

CABINET MEETING – 15 JUNE 2021

EXECUTIVE SUMMARY SHEET – PART I

Title of Report:

Sunderland Heat Network – application for a Heat Networks Investment Project grant, and the appointment of a specialist team of consultants and contractors.

Author(s):

Executive Director of City Development

Purpose of Report:

The purposes of the report is to:

- a) inform Cabinet of the outcomes from the work on the Sunderland Heat Network's Detailed Project Development and Outline Business Case; and
- b) seek Cabinet's approval to
 - i. the submission of a Heat Networks Investment Project (HNIP) grant application to the Department for Business, Energy and Industrial Strategy (BEIS) for the next stages of the project and the delivery of Sunderland's Heat Network; and
 - ii. continue discussions with the prospective off-takers (purchasers) of heat from the Sunderland Heat Network, including the negotiation of Heads of Terms;
- c) Subject to the Council securing further grant funding from BEIS, authorise the procurement and appointment of all necessary technical and specialist advisors to develop the project.

Description of Decision:

Cabinet is requested to:

- i. note the outcomes from the work on the Sunderland Heat Network's Detailed Project Development and Outline Business Case;
- ii. authorise the Executive Director of City Development in consultation with the Executive Director of Corporate Services and the Deputy Leader to submit a Heat Networks Investment Project (HNIP) grant application to the Department for Business, Energy and Industrial Strategy (BEIS) for the next stages of the project and the delivery of Sunderland's Heat Network;
- iii. authorise the Executive Director of City Development in consultation with the Executive Director of Corporate Services to agree the detailed terms of any grant agreement for the HNIP funding, should the Council's application be successful;

iv. subject to the Council securing further grant funding from BEIS, authorise the Executive Director of City Development in consultation with the Executive Director of Corporate Services and the Deputy Leader to procure and appoint of all necessary technical and specialist advisors to develop the project in order to progress the detailed design, Full Business Case and preparations for delivery of the heat network; v. authorise the Executive Director of City Development (in consultation with the Leader/Deputy Leader) to continue commercial discussions with the prospective off-takers of heat, including the negotiation of Heads of Terms for the long term supply of heat to key partners; and vi. agree to receive a further report to consider whether to progress beyond the commercialisation phase and deliver Sunderland's Heat Network including the proposed delivery model.
Is the decision consistent with the Budget/Policy Framework? Yes
If not, Council approval is required to change the Budget/Policy Framework
Suggested reason(s) for Decision: The Sunderland Heat Network's Detailed Project Development (DPD) and Outline Business Case (OBC) concludes there is a potentially viable low carbon heat source in the mine workings of the former Wearmouth Colliery. The OBC also concludes that a sufficient financial return can potentially be achieved which will cover the cost of the Council's investment associated with delivery of the scheme. Further work and due diligence is now required in support of the project. The application for HNIP grant includes £2.22m of 'Commercialisation Funding' will fund the estimated cost of the required specialist consultant support and the drilling of boreholes required to prove the existence and accessibility of the heat source. As part of the commercialisation stage, the project team will develop a Full Business Case for the project and prepare a detailed specification to facilitate the procurement of a contractor to deliver and operate the Heat Network. The decisions detailed above are required in order to continue progress towards delivery of a City Centre Heat Network, in support of the ambitions set down in the City Plan and the Low Carbon Action Plan.
Alternative options to be considered and recommended to be rejected: i. Reject the findings of the current study, and not progress a City Centre Heat Network scheme. This option is rejected on the basis that the scheme has the potential to delivery significant carbon savings and is a strategic project within the City Plan and the Low Carbon Action Plan. ii. Not to submit a HNIP grant application to further support development. This option is rejected as the grant support is required to fund the next stage of the project and to ensure the overall project is viable. iii. Not to procure external support. This option is rejected as the Council doesn't have the capacity and expertise to undertake this highly specialist work.

