

Bath Road Energy Centre

Introduction

About Vattenfall and Bristol City Leap

Vattenfall is working with Bristol City Leap, a world-first city-scale public and private sector partnership aimed at achieving carbon neutrality for the city's energy infrastructure by 2030.

The twenty-year partnership between Bristol City Council, Ameresco and Vattenfall will enable the delivery of at least £1 billion of investment into Bristol's energy system.

As owners and operators of the Bristol heat network, Vattenfall is responsible for expanding the existing heat network, developing new network areas and ultimately interconnecting them to create a single Bristol heat network that serves residents with low carbon, reliable heating and hot water at a fair price.

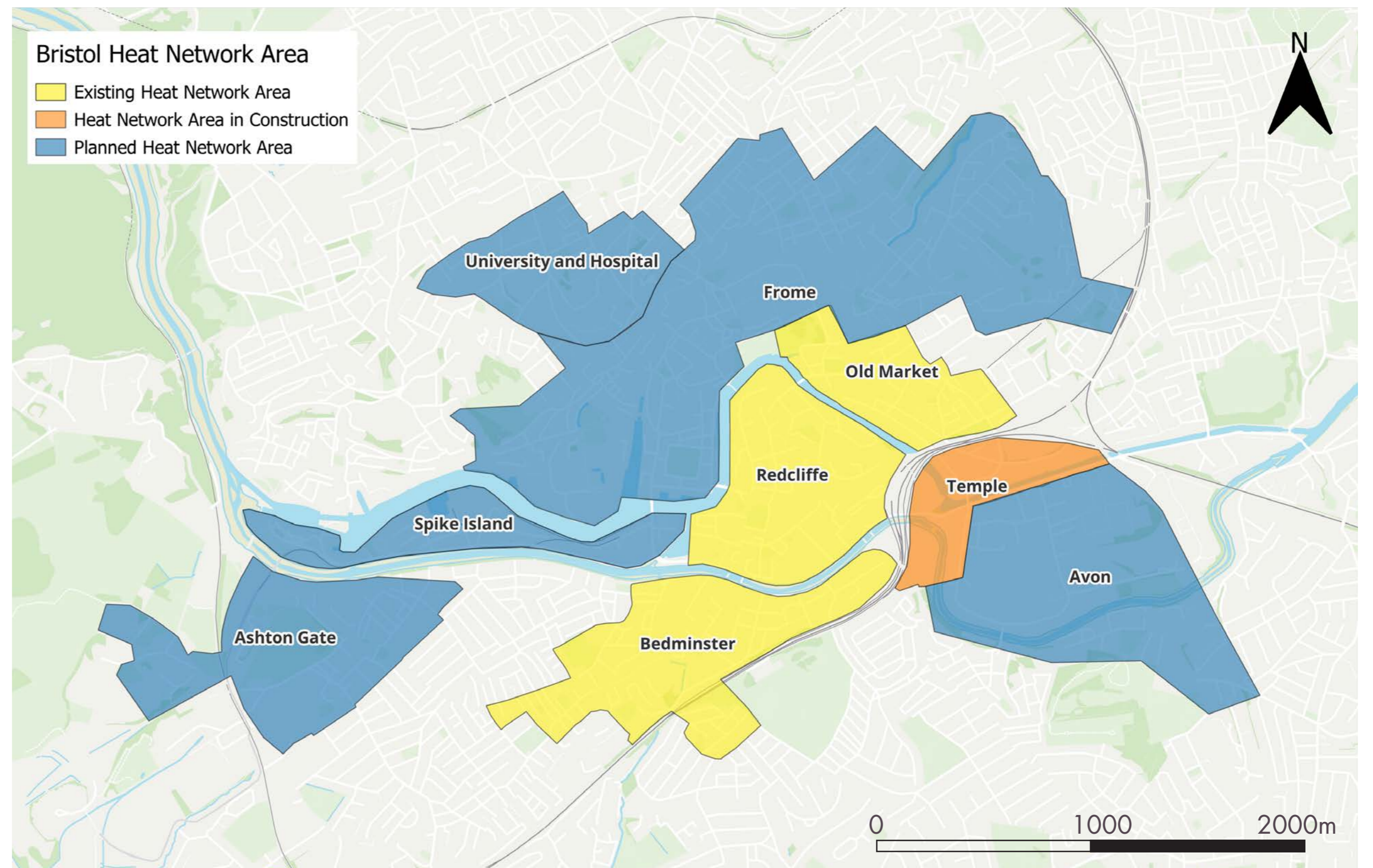
What are heat networks and how do they work?

Heat networks are a more efficient way of providing heating and hot water to multiple properties from a shared, central source rather than each property having to generate its own by burning fossil fuels.

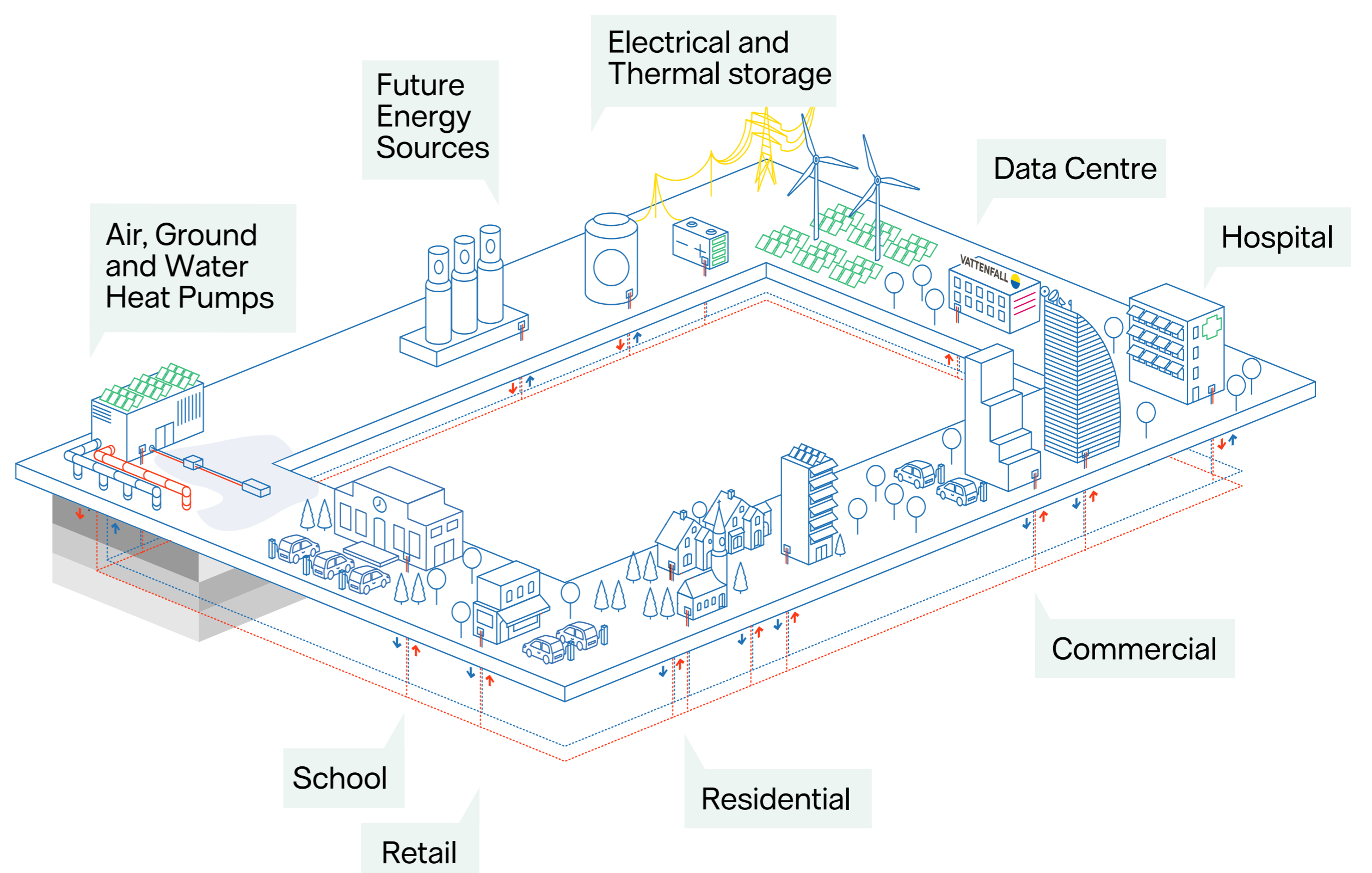
Energy centres are needed to generate the heat that is then distributed to buildings connected to the heat network. For example in Bristol, Vattenfall has a low carbon energy centre in Castle Park which utilises water source heat pumps, taking heat from the harbour and using it to generate heating and hot water for buildings connected to the heat network like Castle Park View, Temple Fire Station and the Central Health clinic.



Castle Park Energy Centre, another Vattenfall scheme that already supplies the network



Map of overall Bristol heat network



Schematic of a typical heat network

What's the Bristol heat network?

The heat network currently provides heating and hot water to the equivalent of 6,000 homes, and is aiming to serve the equivalent of 12,000 homes by 2030.

