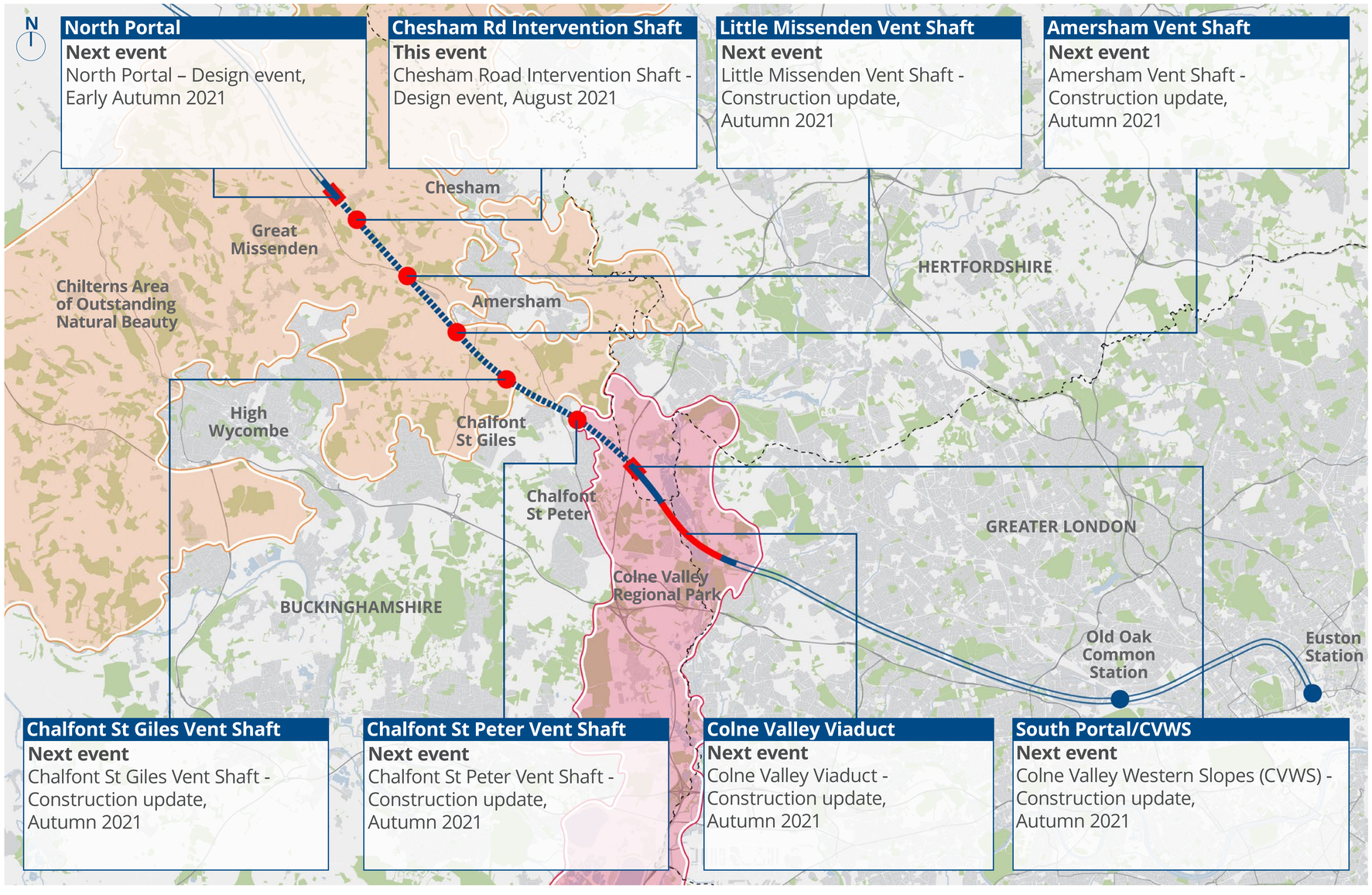
The HS2 route in the Chilterns and the Colne Valley

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 had to postpone postponed all public face-to-face engagement events and meetings however we are now looking to start these again, but will also continue to run online events.



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Introduction

Welcome to our design event for the Chesham Road intervention shaft.

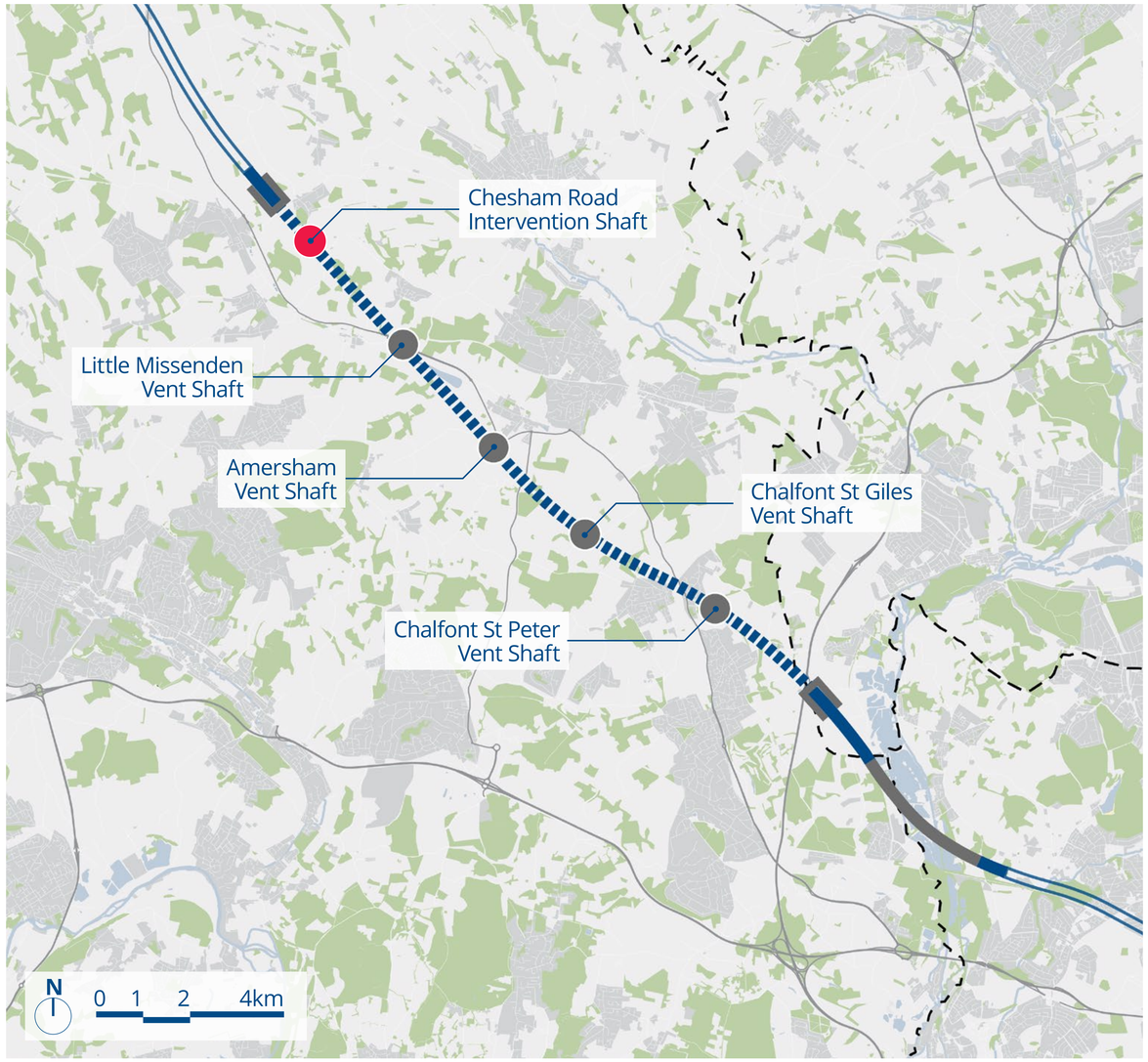
The information in this exhibition is presented to show you the design for the intervention shaft headhouse and landscape, and to share our construction plans. We are also asking for your feedback to help shape our final plans. Your comments will be considered in the next stage of review, which will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

We will keep you informed of any design changes at future 'you said we did' events and webinars.

