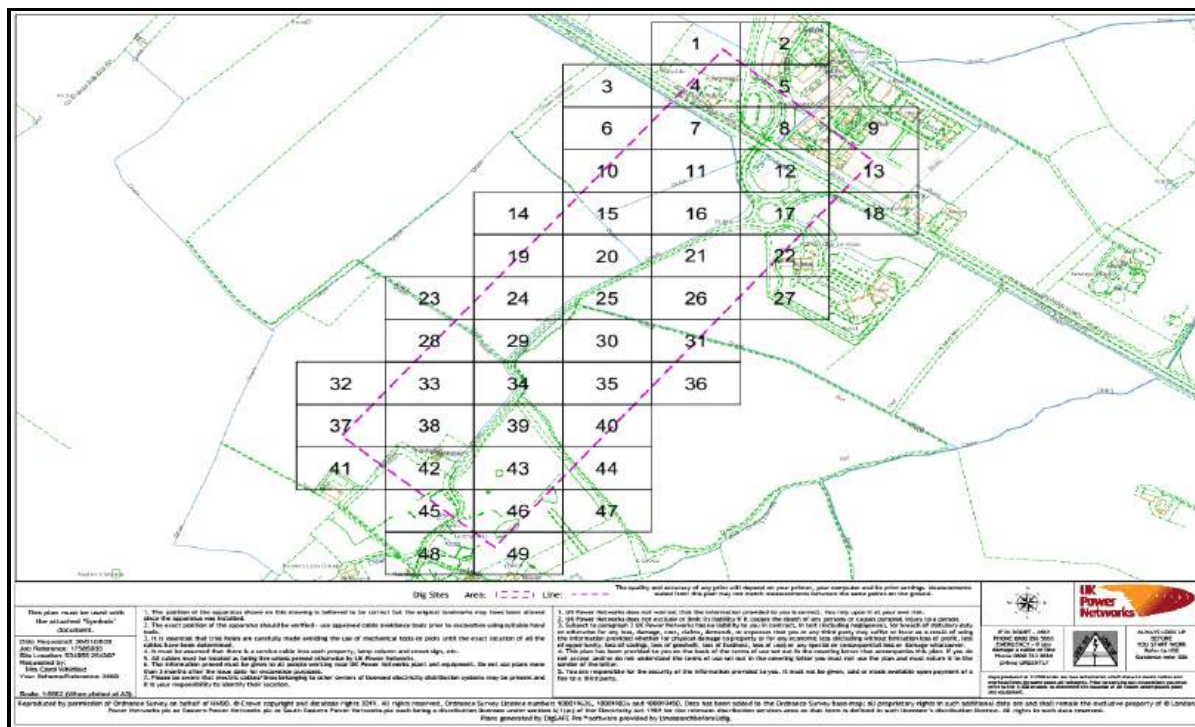
It is intended for the existing IP gas main to be left in situ and the development layout will be suitably designed to ensure this apparatus remains in public open spaces or under the newly constructed highways / footways at the site.

Further investigations will be required to locate and confirm the depth and position of the pipelines. Assessments of the proposals by Cadent's plant protection team will be required long with coordination with the appointed design team.

7.3. ELECTRICITY (DNO) – UK POWER NETWORKS

UK Power Networks (UKPN) are the distribution network operator (DNO) for the Cambridge area and have existing mains infrastructure in the vicinity of the site being considered as can be seen in figure 7.3.1 below.

Figure 7.3.1– Existing UKPN asset records for the development area being considered.



The above asset records indicate that the site being considered for development is clear of existing electricity infrastructure.

132,000 VOLT NETWORKS

No 132kV EHV infrastructure present within area.

33,000 VOLT NETWORKS

No 33kV EHV infrastructure present within area.

11,000 VOLT NETWORKS

The UKPN records note there is 11kV HV infrastructure present adjacent to the existing roundabout on Boxworth Road with this serving the A14 Swavesey North Site Compound substation.

LOW VOLTAGE 400/230 VOLT NETWORKS

UKPN has existing low voltage mains infrastructure located north of the A14.

SUMMARY OF WORKS – DISCONNECTIONS / DIVERSIONS

Based upon the proposed development layout no alteration works are envisaged. Depending on final S278 work proposals further consideration may be needed.

7.4. TELECOMS – OPENREACH

Openreach currently has existing infrastructure within and in the vicinity of the site being considered as can be seen in figures 7.4.1, 7.4.2 and 7.4.3 below.

Figure 7.4.1– Existing Openreach asset records for the development area being considered.

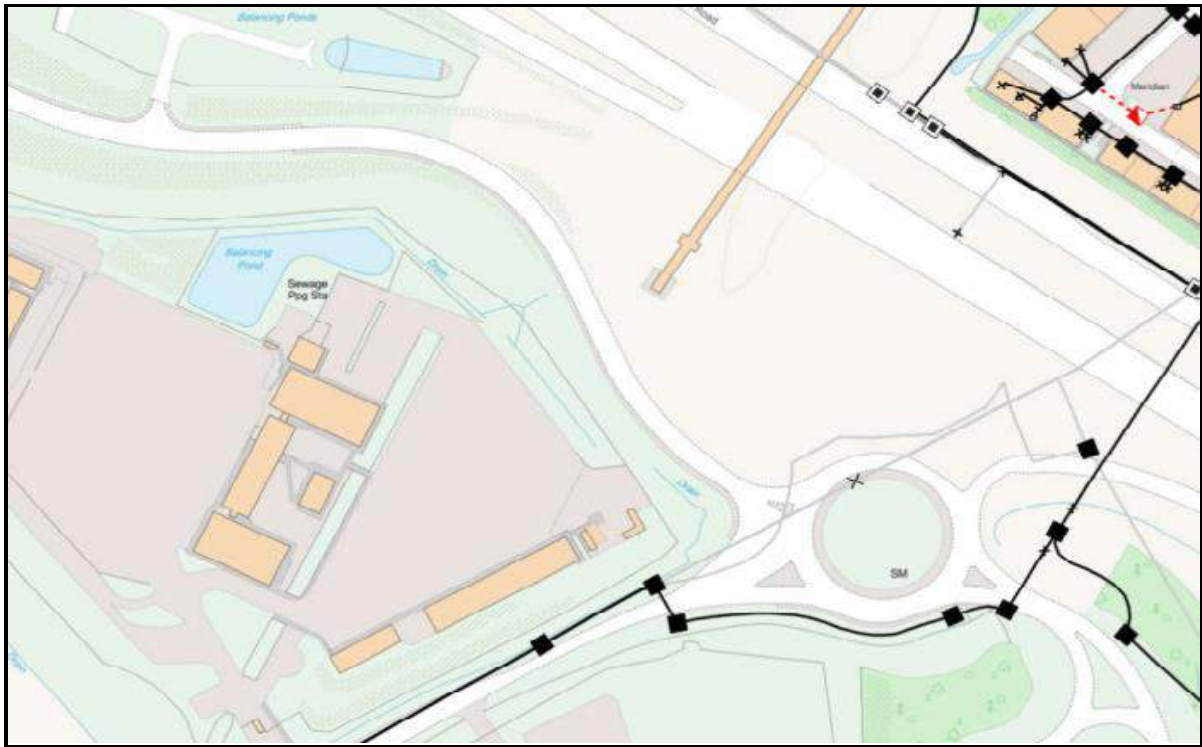


Figure 7.4.2– Existing Openreach asset records for the development area being considered.



Figure 7.4.3– Existing Openreach asset records for the development area being considered.



The above asset records indicate that the site being considered for development has existing Openreach apparatus present along Boxworth Road as well as an element of underground infrastructure along the southern boundary of the site.

DUCTED NETWORK

As per the asset records above Openreach have existing underground ducts in the vicinity of the development area being considered.