Vattenfall currently supplies heating to buildings across the city, including areas such as Old Market, Redcliffe and Bedminster.

To decarbonise new residential and commercial developments across Bristol, in areas like Bristol Temple Quarter and Frome Gateway, Vattenfall is expanding the heat network by installing new pipes and building new low carbon energy centres, including the Bath Road Energy Centre.

About Bath Road Energy Centre

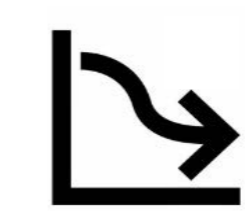
What is it? Bath Road Energy Centre will be Vattenfall's second low carbon energy centre to supply heating and hot water to the Bristol heat network. It will be the engine room behind the development of Bristol Temple Quarter, and ultimately support the wider Bristol heat network once the current network areas are joined together.

How will it work? It will be an air source heat pump led system with electric (e-) boiler top up and back up, that will generate 13MW of heating and hot water – this is enough to supply the equivalent of 2,350 homes. At full capacity, this could save up to 7,385 tonnes of carbon emissions per year, which is the same as getting 3,690 diesel cars off Bristol's roads every year.

Why will it be put here? The location balances the need for it to be close to existing energy infrastructure and the buildings it is serving, whilst minimising interference with local residents and businesses.

Why is it needed? This energy centre will unlock a fossil free future for Bristol. It will give buildings in the city centre access to a long-term and future proofed decarbonisation solution, eliminating the need to burn fossil fuels to heat new homes, offices, education centres, leisure and social spaces – creating a healthier and more sustainable environment for Bristolians to live, work and learn in.

More sustainable, higher efficiencies



Carbon Reduction



Space Efficiency



Operational Efficiency

What are air source heat pumps?

Air Source Heat Pumps (ASHP) are a great low carbon solution for heat generation. An ASHP takes low temperature energy from air and raises it to a higher, useful temperature. Whilst gas boilers have historically been the answer, ASHPs can offer an energy efficient, low carbon, more sustainable alternative.

How do they generate heat?

ASHPs absorb heat from the air and transfer it to a fluid refrigerant. This fluid passes through a compressor, which raises the fluid's temperature. This heat is then transferred to water which is distributed around the city wide network as useful heat. Instead of natural gas or other fossil fuel alternatives, they use electricity to operate, meaning there are no emissions to the local area.

How will the energy centre operate?

The ASHPs in the centre will operate to match the heat demand requirements of the heat network. They will work in tandem with thermal stores to ensure maximum utilisation of these highly efficient systems. Any additional heat required will be provided by less efficient electrical boilers.

The largest part of ASHPs are the fan units, which bring the air flow near the refrigeration circuit to enable the heat transfer. The fan units are installed externally on the roof. Other parts are to be located internally within the centre.

ASHPs are reasonably quiet and reliable. We are undertaking a noise impact assessment for the scheme and will be implementing

mitigation measures to ensure no negative noise impact beyond the existing background noise levels on the site (recorded with noise sensitive receptors), as agreed with Bristol City Council.

How is it sustainable and environmentally friendly?

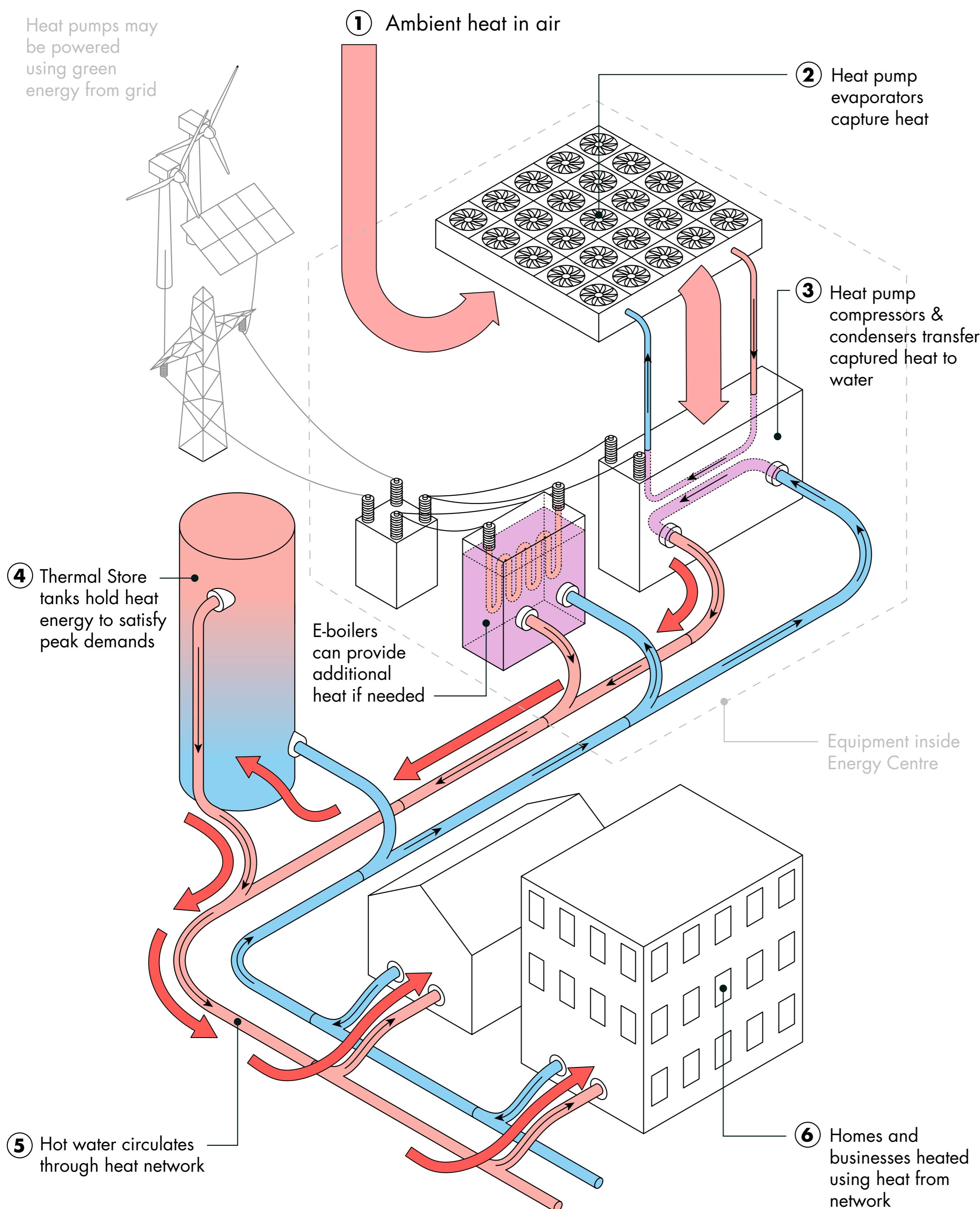
Heat pumps generally are a more sustainable way to generate heat when compared to traditional gas boilers, reducing the environmental impact. ASHPs can be very efficient - designed to work even in chilly weather, the amount of thermal energy produced is much greater than the electrical energy used to drive the process.

While an average modern gas boiler is around 90% efficient (for 1 unit of gas, they produce 0.9 unit of heat), ASHPs run at an

average seasonal efficiency of 250% (for 1 unit of electricity, they produce 2.5 unit of heat).

The carbon value of heat produced is around 4 times less than a typical gas boiler*. Heat pumps are powered by electricity, which will continue to reduce in carbon as the electric grid decarbonises and more renewable electricity sources are added on to the grid.

(*based on 2028 Green Book GHG long-run marginal electricity emissions factors for the commercial/public sector: 0.143 kgCO₂/kWh_e and GHG reporting conversion factors for 2024: 0.183 kgCO₂/kWh_{gas}.)



Left - functional diagram of proposed energy centre
Below from top - typical images of equipment:

- ASHP fan units (copyright: Fenagy)
- ASHP compressor unit (copyright: Solid Energy)
- External thermal storage tanks (copyright: Mibec)

