Hydrock

East Devon New Community

Utilities Due Diligence Report

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1. INTRODUCTION

Hydrock Consultants has been appointed by CBRE to provide utilities due diligence for the proposed development for East Devon New Community and investigate whether the existing nearby utility infrastructure could support the development. This document is provided to give an overview of existing utility services, high level capacity advice and new supply strategy advise, and advise if diversionary works might be required at the three option sites.

The scope of this assessment includes the following utility services:

- Electricity (Power and heat)
- Gas (Heat)
- Potable Water
- Telecommunications
- Foul Drainage

The report is split into Capacity and New Supplies, and Existing Utilities Infrastructure. The first section will assess the new connections for each of the utility services to serve the development. The second sections will cover the existing infrastructure and their impact on the three possible development sites, assessing the possible diversions or disconnections required.

This report is based upon utility information that has been provided by third parties and is a desktop assessment only. The presence of onsite infrastructure should be confirmed by the client's contractors, and safe working practices adhered to at all times. Please note that utility asset information is only valid for 3 months from the point of issue as the networks are constantly changing. Therefore, we recommend updating any enquiries once this time has elapsed.

2. EXECUTIVE SUMMARY

This report assesses the existing utilities infrastructure and both their constraints on, and opportunities for, the three proposed sites. Opportunities for new supplies has also been assessed.

The primary challenges expected with bringing forward a new community settlement in East Devon with respect to Utilities will be around capacity and infrastructure to support such a large new demand. Early engagement with the Utility providers will be key, as well as developing a detailed, thought-out and collaborative strategy that considers both the immediate needs of the site and the local community, and the need for futureproofed utility and energy infrastructure that will see the development through its years of construction, and in-use for years to come.

With the above in mind, it should be acknowledged that the opportunities and constraints of the three options within this report are only *marginally* impacted by geographical location. An example being the presence of extra-high voltage electricity infrastructure on 2 of the 3 sites and not the other, or proximity to existing clean water trunk mains possibly reducing the distance from the main Source of Water (SoW). This would make an option slightly more favourable, but would not exclude the other option from any opportunity, or present an unavoidable obstacle for that option. A suitable utility strategy would be employed at each and any of the 3 option sites and may face either equal challenges, or only marginal differences between them.

No infrastructure deemed to be major (or "showstopping") constraints to development has been identified on any three of the optional sites, however, Site 2 does contain a National high pressure gas main which is classed by the Health and Safety Executive as a “major accident hazard pipeline” and poses some considerable design limitations, particularly with regards to proposals for public residence.

It is highly likely all sites will require diversions and disconnections to facilitate any new development. Some areas have utility services that are more problematic to divert than others. Equally, some of the areas have services running in existing highways which may help limit the number of diversions required, depending on the proposed masterplans and variations to existing highways.

The three sites have been analysed based on the two categories; impact of existing utility infrastructure; and utility capacities/opportunities for connection to key infrastructure.

Assessment Category	Option 1	Option 2	Option 3
Utility capacities and opportunities for connection	4 – Good opportunity	4 – Good opportunity	2 – Limited opportunity
Foul Drainage capacities and opportunities for connection	2 - Limited opportunity	2 - Limited opportunity	2 - Limited opportunity
Existing Infrastructure Impact	3 – Medium impact	1 – Significant impact	3 – Medium impact
Overall (/15)	9	7	7

- Option 1 is presenting as the highest scoring site from a Utilities perspective due to the relatively minimal impacts from existing major infrastructure, whilst also providing an opportunity to connect to WPD’s 132kV overhead for a new Bulk Supply Point to service the site with power.
- Option 2 whilst presenting a good opportunity for power connection similar to Option 1, is lower scoring due to the presence of the National High Pressure gas main, which will restrict development and layout.
- Option 3 has an extensive amount of existing infrastructure to consider for either diversions to free up developable space, or layout impacts with clearance zones, and also does not present as good an opportunity for electrical connection to the 132kV network.
- All three options are constrained for foul drainage capacities due to the rural locations not being served with extensive existing infrastructure, with none of the 3 options presenting any better opportunity than the other, and the strategy for providing a connection being the same.

3. CAPACITY & NEW SUPPLIES

As mentioned in the introduction, the geographical location only marginally affects the outcomes of a capacity assessment with a development of this scale. Each of the three site options would proceed with a new supply strategy that will trigger reinforcements and new major infrastructure installations, regardless of site location.

The main differentiator in this case is only proximity to existing Extra High-Voltage (EHV) networks, presenting an option for a bulk point of connection (POC) and land opportunities for new substation infrastructure directly beneath, and similarly, proximity to clean water trunk mains.

3.1 Utility Capacity and New Supplies Options Summary

Option 1: [4 - good opportunity]

- Presence of 132kV electrical infrastructure onsite, opportunity for EHV connection for BSP;
- Close proximity to water trunk main, opportunity for large clean water supply connection.

Option 2: [4 - good opportunity]

- Presence of 132kV electrical infrastructure onsite, opportunity for EHV connection for BSP;
- Presence of water trunk main onsite, opportunity for large clean water supply connection.

Option 3: [2 - limited opportunity]

- Only 33kV and 11kV infrastructure onsite, limited opportunity for EHV connection for BSP;
- In proximity to water trunk main, but further distance required for large clean water supply connection, involving third party land crossing.

3.2 Foul Drainage Capacity and New Connections Options Summary

Option 1, 2 and 3: [2 - limited opportunity]

- All three options are constrained for foul drainage capacities due to the rural locations not being served with extensive existing infrastructure, with none of the 3 options presenting any better opportunity than the other, and the strategy for providing a connection being the same.
- In the case of all of the sites, it is assumed that there will be one main point of discharge, either via a new treatment works specifically for the development, or connection to the Countess Wear works.
- Due to the topography of each of the sites, local pumping stations will be required at a number of locations to convey flows to the main discharge point.

3.3 Electricity

As part of this report existing capacities on Western Power Distribution's (Now "National Grid Electricity Distribution" – referred to as NGED) grid infrastructure have been assessed using Long Term Development

Statements and heat maps in order to identify the level of constraint in the local electrical infrastructure, and to identify opportunities for securing capacity.

The site's full site load is to be determined once unit numbers and build types can be confirmed; however, what can be determined is that we expect the power load for this development to be significant, given the targets for decarbonisation of heat and transport (i.e. the energy strategy would likely incorporate some form of electric heating, either by Air Source Heat Pumps (ASHPs) or other technology, and the provision of EV charge points for futureproofing).

Based on current DNO guidance for power and heat loads, an early stage estimation for 8000no new residential dwellings with ASHPs and 1no EV Charge Point per home is expected to be in the region of 35mVA-50mVA after diversity maximum demand (ADMD).

We can see that it is unlikely the full site can be served from the existing available capacity in the grid. Also given the known constraints in the area and other developments coming forward in the local area, it is assumed that there is no spare capacity in the region for a new development of this size. Therefore, both reinforcements and new dedicated bulk and primary infrastructure installations are anticipated, and a phased ramp up and use of capacity is recommended in line with the phasing of the development.

It is expected that the most likely feasible strategy would focus on providing a new Bulk Supply Point (BSP) for the site from a point of connection (POC) to NGED's existing 132kV infrastructure. From this BSP, a number of Primary substations would be installed throughout the development, serving the parcels of dwellings in their own HV grid systems. Timescales, costs, and technical viability of this strategy would need to be determined with NGED once an understanding of the likely loads as well as phasing is developed.

A supply for initial phases of the site could potentially be formed via POCs to existing local infrastructure, such as the 11kV, which would not require BSP or Primary substation infrastructure. This would also be dependent on capacity available at the time, and/or local HV reinforcements that could be undertaken on the 11kV networks in the short term.

There are two substations which provide the greatest opportunity of securing capacity from WPD's grid network for an initial phase of development:

1. Sowton BSP, c. 6km from site, has ~28.23MVA of capacity available which is a significant amount of power and could certainly serve the earlier phases of delivery.
2. Exeter Main BSP, c.10km to site, has ~20.70MVA of capacity available which is also a significant amount of power which could serve the earlier

**Note this is only a snapshot of the current situation and should be reviewed regularly for changes and updates. The data could also be out-of-date and does not replace engagement with an NGED engineer.*

On Option 1, there is also a 33kV/11kV Substation 'Hill Barton Primary' which may present an opportunity for early phase connections, however, capacity information on this substation is not currently available. This substation is located within Hill Barton Business Park, so it's expected to be at capacity serving the existing

industrial estate and any proposed connections to this would trigger some level of reinforcements. There may be an opportunity to expand this substation however, given that the land is already within NGED ownership.

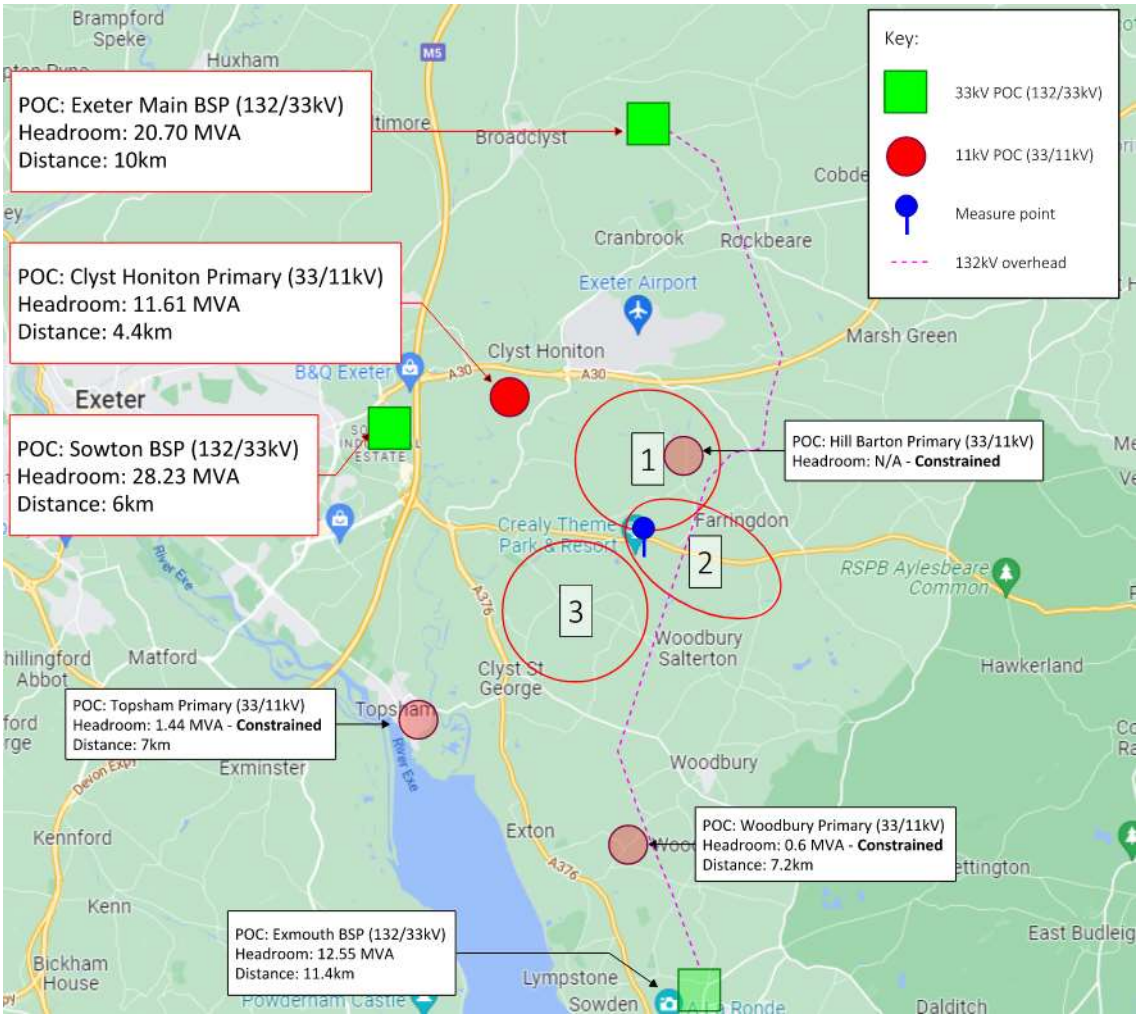


Figure 1 - NGED Regional Infrastructure overview

The key difference in supply solution between the three sites will be the cable route distances from the Point Of Connection (POC) to the preferred site location. The resulting infrastructure and possible reinforcements required to supply the quantum of build uses in the masterplan is anticipated to be much the same for each of the three sites.

