

HS2

Radio Systems for HS2

HS2 Liaison Group

15 September 2023

Tim Ward – HS2 Head of Telecoms Engineering

Chris James – EKFB Senior Engagement Manager



HS2 Mobile Communication Systems

Railways require radio systems to operate the train service

HS2 has developed a telecommunications design to accommodate:

Operational
GSM-R for Voice
and Train Control

**Passenger
communications**
Mobile Network
operators (eg EE,
Vodafone, 3, O2)

**Non-Rail
opportunities**
Share network with
wider community

GSM-R and its role in High-Speed Rail



Global System for Mobile communications – Railway

- Due to the capacity and speed requirements on HS2 it is not practicable to have conventional lineside signals.
- When travelling at High Speed lineside signals cannot be seen in time to react.
- Train control system (signaling) selected for HS2 is ETCS (European Train Control System) Level 2.
- In cab signaling is where movement authority is sent directly to the train drivers display.
- The RBC (Radio Block Centre) uses GSM-R to receive train position information and send the movement authority to the train.
- HS2 trains will have ATO (Automatic Train operation) which will use the radio systems.
- GSM-R is used for driver voice communication including railway emergency calls.
- The HS2 railway maintenance teams will use GSM-R.

Regulatory Compliance

Railways and Other Guided Transport Systems (Safety) Regulations 2006 put the requirements of the 2004 European Railway Safety Directive into practice in Great Britain.

The directive aims to remove barriers to providing transport services by creating a common framework for railway safety.

This sits alongside the European Interoperability Directive, a common framework for railway systems design.

The National Technical Specification Notices (NTSN's) (old TSI's) define the technical and operational standards which must be met in order to meet the requirements of the railway system.

Radio Systems Design

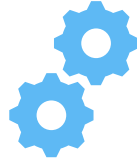


Railway Mobile Radio

Original Concept- The GSM-R system was due to be upgraded by 2025. HS2 planned to use the next generation of radio technology for train communications.

Current Design – The validated specifications for the successor to GSM-R, FRMCS (Future Railway Mobile Communication System) are expected to be available +2026.

GSM-R is the mandated radio system in the NTSN's and will be supported to at least 2035.



Radio Technology

Original Concept – Frequent, smaller antennae with radio equipment at their bases made possible by the development of Distributed Base Station architecture.

Current Design- HS2 has engaged with the supplier of GB GSM-R infrastructure and the GSM-R system does not support Distributed Base Station technology, therefore HS2 to use radio towers to ensure full line of route coverage in line with the specifications mandated in the NTSN to ensure safety and operational reliability.



Radio Planning

Original Concept - As the propagation of radio varies with frequency and given the uncertainty of the radio operating frequency(s), it was not possible to conduct detailed radio propagation modelling to determine the locations of the radio sites.

Current Design- Mandated GSM-R radio frequencies are defined in the NTSN. HS2 has worked with Network Rail to model the route and determine the locations of the radio sites. FRMCS (GSM-R successor) will use the same radio frequencies.

Example of similar infrastructure



Example of a GSM-R site on HS1 at Lenham in Kent.

The radio tower is approximately 25m high, the google maps image of the site is from a bridge at circa 450m distance.

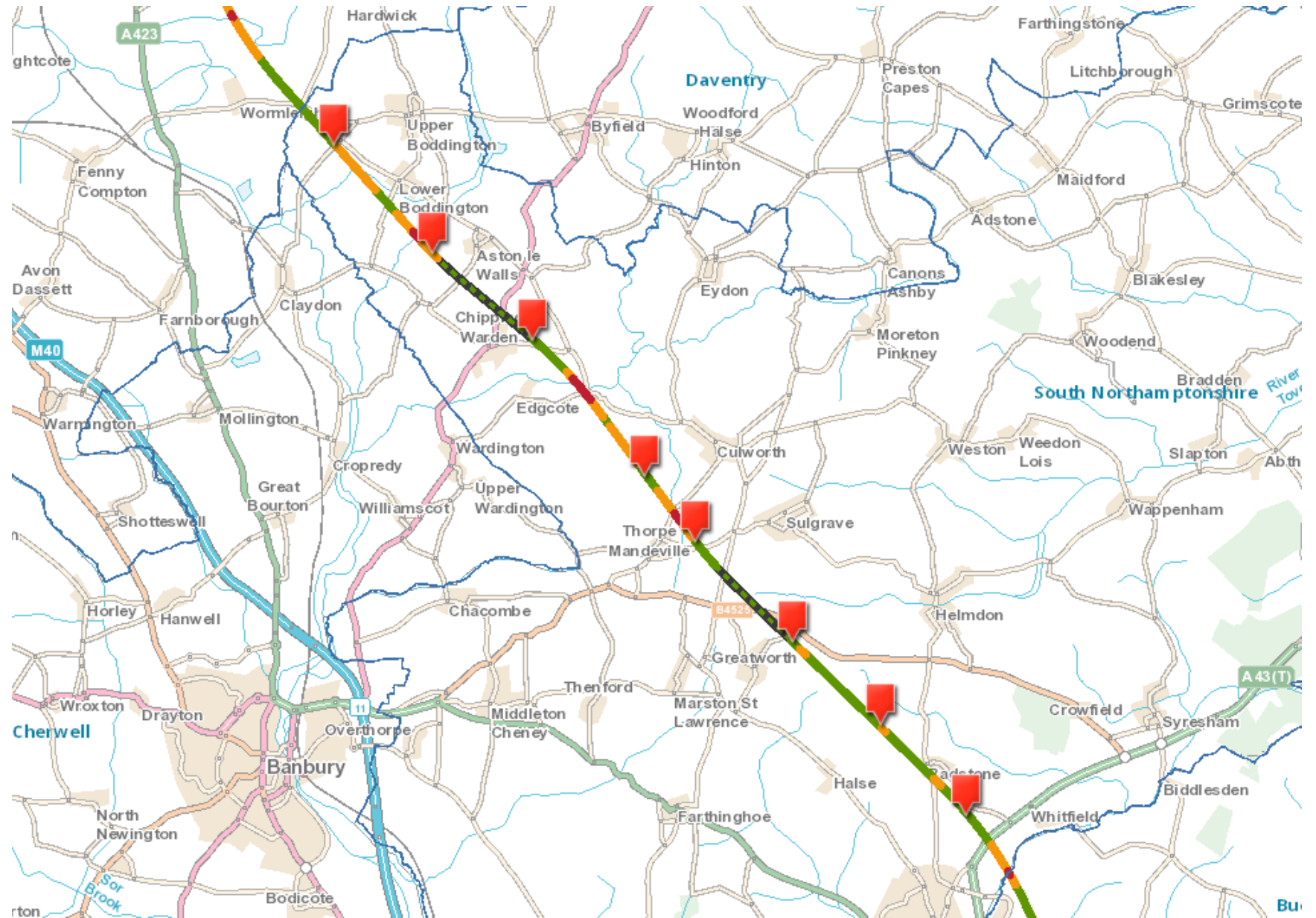


Overview

Total of 8 sites.

4 sites co-located with tunnel portals

4 new Radio Compounds



Key considerations

1. The radio planning is based on GSM-R coverage with proposed antenna heights, this is to be validated by the HS2 Rail System Telecommunication contractor during scheme and detailed design.
2. The maps shown in this presentation indicative and may change, exact locations are being developed and will be submitted through the Schedule 17 planning process.
3. Mast heights expected to be 12 to 15 metres high.



Locations

A43 to Halse Copse

● Two locations



Locations

Greatworth to Thorpe Mandeville

● Two locations



Locations

Culworth to Chipping Warden

● Two locations



Locations

Aston le Walls to Boddington

● Two locations



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HS2

Works update

15 September 2023

Chris James – EKFB Senior Engagement Manager

Dave Butcher – T2G - Engagement Manager, EKFB



Local village support

- Brackley Food Bank – We ran a collection throughout the month of August at our office in Brackley and made a large donation last week. We will now continue to keep a collection point at the office for employees to make donations.
- We donated a new weatherproof noticeboard to Greatworth Sports Club.
- We have volunteered at Greatworth Primary School, clearing an old shed, preparing a forest school area and donating new benches.



Brackley Allotments

This Spring, we donated 3,200 hedgerow plants to the Brackley Allotment Association's Egerton site and Castle site to help replant dying hedgerow. In July, some of our team helped repair a stone wall that the association had been unable to get help with for over a year.



Before



After

“Brilliant job by the team yesterday! Many thanks to all of you.”

“It is certainly a fantastic job, way beyond our expectations – it blends beautifully with the rest of the wall.”

Men in Sheds



Volunteer's from Men in Sheds help with the Brackley Methodist Church kitchen project, the first project for the Brackley Chapter carried out in June.

In May the team met with the local Men in Sheds group to learn about the organisation and how we could support them while they establish themselves in Brackley; with their first permanent site located at Evenly Wood Gardens. We are now working with them and our subcontractor HW Martin to carry out some site work prior to the installation of their new shed this autumn.

Men in Sheds is an organisation established to create a space where men and women of all ages and abilities can gather to undertake projects for the local community, themselves, or just meet like-minded individuals.

In doing so people, who otherwise might be isolated, or feel excluded will find a welcoming community to accept them, their skills, and have them teach or learn new ones.

“Thank you for meeting with us today in Evenly Wood Garden (EWG) and we would like to thank you both for your support. ”

Helmdon Community Foundation

Reading Room Improvement Project - HS2 CEF funding: £47,650

The project is to renovate Helmdon's village hall, which is called The Reading Room, into a facility that can cater for the leisure, educational and social needs of the village. The Reading Room currently hosts a wide range of community activities, social clubs and essential services such as a post office. The project will improve and update the building's interiors, heating system and accessibility, which will benefit existing users as well as accommodate new community activities and users.

