

HS2

Yarnfield and Cold Meece Parish Council, Stone Town Council and Chebsey Parish Council

HS2-HOL-023

Petition paragraph 3.1 – Aldersey's Rough

The case for the siting of the Railhead and IMB-R at Aldersey's Rough instead of Stone was heard by the House of Commons Select Committee in April 2018.

The Select Committee heard evidence from both Stone Town Council and Chebsey Parish Council and the Promoter on the alleged engineering, operational and environmental advantages of Aldersey's Rough as an alternative location to Stone for the Railhead and the IMB-R.

On 24 May 2018 the Select Committee announced their decision. Having considered the evidence, the Select Committee set out in its First Special Report that the proposal to site the Railhead and IMB-R at Stone should not be changed.

Paragraph 30 of the House of Commons Select Committee's Second Special Report of Session 2017 - 2019 (July 2018) states that:

"The Committee confirms its "in principle" decision that the Infrastructure Maintenance Base-Railhead should be sited as is proposed in the Bill Scheme at Stone."



Petition paragraph 2.3 – AP2 programme

The Promoter considers that the design for the construction of the Stone Railhead and IMB-R is a practical proposition in civil engineering terms.

The Promoter is satisfied that it can be constructed and brought into use within the proposed construction programme.

The indicative construction programme shows completion of the Stone Railhead/IMB-R earthworks and associated structures within that programme.



Petition paragraph 2.3 – AP2 programme

Stone and Swynnerton	2020 Quarters				2021 Quarters				2022 Quarters				2023 Quarters				2024 Quarters				2025 Quarters				2026 Quarters				2027 Quarters			
Construction Activity	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Advanced Works																																
Yarnfield North Embankment satellite compound																																
Site preparation and set-up																																
Worker Accommodation																																
Demolitions																																
Utilities																																
Yarnfield Lane underbridge																																
Yarnfield Lane IMB-R underbridge																																
Yarnfield Lane M6 overbridge replacement and realignment																																
Yarnfield Lane M6 demolition																																
Stone railhead/IMB-R earthworks																																
Norton Bridge to Stone Railway underbridge																																
Filly Brook West underbridge																																
Norton Bridge to Stone Railway viaduct																																
Railhead Structures																																
IMB-R Structures																																
Yarnfield Lane auto-transformer station foundation																																
Yarnfield North embankment																																
Site reinstatement																																



Petition paragraph 2.4 - excavated material volumes

The Petitioners assert that they have “comprehensive evidence that HS2 has severely under-estimated the amount of material that will need to be excavated at the site, whilst over-estimating the quantity of excavated material that can be reused as engineering fill.”

On 27 September 2019 the Promoter asked the petitioners to provide the “comprehensive evidence” so that the Promoter could review it in advance of the petitioners’ appearance before the Select Committee.

On 16 January 2020 the Petitioners provided the Promoter with their evidence.

On 11 March 2020 the Promoter responded to that evidence in the report entitled “Response to Stone Railhead Crisis Group summary of excavated materials evidence and actions from meeting with Yarnfield and Cold Meece Parish, Stone Town and Chebsey Parish Councils”.

As set out in later correspondence issued to the Petitioners, the Promoter does not consider that the Petitioner's evidence demonstrates either that HS2 has severely underestimated the amount of material that would need to be excavated at this site, or overestimated the quantity of excavated material that can be reused as engineering fill.



Petition paragraph 2.4 - excavated material volumes

The estimated amount of material that would need to be excavated at the Stone IMB-R site is based on a comprehensive desk study of available information together with volumetric assessment based on the design geometry.

On 17 December 2019 the Promoter provided the Petitioners with a report which summarised the relevant findings of the desk study for the Stone Railhead/IMB-R construction site.

At the request of the Petitioners, on 16 January 2020 the Promoter provided the Petitioners with a copy of the Phase 2a route wide geotechnical desk study.

The quantity of excavated material that can be reused as engineering fill is based on published information and previous experience of working with these materials. There would not be large quantities of excavated material requiring off-site disposal because of its unsuitability for engineering reuse.

The Promoter's current estimate is that less than 1000m³ of excavated materials would require off-site disposal.



Petition paragraph 2.5 - Stone IMB-R ground conditions

HS2 Ltd's geotechnical desk study predicts the following ground conditions in the area of the proposed footprint of the IMB-R embankment and adjacent HS2 railway embankment:

- An extensive area of ground with poor geotechnical properties ('poor ground') in the Filly Brook valley associated with the alluvial deposits there and with the infilled Darlaston Pool.
- Localised areas of 'poor ground' associated with former ponds and mineral workings and a former landfill.

Prior to the results of preliminary ground investigations, the design for the IMB-R and adjacent HS2 railway embankments includes:

- 0.17 million m³ of ground treatment comprised of the excavation of the 'poor ground' and replacement with high quality granular material; and
- 0.10 million m³ of embankment starter layers (high quality granular material) where the HS2 railway embankments are built on the sides of the Filly Brook valley (over less 'poor ground').

The required high quality granular material will be imported via the Yarnfield North Embankment Transfer Node.



Petition paragraph 2.5 - Stone IMB-R ground conditions – post-draft PGI preliminary interpretation

The findings of the preliminary interpretation of draft PGI results can be summarised as follows;

- Some of the risks previously identified from desk study information have materialised and have been confirmed by the draft PGI.
- In the Filly Brook valley near Pool House Farm, the depth of soft ground which will require treatment will be greater than expected from the desk study information; however, the footprint area of the soft ground is similar to that expected from the desk study data.
- The draft PGI has shown that the glacial meltwater channel in the Filly Brook valley near Pool House Farm is deeper than expected from the desk study data, but most of this natural channel infill material will not require treatment.
- Artesian groundwater conditions were encountered during the draft PGI and subsequent groundwater monitoring in the Filly Brook valley near Pool House Farm.
- The draft PGI results accord with historical GI data near the northern end of the Yarnfield Lane bridge over the M6 motorway and confirm that significant depths of soft ground is present. Therefore, a small additional area of ground treatment (footprint area of approximately 4,600 m² and an estimated volume of 14,300 m³) will be required at the north-eastern end of the proposed Yarnfield Lane Bridge over the M6 motorway to increase the strength of the ground there.



Implications of draft PGI findings for ground treatment design at and near Stone IMB-R

Ground treatment can either be achieved by excavating the soft ground and replacing it with material with better stiffness characteristics, or by using an in-situ method to improve its strength and stiffness.

The AP2 earthworks design assumes that ground treatment is required at several locations at and near the Stone IMB-R and the ground treatment method adopted in the AP2 design comprised the excavation of soft ground and replacement with granular fill.

The draft PGI has confirmed that the excavate and replace ground treatment method is suitable for areas away from the part of the Filly Brook valley near Pool House Farm, where the soft ground deposits have been confirmed as being up to an average of two metres thick.

The draft PGI has confirmed artesian groundwater conditions and a greater thickness of soft ground in the Filly Brook valley near Pool House Farm. In this area an in-situ ground improvement method would be a more appropriate ground treatment method than the excavate and replace method originally proposed in the AP2 design.

If an in-situ ground improvement method were to be adopted, there would also be a reduction in the amount of granular material that would need to be imported as backfill to ground treatment excavations. This could reduce the number of HGV and articulated dump truck site traffic movements through Yarnfield North Embankment Transfer Node and could be achieved within the powers of the Bill and in accordance with the HS2 Environmental Minimum Requirements.

Monitoring of groundwater levels is ongoing and further hydrogeological studies will be required at the next design stage to inform the ground treatment design.



Petition paragraph 2.5 - Stone IMB-R ground conditions

The design assumes that the IMB-R embankment and most of the headshunt embankments would be built out of normal quality cohesive material rather than the high quality granular material required for mainline high speed embankments.

Based on the desk study, the cuttings for the IMB-R, headshunt and adjacent HS2 mainline will be engineered within Mercia Mudstone with localised Head deposits.

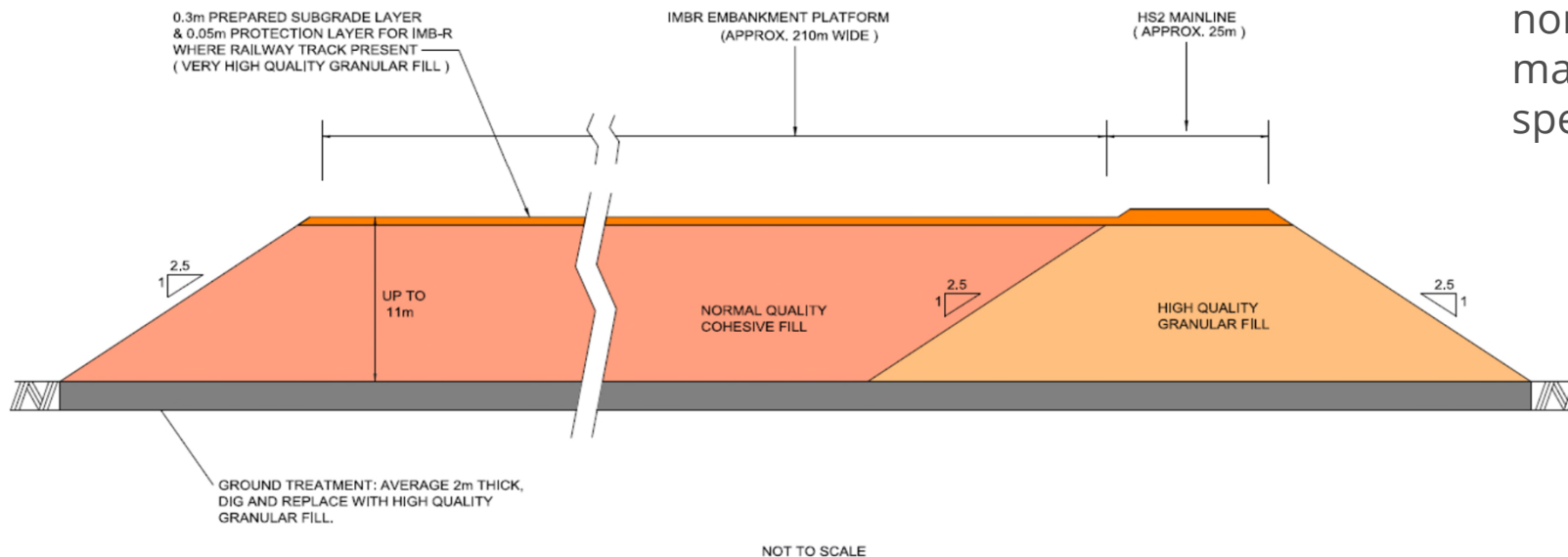
The design assumes that almost all material excavated from these cuttings would be reused as cohesive material or landscape material. This assumption is based on published information and previous experience of working with these materials.

Cohesive material would also be sourced from adjacent or nearby cuttings along the trace and would be moved via site haul roads to its required destination.



Petition paragraph 2.5 - Cross section of IMB-R Embankment

SKETCH CROSS - SECTION AT CH 221+100



The design assumes that the IMB-R and most of the headshunt embankments would be built out of normal quality cohesive fill material for normal low speed operation.



Petition paragraph 2.6 - HGVs and Transfer Node

A primary focus of AP2 was to reduce further HS2 construction traffic volumes on the local road network.

One measure that reduces HS2 construction traffic on the local road network is to route more traffic directly on to the Strategic Road Network (SRN). This includes:

- Provision of new slip roads onto the M6 motorway to be brought forward in the construction programme to reduce construction traffic volumes on the A34 and Yarnfield Lane (between the HS2 route and the A34).
- Two bridges to be maintained on Yarnfield Lane across the M6 motorway during the busy period of construction enabling the existing Yarnfield Lane M6 overbridge to be used as an internal site haul route only.

In addition Smart Motorway improvements on the M6 have been forecast by Highways England to be complete by Spring 2022. The improvements would upgrade the M6 motorway from three lanes to four lanes through the introduction of all lane running.



Petition paragraph 2.6 - HGVs and Transfer Node

During the construction period the Yarnfield North Embankment Transfer Node is used for the import of material, the export of material, and the internal transfer of material within the site boundary.

- Imported material is transported to the transfer node via the M6 slips and site haul routes. Upon arrival at the transfer node, imported material is transferred to its destination along the trace via site haul routes.
- Material for export is transported to the transfer node via site haul roads and would exit the site via the M6 slips for disposal.
- Transfer of material involves movement of material from the transfer node to backfill borrow pits in CA4 and CA5. Vehicles would exit the transfer node via the M6 and access borrow pits principally via the A53 via M6 Junction 15 and A500 via M6 Junction 16.



Petition paragraph 2.6 - HGVs and Transfer Node

The AP2 ES (February 2019) reports average daily combined two-way vehicle trips during the busy period and within the peak month of activity for HGVs passing through the Yarnfield North Embankment Transfer Node.

These HGV vehicle trips are generated by the following activities:

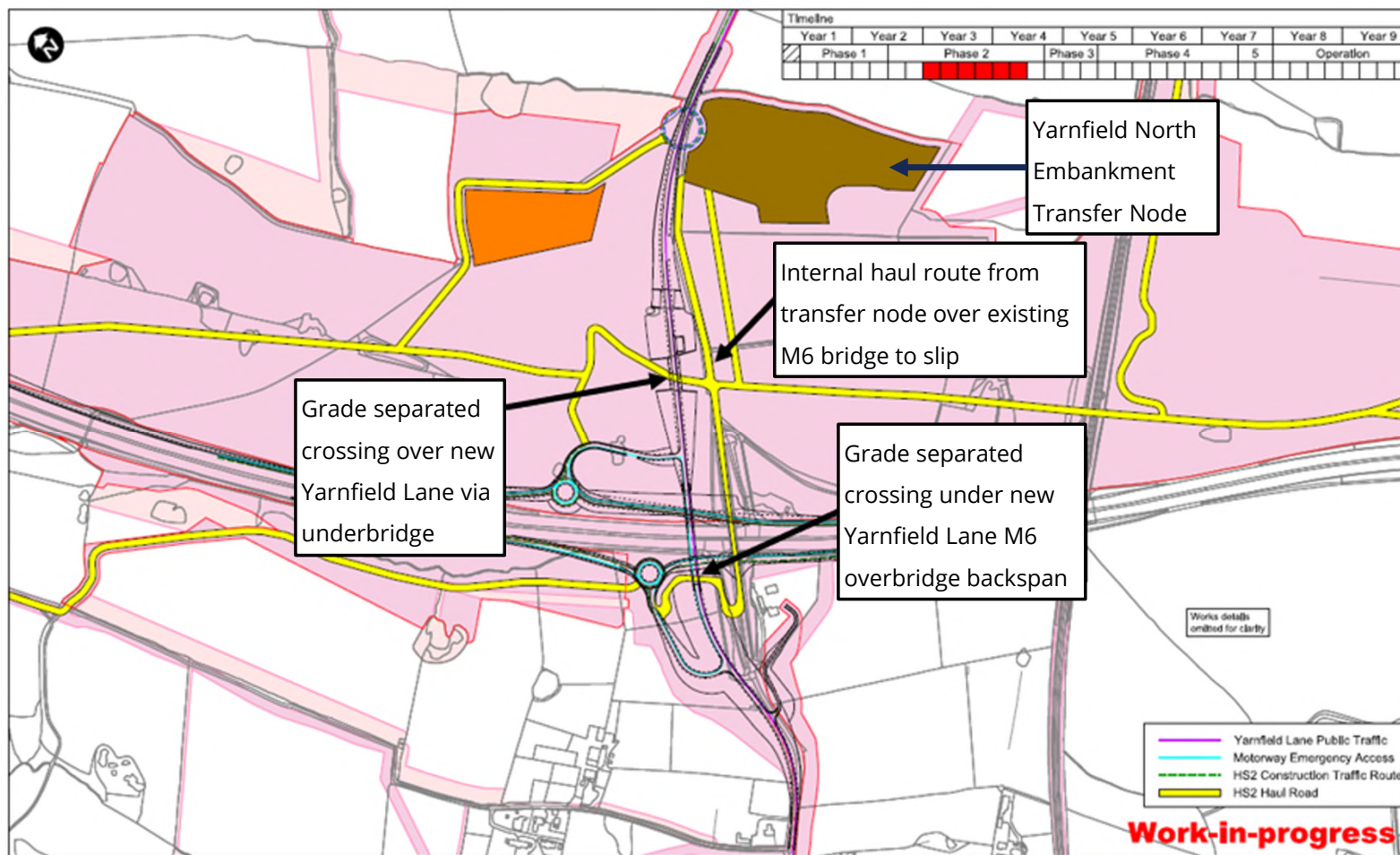
- Mass haul earthworks programme.
- Disposal of surplus excavated material.

The proposed routes for HGV traffic assume:

- Use of direct connections to the M6 motorway via the new M6 slips.
- Better use of internal site haul roads to reduce impacts on local road network.



Petition paragraph 2.6 - HGVs and Transfer Node



Petition paragraph 2.6 - HGVs and Transfer Node

The peak 2329 average daily HGV movements at the Yarnfield North Embankment Transfer Node in August 2022 comprises:

- 701 imported loads (1402 movements).
- 88 exported loads (176 movements).
- 376 loads transferred to other transfer nodes (751 movements):
 - A53 Newcastle Road transfer node at Whitmore, via M6 Junction 15/A500/A519/A5182/A53 – 242 movements.
 - Basford Cutting transfer node transfer node, via M6 junction 16/A500 - 509 movements.



Petition paragraph 2.6 - HGVs and Transfer Node

Yarnfield North Embankment Transfer Node – peak month summary

Origin / Material type	Destination / Material type	Peak month average daily combined two-way HGV movement (Aug 2022)	Import/Export/Transfer
Stone <u>Headshunt</u>	Topsoil Export	176	Export
<u>Yarlet</u> North Cutting	Borrow Pit 241	509	Transfer to Basford Cutting Transfer Node via M6 J16
<u>Yarlet</u> Central Cutting	Borrow Pit 235	242	Transfer to A53 Newcastle Road Transfer Node via M6 J15
Class 6 Import	Stone IMBR	408	Import
Class 1 Import	<u>Yarnfield</u> North Embankment	381	Import
Sub Grade Import	Stone IMBR	248	Import
Class 6 Import	Stone <u>Headshunt</u>	365	Import
Total		2329	

Petition paragraph 2.6 - HGVs and Transfer Node

Up to 2329 HGV movements per day = 1165 HGV movements per day each way which equates to:

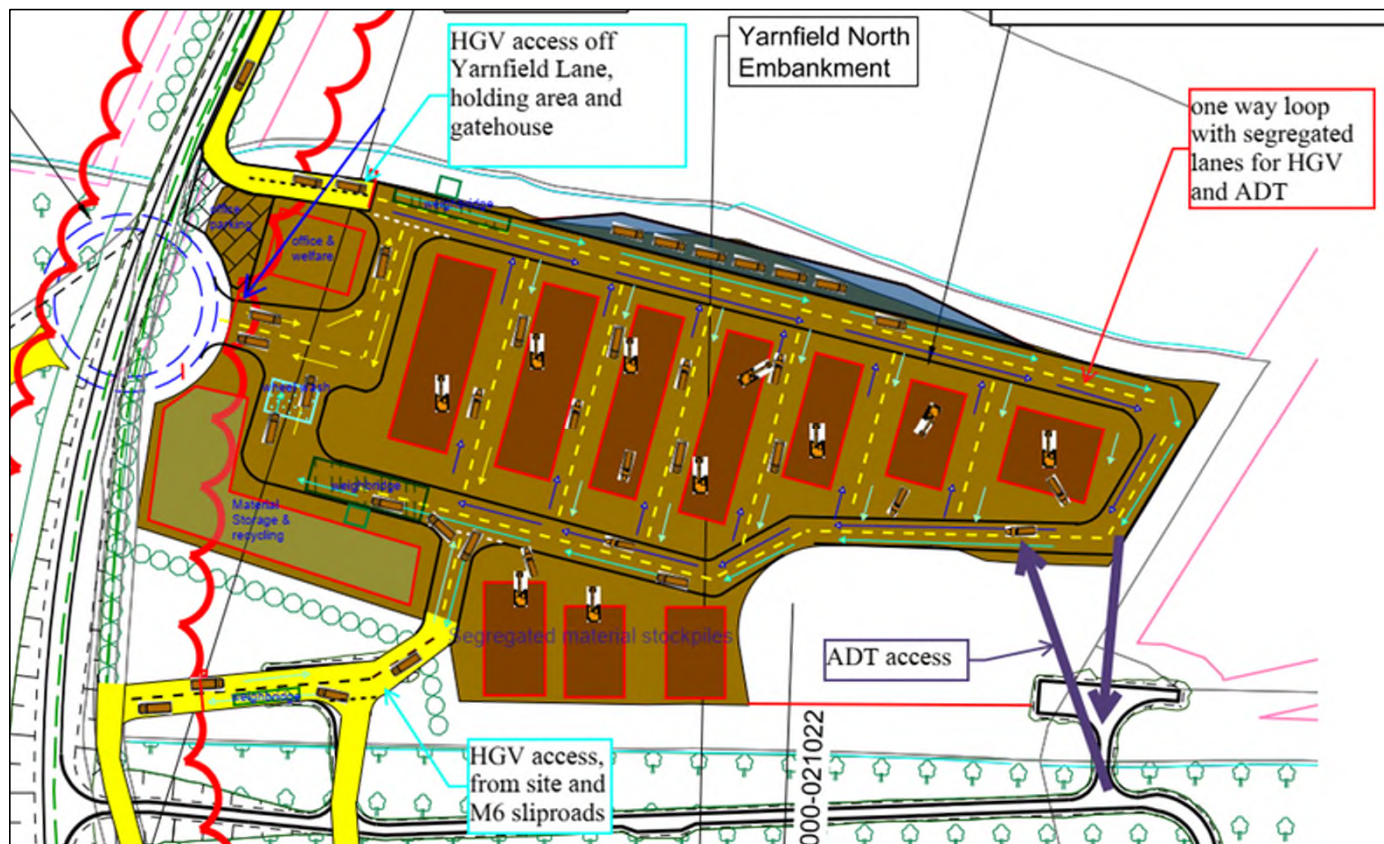
- One movement in to the transfer node every 31 seconds (i.e. $(10 * 3600) / 1165 = 30.9$ seconds).
- One movement out of the transfer node every 31 seconds.

This equates to one lorry movement per minute on each M6 slip during the peak month of construction.



Petition paragraph 2.6 - HGVs and Transfer Node

Yarnfield North Embankment Transfer Node - indicative internal layout



Yarnfield Lane construction compound traffic

Histograms in the following slides are presented to demonstrate that all HS2 Phase 2a construction traffic histograms produced for different sections of Yarnfield Lane, during the House of Commons hearings, accurately reflect the assignment of HS2 Phase 2a HGV construction traffic in the SES2 and AP2 revised scheme.

The histograms show the following:

- Construction compound histograms – histograms for all compounds and the transfer node that use Yarnfield Lane as a construction traffic route;
- Yarnfield Lane histograms – histograms on Yarnfield Lane for traffic accessing and egressing the A34 Stone Road and the section that crosses the M6 motorway, including the existing overbridge and the realigned overbridge; and
- Traffic analysis, which compares all HS2 Phase 2a HGV construction traffic with all traffic on the highway network and explains clearly that all traffic accessing and egressing the compounds either uses part of Yarnfield Lane or some other route.



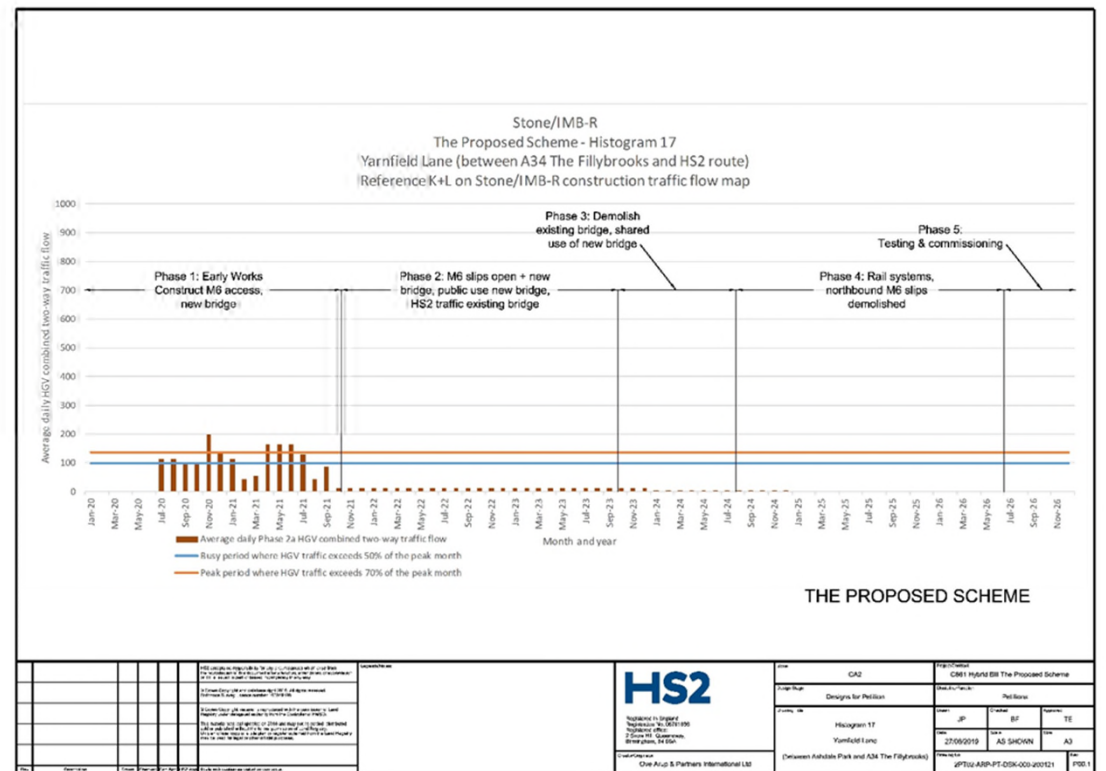
Construction traffic histogram Yarnfield Lane east of the HS2 Phase 2a alignment

This histogram shows the HGV construction traffic associated with all movements on Yarnfield Lane to the east of the HS2 Phase 2a alignment between A34 The Fillybrooks and the HS2 route.

The average daily combined two-way HGV flows during the peak month is 198 HGVs. The peak period duration (where HGV traffic exceeds 70% of the peak month flow) is four months and the busy period (where HGV traffic exceeds 50% of the peak month flow) is nine months.

This histogram has previously been made available to the public as part of the House of Commons, and House of Lords, traffic and transport exhibit packs.*

*https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/840760/Section_A_-_Traffic_Arrangements.pdf

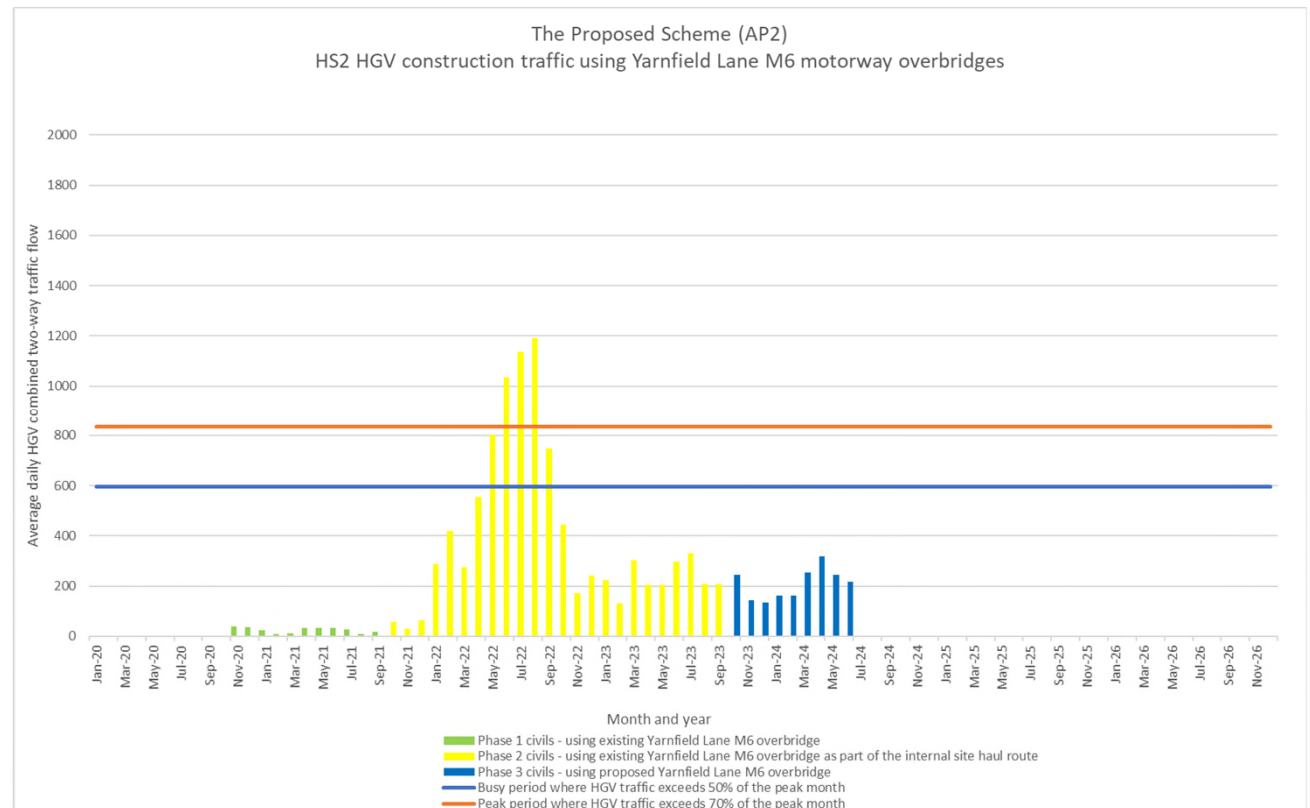


Construction traffic histogram Yarnfield Lane M6 overbridges west of the HS2 Phase 2a alignment

This histogram shows the HGV construction traffic associated with all movements on Yarnfield Lane M6 overbridges (existing and proposed), west of the HS2 Phase 2a alignment.

In Phase 2 all HGV construction traffic uses the existing bridge which will become part of the site haul route network. Public traffic will use the proposed realigned Yarnfield Lane M6 overbridge. The busy and peak period of traffic occurs during Phase 2.

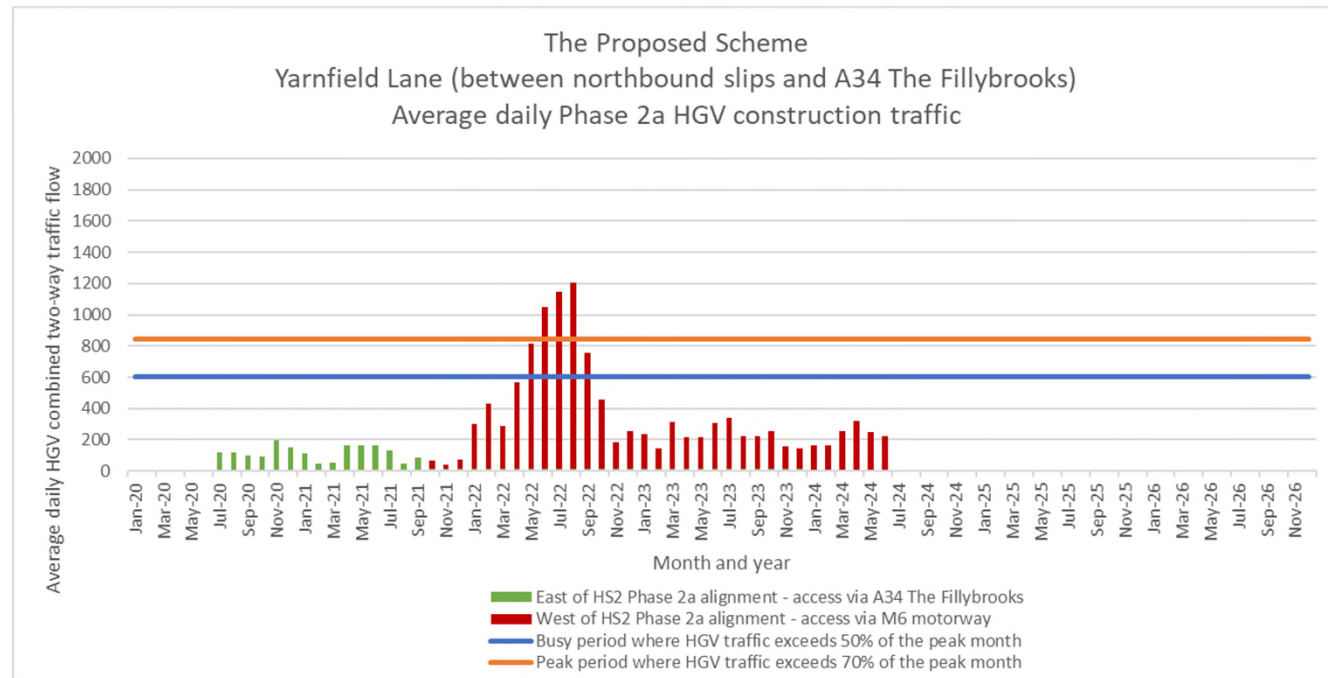
During Phase 3 the average daily combined two-way HGV flows during the peak month is 318 HGVs.



Combined HGV construction traffic histogram on Yarnfield Lane, east and west of the HS2 Phase 2a alignment

This histogram is a combined HGV construction traffic histogram for all HGV movements on Yarnfield Lane (including existing and proposed) both east and west of the HS2 Phase 2a alignment.

It shows that the average daily combined two-way HGV flows during the peak month is 1204 HGVs. The peak period duration (where HGV traffic exceeds 70% of the peak month flow) is three months and the busy period (where HGV traffic exceeds 50% of the peak month flow) is five months.

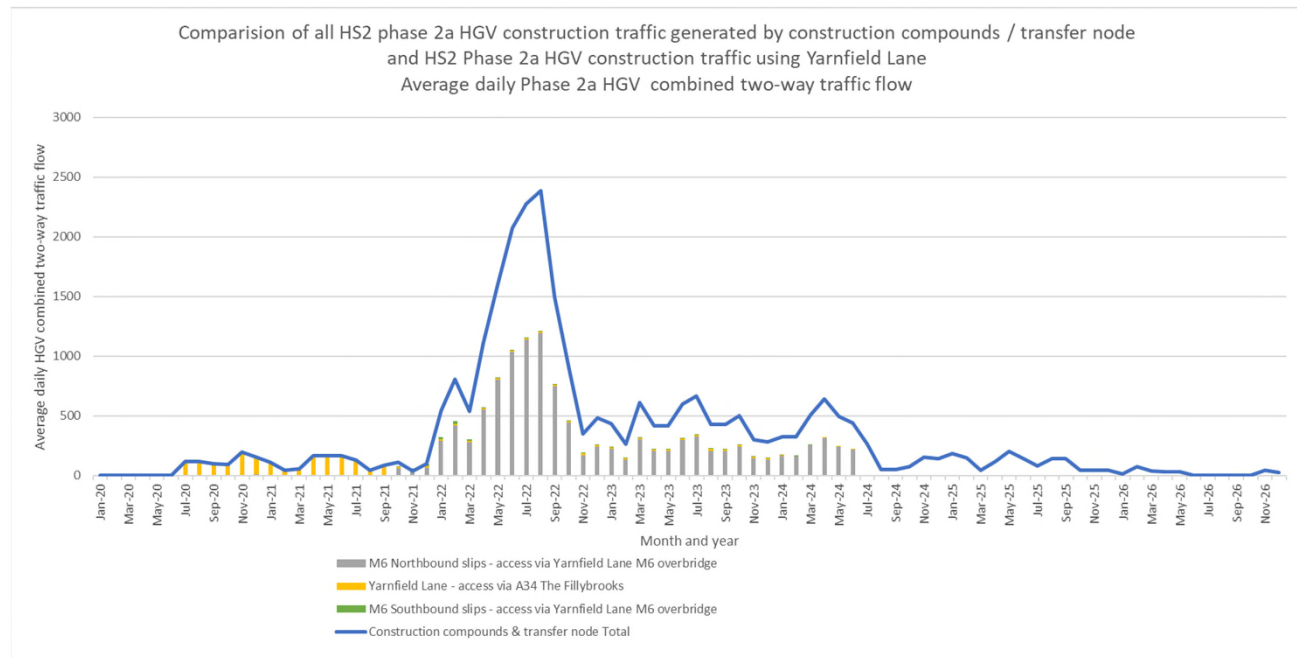


Comparison of HGV construction compound / node generated traffic and traffic using Yarnfield Lane (existing and realigned)

This histogram shows the comparison between HS2 Phase 2a HGV construction traffic generated by all four compounds and the transfer node, and all traffic generated by these compounds and transfer node that uses Yarnfield Lane.

The majority of this HGV construction traffic would use Yarnfield Lane when this road is no longer open to the public and is thus used as an internal site haul route.

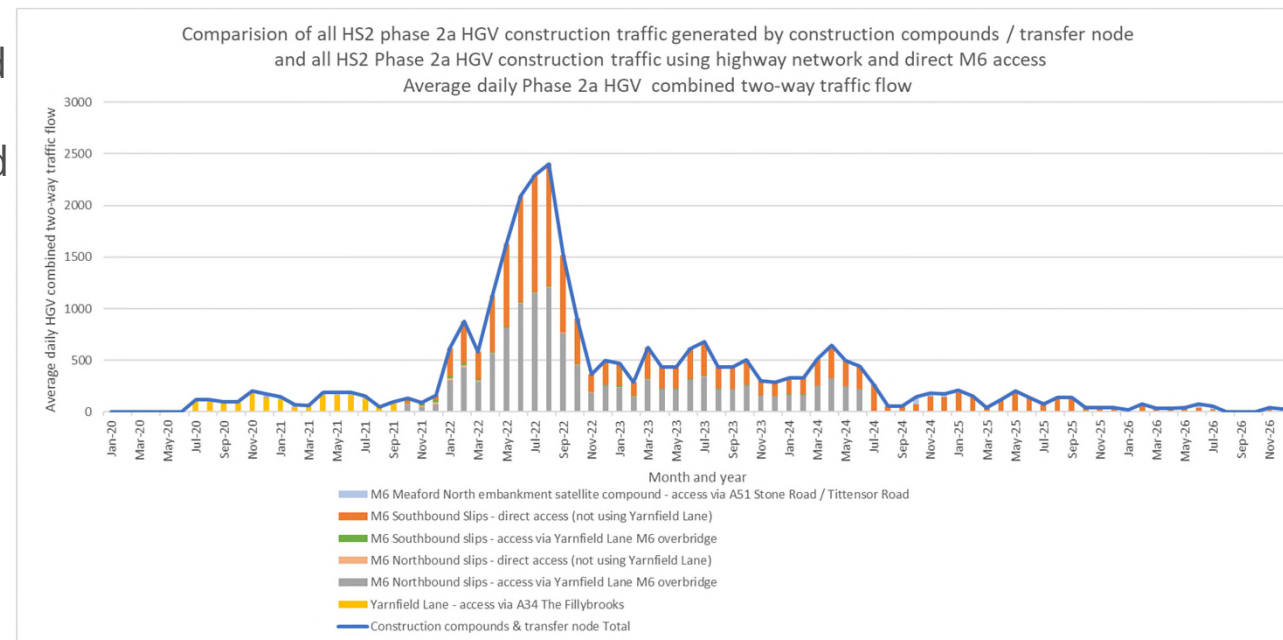
This histogram shows that not all construction traffic generated by the compounds and transfer node would use Yarnfield Lane as a construction traffic route.



Comparison of HGV construction compound / node generated traffic and traffic using local roads and M6 slips

This histogram shows the comparison between HS2 Phase 2a HGV construction traffic generated by all four compounds and the transfer node, and all traffic that would use the highway network including Yarnfield Lane, all M6 slips (either direct or via Yarnfield Lane), and Tittensor Road / A51 Stone Road to access the Meaford North embankment satellite compound.

It shows that the total volume of HGV construction traffic generated by construction compounds (blue line) and the histogram bar peaks (traffic using the highway network) are the same. Therefore all traffic generated by these compounds and transfer node has been accounted for in the traffic assignment to the highway network.



Petition paragraph 2.9 – M6 slips and capacity

The Smart Motorway improvements to the M6 between junctions 13-15 will add an additional lane to both carriageways and result in a highway capacity increase on the M6 mainline of approximately 33%.

M6 mainline capacity once smart motorway improvements are operational will be in the order of 7,200 vehicles per hour in each direction, based upon an assumed capacity of 1800 vehicles per lane.

Tables 279 & 280 of the AP2 ES (2019) Vol 5 reports peak hour traffic volumes on the M6 between Yarnfield Lane and the M6 Junction 15 slip road.



Petition paragraph 2.9 – M6 slips and capacity

Table 279: 2023 future baseline and with the AP2 revised scheme construction traffic (vehicles) – AM peak hour (08:00 – 09:00)

Location	Direction	2023 baseline		2023 with HS2		with HS2 % change from 2023 baseline	
		Vehicle	HGV	Vehicle	HGV	Vehicle	HGV
M6 (between Yarnfield Lane and M6 junction 15 slip road)	NB	4525	848	4768	980	5.4%	15.6%
	SB	4079	723	4322	856	6.0%	18.3%

Table 280: 2023 future baseline and with the AP2 revised scheme construction traffic (vehicles) – PM peak hour (17:00 – 18:00)

Location	Direction	2023 baseline		2023 with HS2		with HS2 % change from 2023 baseline	
		Vehicle	HGV	Vehicle	HGV	Vehicle	HGV
M6 (between Yarnfield Lane and M6 junction 15 slip road)	NB	4389	623	4598	755	4.8%	21.3%
	SB	4281	718	4490	851	4.9%	18.5%

Petition paragraph 2.9 – M6 slips and traffic flows

HS2 HGV construction traffic would use the dedicated M6 slips.

During the peak month of construction activity daily average daily weekday traffic flows are as follows:

- Northbound slips - 800 HGVs per day, or 80 per hour, or one movement every 45 seconds.
- Southbound slip roads - 409 HGVs per day, or 41 per hour, or one movement every 87 seconds.

Such volumes are low compared to other existing slip roads on this stretch of the M6:

- M6 junction 15 – future baseline traffic flows, peak hours, 800 – 1600 passenger car units per hour.
- M6 junction 14 – future baseline traffic flows, peak hours, 400 – 1200 passenger car units per hour.

One HGV equates to 2.3 passenger car units.



Petition paragraphs 2.11 & 2.13 - Stone IMB-R and Norton Bridge to Stone Railway passenger services

Before the House of Commons Select Committee, the Promoter provided detailed evidence that it had considered the impact of the Stone Railhead and IMB-R on the operation of the Norton Bridge to Stone railway.

There is no requirement for trains serving the Stone Railhead and IMB-R to arrive at or depart from the Stone IMB-R reception sidings during the period of daytime passenger operations on the Norton Bridge to Stone line. The Promoter's modelling shows that neither the railhead nor the IMB-R would interfere with the Norton Bridge to Stone railway passenger service. The Promoter has discussed its modelling work with Network Rail.

The operational concept for the IMB-R envisages that trains would arrive and depart during night hours and the average number of maintenance trains would not be likely to exceed one per week.



Petition paragraph 2.8 – Yarnfield Lane widening

In its Second Special Report the House of Commons Select Committee directed the Promoter to widen the bridge at Yarnfield Lane “to ensure better safety for all users”.

In its response, the Promoter said in paragraph 114:

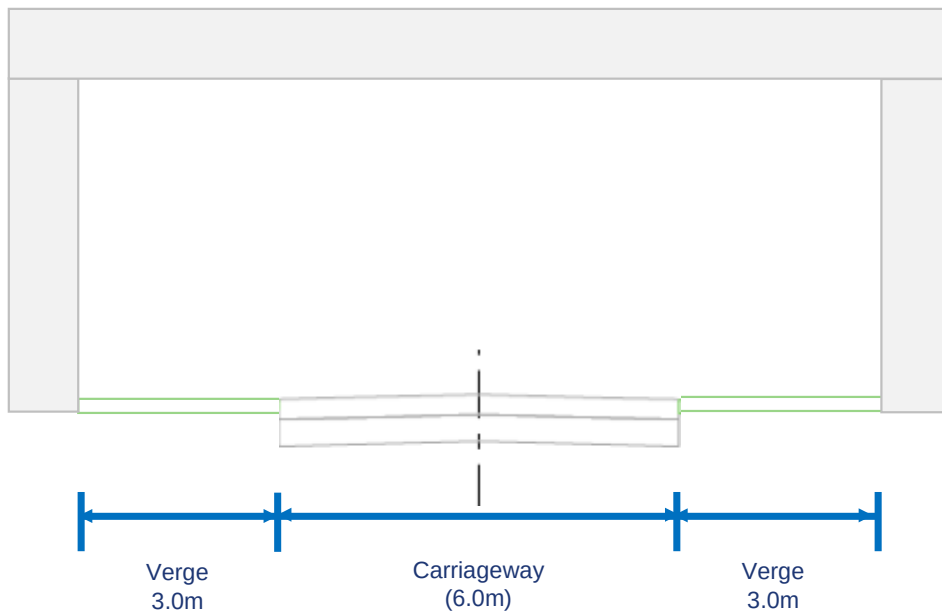
114 Subject to the approval of the detailed design by the highway authority, Yarnfield Lane overbridge will be widened to ensure the safety of all users. At detailed design HS2 Ltd will work with the highway authority to determine appropriate lane widths for road users to cross the Yarnfield Lane overbridge and the Bill includes the powers required to change the width of the bridge to accommodate the required lane widths.

The Promoter has further confirmed to the Petitioner, through additional information provided on 11 March 2020, that there is adequate land included within Bill limits to ensure the safety of all road users.

