

**LAND AT CHANNEL VIEW, GRANGETOWN
CARDIFF**

ENVIRONMENTAL STATEMENT

**VOLUME 2
CHAPTER 11: UTILITIES AND ENERGY**

INTRODUCTION

- 11.1 This chapter of the ES has been prepared by McCann and Partners to assess the potential effects of the proposed development upon the local Statutory Undertakers service supplies and any associated impacts associated with the provision of the additional services, which maybe required.
 - 11.2 This chapter has been compiled by Graham Carr, a Senior Mechanical Engineer at McCann and Partners.
 - 11.3 This Chapter describes the baseline conditions currently existing at the Site; the mitigation measures required to prevent, reduce or offset any significant negative impacts; and the likely residual impacts after these measures have been adopted. This chapter refers to the Energy Strategy Report (hereafter referred to as the ESR) (Appendix 11.1). These studies were based on the principles of the scheme as it stood at the time and are included in this chapter's appendices.
- .

LEGISLATIVE AND POLICY CONTEXT

National Planning Policy

- 11.4 **Future Wales: The National Plan 2040** is the national development framework which sets the direction for development in Wales up to 2040. It is the development strategy which addresses key national priorities through the planning system including achieving de-carbonisation and a climate resilient Wales.
- 11.5 Policy 13 of Future Wales relates to supporting digital communities and requires all new development to include the provision of Gigabit capable broadband infrastructure from the outset.
- 11.6 Policy 16 of Future Wales relates to Heat Networks and requires development over 100no. dwellings to consider heat networks to encourage reduced carbon emissions through residential heating system.
- 11.7 **Planning Policy Wales, 11th Edition** (hereafter referred to as PPW) is the policy document that deals with overarching planning matters in Wales. Chapter 4 of PPW confirms the Welsh Government's commitment to sustainable development.
- 11.8 This is a general requirement to achieve sustainability through the development process. PPW acknowledges that adequate and efficient infrastructure is crucial for the economic, social and environmental sustainability of all parts of Wales. At paragraph 5.4.13 PPW states that development should be co-ordinated to ensure it can be served by the necessary utilities. Paragraph 6.6.13 of PPW states that developments may need to be phased to allow providers time to ensure the provision of utilities can be managed in a way which is consistent with sustainable development policies.
- 11.9 PPW recognises that the provision of utilities is fundamental to any development and in order to comply with general sustainability objectives the proposed type and level of services provision for any development should be sustainable.
- 11.10 PPW also encourages low carbon energy generation schemes to support the de-carbonisation agenda.
- 11.11 **Technical Advice Note (TAN) 12: Design** states in relation to carbon emission from new developments, TAN 12 states that; *"Good practice in mitigating the causes of climate change is to apply the energy hierarchy which details a series of steps that should be taken to minimise the carbon emissions associated with a new development in the most efficient and cost effective way. In taking forward an energy hierarchy, an approach to 'carbon reduction' can be prepared for developments, where appropriate, and included or summarised in a design and access statement to*

illustrate how the design of the development has sought to reduce the carbon emissions associated with the development - including opportunities to move towards zero carbon”

Local Planning Policy

- 11.12 **Cardiff Council adopted Local Development Plan, covering the period 2006 to 2026**, sets out the local planning policies which are relevant to Cardiff and the following are most relevant to the Services in the context of the proposed development.
- 11.13 **Policy KP6: New Infrastructure** requires development to make appropriate provision for essential infrastructure including utility services.
- 11.14 **Policy KP15: Climate Change** requires developments to, amongst other things, promote energy efficiency, reduce carbon emissions.
- 11.15 **Policy EN12: Renewable Energy and Low Carbon Technologies** encourages developers of large schemes to incorporate opportunities to reduce carbon emissions including in relation to heating systems.

Relevant Guidance

- 11.16 The UK Green Building Council (UKGBC) and London Energy Transformation Initiative (LETI) have produced a series of guidance in regards to key features required for a new building to meet whole life carbon - a building that generates the lowest carbon emissions over its whole life. These include key performance indicators on building fabric, efficiency measures, heating and hot water and renewables which contribute towards low energy and net zero carbon buildings. The key performance indicators should be used as a guide to determine what measures should be adopted in the design of the development of achieve low or net zero carbon and whether future adaptability should be included in the design to allow the building to achieve net zero carbon.
- 11.17 The recent Welsh Government Consultation on Part L detailed the proposed changes for 2020 and future direction of building energy policy in 2025. For 2020 a 37% improvement on the current Part L standard is proposed. It is envisaged that for Part L 2025 a dwelling will have a similar fabric specification to 2020 requirements but with higher specification glazing and low carbon heating via heat pumps or heat networks to achieve an anticipated reduction of 75-80% improvement on the current Part L standard.