Initial correspondence with NGED's local team in Exeter North determined that a site of this size would likely be dealt with by their Primary System Design team, but is to be confirmed based on confirmed site load. NGED is set up so that there are teams and appropriate engineers dealing with each voltage level. Until a confirmed site load can be provided, NGED will not engage in consultation, as they cannot determine which engineering level their assessment will require.

A NGED budget estimate will indicate the solution and provide budgetary costs, however, a formal application will need to be submitted for NGED to complete a detailed design in order to determine the exact supply solution for the site.

3.3.1 Load Assessment

A very high-level estimation of power required for 8,000 homes is circa 35MVA. The 'Commercial' power requirement is to be confirmed on receipt of an area schedule and completion of a load assessment.

A load assessment will be completed at the next stage once a preferred site location has been agreed and the quantum of residential, commercial and other building uses is defined. From here, budget applications will be submitted to WPD in order to understand the estimated costs for obtaining a POC to their network for the calculated load demand.

3.3.2 Delivery Models

3.3.2.1 Independent Distribution Network Operators

With regards to Utility Delivery Models, there are opportunities to engage with Independent Distribution Network Operators to provide an embedded network within WPD's (now "National Grid") wider supply area, and offer 'Asset value' discounts under the Competition in Connections (CiC) market that OFGEM commits to as mechanism to benefit consumers through increased quality, or decreased prices, or both. This option is equally suitable for any site location.

3.3.2.2 Microgrids

Smart Microgrids also offer an alternative delivery model, benefitting both Net Zero Carbon targets with regards to ensuring renewable electricity generation is maximised and utilised on site within a smart controlled network with storage facilities, as well as lowering site electrical demand and thus slightly less reliance from the Grid or the DNO network, and being able to set energy prices for customers through the creation of an Energy Services Company (ESCo).

A microgrid is a local power network that uses distributed energy resources (DERS), such as solar PV, wind turbines, backup generators and battery storage systems, to manage local energy supply and demand.

For a residential microgrid, a single point of connection (POC) is provided by the DNO with all generation (including rooftop PV), supply and metering owned by, and connected directly in to, the microgrid with its associated digital infrastructure and smart controls system. It is the smart controls that enables forecasting to be carried out to optimise when to produce, consume, store or sell energy based on the flexibility of batteries, EVs, and site loads connected to the microgrid. It can also perform use-cases such as tariff management and metering and billing for the site. The only differentiator to each of these sites with regards to Micro-grids is where the POC will be to the DNO network.

To operate a microgrid, an energy services Company (ESCo) is normally formed to manage energy supply. The ESCo's business model can be formed on various bases such as non-profit, community share-holding or more commercial arrangements.

Microgrids connect both demand and generation on a shared network, leading to improved performance of technology, lower energy emissions and greater equity, with all able to benefit from the communal system.

3.4 Gas

As of 2025, gas boilers will be banned in the UK for newly built homes. Therefore, it is assumed gas will not be part of the site's heating strategy.

Should a gas connection be required for the site, a budget application can be submitted to Cadent to understand the POC to their network and associated costs to provide this connection.

3.5 Potable Water

South West Water (SWW) is the incumbent water provider for East Devon, who will need to undertake assessments on their network to be able to provide a strategy to move forward with.

It is expected that all three site options will require a significant level of reinforcements to the potable water network, potentially including offsite trunk main upgrades.

SWW's strategic team have been made aware of the proposals and have expressed their desire to engage with EDDC to ensure a solution can be offered and infrastructure upgrades undertaken in line with the proposed build programme.

Without undertaking a water load calculation (which requires information currently undeveloped, such as a detailed building schedule or schedule of accommodation), SWW will only be able to comment from a high level perspective on the current state of their networks with regards to new supply provision, trunk main capacity etc.

In order to understand the implications of obtaining a clean water supply from SWW in more detail, a pre-development enquiry will need to be submitted including the expected water loads. For a scheme of this size, it is common for the water utility company to undertake water modelling. This process will allow SWW to assess their network and determine a strategy for how they will supply the site, and where the POC will be, whilst still serving their existing customers without negative affects to their water supply.

Water modelling typically takes 12 months to complete (6 months for modelling and 6 months for detailed design). A further 6 months is estimated for SWW to install the proposed supply solution, although this could extend depending on the level of upgrades needed.

It is unlikely that a site of this size would achieve a POC to a distribution main, but rather to a trunk main with a pressure reduction valve to reduce the water pressure down to be suitable for distributing to residential customers.

There is a key Ductile Iron (DI) trunk main is shown to run along the A3052, which is in close proximity to all three site Options, and directly through Option 2. SWW records also show the presence of a trunk main network shown to run in London Road and Honiton Road, north west of Exeter Airport, which is north-west of Option 1.

Given these locations, each site is presented with an opportunity to connect to a trunk main, and the reinforcements required to accommodate the new development would not be differentiated between the sites. The cost of reinforcement works are covered through infrastructure charges. Infrastructure charges are a one off charge, charged by all water companies for first time connections. Each new connection that adds a demand to the water and sewerage network will incur these costs. These charges ensure the upkeep and maintenance of the network.

3.6 Foul Drainage

3.6.1 Development Flows

An assessment has been made of the potential foul flows that could be delivered by the whole development in order to ascertain the level of impact on the existing sewerage network.

Flows have been calculated using the recommendations contained within the Water UK Sewerage Sector Guidance, Appendix C, Homes & Community Employment Density Guide 2015, Section 4, and the British Water Flows and Loads.

On the basis of the above, the following flow rates have been estimated;

180 ha of housing equating to circa 8,000 dwellings	Peak = 368 l/s	DWF = 61 l/s
10 ha of office employment use	Peak = 19 l/s	DWF = 6 l/s
38 ha of Class B2/B8 industrial use	Peak = 19 l/s	DWF = 6 /s
15 ha of retail and leisure use	Peak = 7 l/s	DWF = 3 l/s
23 ha of education use	Peak = 9 l/s	DWF = 3 l/s

(NB: DWF = dry weather flow)

Therefore, the total Peak Flow is predicted to be 422 l/s and the total DWF 79 l/s.

It should be noted that this figure may be adjusted subject to discussions with South West Water who may have their own factors to apply to large scale developments.

3.6.2 Sewerage Catchment Area

Due to the proximity of the three option sites, they all fall within the same catchment area for the existing sewerage network.

From an inspection of the South West Water sewer record plans, existing foul and combined drainage in and around the development areas all drain generally to the west and ultimately discharge to the Countess Wear treatment works near Topsham. This is done via a mixture of gravity sewers and pumped mains, both foul only and combined systems.

In general, the three site options are in relatively rural settings and therefore there are not a significant existing foul/combined drainage networks present. Those systems that are available are of small diameter (150/225mm) and therefore unsuitable to cope with the projected development flows.

Pipe sizes do increase further to the west however the network also passes through multiple pumping stations which affect the sizing.

3.6.3 Connection/Discharge Points

At this stage it is anticipated that two opportunities exist for the disposal of foul drainage from the three site options as set out below. The following comments can be taken as applying to all three sites.

Discharge to Local Watercourse via New Treatment Works

In view of the potential size of the development, it may be considered economic to provide a standalone treatment works which can discharge to the local watercourse network.

Site 1 has a tributary of the River Clyst running approximately through the centre of the site.

Site 2 benefits form the same tributary on its northern boundary as noted for Site 1, and from the Grindle Brook passing through the southern part of the site.

Site 3 has the Grindle Brook passing just within the northern boundary of the site area. An additional watercourse lies within the southern part of the site however it is likely to be too minor and possibly discontinuous to act as a receptor for treated water.

As a very high level guide, a new waste water treatment works my require an area of some 3 ha and have a potential overall cost of circa £10m. This option would also be subject to obtaining the necessary approvals form the Environment Agency.

Connect to Existing South West Water Sewerage Network

As noted above, there are existing foul and combined sewers in and around the various site options. None at present will be of a sufficient size to cater for the proposed development flows.

Assuming that a point of connection is to be made to the existing network, it is evident that significant upgrades will be required to the system. Under normal charging arrangements, such upgrade works would be carried out by South West Water at their own cost under the assumption that they will recoup their costs through standard charges for new house connections etc. However, this only applies from the point on the existing network where the size of the sewer is 'like for like' for the pipe diameter needed to serve the development on its own. In this instance, and using the estimated flows set out in section 2.2.2 above, this would approximately equate to a 700mm dimeter pipe.

From an inspection of the available sewer record plans, there is no point on the existing network where a connection could be made to a 700mm diameter pipe. On this basis the developer would be responsible for all costs relating to the upgrading of the existing network.

The alternative could be to requisition a new outfall sewer purely serving the development site to the treatment works at Countess Wear. Given their relative locations, Site 1 would have a slightly longer distance and therefore potential greater cost than Sites 2 and 3 however this is likely to be relatively insignificant as a whole.

Improvements are likely to be required to the existing Countess Wear treatment works given the scale of the proposed development. These works would be undertaken by South West Water as part of their 5 year Asset management Plan (AMP) for the relevant period.

3.7 Water and Sewerage Alternative Delivery models

3.7.1 NAV Operators

New appointments and variations ("NAVs") allow companies to offer water, sewerage or water and sewerage services to a specific geographic area instead of the existing incumbent company. As a result, similarly to the

electricity market, developers and large business customers can choose their supplier for these services and enjoy the benefits of this competitive market.

Although the main Source of Water (SoW) will ultimately come from a South West Water supply such as a reservoir or trunk main network, the ownership, operation, maintenance and wholesale of the water supply will then be under the chosen NAV. Therefore any issues with supply, quality of service, leaks, faults etc with the new water network will not be with South West Water to resolve, but the newly appointed provider.

The process involves the chosen NAV company applying to Ofwat with evidence of a supporting large or significant consumer who would support their case for becoming the monopoly wholesale provider, and undergoing a detailed assessment on their application, including a public consultation of no less than 28 calendar days.

The interactions usually required between applicants and existing appointees, the Consumer Council for Water (CCWater), the Drinking Water Inspectorate (DWI), the Environment Agency (EA) and the Market Operator Services Limited (MOSL) during the application process.

Any Limited company can become a NAV operator, although there are a few already operating across the UK, allowing them to give confidence of their service levels through a track record.

The current list of active companies is:

- Albion Water Limited
- Albion Eco Limited
- County Water Limited
- Icosa Water Services Limited
- Independent Water Networks Ltd
- Leep Networks (Water) Ltd
- Severn Trent Services (Water and Sewerage) Ltd
- Veolia Water Projects Ltd

3.8 Telecommunications

Procurement of telecoms services is a low-risk item and is relatively straightforward to complete. To procure new telecoms connections, the site will need to be registered with Openreach to allow a survey to be completed, and dialogue to open for Openreach to assess the sites requirements ahead of providing a service proposal.

