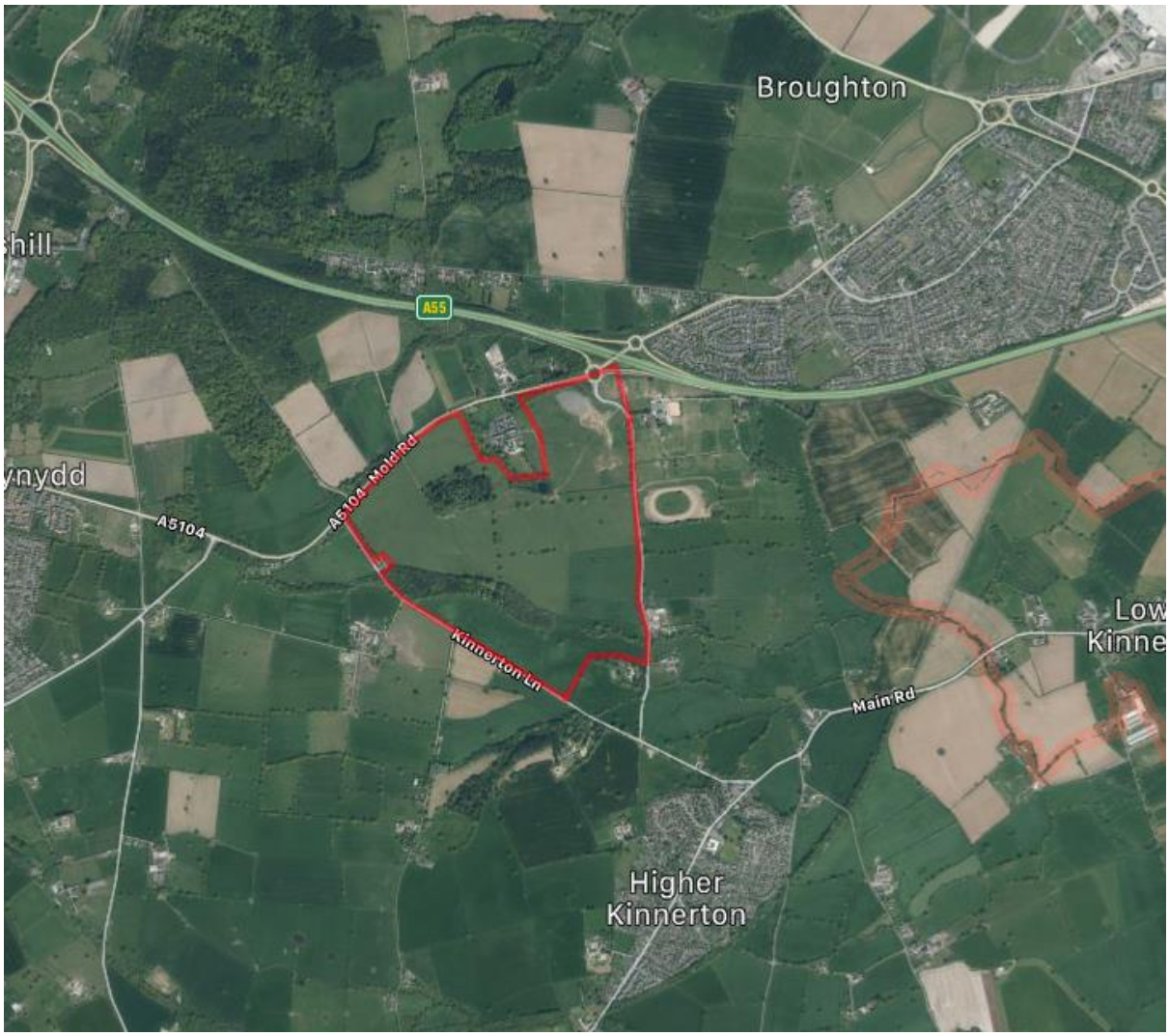
Warren Hall, Broughton

Preliminary Utilities Appraisal Report

10th June 2019

Prepared by WYG on behalf of Llywodraeth Cymru Welsh Government



Executive Park, Avalon Way, Anstey, Leicester, LE7 7GR
Tel: +44 (0)116 234 8000 Fax: +44 (0)116 234 8001
Email: info@wyg.com Website: www.**wyg**.com

WYG Engineering Limited. Registered in England & Wales Number: 01959704
Registered Office: Arndale Court, Otley Road, Headingley, Leeds, LS6 2UJ

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1.0 Introduction

1.1 Introduction

1.1.1 This report has been prepared by WYG on behalf of Llywodraeth Cymru Welsh Government (LCWG) to provide capital costs and risks associated with procuring potable water, gas, electricity, and telecommunications services in support of a proposed residential and commercial development at Warren Hall, Broughton. The Illustrative Masterplan for the scheme is presented in Appendix A.

