

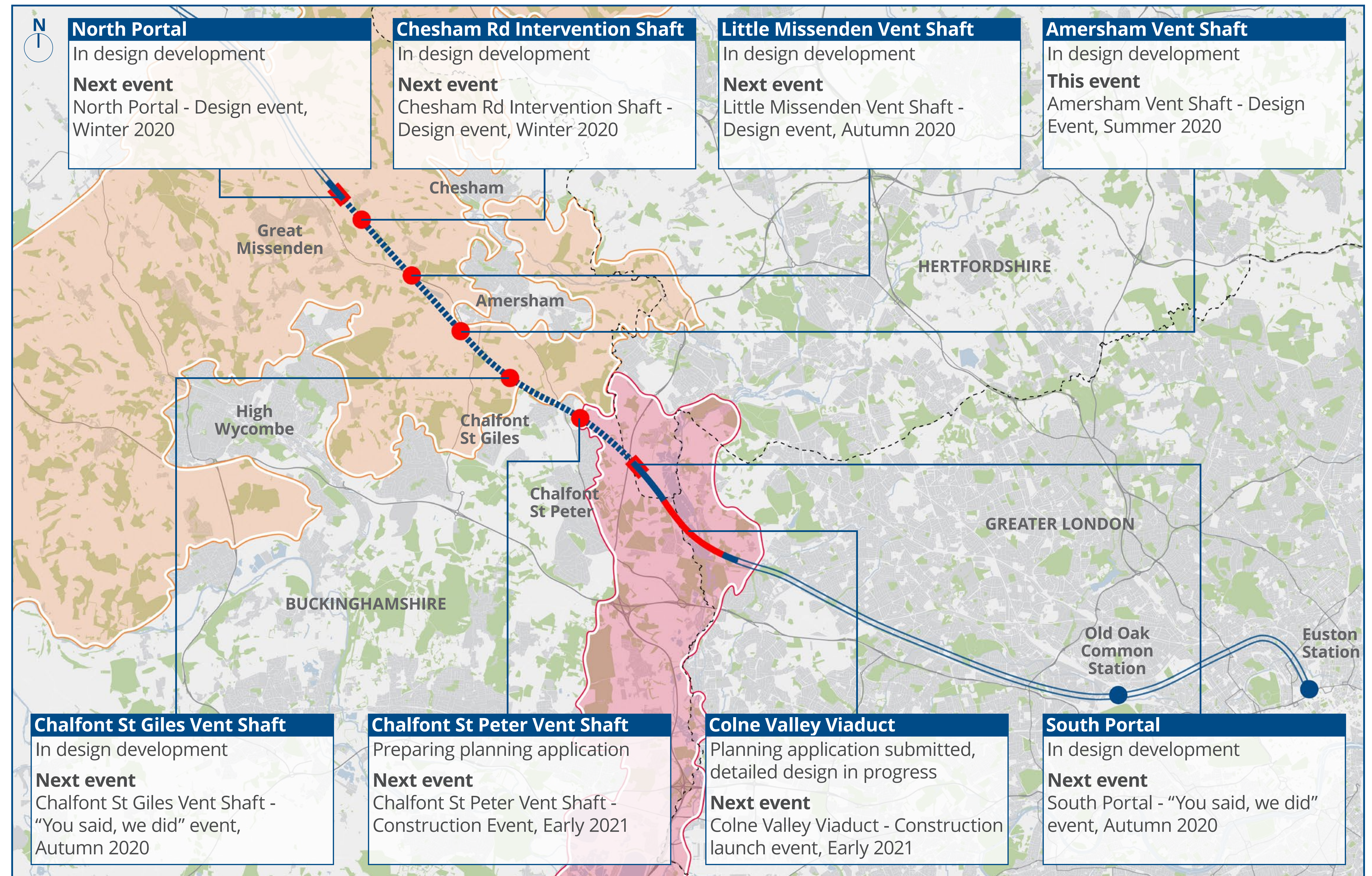
# The HS2 route in the Chilterns and the Colne Valley

High Speed Two (HS2) is the new high speed railway for Britain.

## What we are doing

Align are working on behalf of HS2 Ltd to build 22 kilometres of the high speed rail line, running between the Colne Valley and the Chilterns. It includes the 3.4 kilometre long Colne Valley Viaduct and the Chiltern tunnel with four ventilation (vent) shafts to regulate airflow, one intervention shaft and the shaft headhouses which house electrical equipment.

Our main works programme is now underway and we are holding regular information events to share details on the progress of the designs, seek views and respond to feedback. Due to COVID-19 we have postponed all public face-to-face engagement events and meetings, but we will continue to find new ways to involve the community.





# Introduction

Welcome to our information event for the Amersham vent shaft.

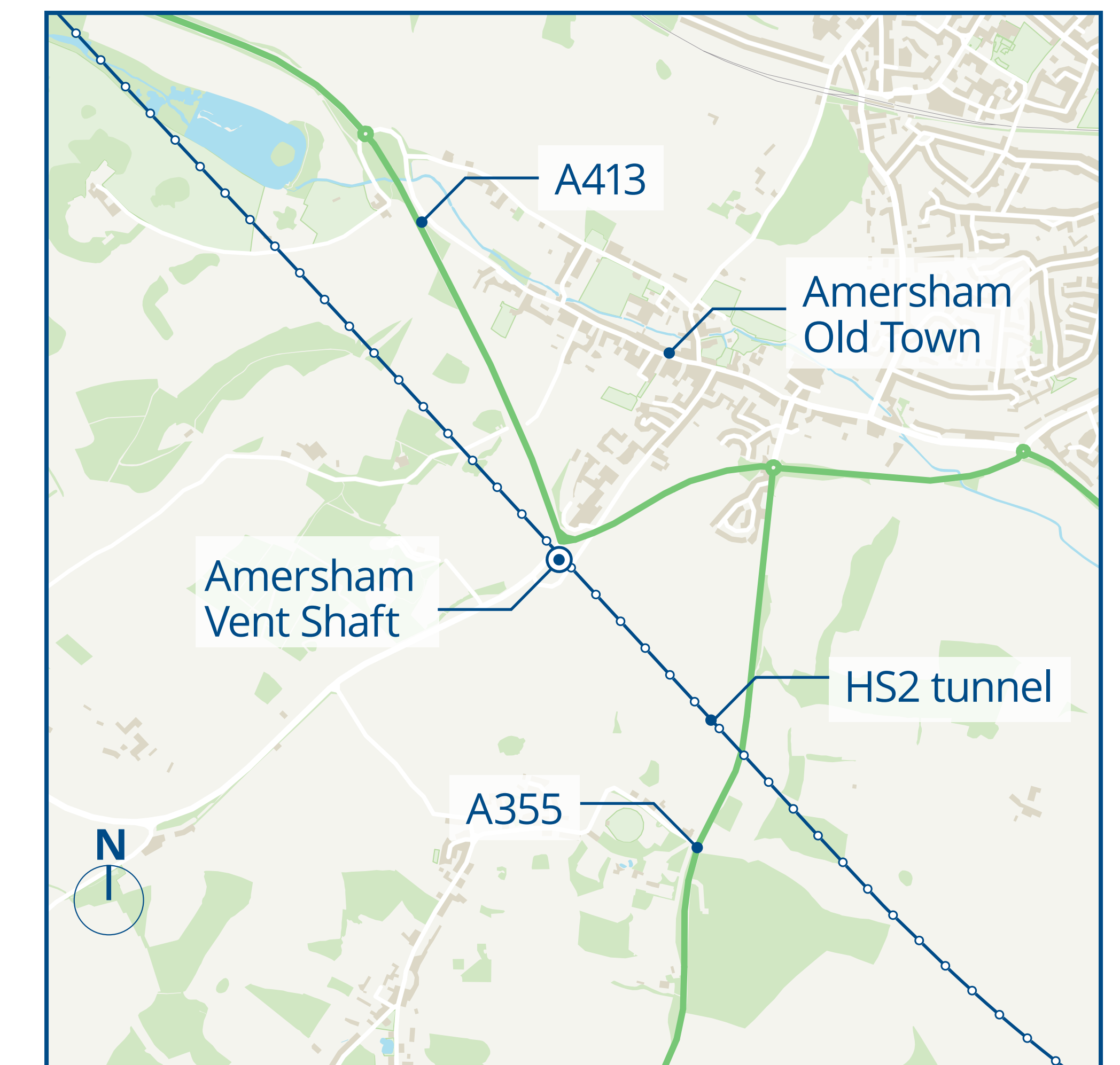
The information in this exhibition is presented to show you the design for the vent shaft headhouse and landscape, and to share our construction plans. We are also asking for your feedback to help shape our final plans. Your comments will be considered in the next stage of review, which will take place within the next couple of months.

We will keep you informed of any design changes at future events.

We would like your views and ideas on the following topics:

- Landscape design
- Ecology
- Design of the vent shaft and headhouse
- Construction

## HS2 route through the Chilterns



Amersham vent shaft will provide air ventilation and access for emergency services. It will be located on the parcel of land at the junction of the A404 Whielden Lane and the A413, south of Amersham Hospital.

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# Landscape and site context

## Surrounding context

We have studied the site and its natural environment to help shape our landscape restoration works. We want to reflect as much as we can the character of native trees and chalk grasslands in the Area of Outstanding Natural Beauty to positively integrate the new building into the landscape.

### Key

- 1 Retained woodland edges
- 2 Toothwort colony
- 3 Public right of way
- 4 Views from elevated ground
- 5 Amersham Hospital
- 6 Removed trees
- 7 Site area