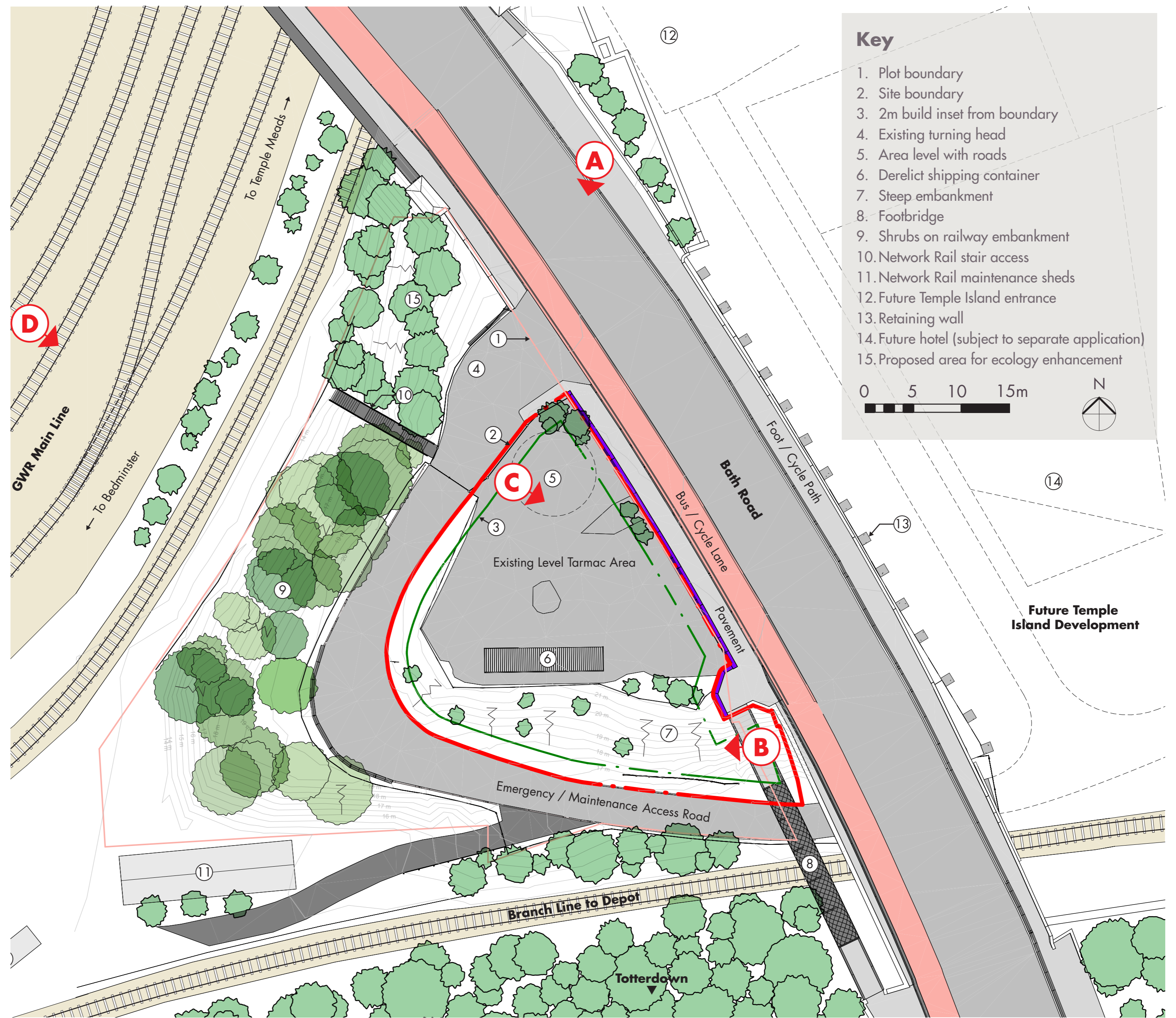


Site Conditions

The scheme sits adjacent to Bath Road on a small site which has not previously been developed. It is crossed by an access road which follows the site gradient and forms the outer extent of the area we are planning to utilise for the energy centre. The site has a 2m high stone wall along the eastern boundary to Bath Road, with palisade fencing along the inner side of the existing maintenance /access road. The site was formed when ground was excavated to either side to construct the railway lines. It has a flattened upper area towards its central and northern edge, which is approximately level with Bath Road. The site then banks steeply to the south with rough planting that has developed over time.

Landscape and Ecology

An ecological survey has been undertaken and mitigation is being coordinated between the ecologist and landscape architect to address the loss of three low quality trees and a small portion of habitat impacted by the proposed energy centre building (area 7 on plan opposite). An area within the wider site has been identified for ecology enhancement to meet the required biodiversity net gain (BNG) for the scheme (area 15 on plan). This entails improving the shrub habitat in the northernmost corner into a native mixed scrub habitat with additional tree planting. This planting will compensate for the loss of the three trees, and there is no intention to remove existing woodland and trees in any other areas of the site.



Existing site plan

Existing Site Photos



View into site entrance from across Bath Road



View overlooking site from Bath Road foot bridge



View across site looking south-eastward along rear of Bath Road boundary wall



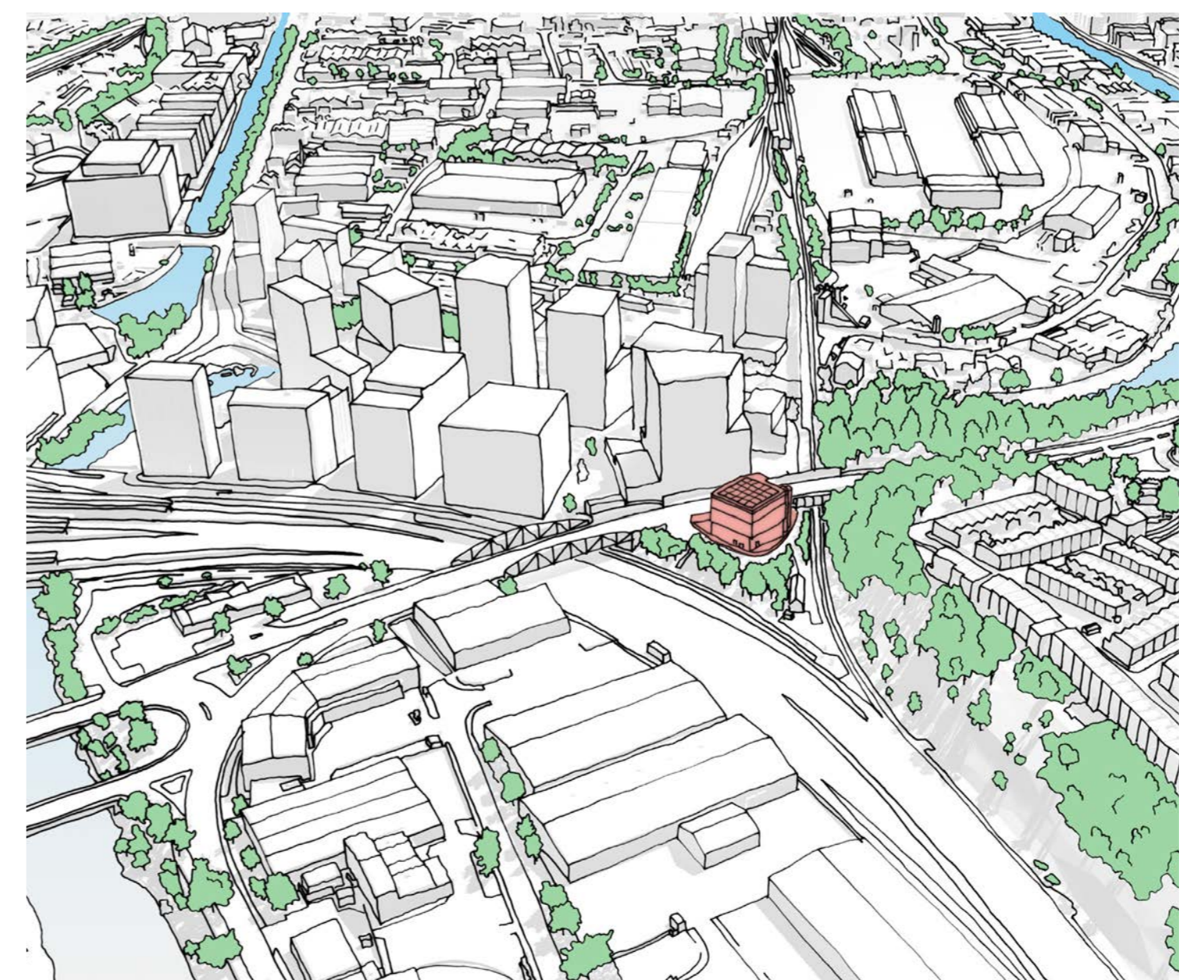
View towards site looking south across mainline railway

Proposed Building Massing

In order to contain the equipment needed to form an energy centre, the building will need to have two levels of enclosed space, plus a screened roof level containing plant equipment. This will give a building height which sits both below the level of the Totterdown escarpment and below the buildings proposed for the adjacent Temple Island development. When viewed from afar the building will sit within and below this surrounding context.

