

Report to: **Planning Committee**

Date of Meeting 10<sup>th</sup> March 2021

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Review date for release N/A



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## **Towards Zero Carbon Development in the West End**

### **Report summary:**

There is a long standing ambition to support the large scale delivery of low and zero carbon development in the West End of the District. In the case of Cranbrook a strategic choice was made over a decade ago to underpin the achievement of this ambition through the roll out of a district heating network with associated obligations in terms of the installation of a biomass fuelled combined heat and power plant.

Much has changed over the past decade since the development of Cranbrook began. But now, in the context of the government's commitment to the introduction of the Future Homes Standard in 2025 and endorsement of the ongoing roll out of district heating network to serve the expansion areas by the Inspector for the Cranbrook Development Plan Document, there is an opportunity to complete this journey. This will serve to both decarbonise existing homes at both Cranbrook and Monkerton/Tithebarn and support new development that achieves at least 75% carbon savings relative to current build standards as part of an overall requirement to deliver net zero development

The reports put forward a framework for a Deed of Variation to the current section 106 agreement attached to the energy centre at Skypark with the overall intent that this will move away from biomass CHP to utilising waste heat from the forthcoming Energy from Waste at Hill Barton. This change will align with the updated strategy for supporting the delivery of low and zero carbon development in the West End that will ultimately comprise of over 12,000 homes and 2m sq ft of commercial space.

### **Recommendation:**

It is recommended that members;

- Note the further technical work that has been undertaken to support the delivery of low and zero carbon development in the West End of the District
- Agree the principle of the proposed Deed of Variation based on the core provisions set out in paragraph 6.2
- Delegate authority to the Service Lead (Strategic Planning and Development Management) in consultation with the Chair of Planning Committee and the ward members to agree the detailed provisions of the Deed of Variation

### **Reason for recommendation:**

To ensure that there is a clear pathway for achieving large scale low and zero carbon development in the West End of the District.

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Portfolio(s) (check which apply):

- ☒ Climate Action
- ☐ Corporate Services and COVID-19 Response and Recovery
- ☐ Democracy and Transparency

- ☒ Economy and Assets
- ☒ Coast, Country and Environment
- ☒ Finance
- ☒ Strategic Planning
- ☒ Sustainable Homes and Communities

### **Financial implications:**

Financial details are contained in the report. There is a complex and specialist nature to this report, the deed of variation with a £6m negotiated sum for EON in lieu of s.106 obligation has been advised through suitable legal, technical and financial advice.

### **Legal implications:**

Modifications to planning obligations fall under section 106A of the Town and Country Planning Act 1990 (as amended) and obligations may be modified by agreement of the parties. If approved by planning committee full instructions as to the modifications required to fulfil the core provisions as set out within paragraph 6.2 will have to be confirmed to the legal department under the delegated authority.

**Equalities impact** Low Impact

**Climate change** High Impact

The vision for Cranbrook to develop as a zero carbon town is clearly stated in the Cranbrook Development Plan Document. The continued role out of district heating and the connection to a low carbon energy source has the potential to secure very substantial carbon savings. This will make a major contribution to achieving this objective.

**Risk:** High Risk. This is a complex project involving a wide range of different actors, both public and private. The role for the Council is potentially multi-faceted, from regulatory through to becoming a potential investor. The application to the Heat Network Investment Programme includes to secure funding for technical support, such as legal and financial advice, to ensure that all relevant risks can be identified and managed going forward.