The underground apparatus noted along Boxworth Road will be affected by the new roundabout access proposals into the development area.

OVERHEAD NETWORK

N/A

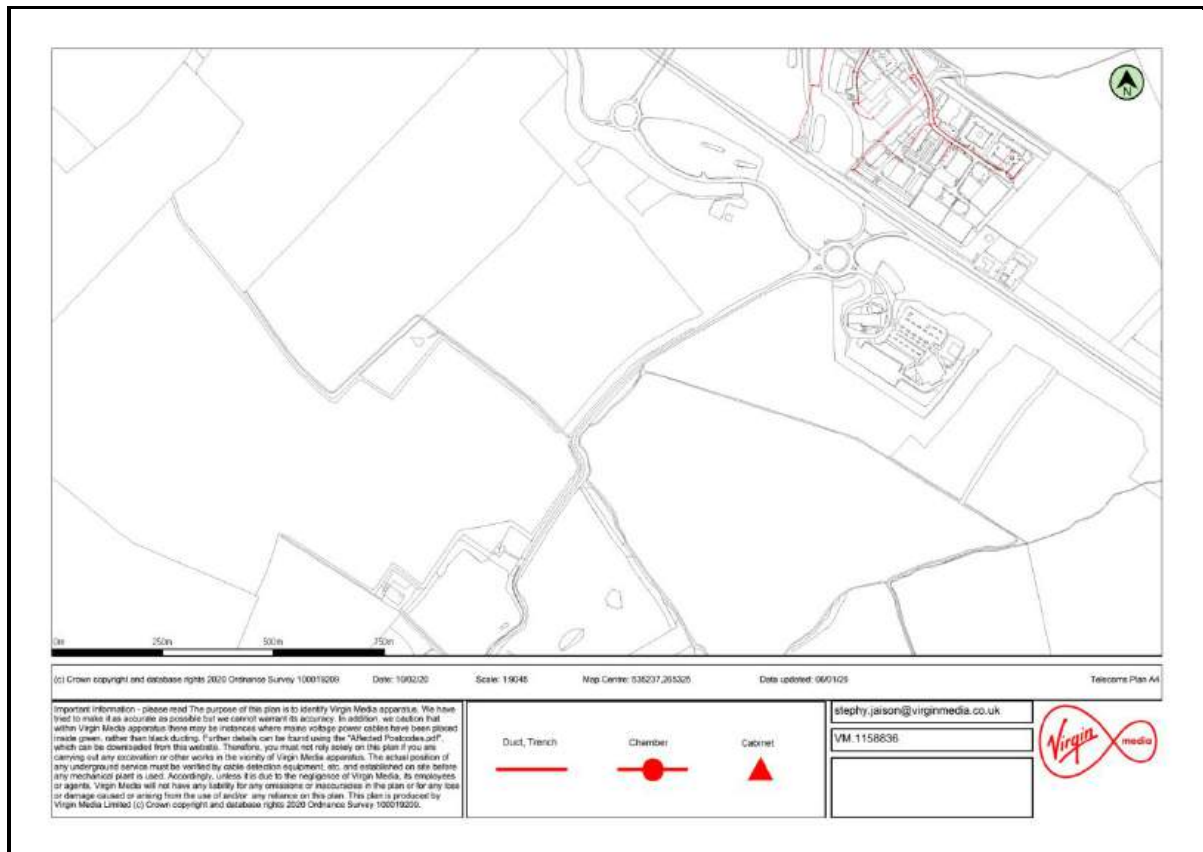
SUMMARY OF WORKS – DIVERSION

Duct and chamber alteration works are anticipated where the new access proposals are envisaged off Boxworth Road. Openreach have been approached with a view of providing a C4 detailed estimate once a site survey has been completed.

7.5. TELECOMS – VIRGIN MEDIA

Virgin Media currently has existing infrastructure in the vicinity of the site being considered as can be seen in figures 7.5.1, below.

Figure 7.5.1– Existing Virgin Media asset records for the development area being considered.



The above asset records indicate that the site being considered for development is clear of any existing Virgin Media apparatus.

DUCTED NETWORK

As per the asset records above Virgin Media have existing underground ducts north of the A14.

OVERHEAD NETWORK

N/A

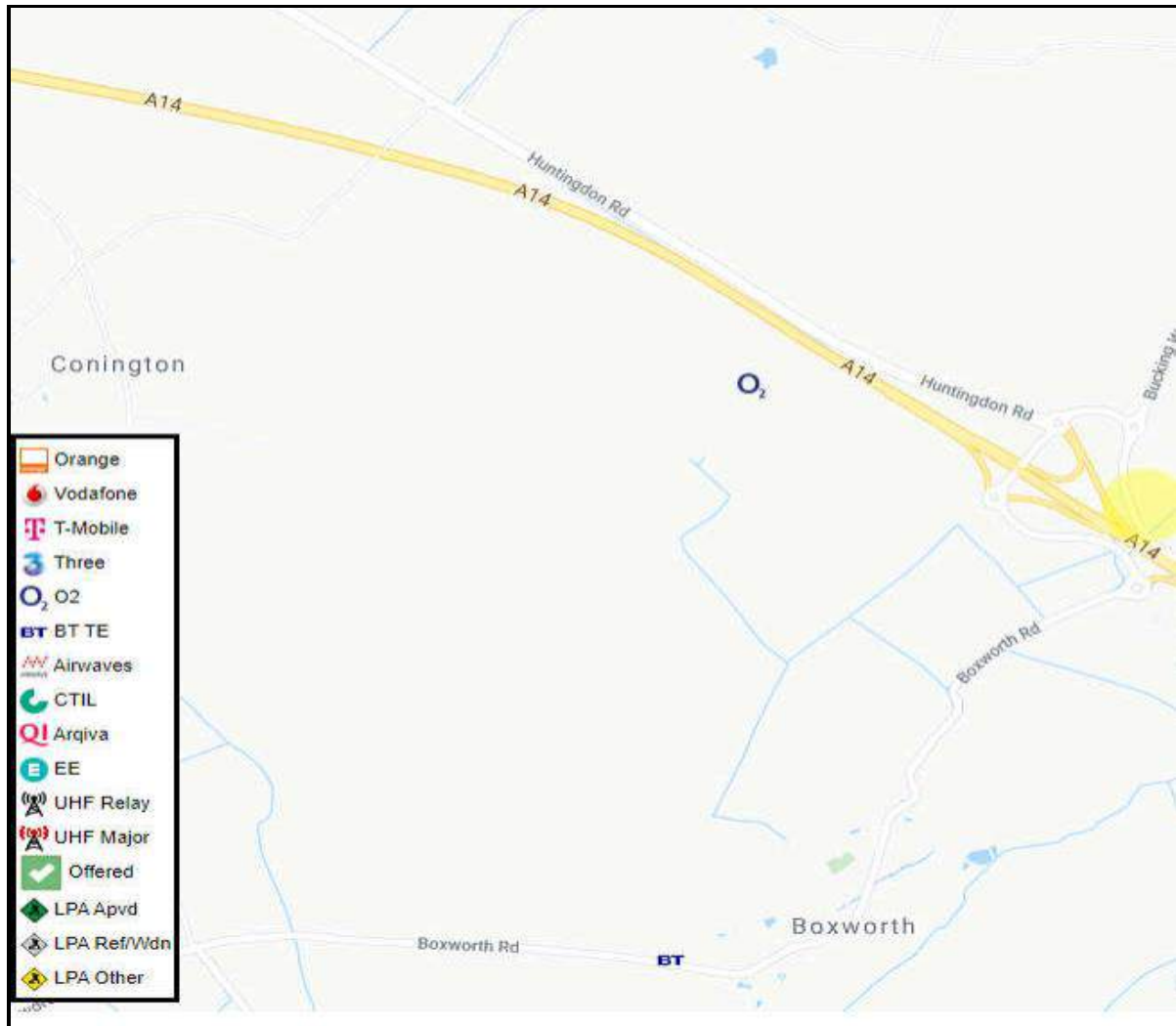
SUMMARY OF WORKS – DIVERSION

No alteration / diversion works required.