Impacts analysed;	
Equality ☐	Privacy ☐ Sustainability ☒ Crime and Disorder ☐
Is the Decision consistent with the Council's co-operative values? Yes	
Is this a "Key Decision" as defined in the Constitution?	Yes
Is it included in the 28 day Notice of Decisions?	Yes

SUNDERLAND HEAT NETWORK – APPLICATION FOR A HEAT NETWORKS PROJECT INVESTMENT GRANT AND THE APPOINTMENT OF A SPECIALIST TEAM OF CONSULTANTS AND CONTRACTORS

Report of Executive Director of City Development

1. Purpose of the Report

1.1 The purposes of the report is to:

- a) inform Cabinet of the outcomes from the work on the Sunderland Heat Network's Detailed Project Development and Outline Business Case; and
- b) seek Cabinet's approval to
 - i. the submission of a Heat Networks Investment Project (HNIP) grant application to the Department for Business, Energy and Industrial Strategy (BEIS) for the next stages of the project and the delivery of Sunderland's Heat Network; and
 - ii. continue discussions with the prospective off-takers (purchasers) of heat from the Sunderland Heat Network, including the negotiation of Heads of Terms;
- c) Subject to the Council securing further grant funding from BEIS, authorise the procurement and appointment of all necessary technical and specialist advisors to develop the project.

2. Description of Decision (Recommendations)

2.1 Cabinet is requested to:

- i. note the outcomes from the work on the Sunderland Heat Network's Detailed Project Development and Outline Business Case;
- ii. authorise the Executive Director of City Development in consultation with the Executive Director of Corporate Services and the Deputy Leader to submit a Heat Networks Investment Project (HNIP) grant application to the Department for Business, Energy and Industrial Strategy (BEIS) for the next stages of the project and the delivery of Sunderland's Heat Network;
- iii. authorise the Executive Director of City Development in consultation with the Executive Director of Corporate Services to agree the detailed terms of any grant agreement for the HNIP funding, should the Council's application be successful;

- iv. subject to the Council securing further grant funding from BEIS, authorise the Executive Director of City Development in consultation with the Executive Director of Corporate Services and the Deputy Leader to procure and appoint of all necessary technical and specialist advisors to develop the project in order to progress the detailed design, Full Business Case and preparations for delivery of the heat network;
- v. authorise the Executive Director of City Development (in consultation with the Leader/Deputy Leader to continue commercial discussions with the prospective off-takers of heat, including the negotiation of Heads of Terms for the long term supply of heat to key partners; and
- vi. agree to receive a further report to consider whether to progress beyond the commercialisation phase and deliver Sunderland's Heat Network including the proposed delivery model.

3. Introduction/Background

- 3.1 Local Authorities have a key role to play in making heat networks succeed. Their involvement, particularly in the development stages, can help realise the benefits of heat networks, while also delivering jobs and growth. To address the capacity and capability challenges that Local Authorities identified as barriers to heat network deployment in the UK, the Government set up the Heat Networks Delivery Unit (HNDU) in 2013. It is part of and directly funded by the Department for Business, Energy and Industrial Strategy (BEIS) and designed to help progress the development stages of heat network projects.
- 3.2 In addition to the HNDU, the Government set up the Heat Networks Investment Project (HNIP), a £320 million HNIP capital investment programme to support project delivery (up to the end of 2021) through grants and loans and other mechanisms, and to lever in up to £2 billion of wider investment, with a view to reducing energy bills, cutting carbon and forming a key part of wider urban regeneration in many locations.
- 3.3 The Council, benefitting from the support of HNDU funding, has now investigated the potential for developing a strategic City Centre heat network, as part of its overall objectives to reduce the City's carbon footprint and promote energy security. The heat network ambitions are featured in the Sunderland "City Plan" and the "Low Carbon Action Plan", recognising that a district energy scheme could deliver multiple benefits, including jobs and employment, a catalyst for regeneration and growth, enabling heat decarbonisation and improving energy security.
- 3.4 HNDU Phase 1 identified five clusters that presented opportunities for district heating, in which schemes were assessed against technical and financial indicators. The City Centre was shown to present the most significant viable opportunity for district heating in Sunderland, with high heat density and a range of public and private sector stakeholders. Two network iterations in the city centre were modelled – one scheme served by gas Combined Heat and Power (CHP), and another served by a large-scale open-loop Ground Source Heat Pump (GSHP).