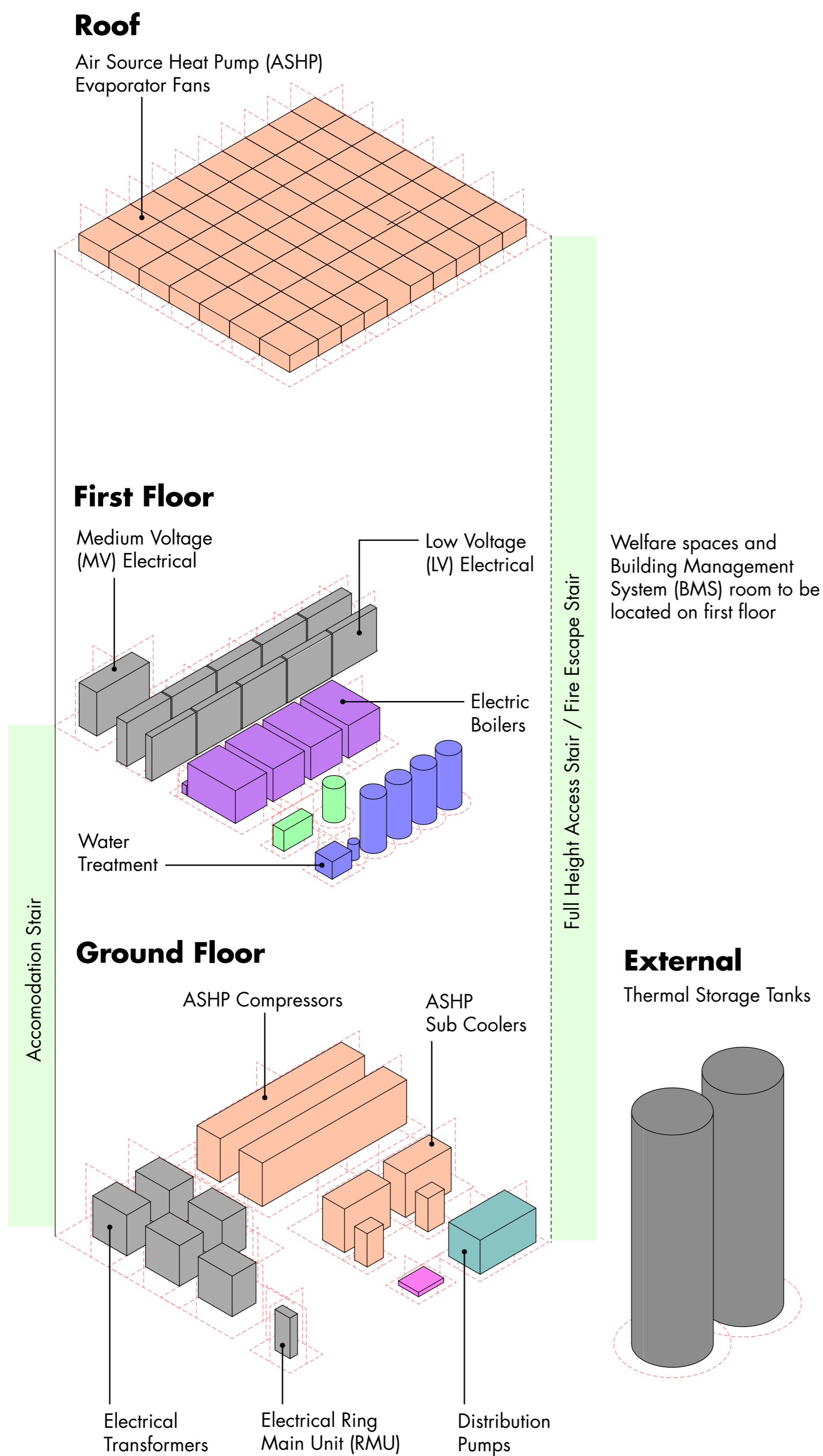


Aerial photograph of current site (copyright: Google Maps)