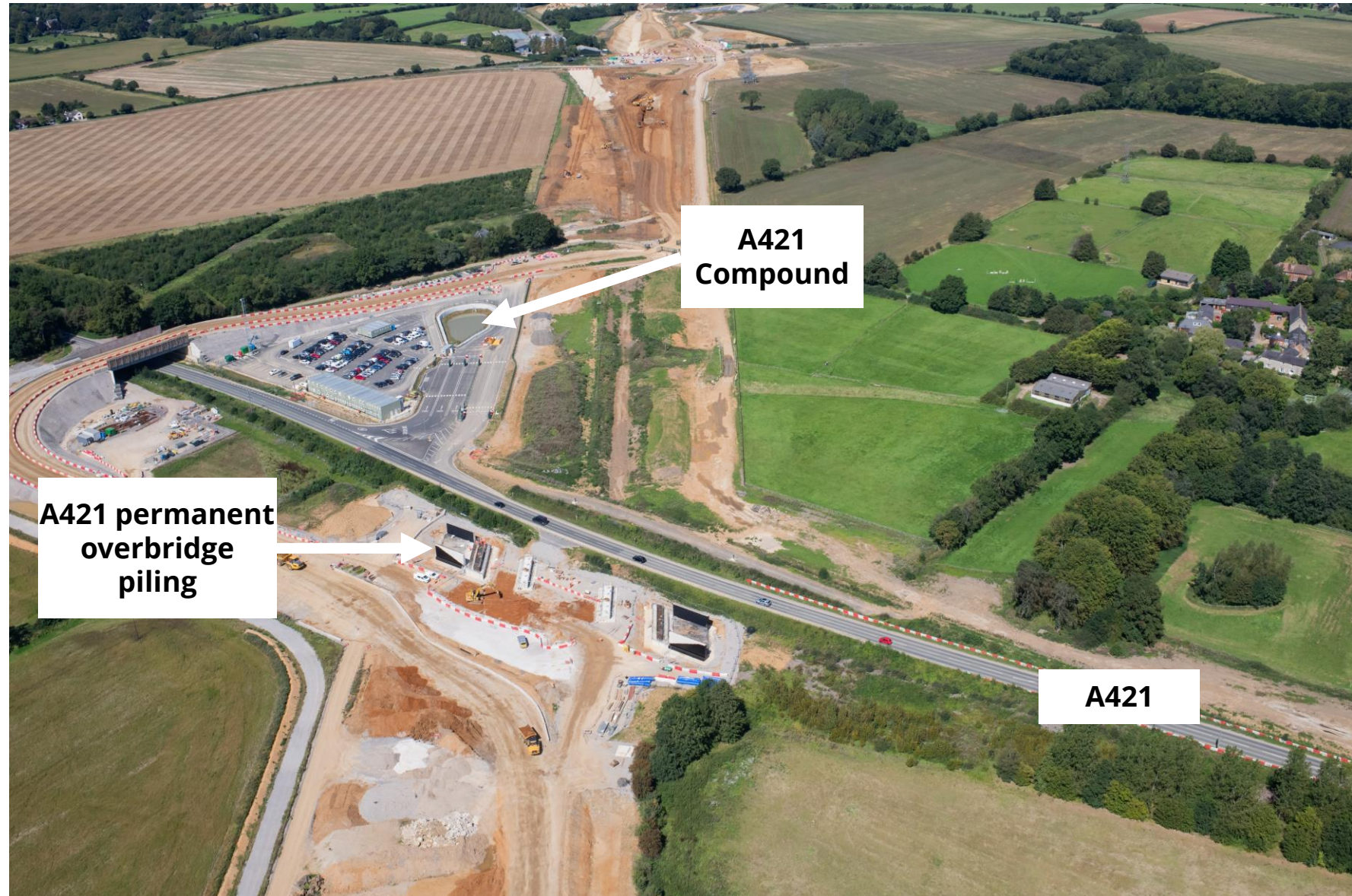
HELMDON
READING
ROOM



A421

Current Activity

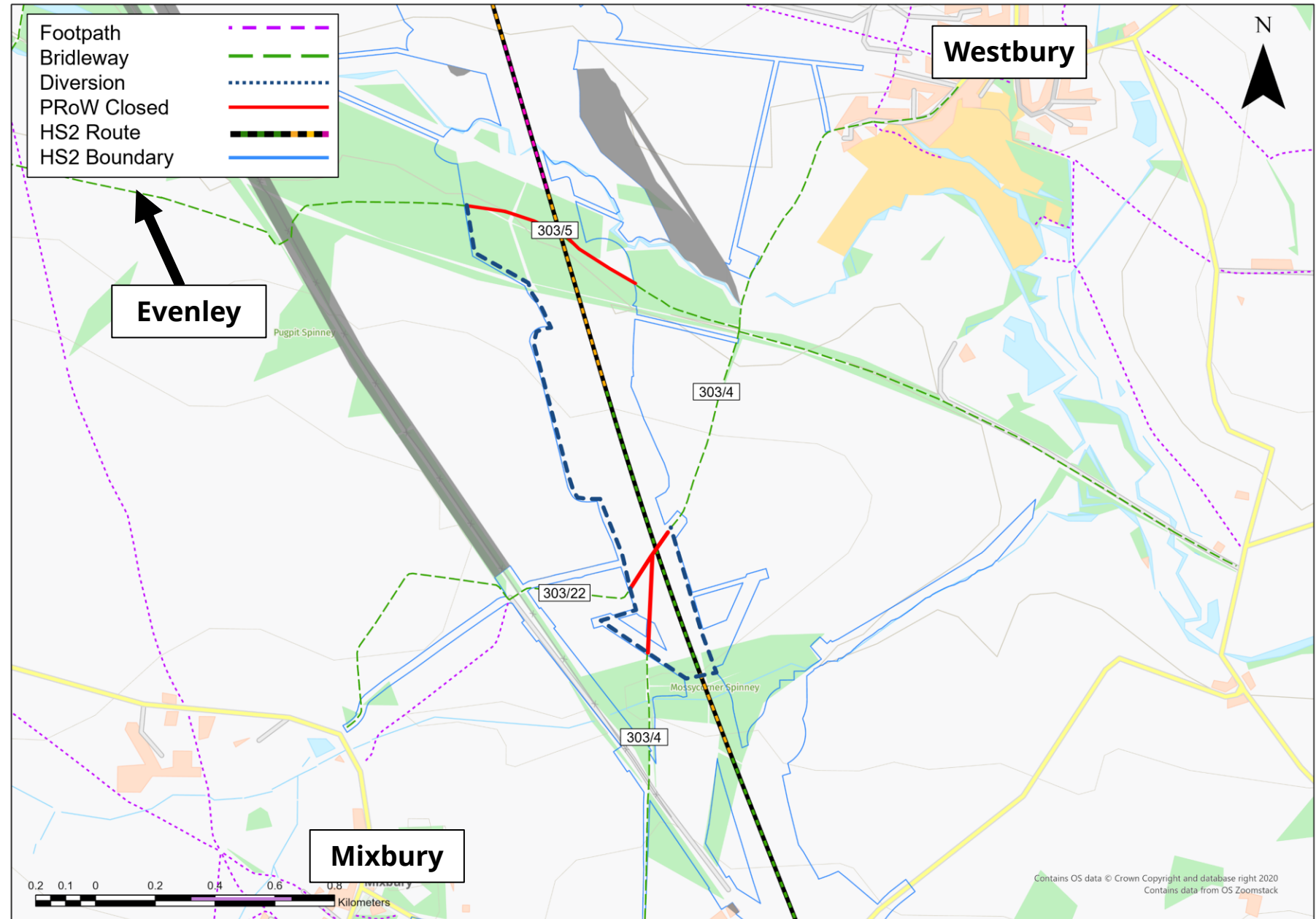
- Construction of the A421 compound is complete.
- A421 overnight closure for planned maintenance on the internal road bridge
 - Monday 18 September.
- A421 overbridge
 - Completing wingwalls
 - Abutments
 - Crane platform
 - Steel beam deliveries in October.



Footpaths

Current Activity

- Westbury 'circular ride'
- Bridleway 303/5 will need to close in October 2023 to allow the construction of the Westbury Viaduct.
- We will provide a diversion route using the existing 303/4 bridleway crossing and construct a temporary route to the west of the HS2 line.
- The bridleway known as 303/4 crosses the route of the HS2 railway.



A422

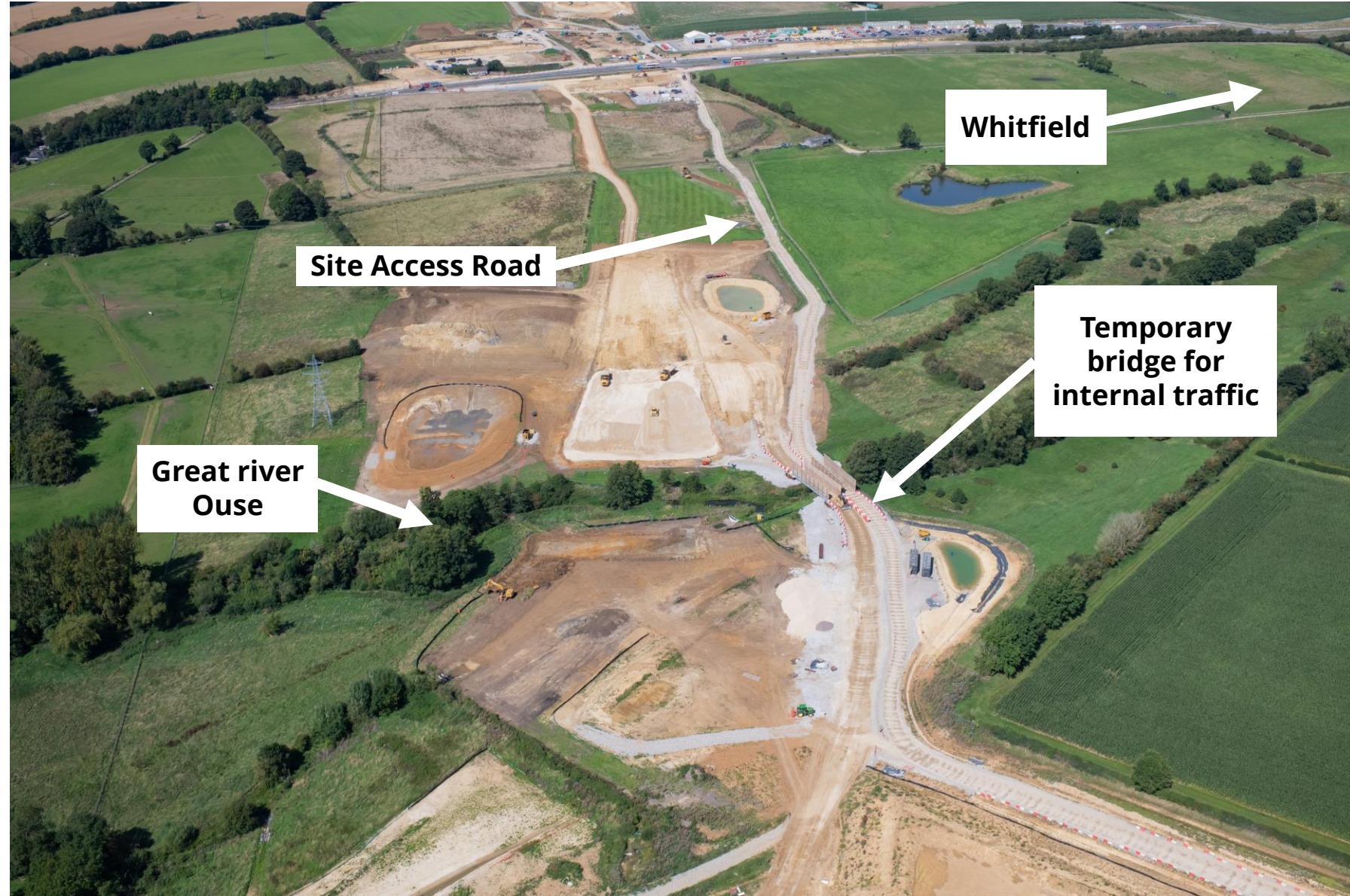
Current Activity

- Construction of the A422 temporary bridge is complete.
- Carrying out utility diversions.
- 24/7 2-way lights to carry out the connections in preparation for the full weekend closure.
- Full weekend closure and opening of the temporary road and bridge:
 - 22 September 2023.
 - AWN issued and local door drop to some communities affected.



A43 to Turweston

- Construction of the site access road from the A43 and the temporary A43 diversion.
- The temporary bridge for construction access is now operational, completes our access from the A422 compound.
- Preparation for the temporary Great River Ouse diversion, to support the permanent design works on going.



External Communication Examples

Contact our HS2 Helpdesk team on **08081 434 434**

HS2 Update

A43 Overbridge Brackley | Summer 2023



High Speed Two (HS2) is the new high speed railway for Britain. You can sign up for regular updates in your local area at www.hs2inyourarea.co.uk.

Building HS2 near Brackley

Our newsletters are an important tool used to update local communities on the progress of the HS2 project. This newsletter has been created to specifically update the local communities on our work constructing the A43 Overbridge, near Brackley. It includes the latest information on upcoming construction activities and expected timelines.

The A43 Overbridge will carry traffic over the new High Speed Railway Line. The overbridge will be located between the Brackley BP roundabout and the A43 junction for Syresham.

Our preparatory works for the overbridge have involved utility diversions, extensive earthworks, temporary road and footpath the sole use of our construction teams as they travel up and down the project.

Throughout the spring of 2023, we have been preparing for the main construction phase of the new temporary diversion.



Figure 1: The image above details the location of the temporary diversion that will be constructed this year for a section of the A43 near Brackley.

This has included the installation of temporary narrowed lanes and a reduction in the speed limit on this section of the A43. The new temporary diversion is expected to become operational in early 2024.

At the end of April, we began introducing periodic overnight closures of the A43, on both the southbound and northbound sides.

Update Continued

Where possible, to minimise disruption, these overnight closures will be reduced to single lane closures.

Throughout the summer and into autumn, our activities will focus on earthworks, which will involve excavating approximately 11,000 cubic metres of material from the north side of the A43. This material will be temporarily stockpiled and eventually reused as part of the final landscaping designs for HS2.

Once we carry out our main earthworks for the temporary diversion, we will then begin installing drainage. Following the completion of the drainage works, we will begin constructing the new road, which will involve surfacing works, white lining and the installation of road signage. After the road is finished, the local authority will conduct a thorough road safety audit before it is opened for public use.



In order to safely tie in the new temporary diversion into the existing road network, we will require two 57-hour full road closures of the A43. To reduce disruption as much as possible, the northbound closure and the southbound closure will take place on alternate weekends. These closures are expected to take place in late 2023. Once dates are confirmed we will update the public two weeks in advance of the closures.

In addition to our formal Advance Work Notices, the road closure information will also be communicated through traditional

road signage as well as electronic signage. These signs will be located in strategic locations and placed in a safe location.