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

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

HS2 route through the Chilterns



The Chesham Road (B485) intervention shaft will provide access for emergency services. It will be located off the B485 at Hyde End, near Gt Missenden.

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Landscape and site context

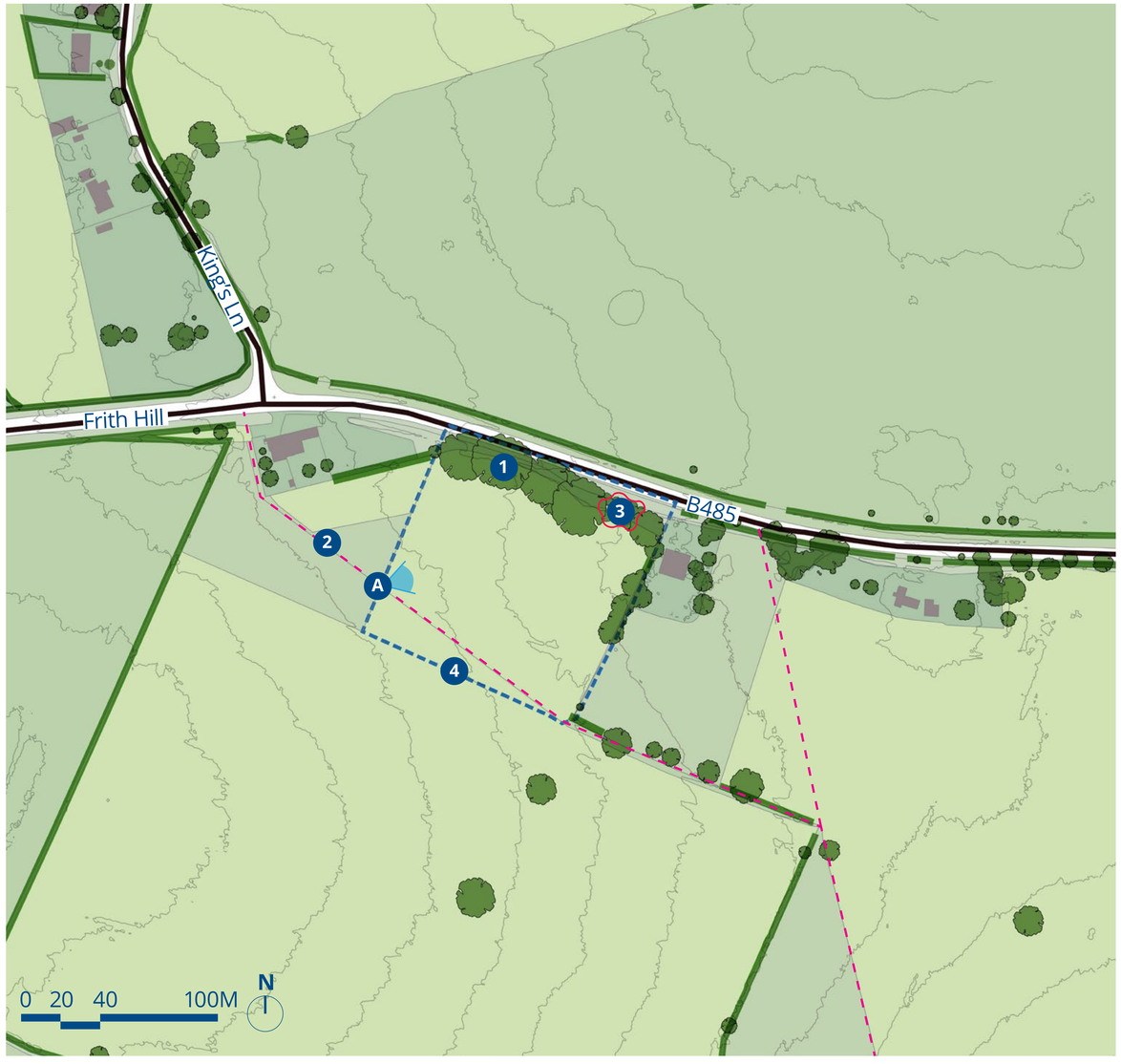
Surrounding Context

We have studied the site and its natural environment to help shape our landscape restoration works. We want to reflect the character of the native trees and hedgerows found in this part of the Area of Outstanding Natural Beauty to positively integrate the new building into the landscape.

Key

1. Retained trees and vegetation
2. Public right of way
3. Removed trees
4. Site area

View A - Looking northeast, across the site (pre-construction)



Context plan

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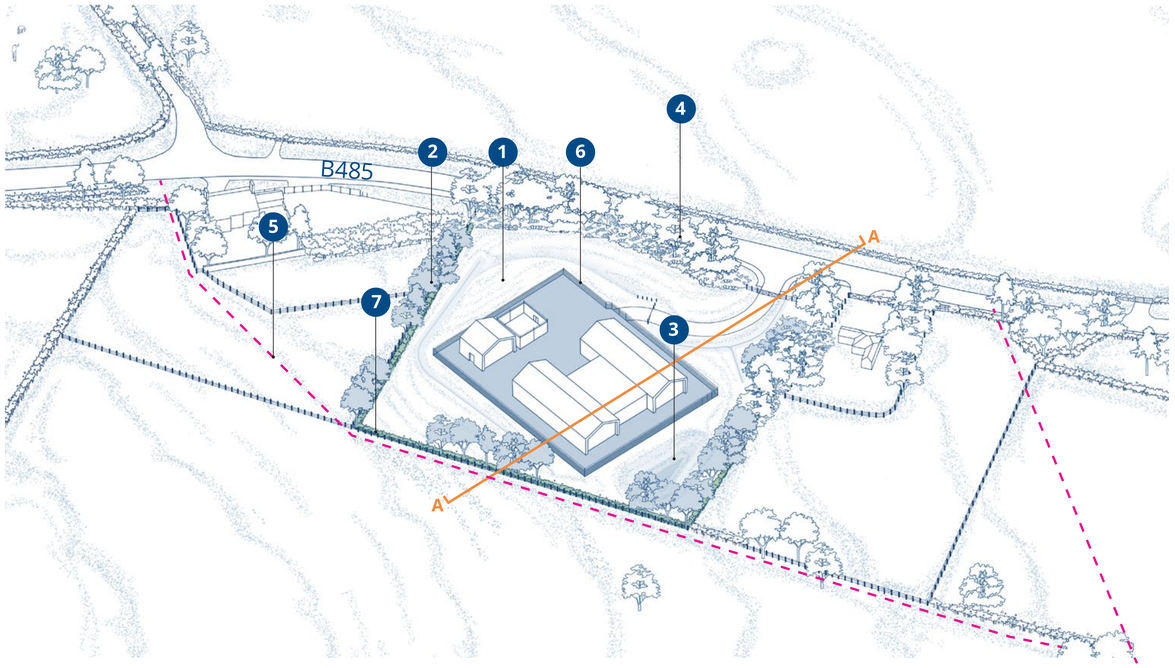
Landscape design

Landscape character

The landscape proposals complement the recessive approach adopted in the architecture, hedgerow and tree planting is used to screen the buildings and integrate the site into the surrounding landscape context.