### **Links to background information**

[Zero Carbon Development in the West End, Cabinet Report July 2019](#)

[Cranbrook Development Plan Document](#)

[The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings](#)

[Towards Zero Carbon Development in the West End, Cabinet Report, September 2020, item 14](#)

[Towards Zero Carbon Development in the West End, Cabinet Report January 2021 item 26](#)

### **Link to [Council Plan](#):**

Priorities (check which apply)

- ☒ Outstanding Place and Environment
- ☒ Outstanding Homes and Communities
- ☒ Outstanding Economic Growth, Productivity, and Prosperity
- ☒ Outstanding Council and Council Services

## **1. Background and context**

1.1 In recognition of the large scale and long term nature of the developments in the West End of the District, the need to factor in increasingly stringent environmental and carbon performance standards has been a key tenet of the adopted approach. In the case of Cranbrook the initial planning took account of the Code for Sustainable Homes and the anticipated timetable for progressing to Code 6 and net zero carbon development in 2016.

1.2 Element Energy were commissioned in 2008 to undertake a study to understand how best to meet these more demanding standards over time. This study demonstrated that it would be much more cost effective to install a district energy network to meet the zero carbon standard rather than rely on fabric and renewable energy measures on each home. Subsequently a requirement for all homes to be connected to a district heating network became a key part of the planning strategy for Cranbrook and the neighbouring Skypark commercial development. Funding made available by the Regional Development Agency to bring forward key infrastructure (such as St Martin's school) was also made contingent upon this network being rolled out.

1.3 Following a competitive exercise E.ON were selected by the Cranbrook developer consortium as the preferred energy company/operator for the network and an 80 year concession agreement was negotiated. It should be remembered that such a large network on a relatively low density greenfield site had never been delivered before in the UK. This was very much viewed as a 'lighthouse' project and significant public sector investment was required to make the scheme viable. This took the form of a £3.8m grant from the government's Low Carbon Infrastructure Fund plus a further £100k each from the Council, County Council and City Council.

1.4 A second network serving the Monkerton/Pinhoe/Mosshayne area together with the Science Park was negotiated in 2013. This was achieved on a purely commercial basis with no grant. Together there are now over 100km of heat pipe in the ground with a capex of circa £50m. The first permanent energy centre at Skypark was commissioned in 2013 and a second energy centre, currently under construction at Monkerton, is due to be commissioned later this year.

1.5 Ultimately it is expected that over 12,000 homes and 2m sq. ft. of commercial space will be served by these networks. Given the length of the concession agreements this is a long term commitment. It should also be remembered that these heat networks are effectively local monopolies – it is only the concession holder that can supply the heat and, unlike the electricity network, there is no ability for heat customers to swap to a different provider. Price controls and wider service guarantees therefore form an important part of the concession agreement.

## **2. Part L and the Future Homes Standard**

2.1 The wider legislative backdrop for and pathway towards zero carbon development has been set back in the intervening period since construction of Cranbrook started in 2011, not least through the abolition of the Code for Sustainable Homes and the scrapping of zero carbon homes target in 2015. During 2019 the Government did commit to there being no fossil fuelled homes from 2025. This is to be enshrined within a new 'Future Homes Standard' for new build homes to be future-proofed with low carbon heating and world-leading levels of energy efficiency.

2.2 The Government consulted on proposed changes to Part L '*Conservation of fuel and power*' of the Building Regulations during October 2019. To meet the Future Homes Standard by 2025 it was recognised that industry will need to develop the necessary supply chains, skills and construction practices to deliver low-carbon heat, and highly energy efficient new homes. The first steps in facilitating these changes is to provide a clear vision for implementing the Future Homes Standard and to set an ambitious uplift to the current energy performance requirements in the Building Regulations for new homes.

2.3 Two options were set out for tightening Part L of the Building Regulations as follows;

Option 1: 20% reduction in carbon emissions compared to the current standard for an average home. It was anticipated this could be delivered by very high fabric standards (typically with triple glazing and minimal heat loss from walls, ceilings and roofs).

Option 2: 31% reduction in carbon emissions compared to the current standard. It was anticipated that this could be delivered based on the installation of carbon-saving technology such as photovoltaic (solar) panels and better fabric standards, though not as high as in option 1 (typically double not triple glazing).

It was made clear that Option 2 was the preferred option.