Once the temporary diversion is operational, we will then be able to safely begin construction on the new A43 Overbridge, which is expected to be completed in late 2025.

We will continue to collaborate with National Highways and update local communities on the progression of our works. These works are currently subject to consents.

Should you have any questions about our works you can contact the HS2 helpdesk 24-hours a day.

Contact us

Contact our HS2 Helpdesk team all day, every day of the year on:

Freephone **08081 434 434**

Minicom **08081 456 472**

Email HS2enquiries@hs2.org.uk

Write to:

**FREEPOST
HS2 Community Engagement**

Website www.hs2.org.uk

To keep up to date with what is happening in your local area, visit: www.HS2inyourarea.co.uk



Notice of overnight road closures, A43, Brackley BP roundabout to the Syresham junction

September 2023 | www.hs2.org.uk

High Speed Two (HS2) is the new high speed railway for Britain. EKFB is working in partnership with HS2 Ltd to build the new high speed railway in your area. You can sign up for regular updates in your local area at www.hs2inyourarea.co.uk.

What are we doing?

This spring, we began construction on the temporary diversion of a section of the A43. This diversion is required so that we can build the new A43 Overbridge that will carry traffic over the HS2 railway line. We recently installed narrowed lanes on the both sides of the A43, along with road safety barriers. These narrowed lanes will remain operational into winter.

During the construction of the temporary diversion on the A43, there will be some localised vegetation clearance as well as installing drainage underneath the road. These works will require overnight closures of the A43 to minimise disruption. As our works progress, there will also be periodic overnight lane closures on this section of the A43.

We will continue to collaborate with National Highways and update local communities on the progression of our works.

When will these works take place?

The A43 southbound will be fully closed overnight, from the Syresham Junction to the Brackley BP roundabout, Mon-Fri from 8pm to 6am, on the following dates:

- Tuesday 29 August to Wednesday 6 September
- Monday 2 October to Wednesday 6 October

The A43 northbound will be fully closed overnight, from the Brackley BP roundabout to the Syresham Junction, Mon-Fri from 8pm to 6am, on the following dates:

- Wednesday 6 September to Friday 29 September

To minimise disruption, when possible, we will reduce these full road closures to lane closures. Signage on the road will indicate if it is a single lane closure or full road closure with diversion.

Notification



Duration of works

The A43 southbound will be closed overnight Mon-Fri between 8pm and 6am:

-Monday 14 August to Wednesday 6 September

-Monday 2 October to Wednesday 6 October

The A43 northbound will be closed overnight Mon-Fri between 8pm and 6am :

-Wednesday 6 September to Friday 29 September

What to expect

Overnight full road closures of the A43.

Speed restrictions on this section of the A43.

These dates may be subject to change due to circumstances outside of our control, such as weather.

These works are subject to consents.

What we will do

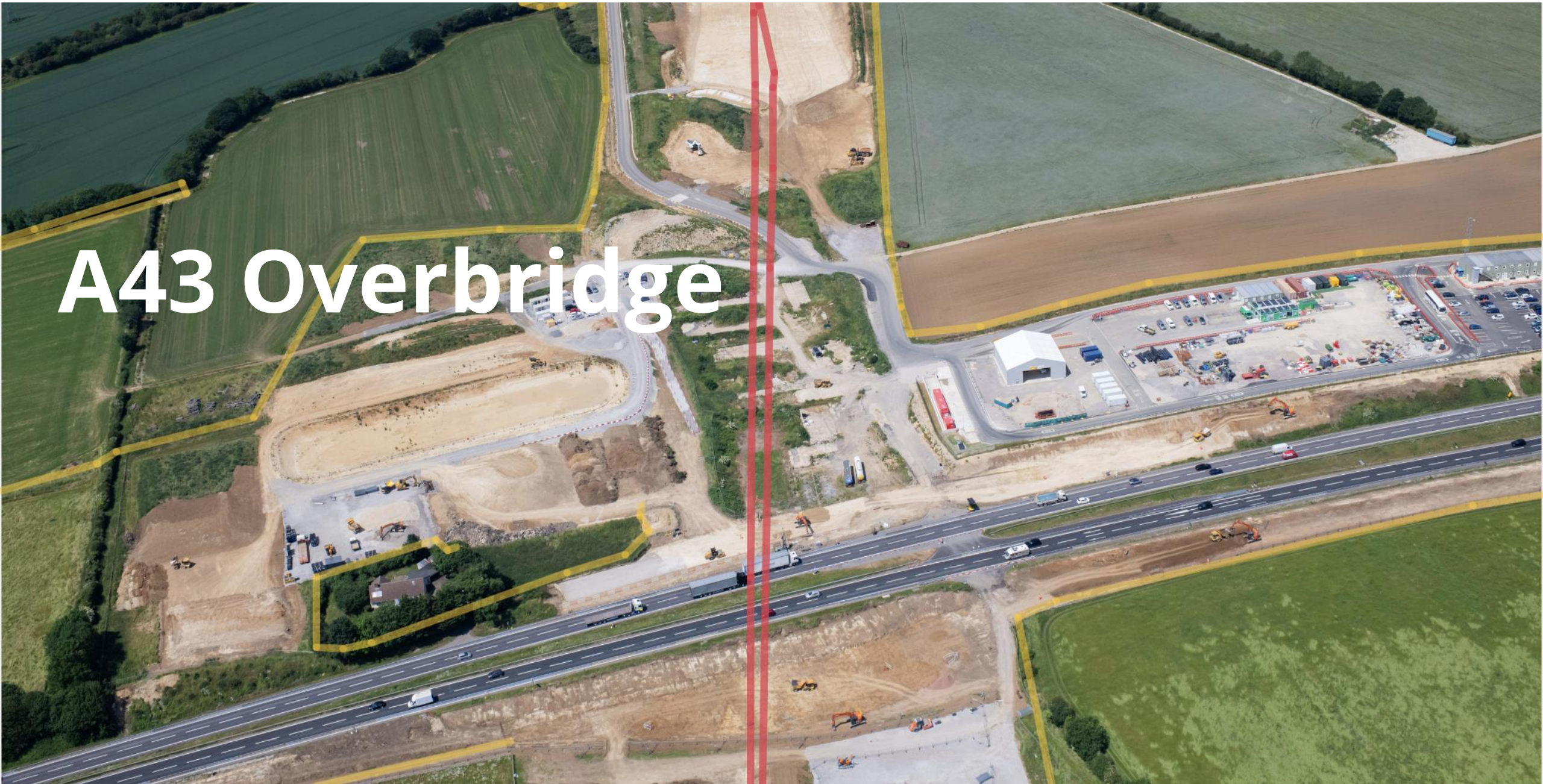
Respond promptly to any complaints and take appropriate action.

Contact our HS2 Helpdesk team on **08081 434 434**

Newsletter Update

Advance Work Notice

A43 Overbridge



Scheme Overview

Phase 1

May 2023-
November 2023



Weekend Closures

Planned NB-Friday 17th November
Planned SB-Friday 01st December
Contingency NB-Friday 08th December
Contingency SB-Friday 15th December



Phase 2

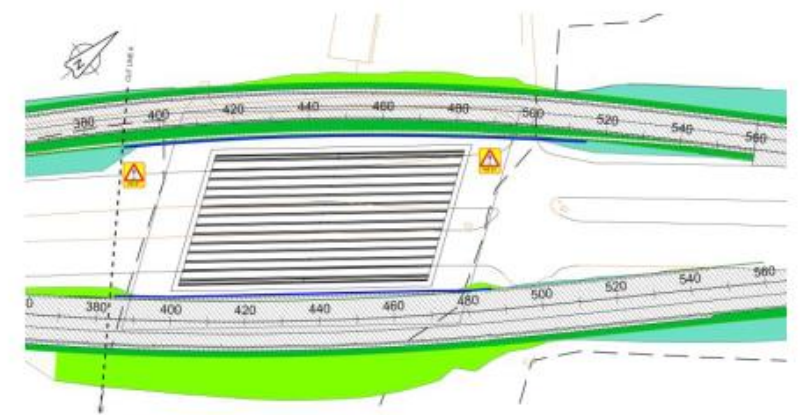
December 2023-
Spring 2025

Construction of temporary diversion route



- Installation of open cut drainage connections
- Tie in pavement detail between the temporary diversion route and the existing A43
- Realign exiting A43 onto the temporary diversion route

Construction of the permanent bridge



A43

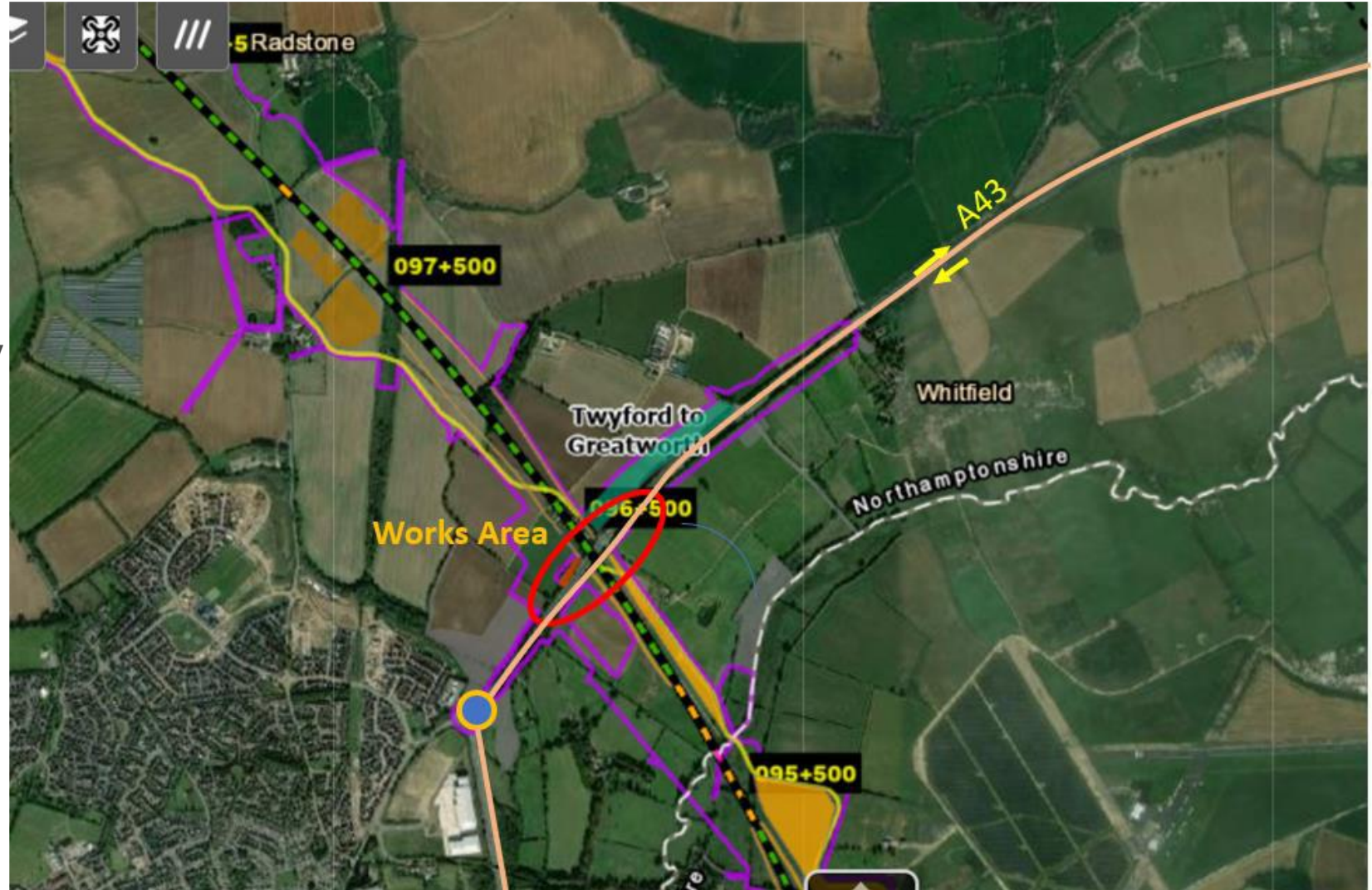
Current Activity

The **A43 northbound** will be closed **overnight** between:

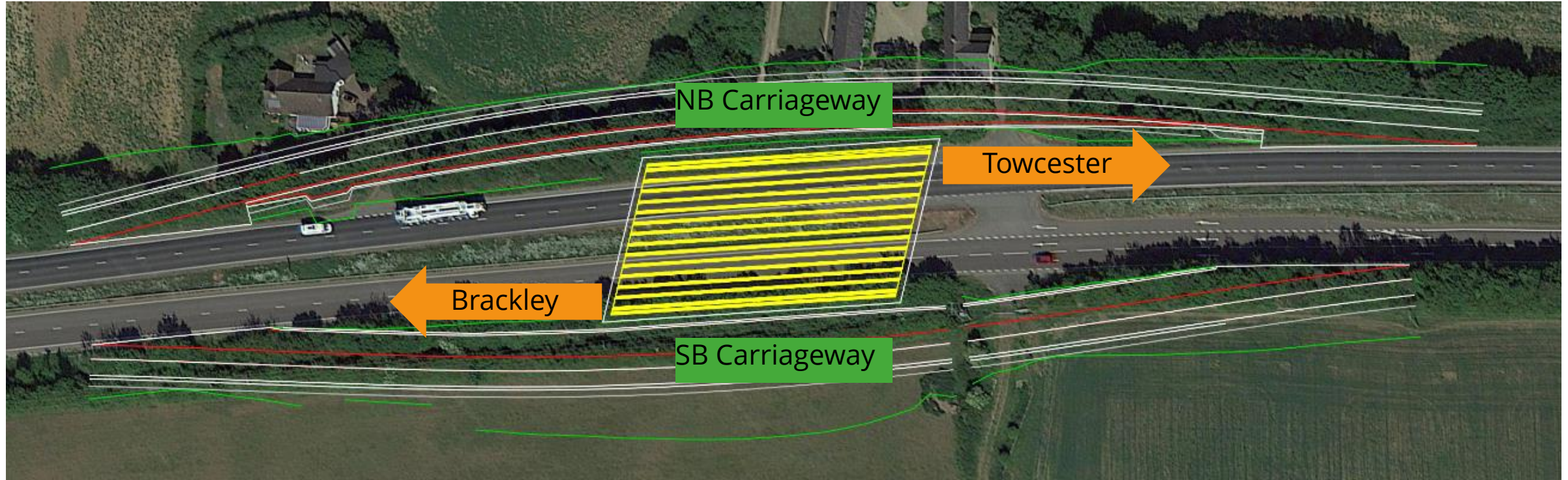
- 8pm and 6am :
 - **Monday 7 August to Saturday 12 August**
 - **Wednesday 6 September to Wednesday 27 September (weekdays)**

The **A43 southbound** will be closed **overnight** between:

- 8pm and 6am:
 - **Monday 14 August to Wednesday 6 September (weekdays)**
- Closures will not take place on Friday 25 August and Monday 28 August over the bank holiday weekend.



Scheme Location Overview



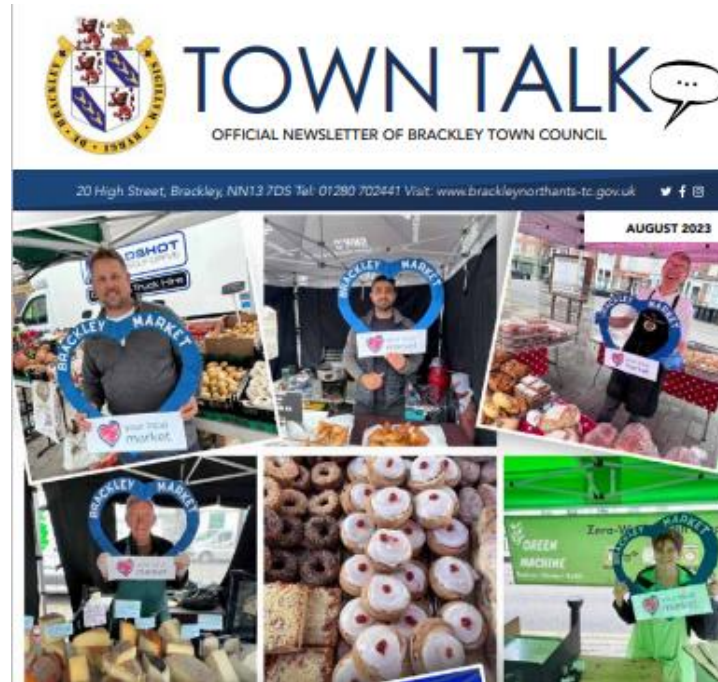
Engagement Planned & Forward Look

Mobile Visitor Centre



- Turweston – 25 August
- Westbury – 25 Augst, 16 Nov TBC
- Syresham – 5 October , 16 Nov TBC
- Helmdon – 2 Nov TBC
- Turweston – 5 Oct TBC

External Communications



- Advance Work Notice – June
- Summer Newsletter – A43 Specific , July
- Brackley Town Talk Magazine, July - Letter Drop - 7,000 Residential Properties & Businesses
- Advance Work Notice –August
- Autum Newsletter – A43 Specific, Oct
- Brackley Town Talk – Oct – Letter Drop - 7,000 Residential Properties & Businesses
- EKFB Works Update Newsletter – Sept
- Advance Work Notice – Oct

Meetings



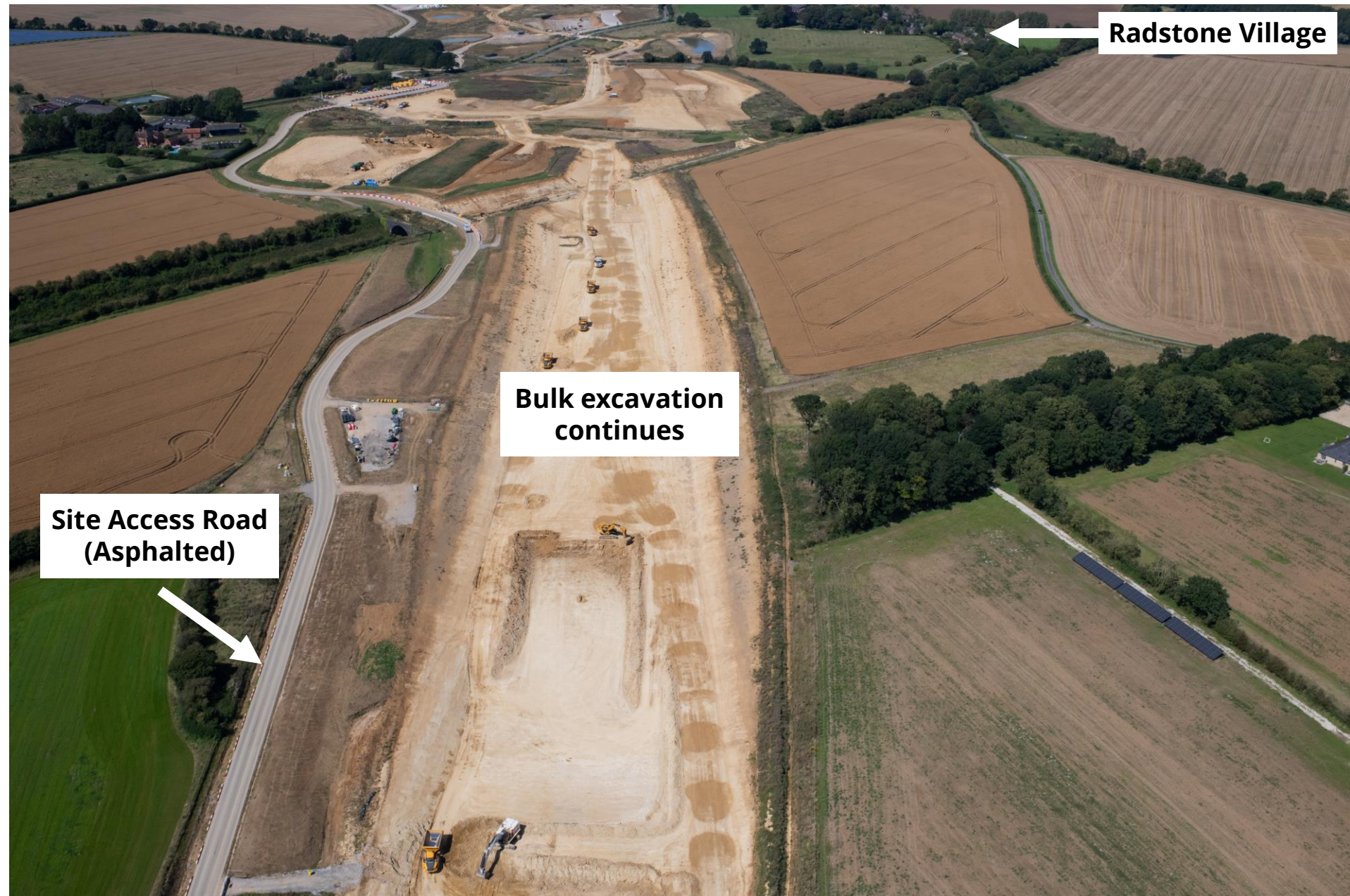
- Brackley UA3 Presentation, July – 127 attendees
- Regular Parish Council Meetings & Updates
- Regular Meetings with National Highways
- Brackley – Meet Our Experts Event –Nov TBC

Radstone

Radstone Rd Area Current Activity

Earthworks:

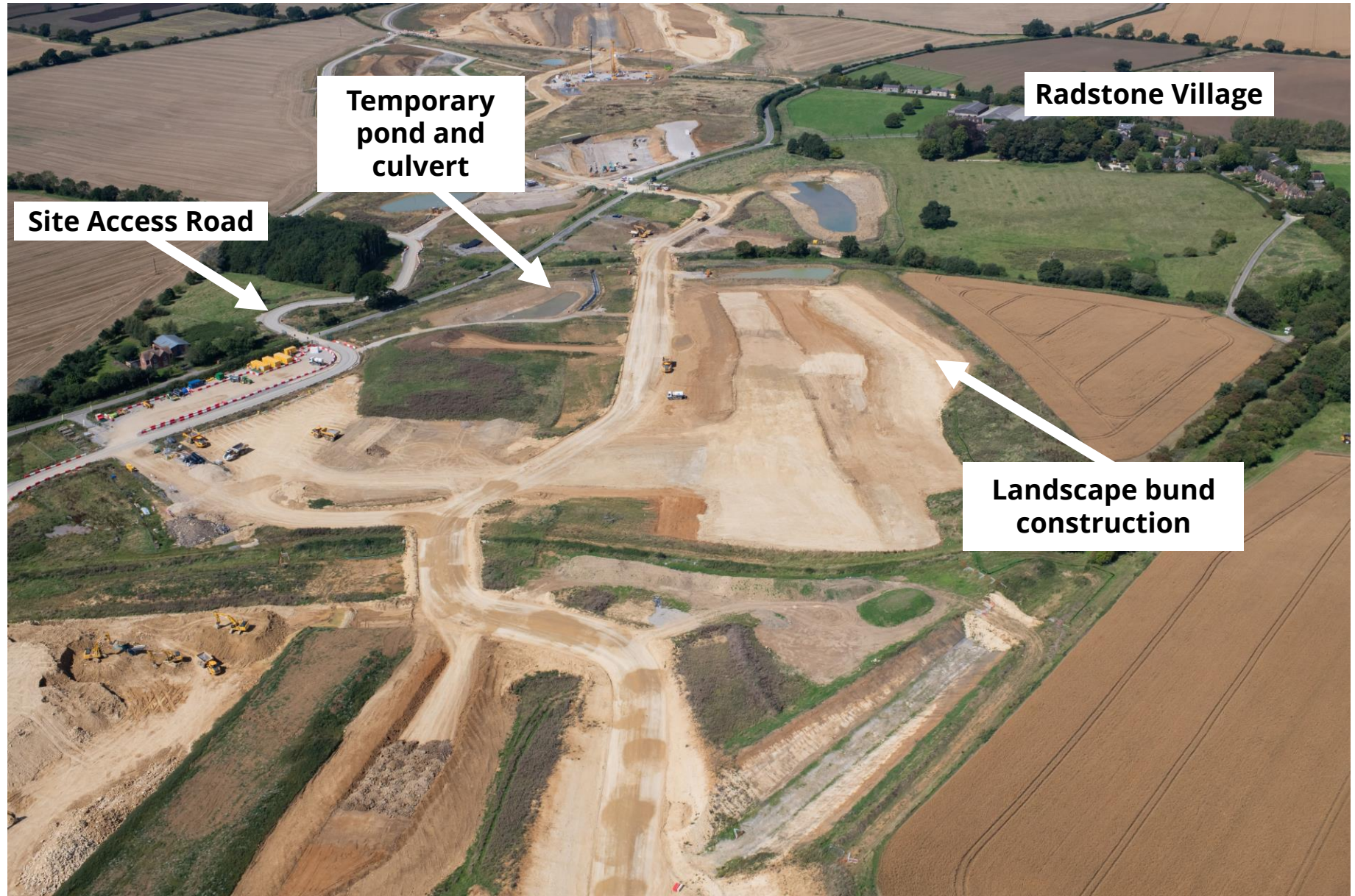
- Bulk excavation continues down towards track level
- Construction of temporary ponds



Radstone

Radstone Rd Area Current Activity

- Earthworks:
- Construction of the temporary pond and Brackley culvert.
- Construction of the permanent landscape bund by Radstone village.
- Bulk excavation on the cutting and movement of material continues.