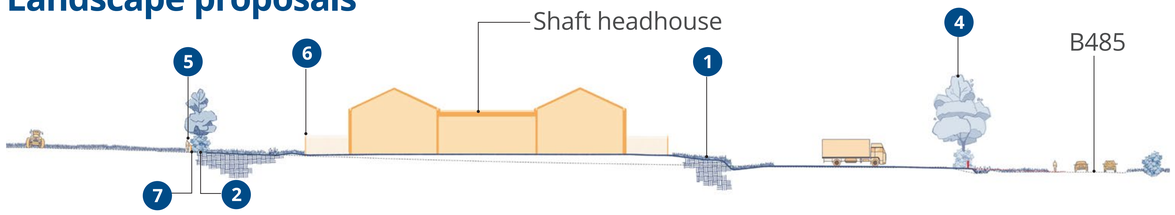
Key

1. Species rich grassland
2. Proposed hedgerow with trees
3. Drainage basin
4. Retained trees and vegetation
5. Public right of way - - -
6. Security fence
7. Boundary fence

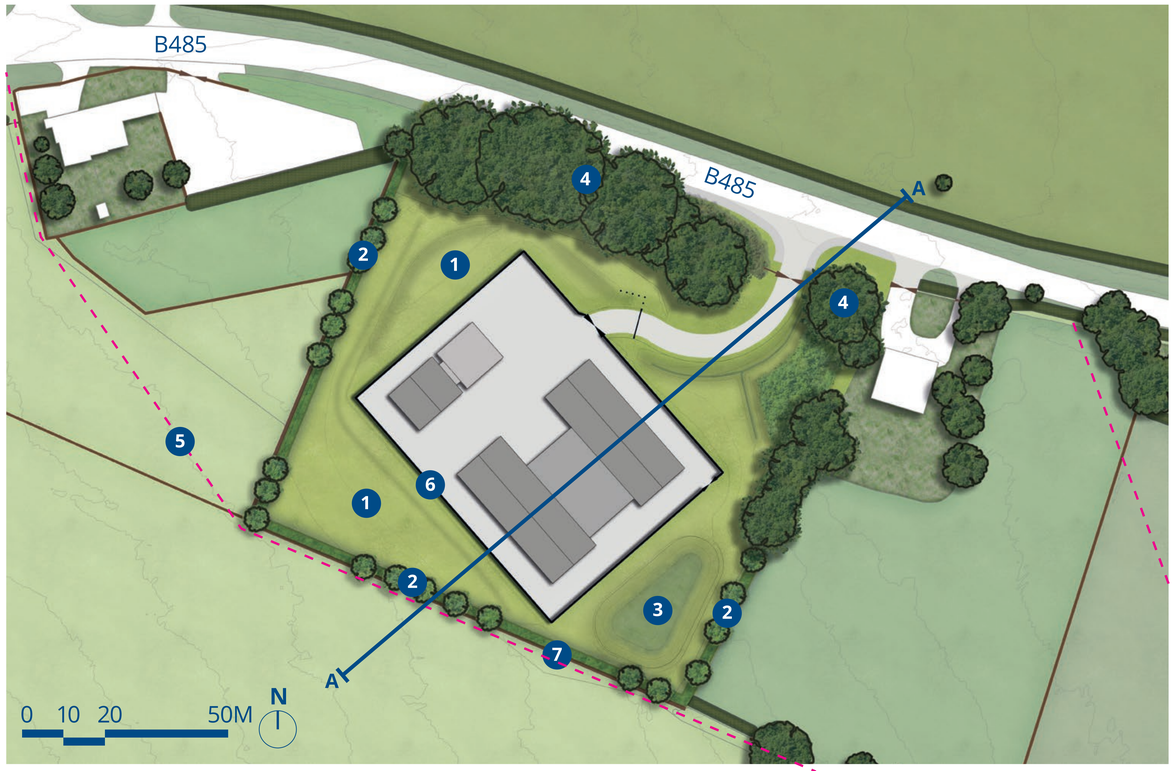


Site sketch

Landscape proposals



Site Section A-A



Landscape masterplan

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Ecology

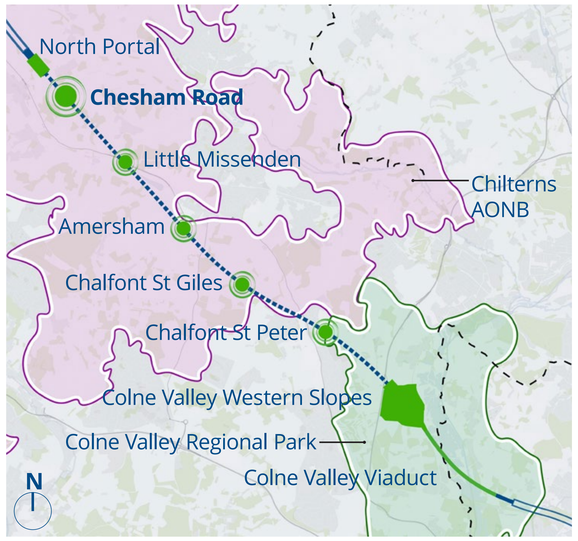
Ecological design

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 Hills AONB. It will significantly improve biodiversity by integrating with the existing surrounding habitats and through the creation of contextually appropriate species-rich grassland with areas of planting and basking banks further increasing the value of the habitat for wildlife.

Key

1. Species rich grassland
2. Tree and hedgerow planting
3. Basking banks
4. Hibernacula
5. Public right of way - - -

Woodland edge



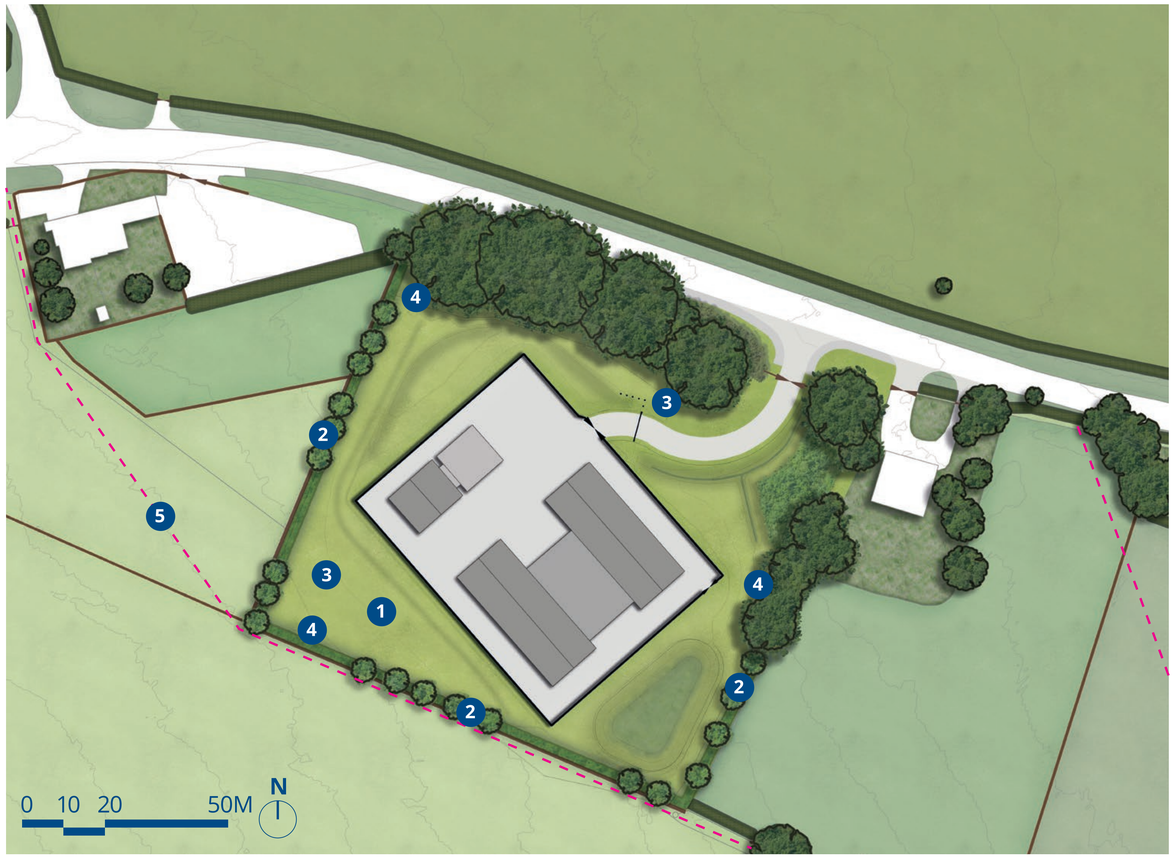
Ecological stepping stones

Species rich grassland (target habitat)