View from elevated ground



Context plan



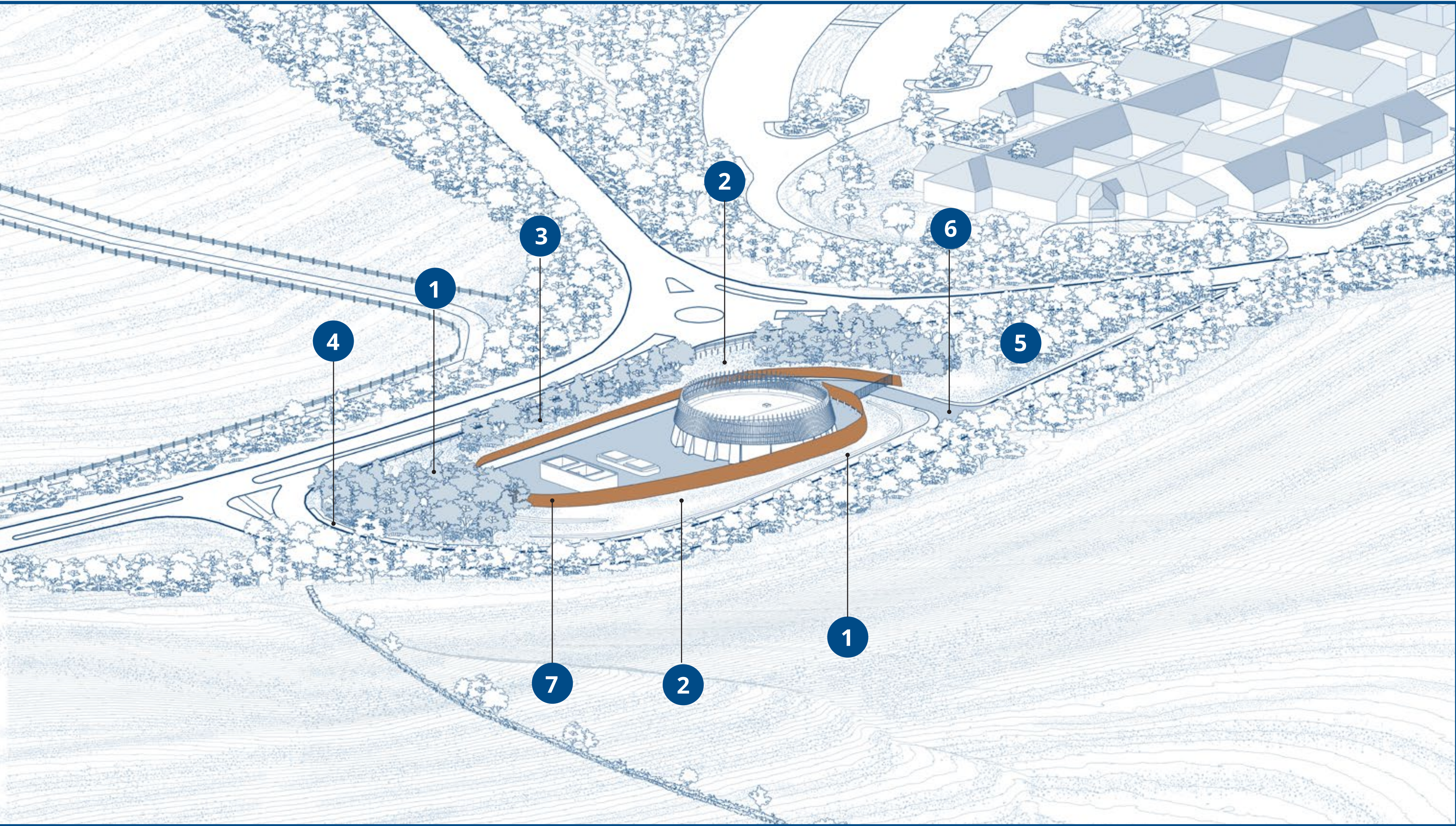
# Landscape design

## Proposed landscape

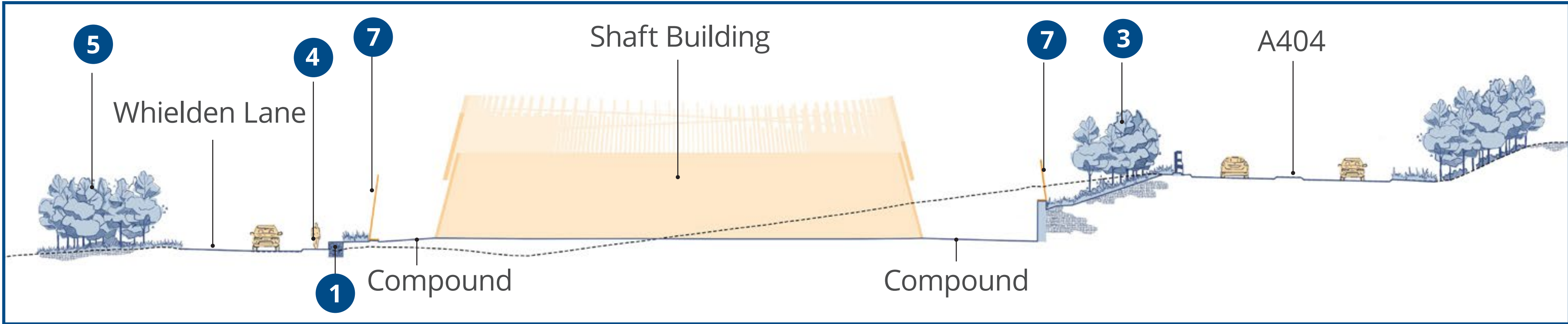
The landscape proposals complement the architecture, with existing and proposed planting framing views of the headhouse. Gabion walling will wrap around the compound and give the site a familiar and local connection.

### Key

- 1 Knapped flint gabion walling
- 2 Calcareous grassland
- 3 Proposed woodland planting
- 4 Realigned Public Right of Way (PRoW)
- 5 Retained habitat
- 6 Access road
- 7 Weathering steel compound wall



Site sketch



Site section A-A



Landscape masterplan



# Ecology

## Ecological design

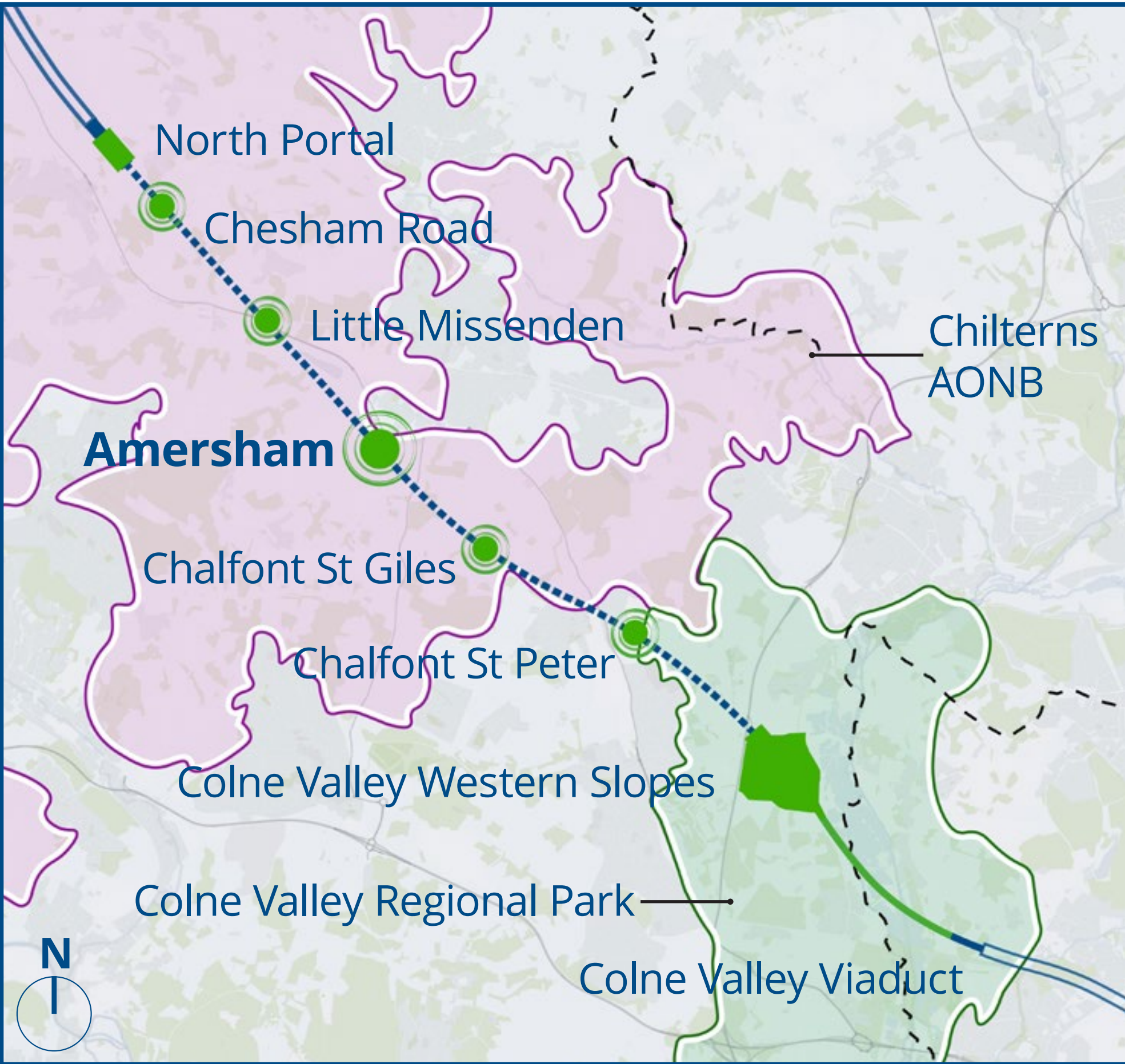
The ecological design is based on the site being one of five Chiltern tunnel shaft sites that would form ecological stepping stones through the Chiltern AONB. It will significantly improve biodiversity by integrating with the existing surrounding habitats and through the creation of species-rich calcareous grassland with areas of planting, basking banks and bat/bird boxes further increasing the value of the habitat for wildlife.

### Key

- 1 Species rich grassland
- 2 Tree planting
- 3 Basking banks
- 4 Bat/Bird boxes
- 5 Retained toothwort colony