ASSESSMENT METHODOLOGY

Assessment of Existing Infrastructure and Consideration of Future Provision

- 11.18 The assessment of existing services infrastructure and future requirements of the development has involved, inter alia, the following:
- Contact with Service Providers to establish status of existing supplies to the site via the primary distribution system;
 - Liaison with Service Providers to establish actual or perceived operational delivery problems;
 - Assessment of site infrastructure and identification;
 - Assessment of future services requirements including option appraisals;
 - Discussions with other Design Team Members; and
 - Preparation of recommendations in respect of a Utilities Strategy for the proposed development site.
- 11.19 The Service Providers which have been contacted as part of this initial review are:
- Electricity - Western Power Distribution
 - Gas - Wales and West Utilities
 - Water - Dwr Cymru Welsh Water
 - Telecoms - BT Openreach
- 11.20 A meeting was held with Cardiff Council to discuss the proposed upcoming changes to Part L and Cardiff Council's aspirations for achieving Net Zero Carbon. It was agreed that the anticipated Part L 2025 requirement of 75-80% improvement on the current Part L standard would be adopted for upcoming future projects. Cardiff Council requested that provision should also be made for adaptability in the future to enable Net Zero Carbon to be achieved for operational energy.
- 11.21 The following services have been considered in the assessment:
- Gas Supply;
 - Electricity Supply;
 - Water Supply; and
 - Telecommunications.
- 11.22 The methodology approach has been to establish the existing baseline situation in respect of the Proposed Development and to compare this with the future provision requirements during and after construction. Depending on the impact, mitigation measures may need to be incorporated into the design of the works. The assessment identifies alternative solutions to overcome development constraints and provides recommendations for the provision of utilities generally.

Significance Criteria

- 11.23 The assessment of the impacts of the development on services needs to be quantified in terms of the significance. The following assessment of significance has been applied to the assessment of the impact of services on the environment.

Assessment of Significance

- 11.24 There are no standard assessment criteria relating to the assessment of service supplies to a residential development site. For the purposes of this assessment, the proposed utility service supply has been assessed by the potential impacts associated with either the diversion of these services, if necessary, or the provision of the service requirements and the final energy performance of the proposed buildings.

Receptor Types

- 11.25 The types of the receptors that will be effected by servicing are identified and their associated sensitivity.
- Proposed properties on the development;
 - Existing properties served or affected; and
 - Existing Network.

Receptor Sensitivity

- 11.26 The sensitivity to any change in environmental conditions of a receptor will be classified according to the following scale:
- Very High
 - High
 - Medium
 - Low
 - Very Low

Magnitude of Impact

- 11.27 The assessment of the magnitude of impact has been undertaken by considering the scale of the the impacts of the proposed development on the existing services infrastructure and natural resources. The consideration of magnitude been considered in relation to the following four criteria:
- the number and activities of the population affected;
 - the type and sensitivity of the receptor; and
 - the type of impact/benefit.

11.28 The magnitude of an impact can be neutral, beneficial, or adverse and will be classified according to the following scale:

- Substantial
- Moderate
- Slight
- Negligible

Geographical Level of Importance

11.29 The geographic level of importance of an impact will be classified according to the following scale:

- National
- Regional
- Local

Significance Criteria

11.30 The overall significance of an impact can then be determined by looking at the following criteria:

- Impact magnitude; and
- Sensitivity of receptor.

Significance of impacts

11.31 Table 11.1 overleaf a matrix that demonstrates how the significance of impact has been assessed.

Table 11.1: Significance of Impact

Sensitivity of Receptor	Magnitude of Impact			
	Substantial	Moderate	Minor	Negligible
Very High	Major	Major-Moderate	Moderate	Minor
High	Major-Moderate	Moderate	Moderate- Minor	Negligible
Medium	Moderate	Moderate- Minor	Minor	Negligible
Low	Moderate-minor	Minor	Minor- Negligible	Negligible

Assumptions and Limitations

11.32 The utilities infrastructure on and adjacent to the application site have been identified using mapping data and locations have not been confirmed by site investigations. As such, the the infrastructure may be in different locations and which could alter the mitigation measures identified. Also, the final design in terms of building fabric, heating and electricity sources are currently still under consideration and not confirmed.

BASELINE CONDITIONS

Existing Services

- 11.33 From reviewing the utility maps (see Figure 11.1 below) provided by WPD, WWU, DCWW and BT Openreach, and the Gwalia Survey information. The site currently has existing below ground gas, water, electricity and telecom services in the areas of the new development which currently serve the existing properties. The site currently has a large amount of existing services, specifically running down Channel View Road, which is the main access road for all the properties on the development.