7.6. TELECOMS – MAST OPERATORS

O2 currently has an existing telecoms mast in the vicinity of the site being considered as can be seen in figures 7.6.1, below.

Figure 7.6.1– Existing Virgin Media asset records for the development area being considered.



The above asset records indicate that the site being considered for development is clear of any existing mast operator apparatus.

DUCTED NETWORK

Openreach currently operate ducts to the telecoms mast noted above.

OVERHEAD NETWORK

O2 telecoms mast positioned to the left of the development area being considered.

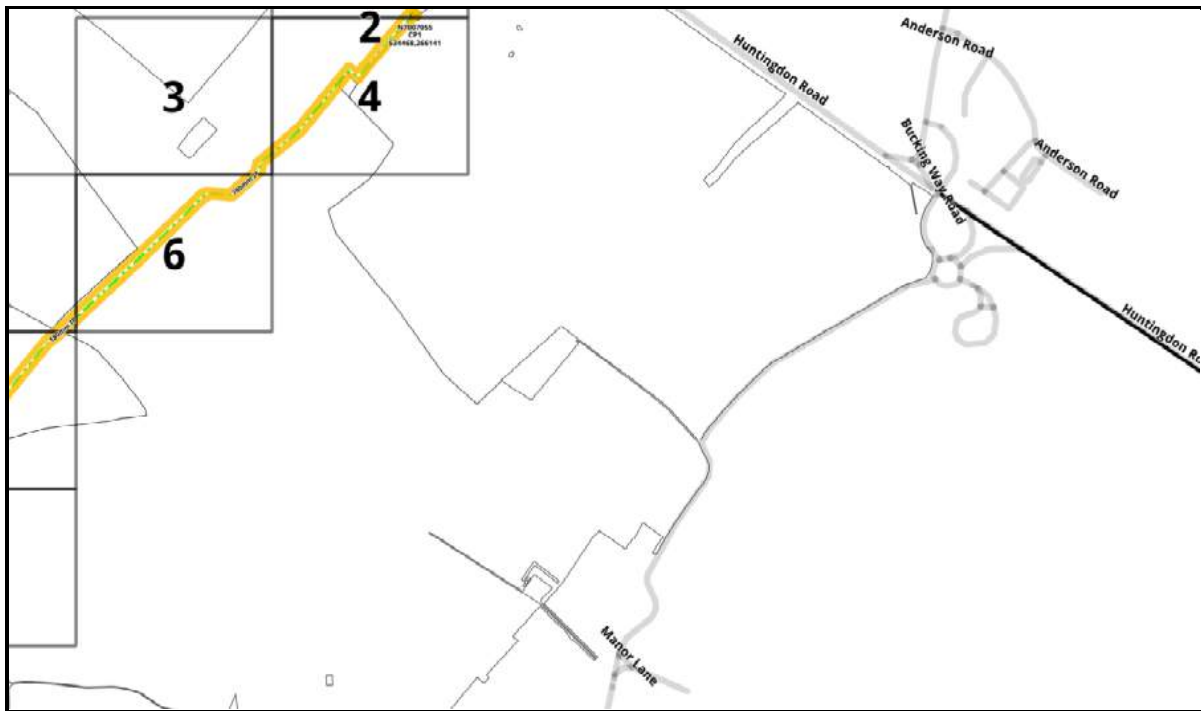
SUMMARY OF WORKS – DIVERSION

No alteration / diversion works required.

7.7. GAS – GTC

GTC are an independent gas transporter (IGT) and have existing mains in the vicinity of the site being considered as can be seen in figure 7.7.1 below:

Figure 7.7.1– Existing GTC asset records for the development area being considered.



The above asset records indicate that the GTC main is connected to the GT's IP network to the left of the development area being considered.

HIGH PRESSURE NETWORK

No HP infrastructure present within area.

INTERMEDIATE PRESSURE NETWORK

GTC's IP infrastructure spans south from the Cadent Gas network to the left of the development area.

MEDIUM PRESSURE NETWORK

No MP infrastructure present within the area.

LOW PRESSURE NETWORK

No LP infrastructure present within the area.

SUMMARY OF WORKS – DISCONNECTIONS / DIVERSIONS

No alteration / diversion works required.

8. NEW INFRASTRUCTURE

A load assessment was undertaken to identify the overall capacity requirements envisaged to serve the proposed Boxworth project.

Table 8.0.1, 8.0.2, 8.0.3 and 8.0.4 indicate the utility capacities that have been allocated to the overall project area based upon a I&C specification, but considerations have been made for specific end users and also the potential for bespoke export requirements.

Table 8.0.1 – Total utility capacities summary based upon I&C usage

Unit	Water - Ltr/s (Potable)	Electricity - kVA	Gas -kWh
13 I&C units	13.37	18,000	13,358
Total utility capacities considered	13.37	18,000	13,358

Table 8.0.2 – Total utility capacities summary based upon I&C usage

Unit	Water - Ltr/s (Potable)	Electricity - kVA	Gas -kWh
13 I&C units	13.37	40,000	13,358
Total utility capacities considered	13.37	40,000	13,358

Table 8.0.3 – Total utility capacities summary based upon export option 1

Unit	Water - Ltr/s (Potable)	Electricity - kVA	Gas -kWh
13 I&C units (With export option 1)	13.37	18,000	51,830
Total utility capacities considered	13.37	18,000	51,830

Table 8.0.4 – Total utility capacities summary based upon export option 2

Unit	Water - Ltr/s (Potable)	Electricity - kVA	Gas -kWh
13 I&C units (With export option 2)	13.37	40,000	101,830
Total utility capacities considered	13.37	40,000	101,830

8.1.1. ELECTRICITY POINT OF CONNECTION (NON-CONTESTABLE) – 18MVA (IMPORT ONLY)

UK Power Networks the DNO for the region have provided a point of connection (POC) offer under reference 8200042468 / QID 3200033267