Species rich calcareous grassland



Ecological stepping stones



Ecological bat box



Basking bank



Toothwort colony



Slow worm



Landscape masterplan

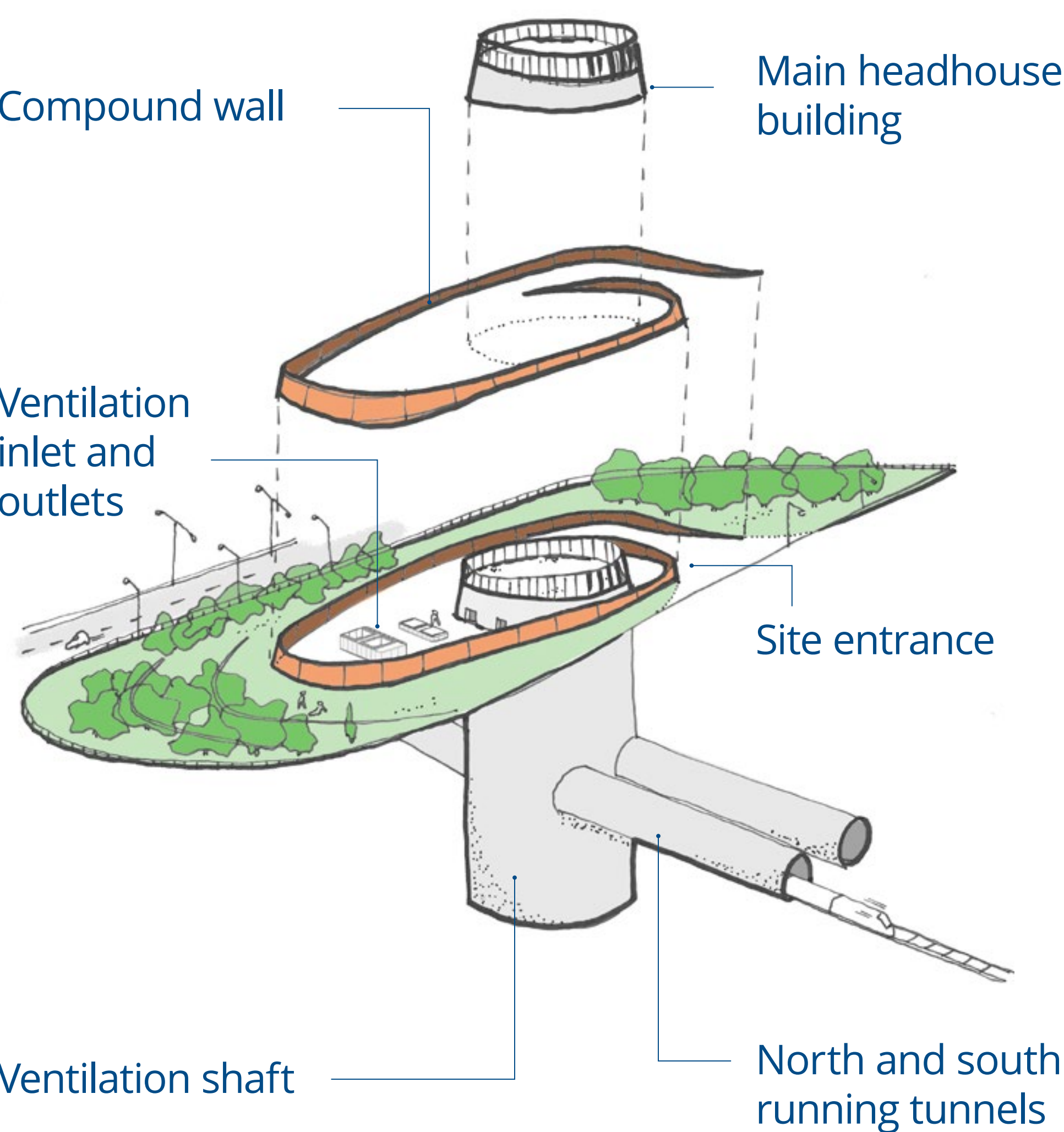


# Headhouse design

## Functional requirements

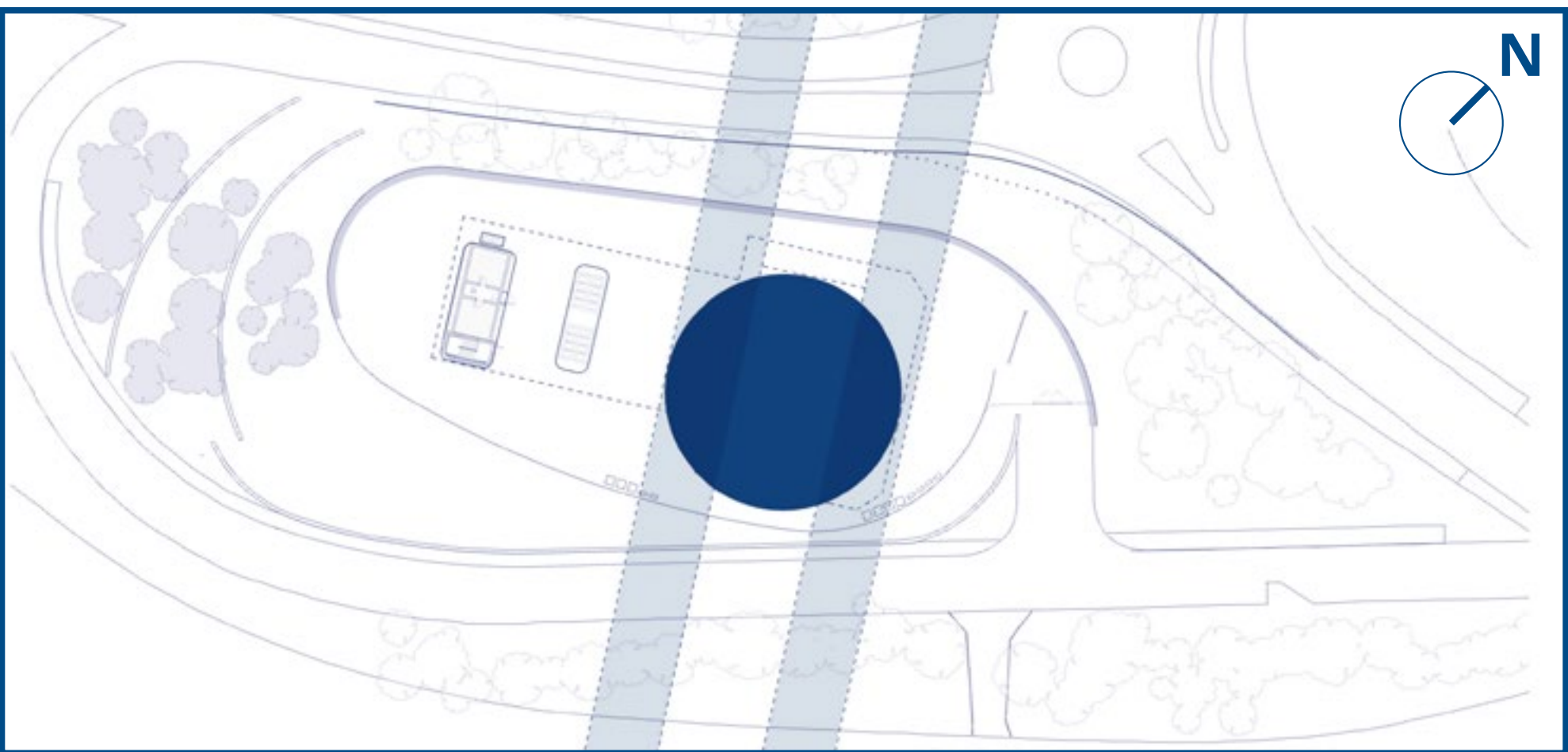
The function of the headhouse is to provide:

- Ventilation to control tunnel environment
- Mechanical and electrical equipment to support the operation of the railway
- Intervention access point for emergency services

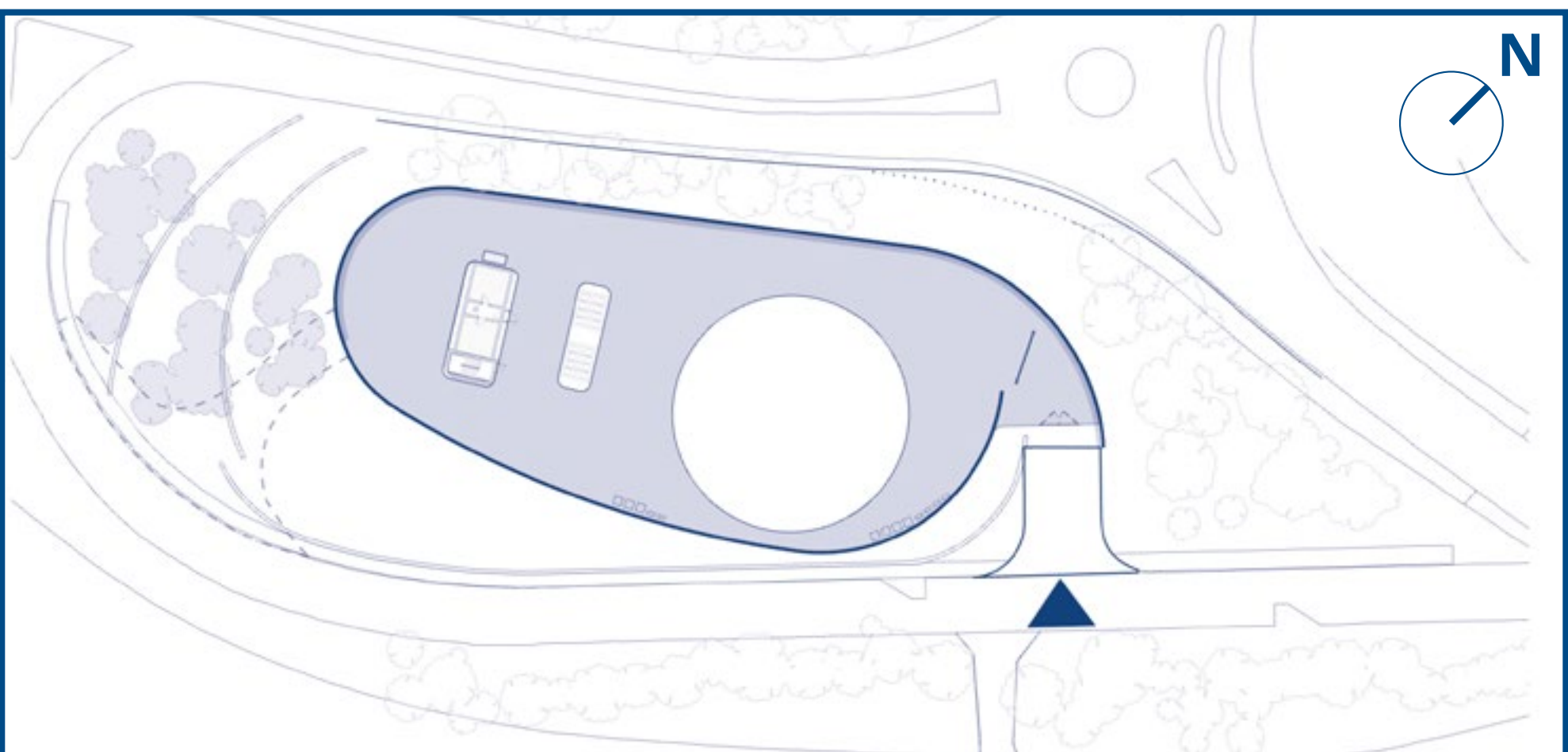


3D diagram - Amersham headhouse

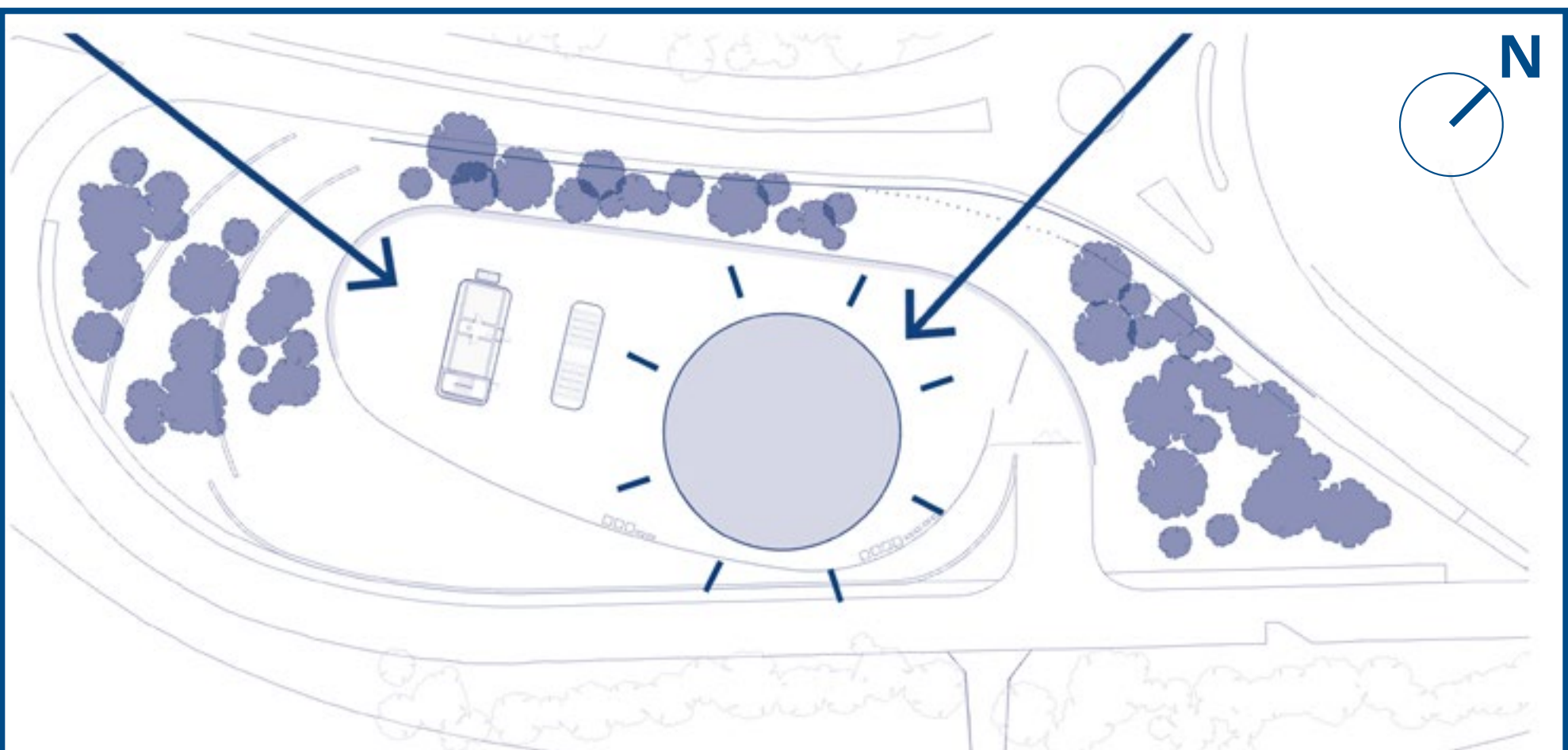
## Site response



Layout - The main headhouse building is positioned over the top of the ventilation shaft and tunnels



Access - A security screen wraps around the compound, following the shape and topography of the site



Framed views - Openings in proposed planting offer framed views of the headhouse building from road



Visualisation - Aerial view (Year 15)