- 3.5 HNDU Phase 2 of the study then built on the previous Energy Masterplanning work, including a more detailed technical and financial feasibility of district heating in the City centre area. Examples of more detailed analysis and assessment carried out through Phase 2 included plant room surveys, refined energy load mapping, heat option appraisal and stakeholder engagement. Three scheme options were evaluated – one utilising Gas CHP as heat supply technology, one with a water source heat pump and one with an open-loop ground source heat pump. The study also suggested that mine source heat could be explored as an alternate low carbon source.
- 3.6 The period following completion of Phase 2 saw a number of fundamental shifts in both national policy and the Council's own stance on Climate Change, namely:
- i. Government announced the closure of the Renewable Heat Incentive (RHI) payments for non-domestic applicants from 31 March 2021 – Financial support upon which the Phase 2 study indicated would be required in order to achieve a commercially attractive CHP scheme, or a Local Authority backed low carbon focused scheme.
 - ii. Revised scoring matrix for HNIP grant support meaning Gas-fired CHP is now unlikely to attract grant support. Again, the Phase 2 study indicated this financial support would be required in order to achieve a commercially attractive CHP scheme, or a Local Authority backed low carbon focused scheme.
 - iii. Sunderland's Climate Emergency Declaration, setting an ambition for The Council to be carbon neutral by 2030 and for the City to be carbon neutral by 2040. The declaration and resultant Low Carbon Framework and Low Carbon Action Plan give further weight to pursuing a low carbon focused scheme.
 - iv. Riverside Sunderland Masterplan and Supplementary Planning Documents setting out the vision and framework for delivery of a sustainable new urban quarter for Sunderland. These add to the case for a more sustainable energy approach, as well as bringing opportunity for any prospective network to cross the River Wear using the proposed new footbridge.
- 3.7 The recently completed HNDU Phase 3, undertaken with the support of WSP (technical consultant), Teno Energy (financial consultant) and Pinsent Masons (legal consultant), moved the project through the Detailed Project Development (DPD) and the preparation of an Outline Business Case (OBC). This stage firstly involved a thorough review of the previous studies, and more importantly any key national policy shifts and developments, before carrying out detailed technical, financial, legal, and commercial project development beyond that of the original phases. It also included discussions with prospective off-takers, with a detailed review of their plant rooms and energy data.

- 3.8 In parallel with work on the DPD & OBC, the Council engaged the services of the Coal Authority to explore mine source heat opportunities within the proximity of the city centre, with particular focus on the workings of the former Wearmouth Colliery. A high level feasibility study identified good potential, and recommended a more detailed desk top analysis be undertaken to review prospective borehole locations. The subsequent, more detailed study identified a primary target north of the River Wear in the form of the roadways that head out to sea.
- 3.9 Taking account of changes in national policy, the Council's low carbon aspirations, and following discussions with BEIS, a decision was taken to focus on low carbon heat sources and model both the potential mine and river sources of heat. Each option was to be taken as far as necessary until the benefits of one clearly outweighed the other.

4. Network and Heat Source

- 4.1 The modelled network consists of approximately 8.1km of pre-insulated district heating pipe, supplying some 33GWh of heat to a variety of off-takers. The proposed network itself extends from Sunderland Royal Hospital in the west, returns east to serve City Centre Campus, City Centre Towers and Riverside Sunderland, then by means of the new footbridge crosses the River Wear to serve the remainder of Riverside Sunderland and heads east to St Peter's Campus. See **Appendix A: Indicative Network Routing** for an overview plan.
- 4.2 To provide heat, water would be pumped from source and passed through a plate or shell heat exchanger, then returned to source. The initial source temperature would then be uplifted by the means of electrically driven Water Source Heat Pumps to c.70°C and then circulated to through the network to prospective off-takers. Gas boilers would also be installed within the Energy Centre as back-up and to cater for absolute peak demand during the coldest periods. The intention would be to replace the gas boilers with a decarbonised alternative when technology and cash flow allow. No mine water is used within the distribution network, the systems are hydraulically separate.
- 4.3 The current study concludes that a mine water source scheme would outperform river source in terms of both capital and operational cost. Mine water should have little to no seasonal temperature variation therefore, despite higher abstraction costs, will have a higher and more consistent source temperature.
- 4.4 While there is a potentially viable heat network scheme utilising heat from mine water, the resource must first be proven by drilling deep boreholes. The Coal Authority advise that the former roadways at Wearmouth Colliery make an excellent target as their records are relatively modern, the roadways are expected to be structurally sound, and they should be flooded.