1.1.2 This study also considers capital costs, risks and physical development constraints associated with existing utility services currently within the site.

1.1.3 The proposed development is located south of the A5104. LCWG advised that the proposed development will include 303 residential units, plus hotel/leisure, and employment area across approximately 75Ha. The site is currently a greenfield site with residential dwellings to the north, east and south. All residential dwellings are assumed to be fully connected to local water, gas, electricity, foul sewerage and telecommunications networks. Building heights are restricted at the site due to the proximity to Hawarden Airport and obstacle limitation surfaces defined in the Civil Aviation Authority's document Licensing of Aerodromes (AP 168).

1.1.4 Access to proposed development plots at the site would be gained from Lesters Lane and Kinnerton Lane. It is expected that the primary access would be from Lesters Lane.

1.1.5 The water undertaker for the site is Hafren Dyfrdwy Water (HDW) and the sewage undertaker is Welsh Water (WW). The public gas transporter is Cadent Gas Networks (CG), and SP Energy Networks (SPEN) is the host Distribution Network Operator (DNO) for electricity. BT Openreach are the licensed open access telecom provider.

1.1.6 An indicative utility loading schedule has been prepared by WYG based on the current development proposals and current industry standards. This schedule was issued to each of the above utility providers to form the basis for their capacity assessments, and to identify the scope of any off-site activities necessary to bring utilities to the boundary of the site. Loadings and calculations have been based on up to 303 residential units along with commercial development.

1.1.7 The report considers contemporary utility asset plans obtained from each utility provider. (These identify only adopted utility assets and not privately-operated networks, and generally do not include individual services).

1.1.8 The report considers each of the primary service disciplines, i.e. water, sewers, gas, electricity and telecommunications. CATV and fixed digital telecommunication services (other than BT Openreach) have not been considered except where existing services are affected by the scheme proposals. Existing utility networks constraints are detailed within the report, and one or more solutions regarding service provision are identified.

1.1.9 A conclusion and financial summary are presented within Section 3 of the report.

1.2 Methodology and Assumptions

1.2.1 Notional water, wastewater, gas and electricity loads were applied to the development using approved civil, mechanical and electrical standards (Sewers for Adoption 7th Edition, BS EN 806, Chartered Institute of Building Service Engineers design data, and BSRIA – The Building Services Research and Information Association).

1.2.2 The Illustrative Masterplan and notional utility loadings (presented in Appendix A) were issued to utility providers and their agents together with requests for budget costings. The results of these enquiries are detailed within this report.

1.2.3 Standard grid utility connection has been assumed in meeting necessary heating, hot water and electrical demands of developments constructed to current building regulation standards.

1.2.4 It is assumed that no disconnections will be required and all existing buildings within the site will remain.

1.2.5 The report is based on responses received from HDW, CG, SPEN, and Openreach, and considers a 'single point in time'. Given this, the proposals and costings presented in the report could vary since network capacity is dynamic and subject to potential change.

1.2.6 All costings are provided for budget purposes only and will need to be reviewed at all stages of design. Where cost estimates have not been provided by utility providers, WYG have provided estimated costings based on experience of similar projects. All costings provided in summary tables are exclusive of VAT.