Radstone

Radstone Rd Area

Current Activity

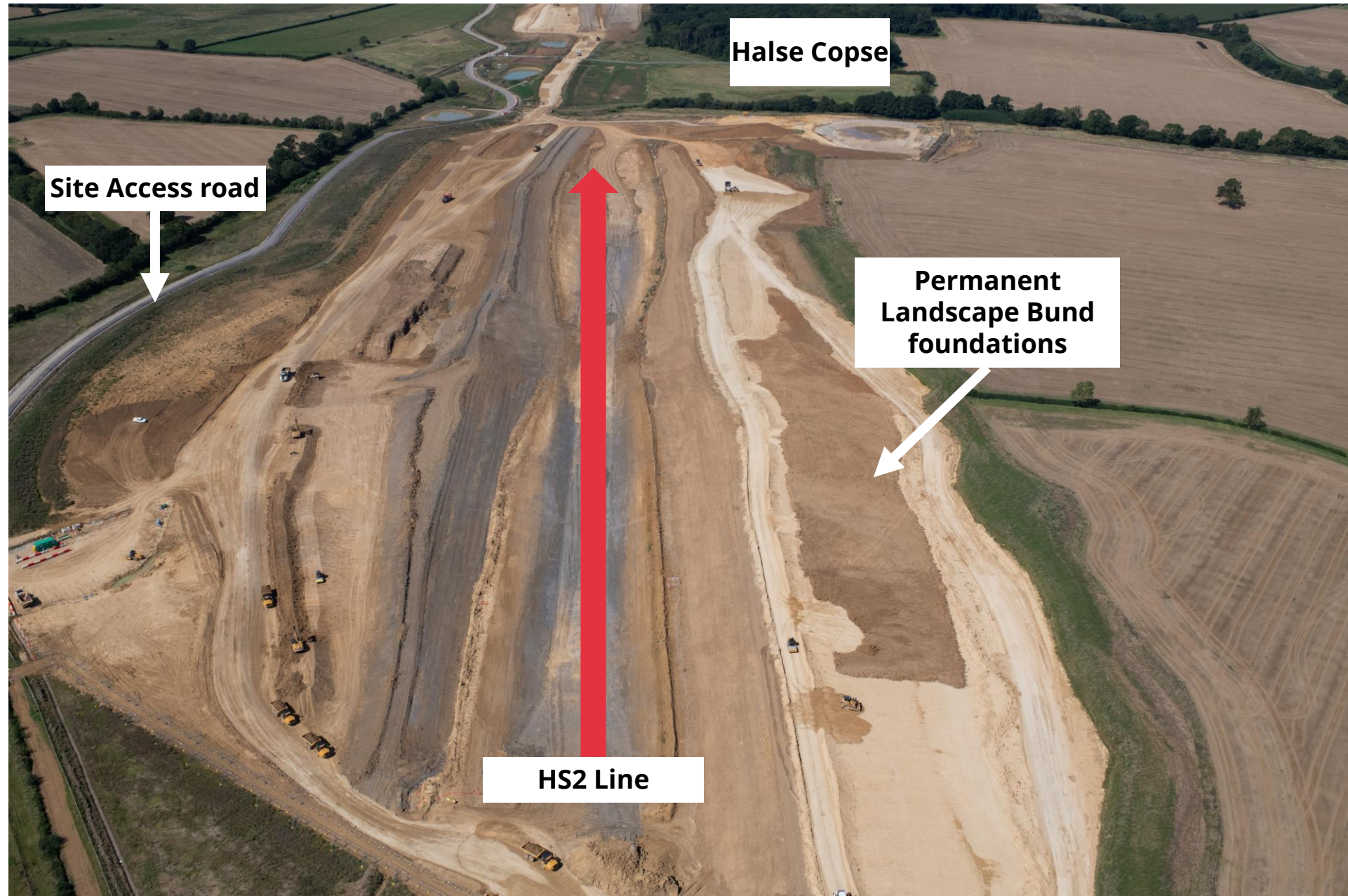
- Radstone overbridge piling update:
 - Piling complete (99)
- Bridleway AX18 Piling completed.
- Bulk excavation –
Continues



Halse

Halse Copse to Radstone Area 2023 Activity

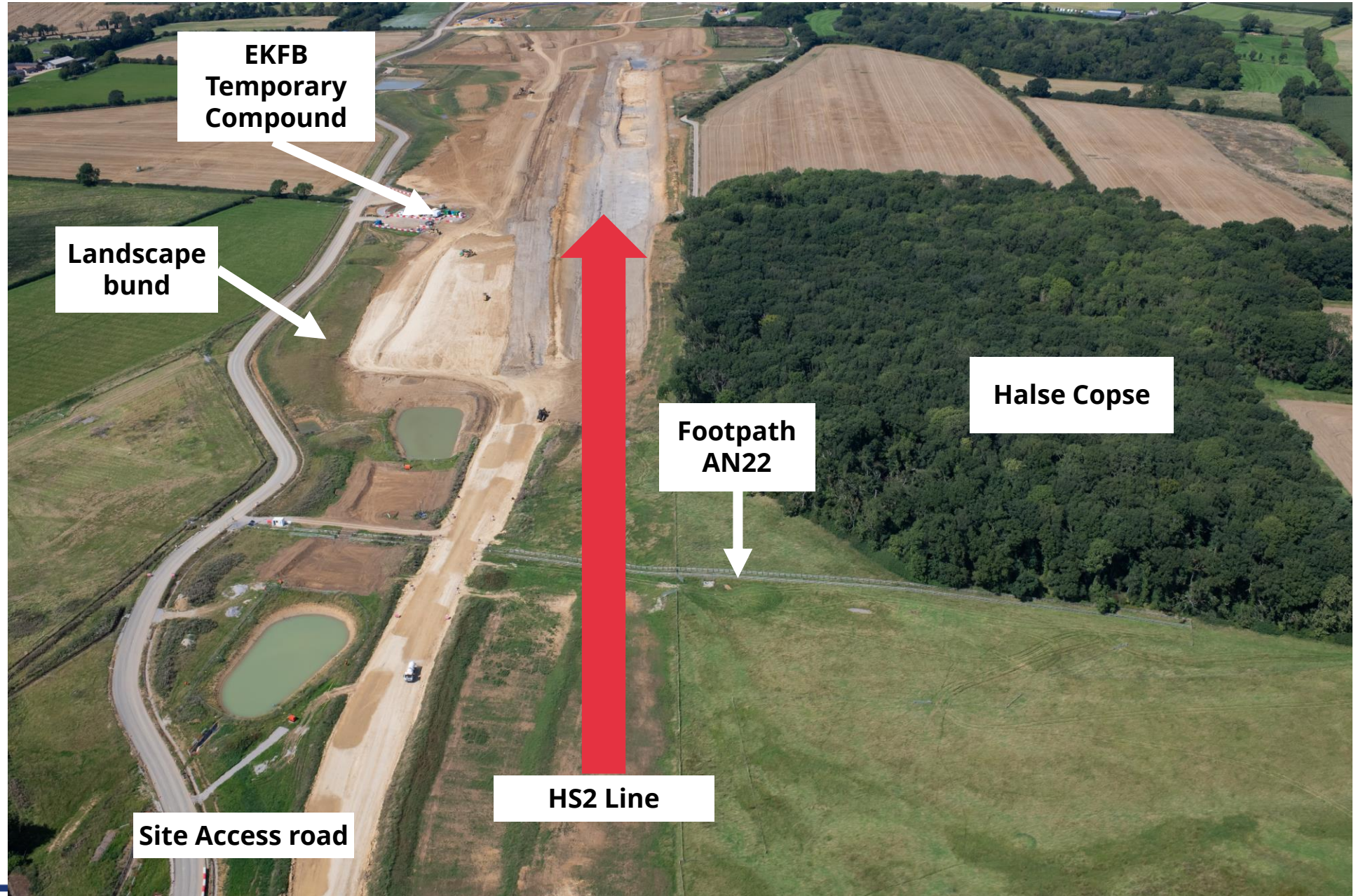
- Earthworks:
 - Permanent landscape construction continue
 - Move stockpile to Greatworth



Halse

Halse Copse Area 2023 Activity

- Earthworks;
 - Bulk excavation & landscape bunds continue.
- Preparation for the AN22 footpath overbridge – Early 2025