Figure 11.1 – Existing Services Crossing Site

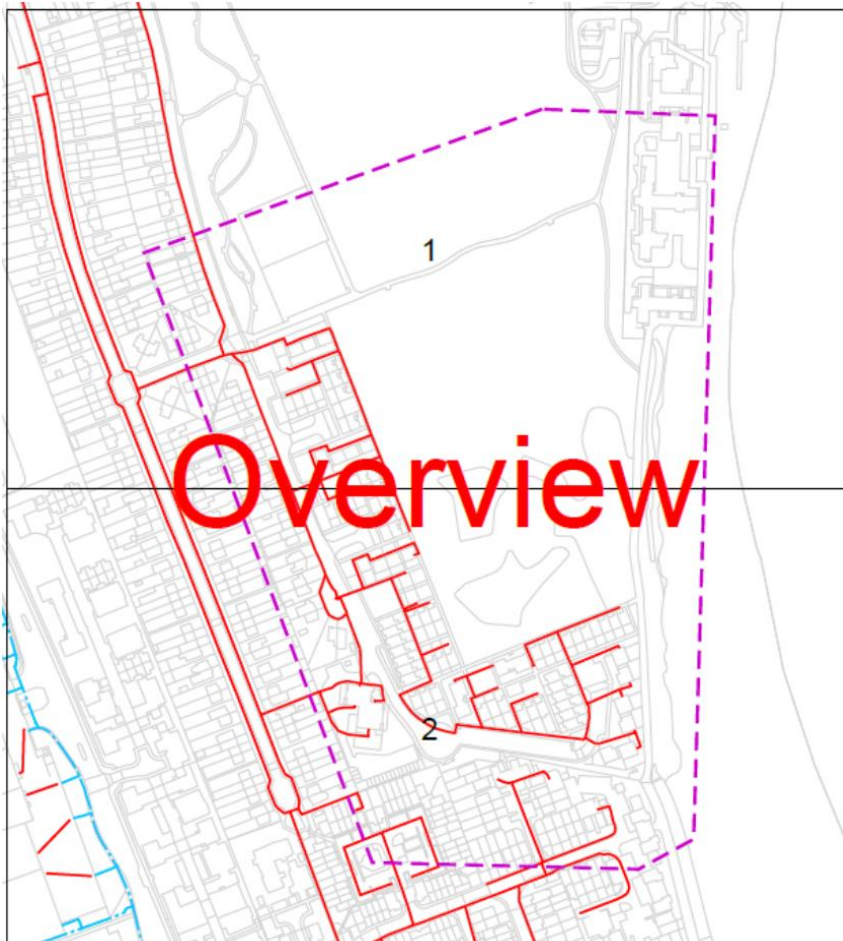


Gas Supply

- 11.34 Below is a copy of the existing Wales and West Utilities (WWU) gas network infrastructure map (Figure 11.2) identifying the existing underground services on, and in the vicinity of the Channel View Development. As can be seen from the map below there is existing gas infrastructure which runs down Channel View Road and branches off to run behind the existing properties. The gas main

is shown to run down the footpath of Channel View Road on the opposite side to the development. This may impact on the final road and landscape design, further investigation required with the Design Team and WWU to ensure the existing mains are at the correct depth.

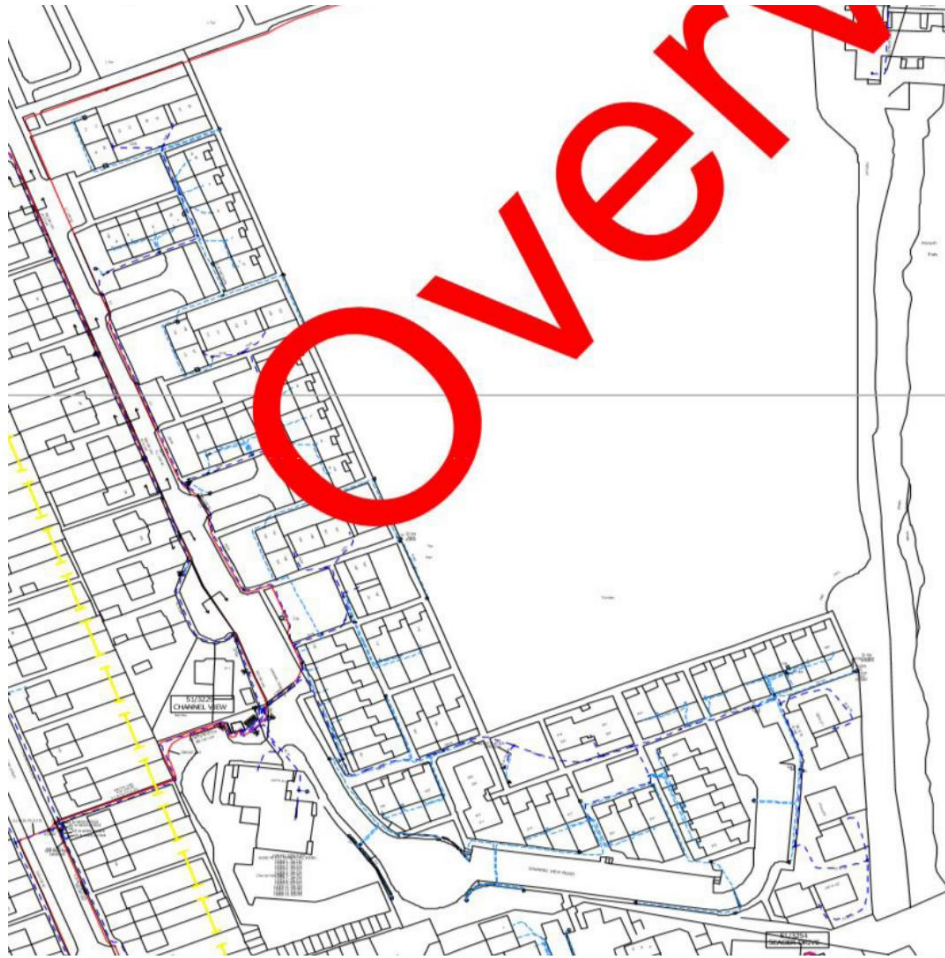
Figure 11.2 - Wales and West Utilities (WWU) gas network infrastructure map