1.2.7 Linesearch has confirmed that the proposed development site is 'Not in the Zone of Interest' of the following utility providers: AWE Pipeline, Balfour Beatty Investments Limited, BOC Limited (A Member of the Linde Group), BP Exploration Operating Company Limited, BPA, Carrington Gas Pipeline, CATS Pipeline c/o Wood Group PSN, Cemex, Centrica Storage Ltd, CLH Pipeline System Ltd, Concept Solutions People Ltd, ConocoPhillips (UK) Ltd, DIO (MOD Abandoned Pipelines), Draz Group E.ON UK CHP Limited, EirGrid, Electricity North West Limited, ENI & Himor c/o Penspen Ltd, EnQuest NNS Limited, EP Language Limited, ESP Utilities Group, ESSAR, Esso Petroleum Company Limited, Fulcrum Pipelines Limited, Gamma, Gateshead Energy Company, Gtt, Humbly Grove Energy, IGas Energy, INEOS FPS Pipelines, INEOS Manufacturing (Scotland and TSEP), INOVYN Enterprises Limited, Intergen (Coryton Energy or Spalding Energy), Mainline Pipelines Limited, Manchester Jetline Limited, Manx Cable Company, Marchwood Power Ltd (Gas Pipeline), Melbourn Solar Limited, National Grid Gas (Above 7 bar), National Grid Gas Distribution Limited (Above 2 bar) and National Grid Electricity Transmission, Northumbrian Water Group, NPower CHP Pipelines, Oikos Storage Limited, Ørsted, Perenco UK Limited (Purbeck Southampton Pipeline), Petroineos, Phillips 66, Premier Transmission Ltd (SNIP), Prysmian Cables & Systems Ltd (c/o Western Link), Redundant Pipelines – LPDA, RWE – Great Yarmouth Pipeline (Bacton to Great Yarmouth Power Station), RWEnpower (Little Barford and South Haven), SABIC UK Petrochemicals, Scottish Power Generation, Seabank Power Ltd, Severn Trent (Chester area only), SGN, Shell (St Fergus to Mossmorran), Shell Pipelines, SSE (Peterhead Power Station), Tata Communications (c/o JSM Construction Ltd), Total (Colnbrook & Colwick Pipelines), Total Finaline Pipelines, Transmission Capital, UK Power Networks, Uniper UK Ltd, Vattenfall, Veolia ES SELCHP Limited, Western Power Distribution, Westminster City Council, Wingas Storage UK Ltd.

1.2.8 Utility providers contacted by WYG during the preparation of this report but who have advised that their apparatus is not affected by the development are listed in Table 1 below.

Table 1. Not affected Statutory Undertakers

Undertaker	**Utility**
C.A. Telecom UK - [Colt Technology Services]	Telecommunications
CenturyLink	Telecommunications
CityFibre	Telecommunications
Energetics	Multi utility
Engie	Gas and Electricity
euNetworks	Telecommunications
GTC	Multi Utility
Harlaxton	Multi Utility
Interoute	Telecommunications
KPN	Telecommunications
KCOM	Telecommunications
Network Rail	Transport
Sky Telecommunications Services Ltd	Telecommunications
Sota	Telecommunications
Telent Telia	Telecommunications
Trafficmaster Ltd	Highways
Utility Assets	Electricity
Verizon	Telecommunications
Vodafone	Telecommunications
Wales & West Utilities	Gas
Warwicknet	Telecommunications

2.0 Utility Services

2.1 Water – Existing Apparatus

2.1.1 HDW asset records and capacity enquiry response are presented in Appendix B.

2.1.2 HDW asset records indicate no apparatus within the site boundary. However, there is a 4" Poly Vinyl Chloride (PVC) main in the southern verge of the A5104 to the north of the site providing a connection to Warren Hall Court. A fire hydrant is located on the A5104 outside Warren Court Farm.

2.1.3 Privately owned mains may be present within the site but would not be shown on HDW asset plans. If existing private mains are not required as part of the development, they would need to be located by survey, then cut and capped, and any formal disconnection applications made to HDW. Whilst this should be a relatively inexpensive activity, it will be necessary to ensure that private water assets do not serve any properties outside of the development boundary otherwise more complex works may be required to maintain supplies.

2.2 Water – Proposed New Connections Strategy

2.2.1 HDW have advised that there is insufficient capacity in the local network to supply the development with only small diameter water mains being present in the local area. HDW have advised that it will be necessary to reinforce their network to provide for the development.

2.2.2 Due to the size of the development, HDW have advised that they will need to undertake a detailed hydraulic model analysis before they can provide details of available capacity & required reinforcement, and determine the effects of the increased load on their distribution network.

2.2.3 The phasing of any works should be agreed with HDW to ensure that any upgrades required are in place at the appropriate time. Phases should be designed to allow for no more that 250 properties per phase where possible, with an aim to occupy these properties within a 5-year period.

2.2.4 HDW will propose a point of connection to the nearest reasonably practicable point on the supply network where the existing main is at least the same diameter as the new water main required to service the site. We would anticipate that a connection would be made to the east of the A55 in Broughton. It is anticipated that a new 180mm supply main would be required to service the proposed residential development at the site, with and additional 250mm main to supply the proposed commercial development. This would require a connection across the A55 and may require consent to cross third-party land. We have asked HDW to expand on their response to provide more clarity on the connection point to allow budget costs to be provided.

2.2.5 From 1st April 2017, the water retail market for business customers changed, giving customers the freedom to choose who provides their retail services. Where the property is for non-domestic customers, a retailer will need to be chosen prior to connection. Developers also need to choose a retailer to process their requirements for temporary water supplies. The developer will need to make an application for a temporary water supply from one of the retailers providing services in the HDW area.