Openreach are the UK largest telecommunications provider and have the greatest infrastructure across the country. The key benefit Openreach offer is other service providers can use Openreach's infrastructure to service the site, therefore, it is recommended to engage with Openreach for new connections at this early stage.

To procure new telecoms connections, the site will need to be registered with Openreach to allow a survey to be completed and dialogue to open for Openreach to assess the sites requirements.

At a later stage, additional and alternative providers (e.g. Virgin Media) can be engaged to ensure a variety of service providers are able to service the site.

Typically, BT Openreach, Virgin Media (who own and manage most of the existing telecoms infrastructure around the UK) plus an increasing number of independent companies, will install fibre infrastructure to new developments at heavy discounts based on projected revenue.

Openreach offer free issue fibre to the premise (FTTP) connections for all new build residential schemes with over 20 units. This includes free issue cabling and ducting. Fibre to the Premise enables superfast broadband to be delivered directly into a property. Fibre is run from the local exchange, terminating in a cabinet. From here, fibre lines connect each property to the cabinet to provide superfast speeds.

For purely commercial developments Openreach typically require a contribution to the cost of installing fibre to the premise (FTTP). This is a bespoke cost to each development which Openreach will review on receipt of confirmed site plans and registration of the site. Fibre to the Premise enables superfast broadband to be delivered directly into a property. Fibre is run from the local exchange, terminating in a cabinet. From here, fibre lines connect the building to the cabinet to provide superfast speeds.

For sites that contain a mix of residential and commercial units, Openreach will provide FTTP at no cost to the developer where there are 30 or more units.

It is also recommended to install a secondary comms supplier in order to provide resilience to the site and more options to the end occupants of the building in terms of the internet service providers available to them. There are a number of different companies that can be approached.

The traditional model for servicing a site, and buildings, with telecoms is for the service provider (e.g., Openreach) to run a fibre to a local cabinet (FTTC) and then run copper cables from the cabinet to serve individual units. This generally achieves between 67MBps to 100MBps. The step up from FTTC is fibre to the premise (FTTP), replacing the previous copper cable from the cabinet with a fibre connection. FTTP can provide speeds of up to 300MBps. FTTP can also provide speeds of up to 950MBps with the Jurassic fibre offer.

Hyperfast Broadband providers can offer speeds of up to 1GBps and guarantee connections for customers from day 1. These types of providers are, more so than Openreach, enabling a futureproofed digital network within which new communities can be serviced with data connections suitable for a fast-moving data-focused communications landscape.

All three site options will be equally suitable for competitively tendered fibre offerings given the number of new residential and business customers that will be connecting to the networks.

3.8.1 Telephone Exchanges

Site 1: Openreach's local exchange, Sowton (WWSOWT) is located c. 7km south west of the site and is fibre enabled.

Site 2: Openreach's local exchange, Woodbury (WWWOOD) is located c. 4.5km south of the site but does not currently offer fibre to the cabinet (FTTC) or fibre to the premises (FTTP).

Site 3: Openreach's local exchange, Topsham (WWTOPS) is located c. 3.5km south west of the site and is fibre enabled.

4. EXISTING UTILITY INFRASTRUCTURE

This section aims to provide an overview of existing utilities infrastructure which may pose constraints predominantly with regards to spatial limitations (ie. easements and safety clearance distances to be adhered to within layout designs), thus feeding in to the scoring of the sites' feasibilities with regards to the extent of the impacts or limitations posed and/or expected financial impact of reducing or removing such constraints through infrastructure diversions.

Option 2 has the most significant constraints, including a National Grid high pressure (HP) pipeline which is considered by the HSE as a "major accident hazard pipeline" or "hazardous installation".

Option 2 is therefore considered to be the least viable for development of the 3 sites, although not impossible to proceed with.

It is important to note that while existing onsite infrastructure poses some design considerations, in general it also presents opportunities for connections and upgrades to provide for a new town. With a Utility requirement this large, a lack of onsite infrastructure would be, in this sense, more problematic than an abundance.

4.1 Existing Utility Infrastructure Options Summary

Option 1: [3 - Medium Impact]

- Option 1 has a large amount of electrical infrastructure and relatively small amounts of other utilities infrastructure.
- A significant number of 11kV & 33kV cabling routes are present throughout the site. As most of the assets do not follow existing highways, it is assumed they are distributed via overhead lines. Therefore, diversions would likely be required to clear them from site or incorporate them into the masterplan with clearance strips.
- Hill Barton Primary Substation exists within the Hill Barton Business Park/industrial estate.
- A service corridor containing intermediate pressure gas, telecoms and a water main runs through the western half of the area. These mostly run in or near to existing highways and it should be possible to avoid any diversions. However, asset record information is indicative only and although aims to be as accurate as possible, the exact positioning can sometimes differ when onsite investigations are completed i.e. ground penetrating radar surveys or trial holes. Therefore it may transpire that these routes don't fully run in the highways and may required diversions if they cannot be accommodated with the masterplan.
- The intermediate gas main could pose to be a key constraint depending on what portion is outside of the highways due to the high costs and long timescales to divert.
- Some foul drainage is present around the perimeter of this area.

Option 2: [1 - Significant Impact]

- Option 2 has the most significant constraints (HP and IP gas mains and EHV cabling) which will need to be designed around due to the cost and time implications of diverting them.
- A high pressure gas main is located in the south east corner of the site. There are limitations to what can and can't be built within the proximity of a HP gas main and the HSE will be a statutory

consultee for any development proposals within the vicinity of this network as it is deemed a hazardous installation.

- EHV (132kV) overhead cabling routes through the site, which is a spatial constraint. Asset specific clearance distances must be kept between the cables and any permanent structure, and between cables and the ground. Additionally, a 30m zone must be kept free around the base of each tower for access for maintenance.
- Figure 6 shows the areas covered by the inner, middle and outer consultation zones, determined by the HSE. The HSE has a land use methodology that determines whether they would advise against or not advise against development in these areas depending on the vulnerability of sensitivity of proposed building types.
- An intermediate gas main routes through various areas of this site. This could be a spatial design constraint depending on how much runs within highways and what portions impact the masterplan. An easement and no-build strip would need to be considered within any site layout designs.
- A wider network of 33kV and 11kV cables are located in multiple locations across the area, which will likely require diversions.
- Foul water and potable water mains are present across this area. The potable water mains look to run within existing highways.
- Comms is present in this area and it's anticipated these will be within existing highways and therefore no diversions will be required.

Option 3: [3 - Medium Impact]

- Option 3 has a higher density of services than Option 1 however, a number of these look to run within existing highways and may in turn require a fewer number of diversions.
- Various 11kV & 33kV cabling route through the site. As most of the assets do not follow existing highways, it is assumed they are distributed via overhead lines. Therefore, diversions would likely be required to clear them from site or incorporate them into the masterplan.
- Multiple water mains are present with a primary route running through the centre of the site. The water mains generally look to be within existing highways which could limit the number of diversions required.
- Foul water drainage routes through the northern edge of this area.

4.2 Option 1

4.2.1 Electricity - WPD

WPD are the incumbent electricity distribution network operator for this service area.

4.2.1.1 Existing infrastructure

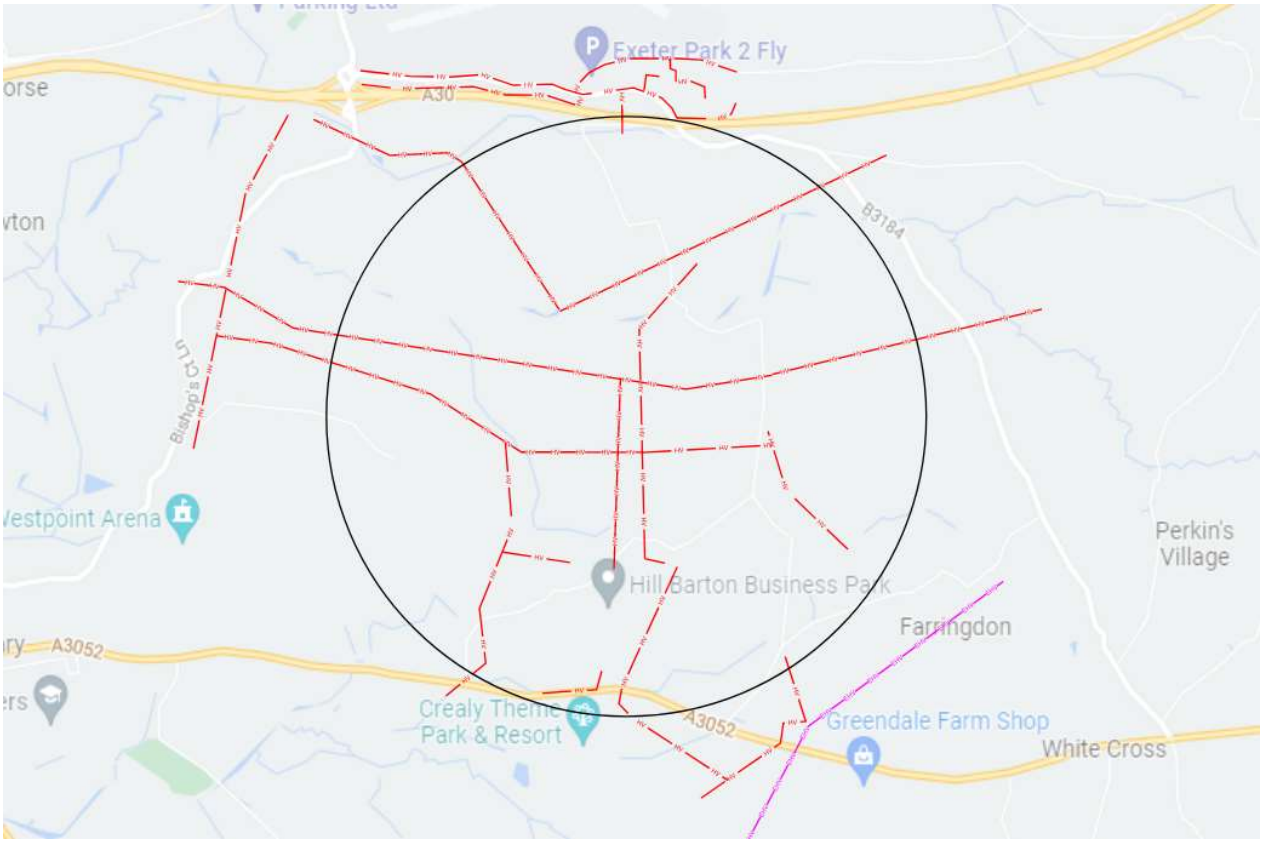


Figure 2 - Overview of key WPD infrastructure within the site vicinity

Records received from WPD show:

- Various 11kV and 33kV cabling routes throughout Site 1;
- LV routes and supply cables also present within the site although too numerous to show on the overview drawing in Figure 1.

4.2.1.2 Conflict assessment

Several 11kV and 33kV overhead cable routes are located throughout Site 1. It is anticipated diversions will be required for all of the overhead services to clear the site ready for the new development. In order to minimise diversion costs, grounding the cables to run within new highways through the site may be preferable than diverting around the site entirely.

Some assets look to serve existing substations/ buildings in the area. If these services are to be retained, diversions may be required to bury the cabling in suitable service corridors as to not impose with the new masterplan.