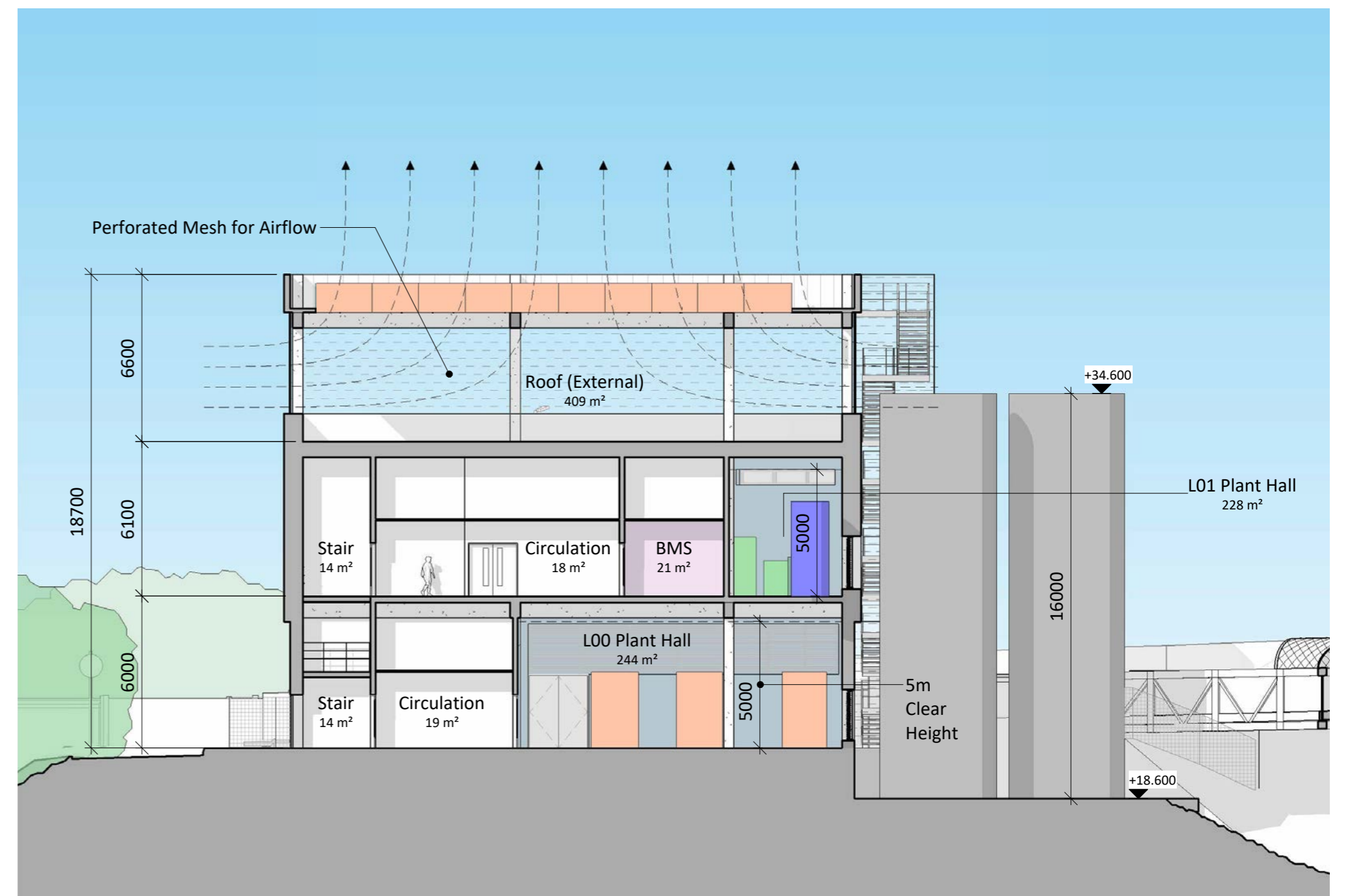


Sketch showing the Bath Road Energy Centre in context

Diagram of Equipment in Energy Centre



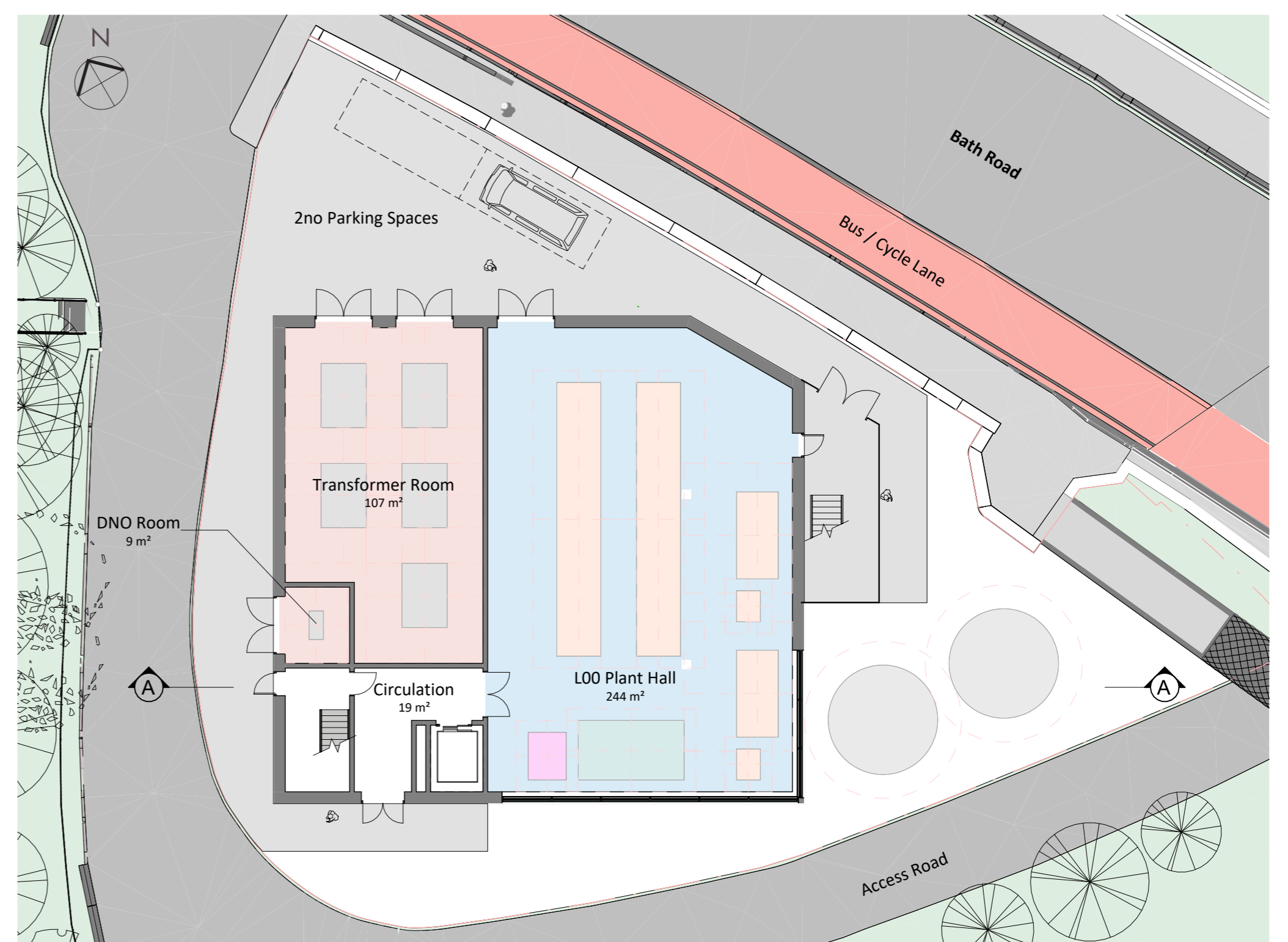
Plans and Section



Section A-A



First Floor Plan



Ground Floor Plan

Equipment Layout

The layout of the energy centre is primarily driven by the functional requirements of the equipment inside, as outlined in the diagram above.

The energy centre utilises fans at roof level to extract heat from the outside air. These need plenty of space below to ensure good airflow passes through the units, so are raised above roof level on a steel frame. This is all screened so that it's obscured from street level. Below this are two enclosed floors which house the main pieces of equipment. These use a refrigerant and compressors in a process which is similar to that which occurs in a refrigerator, but in reverse.

The energy centre requires a dedicated electrical supply to power the equipment. To enable this the building houses a number of transformers at ground floor, plus the associated electrical distribution equipment on the first floor.

The hot water produced from this process will be stored externally in two tall thermal storage tanks alongside the main building.

Amenity Spaces

The energy centre also contains spaces for staff to enter and work within the building, to store equipment and be able to spend break-times. There is also a requirement for a toilet and shower. These have been located along the building's west facade.

Orientation on Site

The building is almost square in plan and has been placed at the upper end of the site so that access to a service area can be achieved from Bath Road. This area will allow limited parking and access for maintenance vehicles. The thermal storage tanks have been located where the site slopes downwards. This allows us to use the change in level to minimise the visual impact of the tanks.

Floor Heights

The internal clear height required will be 5m for both ground and first floors, to house the large equipment and associated servicing overhead. This will result in floor-floor heights of 6 and 6.1 m respectively (see section above).

Bath Road Energy Centre

Proposed Scheme

Context Views

Key Viewpoints

The site's adjacency to Bath Road means that the building's most significant views are along its north-west and north-east elevations. These are shown in image **A** opposite and in image **F** on board 6. These are primarily viewed when traveling past the site, as there are no current neighbouring uses which would have any likelihood of visitors spending time adjacent to the scheme.

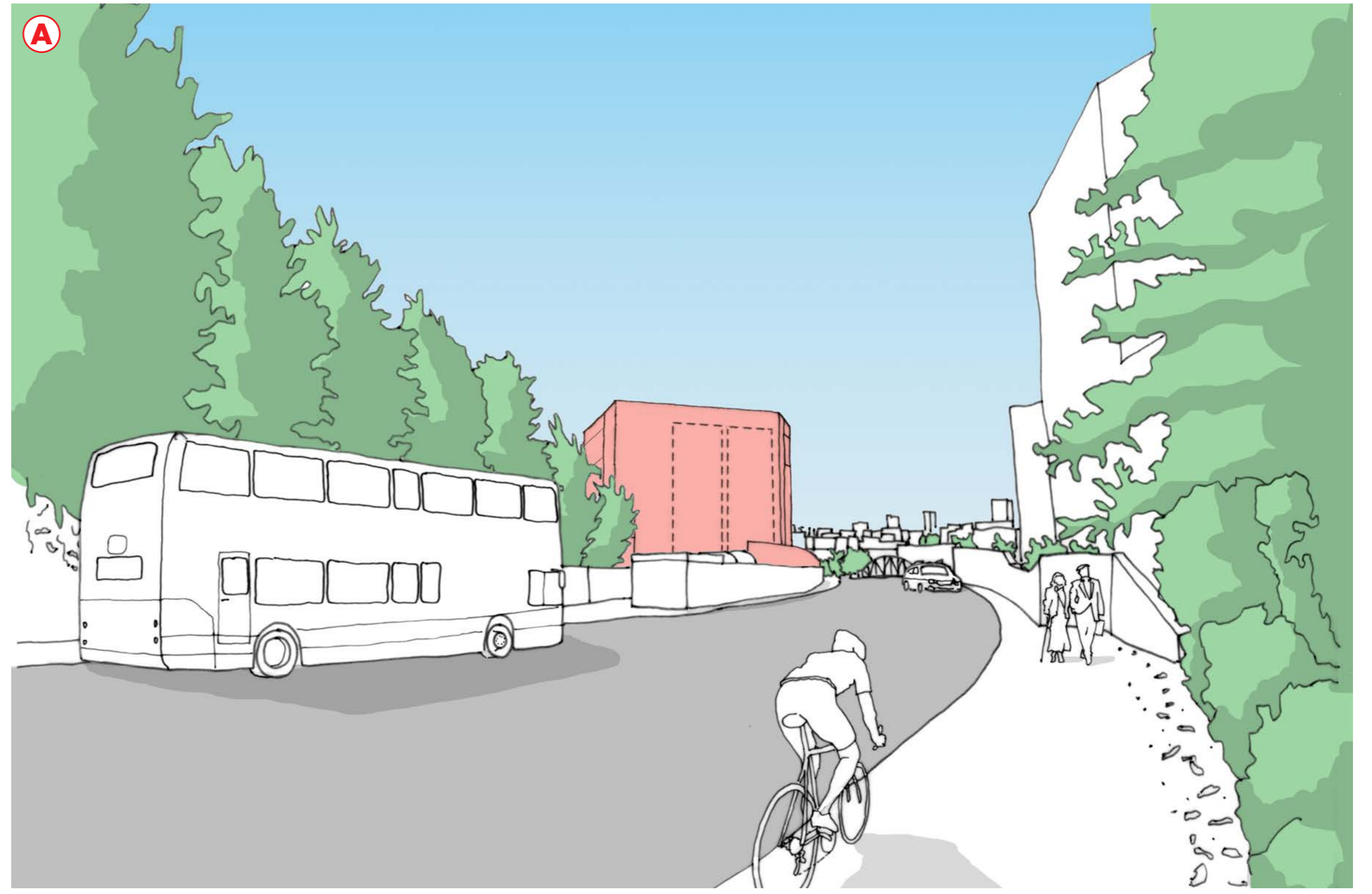
The site will ultimately be read visually with the Temple Island buildings opposite, which are likely to be taller.

The building will be visible from houses on the Totterdown escarpment, and from any new development adjacent to Bath Road within the main Temple Island site.

When viewed at a distance the site is located within a wide panorama and

does not breach development on the Totterdown escarpment. With existing trees on the ridge and planting along the railway embankment the building will be partially obscured by foreground planting and be contained by the context behind.

The building volume has been minimised in order to reduce any impact on the surrounding area, whilst remaining functionally optimal. Service access will need to be level with Bath Road which necessitates the building mass to be slightly skewed away from the main road. This will mean that the building is set back and helps lead the eyeline towards the Wells Road when travelling southwards from Temple Meads.



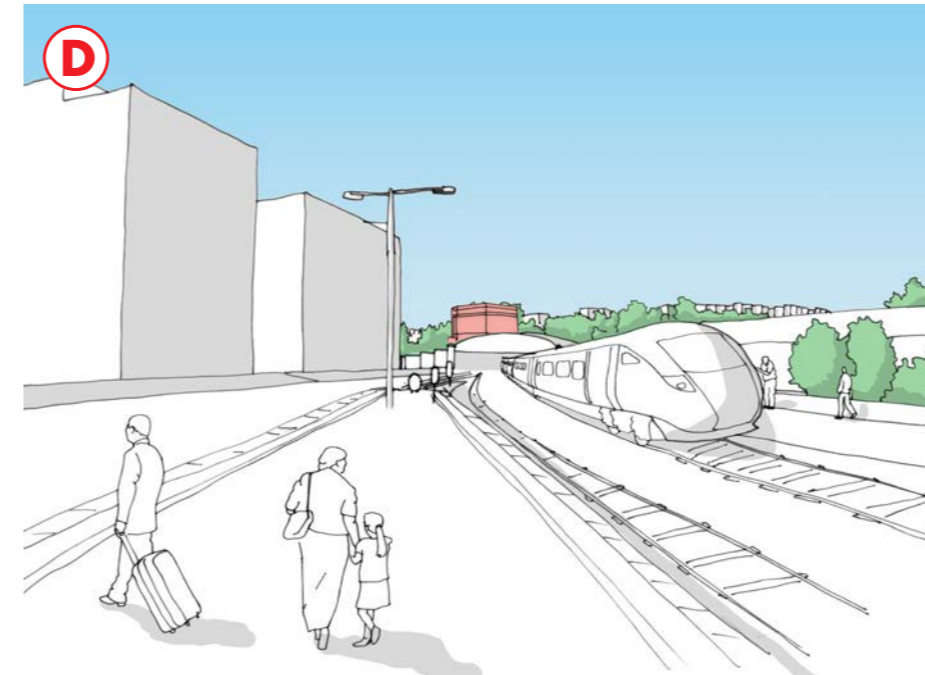
View looking north west along Bath Road towards southern energy centre facade
(Note: indicative massing only, not proposed facade detail)