2.2.6 Infrastructure charges are payable under the Water Industry Act 1991 for anyone wishing to build or develop a property. These costs are used to cover the cost of improving the network to cope with providing extra capacity for developments. Infrastructure charges are payable for a mains water supply connection. For commercial properties, the amount payable varies depending on the number of water taps and appliances. Current infrastructure charges are set at £391.74 for water for a domestic connection.

2.2.7 HDW will pay an asset payment/income offset towards the new mains scheme costs in recognition of future income. This is capped at the value of the mains scheme costs. Asset payments, where the mains are installed by a self-lay company, will be provided as each agreed phase is completed. Income offsets are paid where HDW install the main. Asset payments and income offsets are calculated using a discounted aggregate deficit model and contributions will depend on the cost of the mains to be installed and the number of properties connected.

2.2.8 An indicative budget cost estimate (exclusive of VAT) for providing new water supply to the site is presented in Table 2 below. The budget figures presented below do not include application, design, legal and project management fees. We have not included infrastructure costs and connection charges for the commercial elements of the scheme as the scope of these are largely unknown at this time.

Table 2. Water new connections indicative Budget Estimate

New connections activity	**Cost**	**Comments**
Mains		
Reinforcement to existing HDW network and off-site water main connection to site boundary	£TBC	Scope of works required to be confirmed by HDW
New on-site water mains	£271,500	Estimated by HDW
Estimated income offset	-£244,350	Estimated by HDW based on 90% contribution from HDW
Net cost of water mains payable by developer	£27,150	Estimate provided by HDW
Connections (domestic only)		
Service connections to plots	£136,350	Based on 303 connections – standard 25mm on-site metered connections @ £450 per connection. Estimated by WYG

Infrastructure charges (water and sewage)	£118,697.22	Based on 303 connections @ £391.74 per connection for each water connection. Estimated by WYG. These charges are fixed until 31 March 2020 and reviewed annually).
Connection costs	£255,047.22	Estimated by WYG.
Total developer contribution	**£282,197.22**	

2.3 Water – Proposed Diversions Strategy

2.3.1 It is not anticipated that diversions to HDW water mains will be required to accommodate the development proposals within the site.

2.3.2 Once the masterplan is produced and points of access identified, the diversion requirements should be revisited. Any access over an existing water main may require the main to be lowered/diverted locally to provide protection to the mains from vehicular loading.

2.4 Wastewater – Existing Apparatus

2.4.1 WW asset records are presented in Appendix D.

2.4.2 WW asset records show a Treatment Works to the north of the site, east of Warren Hall Court. A treated effluent sewer is shown exiting the treatment works and running around the northern and eastern site boundary before outfalling to watercourse to the south of Rowlands Farm. A 225mm Vitrified Clay (VC) Surface Water main is present within Warren Hall Court and outfalls to the Treatment Works.

2.4.3 A Sewage Bed Tank is shown within the north east part of the site. This may pick up foul sewage from Warren Hall Court, but this is unclear from the asset plans provided.

2.4.4 A 150mm Combined VC sewer is shown exiting the site across Lesters Lane before continuing east just north of Crab Mill Farm track.

2.4.5 It is not anticipated that diversions to WW apparatus will be required to accommodate the development proposals within the site.

2.5 Gas - Existing Apparatus

2.5.1 CG asset records and budget cost inquiry responses are presented in Appendix E.

2.5.2 CG asset records show that there is a 180mm Polyethylene Low Pressure (LP) main which runs across the Warren Interchange and continues west in the southern verge of the A5104 to provide a connection for existing properties on Warren Hall Court. There is a Medium Pressure (MP) main east of the A55 in Mold Road.

2.6 Gas – Proposed New Connections Strategy

2.6.1 WYG have made enquiries to CG to establish a suitable point of connection for the site.

2.6.2 CG have confirmed that a connection can be made to the MP main east of the A55 in Mold Road around its junction with Cherry Dale Road. CG has also confirmed that this main currently has sufficient capacity to supply the full site.

2.6.3 Assuming a MP point of connection, at least one Pressure Reducing Installation (PRI) would be required at the development site. Given this we would advise allowing an area of 6m^2 within the scheme masterplan to accommodate the PRI within the site.

2.6.4 CG have also confirmed that there is currently sufficient capacity in the 180mm LP main in the A5104 to provide for up to 150 residential units.

2.6.4 Contestable infrastructure works downstream of the point of connection can be installed by either an Independent Gas Transporter (IGT) or an accredited contractor. An IGT may contribute to the cost of the connection based on the revenue stream generated by the development proposals based on the rate of occupation for the site.