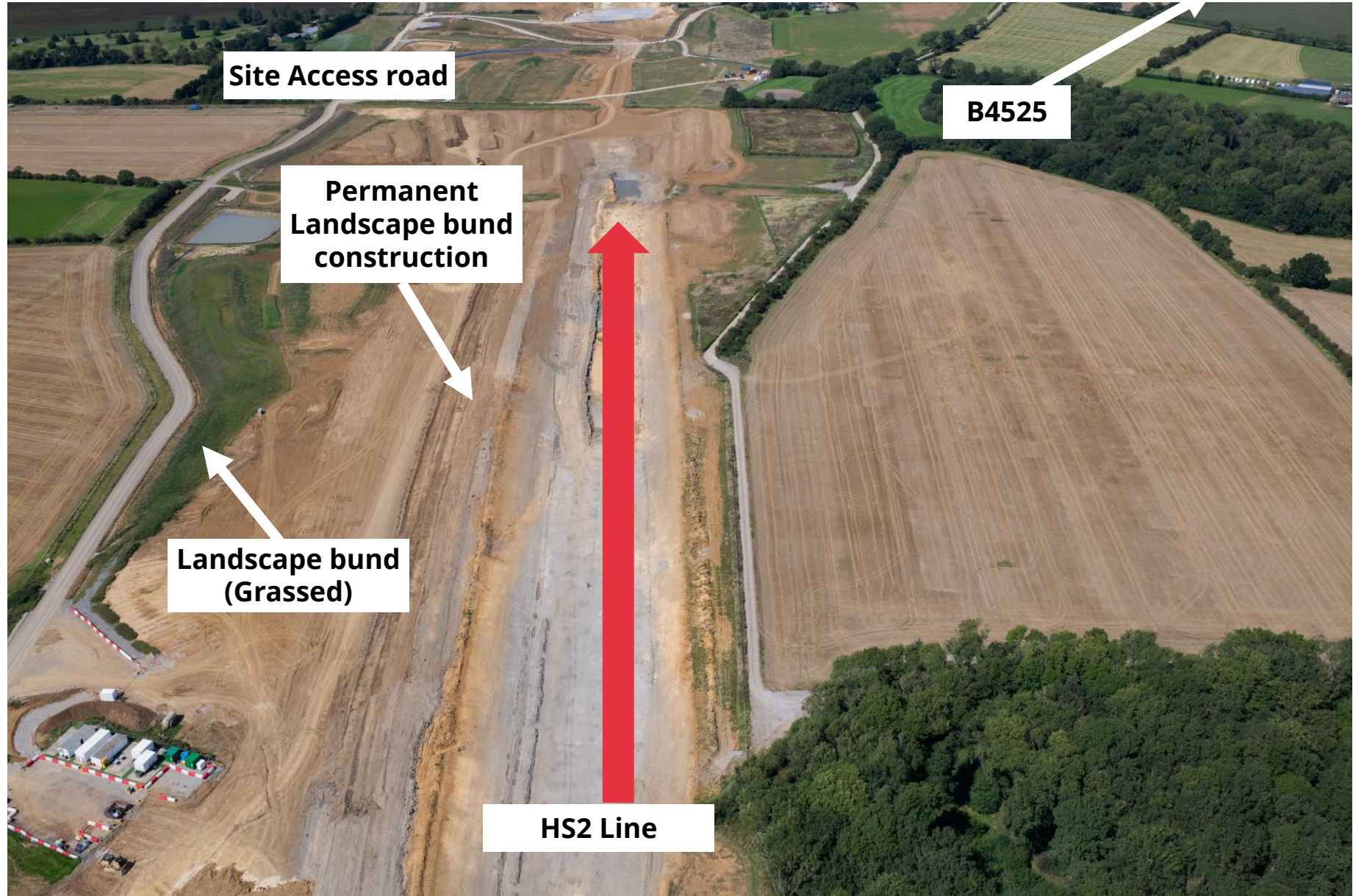


Halse

Cutting Area

2023 Activity

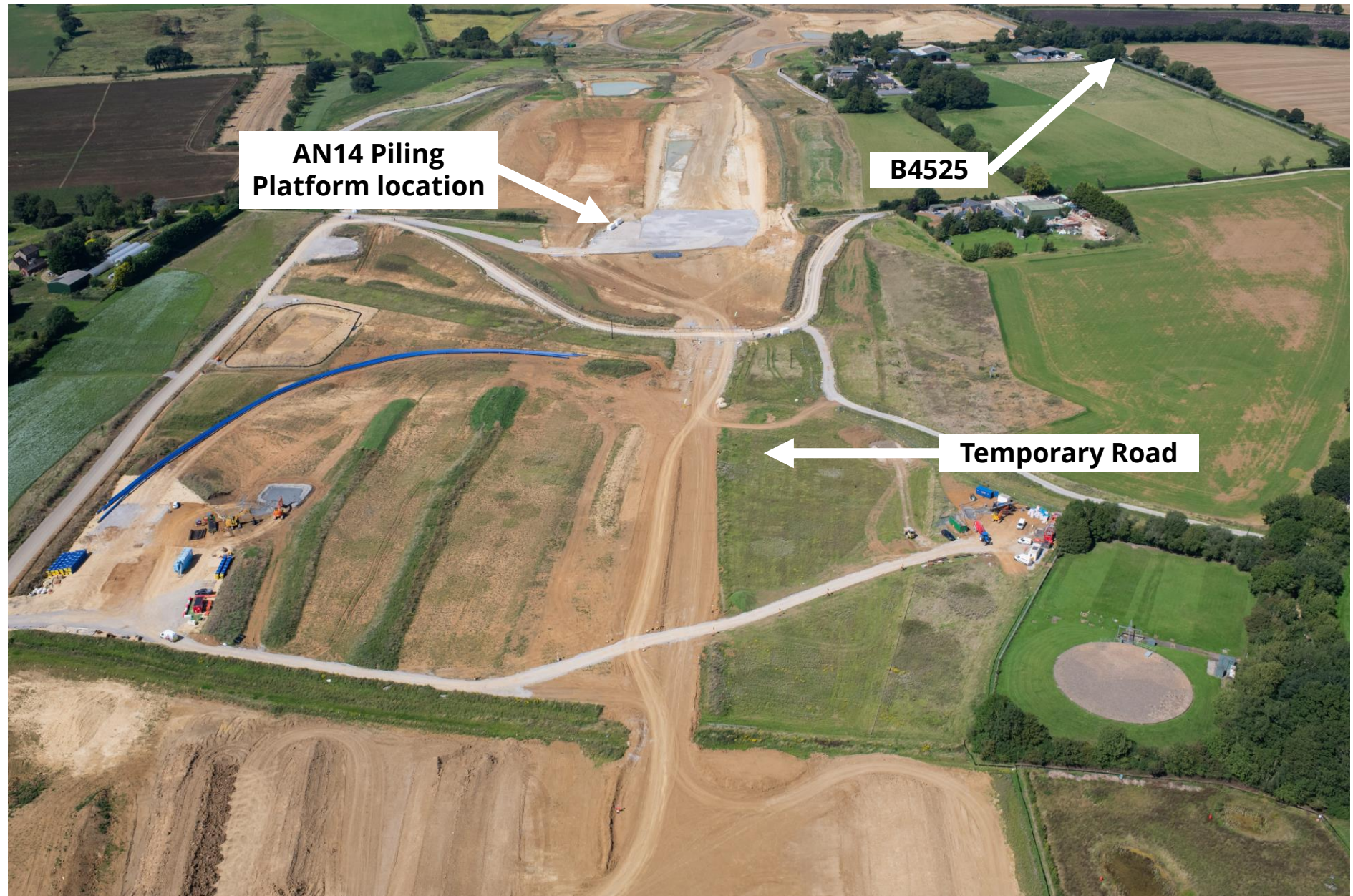
- Temporary Landscape bunds constructed, which have now germinated to support with visualisation.
- Excavation of the cutting and creation of permanent landscape bunds.
- The permanent bund will be 5 meters high.



Halse

2023 Activity

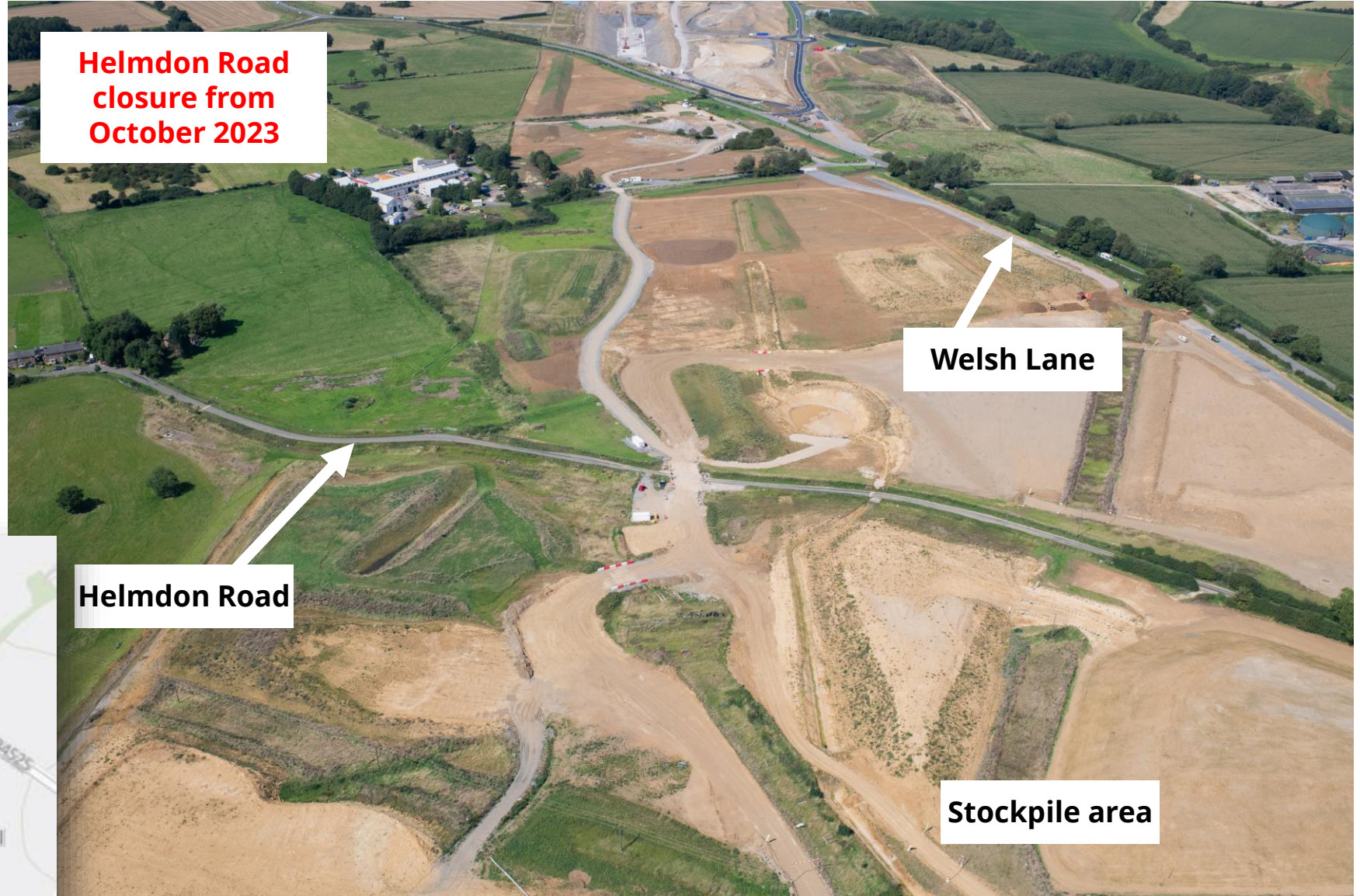
- AN14 Accommodation overbridge preparation:
- Earthworks continue
- AN14 piling have completed - Eight piles to support the structure
- Local water diversion ongoing



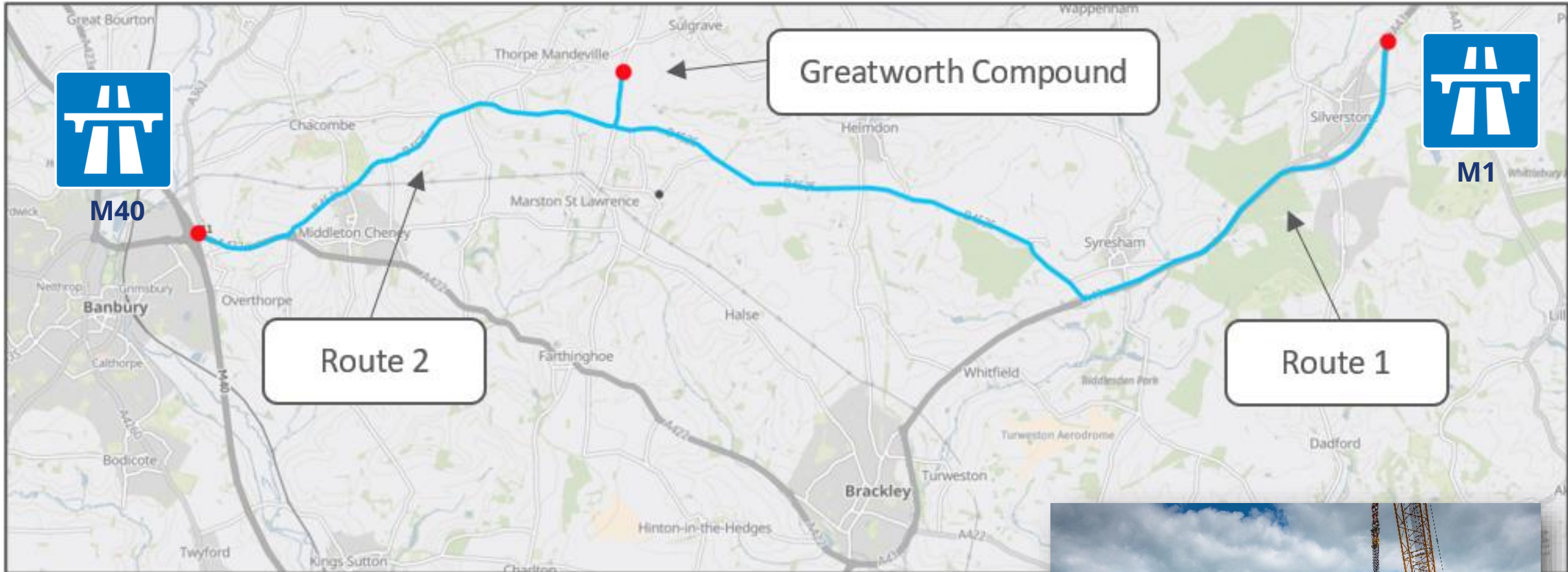
Greatworth

Helmdon Road Area

- Helmdon Road closure October 2023
- Stockpile area
- Tunnel excavation to commence