Two of the cabling routes looks to be strategic running across the site as part of a wider circuit, and do not necessarily serve any existing buildings. An option could be explored to divert the entire section of cabling around the site to best clear the site of existing infrastructure. However, this will likely impose higher diversion costs than incorporating the cable routes within new highways installed as part of the new masterplan. Alternatively, the cable routes could be incorporated into the masterplan, with the necessary clearance distances adhered to, in order to avoid diversion costs if required.

4.2.2 Gas - Cadent

Cadent Gas are the incumbent gas distribution operator for this service area.

4.2.2.1 Existing infrastructure

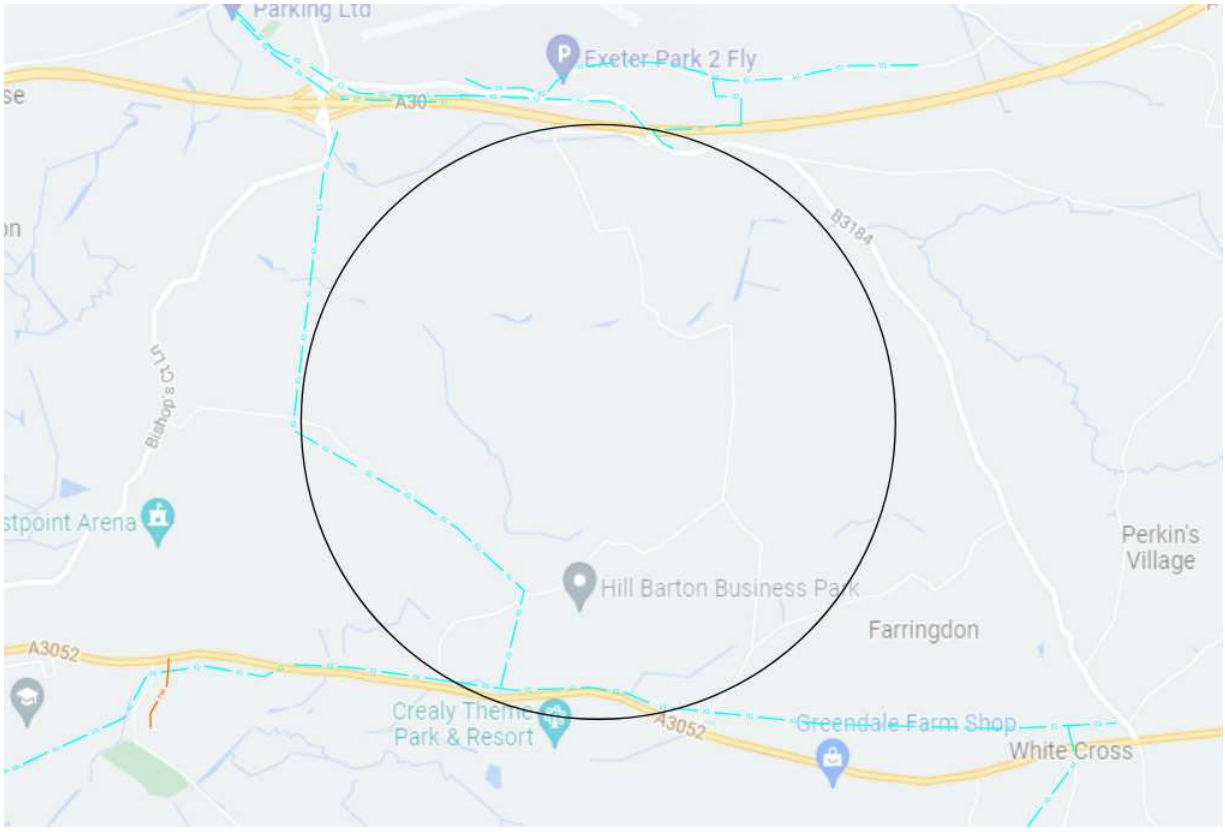


Figure 3 - Overview of key Cadent infrastructure within the site vicinity

Records received from Cadent show:

- An Intermediate Pressure (IP) gas main routes through the south-west corner of Site 1;
- There is a network of low pressure (LP) pipes within the area, which are not shown in Figure 2 drawing but should be noted as the masterplan develops.

4.2.2.2 Conflict assessment

The Cadent IP gas main routes through the site and looks to run within or alongside the existing highways. This main may be a key constraint depending on what portion of the main is within the highways. It is possible to divert sections that interact with the proposed masterplan.

Diverting an IP gas main is an expensive and long process and they are not commonly diverted due to these implications. Cadent can be engaged to confirm the implications of diverting the asset via a budget diversion application.

If the IP main is to remain, it will have associated easements and wayleaves. An indicative easement is estimated to be between 4-8m either side of the main, however, the exact easement for this specific asset can be confirmed by Cadent.

4.2.3 Water - South West Water

SWW are the incumbent gas distribution operator for this service area.

4.2.3.1 Existing infrastructure

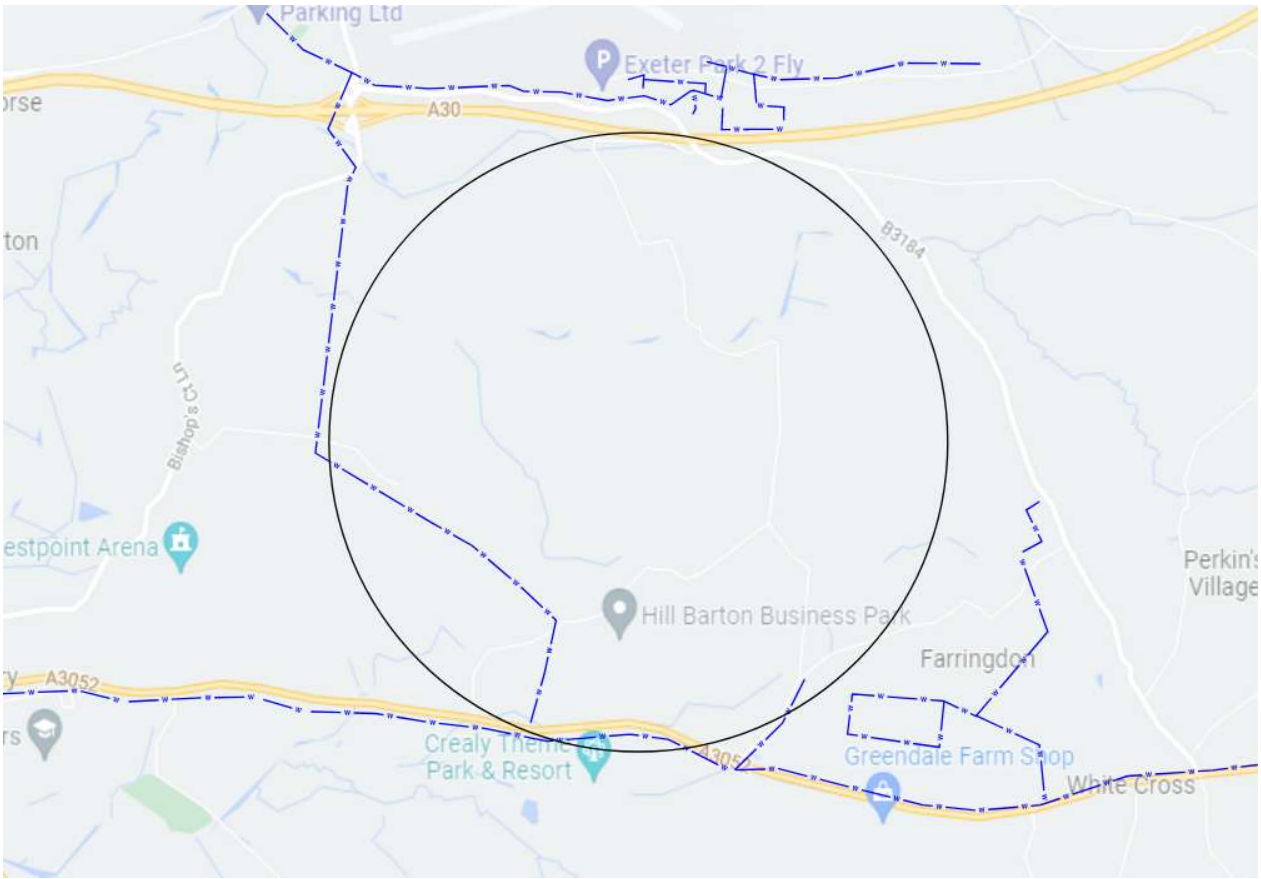


Figure 4 - Overview of key SWW apparatus within the site vicinity

Records received from SWW show:

- A water main routes through the south-west corner of Site 1.

- There will be other service mains within the area, which are not shown in Figure 3 drawing but should be noted as the masterplan develops.

4.2.3.2 Conflict assessment

The SWW water main routes through the site and looks to run within or alongside the existing highways. A diversion may be avoided if the main routes entirely within the highways. However, if a portion runs outside of the highways and interacts with the site, these sections could be diverted in order to clear the site ready for development.

4.2.4 Telecommunications – Openreach

Openreach manage and install the infrastructure for telecommunication services. BT are the branch of the company that provides telecoms service throughout the UK.

4.2.4.1 Existing infrastructure

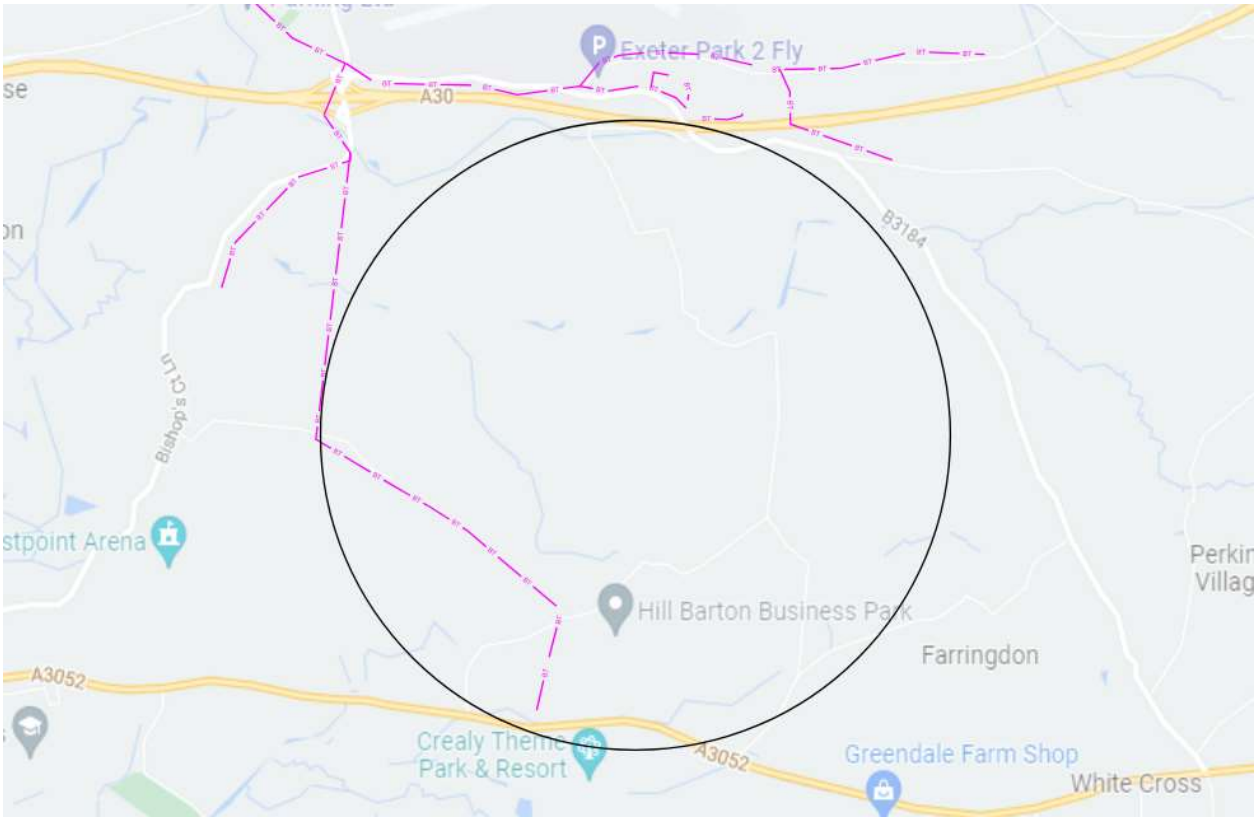


Figure 5 - Overview of key Openreach apparatus within the site vicinity

Records received from Openreach show:

- Openreach telecoms infrastructure runs through the south-west corner of Site 1.

