GREATER**LONDON**AUTHORITY

Address

Our reference: MGLA270422-9809

Date: 11 May 2022

Dear

Thank you for your request for information which the Greater London Authority (GLA) received on 27 April 2022. Your request has been considered under the Environmental Information Regulations (EIR) 2004.

You requested:

> *Having looked on the London Heat Map website, I can see that there were proposed plans in 2012 to introduce a heat network in the Royal Docks in Newham. From what I can gather online, the development of this was stalled so I was hoping to find out the current state of this development and any information regarding estimated time for delivery.*

Our response to your request is as follows:

The Royal Docks Team (a joint initiative between the Mayor of London and the Mayor of Newham[1]) commissioned Buro Happold to undertake a strategic feasibility study into a heat network for the Royal Docks. This built upon previous work undertaken by the London Development Agency some years ago, as well as reflecting updated policy and guidance at national and London level, including the new London Plan:

https://www.london.gov.uk/what-we-do/planning/london-plan/new-london-plan/london-plan-2021

The report explores the options both from a technological and spatial perspective and makes some recommendations relating to those options. It is not the intention for the GLA to directly invest in a heat network in the Royal Docks but the Royal Docks Team is working with local developers and stakeholders to examine the options for further work. Since the report was written some of the dates referred to in the report have changed.

If you require any further information, Head of Development & Placemaking, would be happy to discuss this with you:

If you have any further questions relating to this matter, please contact me, quoting the reference MGLA270422-9809

[1] Home | Royal Docks

Yours sincerely

Information Governance Officer

If you are unhappy with the way the GLA has handled your request, you may complain using the GLA's FOI complaints and internal review procedure, available at:
https://www.london.gov.uk/about-us/governance-and-spending/sharing-our-information/freedom-information

BURO HAPPOLD

Royal Docks

Low carbon heat feasibility study

Information for Stakeholders

May 2021

Introduction

Buro Happold has been commissioned by the Royal Docks Team (a joint initiative between the Mayor of London and the Mayor of Newham) to develop a District Energy Feasibility Study, with accompanying delivery plan and commercial appraisal within the Royal Docks and Beckton Opportunity Area.

This document provides an update to the December 2020 and February 2021 stakeholder packs to provide further detail on the proposed solution for a local process waste heat opportunity into a low carbon heat network serving new developments including Silvertown Quays (STQ) along the North Woolwich Road area indicated in pink in the adjacent map.

Waste heat available is in excess of the forecast annual heat demand of the nearby major developments. Intermittency and temperature of the waste heat process operation requires thermal storage combined with heat pumps to boost the supply temperature when required to deliver a reliable supply to developments. Plant would be located at a centralised energy centre.

Two configurations of heat pump interface on a new heat network have been considered, with the main variable between options being the network temperature (either low temperature 4G or ultra-low temperature 5G).

The study finds that development of a 5G central network along North Woolwich Road initially connecting to STQ, then expanding to further developments would be the most cost-effective solution, making good use of the low-grade heat available at the waste heat source to deliver areawide decarbonisation.

Royal Docks study area (red boundary), with south western portion shaded

Network technical solution
North Woolwich Road spine

Highway works are planned along North Woolwich Road during late 2021 and 2022, which present a cost-effective opportunity to install a district heat network, coordinated with other utilities works.

Completion of Phase 1 of the STQ development is anticipated in 2023. Talks are ongoing with a local ESCo operating an existing 3G network to provide a district heating connection to STQ for this date, as shown in option A. This requires pipework to be installed in North Woolwich Road.

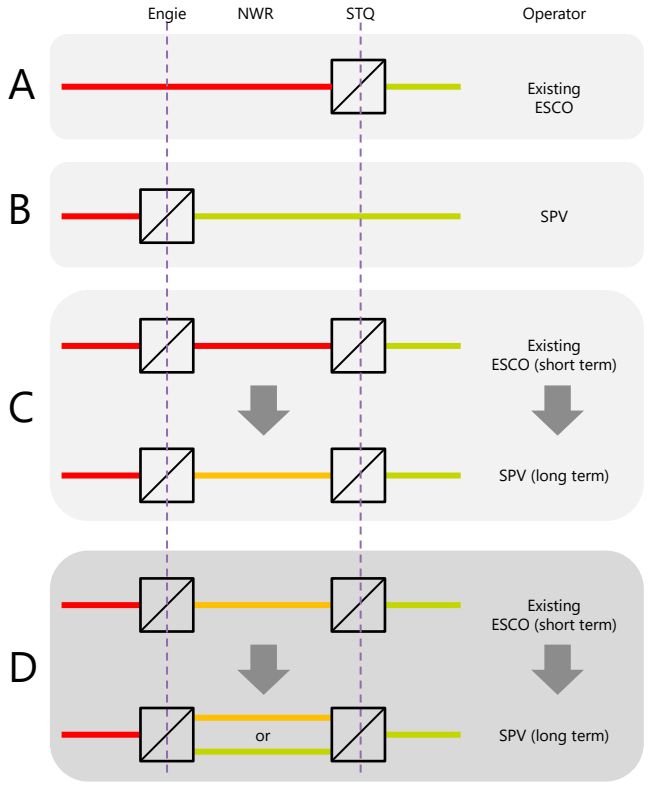
Option B presents an alternative, to install larger diameter ambient loop pipework in North Woolwich Road, which could be operated by a Special Purpose Vehicle (SPV) rather than the existing ESCo, futureproofing a thermal energy network for the area and allowing for lower operating temperatures to be achieved.