Electricity Supply

- 11.35 Below is a copy of the existing Western Power Distribution (WPD) electricity network infrastructure map (Figure 11.4) identifying the existing underground services on, and in the vicinity of, the development. As can be seen from the map below, there are several existing electricity cables, both HV and LV which run through the site. The vast majority of these cables are in Channel View Road, which then branch off to serve individual properties.

Figure 11:4 Western Power Distribution (WPD) electricity network infrastructure map



Water Supply

- 11.36 Below is a copy of the existing Dwr Cymru Welsh Water water network infrastructure map (Figure 11.3) identifying the existing underground services on, and in the vicinity of the development. As can be seen from the map below there is existing water infrastructure which runs down Channel View Road. The water main is shown to run down the footpath of Channel View Road on the opposite side to the development. This may impact on the final road and landscape design, further investigation required with the Design Team and DCWW to ensure the existing mains are at the correct depth. A water main is shown to branch off the main infrastructure at the north and south ends of the site to serve the existing properties with a water main running along the footpath on the development side of Channel View Road and around the side roads to serve the existing properties and fire hydrants. The water main and connections to existing properties will need to be disconnected from the main infrastructure in Channel View Road by DCWW. The works will need to take phasing into account. The main infrastructure currently extends as far as Channel View Flats on Channel View Road. The water main will need to be taken back to No. 114 to suit the changes in road layout on the development

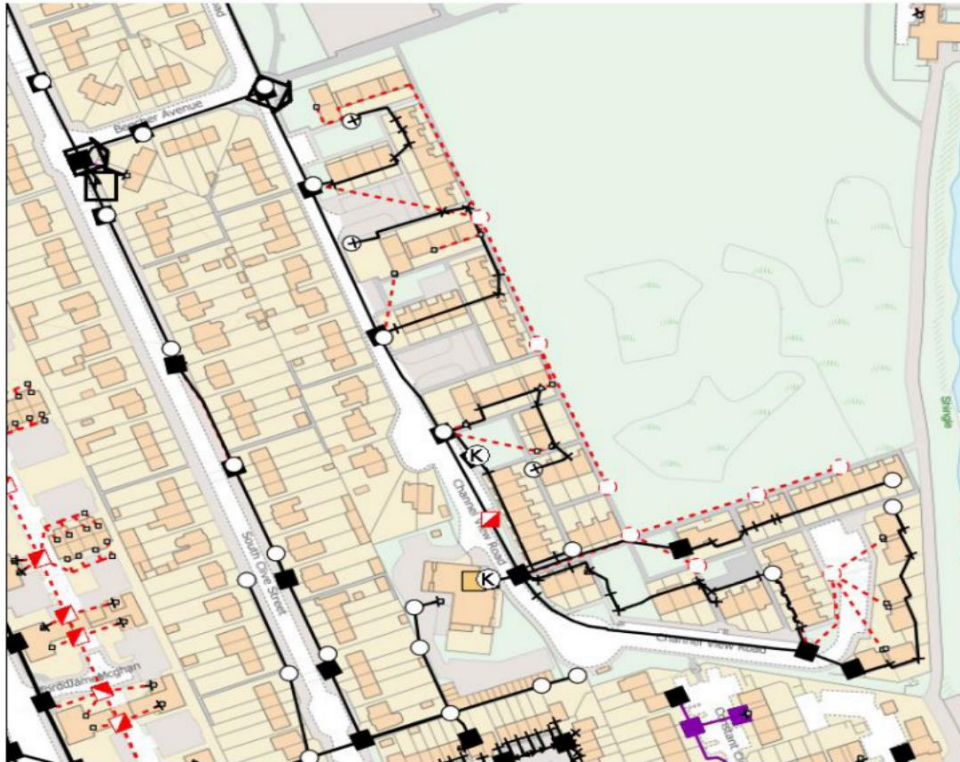
Figure 11.3 Dwr Cymru Welsh Water water network infrastructure map



Telecommunications

- 11.37 Overleaf is copy of the existing Openreach Telecoms Network Map (Figure 11.5) identifying the existing underground services on, and in the vicinity of, the development. As can be seen from the map below there is an existing Telecoms network in the vicinity of the site, running both above and below ground. These services will need to be diverted, and/or isolated as part of the on-going design development of the scheme.