4.2.4.2 Conflict Assessment

The Openreach telecoms infrastructure routes through the site but it is anticipated this will route within existing highways. Therefore, a diversion is not anticipated.

Should a diversion be required, Openreach in the first instance will need to conduct a site survey to establish the extent of any work required and which apparatus will need to be diverted. This survey will be chargeable.

If a new site access road or any changes in levels are proposed over the route of existing services then the cables must retain the minimum level of cover required by the NJUG guidelines: 350mm in the footway and 600mm in the carriageway.

4.3 Option 2

4.3.1 Electricity - WPD

WPD are the incumbent electricity distribution network operator for this service area.

4.3.1.1 Existing infrastructure

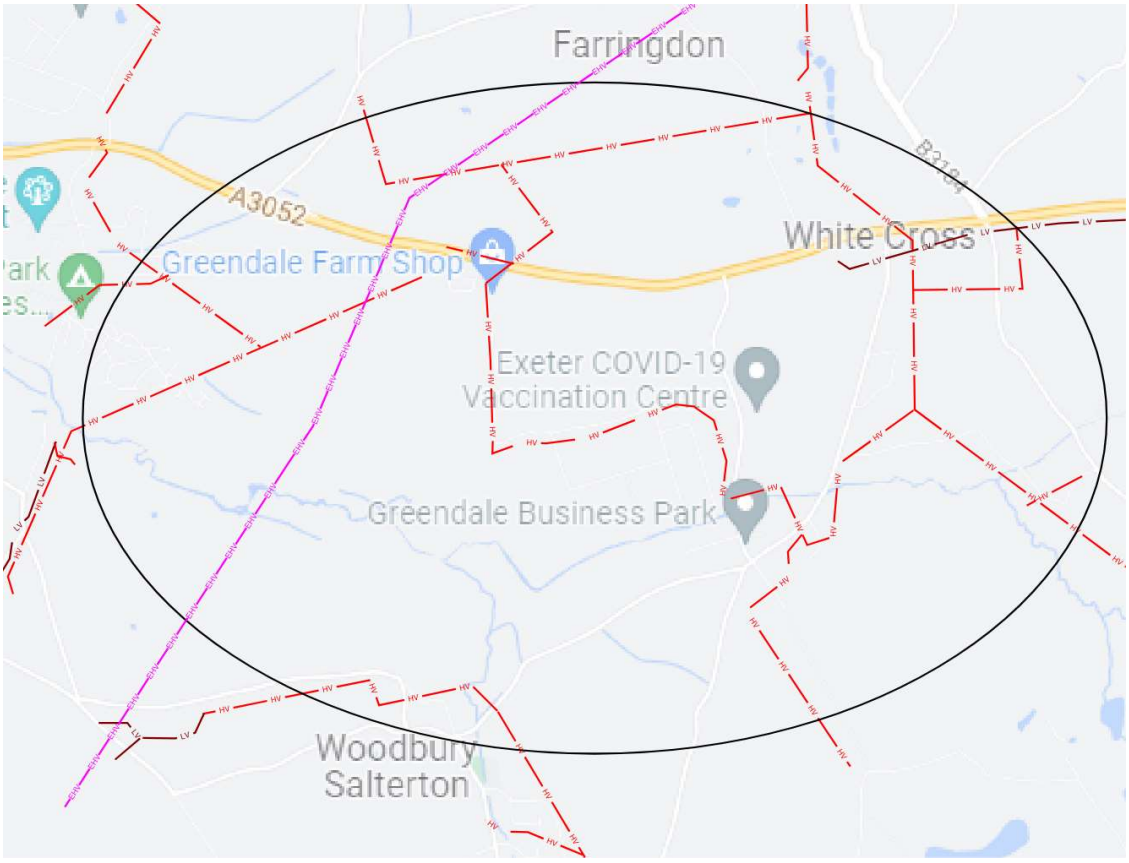


Figure 6 - Overview of key WPD infrastructure within the site vicinity

Records received from WPD show:

- 132kV overhead cabling routes through Site 2 from north to south;
- Various 11kV and 33kV cabling routes throughout Site 2.

4.3.1.2 Conflict assessment

The key constraint in terms of electrical infrastructure for Site 2 is the 132kV overhead cable route (illustrated as pink line). 132kV assets are expensive and timely to divert and although a diversion could be explored, it would be recommended this asset is designed into the masterplan.

Leaving the 132kV assets in place presents a number of implications. WPD will need to complete a 'swing and sag' assessment of the overhead cables to determine the clearance distances which must be maintained during development. The clearance distances include distances between cables and the ground (e.g. 7.3m), in addition to distance between cables and any object/ building on which a person may stand from (e.g. 5.3m). The distances are site specific and depend on things such as the length of cable, the natural sag of the cables and

local weather conditions. This requires the scheme architect to liaise with WPD's plant protection team to work through the 'swing and sag' assessment to work out clearances, which the architect can then incorporate into their parameters plan. Furthermore, a circular zone (e.g. 30m) will be required at the base of each tower for maintenance. Landscaping in the areas beneath the overhead cabling will need to be considered with only low growing species of trees/ shrubs being permitted to avoid risk of contact with the cables.

Various 11kV and 33kV overhead cabling routes throughout Site 2. It is anticipated diversions will be required for all of the overhead services to clear the site ready for the new development. In order to minimise diversion costs, grounding the cables to run within highways through the site may be preferable than diverting around the site entirely.

Some of these 11kV/ 33kV assets look to serve existing substations/ buildings in the area. If these services are to be retained, diversions may be required to bury the cabling in suitable service corridors as to not impose with the new masterplan.

4.3.2 Gas - Cadent

Cadent are the incumbent gas distribution operator for this service area.

4.3.2.1 Existing infrastructure

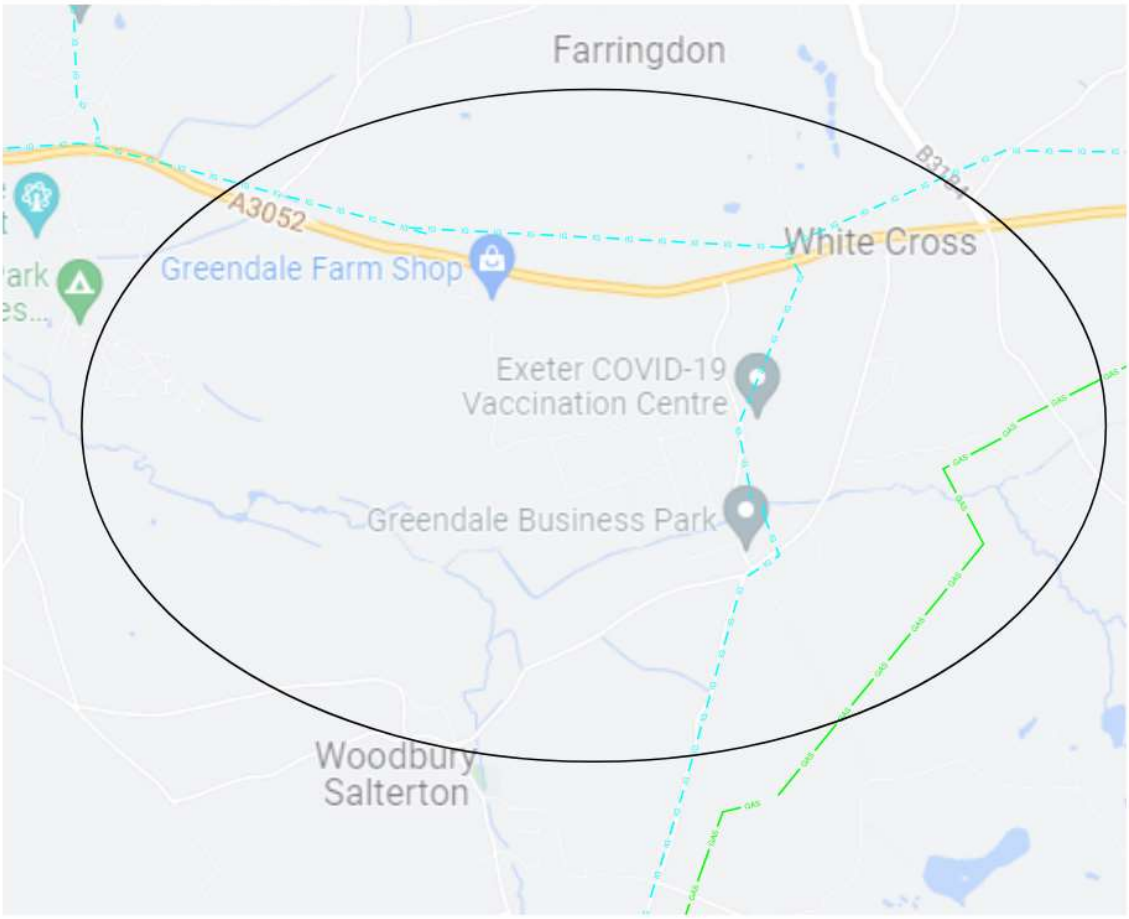


Figure 7 - Overview of key Cadent infrastructure within the site vicinity

Records received from Cadent show:

- High pressure (HP) and Intermediate Pressure (IP) gas mains route throughout Site 2.

4.3.2.2 Conflict assessment

The HP gas main route, which is classed by the Health and Safety Executive as a "major accident hazard pipeline presents a major constraint on the site and the design, particularly with regards to proposals for public residence.

HP gas mains have certain safety zones, with the relevant radius depending on a number of factors (gas pressure, pipe material/wall thickness, installation context), of which the governmental Health and Safety Executive (HSE) may advise the relevant planning authority not to grant planning permission under certain developmental circumstances, based on grounds of public safety. The HSE's is treated as a Statutory Consultee

in the Planning process and their feedback is compulsory to each site that contains a 'hazardous installation', and cannot be contested.

The risks of building within proximity of a 'hazardous installation' can be assessed by consulting with the HSE, and by using their land use planning methodology; PADHI guidelines (Planning Advice for Development near Hazardous Installations); which provides design and safety advise on what types of development are acceptable within each of the 'Consultation (safety) Zones.'

The PADHI Consultation Zones (CZ) are 3no distinctive areas (noted as the 'inner', 'middle' and 'outer' zones,) that are defined and assessed by the impact of an accident on the public in its vicinity. The Inner Zone (IZ) is the area of land immediately surrounding the pipeline. This zone has the highest risk to public safety due to its proximity to the apparatus. The Middle Zone (MZ) is the area of land surrounding both sides of the IZ and poses a medium risk to public safety. The Outer Zone (OZ) is a specified distance of land located thereafter; posing a lesser risk. Each pipeline, and each CZ, has its own safety distance. Some smaller diameter pipes may incur a CZ that is the same for the IZ, MZ and OZ.