2.4 In relation to district heating the consultation document included the following paragraph;

*Heat networks (sometimes referred to as district heating) are a distribution system that takes heat from a centralised source and delivers it to a number of different buildings. These heat networks also form an important part of our plan in the future of low carbon heat, in particular in cities and high-density areas. Heat networks can decarbonise more easily compared to most other heat sources because new technologies can be added to the system with little disruption to individual householders. They provide a unique opportunity to exploit larger scale, renewable and recovered heat sources that can't be accessed at an individual building level. Heat networks also provide system benefits such as thermal storage and reducing the energy demand of the grid at peak times. It is estimated by the CCC that around 18% of UK heat will need to come from heat networks by 2050 if the UK is to meet its carbon targets cost-effectively. We expect that heat networks will have a strong role to play in delivering low carbon heat to new homes in future*

2.5 MHCLG published the response to the 2019 consultation on Part L on the 19<sup>th</sup> January 2021. The key provisions of this are set out below;

- From 2025, the Future Homes Standard will deliver homes that are zero-carbon ready
- These homes will be future-proofed with low carbon heating and high levels of energy efficiency
- New homes built to the Future Homes Standard will have carbon dioxide emissions at least 75% lower than those built to current Building Regulations standards.
- There will be consultation on a full technical specification for the Future Homes Standard in 2023 with a commitment to introduce the necessary legislation in 2024, ahead of implementation in 2025
- Local authorities will retain powers to set local energy efficiency standards for new homes.
- A 2021 interim uplift will deliver high-quality homes that are in line with the broader housing commitments and encourage homes that are future-proofed for the longer-term. These homes will be expected to produce 31% less CO<sub>2</sub> emissions compared to current standards.

2.6 In the context of the development of Cranbrook the changes to the national timetable for achieving zero carbon development have been deeply frustrating not least as a result of the abolition of the Code for Sustainable Homes. Critically though the recent response to the Part L consultation and the confirmation of the timetable for the introduction of the Future Homes Standard does now re-establish this policy foundation. The expectation that an average home built to the Future Homes Standard will have at least 75% less carbon emissions than one built to current energy efficiency requirements (Approved Document L 2013) is clear. Equally the expectation is that this will be achieved through high fabric standards and a low carbon heating system. In the words of the 2019 consultation, this will ensure that new build homes 'will be fit for the future, better for the environment and affordable for consumers to heat'.

### **3. Cranbrook/Skypark District Heating**

3.1 It is in this context that the district heating network at Cranbrook needs to be considered. Policy CB13 (see Appendix A) of the draft Cranbrook Development Plan Document sets out a

policy to achieve the vision of delivering a truly zero carbon new town. This includes ensuring connections to an expanded district heating network. The availability of a decentralised energy network is a core sustainability credential. Clearly this in turn relies on a low carbon energy source to provide both the heat and the power that is generated. This is particularly the case given the decreasing carbon factor of the wider electricity grid as, for example, coal is phased out and additional large scale offshore wind and other renewable electricity generating capacity is brought on stream.

## Section 106 obligation

3.2 Planning permission for the energy centre was granted on the 30<sup>th</sup> June 2010 (Application no. 09/2460/MFUL). In recognition of the need to ensure that the district heating network would meet increasingly stringent carbon performance standards for the first 2,900 homes at Cranbrook, the s.106 agreement attached to the planning permission included the following provisions;