5. Heat Pricing and Off-takers

- 5.1 District heating schemes typically set their prices, and any projected off-taker/customer savings against equivalent gas supplied heating costs, referred to as the 'counterfactual heat supply'. The need to focus on a low carbon approach, and the imbalance between gas and electricity pricing ultimately mean that a low carbon scheme can't commercially compete with current gas prices. Setting the Sunderland Heat Network's supply price by way of a link to a gas counterfactual would result in significant operational losses, making the scheme unviable. For the UK to meet its Climate Change targets it is however highly likely that BEIS will look to promote and further support changes to heat supply, in favour of decarbonised heat, and it is expected that this project would benefit from any such future incentives.
- 5.2 Following discussions with BEIS, the Project Team developed an alternate approach to pricing heat, by looking at what a Sunderland Heat Network could afford to sell heat for, while still achieving a positive rate of return that would enable it to qualify for HNIP support. Heat pricing is therefore to be set against an alternate decarbonised counterfactual heat supply, in this case Air Source Heat Pumps (ASHP) as the most likely and accessible alternative.
- 5.3 The alternate pricing approach generally increases the prospective heat price for existing building off-takers by around 50%, against their current gas counterfactual. It is however possible to demonstrate a saving of approximately 30% against an ASHP counterfactual, as well as a c.70%+ carbon saving vs. gas, owing to the improved relative performance and thermal storage of the network. Connection to the network also brings additional benefits to off-takers in reduced capital outlay, plant maintenance, power supply upgrades and floor space requirement.
- 5.4 The Project Team have been in dialogue with prospective off-takers for the past year. The principle aim of such dialogue is to secure a sufficient 'anchor load' to achieve a viable core network, which could then be further developed in future years. The identified key 'anchor loads' come from South Tyneside and Sunderland NHS Foundation Trust (Sunderland Royal Hospital), University of Sunderland (City Campus and St Peter's Campus), Sunderland City Council (City Hall and Riverside Sunderland) and a number of existing City Centre residential buildings.
- 5.5 Dialogue with the key off-takers to date has been relatively technical and sustainability focused, with some high-level financial discussions taking place. All prospective partners share the low carbon ambitions of the Council, can see the merits of the network, and are willing to continue with discussions. Based upon the current programme, a firm decision point for any prospective off-taker is not required until September 2022. Government are expected to clarify and announce further decarbonisation policies in this time period.

- 5.6 With Cabinet's approval, the Executive Director of City Development and Project Team will progress these discussions and look to agree draft Heads of Terms in order to support the HNIP grant application, then ultimately work towards agreeing long-term heat supply contracts as part of the Commercialisation phase.

6. Financial and Economic

- 6.1 The following outcomes and figures are derived from the OBC prepared by WSP, Teno Energy and Pinsent Masons on behalf of the Council.
- 6.2 Subject to Cabinet approval, the Council intend to apply for HNIP Commercialisation funding to the value of £2.22m. Based upon the estimates and fee proposals from the existing technical and specialist advisors this will cover the costs of consultancy support for the Commercialisation phase, and the design and drilling of boreholes. The assumptions and modelled data obtained would then be updated, with a Green Book compliant Full Business Case prepared. The decision on whether or not to proceed beyond this Commercialisation stage will then be brought back to Cabinet for further consideration.
- 6.3 As mentioned above, the £2.22m of HNIP Commercialisation funding will cover 100% of the estimated costs of consultancy support and the design and drilling of boreholes. At present, there is no requirement for the Council to contribute match funding, nor is there any requirement to repay the HNIP grant should the project ultimately not proceed to delivery.

Note: HNIP is likely to be superseded by the Green Heat Networks Fund during the life of the project, while there is relatively little detail around this BEIS envisage ongoing schemes will transition on broadly similar or more favourable terms.