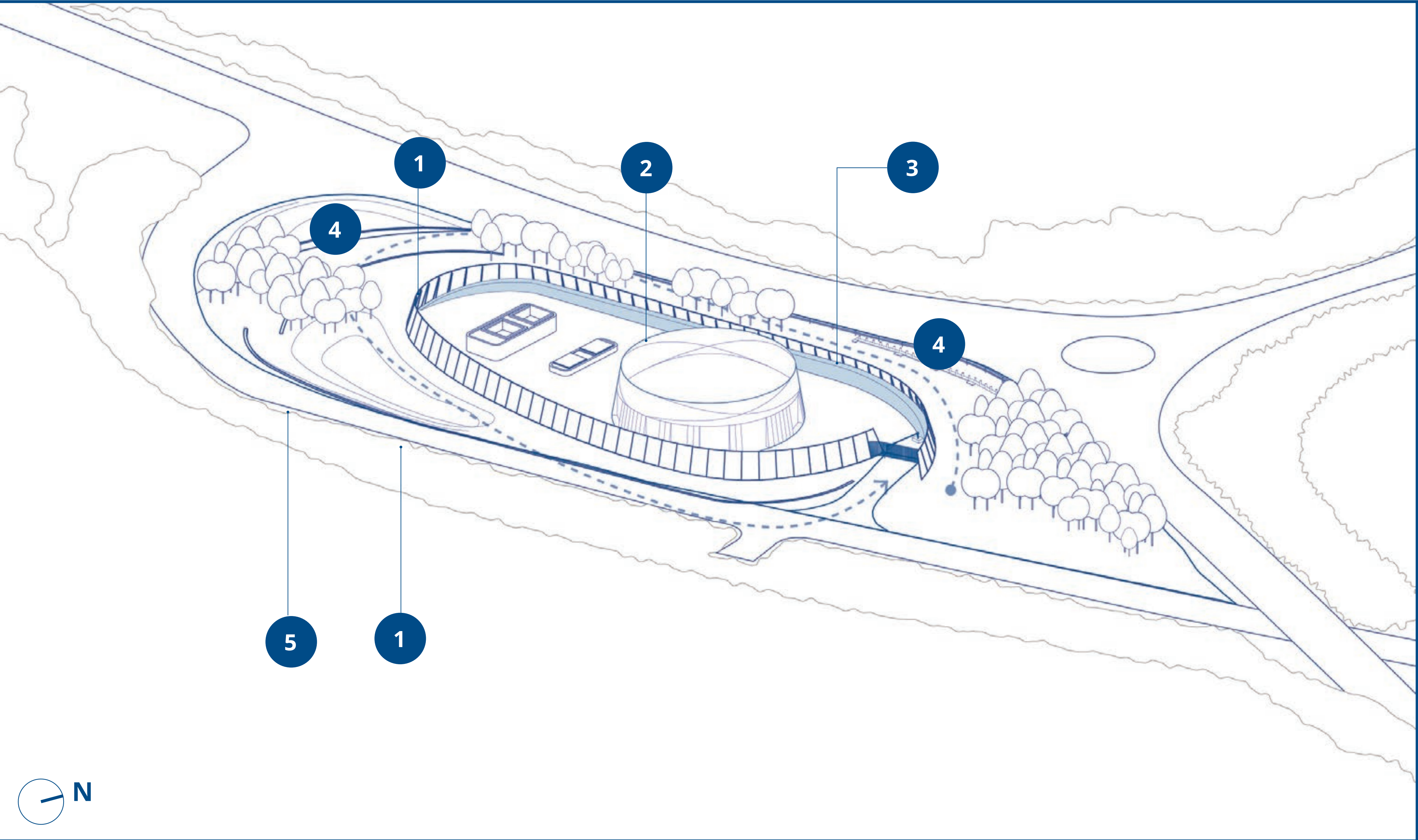
# Headhouse design

## Gabion walls

The gabion walls follow the shape of the site and height differences across its topography. They also function as vehicle protection barriers. We propose using flint to make reference to local geology and building materials, in particular the nearby Old Amersham Hospital and St Mary's Church.

### Key

- 1 Flint gabion landscape walls
- 2 Flint faced retaining wall
- 3 Steel highways barrier
- 4 Gaps in proposed planting framing views of the structure
- 5 Redirected footpath



3D diagram - Flint gabion walls

## Materials



Amersham Old Hospital with flint walls



Flint walls for landscape level changes



Closeup of flint in gabion cage



Visualisation - Flint gabion walls alongside footpath on Whielden Lane (Year 15)



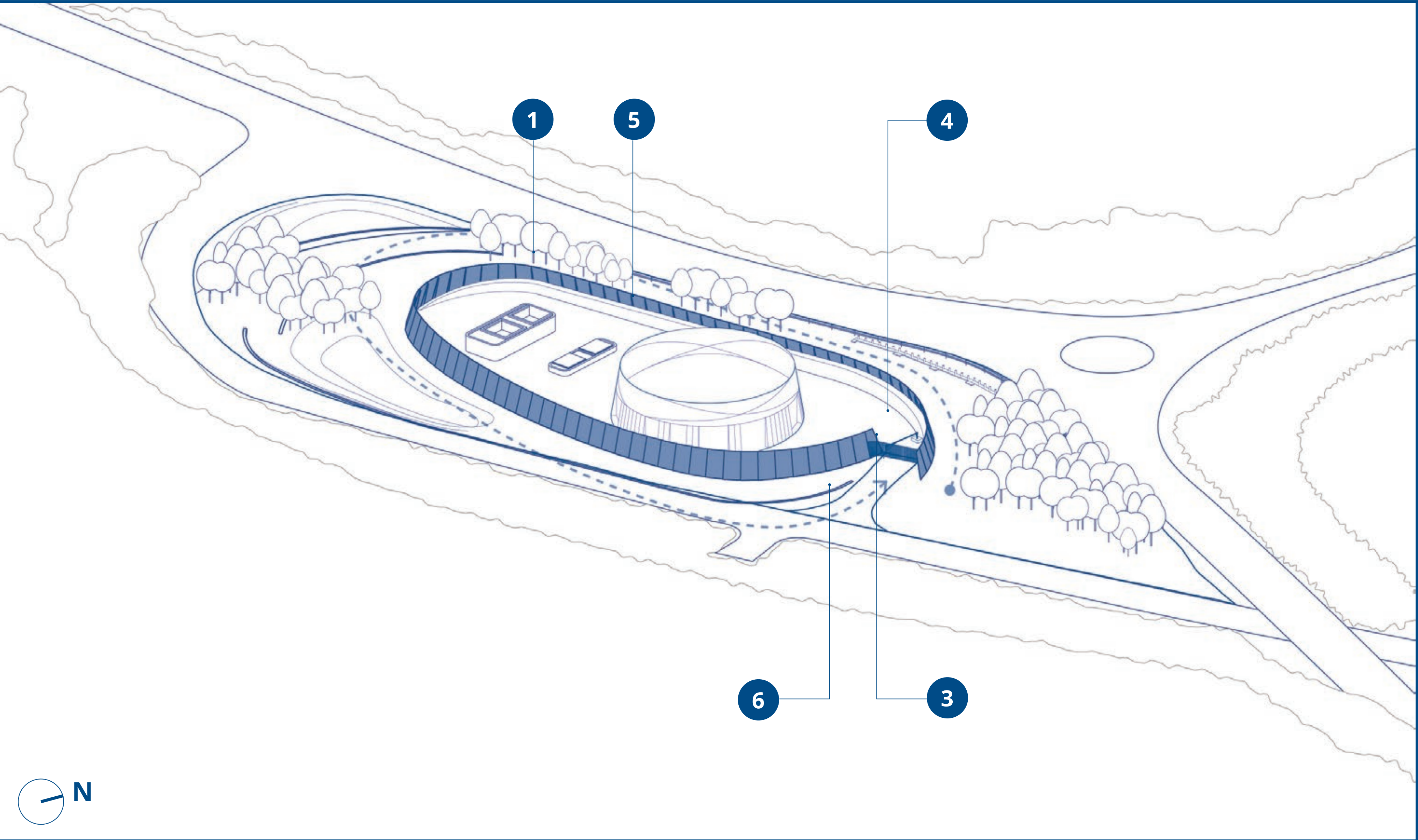
# Headhouse design

## Compound wall

The compound wall has been designed to complement the natural colours of the landscape and reflect the shape of the site. Weathering steel ages over time and will blend in with the landscape. Perforations will allow light through at a high level, while the pattern reflects the appearance of tree foliage.

### Key

- 1 Weathering steel compound wall
- 2 Perforated pattern
- 3 Compound security gate
- 4 Secondary vehicle gate
- 5 Flint faced retaining wall
- 6 Access Road

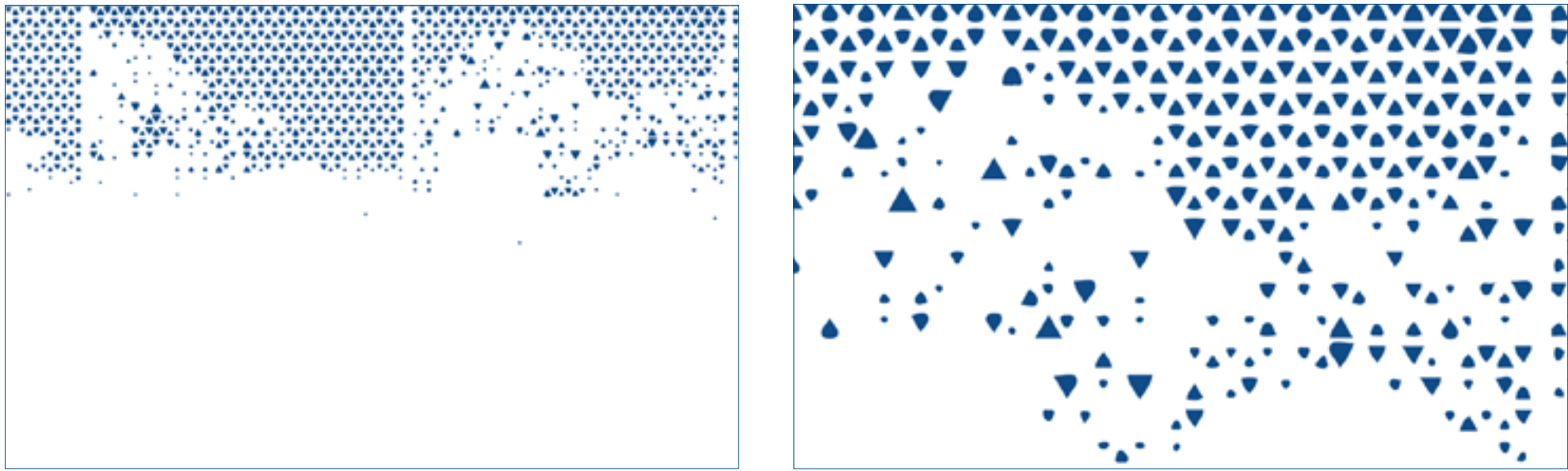


3D diagram - Compound screen wall

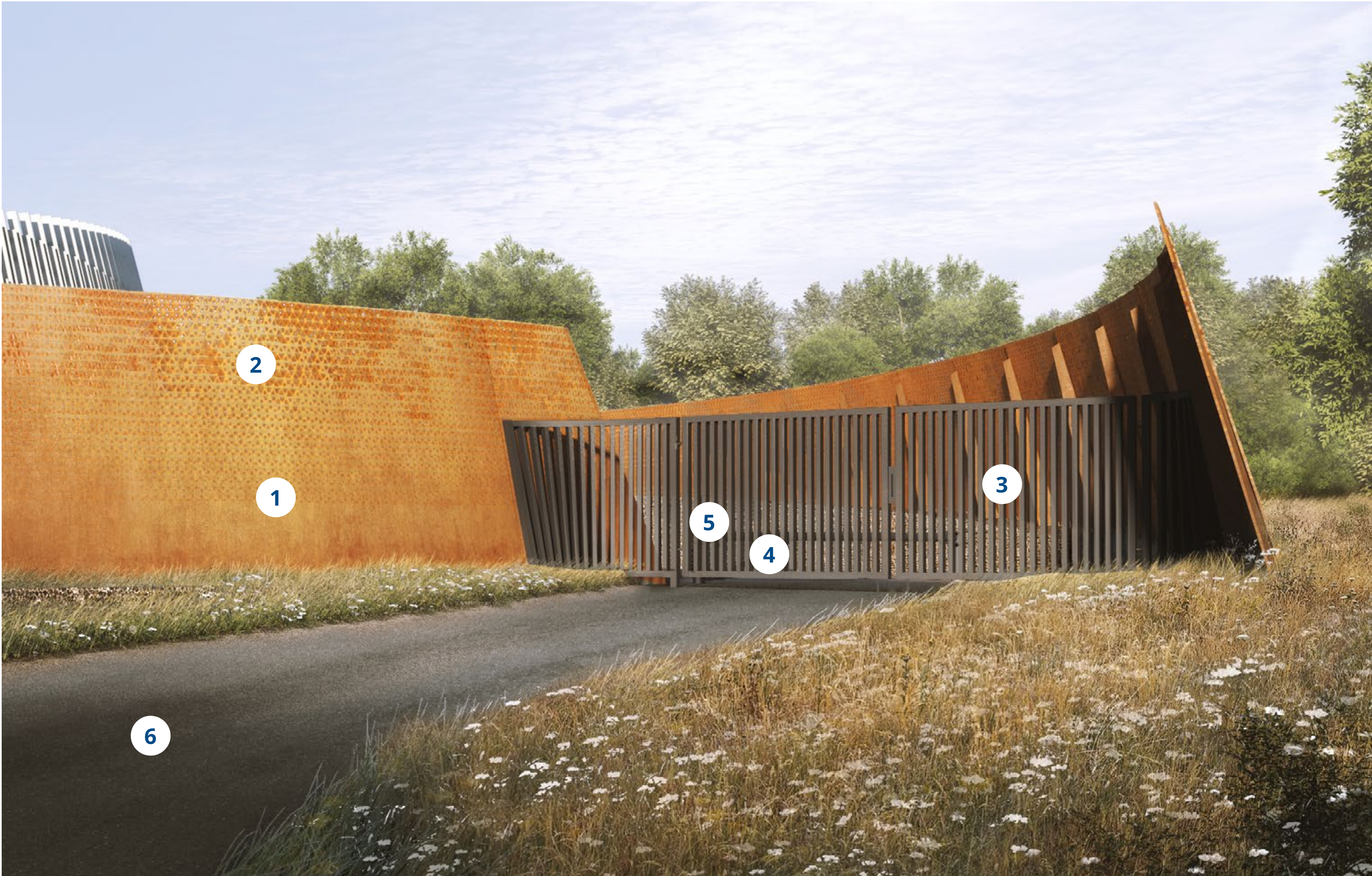
## Materials



Weathering steel - Aging sequence



Perforated patterns - Abstracted tree foliage



Visualisation - Entrance gate and compound wall from Whielden Lane (Year 15)