1. The Facility is to be a solid biomass Combined Heat and Power (CHP) system with supplemental gas boilers and supplemental gas combined heat and power engines (definition of District Heating Facility).
2. Clear direction that the facility shall supply 'heat' to the whole of both Cranbrook and Skypark (paragraph 6.1).
3. Clear direction that the biomass CHP shall be constructed as part of the Facility (para 6.3). It is acknowledged that temporary facilities may have needed to be provided during construction depending how quickly Cranbrook / Skypark developed (paragraph 6.2) but this didn't avoid the need to construct the facility with the biomass CHP as part of it.
4. The Facility needs to be supplying 'heat' to the majority of the buildings granted permission at Cranbrook and Skypark prior to or at occupation of 2,000 dwellings at Cranbrook (definition of Fully Operational and paragraph 6.6).
5. By the same time, the biomass CHP needs to be of sufficient capability (capacity) to be able to supply electricity (2MWe) and heat (2.4MWth), although the latter is predicated on the demand for the heat being sufficient to warrant the capability (paragraph 6.4).
6. If the heating demand is such that running the biomass CHP would result in '*wasting excessive quantities of heat*' then the supplemental gas boiler / gas combined heat and power engines can be used to provide heating to Cranbrook (paragraph 6.5). Once there wouldn't be excessive wasted quantities of heat then the biomass CHP should be used to provide the base heat load with the supplemental equipment being used to provide heat at peak times or during maintenance / repair of the biomass CHP.

3.3 Of particular significance is the 2,000 occupations trigger. Notification was received in 2020 that point had been reached at Cranbrook. In anticipation of this, work had been ongoing over the preceding two years to understand whether there was a technically and financially feasible solution to meeting the obligations of the s.106 agreement - essentially a solid biomass fuelled combined heat and power plant capable of generating 2MW electric and 2.4 MW thermal.

3.4 With the benefit of further technical advice it was accepted that the gasification and pyrolysis technologies, which it was hoped would be scalable to 2MW as well as being more efficient and lower cost than traditional steam based technology, had not matured sufficiently in the decade since the s.106 agreement was negotiated to provide a reliable way forward. However, the expansion of Cranbrook to circa 8,000 homes in line with policies set out in the Local Plan and Cranbrook Development Plan Document and the potential for further strategic development coming through the next Local Plan provides an opportunity to reconsider the strategic basis for the choice of technology.

3.5 A report considered by EDDC's Cabinet in July 2019 ([Zero Carbon Development in the West End, Cabinet Report July 2019](#)) sought authority to commit funding of up to £30k to support an application to Round 9 of Heat Networks Delivery Unit funding. The Heat Networks Delivery Unit (HNDU) is part of, and directly funded by, the Department for Business, Energy and Industrial Strategy (BEIS). The bid was submitted and was successful. Subsequently a detailed techno-economic study was commissioned from consultants WSP.

## 4. Techno-economic study

4.1 WSP were commissioned in December 2019 to undertake the techno-economic study. The primary aim for this feasibility work was to build from the existing strategy work that has been undertaken to date and to create a framework for achieving zero carbon development for Cranbrook/Skypark and provide a clear pathway for supporting the large scale delivery of zero carbon development that will ultimately comprise around 8,000 homes and 1.4 m sq. ft. of commercial space. The study addressed a number of key areas including;

- heat demand
- energy source(s)
- choice of technology(ies)
- heat network pressure/temperature regimes
- associated cost/project economics/techno-economic cash flow modelling
- funding requirements
- risks.

4.2 The study identified six potential local heat supply opportunities. An alternative commercially available and technically proven biomass CHP option (based on Organic Rankine Cycle) was considered as part of this and excluded on both financial and local environmental impact grounds. Subsequently three options were modelled in detail. These were;

- The energy from waste (EfW) plant at Hill Barton
- The convertor station for France-Aldernay-Britain (FAB) project connected to a water source heat pump
- Solar thermal with seasonal pit thermal storage

The first two of these involve harnessing waste heat. With regard to the FAB project two sub-options were identified – with and without a second energy centre. A second energy centre would be in addition to the one currently located at Skypark and would need to be positioned towards the eastern end of Cranbrook. This would facilitate a lower temperature network to serve the eastern expansion areas.

4.3 The overall energy balance from the four scenarios is set out below. This includes accounting for the energy consumption required to run gas boilers and/or heat pumps in order to raise temperatures, meet peak demand and account for periods when the primary heat source is not available.