2.6.5 It is likely that new gas connections procured through an Independent Connection Provider (ICP) or IGT would provide significant cost and programme savings over that offered by CG.

2.6.6 An indicative budget cost estimate (exclusive of VAT) for providing new gas supply to the site is presented in Table 4 below. The budget figures presented below do not include application, design, legal and project management fees.

Table 4. Gas New connections indicative Budget Estimate

New connection activities	Cost	Comments
New on-site gas mains and service connections	£50,000	Estimated for budgeting purposes assuming procurement through an IGT – Developer to carry out all excavations and reinstatements within the site boundary. No meter works included. Estimated by WYG.
Gas governor and housing		
Excavation and reinstatement work in public highway up to site boundary		
Total	**£50,000**	

2.7 Gas - Proposed Diversions Strategy

2.7.1 It is not anticipated that diversions to CG gas mains will be required to accommodate the development proposals within the site.

2.7.2 Once the masterplan is produced and points of access identified, the diversion requirements should be revisited. Any access over an existing gas main may require the main to be lowered/diverted locally to provide protection to the mains from vehicular loading.

2.8 Electricity – Existing Apparatus

2.8.1 SPEN asset records and budget cost enquiry responses are presented in Appendix F.

2.8.2 SPEN asset records show an existing Extra High Voltage (EHV) 33kV overhead line running across the site east to west. This runs to the north of the watercourse crossing the site, and crosses Lesters Lane to the north of Crab Mill Farm.

2.8.3 There are also 11kV High Voltage (HV) overhead cables which run from the southwest corner of the site through to the north east corner, where the cables revert to underground.

2.8.4 An 11kV underground cable runs from the south side of the pond to the east side of Warren Hall Court to provide Low Voltage (LV) service connections via a pole mounted transformer.

2.9 Electricity – Proposed New Connections Strategy

2.9.1 WYG have made an initial estimate of the loads which will be required to supply the site. For the residential development and supporting commercial aspects, primary school and local centre, we would anticipate that a capacity in the order of 3.5MVA, after diversity, would be required. We would estimate that approximately 610kVA of this load requirement would be required to service the proposed residential development at the site. The overall figure would vary depending on the type and size of commercial development proposed.

2.9.2 SPEN have confirmed that to provide 2.2MVA of load for the development they would need to reinforce the 11kV circuits from Kinnerton Primary substation (located off Brick Road to the east of the development site) and lay two new 11kV circuits from a connection point at the south end of Kinnerton Lane into the site.

2.9.3 SPEN have also confirmed that further assessment would be required to establish if there is sufficient capacity within the existing circuits from Kinnerton Primary to provide a capacity of 3.5MVA given that there is only a single transformer at Kinnerton Primary substation, rated at 7.5MVA. According to the published data on the substation contained in the SP Manweb Long Term Development Statement, System Load Table dated November 2018, there is approx. 4-4.5MVA spare capacity at the primary. This currently feeds 5 No. circuits and therefore an assessment would need to be made of the existing circuits to see how much of the spare capacity can be made available.

2.9.4 Provision of loads above the capacity of Kinnerton primary would require a new transformer at the primary (assuming there is sufficient space at the site), a new primary on the development site, or a connection to another primary substation.

2.9.5 A new distribution substation will be required on site to provide LV supplies to each property. We would anticipate that two substation will be required for the residential development, one in the northern part of the site and one in the southern part, due to the distance been development parcels. To provide a capacity of 3.5MVA on the site a minimum of an additional two distribution substations would be required, located within the commercial area.

2.9.6 We would advise that an area of 5.5m x 5.5m should be included within the development Masterplan for each new distribution substation. These should be located as centrally as

possible to the area which they will serve to avoid additional substations being necessary.

2.9.7 Contestable works downstream of the point of connection can be installed by an Independent Distribution Network Operator (IDNO) or an independent connection provider. An IDNO may contribute to the cost of the connection based on the revenue stream generated by the development proposals based on the rate of occupation for the site.

2.9.8 We would advise that electrical connection should be procured at an early stage of the development given that any other proposed development in the area might affect the capacity available for the development. Capacity can be secured by accepting a formal quotation issued by the DNO or secured through an IDNO.

2.9.9 An indicative budget cost estimate (exclusive of VAT) for providing a new electricity supply to the site is presented in Table 5 below. The budget figures presented below do not include application, design, legal and project management fees. Figures below are provided based on 2.2MVA as per the SPEN quotation.