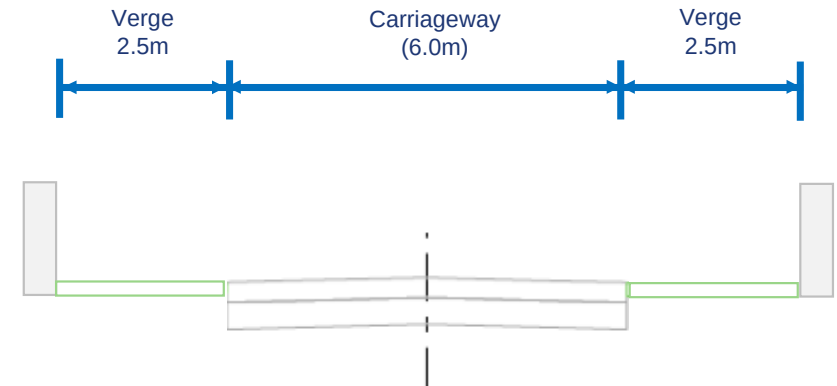


Yarnfield Lane indicative overbridge and underbridge design

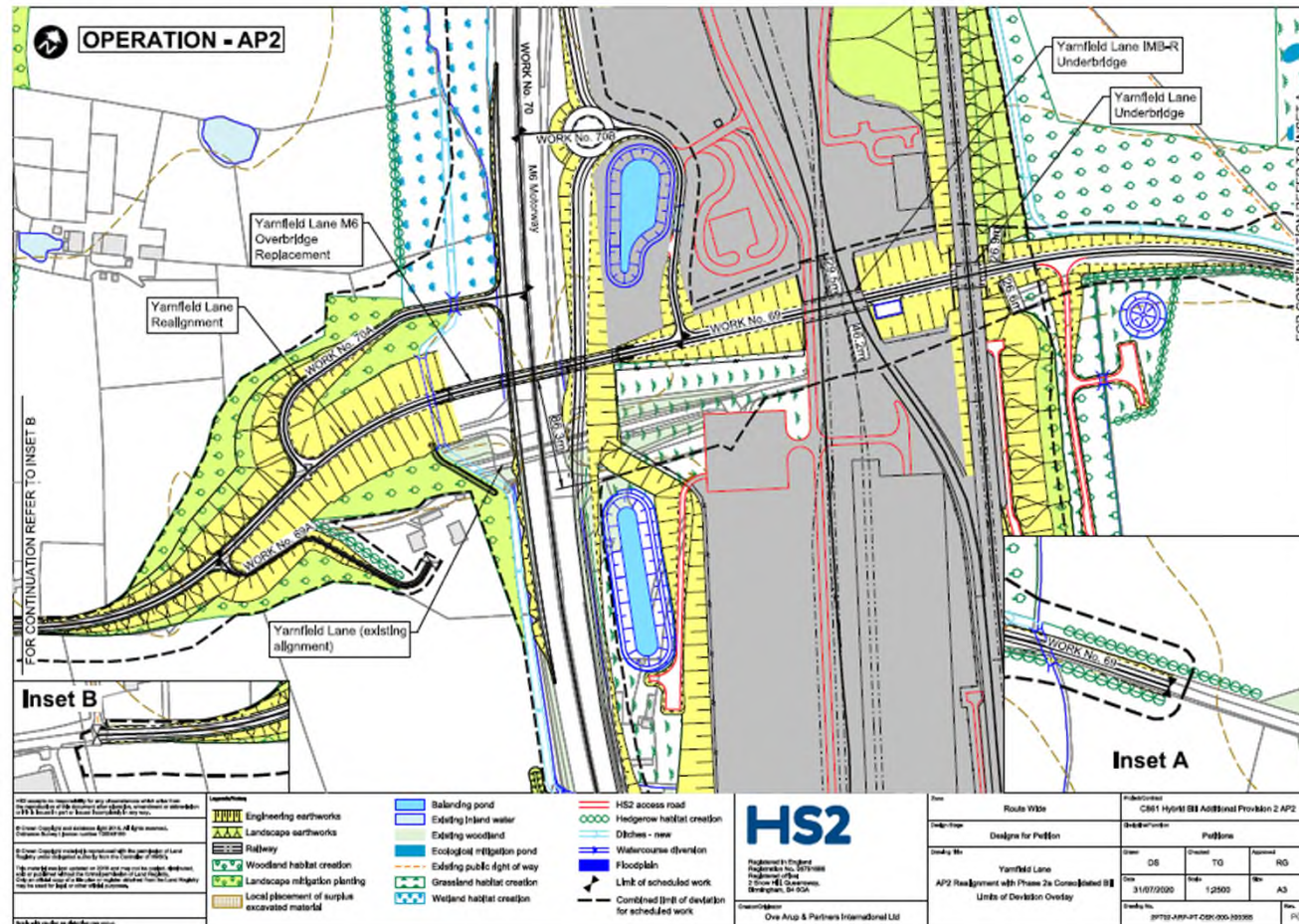
AP2 Yarnfield Lane IMB-R Underbridge Design

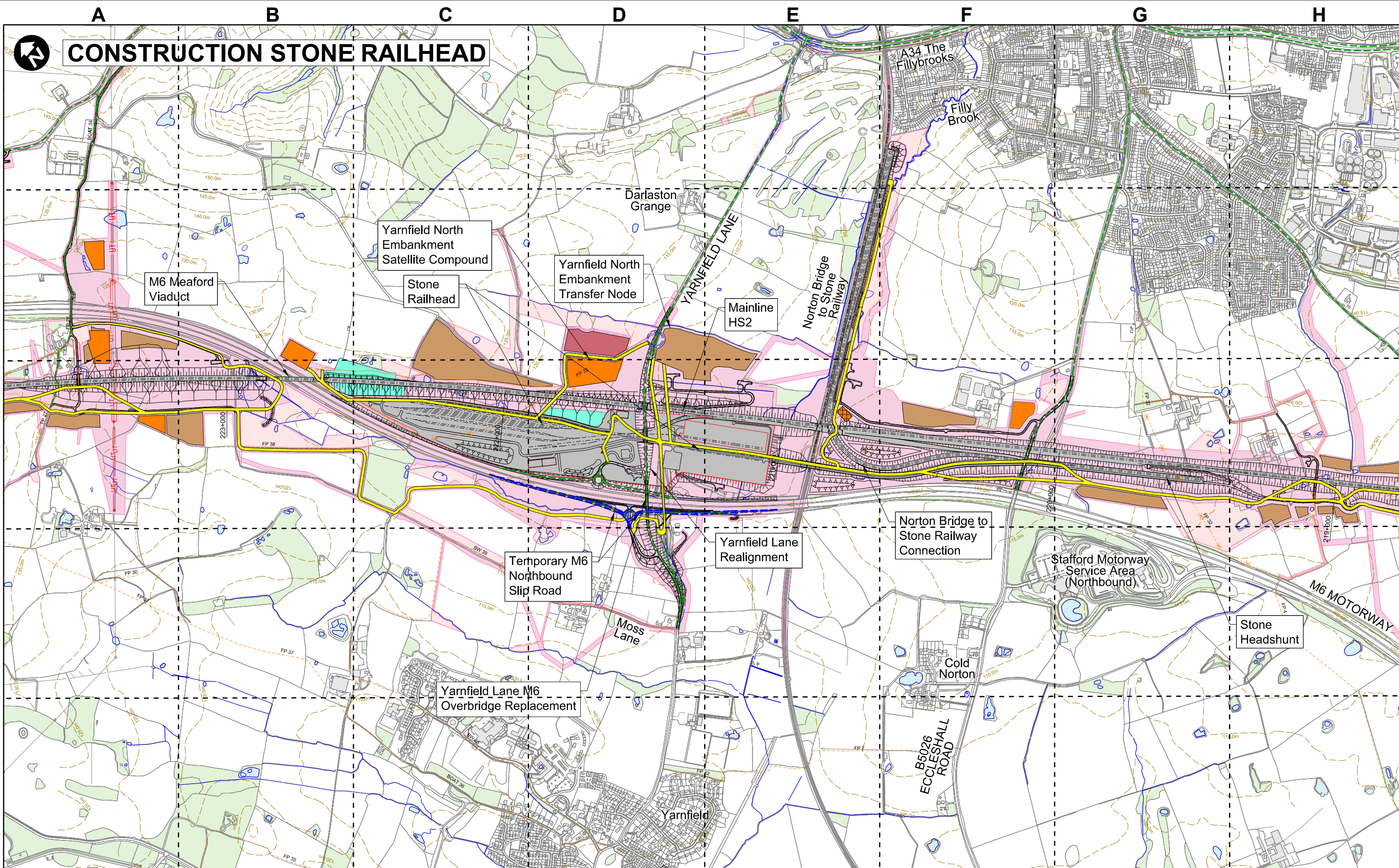


AP2 Yarnfield Lane M6 Overbridge Design



Yarnfield Lane realignment – limits of deviation





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Legends/Notes:

- Engineering earthworks
- Landscape earthworks
- Railway
- Satellite Construction Compound
- Temporary Material Stockpile

- Land potentially required during construction
- Extent of land potentially required during construction for mitigation planting
- Existing Inland Water
- Existing Woodland

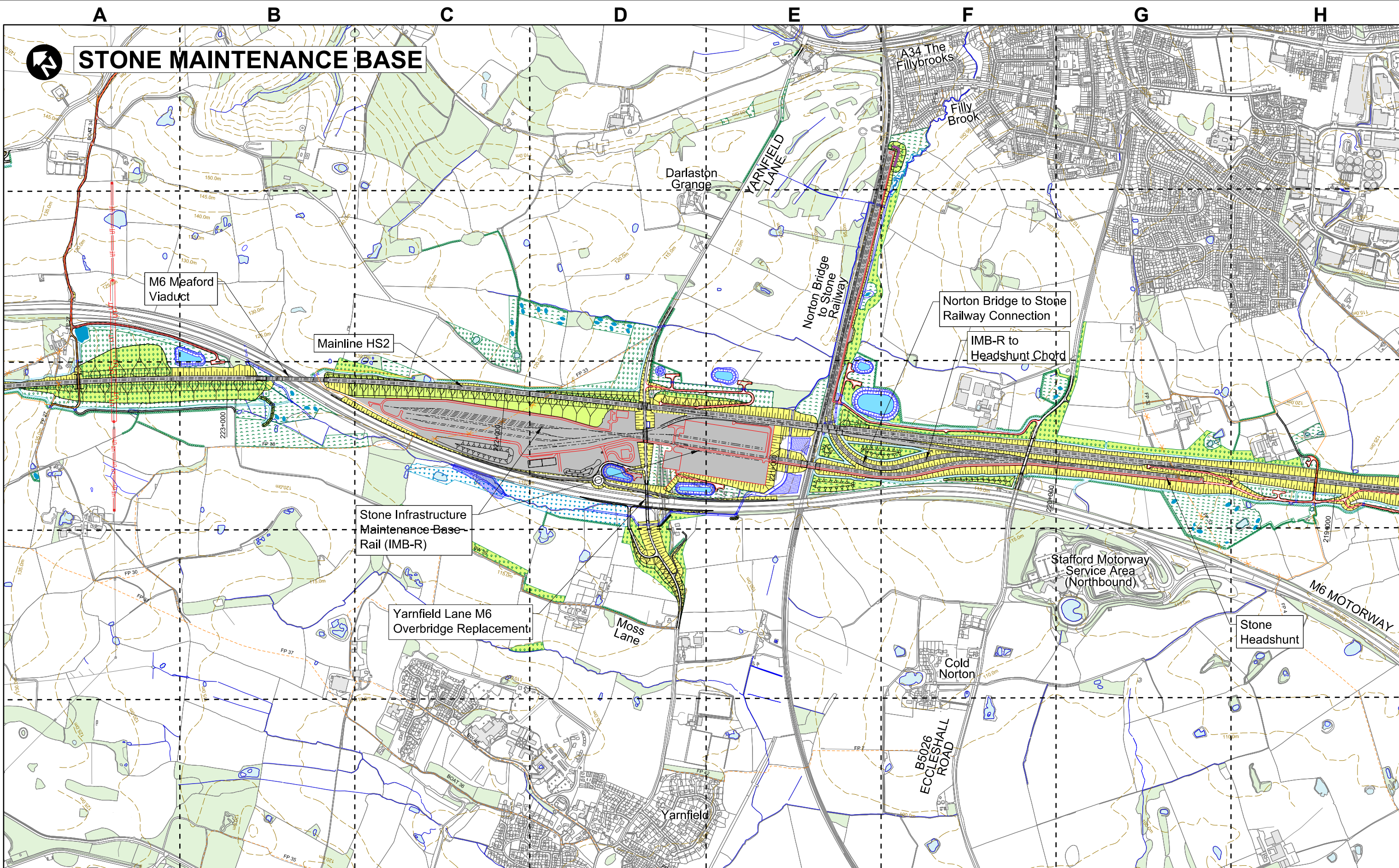
- Existing public right of way
- New, diverted or realigned PROW
- Stopped-up PROW
- Main Utility Work
- Haul Road
- Construction Traffic Route

HS2

Registered in England
Registration No. 06791686
Registered office:
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Birmingham, B4 6GA

Creator/Originator
Ove Arup & Partners International Ltd

Zone	Community Area 3		Project/Contract C861 Hybrid Bill Additional Provision 2 AP2		
Design Stage	Designs for Petition		Discipline/Function Petitions		
Drawing Title	Stone Maintenance Base		Drawn DS	Checked RGI	Approved TE
	Constructional Features		Date 2019/09/30	Scale 1:12500	Size A3
			Drawing No. 2PT02-ARP-PT-DSK-000-203311	Rev. P01	



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Legends/Notes:

- Engineering earthworks
- Landscape earthworks
- Railway
- Woodland habitat creation
- Landscape mitigation planting
- Grassland habitat creation
- Wetland habitat creation

- Balancing pond
- Existing inland water
- Existing woodland
- Ecological mitigation pond
- Existing public right of way (PRoW)
- New, diverted or realigned PRoW
- Stopped-up PRoW

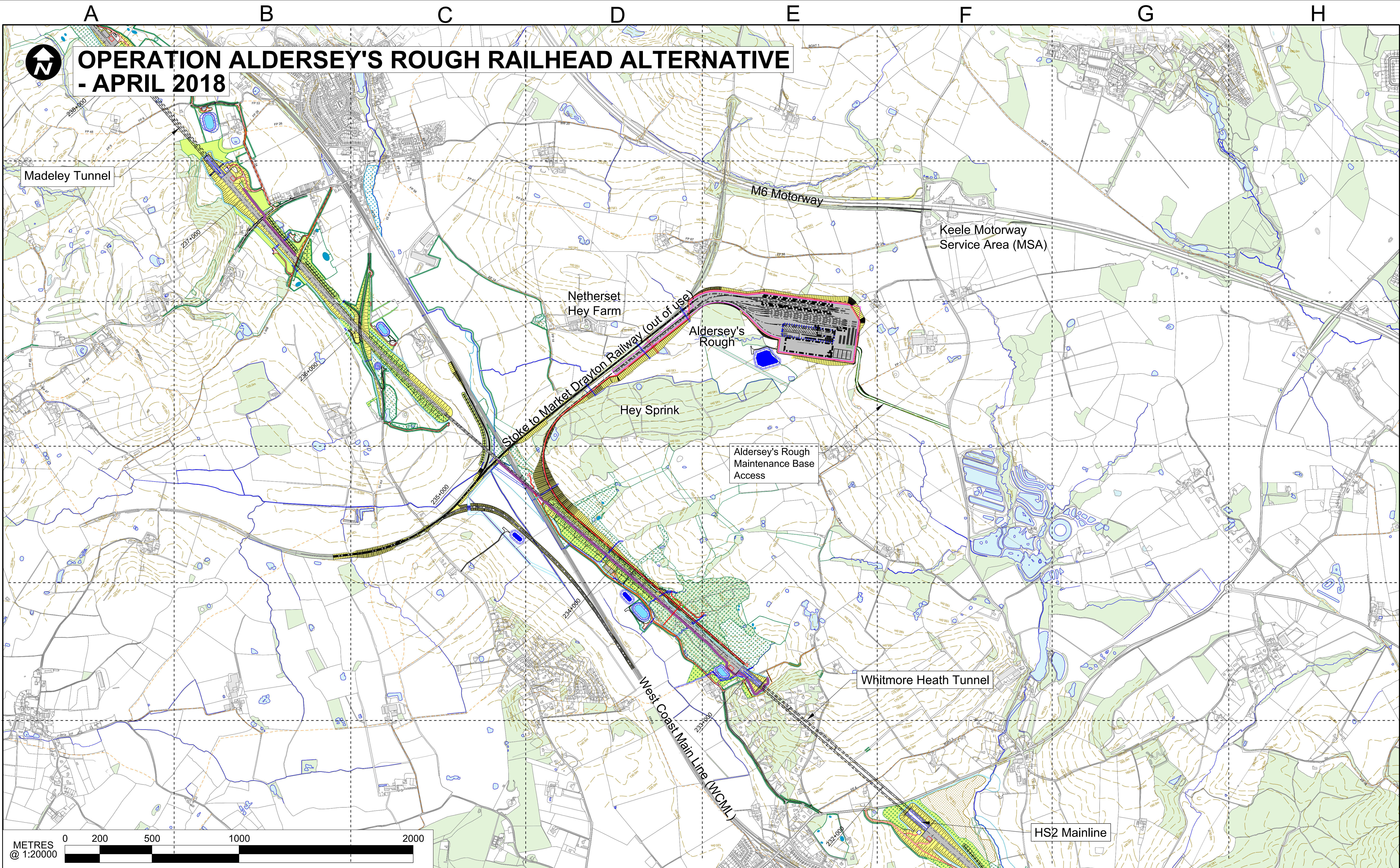
- UT— Main utility work
- HS2 access road
- Noise barrier
- Hedgerow habitat creation
- Ditches - new
- Watercourse diversion
- Floodplain

HS2

Registered in England
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Creator/Originator
Ove Arup & Partners International Ltd

Zone	Community Area 3		Project/Contract C861 Hybrid Bill Additional Provision 2 AP2		
Design Stage	Designs for Petition		Discipline/Function Petitions		
Drawing Title	Stone Maintenance Base Operation Features		Drawn DS	Checked RGI	Approved TE
			Date 2019/09/30	Scale 1:12500	Size A3
			Drawing No. 2PT02-ARP-PT-DSK-000-203310		Rev. P01



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Scale with caution as distortion can occur.

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- Stopped-up PRoW

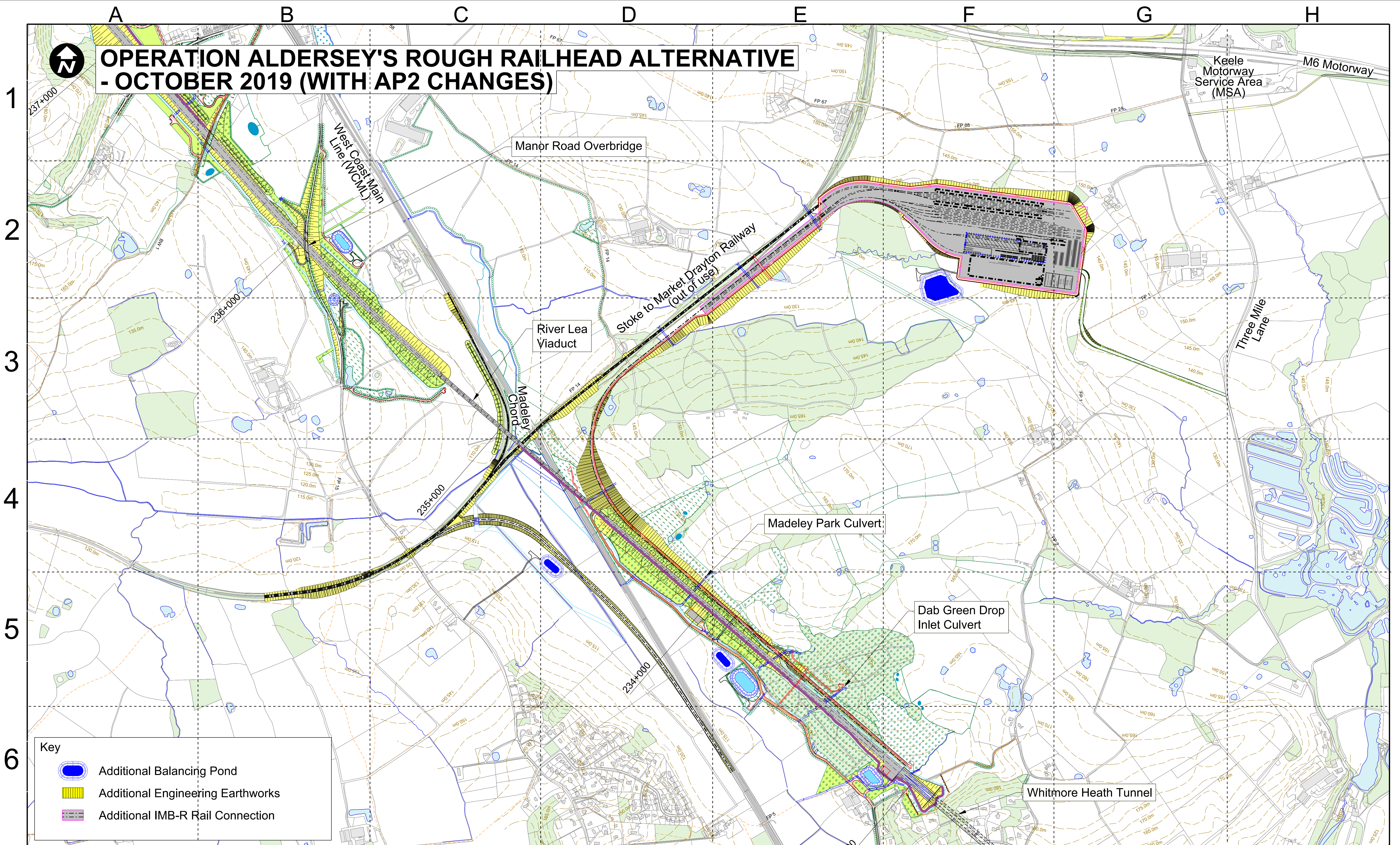
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Ove Arup & Partners International Ltd

Zone	Community Area 4			Project/Contract C861 Hybrid Bill Additional Provision AP2		
Design Stage	Designs for Petition			Discipline/Function Petitions		
Drawing Title	Aldersey's Rough Railhead			Drawn DS	Checked PM	Approved TE
	Operation			Date 2019/10/02	Scale 1:20000	Size A3
	Location Plan			Drawing No. 2PT02-ARP-PT-DSK-000-204932		Rev. P01



Key

Additional Balancing Pond

Additional Engineering Earthworks

Additional IMB-R Rail Connection

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Scale with caution as distortion can occur.

- Legends/Notes:
- Engineering earthworks
- Landscape earthworks
- Railway
- Woodland habitat creation
- Landscape mitigation planting
- Grassland habitat creation
- Wetland habitat creation

- Balancing pond
- Existing inland water
- Existing woodland
- Ecological mitigation pond
- Existing public right of way (PRoW)
- New, diverted or realigned PRoW
- Stopped-up PRoW

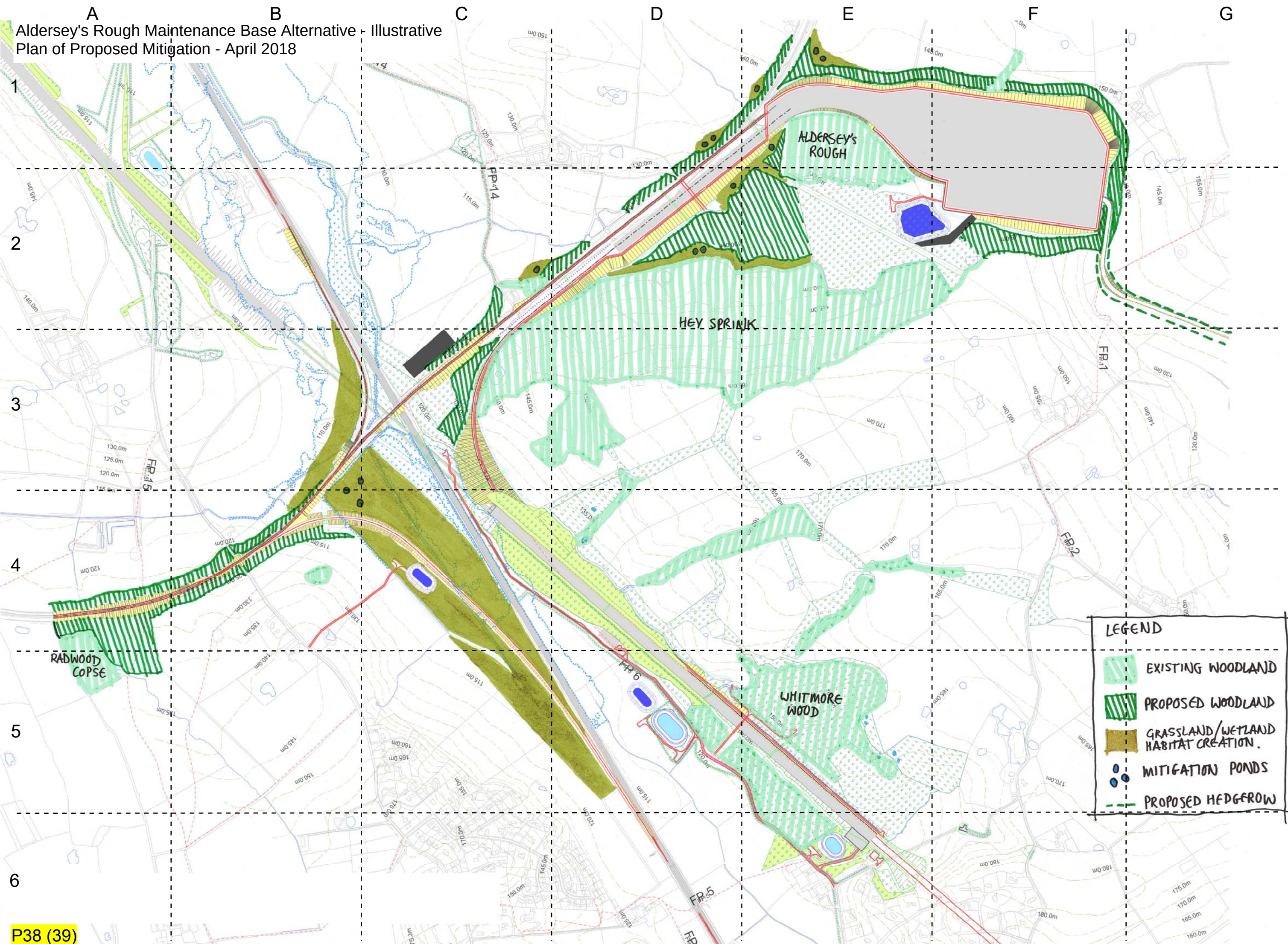
- Main utility work
- HS2 access road
- Noise barrier
- Hedgerow habitat creation
- Ditches - new
- Watercourse diversion
- Floodplain

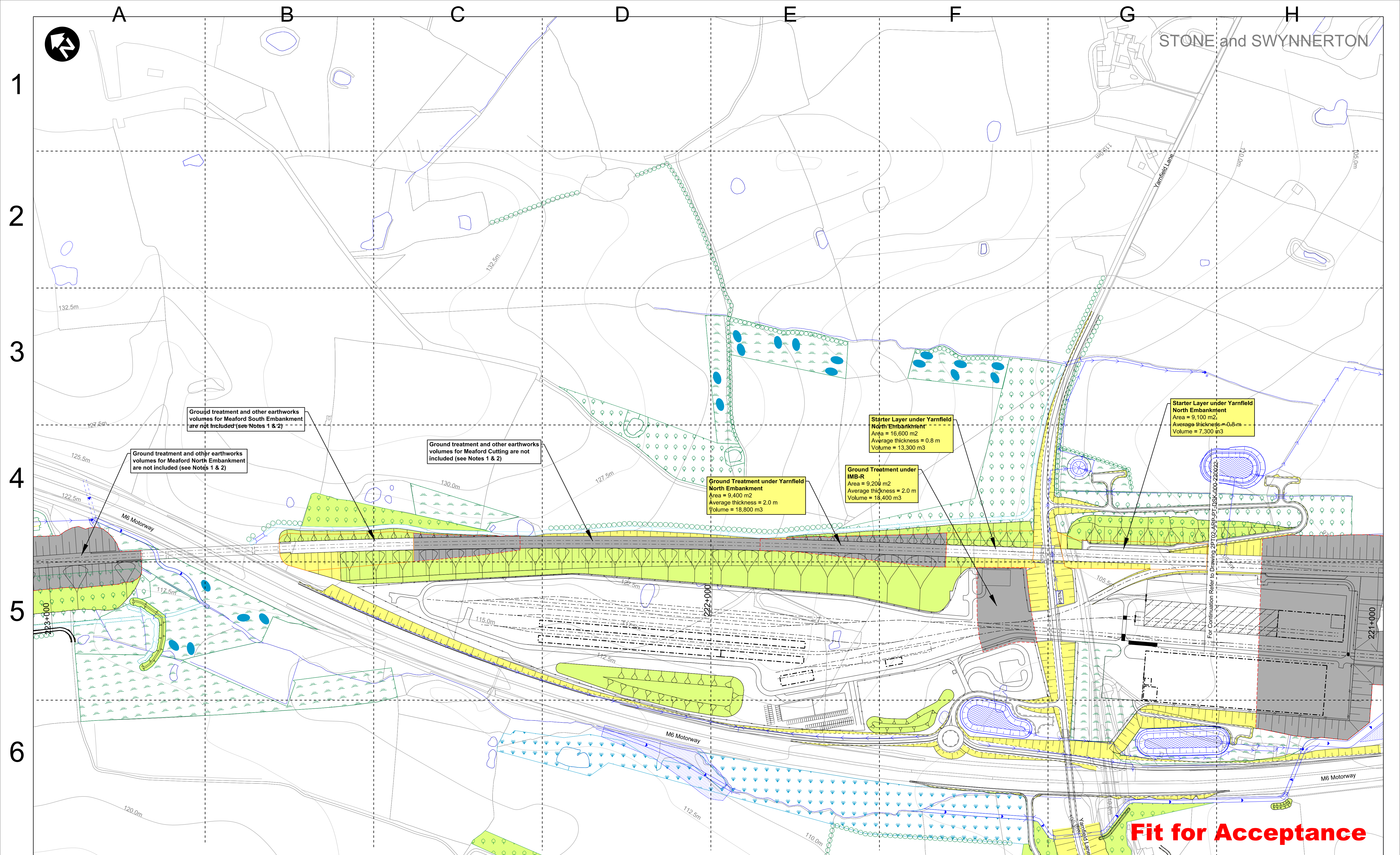
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Registered office:
2 Snow Hill, Queensway,
Birmingham, B4 6GA

Creator/Originator
Ove Arup & Partners International Ltd

Zone	Community Area 4		Project/Contract		
Design Stage	Designs for Petition		C861 Hybrid Bill Additional Provision AP2		
Drawing Title	Aldersey's Rough Railhead		Discipline/Function		
			Petitions		
			Drawn	Checked	Approved
Operation			DS	PM	TE
			Date	Scale	Size
			2019/10/02	1:12500	A3
			Drawing No.	Rev.	
			2PT02-ARP-PT-DSK-000-204931	P01	





Fit for Acceptance

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Rev	Description	Drawn	Checked	Con App	HS2 App	Scale with caution as distortion can occur.

Legend/Notes:	
Engineering earthworks	Balancing pond
Landscape earthworks	Existing Inland Water
Railway	Existing Woodland
Woodland habitat creation	Ecological mitigation pond
Landscape mitigation planting	Starter Layer under embankment
Grassland habitat creation	Ground Treatment in cuttings
Wetland habitat creation	
Hedgerow habitat creation	
Ditches - new	
Watercourse diversion	
Proposed floodplain storage area	
Ground Treatment under embankment	

Note 1: All proposed ground treatment areas are part of the volumes in Table 1 of Report No. C861-ARP-PT-REP-000-100294 unless stated otherwise.

Note 2: All proposed starter layer areas are part of the volumes in Table 1 of Report No. C861-ARP-PT-REP-000-100294 unless stated otherwise.

Note 3: Thickness of proposed starter layer areas is average of 0.8 m. Proposed starter layer continues over proposed ground treatment areas on HS2 mainline but not over proposed ground treatment areas within Stone Headshunt and IMB-R.

Note 4: Thickness of proposed ground treatment areas is average of 2.0m unless stated otherwise.

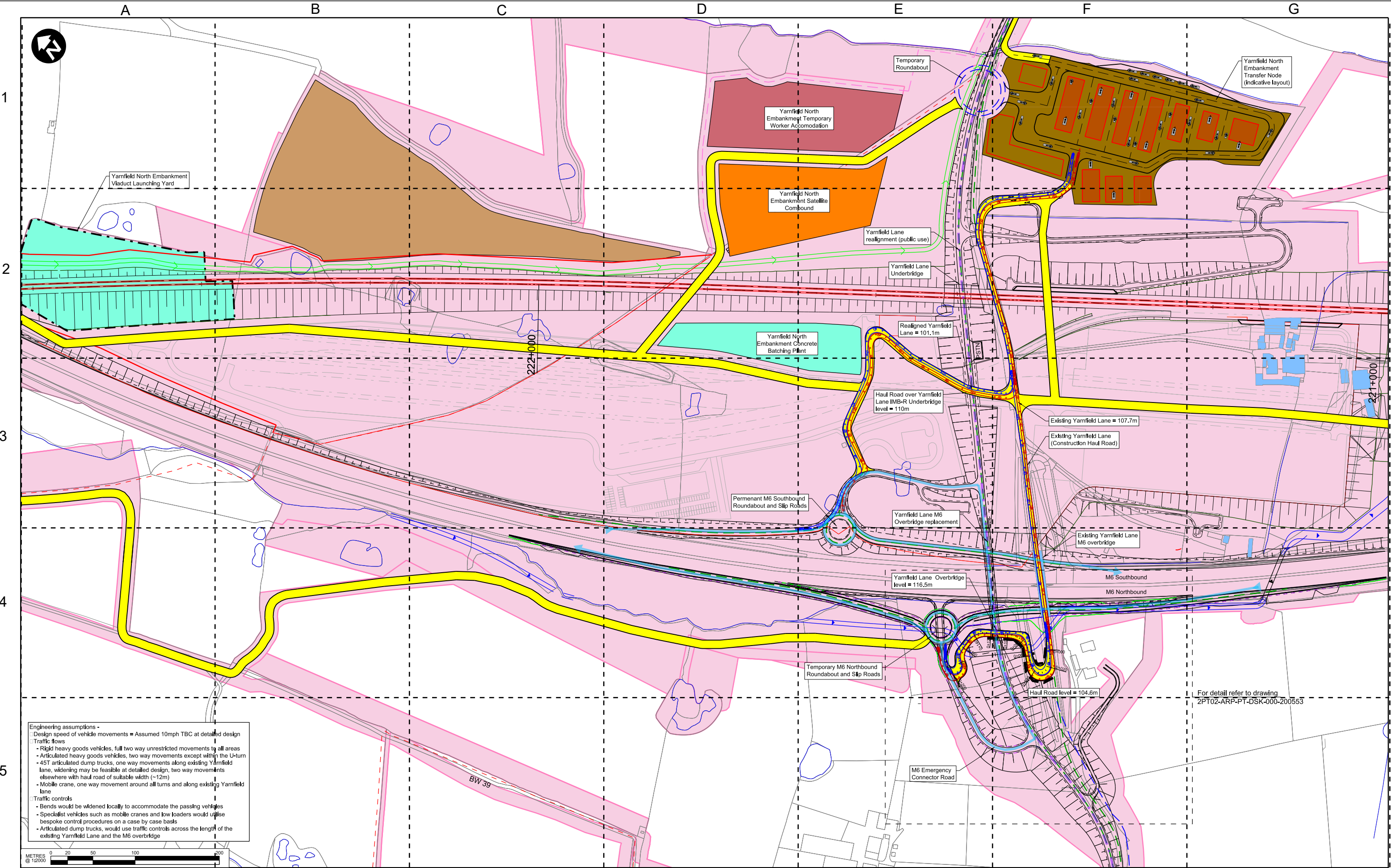
Note 5: Volume of proposed ground treatment & starter layer for Stone IMB-R in Table 1 of Report No. C861-ARP-PT-REP-000-100294 also includes 800m3 of ground treatment at Pool House Farm Landfill (whose location is unknown).

HS2

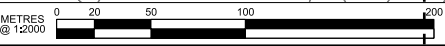
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Ove Arup & Partners International Ltd

Zone	Community Area 3		Project/Contract	
Design Stage	Designs for Petition		C861 Hybrid Bill Additional Provision 2 AP2	
Drawing Title	Stone IMB-R Ground Treatment Sheet 2		Discipline/Function Petitions	
Date		20/01/2020	Checked AP	Approved TE
Scale		1:2500	Size	A3
Drawing No. 2PT02-ARP-PT-DSK-000-220023				Rev. P02



Engineering assumptions -
 Design speed of vehicle movements = Assumed 10mph TBC at detailed design
 Traffic flows
 - Rigid heavy goods vehicles, full two way unrestricted movements to all areas
 - Articulated heavy goods vehicles, two way movements except within the U-turn
 - 45T articulated dump trucks, one way movements along existing Yarnfield lane, widening may be feasible at detailed design, two way movements elsewhere with haul road of suitable width (~12m)
 - Mobile crane, one way movement around all turns and along existing Yarnfield lane
 Traffic controls
 - Bends would be widened locally to accommodate the passing vehicles
 - Specialist vehicles such as mobile cranes and low loaders would utilise bespoke control procedures on a case by case basis
 - Articulated dump trucks, would use traffic controls across the length of the existing Yarnfield Lane and the M6 overbridge



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 - Railway
 - Main construction compound
 - Satellite construction compound
 - Temporary material stockpile
 - Land potentially required during construction
 - Extent of land potentially required during construction for mitigation planting

- Existing public right of way
- New, diverted or realigned PRoW
- Stopped-up PRoW
- Indicative haul road alignment
- Construction traffic route
- Yarnfield Lane Public Traffic
- Motorway Emergency Access
- Demolitions

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Zone	Route Wide		Project/Contract	
Design Stage	Designs for Petition		C861 Hybrid Bill Additional Provision 2 AP2	
Drawing Title	Yarnfield Lane		Discipline/Function	Peti
	Phase 2 Road Layout		Drawn	Checked
	Sheet 1		DS	CS
			Date	Scale
		08/01/2020	1:2	Approved
		TE		
		Size		A1
		Drawing No.		Rev.
		2PT02-ARP-PT-DSK-000-200552		P01

PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL & CHEBSEY PARISH COUNCIL

CHRONOLOGY OF CORRESPONDENCE

Date	Correspondence
30 September 2019	HS2 PRD issued
16 October 2019	HS2 Promoter's position letter
22 November 2019	Yarnfield & Cold Meece Parish Council (Y&CM PC) letter to HS2 responding to PAL
17 December 2019	HS2 letter to Y&CM PC, included: - Bespoke technical report to provide relevant information in relation the Petitioner's questions about the assumptions for excavated material for the Stone IMB-R. - A1 sized drawing showing the haul road connections between the Yarnfield transfer node and M6 motorway
23 December 2019	Y&CM PC letter to HS2
14 January 2020	HS2 letter to Y&CM PC, explained: - that at the meeting on 16 January 2020 a copy of the Phase 2a geotechnical desk study report, a set of A1 size scale plans that correlate to ground treatment locations, and additional A1 scale plans showing Stone IMB-R site and the Yarnfield Lane haul road connection to the northbound M6 motorway would be provided - the differences in requirements for settlements limits for different features
16 January 2020	<i>HS2 meeting with representatives of petitioning Parish and Town Council's and the Stone Railhead Crisis Group (SRCG), HS2 provided:</i> - Phase 2a geotechnical desk study report - A1 scale plan showing locations of ground treatment areas - Additional A1 scale plans showing Stone IMB-R site and the Yarnfield Lane haul road connection to the northbound M6 motorway
28 January 2020	HS2 letter to Y&CM PC - provided updated ground treatment area plans
24 February 2020	HS2 letter to Y&CM PC, included: - response to PC on railway systems questions raised at January 2020 meeting
11 March 2020	HS2 letter to Y&CM PC, included: - response to PC on SRCG evidence and actions from January 2020 meeting
13 March 2020	Y&CM PC letter to HS2
17 April 2020	HS2 letter to Y&CM PC - restating information provided in the response to SRCG evidence document.
7 May 2020	Y&CM PC letter to HS2
16 June 2020	HS2 letter to Y&CM PC, included: - drawing of a typical haul road as referred to in a presentation to the Institute of Mechanical Engineers at Staffordshire University on 11 March 2020 - Yarnfield Lane Traffic Survey results - a map showing the locations at which traffic speed surveys were carried out and table showing the duration and findings - further explanation on petitioners concerns about shortfall of fill material and M6 overbridge
22 July 2020	HS2 letter to Y&CM PC, included: - contractors' findings from WP3 PGI at Stone IMB-R site and technical note
27 July 2020	Y&CM PC letter to HS2
14 August 2020	HS2 letter to Y&CM PC - response to previous correspondence and to bring to their attention the HoL Select Committee's statement on 29 July 2020 about the SC's intended approach on matters that would otherwise require an additional provision or other powers.
21 August 2020	Y&CM PC letter to HS2
1 September 2020	HS2 Promoter's position letter - included response to petitioners' letter of 21 August 2020 and M6 traffic note.

Mr John Fraser
5 De Havilland Drive
Yarnfield
Stone
ST15 0SX

16 October 2019

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

I am writing to you in my capacity as the Director of Hybrid Bill Delivery at HS2 Ltd, which is acting on behalf of the Promoter of the High Speed Rail (West Midlands-Crewe) Bill ('the Bill') currently before Parliament. I understand that Yarnfield and Cold Meece Parish Council, Stone Town Council and Chebsey Parish Council ('the Petitioners') have concerns about the impact of Phase 2A of HS2 (known as 'the Proposed Scheme') and have submitted a petition on that basis against the Bill in the House of Lords.

I am writing to set out the Promoter's position in relation to the issues you have raised in your petition and the measures identified to address your concerns, as provided in the Promoter's Response Document (PRD) sent to you on 30 September 2019 and in advance of your appearance before the Select Committee.

I understand my colleagues met with representatives of Yarnfield and Cold Meece Parish Council on 22 July 2019 to discuss their concerns in respect of the Proposed Scheme prior to the deposit of your petition against the Bill in the House of Lords.

On 27 September 2019 we wrote to you asking that you share the 'comprehensive evidence' referred to in paragraph 2.5 of your petition in relation to excavated material, and to offer a meeting to discuss this evidence. We await this evidence and would welcome the opportunity to discuss it in advance of your appearance before the Select Committee.

Relocation of the proposed railhead at Stone

We have explained that the case for the siting of the railhead and IMB-R at Aldersey's Rough instead of Stone was heard by the House of Commons Select Committee in April 2018. On 24 May 2018 the Select Committee announced their decision. Having considered the evidence, the Select Committee decided that the proposal to site the railhead and IMB-R at Stone should not be changed and rejected the contrary argument that these facilities should be relocated to a site at Aldersey's Rough¹. Furthermore,

¹ <https://publications.parliament.uk/pa/cm201719/cmselect/cmhs2/1085/108502.html>

in paragraph 30 of their Second Special Report of Session 2017-19² in July 2018, the House of Commons Select Committee stated:

"The Committee confirms its "in principle" decision that the Infrastructure Maintenance Base-Railhead (IMB-R) should be sited as is proposed in the Bill Scheme at Stone."

The Promoter does not consider that your petition raises any reason to depart from the decision thereby confirmed by the House of Commons Select Committee. We explained in the PRD that relocation of the IMB-R would require amendments to the Bill that would necessitate an Additional Provision.

The guidance on petitioning published by the Private Bill Office in the House of Lords in July 2019 in advance of the petitioning period explains:

"An additional provision is a change to the bill that goes beyond the scope of the existing powers of the bill and which may potentially have an adverse direct and special effect on particular individuals, groups or bodies, over and above any effect on the general public.

Two additional provisions were submitted and considered by the House of Commons Select Committee. However, under the rules governing private bill procedures, it is expressly forbidden to introduce an additional provision in respect of a bill in the second House – in this case, the House of Lords. The Lords Select Committee on the High Speed Rail (London – West Midlands) Bill heard extensive procedural argument on the issue concerning its application to a hybrid bill and concluded that it would be contrary to well-established practice for an additional provision to be included. It can therefore with some confidence be expected that the same would apply to the High Speed Rail (West Midlands – Crewe) Bill."³

Powers of the House of Lords Select Committee to consider a Transport and Works Act Order (TWAO) as an alternative to an Additional Provision to the Bill

Your petition makes reference to promoting a Transport and Works Act Order for the relocation of the proposed railhead and IMB-R to Aldersey's Rough.

As set out in our response to paragraph 3.2 of your petition, a TWAO is a statutory instrument that authorises works and other powers for specific types of projects. The power to make a TWAO derives from the Transport and Works Act 1992. The Secretary of State is the decision maker. Parliament has no role in the TWAO consenting process and applications are handled by officials within the Department for Transport. In the event of objections, a public inquiry is held, which is presided over by a Planning Inspector. In order to justify promoting a TWAO for the purpose of relocating the railhead and IMB-R to the location proposed by the Petitioners at Aldersey's Rough, the Promoter must be satisfied of the need to make that change to the Proposed Scheme. The Promoter must be able to present a convincing case that the performance of a railhead and IMB-R at that alternative location would be so superior to Stone on engineering, operational and environmental grounds as to justify its substitution for the Stone facility whose delivery is authorised under the Bill. Not only does the Promoter remain of the view, in the light of the evidence, that the alternative location at Aldersey's Rough is clearly inferior to Stone on each of those grounds; it is also the case that the House of

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/755284/hs2-phase2a-promoters-response-select-committee-second-special-report.pdf

³ See section 1 <https://www.parliament.uk/business/committees/committees-a-z/lords-select/high-speedrail-westmidlands-crewe-bill-select-committee-lords/petitioning-guidance-17-19>

Commons Select Committee rejected the Petitioners' case that the railhead and IMB-R should be relocated to Aldersey's Rough by amendment of the Bill. For these reasons, there is simply no reasonable basis upon which the Promoter is able to justify the promotion of the TWAO for which your petition now argues.

That being the position, and given the approach adopted by the Select Committee on the Phase One Bill, which followed well established practice, the Promoter's position is that it would not be appropriate for the House of Lords Select Committee to entertain directing the Promoter to promote the TWAO sought by the Petitioners, as an alternative means of achieving changes to the Bill to extend the scope of the Phase 2A Bill.

Please refer to the response in the PRD to paragraphs 2.1 – 2.5, 2.11 – 2.16, 3.1 – 3.15 of your petition for further information on this matter.

Excavated material

I understand that your concerns related to excavated material are about the Promoter's assessment. At paragraph 2.4 of your petition, it is stated that you have 'comprehensive evidence' to suggest that we have severely underestimated the amount of material that will need to be excavated at site, whilst overestimating the quantity of excavated material that can be reused as engineering fill. The estimated amount of material that will need to be excavated at the Stone railhead/IMB-R is based on a comprehensive desk study of the available information together with a volumetric assessment based on the design geometry for the Proposed Scheme. The Promoter does not accept that the amount of material to be excavated for the Stone railhead has been severely underestimated as your petition contends.

As low train speeds are anticipated at the Stone railhead/IMB-R, the Additional Provision 2 (AP2) design assumes that, with the exception of the ground treatment, the IMB-R embankment and most of the headshunt embankments will be built out of normal quality cohesive material rather than the high quality granular material required for embankments where the train speeds will be higher. It is anticipated that this cohesive material would be excavated from adjacent or nearby cuttings and moved to these embankment locations by site haul.

The quantity of excavated material that can be reused as engineering fill is based on published information and previous experience of working with these materials. The Promoter therefore considers that the quantity of excavated material that can be reused as engineering fill has not been over-estimated. The Promoter also considers that there would not be large quantities of excavated material requiring off-site disposal because of its unsuitability for engineering re-use.

The Promoter is aware that there is an extensive area of poor ground in the Filly Brook valley under the footprint of the mainline railway embankment there, the IMB-R embankment and the northern part of the embankment for the IMB-R to the headshunt chord. There are also other smaller areas of poor ground elsewhere under the IMB-R embankment.

Provision for extensive ground treatment of poor ground has been included in the AP2 design under these embankments. The design assumes that the poor ground would be excavated and replaced with granular material which would be sourced from elsewhere on the Proposed Scheme site and moved to these locations via the Yarnfield North Embankment Transfer Node. Therefore, there would not be a far greater demand for the importation of suitable engineering fill to build these major earth structures than is currently included in the AP2 design.

On 1 October 2019 my colleagues from the Community Engagement Directorate accompanied Parish Councillors from Yarnfield Parish Council to observe HS2 ground investigation works in the local area.

Please refer to the response in the PRD to paragraphs 2.4 – 2.5 of your petition for further information on this matter.

Potential impacts of Stone railhead/IMB-R on Norton Bridge to Stone railway passenger services

I understand that you have a concern related to the potential impacts of the proposed Stone railhead/IMB-R on the frequency of future passenger service trains of the Norton Bridge to Stone railway. Paragraph 2.13 of your petition specifically questions whether the addition of two HS2 classic compatible trains per hour to serve Macclesfield via Stafford and Stoke-on-Trent would lead to insufficient train paths to serve both the Stone railhead and IMB-R in the daytime.

Our response in the PRD explains that there are currently five passenger services per hour in each direction passing through Stone on the Norton Bridge to Stone line, plus one freight per hour. This information was obtained from an analysis of Realtime Trains' data in September 2019⁴, which identified five passenger services per hour in each direction passing through Stone and one freight/empty coaching stock (ECS)/engineering train per hour. The first timetabled train was at 06:13 and the last timetabled train was at 23:11.

The proposed HS2 railhead and IMB-R facilities at Stone is expected to receive occasional trains from the national railway network from various locations to support the future construction and maintenance of the HS2 network.

Analysis of the proposed December 2019 timetable for the Norton Bridge to Stone railway line has identified a planned passenger train frequency of three trains per hour. When HS2 opens for passenger services, if the franchisee introduces a service between Macclesfield and London Euston this could increase the total number of passenger trains to four an hour in each direction on the Norton Bridge to Stone railway line. Some of the proposed HS2 passenger services could replace existing passenger services on West Coast Mainline.

Timetable studies that have been undertaken by the Promoter analysing daytime paths in and out of the Stone railhead during the construction phase have concluded that, with this quantum of trains, additional paths could be found for up to five trains during daytime operations for trains to arrive and depart the railhead. These additional paths could be allocated for freight or passenger train use.

The Promoter's current assumption therefore is that the Stone railhead and IMB-R could be served either in the daytime or at night, due to the low number of trains requiring access from the Norton Bridge to Stone railway line.

The Promoter considers that the proposed location for the HS2 permanent maintenance depot at Stone IMB-R would be able to support daytime activity with up to three different train paths available once HS2 opens for passenger services. This would provide flexibility in arrival and departure times for both daytime and night-time operations at the IMB-R.

Please refer to the response in the PRD to paragraphs 2.1 - 2.5, 2.11 - 2.16, and 3.1 - 3.15 of your petition for further information on this matter.

⁴ <https://www.realtimetrains.co.uk>

Construction traffic around Yarnfield Lane

With specific respect to paragraph 2.6 of your petition, and your assertion that we would not be able to accommodate the peak frequency of Heavy Goods Vehicles (HGV) movements in and out the Yarnfield North Embankment Transfer Node as reported in the AP2 traffic assessment, the Promoter's position is as follows:

- The peak month of construction activity at the Yarnfield North embankment transfer node would be August 2022 with 2329 HGV two-way movements. At detailed design, the transfer node would therefore be configured to accommodate this peak in HGV movements;
- During the AP2 design, the construction of the Yarnfield Lane M6 replacement overbridge was brought forward to accommodate a revised approach to managing traffic interfaces with Yarnfield Lane. This enables an opportunity to segregate the traffic and improve the utilisation of the proposed M6 slip roads, and thus reduce wider traffic impacts on the local road network;
- A temporary site haul road beneath the realigned Yarnfield Lane would be implemented prior to the main phase of transfer node HGV movements, thus enabling the separation of HS2 construction traffic between the transfer node and the M6 motorway;
- Future traffic growth on the M6 motorway has been considered as part of the AP2 traffic assessment;
- The planned introduction of the Smart Motorway hard shoulder running, expected to be available from the spring of 2022⁵, will provide additional capacity and more effective management of traffic flows on the M6; and
- The AP2 traffic assessment has demonstrated that there would not be a new capacity constraint created on the M6 motorway as a result of HS2 construction traffic leaving or joining the motorway.

With specific respect to paragraph 2.7 of your petition, the response in the PRD states that "The Promoter is able to demonstrate that use of the existing Yarnfield Lane as a site haul road segregated from the replacement Yarnfield Lane is practical from an engineering perspective and would be accommodated within the proposed construction boundary".

Further to this response, and as evidence to demonstrate that the indicative haul roads are feasible from an engineering perspective, please refer to a drawing showing the Yarnfield Lane Haul Road U - Turn, a copy of which is attached to this letter. This drawing details the construction haul road connection from the transfer node to the temporary northbound M6 slip roads. The existing Yarnfield Lane M6 overbridge would be retained for temporary use by HS2 traffic whilst the public would be able to use the realigned Yarnfield Lane and associated replacement M6 overbridge. The drawing shows an indicative HS2 construction traffic site haul route which has been designed to accommodate passing movements for articulated HGVs. This is illustrated in the vehicle tracking swept paths on the right hand side of the drawing.

Please refer to the response in the PRD to paragraph 2.6, 2.7, 2.9 and 2.10 of your petition for further information on this matter.

⁵ <https://highwaysengland.co.uk/projects/m6-junction-13-to-junction-15-smart-motorway/>

Yarnfield Lane M6 overbridge

Please refer to the response in the PRD to paragraph 2.8 of your petition.

Engagement

Communication and engagement are critical to the success of the Promoter's construction works, and the quality of engagement will define the nominated undertaker's relationships with communities and stakeholders alike⁶. As the Bill progresses through the House of Lords, achieves Royal Assent and construction of the Proposed Scheme begins, the Promoter would continue to engage with the Petitioners, giving opportunities to raise and address concerns.

If you have any further queries please don't hesitate to contact Anne-Marie Sahakian, Petition Adviser on 07796941919, or AnneMarie.Sahakian@hs2.org.uk.