### Energy Balance Results

Parameter	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Primary Plant	EfW	FAB Link	FAB Link	Solar Thermal
Thermal MW <sub>th</sub>	15	9	9	30
Heat output				
Primary heat source output (MWh)	62,187	50,634	51,365	56,269
ASHP output (MWh)	5,685	12,111	12,469	5,958
Gas boiler output (MWh)	3,106	6,643	6,656	8,823
Proportion of low carbon heat supplied	95.6%	90.4%	90.6%	87.4%
Carbon emissions				
Emission savings over 25years, compared to gas boilers	83%	78%	78%	83%

4.4 The outcomes of the study demonstrate that it is possible to secure large scale carbon savings by utilising alternative technologies to the biomass solution that was originally negotiated a decade ago. This would equate to around an 80% reduction relative to using gas boilers which, critically, will also ensure compliance with the forthcoming Future Homes Standard. It is anticipated that other provisions within the Cranbrook Plan such as fabric energy efficiency

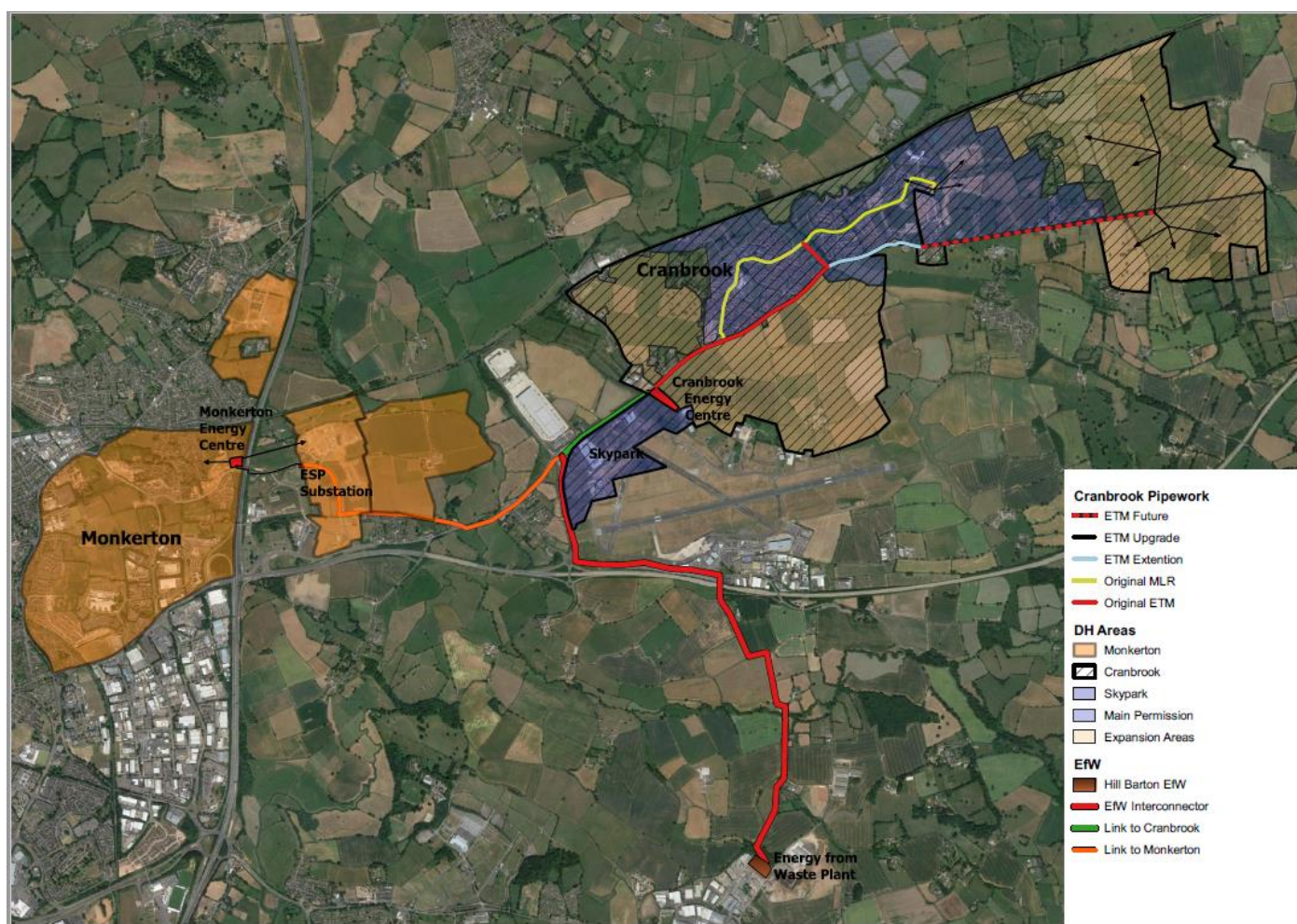


measures and on-plot renewable energy generation will, in combination with the district heat network, deliver net zero carbon development at Cranbrook.

## 5. Heat Network Investment Programme Application

5.1 The outcome of the feasibility study was reported to Cabinet in September 2020. Since this point a project team including representation from BEIS, EON, University of Exeter and City and County Councils had been meeting weekly to work up a detailed proposal. This was based on the preferred option arising from the feasibility study, namely utilising waste heat from the forthcoming Energy from Waste (EfW) plant at Hill Barton that is due to start construction during the summer of 2021 and be operational by the summer of 2023.

5.2 The government's Heat Networks Investment Programme (HNIP) is a £320m capital programme designed to support the roll out of district heating networks. A proposal was submitted to Round 8 of this programme in January 2021 based on securing a connection from the EfW plant to both the Cranbrook/Skypark and Monkerton networks. This would take the form of a trunk heat main carrying hot water under pressure and is hereafter referred to as the interconnector. The proposed alignment is set out on the plan below. This will enable connections to the two existing concession agreement totalling circa 8,000 homes and 2m sq ft of commercial space as well as the potential to serve the Cranbrook expansion areas (an additional 4,000 homes).



5.3 The HNIP is a competitive programme. Key metrics by which applications are measured and evaluated are value for money and carbon savings. The overall financial breakdown of the bid is given below.