Figure 6 provides an illustration of the consultation zones at Site 2 assessed by HSE.

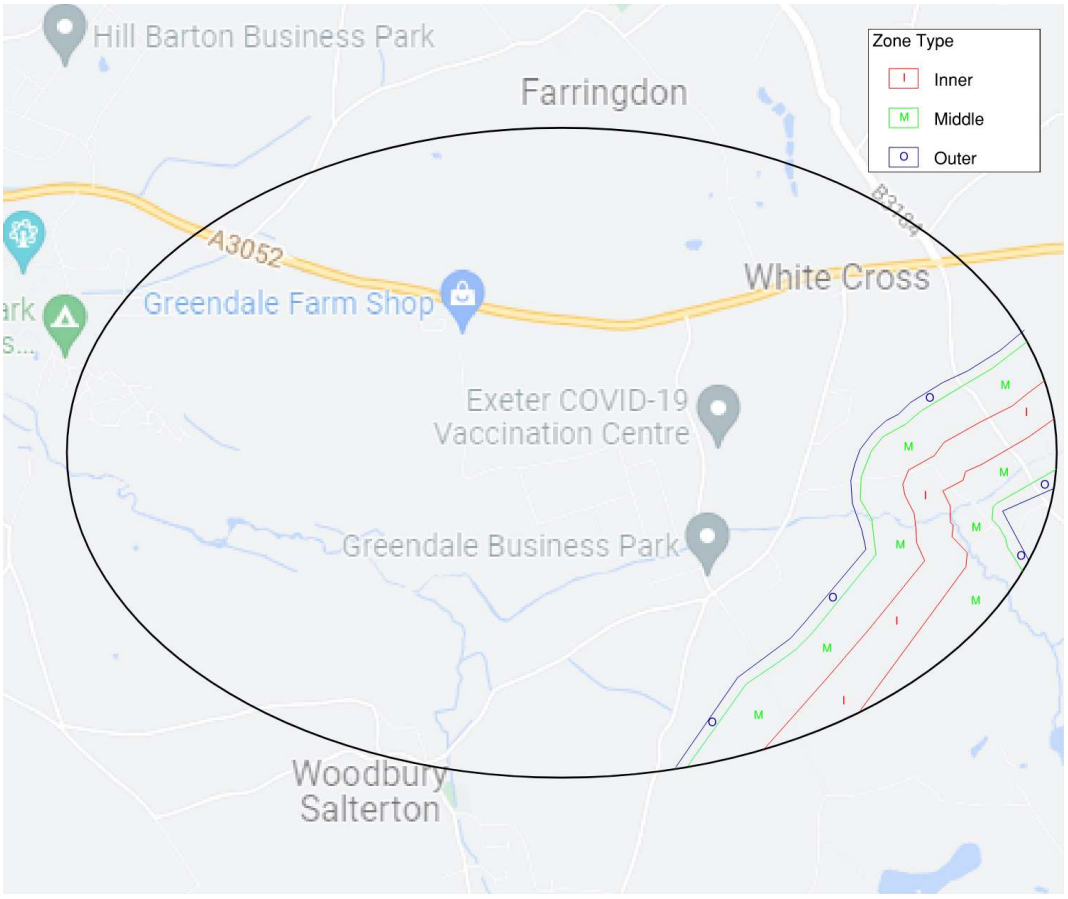


Figure 8 – Illustration of HSE gas consultation zones

In determining what can be built within each zone, the HSE have established different sensitivity levels for different development types. These sensitivity levels are shown in Table 1, and are ranked between 1-4 (4 being the most sensitive). For example, a 24hr care home for the elderly is rated a level 4 sensitivity due to the practicality of physically being able to safely remove all occupants from the building within a timely manner. A

sensitivity level 4 build type would not therefore be permitted within the Inner Zone of a hazardous installation due to the obvious safety risks, and would be 'advised against' by the HSE. In contrast, a car park with 10no spaces would pose less of a risk to public safety if built within an IZ and would therefore be rated as a less sensitive build type (type 1). A sensitivity level 1 build would achieve a 'don't advise against' HSE rating for the IZ and would be approved for planning.

Level of sensitivity	Development in **Inner Zone**	Development in **Middle Zone**	Development in **Outer Zone**
1	DAA	DAA	DAA
2	AA	DAA	DAA
3	AA	AA	DAA
4	AA	AA	AA

Table 1 - HSE CZ Decision Matrix
DAA = Don't advise against (permittable)
AA = Advise against development (not permitted)

Examples of which forms of development lie within which Sensitivity Level are given in Table 2 below. Please note that this list is not exhaustive, and more information, including special cases and exclusions, can be found within the HSE PADHI guidelines.

Development	Detail	Sensitivity Level
Residential	**3- 30 dwelling units and at a density of no more than 40 per hectare**	**2**
	<2 dwellings	1
	>30 dwellings	3
	Density of 40 dwellings (and more) per hectare	3
	Temporary accommodation (hotels, hostels, camping) of more than 100 beds of 33 caravans/pitches	3
	Institutional accommodation (hospitals, convalescent homes, nursing homes, sheltered housing)	3
Employment (building level)	Less than 100 occupants and less than 3 storeys	1
	100 or more occupants or 3 or more storeys	2
Commercial	Total floor space 250m2 – 5000m2 (less than 250m2 is level 1)	2
	5000m2 plus total floor space	3
Education	Schools (exc. Nurseries, which are a level 4)	3
Car park, estate and access roads, park and ride	With no associated facilities	1

*Table 2 - Sensitivity levels for particular forms of development. The proposed development currently lies within the **bolded category**.*

HSE would need to be engaged to confirm these consultation zones and then the development carefully designed accordingly to avoid conflict with the PADHI guidelines.

The Cadent IP gas mains routes through the site in three areas. Asset records indicate the primary pipeline traces the A3052 but sections of the main will interact with development site. These sections could be a key constraint. Diversions may be required for sections of this main depending on its impact to the proposed masterplan.

The section of IP main which routes south from this primary route looks to run existing highways, therefore, a diversion is not anticipated for this section of infrastructure.

The shortest length of IP pipe routes north from the primary route and looks to serve the existing Hill Barton Business Park, and mostly runs within highways. This section may need to be retained and incorporated within the masterplan to maintain the existing supplies.

Diverting an IP gas main is an expensive and long process and they are not commonly diverted due to these implications. Cadent can be engaged to confirm the implications of diverting the asset via a budget diversion application.

If the IP main is to remain, it will have associated easements and wayleaves. The easement is estimated to be between 4-8m either side of the main, however, the exact easement for this specific asset can be confirmed by Cadent.

4.3.3 Water - south west water

SWW are the incumbent gas distribution operator for this service area.

4.3.3.1 Existing infrastructure

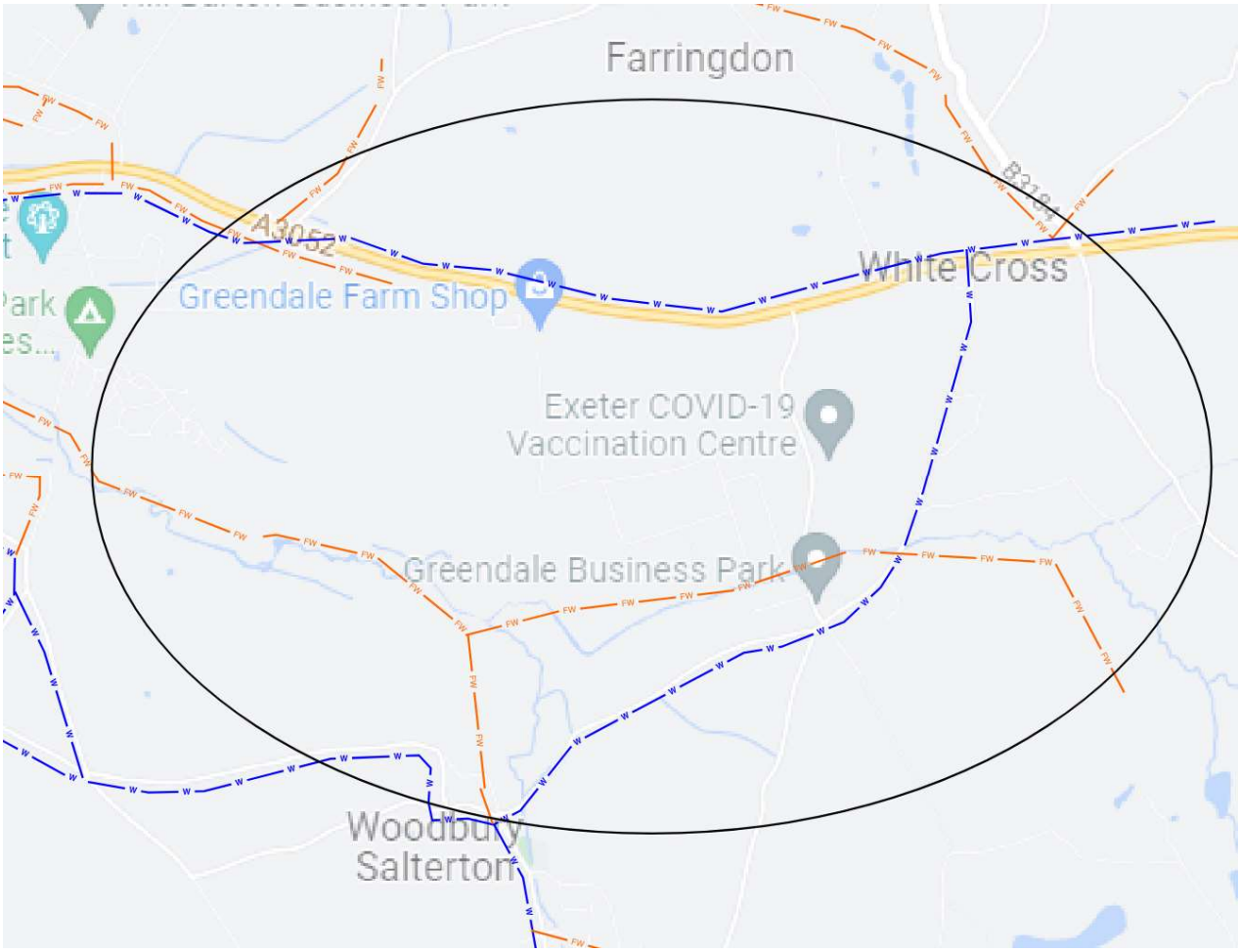


Figure 9 - Overview of key SWW infrastructure within the site vicinity

Records received from SWW show:

- Various potable water mains route throughout Site 2;
- Two foul water services are present within Site 2.

4.3.3.2 Conflict assessment

The SWW potable water mains route through the site and look to run within or alongside the existing highways. It is anticipated diversions will not be required if the mains route entirely within the highways. However, if a portion runs outside of the highways and interacts with the site, these sections could be diverted in order to clear the site ready for development.

Assessment of the foul sewer network is excluded from this report and is recommended that advice is sought from by a Civil Engineer.

4.3.4 Telecommunications – Openreach

Openreach manage and install the infrastructure for telecommunication services.