Slow worm

Foraging insects

Complex wildflower habitats



Landscape masterplan

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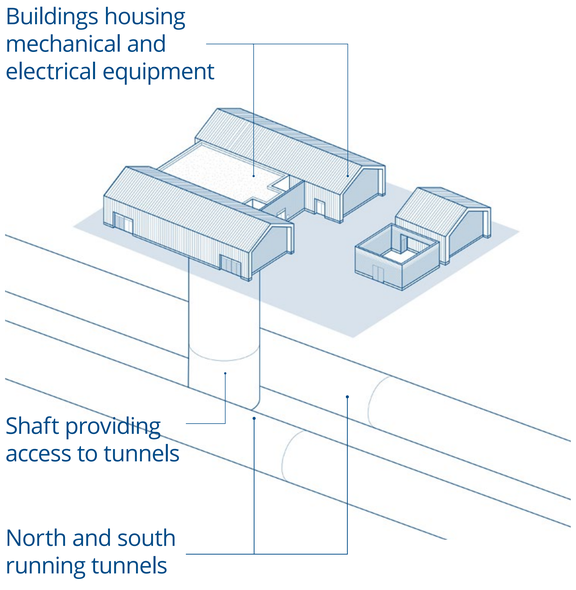
Headhouse design

Functional requirements

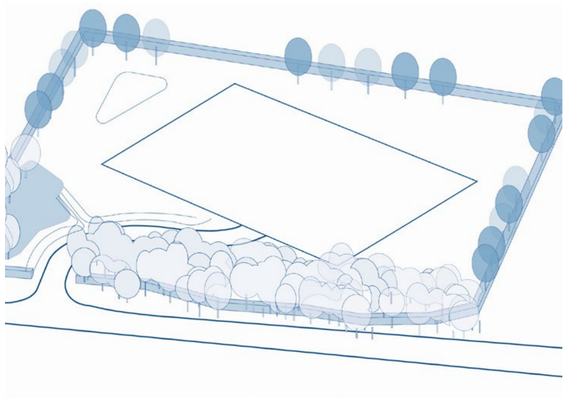
The function of the headhouse is to provide:

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

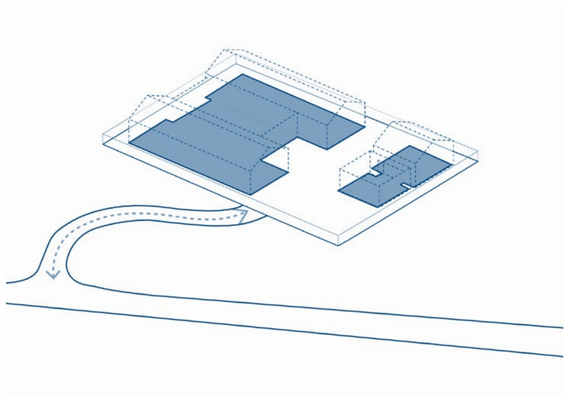


3D diagram - Chesham Road intervention shaft

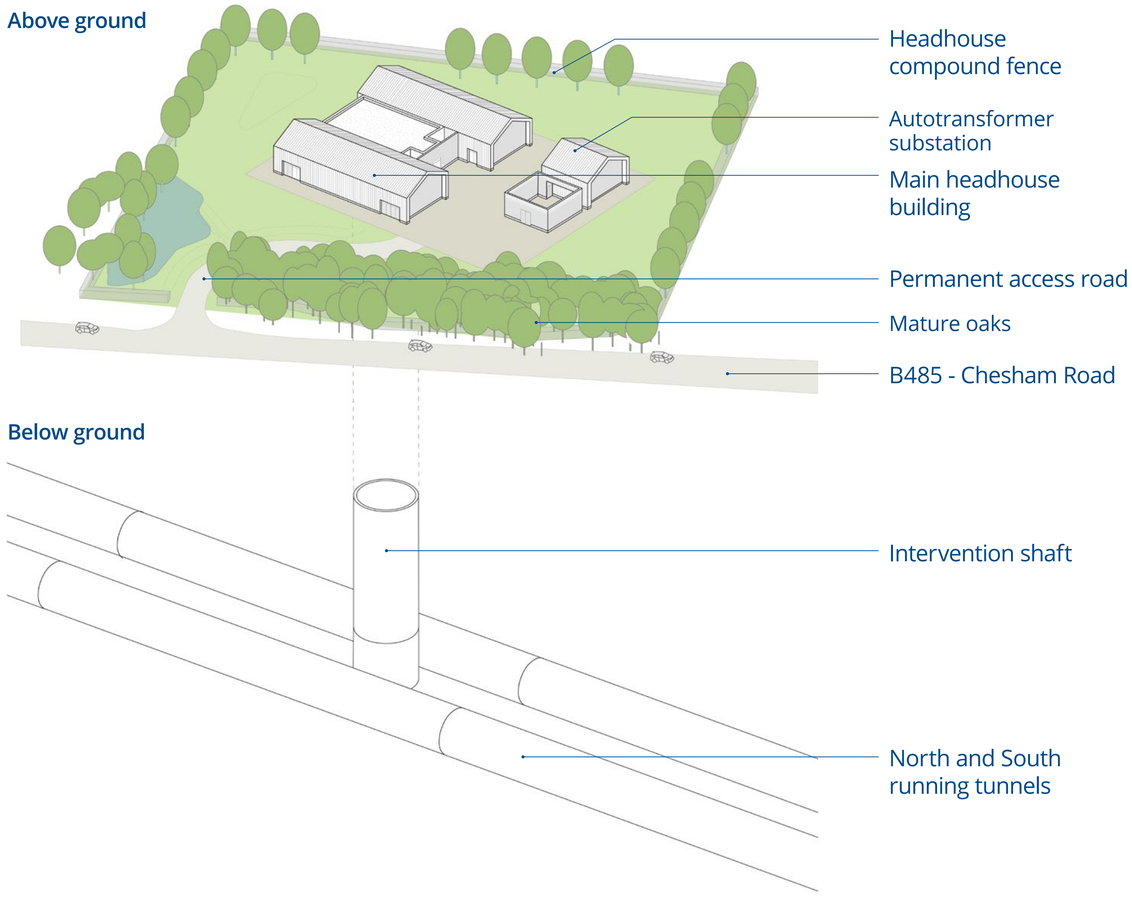
Site response



Integration within landscape - Integration of drainage and security features into landform and using existing planting to screen headhouse



Agricultural courtyard arrangement - Based on typical agricultural courtyard with the overall footprint kept as small as possible.