Two alternatives for pipework installation could be feasible:

C. Install pipework that is operated at 3G temperatures in the short term, with offtake from the local ESCo network, which then transitions to 4G temperatures in the long term to enable heat offtake from the waste heat source.

D. Install larger diameter insulated pipework initially, that can operate at either 4G or 5G temperatures in the long term, depending on the requirements in the wider area.

Option D is recommended, as it enables the greatest flexibility, whilst retaining the option for heat recovery from T&LS or other waste heat sources.



Network technical solution

Network demand

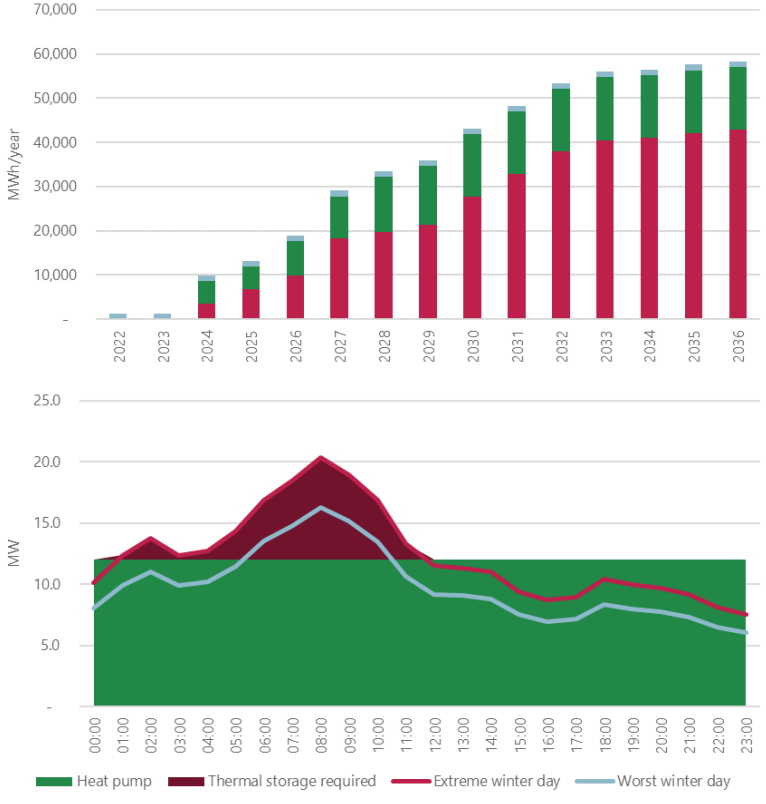
Further engagement with stakeholders and more in-depth analysis of the heat demands in the area has been carried out during Phase 2 of this study.

The adjacent upper chart presents the end user heat demand by year for identified key connections for the full heat network scheme, from 2022, through to 2036.

Energy modelling has been carried out to determine plant requirements at a strategic network energy centre as a result of the continuing development build-out, factoring in losses within the developer-led heat networks.

Thermal storage has been sized such that it is able to meet the heat demand on the network which is in excess of the heat pump capacity considering an extreme winter day, as illustrated in the lower chart to the right. This provides a balance between practicality of the size of thermal storage, and resilience to the system.

The priority of heat source for the network follows a hierarchy based on the efficiency of heat delivery, as described on the following slides for 4G and 5G.



Network technical solution
Operating principle, 4G

Low temperature district heating (~60 deg C) is referred to as 4G. This circulates hot water to deliver heat to connections via a heat exchanger. Any recovered heat must be raised to the delivery temperature before being distributed on the network. The proposed operating strategy for a 4G network has been developed to rely on the most efficient means of heat generation first, with appropriate backup and storage capacity.

The hierarchy of technologies on the network is as follows:

1. Rejected heat from the identified waste heat process connected to a new heat pump plant. The heat pumps use this waste heat efficiently to raise the 4G network to temperature
2. When insufficient waste heat is available, the heat pumps will run in air source mode, a less efficient mode of operation
3. Should there be downtime on the heat pumps, backup electric boilers shall provide heating to the network
4. Heat raising plant will charge thermal storage on the 4G side of the network to allow demand to be met during peak times and to maximise efficient operation when waste heat is available.

Heat is distributed across the 4G network and sold at the development boundaries to local thermal energy networks. networks. Heat is sold to plot level ambient heat network, to balance the network when heating dominant. Provision of cooling requires separate infrastructure.