Yours sincerely



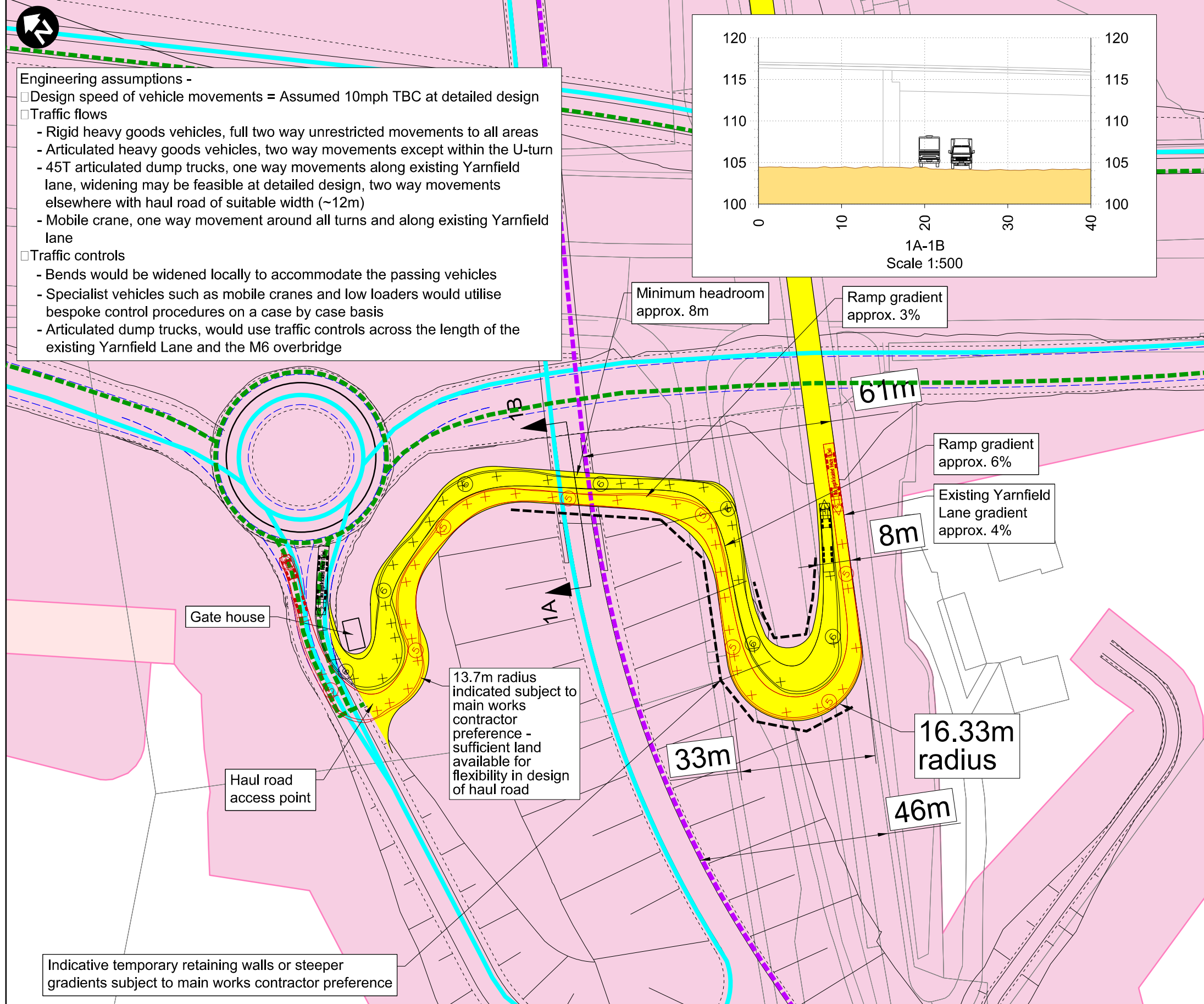
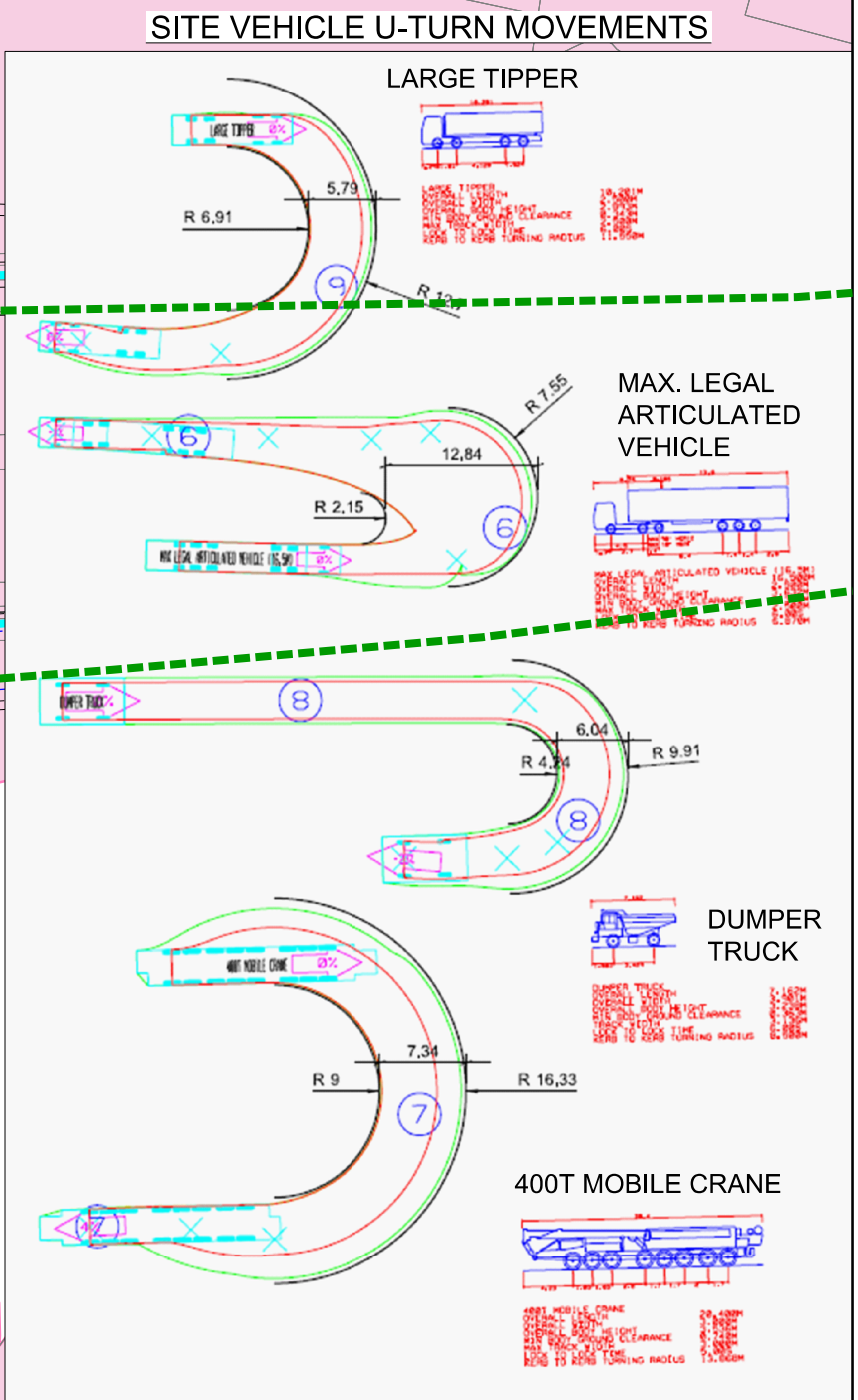
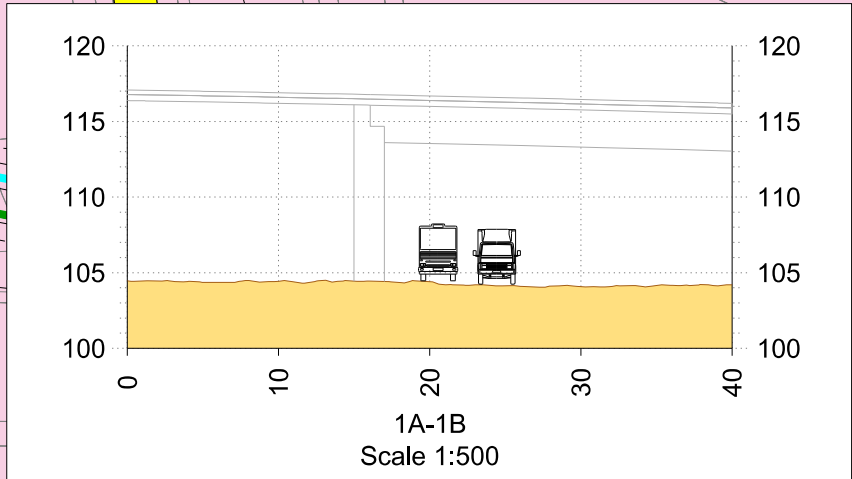
Oliver Bayne

Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

⁶https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779318/G2_Community_Engagement_v1.1.pdf



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--- Yarnfield Lane Public Traffic
--- Motorway Emergency Access

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Zone	Route Wide		Project/Contract		
			C861 Hybrid Bill Additional Provision 2 AP2		
Design Stage	Hybrid Bill - Interim Preliminary Design AP2		Discipline/Function		
			Petitions		
Drawing Title	Annex A Yarnfield Lane Haul Road U Turn		Drawn	Checked	Approved
			DS	AG	TE
			Date	Scale	Size
			23/08/2019	1:1000	A3
			Drawing No.		Rev.
			2PT02-ARP-PT-DSK-000-000550		P01

Yarnfield & Cold Meece Parish Council

Yarnfield Village Hall
Yarnfield Lane
Yarnfield
ST15 0NJ
ycmclerk@gmail.com

22 November 2019

Dear Mr Bayne

HS2 Phase 2a House of Lords Select Committee: Petition 023

Further to your letter dated 16 October 2019, I am writing to confirm that we would be happy to meet HS2 Ltd to discuss our petition in advance of any appearance before the House of Lords Select Committee. Possible dates for the meeting are the 3rd, 4th or 6th December at a time that would suit you. If you could ask Anne-Marie Sahakian to confirm the details with me on the assumption that the meeting will be held in Yarnfield. As you may know we can arrange for a meeting room to be available at the Yarnfield Park Conference Centre, subject to availability.

With regard to your request that we provide you with our comprehensive evidence regarding excavated material, we do not believe that it would be appropriate to provide this information in advance of such a meeting unless HS2 Ltd is prepared to be equally candid with the information which, from the contents of your letter, it claims to hold with respect to ground conditions in the vicinity of the Stone Railhead/IMB-R. This information includes:

- The “*comprehensive desk study*” and the accompanying “*volumetric assessment based on the design geometry for the Proposed Scheme*” referred to the first paragraph under the heading of excavated material on page 3 of your letter.
- The engineering basis for the assumption that train speed is the key factor for HS2 Ltd determining that “...*the IMB-R embankment and most of the headshunt embankments will be built out of normal quality cohesive material rather than the high quality granular material.*”
- The volumetric assumptions regarding the reuse of locally sourced cohesive fill, i.e. where will it be excavated and transported from/to.
- Details (including via the provision of a scale plan) confirming the location and extent of the “*extensive area of poor ground in the Filly Brook valley under the footprint of the mainline railway embankment there, the IMB-R embankment and the northern part of the embankment for the IMB-R to the headshunt chord*”, together with the “*other smaller areas of poor ground elsewhere under the IMB-R embankment*”.
- Details of the “*extensive ground treatment of poor ground*” that HS2 Ltd is stating is included in the AP2 design, including its volumetric assumptions with respect to replacing poor ground with granular material, together with details of the method and extent of ground treatment required.
- How the assumptions derived by the original desk study have been influenced by the results emerging from the ground investigations completed to date.

With respect to the latter bullet point, you should be aware that prior to the visit by representatives of Yarnfield & Cold Meece Parish Council to the local Balfour Beatty compound near Clifford's Wood, together with a site near Wrinehill, we asked to be provided with details of the extent of ground investigation within the vicinity of the Stone Railhead/IMB-R, but were denied access to this information by HS2 Ltd's local consultation

representatives. However, if HS2 Ltd wishes to effectively engage with local parish councils it needs to be far more transparent about providing information that is pertinent to their concerns. We therefore request again that this information is provided to us as part of the ongoing engagement process.

Turning to your response regarding construction traffic on Yarnfield Lane and specifically the drawing that accompanies your letter, I can confirm that we wish to discuss this issue when we meet, not least because we continue to doubt whether this proposal represents a practical or cost-effective engineering solution.

Furthermore, we do not consider that this drawing fulfils Mr Mould's commitment to the House of Commons Select Committee or addresses our request for the provision of relevant engineering information. Such information includes the provision of levels (mAoD) and sections along the length of proposed Yarnfield Lane haul route, including the proposed ramp that connects to the northbound carriageway of the M6, together with other key features such as the realigned Yarnfield Lane, the M6 link roads and the length of the top/toes of the embankment batters and the newly proposed retaining walls.

In addition, and contrary to what is stated in the penultimate paragraph of page 6 of your letter, the drawing does not detail the construction haul road connection from the transfer node to the temporary northbound M6 slip roads. Indeed the transfer node is not shown at all, and nor is the proposed connection to the transfer node from the M6 southbound. Also missing from the drawing is the connection between the existing and realigned Yarnfield Lane, as well as the M6 link road near to Moss Lane.

It is also not clear whether the third bullet point on page 6 of your letter is referring to the ramp on the western side of the M6, as shown on the enclosed drawing, or another haul road on the eastern side of the M6 to connect the southbound M6 to the transfer node without interfering with the operational Yarnfield Lane?

Given the above stated omissions, I would be grateful to receive a larger (i.e. at A2 or A1 - as appropriate) drawing of greater extent via the post to my address at 5 De Havilland Drive, Yarnfield, Stone, ST15 0SX. Ideally this plan should also include details of an indicative layout of the transfer node to address our concerns regarding its ability to handle such large volumes of HGVs, as well as internal site traffic.

Finally, I look forward to hearing from you or Anne-Marie in the near future.

Yours sincerely

A handwritten signature in black ink, appearing to read 'J Fraser', written in a cursive style.

John Fraser

Parish Clerk

Yarnfield & Cold Meece Parish Council

Mr John Fraser
5 De Havilland Drive
Yarnfield
Stone
ST15 0SX

17 December 2019

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

Thank you for your letter of 22 November 2019, in response to mine of 16 October.

My colleague Anne-Marie Sahakian contacted you on 29 November to let you know that we were considering the requests in your letter and would respond before Christmas, and to ask for Parish Council members' availability for a meeting in early January 2020 (Anne-Marie subsequently contacted you on 6 December to let you know that she would be leaving HS2 Ltd and that your contact going forward would be Rachna Shah).

I note that in your letter you said that the Parish Council were not minded to provide us with the comprehensive evidence you hold in respect of excavated material, as referred to in your petition against the Bill in the House of Lords, unless we provided you with the further information specified in your letter.

I am writing to you to provide the further information you requested.

In your letter you asked for information in respect of the comprehensive desktop study undertaken on the ground conditions in the vicinity of the Stone IMB-R. Please find enclosed a technical report and accompanying appendices which provides the information you asked for.

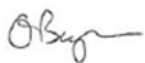
You also asked for a larger drawing showing the haul road connections between the Yarnfield transfer node and M6 motorway. Please find enclosed an A1 size drawing as requested.

I understand that Rachna has recently been in contact with you regarding Parish Council member's availability for a meeting between the 14-17 January 2020.

I trust the information provided with this letter will be of assistance to you. I would be grateful if you would now share with us the comprehensive evidence referred to in your House of Lords petition.

If you have any further queries please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

Yours sincerely

A handwritten signature in black ink, appearing to read 'O Bayne', with a stylized flourish at the end.

Oliver Bayne

Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

HS2

Infrastructure Maintenance Base – Rail: Ground conditions and basis of earthworks volumes in AP2 Design

Document no: C861-ARP-PT-REP-000-100294

Document revision no: P02

Revision	Author	Reviewed by	Approved by	Date approved	Reason for revision
P02				17/12/2019	Issue to HS2 to address comments on P01 and for issue to Yarnfield PC
P01				14/10/2019	Issue to HS2 for information
P01.2 WIP					Updates following internal review. Draft2 issued to Hs2 by email on 9/10/2019
P01.1 WIP					Draft1 issued to Hs2 by email on 4/10/2019

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- Appendix E: Geotechnical constraints plans and key

1 Introduction

1.1.1 This report provides a summary of the sources of information and assumptions used to establish HS2 Ltd's understanding of the ground conditions at the Infrastructure Maintenance Base – Rail (IMB-R) at Stone which were used to assess the volumes of excavated material, of embankment fill material required and of the required ground treatment.

1.1.2 The following information is contained within this report:

- the sources of information which were used to assess the ground conditions at the IMB-R;
- information about the ground conditions at the IMB-R based on desk study data;
- the assumptions which were used to develop the AP2 earthworks design for the IMB-R;
- a summary of the main earthworks volumes at the IMB-R, headshunt and adjacent HS2 mainline railway embankments;
- a summary of the mass haul movement plan for the IMB-R, headshunt and adjacent HS2 mainline railway embankments;
- a site plan of the IMB-R, headshunt and adjacent HS2 mainline earthworks and a cross section through the IMB-R embankment;
- options for ground treatment; and
- conclusions.

2 Sources of information

2.1.1 Information included in the desk study on the ground conditions at the Stone IMB-R was obtained from the following sources:

- the published British Geological Survey (BGS) geological maps:
 - 1:10,560 Staffordshire 30 NW (dated 1901) (appended to this report in Appendix A); and
 - 1:50,000 Stafford, Sheet 139 (dated 1974) (available from the BGS at <https://www.bgs.ac.uk>);
- the published BGS memoir “Explanation of Sheet 139, The Country between Stafford and Market Drayton”, Whitehead et al (1927) (out of print);
- BGS historical exploratory hole logs – these were all from the M6 Widening Ground investigations (GI) in the early 1990s. The relevant logs are appended to this report together with the exploratory hole location plans in Appendix B and most of them can also be accessed in the BGS Geoindex Onshore online viewer (<http://mapapps2.bgs.ac.uk/geoindex/home.html>);
- Historical Ordnance Survey (OS) topographical maps, 1:2,500 scale, various dates from 1880 to 1994. The relevant maps are appended to this report in Appendix C;
- Historical Ordnance Survey (OS) topographical maps, 1:10,560 scale, various dates from 1887 to 1980. The relevant maps are appended to this report in Appendix C;
- Google Earth aerial photography (2016); and
- Section 10, Land quality, of Volume 2¹ of the main HS2 Phase 2a Environmental Statement (main ES) (July 2017) and supporting material in Volume 5² of the main ES.

¹HS2 Phase 2a Environmental Statement, Volume 2: Community Area Report, CA3: Stone to Swynnerton, ES (July 2017) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627565/E15_CA3_Stone_and_Swynnerton_WEB_final.pdf.

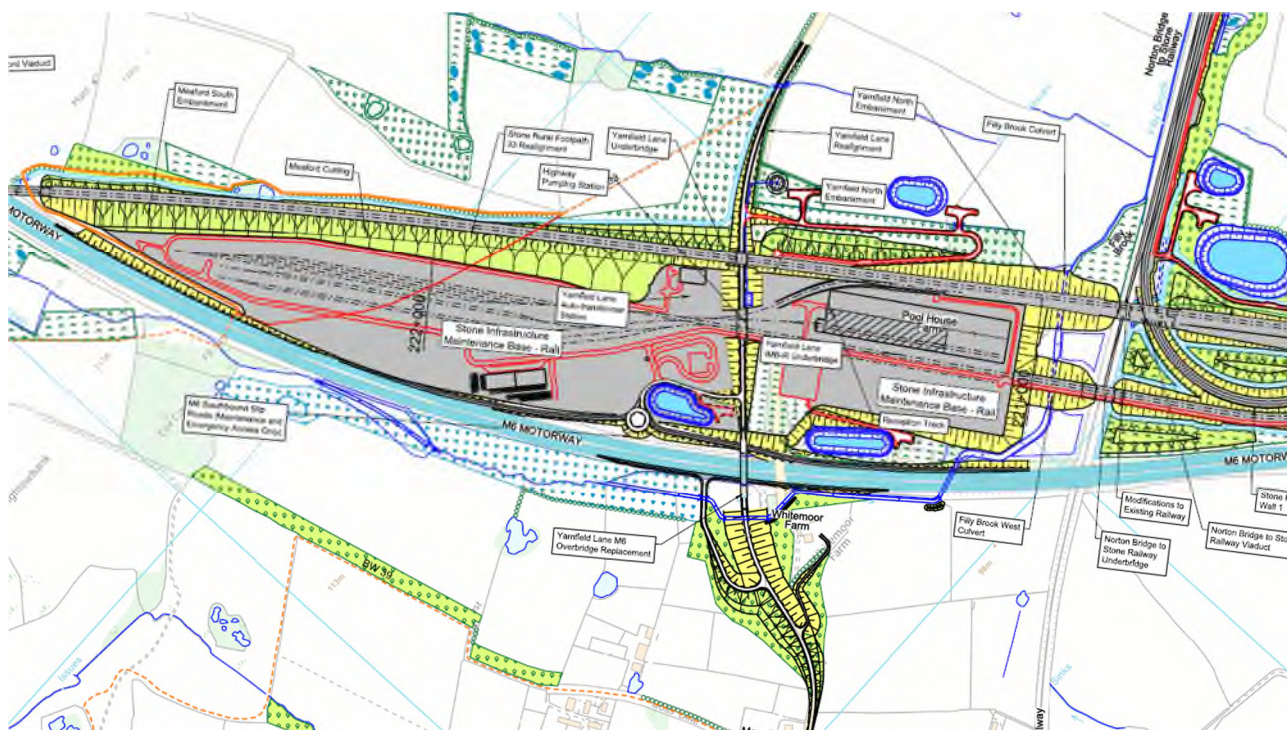
² HS2 Phase 2a Environmental Statement Volume 5: Map book: Land quality (July 2017) <https://www.gov.uk/government/publications/hs2-phase-2a-environmental-statement-volume-5-land-quality>.

3 Site description

3.1 Proposed development

- 3.1.1 The proposed Stone IMB-R is located between HS2 chainage³ (Ch) 221 + 000 and Ch 222 + 500 (see Figure 1). It will be located on an earthworks platform which is partially in cutting and partially on embankment. The Stone IMB-R will be on up to 11m of raised embankment at Ch 221+050 (in the Filly Brook valley) reducing in height north-westwards towards existing ground levels at Ch 221+ 500 (near Yarnfield Lane) and in up to 5m of cut at the north-western end of the IMB-R (Ch 222 + 500). The drawing from which Figure 1 is taken is included in Appendix D.

Figure 1: Stone IMB-R (extract from base plan for AP2 Plans CT-06-222 and CT-06-223)



3.2 Geology

- 3.2.1 The available sources of information (see Section 2 and Appendices A, B and E) indicate that the Filly Brook valley between Ch 220+900 and Ch 221+200 was a relatively short-lived glacial melt water channel at the end of last Ice Age. The modern Filly Brook watercourse has eroded the glacial deposits in the former meltwater channel that it occupies and has deposited alluvial deposits and River Terrace Deposits.
- 3.2.2 The south-eastern part of the platform for the Stone IMB-R and the southern part of the adjacent HS2 Yarnfield North railway embankment between about Ch 221+000

³ Chainage (known as reference chainage) is referenced from Euston Station, which is 0+000, and the value presented is in metres. E.g. 192+000 refers to the point, 192,000m, or 192km, from Euston Station.

and Ch 221+100 will be founded on alluvial deposits associated with the Filly Brook valley. These alluvial deposits comprise soft silts and clays with variable sand content and organic material. River Terrace sands and gravels are also present. The BGS historical exploratory hole logs in the area of the Stone IMB-R are all from the M6 widening ground investigations carried out in the early 1990s.

- 3.2.3 During the second phase of the M6 widening ground investigations (GIs) in 1994, 28 dynamic probeholes (2574-1 to 2574-14 and 2575-1 to 2575-14) were carried out along the northern side of the existing M6 motorway embankment across the Filly Brook valley and five were carried out immediately to the north-west of Yarnfield Lane Overbridge (2577-1 to 2577-5) (see Geotechnical Constraints Plan GE-01-521 in Appendix E). None of these probeholes are included on the BGS Geoindex. They were carried out to investigate the depth of soft ground in these areas. This probing showed that:
- for the area up to approximately 200m westwards from the existing railway bridge (probeholes 2574-1 to 2574-14 inclusive), the soft ground was typically from 0.3 to 4.5m deep, and 5.5m deep at one location, with an average depth of 2.9m;
 - for the area extending to approximately 200m eastwards from the existing Yarnfield Lane (probeholes 2575-1 to 2575-14 inclusive), the soft ground was typically from 0.2 to 3.5m deep, and was 5.5m deep at one location, with an average depth of 2m. It is unclear how much of this soft ground was Alluvium and how much was Head⁴ and this should be investigated further during the HS2 preliminary ground investigation (PGI); and
 - for the small area immediately to the north of the M6 and west of Yarnfield Lane Overbridge (2577-1 to 2577-5), the soft ground was typically from 2.8 to 3m deep, and 3.7m deep at one location.
- 3.2.4 Based on the historical ground investigation (GI) information, the alluvial deposits are likely to be soft and around 2m thick⁵, but may be thicker locally, and the River Terrace deposits are likely to be up to about 3.7m thick.
- 3.2.5 Head deposits are present in some locations to the north of approximately Ch 222+000. These typically comprise soft to firm, silty clays with varying proportions of sand and gravel and are typically up to 1.5m thick.
- 3.2.6 The exploratory hole logs from the M6 widening GIs did not record the presence of the Head which is contrary to the geological map. They also record the presence of Glacial Till which is not shown to be present in this area of the route on the geological map. The Glacial Till descriptions in the logs of the M6 exploratory holes are mostly likely to be Head and it is therefore considered that the M6 GI logging may have misinterpreted the Head as Glacial Till. This further emphasises the importance of the results of the current HS2 Preliminary Ground Investigation (PGI) as there is some

⁴ This is because the probehole logs only comprise blowcounts with depth and do not include geological descriptions.

⁵ HS2 Ltd has commenced a site-specific confirmatory preliminary ground investigation (PGI) and the depth and extent of soft ground will be reassessed when the results are available.

uncertainty over the interpretation of the geological descriptions provided in the M6 widening investigations.

- 3.2.7 Underlying the superficial drift deposits and where those deposits are absent, the solid geology is Mercia Mudstone. This typically comprises a weak, red brown, silty mudstone. It typically weathers to a stiff, silty clay with varying proportions of mudstone gravel/lithorelic structures. The weathered zone may be 10m thick or more.
- 3.2.8 The interpreted geology of the Stone IMB-R, Stone Headshunt and adjacent HS2 mainline railway is shown on the Geotechnical Constraints Plans in Appendix E. The Alluvium is shown in light yellow and the Mercia Mudstone in reddish-brown/pink.

3.3 Historical development

- 3.3.1 The historical OS maps (included in Appendix C) and the land quality assessment carried out for the Phase 2a Environmental Statement indicate that several former pits or mineral workings, ponds, farm buildings and a small historical unlicensed landfill are present within the footprint of the proposed Stone IMB-R (see Figures 2 to 4), as follows:

- Darlaston Pool (Ch 221 + 100);
- Former ponds/mineral workings near Yarnfield Lane (Ch 221 + 450);
- Pool House Farm (Ch 221+120);
- Pool House Landfill (approximately Ch 221+300); and
- Other former pits and ponds.

Darlaston Pool (Ch 221+100)

- 3.3.2 The historical OS maps indicate that Darlaston Pool was present from the first edition map (1880) to the 1958 map (see Figure 2). The location of this Figure is shown on the first sheet of the maps in Appendix C. This lies within the footprint of the proposed embankment for the Stone IMB-R. The pool was not present on the 1965 map and appears to have been largely backfilled by then to create a platform for some of the farm buildings or hardstandings. The plan dimensions of Darlaston Pool were approximately 100m by 250m. Managed watercourses were also indicated to be present associated with the pool, possibly for topping up or controlling its water levels. This pool is also mentioned in paragraph 7.3.7 of the Phase 2a Environmental Statement⁶.
- 3.3.3 Darlaston Pool is located within the Filly Brook valley. The Google Earth map (2016), reviewed prior to the submission of the HS2 Phase 2a hybrid Bill, indicates that the area of the former pool is currently densely vegetated.

⁶ HS2 Phase 2a Environmental Statement, Volume 2: Community Area Report, CA3: Stone to Swynnerton, ES (July 2017).

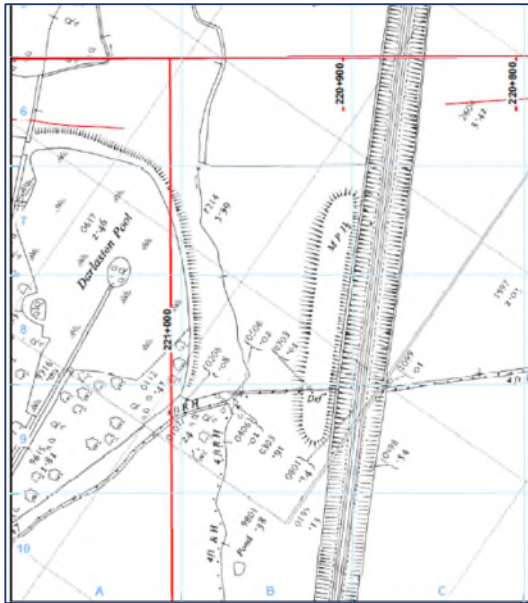


Figure 2 Excerpt from 1:2500 OS Map dated 1958 showing Darlaston Pool, Filly Brook, the Norton Bridge to Stone railway line and the indicative HS2 centreline (in red)

- 3.3.4 No specific exploratory holes were carried out in the footprint of the pool as part of the M6 widening GI, although Trial Pit 2572-2 (BGS SJ83SE83) was carried out close to the pool margins. This indicated the presence of soft sandy clay to 1.0m below ground level (bgl) with varying amounts of sandstone and quartzite gravel, cobbles and boulders. Below 1.0m depth the sandy clay became firm and then stiff below 2m depth. As discussed above, the Filly Brook valley is a glacial melt water channel and hence the presence of sandstone and quartzite cobbles and boulders is not unexpected.
- 3.3.5 Two of the M6 widening exploratory holes (TP2571, BGS SJ83SE80) and (TP2574, BGS SJ83SE86) were located along the western margins of Darlaston Pool (near the southbound M6 carriageway). These encountered made ground to depths in excess of 4.8m and to 1.95m respectively.
- 3.3.6 The made ground in TP2571 comprised stiff sandy clay with occasional gavel, cobble and boulder size fragments of sandstone and quartzite and occasional roots, twigs and plants to 2.5m where a soft to firm becoming stiff, silty clay with pockets of gravelly, fine to medium sand was encountered to the base of the trial pit at 4.5m.
- 3.3.7 TP2574 encountered made ground comprising very sandy gravel with quartzite cobbles and pockets of sandy clay to 1.1m depth underlain by a soft to firm, sandy clay with a little quartzite gravel and numerous decayed shoots and rootlets to 1.95m. This sandy clay was underlain by possible reworked Mercia Mudstone.

Former ponds or mineral workings near Yarnfield Lane Ch 221 + 450

- 3.3.8 The historical OS maps indicate that a series of five ponds of varying size were present north of Yarnfield Lane on the first edition map (1880). These lie within the footprint of the proposed Stone IMB-R. The ponds were still present on the 1947 map but are not indicated on the 1961 map, indicating that they had been infilled by this date. The plan

dimensions of the area covered by the former ponds is approximately 100m by 40m (see Figure 3). The location of this Figure is shown on the first sheet of the maps in Appendix C.

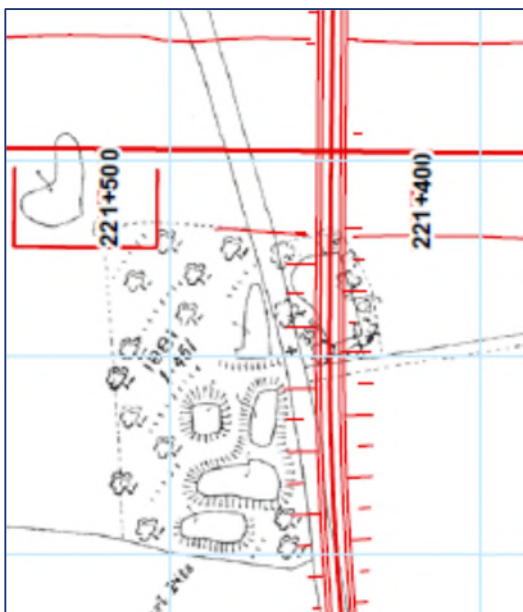


Figure 3 Excerpt from 1:2500 OS Map dated 1924 showing former pits and ponds, Yarnfield Lane and the indicative HS2 centreline (in red)

- 3.3.9 One exploratory hole was excavated alongside Yarnfield Lane in the area of these former ponds or pits as part of the M6 widening GI (TP 2584, BGS SJ83SE97). Made ground was encountered in the trial pit to a depth of 3.6m over Mercia Mudstone.
- 3.3.10 The made ground encountered is described as a firm to stiff⁷, silty clay with varying amounts of gravel (mudstone, sandstone, quartzite), with some to much decaying organic material (roots, twigs and wood fragments). A strong organic odour was noted in TP2584 below 2.3m depth.

Pool House Farm (Ch 221+120)

- 3.3.11 The historical OS maps first indicate the buildings of Pool House Farm on the 1965 map. The farm lies under the proposed footprint of the IMB-R and HS2 mainline embankments (see Figure 4). The location of this Figure is shown on the first sheet of the maps in Appendix C. The infilled Darlaston Pool would be to the south of the farm on this map. Some of the existing farm buildings and hardstandings may be built on this made ground.

⁷ In paragraph 3.3.10, the terms “firm to stiff” and “some to much” are geological descriptions used to log excavations.

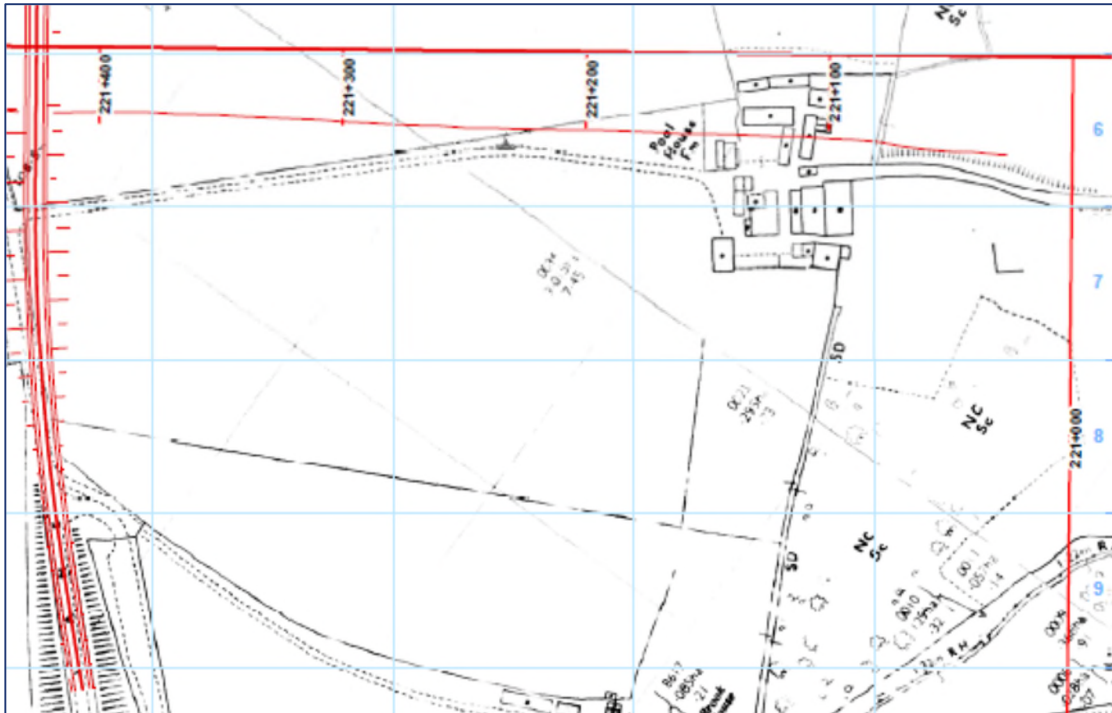


Figure 4 Excerpt from 1:2500 OS Map dated 1965 showing Pool House Farm and the indicative HS2 centreline and proposed realigned Yarnfield Lane (both in red)

Pool House Farm Landfill (approximately Ch 221+300)

- 3.3.12 The Land Quality assessment undertaken for the Phase 2a Environmental Statement⁸ indicates that there was a small historical licensed landfill located to the south of Yarnfield Lane near Pool House Farm. Environment Agency records state that the landfill received household waste. The first input of waste was in December 1958 and the last input was in December 1960. No further information with regards to licence issue and surrender dates is available. This landfill site is not shown on the historical OS maps and its exact location and size are uncertain.

Other former pits and ponds

- 3.3.13 The historical OS maps also show several small former pits and ponds, some of which have subsequently been infilled, within the footprint of the proposed Stone IMB-R.

⁸ HS2 Phase 2a Environmental Statement, Volume 2: Community Area Report, CA3: Stone to Swynnerton, ES 3.2.1.3 (July 2017).

4 Assumptions in the AP2 earthworks design for Stone IMB-R

4.1 Estimated earthworks volumes

- 4.1.1 The estimated bulk earthworks volumes for the Stone IMB-R, Stone Headshunt, and adjacent HS2 mainline railway embankments (Yarnfield South Embankment and Yarnfield North Embankment) in the AP2 design are summarised in Table 1 below:

Table 1: Summary of AP2 Earthworks volumes for Headshunt, IMB-R and adjacent HS2 mainline railway embankments

Item Description	Stone Headshunt	Yarnfield South Embankment	Yarnfield North Embankment	Stone IMB-R	Total (m ³)
Bulk excavation (m ³)	567,000	0	0	599,000	1,166,000
Ground treatment and railway embankment starter layers (m ³)	41,000	27,000	66,000	139,000	273,000 (granular)
Bulk embankment material (m ³)	137,000 (cohesive material) 13,000 (granular material)	32,000 (granular material)	303,000 (granular material)	1,129,000 (cohesive material)	1,266,000 (cohesive material) 348,000 (granular material)
Landscape material (m ³)	74,000	0	34,000	144,000	252,000 (cohesive)
Granular railway trackbed layer material (m ³)	58,000	4,000	13,000	94,000	169,000 (granular)

4.2 Assumptions in AP2 earthworks design for Stone IMB-R, Stone Headshunt and adjacent HS2 mainline

Train speeds and geotechnical requirements for embankment materials

- 4.2.1 The assumed design speed for the Proposed Scheme varies from up to 32kph for sidings within the proposed Stone IMB-R to up to 400kph for the HS2 mainline. A design speed of up to 32kph has been assumed for low speed train operations in the sidings between the Stone Headshunt and the Stone IMB-R. Cohesive fill, such as Mercia Mudstone, is considered to be suitable for railway embankments with low design speeds, but not suitable as a fill material for high speed mainline railway embankments.

Ground treatment

- 4.2.2 The ground treatment within the IMB-R earthworks design principally comprises two main areas (see Figure 5) as follows and would be carried out by excavating the soft ground and replacing it with high quality granular material:
- treatment of alluvium in valley of the Filly Brook and of the large backfilled historical pond there (Darlaston Pool – see Section 3.3). The average depth of the ground treatment is assessed to be 2m (although locally the ground treatment may need to be deeper)⁹ based on the desk study data and the plan extent for the area requiring ground treatment is conservative; and
 - treatment of an area of former ponds or mineral workings to the north of Yarnfield Lane (see Section 3.3). The average depth of the ground treatment is assumed to be 2m thick based on the desk study data and the plan extent for the area requiring ground treatment is conservative.
- 4.2.3 The earthworks volumes also include an allowance for treatment of the former Pool House Farm Landfill and several other small backfilled historical pits identified from desk study data (see Section 3.3).
- 4.2.4 It was assessed that almost all of the material excavated from the ground treatment areas would need to be treated (e.g. with a small percentage of lime) to improve its strength so that it can be used as landscape material. This assessment was based on previous experience of working with these materials. It was also estimated that there would be a small volume (approximately 800 m³)¹⁰ of potentially contaminated material from the former Pool Farm Landfill which would need to be disposed of off-site.
- 4.2.5 There is proposed ground treatment (excavate soft ground and replace with high quality granular material) of alluvium in the Filly Brook valley under the HS2 mainline railway embankment (Yarnfield North Embankment) adjacent to the IMB-R embankment, and under the embankment for the IMB-R to Stone Headshunt Chord. The average depth of the ground treatment for these is also assessed to be 2m.
- 4.2.6 There is also ground treatment (excavate clay and replace with high quality granular material) under the HS2 railway at the transition from Yarlet North Cutting into Yarnfield South Embankment, and at the transition from Yarnfield North Embankment into the cutting beyond that (Meaford Cutting) to the north-west of Yarnfield Lane. These two ground treatment areas under the HS2 mainline are to address the dynamic effects of the high-speed trains as they pass between a cutting and an embankment rather than to address settlement, as is the case for the other ground treatment areas.

⁹ The extent and depth of ground treatment will be reassessed when the results of the HS2 PGI are available.

¹⁰ Based on previous experience of other similar sized farm landfills.

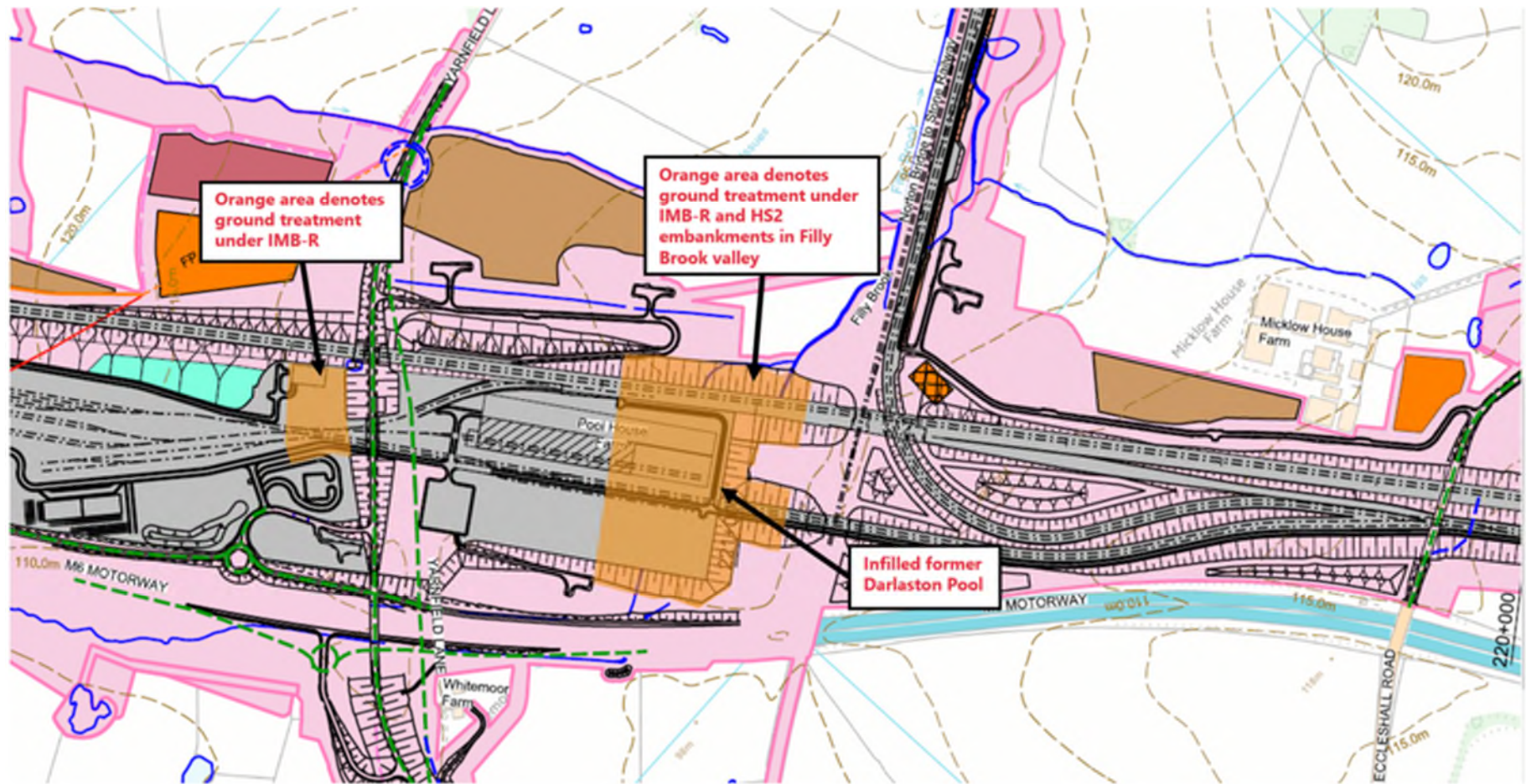


Figure 5 Plan of IMB-R showing indicative ground treatment areas (shown in orange) in the AP2 design (areas assessed from desk study data and subject to confirmatory HS2 Preliminary Ground Investigation).

Stone IMB-R Cutting north-west of Yarnfield Lane and Cuttings for Stone Headshunt and adjacent HS2 mainline

- 4.2.7 There is a large excavation cut area to the north-west of Yarnfield Lane in the AP2 earthworks design for Stone IMB-R. There are also cuttings for the Stone Headshunt and adjacent HS2 mainline (Yarlet North Cutting). Based on the desk study information, these were all assessed to be within Mercia Mudstone with localised Head deposits. It was assessed that almost all of the material excavated from these cuttings would be able to be used as cohesive embankment material or landscape material, although some may need treatment (e.g. with a small percentage of lime) to improve its strength. This assessment was based on published information and previous experience of working with these materials.

Material for embankments for Stone IMB-R and Stone Headshunt

- 4.2.8 As low train speeds are anticipated at the Stone IMB-R and the Stone Headshunt, the AP2 design assumed that the embankments for the Stone IMB-R and the Stone Headshunt would be built out of normal quality cohesive material (see Figure 6) rather than the high quality granular material required for embankments where the train speeds will be higher, together with the associated highways and access tracks.

Materials for trackbed layers in Stone IMB-R, Stone Headshunt and HS2 Mainline

- 4.2.9 The railway trackbed layers, namely the prepared subgrade layer and protection layer, will be installed on the parts of the footprint of the Stone IMB-R where there are railway tracks and will be formed of very high quality granular fill.
- 4.2.10 For the AP2 design, it was assumed that there would be a 0.3m thick prepared subgrade layer over half of the footprint of the Stone IMB-R. It was assumed that this prepared subgrade material would have the same specification as for the HS2 mainline and that it cannot be site-won and would need to be imported from external commercial quarries.
- 4.2.11 It was assumed in the AP2 design that there would be a 0.05m thick protection layer (based on required thickness for depots) over the part of the depot area that will be occupied by railway tracks. It was also assumed that this material would have the same specification as for the HS2 mainline, that it cannot be site-won and would need to be imported from external commercial quarries.
- 4.2.12 In the AP2 design for the Stone Headshunt and HS2 mainline, there would be 0.5m thick prepared subgrade layer and a 0.2m thick protection layer under the railway tracks. These would both be very high quality granular materials and it has been assumed that they cannot be site-won and would need to be imported from external commercial quarries.

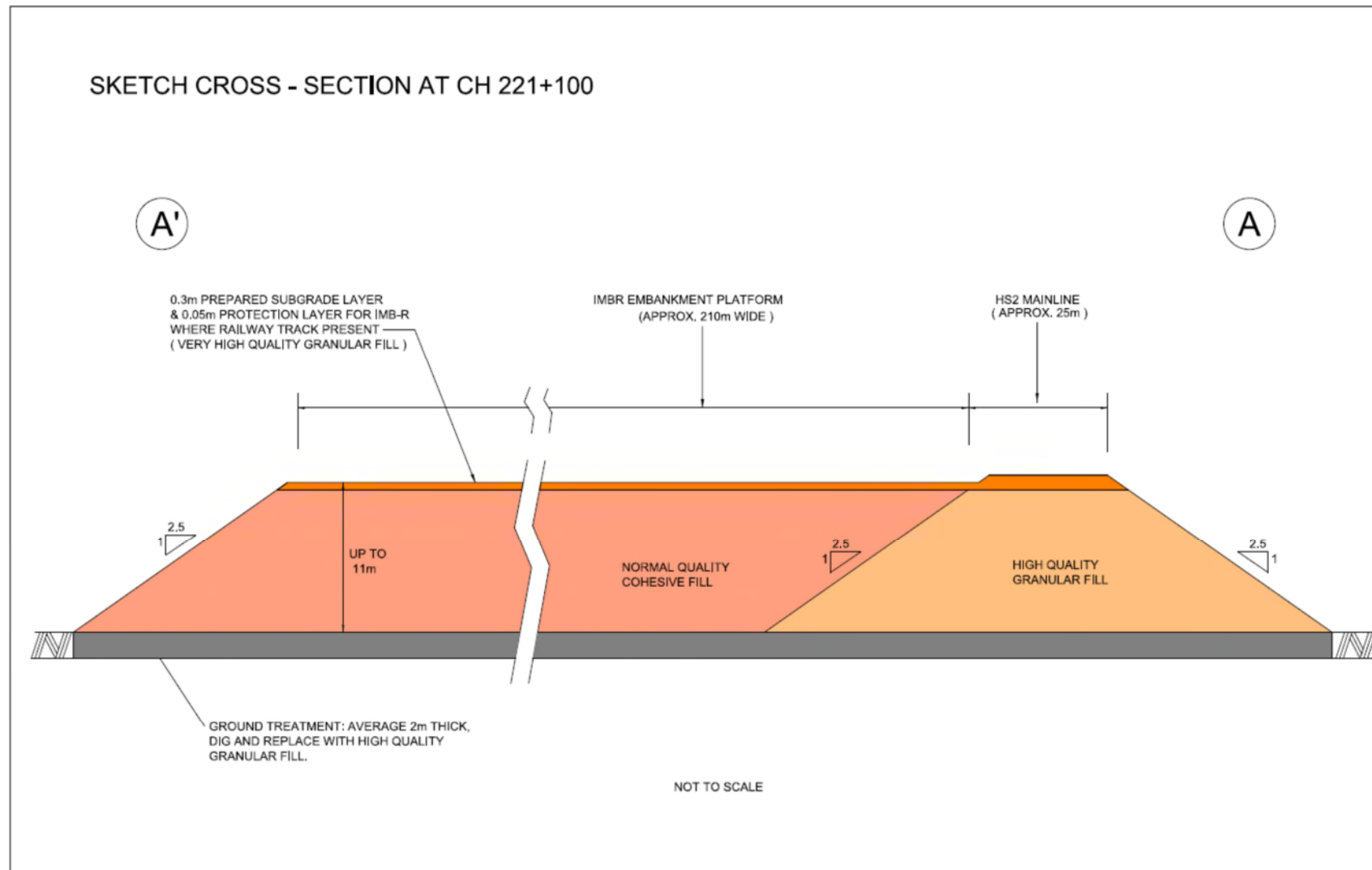


Figure 6: Sketch Cross-section through IMB-R embankment and adjacent HS2 railway embankment showing embankment materials and ground treatment

4.3 Assumptions in AP2 mass haul movement plan for Stone IMB-R

- 4.3.1 In the AP2 mass haul movement plan for the Stone IMB-R, almost all of the material required for the IMB-R embankment is normal quality cohesive material and most of this is sourced from the IMB-R cutting and the adjoining Stone Headshunt cutting to the south-east of the Filly Brook valley, as follows:
- 597,000 m³ of cohesive material is sourced from the cutting for Stone IMB-R;
 - 457,000 m³ of cohesive material is sourced from the cutting for Stone Headshunt; and
 - 75,000 m³ of cohesive material is sourced from Yarlet North Cutting.
- 4.3.2 All of this material would either be moved within the IMB-R footprint or moved along the trace to the IMB-R embankment location.
- 4.3.3 It was also assumed that:
- 144,000 m³ of landscape material at the IMB-R will either be sourced from the IMB-R ground treatment areas (and treated as necessary to improve strength) or from the IMB-R cutting;
 - 139,000 m³ of high quality granular material required for the ground treatment areas would be sourced from elsewhere on the Phase 2a route and moved via Yarnfield North Embankment Transfer Node (TN-221); and
 - the very high quality granular materials for the trackbed layers (94,000 m³) would be imported to the IMB-R via TN-221 from external commercial quarries.

4.4 Assumptions in AP2 mass haul movement plan for Stone Headshunt

- 4.4.1 In the AP2 mass haul movement plan for Stone Headshunt, it was assumed that (see Table 1):
- all of the cohesive material required for the Stone Headshunt embankment and landscape areas would be sourced from the Stone Headshunt cuttings;
 - 13,000 m³ of high quality granular material for the Stone Headshunt embankment would be sourced from Swynnerton North Cutting and moved to the Stone Headshunt by site haul;
 - 40,000 m³ of high quality granular material for the starter layer to the Stone Headshunt embankments would be sourced from elsewhere on the Phase 2a route and moved via TN-221; and
 - the very high quality granular materials for the trackbed layers (58,000 m³) would be imported to the Stone Headshunt via TN-221 from outside sources.

4.5 Assumptions in AP2 mass haul movement plan for Yarnfield South and North railway embankments

Yarnfield South railway embankment

- 4.5.1 In the AP2 mass haul movement plan for the Yarnfield South railway embankment, it was assumed that (see also Table 1):
- 32,000 m³ of high quality granular material for the railway embankment would be sourced from Swynnerton North Cutting and moved to this location by site haul;
 - 27,000 m³ of high quality granular material for ground treatment and the starter layer to this embankment would be sourced from elsewhere on the Phase 2a route and moved via TN-221; and
 - the very high quality granular materials for the trackbed layers (4,000 m³) would be imported via TN-221 from outside sources.

Yarnfield North railway embankment

- 4.5.2 In the AP2 mass haul movement plan for the Yarnfield North railway embankment, it was assumed that (see also Table 1):
- 175,000 m³ of high quality granular material for the railway embankment would be sourced from Swynnerton North Cutting and moved to this location by site haul;
 - A further 128,000 m³ of high quality granular material for the railway embankment would be sourced from elsewhere on the Phase 2a route and moved via TN-221;
 - 67,000 m³ of high quality granular material for ground treatment and the starter layer to this embankment would be sourced from elsewhere on the Phase 2a route and moved via TN-221; and
 - the very high quality granular materials for the trackbed layers (13,000 m³) would be imported via TN-221 from outside sources.

5 Summary

5.1 Treatment of soft ground under Stone IMB-R embankment and adjacent HS2 railway embankments

5.1.1 Information on the ground conditions at the Stone IMB-R is based on a comprehensive desk study, as discussed in this report. This has identified that within the proposed footprint of the IMB-R embankment there:

- is an extensive area of soft ground in the Filly Brook valley associated with the alluvial deposits there and with the infilled Darlaston Pool. This area of soft ground also extends under the adjacent HS2 railway embankment; and
- are localised areas of soft ground associated with former ponds and mineral workings and a former landfill.

5.1.2 The AP2 earthworks design for the IMB-R includes a substantial amount of ground treatment of the soft ground under the proposed IMB-R embankment. The extent of this treatment in plan is considered to be conservative and the average depth of the treatment is based on desk study data which will need to be confirmed by supplementary ground investigation (i.e. the HS2 PGI currently in progress). It was assessed that almost all of the material excavated from the ground treatment areas would need to be treated (e.g. with a small percentage of lime) to improve its strength for use as landscape material. It is also estimated that there would be a small volume (approximately 800 m³) of potentially contaminated material from the former Pool Farm Landfill which would need to be disposed of off-site.

5.1.3 The AP2 earthworks design for the adjacent Yarnfield North and South railway embankments includes a further volume of ground treatment of the soft ground under those embankments.

5.1.4 The high quality granular material required for the ground treatment areas and for the starter layers for the Stone Headshunt and Yarnfield South and North Embankments would be sourced from elsewhere on the Phase 2a route and moved to these locations via the Yarnfield North Embankment Transfer Node (TN-221).

5.2 Cuttings for Stone IMB-R, Stone Headshunt and adjacent HS2 mainline

5.2.1 Based on the desk study information, the cuttings for the Stone IMB-R, Stone Headshunt and adjacent HS2 mainline have been assessed to be within Mercia Mudstone with localised Head deposits. It has been assessed that almost all of the material excavated from these cuttings would be able to be reused as cohesive embankment material or landscape material, although some may need treatment (e.g. with a small percentage of lime) to improve its strength.