- 6.4 Financial modelling suggests that the projected rates of return of investment in the proposed Sunderland Heat Network will not be sufficient for private sector investors, so it is assumed that the balance of any capital required to construct the network will be provided through Council borrowing. The scheme will not seek primarily to maximise its own commercial returns, and instead will focus on carbon reduction and alleviation of fuel poverty where applicable. The Council will however seek to cover the full costs associated with the operation of the Network and recover the costs of its investment over the life of the Network.
- 6.5 HNIP Round 10 has an application deadline of 2 July 2021, and an anticipated decision date of September 2021. Typically, a grant of up to 49% can be claimed from this programme, however the Council's financial model includes a reduced claim representing 45% of costs, as initial discussions with BEIS have suggested that the grant required at 49% would be more than they would usually allocate. Further discussions are ongoing, as BEIS are keen to support the project due to the level of innovation and contribution to carbon reduction.

- 6.6 The projected capital expenditure required for completion of the project is £40.6m. Dialogue with BEIS has indicated that c. 45% of the capital investment costs (£18.2m) would be funded from HNIP Round 10, with the balance (£22.3m) required to be funded through long term borrowing by the Council. The final capital cost is subject to further refinement and will be updated and included, alongside the amount of Council investment required, within the subsequent report to Cabinet to assist with considering whether to progress beyond the commercialisation stage. The current financial model demonstrates that all required equipment replacements within the 40-year expected lifetime are covered by cashflows derived from the project, so there should be no further cash outlay after the build of the Network is completed.
- 6.7 Should the Council secure HNIP grant funding of 45% (£18.2m) the returns from the project would be sufficient to ensure that financing costs associated with the Council's investment of £22.3m.
- 6.8 Further evaluation of the costs and benefits of the scheme have been undertaken with a Net Present 'Social Value' (NPSV) calculation. The NPSV determines the social value of a project by analysing the present value of benefits minus costs as appropriate to the intervention being considered. The analysis is undertaken in advance of a spending decision and therefore the cost of raising public funds, e.g. the cost of issuing debt or impact of taxes is not considered.
- 6.9 The NPSV calculation was determined using the H.M Treasury Green Book recommended discount rates over a 40-year project lifecycle, concluding that the mine water source scheme is likely to deliver a positive NPSV in the region of £3.4m. With proper maintenance there is no reason the scheme could not deliver well beyond this 40-year period, further improving the NPSV.

7. Sustainability

- 7.1 District heating networks have a key role to play in support of the UK's legally-binding target to reduce its greenhouse gas emissions by at least 100% by 2050, from 1990 levels. The UK Government is currently running an investment programme providing £320m of capital funding for heat networks to drive their delivery. The Council is considering developing strategic heat network infrastructure in the Local Authority area as part of its overall objectives to reduce the City's carbon footprint, helping to lower energy costs and promote energy security.
- 7.2 Development and delivery of what would be the UK's largest geothermal mine source district heat network, would be a major milestone in achieving the Council's ambition to be carbon neutral by 2030 and the City's target of being carbon neutral by 2040. It is envisaged that the scheme could save upwards of 4,100 tCO₂e per annum, which by comparison equates to over half of Sunderland City Council's carbon emissions from its direct estate. Note: these carbon savings would be City carbon savings, only those associated with Council buildings would be attributed to the Council.

- 7.3 The proposed heat source typically delivers a 70%+ carbon saving against mains gas, based upon BEIS current carbon factors. It is envisaged that this saving can be increased by limiting use of the gas back-up boilers and making proper use of thermal storage and balancing. The intention would be to replace the back-up boilers with a more sustainable system when technology and finances permit, with the aim of providing net carbon neutral heat.
- 7.4 In terms of carbon payback; despite the high capital cost, the scheme is expected to offer a sub £300 per tonne of CO₂e saved over a 40-year project lifecycle. This figure compares favourably with the likes of solar PV. With proper maintenance there is no reason the scheme could not deliver well beyond this 40-year period. The current figures also do not account for any additional loads and expansion of the Network, all of which should further improve the £/tCO₂e performance.