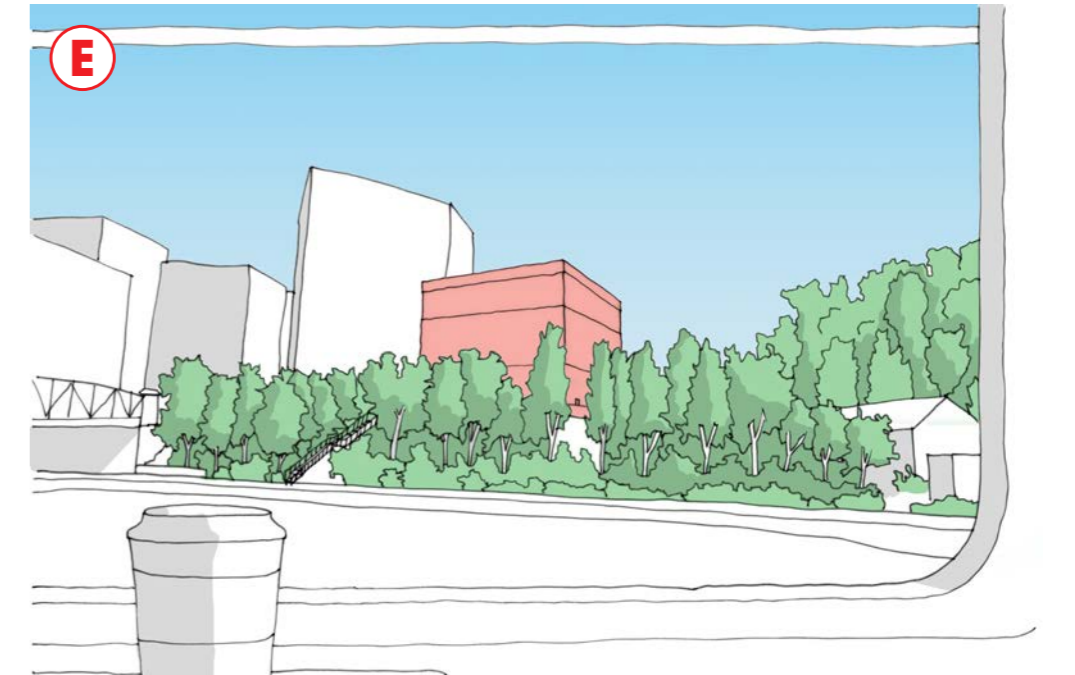
Looking south-east along Bath Road from opposite Fowlers



View from bottom of Station Approach at Temple Meads, looking south-east

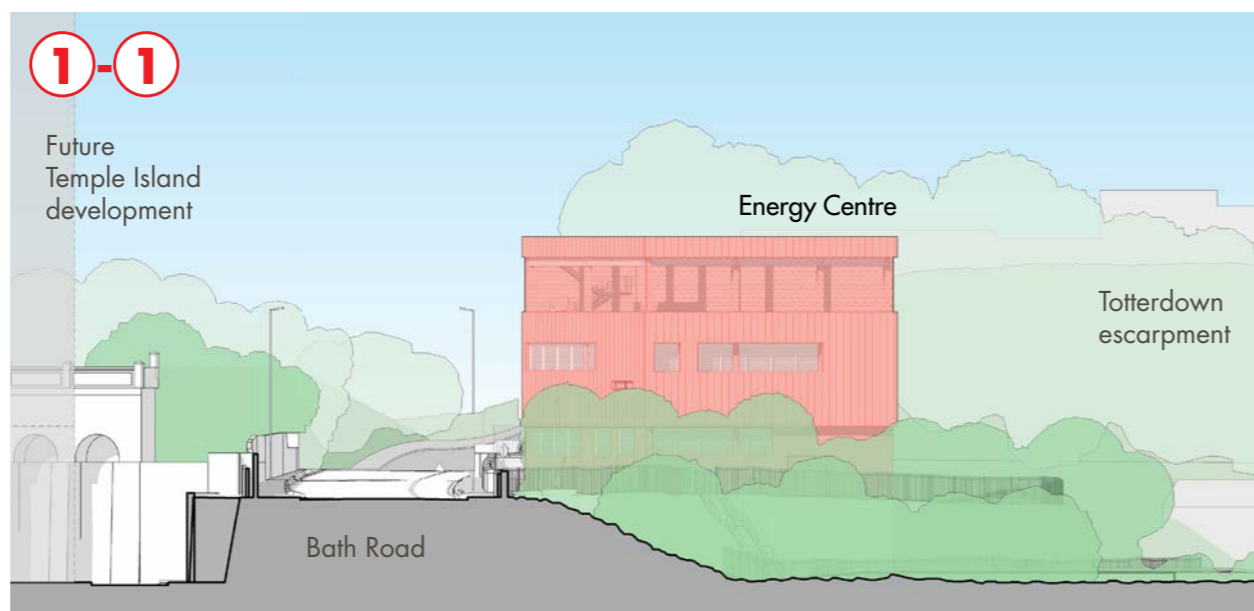
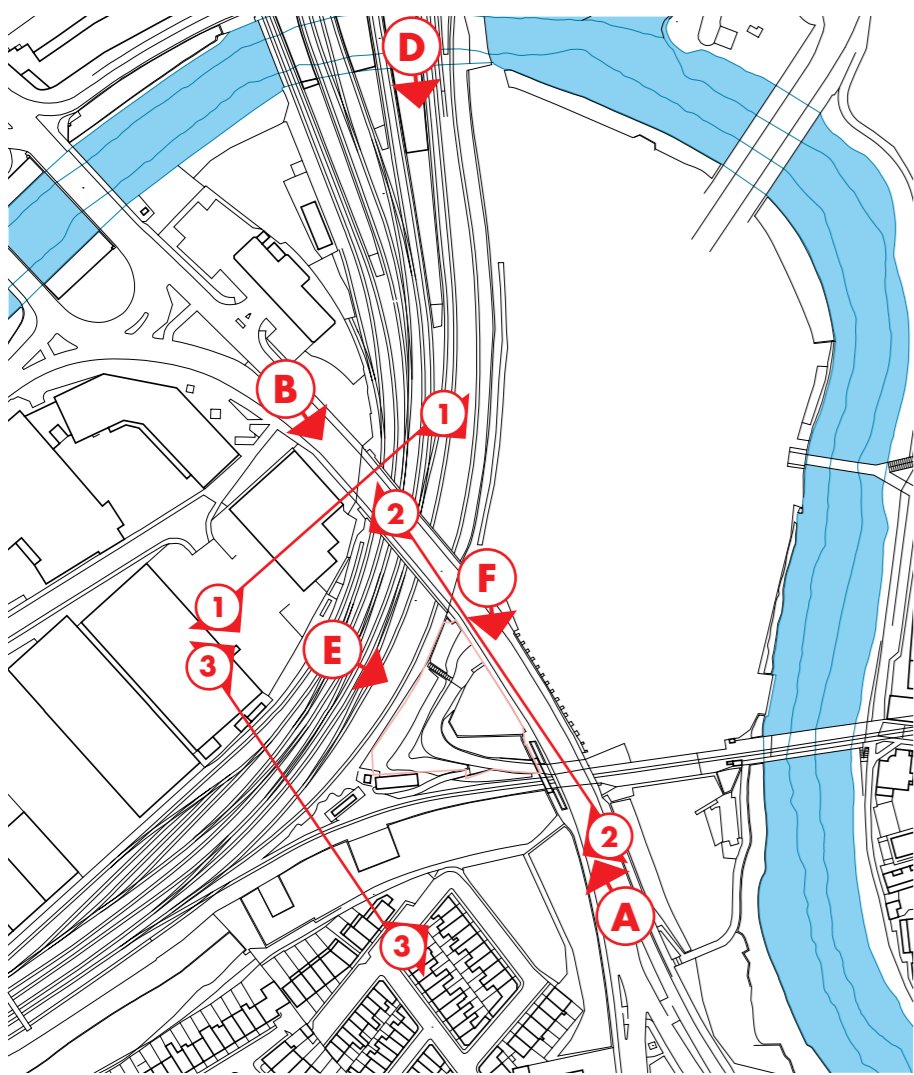