4.3.4.1 Existing infrastructure

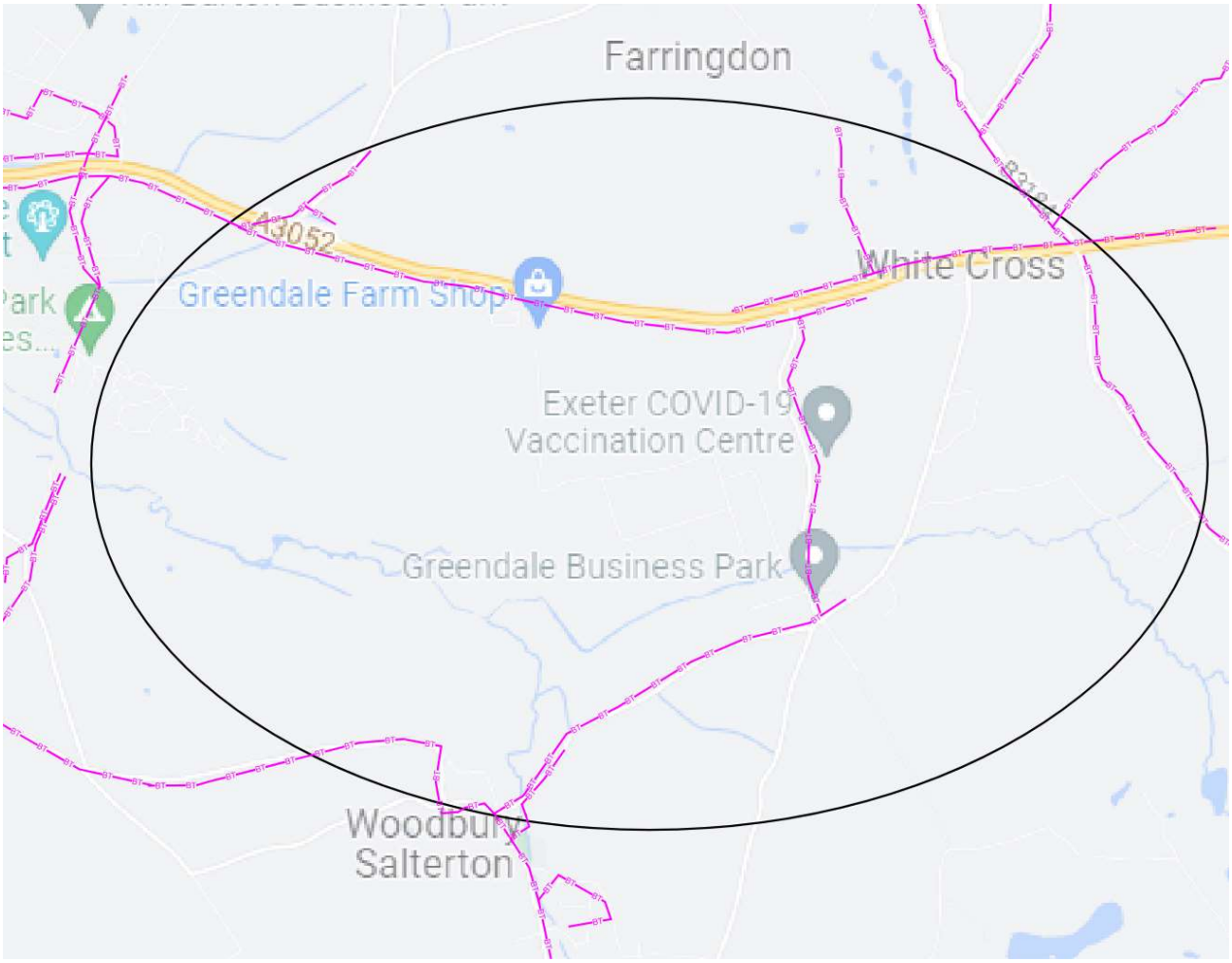


Figure 10 - Overview of key Openreach infrastructure within the site vicinity

Records received from Openreach show:

- Openreach telecoms infrastructure are present throughout Site 2.

4.3.4.2 Conflict Assessment

The Openreach telecoms infrastructure routes through the site but it is anticipated this will route within existing highways. Therefore, diversions are not anticipated.

Openreach, in the first instance, will need to conduct a site survey to establish the extent of any work required and which apparatus will need to be disconnected. This survey will be chargeable. Typically, Openreach remove their infrastructure free of charge when there is no live line left in use.

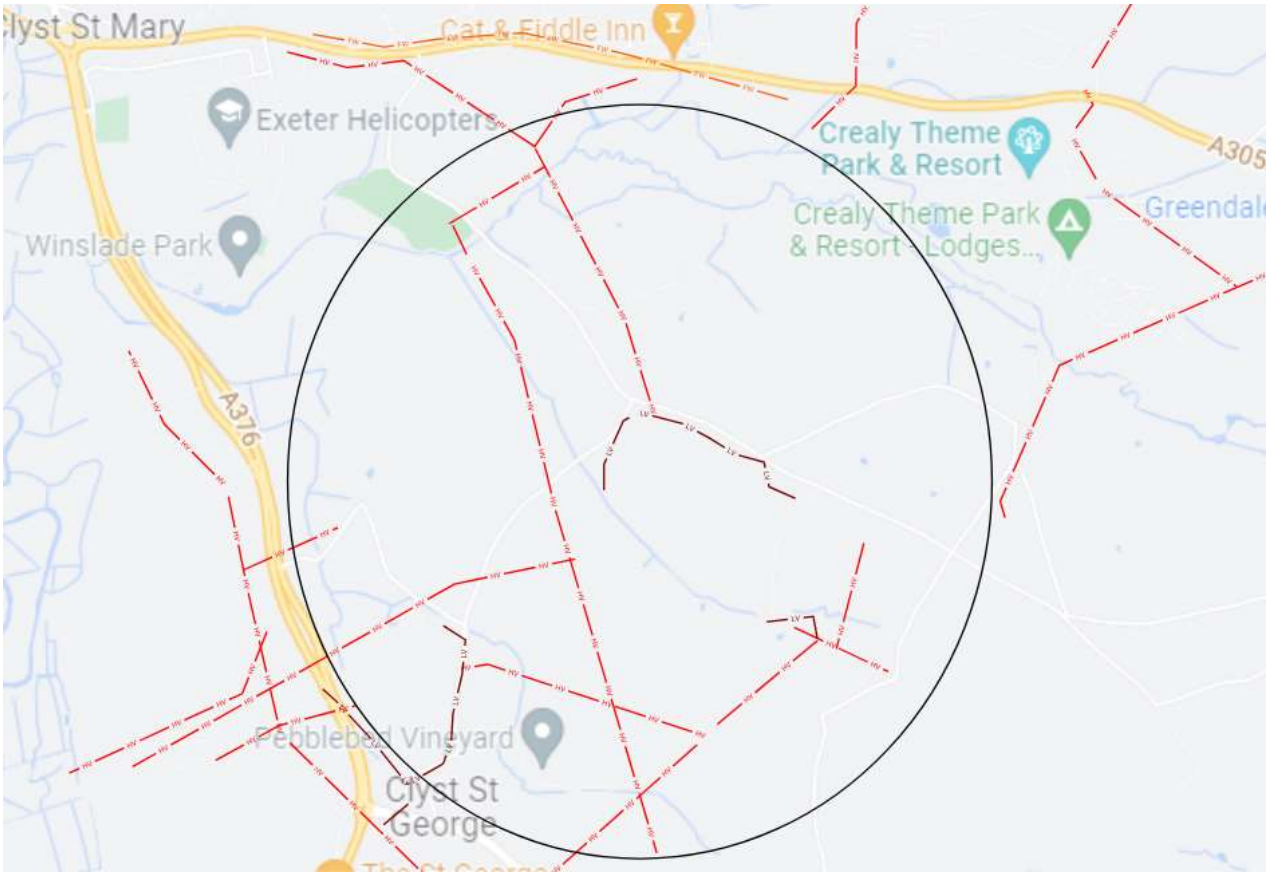
If a new site access road or any changes in levels are proposed over the route of existing services then the cables must retain the minimum level of cover required by the NJUG guidelines: 350mm in the footway and 600mm in the carriageway.

4.4 Option 3

4.4.1 Electricity - WPD

WPD are the incumbent electricity distribution network operator for this service area.

4.4.1.1 Existing infrastructure



Records received from WPD show:

- Various 11kV and 33kV cabling routes are present throughout Site 3;
- LV networks are present in areas of Site 3.

4.4.1.2 Conflict assessment

Several 11kV/ 33kV overhead cable routes and located throughout Site 3. It is anticipated diversions will be required for all of the overhead services to clear the site ready for the new development. In order to minimise diversion costs, grounding the cables to run within new or existing highways through the site may be preferable than diverting around the site entirely.

Many of these 11kV/ 33kV assets look to serve existing substations/ buildings in the area. If these services are to be retained, diversions may be required to bury the cabling in suitable service corridors as to not impose with the new masterplan.

One of the cabling routes looks to be strategic running across the site as part of a wider circuit, and may not necessarily serve any existing buildings. An option could be explored to divert the entire section of cabling

around the site to best clear the site of existing infrastructure. However, this will likely impose higher diversion costs than incorporating the cable routes within new highways installed as part of the new masterplan.

4.4.2 Gas - Cadent

Cadent are the incumbent gas distribution operator for this service area.

4.4.2.1 Existing infrastructure

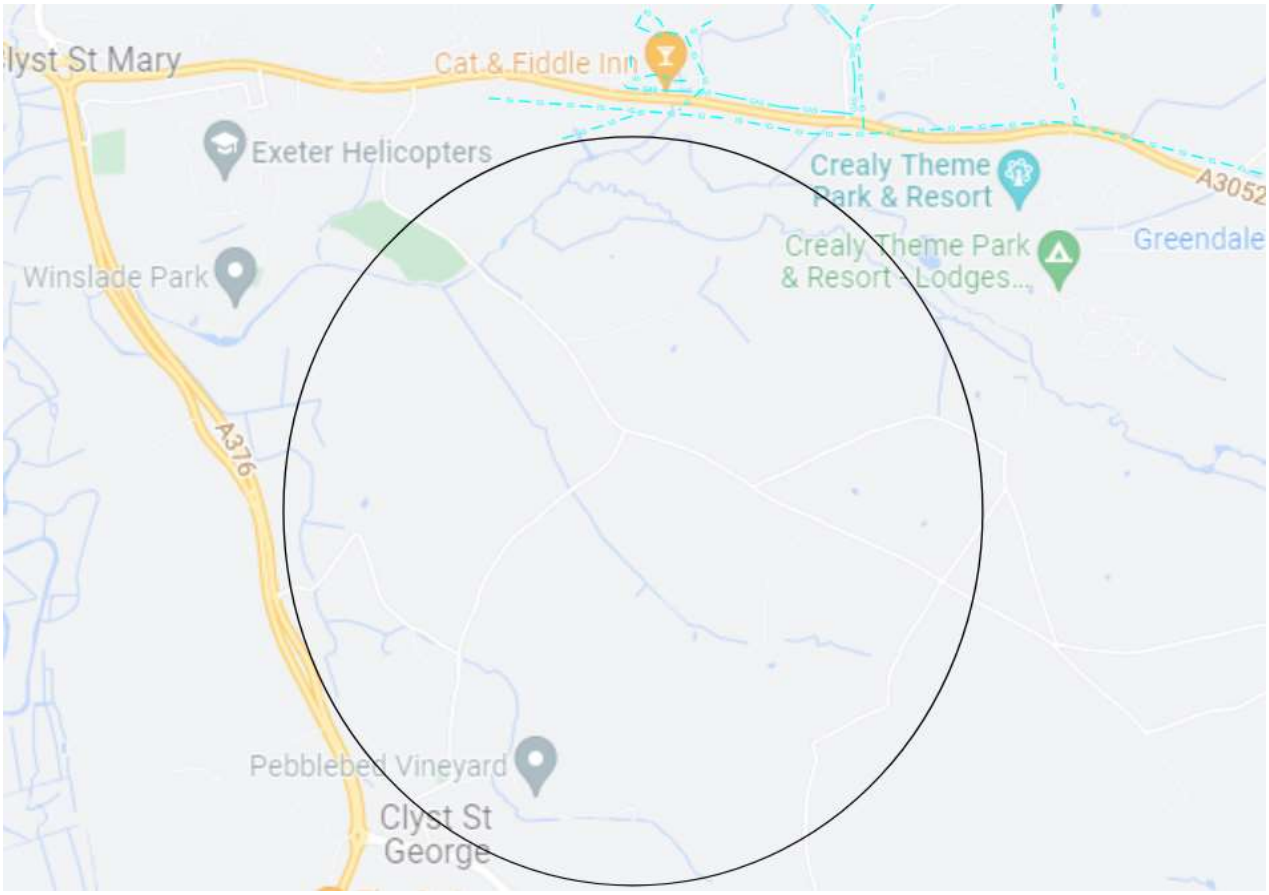


Figure 12 - Overview of key Cadent infrastructure within the site vicinity

Records received from Cadent show:

- An IP gas main is present on the northern edge of Site 3, south of the A3052.