3D View - Chesham Road intervention shaft and headhouse

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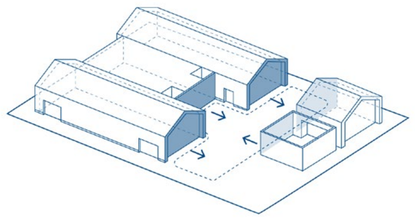
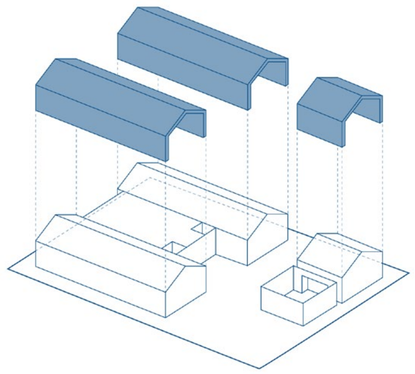
Headhouse design

Building design principles

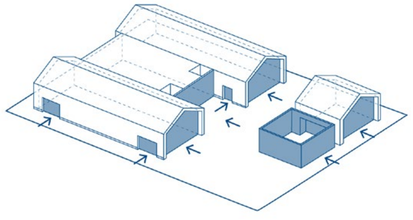
A clear set of design principles have been employed to achieve sensitivity and aesthetic consistency with surroundings. The building colour and detail has been designed to blend into the landscape, using a simple palette of materials inspired by the local agricultural buildings.



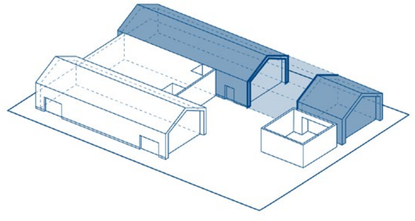
Central courtyard for access and manoeuvring



Roof wrap - The pitched roofs wrap around the buildings, creating simple agricultural barn shapes



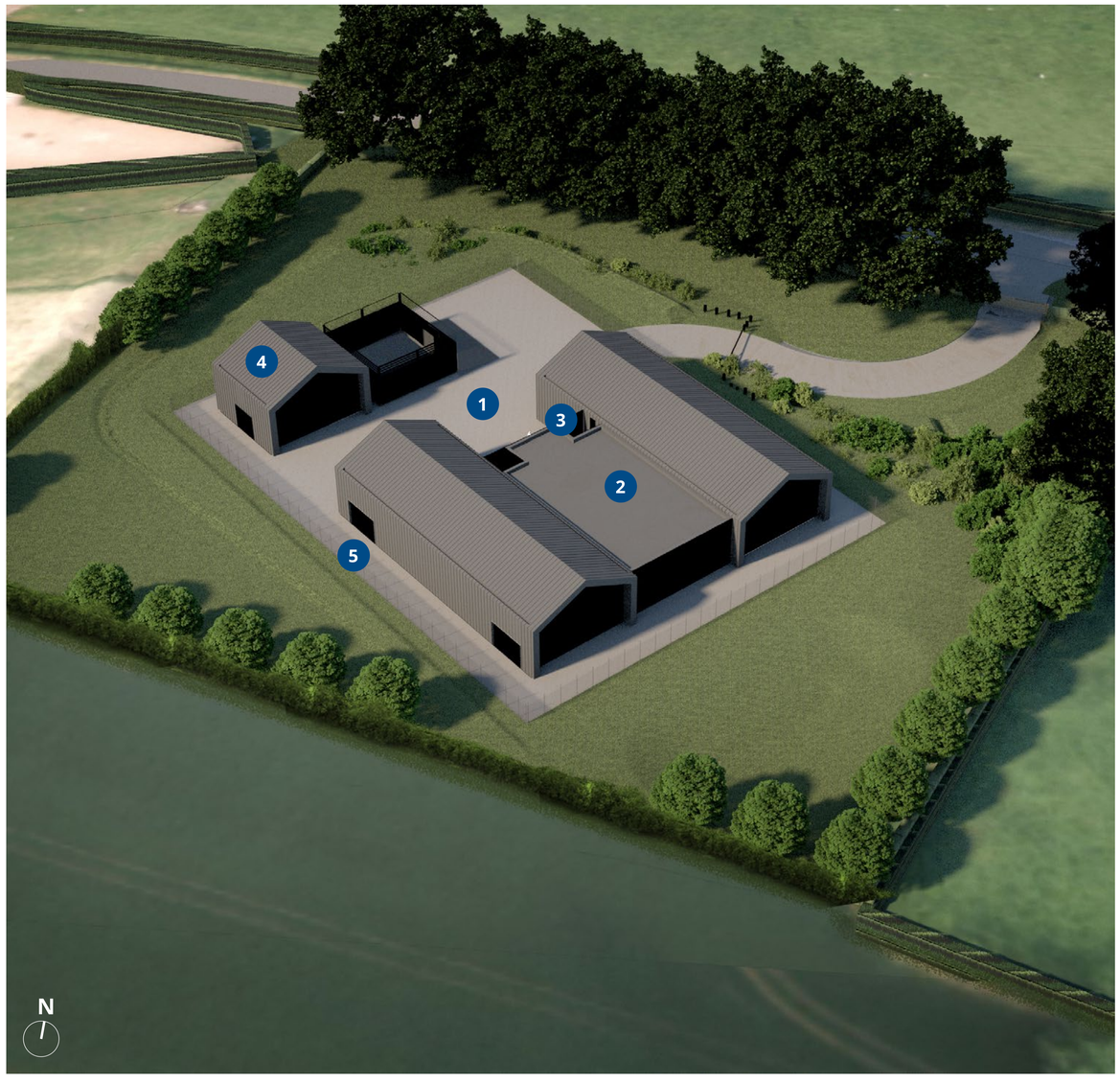
Door and vents - Openings are pushed inwards and treated in a different material, similarly to local agricultural buildings



Substation - ATS building as a matching barn form to the main headhouse with an external louvred enclosure

Key

1. Central courtyard headhouse
2. Autotransformer station (ATS)
3. Air condenser
4. ATS building
5. Doors



Visualisation - Aerial view (Year 15)

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Headhouse design

Historic precedents

Historic agricultural buildings in the surrounding area have influenced the design proposals, in particular the simple pitched roof forms and horizontal cladding.

Materials

The material palette will be durable and designed to age naturally over time without compromising robustness or quality. Dark, neutral colours will ensure the buildings appear recessive within their surrounding context.

Visualisations

Key plan

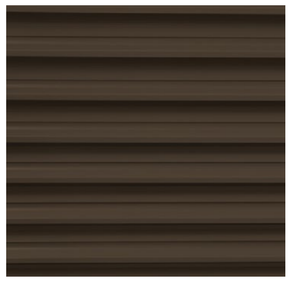
Visualisation - View from Chesham Road (Year 1)

Local context - Example of industrial precedent

Roof wrap - Pre-patinated zinc

Visualisation - View from Chesham Road (Year 15)