8. Reasons for the Decision

- 8.1 The Sunderland Heat Network's Detailed Project Development (DPD) and Outline Business Case (OBC) concludes there is a potentially viable low carbon heat source in the mine workings of the former Wearmouth Colliery. The OBC also concludes that a sufficient financial return can potentially be achieved which will cover the cost of the Council's investment associated with delivery of the scheme. Further work and due diligence is now required in support of the project.
- 8.2 The application for HNIP grant includes £2.22m of 'Commercialisation Funding' will fund the estimated cost of the required specialist consultant support and the drilling of boreholes required to prove the existence and accessibility of the heat source. As part of the commercialisation stage, the project team will develop a Full Business Case for the project and prepare a detailed specification to facilitate the procurement of a contractor to deliver and operate the Heat Network. See **Appendix B: Key Project Milestones**.
- 8.3 The decisions detailed above are required in order to continue progress towards delivery of a City Centre Heat Network, in support of the ambitions set down in the City Plan and Low Carbon Action Plan.

9. Alternative Options

- 9.1 The alternative options are:
- i. Reject the findings of the current study and not progress a Heat Network scheme. This option is rejected on the basis that the scheme, subject to grant support, has the potential to deliver significant carbon savings and is seen as a strategic project within the City Plan and Low Carbon Action Plan.
 - ii. Not to submit a HNIP grant application to further support development. This option is rejected as the grant support is required to fund the next stage of the project and to ensure the overall project is viable.

- iii. Not to procure external support. This option is rejected as the Council doesn't have the capacity and expertise to undertake this specialist work.

10. Other Relevant Considerations / Consultations

- (i) **Financial Implications** – The Commercialisation grant submission for £2.22m is for 100% grant funding, with no repayment should the project not proceed to delivery. The costs of delivering the next stages of the project including the appointment of technical and specialist advisors and the drilling of the bore holes will be met from this grant.

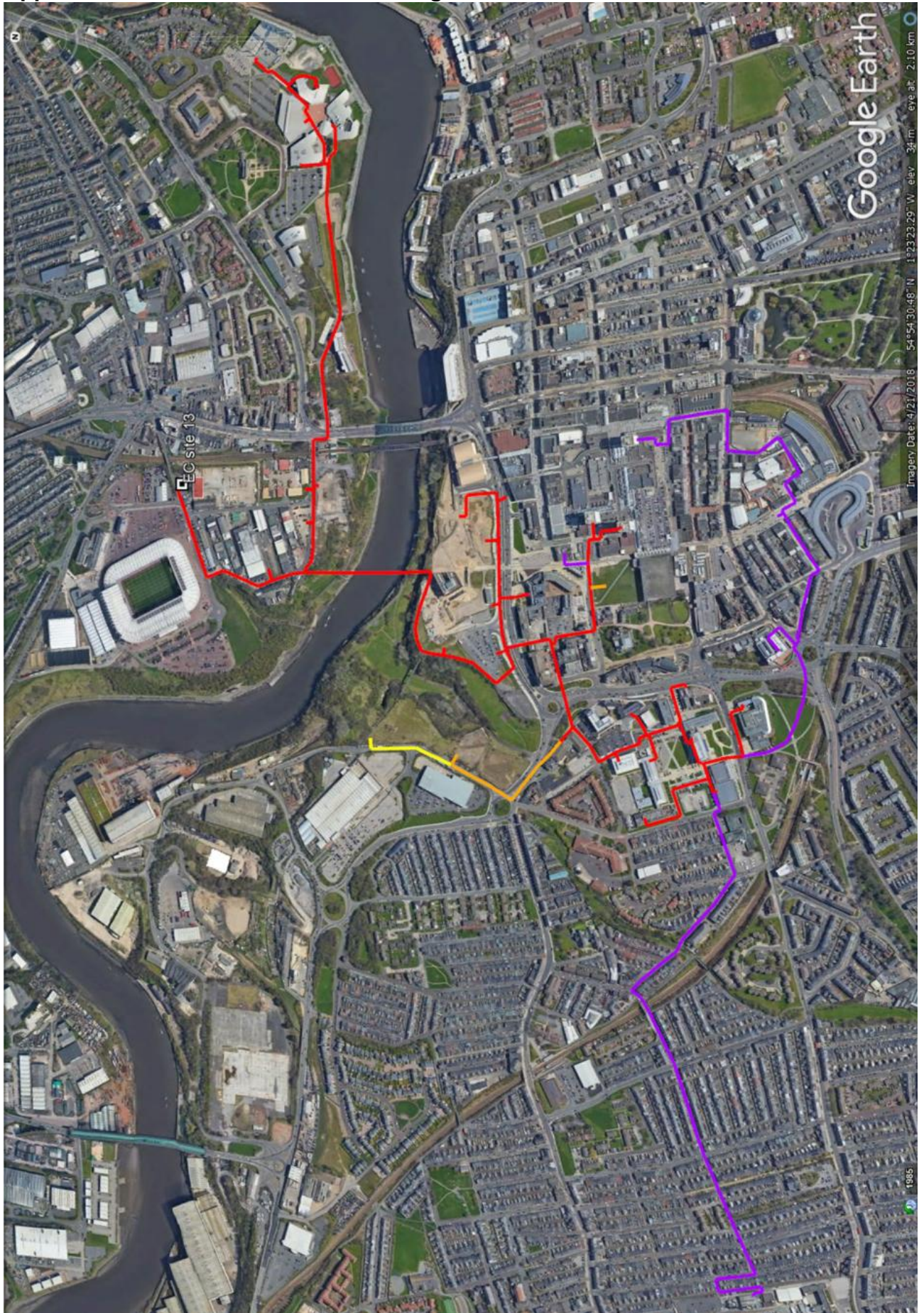
Cabinet will consider, alongside other matters, a subsequent report detailing the amount of capital investment required by the Council to deliver the Heat Network.