DNO Non-Contestable charges	£3,297,812.62
Valid until	25/09/21

SITE LOAD

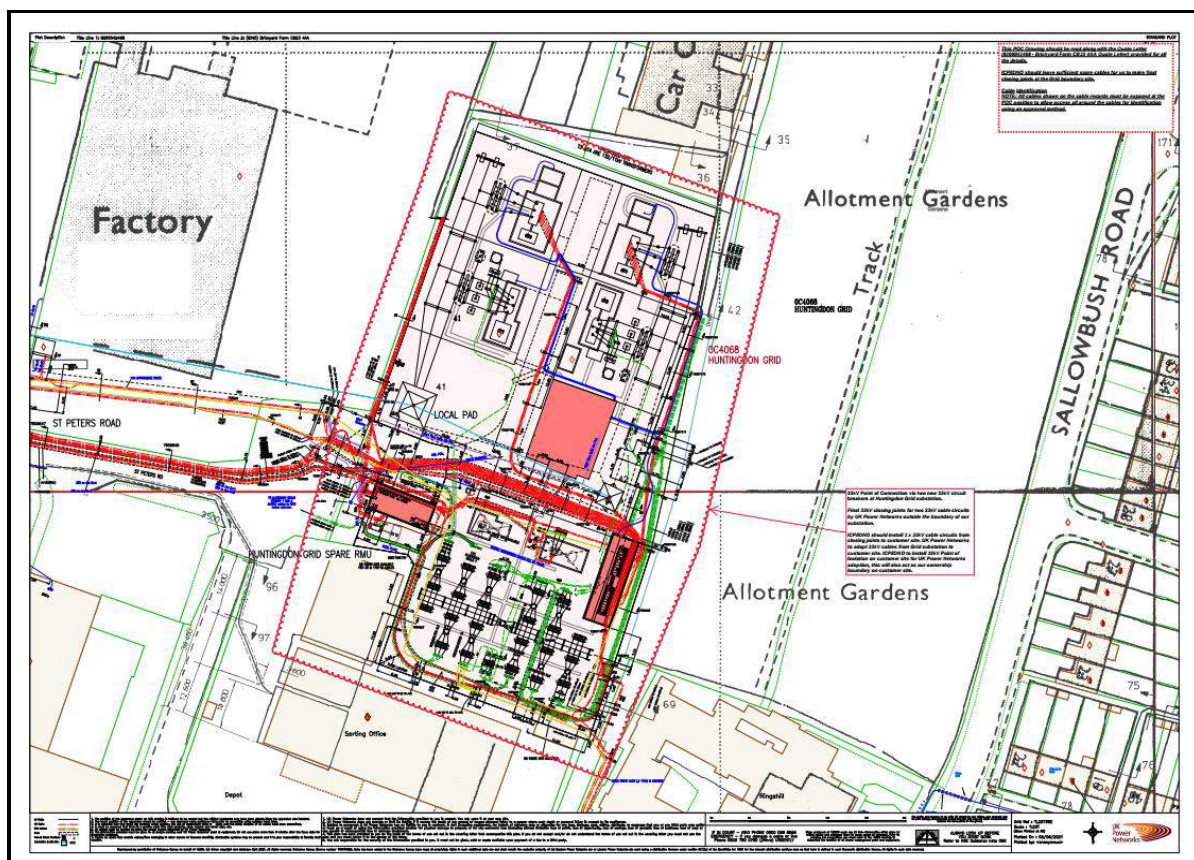
An electrical supply capacity of up to 18MVA has been requested from UKPN as detailed within Table 8.0.1.

POINT OF CONNECTION

UKPN have identified a point of connection from their existing 33kV EHV network at Huntington Grid site to provide the ASC of 18MVA required.

The POC location drawing showing the area where a connection can be seen in figure 8.1.1 below.

Figure 8.1.1– UKPN point of connection drawing for import capacity of 18MVA.



NON-CONTESTABLE WORKS

The non-contestable works that will be completed by the DNO can be seen in figure 8.1.2 below.

Figure 8.1.2– Summary of UKPN non-contestable works.

- Install 2 new 33kV circuit breakers at Huntingdon Grid for your connection
- Replace existing switchgear with 33kV indoor switchboard at Huntingdon Grid substation
- Construct new 33kV switch room to house the 33kV indoor switchboard
- Remove existing 33kV outdoor switchgear
- Power Quality Assessment
- SCADA and Commissioning works at the Customer Substation
- 33kV cabling along with associated pilots within Huntingdon Grid to the boundary of Huntingdon Grid substation including final closing joints
- Site Setup/Prelims

REINFORCEMENT WORKS

UKPN have noted in their connection offer, that the 18MVA capacity is dependant on the completion of planned 132kV reinforcement works at Eaton Socon and Little Barford grid site. The reinforcement works noted by the DNO are expected to be completed before October 2024.

OFFSITE CONSTRAINTS

All non-contestable works to be undertaken by the DNO.

8.2. ELECTRICITY – NEW CONNECTION (CONTESTABLE) – 18MVA (IMPORT ONLY)

The contestable element of electricity infrastructure works will consist of the installation of suitably rated 33kV EHV triplex cable from the POC identified at Huntington Grid to the development area where this apparatus will terminate within a new 33kV / 11kV primary substation.

From the new primary substation, a new set of 11kV HV CB's will be installed to accommodate an 11kV HV circuit onsite to facilitate landlords' and initial infrastructure requirements with provision of future extension works to accommodate future plot connections.

OFFSITE ROUTE (33,000 VOLT NETWORK)

Based upon a desktop study, the anticipated 33kV EHV cable route from the POC identified at Huntington Grid site to the development area will span approximately 20km and this can be seen in figure 8.2.1 below.

Figure 8.2.1– Anticipated 33kV EHV cable route from 18MVA POC to development area.



The above route will include multiple river and motorway crossings and it is anticipated that directional drilling works will be required where it is not achievable to install cables in existing bridge decks / crossing points. A detailed route proving study will need to be undertaken to identify any additional constraints along the route suggested.

ONSITE 33,000 VOLT NETWORK

The 33kV EHV circuit noted above will terminate at a new 33kV / 11kV primary substation located within the curtilage of the development area. The primary substation compound will be approximately 32m x 28m in area and will consist of 2 x 33kV / 11kV transformers as well as an 11kV HV switchboard located within a suitable brick or GRP accommodation.

ONSITE SECONDARY NETWORK (11,000/400 VOLT NETWORK)

It is proposed that the 18MVA will be supplied onsite at 11,000 Volts (11kV) through multiple looped 11kV HV circuits which will terminate at new ring mains units (RMU's) or package substations onsite depending on end users' power and metering requirements.

It would be proposed that an initial set of circuit breakers would be installed at the new 33kV / 11kV primary substation and a new 11kV HV circuit installed within the spine road infrastructure to serve multiple landlords secondary substations.

LOW VOLTAGE (400/230V) INFRASTRUCTURE

From the new landlord's secondary substation, LV main infrastructure will be installed within the new footways of the development to facilitate any street lighting or pumping stations that may be required to serve the development area.

TENDERING WORKS

Tendering works will progress once final development proposals have been agreed. Budget costs for all proposed electricity infrastructure requirements have been included in the financial summary of this report.

8.3. ELECTRICITY POINT OF CONNECTION (NON-CONTESTABLE) – 40MVA (IMPORT ONLY)

UK Power Networks the DNO for the region have provided a budget point of connection (POC) offer under reference 8200043569 / QID 3200035282

DNO Non-Contestable charges	£12,550,000.00
DNO Second Comer charges	£2,665,000.00
Valid until	Budget only

SITE LOAD

An electrical supply capacity of up to 40MVA has been requested from UKPN as detailed within Table 8.0.2.

POINT OF CONNECTION

UKPN have identified a budget point of connection from their existing 33kV EHV network at Histon Grid site to provide the ASC of 40MVA required.

The POC location can be seen in figure 8.3.1 below.

Figure 8.3.1– UKPN point of connection location at Histon Grid Site for import capacity of 40MVA.



NON-CONTESTABLE WORKS

The 40MVA capacity requested can be provided from the POC noted in figure 8.1.2 but UK Power Networks have noted that a 3rd grid transformer will be required as well as a 33kV switchboard replacement before the full capacity requested can be made available.

The budget non-contestable works that will be completed by the DNO can be seen in figure 8.1.2 below.

Figure 8.1.2– Summary of UKPN budget non-contestable works.

Based on the required capacity, the connection will have to go back to Histon Grid via two new 33kV CB, however will only be able to connect once the current reinforcement works at Histon Grid for a 3rd 132/33kV grid transformer and 33kV switchboard replacement are completed (Currently due to be completed by Q1 2023).

POC location: 33kV board at Histon via 2x33kV new circuit breakers ***TO BE ENERGISED AFTER 3rd GT and 33kV SWITCHBOARD REPLACEMENT*** Second comer charges apply as follows:

£1,390,000.00 (Histon Grid 132/33kV Grid Tx) + £1,275,000 (Histon Grid 33kV switchboard replacement) =
£2,665,000.00

REINFORCEMENT WORKS

UKPN have noted that reinforcement works will be required with extensive 132kV overlay works needed between existing grid sites in the Cambridge area. The extent of the reinforcement works required is noted in figure 8.1.3 below.

Figure 8.1.3– Summary of UKPN reinforcement works.