Local context - Northolt Barn



Louvres - Painted steel

Plinth - Engineering brick

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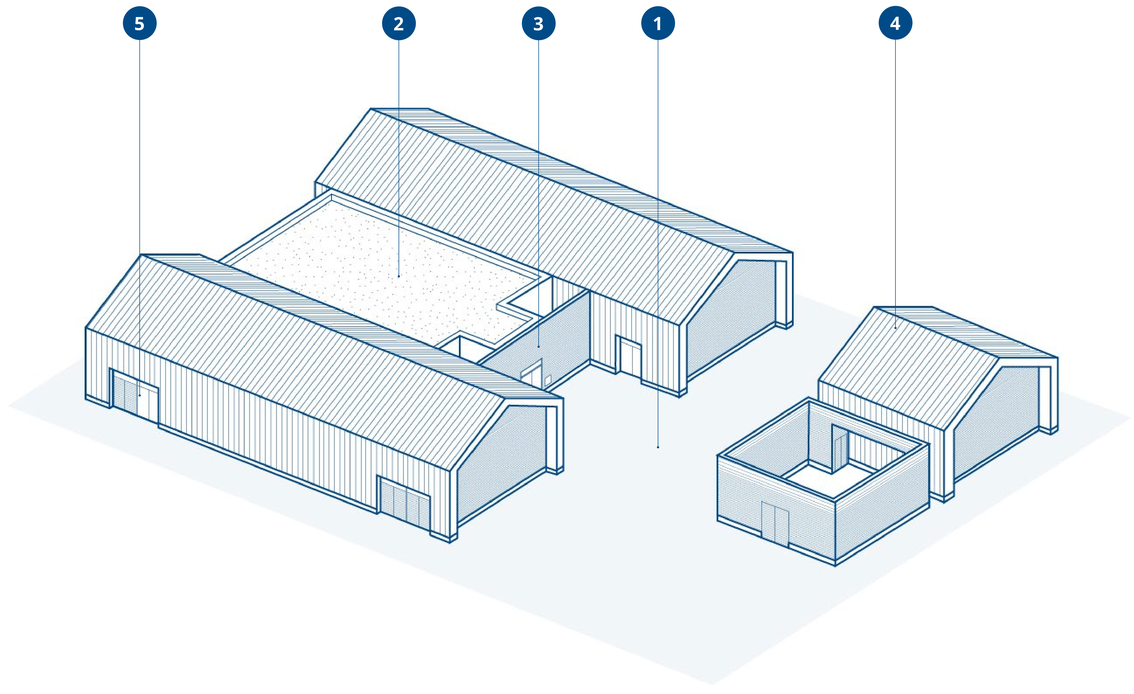
Headhouse design

Scale and appearance

The form and orientation of the buildings have been designed to reduce their scale when seen from key viewpoints. The openings within the buildings have been sized in proportion to the buildings, whilst the ridge line of the pitched roofs help to lower their apparent height.

Key

1. Central courtyard headhouse
2. Autotransformer station (ATS)
3. Air condenser
4. ATS building
5. Doors



Chesham Road
Compound area: 3160 sqm

Visualisations

Key plan

Visualisation - View from Chesham Road (Winter Year 1)

Visualisation - View from Chesham Road (Winter Year 15)

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Headhouse design

Family of headhouses

Chesham Road is one of four headhouses located on rural sites within the Chilterns. All headhouses and ancillary structures have been designed to be recessive and form part of a common family of buildings. The buildings are distinguished by the colour of painted louvres, selected to reflect the specific features of each site.

Headhouse location map

Visualisation - Chalfont St Peter headhouse (Year 15)

Visualisation - Chalfont St Giles headhouse (Year 15)

Visualisation - Little Missenden headhouse (Year 15)

Visualisation - Chesham Road headhouse preliminary (Year 15)

Visualisations

PRoW South View

Hyde Lane view

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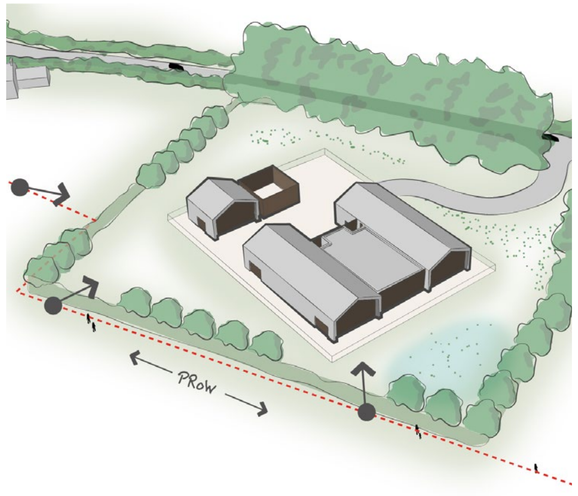
Headhouse design

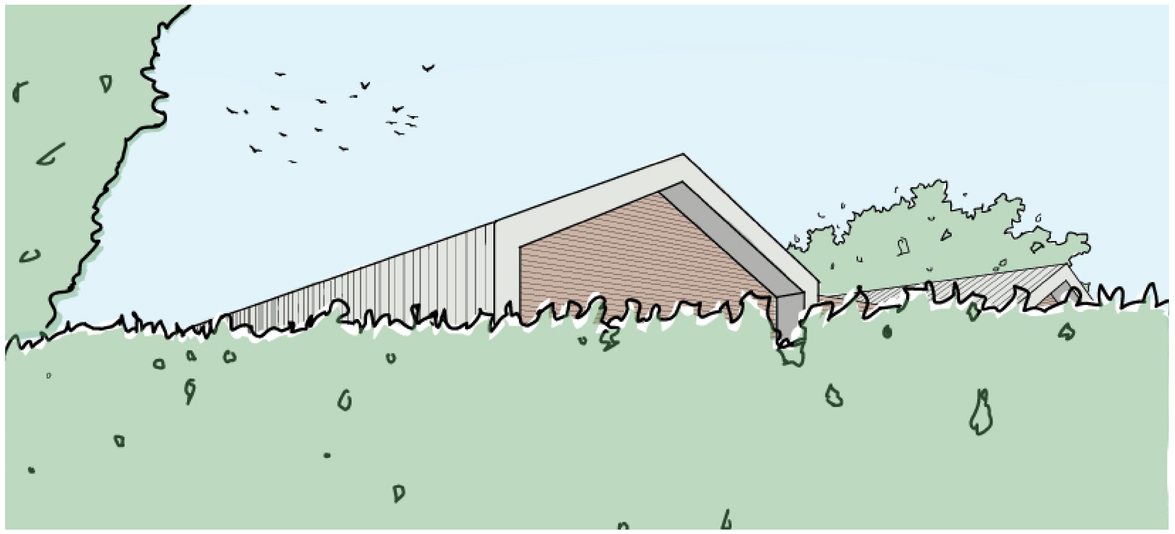
Visibility

The form and position of the buildings have been designed to reduce their scale when seen from key viewpoints. The lower part of the compound and security fencing are screened from views as you walk along the public footpath by new hedging. Proposed trees frame key views through to the headhouse.



Views from Public Right of Way (PRoW)

Visibility experience – View 2



Visibility experience – View 1

Visibility experience – View 3

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Traffic management and planning