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Network technical solution
Operating principle, 5G

Ultra Low temperature district heating (~10-40 deg C) is referred to as 5G. This circulates low temperature water to deliver or accept heat from connections which then use a local water source heat pump to generate locally usable heating or cooling. Waste heat can be directly recovered into the network.

In the 5G operating principle, the operating strategy is as follows:

- Rejected heat from the waste heat source is passively via plate heat exchangers where temperature is greater than required 5G network temperature operating temperature
- Rejected heat from industrial processes is used actively via heat pumps, when waste heat temperature is less than 5G network operating temperature
- When insufficient waste heat is available, the heat pumps will run in air source mode, a less efficient mode of operation
- Should there be downtime on the heat pumps, backup electric boilers shall provide heating to the network if required
- Heat raising plant will charge thermal storage on the 5G side of the network to allow demand to be met during peak times and to maximise efficient operation when waste heat is available.

The heat pumps are reversible to allow balancing of the 5G network and reject heat back to either the industrial discharge circuit or via a new evaporator compound if required.

Thermal energy is provided to the 5G network and sold at development boundaries to local networks. Developer networks can operate as heating only or heating and cooling.

Excess heat from local networks (when operating predominantly in cooling mode) can captured and used elsewhere on the network.

Heat pumps on local developer networks would be required to boost temperatures to final delivery temperature at unit level.

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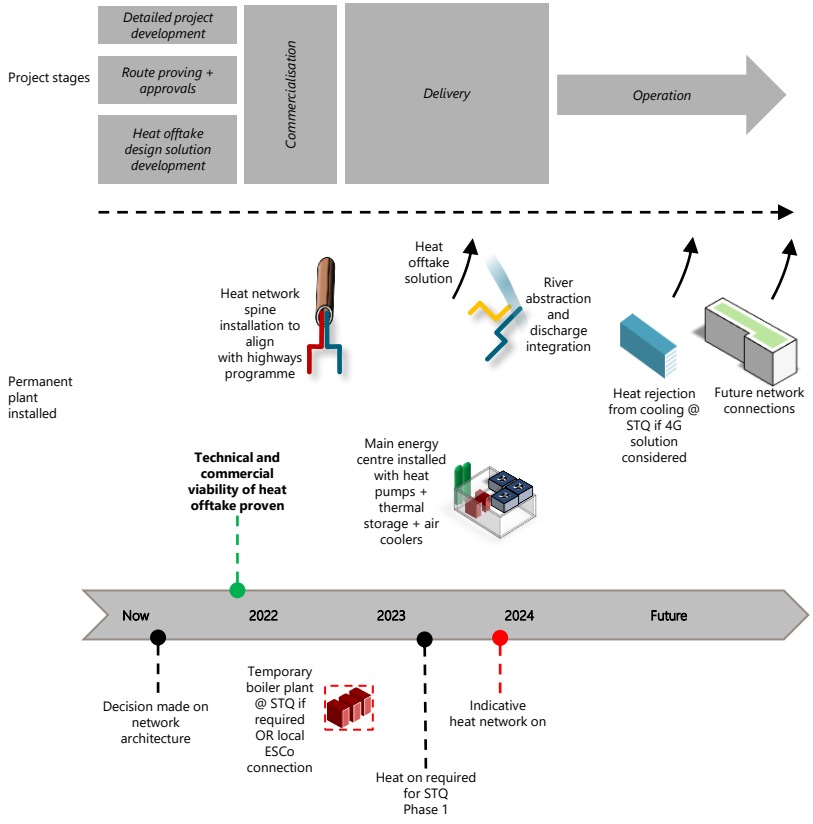
Phasing & Summary

The study finds that development of a 5G central network along North Woolwich Road, initially connecting to STQ, then expanding to further developments would be the most cost-effective solution, making good use of the low-grade heat available at the waste heat source to deliver areawide decarbonisation

In order to de-risk and advance the design of a thermal energy network at the Royal Docks; the following key activities should be considered:

- Local authority decision made to proceed with 4 or 5G network architecture (study suggests good potential for 5G network with waste heat input) and identify preferred commercial operating structures
- STQ decision to progress with either local ESCo connection or seek alternative arrangement to serve STQ. Temporary boiler plant may be required due to heat on date in Q3 2024, while a long-term external network solution is developed
- If local ESCo connection progressed, pipework should be installed in a futureproof manner to allow connection to additional developments and reduced in operating temperatures.
- Engagement with developments providing heat only to customers required to determine feasibility of 5G bulk network supply integration
- More detailed technical and commercial assessment must be undertaken to verify viability of heat offtake solution.
- Route proving activities including GPR and topographic surveys should be undertaken along the proposed network route
- Detailed design activities should then be undertaken for the energy centre and thermal network



BURO HAPPOLD

[redacted]@burohappold.com

[redacted]@burohappold.com

[redacted]@burohappold.com

www.burohappold.com