5.3 Material for embankments for Stone IMB-R and Stone Headshunt

- 5.3.1 As low train speeds are anticipated at the Stone IMB-R and Stone Headshunt, the AP2 design assumed that the embankments for the Stone IMB-R and for most of the Stone Headshunt would be built out of normal quality cohesive material rather than the high quality granular material required for embankments where the train speeds will be higher, together with the associated highways and access tracks.
- 5.3.2 In the AP2 mass haul movement plan, most of the cohesive material required for the IMB-R embankment and landscape areas (1.27 million m³) would be sourced from the IMB-R cutting and ground treatment areas, and the adjoining Stone Headshunt cutting to the south-east of the Filly Brook valley. The remainder would be sourced from Yarlet North Cutting. All of this material would either be moved within the IMB-R footprint or moved along the trace to the IMB-R embankment location.
- 5.3.3 All of the cohesive material required for the Stone Headshunt embankment and landscape areas (0.21 million m³) would be sourced from the Stone Headshunt cuttings.

5.4 Imported fill materials

- 5.4.1 It is estimated that 0.17 million m³ of very high quality granular materials for the railway trackbed layers for the Stone IMB-R, Stone Headshunt and Yarnfield South and North railway embankments would be imported via TN-221 from outside sources.

5.5 Options for ground treatment for future consideration

- 5.5.1 The AP2 earthworks design assumes that the ground treatment method adopted for the Stone IMB-R earthworks design comprises the excavation of soft ground and its replacement with high quality granular material. However, this is an assumption based on the information available at the time of the design and, subject to confirmatory PGI, there are other methods that could be adopted such as deep soil mixing, where cement or another type of binder is mixed into the soft soil in-situ to improve its strength so that it does not then need to be excavated.
- 5.5.2 The rate at which deep soil mixing could be carried out would be dependent on the conditions confirmed by the HS2 PGI as well as the binder selected. A soil mixing treatment strategy may be slower than the excavate-and-replace method that has been assumed for the AP2 scheme. However, any difference in treatment rates is likely to be largely balanced by a reduction in the amount of soft material that needs to be excavated and treated. If a soil mixing treatment method were to be adopted, there would also be a reduction in the amount of granular material that would need to be imported as backfill to ground treatment excavations. This could reduce the number of HGV and articulated dump truck site traffic movements through Yarnfield North Embankment Transfer Node.

5.6 Programme for confirmatory site-specific preliminary ground investigation

- 5.6.1 HS2 Ltd has procured site-specific preliminary ground investigation work at the proposed location of the Stone IMB-R to confirm (or otherwise) the findings and interpretation of the ground conditions from the desk study data. At the time of preparation of this report (December 2019) the first part of this investigation is in progress in the form of fieldwork at the proposed Stone IMB-R location.
- 5.6.2 Once the preliminary ground investigation fieldwork has been completed (end of 2019 anticipated), there will be a period when the contractor will procure laboratory testing, followed by the production of a draft factual report on the preliminary ground investigation (March to April 2020).
- 5.6.3 The contractor's final factual ground investigation report is expected to be completed in the spring of 2020. At that point it will be reviewed by HS2 Ltd and its specialist geotechnical consultant to confirm the ground conditions at the IMB-R assessed from the desk study information, the likely volumes of material requiring treatment, and the most appropriate method to achieve the geotechnical requirements beneath the Stone IMB-R and associated embankments.

Yarnfield & Cold Meece Parish Council

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ST15 0NJ
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23 December 2019

Mr O Bayne
Director, Hybrid Bill Delivery
Albany House
96-98 Petty France
London
SW1H 9EA

Dear Mr Bayne

HS2 Phase 2a House of Lords Select Committee: Petition 023

Thank you for your letter dated 17 December 2019, together with the accompanying folder containing the report entitled '*Infrastructure Maintenance Base – Rail: Ground conditions and basis of earthworks volumes in AP2 design*' as well as an A1 plan showing the layout of part of the Stone Railhead and associated haul road network.

With regard to the information that you have provided, we note that it did not fully address the list of items set out in our letter of 22 November and therefore we request that you provide the missing information before we meet in January. To assist you I have provided a further commentary in red below with respect to four bullets from our original bullet point list.

- The “*comprehensive desk study*” and the accompanying “*volumetric assessment based on the design geometry for the Proposed Scheme*” referred to the first paragraph under the heading of excavated material on page 3 of your letter. **We note that the text of the report provided is newly produced and cannot therefore represent the desk study that would have been used to inform the original design that formed the basis of the Environmental Statement or subsequent changes at AP1 or AP2. In addition, the volumetric assessment provided in Section 4 (e.g. Table 1) does not fully correlate with Figure 5 on page 11, especially with regard to the proposed areas of ground treatment.**
- The engineering basis for the assumption that train speed is the key factor for HS2 Ltd determining that “...*the IMB-R embankment and most of the headshunt embankments will be built out of normal quality cohesive material rather than the high*

quality granular material.” This issue has not been addressed. Instead the report simply repeats previous statements (paragraph 4.2.1) regarding the slow speed of trains within the Railhead/IMB-R and that HS2 Ltd considers cohesive fill to be suitable for the construction of this embankment.

- Details (including via the provision of a scale plan) confirming the location and extent of the “*extensive area of poor ground in the Filly Brook valley under the footprint of the mainline railway embankment there, the IMB-R embankment and the northern part of the embankment for the IMB-R to the headshunt chord*”, together with the “*other smaller areas of poor ground elsewhere under the IMB-R embankment*”. Figure 5 on page 11 is a sketch and not a scale plan and does not show all of the areas of poor ground stated as requiring ground treatment in Table 1. Please provide a plan at a readily measurable scale in hard copy, or preferably overlay the information on the main layout plan referred to below..
- How the assumptions derived by the original desk study have been influenced by the results emerging from the ground investigations completed to date. This question has not been addressed despite the fact that ground investigations of the Stone Railhead/IMB-R and surrounding area started a considerable amount of time ago and have been ongoing throughout 2019. We are also aware that these ground investigations have identified extensive areas of poor ground across the site, as well as elevated groundwater levels. The idea that none of this emerging information has yet been taken into account by HS2 Ltd and its consultants is not tenable and we again request that this information, including a scale plan of the location of boreholes, trial pits etc., is made available now so it can be considered by the House of Lords Phase 2a Select Committee when it sits in the New Year.

With respect to the A1 sized drawing provided, this has not been subject to Quality Assurance as the various scale bars are not accurate making it extremely difficult to use a scale rule to measure distances. It is also disappointing that the main part of the drawing is obscured by the various insets and sections. We therefore request that you reissue this information using two separate drawings with accurate scales, with the first drawing showing the layout of the entire Stone Railhead/IMB-R site and the second drawing showing the larger scale inset plan of the proposed Yarnfield Lane haul road to the northbound M6, together with the various sections.

Our letter also requested that the drawings included the provision of levels (mAoD) along the length of proposed Yarnfield Lane haul route, including the proposed ramp that connects to the northbound carriageway of the M6, together with other key features such as the realigned Yarnfield Lane, the M6 link roads and the length of the top/toes of the embankment batters and the newly proposed retaining walls. This information is missing but is essential to understanding how the proposals would be engineeringly feasible and should therefore be included on the larger scale inset plan.

Once again, I would be grateful if you could send the additional hard copy information requested via the post to my address at 5 De Havilland Drive, Yarnfield, Stone, ST15 0SX, as well as providing copies of the various reports and drawings in pdf format to my email address (shown above).

Finally, I will find a suitable venue for our meeting which will take place on Thursday 16 January 2020.

Yours sincerely



John Fraser

Parish Clerk

Yarnfield & Cold Meece Parish Council

Mr John Fraser
5 De Havilland Drive
Yarnfield
Stone
ST15 0SX

14 January 2020

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

Thank you for your letter of 23 December 2019, in response to my letter of 17 December 2019 and the information sent to you by courier on 19 December 2019.

I am writing to provide you with a response to the points you have raised in your letter. I understand that a meeting has been scheduled for 16 January 2020 between members of the Parish Council and HS2 Ltd.

In your letter of 23 December 2019 you ask for a copy of the Phase 2a route wide geotechnical desk study. My letter of 17 December 2019 included a bespoke report produced for the specific purpose of responding to your earlier questions about the assumptions for the amount of material to be excavated for the Stone IMB-R. Our intention in providing that bespoke report was to share the relevant information you had asked for from the overall Phase 2a route wide geotechnical desk study (an extensive document amounting to several hundred pages) in a condensed and more readily accessible form. That said, my colleagues will provide a copy of the Phase 2a geotechnical desk study report at the meeting on 16 January 2020. Appended to the study as Appendix 1 will be a table explaining the necessary redactions and removals that have been made to the desk study report and its accompanying appendices.

In respect of your comments on the volumetric assessment provided in Section 4, Table 1 of the report sent to you in December 2019 and your comments in the third bullet point of your letter of 23 December 2019, my colleagues will provide at the meeting on 16 January 2020 a set of A1 size scale plans that correlate to all of the locations cited in the aforementioned Table 1.

As per our letter of 17 December 2019 and the report enclosed with that letter, the AP2 earthworks design assumes that cohesive material will be suitable for railway embankments for the Stone IMB-R embankment and most of the headshunt embankments. In particular, a total settlement limit of up to 100mm for depots with ballasted track is considered appropriate, for the following reasons:

- they have very low design speeds (up to 32kph), compared to up to 360kph for the HS2 mainline;
- trains will not be carrying passengers in these environments which means considerations of ride quality can be relaxed;
- they will have ballasted track, which will need to be maintained more frequently and can be more easily adjusted to accommodate earthworks settlements, in contrast to slab track which will be used for the HS2 mainline; and
- maintaining the track in the Stone IMB-R and headshunt can be done with very limited risk of impact to the operation of the railway on the HS2 mainline.

In contrast, the HS2 mainline requires settlements to be typically less than 30mm (but in the range 15mm to 60mm depending on whether or not switches and crossings are present and other factors), and the mainline earthworks are being designed for minimum maintenance.

In summary, because the performance criteria and trackform (slab or ballast) are different between the depot areas and the mainline, the designers are able to use different materials to ensure the design is both compliant and economic. Cohesive materials are suitable for the low speed depot and headshunt applications with ballasted track and opportunities for regular/frequent maintenance; and high quality granular material is required for railway embankments for high speed applications with slab track and limited maintenance opportunities.

As you know, the geotechnical desk study was used to inform the Bill, AP1 and AP2 preliminary designs. Site-specific preliminary ground investigation work at the proposed location of the Stone IMB-R is in progress. This preliminary ground investigation is designed to provide information to supplement and validate the understanding of geotechnical conditions at the Stone IMB-R and will be taken into account in future, more detailed, stages of design. Section 5.6 of the bespoke report sent to you in December 2019 provides details of the programme for this preliminary ground investigation work, including when outcomes are expected to be reported.

The A1 drawing sent to you in December 2019 included the features you had asked for in respect of the haul road connections between the Yarnfield North embankment transfer node and the M6 motorway. In your letter of 23 December 2019 you now ask that separate drawings are provided to show the Stone IMB-R site and the Yarnfield Lane haul road connection to the northbound M6 motorway. Again, my colleagues will provide the separate A1 size drawings at the meeting on 16 January 2020.

I can confirm that the scale bars drawn on the drawing sent to you in December 2019 are accurate when printed at A1, which is the size that was sent to you.

The drawing provided shows in principle, at the preliminary design stage, that temporary construction haul road connections can be constructed within Bill limits between the M6 motorway northbound and southbound carriageways and the Yarnfield North embankment transfer node. Further design work would be carried out at the detailed design stage, including consideration of details of temporary works such as embankment slopes, potential retaining walls and the interface with the permanent Yarnfield Lane M6 overbridge southern abutment and wing walls.

In respect of your comments on the engineering feasibility of the Yarnfield Lane haul route and associated features for the Proposed Scheme, I reiterate the response in the Promoters Response Document sent to you in September 2019 and shown on the subsequent drawings sent to you

alongside my letters of 16 October 2019 and 17 December 2019, that "The Promoter is able to demonstrate that use of the existing Yarnfield Lane as a site haul road segregated from the replacement Yarnfield Lane is practical from an engineering perspective and would be accommodated within the proposed construction boundary".

If you have any further queries please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

Yours sincerely



Oliver Bayne

Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

QUESTIONS REQUIRING HS2 LTD TO SUBMIT EVIDENCE TO BACK UP ITS CLAIMS

1) PROMOTER'S RESPONSE DOCUMENT

Aldersey's Rough

Page 13, point 17

- Can HS2 Ltd quantify the extent of the claimed *"high disruption to passenger and freight services"*?

Page 14, point 19

- What clearance is there for the Newcastle to Market Drayton branch line below the height of the Lea Valley viaduct?
- Can HS2 Ltd confirm there are no outstanding representations from petitioners, borough councils, or elsewhere to lower the level of the River Lea viaduct?

Stone Railhead/IMB-R

Page 15, point 25

- Please confirm that the 5 passenger services per hour on the Stone to Norton Bridge line do not include those trains that pass through Stone on the Stoke to Colwich section of the WCML.
- What does HS2 Ltd consider to be *"daytime passenger operations"*? Is this a reference to the 5-hour maintenance window on the HS2 main line, or the gap in train services on the Norton Bridge – Stone line between 23:11 and 06:13?
- What account has been taken of the increased number of passenger trains that will be using the Norton Bridge to Stone line once HS2 is open, particularly the HS2 classic compatible service to Stoke and Macclesfield?

Page 15, point 26

- Mr Smart's evidence to the HoC Select Committee stated *"not more than one train per night"* entering the IMB-R. The response document states, *"not be likely to exceed one per week."* Why is there such a disparity between what HS2 Ltd's expert witness said under oath and what is now being stated?
- For how long would only 1 train per week be required?
- What about when the ballasted section of Phase 2b is commissioned?
- Has any assessment been made of how many trains will be required after 20, 50 or 100 years?

Page 16, point 29

- Is HS2 Ltd intending to purchase a High output ballast cleaner (HOBCL) and keep it stabled at Stone IMB-R?
- What is the length of a ballast train once the HOBCL machine section is uncoupled?
- Is it intended that maintenance trains from NR will continue onto HS2 tracks, or will all materials need to be transferred to dedicated HS2 maintenance trains?

Note: The IMB-R drawings show hard standing for materials alongside the reception sidings. Is this for ballast? If so, why do separate ballast trains need to be stabled in the sidings?

2) HS2 LTD LETTER 16/10/19

HS2 Ltd claim that 5 additional freight paths could be found daily on the Norton Bridge to Stone line.

- Is this during the construction phase of the Railhead, or operational phase of the IMB-R?
- How has the figure of 5 paths been arrived at?

What are the “3 different train paths” that will be available once HS2 opens for passenger traffic?

How big a gap in the timetabled passenger service on the Norton Bridge to Stone line is required in order to path a freight train into, or out of, the IMB-R during the day?

3) FURTHER QUESTIONS

What is the additional cost of both constructing the Stone Railhead and operating the IMB-R, compared to the cost at the time of the HoC Select Committee hearing in April 2018?

By how many kilometres per hour will the speed of HS2 trains be reduced when passing the following speed restrictions:

- i) The tunnels at Madeley and Whitmore Heath?
- ii) The pointwork associated with the connections to the Stone IMB-R?

Summary of excavated materials evidence

1. Introduction

1.1 Background

1.1.1 The Stone Railhead Crisis Group (SRCG) has been investigating the feasibility of the proposed Stone Railhead/IMB-R since November 2016.

1.1.2 The SRCG's technical specialists have given evidence to the House of Commons HS2 Phase 2a Select Committee on behalf of local parish councils located in the vicinity of the site of Stone Railhead/IMB-R and are now preparing to appear before the equivalent Select Committee of the House of Lords in early 2020.

1.1.3 Much of our evidence has been derived from information produced by HS2 Ltd itself and comprises both information that has been specifically produced for the SRCG or the parish councils, or other HS2 documentation that is publicly available. The key HS2 Ltd documents that have been used are:

- The Volume 2 Environmental Statement, relating to the Stone and Swynnerton Community Area (CA3), for the original Environmental Statement (July 2017), together with the equivalents for AP1 (March 2018) and AP2 (February 2019).
- 'HS2 Assurance No.8 to NFU - Borrow Pit Review – Final', dated April 2019.
- 'IMB-R: Ground conditions and basis of earthworks volumes in AP2 design', dated December 2019.

1.1.4 In addition, it is information that HS2 Ltd must have, but appears to be withholding, that provides a very strong indication that it is facing major engineering problems along the entire length of Phase 2a, and specifically in the geographical area where the Stone Railhead/IMB-R is located.

1.2 Purpose of this note

1.2.1 This note has been produced as part of an agreed information exchange with HS2 Ltd relating to the petition of Yarnfield & Cold Meece Parish Council, Stone Town Council and Chebsey Parish Council to the House of Lords.

1.2.2 It has been produced in response to requests contained in HS2 Ltd's 'Promoters Response Document' (dated September 2019) and its subsequent letters of 16 October and 17 December 2019. However, the SRCG and parish councils' agreement to the request was predicated on HS2 Ltd being transparent and releasing further evidence to support its own case.

1.2.3 The evidence being sought by the parish councils was set out in the letter from Yarnfield & Cold Meece Parish Council to HS2 Ltd dated 22 November 2019. HS2 Ltd responded with some additional information to partially address the issues that had been raised, but it was considered that this fell well short of what was requested. This led to a request that the missing information be supplied on 23 December, and this prompted a further response from HS2 Ltd dated 14 January 2020 that indicated that it would supply some of the missing information at a meeting between the parties scheduled for 16 January 2020.

- 1.2.4 The purpose of this report is to fulfil the parish councils' side of the agreement to exchange evidence. It therefore focuses on our concerns regarding HS2 Ltd's assumptions regarding excavation and fill quantities; its ability to transport materials within the Stone Railhead/IMB-R site and along the trace of its railway; local ground conditions and the implications this has for excavated materials and the importation of suitable engineering fill.

2. Evidence

2.1 Stone Railhead - Excavation and quantities

HS2 supplied excavation quantities

- 2.1.1 HS2 Ltd has provided inconsistent information for excavation quantities regarding the footprint of the Stone Railhead/IMB-R.
- At meetings held between HS2 Ltd engineers and the SRCG technical team in 2017, we were informed that the total excavation was approximately 1.6 million m³, of which 600,000m³ would require off-site disposal. The latter figure was then reduced without explanation to 150,000m³.
 - The above figures do not tally with Table 1 since the earthworks volumes (1,166,000m³) contained in the report dated 17 December 2019, even if the additional 75,000m³ from the Yarlet North Cutting is included.
 - Table 1 also does not contain a volume for the disposal of unsuitable material.

HS2 supplied fill quantities

- 2.1.2 SRCG and the parish councils have always been concerned where the fill to construct the Stone Railhead would be sourced from and how it would be transported to the site.
- 2.1.3 HS2 Ltd has failed for 3 years to provide an adequate explanation and the latest report demonstrates that the problem has still not been resolved.
- 2.1.4 The report states that total fill requirements are approximately 2.3 million m³ and exceed cut volumes from the three local locations (IMB-R footprint, headshunt cuttings and Yarlet North cutting) by 1,067,000m³. This shortfall is broadly split two-thirds granular fill (678,000m³) and one-third cohesive fill (389,000m³).
- 2.1.5 HS2 Ltd's borrow pit report (April 2019), which includes details of material movements across Phase 2a, only briefly mentions the Stone Railhead/IMB-R but does not include any quantities for the supply of fill to it from any location. However, in its latest report, HS2 Ltd is claiming that the Swynnerton North Cutting would supply 220,000m³ of granular fill to the Stone Railhead/IMB-R via site haul. How this would be achieved, given that the 'borrow pit' report confirms that it has made no such provision and that this source is also facing a shortfall of 250,000m³, is also unclear.
- 2.1.6 The Swynnerton North Cutting is also located 5km to the north on the Stone Railhead/IMB-R and on the wrong side of the M6 (see Section 2). Importation via the local road network from other sources therefore appears to be the only realistic option.
- 2.1.7 HS2 Ltd is also claiming that another 273,000m³ of granular fill, which it states is required for ground treatment under four earth structures at the Stone Railhead site, would be sourced from 'elsewhere on Phase 2a' via the Yarnfield North Embankment Transfer Node (TN11). It is unclear whether the reference to the transfer node means that HS2 Ltd has accepted that this material would need to be via the local road network, as HS2 Ltd has never produced a Transport Logistics Profile to support its assumptions regarding HGV movements. However, given the problems highlighted above, with respect to moving earthworks materials along the

trace, this appears the only realistic option, although the route by which this is proposed to be achieved is not stated and therefore remains clear.

- 2.1.8 HS2 Ltd also admits to an effective shortfall of cohesive material of 389,000m³, but it is unclear how this will be addressed as no details are provided. However, it has to be assumed that HS2 Ltd believes that this can be found from elsewhere on the route as well, although how where it would be sourced and how it could be transported to the fill locations is not stated.

2.2 Transportation of earthworks materials

- 2.2.1 It is HS2 Ltd's much repeated position that it will be able to effectively transport bulk earthwork materials along the trace of its railway corridor and within the footprint of the Stone Railhead site. However, in practice its ability to do this is severely constrained by major physical obstructions that its railway will require major structures to cross.

- 2.2.2 In the immediate vicinity of the Stone Railhead, the main barriers to lateral transportation within and beyond the site boundary are:

- The M6 motorway, which forms the northern and western boundary of the Stone Railhead/IMB-R.
- Yarnfield Lane.
- The Norton Bridge to Stone railway.
- The A34 at Yarnfield.

- 2.2.3 The importance of these obstacles cannot be overstated, especially given the location of the earth structures where there is the greatest demand for fill. An example of this is the footprint of the Stone IMB-R, where most of the 1,273,000m³ demand for cohesive fill is situated between Yarnfield Lane and the operational Norton Bridge to Stone railway.

- 2.2.4 SRCG has repeatedly highlighted this problem to HS2 Ltd since 2017. However, it has continued to deny that these features will constrain the efficient construction of the Stone Railhead/IMB-R.

- 2.2.5 Further afield, numerous natural and man-made features also exist to constrain HS2 Ltd's ability to transport bulk earthworks materials along the trace during the construction period.

- 2.2.6 These problems will have the combined and inevitable result that far more material will need to be transported via the existing road network than HS2 Ltd appears to be admitting.

- 2.2.7 As a consequence of this issue alone it is clear that HS2 Ltd is significantly underestimating the number of HGVs that it will require to construct its railway throughout the length of Phase 2a, and especially the Stone Railhead/IMB-R site.

2.3 Ground conditions at the Stone Railhead/IMB-R site

Review of available ground investigation information

- 2.3.1 It is noted, from the report dated 17 December 2019, that HS2 Ltd is stating that its AP2 design is based on information relating to the location of an alluvium channel taken from a geological plan dating from 1901, together with an interpretation of some ground investigations undertaken during the mid-1990s for the purposes of widening the M6 motorway.

- 2.3.2 With respect to the historical ground investigation information, with the possible exception of some boreholes located parallel to a section of Yarnfield Lane and the existing railway, it is clear that these only relate to the very periphery of the massive earth structure that HS2 Ltd

is proposing to construct in the Filly Brook valley to support the southern part of the Stone Railhead/IMB-R.

- 2.3.3 It is also noted (from the drawing contained in Appendix E of the 17 December 2019 report) that the dynamic probing that was carried out does not relate to the footprint of the proposed earthworks structure, and neither was it directly targeted to the alluvium channel that would lie beneath the southern end of the Stone Railhead/IMB-R. We also note that your document does not include an interpretive report relating to the previous investigative works.
- 2.3.4 SRCG had also previously obtained logs from the historical borehole information located in the vicinity of the site, which are available from BGS records. Of particular interest are those deeper boreholes that were drilled using cable percussive boring to the top of rockhead and rotary drilling into the underlying solid geology, i.e. the Mercia Mudstone.
- 2.3.5 Although not located directly under the Railhead/IMB-R railhead structure, some of these boreholes (e.g. BH 2578 and 2579) are located in the vicinity of the proposed realigned Yarnfield Lane and do indicate the presence to considerable depths of weak ground comprising a combination of alluvium, superficial deposits, clays and weathered silty mudstone.
- 2.3.6 This situation is partially acknowledged by HS2 Ltd in paragraph 3.2.8 of its latest report. However, the plan referred to in paragraph 3.2.9, and enclosed in Appendix E, is oversimplified and does not show the extent of superficial deposits that overlie the Mercia Mudstone. It also includes largely irrelevant reference points to geotechnical features, but not the proposed or actual locations of boreholes/trial pits relating to its own ground investigations, which would clearly be targeted to the footprint of the Stone Railhead/IMB-R.
- 2.3.7 Although this omission appears to be down to the fact that the drawing is dated 23 January 2017, it is noted that it has been amended to specifically refer to that fact that it "HAS NOT BEEN UPDATED TO INCORPORATE DESIGN AMENDMENTS AT AP1 OR SP2 DESIGN STAGES". Whilst this specifically means that the layout of the Stone Railhead/IMB-R and adjacent mainline railway is out of date, it begs the question as to why HS2 Ltd is issuing a drawing that is 3 years old to accompany a new and bespoke report, when it could have produced a plan that shows the AP2 layout, as well as the location of its ground investigations boreholes and trial pits.
- 2.3.8 HS2 Ltd then claims in Section 5.6 of its report that it is still at the first part of its investigation and that a draft factual report relating to its ground investigations will not be available until March/April 2020. However, this explanation is simply not tenable and is evidence in itself that HS2 Ltd is unwilling to be open about the actual ground conditions at the Stone Railhead site.
- 2.3.9 SRCG is also aware, from locally sourced anecdotal information, that the ground conditions within the footprint of the Stone Railhead/IMB-R site are far worse than HS2 Ltd is currently publicly acknowledging. Moreover, if this were not the case, and the ground investigation results concurred with its desk study interpretation, then why would it not be in the interests of HS2 Ltd to provide preliminary details of its local ground investigations to address local concerns prior to the forthcoming House of Lords' proceedings?
- 2.3.10 Given the above, it is only reasonable to conclude that HS2 Ltd is delaying the release of the results of its local ground investigations until after it has received Royal Assent, when it would be 'safe' to admit to the bad news and reality of the situation and too late for Phase 2a to be reconsidered.
- 2.3.11 It is also very likely that the volume of the underlying strata that will require excavation and replacement with imported granular fill, in order to provide a solid foundation to the Stone Railhead/IMB-R, will significantly increase. According to the contents of paragraph 4.2.2 of the latest report, HS2 Ltd has assumed that only the alluvium channel and some former pits/ponds will require excavation to an average depth of 2m. However, rather than being a

conservative approach, as HS2 Ltd claims, the existing and emerging evidence suggests that this assumption is looking optimistic.

- 2.3.12 It is also possible that the prevailing ground conditions will require other and much more expensive ground treatment to be used to stabilise the site. At the moment HS2 Ltd has mentioned the possibility of using deep soil mixing involving cement. However, it is also now proposing the construction of substantial retaining wall structures to support temporary haul roads and therefore it is looking increasingly likely that other (and much more expensive) ground engineering techniques, may be required, especially at key structural locations.

HS2 assumptions regarding use of fill for Stone Railhead/IMB-R construction

- 2.3.13 It is clear from the contents of its latest report, and especially Section 5.3, that HS2 Ltd has assumed that it can construct the earth structure on which the Stone Railhead/IMB-R would be founded from predominantly (1,129,000m³) cohesive material. The exception to this approach is the use of 139,000m³ of granular fill for pockets of ground treatment beneath parts of it, notably at its southern end.
- 2.3.14 In its latest letter dated 14 January 2020, HS2 Ltd confirms that the low train speeds proposed within the Railhead/IMB-R suggests that it can cope with settlements of 100mm. It is also stated that its rail sidings will be placed on ballast track and therefore maintained as required. However, whilst this is not disputed, what remains of concern is the apparent assumption that the underlying ground and the cohesive fill it proposes to build the Railhead from, would be able to achieve settlements of less than 100mm without the provision of additional ground engineering works.

3. Conclusions

- 3.1.1 It is clear from the latest report dated 17 December 2019 that HS2 Ltd has a massive imbalance in its cut and fill calculations for the Stone Railhead/IMB-R construction site and will need to import over 1 million m³ of fill to create the finished levels.
- 3.1.2 HS2 Ltd has assumed that its shortage of granular fill could be achieved by a combination of importation from the Swynnerton North Cutting and unnamed locations along the Phase 2a route. However, this approach is not consistent with its own statements regarding earthworks materials needs, as reported in the borrow pit report prepared for the NFU in April 2019.
- 3.1.3 HS2 Ltd also assumes that material imported from the Swynnerton North Cutting and potentially elsewhere along the Phase 2a route can be achieved without using the local road network. However, in so doing it has ignored the major physical barriers that prevent or greatly constrain its ability to do this in practice.
- 3.1.4 Similar limitations, and especially the existing Norton Bridge to Stone railway, will severely constrain its ability to move materials, and especially cohesive fill within the Stone Railhead/IMB-R site itself.
- 3.1.5 With regard to the prevailing ground conditions, it is clear that HS2 Ltd knows far more that it is prepared to share publicly, and this is a major concern. However, the evidence that has been seen by the SRCG suggests that the ground conditions are significantly worse than HS2 Ltd is reporting.
- 3.1.6 HS2 Ltd has also not provided any information to support its claim that the body of the earth structure of the Stone Railhead/IMB-R could be constructed from locally sourced cohesive fill.
- 3.1.7 In conclusion, it is clear that HS2 Ltd has severely underestimated the total quantity of material that it will need to excavate from within the footprint of the site, and significantly overestimated how much of this material could be reused to construct the Stone Railhead/IMB-R. This will result in the need for significantly increased HGV traffic to export waste and import fill.

Mr John Fraser
5 De Havilland Drive
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28 January 2020

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

I am writing to you following a meeting between HS2 Ltd representatives and members of Yarnfield and Cold Meece Parish Council, Stone Town Council, Chebsey Parish Council and representatives of the Stone Railhead Crisis Group on 16 January 2020. I understand that members of the above-mentioned organisations expressed that they were having difficulty in correlating the estimated bulk earthworks volumes for the Stone IMB-R, Stone Headshunt, and adjacent HS2 mainline railway embankments as set out in the report sent you in December 2019 titled '*Infrastructure Maintenance Base – Rail: Ground conditions and basis of earthworks volumes in AP2 Design*' with a figure showing ground treatment areas, also included in the December 2019 report, and separate A1 sized scale plans¹ provided at the meeting on 16 January.

Appended to this letter are updated ground treatment area plans² to assist your understanding of information we have provided. These include:

- An additional inset drawing on sheet 1 to show the full extent of the proposed starter layer under the proposed Norton Bridge to Stone sidings embankment;
- Areas included in Table 1 of the December 2019 report (*Table 1: Summary of AP2 Earthworks volumes for Headshunt, IMB-R and adjacent HS2 mainline railway embankments*) annotated to illustrate indicative areas of proposed ground treatment or starter layers rounded to the nearest hundred square metres, their proposed average thickness in metres to one decimal place and their indicative volumes rounded to the nearest hundred cubic metres; and
- Additional explanatory drawing notes.

I hope this information is of assistance to you. If you have any further queries please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

¹ Drawing no. 2PT02-ARP-PT-DSK-000-220022 P01 & 2PT02-ARP-PT-DSK-000-220023 P01

² Drawing no. 2PT02-ARP-PT-DSK-000-220022 P02 & 2PT02-ARP-PT-DSK-000-220023 P02

Yours sincerely

A handwritten signature in dark ink, appearing to read 'O Bayne', with a long horizontal stroke extending to the right.

Oliver Bayne

Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

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24 February 2020

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

Further to the meeting on 16 January 2020 between representatives of HS2 Ltd and members of Yarnfield and Cold Meece Parish Council, Stone Town Council, Chebsey Parish Council and the Stone Railhead Crisis Group, I am writing to provide a response to the questions raised in relation to railway systems issues as attached to your email of 28 January 2020. Please find attached a technical note setting out our response.

We will provide a separate response to the questions raised in respect of geotechnical and logistics issues in due course.

If you have any queries please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

Yours sincerely



Oliver Bayne

Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

HS2

Yarnfield & Cold Meece Parish, Stone Town and Chebsey Parish Councils

Technical Note

February 2020

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1 Introduction

1.1 Purpose of Document

- 1.1.1 This document is related to Yarnfield and Cold Meece Parish, Stone Town and Chebsey Parish Council's (the Petitioners) petition against the Phase 2a hybrid Bill in the House of Lords (petition number HS2-HOL-023) and has been produced in response to the railway systems related questions raised by the Petitioners at a meeting held with HS2 Ltd. representatives on 16th January 2020. A copy of these questions, as provided by the Petitioners, is included as Appendix A.

2 Questions and responses

2.1 Summary

- 2.1.1 For ease of reference, this section follows the order of questions as set out in Appendix A. Questions raised by the Petitioners are referenced 'Q' and HS2 Ltd answers 'A'.
- 2.1.2 The questions raised by the Petitioners refer to elements of the Promoter's Response Document (PRD) (Appendix B) issued in September 2019 and the letter sent to the Petitioners (Appendix C) on 16th October 2019 in response to the Petitioners' petition in the House of Lords (September 2019).

2.2 Promoter's Response Document – Aldersey's Rough

Page 13, point 17

- 2.2.1 Q: Can HS2 Ltd quantify the extent of the claimed "high disruption to passenger and freight services"?
- 2.2.2 A: At the Aldersey's Rough alternative location, a minimum of nine possessions of the West Coast Mainline (WCML) would be needed for installation of the required railway systems infrastructure. Additional possessions would be required for civil engineering works.

Page 14, point 19

- 2.2.3 Q: What clearance is there for the Newcastle to Market Drayton branch line below the height of the Lea Valley viaduct?
- 2.2.4 A: The clearance between the proposed scheme alignment at the River Lea Viaduct and the Stoke to Market Drayton Railway (SMDR) would be a minimum of 5.8m, which would allow the SMDR line to be returned to use in the future.
- 2.2.5 Q: Can HS2 Ltd confirm there are no outstanding representations from petitioners, borough councils, or elsewhere to lower the level of the River Lea viaduct?
- 2.2.6 A: Yes.

2.3 Promoter's Response Document – Stone Railhead/IMB-R

Page 15, point 25

- 2.3.1 Q: Please confirm that the 5 passenger services per hour on the Stone to Norton Bridge line do not include those trains that pass through Stone on the Stoke to Colwich section of the WCML.
- 2.3.2 A: Three passenger services per hour currently pass along that section of the Norton Bridge to Stone line that routes through the site of the Stone Railhead/IMB-R. An additional two passenger services per hour pass along the Stoke to Colwich section of the WCML through Stone junction which lies to the north-east of the Stone Railhead/IMB-R site. To conclude, the five passenger services per hour on the Stone to Norton Bridge line does include those trains that pass through Stone on the Stoke to Colwich section of the WCML.
- 2.3.3 Q: What does HS2 Ltd consider to be "daytime passenger operations"? Is this a reference to the 5-hour maintenance window on the HS2 main line, or the gap in train services on the Norton Bridge – Stone line between 23:11 and 06:13?
- 2.3.4 A: This refers to the period when passenger services would be typically running on HS2, which at this location would be approximately 06:00 to 23:00.
- 2.3.5 Q: What account has been taken of the increased number of passenger trains that will be using the Norton Bridge to Stone line once HS2 is open, particularly the HS2 classic compatible service to Stoke and Macclesfield?
- 2.3.6 A: For the purposes of assessing the capacity of the Norton Bridge to Stone line to accommodate HS2 services from the opening of Phase 2a, it has been assumed that one HS2 service would use the Norton Bridge to Stone line (Macclesfield – Euston) over and above the current three trains per hour for conventional passenger services.

Page 15, point 26

- 2.3.7 Q: Mr Smart's evidence to the HoC Select Committee stated "not more than one train per night" entering the IMB-R. The response document states, "not be likely to exceed one per week." Why is there such a disparity between what HS2 Ltd's expert witness said under oath and what is now being stated?
- 2.3.8 A: Mr Smart's evidence was correct. When asset renewal occurs, such as a ballasted track renewal campaign following the opening of Phase 2B, this is likely to increase to one per night to/from Network Rail on average. The quoted passage from the PRD addresses the frequency of typical maintenance activities only for which the likely quantity is one per week on average.
- 2.3.9 Q: For how long would only 1 train per week be required? What about when the ballasted section of Phase 2b is commissioned?
- 2.3.10 A: Please see paragraph 2.3.8.

- 2.3.11 Q: Has any assessment been made of how many trains will be required after 20, 50 or 100 years?
- 2.3.12 A: No. The number of trains required to support the detailed maintenance and renewals requirements for Phase 2a at 20, 50, or 100 years into its operation will be determined at those times.
- Page 16, point 29*
- 2.3.13 Q: Is HS2 Ltd intending to purchase a high output ballast cleaner (HOBC) and keep it stabled at Stone IMB-R?
- 2.3.14 A: No. The working assumption is that the railway operator will hire a HOBC when it is required for maintenance of the railway.
- 2.3.15 Q: What is the length of a ballast train once the HOBC machine section is uncoupled?
- 2.3.16 A: 400m.
- 2.3.17 Q: Is it intended that maintenance trains from NR will continue onto HS2 tracks, or will all materials need to be transferred to dedicated HS2 maintenance trains?
- 2.3.18 A: To minimise the need for double handling equipment and materials, engineering trains brought in from Network Rail will be able to travel onto the HS2 network.
- 2.3.19 Q: The IMB-R drawings show hard standing for materials alongside the reception sidings. Is this for ballast? If so, why do separate ballast trains need to be stabled in the sidings?
- 2.3.20 A: Open storage compounds are provided for items such as rails, cable drums, Overhead Catenary System (OCS) components, drainage pipes, cable troughing, ballast and spoil. It is intended that the loading/unloading of ballast/spoil within the IMB-R is minimised by arranging for engineering trains to arrive at the facility in readiness for planned maintenance work.

2.4 HS2 Ltd letter 16/10/19

- 2.4.1 Q: HS2 Ltd claim that 5 additional freight paths could be found daily on the Norton Bridge to Stone line. Is this during the construction phase of the Railhead, or operational phase of the IMB-R?
- 2.4.2 A: As stated in the letter of 16th October 2019 (Appendix C), the construction phase.
- 2.4.3 Q: How has the figure of 5 paths been arrived at?
- 2.4.4 A: Please see the explanation given on page four of the letter of 16 October 2019 (Appendix C).
- 2.4.5 Q: What are the "3 different train paths" that will be available once HS2 opens for passenger traffic?

2.4.6 A: A study undertaken on the latest available timetable showed three available train paths post HS2 becoming operational from Wolverhampton via Stafford to the Norton Bridge to Stone line. A timetable update will be undertaken in due course to take into account the chosen HS2 services.

2.4.7 Q: How big a gap in the timetabled passenger service on the Norton Bridge to Stone line is required in order to path a freight train into, or out of, the IMB-R during the day?

2.4.8 A: Between two and four minutes once a train has passed Yarnfield Junction, near Norton Bridge.

2.5 Further questions

2.5.1 Q: What is the additional cost of both constructing the Stone Railhead and operating the IMB-R, compared to the cost at the time of the HoC Select Committee hearing in April 2018?

2.5.2 A: We will provide a response to this question separately.

2.5.3 Q: By how many kilometres per hour will the speed of HS2 trains be reduced when passing the following speed restrictions:

- The tunnels at Madeley and Whitmore Heath?
- The pointwork associated with the connections to the Stone IMB-R?

2.5.4 A: There is no planned operational speed reduction through the Madeley and Whitmore Heath tunnels or on through routes over the Stone IMB-R points during the normal operation of the railway.

3 List of acronyms

Acronym	Title
HOBC	High Output Ballast Cleaner
HoC	House of Commons
HS2	The High Speed 2 scheme
HS2 Ltd.	The High Speed 2 company
IMB-R	Infrastructure Maintenance Base – Rail connected
NR	Network Rail
OCS	Overhead Catenary System
PRD	Promoter's Response Document
WCML	West Coast Main Line

Mr John Fraser
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ST15 0SX

11 March 2020

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

I am writing to provide you with the Promoter's response to the Stone Railhead Crisis Group's 'Summary of excavated materials evidence', which was presented to us at a meeting with Yarnfield and Cold Meece Parish, Stone Town and Chebsey Parish Councils and members of the Stone Railhead Crisis Group (SRCG) on 16 January 2020. During that meeting, a number of additional points were noted as actions for us.

Please find attached our response. This response, together with the technical note issued to you on 24 February 2020 in relation to questions about railway systems, responds to all of the actions assigned to us.

You will also recall that I wrote to you on 16 October 2019 setting out the Promoter's position in relation to the issues raised in your petition against the High Speed Rail (West Midlands-Crewe) Bill in the House of Lords. Since then you have requested further information in respect of the geotechnical desk study that was used to inform the estimated amount of excavated materials at the Stone railhead/Infrastructure Maintenance Base – Rail (IMB-R) and additional plans in relation to construction traffic and logistics.

On 17 December 2019 a bespoke technical report was sent to you providing further information in relation to your questions about the assumptions for excavated material for the Stone IMB-R. At the same time a bespoke A1 sized scale drawing was sent to you showing indicative haul road connections between the Yarnfield transfer node and the M6 motorway.

Further to this, at the meeting on 16 January 2020, a copy of the Phase 2a route wide geotechnical desk study was provided to you, alongside A1 scale plans showing indicative locations of ground treatment areas and additional A1 scale plans showing the Stone IMB-R site, and internal site haul road connections to the M6 motorway.

I then wrote to you on 28 January 2020 to provide further updated ground treatment area plans to further assist your understanding of the information provided in the December 2019 bespoke report and the additional plans provided at the meeting on 16 January 2020.

In responding to your requests for further information, as set out above, the Promoter has provided information to a level of design detail that would not normally be produced until the later detailed design stage.

The Promoter's position in respect to the issues raised in your petition remains as that set out in my letter of 16 October 2019 and the Promoter's Response Document sent to you on 30 September 2019.

If you have any further queries please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

Yours sincerely



Oliver Bayne

Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

HS2

Response to Stone Railhead Crisis Group summary of excavated materials evidence and actions from meeting with Yarnfield and Cold Meece Parish, Stone Town and Chebsey Parish Council's

March 2020

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Appendix B - HS2 Action Summary

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1 Introduction

- 1.1.1 This note provides HS2 Ltd's response to an evidence document prepared by Stone Railhead Crisis Group (SRCG), titled 'Summary of excavated materials evidence' which was shared with HS2 Ltd at a meeting between HS2 Ltd and Yarnfield and Cold Meece, Stone Town, Chebsey Parish Councils (the Petitioners) and SCRG on 16 January 2020. A copy of the SCRG evidence document is included in Appendix A.
- 1.1.2 It is understood that the key HS2 Ltd documents that have been used by SRCG to prepare its evidence are:
- the Volume 2 Environmental Statements, relating to the Stone and Swynnerton Community Area (CA3), the main Environmental Statement (ES) (July 2017)¹, together with the equivalents for Additional Provision (AP) 1 (March 2018)² and AP2 (February 2019)³;
 - the report prepared in accordance with Assurance No.8 to the National Farmers Union (NFU) – 'Borrow Pit Review - Final', dated April 2019; and
 - the report issued to the Petitioners titled 'Infrastructure Maintenance Base – Rail: Ground conditions and basis of earthworks volumes in AP2 Design (C861-ARP-PT-REP-000-100294) dated December 2019 ["the December 2019 report"].
- 1.1.3 This note also provides responses to each action point relating to additional issues raised by Yarnfield and Cold Meece Parish, Stone Town and Chebsey Parish Councils and SCRG as identified in the minutes of the meeting with HS2 Ltd on 16 January 2020. A table summarising the key action points from the minutes from the said meeting is appended as Appendix B.
- 1.1.4 The information provided in this report is considered to be accurate at the time of writing (March 2020).

¹ High Speed Rail (West Midlands - Crewe), Environmental Statement (July 2017), Volume 2, CA3 Stone and Swynnerton. Available online at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627565/E15_CA3_Stone_and_Swynnerton_WEB_final.pdf

² High Speed Rail (West Midlands – Crewe) Supplementary Environmental Statement and Additional Provision Environmental Statement. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2a-supplementary-environmental-statement-and-additional-provision-environmental-statement>

³ High Speed Rail (West Midlands - Crewe) HS2 Phase 2a Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement (February 2019), Volume 2, CA3 Stone and Swynnerton. Available online at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/775953/J12_HS2_Phase_2a_A_P2_ES_Volume_2_CA3_Stone_and_Swynnerton.pdf

2 SRCG - Stone Railhead Excavations and quantities

HS2 supplied excavation quantities

2.1 SRCG Para 2.1.1

HS2 Ltd has provided inconsistent information for excavation quantities regarding the footprint of the Stone Railhead/IMB-R.

- *At meetings held between HS2 Ltd engineers and the SRCG technical team in 2017, we were informed that the total excavation was approximately 1.6 million m³, of which 600,000m³ would require off-site disposal. The latter figure was then reduced without explanation to 150,000m³.*
- *The above figures do not tally with Table 1 since the earthworks volumes (1,166,000m³) contained in the report dated 17 December 2019, even if the additional 75,000m³ from the Yarlet North Cutting is included.*
- *Table 1 also does not contain a volume for the disposal of unsuitable material.*

HS2 Response

- 2.1.1 Bullets 1 and 2: We provided information that was appropriate at the time that it was shared, based on the assumptions at the design stage at that date. As the design has developed, the design assumptions have changed and evolved. The supporting assessments of volumes of excavated materials, materials movements, mass haul and traffic have changed accordingly.
- 2.1.2 Bullet 3: In the AP2 design, it is estimated that the volume of unsuitable material to be disposed off-site from the locations in Table 1 referred to is 1,000 m³. Most of this is assumed to come from the former Pool House Farm landfill as described in para 4.2.4 of the December 2019 report which states that 800m³ of potentially contaminated material from the former Pool House Farm landfill would be removed and would need to be disposed of off-site.

HS2 supplied fill quantities

2.2 SRCG para 2.1.2 and 2.1.3

SRCG and the parish councils have always been concerned where the fill to construct the Stone Railhead would be sourced from and how it would be transported to the site.

HS2 Ltd has failed for 3 years to provide an adequate explanation and the latest report demonstrates that the problem has still not been resolved.

HS2 Response

- 2.2.1 The locations from which the fill to construct the Stone Railhead / IMB-R will be sourced are provided in Sections 4.3, 4.4 and 4.5 of the December 2019 Report.
- 2.2.2 Information which summarises the AP2 mass haul movement plan for the Stone IMB-R is provided in Sections 4.3, 4.4, 4.5, 5.3 and 5.4 of the December 2019 report and Section 2.5 of this report.

2.3 SRCG para 2.1.5

HS2 Ltd's borrow pit report (April 2019), which includes details of material movements across Phase 2a, only briefly mentions the Stone Railhead/IMB-R but does not include any quantities for the supply of fill to it from any location. However, in its latest report, HS2 Ltd is claiming that the Swynnerton North Cutting would supply 220,000m³ of granular fill to the Stone Railhead/IMB-R via site haul. How this would be achieved, given that the 'borrow pit' report confirms that it has made no such provision and that this source is also facing a shortfall of 250,000m³, is also unclear.

HS2 Response

- 2.3.1 The Borrow Pit Review was in response to an assurance given to the National Farmers Union (Assurance No 8) and was designed to provide an assessment of the extent of borrow pits in light of emerging ground investigation information. The borrow pit report includes reference to the use of borrow pit material for zones of high quality granular fill associated with bridges, viaduct and autotransformer station (para 2.1.13, Table 7, BP4 Blithbury) which includes those located at the IMB-R. It should also be noted that the Borrow Pit Review provides an example of how material might be sourced from borrow pits and six major cuttings and this is likely to change as more information becomes available through detailed design.
- 2.3.2 The Borrow Pit Review does include Swynnerton North Cutting as one of the major cuttings along the route from which granular material will be excavated (see paras 3.3.11 to 3.3.16 and Table 5 of that review).
- 2.3.3 Section 3.5 of the Borrow Pit Review explains how the development of the earthworks strategy is a live process and will take account of new information as ground investigation progresses throughout the scheme. This section also sets out how HS2 Ltd and its contractors will investigate opportunities for reducing environmental effects arising from the earthworks and materials movements taking account of the balance of engineering, environmental and construction

requirements and cost, in accordance with the HS2 Phase 2a Environmental Minimum Requirements (EMR).

- 2.3.4 The Phase 2a HS2 EMRs is a suite of documents that has been developed in consultation with local authorities and other relevant stakeholders in relation to the environmental impacts of the design and construction of the Proposed Scheme. Any nominated undertaker would be contractually bound to comply with the controls set out and as may be developed during the passage of the Bill through Parliament. Where it is considered necessary, these documents would be supplemented or varied in site specific undertakings in order to deal with specific issues around a particular site.
- 2.3.5 For HS2, the Promoter has now published draft EMRs⁴, which set out the environmental and sustainability commitments that would be observed in the construction of the Proposed Scheme.
- 2.3.6 Further information on EMRs is provided in HS2 Phase 2A Information Paper E1: Control of Environmental Impacts⁵.

2.4 SRCG para 2.1.6 (HS2 Action 8)

The Swynnerton North Cutting is also located 5km to the north of the Stone Railhead/IMB-R and on the wrong side of the M6 (see Section 2). Importation via the local road network from other sources therefore appears to be the only realistic option.

HS2 Response

- 2.4.1 Bulk earthworks would commence after the new Yarnfield Lane has been constructed and open to the public. At this point the existing Yarnfield Lane would become part of the construction site. An internal site haul road would be established (as per drawings already issued) that connects to a haul road adjacent to the M6 northbound carriageway to connect to northern areas including Swynnerton North Cutting. This is also discussed further in Section 3.1 of this report.

2.5 SRCG para 2.1.7 (HS2 Action 9/10)

HS2 Ltd is also claiming that another 273,000m³ of granular fill, which it states is required for ground treatment under four earth structures at the Stone Railhead site,

⁴ HS2 Ltd (2017), Environmental minimum requirements for HS2 Phase 2a. Available online at: <https://www.gov.uk/government/publications/environmental-minimum-requirements-for-hs2-phase-2a>

⁵ HS2 Phase 2a Information Paper E1: Control of Environmental Impacts
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/628447/E1_Control_of_Environmental_Impacts_v1.0.pdf

would be sourced from 'elsewhere on Phase 2a' via the Yarnfield North Embankment Transfer Node (T N 211). It is unclear whether the reference to the transfer node means that HS2 Ltd has accepted that this material would need to be via the local road network, as HS2 Ltd has never produced a Transport Logistics Profile to support its assumptions regarding HGV movements. However, given the problems highlighted above, with respect to moving earthworks materials along the trace, this appears the only realistic option, although the route by which this is proposed to be achieved is not stated and therefore remains clear.

HS2 Response

2.5.1 Materials imported through the Yarnfield North Embankment Transfer Node (TN221) would come into the transfer node directly from the M6 via the slip roads whose provision early in the construction phase is authorised by the Bill. Such materials will originate from two sources:

- imported materials from off-site (i.e. outside the Consolidated Construction Boundary, such as from commercial quarries) via the strategic road network / M6; and
- materials won elsewhere on the site (i.e. from a site or sites lying within the Consolidated Construction Boundary, including from Borrow Pits) and transported to the Transfer Node using the strategic road network / M6, due to physical blockers⁶ along the route.

2.5.2 From the date on which the slip roads come into use, such materials will not be transported into the transfer node via the local road network. The HGV traffic that is predicted to pass along the existing Yarnfield Lane prior to the coming into use of the slip roads is shown on the histogram that has been provided to Petitioners. The Bill includes powers to carry out localised widening works on Yarnfield Lane and to improve the junction of Yarnfield Lane and the A34 (The Fillybrooks) in order to enable that traffic to pass freely along Yarnfield Lane and into the Stone construction site during the initial construction phase (approximately nine months in duration) prior to the coming into use of the slip roads. The following materials detailed in Table 1 would be transported by the strategic road network / M6 into the Yarnfield North Embankment Transfer Node (TN221):

- 273,000m³ granular material for ground treatment and railway embankment starter layers;
- 169,000m³ granular material for railway track bed layer; and
- 128,000m³ Granular material for granular bulk fill for Yarnfield North embankment.

⁶ See Section 3.1 of this report.

- 2.5.3 These hauls using the road network are included within the mass haul schedule, which in turn inform the traffic assessment which is published in the Supplementary Environmental Statement (SES) 2 and AP2 ES⁷.
- 2.5.4 A further 220,000m³ of granular material from the Swynnerton North Cutting is planned to be site hauled to the Stone IMB-R using site haul roads and the existing Yarnfield Lane M6 overbridge.

2.6 SRGC para 2.1.8

HS2 Ltd also admits to an effective shortfall of cohesive material of 389,000m³, but it is unclear how this will be addressed as no details are provided. However, it has to be assumed that HS2 Ltd believes that this can be found from elsewhere on the route as well, although how where it would be sourced and how it could be transported to the fill locations is not stated.