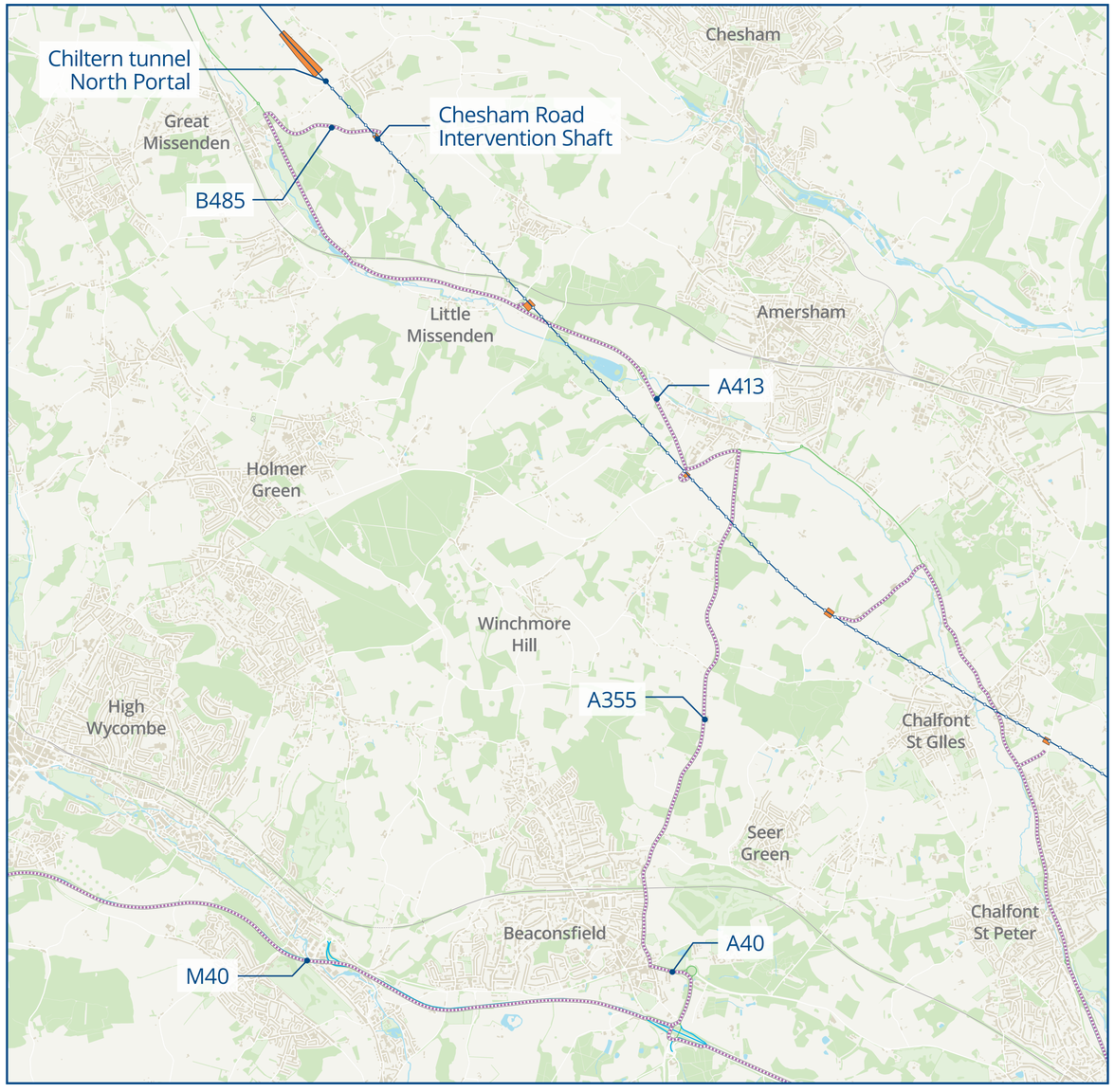
We recognise that there are concerns regarding Heavy Goods Vehicles using local roads in the area of the shaft site. Our routes to each site are carefully planned to reduce impact on local communities.

During stages of high activity on site – such as excavation, concreting 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 are:

- Reducing the number of HGV movements by changing the method of construction on site
- Scheduling all deliveries electronically to prevent congestion near the site. This includes working with the main works contractor EKFB who are building the next part of the line from South Heath northwards
- We have now built the permanent access to the site



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Construction site map

We will build the intervention shaft safely, and minimise our impact on the local community.

Air quality

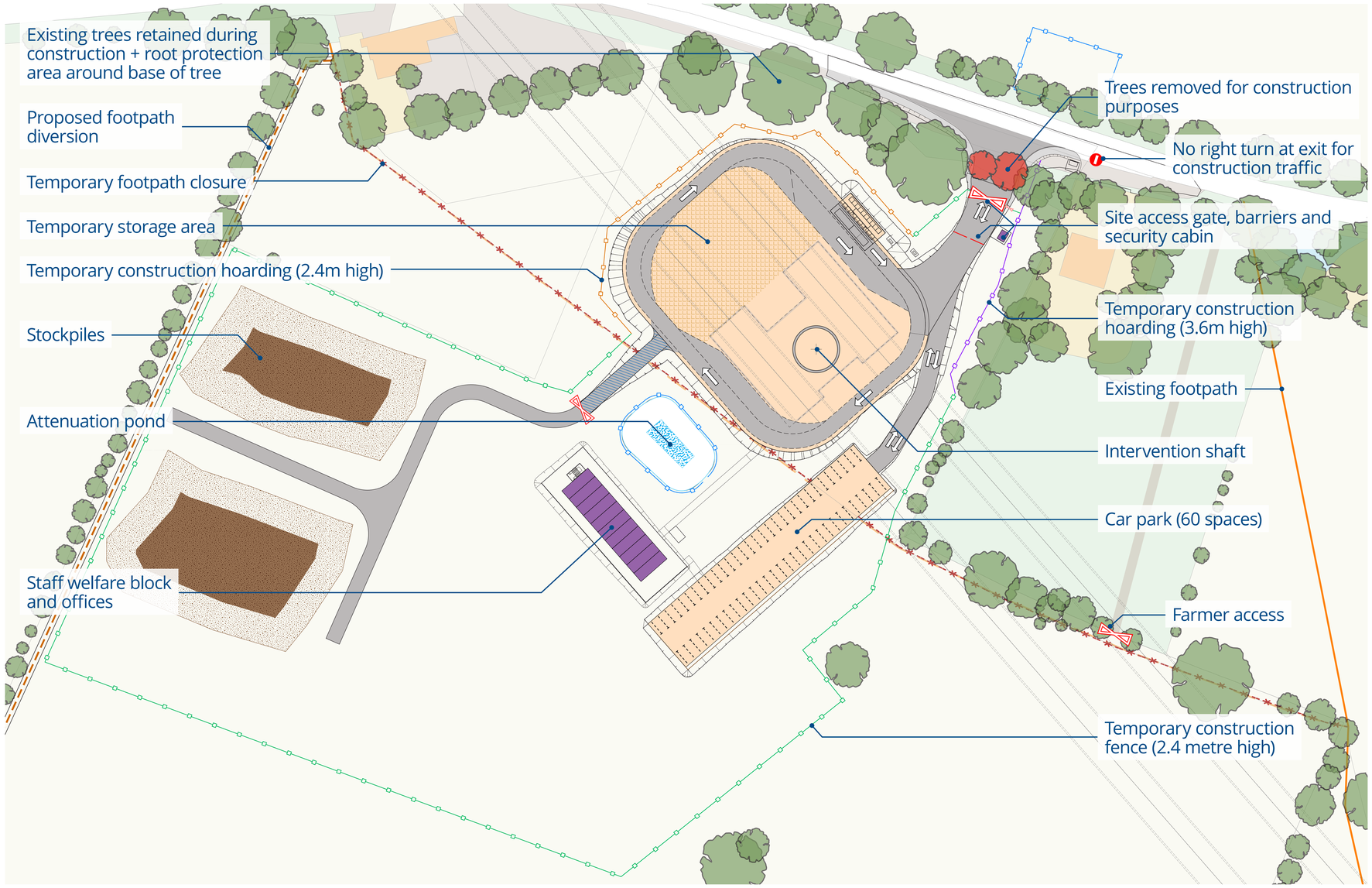
We will manage air quality by:

- 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



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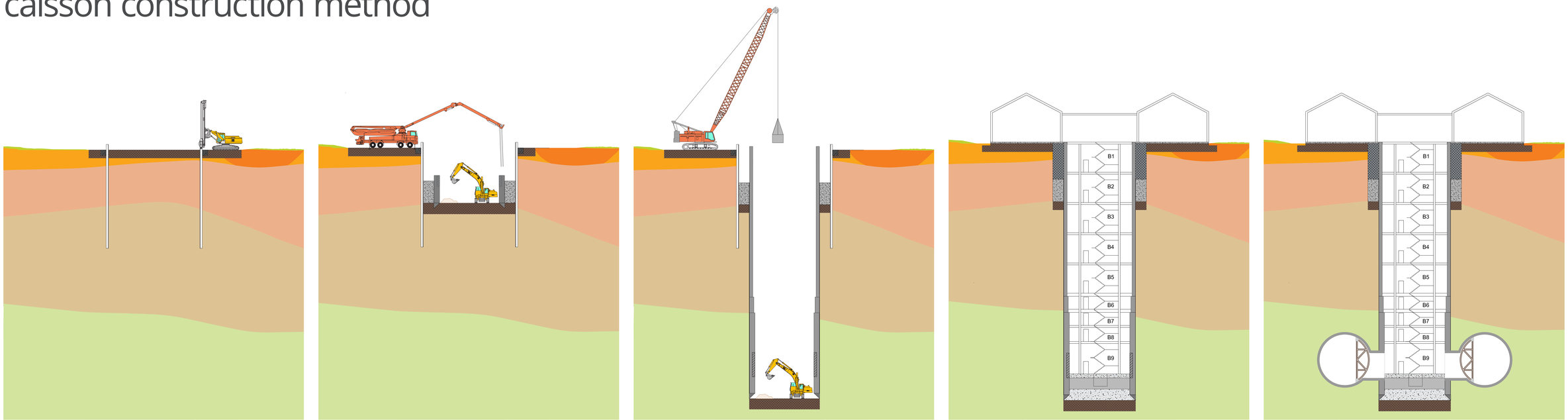
Construction method

Building an intervention shaft using the caisson construction method



Temporary sheet piling

A temporary sheet pile cofferdam is constructed. These are preformed corrugated steel piles which are driven in from the surface. The cofferdam is circular and allows excavation of the weaker superficial clays so that the caisson can be installed directly into the stronger chalk.