Figure 11.5 - Openreach Telecoms Network Map



Existing Buildings

- 11.38 The buildings currently on site were constructed many years ago and do not meet the up to date energy requirements. This results in higher fuel costs for occupiers and unmitigated carbon emissions.

Future Baseline

- 11.39 The future baseline without development will likely remain the similar to the current situation. It is possible that Cardiff Council, the owner of the buildings, would seek to increase the energy performance of the buildings to increase its efficiency. The likelihood of this occurring and the type of work that could be undertaken is unknown at this stage.

POTENTIAL IMPACTS

During Construction

- 11.40 The proposed impacts in relation to each service supply is described below in turn and then generalised impacts during construction are discussed at paragraph 11.53 to 11.55.

Gas Supply

Northern Boundary

- 11.41 A low pressure gas main is shown branching off the main infrastructure in Channel View Road at the north end of the site and runs behind the existing properties. The gas main and connections to existing properties will need to be disconnected from the main infrastructure in Channel View Road by Wales and West Utilities. The works will need to take phasing into account.

Channel View Road

- 11.42 A low pressure gas main is shown branching off the main infrastructure in Channel View Road at the south end of the site and runs around the side roads between the existing properties. The gas main and connections to existing properties will need to be disconnected from the main infrastructure in Channel View Road by Wales and West Utilities. The works will need to take phasing into account.
- 11.43 It is possible that construction work could affect the existing gas infrastructure which runs down Channel View Road and branches off to run behind the existing properties. Due to the uncertainty of its location, construction work could breach this infrastructure which could affect supply to surrounding dwellings. Breaching the gas infrastructure could also be dangerous. The adverse impacts associated with the laying of utilities on these receptors of medium sensitivity with no mitigation are likely to be local, temporary, of substantial magnitude, and overall of **moderate significance**.

Electricity Supply

Northern Boundary

- 11.44 There is an existing WPD HV cable running along the Northern boundary of the site, from East to West as shown below. This cable is on the boundary of the site and avoids the new properties and gardens. The adverse impacts on the nearby receptors of low sensitivity with no mitigation is likely to be local, temporary, of minor magnitude, and overall of **minor –negligible significance**.

Channel View Road

- 11.45 Existing WPD HV and LV cables currently exist within the existing Channel View Road. These cables serve properties at the Southern end of the site. The Northern section of Channel View Road is not changing in layout. It may be possible for the existing buried services to remain, however, the levels of the services will need to be reviewed to ensure the services are at the correct depth, particularly if there are to be any changes in levels. This will also need to be reviewed with the service provider.

The adverse impacts on the nearby receptors of medium sensitivity with no mitigation is likely to be local, temporary, of minor magnitude, and overall of **minor-negligible significance**.

11.46 The Southern end of Channel View Road is being amended, and therefore the existing services will need to be diverted as these now clash with the new development. Some of the services will be isolated as part of the demolition works, and will not require diverting. This is to be further developed as part of the ongoing design. The adverse impacts on the nearby receptors of medium sensitivity with no mitigation is likely to be local, temporary, of moderate magnitude, and overall of **moderate-minor significance**.

11.47 At the Southern end of the site, existing services serving existing properties, will clash with the new development. Many of these services will be isolated as part of the phase 1 works. The adverse impacts on the nearby receptors of medium sensitivity with no mitigation is likely to be local, temporary, of moderate magnitude, and overall of **moderate-minor significance**.

Water Supply

11.48 There is existing water infrastructure which runs down Channel View Road on the opposite side to the proposed development. Further investigation required with the Design Team and DCWW to ensure the existing mains are at the correct depth. A water main is shown to branch off the main infrastructure at the north and south ends of the site to serve the existing properties with a water main running along the footpath on the development side of Channel View Road and around the side roads to serve the existing properties and fire hydrants. The water main and connections to existing properties will need to be disconnected from the main infrastructure in Channel View Road by DCWW. The works will need to take phasing into account. The main infrastructure currently extends as far as Channel View Flats on Channel View Road.

11.49 The construction works could affect the existing water infrastructure which runs down Channel View Road. Due to the uncertainty of its depth, construction work could breach this infrastructure which could affect supply to surrounding dwellings. Breaching the water main could also affect supply to fire hydrants in area. Also, the water main and connections to existing properties will need to be disconnected during construction from the main infrastructure in Channel View Road by DCWW. If this isn't phased it could result in the supply to existing properties being disrupted. The adverse impacts on the nearby receptors of medium sensitivity with no mitigation is likely to be local, temporary, of moderate magnitude, and overall of **moderate-minor significance**.