HS2 Response

- 2.6.1 We assume that this 389,000 m³ “shortfall” referenced by SCRG is the difference between:
- the requirement for bulk embankment cohesive material of 1,266,000m³ plus the requirement for landscape material (cohesive) of 252,000m³ in Table 1 of the December 2019 report, giving a total of 1,518,000 m³; and
 - the sources of normal quality cohesive material for the Stone IMB-R given in paragraph 4.3.1 of the December 2019 report, giving a total = 1,129,000m³.
- 2.6.2 As set out in the December 2019 report, the remainder of the required volume of normal quality cohesive material and landscape material (cohesive) (i.e. the 389,000m³ “shortfall” described by SCRG) is assumed to be provided as follows:
- as stated in paragraph 4.3.3, 144,000 m³ (also as per Table 1) of landscape material at the IMB-R will either be sourced from the IMB-R ground treatment areas (and treated as necessary to improve strength) or from the IMB-R cutting;
 - as stated in paragraph 4.4.1, all of the cohesive material required for the Stone Headshunt embankment and landscape areas (211,000 m³ as per Table 1) would be sourced from the Stone Headshunt cuttings; and

⁷ High Speed Rail (West Midlands - Crewe) HS2 Phase 2a Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement (February 2019), Volume 2, CA3 Stone and Swynnerton. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/775953/J12_HS2_Phase_2a_A_P2_ES_Volume_2_CA3_Stone_and_Swynnerton.pdf

- the landscape material for Yarnfield North Embankment (34,000 m³ as per Table 1) will either be sourced from:
 - the Yarnfield North Embankment ground treatment area (and treated as necessary to improve strength);
 - the Yarnfield South Embankment ground treatment area (and treated as necessary to improve strength); or
 - the Yarlet North Cutting.

3 SRCG - Transportation of earthworks materials

3.1 SRCG para 2.2.4 (HS2 Action 11)

SRCG has repeatedly highlighted this [blockers] problem to HS2 Ltd since 2017. However, it has continued to deny that these features will constrain the efficient construction of the Stone Railhead/IMB-R.

HS2 Response

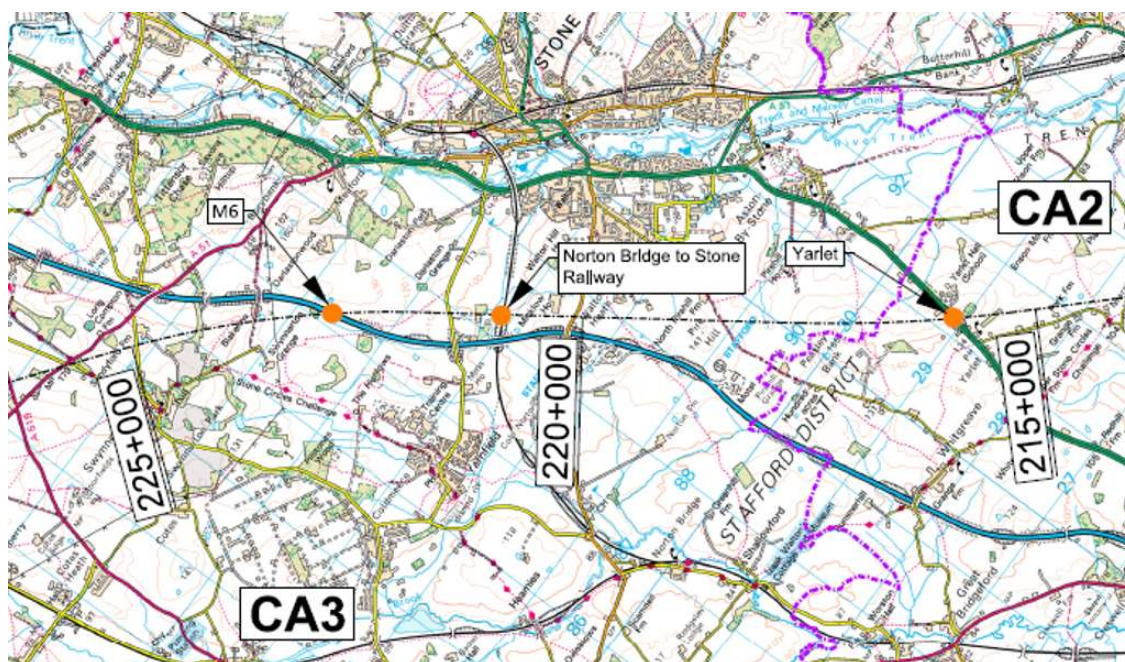
- 3.1.1 Figure 1 of this report shows the location of three potential “blockers” (the A34 at Yarlet, the Norton Bridge to Stone Railway and the M6⁸), to the movement of materials along the site haul routes that are planned for the transport of imported and excavated material with the Consolidated Construction Boundary.
- 3.1.2 The construction arrangements authorised under the Bill and described in the ES take account of the existence of these blockers and make the necessary arrangements to avoid them without the need to undertake the mass haul of materials along local roads.
- 3.1.3 During the advanced works and site preparation and set up activities shown in the Indicative Construction Programme included in the SES2 and AP2 Environmental Statement (SES2 and AP2 ES), a network of haul routes would be established. These would be a mix of surfaced and unsurfaced temporary roadways primarily for use by road going vehicles for the transportation of construction workers and materials around the site. Generally, these will have speed restrictions in place, likely 10 mph or 15 mph, due to the mix of people and vehicles. The illustrative proposals for the haul route (yellow lines) in the vicinity of the IMB-R are shown on Yarnfield Lane Phase 2 Road Layout Sheets 1 and 2 (Drawing Nos: 2PT02-ARP-PT-DSK-000-220552 and 220553 Revs P00.1) given to the petitioners during the meeting of 16th January 2020 and dated 8/1/2020. The haul route network will be supplemented by short spurs to facilitate access for construction plant to local worksites such as piling platforms at bridge pier locations. As explained during the meeting on 16th January 2020, this level of detail is not typically shown at this stage of design.
- 3.1.4 Wherever practical, haul routes would be established in the early phases of construction and maintained in the same location throughout the construction period. In some locations, such as where new structures or watercourses cross the works it will be necessary to move the location of the haul route as works progress.

⁸ As is the case for many other roads crossed by the HS2 construction site haul roads, Yarnfield Lane and Eccleshall Road are not considered to be potential “blockers”. However, the arrangements for site haul road crossings at these locations are discussed in more detail in para 3.1.13 and 3.1.14.

In some cases, such as Yarnfield Lane, several iterations of the haul route may be required. These illustrative scenarios are shown at Appendix C of this report.

- 3.1.5 Wherever possible, for safety and efficiency purposes, road going vehicles will be segregated from the Articulated Dumper Trucks (ADTs) transporting the site hauled bulk earthworks materials. Typically, the ADTs would travel along the footprint of the earthworks, along the 'trace'. Pedestrians would generally be excluded from the trace whilst earthworks activities are ongoing, so vehicle speeds can be increased (subject to suitable risk assessment). Whilst conditions are good ADTs are able to travel along the unmade surface.
- 3.1.6 In several areas however, due to spatial or physical/construction constraints, it may be necessary for the ADTs carrying the site hauled bulk earthworks materials to share the haul routes with road going vehicles. In this case the ADTs would need to comply with site haul route speed limits. The use of the existing Yarnfield Lane bridge and the haul route locally is an example of this.
- 3.1.7 The haul route network has been considered to provide as much access along the site as is practical. Where blockers exist, temporary engineering solutions or alternative routes are generally provided.

Figure 1: Location of blockers relevant to the works at Stone IMB-R



A34 Stone Road at Yarnlet

- 3.1.8 'Left in' and 'Left out' connections to the A34 Stone Road at Yarnlet would be provided via the transfer nodes and the haul route network. Once the construction of the A34 Stone Road Overbridge has reached a stage of completion that is

sufficient to enable vehicle movements underneath safely, a through route can be established without the need to transfer materials using road going HGVs via the transfer nodes.

Norton Bridge to Stone Railway

- 3.1.9 A bridge crossing of the Norton Bridge to Stone Railway would be provided to facilitate internal site haul construction traffic movements.

M6 motorway

- 3.1.10 The M6 motorway would be a blocker throughout the civils phase, until a new M6 Meaford Viaduct is able to carry construction traffic and allow the rail systems installation work to progress. Until this date access across the M6 motorway would be via the slip roads provided at the IMB-R, or the existing Yarnfield Lane, or the internal haul road network once the new Yarnfield Lane is constructed.
- 3.1.11 Within the IMB-R the haul route network would run typically through the centre of the works, taking advantage of temporary structures/crossings and then permanent structures as they become available. This route would connect to works areas further south including the Yarlet Cuttings (South, Central and North) and towards the A34. Heading north, the haul route would take advantage of the existing Yarnfield Lane bridge to cross the M6. A dedicated corridor is provided for the haul route to connect to works areas such as Swynerton North Cutting and on towards the A51 Stone Road. Typically, between the M6 and the A51 this corridor is to the west of the works.

Yarnfield Lane and Eccleshall Road

- 3.1.12 With respect to the use of the existing Yarnfield Lane, plant vehicle crossings would be required in the early phase (before the new Yarnfield Lane is constructed and before main works start). Once the new Yarnfield Lane bridge is in place, full grade separation of construction and public traffic crossing Yarnfield Lane would be provided (Yarnfield Lane Phase 2 Road Layout Sheets 1 and 2 (Drawing Nos: 2PT02-ARP-PT-DSK-000-220552 and 220553 Revs P00.1) dated 8/1/2020).
- 3.1.13 Should there be a need for non-road going vehicles to cross the existing Yarnfield Lane and Eccleshall Road, this would be via a signal-controlled plant crossing. These would be perpendicular crossings only at points that would connect to the site haul road network. Suitable measures would be implemented to maintain a safe interface between the works and the public, including where appropriate the use of attendant labour and plant to maintain a clean road surface. Figure 2 shows an illustration of a typical plant crossing.

3.1.14 Additional information that relates to this response can be found in Section 6.1 of this report.

Figure 2 - Illustration of typical plant crossing



3.1.15 The indicative locations of a typical plant crossing are also shown on sequencing drawings in Appendix C.

3.2 SRCG para 2.2.7

As a consequence of this issue [blockers] alone it is clear that HS2 Ltd is significantly underestimating the number of HGVs that it will require to construct its railway throughout the length of Phase 2a, and especially the Stone Railhead/IMB-R site.

HS2 response

3.2.1 Blockers have been considered in the assessment, see response to SRCG paragraph 2.2.4 in paragraphs 3.1.1 to 3.1.13 of this report.

4 SRCG - Ground conditions at the Stone Railhead/IMB-R site

4.1 SRCG para 2.3.1 and 2.3.2 (HS2 Action 12)

It is noted, from the report dated 17 December 2019, that HS2 Ltd is stating that its AP2 design is based on information relating to the location of an alluvium channel taken from a geological plan dating from 1901, together with an interpretation of some ground investigations undertaken during the mid-1990s for the purposes of widening the M6 motorway.

With respect to the historical ground investigation information, with the possible exception of some boreholes located parallel to a section of Yarnfield Lane and the existing railway, it is clear that these only relate to the very periphery of the massive earth structure that HS2 Ltd is proposing to construct in the Filly Brook valley to support the southern part of the Stone Railhead/IMB-R.

HS2 response

- 4.1.1 The information on the ground conditions at the IMB-R in the AP2 design is also taken from the other sources of desk study information set out in paragraph 2.1.1 of the December 2019 report.

4.2 SRCG para 2.3.3 and 2.3.4 (HS2 Action 7)

It is also noted (from the drawing contained in Appendix E of the 17 December 2019 report) that the dynamic probing that was carried out does not relate to the footprint of the proposed earthworks structure, and neither was it directly targeted to the alluvium channel that would lie beneath the southern end of the Stone Railhead/IMB-R. We also note that your document does not include an interpretive report relating to the previous investigative works.

SRCG had also previously obtained logs from the historical borehole information located in the vicinity of the site, which are available from BGS records. Of particular interest are those deeper boreholes that were drilled using cable percussive boring to the top of rockhead and rotary drilling into the underlying solid geology, i.e. the Mercia Mudstone.

HS2 response

- 4.2.1 Ground and groundwater conditions are often variable and present risks which need to be managed proactively in any construction project. A major part of the geotechnical design process is to identify those risks and then to manage and, if possible, to minimise or eliminate them. A risk register is used to manage this

process. It applies to all the stages of a project; through all the design phases, on to construction, and thereafter to the operation and maintenance phases. It is subject to progressive adjustment and amendment through all the project phases.

4.2.2 The geotechnical risk management approach adopted on this project is as described below. This approach has been standard industry practice for UK infrastructure projects for over 20 years and can be summarised as follows for the HS2 Phase 2a scheme:

- carry out geotechnical desk study for the proposed Phase 2a route. One of the main outputs of this desk study is the identification of geotechnical risks based on desk study information. These are incorporated into a geotechnical risk register as discussed in paragraph 4.2.3; then
- carry out one or more stages of site-specific ground investigation to obtain further information about the geotechnical risks; then
- technical specialists interpret the information obtained from the ground investigation(s) and their recommendations are incorporated into the design in later stages, with the aim of reducing the severity of or eliminating the geotechnical risks through subsequent project stages.

4.2.3 The geotechnical risks have been summarised in a geotechnical risk register. Each risk was assessed according to its probability, cost, time (i.e. effect on construction programme), and other factors, and was assigned a pre-mitigation severity score. Each risk is annotated with details such as its cause, consequence and the project stage to which it applies. A table which illustrates extracts of the risk register as of January 2019 and shows the risks most relevant to the Stone IMB-R is appended to this report in Appendix D.

4.2.4 The geotechnical risk register is a live document so that, as more information becomes available about the ground and groundwater conditions, the geotechnical risks are reviewed, re-assessed and updated as appropriate. The geotechnical risk register was originally created as part of the geotechnical desk study when the preliminary design stage of Phase 2a commenced in late 2015. It has subsequently been updated several times as more desk study information and site-specific ground investigation results have become available, and as the engineering design has developed. There would be a further update at the next design stage after the Preliminary Ground Investigation (PGI) results have been interpreted and incorporated into the design.

4.2.5 During the development of the HS2 Phase 2a AP2 design, the ground conditions at the IMB-R were assessed based on the desk study data, including historical GI data, available at that time. The AP2 design included what was considered to be a reasonable estimate of the volume of ground treatment that would be required. It was acknowledged that there were uncertainties relating to the reliability of publicly available historical GI data on which the initial assessment of ground

conditions at the IMB-R was based. For example, the ground and groundwater conditions at the IMB-R may be different to those assessed from the desk study data and the most relevant geotechnical risks are listed below:

- *Embankment settlement* – the extent and/or depth of ground treatment in the design may be insufficient;
- *Compressible alluvial deposits* – there are uncertainties in the material types, strength and extent of compressible alluvial deposits in current and historical river crossings;
- *Unexpected ground conditions* – there may be unexpected ground conditions in relation to materials suitability, earthworks slope angles, founding materials, and other aspects;
- *Buried channels* – the presence of interbedded fine and coarse-grained sediments could lead to hydrogeological, slope stability, differential settlement, and other construction issues;
- *Highly variable ground conditions* – the depths to competent strata (e.g. to less weathered Mercia Mudstone) may be highly variable over short lateral distances in some areas;
- *Ground contamination - unknown sites* – there are uncertainties associated with type and extent of unknown contaminated land sites;
- *Artesian / sub-artesian groundwater* – there is a risk that groundwater under pressure could come up into excavations; and
- *Shallow groundwater* – there is a risk that shallow groundwater could require temporary dewatering for excavations.

4.2.6 As the design has been progressed, further work has been undertaken to examine and interpret the historical GI data (some of which is confidential⁹) and to refine the extent of the ground treatment areas. This work also revealed further inconsistencies in the historical GI data and the geotechnical risks were refined accordingly.

4.2.7 HS2 Ltd has commissioned a programme of preliminary GI (PGI) to assess how many of the geotechnical risks are likely to materialise. Some of this PGI has been carried out since April 2019, and at the time of writing some is still in progress. Problems in obtaining land access to some GI locations and poor weather have delayed the progress of the PGI fieldwork. The GI programme will continue as the detailed design of the project progresses.

⁹ The most recent historical GI data was obtained in January 2020. We cannot provide the geotechnical interpretive report prepared for the M6 widening project because the information is confidential and owned by Highways England and is not in the public domain.

4.2.8 The results of the preliminary consideration of the GI works indicate that several of the risks listed in paragraph 4.2.5 above have eventuated, as described below:

- in the Filly Brook valley near Pool House Farm, the depth of soft ground which will require treatment will be greater than expected from the desk study information; however, the footprint area of the soft ground is similar to that expected from the desk study data;
- the PGI has shown that the glacial meltwater channel in the Filly Brook valley near Pool House Farm is deeper than expected from the desk study data, but most of the infill material will not require treatment; and
- artesian groundwater conditions were encountered during the PGI and subsequent groundwater monitoring in the Filly Brook valley near Pool House Farm.

4.2.9 None of this affects the ability of HS2 to construct the railway within the powers of the Bill and in accordance with the EMRs.

4.2.10 We note the Petitioner's comment regarding the boreholes in Mercia Mudstone which were started using cable percussive boring and completed with rotary coring techniques. This is the standard technique for progressing boreholes in Mercia Mudstone and is therefore not an unusual methodology.

4.3 SRCG para 2.3.5

Although not located directly under the Railhead/IMB-R railhead structure, some of these boreholes (e.g. BH 2578 and 2579) are located in the vicinity of the proposed realigned Yarnfield Lane and do indicate the presence to considerable depths of weak ground comprising a combination of alluvium, superficial deposits, clays and weathered silty mudstone.

HS2 response

4.3.1 Boreholes 2578 and 2579 were carried out as part of the M6 Widening GI in the 1990s and are shown on one of the drawings in Appendix E of the December 2019 report. As can be seen on that drawing, these boreholes were drilled into the alluvial valley associated with the Filly Brook (shown yellow on that plan) at the northern end of the Yarnfield Lane bridge over the M6 motorway.

4.3.2 BH 2578 found alluvium over Mercia Mudstone. BH 2579 found made ground then alluvium over Mercia Mudstone. The Mercia Mudstone becomes less weathered with depth. No soft ground was encountered at BH 2578 and only 0.7m was encountered at BH 2579.

4.3.3 The historical GI data near the northern end of the proposed Yarnfield Lane bridge over the M6 motorway is variable. Although boreholes 2578 and 2579 encountered

hardly any soft material, other historical GI locations nearby indicated significant depths of soft ground.

- 4.3.4 See approach to geotechnical risk management described in the response to SCRG paragraphs 2.3.3 and 2.3.4 (Section 4.2 of this report). The ground conditions at this location were assessed based on the available desk study data including historical GI data. The AP2 design included what was considered to be a reasonable estimate of the volume of ground treatment that would be required at this location, which here was assessed to be none. In doing so it was acknowledged that the publicly available historical GI data on which the initial assessment of the ground conditions at this location was based was not reliable. The most relevant geotechnical risks at this location were similar to those described in our response to SCRG paragraphs 2.3.3 and 2.3.4 (See Section 4.2 of this report), except that it was considered that there was no risk of a glacial meltwater channel at this location.
- 4.3.5 As the design developed, further work was carried out to examine and interpret the historical GI data (some of which was confidential – see para 4.2.6 footnote 9). That work also revealed further inconsistencies in the GI data and the geotechnical risks were refined accordingly.
- 4.3.6 HS2 Ltd has commissioned a programme of preliminary GI (PGI) to assess how many of the geotechnical risks are likely to materialise, as discussed in paragraph 4.2.7.
- 4.3.7 The results of the preliminary consideration of the draft PGI results indicate that several of the risks most relevant to this location identified in the geotechnical register have materialised. Preliminary consideration of the draft PGI results has confirmed that the depth of soft ground here will be greater than expected from historical boreholes 2578 and 2579; and the draft PGI results give more confidence that the historical GI data which showed significant depths of soft ground here is correct. Therefore, a small area of ground treatment will be required at this location – i.e. where the IMB-R slip roads to the southbound carriageway of the M6 motorway pass under the northern end of the new Yarnfield Lane motorway bridge.
- 4.3.8 None of this affects the ability of HS2 to construct the railway within the powers of the Bill and in accordance with the EMRs.
- 4.3.9 The terms “very weak” and “weak” which are used in some of the log descriptions for the Mercia Mudstone in BH 2578 and BH 2579 are strength descriptors for rock and are of much higher strength than for soils. For example, “very weak” means a rock with an unconfined compressive strength of between 1 and 5 MPa, which is more than an order of magnitude stronger than a “soft” soil.
- 4.3.10 The ground conditions at these two boreholes (Boreholes 2578 and 2579) are different from the remainder of the IMBR footprint where Mercia Mudstone Group

strata are present up to the ground surface - with the exception of another part of the Filly Brook valley at the south-east end of the IMB-R.

4.4 SRCG para 2.3.6

This situation is partially acknowledged by HS2 Ltd in paragraph 3.2.8 of its latest report. However, the plan referred to in paragraph 3.2.8, and enclosed in Appendix E, is oversimplified and does not show the extent of superficial deposits that overlie the Mercia Mudstone. It also includes largely irrelevant reference points to geotechnical features, but not the proposed or actual locations of boreholes/trial pits relating to its own ground investigations, which would clearly be targeted to the footprint of the Stone Railhead/IMB-R.

HS2 response

- 4.4.1 The geology on the plan in Appendix E of the December 2019 report is based on the available desk study data.
- 4.4.2 The drawings in Appendix E of the December 2019 report do not include the proposed locations of the HS2 site-specific GI because that was not the purpose of these drawings.

4.5 SRCG para 2.3.8

HS2 Ltd then claims in Section 5.6 of its report that it is still at the first part of its investigation and that a draft factual report relating to its ground investigations will not be available until March/April 2020. However, this explanation is simply not tenable and is evidence in itself that HS2 Ltd is unwilling to be open about the actual ground conditions at the Stone Railhead site.

HS2 response

- 4.5.1 The programme for the delivery of the HS2 site-specific preliminary ground investigation is provided in Section 5.6 of the December 2019 report and has not changed.

4.6 SRCG para 2.3.9

SRCG is also aware, from locally sourced anecdotal information, that the ground conditions within the footprint of the Stone Railhead/IMB-R site are far worse than HS2 Ltd is currently publicly acknowledging. Moreover, if this were not the case, and the ground investigation results concurred with its desk study interpretation, then why would it not be in the interests of HS2 Ltd to provide preliminary details of its local

ground investigations to address local concerns prior to the forthcoming House of Lords' proceedings?

HS2 response

- 4.6.1 The programme for PGI is set out in Section 5.6 of the December 2019 and has not changed.

4.7 SRCG para 2.3.11

It is also very likely that the volume of the underlying strata that will require excavation and replacement with imported granular fill, in order to provide a solid foundation to the Stone Railhead/IMB-R, will significantly increase. According to the contents of paragraph 4.2.2 of the latest report, HS2 Ltd has assumed that only the alluvium channel and some former pits/ponds will require excavation to an average depth of 2m. However, rather than being a conservative approach, as HS2 Ltd claims, the existing and emerging evidence suggests that this assumption is looking optimistic.

HS2 response

- 4.7.1 Paragraph 4.2.2 of the December 2019 report acknowledges that the depth of the ground treatment of the alluvium in the valley of the Filly Brook and of the large backfilled historical pond there (Darlaston Pool) may need to be deeper locally than the average depth assessed from the desk study data. Footnote 9 to paragraph 4.2.2 of the December 2019 report states that the extent and depth of ground treatment will be reassessed when the results of the HS2 PGI are available.
- 4.7.2 Paragraph 4.2.2 also states that “the plan extent for the area requiring ground treatment is conservative” and we believe that statement to be correct.

4.8 SRCG para 2.3.12

It is also possible that the prevailing ground conditions will require other and much more expensive ground treatment to be used to stabilise the site. At the moment HS2 Ltd has mentioned the possibility of using deep soil mixing involving cement. However, it is also now proposing the construction of substantial retaining wall structures to support temporary haul roads and therefore it is looking increasingly likely that other (and much more expensive) ground engineering techniques, may be required, especially at key structural locations.

HS2 response

- 4.8.1 The costs and design of temporary haul road retaining features (where required) will be confirmed at detailed design by the contractor.

4.9 SRCG para 2.3.13 – 14

In its latest letter dated 14 January 2020, HS2 Ltd confirms that the low train speeds proposed within the Railhead/IMBR suggests that it can cope with settlements of 100mm. It is also stated that its rail sidings will be placed on ballast track and therefore maintained as required. However, whilst this is not disputed, what remains of concern is the apparent assumption that the underlying ground and the cohesive fill it proposes to build the Railhead from, would be able to achieve settlements of less than 100mm without the provision of additional ground engineering works.

HS2 response

- 4.9.1 The AP2 design for the IMB-R includes proposed ground treatment where, based on desk study data, it is considered that the underlying ground would not be sufficiently competent in its untreated state to be able to achieve the required settlement performance under the IMB-R embankment.

5 SRCG - Conclusions

5.1 SRCG para 3.1.1

It is clear from the latest report dated 17 December 2019 that HS2 Ltd has a massive imbalance in its cut and fill calculations for the Stone Railhead/IMB-R construction site and will need to import over 1 million m³ of fill to create the finished levels.

HS2 response

- 5.1.1 HS2 Ltd agrees that a requirement is identified in the December 2019 report to import a large amount of fill for the construction of Stone Railhead / IMB-R in the AP2 design. However, HS2 Ltd estimate that this volume is approximately 0.9 million m³ and comprises both granular and cohesive material. This material will either be sourced from elsewhere on the Phase 2a site or from external sources.

5.2 SRCG para 3.1.2

HS2 Ltd has assumed that its shortage of granular fill could be achieved by a combination of importation from the Swynnerton North Cutting and unnamed locations along the Phase 2a route. However, this approach is not consistent with its own statements regarding earthworks materials needs, as reported in the borrow pit report prepared for the NFU in April 2019.

HS2 response

- 5.2.1 See response to SRCG para 2.1.5 (paragraphs 2.3.1 to 2.3.5 of this report).

5.3 SRCG para 3.1.3

HS2 Ltd also assumes that material imported from the Swynnerton North Cutting and potentially elsewhere along the Phase 2a route can be achieved without using the local road network. However, in so doing it has ignored the major physical barriers that prevent or greatly constrain its ability to do this in practice.

HS2 response

- 5.3.1 See above response to SRCG para 2.1.7 & 2.2.4 (paragraphs 2.5.1 to 2.5.4 and 3.1.1 to 3.1.15 of this report).

5.4 SRCG para 3.1.4

Similar limitations, and especially the existing Norton Bridge to Stone railway, will severely constrain its ability to move materials, and especially cohesive fill within the Stone Railhead/IMB-R site itself.

HS2 response

- 5.4.1 See above response to SRCG para 2.1.7 & 2.2.4 (paragraphs 2.5.1 to 2.5.4 and 3.1.1 to 3.1.15 of this report).

5.5 SRCG para 3.1.5

With regard to the prevailing ground conditions, it is clear that HS2 Ltd knows far more that it is prepared to share publicly, and this is a major concern. However, the evidence that has been seen by the SRCG suggests that the ground conditions are significantly worse than HS2 Ltd is reporting.

HS2 response

- 5.5.1 See above response to SRCG para 3.1.4. (paragraphs 2.5.1 to 2.5.4 and 3.1.1 to 3.1.15 of this report).

5.6 SRCG para 3.1.6

"HS2 Ltd has also not provided any information to support its claim that the body of the earth structure of the Stone Railhead/IMB-R could be constructed from locally sourced cohesive fill."

HS2 response

- 5.6.1 As stated in paragraph 4.3.1 of the December 2019 report, it is anticipated that the cohesive material for the Stone IMB-R embankment would be locally sourced from the cutting for Stone IMB-R, the cutting for Stone Headshunt and from Yarlet North Cutting. Based on desk study data, it is anticipated that the vast majority of the volume to be excavated from these cuttings would be Mercia Mudstone Group material, i.e. clay and weak rock. Fill derived from the Mercia Mudstone Group generally forms stable, permanent embankments. It has widely been used for embankments for motorways, roads and other infrastructure throughout the Midlands for many years, including for the M6 motorway.

5.7 SRCG para 3.1.7

In conclusion, it is clear that HS2 Ltd has severely underestimated the total quantity of material that it will need to excavate from within the footprint of the site, and significantly overestimated how much of this material could be reused to construct the Stone Railhead/IMB-R. This will result in the need for significantly increased HGV traffic to export waste and import fill.

HS2 Response

- 5.7.1 HS2 Ltd has previously responded to this item in its letter, dated 16 October 2019, in the section headed *Excavated material* – see below.

“The quantity of excavated material that can be reused as engineering fill is based on published information and previous experience of working with these materials. The Promoter therefore considers that the quantity of excavated material that can be reused as engineering fill has not been over-estimated. The Promoter also considers that there would not be large quantities of excavated material requiring off-site disposal because of its unsuitability for engineering re-use.

The Promoter is aware that there is an extensive area of poor ground in the Filly Brook valley under the footprint of the mainline railway embankment there, the IMB-R embankment and the northern part of the embankment for the IMB-R to the headshunt chord. There are also other smaller areas of poor ground elsewhere under the IMB-R embankment.

Provision for extensive ground treatment of poor ground has been included in the AP2 design under these embankments. The design assumes that the poor ground would be excavated and replaced with granular material which would be sourced from elsewhere on the Proposed Scheme site and moved to these locations via the Yarnfield North Embankment Transfer Node. Therefore, there would not be a far greater demand for the importation of suitable engineering fill to build these major earth structures than is currently included in the AP2 design.”

6 Further issues raised by Yarnfield and Cold Meece Parish Council

- 6.1.1 A number of additional issues were raised by Yarnfield and Cold Meece Parish, Stone Town & Chebsey Parish Councils and the SCRG at the meeting with HS2 Ltd on 16/01/2020. HS2 Ltd's responses include both the responses given at the meeting and further post meeting clarification and additional information. A summary of the action points from the 16/01/2020 meeting is provided in Appendix B.

6.1 Construction use of existing Yarnfield Lane and M6 overbridge

Parish Council's asked whether the Yarnfield Lane haul road would only be used for HGV traffic or also by articulated dump trucks and whether it was proposed to run dump trucks on the road and over the M6 on the existing bridge.

HS2 Response

- 6.1.1 When considering the potential use of the existing Yarnfield Lane for HS2 construction traffic it is useful to split it into different sections, and understand its use in the different construction phases (e.g. construction phases 1, 2 and 3 as shown on sequencing drawings provided as Appendix C and as referenced in published AP2 traffic and transport exhibits (see Histogram 15)¹⁰.

Existing Yarnfield Lane from the A34 Fillybrooks to the Yarnfield North Embankment Transfer Node and Yarnfield North Satellite Compound.

- 6.1.2 HGV and other road going works traffic would use this route.
- 6.1.3 During construction phase 1 all construction traffic would initially use this road to establish the site and the compounds and carry out initial environmental survey and mitigation.
- 6.1.4 During construction phases 2 and 3 only very limited HS2 Ltd construction related HGVs would use this road as access to the compounds and associated works would be provided via the M6 slip roads and/or the internal haul route network.

¹⁰

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/796124/section_p_part_3.pdf

Existing Yarnfield Lane from the Yarnfield North Embankment Transfer Node and Yarnfield North Satellite Compound west across the M6 to Moss Lane.

- 6.1.5 During construction phase 1, HGV construction traffic would share use of the existing Yarnfield Lane with public traffic. Only road going vehicles, including HGVs, would use the existing Yarnfield Lane. Only those HGVs required for construction of the works to the west of the M6 would need to use this section of road.
- 6.1.6 As detailed design and discussions with the highway authorities progress, it may be possible to further reduce traffic on the existing Yarnfield Lane through increased and earlier use of the existing emergency turn-around facilities to/from the M6 for HS2 construction traffic. This would need to be carried out under a Chapter 8 traffic management¹¹ scheme on the M6 and the effects on the operational M6 would need to be considered alongside the benefit of reduced movements on the existing Yarnfield Lane.
- 6.1.7 Where there is a need for non-road going vehicles to cross the existing Yarnfield Lane then this would be via a signal-controlled plant crossing, as illustrated in Figure 2 above. These would be perpendicular crossings only at points that would connect to the internal site haul road network. Suitable measures would be implemented to maintain a safe interface between the works and the public, including where appropriate the use of attendant labour and plant to maintain a clean road surface.
- 6.1.8 During construction phase 2 the existing Yarnfield Lane becomes an internal site haul route. It would therefore be used for all site movements including mass haul of bulk earthworks and imported materials.
- 6.1.9 Mass haul bulk materials would generally be transported in ADTs. In terms of an efficient mass haul operation, ADTs would be the preferred means of transporting bulk materials, however the capacity of the existing Yarnfield Lane bridge to accommodate the dump truck loadings has not yet been assessed. ADTs may increase the potential for materials to fall onto the carriageway below and this would also need to be considered and the necessary safety measures implemented to mitigate this. For example, a structural assessment of the bridge could be carried out by the selected contractor and a suitable physical temporary barrier could address the issue of falling materials to inform the chosen methodology. At this stage on a precautionary basis, it is assumed that mass haul materials would be transported over the existing Yarnfield Lane predominantly in 8-wheel tipper type HGVs.

¹¹ Traffic Signs Manual – Part 1

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/203669/traffic-signs-manual-chapter-08-part-01.pdf

- 6.1.10 Public traffic would be segregated from the works traffic on the new Yarnfield Lane alignment.
- 6.1.11 The existing Yarnfield Lane M6 overbridge would be demolished in construction phase 3.

West of the Moss Lane

- 6.1.12 There are no plans for HS2 construction traffic to use the existing Yarnfield Lane, through Yarnfield village.

6.2 Construction use of existing M6 overbridge (HS2 action 1)

Parish Council's noted that HS2 had assumed in its calculations that only HGVs coming in and out of the transfer node would use the existing Yarnfield Lane overbridge.

HS2 Response

- 6.2.1 Structural and safety inspections will be undertaken as required on the use of the existing Yarnfield Lane to see if the intra-site movements across it can be undertaken using ADTs, as this would be more efficient. At this stage on a precautionary basis, it is assumed that mass haul materials would be transported over the existing Yarnfield Lane predominantly in 8-wheel tipper type HGVs.
- 6.2.2 Movements using the road network to/from the transfer node would be in road legal vehicles.

6.3 Maintaining public access along Yarnfield Lane (HS2 Action 2)

The Parish Councils asked about how Yarnfield Lane will be kept open to the public, when the embankment required to support a 200m length of the realigned lane would bury it under up to 10m of fill, given that the topography falls away sharply on the southern side of the existing Yarnfield Lane near to the access to Whitemoor Farm. The Parish Councils requested scaled phasing plans.

Referring back to the timescales proposed at AP2 by HS2, i.e. bringing the whole programme forward by 12 months, said that this (in itself) justifies phasing drawings to demonstrate HS2's claims that it is possible. He therefore asked again for HS2 to prepare phasing plan and a programme to prove its case.

HS2 Response

- 6.3.1 At AP2 a temporary highway diversion to the south of the existing alignment was introduced to keep Yarnfield Lane open whilst the embankment works for the new alignment are constructed. Similarly, a temporary access was introduced to maintain to Whitemoor Farm during construction. Additional land was therefore included in the AP2 design to allow for a temporary highway diversion and the provision of a temporary access to Whitemoor Farm.
- 6.3.2 A temporary gas diversion is likely to be required as the gas main may not be able to accommodate the overburden from the new embankment and the utility owner would not be able to access the service if a fault develops once the embankment fill is in place. This temporary gas diversion can be accommodated in the temporary highway diversion alignment.
- 6.3.3 The construction phasing plans provided in Appendix C demonstrate that the temporary highway diversion and access track can be sequenced to maintain public access along Yarnfield Lane within the additional land taken at AP2. The illustrative construction sequence builds upon, and should be read in conjunction with, the sequencing already presented to Stone Town Council (AP2 petition 00047) at a meeting in April 2019 prior to their appearance at the HOC Select Committee hearing in May 2019. It follows the same construction programme and sequence, providing further information. A narrative to accompany the sequencing is provided in the paragraphs below.

Construction Phase 1 – Quarter 2 to Quarter 4 of Year 1

- 6.3.4 Sheet 1 (Drawing 2PT02-ARP-PT-DSK-000-200014) shows the public traffic and construction traffic on the existing Yarnfield Lane. The motorway Maintenance and Emergency access provision follows the M6 Smart motorway alignment. Construction traffic is limited initially during this period as the works are predominantly environmental survey and mitigation, supported by local mobilisation.
- 6.3.5 The principal activities include:
- mobilise compounds and secure site;
 - environmental mitigation works;
 - commence construction of site haul routes;
 - commence M6 Slip roads northbound and southbound;
 - construct Whitemoor Farm temporary access;
 - construct Yarnfield Lane temporary road diversion;
 - commence Yarnfield Lane M6 Overbridge Replacement; and

- commence Yarnfield Lane underbridge and Yarnfield Lane IMB-R underbridge.

Construction phase 1 – Quarter 1 of Year 2

6.3.6 Sheet 2 (Drawing 2PT02-ARP-PT-DSK-000-200015) shows the public traffic and construction traffic on the existing Yarnfield Lane. It uses the existing overbridge but follows the temporary highway diversion to avoid the new embankment works. The temporary access to Whitemoor Farm is now operational and the motorway Maintenance and Emergency access provision continues to follow the Smart motorway alignment.

6.3.7 The principal activities include:

- continue M6 slip roads construction with associated traffic management;
- continue Yarnfield Lane M6 Overbridge Replacement construction;
- continue structures and highway to the east of M6; and
- upgrade haul route from temporary M6 northbound slips roundabout to Yarnfield Lane temporary diversion for shared use with maintenance and emergency access provision.

Construction phase 1 – Quarter 2 of Year 2

6.3.8 Sheet 3 (Drawing 2PT02-ARP-PT-DSK-000-200016) shows public and construction traffic on the existing Yarnfield Lane and temporary highway diversion. The maintenance and emergency access route on the western side of the M6 is using the northbound slips and temporarily sharing the alignment of the haul route to the existing Yarnfield Lane.

6.3.9 The principal activities include:

- northbound M6 temporary slip roads completed and opened;
- southbound M6 slip roads opened for construction traffic only;
- construct permanent Yarnfield Lane and emergency access route embankment west of motorway;
- construct permanent maintenance and emergency access route;
- continue Yarnfield Lane M6 Overbridge Replacement construction;
- construct haul route from existing Yarnfield Lane to temporary roundabout underneath new Yarnfield Lane M6 Overbridge structure (see insert A);
- continue Yarnfield Lane works to the east of the motorway, and
- utility diversions.

Construction phase 1 – Quarter 3 of Year 2

- 6.3.10 Sheet 4 (Drawing 2PT02-ARP-PT-DSK-000-200017) shows public and construction traffic on the existing Yarnfield Lane and temporary highway diversion. The maintenance and emergency access route on western side of the M6 now uses the temporary haul route underneath the new Yarnfield Lane M6 Overbridge structure.
- 6.3.11 The principal activities include:
- complete permanent maintenance and emergency access route;
 - complete M6 southbound slip roads for maintenance and emergency route;
 - complete Yarnfield Lane M6 Overbridge Replacement; and
 - complete Yarnfield Lane works to the east of the motorway.
- 6.3.12 This completes the works necessary to switch public traffic from the temporary highway diversion to the new Yarnfield Lane alignment. Construction and public traffic can now be grade separated using the existing Yarnfield Lane overbridge and the new Yarnfield Lane M6 Overbridge respectively.

Construction phase 2 – Quarter 4 of Year 2 to Quarter 2 of Year 4

- 6.3.13 Sheet 5 (Drawing 2PT02-ARP-PT-DSK-000-200018) shows the public traffic using the new Yarnfield Lane M6 Overbridge and construction traffic using the existing Yarnfield Lane overbridge. Grade separation is achieved through a haul route that crosses under the new Yarnfield Lane M6 Overbridge on the west of the M6. On the east of the M6 the haul route crosses the new Yarnfield Lane via the new underbridge structures.
- 6.3.14 On the western side of the M6 motorway, maintenance and emergency access is provided via the temporary northbound slip roads and the permanent link to Yarnfield Lane. On the eastern side of the M6 motorway, maintenance and emergency access is provided via the permanent arrangements of the M6 slip roads and the link to Yarnfield Lane.
- 6.3.15 The principal activities include:
- civil engineering works throughout the project.

Construction phase 2 – Quarter 3 of Year 4

- 6.3.16 Sheet 6 (Drawing 2PT02-ARP-PT-DSK-000-200019) shows traffic maintained in the existing configuration.

6.3.17 The principle activities include:

- preparation for, and then demolition of, the existing Yarnfield Lane M6 overbridge: and
- ongoing civil engineering works throughout the project.

Construction phase 3 – Quarter 4 of Year 4

6.3.18 Sheet 7 (Drawing 2PT02-ARP-PT-DSK-000-200020) shows construction traffic and public traffic sharing the new Yarnfield Lane alignment. Maintenance and emergency access are via the permanent arrangement to the east of the motorway, and via the temporary northbound slip roads to the west.

6.3.19 The principal activities include:

- construction of permanent northbound M6 motorway maintenance and emergency access:
- construction of permanent access to Whitemoor Farm; and
- ongoing civil engineering works throughout the project.

Construction phase 3 – Quarter 1 of Year 5 and Quarter 2 of Year 5

6.3.20 Sheet 8 (Drawing 2PT02-ARP-PT-DSK-000-200021) shows construction traffic and public traffic sharing the new Yarnfield Lane alignment. The Maintenance and emergency accesses are via the permanent arrangements both southbound and northbound.

6.3.21 The principal activities include:

- complete civil engineering works that use Yarnfield Lane; and
- commence rail systems installation activities.

Construction phase 4 – Quarter 1 of Year 5 to Quarter 2 of Year 5

6.3.22 In construction phase 4, construction vehicles will access and egress the works from the M6 motorway via the permanent southbound slip roads.

Temporary access track to Whitemoor Farm

6.3.23 Plan and cross section drawings provided in Appendix E confirm that a temporary highway diversion of Yarnfield Lane and a temporary access track to Whitemoor Farm can be accommodated within the additional land included at AP2.

6.4 Maintaining emergency access onto northbound M6

The Parish Councils asked how emergency vehicles would be able to get access to the M6 northbound during the construction of the realigned Yarnfield Lane. The Parish Councils requested phasing plans to demonstrate.

HS2 Response

- 6.4.1 The sequencing plans provided in Appendix C demonstrate that the phasing of construction works will enable emergency vehicles to continue to gain access to/from the M6 at all times. This would be maintained unless agreed otherwise with the relevant highway authorities and emergency services.
- 6.4.2 Detailed phasing arrangements would be developed ahead of construction, once the operational requirements from Highways England and the Emergency Services are fully understood. It should be noted that periodically, the emergency routes have been closed whilst Highways England's construction works for the Smart motorway on the M6 are in, between junctions 13-15 are in progress.

6.5 Stone Railhead/IMB-R cost

The Parish Councils raised the issue of costs and said that changes made since the ES was submitted in July 2017 would have added considerable additional costs to the construction of the Stone Railhead/IMB-R and asked whether these changes had been costed by HS2 Ltd.

HS2 Response

- 6.5.1 Temporary works were accounted for within the preliminary costs provided to the House of Commons Select Committee in the Aldersleys Rough Costs Comparison 30th April 2018.

6.6 Increased length of Yarnfield Lane M6 Overbridge

The Parish Councils asked why the length of the M6 overbridge had increased by 38m since the ES?

HS2 Response

- 6.6.1 The Yarnfield Lane M6 Overbridge at AP2 remains as a three-span structure but in the AP2 design it has increased in length to allow the two piers for the central span to be set further back to enable construction of the piers at an early stage in the construction programme, thus avoiding the need for substantial traffic management on the M6.

- 6.6.2 This also provided the opportunity to introduce grade separation for the haul route on the western side of the M6 to remove a crossing conflict with traffic, including non-motorised users, on Yarnfield Lane with the associated safety benefits.

6.7 Width of the realigned Yarnfield Lane (HS2 Action 3)

The Parish Councils asked HS2 to confirm the width of the realigned Yarnfield Lane, including the section that crosses the new M6 overbridge and the ramps either side?

HS2 Response

- 6.7.1 The carriageway of the realigned Yarnfield Lane would be 6m wide.
- 6.7.2 The following verge widths are proposed for the new Yarnfield Lane realignment on the approaches to the proposed Yarnfield Lane M6 Overbridge and IMB-R/HS2 underbridges:
- 1.5m at the western Tie-in and Yarnfield Lane M6 Overbridge;
 - 2.5m at the south western approach to the Yarnfield Lane M6 Overbridge; and
 - 3m at south western and north eastern approaches to the IMB-R / HS2 underbridges.
- 6.7.3 The proposed width of the new Yarnfield Lane realignment accords with the rural road design criteria in HS2's Roads Technical Standard (see clause C.6.2)¹².
- 6.7.4 The existing Yarnfield Lane carriageway is approximately 5.65m wide with approximately 1.5m verges on both sides. The existing Yarnfield Lane overbridge over the M6 motorway has a verge of approximately 1.5m wide on its north western side and a verge width of approximately 2.5m on its south eastern side.
- 6.7.5 The cross sections proposed for the new Yarnfield Lane Realignment at the new Yarnfield Lane M6 Overbridge and the IMB-R/HS2 underbridges are shown in Figure 3 and Figure 4.

¹² HS2 Technical Standard - Roads HS2 - HS2 - HW - STD - 000 - 000001.

Figure 3: Cross section AP2 Yarnfield Lane M6 Overbridge Design

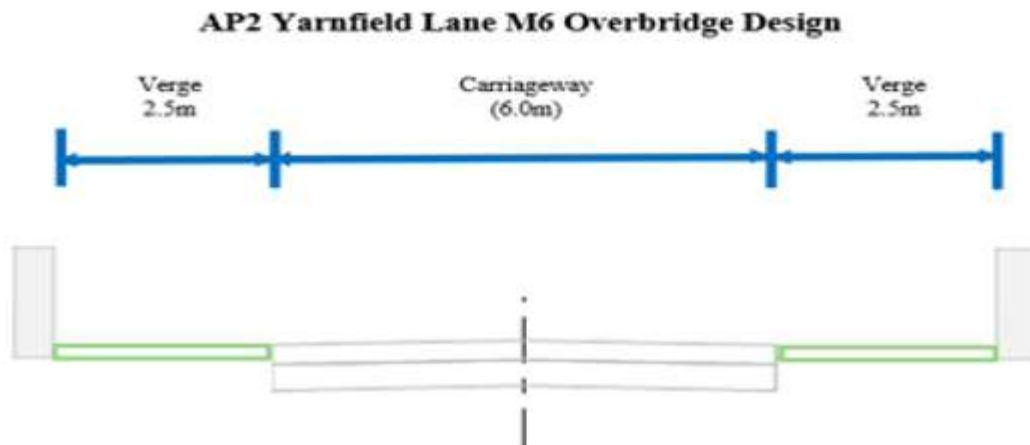
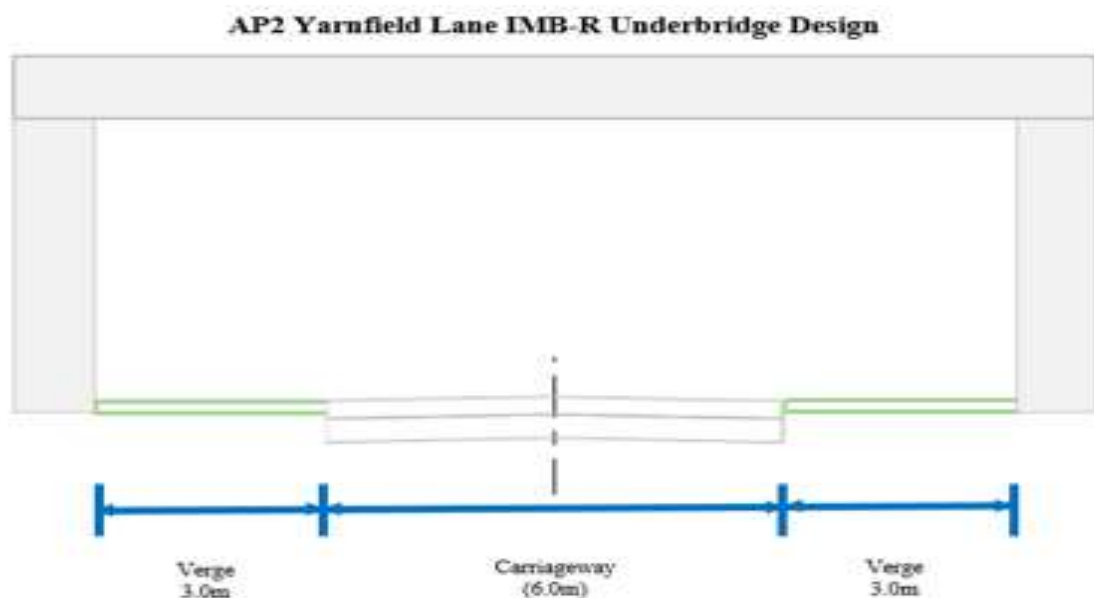


Figure 4: AP2 Yarnfield Lane IMB-R Underbridge Design



6.8 Earthworks on the western side of the M6 motorway (HS2 Action 4)

The Parish Councils requested that HS2 provide the quantity of material and the number of HGV movements that will be needed for the earthworks on the western side of the M6.

HS2 Response

- 6.8.1 The overall amount of earthworks fill required is approximately 129,000 m³, this equates to 30,400 two-way HGV movements. This is comprised of the elements of work listed in Table 1 and includes earthworks quantities for the temporary situations. The works would be carried out across the different construction phases as follows:

- in construction phase 1, the total volume of earthworks fill required would be approximately 112,000m³. This equates to 26,400 two-way HGV movements;
- in construction phase 2, the total volume of earthworks fill required would be approximately 16,000m³. This will be transported as a site haul and segregated from any public traffic interface; and
- in construction phase 3, the total volume of earthworks fill required would be approximately 1000m³. This equates to 240 two-way HGV movements, however it is expected that this can be delivered via the M6 slip roads.

6.8.2 In May 2018, an assurance was given to Staffordshire County Council regarding the construction of the M6 slips as follows:

- 6. (a) The Promoter will (subject to any necessary consents or approvals being in place) require the nominated undertaker to use reasonable endeavours to complete the construction and commissioning of the M6 Slip Roads as soon as reasonably practicable in the main civil engineering works construction programme for the Proposed Scheme.
- 6. (b) The Promoter will (subject to any necessary consents or approvals being in place) require the nominated undertaker to ensure that, upon the opening of the completed M6 Slip Roads to HS2 construction traffic, it will use reasonable endeavours to maximise the use of the M6 Slip Roads by HS2 Large Goods Vehicle construction traffic, so far as reasonably practicable, for access to and egress from the Stone railhead main compound so as to reduce so far as reasonably practicable the use of Yarnfield Lane by HS2 Large Goods Vehicle construction traffic accessing the Stone railhead main compound.

6.8.3 The use of the M6 northbound slips early in the construction programme (i.e. early in construction phase 1) would allow material to be imported via this route to construct earthworks on the western side of the M6, thus avoiding the need to take the associated earthworks HGVs across the existing Yarnfield Lane M6 Overbridge.

Table 1: Illustrative fill quantities for Yarnfield Lane and M6 slip roads to the west of the M6 (to nearest 1000m³)

Element description	Phase 1 Volume (m³)	Phase 2 Volume (m³)	Phase 3 Volume (m³)
Yarnfield Lane western embankment fill	93,000		
Yarnfield Lane temporary diversion and Whitemoor Farm temporary access	1,000		
Northbound temporary slip roads	2,000		
Northbound slip roads and roundabout (permanent) and emergency access road	16,000		1,000
Whitemoor Farm access fill (permanent)		9,000	
Landscape		7,000	
In Phase sub-total	112,000	16,000	1,000
Total	129,000		

6.9 Yarnfield Lane haul road levels

Referring to the detailed A1 plan, The Parish Councils had previously asked for levels along the length of the proposed Yarnfield Lane haul road, including the M6 haul road ramp/link, and the tops/toes of batters and retaining walls, together with key features of the realigned Yarnfield Lane. However, only a few levels had been provided. Specifically, the Parish Councils were interested in the level of the new lane at the eastern abutment and the level of the road at the point the permanent access from the IMB-R joins the new lane?