Table 5. Electricity new connections indicative Budget Estimate

New connection activities	**Cost**	**Comments**
New off-site connection works	£650,000	Reinforcement of the 11kV circuits from the Primary substation Budget estimate provided by SPEN
New on-site electricity infrastructure		Provision of new 11kV assets on the proposed site including distribution substations Budget estimate provided by SPEN
New on-site service connections	£333,300	Based on 303 connections @ £1100 for LV electric mains and connections. Estimated by WYG
Total	**£983,300**	

2.10 Electricity - Proposed Diversions Strategy

2.10.1 Diversions of the 33kV and 11kV cables within the site boundary will probably be required to facilitate development of the site. The extent of the diversions required will become clear once the masterplan is finalised. Costs may be reduced if sections of overhead cable can be left insitu or diverted into shorter routes through the development site with appropriate easements. SPEN included a budget estimate for diversions within their new connections quotation. Of the £1,000,000 quoted, we have estimated that £350,000 would be diversion costs and the remainder for new connections.

2.10.2 Once the masterplan has been produced and points of access identified, the diversion requirements should be revisited. Any access over/under an existing electricity cable may require the cable to be lowered/diverted locally to provide protection to the mains from vehicular loading/vehicle strike.

Table 6. Electricity diversion/abandonment activities indicative Budget Estimate

Diversion/abandonment activities	Cost	Comments
Provisional Sum	£350,000	Allowance for 33kV and 11kV diversions if required 11kV 650m overhead removed plus 350m underground cable removed 33kV 1000m of overhead removed Budget estimate provided by SPEN
Total	**£350,000**	**Provisional Sum**

2.11 Telecommunications – Existing Apparatus

2.11.1 Openreach, Zayo and Virgin Media asset plans are presented in Appendix G.

2.11.2 Openreach asset plans show underground apparatus in Lesters Lane, the A5104 and Kinnerton Lane as well as overhead apparatus in Kinnerton Lane. This apparatus services the existing farms and properties surrounding the development site. Overhead and underground apparatus are also present in Warren Hall Court. A short section of underground cable appears to cross inside the site boundary on the east side of Warren Hall Court.

2.11.3 Zayo Group Ltd assess plans show a cable within the northern verge of A5104 turning into the western verge of Kinnerton Lane, then into the northern verge of Bramley Lane.

2.11.4 Virgin Media do not have any apparatus within the site boundary or surrounding roads, although their asset records include apparatus within the Cherry Dale Road estate in Broughton to the north of the A55.

2.11.5 No mobile phone masts are shown within or close to the site boundary.

2.12 Telecommunications - Proposed New Connections Strategy

2.12.1 BT Openreach has a Fibre to the Cabinet (FTTC) enabled telephone exchange in Kinnerton to the east of the site. Fibre to the Premises (FTTP) is not yet available in this area.

2.12.2 Openreach will offer to provide FTTP infrastructure for residential plots for a site of this magnitude free of charge. This is provided as part of the Openreach standard New Sites package whereby the developer will install all the on-site infrastructure on behalf of Openreach. Openreach will then install fibre services direct to each property through newly installed ducts and will undertake all off-site network reinforcement.

2.12.3 Openreach currently offer a contribution to the developer for each connection completed. The current rebate is £50 per apartment and £140 per house (exclusive of VAT) as per the current House Builders Federation (HBF) agreement – refer to Table 7 below.

Table 7. Telecommunications new connection activities indicative budget estimate

New connection activities	Cost	

BT Openreach rebate	-£42,450	Rebate of £140 per residential property, assuming 303 houses – estimated by WYG
Total	**-£42,450**	**Rebate**

2.13 Telecommunications - Proposed Diversions Strategy

2.13.1 Diversions of existing Openreach and/or Zayo apparatus may be required to facilitate development at the site. The extent of the diversions required will become clear once the masterplan is finalised. The budget cost estimate below allows for Openreach diversion of underground apparatus in the A5104 north end of Lesters Lane, as well as Kinnerton Lane at the proposed access locations and short diversion to underground apparatus within the site boundary to the east of Warren Hall Court.

2.13.2 Once the masterplan is finalised and points of access identified, the diversion requirements should be revisited. Any access over/under an existing telecoms cable may require the cable to be lowered/diverted locally to provide protection to apparatus from vehicular loading/vehicle strike.

Table 8. Telecommunications diversion/abandonment activities indicative Budget Estimate

Diversion/abandonment activities	**Cost**	**Comments**
Provisional Sum	£45,000	Diversion/lowering of Openreach underground cables at proposed access locations – x 3 Estimated by WYG
Provisional Sum	£10,000	Diversion of Openreach cable – East of Warren Hall Court Estimated by WYG
Total	**£55,000**	**Provisional Sum**

2.14 Water Quality

2.14.1 The water supply to this area comes from Saltney Zone, Supply Zone Z16. The water is classed as slightly hard. The supply to this area is from surface water treated from the River Dee.