View from station platform, looking south towards Totterdown

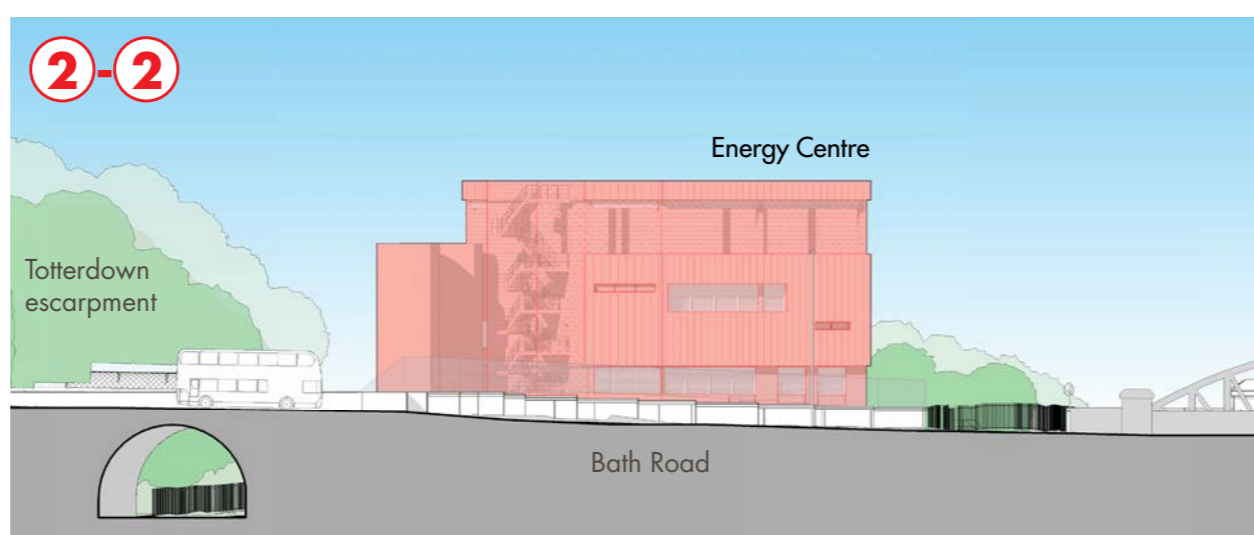


View from train looking south

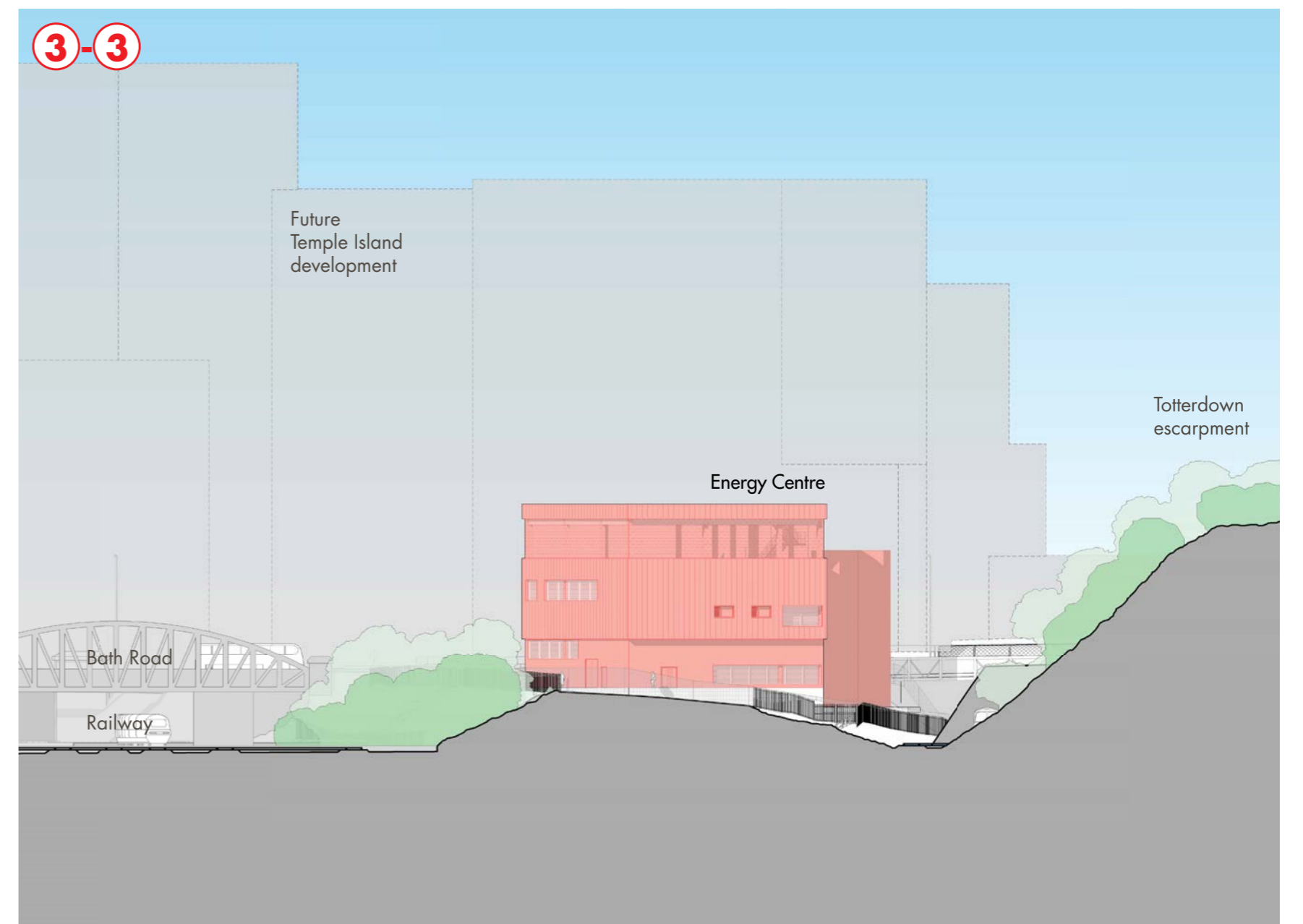
View Key



Section view looking south-east along Bath Road



Section view looking south-west across Bath Road



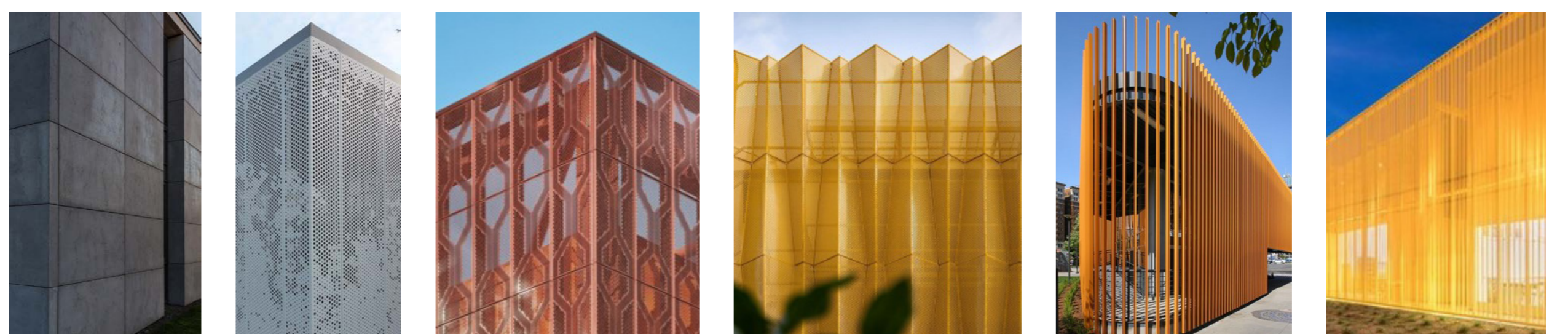
Section view looking north-east towards future Temple Island development

Facade Strategy

With the energy centre situated prominently alongside Bath Road, an active route into the city centre, it's key that the facade aesthetic is distinctive and contextual, whilst also serving to both visually screen and facilitate the operation of the centre's equipment within.

The building is a new typology for Bristol and is intended to be an elegant piece of civic industrial architecture, that celebrates its sustainable purpose in serving the wider area.

The images here give an indication of current design intent in advance of planning submission, with profiled and perforated metal cladding to the upper floors, combined with understated and robust precast panels to the ground floor. A unified colour palette will reflect both the local industrial and transport contexts, whilst an integrated and subtle facade lighting scheme will also be incorporated.



Precedent images of facade materials: precast concrete, perforated and folded metal cladding, metal fins and lighting behind cladding



Context images for facade colour and patterns: brick wall on Bath Road opposite site, Bath Bridge and Bath Road rail bridge next to site

Overview

The Bath Road Energy Centre will be Bristol's second low carbon energy centre, providing heating and hot water to the Temple area, and ultimately the wider Bristol heat network once the network areas are connected together. The energy centre will use a combination of air source heat pumps (ASHPs) and top-up / back-up electric (e-) boilers, unlocking a fossil free future for Bristol.

We are finalising the façade design of the energy centre, full details of which will be submitted within the upcoming planning application, and are intent on making the scheme a stand-out piece of architecture which celebrates its location within the city.