Telecommunications

Channel View Road

11.50 Channel View Road Telecommunication services run down existing Channel View Road below ground, with above ground poles to serve existing properties. Similarly, to the WPD cables, some of the below ground telecoms cables at the Northern end of Channel View Road may not require diverting as may be utilised for the future development. The above ground poles will be isolated

and removed as required to suite the demolition plans. The adverse impacts on the nearby receptors of medium sensitivity with no mitigation is likely to be local, temporary, of moderate magnitude, and overall of **moderate-minor significance**.

Southern Boundary

- 11.51 At the Southern end of the development, the existing Channel View Road is being amended, all of the existing telecom services will need to be isolated and/or diverted to suit the proposed development. This will be ongoing as part of the schemes design development. The adverse impacts on the nearby receptors of medium sensitivity with no mitigation is likely to be local, temporary, of moderate magnitude, and overall of **moderate-minor significance**.

Generalised Impacts During Construction

- 11.52 Potential impacts during the construction phase will be associated with accidental damage of services infrastructure. This could result in a danger to construction workers and surrounding sensitive receptors, i.e. existing housing. The adverse impacts associated with the construction phase on these receptors of medium sensitivity, with no mitigation, are likely to be local, temporary, and affect a small number of the population and be of moderate/substantial (gas) magnitude and of **moderate significance**.
- 11.53 The construction noise, vibration and dust generating activities in close proximity to existing and proposed properties during works associated with the provision or alteration of services. It could also result in nearby properties having utility services to their properties disrupted. The adverse impacts associated with the construction phase on these receptors of medium sensitivity, with no mitigation, are likely to be local, temporary, of moderate magnitude and of **moderate-minor significance**.
- 11.54 The laying of utilities underground requires clear working space which varies depending on the type and size of apparatus. To provide access there is potential for the clearance of vegetation including trees and shrubs, which may impact on local wildlife. The adverse impacts associated with the laying of utilities on these receptors of medium sensitivity with no mitigation are likely to be local, temporary, of moderate magnitude, and overall of **moderate-minor significance**.

During Operation

- 11.55 The proposed development is intended to be developed using heating and power sources which reduce carbon emissions but will still require a gas and electricity supply. The impacts below are discussed on the basis of no reduction in carbon emissions since these are detailed as mitigation measures for the purposes of this assessment.

Gas Supply

- 11.56 Natural gas may be used primarily for heating and cooking on the development. Natural gas is mostly methane (CH₄), typically 70-90%, with much of the remainder composed of ethane,

propane and butane. When fully combusted with a good supply of oxygen natural gas produces H₂O (water) and CO₂ (carbon dioxide). It is clean burning, producing none of the particulates associated with adverse health issues.

- 11.57 The CO₂ released to the atmosphere from burning gas will contribute to global warming. The adverse impact of additional CO₂ generated by the burning of fossil fuels on the environment (atmosphere) of medium sensitivity, with no mitigation, is likely to be national (global), permanent, of slight magnitude and **minor significance**.
- 11.58 No issues with capacity has been raised by WWU and, therefore, the extension or enhancement of the existing services provision will facilitate the demands of the proposed development. In this case, since there are no plans to enhance the capacity supply the likely significant effect without any mitigation is considered to be **negligible**. The reliance on gas will be further reduced by the use of more energy efficient designed properties and alternative methods of heating to reduce carbon emissions. The final layout design will, however, need to be designed to take account of existing infrastructure.

Electricity Supply

- 11.59 Electricity use will be primarily for domestic power requirements. Power is generated from a variety of sources but primarily through the combustion of coal, oil and gas, with nuclear generating much of the remainder. As electricity is transmitted via a national distribution grid the UK electricity generation mix is considered in this assessment. The DEFRA / DECC source, referenced previously, states that using 1kWh of grid supplied electricity produces a CO₂ equivalent of 0.4846Kg (including the effect of CH₄ & N₂O).
- 11.60 The development site's electricity supply will be served via the local HV network although some reinforcement works will be required. This is likely to result in short term loss of supplies whilst connections are made. As a result, the adverse impact anticipated on existing and proposed properties will to be local, temporary, of slight magnitude and overall, **minor significance**.

Water Supply

- 11.61 No issues with capacity has been raised by WWU and, therefore, the extension or enhancement of the existing services provision will facilitate the demands of the proposed development. In this case, since there are no plans to enhance the capacity supply the likely significant effect without any mitigation is considered to be **negligible**.

Telecommunications

- 11.62 No issues with capacity has been raised by Open Reach and, therefore, the extension or enhancement of the existing services provision will facilitate the demands of the proposed development. In this case, since there are no plans to enhance the capacity supply the likely significant effect without any mitigation is considered to be **negligible**.