Cable Route: 2x 10.5km of 1000mm² Al cable (Approx Cost: **£450k Non Contestable**)

Reinforcement required (to unlock the potential of the 3rd GT at Histon Grid):

- Histon to Arbury 132kV PT/PTD reinforcement (Approx. Cost: **£3.8m**)
- Arbury to Horningsea tee 132kV PMK/PTK reinforcement (Approx. Cost: **£8.3m**)

OFFSITE CONSTRAINTS

All non-contestable works to be undertaken by the DNO.

8.4. ELECTRICITY – NEW CONNECTION (CONTESTABLE) – 40MVA (IMPORT ONLY)

The contestable element of electricity infrastructure works will consist of the 33kV EHV 1000mm AL triplex cable installation works from the POC identified to the development area where this apparatus will terminate within a new 33kV / 11kV primary substation.

From the new primary substation, a new set of 11kV HV CB's will be installed to accommodate an 11kV HV circuit onsite to facilitate multiple landlords' secondary substations.

OFFSITE ROUTE (33,000 VOLT NETWORK)

Based upon a desktop study, the anticipated 33kV EHV cable route from the POC identified at Histon Grid site to the development area will span approximately 22km and this can be seen in figure 8.4.1 below.

Figure 8.4.1– Anticipated 33kV EHV cable route from 40MVA POC to development area.



The above route will include multiple river, bus lane and motorway crossings and it is anticipated that directional drilling works will be required where it is not achievable to install cables in existing bridge decks / crossing points. A detailed route proving study will need to be undertaken to identify any additional constraints along the route suggested.

ONSITE 33,000 VOLT NETWORK

The 33kV EHV circuit noted above will terminate at a new 33kV / 11kV primary substation located within the curtilage of the development area. The primary substation compound will be approximately 32m x 28m in area and will consist of 2 x 33kV / 11kV transformers as well as an 11kV HV switchboard located within a suitable brick or GRP accommodation.

ONSITE SECONDARY NETWORK (11,000/400 VOLT NETWORK)

It is proposed that the 40MVA will be supplied onsite at 11,000 Volts (11kV) through multiple looped 11kV HV circuits which will terminate onsite at new package substations, ring mains units (RMU's) or an HV panel board depending on end users' power and metering requirements.

It would be proposed that an initial set of circuit breakers would be installed at the new 33kV / 11kV primary substation and a new 11kV HV circuit installed within the spine road infrastructure to serve a new landlords secondary substation.

LOW VOLTAGE (400/230V) INFRASTRUCTURE

From the new landlord's secondary substation, LV main infrastructure will be installed within the new footways of the development to facilitate any street lighting or pumping stations that may be required to serve the development area.

TENDERING WORKS

Tendering works will progress once final development proposals have been agreed. Budget costs for all proposed electricity infrastructure requirements have been included in the financial summary of this report.

8.5. ELECTRICITY - NEW IMPORT & EXPORT, 18MVA CONNECTION (BUDGET DNO OPTION)

UK Power Networks the DNO for the region have provided a budget connection offer under reference 8200043770 for an import and export option of 18MVA with unconstrained and flexible connection options.

DNO unconstrained connection offer costs (non-contestable element)	£16,000,000.00
Offsite infrastructure installation works from POC to development.	As per import costs.
Valid until	Budget only

DNO flexible connection offer costs (non-contestable element)	£3,200,000.00
Offsite infrastructure installation works from POC to development.	As per import costs.
Valid until	Budget only

SITE LOAD

An electrical import and export supply capacity of up to 18MVA has been requested from UKPN as detailed within Table 8.0.3.

POINT OF CONNECTION

UKPN have identified a budget point of connection from their existing 33kV EHV network at Huntington Grid site to provide the import and export connection arrangement of 18MVA required. The POC location can be seen in figure 8.5.1 below.

Figure 8.5.1– UKPN point of connection location at Huntington Grid Site for import and export capacity of 18MVA.



NON-CONTESTABLE & CONTESTABLE WORKS

The 18MVA import and export connection requested can be provided from the POC noted in figure 8.5.1 but UK Power Networks have noted that a new Supergrid Transformer will be required at Eaton Socon to enable an unconstrained connection.

The budget unconstrained works that will be completed by the DNO can be seen in figure 8.5.2 below.

Figure 8.5.2– Summary of UKPN budget costs for unconstrained connection works.

Unconstrained connection The following is the estimated price for an unconstrained connection of 18MW Battery Storage, 18MW Solar or 18MW Gas:- The budget estimation for this work is: £28,850,000.00 (excluding VAT) Non Contestable: £16,000,000.00 Point of Connection voltage: 33kV Point of Connection location: Huntingdon Grid (TL23887296) Approximate cable length: 19km of 33kV cable Further information: This will be a 33kV connection to Huntingdon Grid via 2 x 33kV circuit breakers and 19km dual circuit 33kV cable. A new Supergrid Transformer will be required at Eaton Socon to enable an unconstrained connection.

UKPN have also noted that a flexible connection is also available however this does not provide the surety of supply that the unconstrained offer above does, the budget flexible connection works that will be completed by the DNO can be seen in figure 8.5.3 below.

Figure 8.5.3– Summary of UKPN budget costs for flexible connection works.

Flexible connection The following is the estimated price for a flexible connection of 18MW Battery Storage, 18MW Solar or 18MW Gas:- The budget estimation for this work is: £16,150,000.00 (excluding VAT) Non Contestable: £3,200,000.00 Point of Connection voltage: 33kV Point of Connection location: Huntingdon Grid (TL23887296) Approximate cable length: 19km of 33kV cable Further information: This will be a 33kV connection to Huntingdon Grid via 2 x 33kV circuit breakers and 19km dual circuit 33kV cable.
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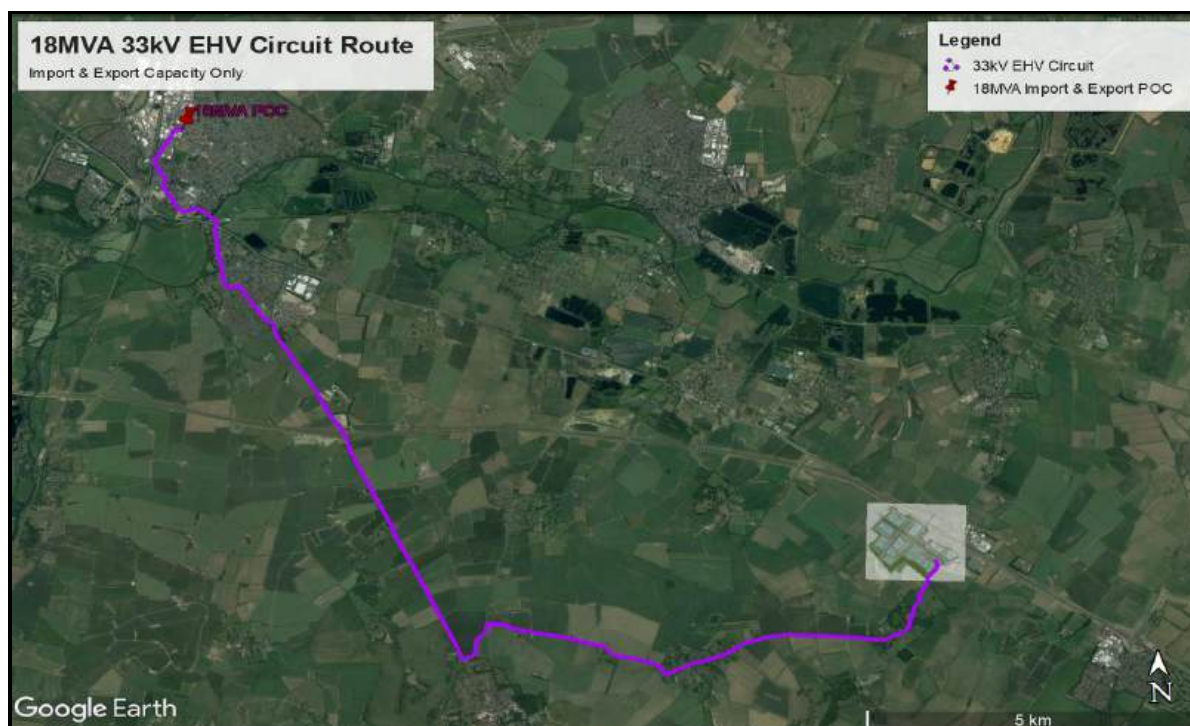
OFFSITE CONSTRAINTS

All non-contestable works to be undertaken by the DNO.