Source	£
Contribution from EON in lieu of s.106 obligation	£6m

Enterprise Zone (to be confirmed)	£4m
Council/Third party finance	£3.3m
HNIP grant	£8m

5.4 A decision on the bid is expected to be confirmed in April. In anticipation of a successful outcome it is important to ensure that the various ingredients, including the section 106 position, are aligned.

## 6. Deed of Variation

6.1 In order to reflect the change in the preferred energy source for the district heating network and to secure the financial contribution anticipated by the HNIP application, it is proposed to pursue a Deed of Variation to the current section 106 agreement for the Energy Centre. This will also need to ensure various legal safeguards including in relation to the alignment and use of what is known as the Eastern Transmission Main. This is needed to reinforce the current network including serving the easternmost parts of the area of the current outline planning permission. By upgrading and rerouting this heat main it is possible to also ensure that this is future proofed so as to be capable of serving the eastern expansion areas of Cranbrook.

6.2 The core provisions of the Deed of Variation would be to;

- Convert the obligation to install solid biomass CHP in to a financial obligation to be fixed at £6m
- This to be taken as;
  - A payment in kind in relation to the extra over costs for the rerouting/future proofing of the Eastern Transmission Main – to be delivered in 2021/22.
  - A capital contribution for the balance of the £6m to the interconnector project
- Legal safeguards to include;
  - Use of system including supply to the expansion areas
  - A requirement to share facilities at the Skypark energy centre – including space, utility connections, thermal storage and boilers etc. all subject to appropriate cost sharing – for use to supply new development
  - Timing regarding ending of use of the current gas CHP engines (2027) or their conversion to a zero carbon energy source
- An obligation to ensure that the Monkerton network connects to the interconnector and associated conditions around the installation of infrastructure and the use of gas CHP
- A fall-back position covering the ‘what if’ scenario if the interconnector project to utilise waste heat from the EfW plant does not proceed. As well as the financial contribution this would need to consider how an alternative technology/solution would be facilitated on a reasonable endeavours basis including requirements around the timing of delivery to ensure ongoing compliance with Building Regulations.