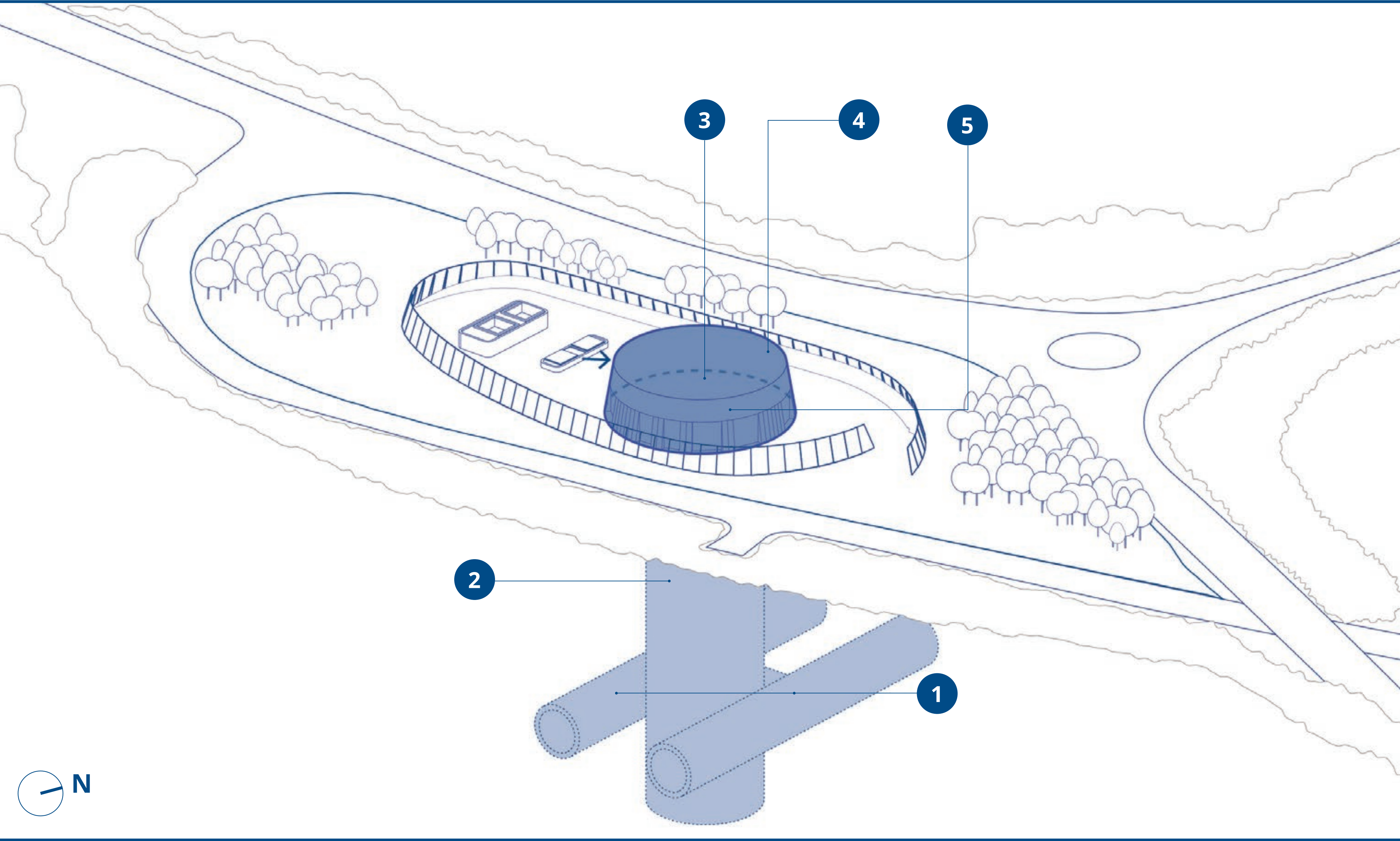
# Headhouse design

## Headhouse form

The circular plan of the headhouse is a direct reference to the shape and location of the shaft beneath. The tapering of the building into a conical shape helps to reduce the scale of the building when viewed against its context from outside.

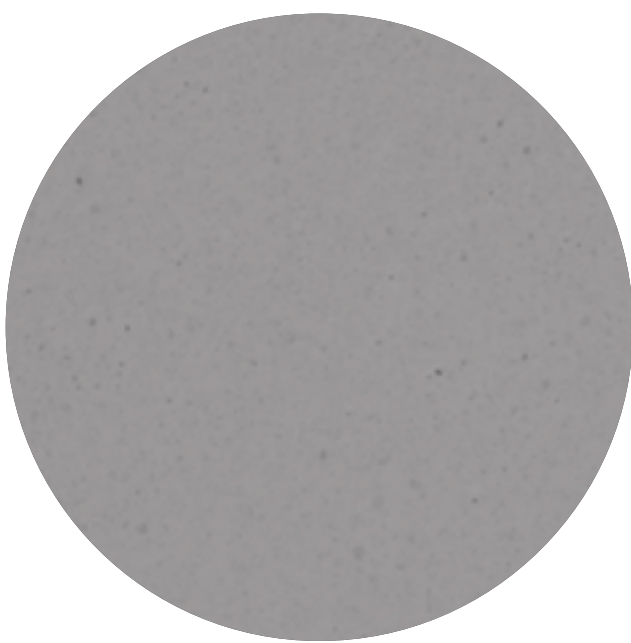
### Key

- 1 Tunnels below ground
- 2 Shaft below ground
- 3 Circular headhouse over top of shaft
- 4 Building tapered to conical shape
- 5 Segments of wall panels and door openings



3D diagram - Headhouse form

## Materials



Mid-grey concrete colour for buildings



Glass fibre reinforced concrete (GFRC) wall panels



Mid-grey horizontal louvred doors



Visualisation - View from the A413 approach looking south (Year 15)



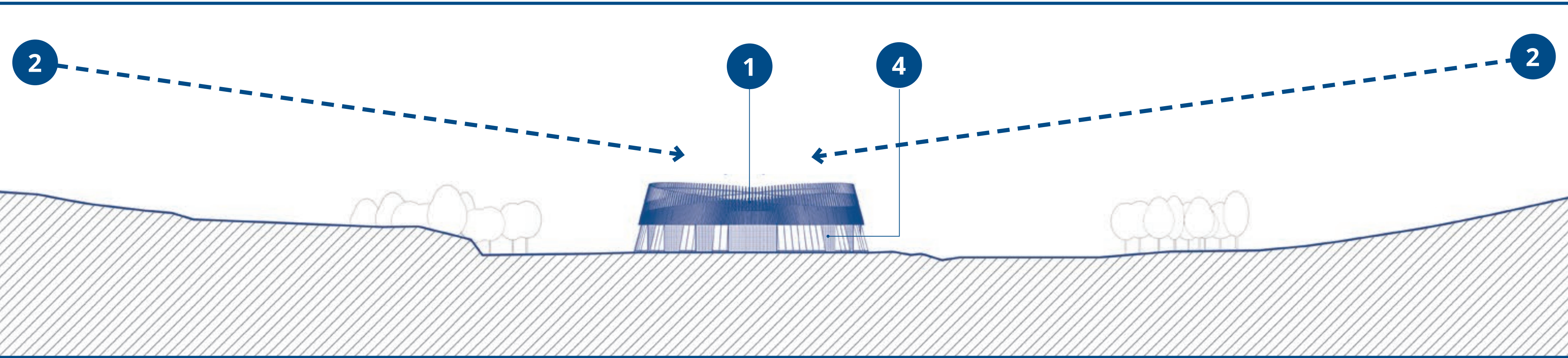
# Headhouse design

## Headhouse 'Crown'

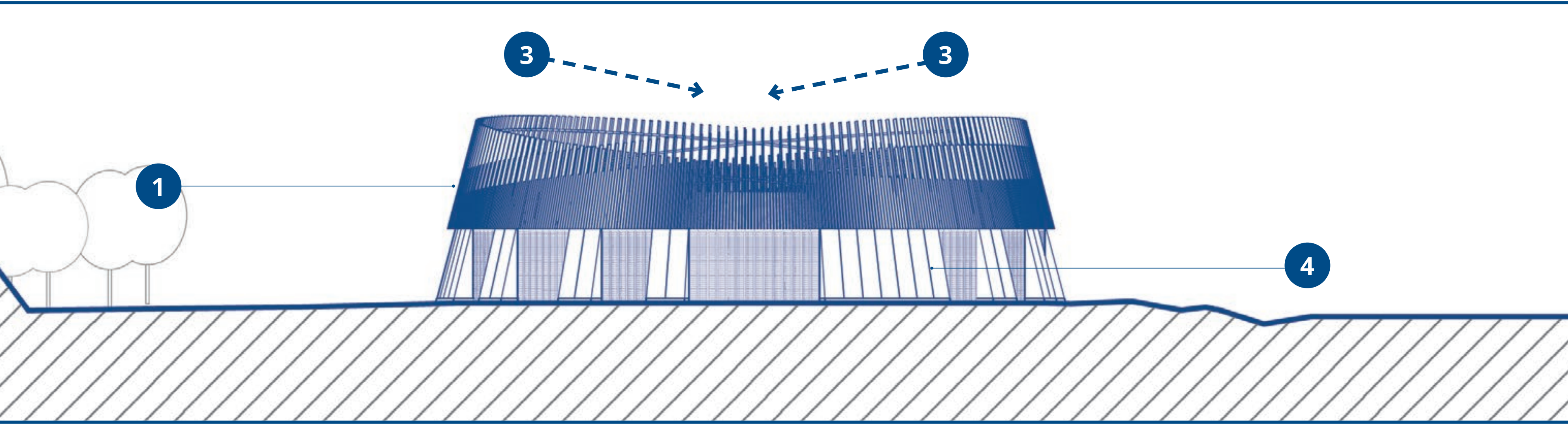
The top of the headhouse is formed by an array of vertical anodised aluminium fins, softening views and reflecting light when viewed from around the site. The lengths of the fins are cut to an incline to reference the shape of the valley. Discrete uplighting is being considered to provide subtle illumination of the fins at night.