Pre-cast tunnel section deliveries



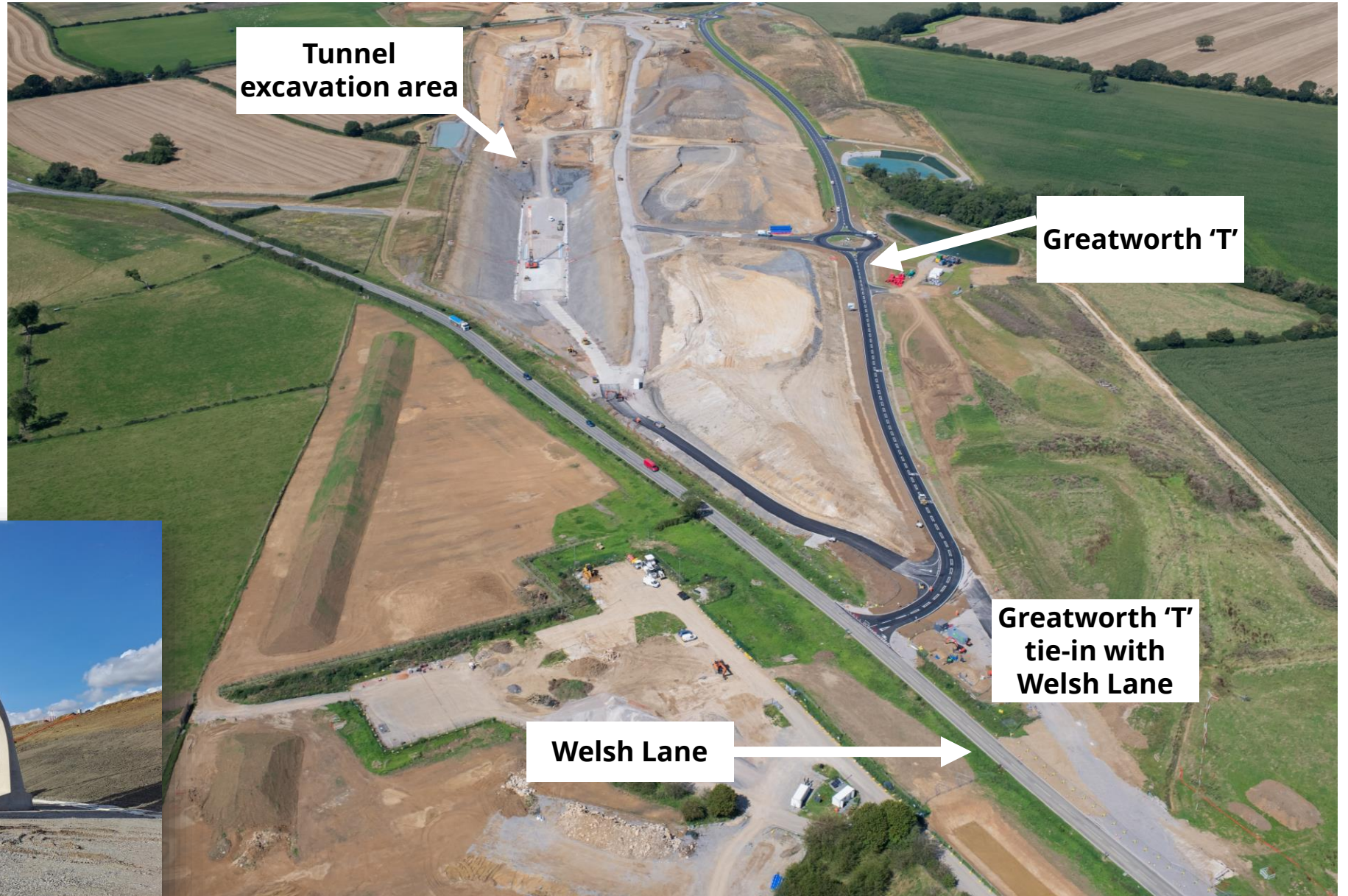
- Gradual increase to approximately 10 deliveries per day
- No escort required.
- Powerful and efficient HGV's travelling at normal highway speeds



Greatworth

2023 Activity

- Tunnel excavation is ongoing.
- First pre-cast tunnel sections are being installed

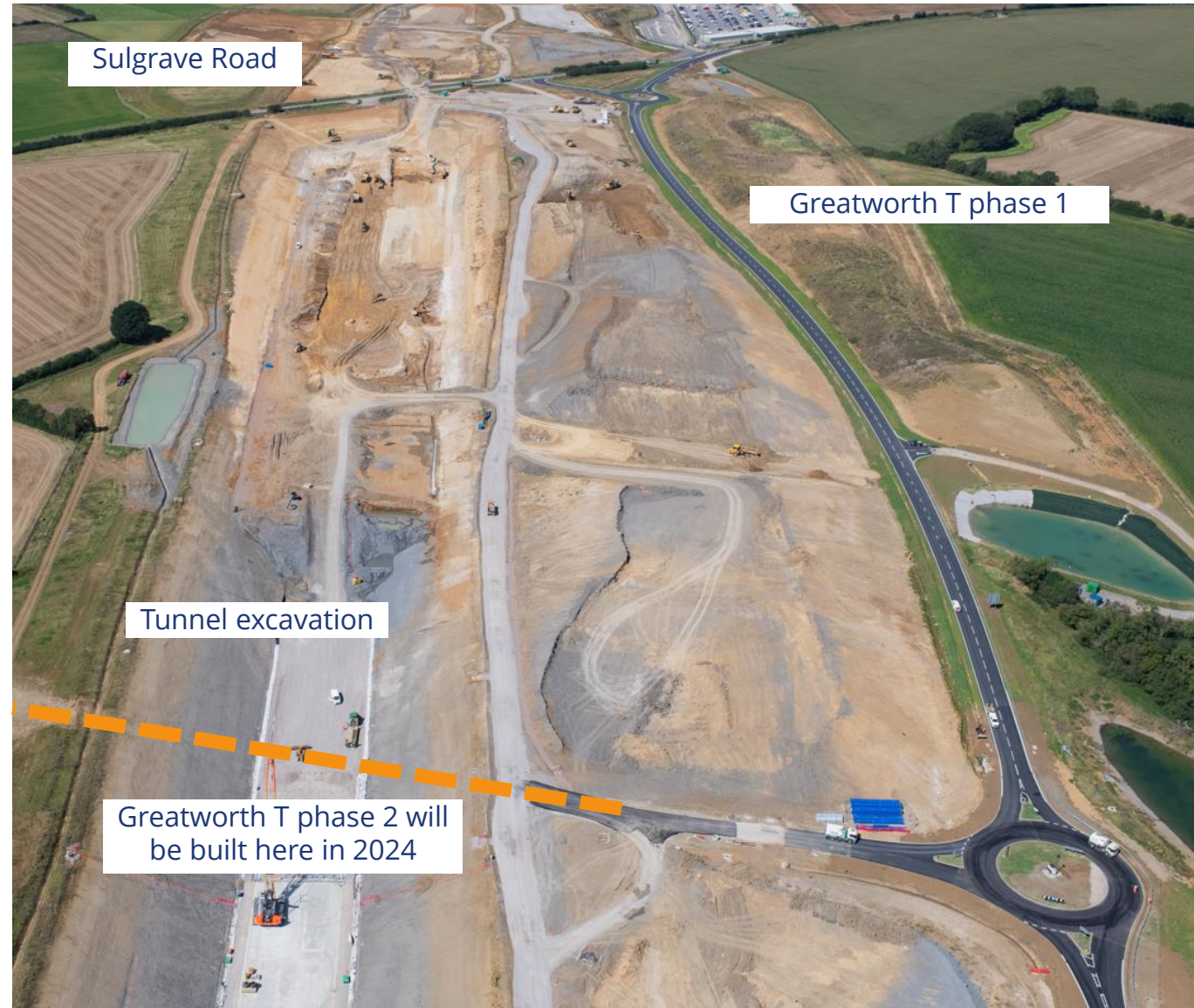


First tunnel segments installed at Greatworth

Greatworth Temporary Road

Greatworth T opening

- Detailed inspection and sign-off process.
- Some technical issues to resolve prior to opening.
- We anticipate the new road to open in late October.

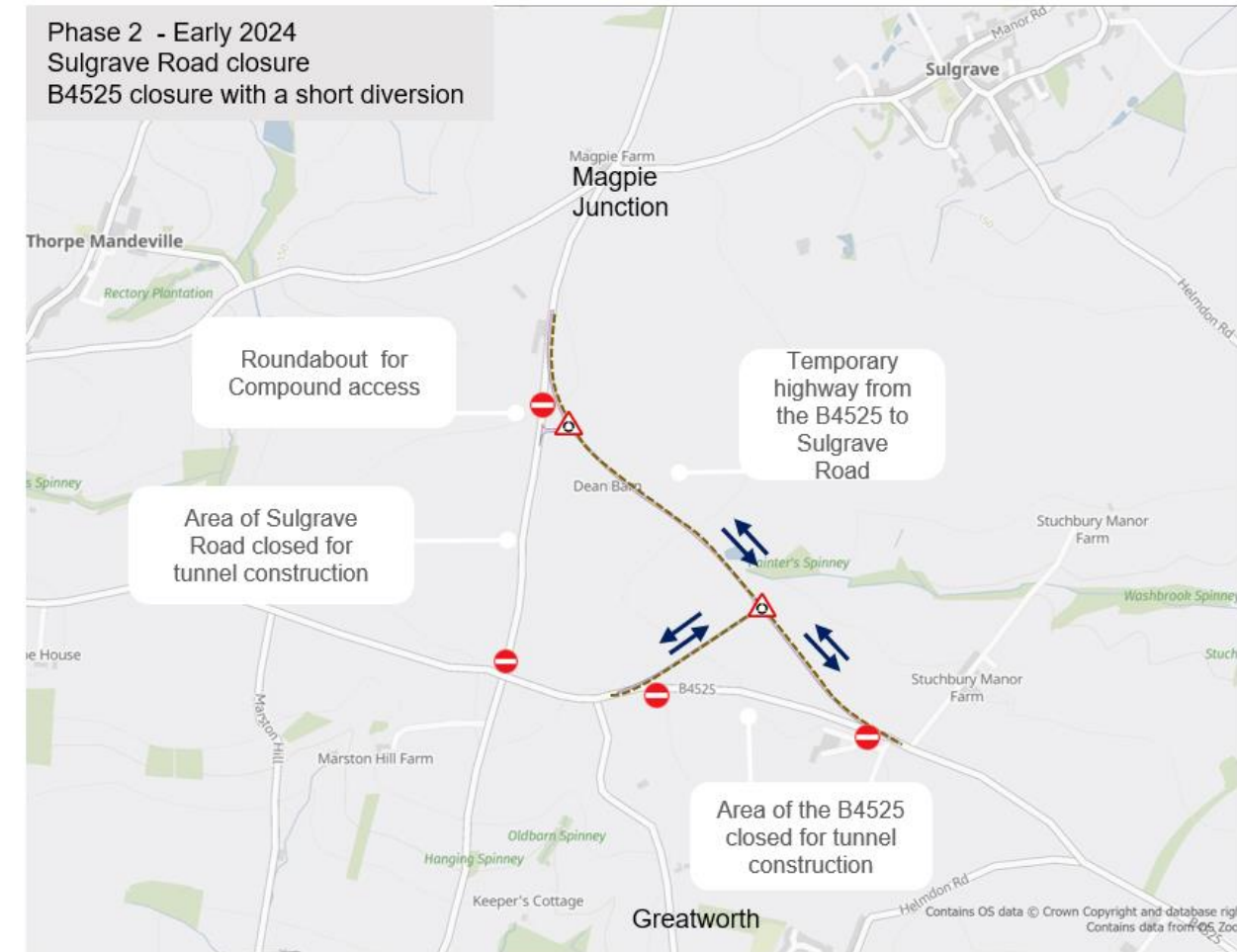


Greatworth T layout

Phase 1 – Autumn 2023



Phase 2 – Early 2024



Sulgrave

2023 Activity

- Greatworth T
- Tunnel excavation
- Tunnel Segments are now being delivered.