6.3 Following extensive negotiations the proposed contribution of £6m is considered to be a fair contribution to the interconnector project for the following reasons;

- It is reasonably related to the avoided cost of installing the biomass CHP plant and the loss of income from the expected cessation of the use of the current private wire connection.
- The future proofing of the Eastern Transmission Main and its use to serve the expansion areas is critical to making sure that a key policy provision of the Cranbrook Plan can be achieved and that the ongoing roll out of district heating is both seamless and cost effective.
- The inclusion of the Monkerton network, which will ultimately serve 4,600 homes as well as Exeter Science Park, will both add scale, thereby improving the overall business case for the interconnector project, and achieve accelerated carbon savings. Unlike for Cranbrook, the principle energy centre serving this network is not subject to an equivalent legal agreement governing the transition to a low carbon energy source. Utilising waste heat from the EfW plant will therefore bring forward the timing of the transition away from gas.



6.4 It is a specific recommendation of this report that the provisions set out in paragraph 6.2 are worked up into a detailed deed of variation to the current section 106 agreement. This would need to be informed by further technical assessment, for example to verify the costs associated with future proofing the Eastern Transmission Main.

## 7. Assessment

7.1 The vision for Cranbrook to develop as a zero carbon town is clearly stated. A strategic decision was made over a decade ago to pursue the roll out of a heating network to underpin this ambition. Despite some frustrations, particularly around the abolition of the Code for Sustainable Homes, and the technological challenges in the intervening period there is now the opportunity to complete this journey.

7.2 The report sets out changes to the current section 106 agreement attached to the energy centre that would facilitate this in the context of utilising waste heat from the forthcoming EfW plant. This would serve not only to decarbonise the current network, thereby avoiding the need to retrofit individual homes, but would also support the cost effective roll out of a Future Homes Standard compliant solution to serve the expansion areas.

7.3 The policy requirement regarding connecting to the district heating network has recently been considered by the Inspector in relation to the Cranbrook DPD examination. The relevant extract from her letter of the 20<sup>th</sup> January 2021 is set out below. In conjunction with the Government's response to the Part L consultation, there is now a solid foundation and alignment between national and local policy to support the continued roll out of district heating.

### *The provision of connections to Combined Heat and Power (CHP)*

49. The vision for Cranbrook as a zero-carbon development is stated as being based on a connection to a district heating network served by combined heat and power and private wire electricity connections. This was the subject of some debate earlier in the examination process and again during the viability hearing sessions when the Council outlined the updated position. The concerns related to establishing costs and that any substantive increases would not impact on the estimated 106 contribution of £5,000 per plot. From the evidence regarding external funding bids and the progress which has been made to bring this forward the Council's approach to the requirements and the safeguarding of land appear realistic. The provision of energy efficient heating networks supports objectives set out in paragraph 148 of the Framework in relation to the transition to low carbon future. As such provision for district heating connections as part of Policy CB13 is justified and consistent with national policy.

50. The examination heard evidence from the Council regarding the funding bids to support the provision of CHP which indicated that national funding to assist delivery would be sought. Whilst costs cannot be guaranteed it seems to me that any assistance with funding from external sources would be likely to decrease costs rather than increase them and £5k per plot would be a reasonable figure for this provision.