- (ii) **Legal Implications** – The Assistant Director of Law and Governance has been consulted on the proposals and her comments are included in the report.
- (iii) **The Public / External Bodies** – Stakeholder engagement has been carried out with Sunderland Royal Hospital, University of Sunderland, and Sunderland College as potential consumers.
- (ix) **Procurement** – Corporate Procurement have been consulted and the Council's procurement procedure will be followed.

Glossary:

<u>Abbreviation or term</u>	<u>Description</u>
ASHP	Air Source Heat Pump – electrically driven heating unit working in a similar manner to a fridge in reverse, using the ambient air as its initial heat source and uplifting to the desired temperature.
BEIS	Department for Business, Energy and Industrial Strategy
CHP	Combined Heat and Power – an engine that serves as a generator of electricity and the generated heat is utilised for heating and/or hot water, typically gas powered.
Counterfactual	The assumed future alternative means of heat in the absence of a heat network, used as a benchmark to compare various parameters.
DPD	Detailed Project Development
ESCO	Energy Services Company – a company or an entity that delivers energy services, such as heat.
FBC	Full Business Case
GSHP	Ground Source Heat Pump – electrically driven heating unit working in a similar manner to a fridge in reverse, using the ground temperature as its initial heat source and uplifting to the desired temperature.
GWh	Gigawatt hour – unit of delivered energy, 1GWh = one billion watt hours, or one million kilowatt hours (kWh). Context: a typical medium usage UK domestic property uses 12,000kWh of gas per annum.
HNDU	Heat Networks Delivery Unit – team and grant funding body within BEIS.
HNIP	Heat Networks Investment Project – grant funding source within BEIS, follows on from HNDU.
NPSV	Net Present Social Value – the present value of a stream of future costs and benefits to UK society (that are already in real prices) and that have been discounted over the life of a proposal by the appropriate H.M Treasury Green Book social time preference rate.
OBC	Outline Business Case
RHI	Renewable Heat Incentive – a payment system for the generation of heat from renewable sources.
SPV	Special Purpose Vehicle – a subsidiary created by a parent company to isolate financial risk.

Appendix A - Indicative Network Routing



Appendix B: Key Project Milestones

Description	Date	Note
Seek Cabinet Approval to apply to HNIP and various procurement/appointments for support	June 2021	Purpose of this report
HNIP Full Application	2 July 2021	Dependent on Cabinet approval
HNIP Decision	10 September 2021	
Appoint Coal Authority	10 September 2021	Dependent on Cabinet and HNIP approval
Procure and appoint borehole drilling contractor	February 2022	Dependent on Cabinet and HNIP approval
Procure legal and technical advisers	July 2022	Dependent on Cabinet and HNIP approval
Complete drill and test	September 2022	
Seek Cabinet approval to procure delivery Contractor and to agree delivery model	September 2022	
Procure delivery Contractor	October 2022	Dependent on borehole findings and Cabinet approval
Mobilise Site	January 2023	
Heat on Phase 1	February 2024	
Heat on Phase 2	August 2024	