2.14.2 The Drinking Water Quality Report is presented in Appendix C.

2.15 TV Reception

2.15.1 The address is predicted to receive a good TV signal from the Winter Hill transmitter in the Granada TV region. There will be good reception for 111 channels and good reception for 16 HD channels.

2.15.2 An alternative is the Wrekin transmitter, in the Central TV region with good reception up to 93 channels and 6 HD channels.

2.15.3 Digital services available through an aerial are Freeview, Freeview HD, Youview and BT Vision.

2.16 Street Furniture

2.16.1 Street lighting is present on the Warren Interchange and within Warren Hall Court. There is no street lighting on the A5104, Kinnerton Lane or Lesters Lane adjacent to the site, or within proposed the site.

3.0 Conclusion

3.1 New Connections Summary

3.1.1 The preliminary findings of this report indicate that there will likely be network investment issues required to supply this site.

3.1.2 HDW have advised that there is insufficient capacity in the local network to supply the development with only small diameter being present in the local area. HDW have advised that it will be necessary to reinforce their network in order to provide for the development.

3.1.3 We anticipate that Hafren Dyfrdwy Water (HDW) will propose a point of connection to the nearest reasonably practicable point on the supply network where the existing water main is at least the same diameter as the new water main required to service the site. We would anticipate that a connection would be provided to the east of the A55 in Broughton. We have asked HDW to expand on their response to provide more clarity on the connection point to allow budget costs to be provided.

3.1.4 Sewers in the area are provided by Welsh Water (WW). We do not expect that existing WW sewers will be affected by the proposed development.

3.1.4 SP Energy Networks (SPEN) have confirmed that to provide 2.2MVA of load for the development they would need to reinforce the existing 11kV circuits from Kinnerton Primary substation and lay two new 11kV circuits from a connection point at the south end of Kinnerton Lane into the site.

3.1.5 SPEN have confirmed that further assessment would be required to establish if there is sufficient capacity within the existing circuits from Kinnerton Primary to provide a capacity of 3.5MVA. To provide loads above the capacity of Kinnerton primary would require a new transformer at the primary, assuming there is sufficient space at the site, a new primary on the development site or connection to another primary substation.

3.1.6 A new distribution substation will be required on site to provide Low Voltage supplies to each property. We would anticipate that two substations will be required for the residential development, one in the northern part of the site and one in the southern part, due to the distance been parcels. To provide a capacity of 3.5MVA on the site a minimum of an additional two distribution substation would be required, located within the commercial area.

3.1.7 Cadent Gas (CG) have confirmed that a connection can be made to the Medium Pressure (MP) main east of the A55 in Mold Road around its junction with Cherry Dale Road. This main currently has sufficient capacity to supply the full site.

3.1.8 Assuming a MP point of connection, at least one Pressure Reducing Installation (PRI) would be required at the development site. Given this we would advise allowing an area of $6m^2$ within the scheme masterplan to accommodate the PRI within the site

3.1.9 Fibre broadband could be provided by Openreach to the site. Gigaclear and Virgin also have apparatus in the area and could be approached to provide connections to the site.

3.2 Diversion Strategy

3.2.1 We have assessed the existing on-site utility infrastructure and commented on likely requirements for diversion based on their location within the site only.

3.2.2 The extent of any utility diversion required as part of the development will depend on the location and depths of existing apparatus and the proposed construction works to be carried out in their vicinity. Where utilities can be left in-situ, this would always be the best option.

The following potential diversions have been identified at the site:

- 11kV and 33kV overhead lines crossing through the site
- Openreach underground apparatus east side of Warren Hall Court
- Openreach underground apparatus across proposed site accesses

3.3 Indicative Budget Estimate Summary

3.3.1 The budget costings presented in this report are an indication of the capital sums required for procuring the necessary professional and construction services based on responses from utility providers and experience on similar projects. The budget costings include estimated costs of bringing new utility services to the boundary of the site and notional on-site mains and new service connections.

3.3.2 All budget costings will need to be reviewed at all stages of the design. Given that the budget costings presented in the Table 9 below are subject to caveats, they should be read in conjunction with the body text of this report. The budget figures presented below do not include design and project management fees.

3.3.3 It should be noted that budget costings are based on traditional procurement methods of obtaining new connections to the site through utility providers on a service by service basis unless noted otherwise. Should alternative procurement methods be used, and costs obtained through Independent Connection Providers and an Independent Distribution Network Operator, it is anticipated that significant savings may be possible on both cost and programme.