OFFSITE ROUTE (33,000 VOLT NETWORK)

Based upon a desktop study, the anticipated 33kV EHV cable route from the POC identified at Huntingdon Grid site to the development area will span approximately 20km and this can be seen in figure 8.5.4 below.

Figure 8.5.4– Anticipated 33kV EHV cable route from Huntington Grid to development area.



The above route will include multiple river and motorway crossings and it is anticipated that directional drilling works will be required where it is not achievable to install cables in existing bridge decks / crossing points. A detailed route proving study will need to be undertaken to identify any additional constraints along the route suggested.

ONSITE 33,000 VOLT NETWORK

The 33kV EHV circuit noted above will terminate at a new 33kV / 11kV primary substation located within the curtilage of the development area. The primary substation compound will be approximately 32m x 28m in area and will consist of 2 x 33kV / 11kV transformers as well as an 11kV HV switchboard located within a suitable brick or GRP accommodation.

ONSITE SECONDARY NETWORK (11,000/400 VOLT NETWORK)

It is proposed that the 18MVA will be supplied onsite at 11,000 Volts (11kV) through multiple looped 11kV HV circuits which will terminate at a new ring mains units (RMU's) or package substations onsite depending on end users' power and metering requirements.

It would be proposed that an initial set of circuit breakers would be installed at the new 33kV / 11kV primary substation and a new 11kV HV circuit installed within the spine road infrastructure to serve a new landlords secondary substation.

LOW VOLTAGE (400/230V) INFRASTRUCTURE

From the new landlord's secondary substation, LV main infrastructure will be installed within the new footways of the development to facilitate any street lighting or pumping stations that may be required to serve the development area.

TENDERING WORKS

Tendering works will progress once final development proposals have been agreed. Budget costs for all proposed electricity infrastructure requirements have been included in the financial summary of this report.

8.6. ELECTRICITY - NEW IMPORT & EXPORT, 40MVA CONNECTION (BUDGET DNO OPTION)

UK Power Networks the DNO for the region have provided a budget connection offer under reference 8200043771 for an import and export option of 40MVA with unconstrained and flexible connection options.

DNO unconstrained connection offer costs (non-contestable element)	£28,100,000.00
Offsite infrastructure installation works from POC to development.	As per import costs.
Valid until	Budget only

DNO flexible connection offer costs (non-contestable element)	£12,100,000.00
Offsite infrastructure installation works from POC to development.	As per import costs.
Valid until	Budget only

SITE LOAD

An electrical import and export supply capacity of up to 40MVA has been requested from UKPN as detailed within Table 8.0.4.

POINT OF CONNECTION

UKPN have identified a budget point of connection from their existing 132kV EHV network at Histon Grid site to provide the import and export connection arrangement of 40MVA required. The POC location can be seen in figure 8.6.1 below.

Figure 8.6.1– UKPN point of connection location at Huntington Grid Site for import and export capacity of 40MVA.



NON-CONTESTABLE & CONTESTABLE WORKS

The 40MVA import and export connection requested can be provided from the POC noted in figure 8.6.1 but UK Power Networks have noted that a new Supergrid Transformer will be required at Burwell Main to enable an unconstrained connection.

The budget unconstrained works that will be completed by the DNO can be seen in figure 8.6.2 below.

Figure 8.6.2– Summary of UKPN budget costs for unconstrained connection works.

Unconstrained connection The following is the estimated price for an unconstrained connection based upon a capacity of 40MW and a technology type of Battery Storage:- The budget estimation for this work is: £40,820,000.00 (excluding VAT) Non Contestable: £28,100,000.00 Point of Connection voltage: 132kV Point of Connection location: Histon Grid (TL43586306) Approximate cable length: 10.5km of 132kV cable Further information: This will be a 132kV connection to Histon Grid via 2 x 132kV circuit breakers and 10.5km dual circuit 132kV cable. A new Supergrid Transformer will be required at Burwell Main to enable an unconstrained connection.
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UKPN have also noted that a flexible connection is also available however this does not provide the surety of supply that the unconstrained offer above does, the budget flexible connection works that will be completed by the DNO can be seen in figure 8.6.3 below.

Figure 8.6.3– Summary of UKPN budget costs for flexible connection works.

Flexible connection The following is the estimated price for a flexible connection based upon a capacity of 40MW and a technology type of Battery Storage:- The budget estimation for this work is: £24,820,000.00 (excluding VAT) Non Contestable: £12,100,000.00 Point of Connection voltage: 132kV Point of Connection location: Histon Grid (TL43586306) Approximate cable length: 10.5km of 132kV cable Further information: This will be a 132kV connection to Histon Grid via 2 x 132kV circuit breakers and 10.5km dual circuit 132kV cable.

OFFSITE CONSTRAINTS

All non-contestable works to be undertaken by the DNO.

OFFSITE ROUTE (132,000 VOLT NETWORK)

UKPN have noted on their budget offer that a 132kV cable route of 10.5km would be anticipated as part of the infrastructure work requirements expected. The 10.5km distance noted suggests a direct route to site via new towers and transmission lines so this route would be dependent on obtaining land rights and necessary permissions from possible 3rd party landowners for all apparatus required to facilitate the connection works required.

This element of works will have considerable lead times for planning and implementation (5 years) and should be considered a major constraint.

ONSITE 132,000 VOLT NETWORK

The 132kV EHV apparatus noted above will terminate at a new 132kV / 11kV primary substation located within the curtilage of the development area. The primary substation compound dimensions will be subject to specific design but will consist of 2 x 132kV / 11kV transformers as well as an 11kV HV switchboard located within a suitable brick or GRP accommodation.

ONSITE SECONDARY NETWORK (11,000/400 VOLT NETWORK)

It is proposed that the 40MVA will be supplied onsite at 11,000 Volts (11kV) through multiple looped 11kV HV circuits which will terminate at new package substations, ring mains units (RMU's) or a panel board arrangement depending on end users' power and metering requirements.

It would be proposed that an initial set of circuit breakers would be installed at the new 132kV / 11kV primary substation and a new 11kV HV circuit installed within the spine road infrastructure to serve a new landlords secondary substation.

LOW VOLTAGE (400/230V) INFRASTRUCTURE

From the new landlord's secondary substation, LV main infrastructure will be installed within the new footways of the development to facilitate any street lighting or pumping stations that may be required to serve the development area.

TENDERING WORKS

Tendering works will progress once final development proposals have been agreed. Budget costs for all proposed electricity infrastructure requirements have been included in the financial summary of this report.

8.7. WATER POINT OF CONNECTION

Cambridge Water have previously undertaken a pre-development assessment for the Boxworth, Cambridge project being considered.