Cofferdam excavation

The cofferdam is excavated to a depth of around 10m. A concrete guide collar is installed within the cofferdam. This is essential to ensure that the caisson is cast to the correct shape and that it is sunk straight down.

Shaft excavated to ‘sink’ caisson

The reinforced concrete caisson is constructed in sections of up to 5m height within the cofferdam. As each section is completed, the ground underneath is excavated, causing the caisson to ‘sink’.

Internal caisson structures and headhouse construction

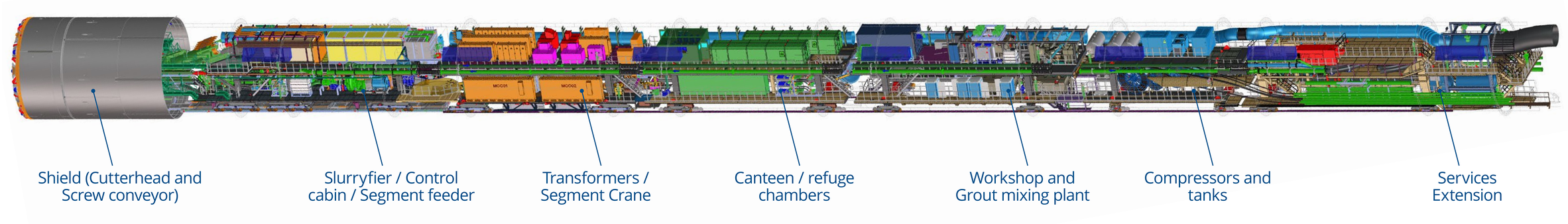
The internal structures of the caisson are constructed. The cofferdam is removed and the headhouse is constructed at ground level.

Tunnel boring and shaft connection

The tunnel boring machines pass the shaft location. A connection adit (passage) is mined between the tunnel and the shaft. The final connection structures are cast in reinforced concrete.

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, Florence, was launched in May 2021 from the South Portal, close to the M25, while the second machine, Cecilia, launched in July 2021. 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.

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Tunnelling under Chesham Road

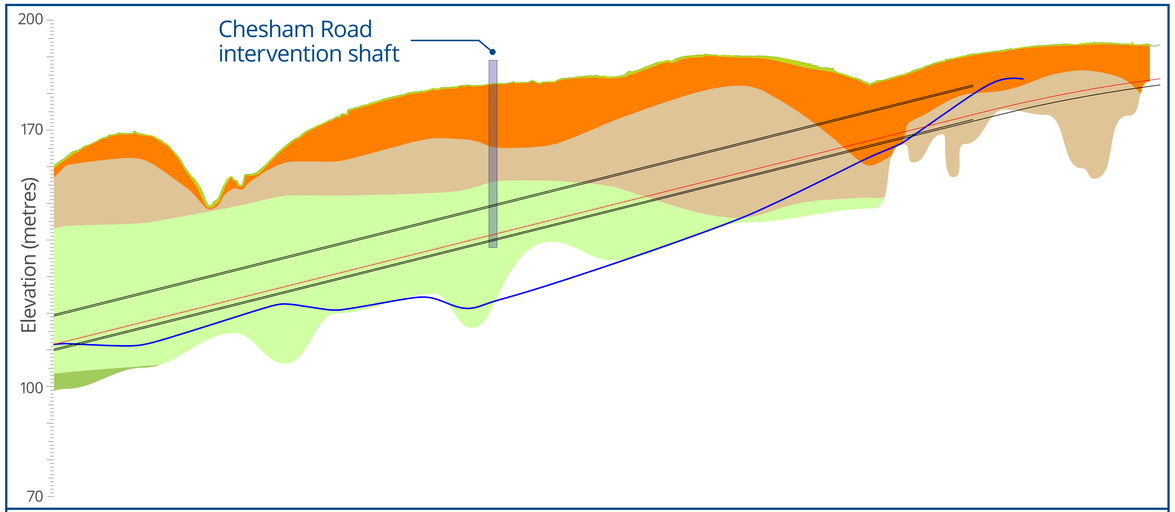
The Chiltern Tunnel will run from the South Portal at West Hyde, to the North Portal near South Heath, Great Missenden

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.

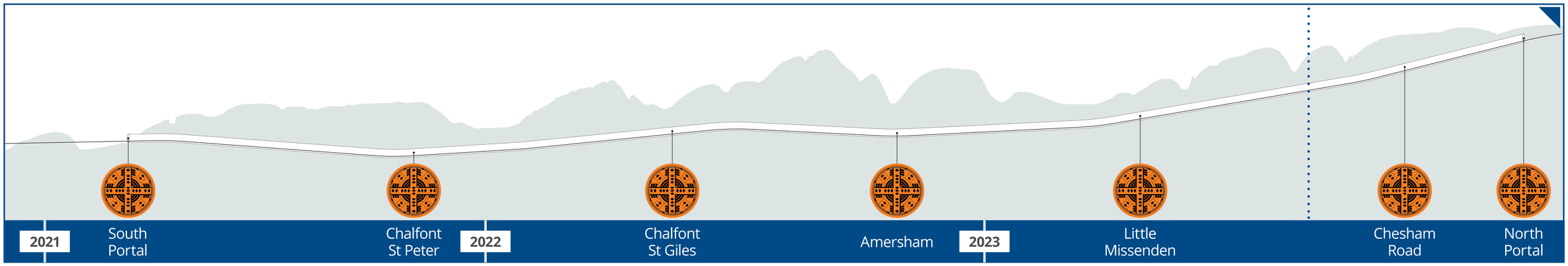
Our extensive ground investigations have shown approximately 50 faults along the tunnel route, which is more than was first anticipated.

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



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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

- Reflect the rural character of the site and surrounding landscape
- Find ways of reusing soil and materials excavated from the vent shaft
- Use existing trees, hedgerows and new planting to conceal structures as far as possible
- Replace lost trees and hedgerows which must be removed during construction
- Consider ways to enhance public experience in places where people get close to the site
- 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 may species as possible (biodiverse)
- Create habitats that are typical of the area but rare and declining – for example chalk grassland
- Protect existing wildlife on the site during construction

Design of the intervention shaft headhouse

- Design structures that can be concealed or blend into the landscape
- Reduce visibility of buildings by lowering them where possible
- Maintain a familiar scale and form to local agricultural setting
- Keep the overall footprint (area) of the compound as small as possible
- Choose materials and detailing to help blend into 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

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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 19 September 2021. 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 intervention shaft and headhouse design.

You can provide feedback in the ways listed below:

Online survey

Visit www.hs2inbucksandox.co.uk for a link to the survey

Email

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 Chesham Road intervention shaft. For more information and to find out how to join these meetings, please visit: www.hs2inbucksandox.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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