### Key

- 1 Headhouse 'crown'
- 2 Shape of the valley
- 3 Incline to top of fins referencing the valley
- 4 Concrete and louvered 'base' of the building



Site section - Response to landscape topography



Section - Headhouse building

## Materials



Vertical anodised aluminium fins



Potential for uplighting 'crown' at night



Close-up of anodised aluminium



Visualisation - View from the A404, Whielden Lane approach looking north-east (Year 15)



# Headhouse design



Visualisation - View from the public right of way looking west (Year 15)



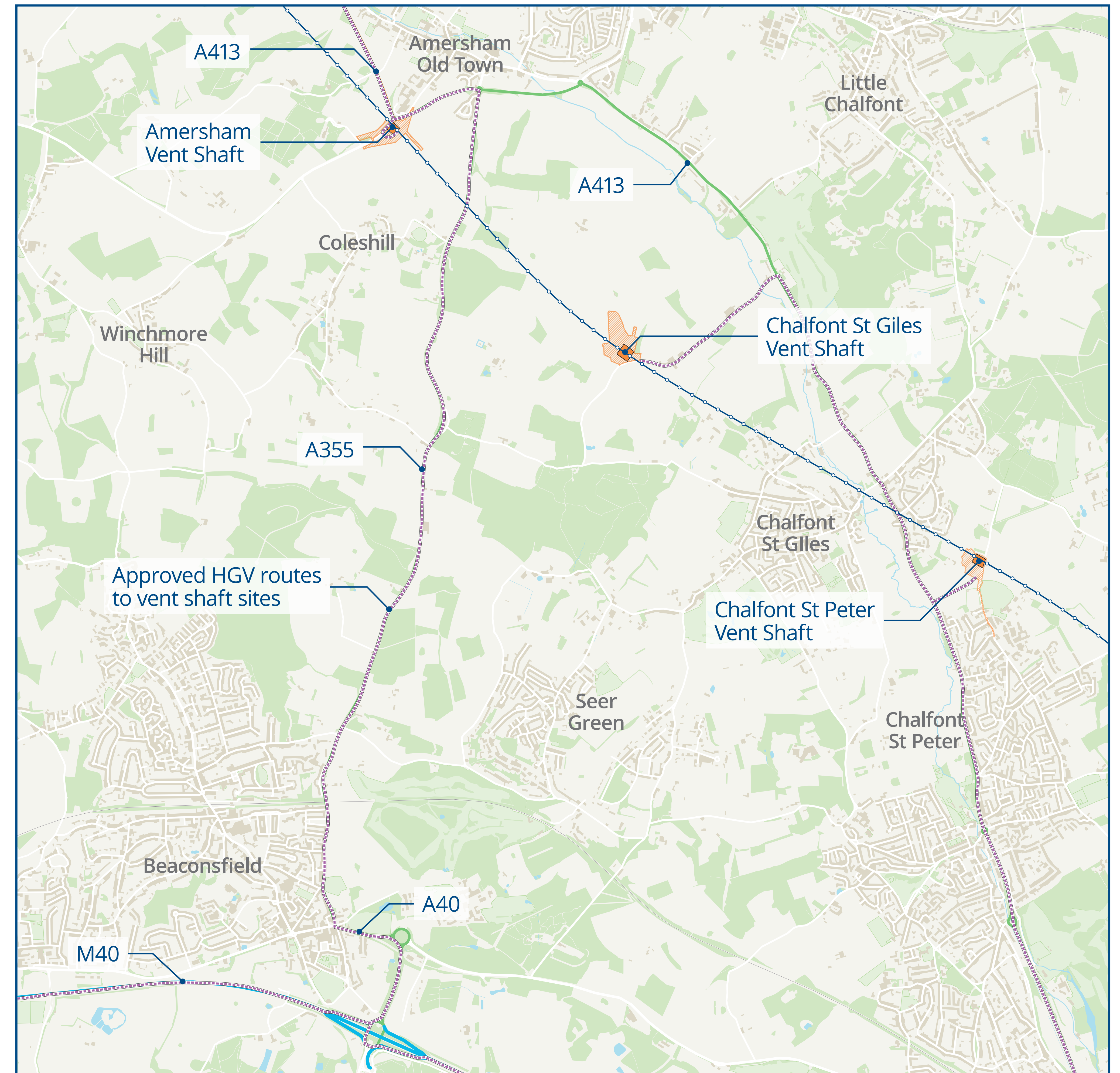
# Traffic management and planning

We recognise that there are concerns regarding Heavy Goods Vehicles using local roads in Amersham. Our routes to each site are carefully planned to reduce any impact on local communities.

During stages of high activity on site – such as shallow shaft excavation, grouting and piling works – there will be a corresponding increase in Heavy Goods Vehicle (HGV) movements. There will also be periods where the need for HGV movements will be lower.

We have been working with local stakeholders including Amersham Hospital and the Crematorium to review our traffic management strategies during construction. We are:

- Looking at ways to reduce the number of HGV movements.
- Reviewing stockpiling locations.
- Signalising the junction of the A404 with Whielden Lane to allow safer traffic movement.
- Creating a new shared path around the site on Whielden Lane.
- Scheduling all deliveries electronically to prevent congestion near the site.



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# Construction site map

We will build the vent shaft as quickly and safely as possible, and minimise our impact on the local community.

## Air quality

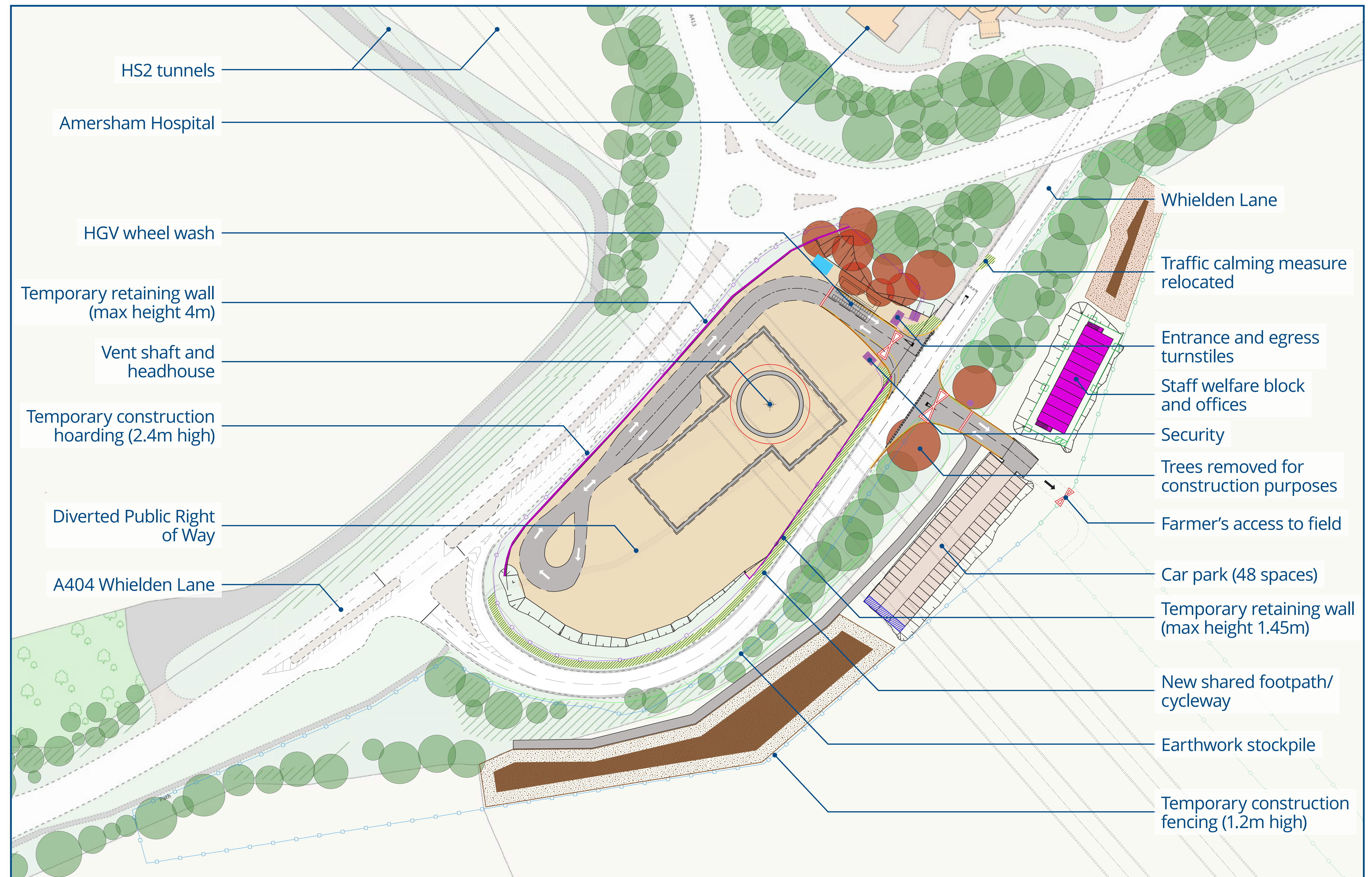
We will manage air quality by:

- Regularly inspecting and monitoring site and equipment
- Cleaning onsite roads and vehicles
- Managing earthworks to contain dust
- Monitoring air quality on site

## Noise

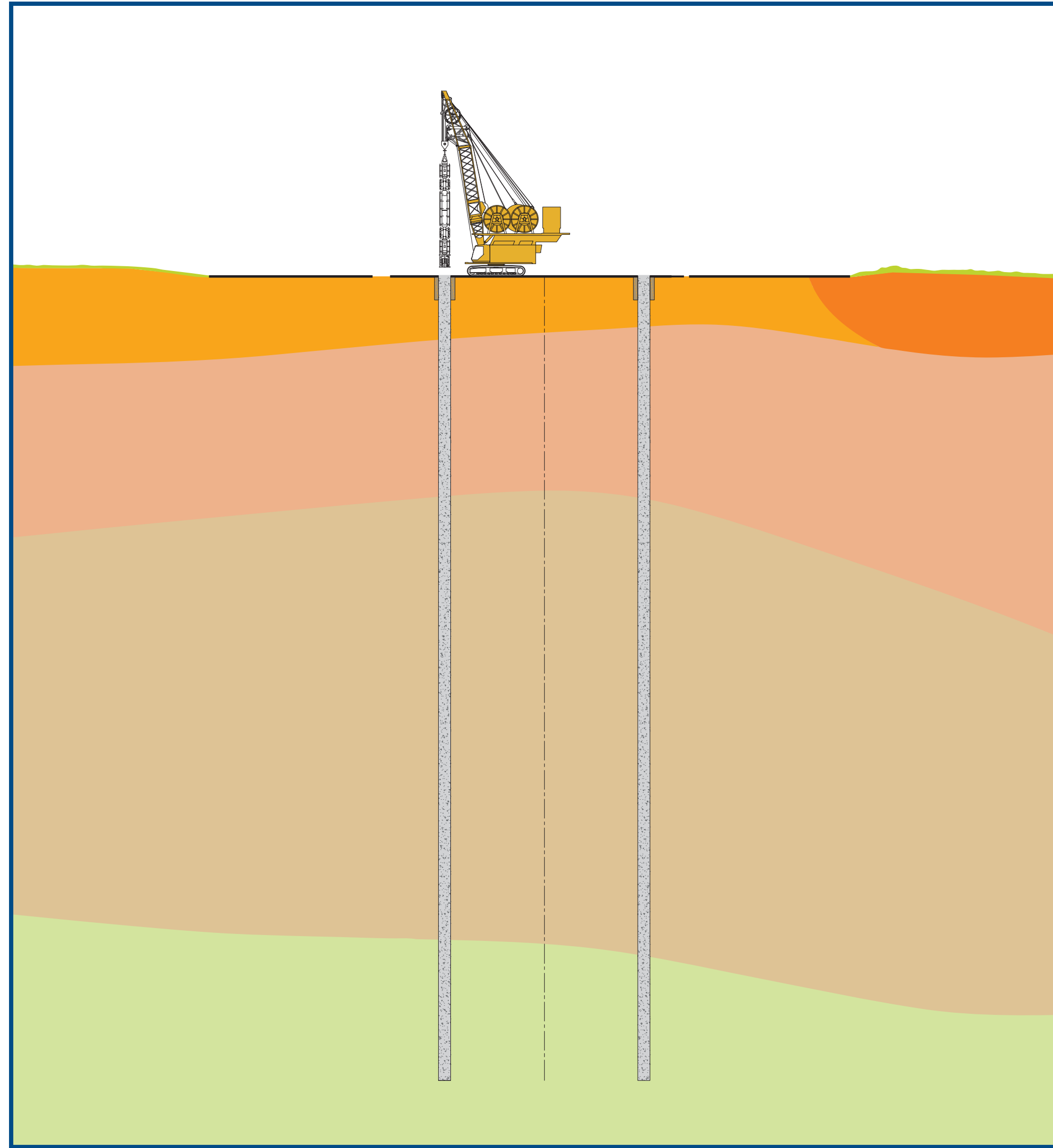
We will control noise and vibration by:

- Monitoring noise using automatic monitoring equipment
- Tackling noise at source and reviewing location of equipment
- Screening and enclosing noisy activities





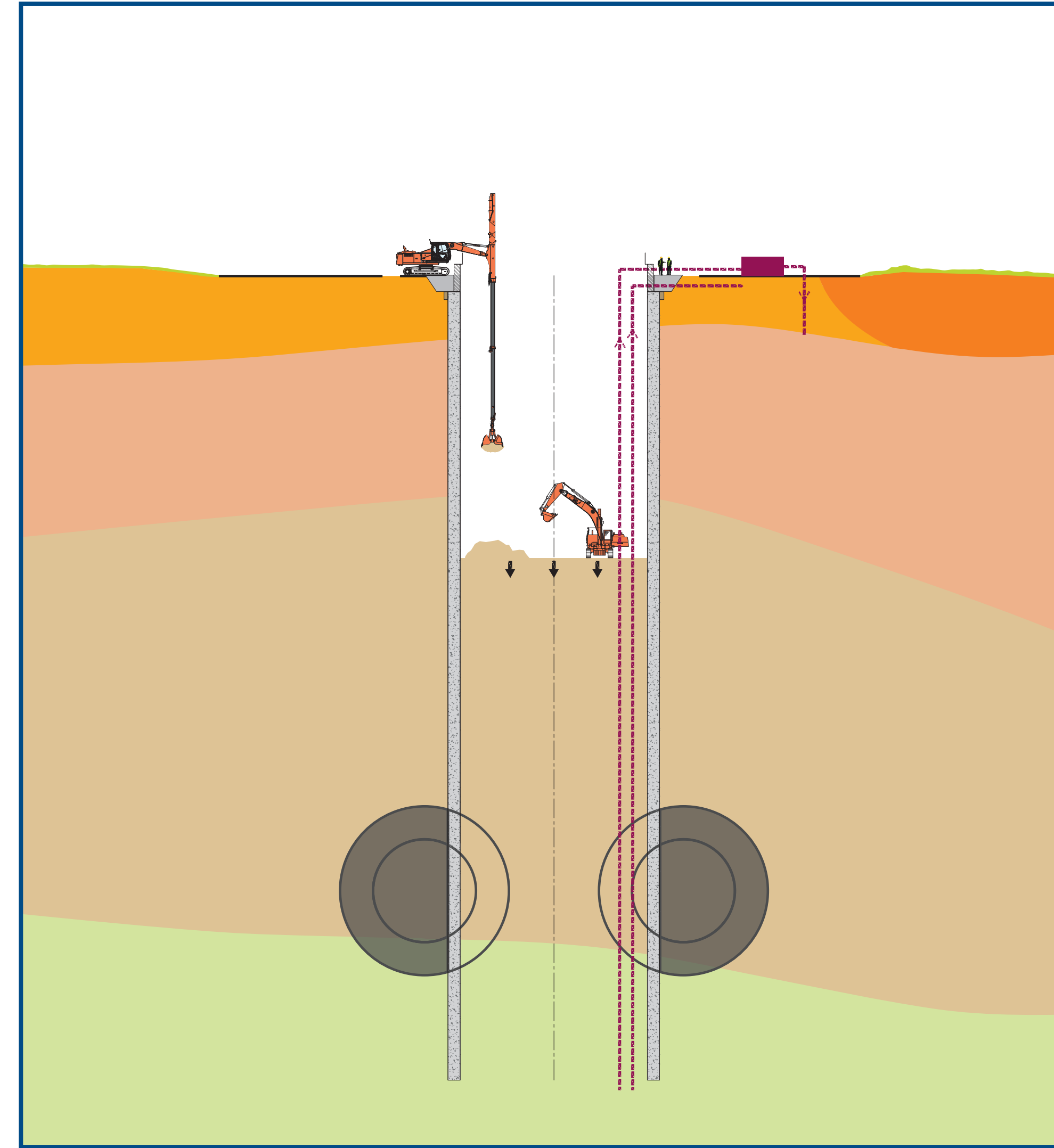
# Building a vent shaft



Outer wall construction

The outer walls of a vent shaft are created using Diaphragm walls (D-walls). These are built from the ground level (top-down). This protects the excavation work from lateral earth pressure and water pressure.

These walls will form the external structure of the finished vent shaft.

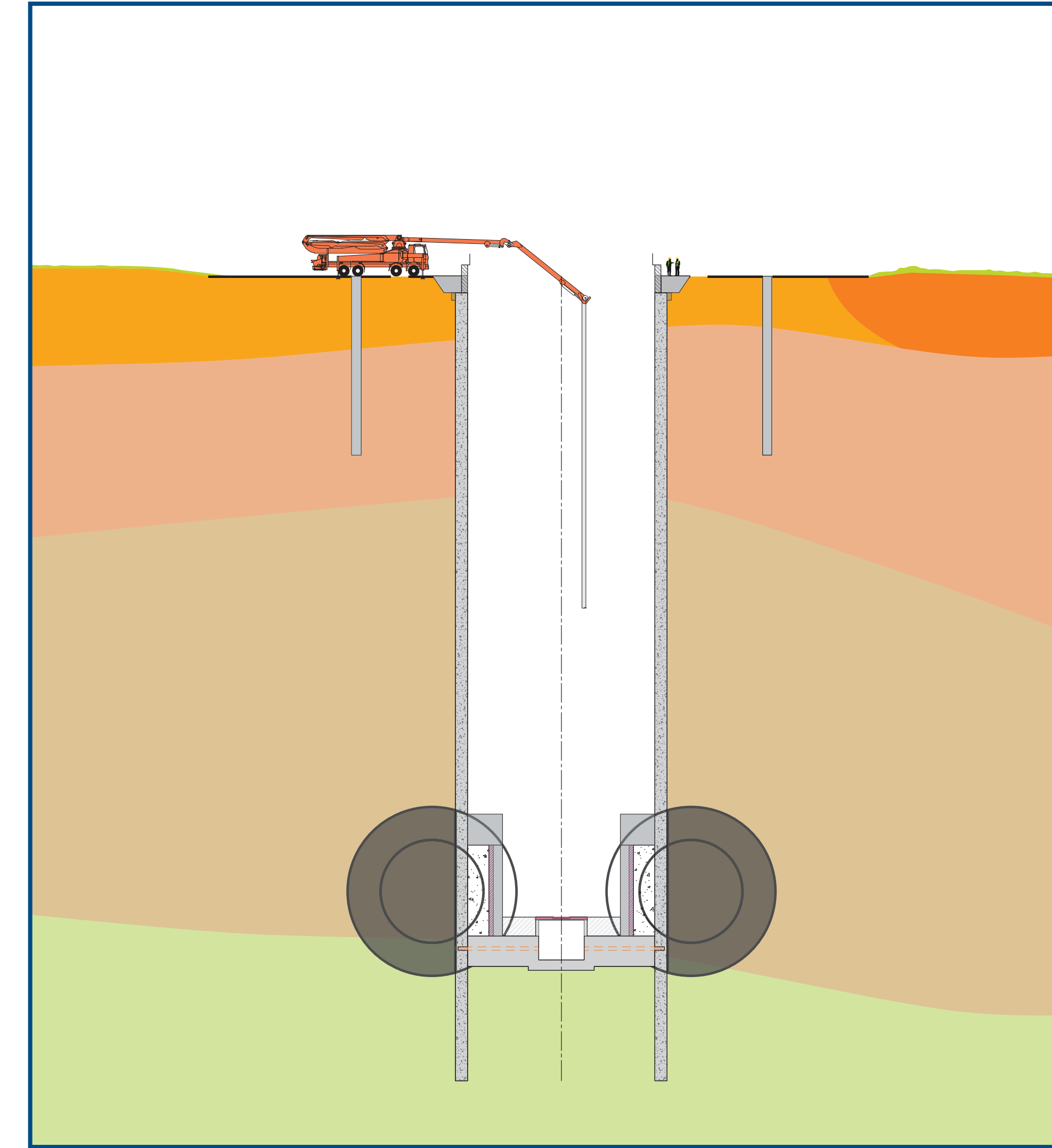


Shaft excavation

The ground around the tunnel entry points is prepared for the arrival of the Tunnel Boring Machines (TBMs).

Earth is removed from within the walls with excavators.

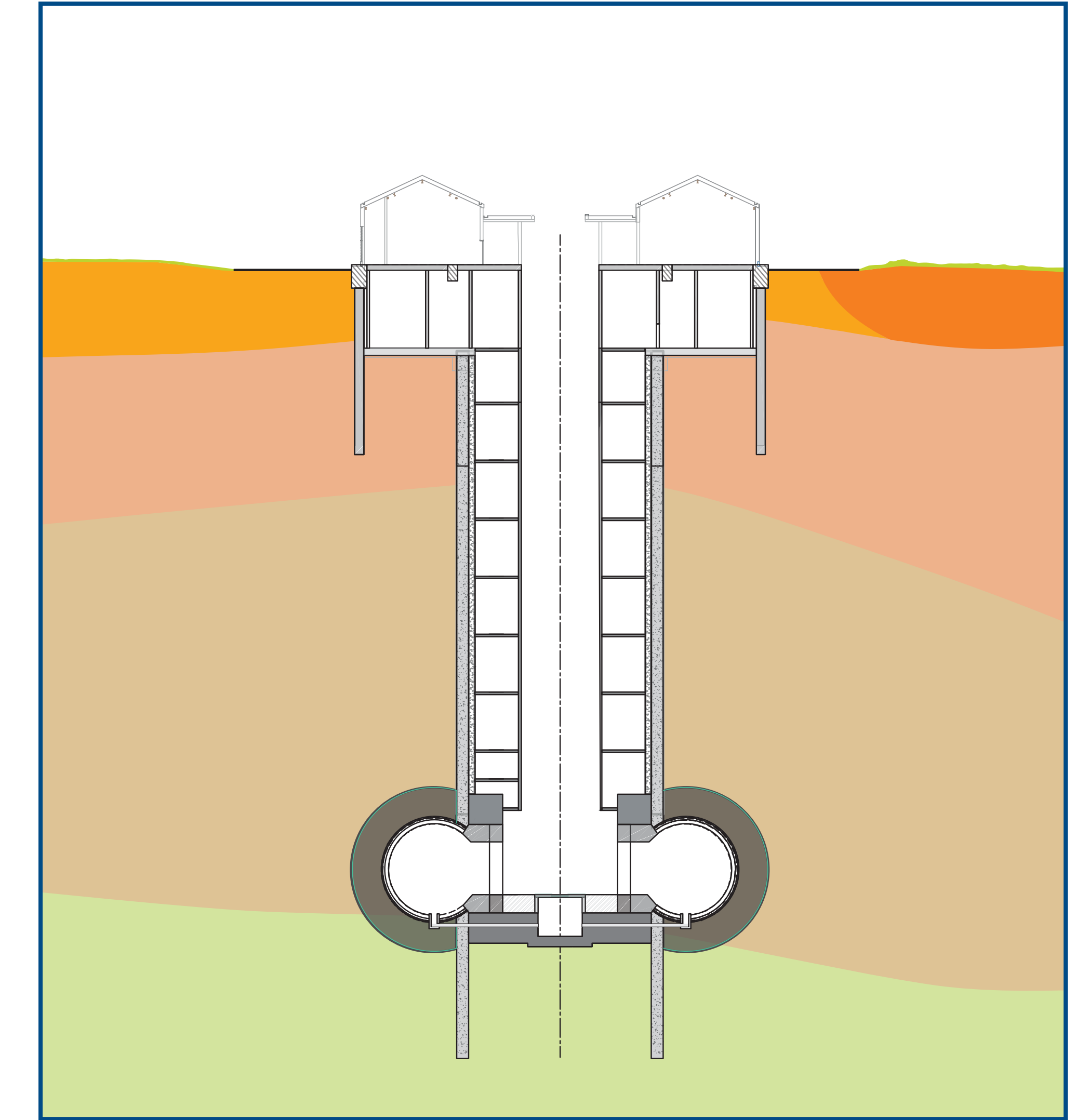
Groundwater in the shaft is pumped out to local recharge wells.