Lower Thorpe

Viaduct Area 2023 Activity

- Piling
- Drainage improvement
- Utility diversions
- Viaduct construction
- Earthworks
- Diverted utility connections



Culworth Road area (Chipping Warden)

2023 Activity

- Tunnel excavation now extending south of the A361.
- Culworth Road 4 week closure for drainage works (October)

Look ahead to 2024

- Culworth Road permanent closure, known as 'Stopping off)



Chipping Warden / A361

Backfilling with earth:
September 2023 – Spring 2024

Realigned A361 construction:
April 2024 – October 2024

Highway open to traffic:
Autumn 2024



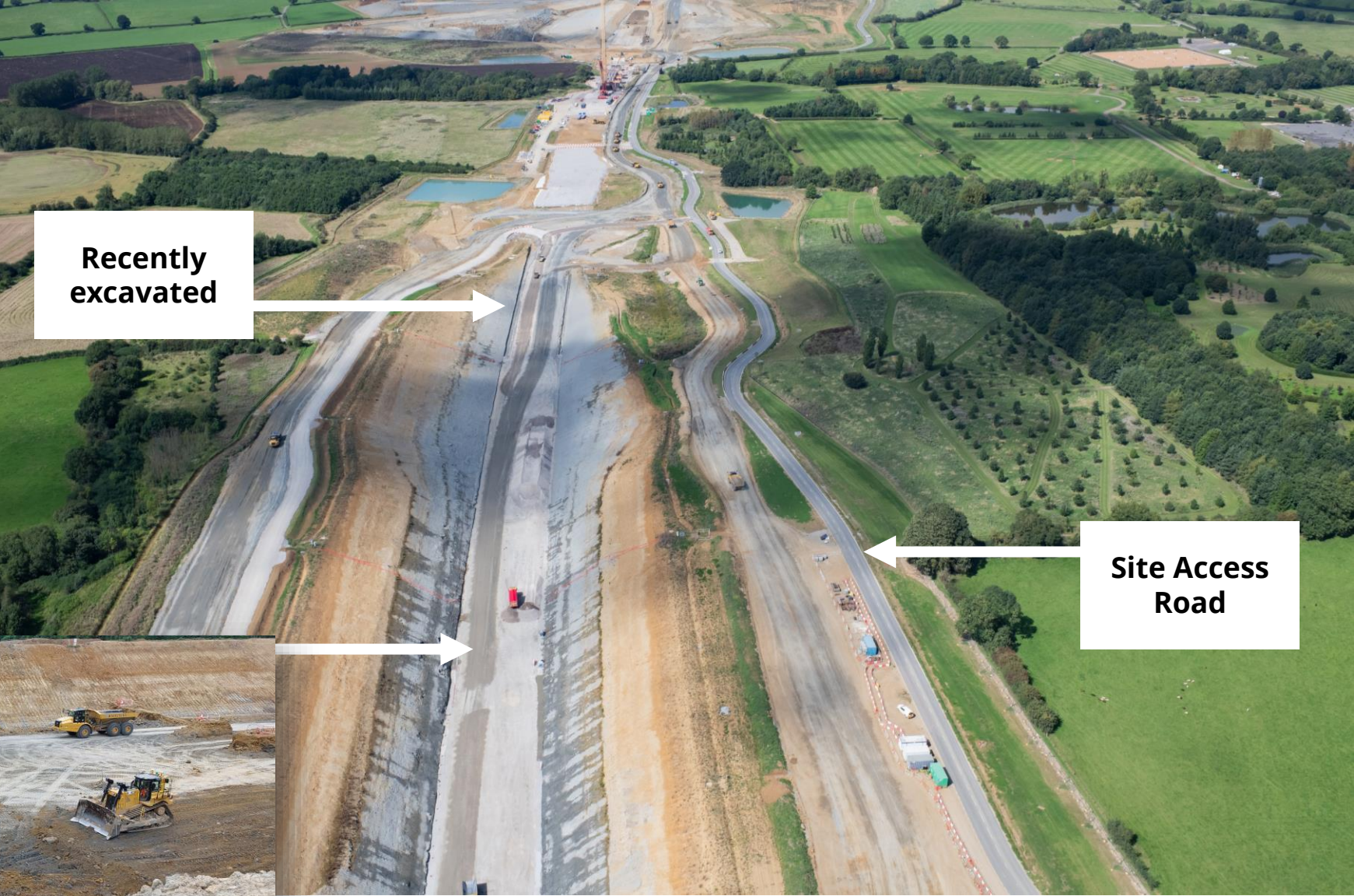
Precast Segment Laydown Area

Realigned A361

Aston Le Walls

2023 Activity

- Ongoing tunnel construction
- Preparations for precast sections.



Recently excavated

Site Access Road



Highfurlong Viaduct

2023 Activity

- Beam installation

Precast concrete beam sections: delivery in late July - August



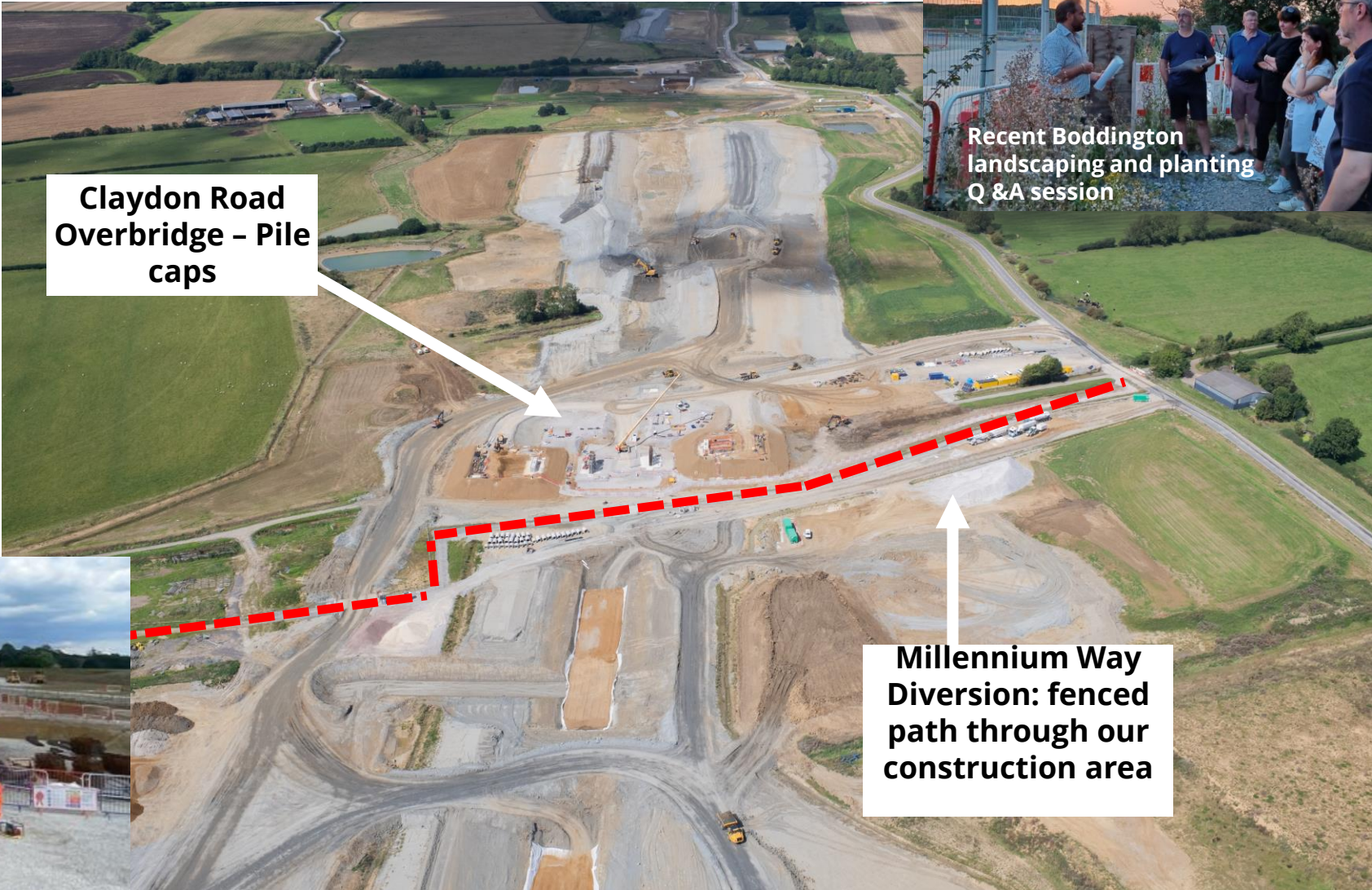
Piers for Highfurlong Brook Viaduct



Boddington Area

2023 Activity

- Claydon Overbridge
- Piling
- Millennium Way footpath remains open.



Claydon Road Overbridge - Pile caps

Millennium Way Diversion: fenced path through our construction area



Recent Boddington landscaping and planting Q &A session

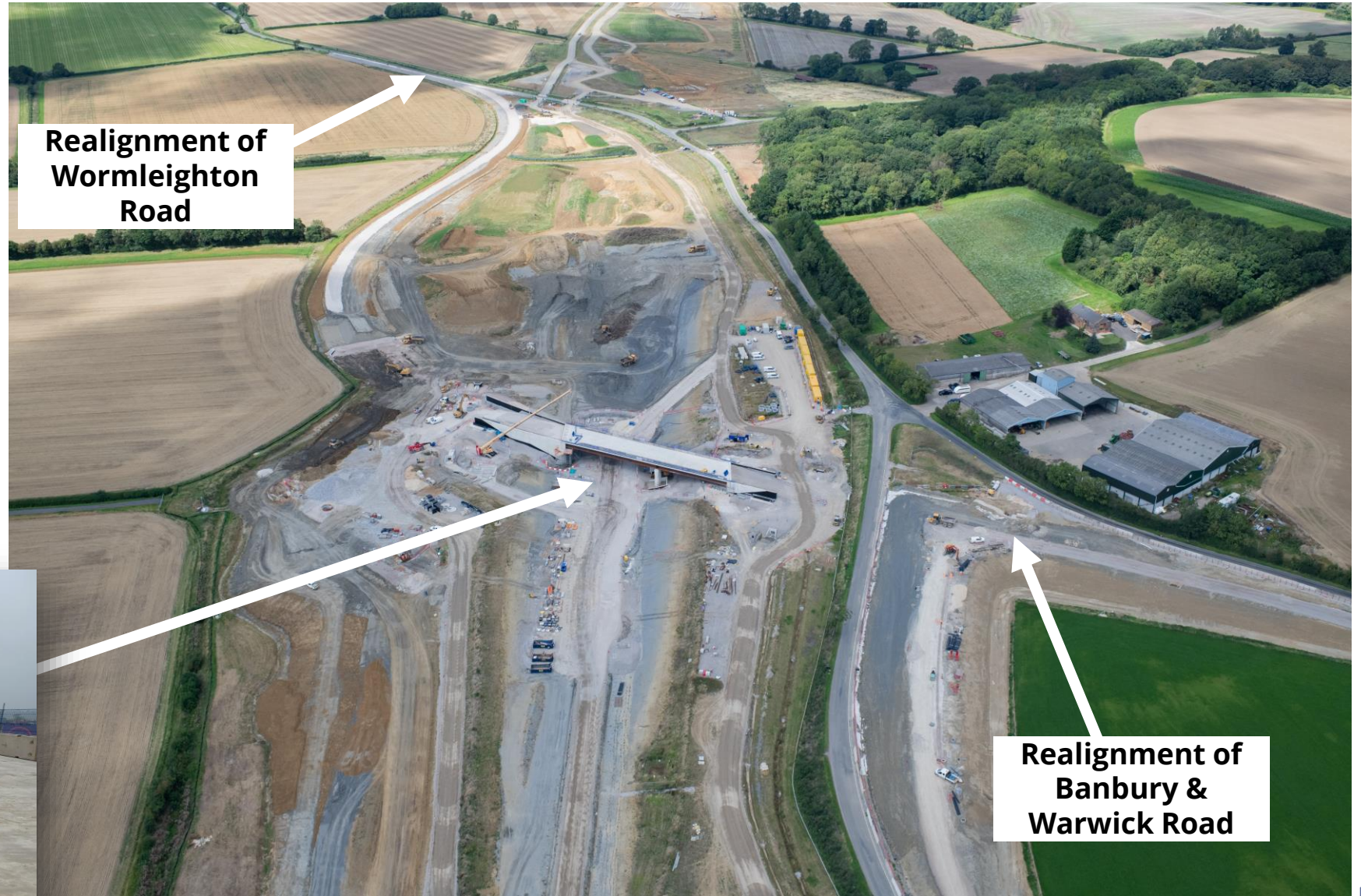


Northamptonshire / Warwickshire Border

Banbury Road

2023 Activity

- Bridge construction
- Highway realignment
- Tie-in works:
 - Wormleighton Road
 - Banbury Road
 - Stoneton Lane



Realignment of
Wormleighton
Road

Realignment of
Banbury &
Warwick Road

Banbury Road Overbridge
Deck completion



Highway connections

Banbury Rd
Wormleighton Rd



HS2

Works update

15 September 2023

Chris James – EKFB Senior Engagement Manager

Dave Butcher – T2G - Engagement Manager, EKFB