11.63 New properties will be served by gigabit capable internet infrastructure which is considered to have a **minor beneficial impact**.

MITIGATION AND MONITORING

Incorporated Mitigation

- 11.64 As part of the master planning for the proposed development various forms of mitigation in respect of services provision have been considered. The principal forms of mitigation can be defined as follows:
- Modifications to Primary Distribution Networks (where necessary) to provide required capacity.
 - Modifications to Primary Distribution Networks to protect visual amenity of existing and future residents.
 - Design of Masterplan layout to accommodate existing Primary Distribution Networks in order to minimise services diversions.
 - Design of Master Plan layout to accommodate existing easements and safety zones associated with Primary Distribution Networks.
 - Design of on-site services distribution systems such that services routes will generally be under or adjacent to principal access roads.
 - Design of existing services diversions and new services infrastructure on a phased basis.
- 11.65 The design of the services provision for the proposed development will involved the consideration of the above mitigation options. The recommendations in respect of the provision of the principal services are described in the following sections.

During Construction

Gas, Electricity, Water and Telecoms

- 11.66 During the construction phase protocols would need to be put in place to ensure that the existing services infrastructure would not be accidentally damaged by the construction works. The agreed construction protocols would be included as part of the Construction Management Plan which would be approved prior to the commencement of construction works and in conjunction with discussions with the relevant Service Providers to ensure existing infrastructure is located on site and protected during construction.
- 11.67 Ensure vegetation clearance is undertaken in accordance with precautionary measures outlined in the Ecology Chapter of this ES (Chapter 7) to avoid harm to important biodiversity features.
- 11.68 The mitigation measures would be monitored by persons identified in the CMP during the works affecting utility infrastructure. The impact during construction, with the mitigation measures identified, would result in the likely impact on services (identified in 11.41 to 11.50 above) during construction being **negligible**.
- 11.69 Enhancements will likely be required to some services to ensure the existing network can take the capacity of the proposed development. Where enhancements are proposed to the services

distribution systems these works will be included in the scope of the contract works. The provision of the enhancements would be monitored by the contractor and client at point of installation. The impact during construction, with the mitigation measures identified, would result in the likely impact on services during construction being **minor beneficial**.

Existing Surrounding Properties

- 11.70 Occupiers of existing properties to be informed in advance if there are to be minor disruptions to services to ensure they can prepare accordingly. The information provided should include the date and the length of time of the disruption and provide contact details to enable occupiers to seek further assistance or information. The impact during construction, with the mitigation measures identified, would result in the likely impact on services during construction being **minor-negligible**.

During Operation

- 11.71 The energy strategy for the proposed development is to work towards achieving a Low Carbon or Net Zero Carbon targets which with the aim to assist climate change but also address fuel poverty and affordability for the future occupiers. The full ESR is contained in Appendix 11.1.
- 11.72 The energy target for the scheme will be based on the anticipated Part L 2025 requirement of 75-80% improvement on the current Part L standard. Provision will also be made for adaptability in the future to enable Net Zero Carbon to be achieved for operational energy.
- 11.73 Once operational, it is intended that the proposed development will aim to drive down carbon emissions as a result of building use. This will directly reduce the need for a gas supply and electricity supply through the use of the following.

Building Fabric

- 11.74 The building fabric U-Values and air tightness are recommended to be improved over the current minimum requirements for Building Regulations AD L1A compliance in accordance with UKGBC/LEFTI standards. Exact details of achievable U-Values and air tightness are to be reviewed with the Design Team and evaluated against the Client's aspirations for operational energy.

Heating and Hot Water

- 11.75 The proposed source of heating is shown in Table 11.4.

Table 11.4: Proposed Source of Heating

<p>Ground Source Heat Pumps</p>	<p>More efficient than ASHPs but high capital cost due to ground works</p> <p>Implementation Strategy:</p> <ul style="list-style-type: none"> • Houses – GSHP per house, borehole arrays serving 4-5 houses • Apartments - Either an GSHP per an apartment with risers close to each apartment or communal GSHP plant with centralised risers. Heat metering and billing required for communal plant
--	--

Electricity Generation

11.77 The proposed source of electricity is shown in Table 11.5.

Table 11.5: Proposed Source of Electricity

<p>PV Array</p>	<p>Provided to each building within the Masterplan to generate electricity to be used generally within each dwelling.</p>
<p>Battery Storage</p>	<p>Can be implemented in each dwelling to store electricity and used to offset electricity consumed within each dwelling.</p>

11.78 The impact of the proposed development, with the mitigation measures described above to reduce reliance on the existing network and reduce carbon emissions, would have a **negligible impact**.