Key Benefits

The proposed scheme seeks to:

- Provide new buildings within the Temple heat network area access to a long-term and future proofed decarbonisation solution
- Support the Bristol Temple Quarter redevelopment
- Deliver the next phase of the wider Bristol heat network
- Create an attractive and engaging building on Bath Road - a piece of civic industrial architecture
- Make best use of a disused plot of brownfield land

Next Steps

We will be submitting a full planning application to Bristol City Council in summer this year, with an ambition to deliver the energy centre in the following timeline*:

- 2025 - planning permission secured
- 2026 - construction begins
- 2027 - construction completed
- 2028 - energy centre is supplying heating and hot water to connected buildings

**Please note, this is a live infrastructure project and exact timings are subject to change. All information provided is estimated, and accurate dates for works will be communicated as and when possible.*

Feedback and Information

We hope this event has been informative, and welcome your feedback on these proposals. Feedback surveys can be filled out and returned at this event.

Alternatively, you can provide feedback using our online survey, which can be accessed via the QR code below, which is also on our welcome table.

Once the planning application is submitted, Bristol City Council will undertake a period of consultation on the proposals. At this stage, you will have an opportunity to comment on the application through the Council's online planning portal.

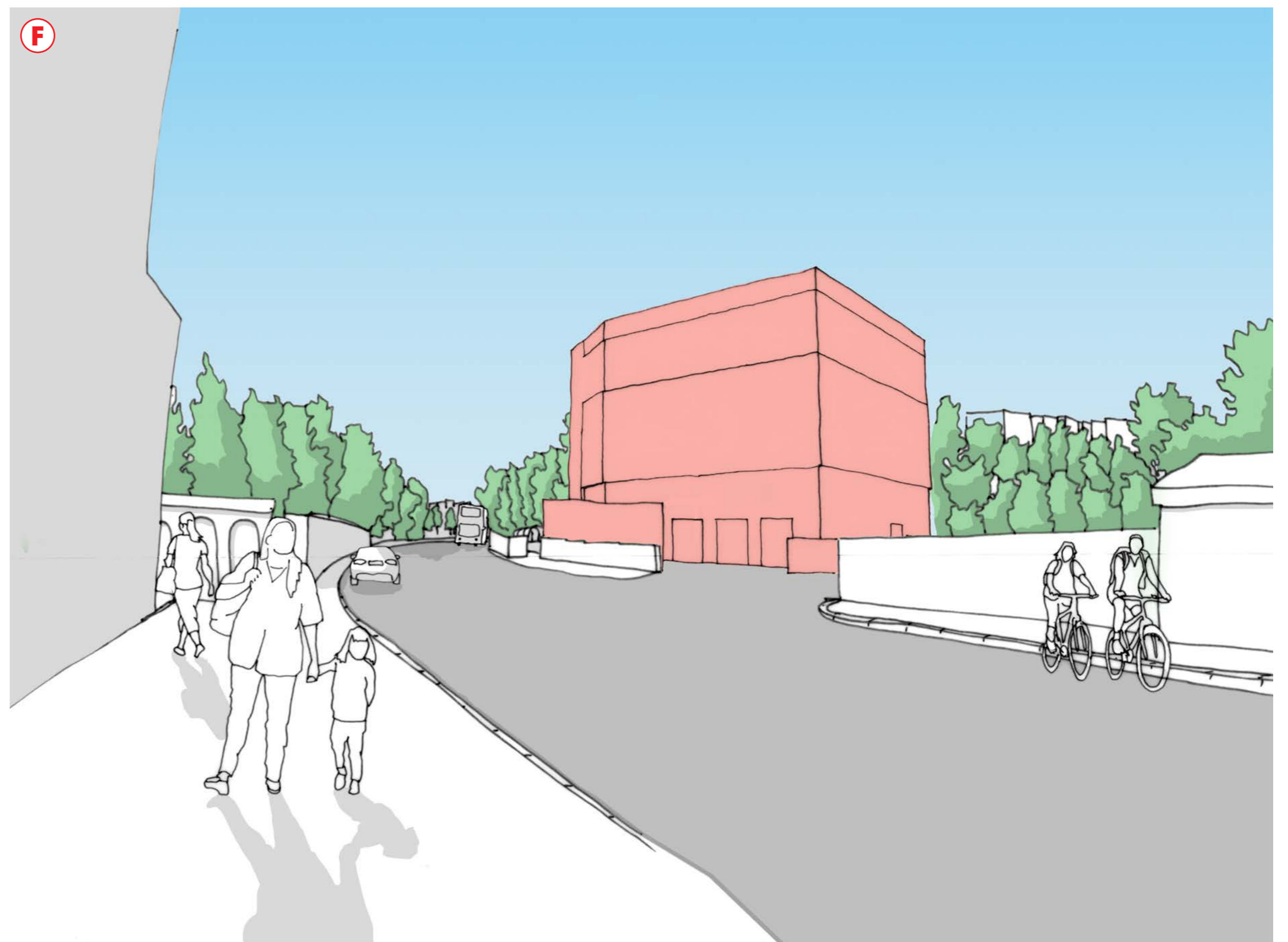
Further information on the Bristol heat network can be found at:

<https://heat.vattenfall.co.uk/where-we-are/bristol/>

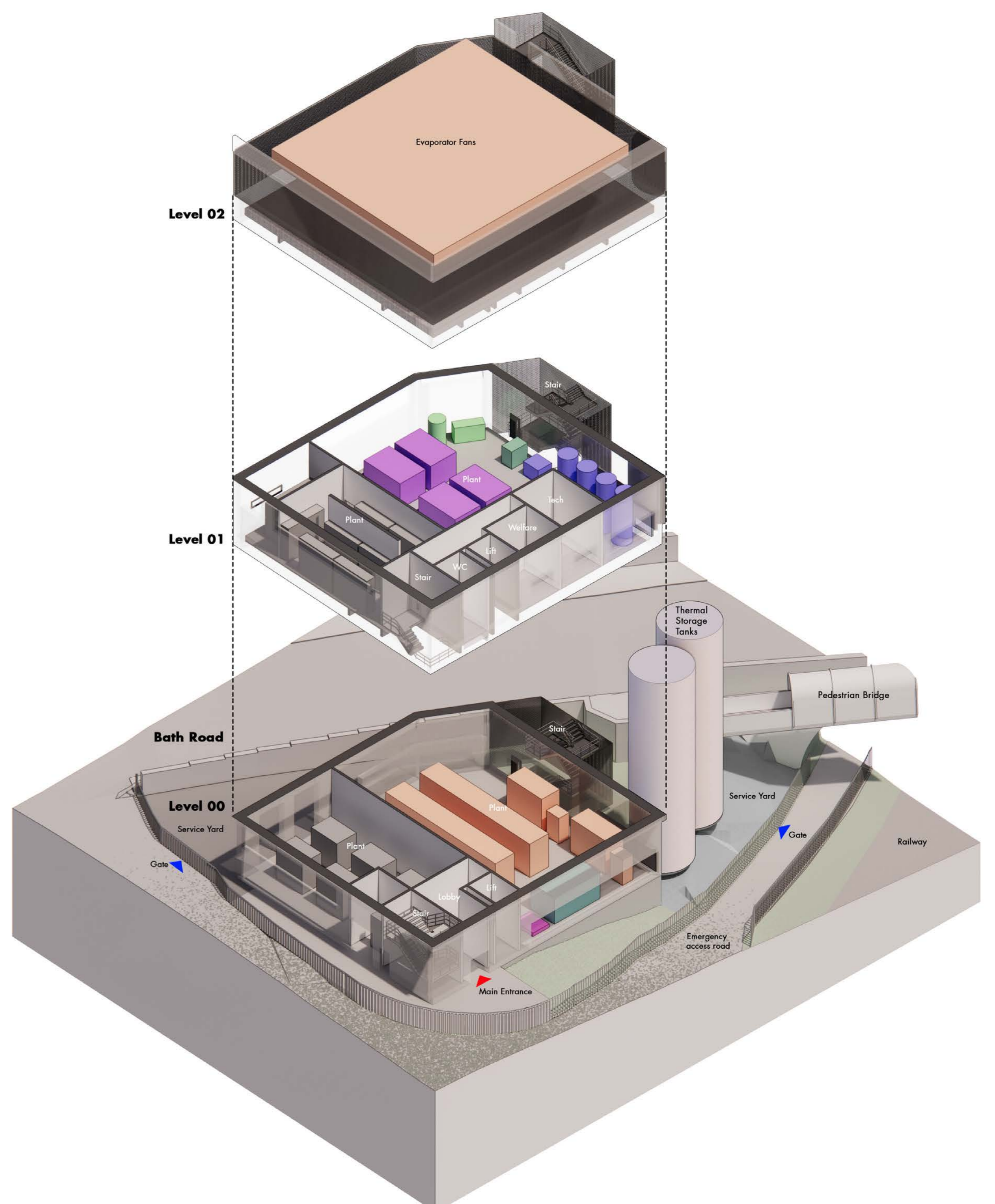
An FAQ on the proposed Bath Road Energy Centre can be also accessed via the QR code below.

If you have any further questions, please contact us at:

bristol.enquiries@vattenfall.com



Context view - looking south along Bath Road towards the Wells Road junction, showing angled and set back building frontage (Note: indicative massing only, not proposed facade detail)



Exploded axonometric view of the energy centre