Secant pile, base slab, and collar construction

The outer walls of the headhouse are constructed using a technique called secant piling. When the earth from within the shaft walls has been excavated, concrete is poured into the shaft to create the base slab.

A structure called a collar is constructed to support the shaft when the TBMs arrive and pass through.



Tunnel connection, basement and headhouse construction

The floors, stairs and other internal structures are built.

When both TBMs have passed through the shaft, works to waterproof the tunnel and vent shaft connection can then be completed.

Excavation within the secant pile walls creates the basement of the headhouse where the machinery and controls are installed. The headhouse is built and landscaping of the site is completed.

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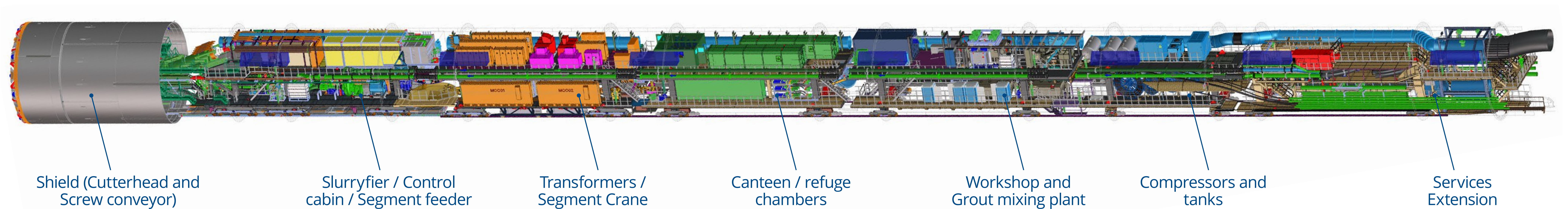
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# The Tunnel Boring Machine

The Tunnel Boring Machines (TBMs) designed to bore the Chiltern tunnel have been specifically designed to protect the ground water and chalk aquifers



## Boring the Chiltern tunnel

The first TBM is due to be launched from the South Portal, close to the M25 in early 2021, with the second machine, due to be launched a month later. These machines will dig the 10 mile long Chiltern tunnel at an average rate of 15.6 metres every day.

The TBMs weigh 2200 tonnes each, and will be 170 metres long.



Picture: The Tunnel Boring Machines are named Florence and Cecilia, as suggested by students at Meadow High School in Hillingdon and The Chalfonts Community College, Buckinghamshire

The TBMs maintain precise control of pressures at the cutting face as they bore through the ground. This helps to prevent slurry loss into the chalk and reduce ground water entering the excavation chamber during tunnel construction.

The spoil and slurry created whilst tunnelling will be transported back through the tunnel to the South Portal to be removed and treated.

## Segment assembly

Behind the TBM cutterhead and shield a machine called an erector installs precast concrete segments which form a ring.

This forms the final tunnel lining. Each of these rings is 2 metres long.

The TBM names honour women of science, astronomer Cecilia Payne-Gaposchkin and the founder of modern nursing Florence Nightingale.



# Tunnelling under Amersham

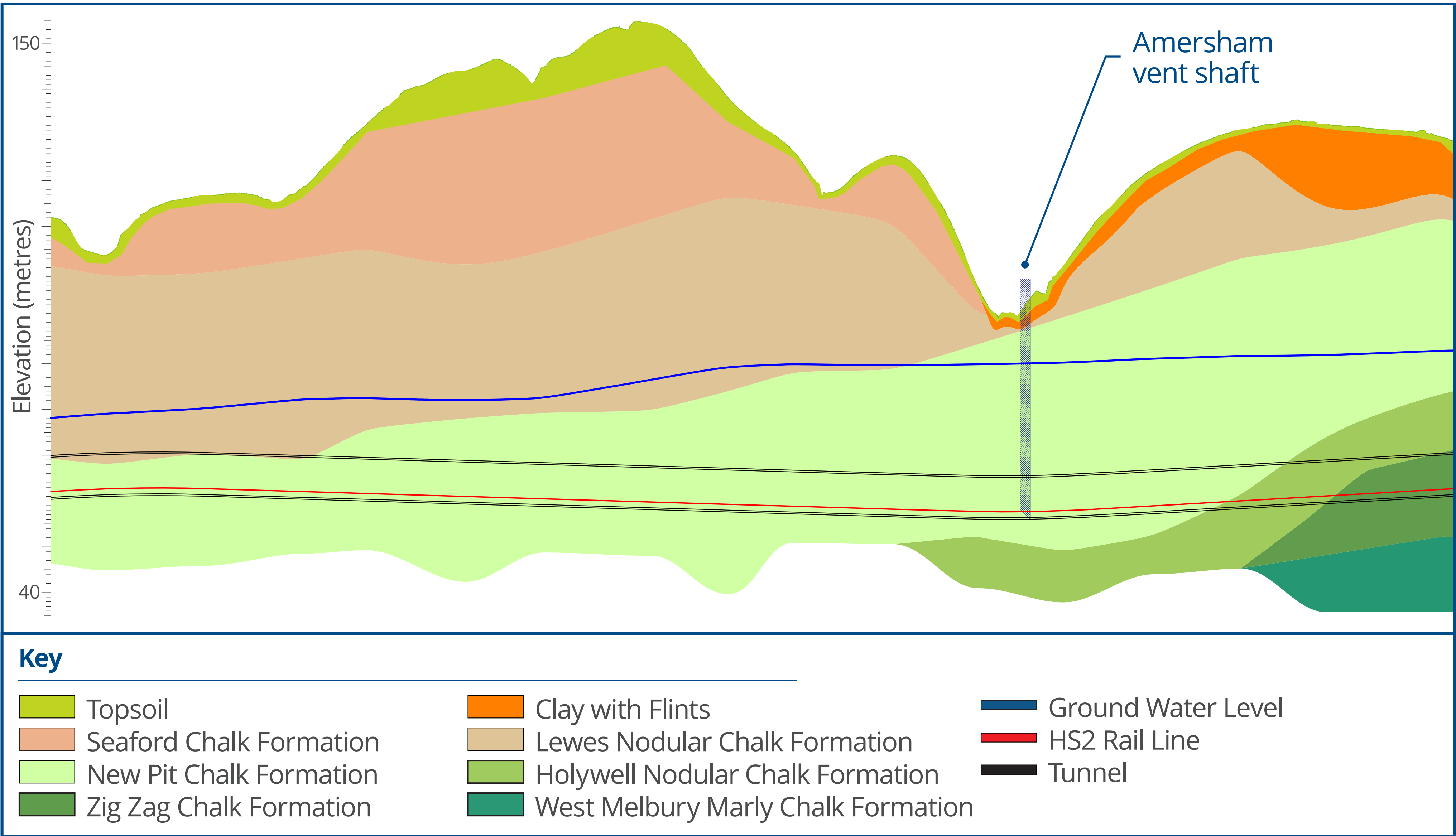
The Chiltern Tunnel will run from the South Portal at West Hyde, to the North Portal near Great Missenden

The two bored tunnels (north and south) will be bored under a series of natural valleys in the Chilterns Area of Outstanding Natural Beauty.

The majority of the tunnel will pass through chalk formations, punctuated by a series of faults.

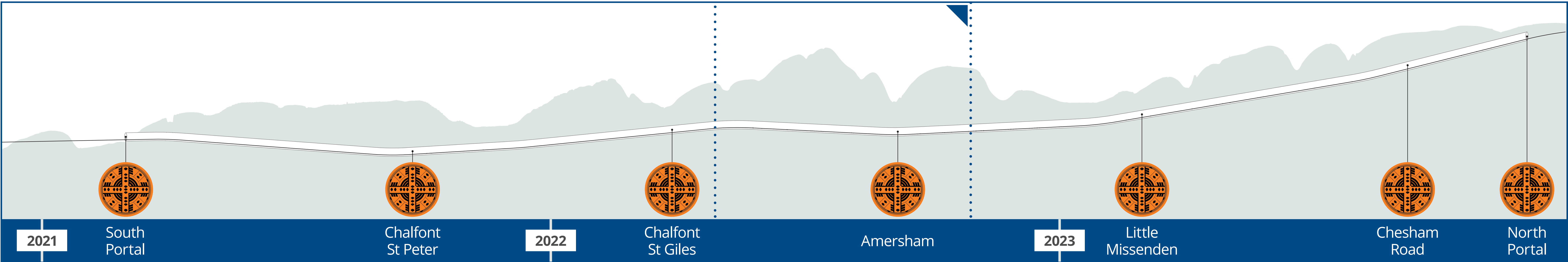
Our extensive ground investigations have shown approximately 50 faults along the tunnel route, which is more than was first anticipated.

Our TBMs have been specially designed to manage the increased water volumes that can occur at these fault lines, preventing water ingress and protecting local ground water conditions.



Indicative geological map

## Indicative timetable for tunnelling





# Our objectives

We think that the following objectives are important. Do you agree?  
Please let us know which of these issues is the most important to you, and any other comments that you have about our plans.

## Landscape

- Respond to the character of the site and its surrounding landscape
- Find ways of reusing soil and materials excavated from the vent shaft
- Use existing trees and new planting to conceal structures as far as possible
- Replace lost trees where possible which must be removed during construction
- Consider ways to enhance public experience in places where people get close to the site (for example, Whielden Lane)
- Consider the long term management and appearance of the site

## Ecology

- Keep as many existing trees and hedgerows as possible
- Restore the area using planting of native and indigenous species
- Create habitats that support as many species as possible (biodiverse)
- Create habitats that are typical of the area but rare and declining – for example chalk grassland
- Create habitats which are integrated with the surrounding area
- Protect existing wildlife on the site during construction

## Design of the vent shaft headhouse

- Design a unique structure at the gateway to the town
- Control visual impact by setting building into the landscape
- Maintain a familiar scale and form to local buildings
- Keep the overall footprint (area) of the compound as small as possible
- Choose materials and detailing inspired by the local landscape
- Reduce the operational impact of the proposed structure

## Construction

- Reduce noise and vibration on construction site
- Let people know when noisy works are occurring and keep residents updated with progress
- Return the wider construction site to how it was before construction started
- Minimise any visible impact of construction
- Reduce HGV movements on local roads
- Minimise carbon footprint, and reduce noise and air pollution across construction fleet



# Seeking your views

Which of our objectives are most important to you?  
What do you think of the design of the headhouse?  
What are your views on the landscape design?

## How to have your say

Please provide us with your feedback by Sunday 27th September 2020. It is important that we receive your comments by this date so that we can consider your feedback in the next stage of review for the vent shaft and headhouse design.

You can provide feedback in the ways listed below:

## Online survey

Visit [www.hs2inbucksandbox.co.uk](http://www.hs2inbucksandbox.co.uk) for a link to the survey

## Email

[hs2enquiries@hs2.org.uk](mailto:hs2enquiries@hs2.org.uk)

## Telephone

Call the HS2 Helpdesk on 08081 434 434.

## Information events

As part of our commitment to keeping you informed, we are holding exhibitions and events for local residents at each vent shaft.

Due to the Covid-19 pandemic we are not currently able to hold face-to-face public events, but we are holding several online meetings in September to share information about the design and construction of Amersham Vent Shaft. For more information and to find out how to join these meetings, please visit: [www.hs2inbucksandbox.org.uk](http://www.hs2inbucksandbox.org.uk)

## Next steps

We will consider the responses we receive and whether aspects of them can be incorporated into the final design.

1

## CONSIDER RESPONSES

We will consider the responses we receive and whether aspects of them can be incorporated into the final proposed design

2

## FEEDBACK REPORT

We will summarise the comments we received and confirm how they can inform the final design

3

## "YOU SAID, WE DID"

We will continue engagement with detailed information on the feedback that we received, and any changes made to the final design

4

## SUBMIT SCHEDULE 17

We will submit our request for approval of the Schedule 17 application, seeking approval for the final design

5

## CONSTRUCTION ENGAGEMENT

We will continue engagement with the local community to describe and discuss the construction impacts and the mitigation that we will put in place

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