3.3.4 A summary of indicative budget cost estimates for providing new services and diverting existing services affected by the development proposals are presented in Table 9 below.

3.3.5 Costings provided are assumed to be exclusive of VAT.

Table 9. Indicative Budget Estimate Summary

New Connections	Capital Cost	Notes
New Connections		
Water		
Reinforcement to existing HDW network and off-site water main connection to site boundary	£TBC	Scope of works required to be confirmed by HDW
Estimated developer contribution to on-site water mains	£27,150	Estimated by HDW based on 90% contribution from HDW
Service connections to plots (residential only)	£136,350	Based on 303 connections – standard 25mm on-site metered connections @ £450 per connection. Estimated by WYG
Infrastructure charges (water and sewage) (residential only)	£118,697.22	Based on 303 connections @ £391.74 per connection for each water connection. Estimated by WYG. These charges are fixed until 31 March 2020 and reviewed annually).
Water Sub Total	**£282,197.22**	
Gas		
New on-site gas mains and service connections	£50,000	Estimated for budgeting purposes assuming procurement through an IGT – Developer to carry out all excavations and reinstatements within the site boundary. No meter work included. Estimated by WYG
Gas PRI and housing		
Excavation and reinstatement work in public highway up to site boundary		
Gas Sub Total	**£50,000**	
Electricity		
New off-site connection works	£650,000	Reinforcement of the 11kV circuits from the Primary substation Budget estimate provided by SPEN
New on-site electricity infrastructure		Provision of new 11kV assets on the proposed site including distribution substations Budget estimate provided by SPEN
New on-site service connections	£333,300	Based on 303 connections @ £1100 for LV electric mains and connections. Estimated by WYG
Electricity Sub Total	**£983,300**	
Telecommunications		
BT Openreach rebate	-£42,450	Rebate of £140 per residential property, assuming 303 houses – estimated by WYG

Telecommunications Sub Total	**-£42,450**	
New Connections Budget Estimate	**£1,273,050**	
Diversions	**Capital Cost**	**Notes**
Diversions		
Electricity		
Provisional Sum	£350,000	Allowance for 33kV and 11kV diversions if required 11kV 650m overhead removed plus 350m underground cable removed 33kV 1000m of overhead removed Budget estimate provided by SPEN
Electricity Sub Total	**£350,000**	
Telecommunications		
Provisional Sum	£45,000	Diversion/lowering of Openreach underground cables at proposed access locations – x 3 Estimated by WYG
Provisional Sum	£10,000	Diversion of Openreach cable – East of Warren Hall Court Estimated by WYG
Telecommunications Sub Total	**£55,000**	
Diversions Budget Estimate	**£405,000**	
Total	**£1,678,050**	

3.4 Recommendations and Next Steps

3.4.1 We would recommend that a full utilities verification survey is conducted to cover all proposed site entrances and any areas of proposed road widening. This, combined with the design proposals for the junctions, will allow C4 detailed diversion/ protection cost estimate applications to be made to utility providers. Once exact locations and depths of utility apparatus are known, it will be possible to assess which utilities will be affected, what diversions will be required, and what apparatus can be left in-situ. A provisional sum should be included in budgets for trial excavations to locate utility apparatus.

3.4.2 When developing the masterplan, provision should be made (where possible) for existing services within the site boundary to be left in place. Diversion of the 11kV and 33KV overhead lines within the site will likely be necessary but the extent of this should be minimised where possible in agreement with SPEN.

3.4.3 Provision should be made for electricity distribution substations to be located within the site boundary. These should be located as centrally as possible to their supply area. A gas pressure reducing station will also likely be required on the site.

3.4.4 Once the masterplan and scheme phasing plans are complete, we would advise that the loadings are reassessed, and the utilities strategy checked to ensure that the assumptions made are still correct.

3.4.5 We note that the enquiries made to utility providers, and thus the proposed points of connection, are only valid for a short period and can and will change depending on other connections onto the networks. We would advise that utility providers are consulted regularly during the planning process to make sure there are 'no surprises' in terms of provision for new connections to the site.

3.4.6 We would advise allowing a minimum of 12 months to organise new connections for the residential site before the first utility apparatus is required to be laid. Off-site works can pose programme risks, as works will need either to be carried out by utility providers or by Contractors approved by them, which is usually a lengthy process.

3.4.7 Multi-utility/dual fuel applications will allow the developer to utilise the asset value of the connections made to offset infrastructure costs.

3.4.8 We would advise that utility providers are kept up to date with progress to construction. The more detail and early warning that they are provided with, the less likely it will be that complications will arise.