RESIDUAL EFFECTS

During Construction

- 11.79 The implementation of the construction phase protocols will protect existing services distribution apparatus from accidental damage during construction. The mitigation measures proposed will reduce the impact from **moderate significance** (at the most significant impact likely) to **negligible**.
- 11.80 Following mitigation the potential significance of impacts during the construction phase on localised noise and air quality will be reduced from the impact moderate-minor significance to **negligible**.
- 11.81 Following mitigation the potential significance of impact on trees, shrubs and wildlife as a result of laying utilities will be reduced from moderate-minor to overall **negligible**.

During Operation

Gas Supply

- 11.82 Following mitigation to reduce the amount of additional CO2 generated by the burning of fossil fuels for the generation of gas the impact will be reduced from minor significance to **negligible**.

Electrical Supply

- 11.83 Following mitigation to reduce the amount of additional CO2 generated by the burning of fossil fuels for the generation of electricity will be reduced from minor significance to **negligible**.

Water Supply

- 11.84 The proposed development's adverse impact on water supply level of service to existing and new customers will be of **negligible** significance without the need for mitigation measures.

Telecommunications

- 11.85 There are no adverse residual effects relating to telecommunications.

SUMMARY AND CONCLUSIONS

11.86 The impact of the development on services during the construction phase of development is summarised in table 11.4 below. Without the suggested mitigation measures the impacts during construction and operation have the potential to be, at worse, major-moderate adverse.

11.87 Following incorporation of the proposed mitigation measures, the impact of the residual risk of the proposed development during the construction is negligible. No residual effects are expected during the operational phase.

Table 11.4 – Summary of impact of the development on Services

Receptor	Effect	Mitigation	Residual Effect
During Construction			
Gas Supply			
Residential Properties on or near the site	Damage gas infrastructure Sensitivity: Medium Impact: Moderate	Construction Management Plan	Negligible
Construction Workers	Damage gas infrastructure Sensitivity: Medium Impact: Moderate		Negligible
Electricity Supply			
New Properties during construction	Affect by cables on site Sensitivity: Medium Impact: Minor-negligible	Incorporated mitigation into the design of the scheme	Negligible
Dwellings at northern Section of Channel View Road	Potential diversion of cables Sensitivity: Medium Impact: Minor-negligible	Construction Management Plan	Negligible

New and existing dwellings at southern Section of Channel View Road	<p>Potential diversion of cables</p> <p>Sensitivity: Medium</p> <p>Impact: Moderate-minor</p>		Negligible
Water Supply			
Properties along Channel View road	<p>Potential disruption to water supply for a short amount of time</p> <p>Sensitivity: Medium</p> <p>Impact: Moderate-minor</p>	Construction Management Plan	Negligible
Telecommunications			
Channel View Road	<p>Potential disruption to service short amount of time</p> <p>Sensitivity: Medium</p> <p>Impact: Moderate-minor</p>	Construction Management Plan	Negligible
Generalised Impacts During Construction			
Surrounding Properties	<p>Accidental damage to services during construction could result in disruption to services</p> <p>Sensitivity: Medium</p> <p>Impact: Moderate</p>	<p>Construction Management Plan</p> <p>Communication with neighbours regarding planned disruptions.</p>	Negligible
Construction Workers	<p>Accidental damage to services during construction could harm construction workers</p> <p>Sensitivity: High/Medium</p>		Negligible

	Impact: Major-Moderate (Gas)/Moderate		
Surrounding properties	Noise, vibration and dust generated during construction. Sensitivity: Medium Impact: moderate-minor		Negligible
Biodiversity	Removal of vegetation for laying of services Sensitivity: Medium Impact: Moderate-minor	Ensure vegetation clearance is undertaken in accordance with the necessary precautionary measures.	Negligible
During Operation			
Gas Supply			
Atmosphere	Increased CO2 emissions Sensitivity: Medium Impact: Minor	Use improved building fabric for new properties Install PV arrays on roofs Battery Storage where necessary	Negligible
Existing Network	There is sufficient capacity to accommodate new development Sensitivity: Medium Impact: negligible	N/A	Negligible

Electricity Supply			
Atmosphere	<p>Increased CO2 emissions</p> <p>Sensitivity: Medium</p> <p>Impact: Minor</p>	<p>Use improved building fabric for new properties</p> <p>Ground Source Heat Pump</p>	Negligible
Existing Network	<p>There is sufficient capacity to accommodate new development</p> <p>Sensitivity: Medium</p> <p>Impact: Sensitivity: Medium</p>	N/A	Negligible
Water Supply			
Existing Network	<p>There is sufficient capacity to accommodate new development</p> <p>Sensitivity: Medium</p> <p>Impact: negligible</p>	N/A	Negligible
Telecommunications			
Existing Network	<p>There is sufficient capacity to accommodate new development</p> <p>Sensitivity: Medium</p> <p>Impact: negligible</p>	N/A	Negligible
New Properties	To be provided with Gigabit capable internet infrastructure	N/A	minor beneficial

	Sensitivity: Medium		
	Impact: minor beneficial		