4.4.2.2 Conflict assessment

The Cadent IP gas main runs across the most northerly plot within Site 3. Asset records indicate this traces the A3052, depending on its proximity it may be possible to leave in place to avoid a diversion. If it does impact the proposed masterplan, the section could be diverted, though this would be an expensive and timely process as noted previously in this report.

Cadent can be engaged to confirm the implications of diverting the asset via a budget diversion application.

If the IP main is to remain, it will have associated easements and wayleaves. The easement is estimated to be between 4-8m either side of the main, however, the exact easement for this specific asset can be confirmed by Cadent.

4.4.3 Water - South West Water

SWW are the incumbent gas distribution operator for this service area.

4.4.3.1 Existing infrastructure

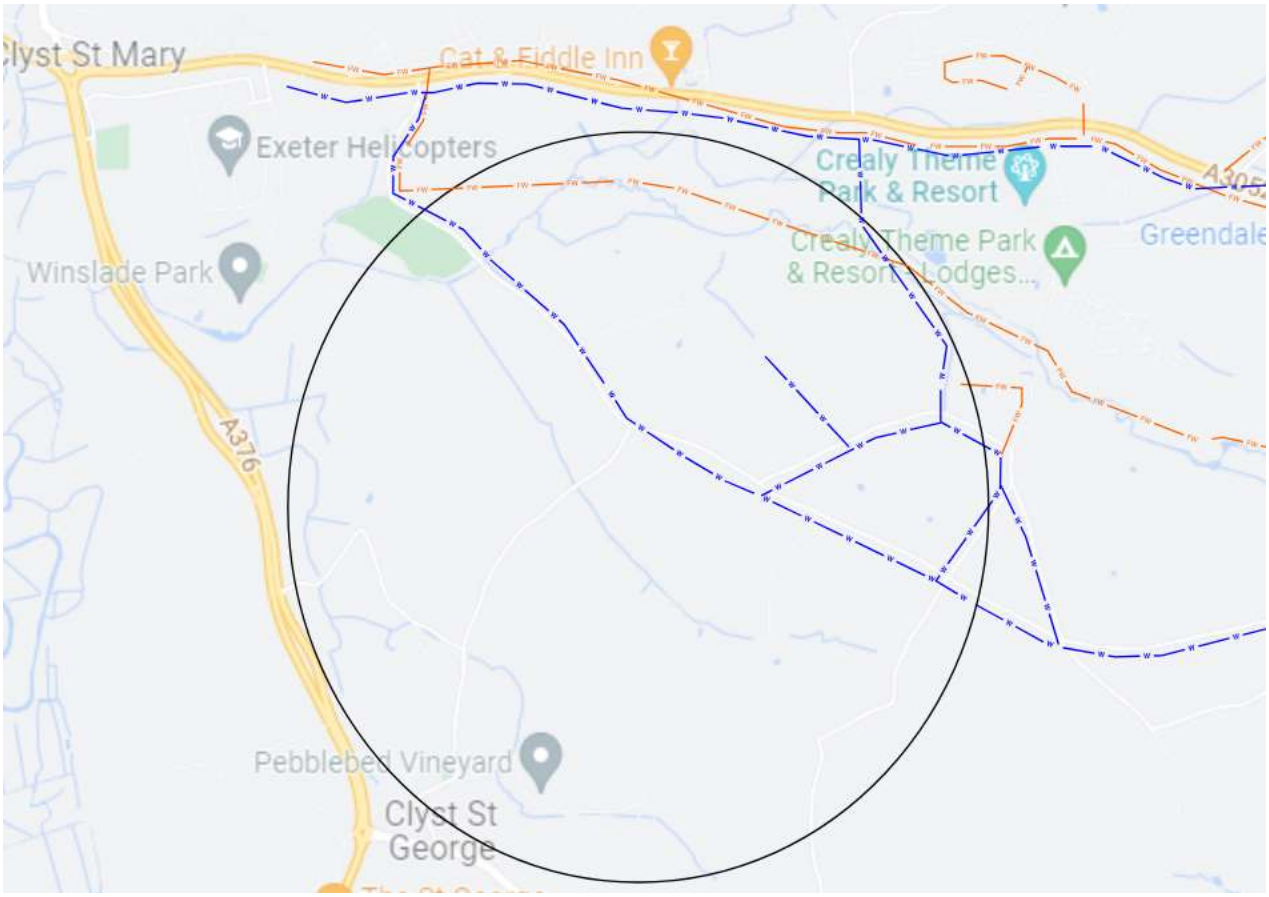


Figure 13 - Overview of key SWW infrastructure within the site vicinity

Records received from SWW show:

- Potable water mains routes through Site 3;
- Foul water mains are present within Site 3.

4.4.3.2 Conflict assessment

The SWW water main routes through the site and looks to run within or alongside the existing highways. The majority of the infrastructure looks to run within the existing highways therefore a diversion is not anticipated in these sections. However, diversions are possible for any sections which impact the proposed masterplan.

One section branches from the highways routed infrastructure to serve an existing customer. It is possible to divert this main if it impacts the proposed masterplan in order to maintain the existing customer. If the existing customer vacates the site, this branch could be disconnected.

Assessment of the foul sewer network is excluded from this report and is recommended that advice is sought from by a Civil Engineer.

4.4.4 Telecommunications – Openreach

Openreach manage and install the infrastructure for telecommunication services.

4.4.4.1 Existing infrastructure

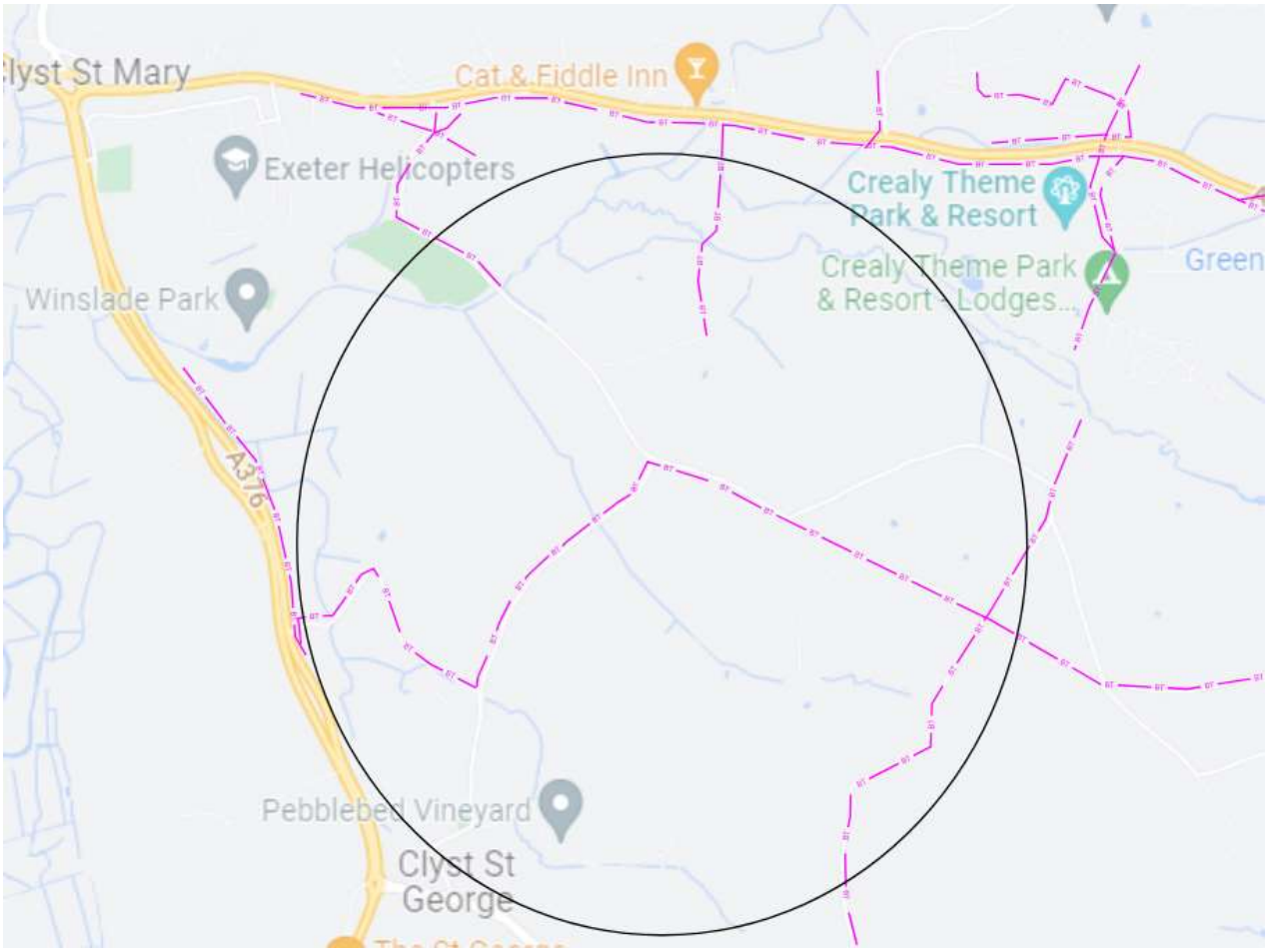


Figure 14 - Overview of key Openreach infrastructure within the site vicinity

Records received from Openreach show:

- Openreach telecoms infrastructure is present in various areas of Site 3.

4.4.4.2 Conflict Assessment

The Openreach telecoms infrastructure routing through the site is mostly situated within highways, therefore diversions are not anticipated for these sections.

One leg of infrastructure routes south from the A3052 spine to serve an existing customer. It is possible to divert this main if it impacts the proposed masterplan in order to maintain the existing customer. If the existing customer vacates the site, this branch could be disconnected.

Openreach, in the first instance, will need to conduct a site survey to establish the extent of any work required and which apparatus will need to be diverted/ disconnected. This survey will be chargeable. Typically, Openreach remove their infrastructure free of charge when there is no live line left in use.

If a new site access road or any changes in levels are proposed over the route of existing services then the cables must retain the minimum level of cover required by the NJUG guidelines: 350mm in the footway and 600mm in the carriageway.