Connection cost contribution	£4,021.71
Valid until	N/A

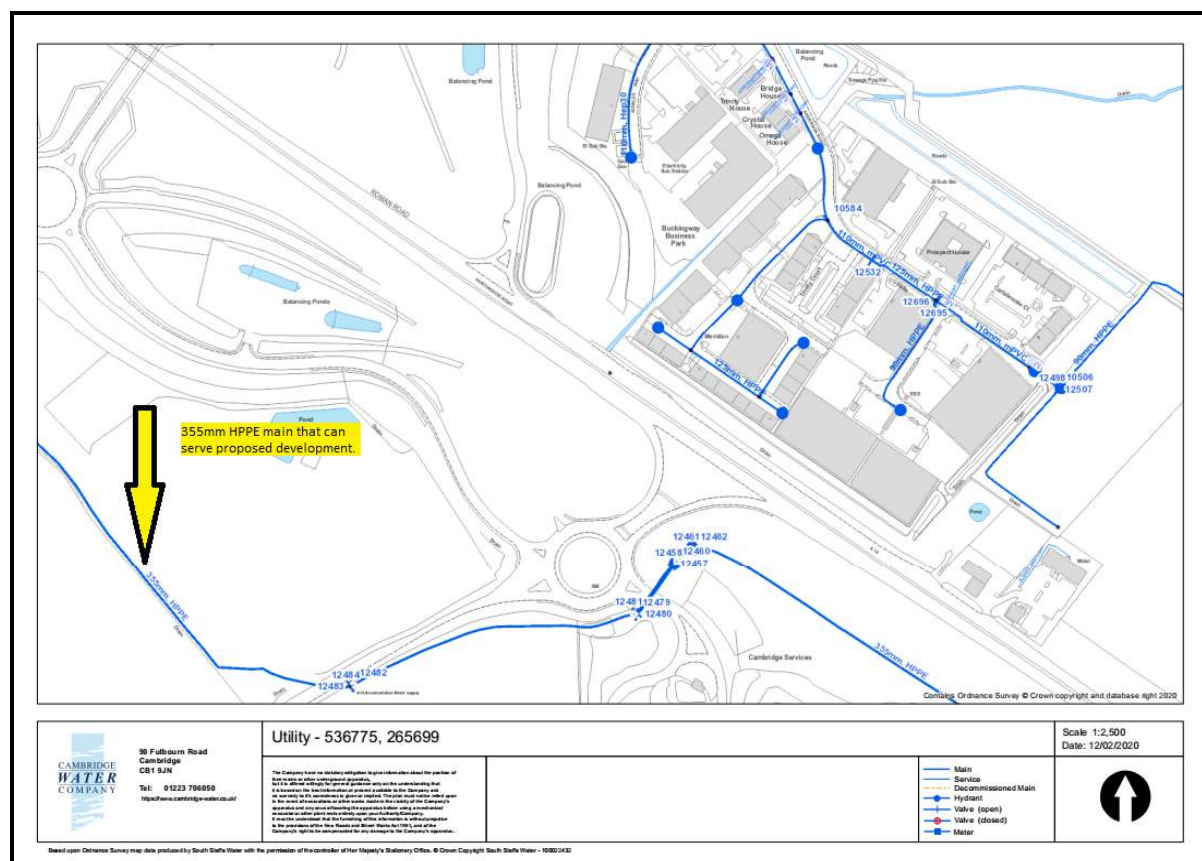
SITE LOAD

A peak flow rate of up to 13.370 l/s has been requested from Cambridge Water as detailed within Table 8.0.1.

POINT OF CONNECTION

Cambridge Water have confirmed that the nearest distribution main that can serve the Boxworth site is the 355mm HPPE main that currently crosses the development area as shown in figure 8.7.1 below.

Figure 8.7.1– Anticipated water connection point to serve proposed development.



NON-CONTESTABLE WORKS

Design approval, inspection and branch connection onto existing distribution main. A mains requisition application will need to be made to obtain a full design and costs for all mains infrastructure and connection works required and identifying current SLO options.

REINFORCEMENT WORKS

Cambridge Water have noted that no reinforcement works will be required to provide the flow rate identified to serve the scheme intended.

CONSTRAINTS

The existing 355mm HPPE main at the site will need to be diverted as part of the development proposals. Cambridge Water have confirmed that the connection to serve the development can be made from the diverted main onsite.

8.8. WATER – NEW CONNECTION (CONTESTABLE)

It would be intended to lay new water mains infrastructure from the diverted main within the development area.

OFFSITE ROUTE

N/A

ONSITE POTABLE WATER NETWORK

The onsite works will consist of establishing a new suitably sized water main within the road infrastructure of the site to serve all units intended.

An SLO will need to be appointed to undertake these installation works once an approved design from Cambridge Water is obtained.

ONSITE CONSTRAINTS

Non-identified.

TENDERING WORKS

Tendering works will progress once final development proposals have been agreed. Budget costs for all proposed water infrastructure requirements have been included in the financial summary of this report.

8.9. GAS - POINT OF CONNECTION (SPECULATIVE UNITS)

Cadent Gas have undertaken a network capacity enquiry under reference 180013348

Non-Contestable contribution	TBC
Valid until	N/A

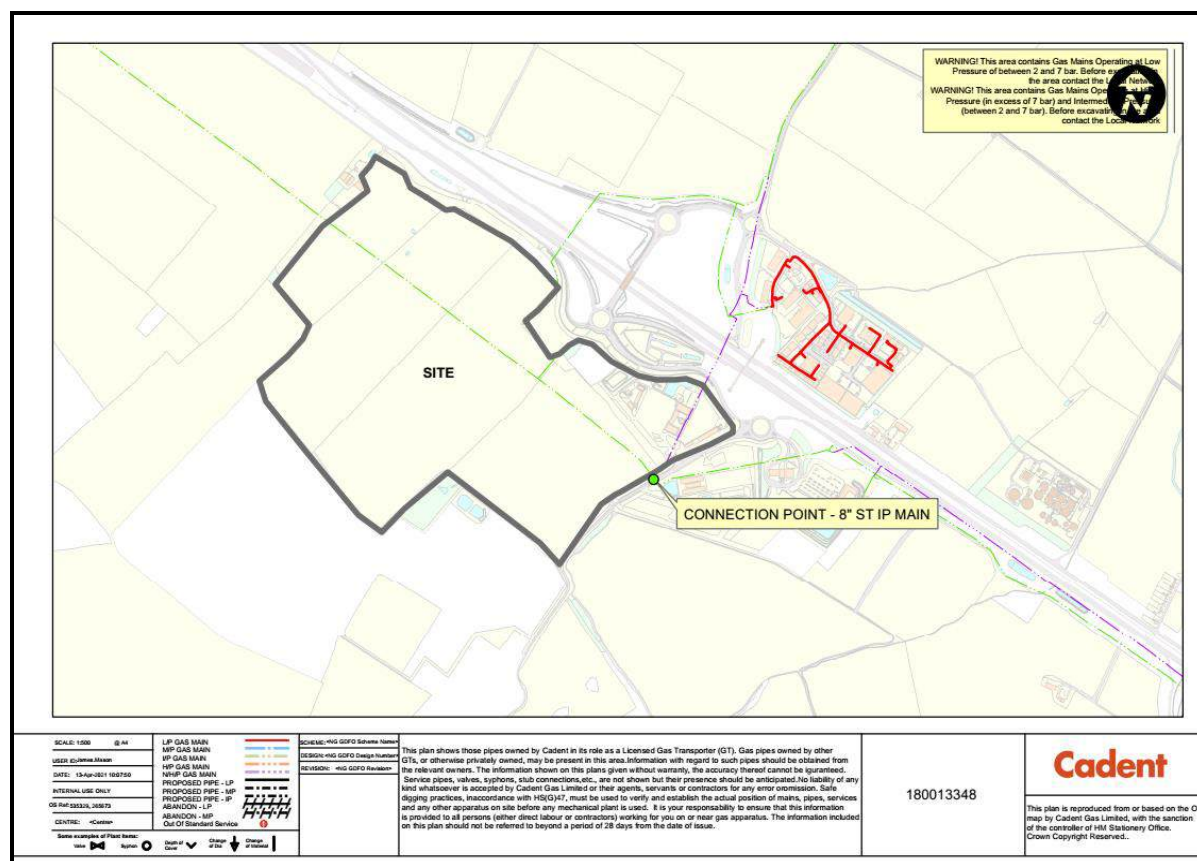
SITE LOAD

A peak flow rate of up to 13,388kWh has been requested from Cadent Gas as detailed within Table 8.0.1.