HS2 Response

- 6.9.1 The A1 drawings issued to the Parish Council in December 2019 and January 2020 provide relevant levels on the Yarnfield Lane haul road and a proposed U-turn ramp at the interfaces with the realigned Yarnfield Lane and existing M6 overbridge. These demonstrate adequate clearances to the haul routes would be achieved within Bill limits.
- 6.9.2 Since the U-turn ramp haul road is temporary for construction purposes only, the detailed design would be developed at a later stage as part of the contractor's temporary works design. It should be noted that at the location of the cross section

on the A1 drawings provided at the meeting with the Council on the 16th January 2020¹³, there would be no requirement for a temporary retaining wall.

- 6.9.3 Detailed extracts of relevant profile drawings for the new Yarnfield Lane and the IMB-R connector road between the new Yarnfield Lane Realignment and the new IMB-R/M6 slip road roundabout are provided in Appendix F.

6.10 Realigned Yarnfield Lane design departures (HS2 Action 5)

The Parish Councils noted that HS2 was previously proposing 20 departures from technical standards, nine of which focused on the new M6 overbridge and asked the HS2 engineers what the new departures from standards were now that it had lengthened the bridge by 38m to 132m.

HS2 Response

- 6.10.1 The changes made to the Yarnfield Lane M6 Overbridge design for the Yarnfield Lane realignment at the AP2 design stage do not introduce any new highway departures from technical standards.

6.11 Railhead/IMB-R junction visibility

The Parish Councils noted they consider that the proposed Railhead/IMB-R access represents a blind junction, which is less than 50m from the bridge abutments.

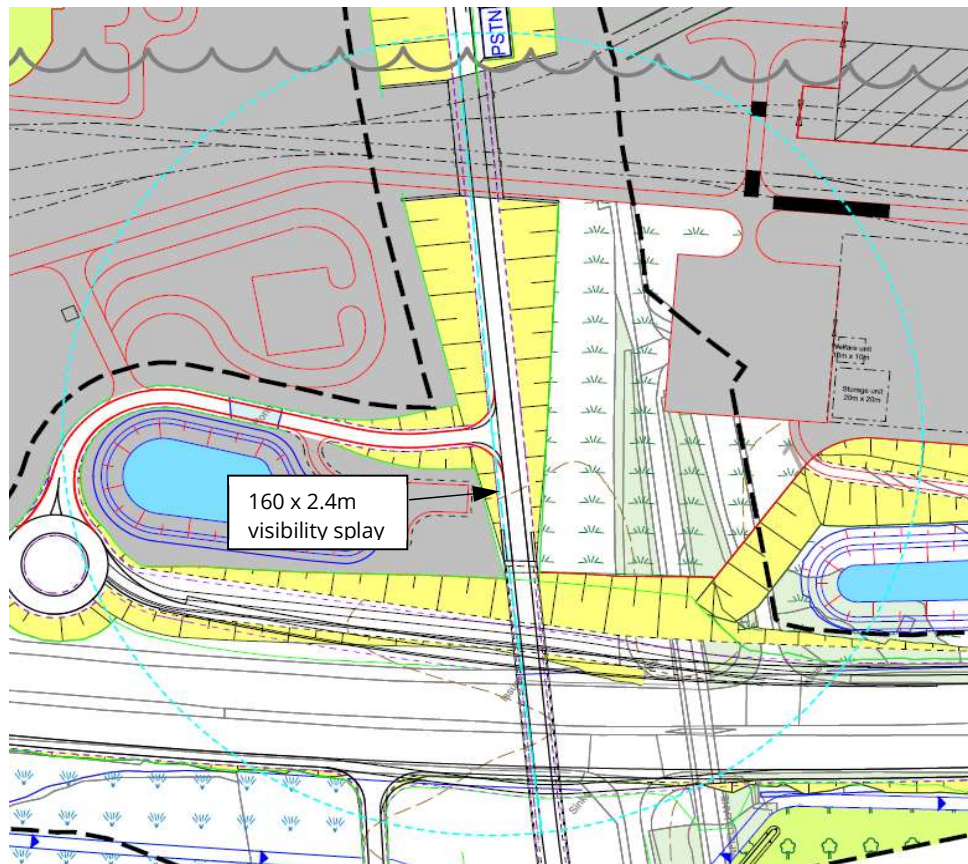
HS2 Response

- 6.11.1 A design speed of 85kph was assumed for the new Yarnfield Lane realignment. In accordance with TD42/95¹⁴ this design speed requires a minimum stopping sight distance of 160m for junction visibility from the IMB-R connector road approach to the new Yarnfield Lane Realignment. Figure 5 demonstrates that the 160m x 2.4m required junction visibility splays are achieved in the AP2 design. The junction visibility is therefore compliant with TD42/95.

¹³ Yarnfield Lane Phase 2 Road Layout Sheets 1 and 2 (Drawing Nos: 2PT02-ARP-PT-DSK-000-220552 and 220553 Revs P00.1 dated 8/1/2020).

¹⁴ TD42/95 – Geometric Design of Major/Minor Priority Junctions (superseded by CD123 Geometric Design of at-grade priority and signal-controlled junctions).

Figure 5: Junction visibility - IMBR connector road approach to the new Yarnfield Lane



6.12 Stone IMB-R cohesive landscape fill material (HS2 Action 6)

The Parish Councils noted that 252,000 m³ of landscaping materials is included in the fill calculations, which seems a very large amount given the nature of the site. How is HS2 proposing to use this material?

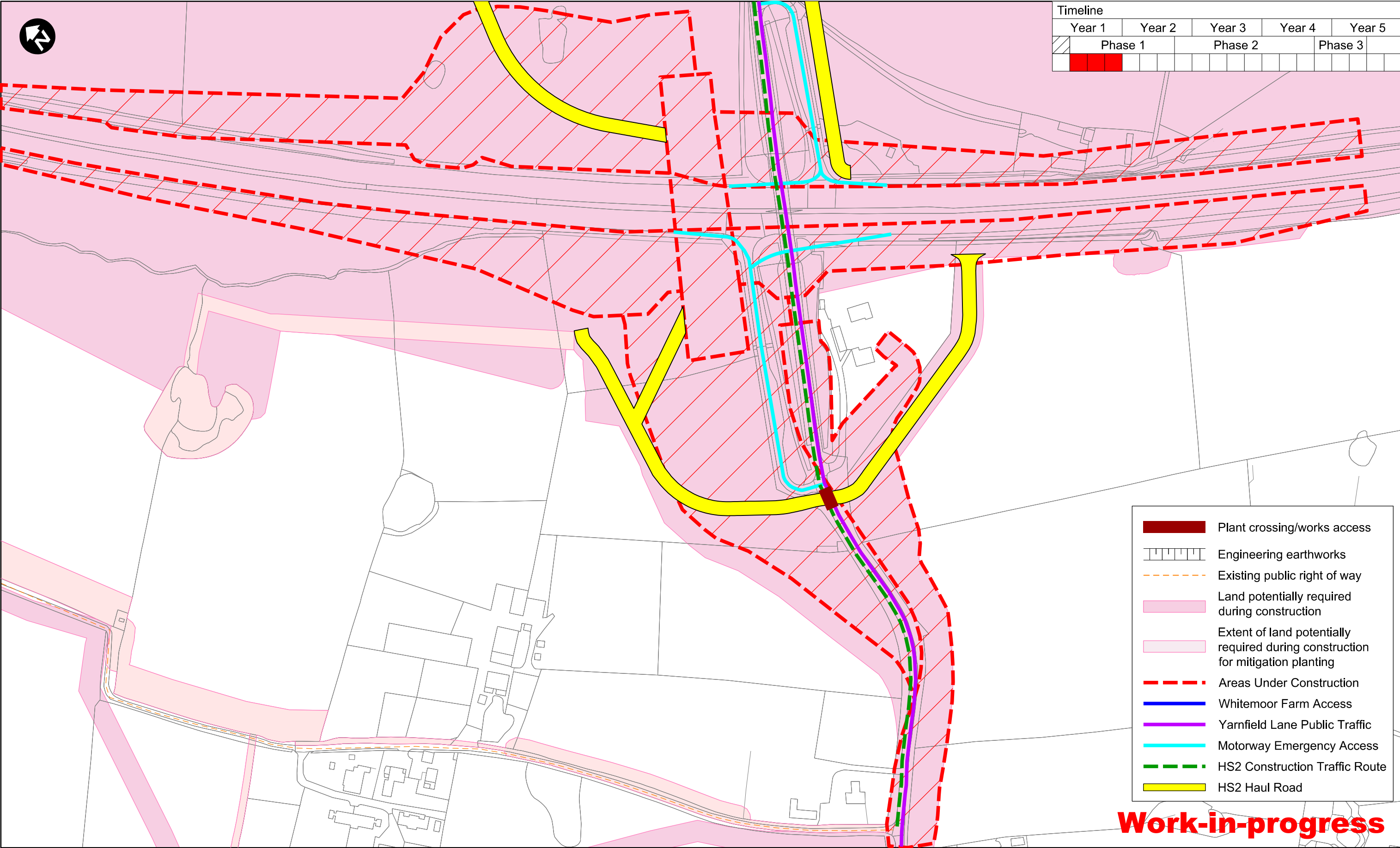
HS2 Response

- 6.12.1 HS2 have prepared a sketch through the largest landscape earthworks area which provides an example of how landscape earthwork volumes have been estimated at Stone Headshunt, Stone IMB-R and Yarnfield South and North Embankments, refer to Appendix G.

Appendix B - HS2 Action Summary

HS2 Meeting Minutes Action Point	SCRG Evidence Section (where relevant)	Subject	HS2 Response Document Section Reference
1		Construction use of existing M6 overbridge	Section 6.2
2		Maintaining public access along Yarnfield Lane	Section 6.3
3		Width of the realigned Yarnfield Lane	Section 6.7
4		Earthworks on the western side of the M6 motorway	Section 6.8
5		Realigned Yarnfield Lane design departures	Section 6.10
6		Stone IMBR cohesive landscape fill material	Section 6.12
7	SRCG para 2.3.3	Ground conditions at the Stone Railhead/IMB-R site	Section 4.2
8	SRCG para 2.1.6	Stone Railhead Excavations and quantities	Section 2.4
9/10	SRCG para 2.1.7	Stone Railhead Excavations and quantities	Section 2.5
11	SRCG para 2.2.4	Transportation of earthworks materials	Section 3.1
12	SRCG para 2.3.1 – 2	Ground conditions at the Stone Railhead/IMB-R site	Section 4.1

Appendix C - Construction phasing plans



Timeline													
Year 1			Year 2			Year 3			Year 4			Year 5	
	Phase 1					Phase 2						Phase 3	

- Plant crossing/works access
- Engineering earthworks
- Existing public right of way
- Land potentially required during construction
- Extent of land potentially required during construction for mitigation planting
- Areas Under Construction
- Whitemoor Farm Access
- Yarnfield Lane Public Traffic
- Motorway Emergency Access
- HS2 Construction Traffic Route
- HS2 Haul Road

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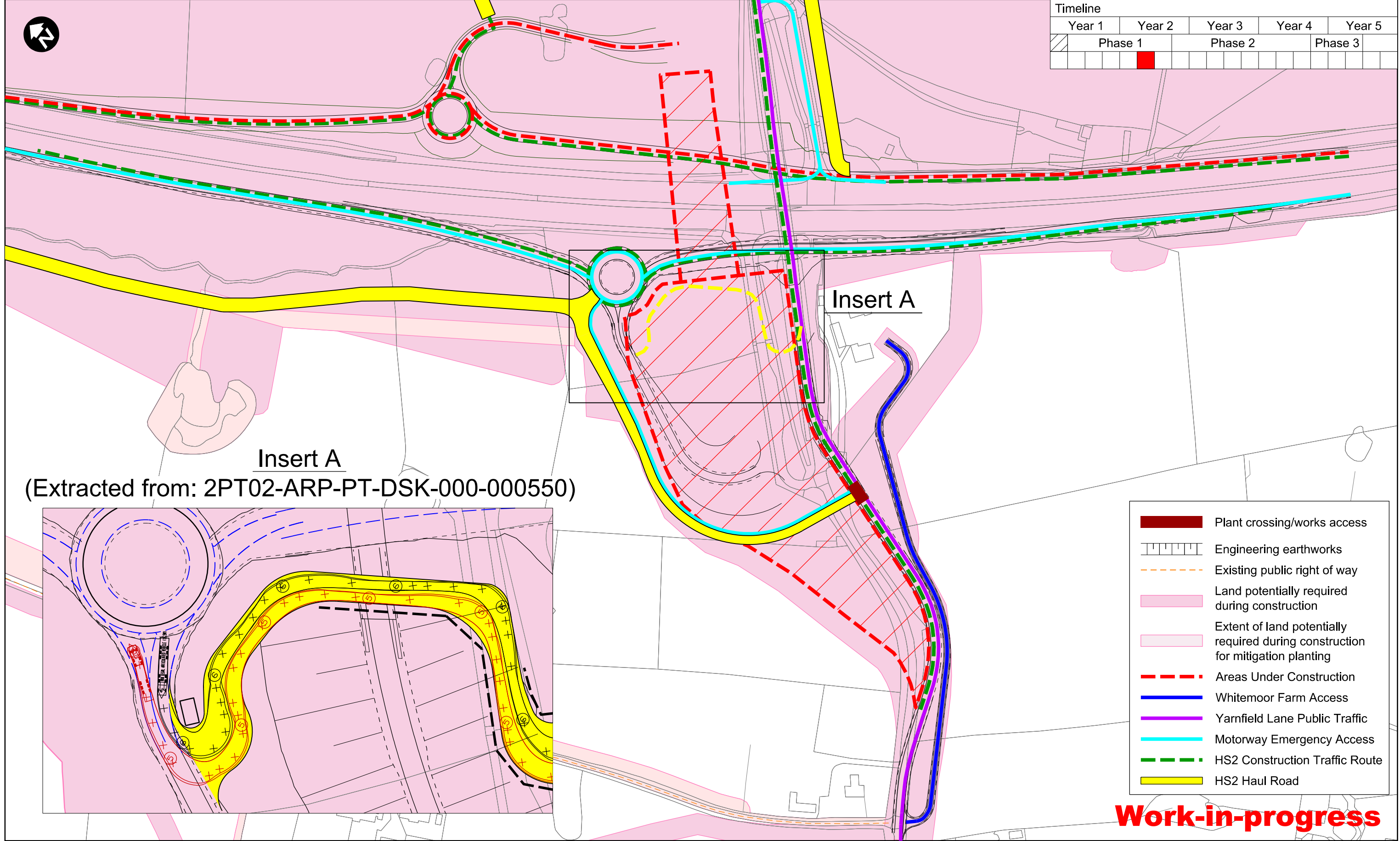
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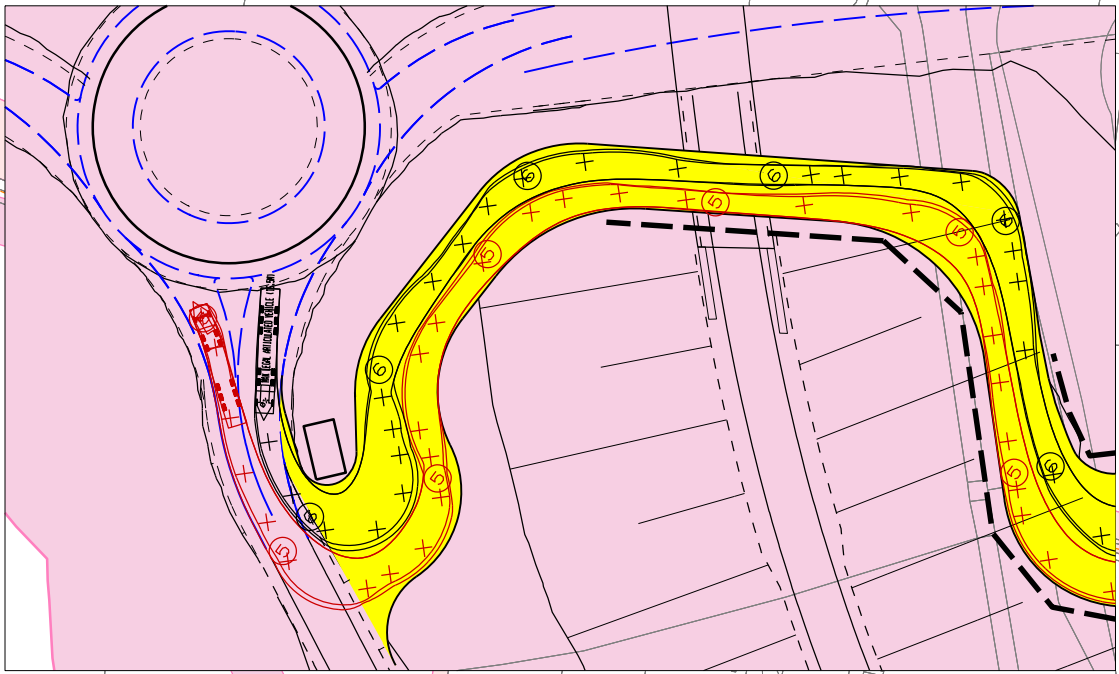
Ove Arup & Partners International Ltd

Zone		Project/Contract		
Route Wide		C861 Hybrid Bill Additional Provision 2 AP2		
Design Stage		Discipline/Function		
Hybrid Bill - Interim Preliminary Design AP2		Petitions		
Drawing Title		Drawn	Checked	Approved
		DS	PJ	TE
		Date	Scale	Size
Illustrative Construction Phasing		24/01/2019	1:2500	A3
for Yarnfield Lane		Drawing No.		Rev.
Sheet 1		2PT02-ARP-PT-DSK-000-200014		P00.1



Timeline														
Year 1			Year 2			Year 3			Year 4			Year 5		
	Phase 1					Phase 2						Phase 3		

Insert A
(Extracted from: 2PT02-ARP-PT-DSK-000-000550)



- Plant crossing/works access
- Engineering earthworks
- Existing public right of way
- Land potentially required during construction
- Extent of land potentially required during construction for mitigation planting
- Areas Under Construction
- Whitemoor Farm Access
- Yarnfield Lane Public Traffic
- Motorway Emergency Access
- HS2 Construction Traffic Route
- HS2 Haul Road

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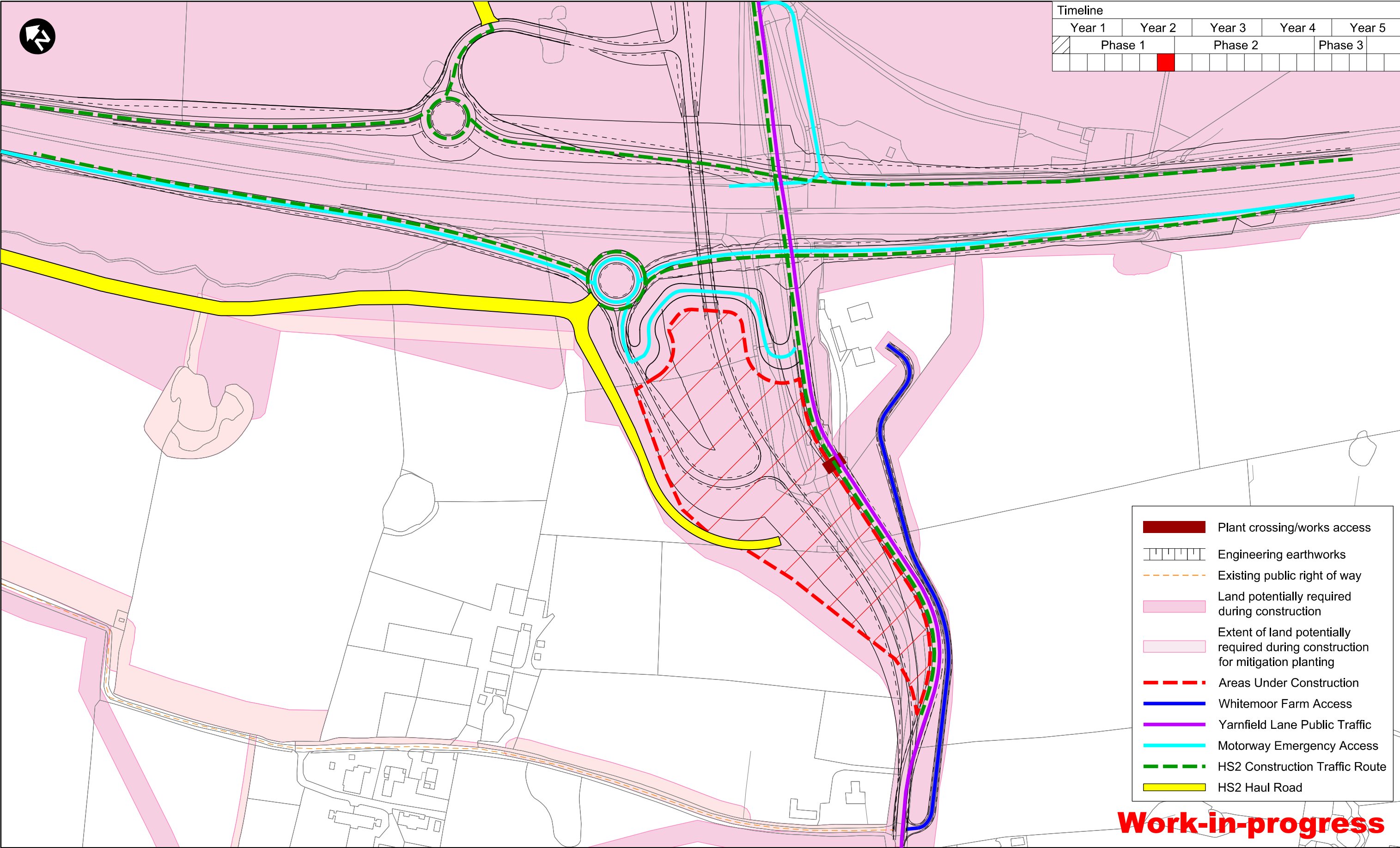
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Zone	Route Wide	Project/Contract	C861 Hybrid Bill Additional Provision 2 AP2		
Design Stage	Hybrid Bill - Interim Preliminary Design AP2	Discipline/Function	Petitions		
Drawing Title	Illustrative Construction Phasing for Yarnfield Lane	Drawn	DS	Checked	PJ
		Date	27/02/2020	Scale	1:2500
		Approved	TE	Size	A3
Sheet 3		Drawing No.	2PT02-ARP-PT-DSK-000-200016		Rev. P00.1

P38 (144)



Timeline														
Year 1			Year 2			Year 3			Year 4			Year 5		
	Phase 1					Phase 2						Phase 3		

- Plant crossing/works access
- Engineering earthworks
- Existing public right of way
- Land potentially required during construction
- Extent of land potentially required during construction for mitigation planting
- Areas Under Construction
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- HS2 Haul Road

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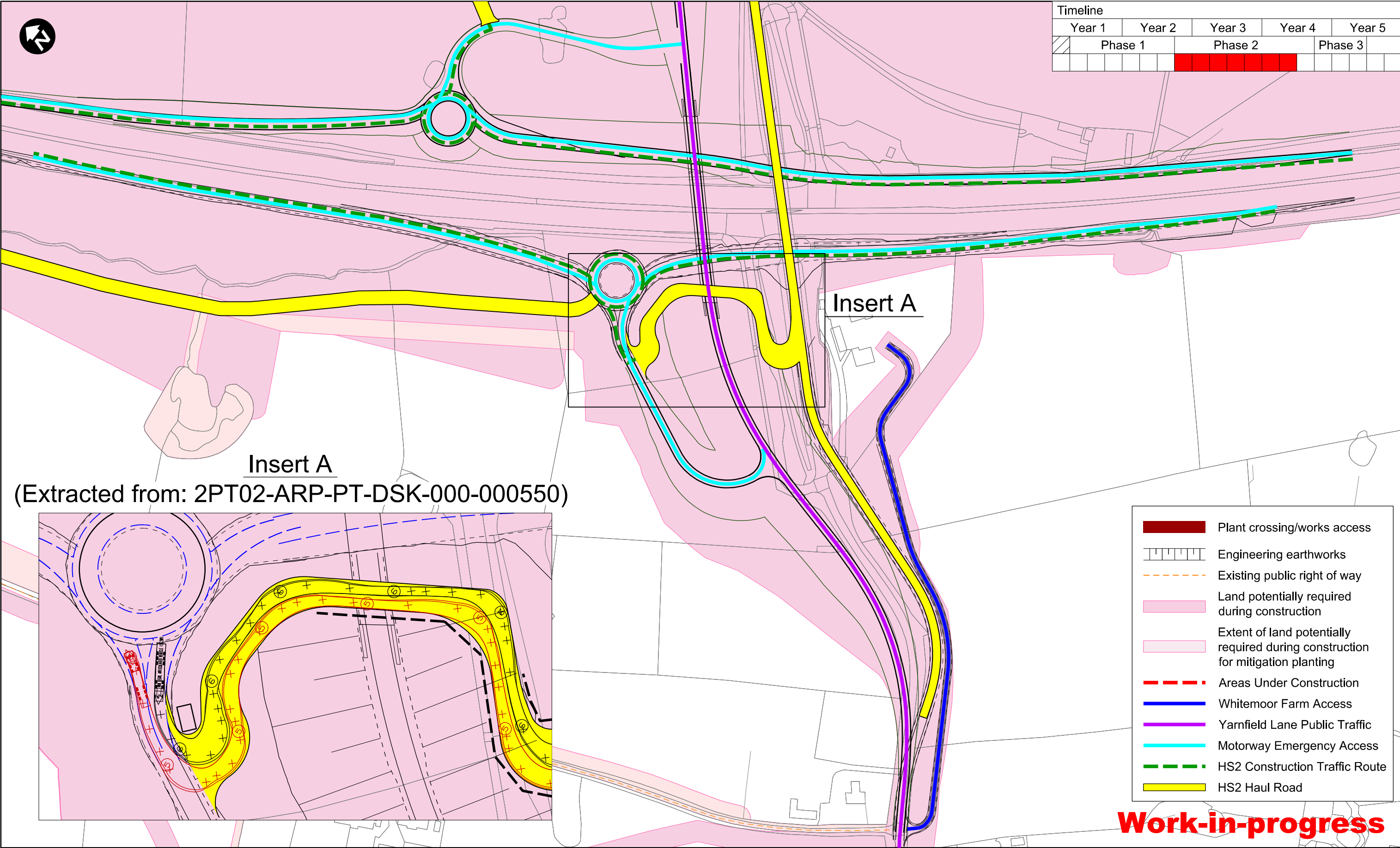
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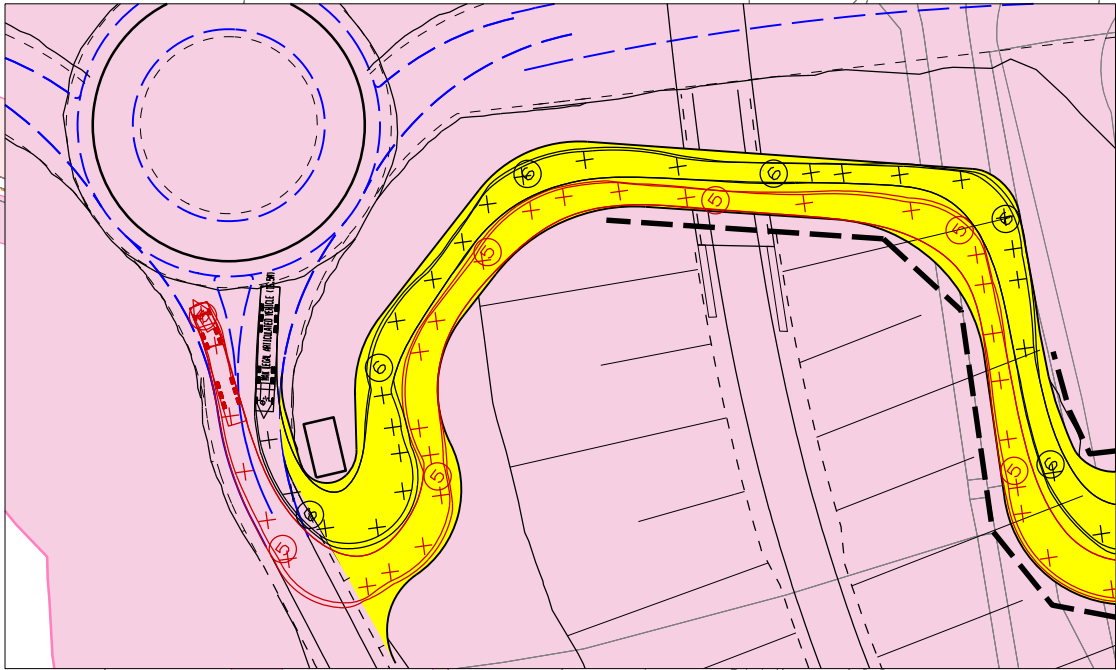
Creator/Originator
Ove Arup & Partners International Ltd

Zone		Project/Contract		
Route Wide		C861 Hybrid Bill Additional Provision 2 AP2		
Design Stage		Discipline/Function		
Hybrid Bill - Interim Preliminary Design AP2		Petitions		
Drawing Title		Drawn	Checked	Approved
		DS	PJ	TE
		Date	Scale	Size
Illustrative Construction Phasing		27/02/2020	1:2500	A3
for Yarnfield Lane		Drawing No.		Rev.
Sheet 4		2PT02-ARP-PT-DSK-000-200017		P00.1



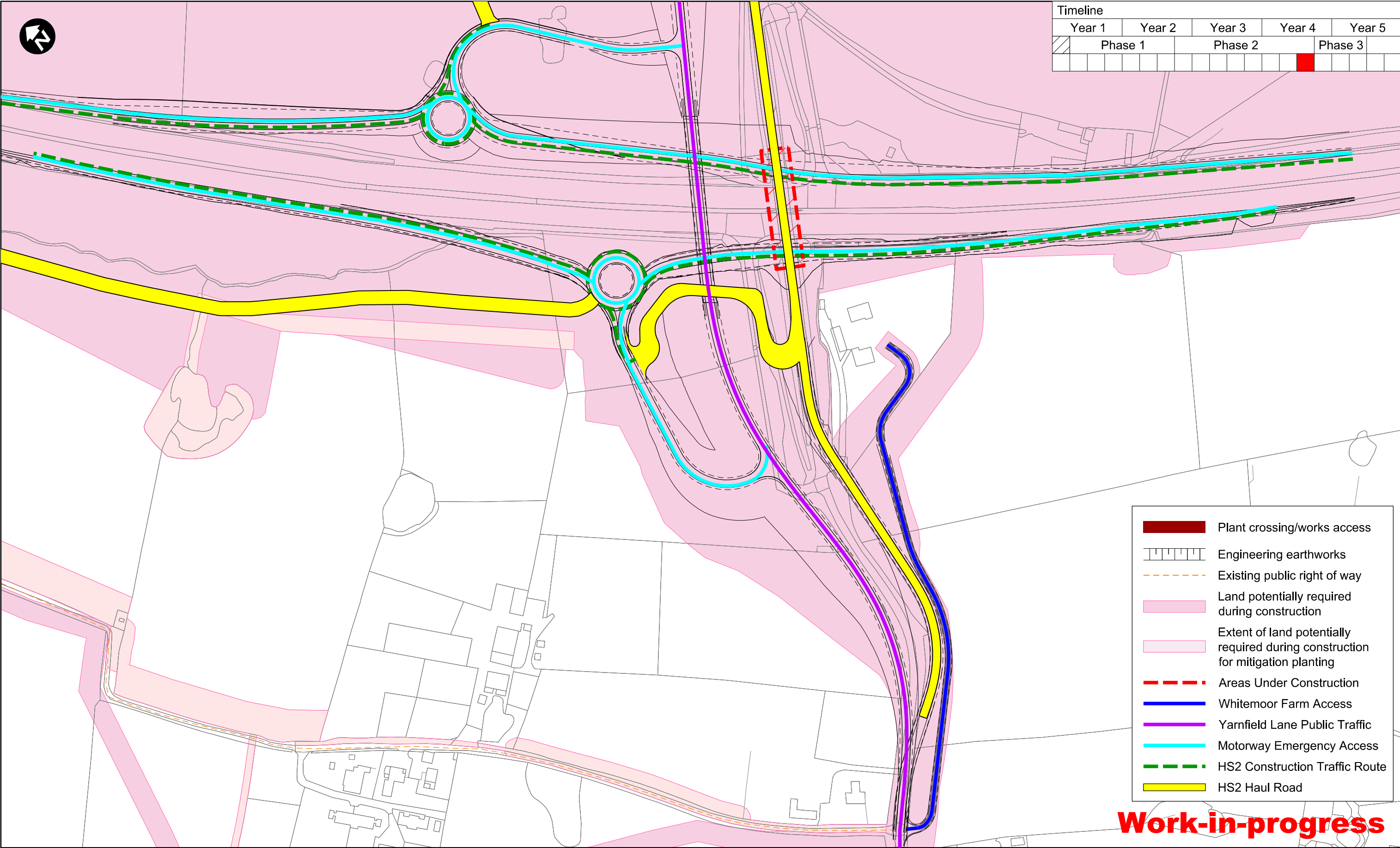
Timeline														
Year 1			Year 2			Year 3			Year 4			Year 5		
	Phase 1					Phase 2						Phase 3		

Insert A
(Extracted from: 2PT02-ARP-PT-DSK-000-000550)



- Plant crossing/works access
- Engineering earthworks
- Existing public right of way
- Land potentially required during construction
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- Motorway Emergency Access
- HS2 Construction Traffic Route
- HS2 Haul Road

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Timeline														
Year 1			Year 2			Year 3			Year 4			Year 5		
	Phase 1					Phase 2						Phase 3		

- Plant crossing/works access
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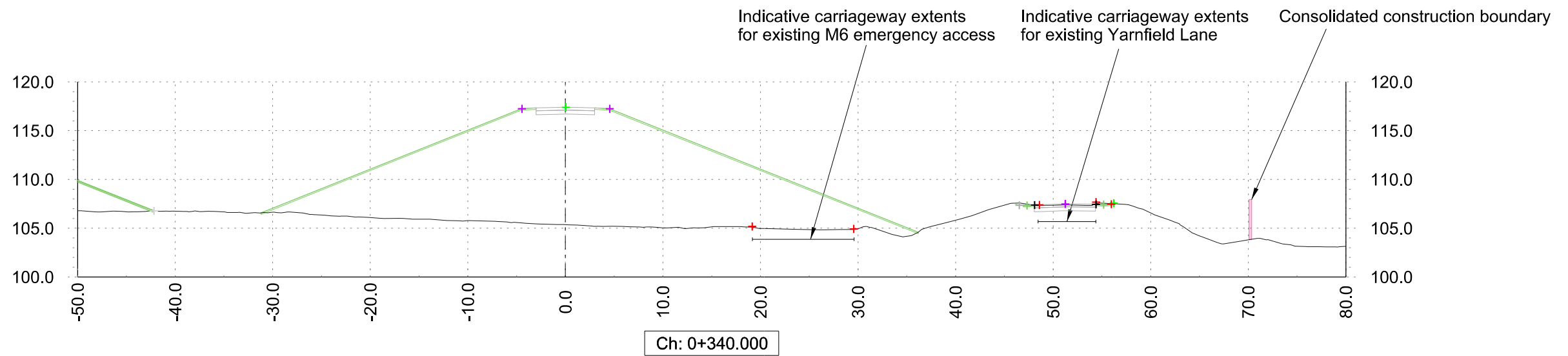
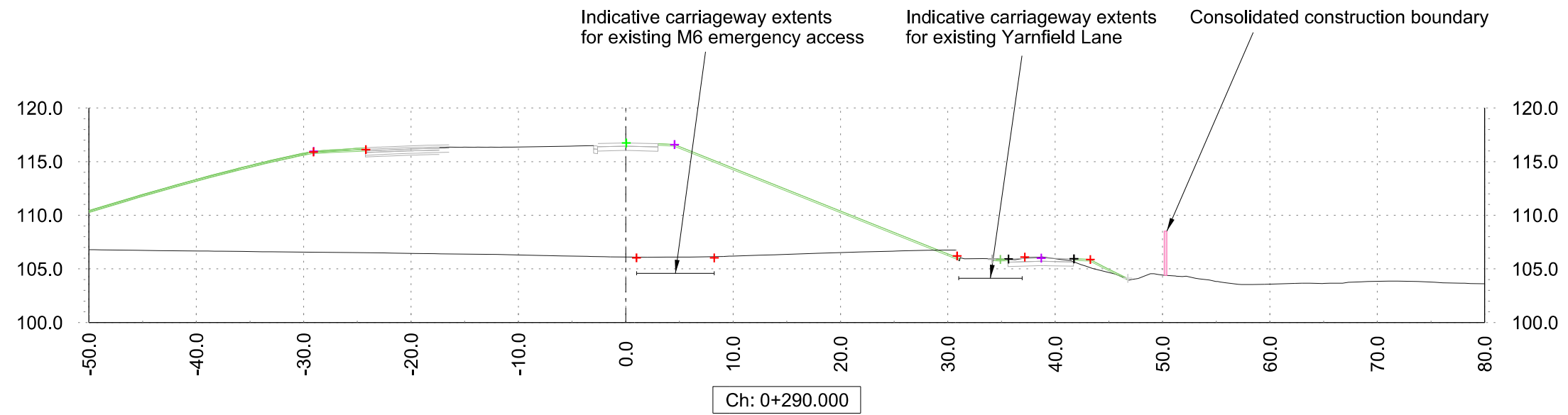
Creator/Originator
Ove Arup & Partners International Ltd

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	Design Stage	Hybrid Bill - Interim Preliminary Design AP2		Discipline/Function Petitions		
	Drawing Title	Illustrative Construction Phasing for Yarnfield Lane Sheet 6		Drawn	Checked	Approved
				DS	PJ	TE
				Date	Scale	Size
Creator/Originator	Ove Arup & Partners International Ltd		11/02/2020	1:2500	A3	
			Drawing No. 2PT02-ARP-PT-DSK-000-200019		Rev. P00.1	

Appendix D – Geotechnical risk register

Title	Lifecycle Phase	Lifecycle Sub-Phase	Macro Category	Sub-Category I (1st level)	Sub-Category II (2nd level)	Status	Type	Risk Title & Description (The risk that... / or Opportunity Title & Description)	Cause of risk (The risk is caused by... / or reasons for pursuing opportunity)	Consequence of risk (The direct impact of the risk will be... / or benefit, of an opportunity)	Proximity of Impact	Risk Owner	Prob	Cost	Time	Reput'n	Env'n	H&S	Pre-Mit Severity	Risk Mitigation or Opportunity action plan	Comments
EMBANKMENT SETTLEMENT	PreConstruction	Design & Procurement	4. Delivery and commercial	Geotechnical	Other	Active	Risk	Settlement under the embankments is greater than anticipated.	Insufficient ground treatment included in the Preliminary Earthworks Design.	Excessive settlements and /or increased maintenance. Differential settlement between embankment earthworks and adjacent structures.	9 Railway Operation								3	Detailed GI to determine ground compressibility properties. Carry out modelling to design ground treatment. Monitoring to be carried out after completion of the construction works through to the initial phase of the operation of the railway line.	11.02.2017 Risk added.
COMPRESSIBLE ALLUVIAL DEPOSITS	HBpreparation	Hybrid Bill Preparation	4. Delivery and commercial	Geotechnical	Other	Active	Risk	Areas of compressible alluvial deposits are present along the route to depths of up to 4m that will affect the cost of ground improvements.	Uncertainties in material types present along route meaning it is difficult to estimate materials location and strength, particularly the strength and extent of compressible alluvial deposits in current and historical river crossings. (Within Trent Valley, Madeley Channel and infilled solution hollows.)	Cost of redesign & associated works to provide space/land (i.e. embankment may require additional stabilisation) for ground improvement. Delay to pre-construction schedule to secure environmental approvals	6 Pre-Construction								8	Timely Geotechnical Investigations to be carried out.	
UNEXPECTED GROUND CONDITIONS	HBpreparation	Hybrid Bill Preparation	4. Delivery and commercial	Geotechnical	Other	Active	Risk	Limited existing ground and groundwater information.	Unexpected ground conditions - materials suitability, earthworks slope angles, founding materials etc.	Cost and delay of earthworks and structures' foundations are different from expected, including land take. Delay to design schedule to accommodate further investigation. Environmental impact (e.g. alternative material may be required)	7 Construction								15	Geotechnical risk management process (e.g. HA22/08). Sufficient and timely ground investigations. Site monitoring during construction. Flexibility of contractual arrangements to accommodate changes.	-
BURIED CHANNELS	HBpreparation	Hybrid Bill Preparation	4. Delivery and commercial	Geotechnical	Other	Active	Risk	Uncertainty associated with the Glaciolacustrine deposits and buried channels of the Cheshire Basin and River Trent Valley.	Presence of interbedded fine and coarse grained sediments causes hydrogeological and slope stability issues, foundation construction, differential settlement and long term settlement.	Cost of earthworks and structures' foundations are different from expected in the Preliminary Design. Delay to design schedule to accommodate further investigation.	4 Hybrid Bill Preparation								6	Thorough Ground Investigation in early stages of design, allowing appropriate measures to be taken either through ground improvement or conservative design.	11.02.17 Risk scores added.
HIGHLY VARIABLE GROUND CONDITIONS	HBpreparation	Hybrid Bill Preparation	4. Delivery and commercial	Geotechnical	Other	Active	Risk	Differential Settlement due to variable ground conditions over short lateral distances.	Variable depth to MMG/highly variable ground conditions over short lateral distances (i.e. A500 rail bridge)	Cost and delays to produce more ridged designs able to deal with differential settlement.	4 Hybrid Bill Preparation								3	Thorough Ground Investigation in early stages of design, allowing appropriate measures to be taken either through ground improvement or conservative design.	There are no outcroppings/ exposed coalfield areas along the route. All historical mine is expected to be deep (i.e. >30m of rock cover). Unrecorded mine shafts unlikely to be encountered. 11.02.17 Risk scores added.
GROUND CONTAMINATION UNKNOWN SITES	HBpreparation	Hybrid Bill Preparation	4. Delivery and commercial	Geotechnical	Contamination	Active	Risk	Uncertainty associated with contaminated land at unknown sites	Uncertainty associated with type and extent of contaminated land - unknown sites	Increased cost, delays & environmental impact associated with remedial works and /or disposal, quarantine contaminated material and importing new material. Cost and time associated with further investigation to identify type and extent of contamination. Cost of premium prices for scarce specialist resource. Increased cost of mass haul (disposal logistics more onerous than assumed e.g. disposal sites yet to be identified)	6 Hybrid Bill Preparation								9	Appropriate and timely Ground Investigation and contamination testing.	17.03.16 Risk owner change
ARTESIAN/SUB ARTESIAN GROUNDWATER	HBpreparation	Hybrid Bill Preparation	4. Delivery and commercial	Geotechnical	Other	Active	Risk	Flooding of excavations due to Artesian/sub-artesian groundwater, and during piling.	Groundwater under pressure coming up into excavations in both solid and superficial deposits, known to occur in the M6 area. Significant ground water strikes associated with faults/fault zones.	Increased time and cost during construction	4 Hybrid Bill Preparation								6	Further Ground investigation, allowing design to take geological features which are likely to be water bearing into account, and put appropriate dewatering measures in place during construction where appropriate.	11.02.2017 Risk updated.
SHALLOW GROUND WATER	HBpreparation	Hybrid Bill Preparation	4. Delivery and commercial	Geotechnical	Other	Active	Risk	Flooding of excavations due to shallow ground water, potential for settlement and interruption to surface and/or groundwater abstraction caused by temporary dewatering.	Shallow groundwater requiring temporary dewatering for excavations.	Increased time and cost during construction due to flooding to excavations and settlements due to removal of shallow groundwater during dewatering.	4 Hybrid Bill Preparation								6	Investigate ground water levels during GI, and take into account requirements for de-watering during the design.	11.02.2017 Risk updated.

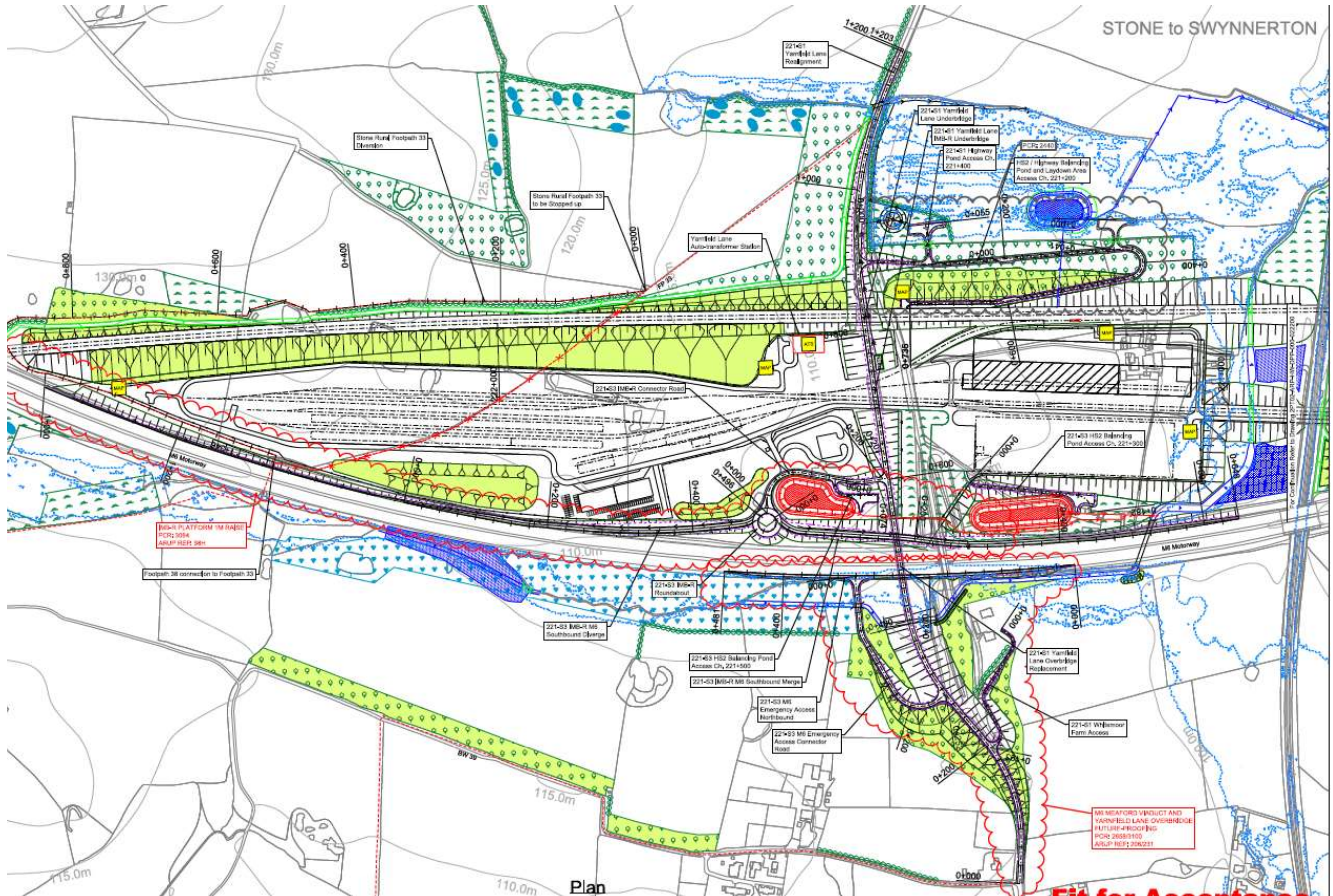
Appendix E – Plans and cross sections (Yarnfield Lane west of M6)

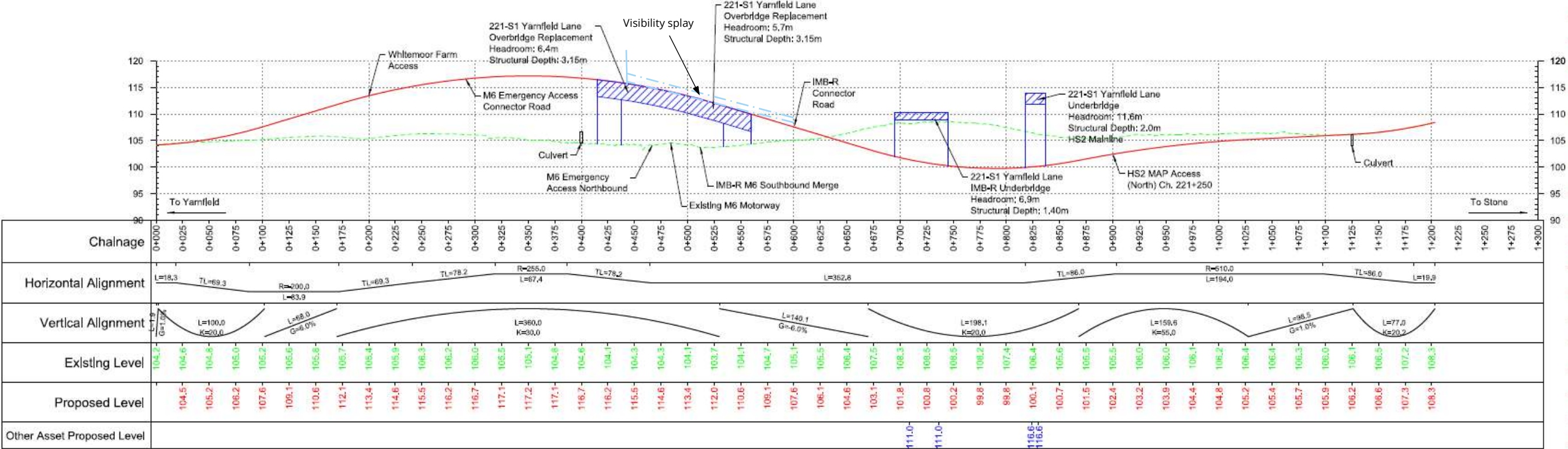


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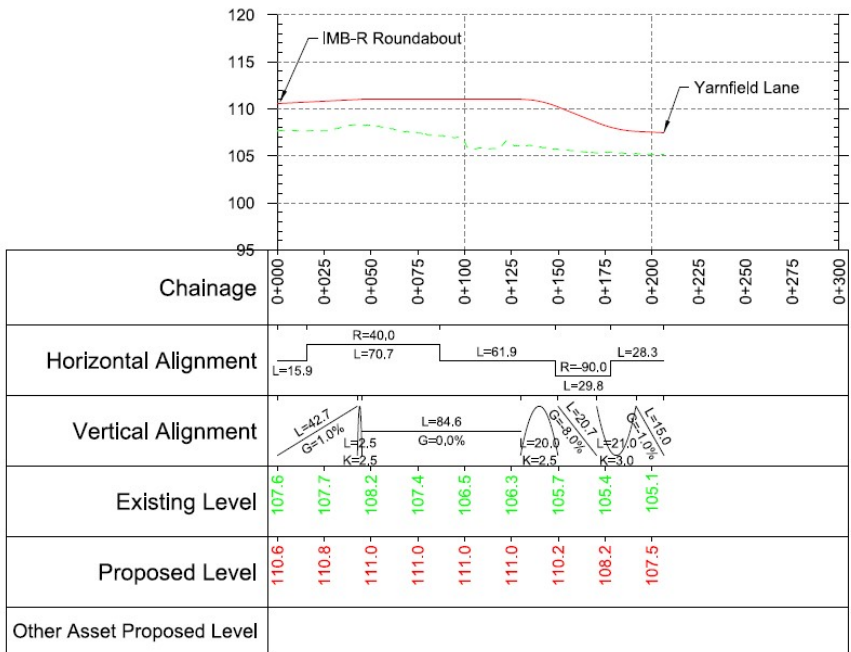
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					Design Stage	Hybrid Bill - Interim Preliminary Design AP2		Discipline/Function Petitions		
					Drawing Title	Yarnfield Lane Proposed Plans and Sections		Drawn DS	Checked PJ	Approved TE
						Date 28/02/2020	Scale 1:500	Size A3		
				Sheet 2		Drawing No. 2PT02-ARP-PT-DSK-000-200023		Rev. P00.1		

Appendix F – Highway Plan and Profile drawings



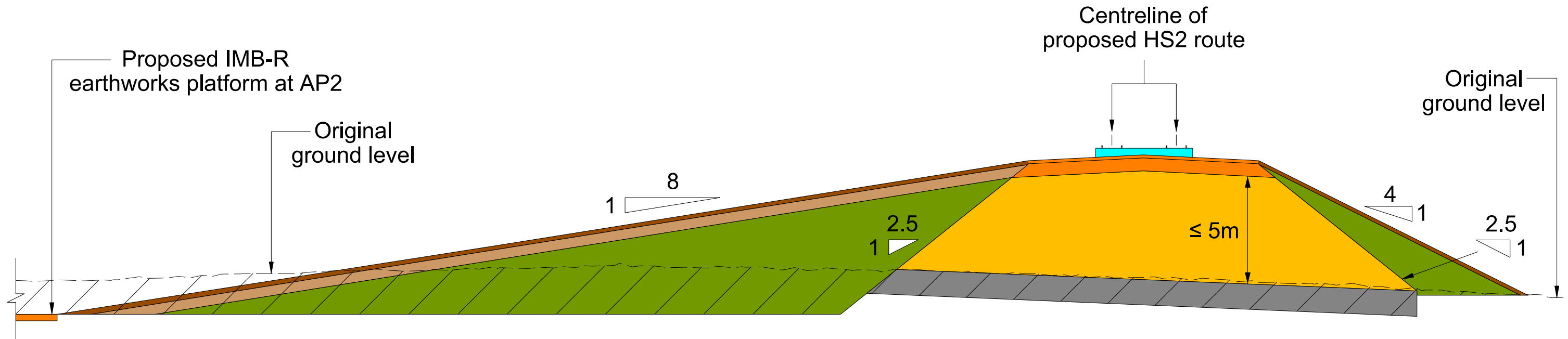


221-S1 Yarnfield Lane Realignment



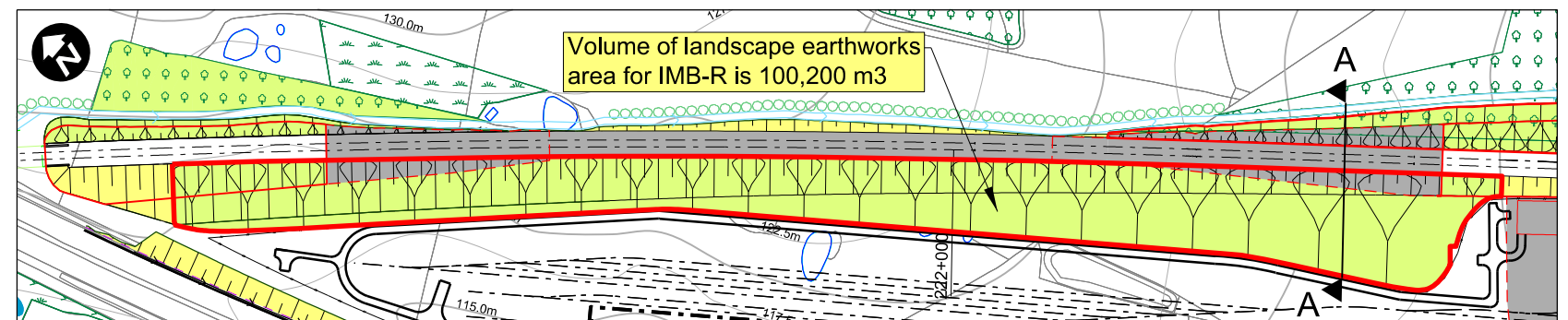
221-S3 IMB-R Connector Road

Appendix G - Example schematic of a landscape earthworks area at Stone IMB-R



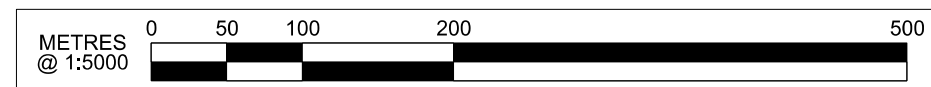
Indicative Cross Section A-A (Not to Scale)

Volume of this landscape earthworks area at the IMB-R is estimated from footprint area of 49,100m² and average maximum height of 4.1m of the landscape earthworks in triangular shape as indicated in section A-A, giving a volume of 100,200m³.