7.5 In addition to Cranbrook and Skypark this approach will also support the decarbonisation of the Monkerton network which straddles the M5. The ability to support the delivery of 12,000 homes and circa 2m sq ft of commercial space makes the West End one of the largest low carbon development areas in the country. The requirement for the new homes in the expansion areas of Cranbrook to be delivered to a net zero standard in terms of carbon emissions is a particularly stretching and ambitious target and one that is in advance of national standards.

7.6 There is clearly still the risk that the interconnector project does not proceed. The outcome of the funding bid will be known in April in this respect. The proposed Deed of Variation will need to make provision for a fall-back position should this project not proceed. The alternative solution will then need to be reported back to Committee.

## 8. Conclusion

8.1 District heating is a key foundation of the sustainability credentials for Cranbrook. Originally this was in the context of increasingly demanding standards being introduced through the Code for Sustainable Homes. Arguably the significance of district heating has only increased in the context of a declared climate emergency, the need to support a green recovery and the forthcoming introduction of the Future Homes Standard.

8.2 The further feasibility work demonstrates that it is possible to secure large scale carbon savings through pursuing a connection to the forthcoming Energy from Waste plant. Any solution will need to be cost effective and deliverable to a timescale that accords with wider development programmes. As well as making a major contribution to achieving the policy requirement for housing in the expansion areas at Cranbrook to be delivered to a net zero standard, this connection will also support the delivery of low carbon development across the wider West End. The proposed framework for the Deed of Variation will enable this project to move forward.

## Appendix A

### CB13. Delivering Zero Carbon

#### CB13 Delivering Zero Carbon

All development at Cranbrook will be designed, constructed and perform to the highest practicable and viable whole life sustainability standards possible.

Detailed development proposals will be required to submit for approval a Carbon Reduction Plan that sets out how the development will deliver carbon savings contributing towards the overall plan vision to “**deliver a truly zero carbon new town**” in line with the **Energy Hierarchy**.

Unless specified by policy elsewhere, all developments which propose the construction of new homes or non-residential floorspace must demonstrate that they:

1. **Minimise the need to travel** and where necessary enable travel by low carbon means through:
  - a) Designing neighbourhoods around 400m walkable zones so that occupiers are located within walking distance of basic services and facilities\*;
  - b) Being served by good quality walking and cycling links and regular public transport routes;
  - c) Having high quality gigabit-capable digital connectivity in-built; and
  - d) Being effectively masterplanned in accordance with active design principles.
2. **Minimise energy demand and carbon emissions** through:

- a) Use of passive design, solar masterplanning and effective use of on-site landscaping and Green Infrastructure;
  - b) Achieving a minimum **19%** carbon reduction improvement over Building Regulations Part L (2013) on a building-by-building basis through fabric energy efficiency measures and on-plot renewable energy generation, with preference being for the “fabric first” approach;
  - c) Use of low carbon solutions where additional energy is required for building services such as heating, ventilation and air conditioning.
3. **Maximise the proportion of energy from renewable or low carbon sources** through:
- a) Exploring opportunities for, and implementing private wire arrangements from renewable sources where practical and viable;
  - b) Ensuring connection to the District Heating network delivers the necessary uplifts over and above the carbon reductions achieved through 3(a), to achieve **zero carbon** across the development; and
  - c) Ensuring that, where not provided as standard, the ability to install future Solar PV or Vehicle-to-Grid connections is not precluded.
4. **Ensure in-use performance** of buildings is as close as possible to designed intent through:
- a) **Use of a recognised quality regime** and consistent approach to calculating at design and in-use performance, which ensures that in-use performance is as close as possible to the at-design calculation; and
  - b) **Ensuring at least 10% of buildings deliver in-use energy performance and generation and carbon emissions data** to home owners, occupiers, developers and the planning authority for a period of 5 years after first occupation clearly identifying regulated and unregulated energy use and any performance gap. Where a performance gap is identified in the regulated use, appropriate remedial action will be required.

\*Basic services and facilities are taken to refer to educational facilities (pre-school/nursery, primary and secondary schools), convenience shop, employment opportunities and open space/sports provision.