POINT OF CONNECTION

Cadent Gas have undertaken a network capacity enquiry and have identified that the site can be served from the existing 8" inch ST intermediate pressure (IP) network located within the curtilage of the development as can be seen in figure 8.9.1 below.

Figure 8.9.1– Cadent Gas CSEP position identified during network capacity enquiry.



NON-CONTESTABLE WORKS

Design approval and inspection.

REINFORCEMENT WORKS

No reinforcement works anticipated.

CONNECTION CONSTRAINTS

The IP connection will be classed as NRO (non-routine operation).

8.10. GAS – NEW CONNECTION

OFFSITE ROUTE

Not applicable due to CSEP position being within the curtilage of the development area.

ONSITE GAS NETWORK

The onsite works will consist of establishing a new IP / MP pressure reducing station (PRS) and MP mains infrastructure within the roads / footways of the site to serve all units intended with boundary connections.

A GIRS accredited contractor will need to be appointed to undertake these installation works once a design from Cadent Gas is approved.

ONSITE CONSTRAINTS

Non identified.

TENDERING WORKS

Tendering works will progress once final development proposals have been agreed. Budget costs for all proposed gas infrastructure requirements have been included in the financial summary of this report.

8.11. GAS - POINT OF CONNECTION (SPECULATIVE UNITS & GENERATION)

Cadent Gas have undertaken network capacity enquiry under references 180013324 & 180013308

Non-Contestable contribution	TBC
Valid until	N/A

SITE LOAD

A peak flow rate of 51,830 and 101,830kWh has been requested from Cadent Gas as detailed within Table 8.0.3 and 8.0.4 based upon the potential of onsite generation.

POINT OF CONNECTION

Cadent Gas have undertaken a network capacity enquiry and have noted that the IP main present onsite has insufficient capacity to provide the additional gas flow required for generation purposes and reinforcement works will be required.

Cadent Gas have confirmed that a feasibility study will need to be undertaken and the estimated costs to progress with these works will be in the region of £25 to £50k.

NON-CONTESTABLE WORKS

Design approval and inspection.

REINFORCEMENT WORKS

Cadent Gas have noted that reinforcement works will be required, and a feasibility study actioned at costs in the region of £25 to £50k.

CONNECTION CONSTRAINTS

The IP connection will be classed as NRO (non-routine operation)

At present a DAS assessment is being progressed with Cadent Gas to identify the proposed CSEP connection position to serve the development and identify what reinforcement works will be required to provide the capacity requested.

8.12. GAS – NEW CONNECTION

OFFSITE ROUTE

The offsite route will be dependent on the results of the feasibility study that Cadent Gas have confirmed is required.

ONSITE GAS NETWORK

The onsite works will consist of establishing a new IP / MP pressure reducing station (PRS) and MP mains infrastructure within the roads / footways of the site to serve all units intended with boundary connections.

A GIRS accredited contractor will need to be appointed to undertake these installation works once a design from Cadent Gas is approved.

ONSITE CONSTRAINTS

Non identified.

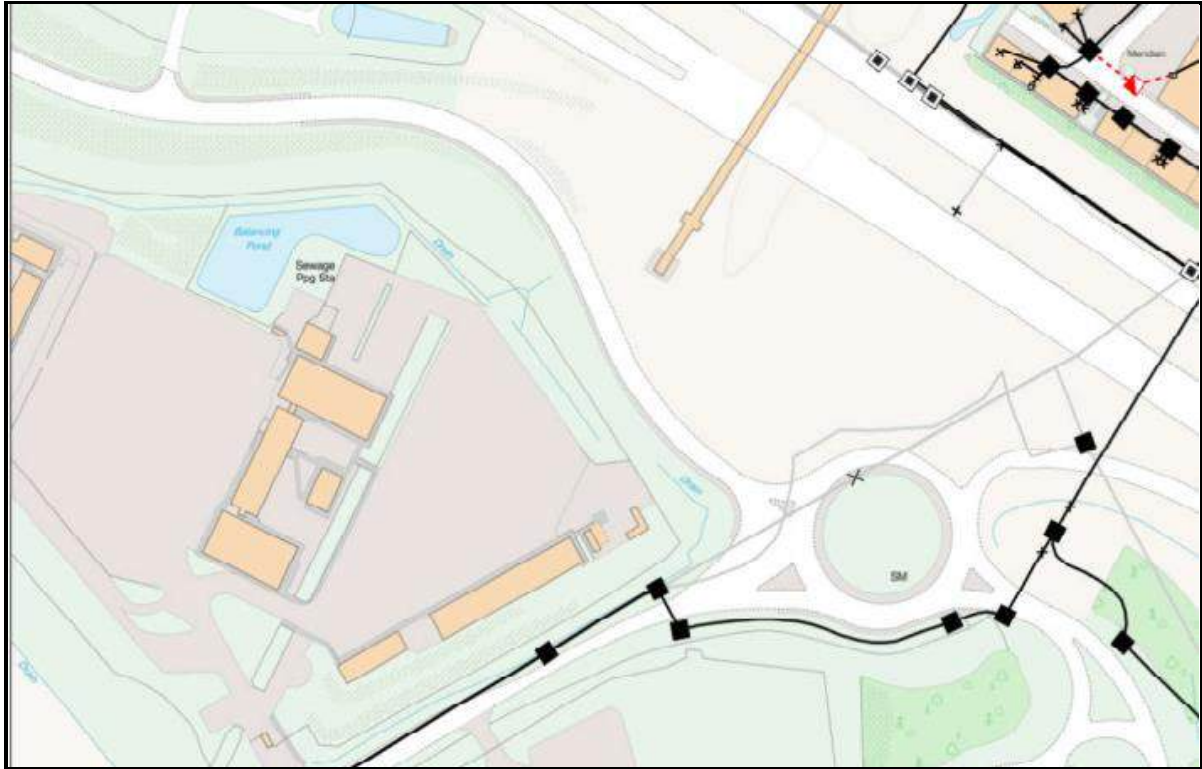
TENDERING WORKS

Tendering works will progress once final development proposals have been agreed.

8.13. TELECOMS

It is anticipated that the telecommunication requirements for the site will be served from the existing BT Openreach network that is present along Boxworth Road as noted below in figure 8.13.1 below.

Figure 8.13.1– Extract of Openreach asset records along Boxworth Road showing existing ducts and chambers that could serve site.



OFFSITE ROUTE

Offsite works should be minimal with existing ducts and chambers located in the local vicinity of the site on Boxworth Road.

ONSITE TELECOMS NETWORK

The onsite works will consist of establishing all ducts and chambers as per the approved Openreach duct design.

ONSITE CONSTRAINTS

Non identified.

EXCHANGE DETAILS & DIVERSITY OPTIONS

The Boxworth development will fall under the coverage area of Elsworth/Building A&Amp exchange (EAESW). There are additional exchanges in the vicinity of the project area to offer potential diversity if required with the nearest being at Crafts Hill (EACFH). The position of Elsworth exchange and the surrounding exchange positions can be seen in figures 8.9.2 and 8.9.3 below.

Figure 8.13.2– Extract of Elsworth exchange point in the vicinity of development area.



Figure 8.13.3– Extract of all local exchange points in the vicinity of development area.



TENDERING WORKS

Openreach Newsites will need to be approached to obtain a connection offer and duct design for the proposed development, all costs and designs are now based on FTTP (fibre to the premises), but copper lines can still be requested if required.

Telecoms diversity can also be requested from Openreach to ensure the overall development is served from multiple exchanges.