Plan of Landscape Earthworks Area (1:5000 at A3 Size)

- | | | | |
|---|---|---|---|
|  | Slab Track (Indicative) |  | Class 2 (General Cohesive Fill) or Class 4 (Landscape Fill) |
|  | Class 6 (Imported Selected Granular Fill) |  | Topsoil |
|  | Class 6 (Selected Granular Fill) |  | Subsoil |
|  | Class 1 or Class 6 (Granular Fill) |  | Existing Ground to be Excavated |



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Zone	Route Wide		Project/Contract		
			C861 Hybrid Bill Additional Provision 2 AP2		
Design Stage	Designs for Petition		Discipline/Function		
			Petitions		
Drawing Title	Indicative Cross Section through a proposed landscape earthworks area adjacent to Stone IMB-R		Drawn	Checked	Approved
			DS	AP	TE
			Date	Scale	Size
			04/03/2020	NTS	A3
			Drawing No.		Rev.
			2PT02-ARP-PT-DSE-000-200013		DN1

Yarnfield & Cold Meece Parish Council

Yarnfield Village Hall
Yarnfield Lane
Yarnfield
ST15 0NJ
ycmclerk@gmail.com

13 March 2020

Mr O Bayne
Director, Hybrid Bill Delivery
Albany House
96-98 Petty France
London
SW1H 9EA

Dear Mr Bayne

HS2 Phase 2a House of Lords Select Committee: Petition 023

Thank you for your letter dated 11 March 2020 and the accompanying report and appendices. I would also like to thank your colleague Rachna Shah who has agreed to send us out a hard copy, together with the drawings at the appropriate size to match the stated scale or, in the case of the geotechnical risk register, to make the text easily readable.

Our technical advisors have been through the contents and noted that some actions or issues raised during the meeting of 16 January 2020 have not been fully addressed or the responses remain unsatisfactory. I am therefore requesting the provision of some further information to enable us to complete our preparations for the House of Lords Select Committee proceedings.

Section 2.3: Supply of fill from borrow pits to the Stone Railhead/IMB-R

We note from paragraph 2.3.1 that HS2 Ltd has confirmed that high quality granular fill from BP4 at Blithbury, near Lichfield, will be used in the construction of the bridges, viaducts and auto-transformer at the Stone Railhead/IMB-R site.

Please can you confirm the quantity of sand and gravel it is proposed to import from BP4 and whether it is proposed to import sand and gravel for use as bulk fill at the Stone Railhead/IMB-R site from BP4, or perhaps any other borrow pits along the route of Phase 2a.

Section 3.1: Network of haul roads

We note that in response to dealing with Action 11 in paragraph 3.1.3, that you refer to your network of haul routes along the length of Phase 2a. Since the haul roads to be used for mass haul by articulated dump trucks (ADTs) will be unsurfaced, please can you provide a cross-section of the typical construction design, including details of the width, depth and the materials that they would be built from.

Section 4: Ground conditions at the Stone Railhead/IMB-R site

It is noted that HS2 Ltd has acknowledged that the ground conditions within the Stone Railhead/IMB-R site are worse than originally expected. Whilst HS2 Ltd is stating in paragraph 4.2.9 that it believes that this will not affect its ability to construct the railway within the powers of the bill, we note that it provides no such reassurance regarding the Stone Railhead/IMB-R.

We therefore believe that it is imperative that the results of the site-specific preliminary ground investigation, the delivery date for which (i.e. March/April 2020) HS2 Ltd has confirmed (in paragraph 4.5.1) has not changed, are independently reviewed and made publicly available prior to the commencement of the House of Lords Select Committee proceedings so that evidence relating to this can be fully considered.

With this evidence in mind, we consider that it is premature for HS2 Ltd to claim in paragraph 4.7.2 that *“the planned extent of the area requiring ground treatment is conservative.”*

Section 5.1: Shortfall of fill

We note that HS2 Ltd now agrees that it faces a substantial shortfall of both granular and cohesive fill, even though we believe that the figure of 0.9 million m³ still represents an underestimate. In an attempt to resolve the discrepancy in the figures between us, please can you now provide a breakdown of how the figure of 900,000m³ is comprised, including the type of fill and how HS2 Ltd intends to import this material to the site.

In addition, you will be aware that we have repeatedly asked for HS2 Ltd to provide a Transport Logistics Profile. This should comprise a clear monthly breakdown of all types of HGV movements into and out of the Yarnfield North Embankment Transfer Node, together with the two satellite compounds and other construction facilities that will be accessed from the existing or realigned Yarnfield Lane.

This information should also be accompanied by updated histograms of the number of HGVs that would use both the eastern section of Yarnfield Lane, i.e. between the construction facilities and the A34, and the western section to the access points to/from the northbound M6, during all construction phases.

Sections 6.1/6.2 - Action 1: Construction use of existing M6 overbridge

It is clear from your responses in Section 6.1, 6.2 and elsewhere within your report, that HS2 Ltd wishes to use the existing Yarnfield Lane M6 overbridge for two-way

movement of earthworks materials, both before it becomes an internal haul road (Construction Phase 1) and especially once it is proposed to become a haul road (Phase 2). Such two-way movements will either involve the use of 8-wheel tipper HGVs, 40-tonne articulated dump trucks or a combination of both.

With many thousands of such movements planned, we cannot understand why HS2 Ltd is unwilling to confirm that it will definitely undertake a structural survey of the existing overbridge. Furthermore, not only should such a structural survey be undertaken, but this should be carried out and the results made publicly available prior to our scheduled evidence session to the House of Lords Select Committee.

Please can you therefore give this matter your urgent attention and confirm whether HS2 Ltd is prepared to agree to this proposal?

[Response in Section 6.11 regarding junction visibility](#)

We note that HS2 is proposing a 160m long visibility splay for the permanent Stone Railhead/ IMB-R junction onto the realigned Yarnfield Lane that is based on a design speed of 85kph. Please can you confirm why you have used this design speed given that Yarnfield Lane currently has an effective speed limit in this area of 60mph.

I look forward to receiving your response to the points raised above in the near future.

Yours sincerely



John Fraser

Parish Clerk

Yarnfield & Cold Meece Parish Council

Mr John Fraser
5 De Havilland Drive
Yarnfield
Stone
ST15 0SX

17 April 2020

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

Thank you for your letter of 13 March 2020 in response to the letter from Oliver Bayne of 11 March 2020 providing the Promoter's response to the Stone Railhead Crisis Group's 'Summary of excavated materials evidence', and meeting action points.

I am writing to you to provide a response to the additional questions you have raised in your letter of 13 March 2020. I understand that Rachna Shah has been in contact with you by telephone and that you have received a paper copy of the response document, including A3 plans, which we sent to you on 11 March 2020.

The responses set out below follow the sequence of the questions raised in your letter of 13 March 2020, a copy of which is appended to this letter as Appendix 1 for ease of reference.

Supply of fill from borrow pits to the Stone Railhead/IMB-R

We have reviewed the need to source material from borrow pit 4 for the purpose of works at the IMB-R location. The current view is that it will not be necessary to source material from that borrow pit or other borrow pits within the Bill limits for that purpose. To be clear, were it to be found necessary to source material from borrow pit 4 or other borrow pits within the Bill limits for works at the IMB-R location, such sourcing would fall within the powers of the Bill and in principle within the scope of the deemed planning permission.

Proposed network of haul roads

Your letter of 13 March 2020 indicates that there may be some misunderstanding around the different types of haul routes, therefore descriptions have been provided below to assist you. The differences between haul routes that would be primarily used by HS2 on-site construction traffic using road-going

vehicles, and the corridors for Articulated Dump Trucks (ADTs) carrying bulk earthworks materials are as follows:

- site traffic will run on haul routes comprising a mix of surfaced and unsurfaced temporary roadways. These will primarily be for road-vehicles that are licensed for operation on public roads. The indicative alignments are as shown in yellow on the plans (Yarnfield Lane Phase 2 Road Layout Sheets 1 and 2 (Drawing Nos: 2PT02-ARP-PT-DSK-000-220552 and 220553 Revs P00.1) dated 8/1/2020) provided at the meeting on 16 January 2020. The haul routes will be used by staff vehicles, deliveries, concrete wagons, cranes, etc; and
- ADTs will operate within the footprint of the works or “trace”. In several areas, due to spatial, physical, or construction constraints, it may be necessary for the ADTs carrying the site-hauled bulk earthworks materials to share the internal site haul routes with road-going vehicles.

Where surfaced haul routes are provided, these would typically consist of a geotextile, overlaid by unbound material of a thickness to suit the ground conditions and expected use. The lower layer may have a higher quality unbound material over it. Where conditions or receptors require, these could be surfaced with a bound material. It is expected that longitudinal drainage would be provided, to prevent water running onto/off the route. Additionally, excavated materials may be used to form a longitudinal bund to provide both water run-off/errant vehicle protection.

At this stage in the preliminary design process, spatial allowances have been made for the haul routes and the associated earthworks movements in order to confirm land-take requirements; ensure the constructability of the scheme as proposed; and assess the environmental effects of the scheme. The earthworks movements have been predominantly identified along the trace, but also, where practicable adjacent to the trace in the later stages of construction once the preparatory civil engineering works for the rail systems have commenced at the latter stages of the civil engineering phase. It has been assumed within the preliminary design that segregation of earthworks plant and other operations would be maintained for construction site safety purposes, where reasonably practical.

The detailed design of site haul routes would be the responsibility of the appointed contractor as part of their chosen method of working, so that they can best maintain a safe and efficient construction site whilst also complying with health, safety and environmental constraints e.g. dust, noise, avoidance of mud on roads. There will be several variables that will make the design of these routes location specific, including anticipated usage, the underlying ground and its strength, obstacles being crossed and local receptors. Additional measures would be provided in the approach to crossings of public rights of way and plant crossings of local highways. Factors such as weather may also result in the designs being amended as works progress.

The construction design prepared for the Additional Provision (AP2) scheme is a preliminary design sufficient to establish the potential spatial requirements and powers for the Proposed Scheme. We have not produced a detailed cross section of a ‘typical’ site haul route for construction activities within the IMB-R site, for the reasons stated above.

Ground conditions at the Stone Railhead/IMB-R site

With reference to paragraph 4.7.2 of the 11 March response document, and based on the data already available, it has been assumed that the combined footprint (i.e. extents in plan) for the locations requiring ground treatment will be of a similar magnitude to those allowed for in the AP2 revised design. This assumption will be reassessed when further results from the HS2 Preliminary Ground

Investigation (PGI) are available. With regard to the concern raised in your letter of 13 March 2020, in respect of our ability to construct the Stone IMB-R, you will wish to note for clarity that the powers conferred by the Phase 2a Bill, as referred to in paragraph 4.2.9 of the 11 March 2020 response document, include the whole of the railway including the Stone Railhead/IMB-R.

In paragraph 5.6.2 to 5.6.3 of the 'Infrastructure Maintenance Base – Rail: Ground conditions and basis of earthworks volumes in AP2 Design Report' sent to you in December 2019 (the December 2019 report), it was stated that a draft factual report on the PGI would be produced by the Ground Investigation (GI) contractor in March/April 2020. The December 2019 report explained that the GI contractor's final factual ground investigation report was expected to be completed in the spring of 2020 (paragraph 5.6.3). At the time of writing, it is now expected that there may be some delay to the completion of the final report due to the COVID-19 related restrictions.

As previously stated in paragraph 5.6.3 of the December 2019 report, the final factual GI report will be reviewed by us and our specialist geotechnical consultant to confirm the:

- ground conditions at the IMB-R assessed from the desk study information;
- likely volumes of material requiring ground treatment; and
- most appropriate method(s) to achieve the geotechnical requirements beneath the Stone IMB-R and associated embankments.

Assumed shortfall of fill material

As noted in paragraph 4.2.8 of the December 2019 report, the AP2 design assumes that the embankments for the Stone IMB-R and the Stone Headshunt, together with their associated highways and access tracks, would be built out of normal quality¹ cohesive material.

The figure of approximately 0.9 million m³ that we previously quoted comprises both granular and cohesive material². As previously stated, this material will either be sourced from elsewhere on the Phase 2a site or from external sources. This figure is for the specific design elements cited in Table 1 of the December 2019 report and these are as follows:

- Stone Headshunt;
- Yarnfield South Embankment;
- Yarnfield North Embankment; and
- Stone IMB-R.

¹ As defined in paragraphs 4.2.8, 4.3.1 and 5.3.1 of the December 2019 Report

² The figure of 0.9 million m³ given in our last response was rounded up from the figure of 865,000 m³ as shown in Table 1.

Table 1: Sources of material

Reference in December 2019 report	Item Description	Material type	Volume (m ³)
Table 1, row 2 (Stone Headshunt, Yarnfield South Embankment, Yarnfield North Embankment and Stone IMB-R)	Ground treatment and railway embankment starter layers	granular	273,000
Table 1, row 3 (Stone Headshunt, Yarnfield South Embankment and Yarnfield North Embankment)	Bulk embankment material	granular	348,000
Table 1, row 3 & paragraph 4.3.1, 3 rd bullet (Stone IMB-R)	Bulk embankment material ³	cohesive	75,000
Table 1, last row (Stone Headshunt, Yarnfield South Embankment, Yarnfield North Embankment and Stone IMB-R)	Granular railway trackbed layer material	granular	169,000
Total			865,000

Paragraph 3.1.1 of the Stone Rail Crisis Group Evidence Document shared with us in January 2020 covered “the Stone Railhead / IMB-R construction site”. If additional other design elements supplied from the Yarnfield North Embankment Transfer Node, or within the wider area of the Stone Headshunt and IMB-R are also included, then the shortfall would increase by 160,000 m³ to 1,025,000 m³, which is consistent with the Petitioner’s estimate of “over 1 million m³”. This comprises both granular and cohesive material. These additional design elements are as follows:

- Eccleshall Road;
- Norton Bridge to Stone Railway Viaduct;
- Yarnfield Lane Underbridges and Overbridge;
- Meaford Cutting; and
- Meaford South Embankment.

As stated previously, the material shortfall we have identified will either be sourced from elsewhere on the Phase 2a site or from external sources.

³ This will be sourced from Yarlet North Cutting and moved to IMB-R by site haul.

With reference to your request for information on how we intend to import the shortfall material, we have provided answers to this question in two previous responses as follows:

- The locations from which the fill to construct the Stone Railhead/IMB-R will be sourced are provided in sections 4.3, 4.4 and 4.5 of the December 2019 report; and
- Information which summarises the AP2 mass haul movement plan for the Stone IMB-R is provided in sections 4.3, 4.4, 4.5, 5.3 and 5.4 of the December 2019 report and section 2.5 of the response document of 11 March 2020.

Traffic

Your letter of 13 March 2020 repeats your request for a "Transport Logistics Profile" including detailed monthly breakdowns of HGV movements associated with the construction works at the IMB-R location. You have previously been informed of the predictions for HS2 HGV traffic movements during the construction works. Please refer to section 2.5 in our response to the Stone Railhead Crisis Group summary of excavated materials evidence sent to you on 11 March 2020.

The AP2 construction traffic histograms published as House of Commons Select Committee exhibits⁴ in 2019 illustrated predicted HS2 HGV traffic movements to and from the Yarnfield North Embankment Transfer Node, together with the two satellite compounds.

There would be the following access routes to the IMB-R location from the local road network/ strategic road network:

1. Yarnfield Lane east from the A34; and
2. Yarnfield Lane west from the M6 motorway.

The histogram provided in Appendix 2 of this letter illustrates the volume of HS2 HGV traffic using Yarnfield Lane on the eastern section of this road to access the A34. The histogram provided in Appendix 3 of this letter illustrates the volume of HS2 HGV traffic using the Yarnfield Lane M6 overbridge to access works to the west of the M6, and to access and egress the proposed M6 northbound slip roads.

Use of existing Yarnfield Lane M6 overbridge for construction traffic and structural surveys

The existing Yarnfield Lane M6 overbridge will be used in construction phase 1 to provide access to construction activities situated to the west of the M6 motorway. During construction phase 1 there will be no direct HGV access available from the M6 and therefore construction vehicles will need to access and egress via Yarnfield Lane and the existing Yarnfield Lane M6 overbridge, thereby requiring the existing bridge to be used in both directions. These movements will include road legal HGVs which will require access to the west of the existing Yarnfield Lane M6 overbridge in advance of the access from the M6 being available. The use of the existing Yarnfield Lane M6 overbridge will be limited in this phase to relatively low levels of construction traffic use as shown in the House of Commons Select Committee AP2 construction traffic exhibits⁵.

⁴ https://www.parliament.uk/documents/commons-committees/hs2-phase-2a/written-evidence/AP2-00047_Stone%20Town%20Council_Promoter.pdf

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/796124/section_p_part_3.pdf

In phase 2 of the construction sequencing of the Phase 2a works in this area, there will be no public use of the existing Yarnfield Lane M6 overbridge, however the construction-related traffic can continue to use the existing overbridge in both directions. The flow of traffic movements across the bridge can be controlled and managed for safety reasons should this be considered necessary by the appointed contractor.

The response document of 11 March 2020 addressed the question raised in respect of future structural surveys of the existing Yarnfield Lane M6 overbridge in paragraphs 6.1.8, 6.1.9 and 6.2.1. It is not considered necessary or appropriate to undertake a structural survey of the existing overbridge at this stage in the development of the Phase 2a scheme.

Junction visibility

The existing Yarnfield Lane in the vicinity of the proposed works is a narrow rural unclassified road with a sinuous alignment. The selection of 85kph (52.8mph) as the design speed for the AP2 preliminary design of Yarnfield Lane was deemed appropriate based on surveyed 85th percentile traffic speeds in the vicinity of the proposed works.

For the construction phase, temporary traffic management measures and plans would be developed in consultation with the relevant highway authorities during the detailed design process. Measures to ensure the safe operation of traffic may include temporary speed limit reductions at this location as well as appropriate signage.

An 85kph design speed would typically correspond with a 50mph speed limit. A permanent reduction in the speed limit at this location from 60mph to 50mph would therefore need to be considered at the detailed design stage. Any speed limit reduction would be subject to the necessary approval of the local highway authority. Appropriate signage and road markings warning drivers of the presence of a junction at this location will also need to be considered as part of detailed design.

I trust the further information set out in this letter will provide you with the clarification and additional information you require.

Should you need any further assistance please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

Yours sincerely



Simon Knight

Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

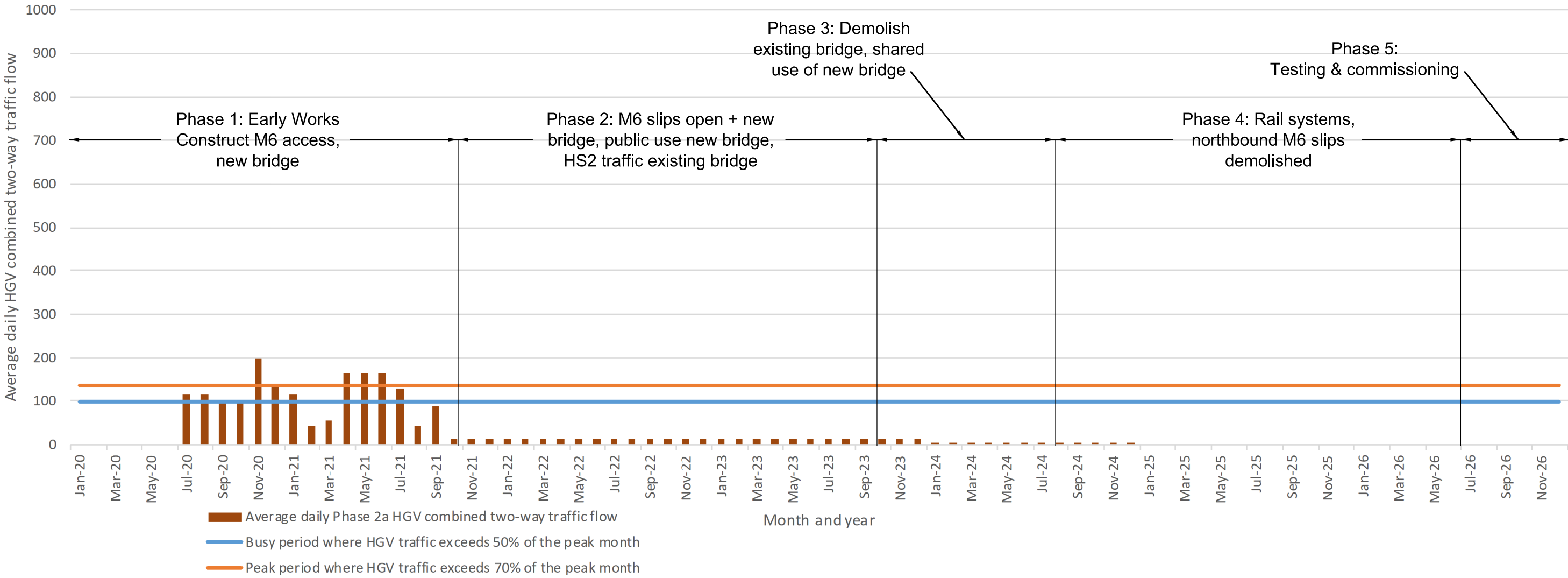
Appendix 1 - Letter from Yarnfield and Cold Meece Parish Council dated 13 March 2020

Appendix 2 - Yarnfield Lane construction traffic histogram

Appendix 3 - Yarnfield Lane M6 overbridge construction traffic histogram

Appendix 2 - Yarnfield Lane construction traffic histogram

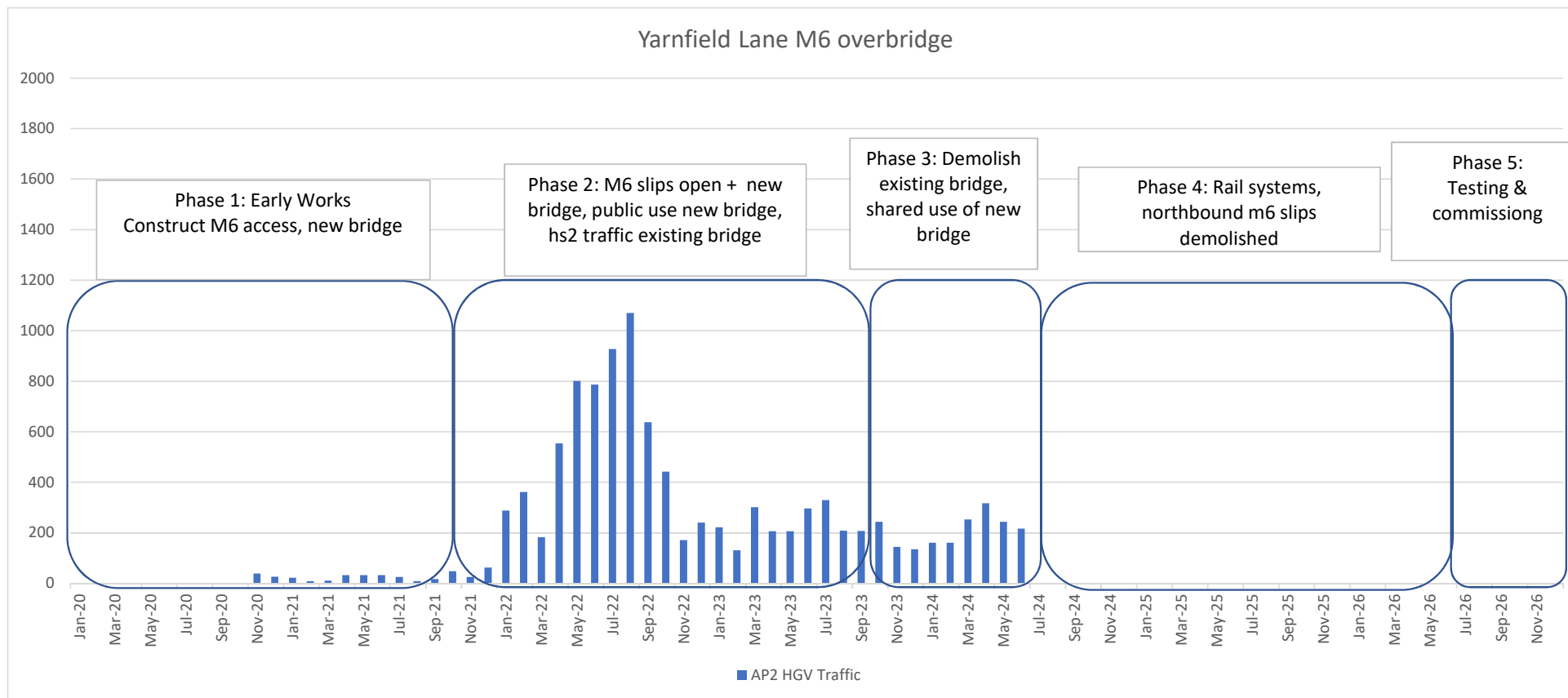
Stone/IMB-R
The Proposed Scheme - Histogram 17
Yarnfield Lane (between A34 The Fillybrooks and HS2 route)
Reference K+L on Stone/IMB-R construction traffic flow map



THE PROPOSED SCHEME

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									Date 27/06/2019	Scale AS SHOWN	Size A3				
									Drawing No. 2PT02-ARP-PT-DSK-000-200121			Rev. P00.1			
3 (169)	Description	Drawn	Checked	Con App	HS2 App	Scale with caution as distortion can occur.									

Appendix 3 - Yarnfield Lane M6 overbridge construction traffic histogram



Yarnfield & Cold Meece Parish Council

Yarnfield Village Hall
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ST15 0NJ
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7 May 2020

Mr S Knight
Director, Hybrid Bill Delivery
Albany House
96-98 Petty France
London
SW1H 9EA

Dear Mr Knight

HS2 Phase 2a House of Lords Select Committee: Petition 023

Thank you for your letter dated 17 April 2020 and accompanying histograms and apologies for not having replied sooner. Our technical advisors have once again been through the contents of your correspondence and help me put together the following response.

Section 2.3: Supply of fill from borrow pits to the Stone Railhead/IMB-R

We note your change of position on the matter of supplying high quality granular fill from BP4 at Blithbury to the Stone Railhead/IMB-R site.

Section 3.1: Network of haul roads

Although I can assure you that we have no misunderstanding about the different types of haul roads that are proposed, we thank you for your clarification over their intended usage of the haul roads.

We also note your comment that you have not produced a detailed cross-section of a typical unsurfaced haul road. However, members of our technical team believe that your colleague (Nick Hilton) used one in his presentation to the Institute of Mechanical Engineers at Staffordshire University on 11th March 2020, even though he then refused to dwell on the relevant slide or answer any questions on the subject when asked by a member of the SRCG technical team.

Since, HS2 Ltd's proposals for the constructing the Stone Railhead and the rest of the Phase 2a railway are reliant on its contractors being able to build a robust network of

haul roads that are wide and strong enough to be safely used by articulated dump trucks (ADTs) and other site vehicles, it is not an unreasonable request to have HS2 Ltd provide evidence relating to their construction, as well as the quantities and source of the material that would be used for their construction.

We therefore once again request that this information be provided at the earliest opportunity.

Section 4: Ground conditions at the Stone Railhead/IMB-R site

We note that HS2 Ltd is continuing to evade the crucial question regarding the results of the site-specific preliminary ground investigation. As HS2 Ltd has acknowledged, the delivery date for this report was March/April 2020, but it is now using the Covid-19 outbreak as a reason for further delay. However, given that the report will be based on ground investigation results obtained last year, we can see no justifiable reason why the draft report should not be available by now, especially since it is widely reported that staff within HS2 Ltd and its contractors have been working remotely or from home during the lockdown.

Since we are now in May and this report still appears to be being withheld from public scrutiny, we can only conclude that it contains information that HS2 Ltd does not want to be known because it will further undermine the company's already extremely weak justification for building a Railhead/IMB-R at Stone.

We therefore again request that this report is made available to us immediately so that it can be used as evidence for the forthcoming House of Lords Select Committee proceedings. In the meantime, we will be raising this matter with our MP, Sir Bill Cash so he can let ministers know about HS2 Ltd's ongoing refusal to release vital engineering information that will impact on the feasibility and cost of its proposals.

Section 5.1: Shortfall of fill

We note that HS2 Ltd is now admitting to an even greater shortfall of fill material and that the SRCG was correct in its estimations that the shortfall exceeds 1 million m³. However, we believe that HS2 Ltd's latest shortfall figure of 1,025,000 m³ is still too low and that it should revisit its calculations again.

Traffic

Over the last 3 years HS2 Ltd has repeatedly changed its position regarding the number of HGV movements that it will impose on Yarnfield Lane. In so doing it has produced several inaccurate histograms that have clearly under-reported or misrepresented the impacts of its traffic on this road.

The only way to check the accuracy of HS2 Ltd's claims regarding HGV movements is for it to provide a Transport Logistics Profile that includes details of how the numbers of all types of HGV movements (and not tipper lorries carrying earthworks materials) have been calculated. We therefore again request that the company ceases prevaricating on this matter and issues the TLP relating to the Yarnfield North Embankment Transfer Node and nearby road satellite compounds immediately.

With regard to the histograms enclosed in that letter, we note that the one relating to HS2 Ltd's claims about HGV traffic using the eastern section of the lane (Appendix 2) was presented as Histogram 17 in Section A of the teach-in submissions to the House of Lords Phase 2a Select Committee on 17 March 2020. However, the one showing more realistic, albeit still somewhat underestimated HGV movements on the M6 overbridge, was not presented to the Lords Select Committee.

Use of existing M6 overbridge for construction traffic and structural surveys

Since we last communicated with you in writing, our colleagues in the SRCG have estimated the number of HGV and ADT movements that HS2 Ltd is proposing would use the existing Yarnfield Lane overbridge to access the Yarnfield North Embankment Transfer Node.

Given that the numbers of these movements run to many 10s of thousands, it is very clear that unless this bridge can take the proposed pounding it will receive, HS2 Ltd's proposals for constructing the Stone Railhead or the adjacent railway will be in total disarray.

The structural integrity of the Yarnfield Lane M6 overbridge is therefore vital to HS2 Ltd's proposals and it is disingenuous for HS2 Ltd to continue to claim that *"it is not considered necessary or appropriate to undertake a structural survey at this stage in the development of the Phase 2a scheme"*.

We therefore urge HS2 Ltd to reconsider its position on this matter and not only undertake such a structural survey but publish the results of the survey well in advance of any resumption of House of Lords Select Committee proceedings.

Junction visibility

We note that in its response on junction visibility HS2 Ltd is belatedly acknowledging that the existing Yarnfield Lane is a narrow rural unclassified road with a sinuous alignment. This is why it is unsuitable for HGV use and is subject to a 7.5 tonne weight limit, except for access purposes.

Furthermore, the point in question here is that HS2 Ltd's proposed new permanent Stone Railhead/IMB-R junction onto the lane is not located on the existing Yarnfield Lane, but on a sloping straight section of the realigned lane where the geometry and gradient is likely to encourage some road users to drive at fast speeds regardless of whether the highway authority agrees to lower the existing speed limit.

With regard to your reference to the apparently surveyed 85th percentile traffic speeds in the vicinity of the works, not only do these relate to the existing lane, but HS2 Ltd has not supplied us with details of the location and type of survey, nor the results. We therefore request that this information is provided to us immediately for review.

We would also point out that the survey would need to record existing traffic in a free-flow situation and relate to a representatively straight section of Yarnfield Lane regardless of its proximity to the site of the Stone Railhead. If the survey previously

carried out does not meet such criteria, then a new survey should be arranged at the earliest opportunity.

HS2 Ltd should also note that Yarnfield Lane is currently subject to the national speed limit for a road of its type, i.e. 60mph between the A34 and the village of Yarnfield. Any new junctions should therefore be designed in accordance with the relevant design criteria, i.e. 100kph and not 85kph. It is therefore unacceptable for HS2 Ltd to lower the design requirements simply because it cannot achieve the necessary standard in its preliminary design.

As you can see from the contents of this letter, there are many outstanding points that still urgently need resolving and I therefore look forward to receiving your response to the points raised above in the very near future.

Yours sincerely

A handwritten signature in black ink, appearing to read 'J Fraser', written in a cursive style.

John Fraser

Parish Clerk

Yarnfield & Cold Meece Parish Council

Mr John Fraser
5 De Havilland Drive
Yarnfield
Stone
ST15 0SX

16 June 2020

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

Thank you for your letter of 7 May 2020 in response to mine of 17 April 2020. Please see below our responses to the points raised in your letter.

Detailed cross-section of a typical unsurfaced haul road

Please find appended to this letter as Appendix A the slide used in a presentation to the Institute of Mechanical Engineers at Staffordshire University on 11 March that you referred to in your letter. The purpose of this slide was to show in general terms how any haul road could be delivered and how this has been done on previous projects. This was not intended to show an illustrative design for a specific HS2 haul road within the Stone IMB-R site.

Methods to form typical surfaced haul roads were set out in my letter of 17 April 2020. A copy of that letter is appended as Appendix B. My letter also explained that it would be the responsibility of the appointed contractor to design haul roads within the powers of the Act and in accordance with the controls set out in the Environmental Minimum Requirements (EMRs)¹. Detailed designs for the site haul roads have therefore yet to be prepared.

Ground conditions at the Stone Railhead/IMB-R site

In our previous letters to you we have explained that our ground investigation contractor's final factual reports for the preliminary ground investigations carried out at the proposed location of the IMB-R to date were expected to be completed in the spring of 2020. I can confirm that the ground investigation contractor's findings from the Work Package 3 ground investigations have been received by us and are currently being reviewed by us and our specialist geotechnical consultants. We expect to be able to share the relevant factual information with you shortly, with a covering letter to explain how we will

¹ HS2 Phase 2a Information Paper E1: Control of Environmental Impacts

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/628447/E1_Control_of_Environmental_Impacts_v1.0.pdf

take into account the findings of the ground investigations in the earthworks design for the Stone IMB-R.

Shortfall of fill

It appears from your letter of 7 May 2020 that you may have misunderstood the figures for the shortfall of fill material included in my letter of 17 April 2020. Table 1 in my letter of 17 April 2020, a copy of which is provided in Appendix B, presented a breakdown of the specific IMB-R design elements for which material would be sourced from elsewhere on the Phase 2a site or from external sources. The estimated figure for the Phase 2a Additional Provision 2 (AP2) scheme is 865,000 m³ which when rounded up to one decimal point equates to approximately 0.9 million m³. We then went on to explain that "If additional other design elements supplied from the Yarnfield North Embankment Transfer Node, or within the wider area of the Stone Headshunt and IMB-R are also included, then the shortfall would increase by 160,000 m³ to 1,025,000 m³, which is consistent with the Petitioners' estimate of "over 1 million m³".

We reiterate what we explained in my letter of 17 April 2020, namely that we estimate the shortfall of fill material at the IMB-R site to be 865,000 m³. The figure of 1,025,000m³ provided in my letter is simply the sum of the 160,000 m³ increase in shortfall of materials that includes the additional design elements, and the 865,000 m³ estimated shortfall of fill material associated with the Stone Headshunt, the Yarnfield South and North Embankments and the IMB-R as set out in Table 1 of my letter of 17 April 2020.

Furthermore, we do not agree with the assertion made in your letter of 7 May 2020 that the figure of 1,025,000 m³ for shortfall of fill material is "too low". We have confidence in the figures reported and therefore do not see a need to revise them.

Traffic

We reject the assertion in your letter of 7 May 2020 that "HS2 Ltd has repeatedly changed its position regarding the number of HGV movements that it will impose on Yarnfield Lane."

We have taken steps during the passage of the Phase 2a Bill to reduce the impact of construction traffic on Yarnfield Lane, and have given an assurance to Staffordshire County Council that we will "use reasonable endeavours to maximise the use of the M6 Slip Roads by HS2 Large Goods Vehicle construction traffic, so far as reasonably practicable, for access to and egress from the Stone railhead main compound so as to reduce so far as reasonably practicable the use of Yarnfield Lane by HS2 Large Goods Vehicle construction traffic accessing the Stone railhead main compound."

You will also be aware that the changes to the Phase 2a scheme introduced as part of AP2 included permanent highway improvements involving signalisation of the junction of the A34 The Fillybrooks with Yarnfield Lane. This was requested by Staffordshire County Council as the relevant highway authority to address concerns of highway safety.

Furthermore, at AP2, changes were introduced to the Yarnfield Lane M6 overbridge and construction sequencing to allow the existing Yarnfield Lane M6 overbridge to be retained for construction traffic. Once the new bridge is open to traffic this would enable the segregation of public traffic on the new Yarnfield Lane M6 overbridge from HS2 construction traffic on the existing M6 overbridge.

As part of the work done for the AP2 changes there was a route-wide update to the Phase 2a scheme traffic assessment. To assist the House of Commons Select Committee consider petitions against AP2, the traffic maps, tables and histograms were revised to reflect the AP2 changes.

In my letter of 17 April 2020, we drew to your attention our response to the "Stone Railhead Crisis Group (SRCG) summary of excavated materials evidence" sent to you on 11 March 2020 to address your request for a "Transport Logistics Profile". Sections 2.5.1 to 2.5.4 of this response document provided answers to questions raised in the SRCG evidence document.

For the purposes of the Phase 2a Bill there is a requirement to provide an Environmental Statement that includes a published Transport Assessment (TA) with associated technical appendices. A Transport Assessment was published as part of the Phase 2a Bill deposited in July 2017 and then revised on a route-wide basis for the deposit of AP2 in February 2019. What has been produced in order to assess the Phase 2a scheme and support the Bill is sufficient to meet Environmental Impact Assessment (EIA) requirements. Further transport and logistics information may be produced by the nominated undertaker during the detailed design stage, subject to a request by the relevant highway authority.

Our response to the "Stone Railhead Crisis Group (SRCG) summary of excavated materials evidence" also explained in section 2.3 that the control of construction impacts would be managed through compliance with the EMRs.

With reference to your comments about the traffic information presented to the House of Lords Select Committee during the session on 17 March 2020, this was to illustrate the type of exhibits that Select Committee members can expect to see when matters related to traffic effects are being discussed, for example traffic routes and vehicle maps, histograms and daily weekday construction flows. The reference to a histogram was solely for the purpose of explaining a typical histogram, and not intended to present detailed information in respect of the IMB-R.

All relevant histograms will be presented to the House of Lords Select Committee as part of the evidence for individual petition hearings.

M6 overbridge

We have been engaging with Highways England over a long period of time in relation to the construction of temporary slip roads to and from the M6 motorway. There are no concerns about the structural integrity of the existing Yarnfield Lane M6 overbridge in respect of the HS2 construction traffic that would be using this structure. Highways England had informed us that this bridge is designed to accommodate road going vehicles up to 40 tonnes. It has since been confirmed to us by Highways England that this bridge can accommodate vehicles up to 44 tonnes, without any prior approval, and vehicles up to 140 tonnes with prior consent of the highway authority.

Whilst the overbridge remains part of the public highway it would form part of a construction vehicle route that would need to be approved by the local highway authority under Schedule 17 of the Bill.

Furthermore, Staffordshire County Council have also confirmed that the existing 7.5T weight limit on Yarnfield Lane was imposed on environmental grounds (and not for structural reasons) to protect Yarnfield village from traffic exiting the A34 at Fillybrooks and travelling through Yarnfield to access the Swynnerton camp industrial site.

Finally, I would like to draw your attention to sections 6.1 to 6.3 of our response to the "Stone Railhead Crisis Group (SRCG) summary of excavated materials evidence". These provided considerable detail on

the potential use of the existing Yarnfield Lane for HS2 construction traffic by splitting this into different sections and the different phases of construction.

Junction visibility

Traffic speed surveys were carried out prior to deposit of the Phase 2a Bill to inform the design of the scheme. Please find appended to this letter as Appendix C a map showing the locations at which traffic speed surveys were carried out, and an accompanying table showing the duration and findings of these surveys.

Additionally, the design of this access and its location would be subject to approval by the local highway authority under Schedule 4 of the Bill. As part of this, highway safety would be a key consideration for the local highway authority.

In reference to your query relating to the future speed limit for Yarnfield Lane, this would be something that would need to be approved by Staffordshire County Council as the local highway authority in the exercise of their powers under the Road Traffic Regulation Act 1984. While Yarnfield Lane currently has a national speed limit, this is not intended to be a target for motorists. In practice, it is the character and alignment of such roads including the prevailing traffic and weather conditions that influence the speed of vehicles, which is why the realigned road has been designed to take into account observed traffic speeds including the forecast increase in traffic. The preliminary design for the realignment of Yarnfield lane would be reviewed further with the highway authority as part of the detailed design process.

We do not accept the assertion in your letter that "HS2 Ltd is belatedly acknowledging that the existing Yarnfield Lane is a narrow rural unclassified road with a sinuous alignment." As part of the AP2 and Supplementary Environmental Statement 2 (SES2) revised scheme we have incorporated a number of design changes that will reduce HS2 construction traffic on the local highway and improve highway safety. We will continue to work with the highway authority and other stakeholders to minimise impacts and risk to other road users.

I hope the responses set out in this letter provide a resolution to the points you have raised. If you require any further assistance please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

Yours sincerely



Simon Knight

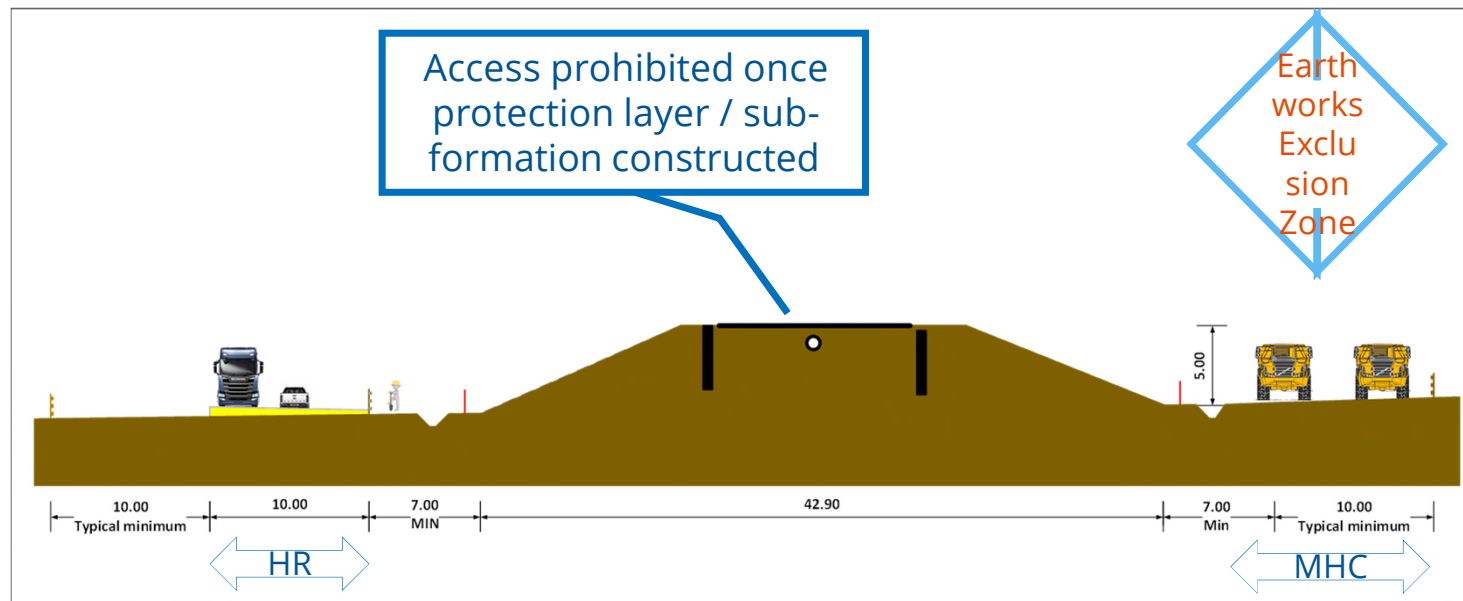
Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

Appendix A – Typical haul road slide

Appendix B - HS2 letter to Yarnfield Parish Council, 17 April 2020

Appendix C – Yarnfield Lane Traffic Survey

Appendix A – Typical haul road slide



Appendix C - Yarnfield Lane Traffic Surveys

Yarnfield Lane traffic survey location map



Baseline traffic surveys on Yarnfield Lane

Transport Survey Data

Survey type	ATC	ATC	ATC
Survey period / hours	30/11-13/12/2015	30/11-13/12/2015	6/6-19/6/2016
Location ref	TSL29	TSL107	TSJ5
Average traffic speed	44.8 mph	30.7 mph	47.8 mph
85 th percentile traffic speed	51.7 mph	35.3 mph	55.3 mph

22 July 2020

Mr John Fraser
5 De Havilland Drive
Yarnfield
Stone
ST15 0SX

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

In my letter of 16 June 2020 I informed you that we would soon share the factual information relevant to the Stone Railhead/IMB-R site from the ground investigation contractor's findings from the Work Package 3 (WP3) ground investigations.

We are now able to share with you three WP3 preliminary ground investigation (PGI) factual reports which contain information that is relevant to Stone IMB-R and Stone Headshunt. These are as follows:

- HS2 Phase 2A Sitewide (Major Assets) Preliminary Ground Investigation Section 2, Factual Report on Ground Investigation ("HS2 PGI Report No.148");
- HS2 Phase 2A Sitewide (Major Assets) Preliminary Ground Investigation Sections 3 and 4 of 4, Factual Report on Ground Investigation ("HS2 PGI Report No.149"); and
- HS2 Phase 2A Sitewide (Major Assets) Preliminary Ground Investigation Sections 3 and 4 of 4, Supplementary Report, Factual Report on Ground Investigation ("HS2 PGI Report No. 160").

Due to the very large sizes of these files we will share these reports and relevant appendices through our secure file transfer site. You will be sent a separate email with instructions for accessing these files.

Please also find appended to this letter a technical note to accompany the reports.

If you require any assistance please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

Yours sincerely



Simon Knight
Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

HS2

Stone IMB-R – Technical note to accompany issue of factual data from the WP3 Preliminary Ground Investigation

July 2020

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Appendix 1 - Summary of PGI reports for Stone IMB-R and Stone Headshunt provided

1 Introduction

- 1.1.1 The purpose of this note is to provide information on the following topics:
- the methodology for identifying the relevant parts of the HS2 site-specific Work Package 3 (WP3) Preliminary Ground Investigation (PGI) reports;
 - the findings of the WP3 PGI at the Stone Infrastructure Maintenance Base-Rail (IMB-R) and Headshunt, and the implications for the earthworks design; and
 - the procedure for the analysis and assessment of the factual data from the PGI at Stone IMB-R and Stone Headshunt.
- 1.1.2 This note will be issued to Yarnfield and Cold Meece Parish Council, Stone Town Council and Chebsey Parish Council in respect of their Petition to the Bill in the House of Lords, together with the relevant factual information from the WP3 PGI at Stone IMB-R and Stone Headshunt.

2 The methodology for identifying the relevant parts of WP3 PGI factual reports

- 2.1.1 Three WP3 PGI factual reports contain information that is relevant to Stone IMB-R and Stone Headshunt. These are as follows:
- SOCOTEC (2020), 2G003 HS2 Phase 2A Sitewide (Major Assets) Preliminary Ground Investigation Section 2, Factual Report on Ground Investigation, Report Eg001-19/2/1 Rev 04 (2nd July) ("HS2 PGI Report No. 148");
 - STRUCTURAL SOILS LTD (2020), 2G003 HS2 Phase 2A Sitewide (Major Assets) Preliminary Ground Investigation Sections 3 and 4 of 4, Factual Report on Ground Investigation, Report 734142-1 Rev 04 (19th June) ("HS2 PGI Report No. 149"); and
 - STRUCTURAL SOILS LTD (2020), 2G003 HS2 Phase 2A Sitewide (Major Assets) Preliminary Ground Investigation Sections 3 and 4 of 4, Supplementary Report, Factual Report on Ground Investigation, Report 734812-1 Rev 03 (19th June) ("HS2 PGI Report No. 160").
- 2.1.2 The factual PGI information that we have provided is summarised for each report in Appendix 1 of this note. The procedure described in paragraphs 2.1.3 to 2.1.7 below has been adopted so that only non-confidential factual PGI information relevant to Stone IMB-R / Stone Headshunt has been included.
- 2.1.3 In the PGI factual report text, information which is not relevant to Stone IMB-R or Stone Headshunt has been highlighted but not removed. This includes:
- appendices which are not relevant;
 - irrelevant GI locations, appendices and descriptions of irrelevant field tests or monitoring mentioned in the report sections on fieldwork; and
 - irrelevant types of laboratory tests in the report section on laboratory testing.

- 2.1.4 Elsewhere in the reports, any exploratory holes irrelevant to the Stone IMB-R or Stone Headshunt on summary pages have been highlighted but not removed.
- 2.1.5 Otherwise, only factual information which is relevant to Stone IMB-R or Stone Headshunt has been provided.
- 2.1.6 Sensitive information such as people's names and signatures, and information confidential to landowners such as underground utilities survey reports and contamination / geoenvironmental laboratory test results have either been redacted or not provided. Digital data, graphical data and calibration certificates have also not been provided.
- 2.1.7 The information supplied to HS2 remains subject to further clarifications from the PGI contractor to address technical queries from HS2 as required.

3 Findings of WP3 PGI at Stone IMB-R / Stone Headshunt and the implications for the earthworks design

3.1 Geotechnical risk management process

- 3.1.1 Ground and groundwater conditions are often variable and present risks which need to be managed proactively in any construction project. A major part of the geotechnical design process is to identify those risks and then to manage and, if possible, to minimise or eliminate them. A risk register is used to manage this process. It applies to all the stages of a project; through all the design phases, on to construction, and thereafter to the operation and maintenance phases. It is subject to progressive adjustment and amendment through all the project phases.
- 3.1.2 The geotechnical risk management approach adopted on this project is described in our previous report titled 'HS2 Response to SRCG Evidence document' (dated 24th February 2020). This approach has been standard industry practice for UK infrastructure projects for over 20 years.
- 3.1.3 During the development of the HS2 Phase 2a AP2 design, the ground conditions at the Stone IMB-R were assessed based on the desk study data, including historical Ground Investigation (GI) data, available at that time. The AP2 design included what was considered to be a reasonable estimate of the volume of ground treatment that would be required. It was acknowledged that there were uncertainties relating to the reliability of publicly available historical GI data on which the initial assessment of ground conditions at the Stone IMB-R was based. For example, the ground and groundwater conditions at the Stone IMB-R may be different to those assessed from the desk study data. Mitigation measures were identified for each of these risks, starting with site-specific ground investigation (see below in 3.2.1).

- 3.1.4 There also remains the risk of unforeseen ground conditions at the site of the Stone IMB-R. This risk was mitigated as far as reasonably practicable in the AP2 design by completing a thorough desk study, but it can never be eliminated, especially where ground has been subjected to human disturbance.
- 3.1.5 As the design has been progressed, further work has been undertaken to examine and interpret the historical GI data (some of which is confidential) and to refine the extent of the ground treatment areas. This work also revealed further inconsistencies in the historical GI data and the geotechnical risks were refined accordingly.

3.2 HS2 site-specific Preliminary Ground Investigation

- 3.2.1 HS2 Ltd has commissioned a programme of Preliminary Ground Investigation (PGI) to assess how many of the geotechnical risks are likely to materialise. Some of this PGI has been carried out since April 2019. Permission was not granted to enter land at some locations and poor weather also delayed the progress of some of the fieldwork. The ground investigation programme will continue as the detailed design of the project progresses (see 3.6 and 3.7 below).

3.3 Implications of WP3 PGI findings in regard to geotechnical risks at and near Stone IMB-R

- 3.3.1 Consideration of the draft PGI results indicate that some of the risks previously identified have materialised, as described below:
- in the Filly Brook valley near Pool House Farm, the depth of soft ground which will require treatment will be greater than expected from the desk study information (see Section 3.4 below); however, the footprint area of the soft ground is similar to that expected from the desk study data;
 - the PGI has shown that the glacial meltwater channel in the Filly Brook valley near Pool House Farm is deeper than expected from the desk study data, but most of the infill material will not require treatment;
 - artesian groundwater conditions were encountered during the PGI and subsequent groundwater monitoring in the Filly Brook valley near Pool House Farm. These groundwater conditions will be addressed in the proposed ground treatment method (see 3.4.3 below); and
 - the depth of soft ground near the northern end of the Yarnfield Lane bridge over the M6 motorway is greater than was expected from historical boreholes (2578 and 2579); the draft PGI results give more confidence that the historical GI data which showed significant depths of soft ground here is correct. Therefore, a small additional area of ground treatment will be required at this location (see Section 3.4 below).

3.4 Implications of WP3 PGI findings for ground treatment design at and near Stone IMB-R

- 3.4.1 The AP2 earthworks design assumes that ground treatment is required at several locations at and near the Stone IMB-R. The purpose of most of the ground treatment is to strengthen the ground so that the embankments built on it have adequate settlement performance. However, in a few locations which are on the HS2 mainline near the Stone IMB-R, the purpose of the ground treatment is to address the dynamic effects of the high-speed trains as they pass between a cutting and an embankment. The ground treatment can either be achieved by excavating the soft ground and replacing it with material with better stiffness characteristics, or by using an in-situ method to improve its strength and stiffness.
- 3.4.2 The ground treatment method adopted in the AP2 design at the Stone IMB-R was in the form of excavation of soft ground and replacement with granular fill. This would have been practicable for the two metres average depth of treatment previously assumed and is still considered to be the most appropriate method for the areas of ground treatment away from the part of the Filly Brook valley near Pool House Farm, where the soft ground deposits are up to an average of two metres thick.
- 3.4.3 Taking into account the interpretation of the draft PGI information, i.e. the greater thickness of soft ground identified in the Filly Brook valley near Pool House Farm and the artesian groundwater conditions observed during initial monitoring of groundwater instrumentation, it is considered that an in-situ ground improvement method would be a more appropriate ground treatment method in this area of the Stone IMB-R than an excavate and replace method as originally proposed in the AP2 design.
- 3.4.4 If an in-situ ground improvement method were to be adopted, there would also be a reduction in the amount of granular material that would need to be imported as backfill to ground treatment excavations. This could reduce the number of HGV and articulated dump truck site traffic movements through Yarnfield North Embankment Transfer Node.
- 3.4.5 The draft PGI also indicated that a small additional area of ground treatment, with a footprint area of approximately 4,600 m² and an estimated volume of 14,300 m³ will be required at the north-eastern end of the proposed Yarnfield Lane Bridge over the M6 motorway to increase the strength of the ground there. This was not previously identified from the desk study information.
- 3.4.6 Further hydrogeological studies are required at the next design stage to inform the ground treatment design.

3.5 Implications for construction logistics and construction traffic

- 3.5.1 None of this affects the ability of HS2 to construct the railway within the powers of the Bill and in accordance with the HS2 Environmental Minimum Requirements.

3.6 Outstanding GI at Stone IMB-R

- 3.6.1 65 exploratory holes were scheduled at the Stone IMB-R in the WP3 PGI. 50 of these (over 75% of locations) were carried out. The remaining 15 locations scheduled in the WP3 PGI could not be undertaken either because permission was not granted to enter land (one location) or due to poor weather conditions in the autumn of 2019 (14 locations). These outstanding locations will be moved into the scope of the Work Package 4 (WP4) PGI, the next tranche of PGI. This is due to start in Autumn 2020.
- 3.6.2 The WP4 PGI will also include a further 19 locations at the Stone IMB-R and the Yarnfield Lane M6 Bridge, giving a total of 34 locations here in the WP4 PGI.
- 3.6.3 Eight exploratory holes were carried out in the Filly Brook valley near Pool House Farm during the WP3 PGI. Eight more are planned in the WP4 PGI. Two holes are also planned in the M6 corridor to the south-east of Yarnfield Lane.
- 3.6.4 It is recommended that further GI holes are added into the WP4 PGI scope in the two areas of woodland in the Filly Brook valley, one of which includes the soft ground near or at Darlaston Pool and stretches almost to the M6 motorway, and one of which is a marshy area to the north of Pool House Farm; and also along the M6 corridor to the south-east of Yarnfield Lane. This further GI will provide valuable data and will provide greater certainty about the remaining geotechnical risks here.

3.7 Outstanding GI at Stone Headshunt

- 3.7.1 20 exploratory holes were scheduled at the proposed location of Stone Headshunt in the WP3 PGI, between its south-eastern end (Ch 219+400) and the existing Norton Bridge to Stone railway (Ch 220+800). It was only possible to carry out five of these GI locations (ie 25% of the locations here) as permission was not granted to enter the land where the other 15 holes were located. All of the exploratory holes that were carried out were to the south-east of Eccleshall Road (Ch 220+050).
- 3.7.2 The outstanding 15 locations from the WP3 PGI here will be moved into the scope of the Work Package 4 (WP4) PGI, the next tranche of PGI. The WP4 PGI will also include a further 39 locations at Stone Headshunt and the proposed Norton Bridge to Stone sidings, giving a total of 54 locations here in the WP4 PGI. This is due to start in Autumn 2020. At the time of reporting (this report, July 2020), permission had not yet been granted to enter the land to carry out GI between Eccleshall Road (Ch 220+050) and the existing Norton Bridge to Stone railway (Ch 220+800). There is therefore currently a gap of 0.75 km in site-specific GI coverage, which covers most of the Stone Headshunt footprint and all of the proposed Norton Bridge to Stone sidings. This GI, which as noted above will form part of the WP4 PGI scope, will provide valuable data

and will provide greater certainty about the remaining geotechnical risks and the earthworks design here. We expect that the WP4 PGI at the proposed Stone Headshunt and the proposed Norton Bridge to Stone sidings will largely confirm the geotechnical interpretation there based on desk study information.

4 Procedure to produce final exploratory hole logs for Preliminary Ground Investigation at Stone IMB-R

4.1 Introduction

4.1.1 After the boreholes and trial pits have been carried out in the field, the procedure to produce a factual report for a ground investigation undertaken with boreholes and trial pits (as at Stone IMB-R and Stone Headshunt) involves the following stages:

- Contractor's daily site records (also colloquially known as "driller's logs");
- Preliminary logs;
- Draft exploratory hole logs, which form part of the draft factual report; and
- Final exploratory hole logs, which form part of the final factual report.

4.1.2 These stages are discussed below.

4.2 Driller's field logs

4.2.1 The Contractor's daily site records are the first documents that are produced during the ground investigation and are unverified work in progress. Dependent on the preference of the drilling sub-contractor, these records are either submitted hand-written on a proforma or are prepared electronically.

4.2.2 The requirements for what is to be included in these daily records are outlined in the Specification for the Ground Investigation. They include, but are not necessarily limited to, the following information:

- Exploratory hole location or number, day and date;
- Equipment and drilling or excavation technique used;
- Diameter and depths of holes and casing (for boreholes);
- Depths of each change of stratum and a non-technical description by driller of each stratum based on visual observation of the arisings from the borehole;
- The types of samples, the depths from/over which they were taken and the sampling method used;
- The depths and details of all in situ tests;
- Depths of hard strata and/or obstructions, the justifying progress rate, driving test observations and times spent on penetration;
- Records of groundwater readings and times of the readings;
- Installation details of any standpipes, piezometers or other instrumentation;
- Details of backfilling and/or infilling;

- Details and duration of standing time;
- *For rotary drilling*: Type of drilling fluid, type of core barrel and bit used, depth of start and finish of each core run, total core recovery and percentage recovery with information as to possible location of core losses, if any for each core run; and
- *For trial pits*: Dimensions of the pit or trench in plan and orientation relative to grid north, method of pit or trench support and comments on stability and details of photographs taken.

4.3 Preliminary Logs

- 4.3.1 Following the preparation of the daily site records, the GI contractor's geologist describes and prepares records of the samples recovered from the borehole or trial pit and, for rotary drilling, of the core runs recovered. The GI contractor combines this information with that in the contractor's daily site records to produce the preliminary logs. These logs include all the information in the contractor's daily site records plus a description of each stratum in accordance with the relevant British standards, the geological name of each stratum (where possible) and details of groundwater observations, etc.
- 4.3.2 C861 (Arup) is the Investigation Supervisor for the PGI. The preliminary logs are reviewed by the Investigation Supervisor's geologists and geotechnical specialists to ensure that the strata descriptions are correct, consistent, compliant with standards, etc. and that relevant information from daily site records has been transcribed adequately. These comments are incorporated into the draft exploratory hole (borehole or trial pit) logs (see below).
- 4.3.3 Laboratory testing of the soil and/or groundwater samples is scheduled on the basis of the information in the preliminary logs. The GI contractor uses the results of this testing, where necessary, together with the comments received from the Investigation Supervisor, to update the information from the geologist's visual logging on the preliminary logs to produce the draft exploratory hole logs. The ground levels and coordinates of the exploratory hole location are also added at this stage.

4.4 Draft exploratory hole logs

- 4.4.1 The draft exploratory hole logs and the rest of the draft factual report (which contains a commentary on the GI fieldwork and in situ and laboratory testing, exploratory hole logs, laboratory test results, photographs of cores and trial pits, etc.) are reviewed by the Investigation Supervisor's geologists and geotechnical specialists, and their comments are incorporated into the final exploratory hole logs, which form part of the final factual report (see below).

4.5 Final exploratory hole logs

- 4.5.1 The GI contractor uses the results of any outstanding laboratory testing, where necessary, together with the comments received from the Investigation Supervisor on the draft exploratory hole logs, to update those logs to produce the final exploratory

hole logs. These, as part of the final factual report, are submitted to the Investigation Supervisor for review and acceptance, and then the final factual report is submitted to the client for acceptance. At the time of preparation of this note (July 2020), the reports noted at 2.1.1 are currently in this final stage – i.e. they have been submitted to the client for acceptance.

Appendix 1 - Summary of PGI reports for Stone IMB-R and Stone Headshunt provided

HS2 Phase 2a: Summary of PGI reports for Stone IMB-R and Stone Headshunt provided to Petitioner

Report	PGI Report Number 148 (2G003-BAF-GT-REP-A000-000148)	PGI Report Number 149 (2G003-BAF-GT-REP-A000-000149)	PGI Report Number 160 (2G003-BAF-GT-REP-A000-000160)	Comments
Table of contents	n/a - No separate table of contents was included for this report	All provided (1 page)	All provided (1 page)	The appendices not relevant to the Stone IMB-R or Stone Headshunt have been highlighted.
Report text	All 21 pages provided	All 53 pages provided	All 47 pages provided	Sensitive and confidential information has been redacted. The following information which is not relevant to Stone IMB-R or Stone Headshunt has been highlighted:- - Appendices which are not relevant; - Irrelevant GI locations, appendices and descriptions of irrelevant field tests/monitoring mentioned in the report sections on fieldwork; and -Irrelevant types of laboratory tests in the report section on laboratory testing.
Appendix A - Plans & drawings	3 pages provided out of a total of 16 pages	6 pages provided out of a total of 34 pages	5 pages provided out of a total of 22 pages	The plans showing locations other than IMB-R and Stone Headshunt have been removed. The borehole summary showing the irrelevant boreholes has been removed. In the remaining pages, the boreholes and their details irrelevant to the Stone IMB-R on the plans and in the summary have been highlighted.
Appendix B - Logs of boreholes and trial pits, photos where are relevant	21 pages provided out of a total of 562 pages	198 pages provided out of a total of 2553 pages	107 pages provided out of a total of 1662 pages	The following have been removed: - Driller's logs, and logs for boreholes or trial pits, including details of groundwater monitoring instrumentation, for locations not relevant to Stone IMB-R or Stone Headshunt.
Appendix C - Cross section drawings	NOT provided	NOT provided	NOT provided	This appendix is not provided.
Appendix D - Utilities Survey	NOT provided	NOT provided	NOT provided	The underground utilities survey report contains sensitive information. The entire appendix is therefore not provided.
Appendix- Geophysics	<u>App F</u> NOT provided	<u>App E & F</u> NOT provided	<u>App E</u> NOT provided	The geophysical logging and tests contain highly technical details and are entirely in graphical format. The entire appendix is therefore not provided.
Appendix- Pressuremeter	<u>App E</u> NOT provided	<u>App G</u> NOT provided	<u>App F</u> NOT provided	The entire appendix is not provided because there were no pressuremeter tests within the area of Stone IMB-R & Stone Headshunt.
Appendix- Cone Penetration Tests (CPT)	n/a - not included in the report	<u>App H</u> NOT provided	<u>App G</u> NOT provided	The Cone Penetration tests contain highly technical details and are entirely in graphical format. The entire appendix is therefore not provided.
Appendix- Other In-situ Tests	<u>App C, D and E</u> NOT provided	<u>App I</u> 17 pages provided out of a total of 107 pages	<u>App H</u> NOT provided	The results of trial pit soakaway tests, borehole permeability tests, packer tests and other in-situ tests irrelevant to IMB-R have been removed.
Appendix- Monitoring	<u>App G</u> 2 pages provided out of a total of 14 pages	<u>App J</u> 13 pages provided out of a total of 1343 pages	<u>App I</u> 5 pages provided out of a total of 282 pages	Monitoring results for piezometers and vibrating-wire piezometers for boreholes irrelevant to IMB-R have been removed.
Appendix- Geotechnical Laboratory Tests	<u>App H</u> 117 pages provided out of a total of 1119 pages	<u>App K</u> 259 pages provided out of a total of 4368 pages	<u>App J</u> 158 pages provided out of a total of 2061 pages	Test verification certificates have been removed. Laboratory test results which were carried out from GI locations not at Stone IMB-R or Stone Headshunt have been removed.
Appendix- Contamination / Geoenvironmental Laboratory Tests	<u>App I</u> NOT provided	<u>App L</u> NOT provided	<u>App K</u> NOT provided	The results of contamination and geoenvironmental tests have not been provided because this information is sensitive and confidential to the landowners
Appendix- Calibration Certs	n/a - Calibration certificates are included separately in various appendices of this report.	<u>App M</u> NOT provided	<u>App L</u> NOT provided	The calibration certificates are considered not relevant and have been removed.
Appendix- Digital data	NOT provided	<u>App N</u> NOT provided	<u>App L</u> NOT provided	The digital data has not been provided.
Appendix- Photographs	Site photos of the relevant boreholes/trial pits are provided in the Volume 2 of the report 27 pages provided	n/a - included with logs in App B	n/a - included with logs in App B	Only the photographs of relevant boreholes and trial pits are included.

Yarnfield & Cold Meece Parish Council

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27 July 2020

Mr S Knight
Director, Hybrid Bill Delivery
Albany House
96-98 Petty France
London
SW1H 9EA

Dear Mr Knight

HS2 Phase 2a House of Lords Select Committee: Petition 023

Thank you for your letters dated 16 June and 22 July 2020 and the ground investigation information that accompanied the second letter via electronic transfer. Our technical advisors have once again been through the contents of your correspondence and helped me put together the following response.

Detailed cross-section of a typical unsurfaced haul road

Your comments about the haul road are noted, and especially the point that this is how a haul road *“has been done on previous projects”*. We are not sure which previous projects you are referring to, but we can inform you that the haul road design does not meet minimum HSE standards in numerous ways. We therefore trust that your future contractors will design safe unsurfaced haul roads even if this means significantly exceeding the controls that are (or will be) set out in HS2 Ltd’s EMRs.

The purpose for asking the question is to try and understand whether HS2 Ltd has made provision for supplying suitable earthworks materials for unsurfaced haul road construction in its overall cut and fill balance calculations or not. If it has we would also be grateful to understand what type of earthworks materials it proposes to use and in what volumetric quantities.

From the answer that you have so far provided it appears that little consideration has been given to this important issue and, if we are correct on this point, this would suggest that the Environmental Statements that the company has produced since July 2017 will be inaccurate and the environmental effects understated.

Ground conditions at the Stone Railhead/IMB-R site

We are grateful to finally receive some information relating to actual ground conditions at the Stone Railhead/IMB-R site.

It is clear from the ground investigation information provided that HS2 Ltd still has a very limited knowledge of ground conditions at the Stone Railhead/IMB-R site.

We are concerned that the company has yet to secure access to all of the land located between Eccleshall Road (B5026) and the Norton Bridge to Stone Railway. This represents approximately one quarter of the site and crucially contains the sidings from the existing railway as well as the reception tracks that provide the connection between the existing railway, the Stone Headshunt the HS2 mainline and the Railhead/IMB-R itself.

More worryingly still, it is evident that the scope of the investigation does not adequately cover the footprint of the massive earth structure on which the Stone Railhead will be built.

The results of the investigations that have been carried out from the limited boreholes that have been drilled so far show that, as predicted by the SRCG, the ground conditions are far worse than HS2 Ltd and its consultants had assumed and have indicated to our Parish Councils to date.

Despite the obvious problems, this has not stopped the unnamed authors of the report entitled '*Stone IMB-R – Technical note to accompany issue of factual data from the WP3 Preliminary Ground Investigation*' trying to put a positive spin on the situation.

In order to try and address some of the very large gaps in HS2 Ltd's knowledge of the local ground conditions, we understand that another round of PGI works will commence this autumn. However, although the aforementioned report does mention the number of investigation holes required, you have not supplied a plan to show where they will be located.

It is also clear from HS2 Ltd's performance to date that the resultant additional ground investigation information is unlikely to be available until at least this time next year. This is far too late to be considered by the ongoing parliamentary process, which is scheduled to conclude in September or October. This means that HS2 Ltd will potentially have received Royal Assent and therefore permission to proceed with building the Stone Railhead/IMB-R, regardless of how expensive or unachievable it is to deliver in practice.

Shortfall of fill

We assure you that there has been no misunderstanding of the figures on our part, but we do think that HS2 Ltd is still significantly underestimating the granular fill requirements to build the Stone Railhead/IMB-R and the nearby mainline railway embankments, which were extended by a total of 385m at AP1.

Traffic

We note HS2 Ltd's denial that it has repeatedly changed its position regarding the number of HGV movements that it will impose on Yarnfield Lane, but the evidence we have seen demonstrates this clearly.

HS2 Ltd's highly caveated assurances with the use of phrases such as "*reasonable endeavours*" and "*so far as reasonably practicable*" are essentially meaningless; only guarantees confirmed in legally binding agreements can provide assurance for our Parish Council. However, even if enforceable promises are made we cannot see how you will achieve the impracticable and unrealistic proposals for the delivery of construction materials to the Yarnfield North Embankment Transfer Node and the adjacent road satellite construction compounds that would be access from Yarnfield Lane.

With regard to our repeated request to be provided with a Transfer Logistics Profile, (TLP) the points that you have made in paragraphs 2.5.1 to 2.5.4 are of only limited relevance and do not address the central point that HS2 Ltd is not prepared, or able, to verify how it has calculated the numbers of HGVs (and the timing and frequency of their access/egress) to the construction sites located on Yarnfield Lane. Furthermore, HGVs carrying earthworks materials are only part of the equation, and the TLP should include all forms of HGV traffic required to construct the project.

We therefore reiterate that the only way we can be assured of the accuracy of HS2 Ltd's claims regarding HGV movements is for it to provide a TLP that includes details of how the numbers of all types of HGV movements have been calculated. We therefore repeat our request that HS2 Ltd provides, without further prevarication, a TLP relating to the Yarnfield North Embankment Transfer Node and the nearby road satellite compounds.

Regarding Histogram 17 presented to the House of Lords Phase 2a Select Committee on 17 March 2020, given your response, we trust that HS2 Ltd will now clarify the position to the members of the Lords Select Committee.

M6 overbridge

We are aware that Highways England has written to Sir Bill Cash regarding the existing Yarnfield Lane overbridge and enclosed a copy of a structural survey that was undertaken 25 years ago in 1995.

We also know that Highways England believes that the bridge can be used by vehicles weighing up to 44 tonnes without any prior approval. However, with regard to its use by vehicles weighing 140 tonnes, it is important to remember that this relates to abnormal loads, which require prior approval from Highways England before each journey.

During our meeting with HS2 Ltd representatives on 16 January 2020, Andy Goodwin of Arup confirmed that HS2 Ltd is considering using articulated dump trucks to cross the existing Yarnfield Lane M6 overbridge. Since HS2 Ltd has also indicated that it

would use what it has termed as 45T dump trucks to carry excavated material along the trace, please confirm whether it is HS2 Ltd's intention to use these on the M6 overbridge and whether such a proposal has been formally agreed with Highways England?

Junction visibility

We note the contents of Appendix C of your letter dated 16 June 2020 and believe that the information provided vindicates our views regarding the design of the permanent Stone IMB-R access onto the realigned Yarnfield Lane.

The first point to note is that automatic traffic counters (ATCs), do not provide robust data for accurately determining vehicle speed in free flow conditions, which is what is required to determine an alternative design speed to an existing speed limit. Small errors in the distance between the tubes can also create considerable inaccuracies but the main problem is that the ATCs cannot tell whether the speeds being measured are being determined by the slowest vehicle in a line of traffic.

Secondly, the summary table enclosed in Appendix C provides no details as to whether the 85% percentile speeds relate to a specific direction or an average of both directions. Notwithstanding this, the 85% percentile figure of 55.3mph at TSJ5 in non-free flow conditions actually confirms that a 60mph design speed is appropriate.

Thirdly, it is noted that the TSL29 and TSL107 surveys were carried out during a sub-optimal period in winter, i.e. over a two week long period in December 2015, when inclement weather conditions are very likely and will have caused vehicles to travel at slower speeds than in normal conditions.

Fourthly, TSL107 is located on the steep wooded bank at the eastern end of Yarnfield Lane. This site is therefore not representative of the majority of the lane and especially the straighter sections where motorists travel at faster speeds. Any traffic speed results obtained from here, even if correctly surveyed, are therefore irrelevant to the design of a new access onto a straight and relatively steeply graded section of the realigned Yarnfield Lane.

In summary, it appears to this parish council that HS2 Ltd failed to give proper consideration to the appropriate design speed for the realigned Yarnfield Lane when it produced its original sub-standard design for the access of the Stone IMB-R in 2017. Furthermore, HS2 Ltd's obvious '*cutting of corners*' by reducing the design speed still resulted in multiple departures from highway standards, which have not been addressed.

HS2 Ltd has since amended its overbridge design to cater for the Smart Motorway widening and to accommodate its snaking haul road to/from existing Yarnfield Lane in an attempt to create a feasible means of accessing the northbound M6. However, in spite of these changes, HS2 Ltd still cannot create sufficient west facing visibility from the junction to meet the appropriate design speed for the road, i.e. 60mph (100kph) and therefore it is seeking to retrofit its flawed design to a lower, and inappropriate, design speed.

In conclusion, the location and design of the proposed junction is fundamentally unsafe and its continued inclusion in the scheme is totally unacceptable to Yarnfield & Cold Meece Parish Council. We therefore urgently request that HS2 Ltd reconsiders its proposals for the Stone Railhead before the conclusion of the ongoing parliamentary process.

Yours sincerely

A handwritten signature in black ink, appearing to read 'J Fraser', written in a cursive style.

John Fraser

Parish Clerk

Yarnfield & Cold Meece Parish Council

cc Sir Bill Cash MP,
Cllr Jeremy Pert

Mr John Fraser
5 De Havilland Drive
Yarnfield
Stone
ST15 0SX

14 August 2020

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

Thank you for your letter of 27 July 2020 in response to mine of 16 June and the contractor's findings from the Work Package 3 (WP3) ground investigations sent to you on 22 July 2020.

As we have sought to explain in our previous letters, the design of the Proposed Scheme to date provides the level of detail necessary for the purposes of the Bill and the requirements of the Environmental Impact Assessment Regulations. Detailed design has yet to be concluded and as such a lot of the information that you would like to see is not available at this stage.

The Bill will establish detailed constraints and controls that will apply not only to the programme of design development of all aspects of the works but also the construction and operation of works. Clause 17(1) of the Bill will grant deemed planning permission for development carried out under the Act. However, such permission is expressly subject to other provisions of the Act including clause 17(2) and (3). Clause 17(3) applies to any permission the requirements set out under Schedule 17 of the Bill to discharge planning conditions relating to proposed works and the Environmental Minimum Requirements (EMRs) will ensure that consistent environmental standards will be maintained throughout and beyond the development process.

The EMRs for the Proposed Scheme are based on those already demonstrated to have been highly effective in controlling and reducing the environmental effects of previous projects, such as HS1 and Crossrail. The EMRs are a suite of draft documents¹ that are being developed in consultation with local authorities and other relevant stakeholders in relation to the environmental impacts of the design and construction of the Proposed Scheme. As is explained in the draft EMRs General Principles document², the objective of the EMRs is to ensure that this Phase of the HS2 project is delivered in accordance with the Environmental Statement (ES) produced during the passage of the Bill through Parliament. Any

¹ As set out in HS2 Phase 2A Information Paper E1: Control of Environmental Impacts

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/628447/E1_Control_of_Environmental_Impacts_v1.0.pdf

² High Speed Rail (West Midlands - Crewe) Draft Environmental Minimum Requirements Draft General Principles

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627554/E175_Draft_EMRs_General_Principles_WEB_final.pdf

nominated undertaker would be contractually bound to comply with the controls set out in the draft EMRs. Any contractors will also be contractually obliged to comply with those controls.

Bearing that in mind, please see below our responses to the points raised in your letter.

Detailed cross-section of a typical unsurfaced haul road

At your request I provided a drawing of a haul road with my letter of 16 June 2020, and I made clear that this was intended to be illustrative. The design of haul routes will not be completed until after the Bill has secured Royal Assent.

You raise a concern in your letter as to whether consideration has been given to the potential need to supply materials for unsurfaced haul roads within the consideration of the environmental effects of the Proposed Scheme which are reported in the ES. As you will be aware, the ES has addressed the potential effects of the scheme during its construction phase including the works necessary to set up the construction sites, which include the traffic movements associated with those works.

As set out above, in designing, constructing and operating any haul road the nominated undertaker will need to comply with the EMRs. The Promoter does not accept that the EMRs would be deficient in controlling and managing the environmental effects of the scheme.

Ground conditions at the Stone Railhead/IMB-R site and assumed shortfall of fill

With regards to the points you have raised in respect of ground conditions at the Stone Railhead/IMB-R site and assumed shortfall of fill, I note your concerns on these and draw your attention to the responses we have provided to you in our previous letters.

M6 overbridge

As your letter suggests, Highways England are content that the M6 overbridge is structurally sound, and able to carry vehicles of a weight in excess of normal highway standards. The detailed construction and logistics plan will be developed by the contractor, when appointed, following Royal Assent. In developing those proposals they will be bound by the EMRs, and the need to gain any necessary consents.

I reiterate what I explained in my letter of 16 June in relation to traffic information presented to the House of Lords Select Committee during the session on 17 March 2020. The histogram included during the presentation was not presented to the Select Committee as a representation of traffic at the Stone IMB-R. During the presentation it was made clear to the Select Committee that the reason for including this information was to introduce the Select Committee members to the type of information they can expect to see when matters related to traffic effects are being discussed during petition hearings. With regards to the hearing of your petition, I can confirm that our evidence, which will be shared with you and members of the Select Committee, will include the full set of traffic exhibits in the usual way.

Traffic speeds and junction visibility

As I mentioned in my letter of 16 June 2020, the local highway authority for this area is Staffordshire County Council (SCC). They have responsibility for ensuring any plans that affect their highways are safe and meet relevant standards. They have also shown a keen interest in ensuring that local interests are properly considered, not least through the commitments that they have secured.

My letter explained that “the character and road alignment including the prevailing traffic and weather conditions influence the speed of vehicles, which is why the realigned road has been designed to take into account observed traffic speeds including the forecast increase in traffic”. The design of the Stone IMB-R access and its location would be subject to approval by the local highway authority under Schedule 4 of the Bill. As part of this, highway safety would be a key consideration for the local highway authority. Any additional surveys would be undertaken during detailed design as necessary and/or upon request by the relevant highway authority.

We have regular discussions with SCC on highways matters. Neither the technical feasibility of providing a safe highway access at this location, nor questions about the accuracy of traffic surveys, have been raised as concerns by SCC.

We are confident that we will be able to deliver a safe permanent Stone IMB-R access onto the realigned Yarnfield Lane. If the Parish Council has concerns about this, or any other any highway issue, may I suggest that you approach SCC directly. That way the local highway authority will be able to provide independent advice and can ensure that any issues that need further consideration are addressed in advance of them granting consent.

House of Lords Select Committee statement

I understand that David Walker of Winckworth Sherwood has written to you to bring to your attention a statement made by the House of Lords Select Committee on 29 July 2020 about their approach to hearing petitions seeking changes to the Bill that would otherwise require an Additional Provision to deliver. The statement explained that the Phase 2a House of Lords Select Committee intend to follow the decision made by the Phase 1 House of Lords Select Committee and therefore would not hear evidence and submissions in support of an application for an Additional Provision that has not been considered by the Phase 2a House of Commons Select Committee.

In addition, the statement also said:

“We are aware that certain petitioners have suggested that changes similar to those that might be made by additional provision might instead be effected through an Order under the Transport and Works Act 1992. That would involve a process which is separate from the parliamentary process on this Bill, and it is highly unlikely that we could be persuaded that there was any recommendation we should or could make in respect of such an Order”.

In light of this ruling it is unclear, based on the requests set out in your petition, what you now intend to ask of the Select Committee when you appear in September, and I would be grateful if you could therefore clarify what issues you propose to raise.

If you require any further assistance on your petition issues please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

Yours sincerely



Simon Knight
Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

Yarnfield & Cold Meece Parish Council

Yarnfield Village Hall
Yarnfield Lane
Yarnfield
ST15 0NJ
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21 August 2020

Mr S Knight
Director, Hybrid Bill Delivery
Albany House
96-98 Petty France
London
SW1H 9EA

Dear Mr Knight

HS2 Phase 2a House of Lords Select Committee: Petition 023

Further to your letter 14th August 2020, we note that you have once again failed to address the concerns that we have raised and continue to use a variety of excuses to justify the poor design work that has resulted in the sub-optimal proposals for the Stone Railhead/IMB-R.

The fact that the promoter has decided that the level of design detail published is sufficient to get through the hybrid bill process offers no comfort to the people of this and neighbouring parishes.

With regard to the Environmental Impact Assessment regulations, all EIA experienced professionals would know that these only provide a framework for what is required to be included in an Environmental Statement; they do not ensure the quality of Environmental Statements. A high-quality Environmental Statement requires the use of a robust and detailed EIA methodology, which is absent in HS2 Ltd's approach.

Turning to the Environmental Minimum Requirements (EMRs), to date all HS2 Ltd has published in respect of Phase 2a are some draft principles supported by some accompanying draft documentation, such as the draft Code of Construction Practice (CoCP) containing some high-level mitigation measures.

These generic documents contain little, if anything, of relevance to the Stone Railhead/IMB-R, the existing design for which will prove extremely difficult, if not impossible, to deliver successfully and in an environmentally acceptable way.

You also refer to the fact that the *“EMRs are a suite of draft documents being developed in consultation with other relevant stakeholders.”* We wonder why the parish councils that are most affected by HS2 Ltd's largest and most complex piece of infrastructure on Phase 2a are not considered to be relevant stakeholders.

Presumably the answer is that HS2 Ltd is hoping that those stakeholders that will be involved would not be familiar enough with the technical design of the development to offer any real challenge and seek appropriate change and mitigation?

If this is not the case, then I urgently request that representatives of our three parish councils be invited to participate in the development all of the EMRs relevant to elements of the HS2 project that affect our community.

Detailed cross-section of a typical unsurfaced haul road

We note that you have evaded the question asking whether HS2 Ltd has made provision for supplying suitable earthworks materials for unsurfaced haul road construction in its overall cut and fill balance calculations.

You state that *“the ES has addressed the potential effects of the scheme during its construction phase including the works necessary to set up the construction sites, which include the traffic movements associated with those works.”* However, this does not tell us whether HS2 Ltd has made provision in its earthworks calculations for the material required to build unsurfaced haul roads, and so we ask you again to clarify the position.

Ground conditions at the Stone Railhead/IMB-R site

We note what HS2 Ltd has said in previous correspondence. However, we continue to ask questions regarding the prevailing ground conditions, because your previous responses do not provide fulsome and comprehensive answers to the key points of concern.

We therefore reiterate the points raised in our letter dated 27th July and ask again to be supplied (by return) with a plan that shows the proposed locations and type of ground investigation boreholes and trial pits.

Shortfall of fill

We note that you have not taken the opportunity to correct what is clearly an underestimate in the granular fill requirements to build the Stone Railhead/IMB-R and the nearby mainline railway embankments, which were extended by a total of 385m at AP1. Referring to previous letters that have not addressed this issue does not adequately deal with the question we have asked.

Traffic

Once again you have refused to provide a Transport Logistics Profile that would enable us to verify the calculations that underpin HS2 Ltd's claims regarding the numbers of HGVs (and the timing and frequency of their access/egress) required to supply the construction sites located on Yarnfield Lane.

Instead, you have sidestepped this difficult question, delegating responsibility to a future contractor following Royal Assent. However, if HS2 Ltd has, as we suspect, grossly underestimated the number of HGVs required to build its project, the assessments contained in its Environmental Statements will be inaccurate and the environmental effects understated. Importantly, it will also be too late for this information to be taken into account in the decision-making process.

We therefore request that this information be provided by next week to give us some time to adequately consider the details prior to our evidence session to the House of Lords Select Committee.

M6 overbridge

You have stated that the existing M6 overbridge is “*able to carry vehicles of a weight in excess of normal highway standards.*” However, Highways England has made it clear that each vehicle using the Yarnfield Lane overbridge, which exceeds 44 tonnes gross weight, would be treated as an abnormal load and would need prior approval before any journey.

Therefore please clarify whether it is HS2 Ltd’s intention to allow its contractors to use 45T articulated dump trucks on the existing bridge or not and whether HS2 Ltd is seeking a blanket exemption from Highways England to avoid the need for each ADT load to be granted prior approval before each journey?

Junction visibility

We are disappointed that you have still not addressed the points we have made and questions we have asked regarding junction visibility and have chosen instead to hide behind Schedule 4 of the Bill and the role of the Highways Authority.

You have also failed to address our concerns relating to inadequate traffic surveys and the fact that they were carried out at an inappropriate time of year.

Furthermore, to simply tell us that this crucial information has not (at least yet) been noticed by Highways officers at Staffordshire County Council is hardly reassuring to the residents of Yarnfield and other users of Yarnfield Lane, whose future safety depends on the provision of an adequate design for the realigned lane and the proposed permanent junction of the IMB-R that will be located half way down a steep slope in a deep cutting.

We also believe that it is unacceptable for HS2 Ltd to seek to do the bare minimum in its design process and that it should immediately take the opportunity to re-evaluate its proposals so that they are based on the prevailing speed limit and 60mph (100kph) design speed.

House of Lords Select Committee Statement

I can confirm that we have received the House of Lords Select Committee statement and ruling and have shared it with Stone Town and Chebsey Parish Councils, together with our technical experts who will be giving evidence on our behalf. I can also confirm

that we are fully aware of the rules regarding additional provisions and the contents of paragraph 8 of the ruling.

In addition, it remains the intention of our parish councils to give evidence to the House of Lords Select Committee on 15th September 2020 and in accordance with normal practice we will submit our evidence at the appropriate time the week before. What we intend to ask of the Select Committee will be made clear at the start of the evidence session.

Yours sincerely

A handwritten signature in black ink, appearing to read 'J Fraser', written in a cursive style.

John Fraser

Parish Clerk

Yarnfield & Cold Meece Parish Council

cc Sir Bill Cash MP,
Cllr Jeremy Pert

Mr John Fraser
5 De Havilland Drive
Yarnfield
Stone
ST15 0SX

1 September 2020

Dear Mr Fraser

**HIGH SPEED RAIL (WEST MIDLANDS – CREWE) BILL – HOUSE OF LORDS SELECT COMMITTEE:
PETITION HS2-HOL-023 - YARNFIELD AND COLD MEECE PARISH COUNCIL, STONE TOWN COUNCIL
& CHEBSEY PARISH COUNCIL**

I am writing to you in respect of the petition from Yarnfield and Cold Meece Parish Council, Stone Town Council and Chebsey Parish Council against the High-Speed Rail (West Midlands-Crewe) Bill ('the Bill') in the House of Lords.

We wrote to you on 16 October 2019 setting out the Promoter's position in relation to the issues you have raised in your petition and the measures identified to address your concerns, as provided in the Promoter's Response Document (PRD) sent to you on 30 September 2019. A copy of our letter of 16 October 2019 is appended to this letter as appendix A.

Since last October there has been further correspondence between us and a meeting also took place on 16 January 2020 between representatives of HS2 Ltd and members of Yarnfield and Cold Meece Parish Council, Stone Town Council, Chebsey Parish Council and the Stone Railhead Crisis Group (SRCG).

This letter provides a summary of the correspondence and dialogue that has taken place under the relevant headings of your petition. Thank you for your letter of 21 August 2020, in response to mine of 14 August 2020; I will also provide our responses to the matters raised in that letter in the sections below.

Relocation of the proposed railhead at Stone

In our letter of 16 October 2019 we explained that the case for the siting of the railhead and Infrastructure Maintenance Base-Railhead (IMB-R) at Aldersey's Rough instead of Stone was heard by the House of Commons Select Committee in April 2018. On 24 May 2018 the Select Committee announced their decision. Having considered the evidence, the Select Committee decided that the proposal to site the railhead and IMB-R at Stone should not be changed and rejected the contrary argument that these facilities should be relocated to a site at Aldersey's Rough¹. Furthermore, in

¹ <https://publications.parliament.uk/pa/cm201719/cmselect/cmhs2/1085/108502.html>

paragraph 30 of their Second Special Report of Session 2017-19² in July 2018, the House of Commons Select Committee stated:

"The Committee confirms its "in principle" decision that the Infrastructure Maintenance Base-Railhead (IMB-R) should be sited as is proposed in the Bill Scheme at Stone."

The Promoter does not consider that your petition raises any reason to depart from the decision thereby confirmed by the House of Commons Select Committee. We also explained in the PRD sent to you in September 2019 that relocation of the IMB-R would require amendments to the Bill that would necessitate an Additional Provision.

In our letter of 14 August 2020 we brought to your attention a statement made by the House of Lords Select Committee on 29 July 2020 about their approach to hearing petitions seeking changes to the Bill that would otherwise require an Additional Provision to deliver. The statement explained that the Phase 2a House of Lords Select Committee intend to follow the decision made by the Phase 1 House of Lords Select Committee and therefore would not hear evidence and submissions in support of an application for an Additional Provision that has not been considered by the Phase 2a House of Commons Select Committee.

Specifically, this statement said:

"We are aware that certain petitioners have suggested that changes similar to those that might be made by additional provision might instead be effected through an Order under the Transport and Works Act 1992. That would involve a process which is separate from the parliamentary process on this Bill, and it is highly unlikely that we could be persuaded that there was any recommendation we should or could make in respect of such an Order".

Excavated material

Your petition included concerns about the Promoter's assessment of excavated material. Specifically paragraph 2.4 of your petition states that you have "comprehensive evidence" to suggest that we have severely underestimated the amount of material that will need to be excavated at the site, whilst overestimating the quantity of excavated material that can be reused as engineering fill.

The Promoter does not accept that the volume of material to be excavated for the Stone railhead has been severely underestimated as your petition contends.

The 'Infrastructure Maintenance Base – Rail: Ground conditions and basis of earthworks volumes in AP2 Design Report', sent to you on 17 December 2019 ('the December 2019 report') provided a breakdown of the specific IMB-R design elements for which material would be sourced from elsewhere on the Phase 2a scheme or from external sources. This sets out that the estimated figure for the Additional Provision 2 (AP2) revised scheme is 865,000 m³ which when rounded up to one decimal point equates to approximately 0.9 million m³. This figure is for the specific design elements cited in Table 1 of the December 2019 report which are the:

- Stone Headshunt;
- Yarnfield South Embankment;
- Yarnfield North Embankment, and

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/755284/hs2-phase2a-promoters-response-select-committee-second-special-report.pdf

- Stone IMB-R.

At the meeting on 16 January 2020 we were provided with a 'Summary of excavated materials evidence' note produced by the SRCG. Paragraph 3.1.1 of this note refers to "the Stone Railhead/IMB-R construction site" in respect of shortfall of fill material. We explained in our letter of 17 April 2020 that "If additional other design elements supplied from the Yarnfield North Embankment Transfer Node, or within the wider area of the Stone Headshunt and IMB-R are also included, then the shortfall would increase by 160,000 m³ to 1,025,000 m³", which would be consistent with the estimate of "over 1 million m³" as stated in paragraph 3.1.1. of the SRCG evidence note. Those additional design elements are:

- Eccleshall Road;
- the Norton Bridge to Stone Railway Viaduct;
- Yarnfield Lane Underbridges and Overbridge;
- the Meaford Cutting; and
- the Meaford South Embankment.

We have repeatedly requested that you share with us the "comprehensive evidence" that you refer to in paragraph 2.4 of your petition. To date we have not received any evidence of this nature from you.

Ground conditions

As explained above, on 17 December 2019 we provided you with the 'Infrastructure Maintenance Base – Rail: Ground conditions and basis of earthworks volumes in AP2 Design Report' ('the December 2019 report'), a bespoke report produced for the specific purpose of responding to your questions about the assumptions for the amount of material to be excavated for the Stone IMB-R based upon the relevant information you had requested. The December 2019 report was based upon findings from the Phase 2a route wide geotechnical desk study. At that time we explained that we did not expect the findings of the preliminary ground investigations (PGI) from work package 3 (WP3) to become available until Spring 2020.

We then upon your request shared with you at the meeting on 16 January 2020 a copy of the 'Phase 2a route wide geotechnical desk study report' and two A1 scale plans showing the locations and extents of potential ground treatment areas.

After the meeting in January we updated those plans to include more information to assist your understanding of the ground treatment areas, which we sent to you on 28 January 2020.

On 16 June 2020 I wrote to you confirming that we had received the contractor's findings from the WP3 ground investigations and that we would share these with you once they had been reviewed by us and our specialist geotechnical consultants.

On 22 July 2020 we shared with you the contractor's findings from the WP3 ground investigations relevant to Stone IMB-R and Stone Headshunt and a technical summary ('Stone IMB-R – Technical note to accompany issue of factual data from the WP3 Preliminary Ground Investigation') of our interpretations of the contractor's findings.

Our July 2020 technical note explained that whilst some of the ground conditions encountered during the PGI were different to those assumed in the earlier desk study, the impact of these ground conditions could be mitigated by an in-situ ground improvement method. This is explained in paragraphs 3.4.3. and 3.4.4:

“3.4.3 Taking into account the interpretation of the draft PGI information, i.e. the greater thickness of soft ground identified in the Filly Brook valley near Pool House Farm and the artesian groundwater conditions observed during initial monitoring of groundwater instrumentation, it is considered that an in-situ ground improvement method would be a more appropriate ground treatment method in this area of the Stone IMB-R than an excavate and replace method as originally proposed in the AP2 design.

3.4.4. If an in-situ ground improvement method were to be adopted, there would also be a reduction in the amount of granular material that would need to be imported as backfill to ground treatment excavations. This could reduce the number of HGV and articulated dump truck site traffic movements through Yarnfield North Embankment Transfer Node.”

These findings do not present any adverse implications for construction logistics and traffic movements at the Stone IMB-R. The Promoter’s position therefore remains that the nominated undertaker would be able to construct the railway within the powers of the Bill and in accordance with the Environmental Minimum Requirements.

In your letter of 21 August 2020 you asked whether we had made provision in our earthworks calculations for the material required to build unsurfaced haul roads. To clarify our position, the Promoter has made a specific allowance for construction of haul roads and this is included in the bulk quantities allowance for temporary materials. This includes import of granular fill materials for haul roads.

Additionally, in your letter of 21 August 2020 you asked for a plan of the proposed borehole locations for outstanding ground investigation. I would like to draw your attention to sections 3.6 and 3.7 of the ‘Stone IMB-R – Technical note to accompany issue of factual data from the WP3 Preliminary Ground Investigation’ sent to you in July 2020 which sets out the proposed locations of outstanding ground investigations at the Stone IMB-R and the Stone Headshunt respectively.

With regards to the matter of assumed shortfall of fill material raised in your letter of 21 August 2020, we have addressed the point you raise in our response to the SRCG summary of evidence sent to you on 11 March 2020 and in our letters of 17 April 2020 and 16 June 2020.

Potential impacts of Stone Railhead/IMB-R on Norton Bridge to Stone railway passenger services

Your petition and subsequent correspondence raise concerns related to the potential impacts of the proposed Stone Railhead/IMB-R, mainly focussed on the frequency of future passenger service trains on the Norton Bridge to Stone railway, and disruption to current service levels as a result of HS2 Phase 2a construction and operation.

Our letter of 16 October 2019 and the September 2019 PRD, in addition to our letter of 24 February 2020 (in response to railway systems related questions raised at the meeting in January 2020) provide our responses in respect of passenger services on the Norton Bridge to Stone railway through the proposed site of the Stone Railhead/IMB-R.

We have explained that passenger services on the Norton Bridge to Stone railway would not be adversely affected by the construction of the Stone Railhead/IMB-R, and that there are sufficient spare train paths available to service the proposed Stone Railhead/IMB-R. We also explained that the frequency of typical night-time maintenance activities would be one train per week on average, and that the Stone IMB-R would be able to accommodate any 800 metre long ballast trains required to maintain sections of ballasted track proposed for the Phase 2b HS2 route to the north of Crewe.

Your subsequent correspondence has not raised any further issues on this matter.

Construction traffic around Yarnfield Lane

Please refer to our letter of 16 October 2019 and the PRD of 30 September 2019 for the Promoter's position in respect of paragraphs 2.6, 2.7, 2.9 and 2.10 of your petition.

Since October 2019 in our ongoing correspondence we have sought to provide further clarity around the assumptions that informed the transport assessment for the Phase 2a scheme as amended by Additional Provisions 1 and 2 (AP1 and AP2).

To assist you with your understanding as to how the materials transfer node adjacent to Yarnfield Lane could be connected directly with the M6 motorway, on 17 December 2019 we provided an A1 sized drawing showing the haul road connections between the Yarnfield transfer node and M6 motorway.

At the meeting in January 2020 we provided a further drawing to illustrate how these haul road connections could be achieved in the AP2 design. During the meeting your technical team asked a number of detailed questions about these haul roads.

In our response to the SRCG summary of evidence sent to you on 11 March 2020 we provided indicative HS2 construction phasing plans to demonstrate that the temporary and permanent highway works can be sequenced in order to maintain public and emergency service access along Yarnfield Lane and the M6 motorway within the consolidated Bill limits.

In March 2020 we provided highway plan and profile drawings for the AP2 Yarnfield Lane realignment to illustrate the preliminary design for this proposed highway work.

Our letter of 17 April 2020 explained in detail the different types of internal haul routes, including haul roads, that would be used by HS2 for on-site construction activity. Furthermore, we sought to explain how surfaced haul routes might be constructed.

In accordance with your request in your letter of 7 May 2020 we provided in June 2020 the drawing of a typical haul road as referred to in a HS2 presentation to the Institute of Mechanical Engineers at Staffordshire University on 11 March 2020.

We have explained in our letters of 16 June 2020 and 14 August 2020 that the design of haul routes will not be completed until after the Bill has secured Royal Assent.

In respect of your continued request for a "Transport Logistics Profile" in your most recent letter of 21 August 2020, we have repeatedly explained the assumptions that have informed the AP2 transport assessment and provided available detail, which I have also set out above. The detailed planning of transport and logistics for the scheme is an activity for the next stage of design.

Yarnfield Lane M6 overbridge

In your correspondence with us you have raised concerns about the structural integrity of the existing Yarnfield Lane M6 overbridge. Our letter of 16 June 2020 explained that no concerns had been raised by the relevant highway authorities about the structural integrity of the existing Yarnfield Lane M6 overbridge in respect of the HS2 construction traffic that would be using this structure. This matter has

also been the subject of ongoing engagement with Highways England in relation to the construction of temporary slip roads to and from the M6 motorway.

Highways England have confirmed to us that this bridge can accommodate vehicles up to 44 tonnes, without any prior approval, and vehicles up to 140 tonnes with prior consent of the highway authority.

The above also reiterates our response to this matter as raised in your letter of 21 August 2020.

Yarnfield Lane traffic surveys

In our letter of 16 June 2020 we provided a summary of traffic speed survey information that helped to inform the preliminary design for the Yarnfield Lane realignment. We further explained in our letter of 14 August 2020 that "Any additional surveys would be undertaken during detailed design as necessary and/or upon request by the relevant highway authority".

Your letter of 21 August 2020 again raises issues in respect of the design of the realigned Yarnfield Lane. Our response is set out in the paragraph above.

M6 traffic note

A report on the traffic impacts of the construction of HS2 Phase 2a on the M6 motorway in Staffordshire has been prepared in response to the petition against the Bill submitted by Theo Clarke, MP for the Stafford constituency. This report has been shared with Theo Clarke MP and the House of Lords Select Committee. Please find attached, as Appendix B, a copy of the report which may be of interest to you in respect of Yarnfield Lane.

Engagement

We have been in on-going and continued engagement with you on matters beyond those raised in your petition, and in doing so we have provided you with information that exceeds the level of detail required at this stage of design so as to assist your understanding of the scheme.

If you require any further assistance with aspects of your petition please contact Rachna Shah, Petition Manager, on 07881 792217 or Rachna.Shah@hs2.org.uk.

Yours sincerely



Simon Knight

Director, Hybrid Bill Delivery
High Speed Two (HS2) Limited

Appendix A – HS2 letter, 16 October 2019

Appendix B - Theo Clarke MP, Petition No. HS2-HOL-037 – T&T Related Concerns and Requests